RCHITECTURAL RECORD

BUILDING TYPES STUDY

BUILDINGS FOR RETAILING

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RCH 1956

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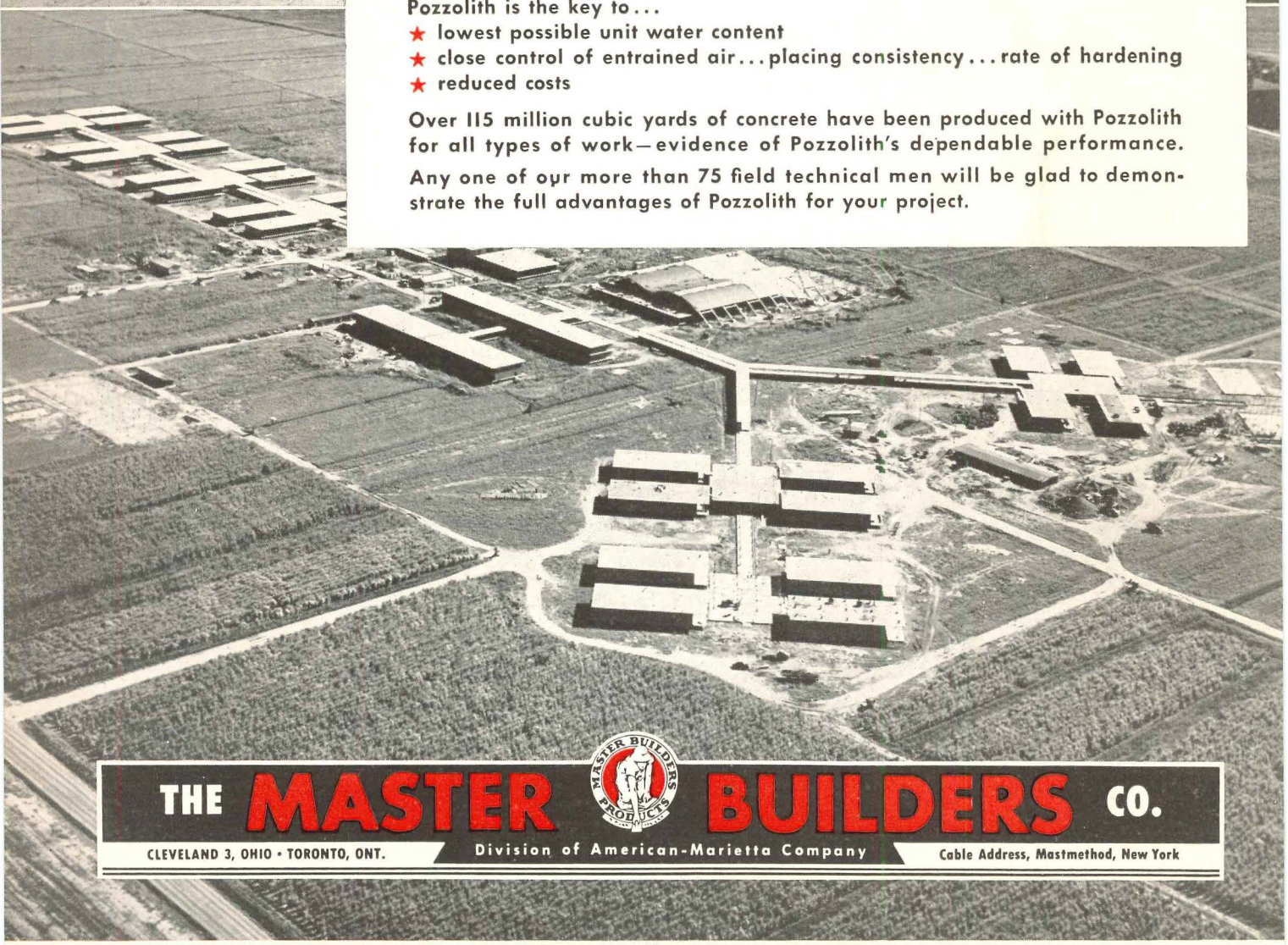

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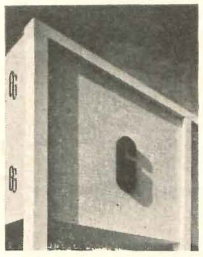

COVER: Gimbels, Milwaukee, Wisc.; Grassold-Johnson & Assoc., Architects; Hedrich-Blessing, Photographer

Two-Story Houses

In the Middle Atlantic States the two-story house has never lost its popularity, but planning inhibitions seem to be disappearing. Here are five such houses from that area.

Sociology and Architecture

Architect and sociologist share the study of man's needs, his desires, his associations, his background, his reactions to the present scene.

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Continued from page 5

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PERSPECTIVES

DEAN HUDNUT'S 'The Engineer's Aesthetics' [AR, Jan. 1956, pages 139-146] cast a penetrating eye on some of our current architectural notions in such a way as to deeply stir the imagination. No contemporary observer has ever surpassed this statement." — Paul Rudolph.

ON FINDING ONESELF OUT OF DATE is the title of a not-very-plaintive little essay by Nicholas Pevsner for *The Architects' Journal* (on the occasion of his appearance there in the *Journal*'s annual selection of "Men of the Year"). "What I call modern industrial design is apparently no longer modern industrial design, and what I call modern architecture is no longer modern architecture," mourns Professor Pevsner. "To me the standard is still that of Gropius aged 72, of Mies aged 69, and of the Le Corbusier of the 'thirties. But what is modern in the sense of the recent and the most eagerly discussed is the crazy, utterly arbitrary perforation of the walls of Le Corbusier's chapel at Ronchamp, and the crazy leaning balconies in Lasdun's Hallfield Estate, and kidney- or worse-shaped occasional tables, their rims upturned for good measure, and Breuer's fantastical church at Collegeville, Minn., and Johnson's Soanian guest-house, and the pretty cottages and flats with low-pitched roofs, and some of the small, pretty motifs of Mr. Gibberd. Now to me that is Art-Nouveau or Neo-Tessenow of about 1912, or neo-Lutyens. But however you may describe these changes, their outcome is something I would call emphatically no longer modern, not in the sense of the outmoded, but in the sense of post-modern. The term shows up the absurdity of the thought. It is I who am no longer modern. For the Pimlico flats to me are modern all right; so are the new LCC estates, the foyers and staircases of the Festival Hall, Mr. Bunshaft of Skidmore, Owings and Merrill, the Olivetti Building at Milan, and Hunstanton School. And woe to him who would dare to list the Smithsons with the out-of-date. So there are here only two possibilities. Either Le Corbusier and Breuer are deviationists, or Mr. Bunshaft and I are reactionaries, putting up a fight to maintain outmoded standards — standards created (as I ought to be the last to deny) as long as fifty or at least forty years ago. It looks alarmingly as if the second part of the alternative is the truth."

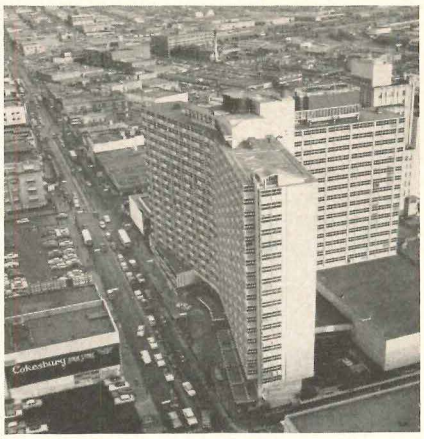
HOW HUNGRY ARE YOU? The monthly *Bulletin* of the Brooklyn Chapter of the American Institute of Architects reports: "Architectural students were invited to hear 'the master' speak at a forum planned by the Architectural League on December 7, 1955. No doubt Mr. Wright is most inspiring, altho he confines architecture to the creative sphere where alterations and violations play no part. Says he, 'The architect survives only if he does not classify himself as a business . . . he must not strive for quantity instead of quality. . . . Don't be afraid to devote your time and love for years and years to a single building. Make an honest and beautiful thing of it. . . . It is better than having a big practice. Stick to the love of the thing you are doing, then we will have an architecture.' Sounds wonderful, but what does one do about eating?"

ANOTHER END OF THE TELESCOPE: the *Journal's* Astragal was intrigued by a note in a recent RECORD story about a Breuer house, and quoted: "This is the owner's third house, not including one designed for them by Frank Lloyd Wright, but not built. Since they were quite happy with the house they had, and their space requirements had not changed, Mr. Breuer naturally asked them why they wanted to build another house. They answered, quite simply, that they admired his architecture so much they wanted the experience of living in a house of his design." Then Astragal: "This attitude towards domestic architecture as an art is a very American one. Astragal recalls the story told by an English architect who visited one of Frank Lloyd Wright's best postwar houses near Minneapolis. 'We asked Mr. Wright to build us a house over ten years ago,' said the client. 'We were quite settled in another house by that time but when he wrote to us saying he could now undertake the job we just had to build it. You never know, it might have been his last and we should never have forgiven ourselves.'"

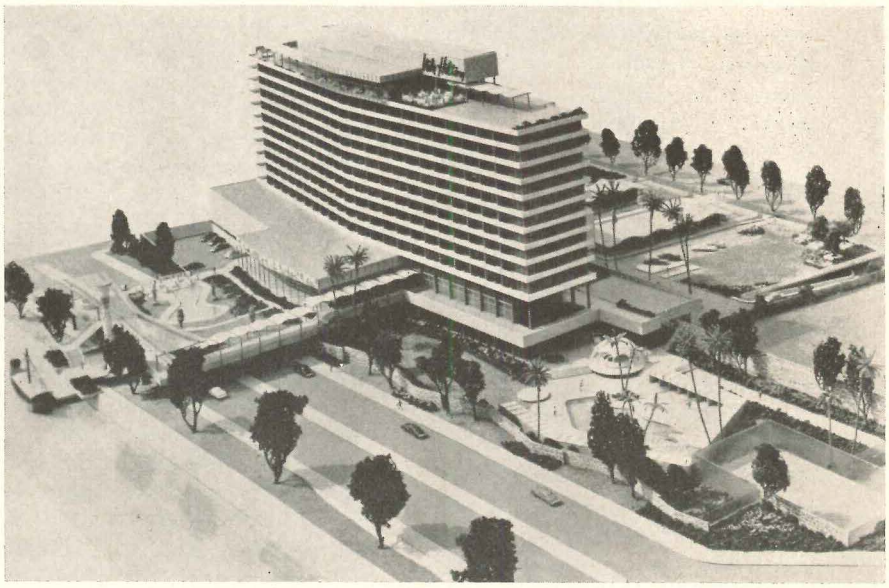
THE [MASONRY] RAMPARTS WE WATCH: The following news item, presented in its entirety, comes from the Clay Products Association of the Southwest: "Building industry experience has produced a revolutionary wall material which is manufactured from the world's most abundant and cheapest raw material. The product possesses natural beauty with a variety of textures and almost infinite color. The material is absolutely permanent, invulnerable to decay, insects and weather. Laboratory tests indicate compressive strengths as high as four tons per sq in. Other physical properties are similarly outstanding. To meet the ready market, manufacturing and distribution facilities have been established throughout the country and the product is immediately available to the construction industry. The revolutionary material is called . . . 'brick.'"

THE RECORD REPORTS

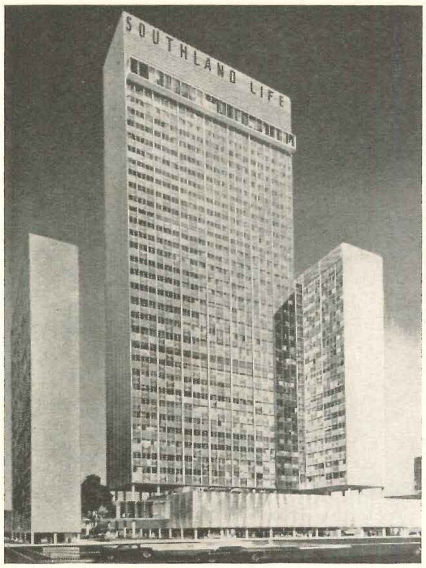
BUILDINGS IN THE NEWS



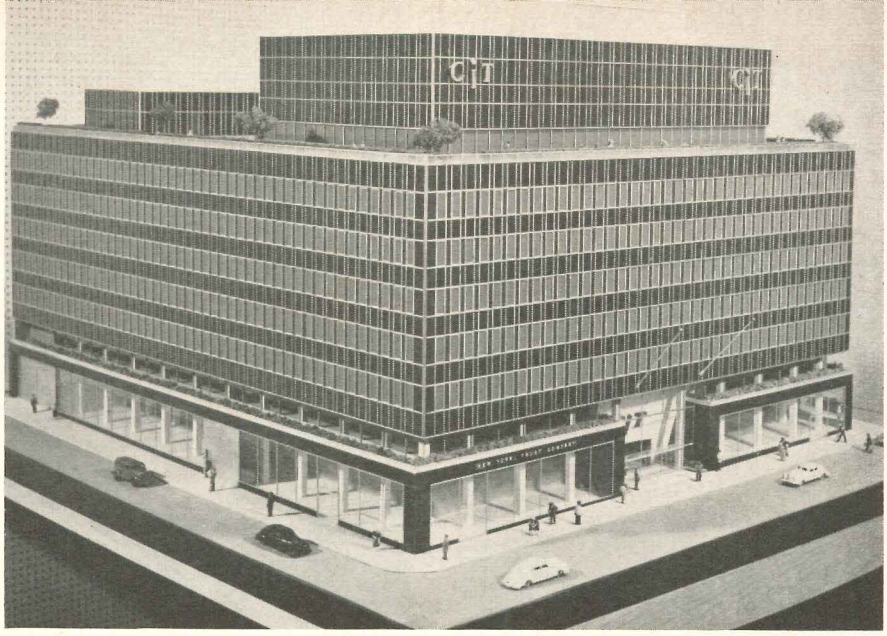
THE STATLER-HILTON, a $16 million, 20-story, 1001-room hostelry on a 56,510-sq ft site in downtown Dallas, opened in January, to provide a twenty-first U. S. city with at least one hotel owned and operated by Hilton Hotels, Inc. (which also operates or soon will operate hotels in 11 cities abroad — see below for some of them). It was designed by architect William B. Tabler of New York for the Statler interests (AR, June 1954, pages 158–163) before they were absorbed by Hilton, and it is the proud boast of the new owners, as of the old, that it is "one of the largest projects of its kind developed anywhere in the world for a quarter of a century." There is no rentable office space, but there are 17,620 sq ft of shops and stores; guest rooms occupy 3,106,480 cu ft and public rooms and service areas 3,038,520 cu ft — or 50.5 per cent to 49.5 per cent, as compared with the 50–50 ratio generally considered optimum for metropolitan hotels. All public rooms are within walking distance of lobby; include five ballrooms, 14 dining rooms, 26 meeting and display rooms. Exteriors are aluminum glass and porcelain enamel curtain walls, structure flat-slab cantilever construction; air conditioning supply lines occupy the vertical mullions



HILTON INTERNATIONAL reaches 'round the world: last month's announcement of the Tokyo project completed the circuit. In January, plans for a $20 million development at Waikiki Beach in Honolulu were announced. (No announcement on architects for either.) Shown here are three Hilton projects now under construction: above left, Habana Hilton, Havana, and top right, Nile Hilton, Cairo, Welton Becket & Associates, architects; right, Cavalieri Hilton, Rome, Emilio Pifferi, architect. Completed: Puerto Rico, Spain and Turkey; also under way: Mexico, Montreal, Berlin. Contemplated: Manila, Hong Kong, Bangkok. Djakarta, Colombo, Sydney, Melbourne



SOUTHLAND CENTER will give Dallas the tallest office building (42 stories) west of the Mississippi and its owner, Southland Life Insurance Company, some 1,400,000 sq ft of space, including 225,000 sq ft of underground parking; 175,000 sq ft of stores, shops, restaurants and auditorium; and approximately 400,000 sq ft of net usable office area (the top 12 floors to be rented); "Sheraton-Dallas" Hotel will occupy 28-story tower (right), offices future 36-story tower (left). Architect: Welton Becket & Associates

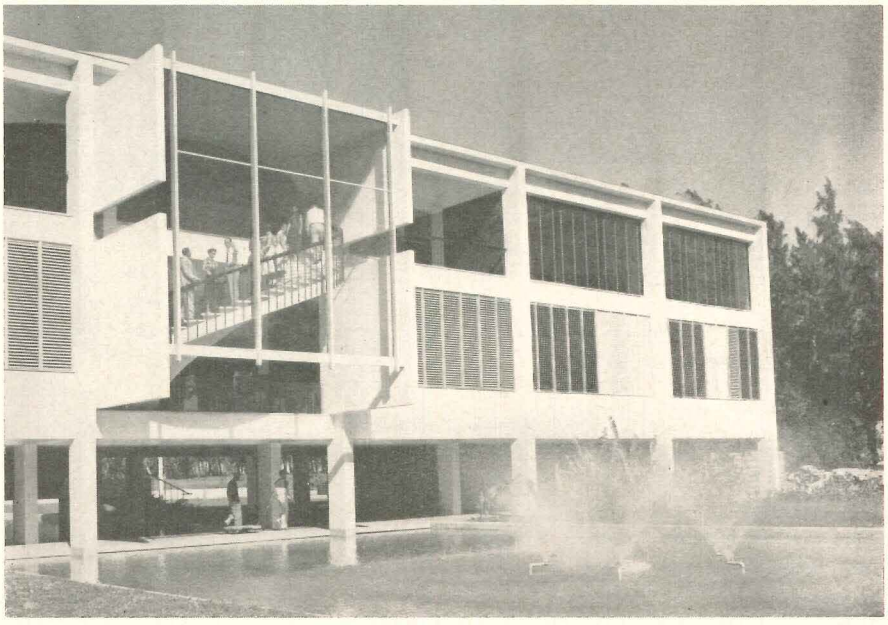


POLISHED BLACK GRANITE set in a grid of stainless steel will make the exteriors of C.I.T. Financial Corporation's projected home office on New York's Madison Avenue between 59th and 60th streets. Harrison & Abramovitz are the architects. The New York Trust Company will establish its sixth midtown branch on the street floor and lower level; architects for the banking quarters are Halsey, McCormack & Helmer. Three other units of space on the ground floor will be available for lease; but the major part of the floor will be reserved for lobby and reception area for C.I.T., which will occupy all of the upper floors. The second floor will be devoted entirely to employe facilities — cafeteria, private dining rooms, lounges, meeting rooms and a 228-seat auditorium — with a planting area of trees and shrubs outside its glass enclosure. A setback terrace will surround the penthouse housing offices of senior executives. Clarke & Rapuano, landscape architects, will design the horticultural treatments. Structure will be bolted. Builder: George A. Fuller

RADIATION MACHINE TEST FACILITY, called the world's largest, will be housed in this building designed for High Voltage Engineering Corporation's 50-acre site on Route 128 in Burlington, Mass., by architect Carleton R. Richmond Jr. Exteriors are mainly insulated aluminum panels; sections housing radiation test vaults are cast concrete, further shielded by mounds of earth 9 ft high tapering to grade 16 ft away. Vaults have 4-ft-thick concrete walls, 20-ton concrete block doors

SUPREME COURT BUILDING FOR PUERTO RICO was dedicated last month in ceremonies at which it was described by the Chief Justice of Puerto Rico, A. Cecil Snyder, as "a happy marriage of form and function." The reflecting pool which runs beneath the building might be taken as an illustration of the marriage, at any rate; it also serves as source of water supply for the air conditioning system. The marble and glass building has a circular session room illuminated by a round skylight above the semi-circular mahogany bar in its center; one arc of the wall can be moved back to enlarge the room for public ceremonials. Architects were Toro and Ferrer of Puerto Rico

(Continued on page 12)



THE RECORD REPORTS

BUILDINGS IN THE NEWS

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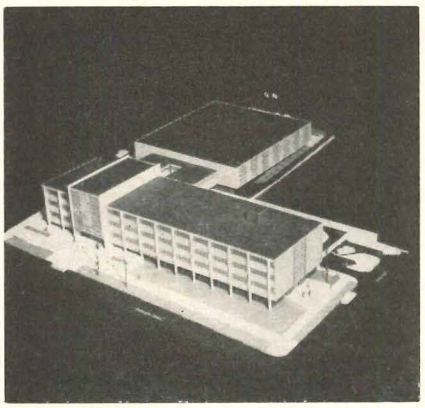
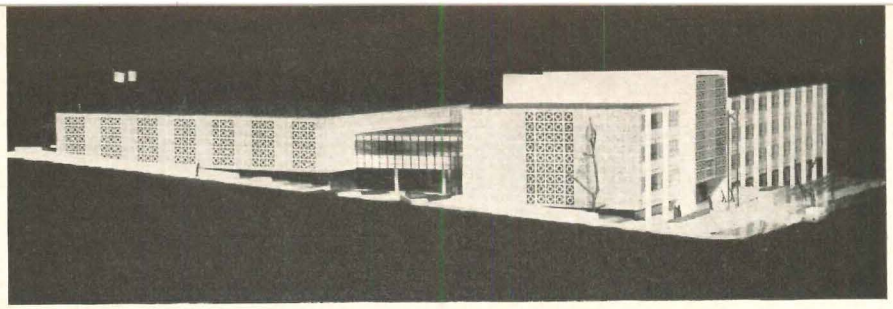
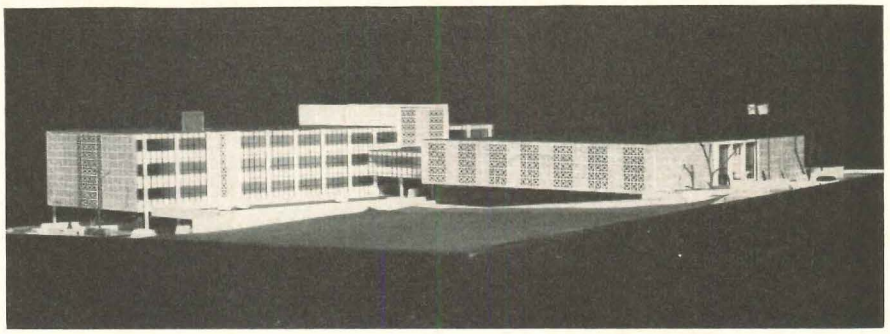






MONTGOMERY COUNTY, ALA., COURTHOUSE: CONTEMPORARY DESIGN WINS A CASE

The traditionalists were up in arms when this design for Montgomery's new courthouse was proposed by architects Pearson, Tittle & Narrows; they didn't object to the basic planning which would yield 125,000 sq ft of floor space within a budget price of $1,750,000, but they wanted changes to make the courthouse "as modern as possible inside but Colonial outside," to quote the architects. The issue was finally debated at a public meeting, with the Board of Revenue (the client) sitting as jury and the Montgomery Association of Architects presenting the winning argument for contemporary design.

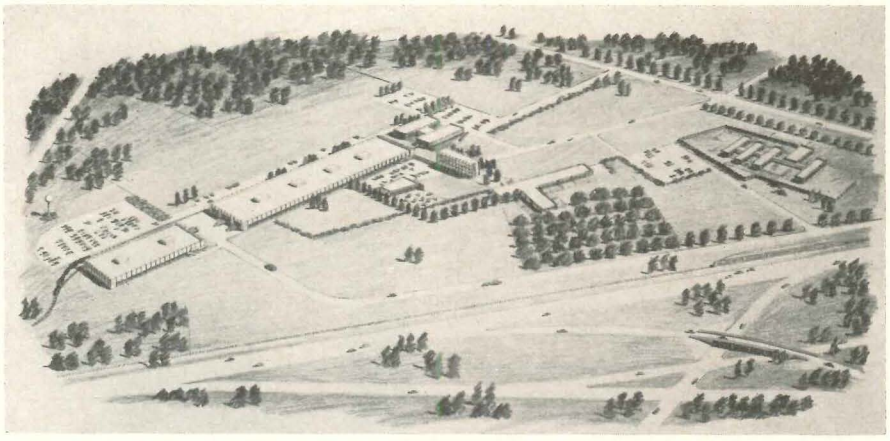
The courthouse will be of reinforced concrete construction, with exterior walls of flat cast stone, aluminum windows and mullions of anodized gray aluminum, and white concrete columns. Stone screens are used as a decorative method of sun control. Interiors will have, for public spaces, terrazzo floors, walls of plaster above marble wainscots, and acoustical tile ceilings. Offices will have plastered walls, acoustical tile ceilings and vinyl tile floors.

The plan puts facilities most visited by the general public — record rooms, public auditorium, sheriff's office, etc. — on the two lower floors; courtrooms and related facilities on the third floor; and jail, along with warden's office and staff quarters, on the top floor. The jail will have a special elevator with a separate entrance; cells and dayrooms will be set back the width of a corridor so prisoners have daylighting and an outside view but no view of the street.

The building will be completely weather conditioned.

CAMPUS AT SAN JOSÉ AMONG PROJECTS IN IBM WEST COAST EXPANSION PUSH

A campus-type center for manufacturing, research and education will be built by International Business Machines Corporation on a 190-acre site at San José, Cal., as the major project in a multi-million-dollar West Coast expansion program announced last month. The San José center (photo of site plan at right), the first project of its size and type ever undertaken by IBM, will include a manufacturing plant, two connected product engineering buildings, a school (for training service engineers), a cafeteria and a multi-building laboratory group; a central administration building will be added later. John S. Bolles of San Francisco is the architect. Some 400,000 sq ft will be built this year and occupied by 1500 employes beginning in the fall.



Other IBM West Coast projects:

— A new 13-story office building and data processing center at Wilshire Boulevard and Mariposa Avenue, Los Angeles; Pereira & Luckman, architects (photo of rendering far right). Completion: mid-1957.

— A six-story office building now nearing completion at Market and Front streets in San Francisco; Meyer & Evans, architects. IBM will occupy four of the six floors; owners (and engineers) are Cahill Brothers. Occupancy was scheduled to get under way late last month.

— A two-story office building in Santa Monica; Milton L. Anderson, architect. Occupied in mid-January.

(More news on page 16)

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THE RECORD REPORTS

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JAPAN AND CUBA GET SÃO PAULO AWARDS AS JURY WARNS FUTURE ARCHITECTS ON OBSESSION WITH "ORIGINALITY"

An international competition and exhibition for schools of architecture was held in connection with this year's III Bienal de São Paulo, sponsored, like the earlier events, by the Museum of Modern Art of São Paulo. No competition for practicing architects was held this year; it was felt that the two years since the last one (AR, June 1954, pages 10–12) was too short a time for the production of sufficient significant new work to promise an adequate number of submissions.

The School of Architecture of Havana University, Cuba, and the Department of Architecture of the University of Waseda, Japan, shared equal honors in the student competition, the "theme" of which was "a resting place fit to accommodate 3000 workmen during their holidays." Architect Jorge Machado Moreira of Brazil, himself a prize-winner in the II Bienal's International Architectural Competition, headed the jury of award and delivered the jury critique at the award ceremonies.

There were entries from 38 schools in 20 countries, eight of them from the United States — the University of Illinois, Harvard, Cranbrook, the University of Minnesota, Pratt Institute, North Carolina State, Rice Institute and Howard University.

Through Mr. Moreira, the jury also had some general advice to offer to "future architects, particularly to Brazilian students" (though it need hardly be so limited):

"We wish to refer to the crying need to consider architectural problems from a serious and lofty point of view, and for architects not to be constantly worried about inventive originality, as are the great majority. This preoccupation has already become a real obsession or is even felt as a duty. This brings, as a result, the frequent use of forms lacking in spontaneity, objectivity and 'raison d'etre,' and conforming neither to functional nor esthetic standards. That is not to say that we are against the development of the creative faculty of our

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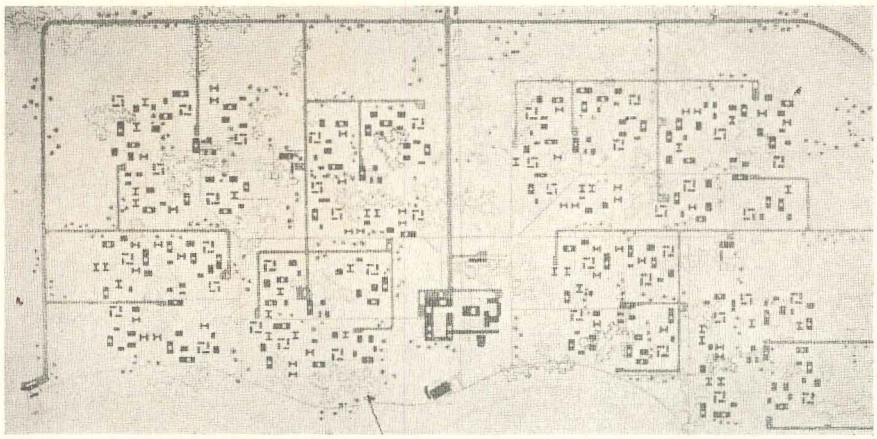
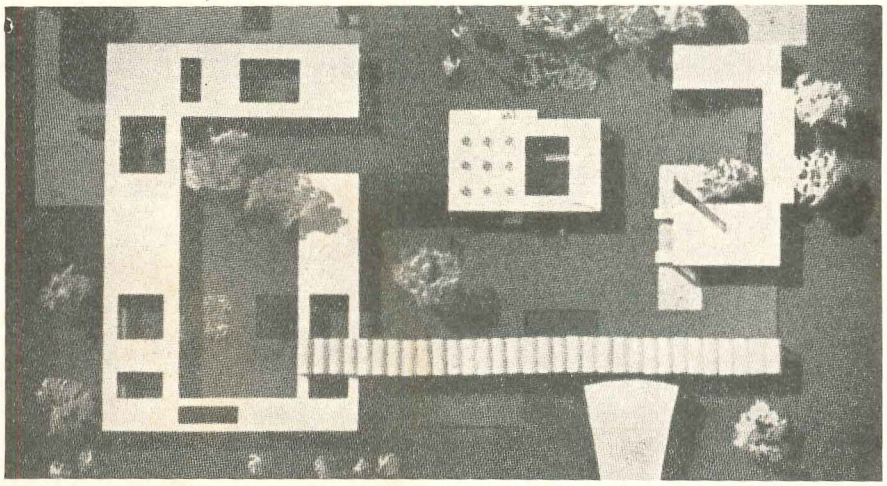
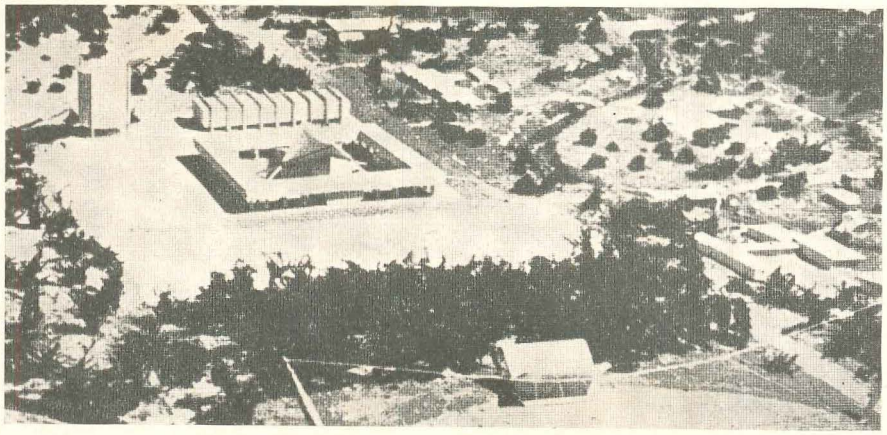
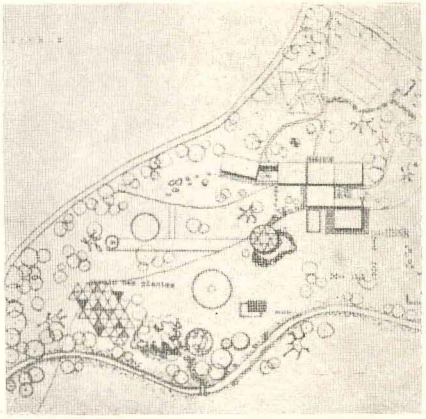


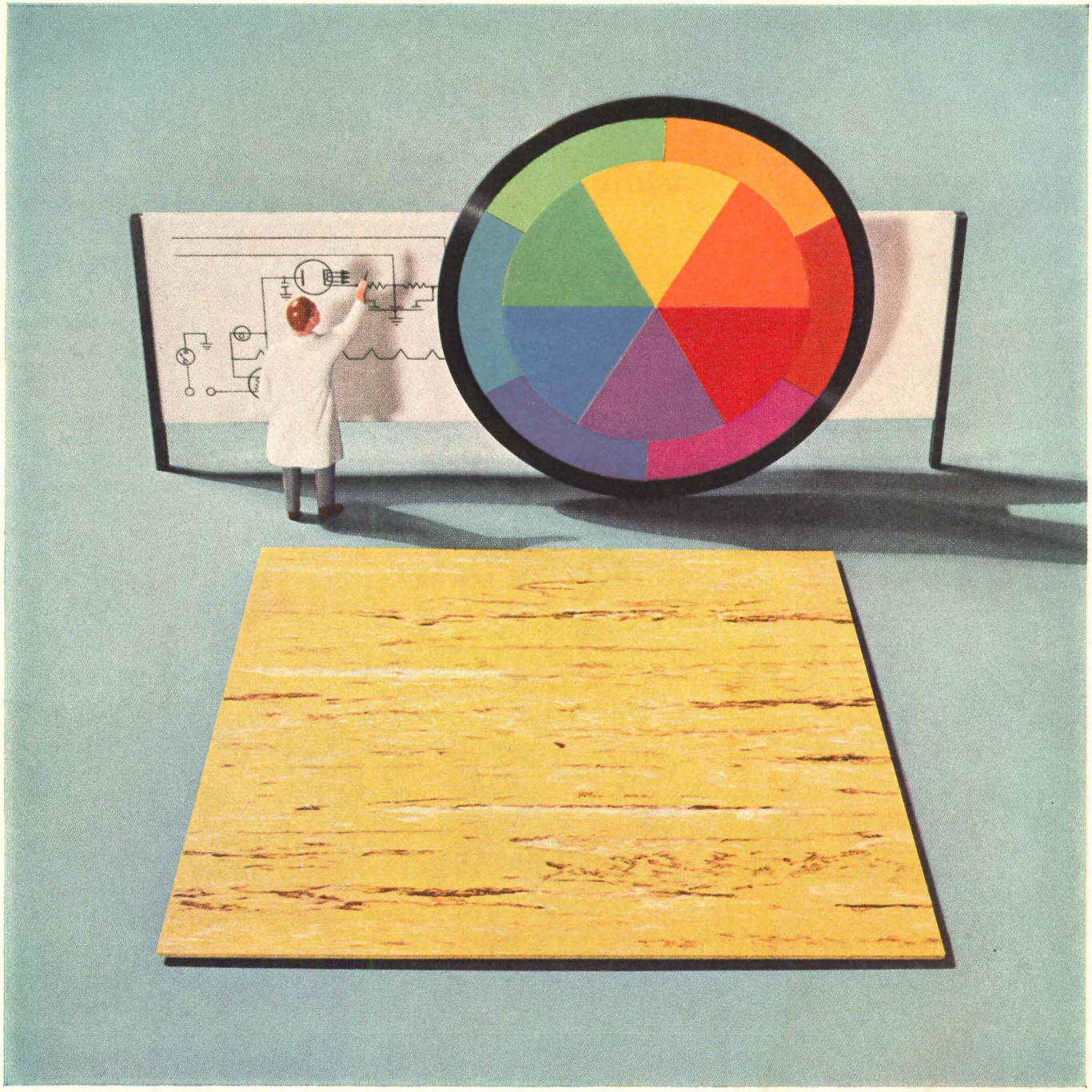




Shown here are examples of the submissions of the two winning entrants. Top and center, left: from the Havana University entry, view of model shows plaza area envisaged as core of project; drawing is of overall plan for site. Below, and at left below: views of portion of model and of site plan from University of Waseda



(More news on page 16B)



Controlled color in floor tile

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KENTILE, INC. America's largest manufacturer of resilient floor tiles

KENTILE Asphalt Tile, Carnival Kentile, Corktone Kentile/KENCORK, Cork tile for Floors and Walls/KENRUBBER, Rubber Tile/KENFLEX, Vinyl Asbestos Tile, Carnival Kenflex, Corktone Kenflex/KENFLOR Vinyl Tile, also available by-the-yard. KENROYAL Vinyl Tile/SPECIAL KENTILE, Greaseproof Asphalt Tile/THEMETILE, KENSERTS, Decorative Inserts/KENCOVE, vinyl wall base/KENBASE, wall base.

THE GRAND PLAN FOR WASHINGTON, D. C.

The plan of Pierre L'Enfant for the capital city, largely ignored through the 19th century, was blessed with a change of fortune in 1902. In that year, a new plan (2) was announced which it was hoped would repair, as far as was possible, the damage which the original plan (1) had suffered. This new plan was the result of concerted efforts by Senator McMillan, then chairman of the Senate Committee on the District of Columbia, by the American Institute of Architects, which has ever since been closely connected with Washington improvement, and by a special commission composed of Daniel H. Burnham, Charles Follin McKim, Frederick Law Olmsted and Augustus St. Gaudens.

Montgomery Schuyler, reviewing the commission's report in ARCHITECTURAL RECORD's issue of May 1902, condemned the unfortunate siting of the Treasury Building and of the Congressional Library, built during the eclipse of the Grand Plan, but added, "The most remarkable malefaction is one mainly of omission. To look even cursorily at the original plan is to see how great was the importance, in the minds of its authors, of the strip reserved, and ever since known in Washington as 'The Reservation,' from the Congress House to the Washington monument. This was the 'Grand Avenue' of L'Enfant, flanked by his 'well-improved fields,' the intended route for inaugural and other stately processions which, from time immemorial, have taken the shabby and now circuitious route by Pennsylvania avenue. For fifty years it has quite faded from the minds of Congress what this wide, straight strip was 'reserved' for, and Congress proceeded to dispose of it, as if it had been a reservation in a Western wilderness, instead of in the capital of the nation. The Smithsonian was planted in it half a century ago, and the grounds were laid out under the direction of Andrew Jackson Downing, in the irregular and naturalistic fashion which he introduced, which is . . . inappropriate to the public architecture of Washington in general . . . Afterwards came the National Museum, which it has not oc-

(Continued on page 376)

Architectural Record, May 1926

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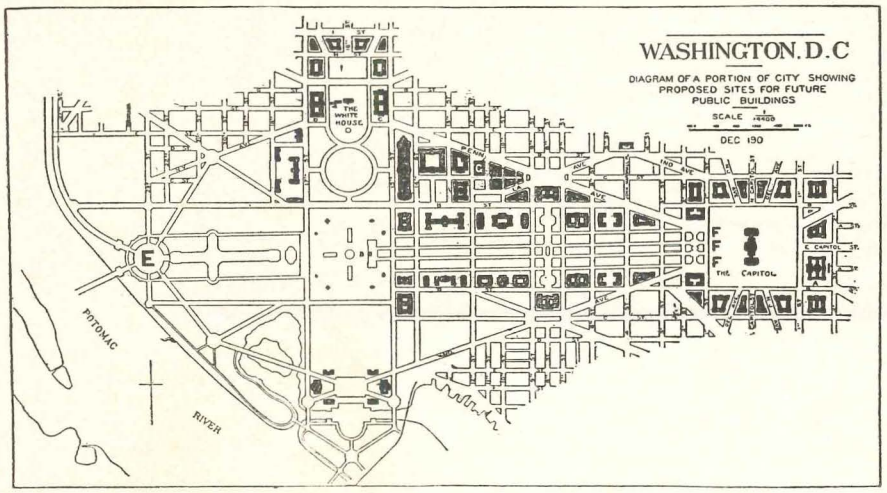
Architectural Record, May 1902



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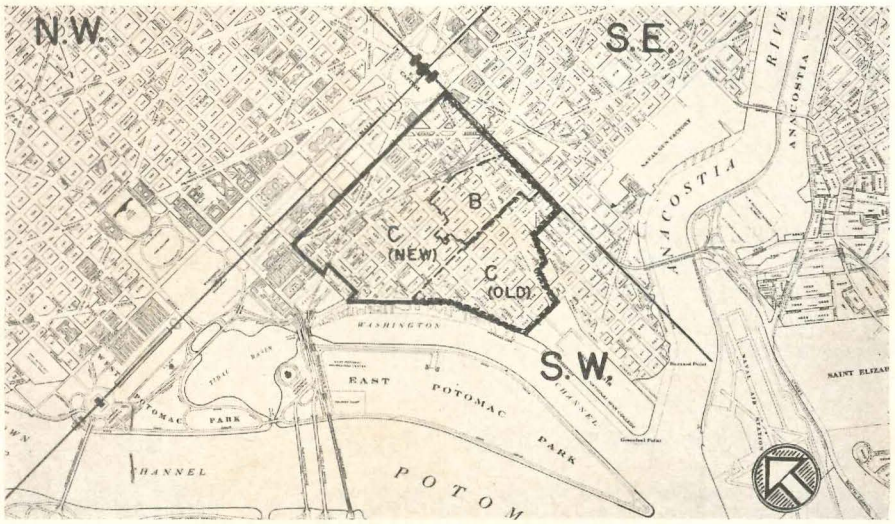

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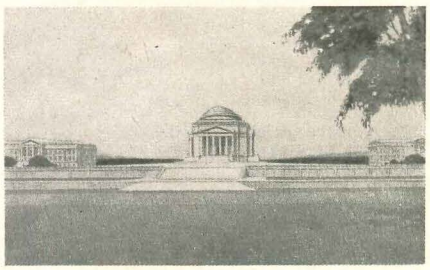
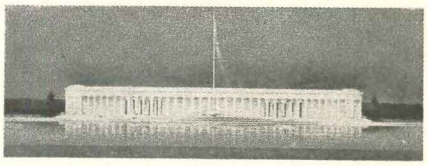
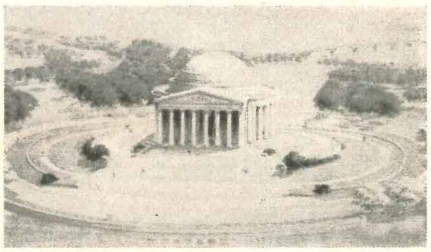


Architectural Record, April 1926



The vicissitudes of the site at the southern arm of the great cross have included the 1902 suggestion for a Monument to the Founders of the Republic (top), from Burnham, McKim, Olmsted and St. Gaudens; the 1926 proposal for a Roosevelt Memorial (center), by John Russell Pope; and finally the Jefferson Memorial (bottom), also by Pope completed in 1943

Architectural Record, April 1938



(More news on page 32)

The State of Construction

The new year did *not* break the spell — fresh from setting its tenth consecutive year of new records, the construction industry in the first month of 1956 proceeded to set some more. As reported by F. W. Dodge Corporation last month, the January totals of construction contract awards amounted to new highs for the month in every category. For details, page 400.

About Architecture

For a lot of talk about architecture, and a week to remember in some other ways, the 88th annual convention of the American Institute of Architects May 15–18 in Los Angeles looks like a sound investment. John Ely Burchard, M.I.T. dean of social studies and humanities whose 1951 convention address "Humanity Our Client" (AR, July 1951, pages 86–99) has become a classic statement of contemporary aspirations, will make the keynote address on the convention theme, "Architecture for the Good Life." The theme will be expanded in three afternoon sessions comprising seminars on general aspects of the theme, with concurrent round tables on their more specific elements. "Architecture for Safety" is the title for the first seminar (round tables on office practice, preservation of historic buildings, school buildings), "Architecture for Enjoyment" for the second (round tables on state organization, hospitals, education, specifications); the third, which has no title yet, will relate the general theme to the community. Business sessions will be held in the mornings. The Southern California Chapter, this year's "host" chapter, has scheduled a full round of tours — "seminar" tours, with architect guides, of schools, hospitals, churches and tract housing in the Los Angeles area; sightseeing tours which will cover not only downtown Los Angeles but Pasadena, Santa Barbara, Westwood-Bel Air and of course Hollywood; there is even an Orange County tour which will take in Disneyland. Special social events will include Premiere Night — described as "Academy of Motion Pictures Arts and Sciences Grand Premiere of one of the year's outstanding pictures in one of Hollywood's greatest theaters, an exciting gala night in the motion picture capital of the world" — and an architects' "Night at the Moulin Rouge." There is also a full ladies' program. And for those who don't want to stop when the convention is over, there are those post-convention tours to Hawaii and Japan arranged by the United States Travel Agency especially for the A.I.A.

SCHWEIKHER NAMED ARCHITECTURE HEAD AT CARNEGIE

The Department of Architecture at Carnegie Institute of Technology has a new head — Paul Schweikher, who has been chairman of the Department of Architecture at Yale for the past two years. Mr. Schweikher, who has also carried on a New Haven practice, at Carnegie succeeds John Knox Shear, who resigned a year ago to become editor-in-chief of ARCHITECTURAL RECORD. No successor to Mr. Schweikher at Yale was immediately announced; his resignation there will be effective with the end of the current academic year and his appointment at Carnegie in July. Mr. Schweikher, who is 53 years old, is a native of Denver, educated at the University of Colorado and Yale (B.F.A.). He was widely known as a designer when he left the Chicago firm of Schweikher and Elting to accept the Yale chairmanship. At Yale he has been associated with Douglas Orr in design of a number of new buildings for the university, and he has just been commissioned to design a fine arts center for the University of Buffalo. He is also professional adviser for the current competition for a new arts center for the city of Memphis.

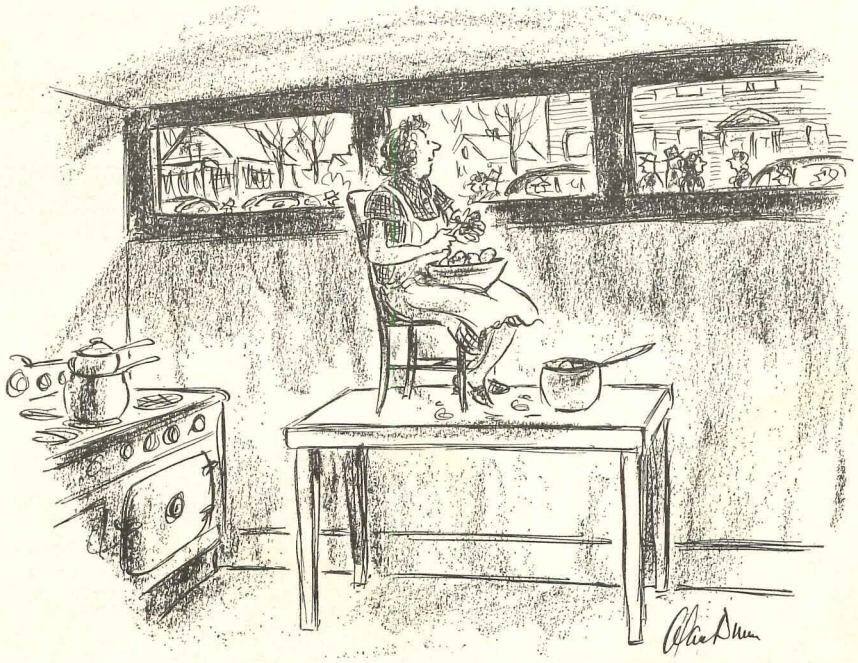
Honor to Ted Coe

Theodore Irving Coe, technical secretary of the American Institute of Architects, will receive the Institute's 1956 Edward C. Kemper Award. The award, which will be presented at the awards luncheon at the annual convention in May, has been given annually since 1950 for outstanding service to the Institute. Previous recipients were Turpin Bannister, Henry Saylor, William Perkins, Marshall Shaffer, William Stanley Parker and Gerritt J. de Gelleke.

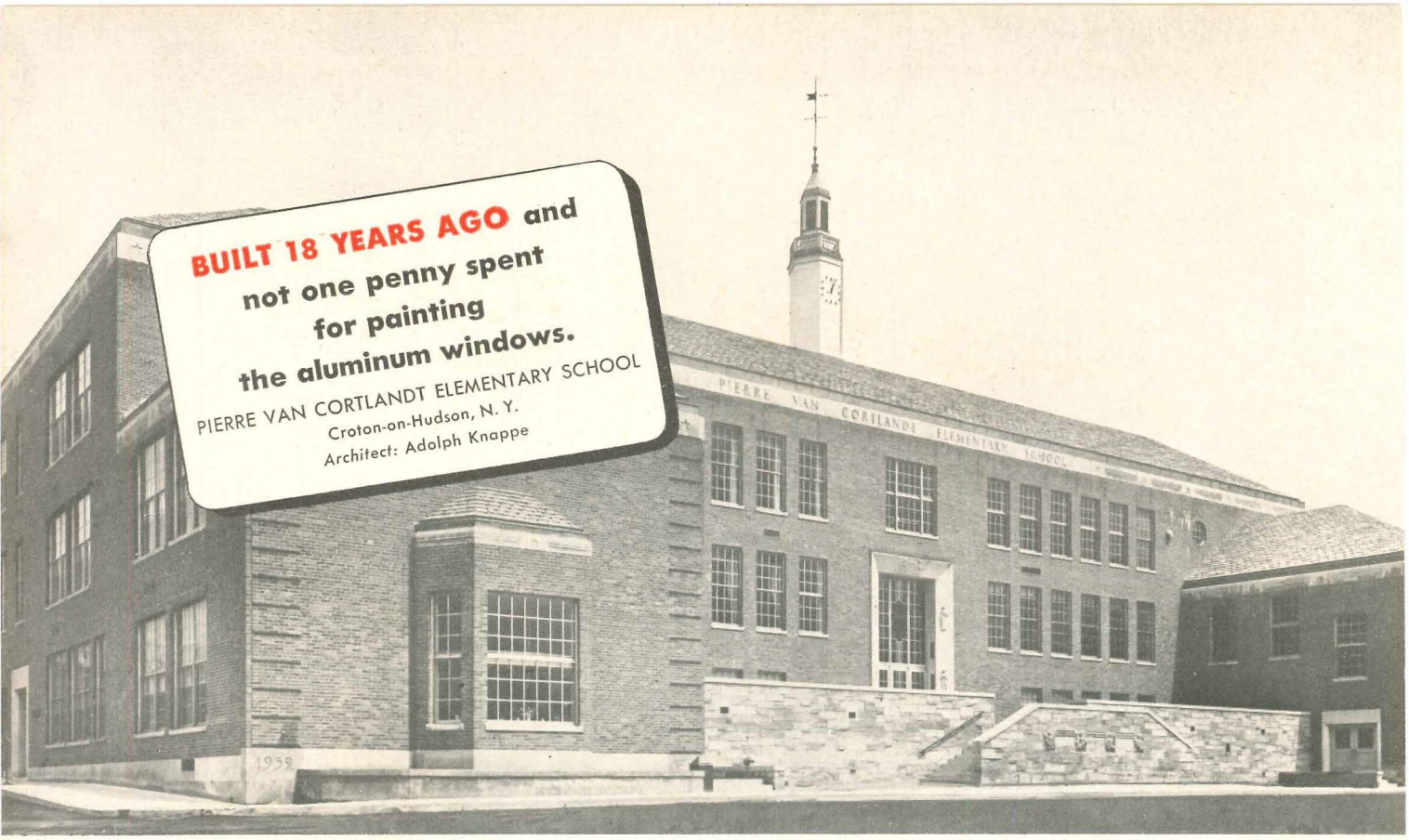
Postscript: R.I.B.A. Medal

Walter Gropius, 1955 R.I.B.A. Gold Medalist (see pages 190–196), sends on a list of earlier foreign winners of the British honor. Here they are: 1926 — Oestberg, Denmark; 1929 — Laloux, France; 1932 — Berlage, Holland; 1935 — Dudok, Holland; 1938 — Tengbom, Sweden; 1941 — Wright, U. S. A.; 1945 — Vesnin, U.S.S.R.; 1948 — Perret, France; 1950 — Saarinen (Eliel), U.S.A.; 1953 — Le Corbusier, France.

(Continued on page 24)



Drawn for the RECORD *by Alan Dunn*



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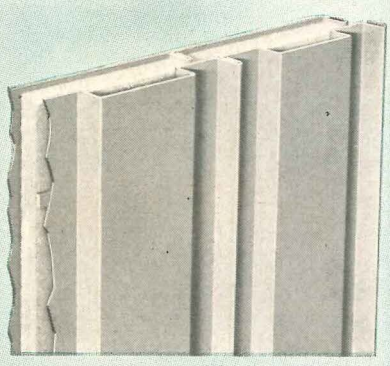
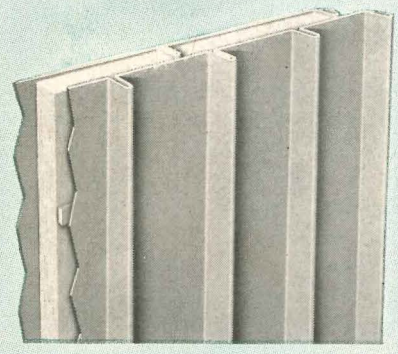


MAHON FLUTED WALL
FIELD CONSTRUCTED



MAHON RIBBED WALL
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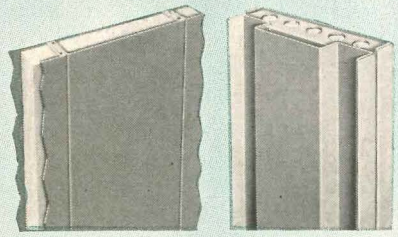


FLUSH FLUTED

MAHON PREFAB WALL PANELS

From Maine to California, and from the far reaches of northern Canada to the Mexican border in the south, you will now find new, modern industrial and commercial buildings with bright, attractive exterior walls of Aluminum or Stainless Steel.

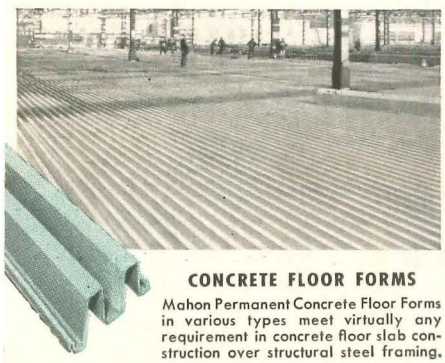
Metal curtain walls have been employed extensively for many years in the industrial and commercial building field. Today, an ever increasing number of architects are turning to this type of permanent construction for schools, office buildings, terminal buildings, armories, and for certain wall areas in monumental buildings too, where inserts of metal add distinctiveness to the over-all design.

Stainless steel wall plates are used in the natural metal finish, but, in many instances, aluminum plates have been employed in various embossed patterns and in colored porcelain or anodized finishes for distinctive effects in combination with other materials such as brick, ornamental stone, glass block, or stained wood . . . the possibilities in design effects in exterior treatment are virtually unlimited.

Mahon Insulated Metal Walls are available in three exterior patterns in Aluminum, Stainless Steel or Galvanized Steel . . . thermal properties are equivalent to a conventional sixteen inch masonry wall. The Mahon Fluted Wall and the Mahon Ribbed Wall can be field constructed up to sixty feet in height without a horizontal joint—a feature of Mahon walls which, from an appearance standpoint, is extremely important in powerhouses, auditoriums, sports arenas and other types of buildings where high expanses of unbroken wall surface are common.

Have a Mahon engineer call, at your convenience, and show you some interesting examples in which Mahon Insulated Metal Walls have been employed in combination with other materials to achieve attractive, individualized exteriors. The powerhouse on the opposite page, recently completed by The Toledo Edison Company, is one of many.

See Sweet's Files for information, or write for Catalog W-56.



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Mahon Permanent Concrete Floor Forms in various types meet virtually any requirement in concrete floor slab construction over structural steel framing.

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THE RECORD REPORTS

MEETINGS AND MISCELLANY

(Continued from page 24)

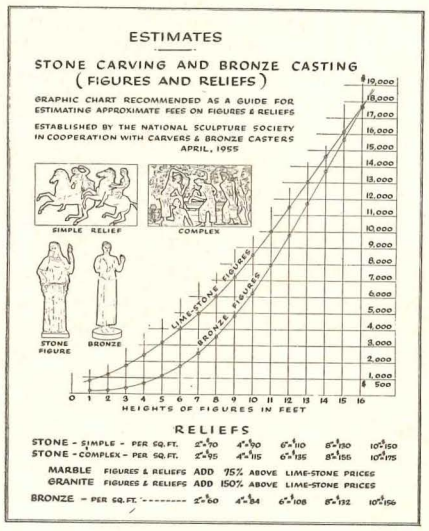
signed for a young family with children; Jones & Urmston, West Los Angeles, for coordination of interior and exterior living space and a combination bath and dressing room for the master bedroom; Seth M. Fulcher Jr. Associates, Seattle, for a split-level house showing especially sympathetic use of hillside sites; Jones & Emmons, Los Angeles, for excellent interior styling and central location of plumbing; Donald H. Honn, Tulsa, for good treatment of playroom areas and kitchen and good separation of living from sleeping areas. G. Hugh Tsuruoka, Chicago, for well-handled family traffic and unusual compartmentation of the bath.

Budgeting for Sculpture

The National Sculpture Society, 1083 Fifth Avenue, New York 28, New York, has published a revised edition of the leaflet first issued in January 1953 as a recommended guide to estimating the cost of sculpture. To the original chart, which offered a method of computing sculptor's fees on figures and reliefs of various sizes, has now been added another (see cut) which provides a guide for estimating approximate fees for stone carving and bronze casting. What the charts are intended to yield, of course, are approximate usual fees — they are, as the Society points out, useful "mainly as a guide for establishing budget prices even before the design for the sculpture is conceived" — to give the client a general idea of the costs. Price charts are available free from the Society.

Worth The Winning

The Morton Arboretum Small House Competition offers prizes and commissions totaling $15,000 for contemporary designs for small two- and three-bedroom suburban and country houses to be occupied by the Arboretum staff and to be featured in a permanent exhibit of residential landscape planting. The Arboretum, a privately endowed foundation in Lisle, Ill., has the cooperation of the A.I.A., the Chicago Building Congress and the Chicago Museum of Science and Industry in the conduct of the competition; professional adviser is Howard T. Fisher, A.I.A. Objective of the program is "to stimulate and demonstrate original thinking on the relationship between the interior and exterior of houses." Open to all comers, professional and otherwise, the competition closes May 7. Information from Mr. Fisher, 322 West Washington Street, Chicago 6, Ill. . . . The James F. Lincoln Arc Welding Foundation of Cleveland offers $20,000 in cash awards "for ideas or suggestions that will accelerate progress in arc welding" — design, engineering or the general application of the arc welding process. Information from the Foundation, Cleveland 17, Ohio. Closing date: July 30.

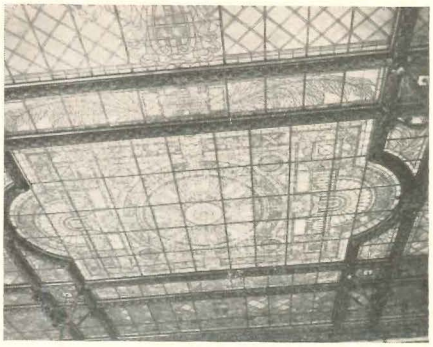


Jury

The nine-man panel that judged the oral presentations for the Master of Fine Arts degree at Princeton's School of Architecture in January represented a rather striking diversity of interests. It included Walter O'Malley, president of the Brooklyn Dodgers; Dr. J. Robert Oppenheimer, director of Princeton's Institute for Advanced Studies; structural investigator and innovator R. Buckminster Fuller; Canon Edward West of the Cathedral of St. John the Divine, New York; engineer Emil Praeger of New York; art historian Professor Frankl; John Knox Shear, editor-in-chief of ARCHITECTURAL RECORD; and architects Kenneth Kassler of Princeton and John C. B. Moore of New York. Among the problems presented were a new scheme for a domed stadium for the Dodgers; a proposal for completing St. John the Divine; and a proposal for a new building for the Institute for Advanced Studies.

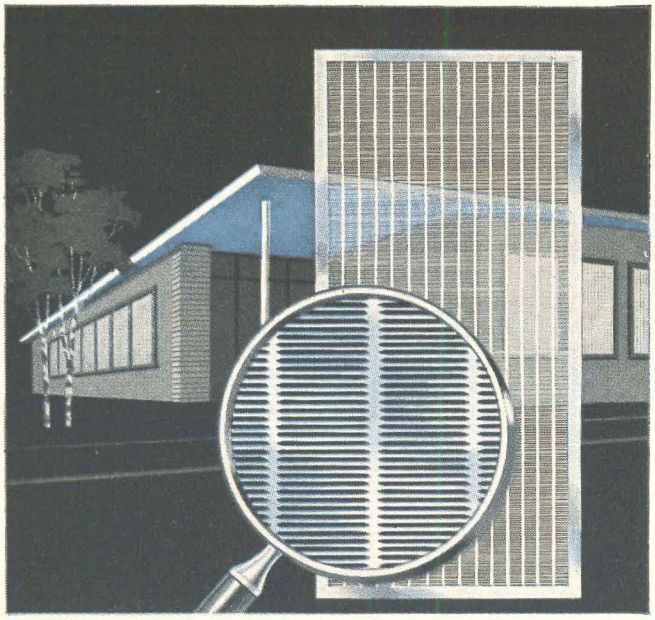
Art for Architecture

Sculptor Isamu Noguchi has been commissioned by Tishman Realty & Construction Co., Inc. to create an original design treatment for the arcade and lobby of the 38-story office building designed by Carson & Lundin, architects, to be started shortly at 666 Fifth Avenue, New York. Mr. Noguchi has been experimenting with combinations of sculpture, light and water in an effort to create new and unusual designs for the beautification of public spaces in institutional and business buildings. . . . Another example of art for architecture was incorporated last spring into Public School 48, the Cerebral Palsy Addition, Staten Island, New York. Max Spivak designed a series of six gay and colorful mosaic panels which were set into the corridors of the Addition to make this part of the school less institutional. The panels are of real and imaginary birds, fishes and animals and are so placed that as the children walk along the halls they have something cheerful to look at and stop by. The chief architect for the Cerebral Palsy Addition was Michael L. Radoslovich and he and Mr. Spivak also chose the colors of the halls (yellow tiles, etc.) to help create a happy mood. . . . In the foreign field an enormous sculpture piece by Naum Gabo is planned for the Bijenkorf Department Store, Rotterdam, Holland, to be done this September. The architects, Marcel Breuer and A. Elsas, had the idea for a piece of sculpture on this scale and Gabo says ". . . the origin of the conception lies in the organic structures found in the vegetable world; especially in the structure of trees." The piece, which will be attached to the side of the building, will be 82 feet high. It will emerge above the pavement in two slightly curving prestressed concrete trunks with steel branches and an inner core of bronze wire springs stretched over a steel skeleton, all meeting at the crown of the structure.

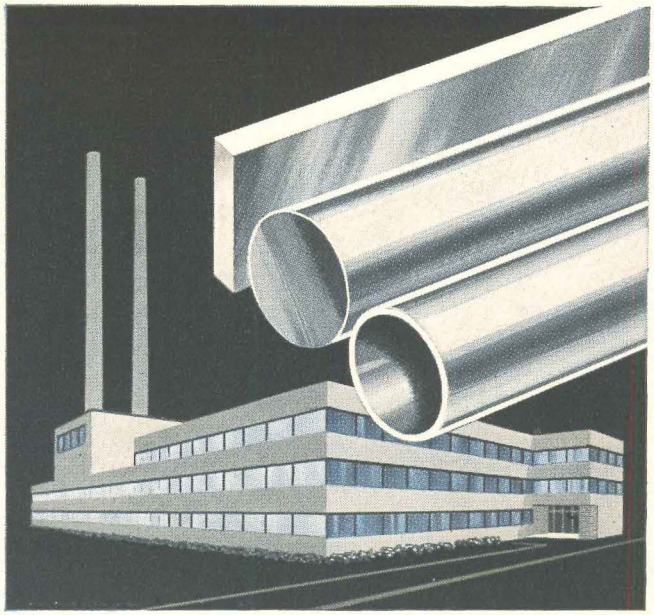


ANACHRONISM — Leaded-glass ceiling covering an area of 6500 sq ft over main banking floor of Union Dime Savings Bank at the northwest corner of Sixth Avenue and 40th Street, New York City. It was demolished along with the monumentally refined edifice designed by the late Alfred Taylor for erection in 1909; a 32-story office tower designed by Kahn & Jacobs will be built on the site

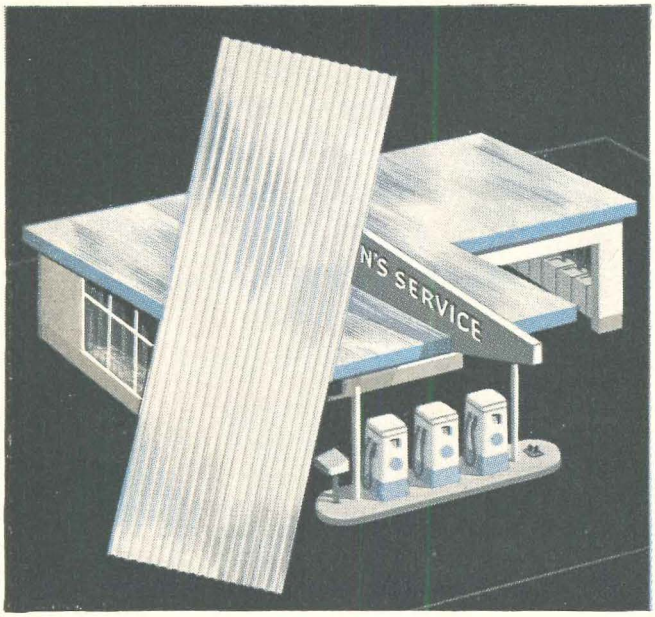
(More news on page 32)



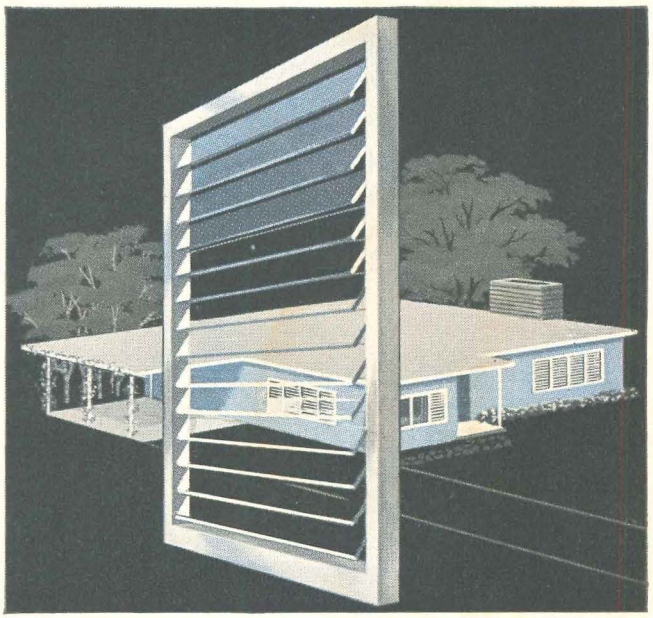
Shade Screening made with Kaiser Aluminum keeps rooms up to 15° cooler. Tiny louvers set at an angle block hot sun rays. Protects furnishings from sun fading. Clean, modern design gives window exteriors new, fresh beauty.



Bus Duct Systems made with high conductivity Kaiser Aluminum cost less than copper. Light weight results in easier, faster installation—another saving. High strength yet workable. Available in rectangular, solid round bar and tubular conductor.



Corrugated Roofing made with Kaiser Aluminum reflects heat . . . helps provide winter warmth, summer coolness. Light reflectivity brightens interiors. Needs no paint—requires minimum maintenance. Ideal for industrial or commercial buildings.



Window Jalousies made with Kaiser Aluminum resist corrosion—defy time and weather. Handsome, natural finish enhances building's appearance, complements any design. Easy to install. Simple to operate.

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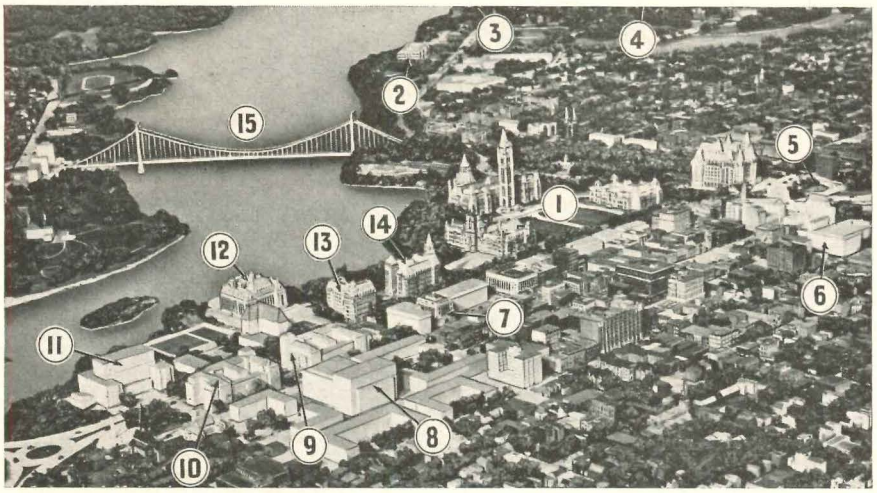
FOR THE NATIONAL CAPITAL: A MASTER PLAN AT WORK

The Federal District Commission, issuing its 56th annual report at the end of 1955, observed that the end of the year also saw the tenth anniversary of the National Capital Plan.

At the same time, the Commission released a photograph of its model of the capital (below) showing final plans for the "Government Row" area. The key: (1) Parliament Hill; (2) National Research Council, facing newly rebuilt Sussex Drive; (3) 24 Sussex Drive, official residence of the Prime Minister; (4) Government House; (5) Confederation Square and the National War Memorial; (6) temporary National Art Gallery Building (project), scheduled for immediate construction, and to be used until Cartier Square, currently taken up by temporary wartime buildings, becomes available for a permanent gallery; (7) Bank of Canada, with proposed office buildings on either side; (8) National Auditorium (project); (9) and (10) Veterans Memorial buildings, of which the East Memorial Building (9) is completed and occupied by the Department of Veteran Affairs, while the West Memorial Building (10), now under construction, will house the Department of Trade and Commerce; (11) the National Library, on which construction is scheduled for 1956; (12) the Supreme Court; (13) Justice Building; (14) Confederation Building; and (15) proposed Interprovincial Bridge to replace the existing Ottawa-Hull bridge.



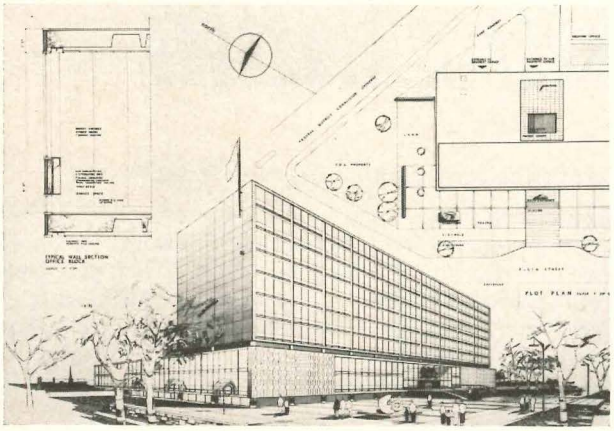
Among its accomplishments for 1955, the Commission counted the opening of the new Walkley rail yards the most important. The yards, in addition to cutting out 75 per cent of Canadian Na-

(Continued on page 40)

FOR THE CITY OF OTTAWA: PROJECT FOR A CITY HALL

1

Winner of the $5000 first prize (1) in Ottawa's competition for a city hall (AR, November 1955, p. 30) was the Montreal firm of Rother, Bland, Trudeau; the jury commended the "spacious and generous" entrance hall, the circular stairs to the Council Chamber and the "dignified restraint" of the exterior. The $1500 second award (2) went to Toronto architect K. Sinclair Lawrie, and the $1000 third award (3) to Wasteneys and Wilkes, Toronto.



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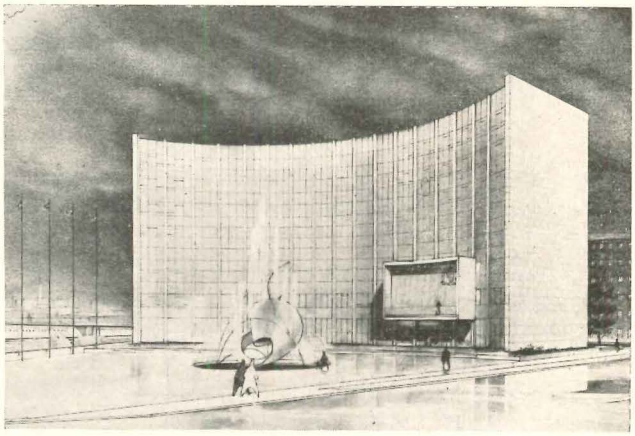

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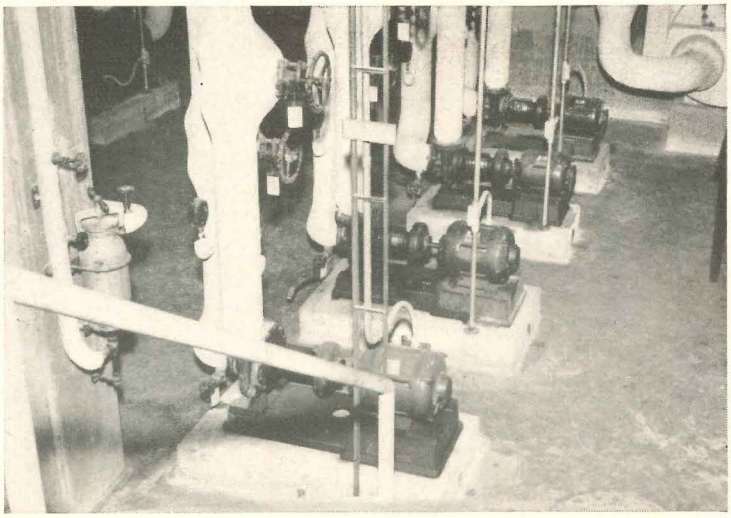
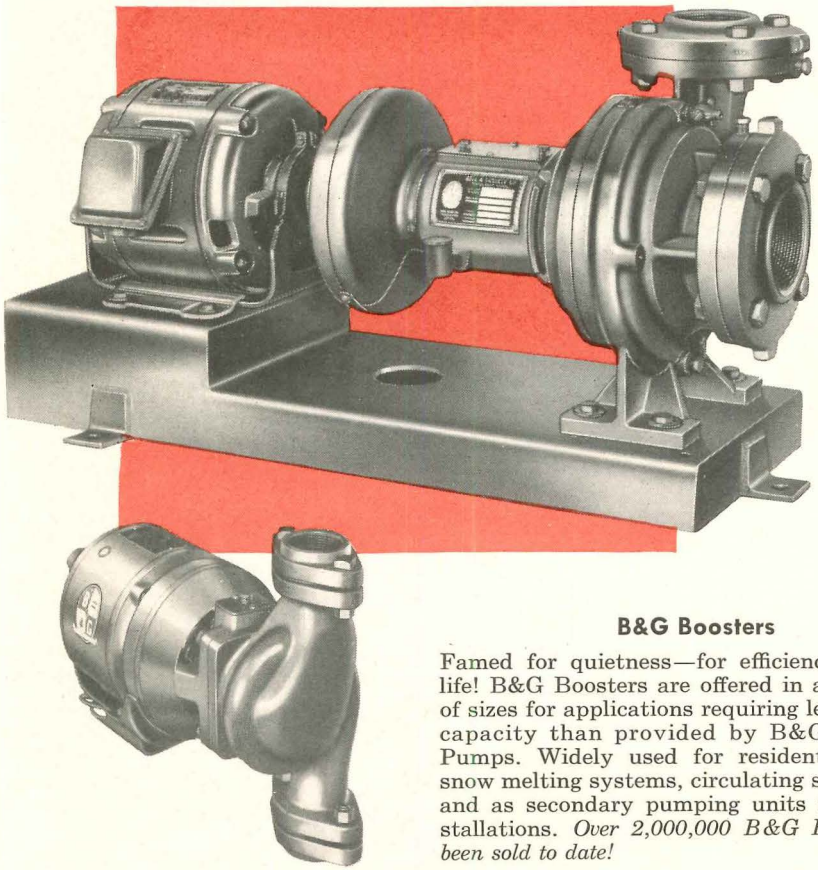


- Apartment Building, Chicago, Illinois (*upper left*). *Quiet B&G Universal Pumps are used to boost city water pressure.*
- Illinois Institute of Technology faculty apartments, Chicago (*lower left*). *Equipped with B&G Universal Pumps and Heat Exchangers.* Architects: *Mies van der Rohe, Pace Associates, Associated, Chicago.* Heating Contractor: *Wm. A. Pope Co., Chicago.*
- Combination heating-cooling system (*above*). *B&G Universal Pumps circulate heated and cooled water through the same piping system.*

and circulating it ***Noiselessly***

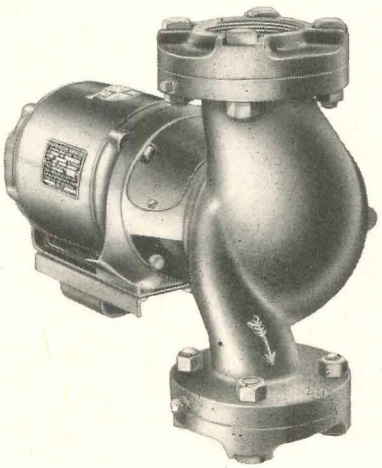


B&G Universal Pumps

In every detail designed and built for *silent, vibrationless* operation!

The motor is specially constructed, tested and *hand-picked* for quietness. Sleeve bearings in both pump and motor...suspension in ring-type rubber mountings and flexible spring couplers, all contribute to velvet-smooth performance.

Other features include the diamond-hard, leak-proof "Remite" Seal, oil lubrication and hydraulically balanced impeller. The removable bearing frame permits servicing without breaking pipe connections—*all the advantages of split case design!*



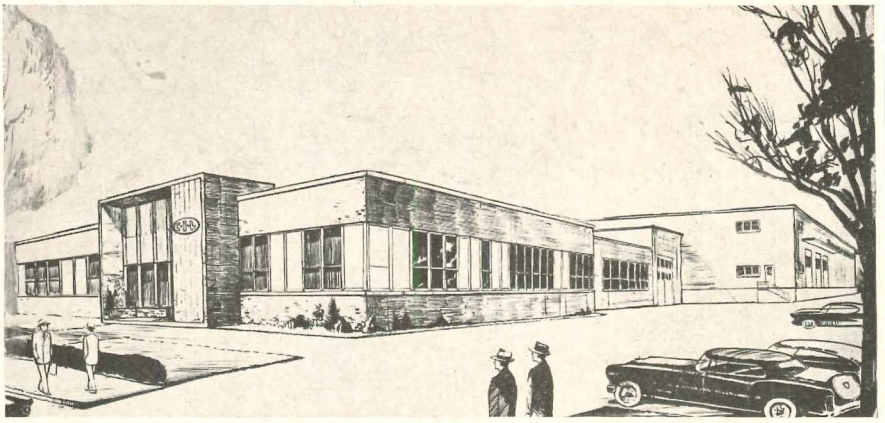
B&G Boosters

Famed for quietness—for efficiency—for long life! B&G Boosters are offered in a wide range of sizes for applications requiring less head and capacity than provided by B&G Universal Pumps. Widely used for residential heating, snow melting systems, circulating service water and as secondary pumping units in larger installations. *Over 2,000,000 B&G Boosters have been sold to date!*

NEWS FROM CANADA

(Continued from page 40)

try to expand its capacity has been dramatically proven on several occasions during the last 15 years," he said, "but the increased demands for the industry's services have been such that construction schedules are being held up by delays in the delivery of a number of materials.



A distributing center is planned for Halifax by Canadian Industries (1954) Limited; the building, which will have a steel frame "sheathed" with tile, will contain offices and warehouse space. J. Philip Dumaresq, of Halifax, is the architect

"Similarly, our training program for practically all personnel classifications has failed to keep up with the pace of the industry's expanded volume. The number receiving apprenticeship training should be at least doubled and there is a chronic shortage of engineers, superintendents, estimators and other skilled men."

Of the outlook for 1956, Mr. Malcom predicted that, despite some curtailment in bank credit, increase in the volume of construction would more likely be limited by the shortage of structural steel than by shrinkage of capital. Taking a still longer look at the future, Mr. Malcom said that the construction industry should establish a greater sense of direction and purpose. A basic requirement, he felt, was maintenance of construction costs at levels that would encourage investment.

Hon. Milton F. Gregg, Federal Minister of Labor, addressed the delegates on the subject of winter employment in the construction industry, and cited prejudice, habit and misunderstanding as the main obstacles to winter work.

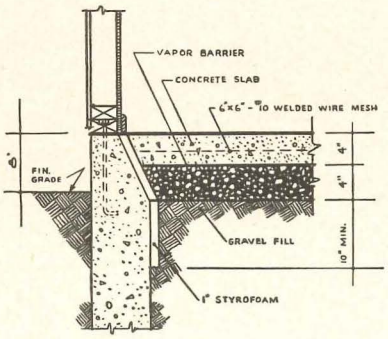
A. Turner Bone, president of the J. L. E. Price & Co. of Montreal, was elected president.

NEWS NOTES

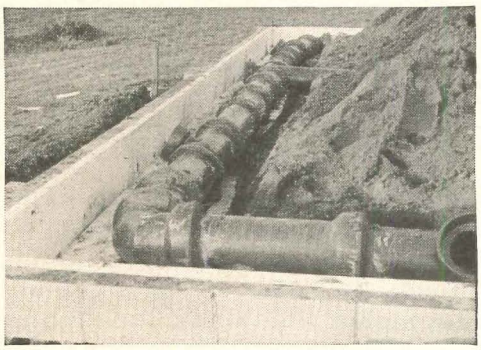
Office buildings are expected to get an even greater share of the construction dollar this year than they did in the record year of 1955, according to the *Financial Post*. . . . **The Manitoba Association of Architects** will hold its annual meeting on Saturday, April 28, in the library of the University of Mani-

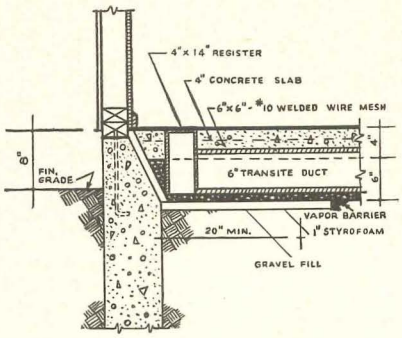
(Continued on page 46)

Here's how Styrofoam is used in perimeter applications

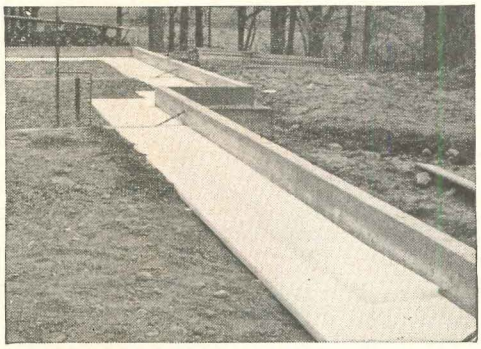


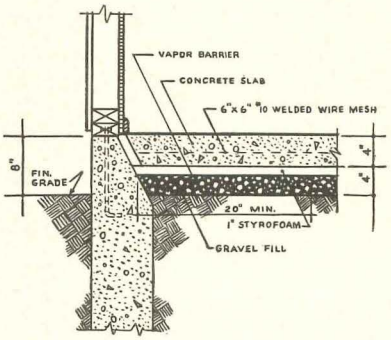
Styrofoam is being used in a vertical position for perimeter insulation. It can be adhered in place or held by back fill. Minimum F.H.A. requirements in vertical position are one to two inches thick from floor line to a depth of 12″-24″ below grade line depending on climatic conditions.





In this perimeter heating application, Styrofoam is used both vertically above grade and horizontally from outer edge of slab on the grade. One inch thick Styrofoam perimeter insulation in a 1′-1½′ combined vertical and horizontal width is accepted by F.H.A. for perimeter, radial and radiant type slab heating systems.





Styrofoam used in a horizontal position for perimeter insulation. One to two inches of Styrofoam is used for a distance of 12″-24″ in from perimeter, meeting F.H.A. minimum requirements in various climatic areas. Due to the strength and moisture resistance of Styrofoam, the concrete floor can be poured directly over it without compressing the Styrofoam.

For further information on Styrofoam send in the coupon below or contact your nearest distributor of Styrofoam.

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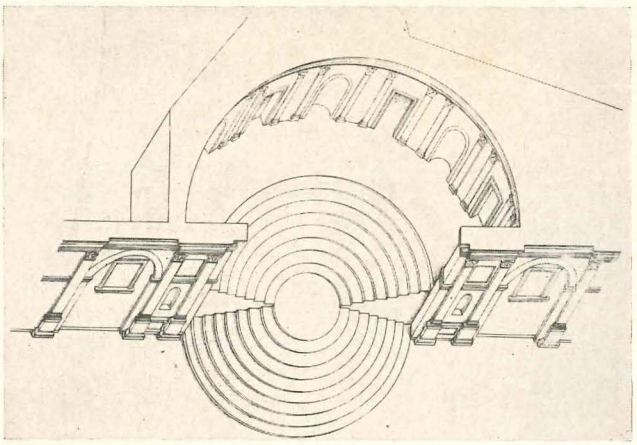

3.

Bramante's Great Space

The Cortile Del Belvedere (Studi e Documenti per la Storia del Palazzo Apostolico Vaticano, III). By James S. Ackerman. (Vatican City) 1954. 259 pp, illus. $27.00. (*U. S. distributor — G. Wittenborn & Co., 38 E. 57th St., New York*)

BY VINCENT J. SCULLY

THIS WORK BY ONE OF AMERICA'S most distinguished young architectural historians is the third in a series published by the Vatican Library and dedicated to the history of the Vatican buildings. The earlier volumes by other scholars treated the topography of the site and the history of the Vatican Palace in Antiquity and the Middle Ages. The present volume is concerned with the most important period of all, that between 1504 and 1585, and with the historically most important domestic project ever undertaken for the Vatican, the Court of the Belvedere, designed by Bramante for Julius II.

The author's task, as he points out, was primarily an archaeological one, since Bramante's scheme for the court has been largely buried under later buildings. Because these, unlike earth, could not be removed to reveal the original complex, the author was forced to reconstruct Bramante's project through the use of sixteenth-century drawings. He has turned this requirement into an outstanding achievement. Years of patient research have turned up not only most of the drawings in European collections which can be made to bear upon the problem (Fig. 1) but also a staggering number of relevant and hitherto unpublished documents from the Vatican and other archives. The result is a careful, totally con-

(Continued on page 66)

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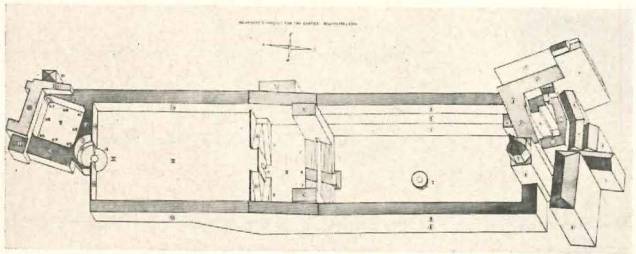

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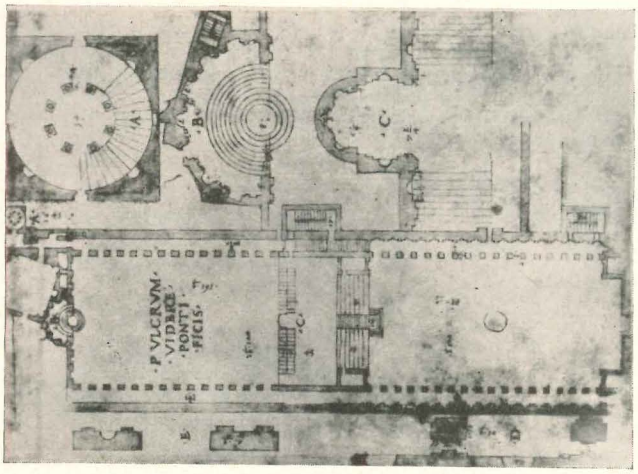

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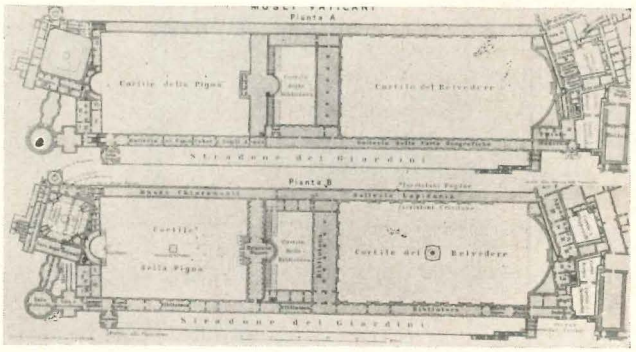

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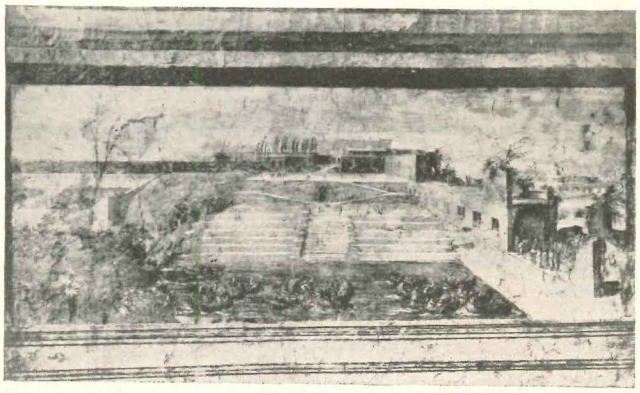

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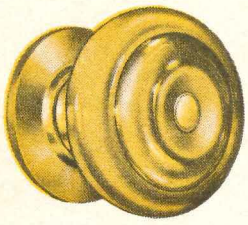
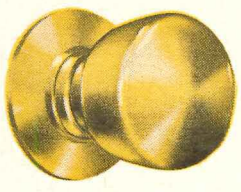


BEDFORD cast knob



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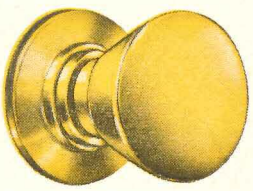
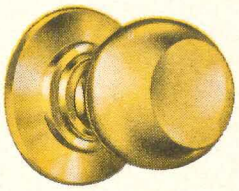


ESSEX cast knob



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(Continued from page 62)

6.

vincing study of the development of Bramante's project, of its fate at the hands of later architects, and of its critical importance in the history of western architecture as a whole.

After his Introduction, in which he is entirely too modest concerning the scope and importance of his work, Ackerman devotes his first chapter to a reconstruction of Bramante's scheme. This is illustrated by several magnificently conceived reconstruction drawings in isometric projection. The choice of isometric was a happy one in that it made possible not only the use of true dimensions but also a strong presentation of spatial volume, the essence of Bramante's design. (Fig. 2) In this way the reader can experience Bramante's power in walling off an extensive area of space, giving it direction by a strong axial movement, drama by changes of level using stairs and ramps, and climax in great Exedra. (Fig. 3)

Chapters II-X carefully follow the construction of the project to 1585, at which time, after certain modifications by other architects — especially Pirro Ligorio and Michelangelo — it was essentially complete. In the process Ligorio has substituted a more decorative set of details than had been envisaged in Bramante's stronger and simpler design. Ligorio and Michelangelo between them had also altered the Exedra by closing off the rear to form a corridor, changing the stairs to diagonal flights, heightening the mass above and turning it thereby into the present "Nicchione."

Only one chapter (XI) is given by Ackerman to the later history of the Belvedere, since directly after 1585 the whole complex was ruined by Sixtus V, who quite consciously destroyed the space by building the

(Continued on page 390)

THE U. S. AIR FORCE ACADEMY

El Paso County, Colorado

First photographs of revised designs as approved by Secretary of the Air Force Donald A. Quarles show little change in basic plan concept (AR, June 1955) but what the Office of the Secretary describes as "a great reduction" in glass areas. Congressional hearings will begin this month on the $57 million appropriation requested for Academy construction in the fiscal 1957 budget. Preliminary work of site preparation is going forward; contracts total $7 million already, are expected to reach $35 million by June 30

ARCHITECTS-ENGINEERS:

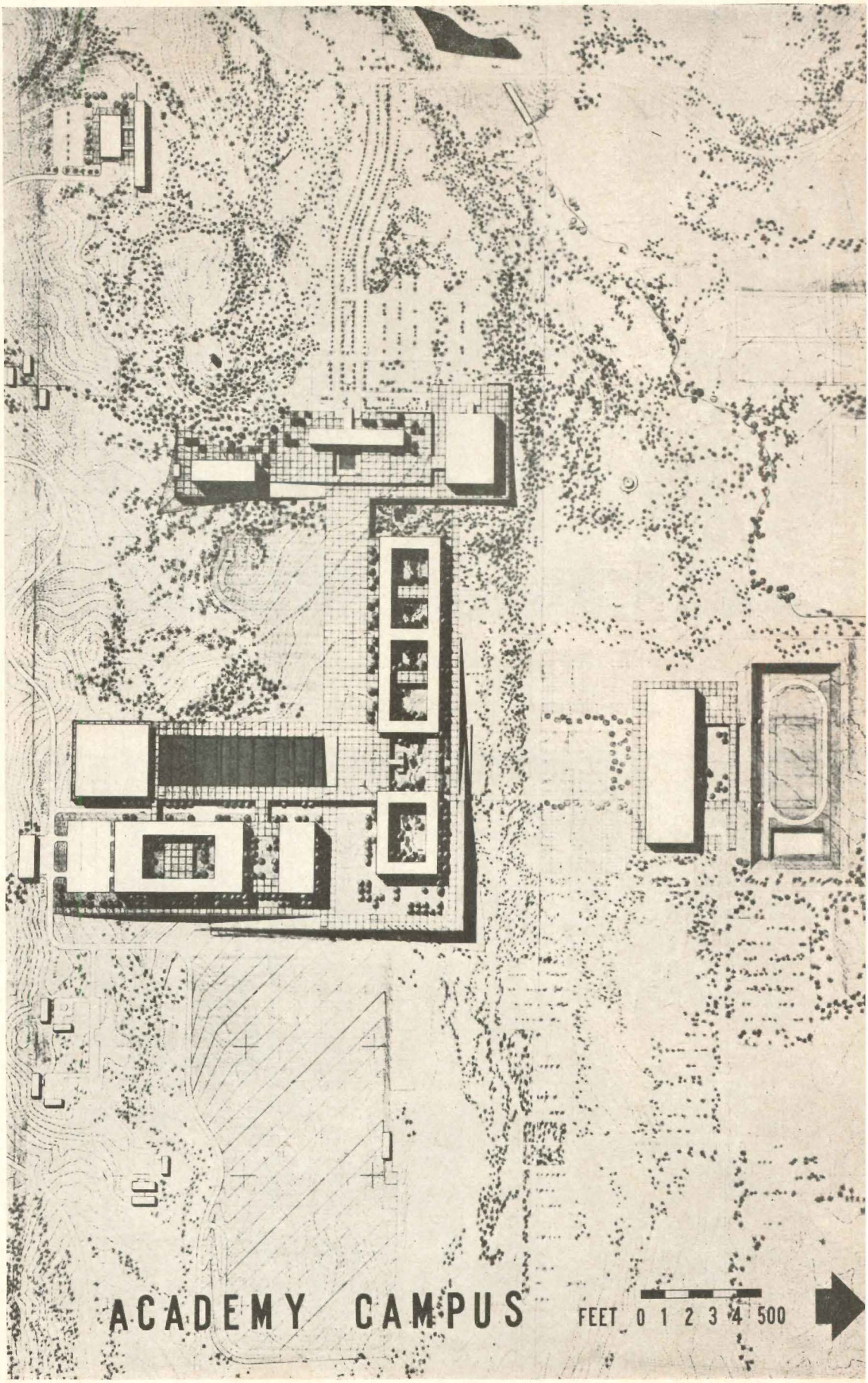
Skidmore, Owings & Merrill

ARCHITECTURAL CONSULTANTS TO AIR FORCE SECRETARY:

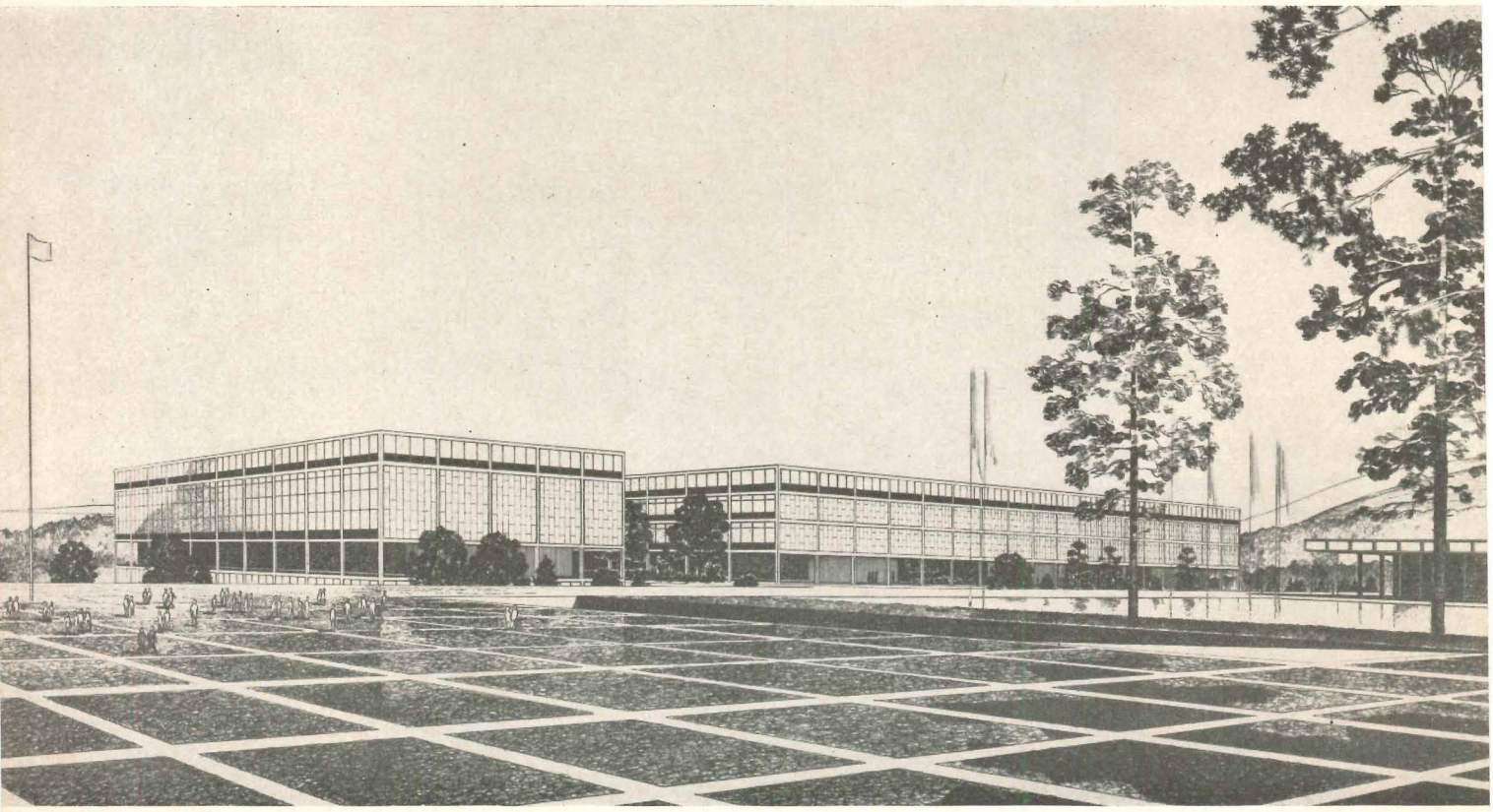
Welton D. Becket, F.A.I.A.

Pietro Belluschi, F.A.I.A.

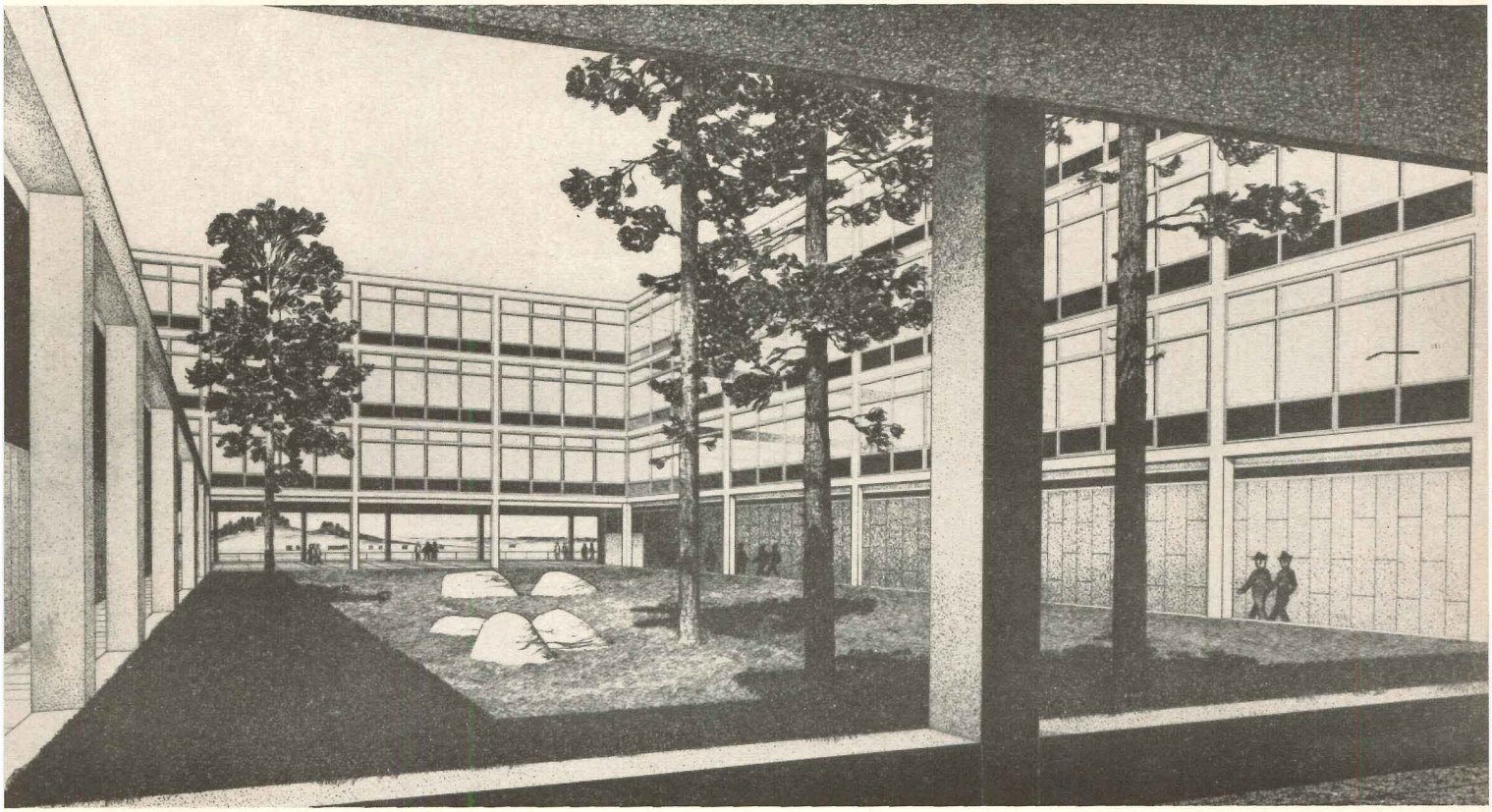
Eero Saarinen, F.A.I.A.



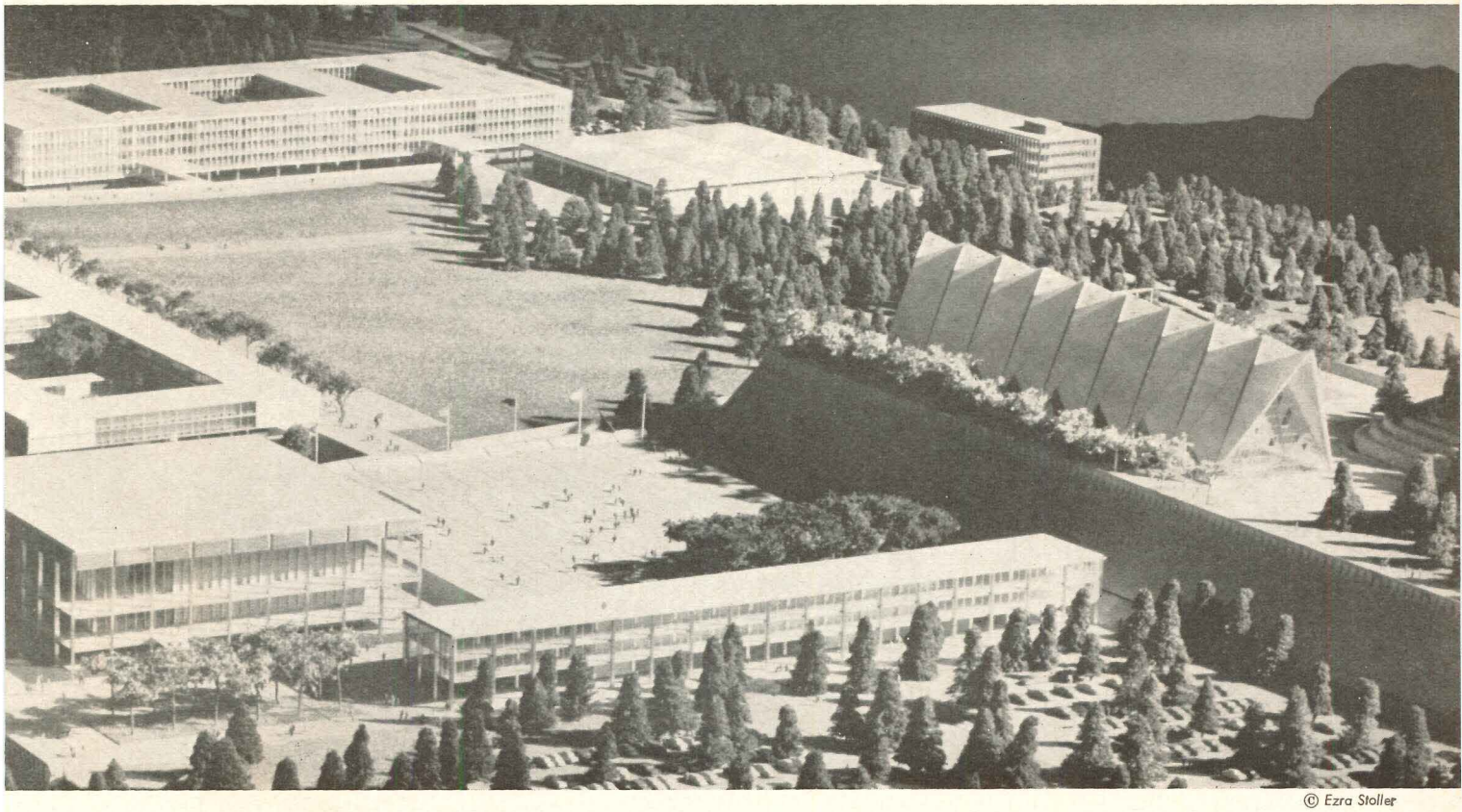
Photos of renderings by Edward M Allen

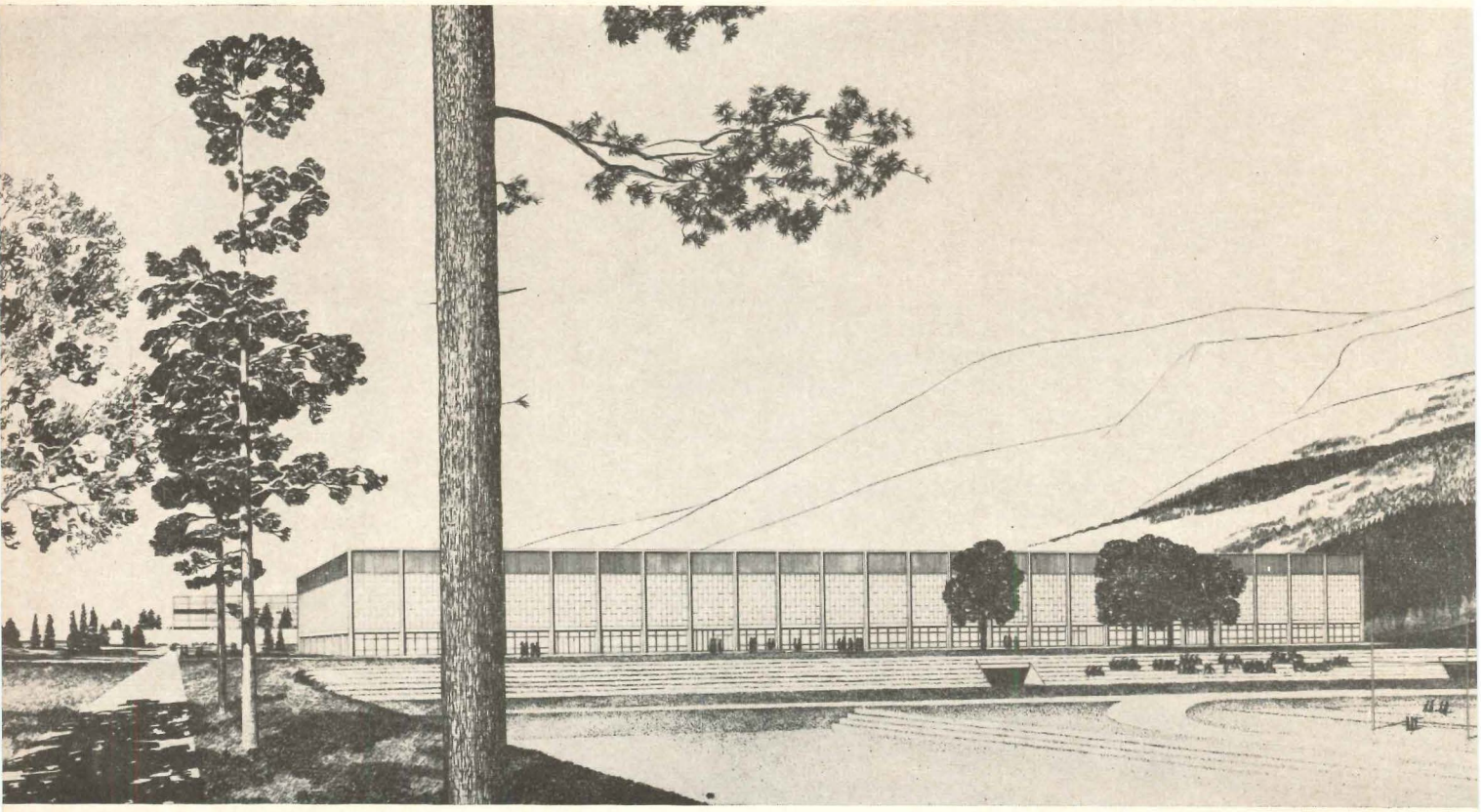


Above: Library and Academic Building (view southeast from Cadet Quarters) are now separated by courtyard (across-page, top) open at two ends as well as above. In earlier scheme glass-enclosed galleries, to be used for circulation between buildings, surrounded court on all four sides

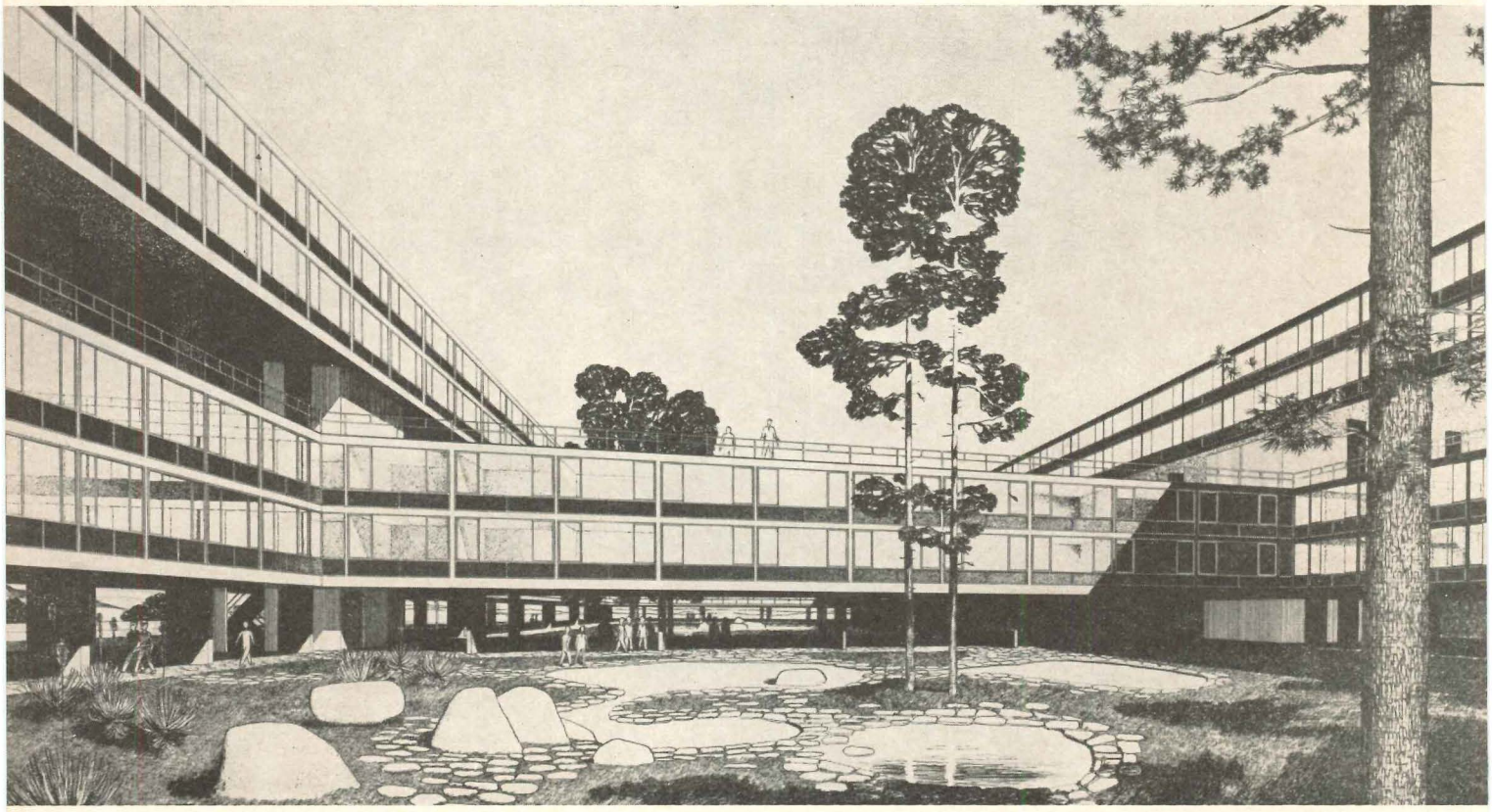


Below: photograph of original model released in May shows Cadet Academic Area, with Social Hall, Administration Building and the much-controverted Chapel (not yet redesigned) in foreground, Cadet Quarters at left, Library and Academic Building, Cadet Dining Hall at rear





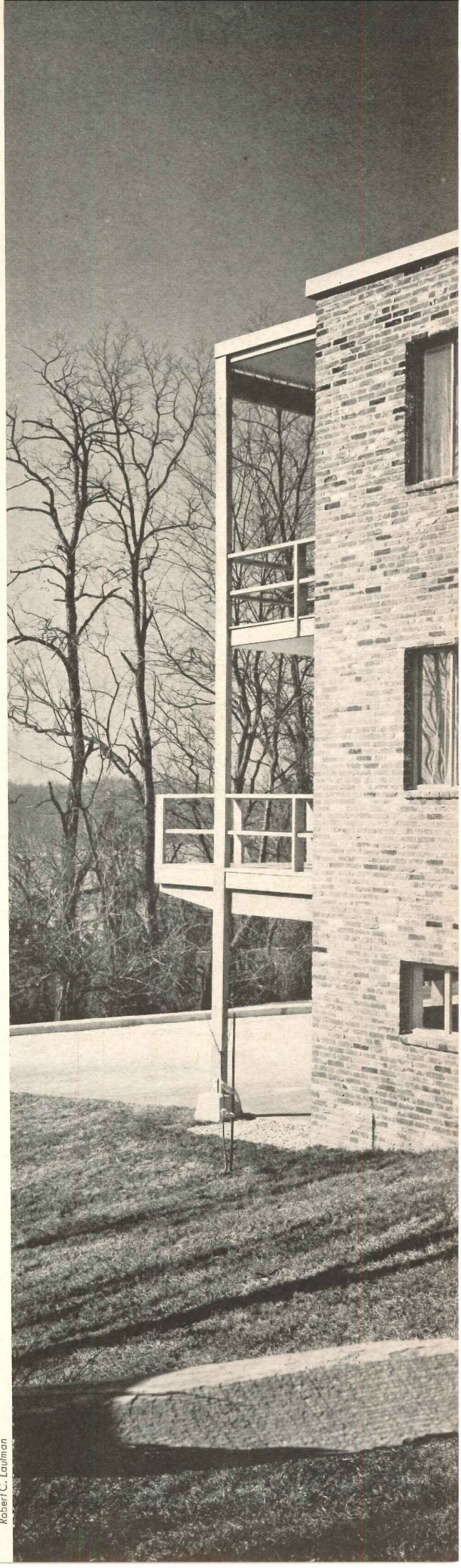
Above: Cadet Gymnasium presents much the same appearance as in the earlier version (the adjacent Basketball Arena had glass walls). Below: courtyard in Cadet Quarters (looking east). Full-scale mockups of basic cadet living unit — 300-sq-ft two-man room — are under construction



TWO-STORY HOUSES

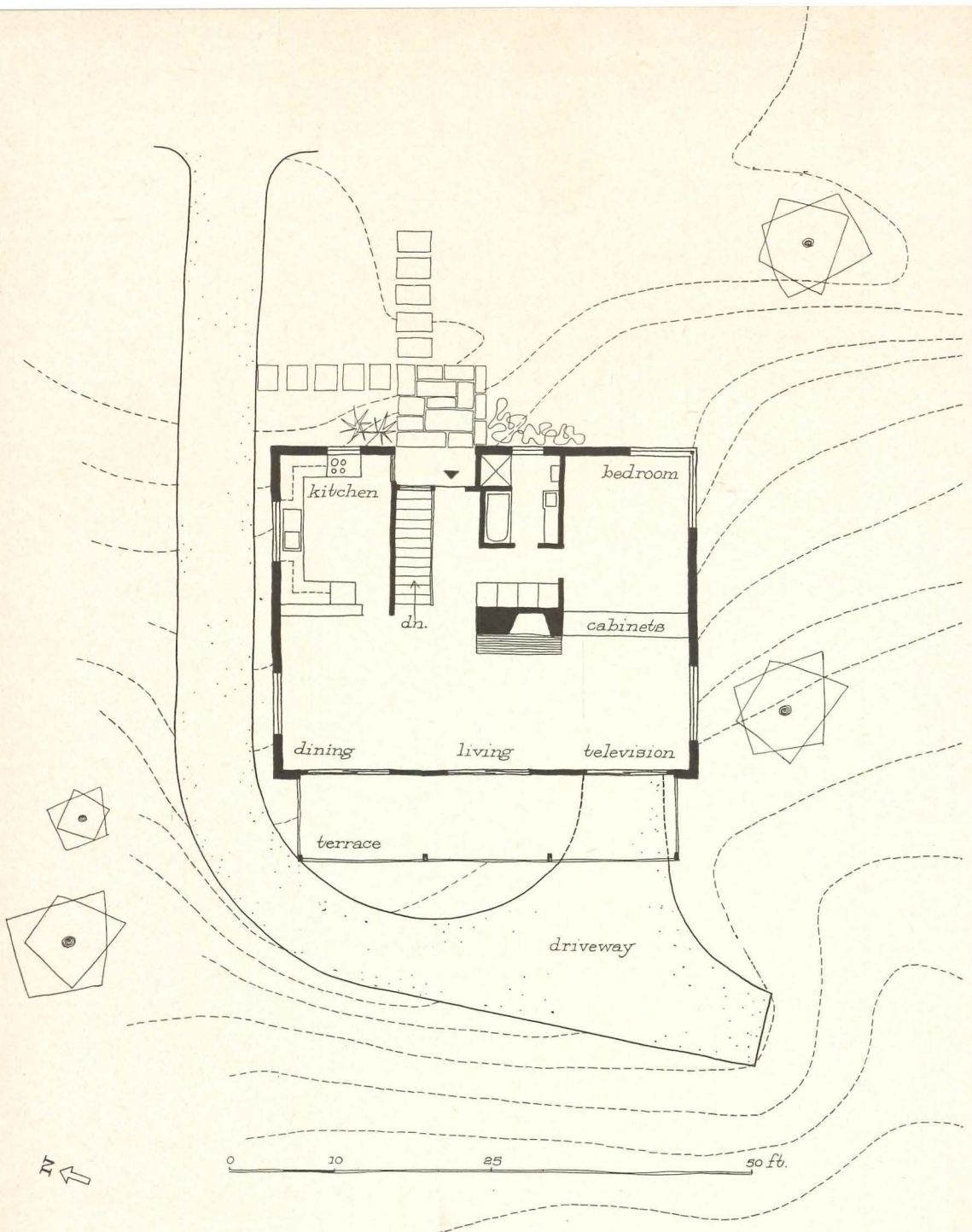
IN THE MIDDLE ATLANTIC STATES the two-story house has never lost its traditional popularity — or wavered, as a rule, from its traditional appearance. Yet here are five recently completed houses in that area which are anything but "traditional" in style and plan. All five were built on sloping and wooded sites and opened up to the view regardless of orientation; all five were planned with the main entrance and living area on the logical level, either upper or lower as the case might be. The old dignity of the two-story house remains, but the old planning inhibitions seem to be disappearing.

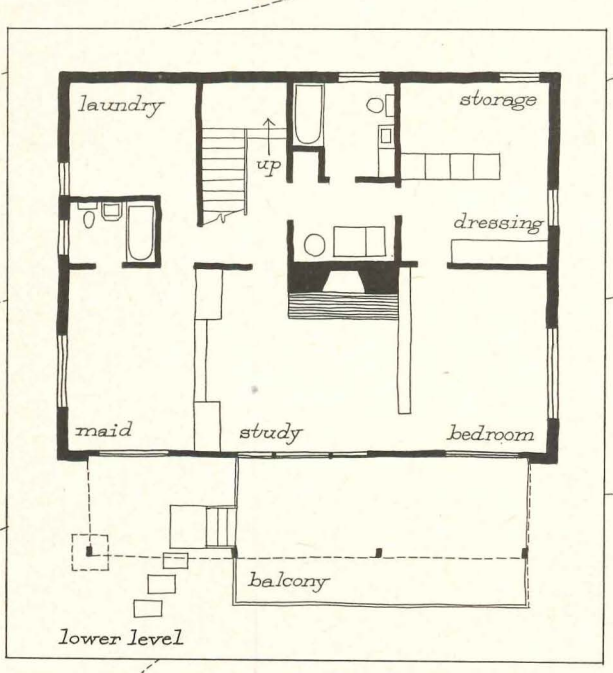
— Florence A. van Wyck



Robert C. Lautman

Robert C. Lautman





Miss Lilly Fox and Mr. and Mrs. Robert W. Hartley Owners

WASHINGTON, D. C.

Harry E. Ormston, Architect

THE SITE OF THIS HOUSE is within the city limits of Washington; sloping steeply down from the street, it overlooks the Virginia hills to the west and (from the uppermost corner of the lot) the city and the Potomac River to the southeast.

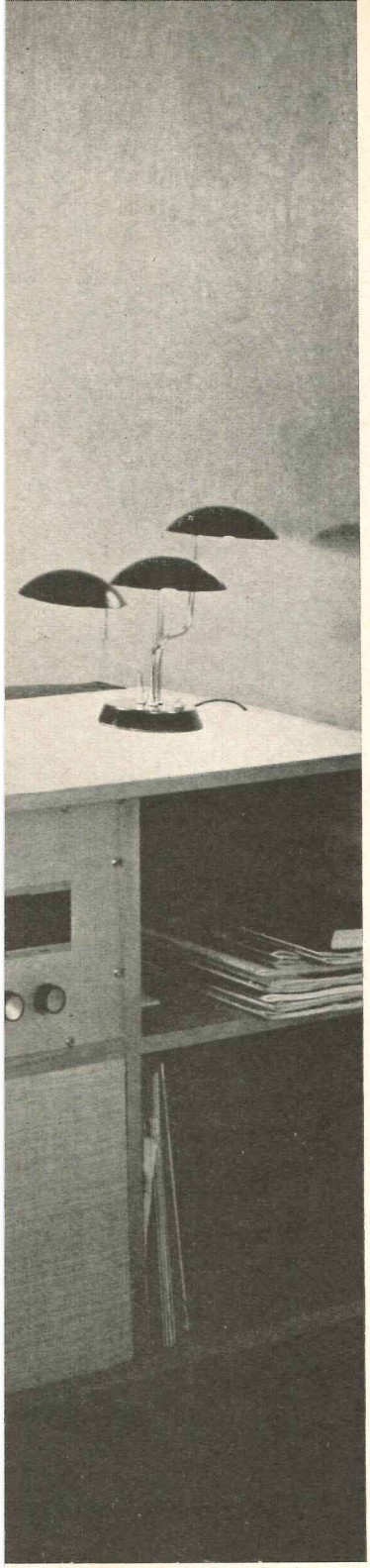
The owners — a couple and the wife's aunt — moved to Washington from Portland, Ore. They particularly wanted a hillside site and put much emphasis on view and outdoor living space.

The house was planned as a compact rectangle with the chimney and utilities in the center. Miss Fox's suite is on the street level; from its corner windows can be seen the Washington Monument, the Lincoln and Jefferson Memorials, and the Potomac. Mr. and

TWO-STORY HOUSES: WASHINGTON, D. C.

Mrs. Hartley have most of the lower floor, including the balcony, to themselves. The two porches provide the desired outdoor living space and also give deep sun shade on the west (view) side of the house.

Construction is wood frame on cinder concrete block foundation. Exterior walls are used brick and stained redwood vertical siding; the single slope built-up roof has a marble chip surface. Interior walls are painted plaster and natural-finish birch plywood, floors are wood or asphalt tile. Sliding aluminum doors and screens and steel casements were used throughout. The house has both wall and roof insulation and is air conditioned. All cabinets and bookcases are birch plywood and were designed by the architect.



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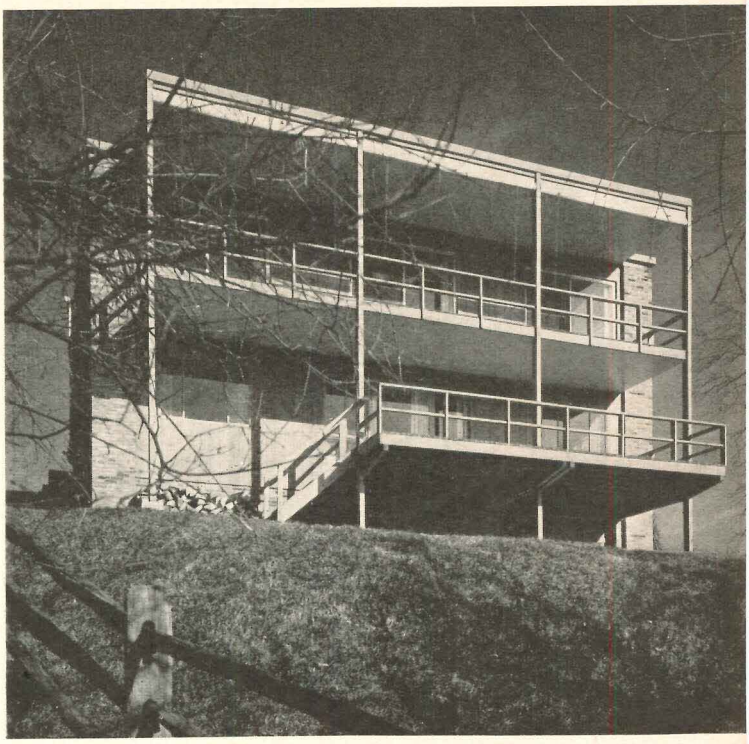
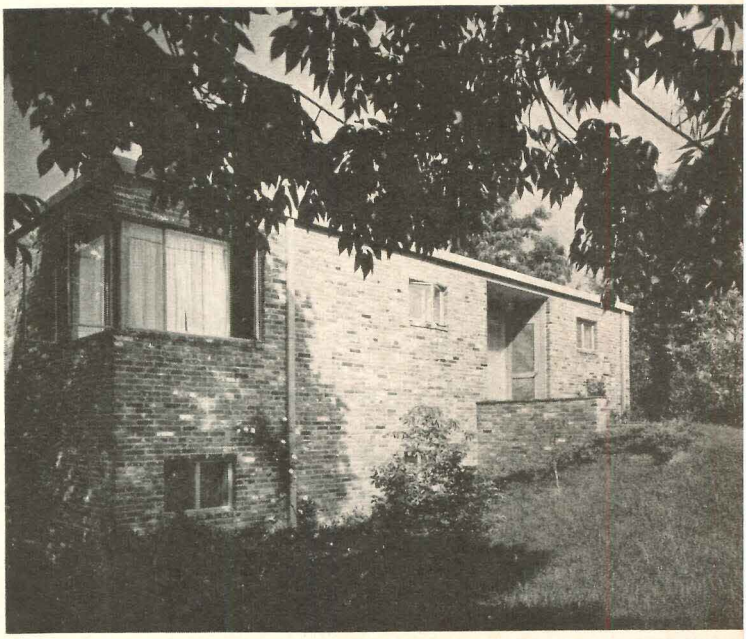
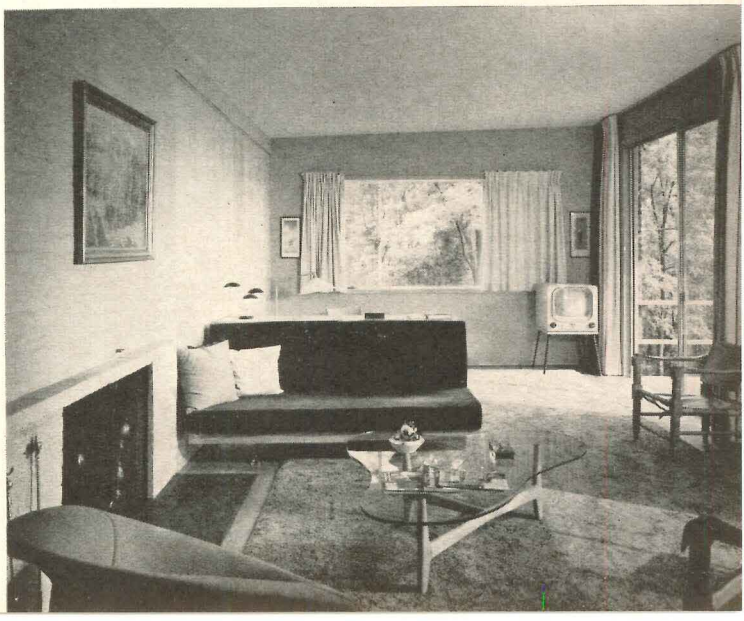
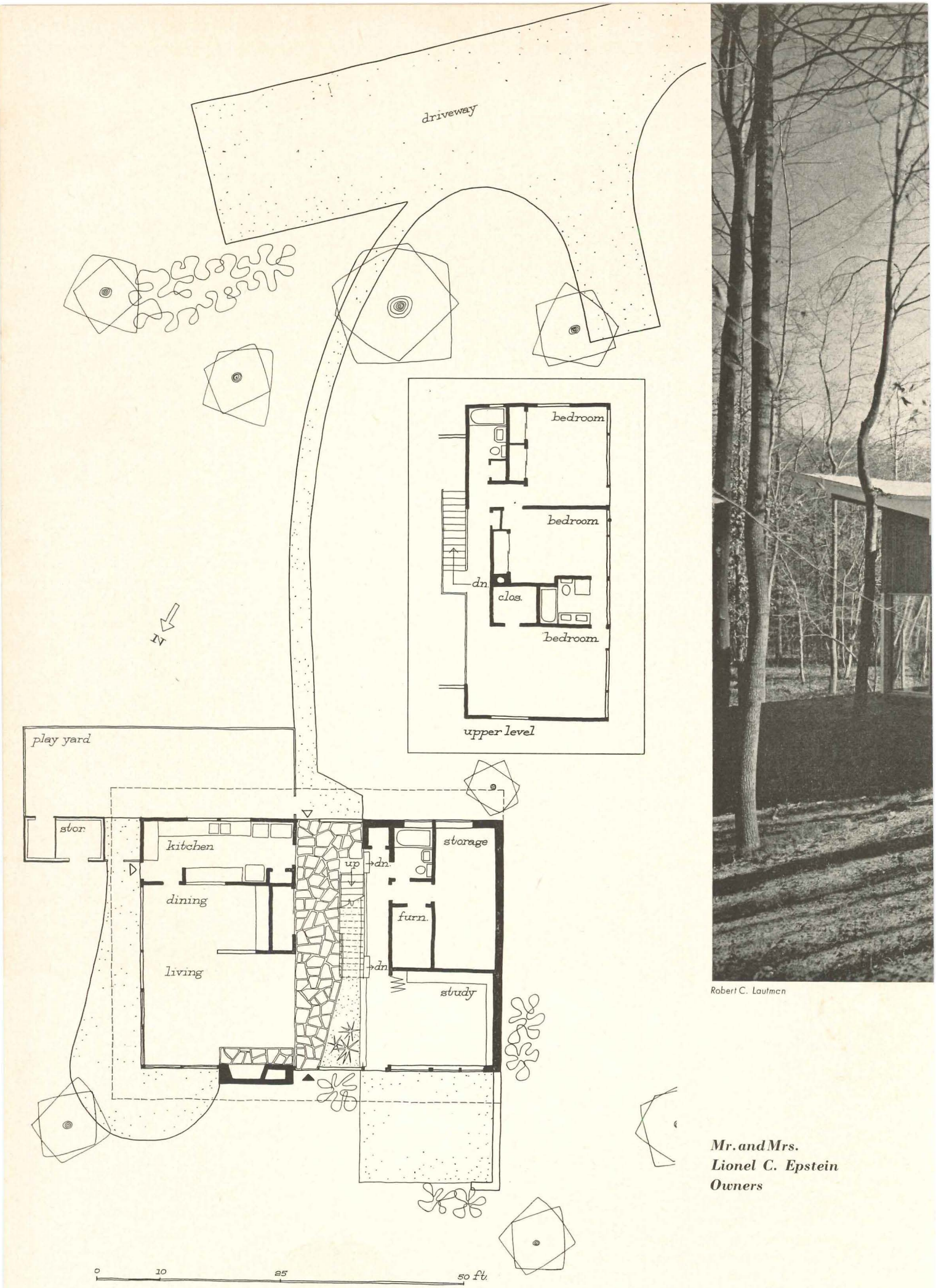








Robert C. Lautman

Mr. and Mrs.
Lionel C. Epstein
Owners

LANGLEY FOREST, VA.

Leon Brown and Thomas W. D. Wright, Architects

THE THICKLY WOODED SITE of this house is only some 25 minutes by car from downtown Washington. It overlooks a forest — obligingly to the north — and presented no privacy problems.

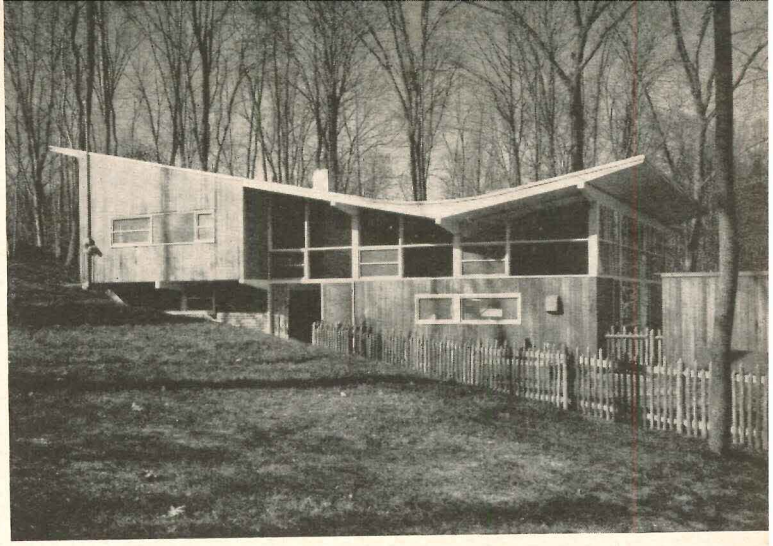
The owners' chief requirement (rather unexpectedly, perhaps, since they have two small children) was for "a single, modulated space for the principal parts of the house, not a segmented articulation of the parts." They also wanted "an intimate relationship with the surrounding land, treetops and sky." Some activity zoning obviously was necessary and was provided by the location of children's bedrooms and play space. The main part of the house, however, is really open: the entrance foyer on the lower level is 15 ft high and glass-

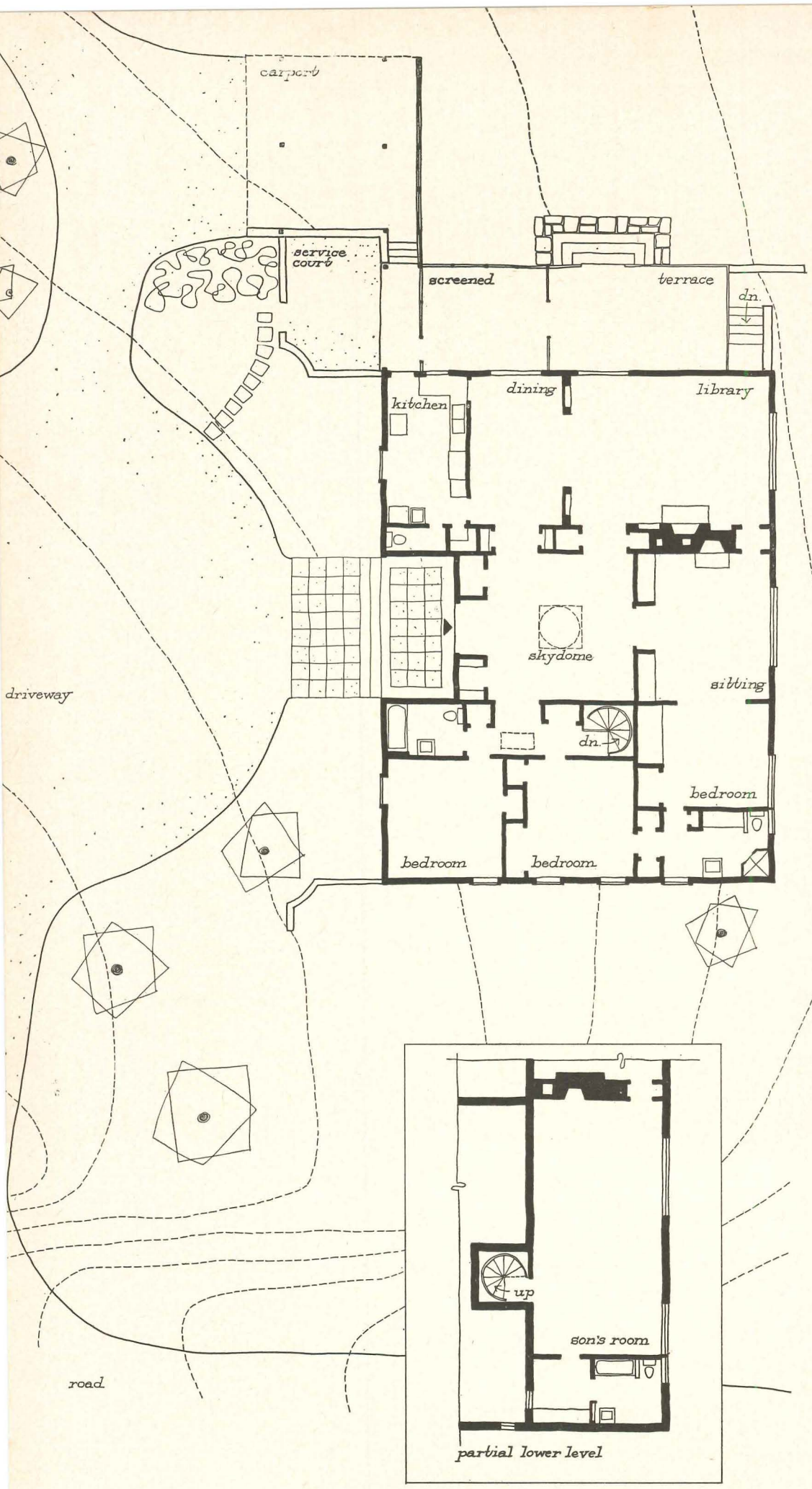
TWO-STORY HOUSES: LANGLEY FOREST, VA.

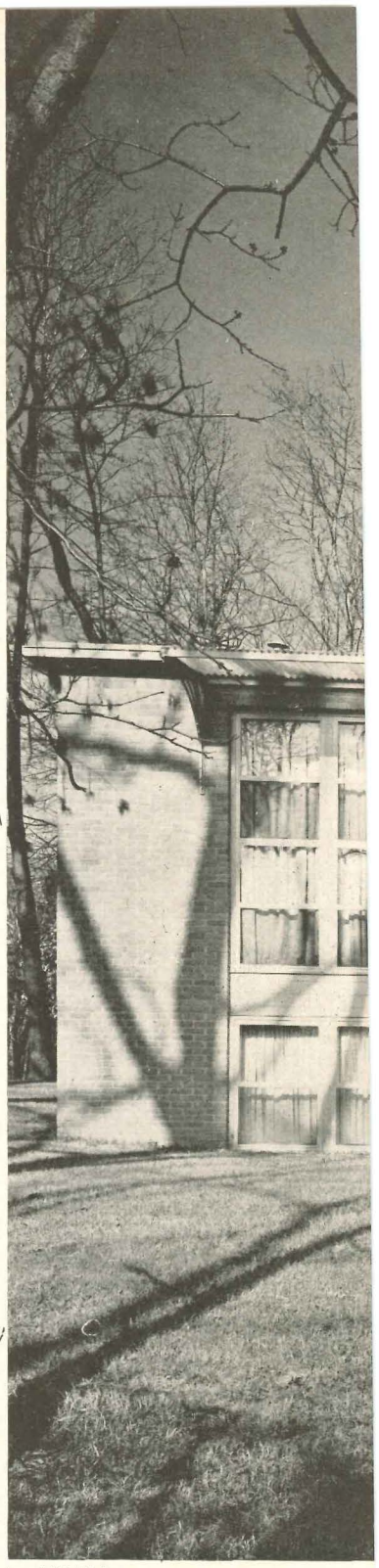
roofed; foyer, living and dining rooms, master bedroom and study form one huge area extending through and across the house on both levels when sliding partitions and folding doors are not in use.

The "intimate relationship" with the site which the owners requested is reflected in the roofline which exactly follows the contours of the land, the sliding glass doors which open one whole corner of the living room to the terrace, and the height of the living room ceiling which ranges from 10 ft at the inner edge to the 13-ft top of the exterior glass wall through which the treetops can be seen. Construction is wood frame with exterior walls of used brick and fir siding; interior walls and ceilings are sheetrock.

Robert C. Lautman







Joseph W. Molitor

Mr. and Mrs.
Joseph E. Johnson
Owners

PRINCETON, N. J.

Victorine & Samuel Homsey, Architects

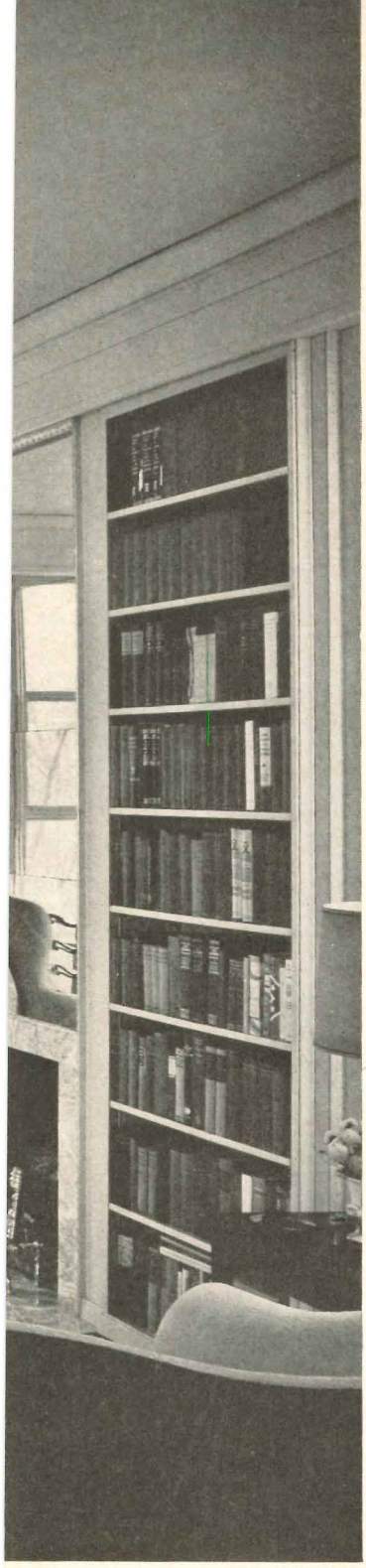
THIS HOUSE occupies part of an old Princeton estate recently cut up into building lots of about an acre each. The slope is to the south toward a ravine, a small stream and a pond.

The owners wanted a contemporary house which would provide a harmonious setting for their collection of antique furniture. They also required generous and well-lighted display space for paintings (Mrs. Johnson's brother is a portrait artist); a separate suite for their son; two guest rooms; and plenty of room for entertaining. They requested door and windows opposite each other, forming axes, and high ceilings and large rooms. They did *not* want an oversized dining room or an elaborate kitchen.

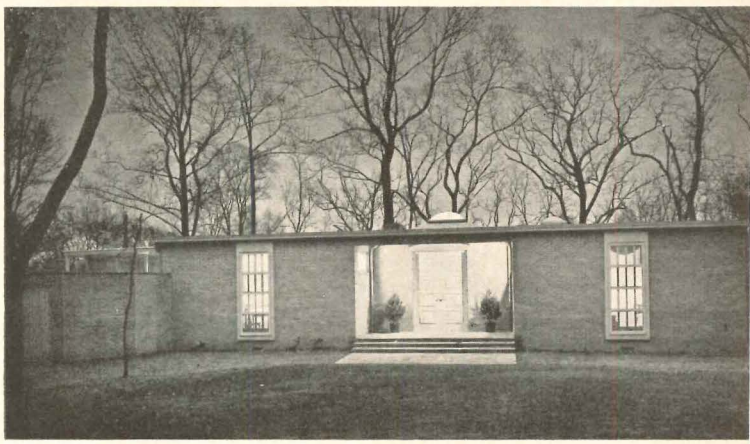
TWO-STORY HOUSES: PRINCETON, N. J.

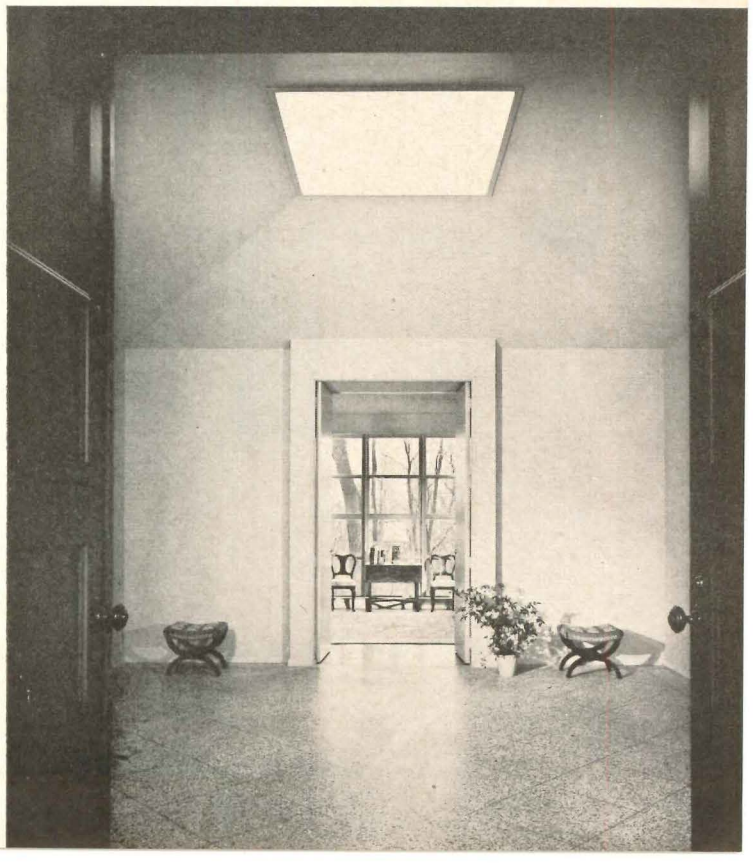
The plan as developed revolves around a domed atrium to which all main rooms open; here extra tables and chairs may be set up for large parties, and here also there eventually will be wall frescoes and a central fountain. This large and airy hall keynotes the entire house: most ceilings are 10 ft high, and most rooms have at least one wall predominantly of glass. A circular stairway just off the hall leads down to the son's suite on the lower level.

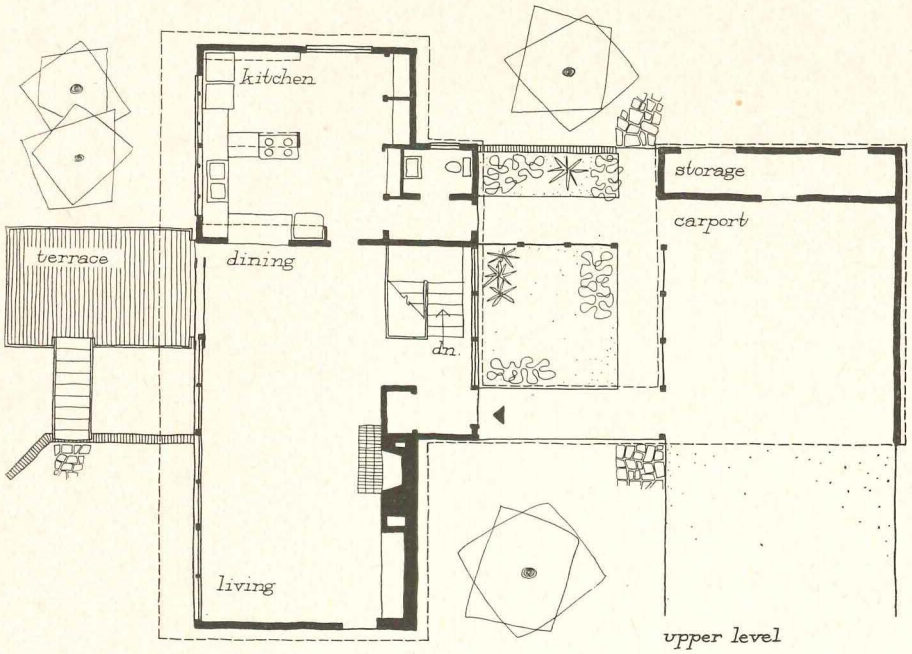
Construction is wood frame with a built-up roof topped by marble chips. Exterior walls are a soft pink brick with brown-gray trim. All interior walls are painted an antique white, and all ceilings except for the atrium are a clear blue.



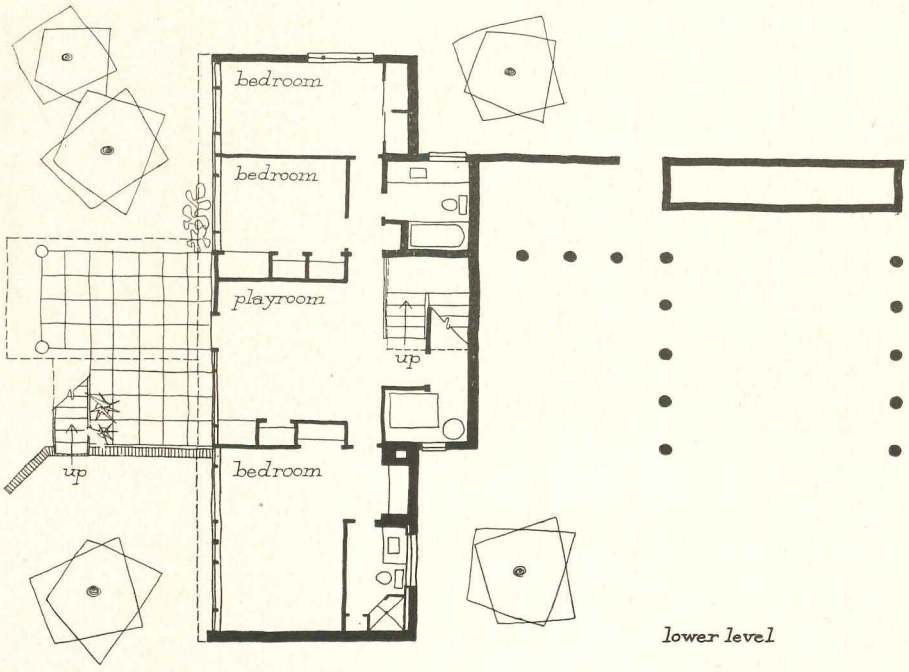
Joseph W. Molitor



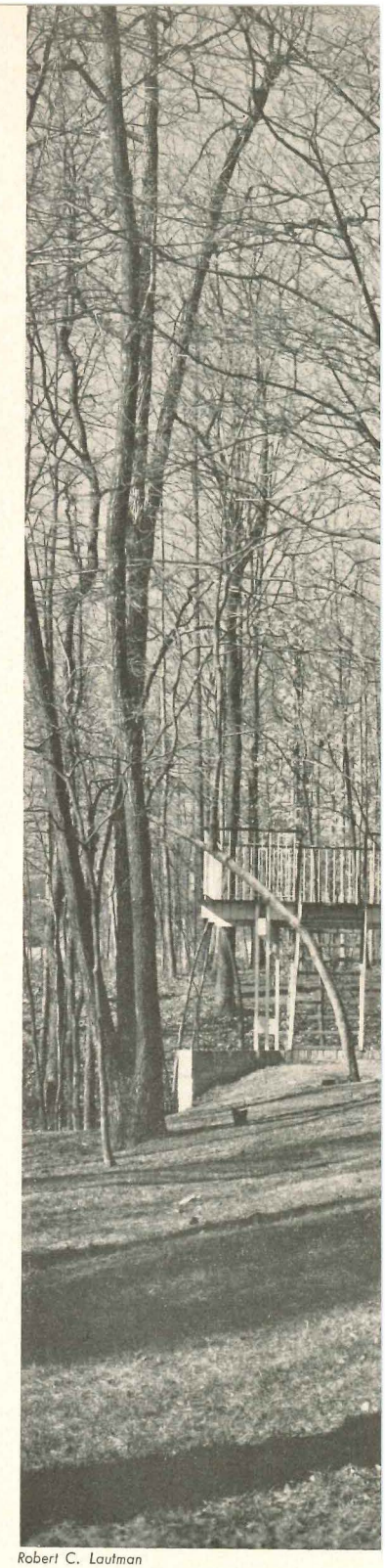




upper level



lower level



Robert C. Lautman

Mr. and Mrs.
Robert W. Komer
Owners

0 10 25 50 ft.

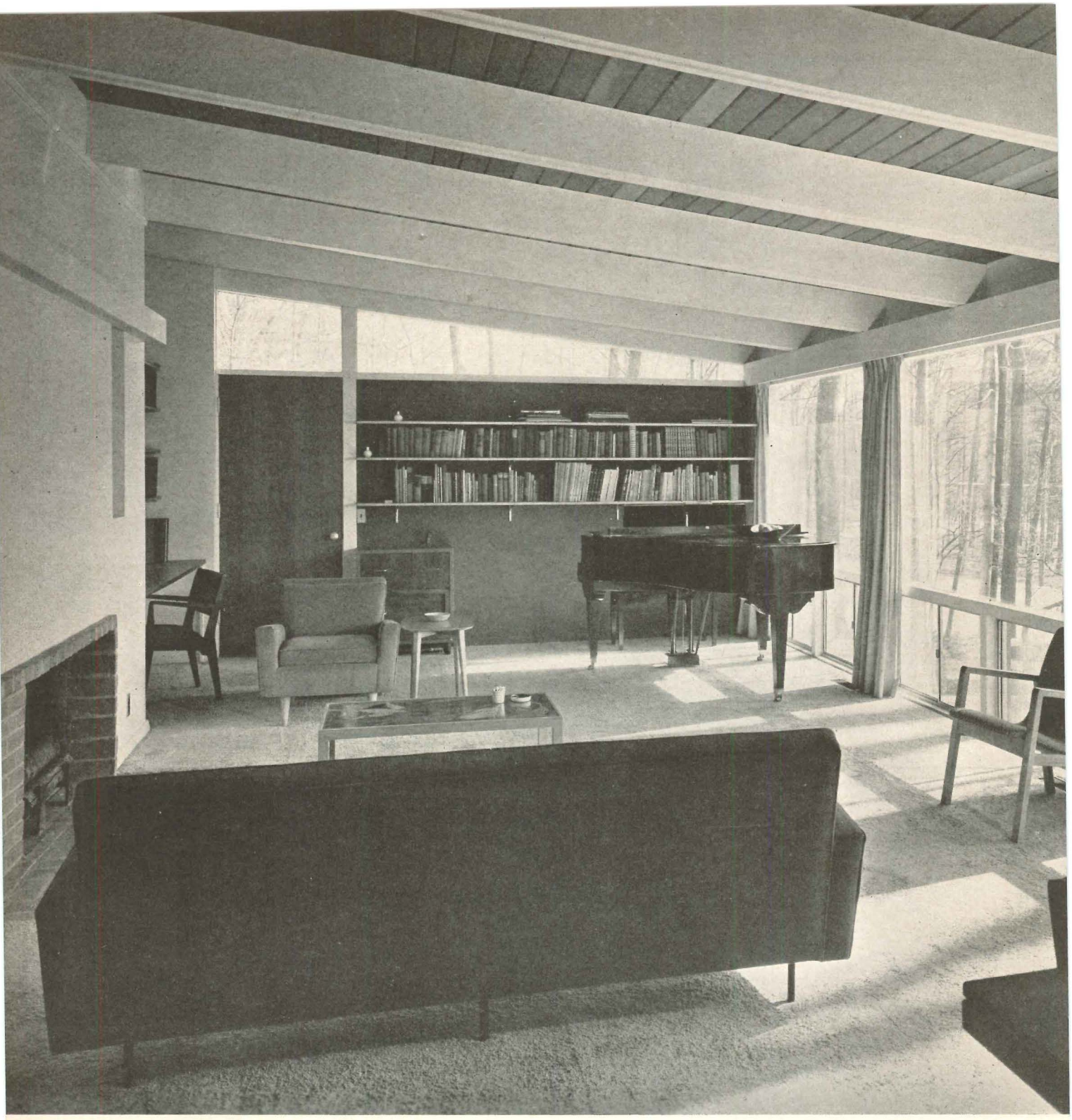
FAIRFAX COUNTY, VA.

Keyes, Smith, Satterlee & Lethbridge, Architects

EVERY ROOM in this house on the outskirts of Washington faces south toward a lake and has direct access to an out-of-doors living area — an open porch on the upper level, a terrace on the lower. The wide roof overhang and the set-back of the lower floor reduce summer sun penetration without limiting the view and permit the south walls to be largely of glass.

The owners have two small children for whom they specified separate bedrooms and bath and a large play area. They also requested "a generous kitchen where everyone could get together," but had no other special requirements.

The plan was worked out as economically as possible since the budget was limited, but good circulation was

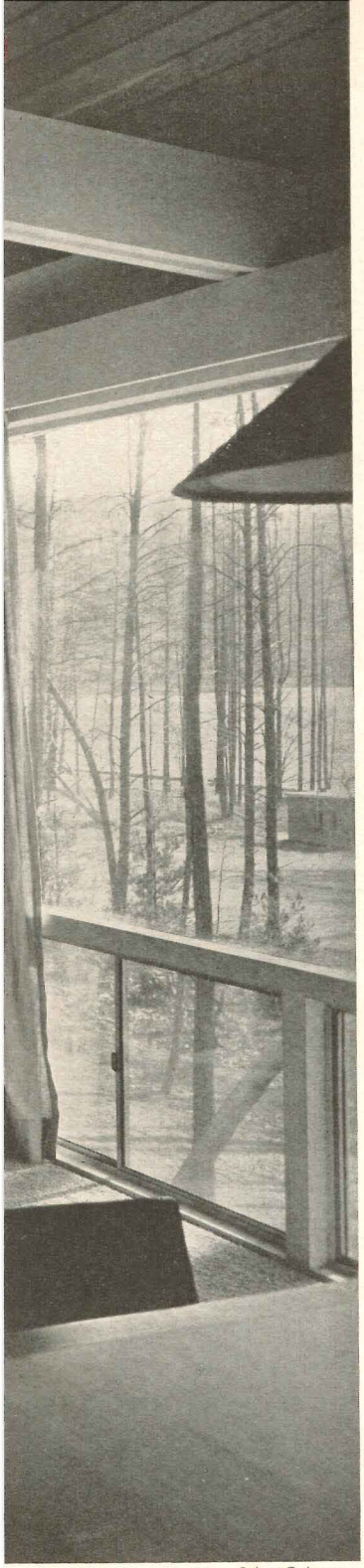


TWO-STORY HOUSES: FAIRFAX COUNTY, VA.

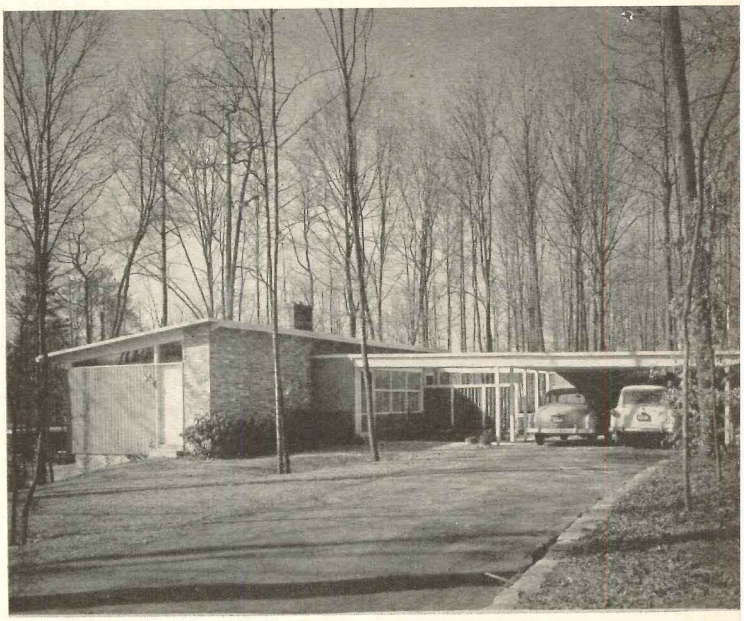
achieved throughout. The stairs down to the bedrooms are adjacent to the main entrance; the kitchen has a service entrance facing the carport; and only the playroom is subject to cross traffic.

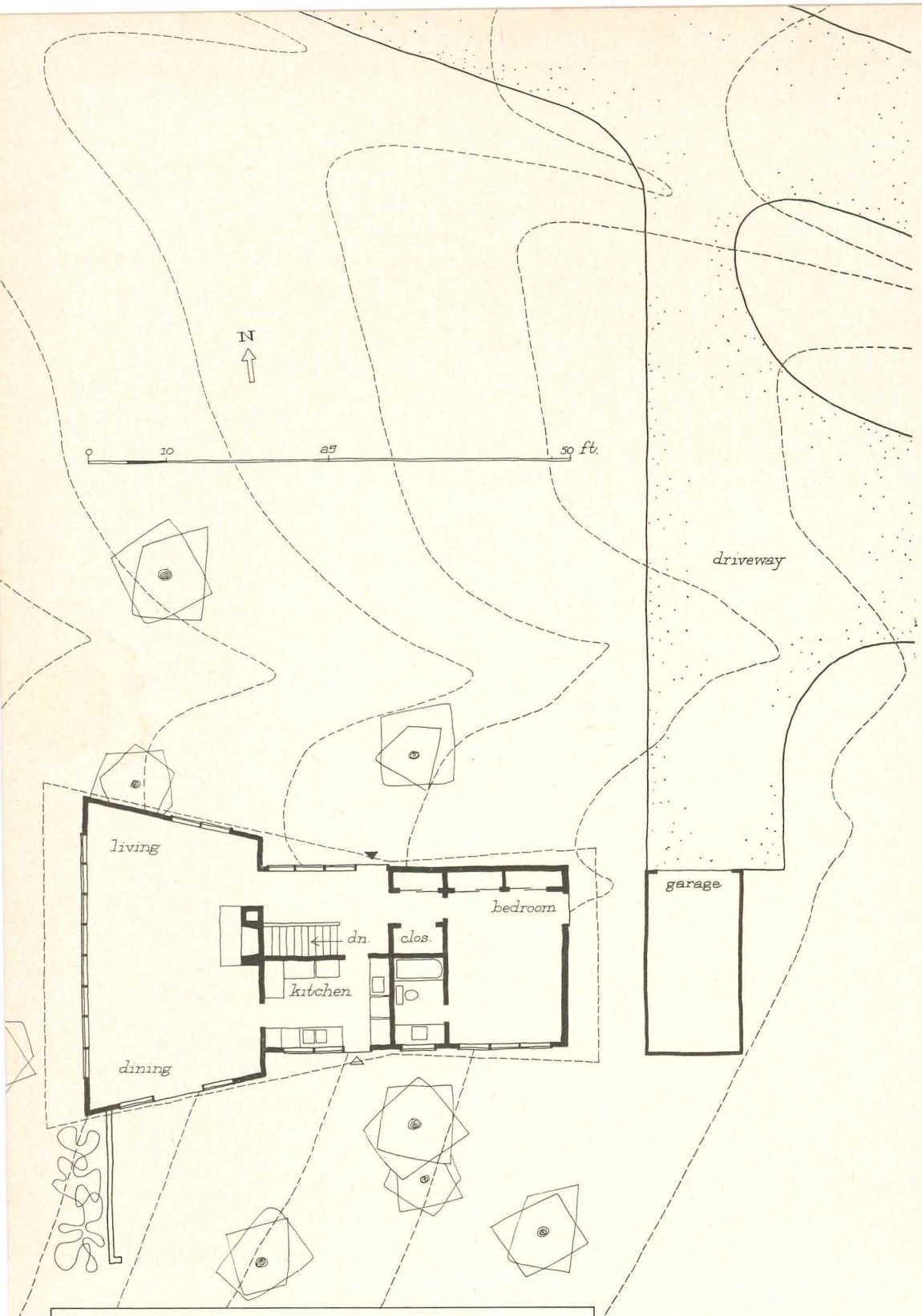
Although the budget precluded much special detailing, some cabinets were built in and a two-chair desk was provided next to the fireplace in the living room.

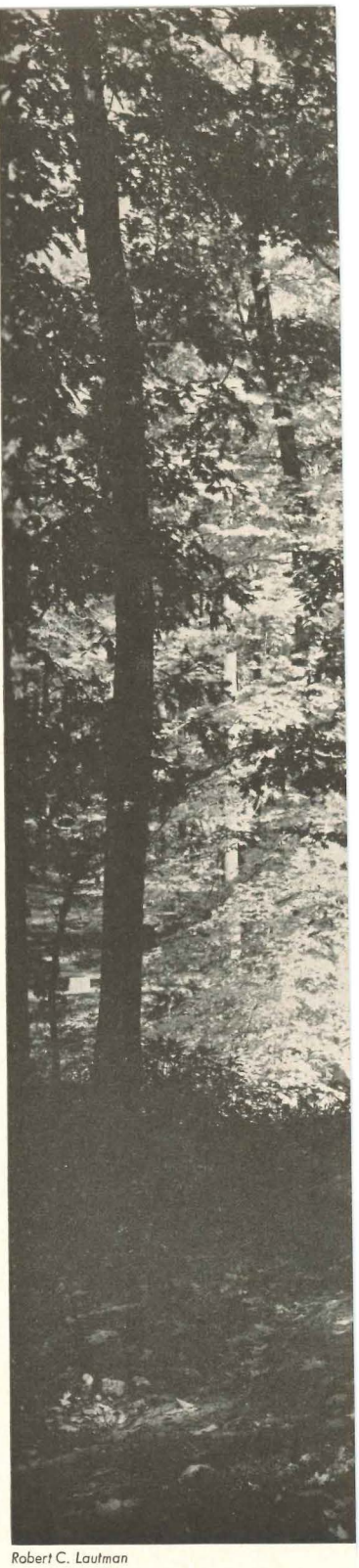
The budget also influenced the choice of construction materials: interior walls are plaster, ceilings are exposed plank or plaster, floors are oak or asphalt tile except for brick in the entry; exterior walls are used brick and vertical T & G siding, painted; the roof is 2 by 6 fir plank and beam. Framing is wood, on a concrete block foundation. Sash are sliding aluminum.



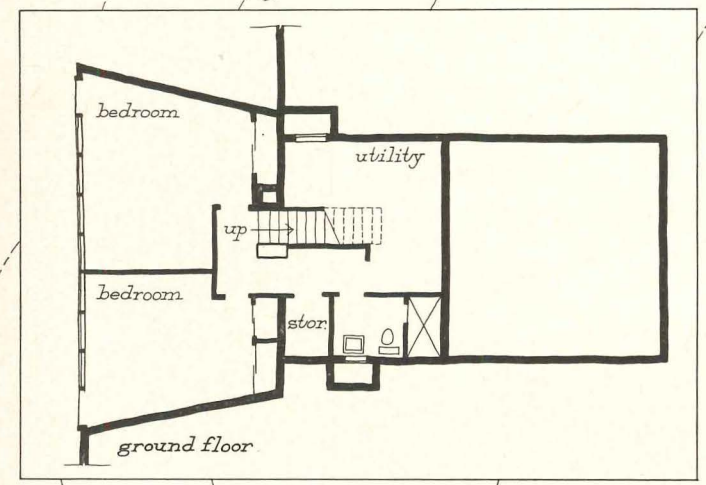
Robert C. Lautman







Robert C. Lautman



Mr. and Mrs.
Verl E. Roberts
Owners

Lou Bernard Voight
Landscape Architect

BETHESDA, MD.

Charles M. Goodman Associates, Architects

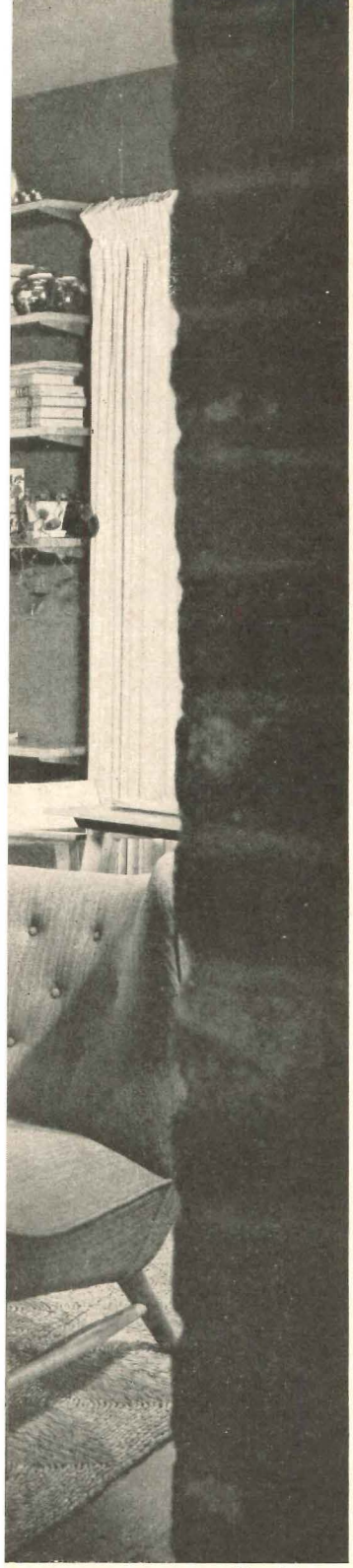
THE VIEW toward which this house is oriented is downward through the woods to the west. The western exposure was no problem at all: the trees are so dense the leaves provide all the sun control needed from early spring through fall, and for the balance of the year the sun is welcome.

The main planning requirement was for two guest rooms well segregated from the rest of the house. Since the owners wanted their own personal living accommodations all on one floor, the guest rooms were placed on the lower level. The master bedroom has complete privacy — and unusually generous storage space: Mr. Roberts is "quite a hobbyist," the architect says. All three bedrooms open directly to terraces.

TWO-STORY HOUSES: BETHESDA, MD.

The house was planned to fit gently into the woods and landscaped to emphasize the forest site. Tanbark pads and wildflowers are scattered naturally among the trees, requiring little care (the owners stressed easy upkeep for both house and grounds), but providing a very pleasant outlook from the living room.

Construction materials also reflect the character of the site. Exterior walls are fir, painted; interior walls are cedar paneling or plaster, and floors are 2¼-in. white oak strip. Framing is wood on concrete footings and brick and cinder block walls. Roof is built-up tar and gravel. The house is thermally insulated with fireproof cotton blanket, but not air conditioned. Windows are steel casement.



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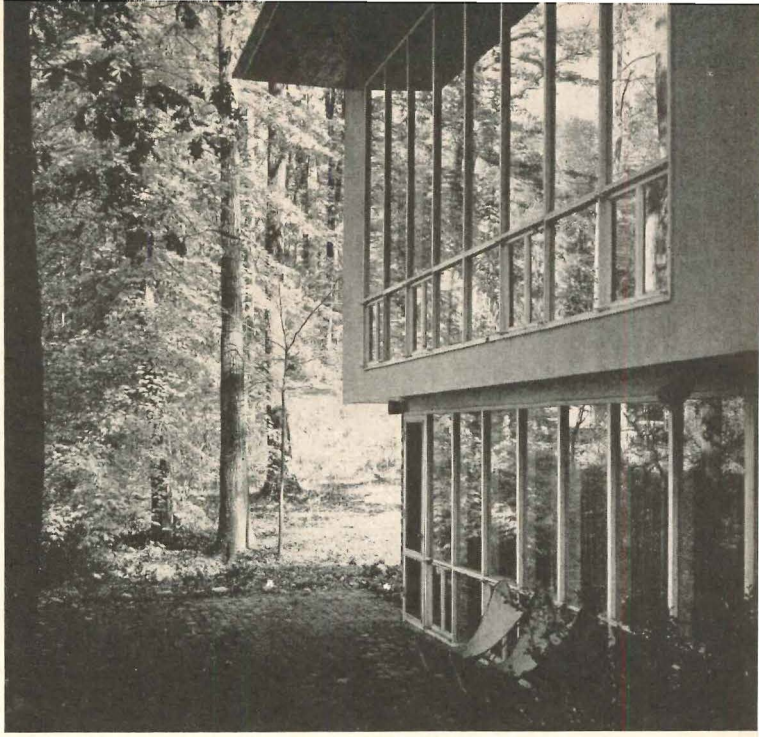
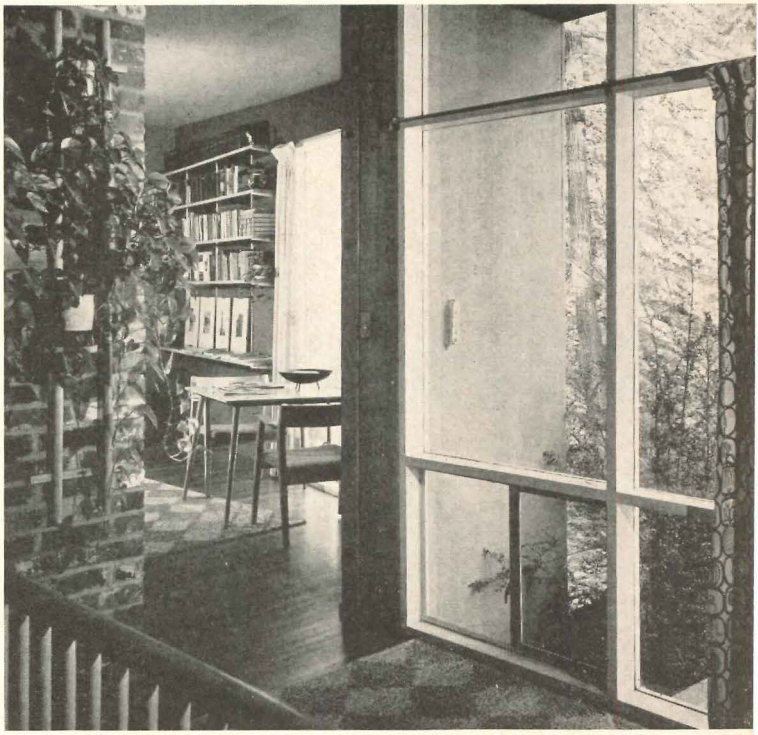
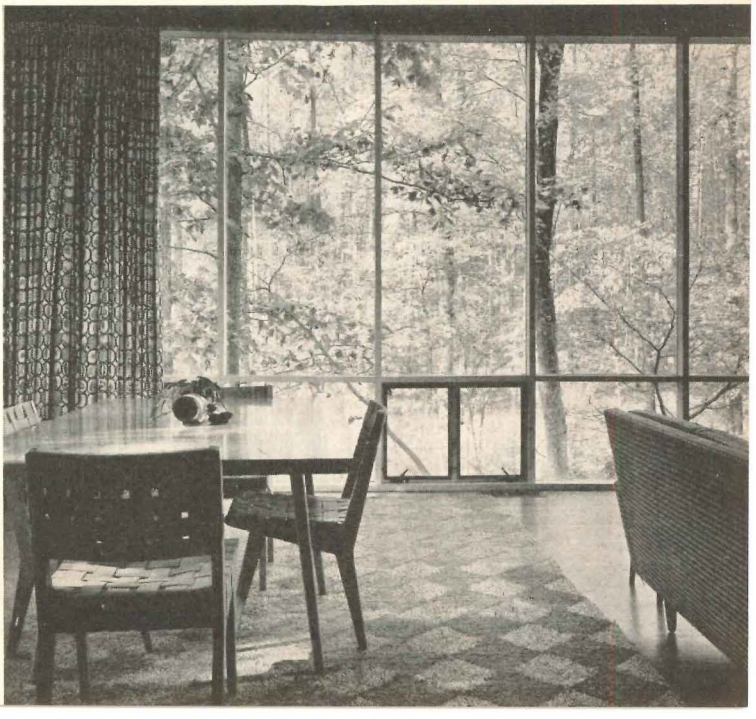






Sociology and Architecture

By Professor Charles Madge

University of Birmingham (England)

". . . architecture and sociology have to try to be 'realistic' . . . they have, I think, managed to maintain their point of view that social man includes but extends beyond economic man and that building includes but extends beyond engineering."

A paper read before the Royal Institute of British Architects and reprinted from the R.I.B.A. Journal

FIRST I SHOULD LIKE to pay homage, as a non-architect, to the profession of architecture. Other people have pointed out that the architect is both scientist and artist, and also he must be something of a politician and a man of affairs. I really believe that the architect in our time has a better chance of being a whole man than most. When other occupations are in general becoming more one-sided, architecture is becoming more many-sided. One only needs to look at the curriculum of the schools of architecture to see that this is so. You find there aesthetics and mathematics, physiology and sociology, the study of materials and structures, the practice of design and the history of design; and all this is tested against the realities of costing and that special branch of human relations which consists in the relationship between architect and client.

Architecture, I believe, is riding trimly on the crest of the wave of urban industrial civilisation and is flourishing in that civilisation at a time when institutions are ossifying and arts are wilting. I am sure this is because it is based on human many-sidedness. One might suppose that mastery of so many kinds of knowledge and skill must lead to one of two things — dilettantism or a nervous breakdown. I honestly believe that there are very few dilettanti in the profession, and, so far as I know, very few nervous breakdowns. There is on the contrary a great deal of work done and a great deal of work satisfaction. I feel fairly sure that the creative nature of the work supplies the architect with an energy that other occupations do not tap.

Among the subjects which architects are interested in is sociology. I realize something of the extent to which it has impinged on you already, both in the schools of architecture and in the professional journals. A whole generation of architects was brought up on the works of one sociologist in particular, Lewis Mumford, and especially on his book *The Culture of Cities*. The spreading out of architectural interest from churches and palaces to the urban environment as a whole has inevitably brought architects face to face with one social dilemma after another. Moreover, architects have turned to sociologists for help in these problems. I myself have had the stimulating experience of collaborative work with architects. What American sociologists would describe as the interaction that has taken place between architecture and sociology has indeed led to some disillusionment on both sides. I do not think we need to regret this, because the shedding of illusions is in general a good thing, provided always that it does not lead to a neglect of what is left after the illusions have been shed. I, too, have been disillusioned. That is why I think you can take my tribute to your profession as a genuine tribute, not based on idealisation or wishful thinking.

Cave drawing. Marching warriors. Cingle de la Mola Remigia, Spain

Architecture is concerned with many other branches of human knowledge besides sociology. And sociology is concerned with many other aspects of human activity besides architecture. Here I want to consider Sociology as a whole and Architecture as a whole and to see what they may have in common. This I think, will be less tedious than a detailed survey of sociological information, or of methods for getting information that might be useful to an architect.

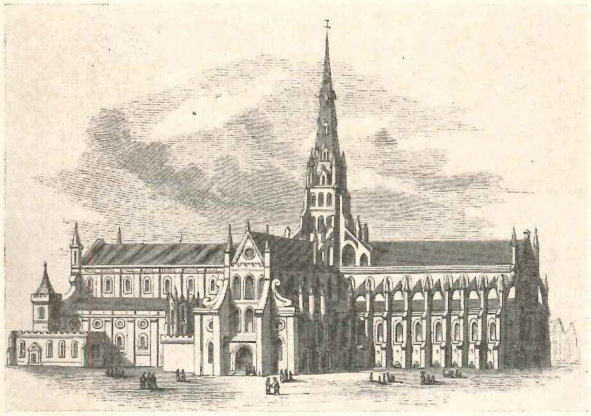
The word 'sociology' was first coined something more than a hundred years ago by Auguste Comte. His conception of society is summed up in a sentence from Pascal which he quoted as a motto: "The whole succession of men, during the long series of ages, should be considered as One Man, who continues to live and who continually learns." This is reminiscent of a phrase in a book by Marx about "the activity of a whole series of generations, each one standing on the shoulders of those preceding it." Within this vivid image of social continuity there lurks another, that of society as a building. In the same way, the Christian Church is visualised both as a lofty cathedral and as the body of the elect. In the sociological writing of our own time the images of structure, framework and pattern are constantly being invoked. One might almost say that sociologists are trying to discover the architecture of society.

Society is, of course, an odd sort of building in that it is constantly being rebuilt. It is always possible that it stands on the site of other buildings which have disappeared. It certainly incorporates old materials put to new uses, and its construction represents a continuous compromise between past and present needs. It is, however, to my mind essential to consider it as a unity both in space and time: as the combined and cumulative performance of the human species during its history. To quote Aristotle, whom I would call the real originator of sociology as of so much else: "Just as in discussing a house, it is the whole figure and form of the house which concerns us, not merely the bricks and mortar and timber; so in natural science (he could have said, also in social science), it is the composite thing, the thing as a whole, which primarily concerns us, not the materials of it, which are not found apart from the thing itself whose materials they are."

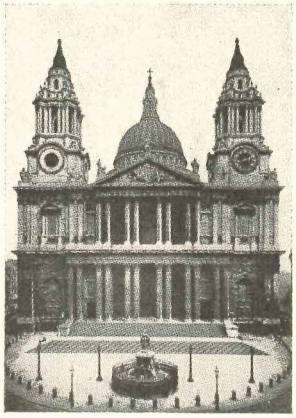
Although Aristotle is here emphasising the importance of the whole, these words are from the introduction to his biological treatise, *De Partibus Animalium*, on the parts of animals. He is really telling us that unless we are prepared to make a patient study of details, that is to say of separate parts and their interrelations, we shall never rise to a proper conception of wholes. He is in fact advocating the scientific attitude, and some words from this passage are quoted with approval by Robert Boyle in his book *Of the Usefulnesse of Natural Philosophy*. I must not get too caught up with Aristotle, but I cannot resist recalling to you the story which he tells at this point in order to emphasise that nothing is too mean or lowly for science to investigate: how some visitors once wished to meet Heracleitus, the early Greek philosopher, and when they came to call and saw him in the kitchen, warming himself at the stove, they hesitated; but Heracleitus said, "Come in; don't be afraid; there are gods even here."

Both sociologists and architects must be prepared to find gods in kitchens, and indeed a kitchen would make a good mutual rendezvous. A sociologist, or an architect, who considers such an area as unworthy is, I would suggest, not to be trusted with the larger and grander tasks. There is indeed one view of the function of sociology which regards it, in the words of Karl Popper, as being no more than "piece-meal social engineering." Anything more ambitious is regarded as dangerous to individual rights and the open society. I do not agree with this; I think that the sociologist should have large views and should start from a sense of history and historical movement. This need not involve the vices of what has been labelled as "historicism," or a belief that certain trends in the past must inevitably be projected into the future. There is nothing inevitable where human destinies are concerned. But we must surely be capable of rising above the mass of piecemeal detail, of seeing beyond our noses, of seeing both the wood and the trees. I feel that many architects will understand what I mean when I say that what we most need nowadays is people who have genuinely large views and also a genuine feeling for detail, which means a first-hand experience in as many different contexts as possible.

The important thing here is an adequate time-scale. I claim no originality in pointing out that while the history of mankind is thought to date from between 500,000 and 250,000 years ago, settled agriculture probably dates from only 10,000 years ago, the earliest towns from 5000 or 6000 years ago, and the industrial type of town which now dominates the scene only dates from about 250 years ago. Reverting to the metaphor of society as a building composed of generations standing on one another's shoulders, this means that the industrial turret in which we stand is at most about one-thousandth part of the whole, measured on a time-scale. At the same time, we must also remember the extraordinary increase in the total population of the world during these past 250 years, and also that it is only during that time that all the areas and peoples of the world have become an interdependent whole. It is this last one-thousandth part of human history which dominates us; and its dominant feature is industry.



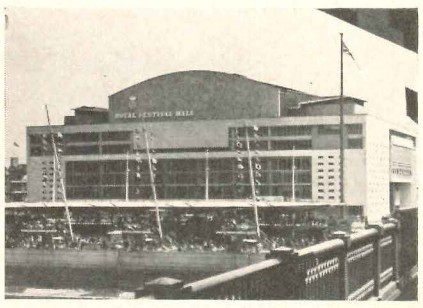
"When the old St. Paul's Cathedral was destroyed . . .



. . . a splendid but quite different kind of building took its place . . .

British Information Services

. . . But no one, I think, wants to pull down Westminster Abbey . . .



British Information Services

. . . and replace that by a building in the style of the Festival Hall."

Our great industrial achievement is based on economics and engineering. These involve what is sometimes called a "realistic" approach to the environment and its problems. A realistic approach is, as a rule, a simplified approach. *Realpolitik* is a form of politics which considers certain kinds of force as more real than others. Economics in practice considers certain kinds of good as more real than others. Engineering in practice considers certain kinds of function as more real than others. To sociologists and architects, reality is considerably more comprehensive, though we do well to recognize the potency of economic forces and of their ally, the engineer. Indeed architecture and sociology have to try to be "realistic" in order to make their way in the present century. As a result they have, I think, managed to maintain their point of view that social man includes but extends beyond economic man and that building includes but extends beyond engineering.

I want to contrast what I consider a right view and a wrong view about the changing standards and values of human history. I can illustrate this either sociologically or architecturally. In architectural history, tastes have changed so that, for instance, at a certain stage of development gothic architecture was no longer esteemed and its place was taken by classical and baroque. When the old St. Paul's Cathedral was destroyed, a splendid but quite different kind of building took its place. But no one, I think, wants deliberately to pull down Westminster Abbey and replace that by a building in the style of the Festival Hall. That must be because the aesthetic and moral conceptions of the builders of Westminster Abbey have significance for us alongside of those of the architects of St. Paul's and the Festival Hall. In the same way we inherit from the Middle Ages the feudal values of nobility, gentleness and honour. We do not want to construct any more feudal systems, but some of the values that arose from them have an endurance beyond the power-structures of the past.

I say, some of the values. We can no more accept the past as a whole than we can reject it as a whole. We are constantly struggling to escape from the past, and I am of one mind with those who view with horror the insidious infiltration of false imitations of the past into the present. In sociology, this can be defined as snobbery; in architecture it is the fake antique.

We all recognise that in some ways children are more attractive than adults. They impress us as more spontaneous, affectionate and imaginative. The innocence of the young has seemed more striking as civilisation has become more hard-boiled and chromium-plated. These values of spontaneity and innocence we select from others less appealing. It is possible to see, for example,

Jade water buffalo. Chinese, 10th c. Courtesy Metropolitan Museum of Ar

in the child the unmitigated effects of original sin; destructiveness, aggressiveness, self-centeredness, unlimited greed. Yet the balance which happy children reach between good and bad has a simplicity which adult compromises lack. In the same way, it seems to me most probable that mankind reached its happiest stage of balance when the first miseries of the fight with nature were overcome and before human groups had begun struggling among themselves for wealth and power. What I have seen of tribal villages in India and peasant villages in Siam has confirmed this idea of mine that there really was once a golden age of primitive felicity. But I am also sure that this was no natural state of affairs: it represented an early victory over nature, both physical nature and human nature. This early victory was not permanent, and mankind has had to renew the fight again and again, every time on a new plane of complexity.

We cannot revert to the first golden age of agriculture, any more than we can avoid the process of growing up. We have to accept those two great social and technical inventions, the town and the factory, which together have so rapidly changed the world and made it what it now is.

What, then, are the right view and the wrong view about our changing values? The wrong view, I am suggesting, can take the form either of iconoclasm or of snobbery: essentially it consists in a failure to distinguish the values themselves from the conditions which generated them. The only conditions that are relevant to us are our own conditions. But many values which arose under quite other conditions have an independent and autonomous meaning for us. So in order to have a right view about the past we have a double task. First, we have to understand and appreciate our own conditions. And second, we have to recognize and perhaps reinterpret those parts of our heritage from the past which have a persisting value.

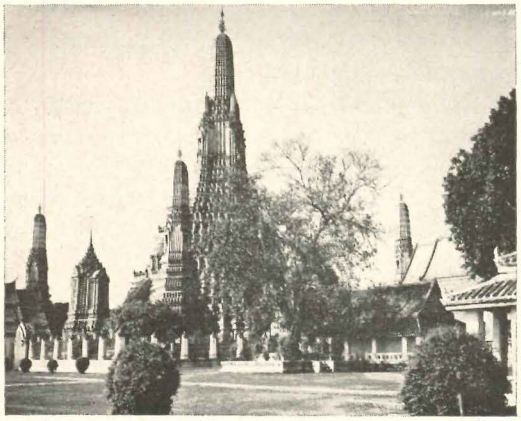
In terms of architecture this means, of course, that while our own architectural style should fit the conditions of our own time, yet structures built under other conditions may still speak to us in a language which we can poignantly understand, without necessarily believing it to be timeless or eternal or outside this world altogether in the Platonic sense.

The conditions under which we live, economic, technological, political, are changing fast and the change has every appearance of being uni-directional and irreversible. In a sense, technology, or the power of man over physical nature, is at the root of all of this. In Marxist terms, the forces of production produce the social relations of production and these in turn produce beliefs and ideologies. But changes in social relations are slower than changes in technology, and changes in belief are slower still. These are like a series of cogwheels each larger, and therefore revolving more slowly, than the last. I believe myself that there is a sense in which social and political change depends on technical and economic change and that changes in ideas, especially in moral and social attitudes, depend in their turn on the social and political trend. Like most sociologists I accept the view of Max Weber that most important systems of ideas have their own autonomous development. The degree of autonomy may vary. In the case of aesthetic styles and in all questions of taste, I believe the degree of autonomy to be very high — which does not preclude, of course, all sorts of interesting connections between aesthetic developments and other contemporaneous developments.

If the arts did not have an autonomous value, how is it that we can be moved by productions as far removed in time as those of the Stone Age, as far removed in space as those of China and Japan? The impression is instantaneous, even though it may take us time and patience to learn the language fully. . . .

But there are some immense problems here, enough to daunt the most determined optimist. These largely centre, I would like to submit, on a new and peculiar relation between the rate of socio-technical change and the life of buildings. The development of industry and the growth of population compel the expansion of cities and communications. But industry is restless, forever changing its location, its processes, its products. The claims of industry are insistent, they trample down other claims, even the claims of humanity and piety. It is only later, when economic imperatives have receded, that we take in the extent of the damage. It is only now that we appreciate the problem bequeathed to us by the crude multiplication of factories, and of the people to work in them, and of the houses for the people to live in. To take housing alone, it is a need we have never caught up with, a need therefore so compelling that we are still meeting it in ways which we know by experience to be wrong — like the great postwar housing estates round London for example — and which are only aggravating the problems we already have on our hands.

Ever since the industrial revolution set a new tempo for urban growth and social change, we have been working under heavy pressure, trying to combine the development of new technical possibilities with the rectification of past mistakes. Our record is a patchwork of success and failure, but looking at the contemporary urban landscape as a whole, who can doubt that failure is more conspicuous than success? Never before have so



Ewing Galloway

"In every Siamese village there is a space set apart for the Buddhist religion. It is called a Wat . . ."

many buildings been erected; never before have so few deserved to survive.

The cheap houses of 70 or 80 years ago were so shoddily built that already many have collapsed and more go down in every gale. Nobody wants to keep them standing and therefore over great areas, as in Birmingham, reconstruction schemes are in progress. But a great deal of Birmingham is, alas, all too solidly built for any idea of replacement to be feasible. In our great cities we must reconcile ourselves to living for generations with these crude and inconvenient monuments to the vigour of economic forces. And, incidentally, while the Londoner has pre-industrial buildings to remind him of pre-industrial values, in many industrial cities these either never existed or have disappeared.

The architect, after a century of uncertainty, seems to have developed a language which is both beautiful and functional. His best buildings do much to redeem the mediocrity of the urban environment as a whole. Nor can one doubt that this language will be intelligible in future generations, even if these generations themselves are building in quite a different way. But there is still a problem about the life of buildings, and of all kinds of construction, including railways and roadways and airfields and all those miles of service pipes and wires which, once laid down, are so expensive to reroute that they have to be accepted as virtually inflexible elements in planning.

In a crowded country like Britain there is all too little room for manoeuvre. Yet technical inventions in the near future may make today's construction as obsolete as yesterday's. Can we devise an architecture and a method of town planning which is better adjusted to an era of rapid change? Can we contrive structures which will be temporary without being shoddy? Can we reconcile the idea of structural transience with lasting aesthetic significance? These are some of the questions to be explored, and there are, of course, some architects already exploring them. But the idea of permanence in building is itself strongly established, and is likely to outlast its own functional justification.

In every Siamese village there is a space set apart for the Buddhist religion. It is called the Wat. It has a surface of swept sand, it is planted with trees for shade and fruit and it contains a number of buildings, often very beautiful in design and decoration. Here the statues of the Buddha are kept, here the monks live and here the people come to hear them preach. Few of these buildings are as much as even a hundred years old. They are built of brick, plaster and wood but not for permanence. Until quite recently, there were craftsmen in every village who were able to replace the decaying

Arita porcelain plate (Kakiemon style). Japan, ancient

buildings by others at least as beautiful. Now the traditional skill is waning: the new temples are both more permanent and less beautiful than the old. This is a case where the continuity of an aesthetic tradition is more important than the life of any particular building. And more important still is the continuity of the Buddhist religion, which the aesthetic tradition has grown up to serve.

This brief excursion to Siam — which you must excuse because I have recently returned from spending a year there which I very much enjoyed — brings me back to sociology. I have so far avoided a definition of that somewhat contentious word, but for my present purpose I think I would define it as the study of those elements in human society that are persistent and recurrent. You may call such elements associations, or social institutions, or systems of social interaction, or the social relations of production. They range from the family to the R.I.B.A., from the Church of England to the darts club. Their membership may change but they remain, and their activities are in part controlled by written and unwritten laws and customs. It is their continuity which has made possible the development of separate societies over time, and the evolution of the Great Society as a whole.

These associations require a space within which to operate and normally this space includes a building or buildings. Sharing a space in common is often the basis of an association. By obtaining a space or a building or both for its activities, an association helps to insure its continuity. This is clearly the case in the examples I chose, in a club or a Church, in a professional association like the R.I.B.A. or in any ordinary family. Of course it is possible for an association to move to a new space or building, but while it is in occupation the physical milieu does substantiate its claim to corporate existence. A family without a home is like a professional body with only an accommodation address: it has not fully arrived. I understand that there are many families in council flats which are in a hurry to augment themselves so as to become eligible for a council house and thus achieve full family status. No doubt there are associations which are searching both for members and for premises, and for whom to have the one is helpful in getting the other. Thus deeply are associations and locations entangled, and this indicates an important part of the common ground between sociology and architecture.

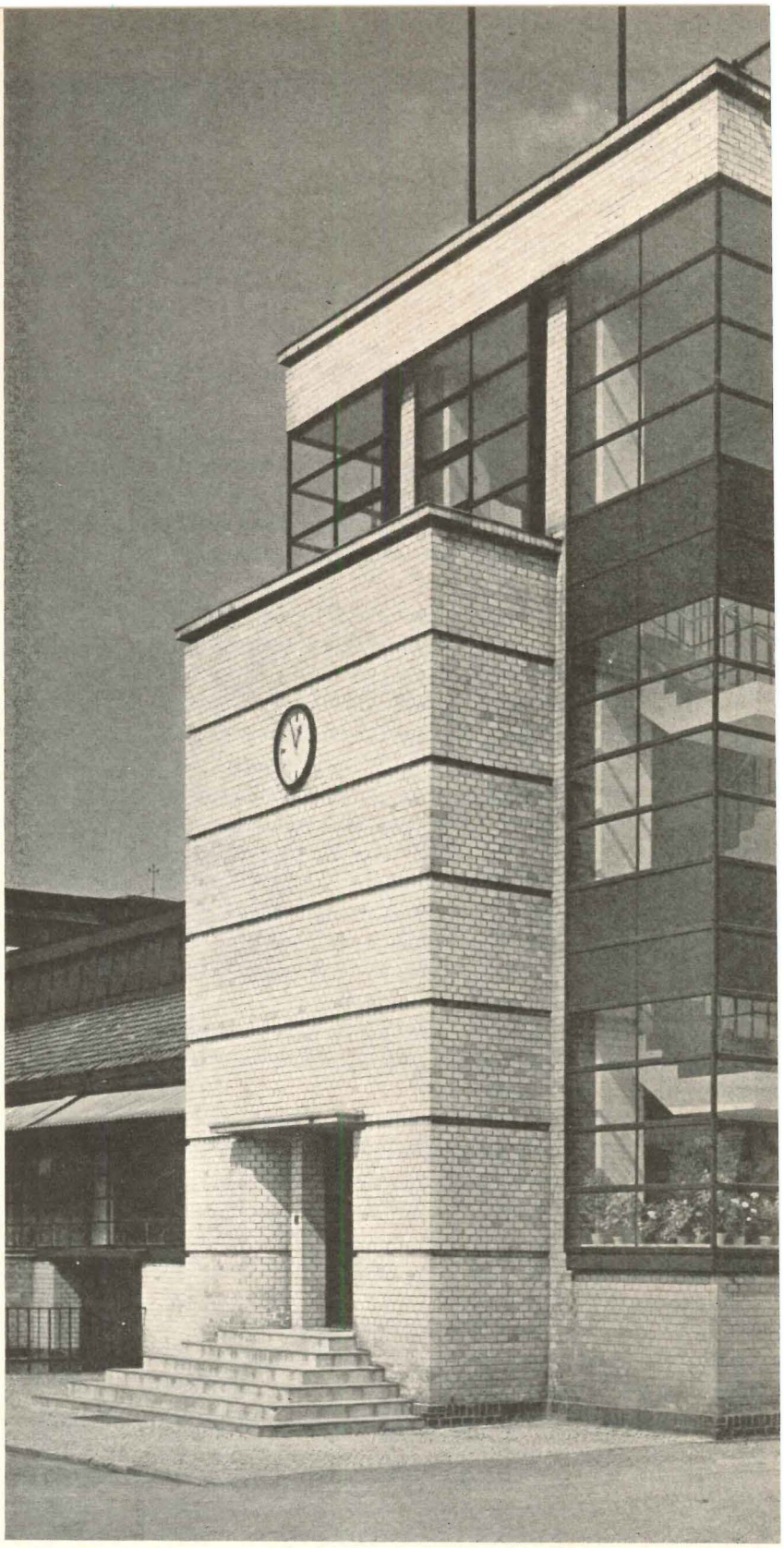
I agree with those who oppose the separation in the contemporary mind between science and art, as I do the lead of my Cambridge teacher, I. A. Richards, to whose splendid essay, "Science and Poetry," I would refer anyone who is interested. I am also inclined to think that sociology has more in common with literature and the arts than any other science and that architecture has more in common with the sciences than any other art. However in the interests of clarity and logic we must distinguish the function of sociology, which is primarily the study of society, and the function of architecture, which is primarily the design, construction and maintenance of buildings. The discipline which for architects would be exactly parallel in function with sociology would consist in a combination of building research, archaeology, art history and architectural criticism: in other words, the assessment of buildings, past, present and future, in all their aspects. There are of course many people whose job it is to design, construct and maintain associations, but in carrying out this job they are not sociologists: they are club leaders, businessmen, politicians, priests and parents, among a host of others. The distinction I am making, you see, is between those who carry out projects and those who assess results and possibilities. Of course in practice the distinction becomes a little blurred. Most architects must at times be critics and researchers in their field, as well as practitioners. Sociologists find themselves at times called upon to legislate and administer. It is worth mentioning that Auguste Comte himself, when he invented the word sociology, really believed in a world virtually ruled by sociologists, and in Marxist Russia the same idea is given another twist by simply giving to Soviet leaders the title of sociologist.

I do not take this position. I would see the task of sociology as one of social observation and criticism, of bringing unknown or neglected social facts to light and of clarifying influential social concepts. To carry out this task, a degree of non-involvement is to my mind essential, and I do not see therefore how, at the present stage of history, a sociologist can at the same time be a politician. The most he can do is to help to inform and enlighten both the politician and the public, and thus reduce the confusion of aims and, incidentally, check up on the results of intended reforms. For example, I am sure it is the province of the sociologist to check up on such things as national housing policy, and the dispersion of industry and population. Here again his interest overlaps with that of the architect.

Of the two, the architect has the more complete and to my mind the more satisfying role, in that he not only studies a given situation but is active in devising means to meet it. Of the sociologist the best that can be said is that in the long run he may aid those forces which are likely to make politicians more creative, more scientific, in short, more like architects.

On April 10 Walter Gropius will receive in London the Royal Gold Medal for 1956 of the Royal Institute of British Architects following its award by Her Majesty Queen Elizabeth II on the unanimous recommendation of the Council of that Institute.

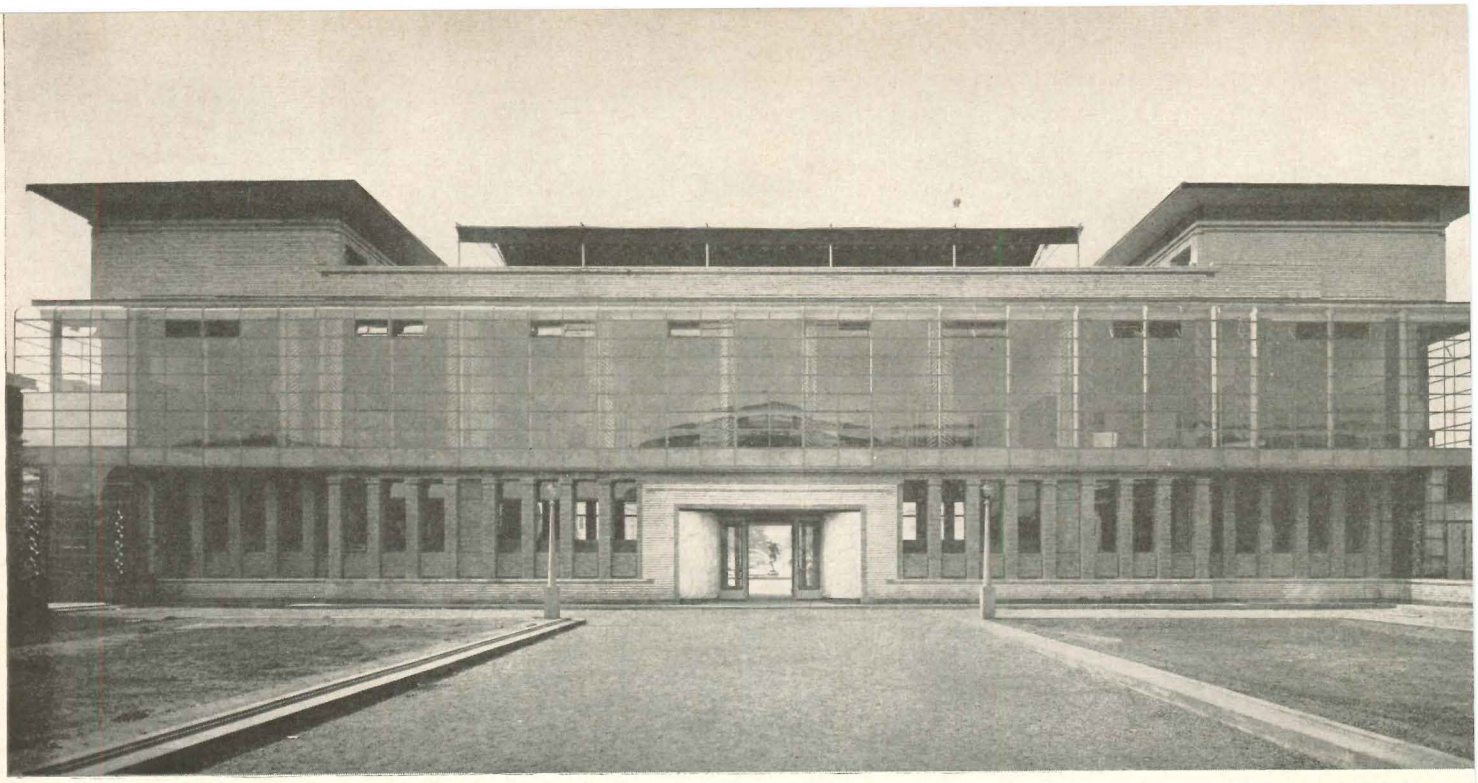
At the request of Architectural Record, Professor Gropius has selected from his outstanding work seven especially significant buildings and projects which we are honored to present here together with a stimulating statement on the architectural state of the nation from a truly pioneer architect and educator.



1911-12

WALTER GROPIUS

1911–12 *Shoe Last Factory, Karl Benscheidt, Alfeld, A. L. Built 1911–12, photographed 1954. Walter Gropius with Adolf Meyer*



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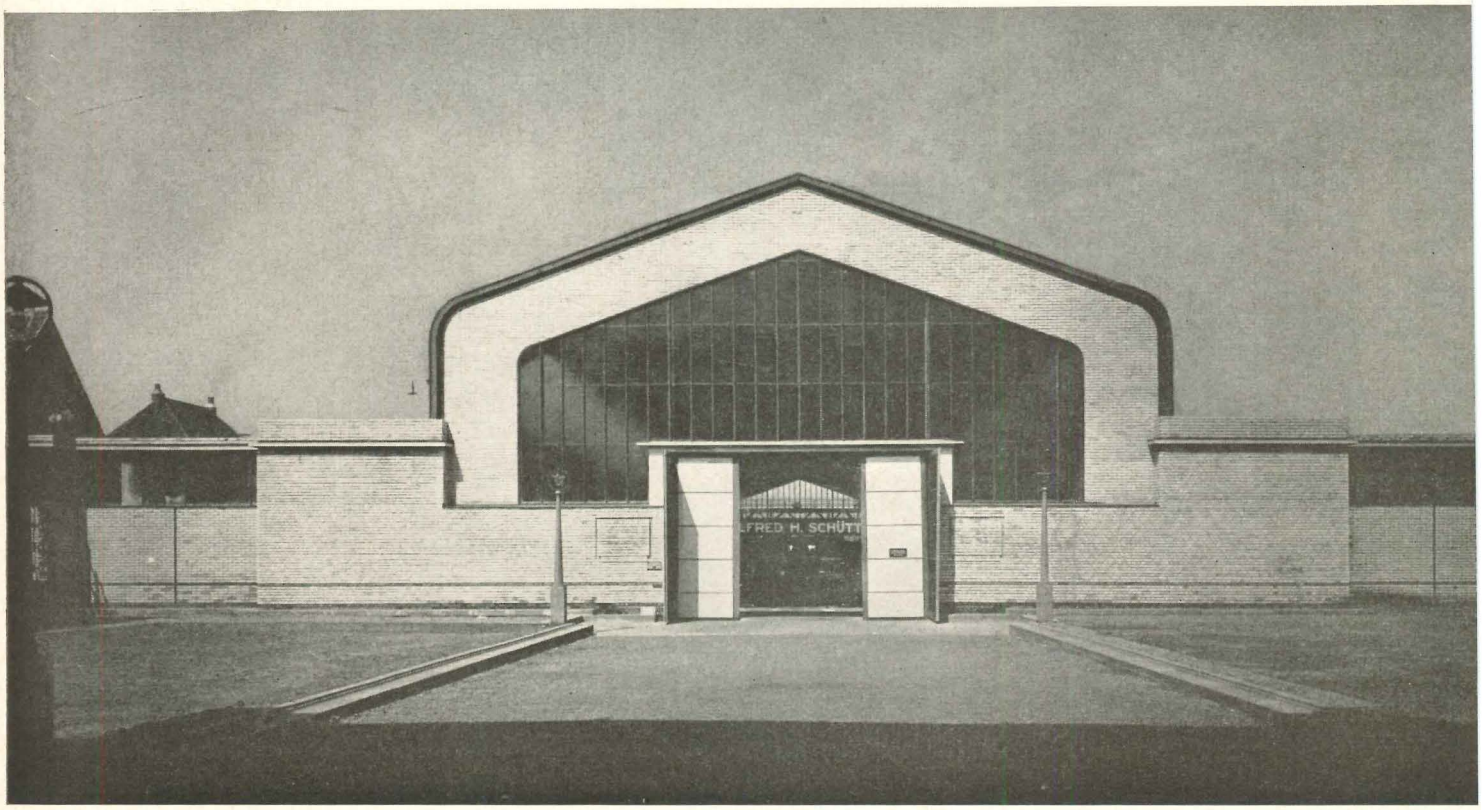


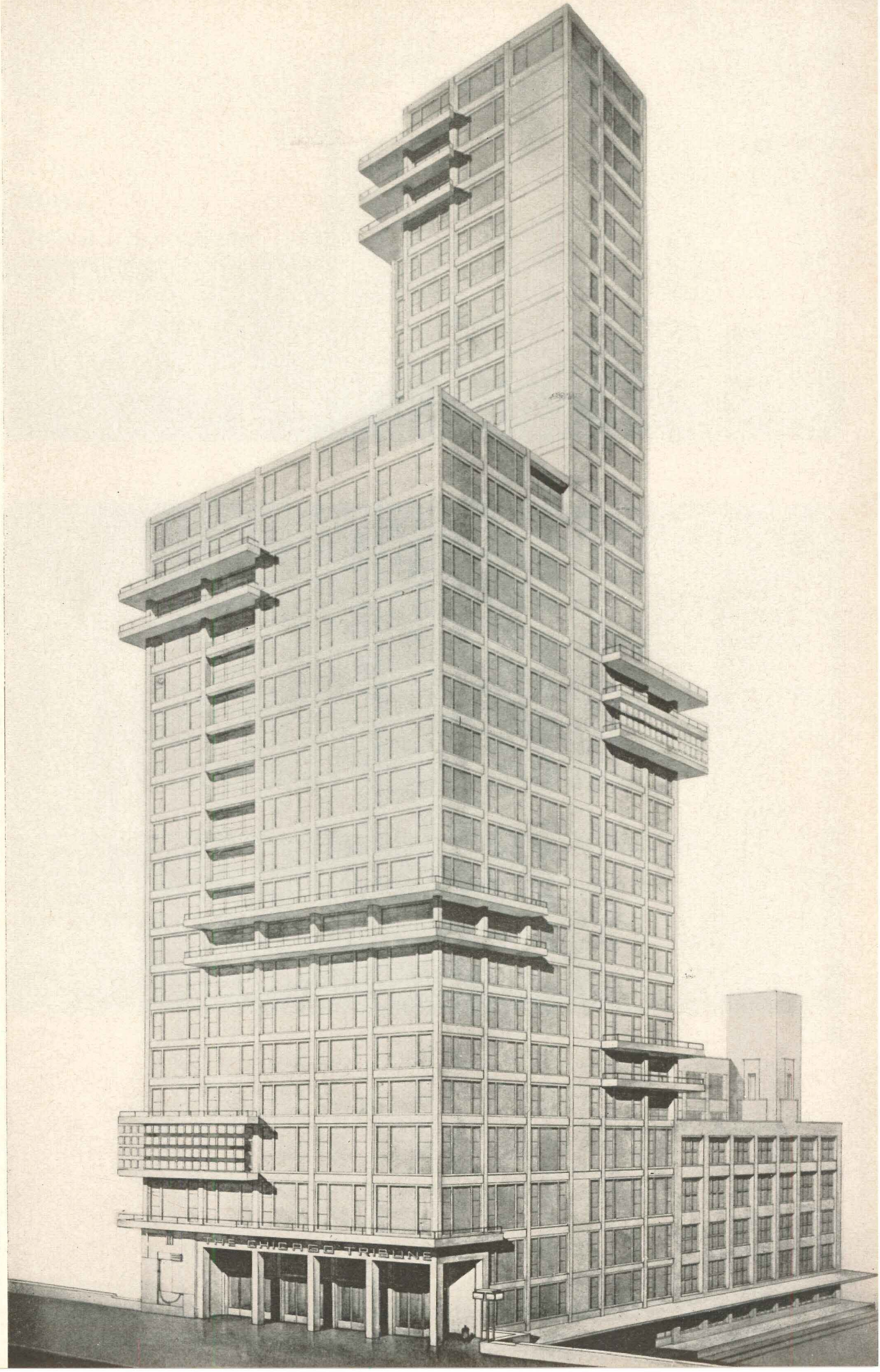
1914

H. Schmolz

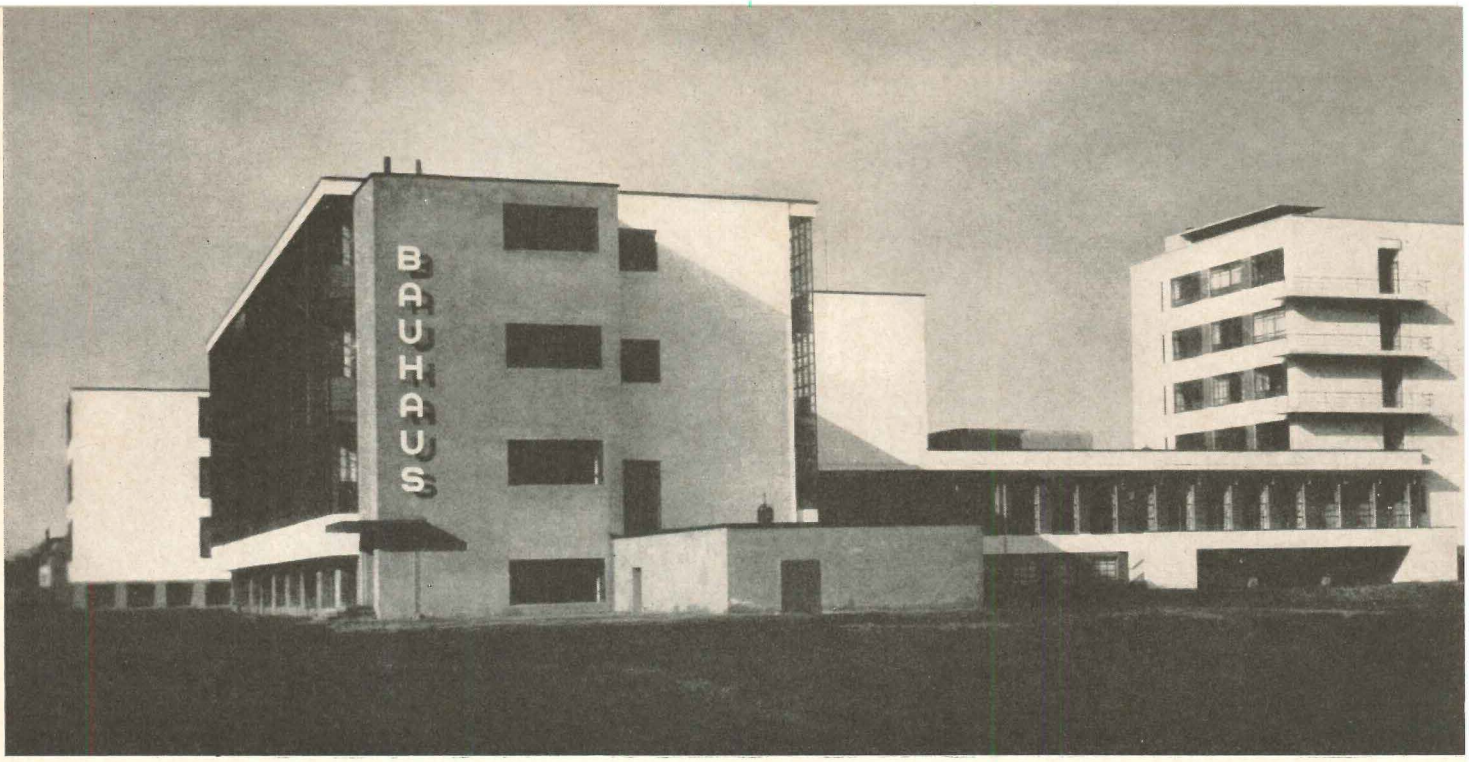
WALTER GROPIUS:

1914 Upper: Office Building at the Werkbund Exhibition, Cologne. Lower: Machine Hall opposite the Office Building at the same exhibition. Both buildings by Walter Gropius with Adolf Meyer

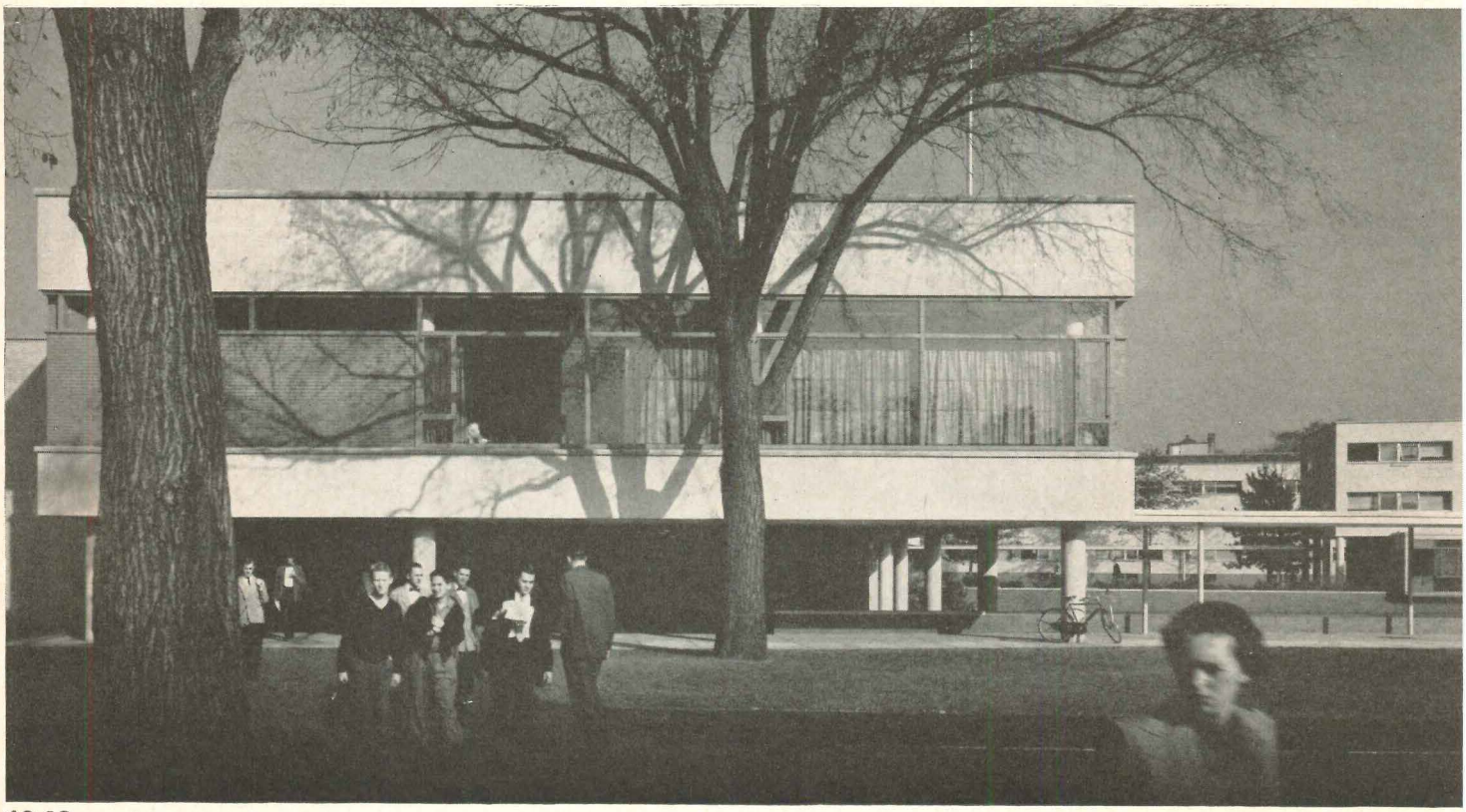
1922 Design for the Chicago Tribune Tower



1922



1924-25



1949

Robert Damora

WALTER GROPIUS:

1953

Robert D. Harvey

1924–25 Bauhaus Building, Dessau

1949 Harvard Graduate Center, Harkness Commons Building. The Architects Collaborative

1953 Office Building, McCormick Estate, Chicago, designed 1953. The Architects Collaborative; Arthur Myhrum, Associate

WALTER GROPIUS:

ARCHITECTURAL RECORD has asked me to state both what troubles me most and what pleases me most in the status of architecture in the United States.

In the May issue of 1937 shortly after I had entered this, my adopted country, for good, ARCHITECTURAL RECORD published a statement about my general intentions as newly-appointed Harvard Professor of Architecture. I emphasized that "it should be our highest aim to produce a type of architect who is able to visualize an *entity* rather than let himself get absorbed into the narrow channels of specialization . . . to make way for the man of vision."

Have we made any progress towards this goal? Indeed we have. During the last twenty years, a young American generation of talented architects has come to the fore — among them, I am proud to say, many of my own former students — whose achievements show definite signs of a growing coherence and kinship of the American architectural idiom. Comparing publications on European architecture with those on American design, the latter stands out in its generally more direct, fresh and flexible solutions, less inhibited, less tempered by prejudice. In a country that is blessed with abundance, an enviable array of technical means offers opportunities for daring experiments, and this challenge has been enthusiastically met.

What a contrast to the early days when we struggled with the first letters of the new architectural alphabet, hemmed in on all sides by colossal prejudices and barely able to surmount the technical difficulties that beset all attempts at creating new, unprecedented forms for living. We were lonely fighters with insufficient equipment, with uncertain allies, and practical demonstrations of our ideas were few and far between.

Now, when a new generation is able to use the architectural language of the twentieth century as a matter of course, when prejudice has died down and a building program is in progress that supersedes any expectation, we architects find ourselves still at a fair distance from our desired goal: the transformation of our chaotic, profusely growing surroundings into a pattern of organic entity and visual bliss. For such a desire has hardly taken root yet within our American population as a whole; we are still without their response and encouragement. We are still in danger of losing control over the vehicle of progress which our time has created. The misuse of the machine tends to flatten the mind, leveling off individual diversity and independence of thought and action. But diversity is, after all, the very source of true democracy! But factors of expediency, like high-pressure salesmanship and money-making as an end in itself, have impaired the individual's capacity to seek and understand the deeper potentialities of life from which the culture of a nation develops. Our sense of neighborly integration, our love of beauty as a basic life requirement, are underdeveloped. We need, on the one hand, distinct diversity of minds resulting from intensive individual performance, and, on the other, a common idiom of regional expression springing from the cumulative experience of successive generations who gradually weed out the superfluous and the merely arbitrary from the essential and typical. Such a voluntary selective process, far from producing dull uniformity, should give many individuals a chance to contribute their own individual variation of a common theme and so help to evolve again the integrated pattern for living that we lost with the advent of the machine age. The two opposites — individual variety, and a common denominator expressed by creating form symbols of human fellowship — need to be reconciled to each other. The degree of success in shaping and fusing these opposites indicates the depth of culture reached and is the very yardstick for judging the architectural achievements of a period.

Our scientific age of specialization, with its glorious achievements for our physical life, has simultaneously brought about confusion and a general dissolution of context; it has resulted in shrinking and fragmentizing life.

But there are indications that we are slowly moving away from overspecialization and its perilous atomizing effect on the social coherence of the community. Many ideas and discoveries of our present civilization are wholly concerned with finding again the relationship between the phenomena of the universe, which scientists had so far viewed only in isolation from neighboring fields. The scientist has contributed new knowledge of the identity of matter and energy. The artist, the architect, has learned to express visibly with inert materials a new dimension — time and motion. Are we on the way to regaining a comprehensive vision of the oneness of the world which we had let disintegrate? In the gigantic task of its reunification, the architect and planner will have to play a big role. He must be well trained not ever to lose a total vision in spite of the wealth of specialized knowledge which he has to absorb and integrate. He must comprehend land, nature, man and his art as one great entity. In our mechanized society, we should patiently emphasize that we are still a world of men, that man in his natural environment must be the focus of all planning and building.

If we, the architects and planners, envisage the strategic goal of our profession in its vast complexity, it indeed embraces the civilized life of man in all its major aspects: the destiny of the land, the forests, the water, the cities and the countryside; the knowledge of man through biology, sociology and psychology; law, government and economics, art, architecture and engineering. As all are interdependent, we cannot consider them separately in compartments. Their connectedness, directed toward a cultural entity, is undoubtedly of greater importance for success in planning our environment than finding ever-so-perfect practical solutions for limited objectives. If we agree on this rank of order, then the emphasis must be on the "composite mind," as we may call it, developed through a process of continuous cross-checking and balancing, rather than on the specialized expert who shuns responsibility for the whole and divides his brain into tight compartments.

To rebalance our life and to humanize the impact of the machine, we must give the creative architect, the artist, his chance to reassert himself as the prototype of "whole man." As soon as the longing for "total architecture," as I like to call it, becomes more universal, there will grow a demand for "experiments in living," for courageous practical attempts to examine the living value of our building and planning habits by setting up organic model communities where our new living standards can be tested and demonstrated. As soon as the average American, with his innate enthusiasm and readiness to act, will feel the need for a more beautiful and more organically coherent environment as an expression of his pride and participation in our democracy, then he may cause a chain reaction conducive to solving our great and complicated task, to have both, unity and diversity, the two indispensable components of a cultural order.

Walter Gropius

WEST COAST ADVERTISING AGENCY HEADQUARTERS

Roger Sturtevant

Honig-Cooper Advertising Agency, San Francisco, Cal.

Architects: Anshen & Allen

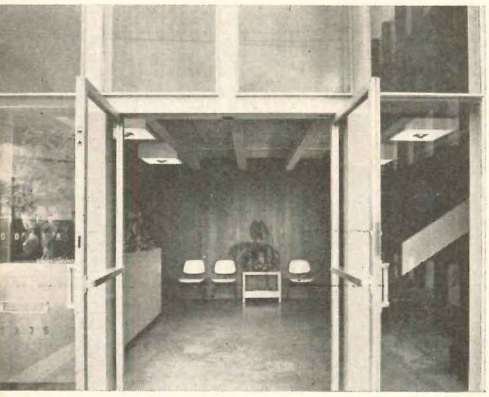
Landscape Architect: Thomas Church

Structural Engineer: Robert Dewell

Electrical & Mechanical Engineers: Earl & Gropp

Contractor: J. L. Eichler & Sons

IN ADDITION to its striking appearance, this new office building holds interest for its structure and plan. The exterior design plays the smooth white of the porcelain enamel panels and the transparency of glass against the grained darkness of the stained redwood columns and boarding to good effect. This combination sheathes a wooden post, beam and plank structure resting on concrete piles and grade beams. Structure, fenestration and lighting are organized on a 3 ft module; cross-partitions are non-structural. Such a scheme has resulted in great flexibility of office rearrangement to take care of future needs as they might arise.



Roger Sturtevant

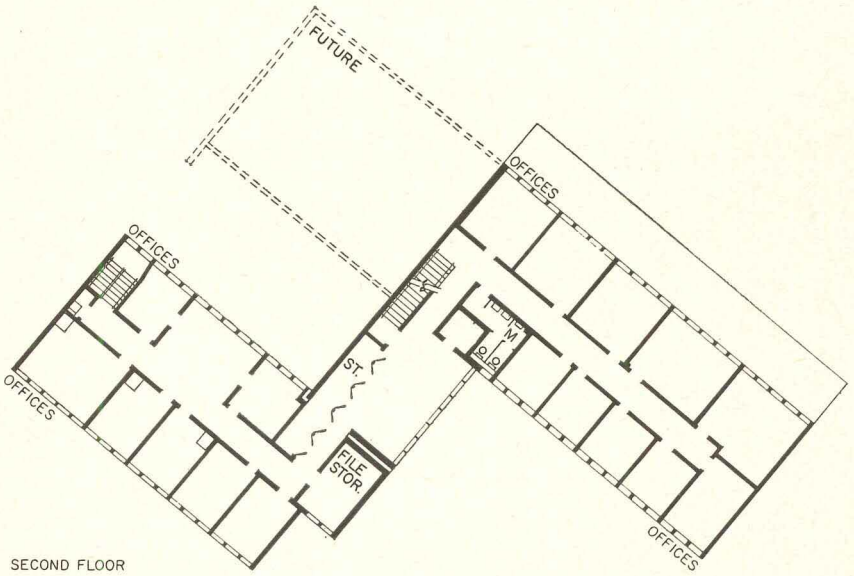
ADVERTISING AGENCY

Architects Anshen and Allen say:

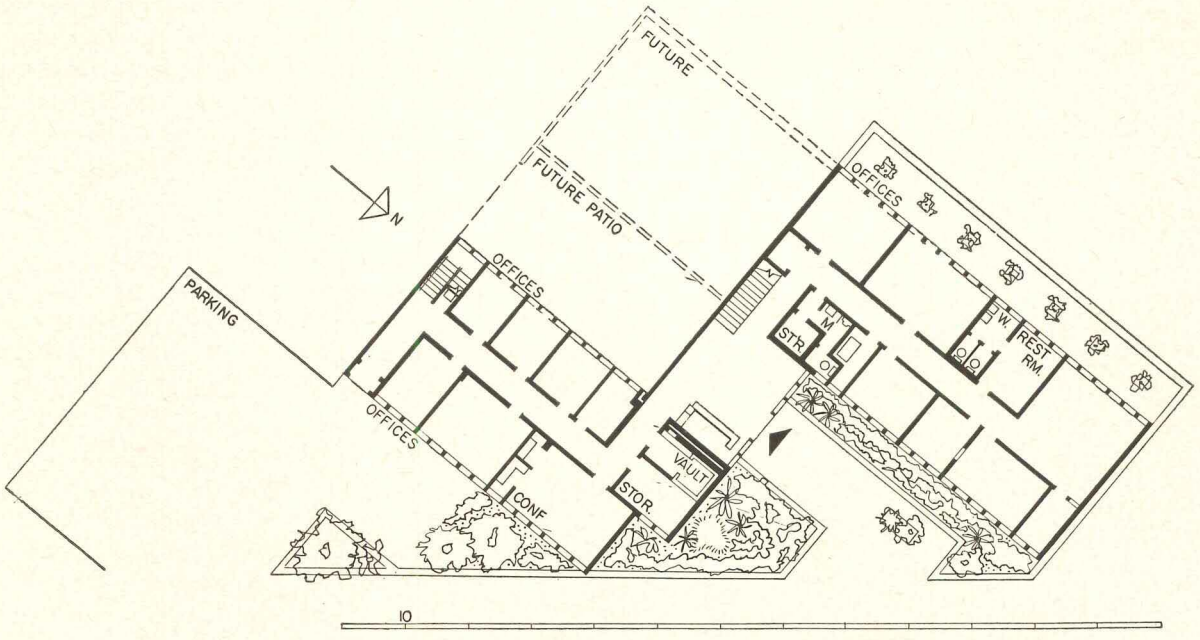
"The search for a most advantageous use of the extremely irregular site was a major factor in the development of the design. Shabby adjacent buildings gave landscaping great importance in creating a screen and a proper environment for the building. The poplar trees on the west façade are also used as a sun screen.

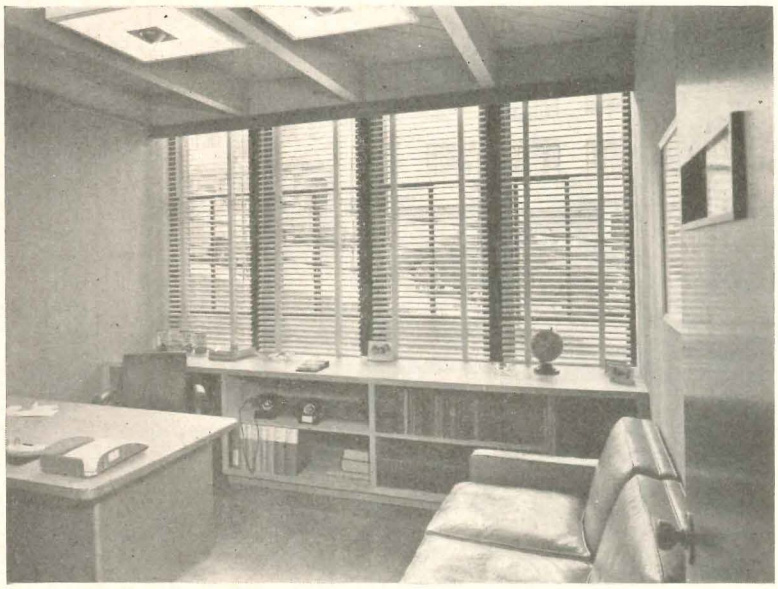
"Although the building was engineered to take a full third floor, investigation of various design schemes indicated that the addition of a new three-story wing would provide more office space at less expense with the least disturbance to existing facilities.

"The new wing will provide 16 offices including a new executive office on the ground floor opening on the patio. A side exit is included as a convenience to clients parking along the rear."



SECOND FLOOR





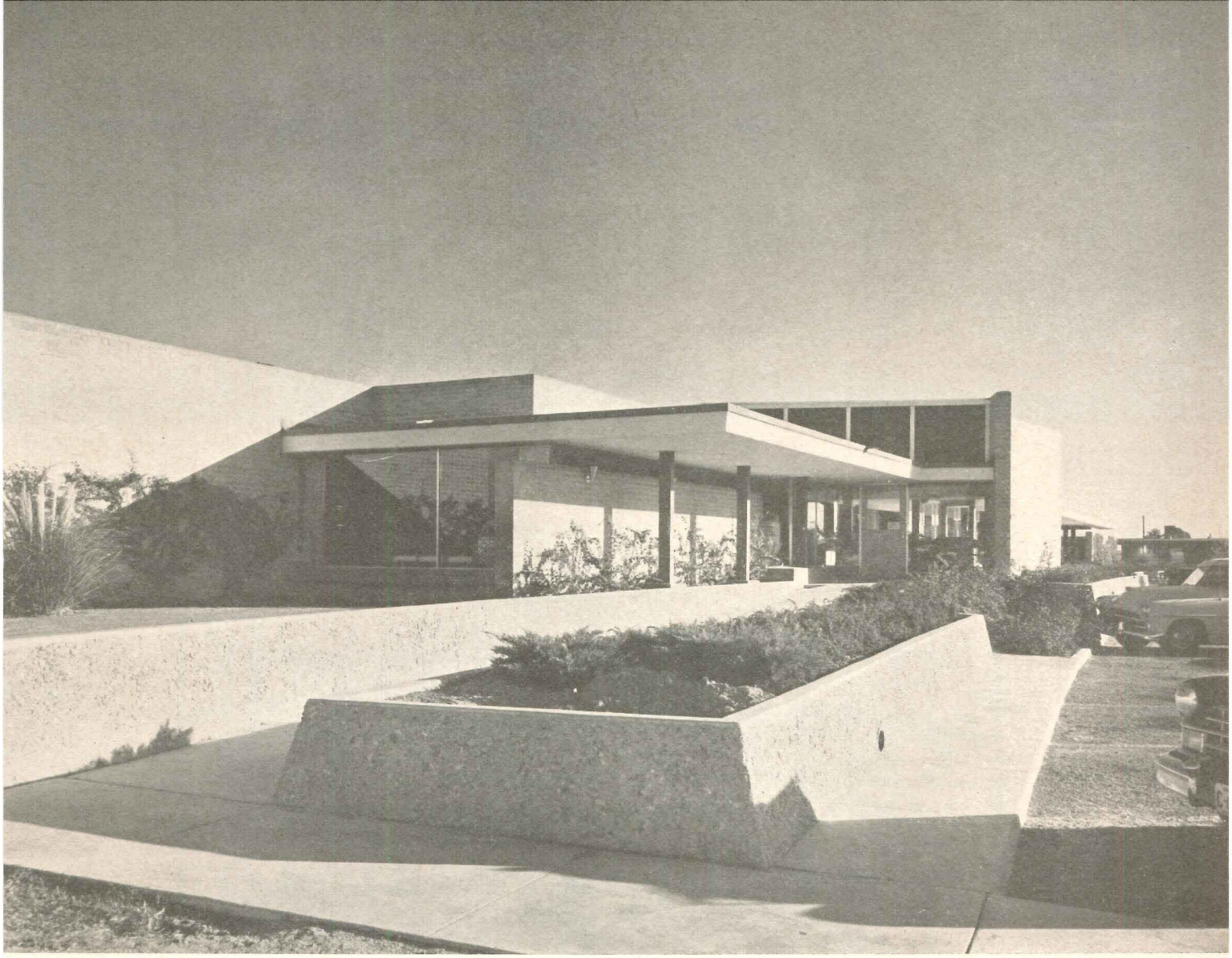
Roger Sturlevant

Interior Finishes

The 2 by 4 partitions are variously clad in Philippine mahogany for the offices, painted gypsum board for the corridors, and vertical redwood boards for the lobby. Cabinetry is of Japanese ash, doors of Philippine mahogany, and hardware of dull bronze.

The concrete membrane over the floor planks (which carries copper hot water tubing for radiant heat) is surfaced with cork tile in the lobby, corridors, and special offices; with asphalt tile otherwise except in toilets, where ceramic tile is installed.

The wood beams and planks remain exposed for ceilings; the lighting consists of surface-mounted incandescent fixtures except for the dining room, where coves for fluorescent tubes have been built-in.



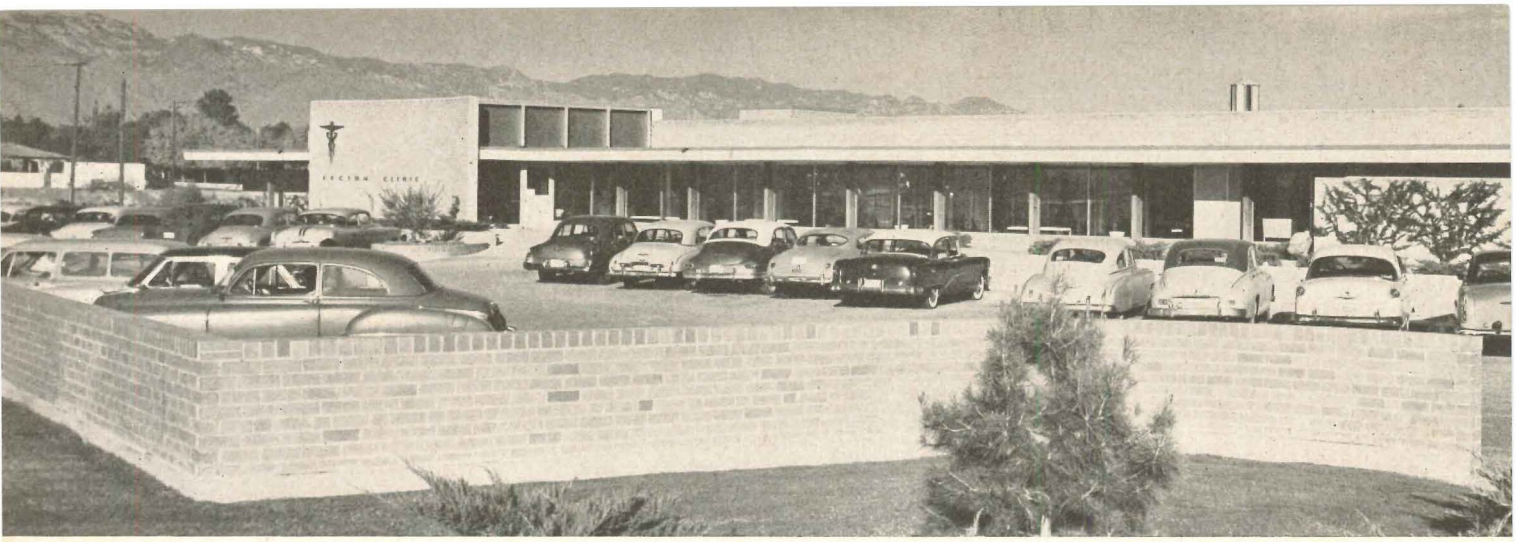
Stuart Weiner

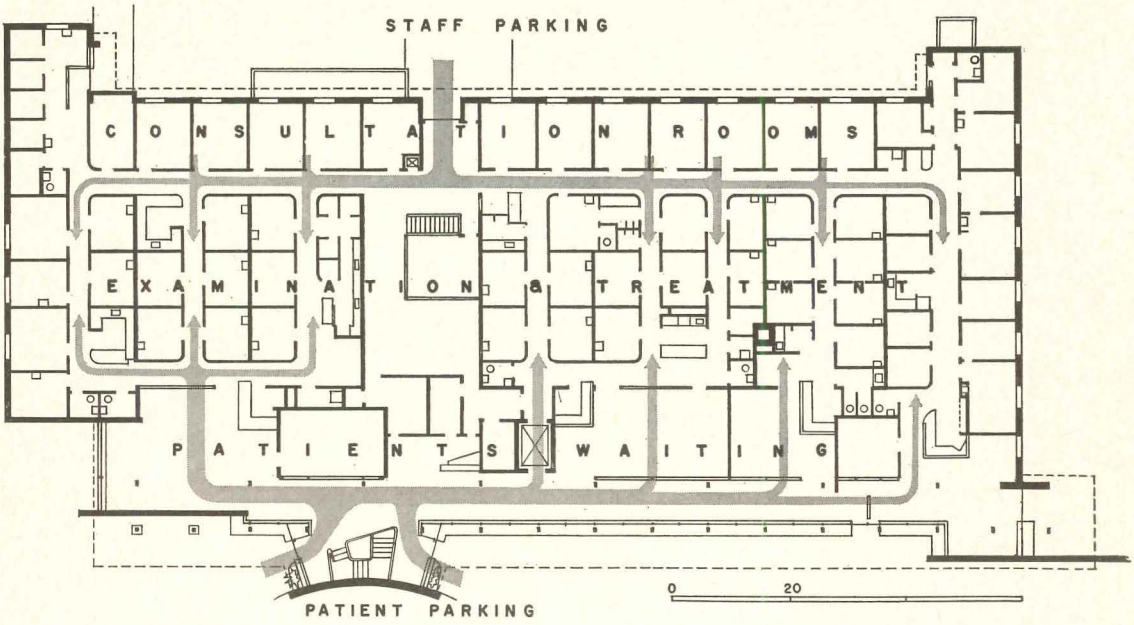
LARGE CLINIC FOR GROUP MEDICAL PRACTICE

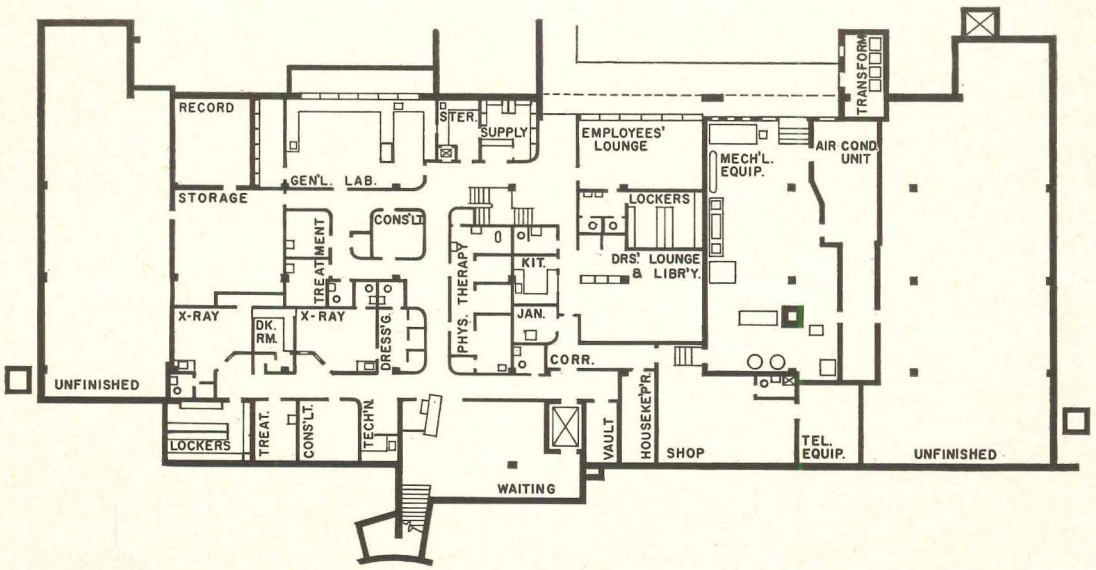
Tucson Clinic,
Tucson, Arizona

Scholer, Sakellar & Fuller,
Architects and Engineers

CLINICS for the group practice of medicine have appeared in large numbers in recent years, and seem to have grown in both importance and size. This is one of the most extensive, busiest clinics in the West. The doctors for whom it was built practice as one professional business, in five areas of practice: internal medicine, surgery, gynecology, pediatrics and laboratory and X-ray. Two long corridors connect these elements; one serving the patients and connecting the waiting rooms, the other, paralleling the first, serving the staff. Between the corridors are the examination and treatment rooms. This basic pattern results in a minimum of cross traffic between doctors and patients. Parking areas for patients and staff are adjacent to the separate entrances. Each doctor uses two or three examining rooms. Nurses' stations are located at strategic corners of connecting corridors. Skylights are used to lighten and soften interior spaces. The pediatrics department has an enclosed play yard which serves to lessen noise and confusion in the waiting room. The building takes its form in part from the difficulties of re-zoning for this business use; approval was finally secured for a one-story building with parking areas depressed and hidden to make the building rather than the cars the more prominent.




STAFF PARKING
CONSULTATION ROOMS
EXAMINATION & TREATMENT
PATIENTS WAITING
PATIENT PARKING
0
20


RECORD
STER.
SUPPLY
EMPLOYEES' LOUNGE
MECH'L. EQUIP.
AIR COND. UNIT
TRANSFORM.
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GEN'L. LAB.
CONS'LT.
TREATMENT
KIT.
LOCKERS
DRS' LOUNGE & LIBR'Y.
PHYS. THERAPY
X-RAY
DK. RM.
X-RAY
DRESS'G.
JAN.
CORR.
UNFINISHED
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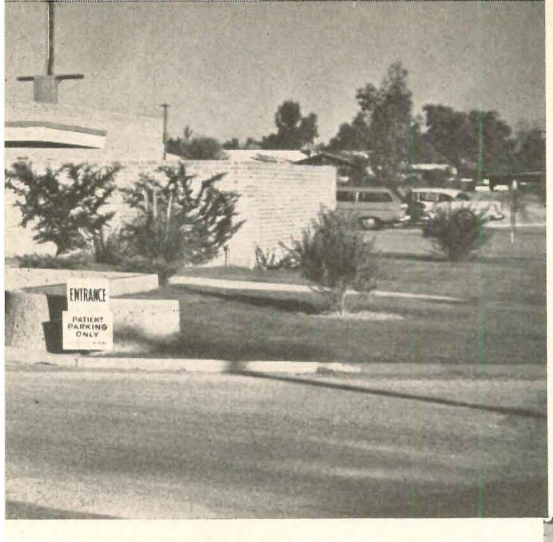
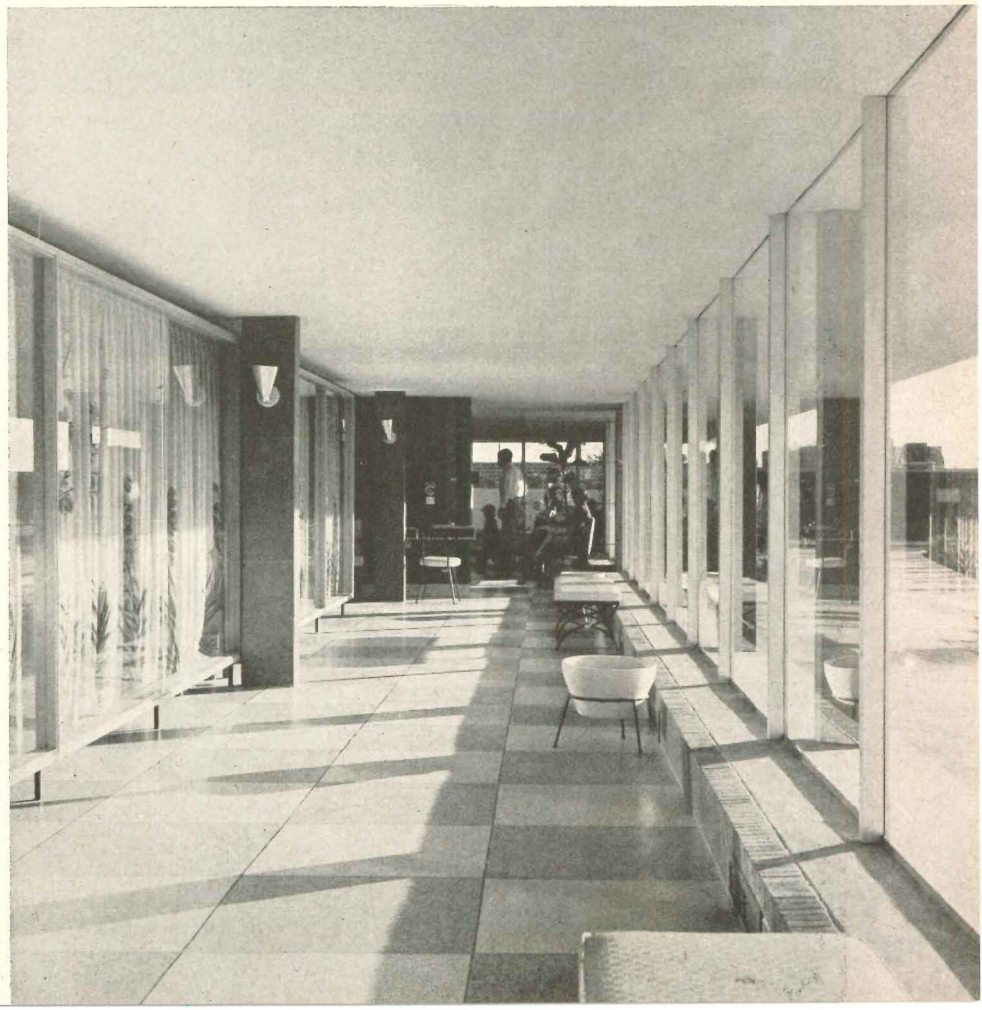
VAULT
HOUSEKEP'R.
SHOP
TEL. EQUIP.
UNFINISHED



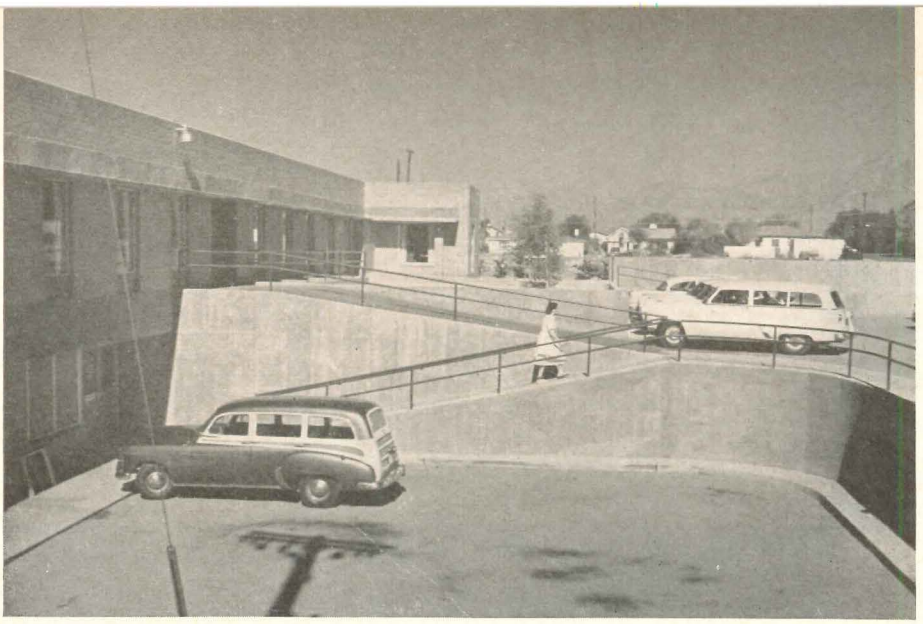
TUCSON CLINIC

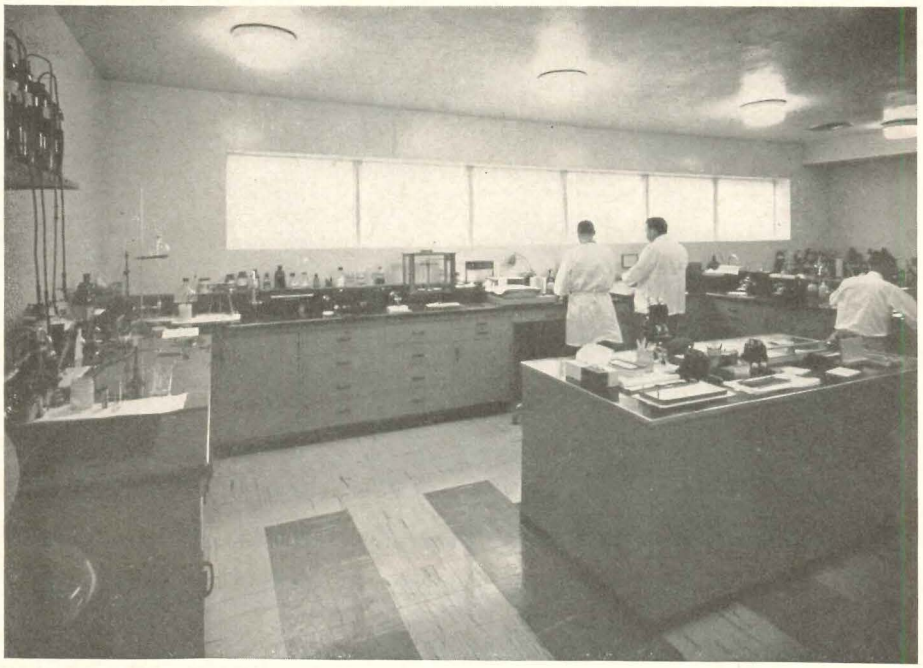
Stuart Weiner



Plans of the Tucson Clinic are almost as complicated as those of a small hospital. Basement houses X-ray clinic and laboratory, employees' locker rooms and lounges, boiler room and air conditioning equipment, the building being fully air conditioned. Staff doctors and patients enter at separate sides of the building, have separate corridors, meet in the middle in examining and treatment rooms.

Structure is steel frame with brick bearing walls, laid in flemish bond. Retaining walls are of poured concrete with large colored aggregate; forms were stripped after an hour and exposed surfaces hydroblasted to give wall color and texture

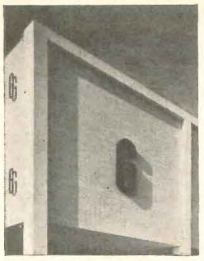




Stuart Weiner

TUCSON CLINIC

A large and well equipped laboratory
one of the assets of a group practice mea
cal clinic, as of course modern diagnost
facilities are one of the reasons for t
banding together. The laboratory serves c
the medical branches represented by t
doctors, and, with the X-ray departmer
virtually becomes a medical entity by itse
A group of therapy booths, lower view,
another group asset



BUILDINGS FOR RETAILING

BUILDING TYPES STUDY NUMBER 232

MORE THAN MANY OTHER TYPES of construction, buildings for retailing tend to follow trends in population growth and movement, since a store obviously must be within shopping range of either one's residence or place of work.

Population is growing (by 2.8 million a year) and families are moving (about 9 million families per year change homes). Since population movement results in not just an exchange of existing houses but rather in the development of whole new neighborhoods and regions, a large volume of building for retailing thus seems assured for some time to come.

Another powerful stimulus to such building is economic rather than sociological in nature. Our complex economy places greater stress on distribution and services than formerly. Consider that in 1920, only one worker in five was engaged in trade, services, and finance. Today that proportion is closer to one in three.

These factors explain why the commercial construction category has gone on setting new records, while industrial building was showing a post-Korea dip from which it is only now recovering. Contract awards for commercial building in the 37 eastern states reached $2.4 billion last year, some 30 percent ahead of any previous record. The 1956 outlook is for another increase of about 6 percent in floor area and possibly slightly more in dollar value.

In the field of retail building, there are several trends. Some are divergent; most are related to the fact that the automobile has become virtually an anatomical appendage of the American species. Suburbia could not have developed without the automobile, nor could the shopping center. Growth of leisure time is another important factor in retailing. Men have suddenly become buyers of such things as groceries and household goods. Night and week-end shopping are increasing tremendously, and Sunday — formerly the only weekly holiday — is now a big day in many suburban stores.

In some places the automobile has taken us past the shopping center stage to what, for lack of a better name, I would call the commercial highway. Since nearly every American family has a car, or access to one, there are few disadvantages in isolated highway locations for stores selling major items. There are, in fact, advantages. The single store, with its own parking lot, is often more accessible than a big shopping center where traffic jams and long walks may be in prospect. The habit of driving to make a purchase is becoming so ingrained that on a well developed commercial highway like US 22 in New Jersey, one finds drug and variety stores with parking areas. These stores, which used to think their retail lives depended on walk-in trade, now find drive-in trade very satisfactory.

Despite the emphasis on suburbia, downtown is far from dead. City centers grew because of certain advantages. In spite of new headaches, many advantages remain; especially for business offices. There will always be a demand for retail outlets where people work. This is one more reason why retail construction will continue to grow, both downtown and in suburbia.

— George Cline Smith

Dr. George Cline Smith is vice president and economist of F. W. Dodge Corp.; also serves as economic consultant to Sweet's Catalog Service, and edits Dodge's monthly bulletin, *Building Business*

AS DR. SMITH has pointed out, the complexity of both our economy and social structure has brought into being a variety of buildings for today's retailing.

In continuance of its policy to reflect actual construction activity, ARCHITECTURAL RECORD, in the following pages, presents a selected sampling of the several kinds of retailing structures most common. The examples include two shopping centers, two stores, and two small shops.

— James S. Hornbeck

O'NEIL SHEFFIELD SHOPPING CENTER, IN OHIO

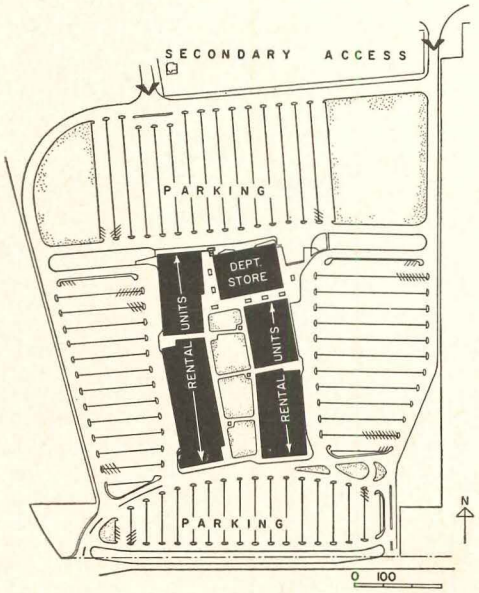
Architects: Weinberg & Teare
Douglas P. Maier, Chief Designer
R. L. Tellman, Structural Engineer
James R. Jones, Jr., Field Supervision

Structural Engineers: Frank Eroskey & Associates
Mechanical Engineers: E. D. & W. A. Kretch
Landscape Architect: Wayne H. Laverty
Contractor: Sam W. Emerson Co.

LOCATED between Elyria and Lorain, in northern Ohio, and designed to serve these cities and the surrounding countryside — total shopping population 175,000 — this regional shopping center was winner of an Award of Merit, AIA National Honor Awards Program, 1955.

The architect and the department store-owner agreed from the start that the center should have more than mere utilitarian appeal for its relatively large market. Thus, its construction includes quality materials, a landscaped mall, an auditorium for civic groups, sign

R. Marvin Wilson, Studio House



O'NEIL SHEFFIELD CENTER

control, and further amenities. The owner's effort was to make shopping a pleasure.

In physical terms, the department store was required to contain 100,000 sq ft for shopping and 50,000 sq ft for service; 200,000 sq ft was to be provided for approximately 40 rental units for the usual food, variety, and specialty shops; and there was to be parking for 3,000 cars — with possible future increase to 4,000. The site fronted on a main highway near an intersection; to prevent traffic jams at this point, extra land was purchased at the rear and side, and roads were built for secondary access from other existing highways.

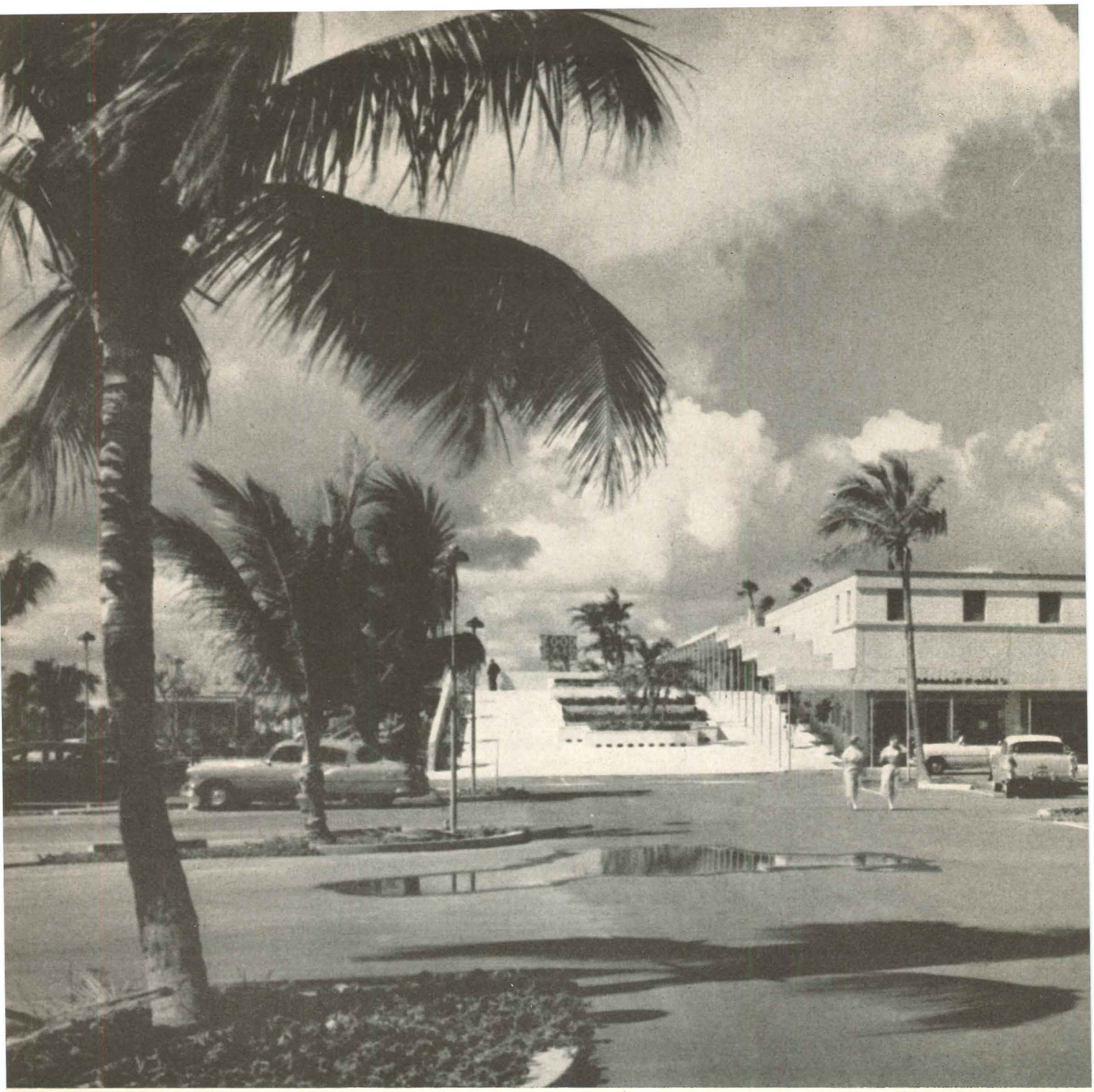
The central landscaped mall is defined by an elongated U-shaped building group, open to the main highway for advertising value. Focal point in the plan is the O'Neil Department Store, which partially closes the U toward the rear. A natural slope in the land was exploited so that two-level access to the department store could be gained; the upper level facing the mall, the lower level facing the rear parking area.

R.Marvin Wilson, Studio House

The compact group of buildings was centered on the plot so it might be surrounded by nearly uniform bands of parking. Such a scheme holds walking distances to a minimum; in this case to 300 ft maximum. Rental space was divided into four buildings in order to keep these units in scale with the department store, and also to provide pedestrian walkways from the parking areas to the central mall.

A deep red-brown granite bulkhead and base for all buildings lends unity to the scheme, as does the continuous marquee, which has a blue-green porcelain enamel fascia and perforated asbestos board soffit. For variety, the department store is faced with salmon colored brick; the other buildings with gray brick.

The department store signs and the suspended signs were architect-designed for uniformity of size and character. For all other signs, tenants are required by lease to follow regulations governing location, height and width limits, etc. No signs which incorporate movement or flashing lights may be erected.



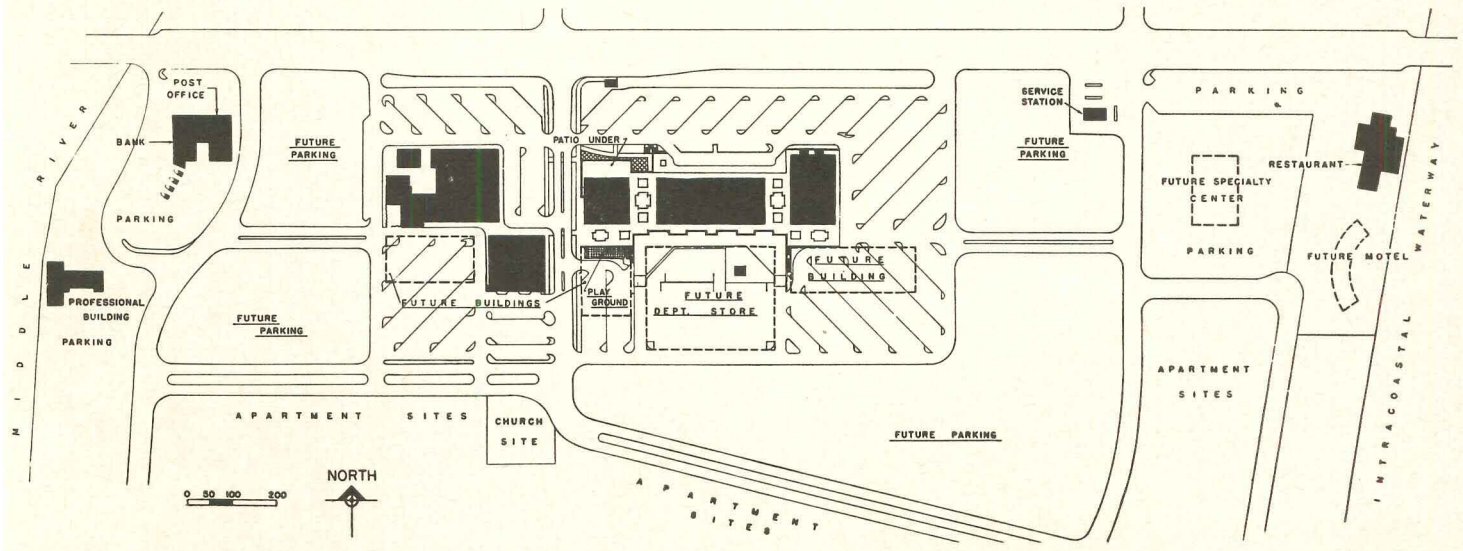
THE SUNRISE SHOPPING CENTER, IN FLORIDA

Architects: Gamble, Pownall & Gilroy

Structural Engineers: Riley & Ross
Mechanical Engineer: George L. Cadenhead
Landscape Architect: Porter G. Reynolds
Color Consultant: John Ullman

THIS SHOPPING CENTER in Fort Lauderdale is part of the development of 150 acres of filled land owned by Antioch College of Ohio. Roughly 100 acres were sold for residential and apartment sites; the remaining 48 devoted to a business center. On the western 5 acres of this latter parcel a bank, post office and professional building were built; on the eastern 6 waterfront acres a restaurant has been built and plans are made for a motel and group of stores for sporting goods. The shopping center proper occupies the central 37 acres.

Alexandre Georges



SUNRISE SHOPPING CENTER

Architect Clinton Gamble says, "I would like to emphasize two points. One is that the present part of Sunrise is only one third of the total job. In planning we decided to compromise the present plan in order to have a really proper arrangement for the final phase — a true regional center based on the mall using the 'Main Street' concept. Also remember that the total area was to be developed, not just the shopping center. This spreads the first buildings more widely apart at present than we would like, but is allowing us to 'fill in' so that everything we do from now on improves the over-all picture. Although this was a hard point to win at the beginning, the owners and tenants are now very happy as we work on the additions and they see the scheme unfold.

"Second, we believe very firmly that in designing retail buildings we are only adding plus values in convenience and appearance as tools for the merchants to use. It is the merchants and their personnel who sell the goods. This idea is of importance to us because it gives

Alexandre Georges

us the right point of view from which to discuss the project. Good selling is more an emotional and human job than a matter of cold logic."

* * *

The present buildings represent the first of two stages and provide 150,000 sq ft of rentable area. There is a 15,000 sq ft Food Fair, a 14,000 sq ft Saks Fifth Avenue, a 10,000 sq ft Allen-Fredericks (women's wear), and 42 other tenants in variously sized quarters. A unique idea is that of a separate building for specialty shops. Called the Arcade Shops, it is placed immediately adjacent the food and drug stores, since most of the smaller tenants depend on traffic generated by the larger convenience goods stores. There are 15 ft walkways piercing this structure, with the front of each of the shops developing the theme of that business in fanciful stage settings. The result is gay and kaleidoscopic — holds interest and appeal. These shops have been most successful, and the same general arrangement is now being followed in other shopping centers.

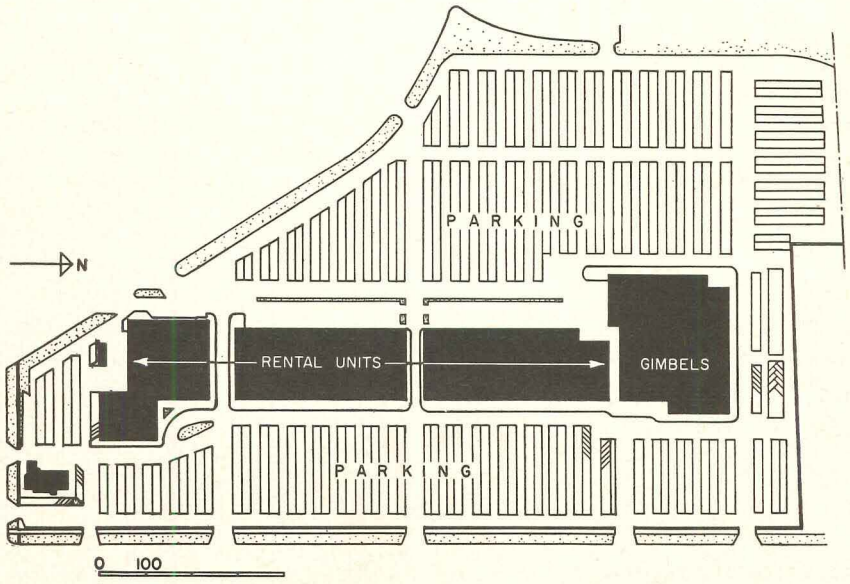
GIMBELS IN THE SOUTHGATE CENTER, WISCONSIN

Architects: Grassold-Johnson & Associates, and Welton Becket & Associates

Structural Engineer: Charles S. Whitney
Heating, Ventilating Engineers: Lofte & Fredrickson
Electrical Engineers: Arthur A. Wanty & Associates
Plumbing Engineers: L. R. Schmaus & Co.
Contractor: Hunzinger Construction Co.

A PART OF SOUTHGATE, the first shopping center in the Milwaukee area, this striking store was designed both to fit into the over-all character of that center and at the same time create an attention-getting character of its own. The already existing structures were designed by Grassold-Johnson Associates, and along with a fourth building now under construction, will complete the project. High intensity exterior lighting for all the parking areas (note a typical standard — above, right) has, according to the architects, contributed heavily to the

Hedrich-Blessing



GIMBELS SOUTHGATE

success of the center. The 5 million dollar Gimbels store, which contains 3,370,000 cu ft on 3 floors — one below grade — was completed and occupied only fourteen months after ground was broken. Its occupancy marks the first time the Gimbel organization has built a second store in any city.

The east and west facades feature large letters of dark green plastic — which are backlighted — on panels of charcoal-speckled glazed white brick. Smaller letters for the end wall are also of green plastic and are pinned away from the building. The reinforced concrete structural frame is faced with smooth finish limestone except at grade, where granite cladding is applied. The store front sections and entrance doors are of extruded aluminum. The blank-walled portion of the first floor and the north facade are faced with brick in a vertical pattern of striations. The building is completely air conditioned, sprinklered, and is lighted by a combination of incandescent downlights and fluorescent tubes in coves, plus accent spots where needed.

Hedrich-Blessing

The store's interior — more or less a departure for the Milwaukee area — was conceived as a single large open area with a minimum of walls, in which the fixtures outline the various merchandising departments. Feature of the interior is a central arrangement of stairways enclosed by electric stairs, accented by cove lighting in a pattern of concentric rectangles. The entrance vestibules, which are floored in travertine, contain large link mats beneath which an air suction arrangement draws snow or dust from customers shoes.

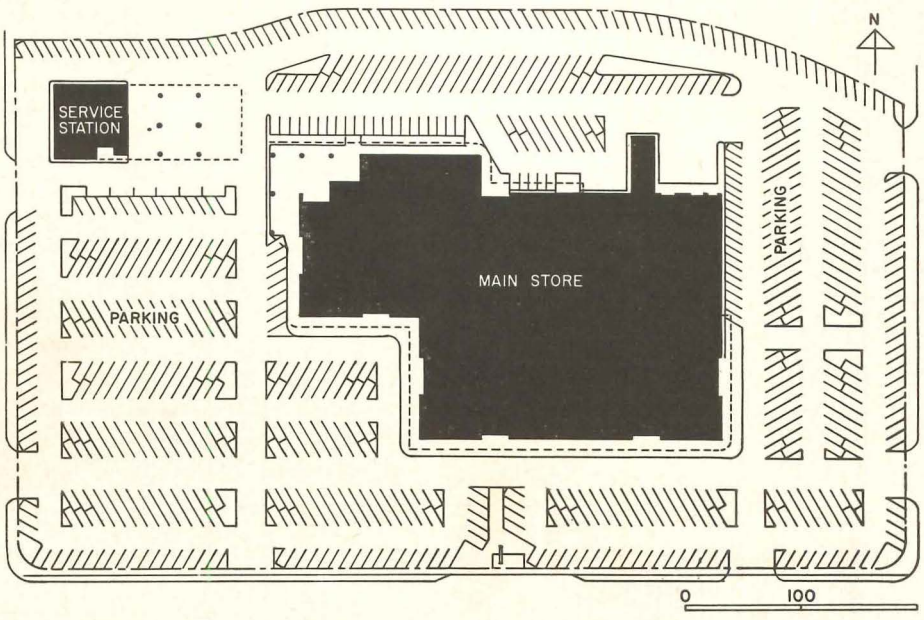
From the Office of Welton Becket & Associates:
Maynard Woodward, Chief Designer
Dan Morganelli, Interior Designer
Charles Gable, Project Chief
William Wilkinson, Store Planning

SEARS STORE AND SERVICE STATION IN FLORIDA

Architects: Weed Russell Johnson Associates

Structural Engineer: Norman J. Dignum
Mechanical Engineer: R. L. Duffer
Landscape Architect: Porter G. Reynolds
Contractor: Edw. M. Fleming Construction Co.

IN EXPLANATION of some of the thinking that went into the design of this attractive Sears unit in Miami, Architect T. Trip Russell says, "In a store of this kind, the plan is of necessity derived from a fixture layout prepared by the owner. Such a layout is based on long and considered experience in merchandising of this particular kind. We were able to simplify it somewhat and make it a bit more straightforward architecturally, but the extent of such improvement was necessarily limited. The parking layout was carefully studied



SEARS IN FLORIDA

to accommodate the greatest possible number of cars and at the same time allow sufficient area for rather elaborate landscaping so the area would not have the appearance of a vast, uninviting, empty field. Sears is willing to invest considerable in landscaping, both on their own and on adjacent city-owned property, for they feel landscaping plays a major role in upholding quality of design. They also maintain such landscaping with great care. In addition, they like to build attractive bus shelters for the convenience of their patrons. In some instances, covered walkways connect such shelters to the store building.

"The location of the service station was dictated by the nearness of another service station, and it was at first considered something of a gamble. It has, however, done a phenomenal business both with Sears customers and with the general public.

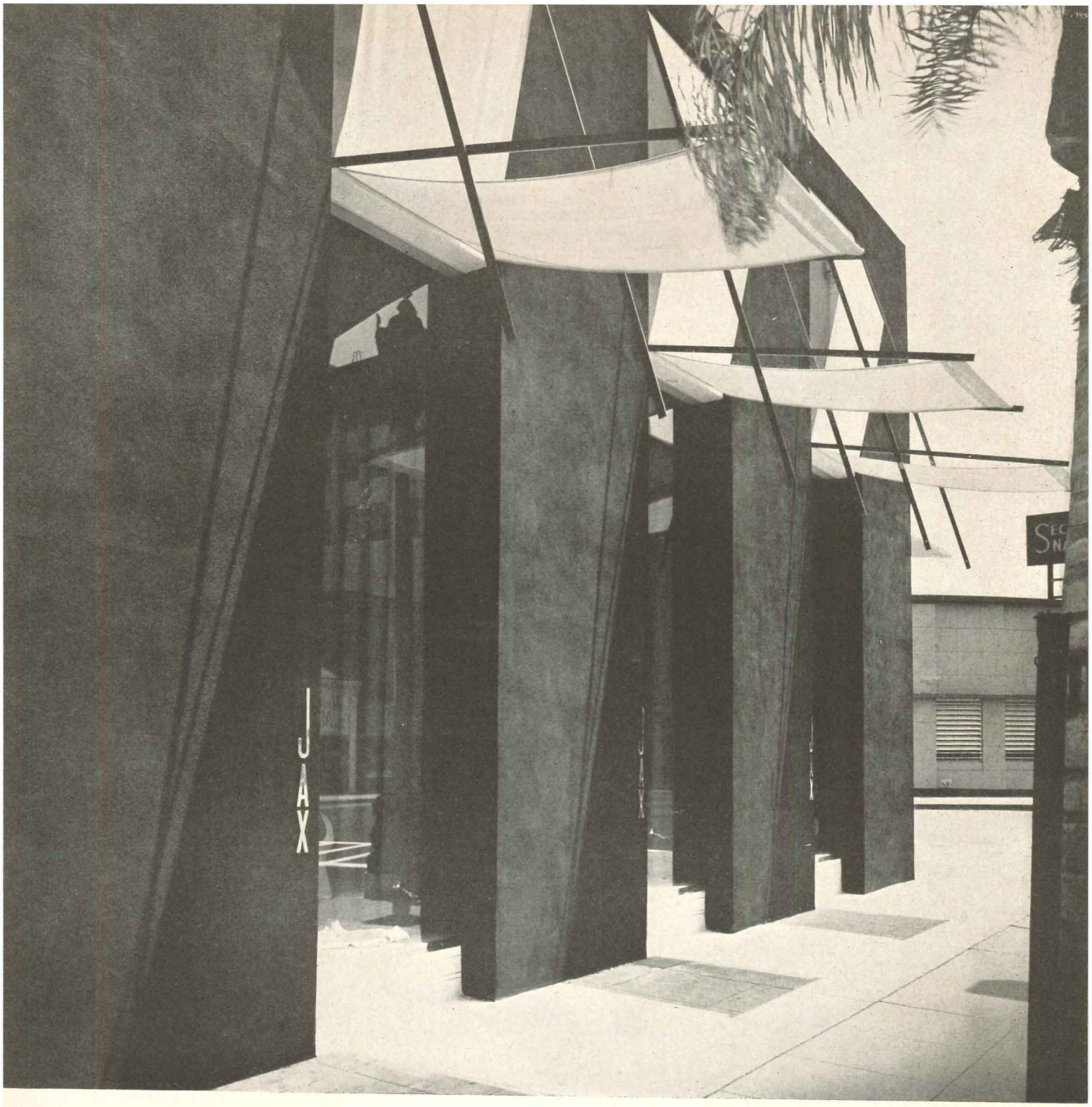
"A two story building with electric stairs is consistent with current thinking, and obviously, large glass display areas are desirable for the first floor.

© Ezra Stoller

On the second floor there was no need for glass except for a patio-furniture sales area, where an outdoor character was achieved by means of a glazed porch.

"The owner is greatly interested in materials that are attractive yet low in maintenance cost. Many Miami buildings are of concrete block and stucco, which requires constant painting and which is difficult to maintain without the appearance of unsightly cracks. We have studied the problem for some time and have found three materials that can be used with relatively low initial cost and which offer the advantages of easy cleaning and permanent surfacing. They are face brick, precast concrete slabs with marble or quartz facing, and porcelain enameled steel. All three are used for this building, and the future cost for exterior maintenance should therefore be virtually negligible.

"It had been expected that this store might draw heavily from Sears downtown Miami store. Instead, it has done a remarkably heavy business since opening and sales at the downtown store have also increased."



JAX SHOP FOR WOMEN'S WEAR, IN CALIFORNIA

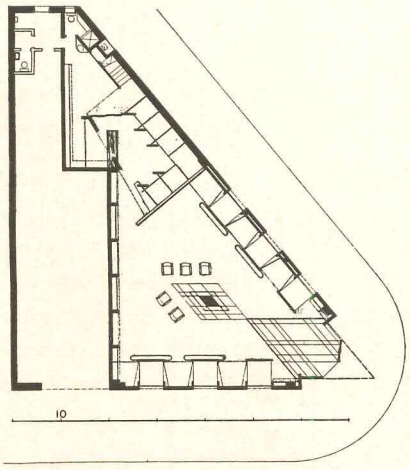
Architect: William Sutherland Beckett

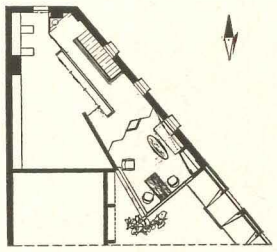
Owner: John M. Hanson

Contractor: Pallisgaard-Wilson Construction Co.

As STRIKING as the high-style women's wear it features, this unusual shop on a triangular corner on Wilshire Boulevard, Beverly Hills, owes much of its success to its eye-catching appearance, as well as an unusual theory of merchandising. The exterior is of black stucco with bulkheads of brass-flecked white terrazzo, polished brass letters and hardware, and awnings of white canvas on metal frames painted a chutney color. The entrance doors and panels over them are of the same chutney. The diamond shaped marquee, which pene-

Julius Shulman





Julius Shulman

JAX WOMEN'S SHOP

trates through from inside to outside, is glossy white. Including the rental area shown in the plan (which this shop will soon occupy) the total area is 3,340 sq ft. Upon arrival, major merchandise is unpacked and stocked in the sales area, thus obviating the need for more than a minimum storage space. Display and hanging devices are flexible for seasonal changes. The design is calculated to build up an informal atmosphere and encourage customers to browse and inspect merchandise. Also, mirrors and fitting rooms are arranged to carry out the idea of "customer modeling" as a sales device, a concept strongly held by the owner of the shop.

The interior is conceived as a subdued, muted background for the merchandise itself. Main center of interior interest is the wood-burning fireplace — centrally located — which is supported on brass bars that pierce the ceiling. The ceiling is painted matt black, but otherwise, colors that are used for accent include chutney (as for the exterior), a gray-green, off-white toward gray, dark mustard-yellow, and a soft gray-blue.

Gordon Sommers

PROTOTYPE REGAL SHOE SHOP ON THE WEST COAST

Architect: Victor Gruen & Associates

Contractor: J. E. Wilson & Son
Store Fixtures: Cowan Co., fabricator
Lighting Fixtures: Strickley & Co., fabricator

ARCHITECT Victor Gruen says, "In designing this particular store in Huntington Park, a Los Angeles Suburb, we were asked by the client to plan in terms of a prototype store, not just one for this particular location. The Regal Company had until this time been primarily interested in men's shoes, but now they wished to open a new type of operation for the entire family and sell women's and children's shoes as well. Shoe sales for an average family were calculated, after market studies, at 20% men's, 40% women's and 40% children's.

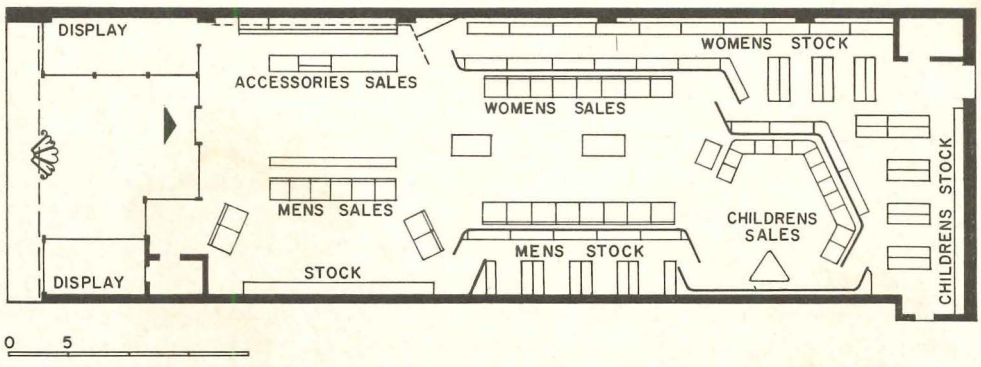
REGAL SHOE STORE

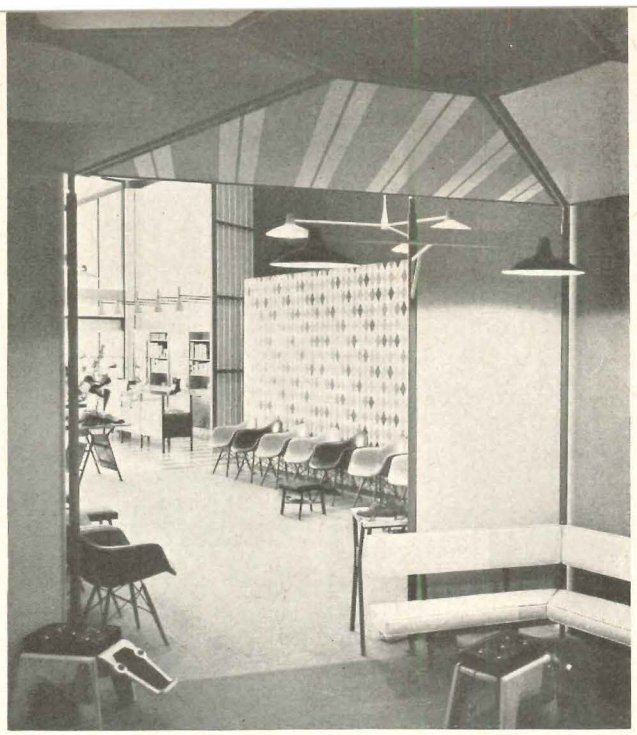
"As the client operated in the middle-price field, he wanted an interior design which would not convey the idea of a luxury shop yet which would be attractive. Attractive especially to women and children, whose trade would account for 80% of their business.

"Specifically, the owner requested that the main body of the store be divided into three merchandising sections: men's, women's and children's. Also, he asked for a new 'Regal' sign — one which would have a more feminine character — so that it might take the place of the previous sign the company had been using and which was designed primarily for a men's store."

The upper facade is composed of plastic-sprayed marine-plywood panels supported on a tubular aluminum frame with exposed and carefully detailed fastenings. The lettering for the word "Regal" is outlined with white neon before a plastic-sprayed background, while the top illumination is from 100 watt incandescent lamps spaced 15 in. on center in a strip reflector which is painted red on its outside surface.

Gordon Sommers





Gordon Sommers

REGAL SHOE STORE

As one enters, he is in the accessories section, in which the floor is sheet rubber. The counter, in three sections, features bags and hosiery in two, with a third section devoted to wrap-and-cash. All of the other retail areas are carpeted wall to wall except the stock rooms. The children's section is of especial interest since it features bench type seating and is decorated in a carrousel spirit, with animal murals.

Metal stock shelving — exposed in the men's department — has proven to be flexible and space-saving. The shelves are adjustable on $\frac{3}{8}$ in. centers, providing storage for both active and inactive stock. The shoe boxes themselves were designed by the architect.

The interior of the store is lighted by a pattern of surface mounted fixtures, softened by small perforations and containing also incandescent reflector lamps. This lighting is supplemented by three chandeliers in the women's section and especially designed wall brackets to illuminate the accessories counter. The combination furnishes between forty and fifty foot candles.

DESIGN FOR FIRE SAFETY

Causes of any fire are hard to determine. Control of fire, however, is largely a responsibility of the architect and engineer, because it should be inherent in good and conscientious design of building structures and their components

FIRE PREVENTION begins on the drawing board" is not a cliché. It is a meaningful phrase which is given active credence by responsible architects, engineers and fire protection specialists, and the effectiveness of which is proved by statistics showing that fire loss is on the wane. True, *actual* fire loss figures are higher than they were, say, a decade ago. But in proportion to the dollar value of existing structures, which has increased logarithmically during the construction "boom," they are on the downgrade.

This is an encouraging sign. But it does not erase the fact that there is a multiplying list of causes contributing to the spread of fire, and therefore an ever-increasing list of elements in building design on which the architect must keep himself contemporary. New products, new methods, new equipment and a new philosophy of design for effective operation — all introduce new fire hazards which must be controlled. Whereas years ago the architect had only such obvious elements to remember as exits, fire walls and fire alarms, in designing today's buildings he must consider the new heating and air conditioning systems and their attendant hazards, the increased use of electricity, and the special dangers of mid-twentieth century operations — all of which have a very definite bearing on the life of the structure: will it "reach maturity," or will it be wasted by fire long before it has survived its expected usefulness?

With the increasing complexity of present-day technical building installations, architects are recognizing more and more the necessity for calling upon the experience of fire protection engineers in designing fire safety into their buildings. Such organizations as the National Fire Protection Association in Boston and the National Board of Fire Underwriters in New York not only publish a never-ending list of valuable books and pamphlets which cover all phases of fire protection, but they also offer advice on all aspects of building design as it relates to fire safety. Most fire insurance companies number among their personnel fire protection engineers who are available for consultation. And there are a few firms which exist for the express purpose of offering fire protection engineering services.

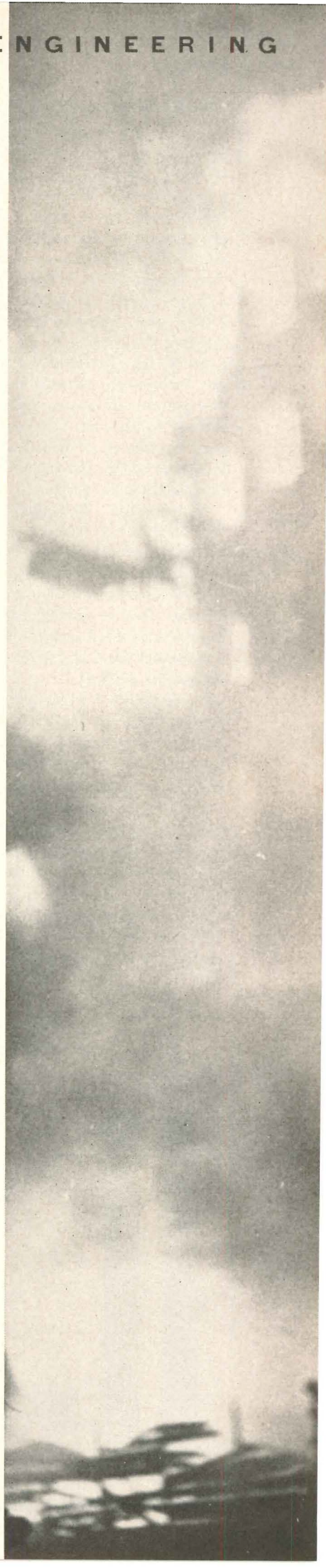
Most of these sources agree that fire protection is expensive only when it is too late. It is expensive, in loss of both property and life, if a building is demolished by fire and must be rebuilt with much-improved fire safety features. It is expensive also if fire protection is added to a building as an afterthought.

Most of these sources agree too that, although building codes are necessary and helpful, there must also be an understanding of the design principles involved. Local building codes, and the National Building Code as recommended by the NBFU, cover the basic elements which must be considered in good, fire-safe design. However, there is more to ensuring maximum fire safety in buildings than a mere compliance with "the letter of the law." There is a "morality" in design which goes beyond the codes and insurance rating schedules. This requires an analysis of such elements as public service facilities (water supply, fire department, etc.), topography and locale, and intended occupancy, which oftentimes shows that there is economic justification for a high degree of built-in fire safety.

This "degree" of fire safety varies, of course, for different building types because of the very nature of their occupancies. Hospitals, for example, call for a high degree of fire safety because they have a concentration of human occupancy which cannot be easily evacuated. Multi-story buildings, in which panic may result in the event of fire, call for a higher grade of construction than low buildings, from which egress can usually be obtained quickly.

In the next few pages twenty-three of the most important elements of design for fire safety will be considered, with particular emphasis on their relation to industrial buildings, mercantile buildings, schools and hospitals.

The editors wish to acknowledge the help of the National Fire Protection Assn. and National Board of Fire Underwriters in preparation of this article.



Wide World Photos

FIRE-RESISTIVE CONSTRUCTION

The term "fire-resistive" is often confused with the terms "fireproof," "fire-retardant" and "non-combustible," and it shouldn't be. "Fireproof" is a misleading term, since there is nothing, really, which is absolutely immune to fire of sufficient intensity and duration. "Non-combustible" is applicable only to those materials which will not ignite or burn when subjected to fire. "Fire-retardant," according to the definition in the *NFPA Handbook of Fire Protection*, "is often used to refer to materials or structures which are combustible in whole or in part, but have surface coverings to prevent or retard ignition or the spread of fire under the conditions for which they are designed."

"Fire-resistive" is a more definitive term because it is relative. A building is constructed of materials which are fire-resistive to a certain specified degree, and this specification is expressed in hours. Thus a building which has a fire resistance of 1, 2, 3 or 4 hr is expected to withstand fire exposure for the specified number of hours.

The elements of a building which determine whether or not it is fire-resistive are its structural components — walls, floors and roof. It is desirable that *all* buildings be highly fire-resistive. However, all factors considered, this is not always absolutely necessary. It depends basically on the occupancy. There must be compensation for its omission, however, and this usually takes the form of complete sprinklering of the building.

The use of fire-resistive materials in construction of a building does not insure the safety of that building unless all the other features of design which are discussed on the following pages are given the proper consideration.

PROTECTED STEEL MEMBERS

Steel will not burn, it's true. However, it will expand under heat of sufficient intensity and so warp the structure it is intended to support that more damage will result from the collapse of the building than would have resulted from the flames alone. Bare steel, then, should be protected with a fire-resistive covering. One of the most commonly used coverings in buildings today is metal lath and plaster. This insulates steel members against a temperature rise which would destroy their strength and usefulness.

It is as important to protect steel decking as it is to protect steel columns and beams. Such protection prevents transmission of high temperatures through floors to other parts of the building where combustibles may be ignited. The practicality of this rule was demonstrated in the disastrous Livonia fire of 1953, in which the light metal roof deck was heated far above the low melting point of the asphalt pitch with which it was covered, thus transforming it into a dripping fuel which contributed to the magnitude of the conflagration.

NON-COMBUSTIBLE FINISHES

Since most fires start within the building, the proper selection of materials for interior use is of even greater importance than fire-resistive construction. A fire-resistive shell simply ensures that the shell itself will be saved and provides little security against spread of the fire.

Most flooring and basic wall materials are fairly resistant to fire, and many ceiling components, fixtures and even paints have been developed which have high ratings. However, with the wealth of these and other products which are available for architects' specification today, it is difficult indeed for the architect to know which of these will best suit his purposes, especially in regard to fire safety. In order to aid him in his selection, a number of agencies maintain testing laboratories which publish reports for his guidance. The largest of these agencies are the Underwriters' Laboratories, Inc.; Factory Mutual Laboratories in Norwood, Mass.; Factory Insurance Association in Hartford.

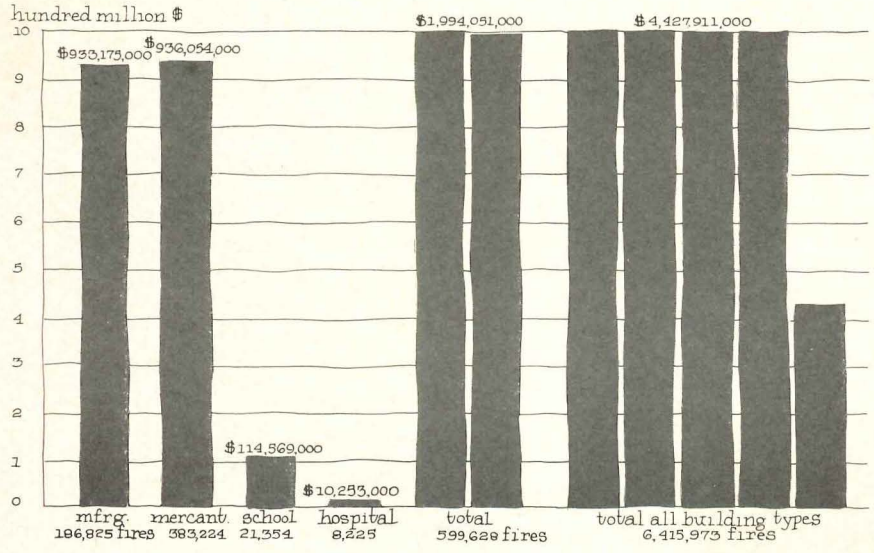
In addition to the building materials which these laboratories test, there are many other interior components, especially furnishings, on which the architect must exercise judgment. Although many materials, by their very nature, are combustible, some of them are available with special treatments which reduce their degree of fire hazard.

SPRINKLERS

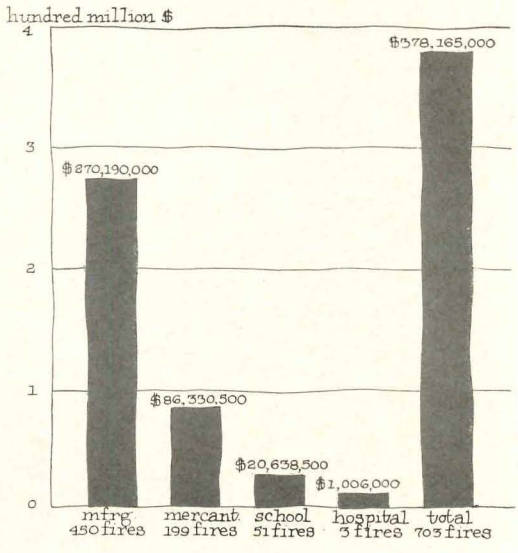
Lack of sprinklers, it can be seen from the graph on the opposite page, was the major contributing factor in the spread of 703 large-loss fires reported to the National Fire Protection Association during the five-year period 1950–1954. It figured in the reports of 76 per cent of the fires.

Sprinklers are recommended, of course, for all buildings. They are especially important in buildings of non-fire-resistive construction and in buildings which house combustible contents. The

TOTAL DOLLAR LOSS OF ALL FIRES
Reported to NFPA, 1950–1954 (U. S. and Canada)



TOTAL DOLLAR LOSS OF 703 LARGE-LOSS FIRES
Reported to NFPA, 1950–1954 (U. S. and Canada)



very nature of their operation — confining the fire to its point of origin and extinguishing it before it has had an opportunity to spread — prevents flames from reaching and thus igniting the combustible structure or its contents.

In many buildings in which the type of occupancy does not call for sprinklers throughout, it is essential to sprinkler certain danger areas. It can be seen from the list on the last page of this article that the major causes of fire are equipment or materials that are usually located in service areas. Basements and storage rooms are serious offenders, because they are often cluttered with highly combustible materials.

The main advantage of a sprinkler system, aside from its obvious function of extinguishing the fire immediately, is that it minimizes water damage. Three basic types of sprinkler systems are: "wet," in which water is already in the pipes ready to supply the sprinkler heads; "dry," for unheated areas, in which air pressure in the pipes admits water at special valves when fire occurs; or "deluge," in which one thermostatic element actuates several sprinklers simultaneously, for extra-hazard occupancies. The new sprinkler heads provide better atomization and distribution pattern and so quicker control of fires.

Sprinkler systems have refinements which increase their merit far beyond the speedy extinguishment of incipient fires. They can incorporate detection and alarm systems as well and can also be provided with safeguards against mechanical failure. In many systems, as soon as one sprinkler is activated, an alarm is sounded at some predetermined point or points so that fire-fighting forces are summoned immediately. If, as so often happens, there is no need for the fire-fighters when they arrive, because the sprinklers have already killed the fire, there is at least assurance that the water is turned off.

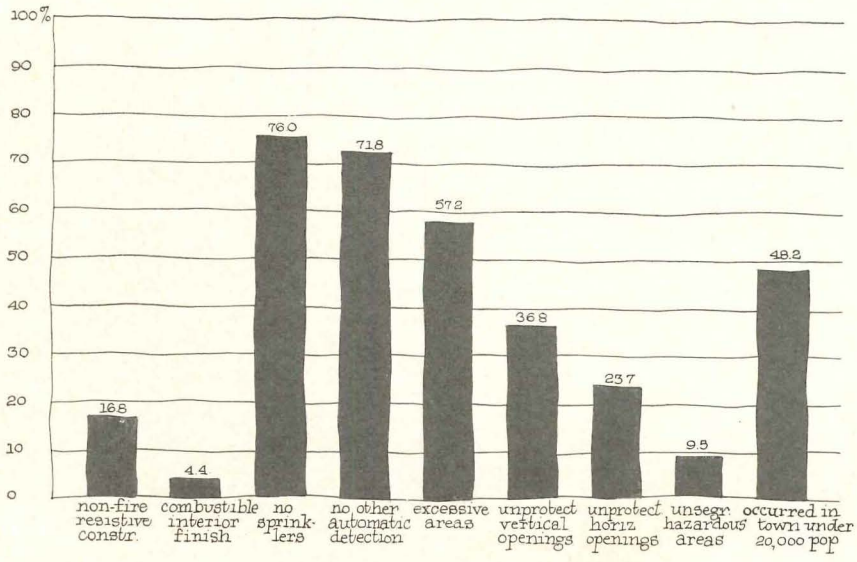
Although not considered in the category of sprinkler systems, there are other automatic extinguishing systems for special uses. In some cases a foam liquid is injected into an extinguishing system to provide a finely divided foam discharge. A dry chemical system has been developed for certain types of special hazards, especially those involving flammable liquids. Nitrogen pressurizes the stored dry chemical, forcing it through piping to outlets in hazardous areas. Carbon dioxide, stored in tanks, can also be pressured through pipes to special outlets.

AUTOMATIC DETECTION

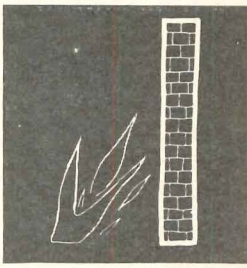
It is desirable that automatic detection be an integral part of a sprinkler system, and that sprinklers be installed in every building. But in the absence of a sprinkler system, some other form of automatic fire detection should be provided. The principle of operation of a heat detection system is generally similar to that of a sprinkler: a heat-sensitive mechanism, usually protected by a small housing as shown in the sketch at the right, reacts when the temperature reaches a pre-determined point, thus opening or closing a circuit and sounding an alarm. No extinguishing action occurs until protective agencies reach the scene.

There are other detection systems

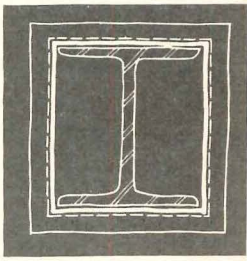
MAJOR CONTRIBUTING FACTORS IN SPREAD OF 703 LARGE-LOSS FIRES
(Expressed in per cent)



As a quick-reference index to elements to be considered in designing buildings for fire safety, the 23 most important elements are sketched and listed briefly in this strip

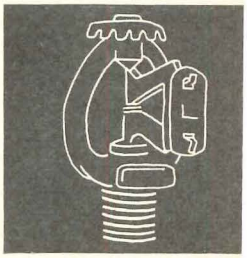


Fire-resistive Construction *Structural members should be of non-combustible materials which have specified fire ratings*

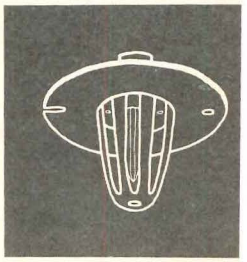


Protected Steel Members *Steel members will expand and buckle under heat of sufficient intensity, and so they should be protected with a fire-resistive covering*

Non-combustible Finishes and Materials *Interior furnishings and coverings should be of materials that won't ignite and burn when subjected to fire*

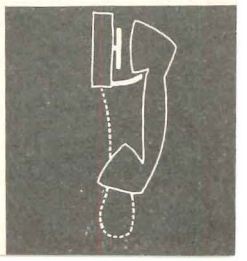


Sprinkler System *Loss by fire in buildings equipped with automatic sprinklers has been practically negligible, thus proving their effectiveness*



Automatic Detection System *If not incorporated in the sprinkler system, automatic fire detection should be installed separately*

Fire Alarm System *An alarm system, either manual or automatic, or both, is essential and should be suited to the building type*



Communication System *A good intercom system is important, either to be used with or to supplement the fire alarm system*

than those for heat. A smoke detection system can be installed, activated either by a broken electric beam or by ionization, or a flame detection system, sensitive to infra-red rays can be used.

FIRE ALARM SYSTEM

The fire alarm box is one of the oldest fire-safety devices, and its age has proved its worth. Today's "Break Glass and Pull Down Hook" may be more streamlined in appearance, but it serves the same valuable function of calling a fire-fighting force.

As with other systems, there are modifications though. The alarm can be sounded directly at fire department headquarters, or it can be sounded in a central communication control station and transmitted from there to the fire department. Usually it is set up to sound alarms throughout the building. In automatic detection systems, either with or without sprinklers, an alarm is often built in, which will be sounded as soon as fire or smoke is detected.

COMMUNICATION SYSTEM

A good communication system is a good adjunct to a good fire alarm system. As stated above, it is sometimes an integral part of the alarm system, with the direct line to the fire department originating in the communication control center.

The communication system should be planned to suit the particular building type. In hospitals, for example, it is unwise to sound loud, insistent fire alerts since many inmates are bed-ridden and incapable of caring for themselves. Instead coded signals, which can be interpreted only by hospital personnel, are usually sent out from a central communication control to all regular speakers in the system. Coding also makes it possible to send an alert only to that section of the building where the hazard exists and so permits normal operations to continue in other areas.

In schools and industrial buildings an adequate communication system can supplement fire warning gongs, horns or bells. However, the fire detection system which actuates the alarms should be considered separately.

FIRE WALLS AND PARAPETS

Fire walls are tied in closely with the subject of excessive areas, and here is a problem on which fire protection authorities have been gnashing their teeth since the appearance of long, spread-out, assembly-line plants. How, they ask, can a raging fire be controlled in these "wind tunnels"? How, with a vast interior floor area, can fire-fighting forces make any attempt to get to the center of the fire?

Here the architect finds himself right in the middle. On one side are the fire protection authorities, and they are not talking without authority when they speak of the disastrous losses, both of property and of life, which have resulted from fires in such undivided areas. And on the other side is the client, who maintains that he *must* have these areas for efficient operation of his plant. And, after all, it is he who pays, not the inspector. So what to do?

The answer usually turns out to be somewhat of a compromise, but not usually so great as might be expected. The client, being of reasonable mind, has realized, especially since Livonia, that it is wise to listen to the counsel of qualified fire protection engineers. They will tell him that nothing really replaces the fire wall. This good, substantial separator will suffer through a fire of maximum intensity and, with proper protection of necessary openings in it, will confine the fire to the designated area until it expires. But they know that there are other not-so-effective devices which can be used to break up excessive areas. Non-combustible partitions will isolate a fire for at least a short period of time. Draft curtains to confine heat are used in some areas, and although only substitute measures, they are better than nothing. Oftentimes the sprinkler system is set up to provide a water curtain, which serves as a wall of sorts.

Fire walls are commonly made thicker than would be required by normal fire resistance rating requirements in order to withstand heat expansion effects. They are generally self-supporting and should be designed to maintain their structural integrity in case of complete collapse of the structure on either side.

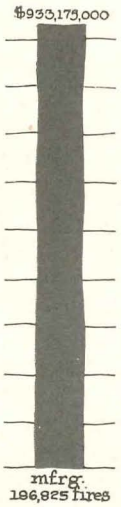
Whether their function is to subdivide a building or to separate two buildings, fire walls should be parapeted when used in non-fire-resistive buildings.

FIRE DOORS

Fire walls are, in the ideal installation, solid walls. However, if, as is true in most cases, they must be broken by openings for the passage of equipment, material or personnel, these openings should be protected with approved fire doors. Fire doors are usually of two types. One is the "automatic" type,

NFPA

McKay-Davis Chemical Co., near Toledo, Ohio. Burned Sept. 14, 1955. Loss: $309,000. Contributing causes: No sprinklers or automatic fire detection system, unprotected horizontal openings, fire doors blocked open, flammable liquids.



INDUSTRIAL BUILDINGS

Industrial buildings accounted for 21 per cent of all fire losses reported in the period 1950–1954! This figure can be decreased if the following factors are given serious consideration: ***Control of Excessive Areas*** *— Manufacturers are finding more attraction in rural areas, which give them plenty of room to spread out horizontally, with long production lines and much overhead equipment. These areas should be divided as much as possible, and fire wall openings protected.* ***Water Supply*** *— These small rural areas are often far removed from adequate water supplies, and therefore some provision must be made for supplementary sources of water to supply not only fire fighting forces but also* ***Sprinklers,*** *which are needed in most areas of modern plants, especially windowless plants. Provision for* ***Automatic Fire Detection*** *must be supplied separately in areas which are not sprinklered.* ***Hazardous Areas*** *— Extra protection must be given them, not only in equipment but also in location and construction to keep them removed from other areas.* ***Steel Beams and Columns*** *should be protected by an insulating covering or by an automatic water spray to decrease the chance of buckling.*

which is held open during normal operations by a chain or some other connector in which is incorporated a thermostatic element. When this element is actuated by the heat of fire, the chain is released and the door springs closed. The second type is "self-closing." It is used regularly during normal operations and swings closed after each opening.

All other openings in fire walls must be protected also, so that there can be no chance for a fire to leak through at any point. All holes for pipes, ducts, conveyor lines and any other services which must break through the wall should be adequately and thoroughly fire-stopped.

ENCLOSED VERTICAL OPENINGS

Open stairways and elevator shafts provide ready-made flues for carrying fire and smoke throughout a building. When properly enclosed from top to bottom of a building, they not only serve to hold a fire in check but also serve as a means of escape for persons in the building. A protected stairway also permits fire fighters to approach closer to the actual seat of the fire and provides a protected area at each floor level from which they can operate.

Vertical openings speed not only the spread of fire and smoke but also the rise of heated gases. Dumbwaiter shafts, wastepaper and laundry chutes and other vertical openings, when not properly enclosed at each opening, also contribute to fire spread. Oftentimes building occupants on upper stories which are not even affected by the fire expire from exposure to gases which have risen through the building. These gases sometimes explode when they reach upper levels, or ignite combustibles on these levels, and so spread havoc to areas which might otherwise have remained untouched.

According to the National Board of Fire Underwriters, "The enclosure walls or partitions for interior stairways and elevator shafts should have a fire resistance rating depending upon the type of construction and class of occupancy. Door openings must obviously be protected by doors of suitable type. In tall buildings, elevators will instinctively be used as the first and most natural means of exit, and to insure that they will not be put out of commission while the shaft is still livable, the elevator operating machinery should be properly enclosed."

AUTOMATIC DAMPERS IN DUCTS

Air conditioning and heating ducts, like vertical openings, act like flues unless they are protected, and when they run horizontally they serve to pass smoke and gases to adjoining areas. The protection that is essential in ducts is fire dampers, especially where the ducts pass through fire walls. Dampers are usually held open with fusible links which melt from the heat of fire and allow the dampers to close in the direction of air movement.

Smoke dampers, although expensive, prove to be a practical investment in buildings in which the stock is likely to be damaged by smoke or in which panic is likely to ensue as a result of smoke. The smoke-detecting system, as mentioned before, is usually based on an electrical beam, which, when broken by the passage of smoke, will cause the dampers to close.

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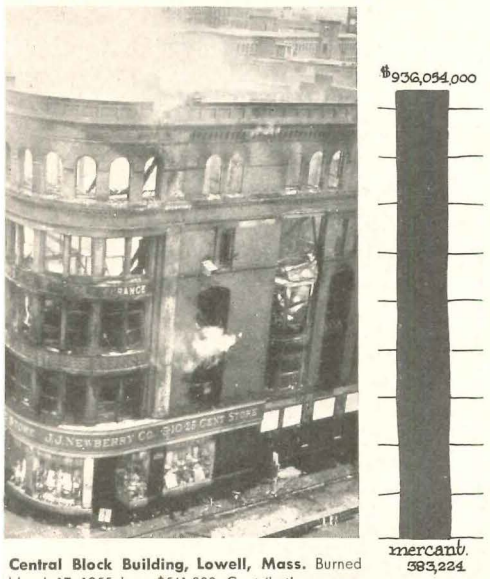
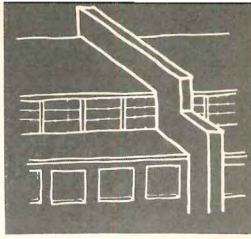


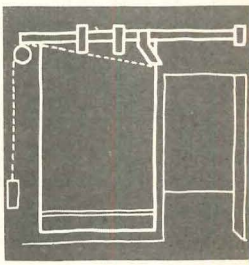
Central Block Building, Lowell, Mass. Burned March 17, 1955. Loss: $561,000. Contributing causes: no automatic detection, unsprinklered areas, unenclosed stairwells and elevator shafts.

MERCANTILE BUILDINGS

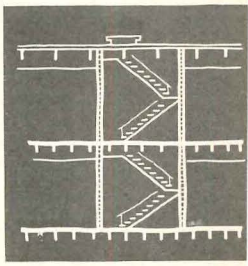
A higher percentage of mercantile loss is accounted for in small fires than is true for industrial buildings. Most fires still break out in storage and service areas, where ***Sprinklers*** *and* ***Automatic Detection Systems*** *can be most useful. New buildings usually boast adequately* ***Enclosed Horizontal and Vertical Openings.*** *This is particularly important in multistory buildings, where protected elevator shafts and stairwells can provide a means of escape. Plans should provide for adequate* ***Exits,*** *well marked and easily reached. This is true especially in stores, in which aisles should be wide enough and markings clear enough for hasty egress. With the increased complexity of ducts and piping in new buildings, increased attention should be given to* ***Dampers in Ducts*** *and other measures to prevent fire spread, also to* ***Insulation*** *around pipes.*



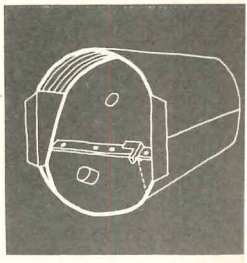
Fire Walls *Excessive floor areas should be subdivided with fire walls where possible; parapeled fire walls should separate adjoining buildings*



Fire Doors *Door openings in fire walls should be protected with standard fire doors; other openings, for pipes, etc. should be firestopped*

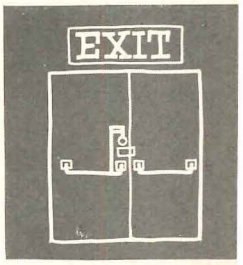


Enclosed Vertical Openings *Stairways and elevator shafts should be enclosed and protected against the spread of fire, smoke and gases*

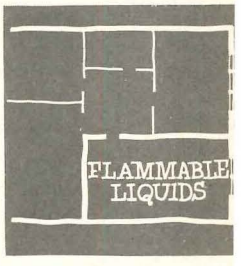


Automatic Dampers in Ducts *Air conditioning and heating ducts should be protected against a "flue" effect by means of automatic fire dampers*

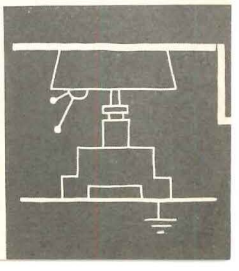
Adequate Venting *Venting should be suited to the function: for exhaust of heat, fire, smoke or gases or for release of explosion pressures*



Adequate, Accessible Exits *Exits should be adequate in number, well distributed and clearly marked to provide a safe path to the outside*



Segregation of Hazardous Areas *Areas which house hazardous materials should be so located as to minimize danger of fire spread*



Protection against Static Electricity *Areas in which static charges can be generated near ignitible materials should be grounded*

All duct linings should, of course, be fire-resistive. If combustible, they provide fuel to spread fire through the ducts; then dampers will do little good.

Dampers lose their value also if the duct fails either by pulling out of the wall, thus leaving an opening, or by collapsing. Protection against the first event is afforded by installing in the wall a 10-gauge or heavier steel sleeve into which the duct can be inserted. Protection against the second event is afforded by fire-resistive enclosures around the main vertical ducts so that the heat will not cause them to collapse.

Conversely to the danger air conditioning ducts present in the spread of fire, they can be used positively under the right circumstances. In windowless buildings or buildings in which there is an extreme panic hazard, the air conditioning system can be used for smoke removal.

ADEQUATE VENTING

Venting is important in many areas of operation, probably the most familiar of which are kitchen and laboratory areas and hazardous industrial areas in which explosions are possible. In many new one-story plants with unbroken interior spaces, roof vents have been installed for exhausting smoke and gases, thus increasing visibility and accessibility for fire fighters.

In kitchens the exhaust of heat and gases presents somewhat of a problem because grease which condenses on duct interiors can be ignited easily by a spark or a small fire from the range. Filters to collect the grease provide a solution only when they are cleaned or replaced frequently. Other factors are standard for almost all duct exhaust installations: no dampers, ample clearance from combustible materials, exhaust to outside of building, no connections with other ventilating systems, handholes and other facilities for cleaning.

In explosive areas, vents should be provided for release of pressure before structural members are damaged. The selection of vents should be governed essentially by the strength of the structure and the expected intensity of the blast. There are a number of different venting methods which can be used.

The structure itself can be the means of venting, with lightweight wall sections which will blow out at the first impact of an explosion.

Hatches in the walls or roof of heavily constructed buildings can be installed to blow out in the event of an explosion. Some roof hatches, often combined with skylights, are designed with thermostatic elements, so that they will open in the event of fire as well as explosion. This type of roof vent, sometimes operated manually instead of automatically, is installed frequently in non-hazardous areas, such as schools, in order to provide a means for removing smoke and gases resulting from fire.

Large roof openings, protected by light weather hoods which will blow off in an explosion, can be installed on the roofs of one-story or multi-story buildings in warm climates.

Louvered openings have served effectively as vents for the release of explosion pressures even though they can't be considered completely unobstructed.

All vents should, of course, be located as close as possible to the expected point or origin of an explosion, if it can be predetermined, with exhaust to the outside of the building.

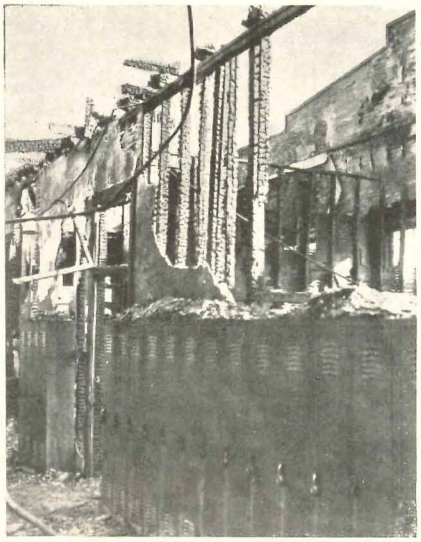
ADEQUATE, ACCESSIBLE EXITS

Exits are usually the only means of escape for occupants of a building in the event of fire. Nobody relishes the prospect of having to use a window to escape, and outside fire escapes are not only impractical in many cases but often dangerous. Therefore, exits should be given very careful consideration. They should be well distributed and clearly indicated. A person on the top floor of a building should be able to find his way, by means of obvious, well-placed signs, to a protected stairway and thence to an outside exit.

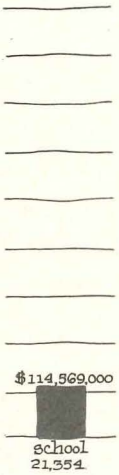
In one-story buildings, ample exits should be provided and marked. In many one-story schools, each classroom has both a door leading to the outside and a door leading to the corridor. Both, of course, should open outwards so that flow of traffic toward them will not prevent their being opened. All exterior doors, for that matter, should open outwards, and often panic bars are useful when there is a chance that there might be a panicked rush toward them. In some buildings, such as psychiatric hospitals, where it is desirable that only a few exits be used regularly, a central control system can be installed to actuate panic bars on doors or locks on windows which should normally be kept locked.

There should always be at least two means of escape from any one area, each remote from the other.

NFPA



Carmi Township High School, Carmi, Ill. Burned Jan. 3, 1955. Loss: $250,000. Contributing causes: No sprinklers or automatic fire detection system, non-fire-stopped walls and ceilings.



SCHOOLS

Schools, like plants, seem to be spreading out horizontally, with one-story buildings the rule, instead of the exception, in rural areas. This makes for a high degree of fire safety, especially in those schools in which there are outside ***Exits*** *from every classroom. Two-story and multi-story schools should have well-planned exits, with the required* ***Enclosed Vertical Openings*** *for stairways. For fire drills a* ***Fire Alarm System*** *and a good* ***Communication System*** *are necessary. Cafeterias and boiler rooms, although not strictly* ***Hazardous Areas,*** *are the origins of many fires and so should be separated from the rest of the school.* ***Steel Beams and Columns,*** *often exposed in one-story schools, should be protected.* ***Interior Finish Materials*** *should be carefully selected, for it is usually these which add fuel to an incipient fire.*

HAZARDOUS AREAS

Structural damage resulting from explosions can be minimized by locating hazardous operations or equipment outside the building, either in a separate building or cut off from the main building by a pressure-resisting wall. With the increasing use and storage of dangerous and combustible gases, vapors and liquids, especially in industrial buildings and hospitals, special attention must be given to protecting the rest of the building from them.

Many hospitals store their oxygen supply outside the main plant and pipe it into the building. In plants, hazardous operations should be carried out in areas which are well segregated from the rest of the building. Even in schools, laboratories should be planned so that they are in a separate wing. No matter where the operation is housed, however, venting, as discussed before, should be adequately provided for, whether it be through roof vents, through blow-out panels or through lightweight walls.

There are other precautions which should be taken in areas in which there is a danger of explosion. Since fire will almost always follow the explosion, sprinklers should be provided and also fixed fire extinguishing equipment. This fixed equipment should be so installed as to minimize damage to it. Piping for the sprinklers should be supported by the strong, explosion-resistant, main framing members of the building. In the event the sprinkler line could be damaged, the inside fire hose lines should be fed by another source. When ductwork is used to vent the explosion, it should be strong enough to withstand maximum explosion pressure.

There are other hazardous areas, of course, than potential explosion areas. Boiler rooms, carpenter shops, trash rooms, even kitchens and laundries present a potential hazard, and these areas should be so arranged as to minimize the danger of fire spreading to other parts of the building. They should have sprinkler systems, fire-resistive walls and ceilings and fire doors at all openings.

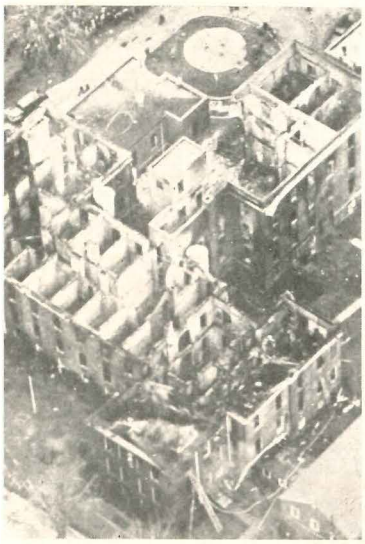
STATIC ELECTRICITY

The generation of static electricity in an area in which there are ignitible elements makes that area dangerous, and although it should be well-protected, it is not necessary to segregate it to the same extent as the hazardous areas described above. A widely used method of protection is that of grounding. In hospital operating rooms, where combustible gases are present and the generation of the slightest spark could start a fire or set off an explosion, the entire floor area is often made conductive and grounded to the building itself. All equipment in the room must then be of metal, conductive rubber or some other conductive material, so that it too will be grounded to the floor. In that way any possible electricity will be drained away before it can be generated in a spark.

SHUT-OFF VALVES

Shut-off valves should be provided in service lines of gases, vapors and hazardous liquids. They are most often located outside a building, so that they can be operated from without in the event

United Press Photo

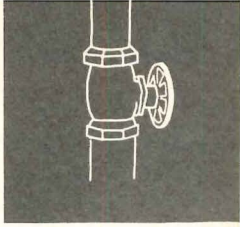


$10,253,000
hospital
8,225

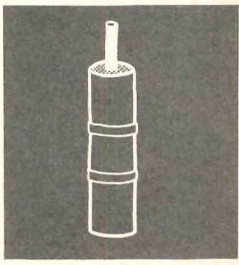
St. Anthony Hospital, Effingham, Ill. Burned April 4, 1949. Loss: $1,000,000+. Contributing causes: no sprinklers or automatic detection, unprotected vertical openings, combustible finishes.

HOSPITALS

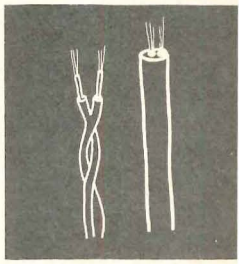
Hospital fire losses are practically negligible when compared with losses in industrial and mercantile buildings, mainly because so many precautions are taken (and are required by building codes) to minimize the chance of fire incidence. Buildings are usually of ***Fire-resistive Construction,*** *and* ***Interior Materials*** *are being selected more for their non-combustibility. The trend is toward smaller rooms;* ***Excessive Areas,*** *such as long corridors, should be broken up with fire partitions.* ***Fire Doors*** *should separate floor areas, especially kitchens, operating rooms, etc., where* ***Hazards*** *exist, and should be used in* ***Enclosed Stairwells.*** ***Communication Equipment*** *is an important consideration and should be used with the* ***Fire Alarm System*** *to provide the most satisfactory type of fire alert. All types of* ***Portable Equipment*** *find special uses.*



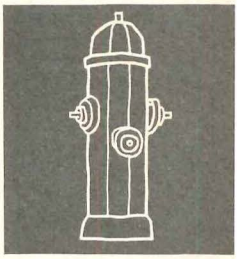
Shut-off Valves *Shut-off valves, automatic or manual, should be incorporated in all supply lines of gas, oil or flammable liquids or vapors*



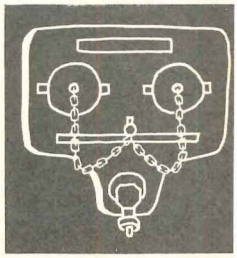
Insulated Pipes *All pipes, ducts and other heat-conducting elements should be adequately protected by insulation*



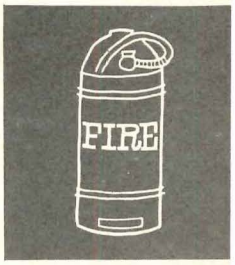
Adequate and Protected Wiring *Wiring should be planned to meet electrical demands of the building and should be properly insulated*



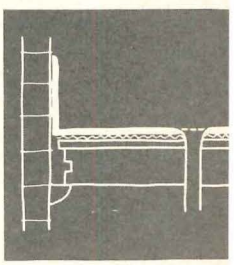
Adequate Water Supply *Either the public water supply should be both plentiful and powerful, or measures should be taken to supplement it*



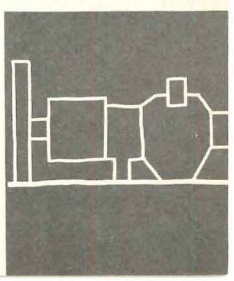
Standpipes *Exterior standpipes should be provided to receive large hose; interior standpipes usually have small hose attached*



Portable Equipment *Fire extinguishers of the proper type should be provided in all areas so that incipient fires can be controlled*



Drained, Watertight Floors *Watertight floors, with scuppers or drains, will protect the building against water damage*



Standby Equipment *Standby generators should be provided to ensure continuance of heat, light and other essential services if power fails*

the building cannot be entered. However, in some instances inside shut-off valves are desirable. This is true in hospitals, where valves located at specified locations in corridors can be reached quickly by hospital personnel if the oxygen supply must be cut off.

INSULATED PIPE

All steam pipes, and any other pipes which carry heated liquids, should be insulated so that they cannot come in contact with any combustible material. They should be especially well protected where they pass through wood partitions.

ADEQUATE, PROTECTED WIRING

If all electrical installations are made in accordance with the specifications of the National Electrical Code, there is almost positive assurance that the building will be well protected against the hazard of electrical fires — except, of course, those that are caused by faulty equipment or misuse of equipment.

The most serious threat in electrical installations today is that of the overloaded circuit. A large safety factor should be planned into each building to allow for an increase in the load. Some current-limiting device, such as a circuit breaker, must also be designed into the system to prevent overheating from an overload. Even though wire is well insulated and protected with cable coverings, overheating can cause it to eat through the insulation and heat the cable covering, thus endangering any combustible material close by.

ADEQUATE WATER SUPPLY

Water is the principal extinguishing medium of fires, and as such should be in adequate supply at all times and available at strong pressures. This has never been so important as it is today, because, with the exodus of many industries to rural areas, oftentimes there is not adequate provision made for reliable supplies of water. In order to assure constant protection in outlying areas, a secondary source of water, such as rivers, lakes and ponds, should be available. In areas where it is not possible to use such sources, the feasibility of installing a pressure tank to supplement the city water supply or gravity tank should be considered.

When water is abundant in both supply and force, its range of projection and thermal properties make it unequalled for controlling fires of all types. The variety of mechanical equipment and varieties of spray and fog nozzles with which it can be applied increase its versatility of extinguishment. It is being perfected to an even higher degree now with the possibility of conditioning it with chemical additives, such as "wetting agents."

STANDPIPES

Standpipes and hose systems are particularly important in multi-story buildings. "Dry" standpipes are usually located on the exteriors of buildings so that they can be hooked up to the main water supply from hydrants and so pump water to the interior standpipes. Interior standpipes often have small hose already attached and ready for use by building occupants. It is desirable that these inside standpipes be recessed into the wall, so that there will be little chance for them to become damaged and perhaps inoperative in time of emergency.

"Wet" standpipes for supplying fire fighting forces, usually from a gravity tank on the building, should be located near exits if possible, so that hose attached to them can be run directly into the building.

PORTABLE EQUIPMENT

Fire extinguishers are, of course, the most used and most practical type of portable fire extinguishing equipment, and they are valuable to have in every building regardless of what other types of equipment are provided. It is especially important to supply them in areas such as kitchens, laboratories and boiler rooms, where flash fires are possible, so that they can be used immediately, before the fire has a chance to gain headway. The original extinguisher has been refined and developed over the years, so that now there is a variety of models available for use on practically any type of fire. The most common types, besides clear water, are foam, soda acid, carbon dioxide, vaporizing liquid and dry chemical. As with inside standpipes, it is desirable to recess portable equipment to reduce its damageability.

Other portable equipment should be considered also. In many industrial buildings, where in-plant fire fighting forces are prepared to attack fires before the fire department arrives, mobile equipment, with well-equipped small trucks, is provided. And there are many areas in which fire axes and other equipment find good use.

DRAINED, WATERTIGHT FLOORS

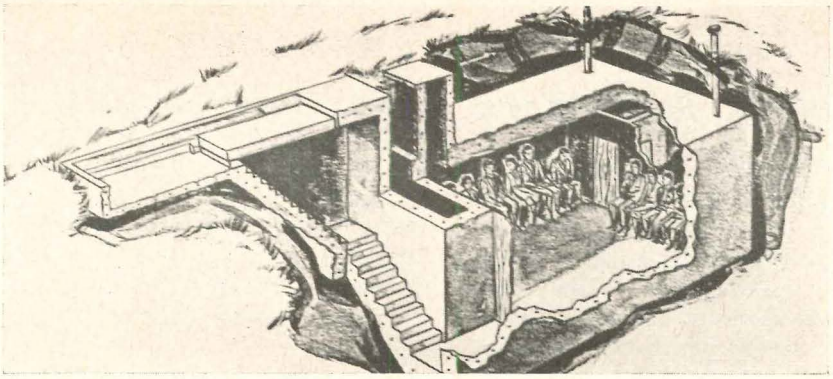
As stated earlier, water damage from fighting fires is often more serious than damage from the fire itself. Water damage can be reduced by installing floor drains or wall scuppers and ensuring that all floors are water-tight. This means that all pipe and conduit holes and floor cracks must be thoroughly caulked. Proper drainage is particularly important in areas in which valuable equipment is located. Watertightness of floors will reduce water damage to the building structure not only from fire fighting but also from common condensation and leakage problems.

STANDBY EQUIPMENT

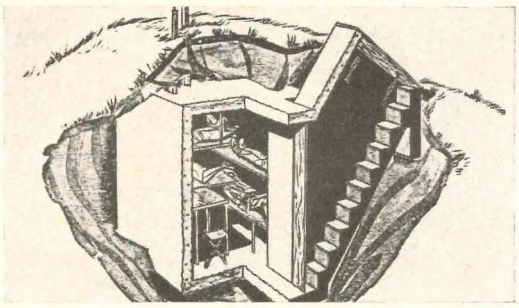
Standby generators should be provided in buildings the size of which warrants them. They are especially important, and urgent, in buildings in which there is the slightest danger that power supply to automatic fire protection equipment will become inoperative. In such an event, auxiliary equipment should be available for immediate use.

MOST FREQUENT CAUSES OF FIRE

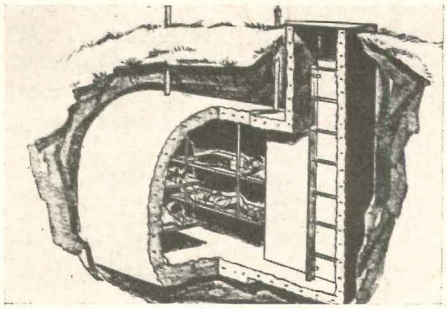
- Smoking and matches
- Careless disposal of trash, hot ashes or coals
- Defective or improperly operated electrical services, fixtures or appliances
- Defective or improperly operated heating equipment
- Defective or poorly installed chimneys or flues
- Inadequate clearance of heating equipment and ducts from combustible materials
- Spontaneous ignition of oily rags or materials
- Explosions
- Open-flame devices (gas appliances, kitchen ranges, laboratory equipment, etc.)
- Special hazards
- Careless handling of flammable liquids or vapors
- Exposure
- Friction and static sparks
- Repair and alteration hazards
- Welding and pipe thawing
- Lightning
- Defective elevator machinery
- Defective incinerators
- Incendiary



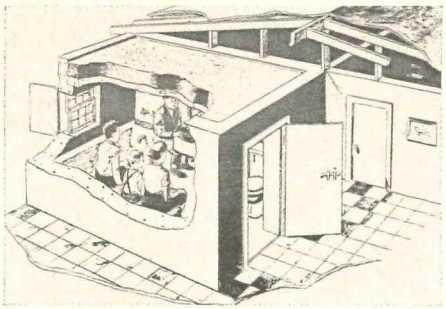
Underground Shelter for 40 Persons



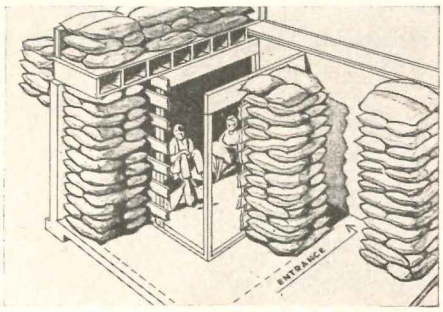
Intermediate Shelter for 4 to 10 Persons



Cattle Pass Pipe Shelter



Reinforced Concrete Bathroom



Fallout Shelter

FCDA PUBLISHES DESIGNS FOR STANDARD BLAST SHELTERS

A SERIES of residential and industrial shelters for protection against blast, heat and radiological effects in areas outside the total-destruction zones of nuclear weapons has been designed by engineers of the Federal Civil Defense Administration. These designs have been issued in keeping with the FCDA's policy of continued urging that residences 10 or more miles from any area that could be a bomb target be equipped with reasonably economical shelters. Shelters are feasible closer than 10 miles from the explosion point of a nuclear bomb, but their cost increases considerably.

The shelter designs were developed on the basis of past test experience and current weapons effects knowledge. They will be furnished without charge by any FCDA office.

Underground Shelter for 40 Persons. This special, heavy-duty shelter was tested at the Operation Cue atomic explosion at Nevada Test Site last May. Based on preliminary evaluation of these tests, it is believed that this shelter would afford adequate protection even in the outer ring of complete destruction surrounding Ground Zero. Designed to withstand an overpressure of 100 psi, the structure is built of reinforced concrete with a 21-in.-thick roof which is 4 ft 7 in. below ground level. The entrance is closed by a sliding slab door of steel and reinforced concrete 8 in. thick, flush with the ground, and this is supplemented with a steel blast door at the bottom of the steps. An alternate way to the surface after an attack is provided by a vertical escape hatch which is filled with sand. A heavy steel trap door at the bottom of the shaft can be opened to let the sand slide into the shelter and so clear the hatch.

Completely equipped with ventilation and its own self-contained power generator, this shelter can be built at a cost (estimated by FCDA) of $15,000 or $16,000. For a larger shelter, to hold 100 or more persons, the cost would be much less per person, since only the lengthening of the shelter room would be necessary. The structural design of this shelter was worked out by Ammann and Whitney, Consulting Engineers, New York City, with FCDA engineers.

Intermediate Reinforced Concrete Underground Shelter for 4 to 10 Persons. This shelter is designed for the peripheral areas of larger cities, the "intermediate" area which must be used if there is insufficient time to permit complete evacuation. It can be built of reinforced concrete or reinforced masonry blocks. The roof is a 6-in.-thick reinforced slab about 2 ft 10 in. under ground level. The entrance is closed with a plywood door 2 in. thick which should withstand an overpressure of 15 psi. It is held down from the inside by turnbuckles to keep it from being ripped off by the suction wave which follows a blast wave. (FCDA estimate: $1100.)

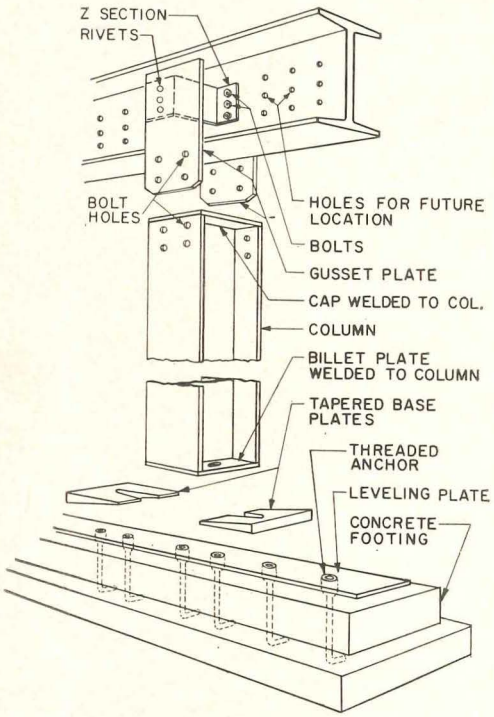
Cattle Pass Pipe Shelter. This shelter is constructed of sections of reinforced concrete pipe or corrugated metal pipe, which is normally used to pass cattle under a highway. The concrete pipe is 6 ft 8 in. in diameter, 6 in. thick and is covered with earth about 2¼ ft deep. The shelter is entered through a vertical shaft and ladder, closed at the top by a plywood door 2 in. thick which should withstand an overpressure of 15 psi. This door is also held down from the inside by turnbuckles. (FCDA estimate: $900.)

Reinforced Concrete Bathroom. In homes which do not have basements, a blast-resistant shelter can be created by making the bathroom walls and ceiling of reinforced concrete 8 in. thick. In Operation Cue, such a reinforced bathroom, tested under an overpressure of 5 psi, remained standing although the one-story frame house containing it was demolished. (FCDA estimate: $500.)

Fallout Shelter. This shelter, which can be built in the corner of a basement, consists of a sturdy framework to support bags filled with earth, sand or similar material. It protects only against radioactive fallout and not against blast effects. Blast protection requires a corner basement shelter of heavier construction (see AR, Sept. 1955, pp. 236–237).

"MOVABLE" COLUMNS INCREASE FLEXIBILITY

STRUCTURAL CHANGES at a fraction of standard cost are offered by Nash Babcock, professional engineer of Old Greenwich, Conn. He has invented and applied for a patent on a "movable" column system which he promises will make possible the enlarging of clear working spaces between columns in existing buildings. What's more, says Mr. Babcock, this structural feat can be performed at a cost of about $500 per column (as opposed to a cost of approximately $25,000 to move a standard column) and can be accomplished overnight (instead of over a period of more than a month). Under normal conditions installation of "movable" columns will not increase original building costs.



The time factor makes this system particularly desirable in industrial buildings, where columns can be moved overnight to accommodate new machinery and production lines without any interruption of normal operations. In other one-story buildings, such as shopping centers, supermarkets and warehouses, areas can be enlarged where desired just as simply. The system can be applied to two-story buildings as well, but original construction costs will be affected slightly to pre-plan the structure for the changes.

The basic components of this system are shown at the left. The beams are of the same depth throughout the structure and are designed as continuous beams. Each beam is pre-punched along its neutral axis, as shown, to receive connections from columns at different locations. Column bearing is taken by a one-way, elongated footing, to the top of which is grouted a leveling plate. Anchors are cast in with the concrete footing to correspond to the pre-drilled beam holes, and they are flush with the top of the leveling plate.

To install the columns, two bolts are placed into a threaded receptacle in the anchor through a billet plate and base plate. At beam height, a gusset plate is welded to a Z-shaped member which is bolted to the pre-drilled holes in the beam. The top of the column is connected to the gusset plates with bolts through four holes in each flange. This arrangement ties the beam to the column with minimum danger of a twist in the beam.

When a column location is to be changed, a new column is first installed where desired, using the pre-drilled bolt-holes in the beam and in the corresponding footing anchors. In order to take up any deflection of the beam which would result from a change in location, two slotted wedge plates are driven up tight between the leveling plate and billet plate and the bolts thoroughly tightened. When the new column is in place, the old column is removed simply by disconnecting the attachments and driving out the wedge-shaped base plates.

There are pre-design features which must be remembered, of course. The beams must be designed for potential future spans using the moment distribution system rather than the simple beam system. Future column location beam holes must be punched as close to the neutral axis as possible, and footings elongated in either a north-south or east-west direction to provide for future column bearing.

The distance a column can be moved will depend on the design of the beam. The flexibility of this system can be applied to wood, steel or concrete and to beams, joists and trusses.

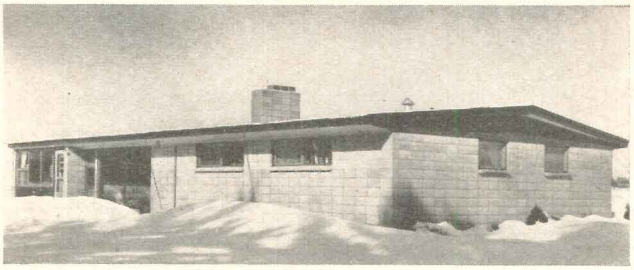
ELECTRONIC GRADING FOR STRUCTURAL WOOD?

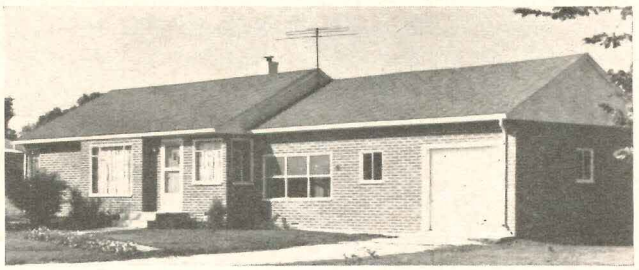
STRUCTURAL WOOD MEMBERS in homes, stores, churches, schools, factories and other buildings may be reduced by as much as 50 per cent — with accompanying reductions in cost — with automatic stress grading of lumber. This could be possible, says the National Lumber Manufacturers Association, with new equipment for ultrasonic testing of wood. Demonstrated at the 1955 annual meeting of the NLMA, the equipment consists of an electronic transmitter and receiver. The transmitter sends out electronic impulses which are converted into sound waves by a piece of quartz. These sound waves penetrate the piece of wood being tested at the rate of about 500,000 vibrations per second, some 30 times faster than most human ears can detect. When the sound waves come across something out of the ordinary in the wood — a knot, void or split — it is registered on the receiver, which is a cathode ray tube, by a sharp variation in the normally horizontal line. Present stress grading of structural members is based on the exterior appearance of the lumber, the law of averages, personal opinion and an added safety factor, which often requires an architect to specify a much larger size wood member than is actually necessary.

Sound waves may also be put to another use, predicts NLMA. Once atomic energy developments have reduced power costs, sound waves could be generated to cut lumber, thus eliminating the nuisance of sawdust.

Lower cost wood building products may also be possible with the development of better outlets for wood waste materials. "Concrete boards," which are now widely used in Europe, could be produced by combining wood excelsior with portland cement. This would produce an efficient building block with the natural insulating values of wood and the known qualities of concrete. "Wooden bricks" may be available in the future from short and narrow pieces of lumber and small clear cuttings from lower grades of lumber.

(*More Roundup on page 252*)





Lightweight, cellular concrete supports house at left; thin brick units are nailed onto house at right

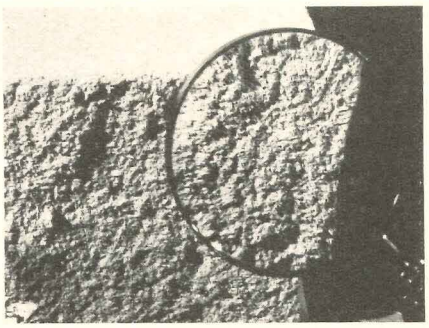
MASONRY MATERIALS ARE LIGHTWEIGHT, EASY TO APPLY, ECONOMICAL

Lightweight Concrete is the important element in the "Elasticrete House" shown above left. *Elasticrete* is a cellular concrete that is said to be strong, self-insulating, highly moisture-resistant and adapted to many uses. Its main ingredient is *Elastizell*, which is compounded of a foaming agent and a water-soluble plastic agent. When these agents are mixed with wet concrete, in a special mixer, the result is a homogeneous cellular or bubble structure of high tensile strength. The process permits a high degree of density control, thus positive control over the factors of weight, strength and insulation.

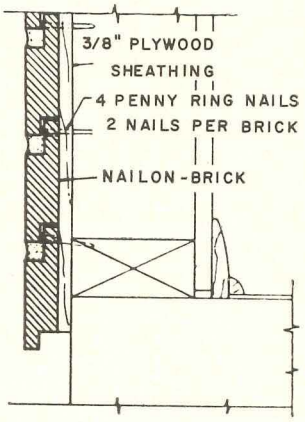
With these controls, the manufacturer claims that unprecedented savings in weight and handling are possible in multi-storied and residential buildings. As a self-insulating floor slab on grade, it has a low moisture-absorption factor and so can take almost any type of floor covering: cork and rubber tile, linoleum, parquet wood flooring or wall-to-wall carpeting. In multi-story buildings Elastizell concrete floors, with the usual fill depth of 2½ in., are said to save 8 psf over ordinary lightweight aggregate concrete and 15 psf over ordinary concrete. As roof fill, it is highly insulating and minimizes the danger of moisture damage from the underside of the roofing.

In the house shown above, the Elasticrete slab was pumped over warm air heating ducts and electrical utilities. Steel piers were also in place to support the roof of corrugated asbestos concrete board. The walls utilized two courses of stacked 4-in., lightweight, concrete masonry blocks.

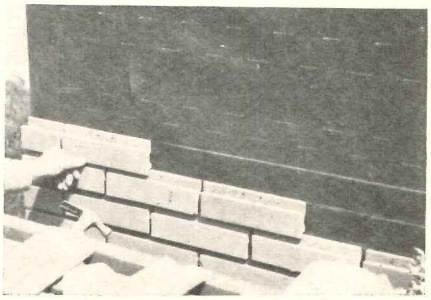
A magnified view of the lightweight, cellular *Elasticrete* is shown above right. *Elastizell Corp. of America, 15555 W. McNichols Rd., Detroit 35, Mich.*



Elasticrete is a homogeneous, cellular material of high tensile strength



Nailon Bricks are 1-in.-thick clay elements which are nailed in place



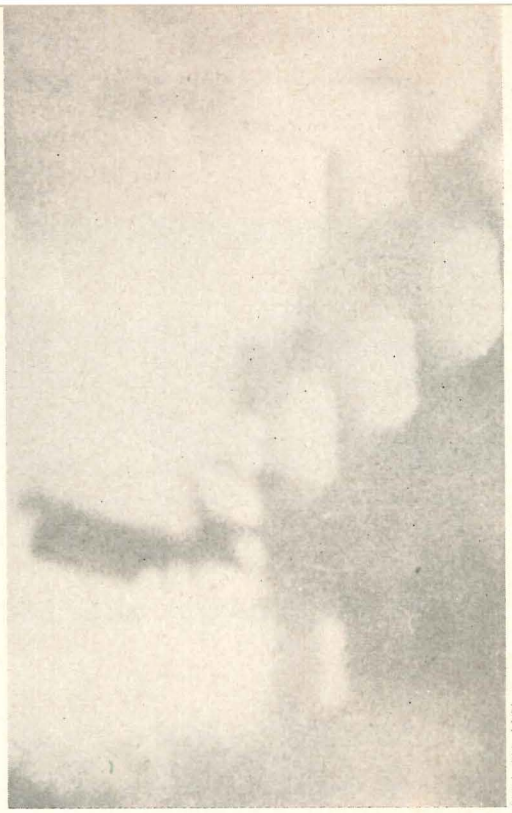
Nailon Brick is the facing on the house shown at right above. The 1-in.-thick "bricks" are of real clay composition and are the same as actual bricks in appearance, texture, size and mortared joints. They can be *nailed directly* to any nailable surface: plywood, wood siding, asbestos siding, stucco and concrete block.

The procedure for applying *Nailon Brick*, as shown in the photograph and drawing at left, is simple. The bottom row of thin brick elements is laid even and then nailed through two holes which are pre-drilled in the brick. Each successive course is fitted over the lips of the bricks in the preceding course and nailed in place. The joint is the same as with ordinary brick, ⅜ in., and is filled with mortar either from a caulking gun or with a trowel or tuck pointer's tool. The horizontal joints are wedge-shaped so that when the mortar has dried, the brick is locked in.

Two sizes of brick are being produced. 2½ by 8 in. and 2½ by 11½ in., to provide both regular and Roman brick effects. A larger brick, 7½ by 15⅞ in., is being tested. The bricks can be applied in any stacked or running bond that is possible with regular brick. An overlapping joint is available for corners which provides a mortared, weathertight joint without need for special corner pieces.

When used in residences, it has been determined that thickness of foundation walls can be reduced from 10 in. to 8 in. Other applications include fireplaces, chimneys and interior walls. Research on the product and its applications was directed by Yost & Taylor, architects, of Kenilworth, Ill. *Ludowici-Celadon Co., 75 East Wacker Drive, Chicago 1, Ill.*

(*More Products on page 263*)


Wide World Photos

ELEMENTS OF FIRE-SAFE DESIGN

As mentioned on page 229 of this issue, in the article entitled "Design for Fire Safety," organizations such as the NFPA and NBFU publish a never-ending list of valuable books and pamphlets which cover all phases of fire protection. Some of those available (at a small charge) from the *National Fire Protection Association, 60 Batterymarch St., Boston 10, Mass.*, are: "Fires in Hospitals and Institutions," "School Fires," "Fires in 'Fireproof' Buildings," "Protecting Our Heritage — Historic Buildings, Museums and Libraries," "Guide for Explosion Venting," "Must Stores Burn?", "Churches Are Burning." Some of those available from the *National Board of Fire Underwriters, 85 John St., New York 7, N. Y.*, are: "Fire Prevention and Protection as Applied to Hospitals," "Fire Safe School Buildings," "Fire Prevention and Protection as Applied to Hotels," "Fire Hazards and Safeguards for Metalworking Industries," "Fire Safeguarding Warehouses," "Fire Resistance Ratings." Also published by NBFU are the "National Building Code," 1955 edition, and "Building Codes — Their Scope and Aims." Some current manufacturers' literature on "designing for fire safety" is listed below.

Fire Protection Equipment. *Allenco Catalog 150* covers steel boxes and bucks, cabinets, carts, connections, couplings, drain connections and plate, extinguishers, fire hose, hydrants, nozzles, racks, reels and other accessories (AIA 29-E-2). *W. D. Allen Mfg. Co., 566 West Lake St., Chicago 6, Ill.**

Fire-resistive Construction. "Furred Metal Lath Ceilings" is the title of *Technical Bulletin 16*, which describes and gives specifications for furred ceilings under steel, concrete and wood joists (AIA File 20-B-1). *Metal Lath Mfrs. Assoc., Engineers Bldg., Cleveland 14, Ohio.**

Automatic Detection. *Detect-a-Fire* thermostats in electric temperature control and detection devices are described in a 4-page bulletin (AIA File 31-I-31) from *Fenwal Inc., 218 Pleasant St., Ashland, Mass.*

Special Hazard Protection. A 28-page booklet offers a thorough presentation of various automatic fire detection and fire protection installations for special hazard areas. It includes also a fire control and extinguishment chart for various occupancies. Bulletin 73. *"Automatic" Sprinkler Corp. of America, Youngstown 1, Ohio.*

Fire Extinguishing Systems. Rate-of-rise type, pressure-operated, carbon dioxide fire extinguishing systems, with accessory equipment, are described in a 16-page booklet from *Walter Kidde & Co., Inc., Belleville 9, N. J.*

Sprinklers. Various types of automatic sprinkler heads are described and explanations given of wet, dry, rate-of-rise and deluge systems in a 20-page booklet published by *Grinnell Co., Inc., 260 West Exchange St., Providence 1, R. I.*

Fire Alarm Systems. Selective code systems, fire alarm boxes, general alarm systems and fire alarm signals are presented in an 8-page illustrated brochure. Waterflow alarm systems, for protection against water damage, are also described. *The Autocall Co., Shelby, Ohio.*

Fire-resistive Construction. Fire-retardant and vapor-resistant built-up roofs for application over steel deck, poured or precast concrete deck or wood-deck are described, with specifications, in an 8-page brochure (AIA File 12-A-1) from *Lexsuco Inc., 4815 Lexington Ave., Cleveland 3, Ohio.**

Venting. Automatic fire venting with *Pyrodomes* and *Pyrovents*, which open automatically when a thermostatic element is actuated, is discussed, with diagrams, in an 8-page bulletin from *Wasco Products, Inc., Cambridge, Mass.**

Automatic Detection. *Fireye* detection systems, which transmit an electrical signal as soon as a sensitive element is exposed to infra-red radiation, are described, with standard specifications, in an 8-page brochure (AIA File 31-I-31) from *Electronics Corp. of America, 77 Broadway, Cambridge 42, Mass.*

Automatic Detection. A new radioactive pre-detector system is the subject of a 4-page bulletin which describes the operation of a radioactive element in detecting either visible smoke or invisible gases over a large area, thus activating alarm signals. *Pyrene — C-O-Two, Newark 1, N. J.*

Plaster Fireproofing. An 8-page brochure on *Perlite* insulating aggregate for concrete and plaster includes tables of fire ratings of Perlite constructions for structural steel columns, floors and ceilings, and walls and partitions (AIA File 21-C-1). *Perlite Institute, 45 West 45th St., New York 36.**

Fire Protection Equipment is the title of *Elkhart Catalog 55*, which covers cabinets, hose racks and reels, valves, standpipe siamese and accessories, nozzles, extinguishers, hose house and accessories, couplings and line hose (AIA File 29-E-2). *Elkhart Brass Mfg. Co., Inc., Elkhart, Ind.*

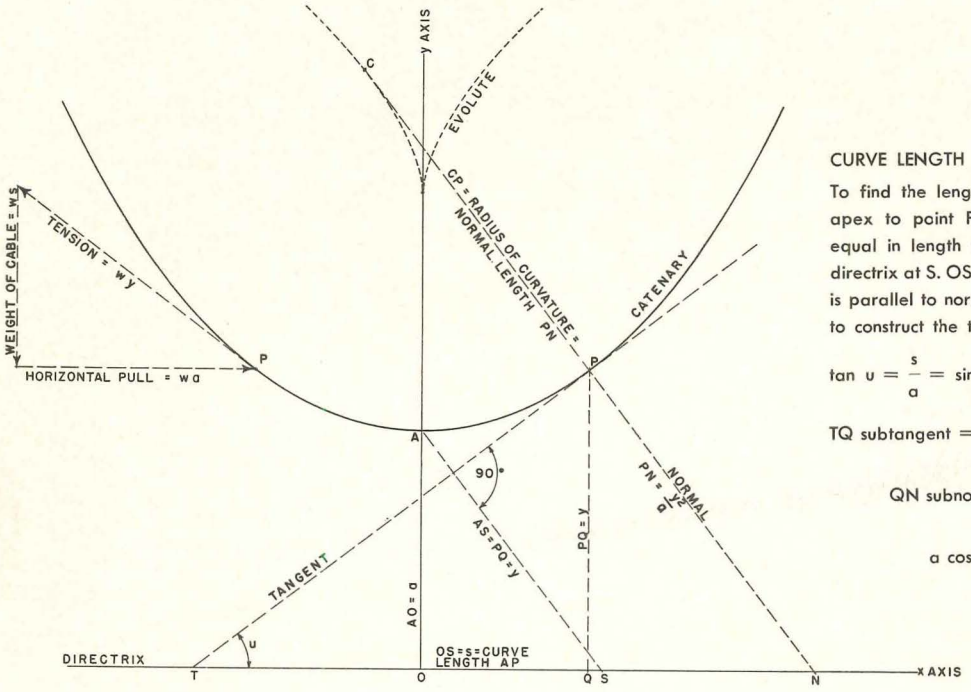
Fire-resistive Construction. A 20-page manual on *Cofar*, a deep-corrugated, high-strength, galvanized steel sheet which functions also as temperature reinforcement as well as a form for reinforced concrete floor and roof slabs, presents photos, details, selection tables, fire ratings, design principles and specifications (AIA File 4-E-4). *Granco Steel Products Co., 6506 North Broadway, St. Louis 15, Mo.**

* *Other product information in Sweet's Architectural File, 1956.*

(Continued on page 302)

USEFUL CURVES AND CURVED SURFACES: 7—Catenary

By SEYMOUR HOWARD *Assistant Professor, Pratt Institute, Architect associated with Huson Jackson and Harold Edelman*



CURVE LENGTH

To find the length of the curve from apex to point P_1 swing arc from A equal in length to y, intersecting the directrix at S. OS = length of curve. AS is parallel to normal and can be used to construct the tangent and normal.

$$\tan u = \frac{s}{a} = \sinh \frac{x}{a}$$

$$\text{TQ subtangent} = \frac{ay}{s} = a \coth \frac{x}{a}$$

$$\text{QN subnormal} = \frac{ys}{a} = a \cosh \frac{x}{a} \sinh \frac{x}{a}$$

DEFINITION

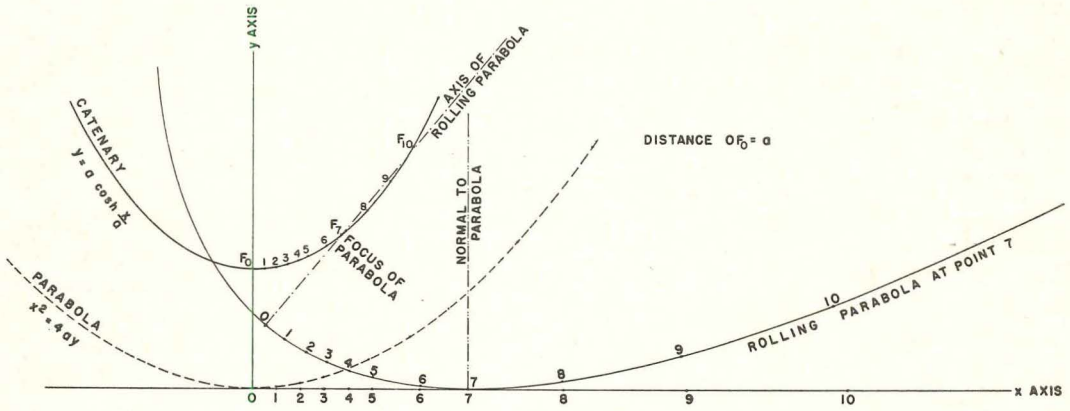
The catenary is the curve described by a perfectly flexible cord of uniform weight, hanging freely between two supports. All catenaries have the same shape and differ only in scale (size). The measure of this scale is the parameter "a," which is the distance from the apex to the directrix.

The relationship between the tension at any point in the cable and the horizontal and vertical components are shown above. w = weight of cable per unit of length.

Upside down, the catenary is also the curve of the pressure line of an arch of uniform cross section, loaded only by its own weight.

When the catenary is reversed, what is tension in the cable becomes compression in the arch.

METHODS OF DRAWING: THE CATENARY AS THE ROULETTE OF A PARABOLA



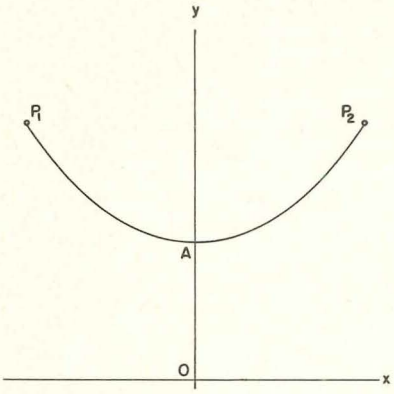
The catenary may be drawn by calculating points for the equation $y = a \cosh \frac{x}{a}$ and joining points, or it can be generated directly by rolling a parabola along the directrix. In either case the parameter "a," must be determined. As this is a trial and error procedure, the values of a in terms of SAG/SPAN ratios have been calculated and can be found directly from the graph on sheet 9. Having determined "a," the catenary can be drawn directly by first drawing a parabola with a parameter of 4a (2p in the notation on parabolas, previously published), shown here as the parabola $x^2 = 4ay$. The parabola is then rolled along the x axis as shown above and its focus will describe the desired catenary.

This is known as a roulette curve (cycloids are the most well known roulettes). The only practical difficulty consists in preventing the rolling curve from slipping as it is rolled. The curve which is to be rolled (in this case the parabola) should be drawn on a piece of tracing paper. Make a hole in the paper at the point whose locus is sought (in this case the focus). Draw the curve (in this case the x axis) along which the curve is to be rolled on another piece of paper. Mark points along the length of the parabola and draw normal (and/or tangent) at each point. Mark points at the same distances measured along the straight line and draw normal at each point. Roll the parabola along the straight line, matching points and lining up normals (and/or tangents) at each point. Mark through the hole the corresponding point of the roulette (in this case the catenary).

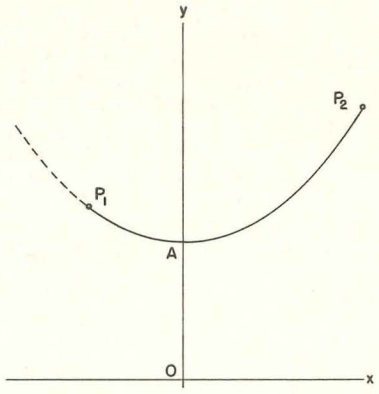
USEFUL CURVES AND CURVED SURFACES: 8—Catenary

By SEYMOUR HOWARD *Assistant Professor, Pratt Institute, Architect associated with Huson Jackson and Harold Edelman*

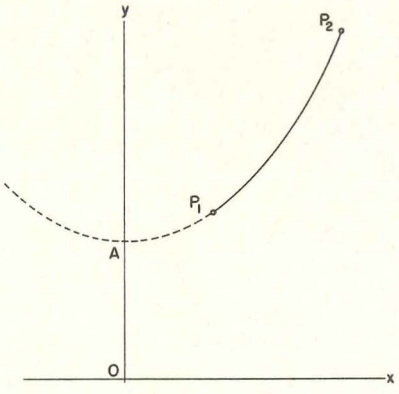
PROBLEMS OF THE CATENARY FALL INTO THREE GENERAL CASES:



CASE 1: BOTH SUPPORTS AT SAME LEVEL



CASE II: SUPPORTS AT DIFFERENT LEVELS, LOW POINT IN BETWEEN



CASE III: SUPPORTS AT DIFFERENT LEVELS, NO LOW POINT BETWEEN

1. If locations of P_1, P_2 and A are known, the SAG/SPAN ratio can be calculated and the parameter "a" found from curve on sheet 9, p. 249.

2. If only the locations of P_1 and P_2 are known, some additional information must be available. This may be:

a. The length of the curve between P_1 and P_2. With this it is possible to find "a" by trial and error graphically, remembering that the shape of the catenary is fixed and that the problem is one of scale. Over a catenary curve which has been accurately drawn, establish points P_1 and P_2 to some scale. The angle between the line which joins them and the y or x axis will be fixed. Measure the distance from P_1 to P_2 along the curve to this same scale. If this distance is less than the given distance, the points P_1 and P_2 must be moved higher (keeping their relative positions the same). (If greater, the points must be slid down the curve.) The correct scale for the new position must be worked out, the length along the curve measured according to the new curve and so on. When the scale is correct, measure the distance from A to O using this scale, and you will have the correct "a." This procedure can also be done algebraically, solving $S = a \sinh \frac{x}{a}$ by trial and error for each of the two distances P_1 A and P_2 A.

b. The tension in the cable and the weight per unit of length. Since $y = \frac{\text{tension}}{\text{unit weight}}$, the distance from P_1 or P_2 to the x axis can be found, and by adjusting the scale and drawing over an accurate curve, the apex A can be found and the parameter "a" calculated.

NOTES

TABLES OF HYPERBOLIC FUNCTIONS CAN BE FOUND:

1. "Smithsonian Mathematical Tables: Hyperbolic Functions," Pub. No. 1871, Gov. Printing Office, 1909, gives values to 5 decimal places
for $x = 0.0001$ to $x = 0.1000$
for $x = 0.001$ to $x = 3.000$
and for $x = 3.00$ to $x = 6.00$

2. "Tables of Circular and Hyperbolic Sines and Cosines for Radian Arguments," published as a WPA project, New York, 1939, gives values to 9 decimal places
for $x = 0.0001$ to $x = 1.9999$
and for $x = 2.0$ to $x = 10.00$

CATENARY AS ROULETTE OF PARABOLA

The demonstration of the catenary as the roulette of a parabola was first made by James Clerk Maxwell, "Theory of Rolling Curves," Transactions Royal Soc. Edin., Vol. XVI, Part 5 (1849), republished in "Scientific Papers of James Clerk Maxwell," edited by W. D. Niven, Dover Pub., New York, 1952.

ERRATA for Sheets 1, 3 and 5

Sheet 1: First paragraph. In lieu of "geodesic surfaces," read "geodesic lines on surfaces."

Sheet 3: (a) Paragraph explaining method of drawing parabola by heights of ordinates. After "All parabolas have the same shape, differing only in scale" add "Note these relations hold true no matter what the height to width ratio, provided the apex is included."

(b) Length of arc from origin to point x_1, y_1. The denominator in the expression between brackets should be p instead of 2.

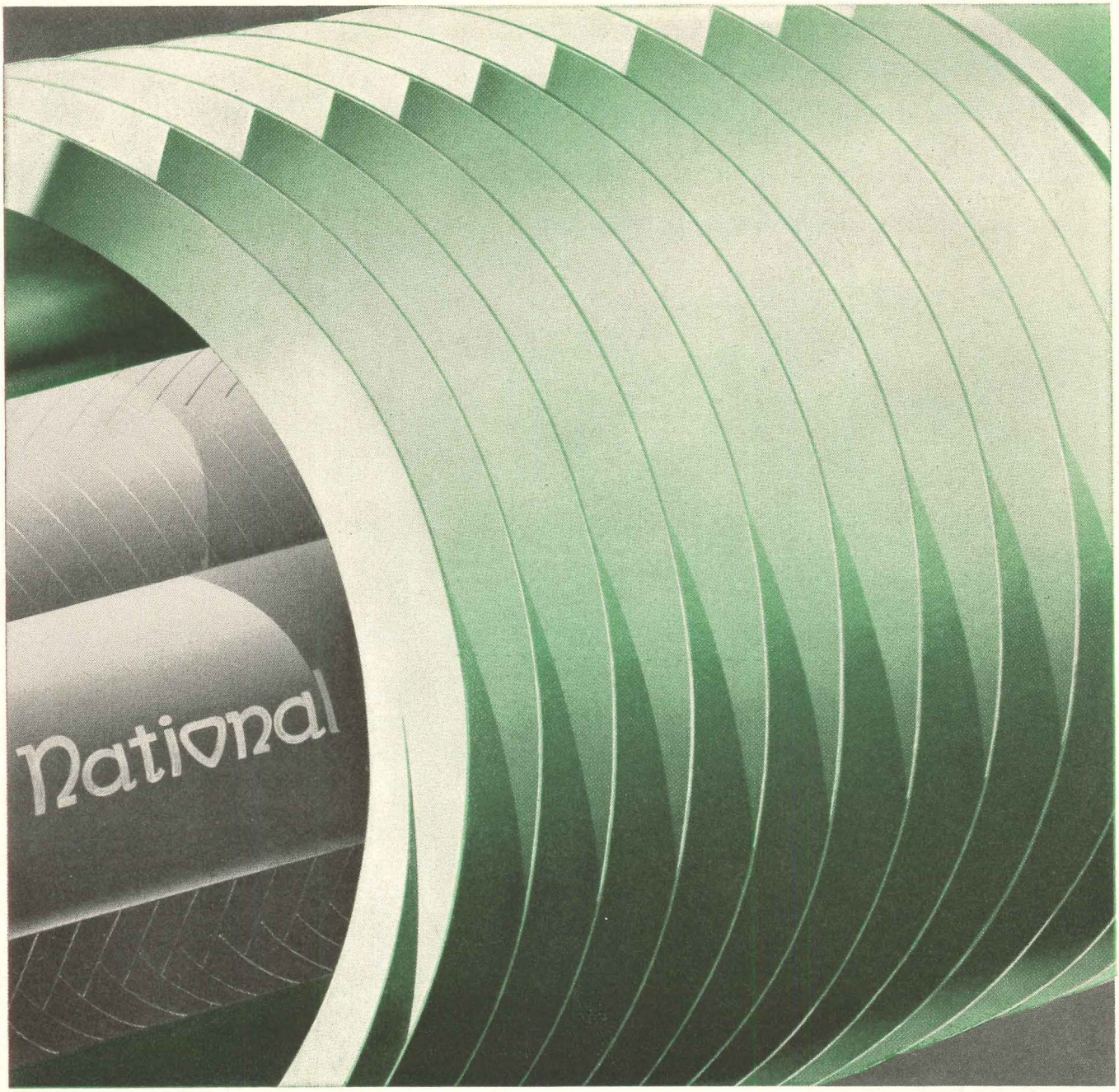
(c) In paragraph explaining how to find center of curvature, read "by setting off subnormal M_1N_1," in lieu of "setting of."

(d) Add to the same paragraph "Center of curvature can be found also by same procedure as for ellipse and hyperbola: P_1N_1, N_1Q, QC_1 (see Sheet 5, Evolute of Ellipse).

Sheet 5: (a) Equation of Evolute (Standard Form) read $a^{2/3} x^{2/3} + b^{2/3} y^{2/3} = (a^2 - b^2)^{2/3}$

(b) Centroidal Axis, read "$Y = \frac{R \sin \alpha}{\alpha}$"

(c) Moment of Inertia; close brackets after $- \frac{2 \sin^2 \alpha}{\alpha}$]



NO RUSTY·THREADS to worry about with Sherarduct

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Sherarduct Couplings are carefully designed to permit conduit end to butt inside the coupling, giving strength and rigidity to the system and making a smooth, continuous raceway through which conductors can be drawn easily and without injury.

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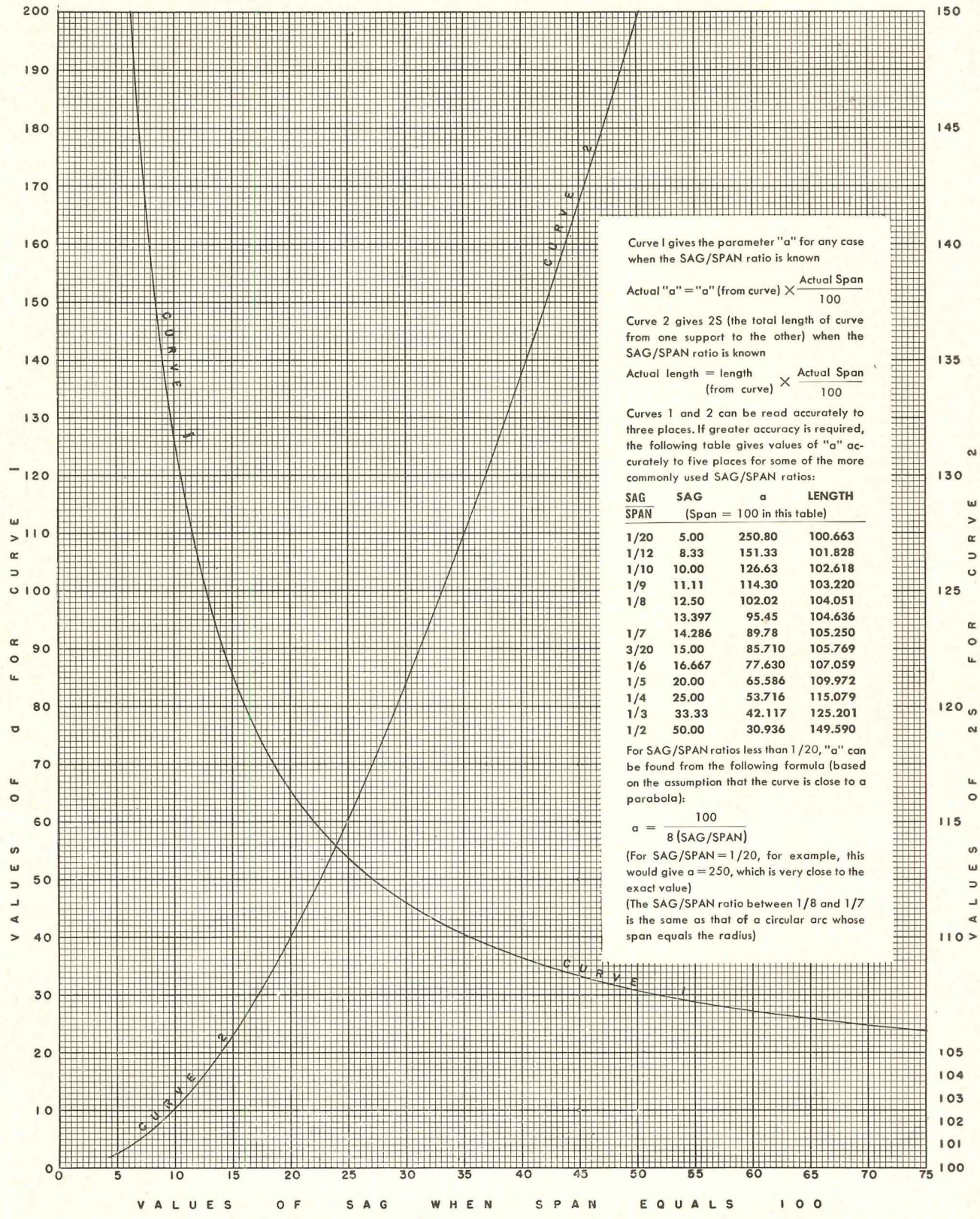
(To be continued in a later issue)

USEFUL CURVES AND CURVED SURFACES: 9—Catenary

By SEYMOUR HOWARD *Assistant Professor, Pratt Institute, Architect associated with Huson Jackson and Harold Edelman*



Curve I gives the parameter "a" for any case when the SAG/SPAN ratio is known

$$\text{Actual "a"} = \text{"a" (from curve)} \times \frac{\text{Actual Span}}{100}$$

Curve 2 gives 2S (the total length of curve from one support to the other) when the SAG/SPAN ratio is known

$$\text{Actual length} = \text{length (from curve)} \times \frac{\text{Actual Span}}{100}$$

Curves 1 and 2 can be read accurately to three places. If greater accuracy is required, the following table gives values of "a" accurately to five places for some of the more commonly used SAG/SPAN ratios:

SAG/SPAN	SAG (Span = 100 in this table)	a	LENGTH
1/20	5.00	250.80	100.663
1/12	8.33	151.33	101.828
1/10	10.00	126.63	102.618
1/9	11.11	114.30	103.220
1/8	12.50	102.02	104.051
	13.397	95.45	104.636
1/7	14.286	89.78	105.250
3/20	15.00	85.710	105.769
1/6	16.667	77.630	107.059
1/5	20.00	65.586	109.972
1/4	25.00	53.716	115.079
1/3	33.33	42.117	125.201
1/2	50.00	30.936	149.590

For SAG/SPAN ratios less than 1/20, "a" can be found from the following formula (based on the assumption that the curve is close to a parabola):

$$a = \frac{100}{8\,(\text{SAG/SPAN})}$$

(For SAG/SPAN = 1/20, for example, this would give a = 250, which is very close to the exact value)

(The SAG/SPAN ratio between 1/8 and 1/7 is the same as that of a circular arc whose span equals the radius)

When the fate of nations... depended on a piece of TEAKWOOD

K'wan Gung, legendary warrior of old Cathay was noted for valor and prodigious feats of arms. His saga, in song and verse—from ancient records, tells of his love for personal combat. His venerated spear, like the sword Excalibur of King Arthur, had a reputation. Its shaft was of polished teakwood and withstood the shocks of over 500 personal combats.

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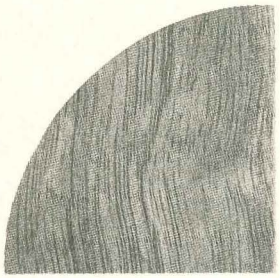

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Butternut	Prima Vera	Macassar Ebony	Figured Cherry
Crowntree	Teak	Brazilian Rosewood	Swiss Pearwood
English Brown Oak	Bosse'	Rhodesian Walnut	Figured White Ash

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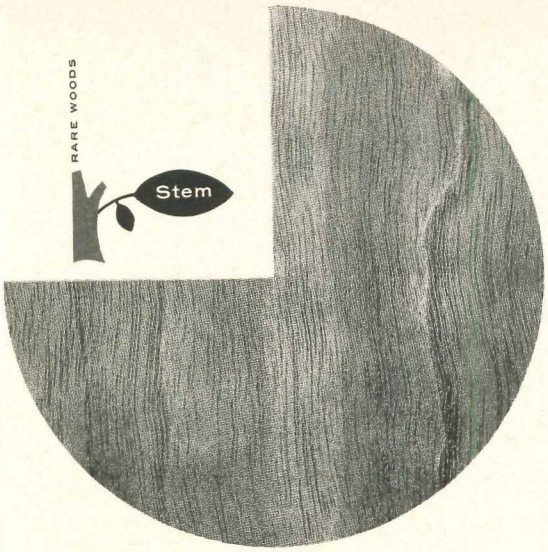
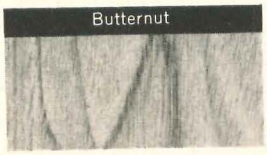
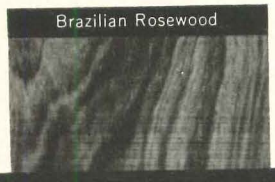
Stem



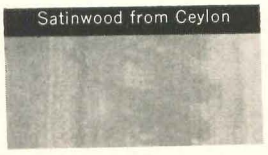
Butternut



Brazilian Rosewood



Satinwood from Ceylon

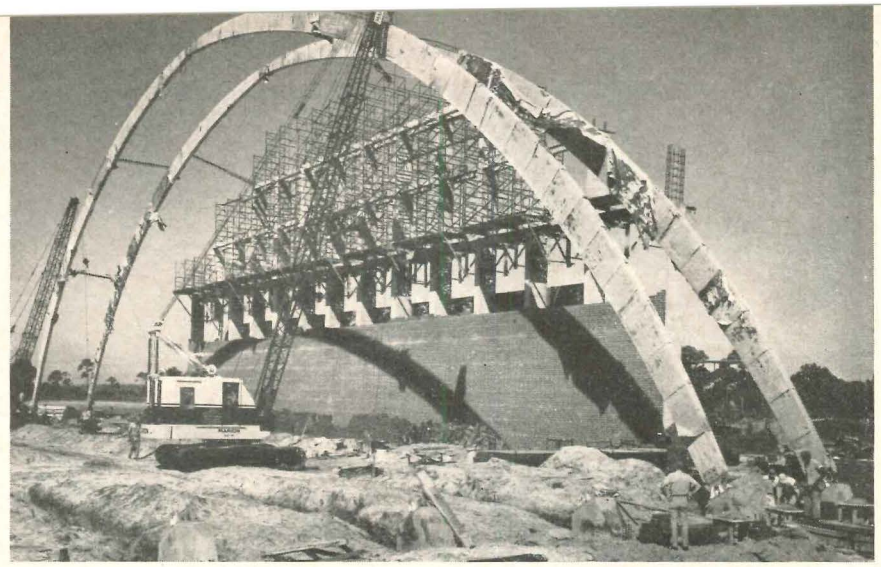


English Brown Oak

(Continued from page 238)

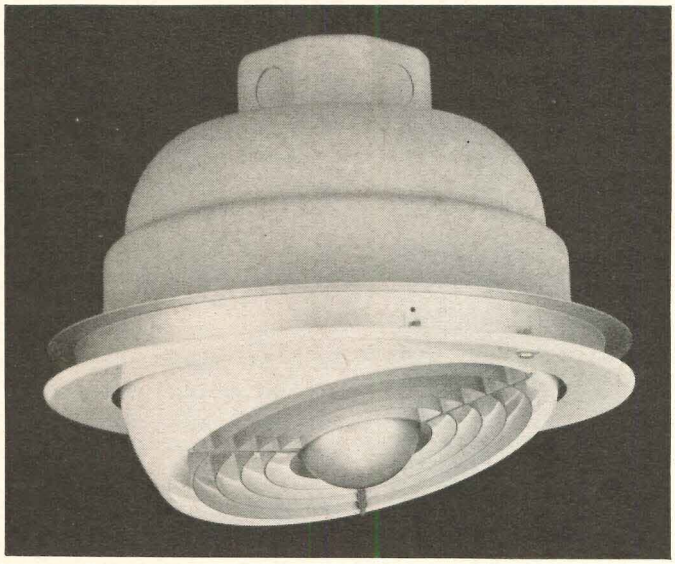
LARGEST WOOD ARCHES ARE SPLICED AT QUARTER POINTS

Twelve laminated wood arches with a clear span of 247 ft support the new Jai Alai Fronton in West Palm Beach, Fla. Said to be the largest glued, laminated wood arches ever manufactured, they were delivered in quarter sections, thus overcoming the problems that would be involved in handling and shipping the complete arches. As shown in the photograph directly below, a special splice joint was used at the quarter points of the arch. This splice was accomplished by using ½-in.-thick steel plates, 12 ft long on top of the arch and 6 ft long on the bottom. These plates were joined to the arch by 100 shear plates at each splice. The crown connection and the two base connections are hinges. Both splices and hinges were applied at the site. Each half of the arch was attached to the base connection while lying on the ground. Two mobile cranes then lifted the two halves, rotating them about the base hinges until the crown hinge was in correct alignment. Insertion of the crown hinge pin completed the erection. As each arch was erected, it was tied to the adjacent arch with 4 struts.



The arches vary in depth from 26 in. at the base to 46 in. at the point of maximum stress to 22 in. at the crown, where the height is 80 ft. Each arch weighs over 15 tons, contains 17,000 board ft of Southern pine lumber and measures 340 ft along its circumference. Wood decking, 3½ in. thick, attached directly to the arches eliminated the need for purlins and other bracing. Architects of the Fronton were Spicer and Gehlert of Daytona Beach. Structural engineer was J. G. Moore.

(Continued on page 257)



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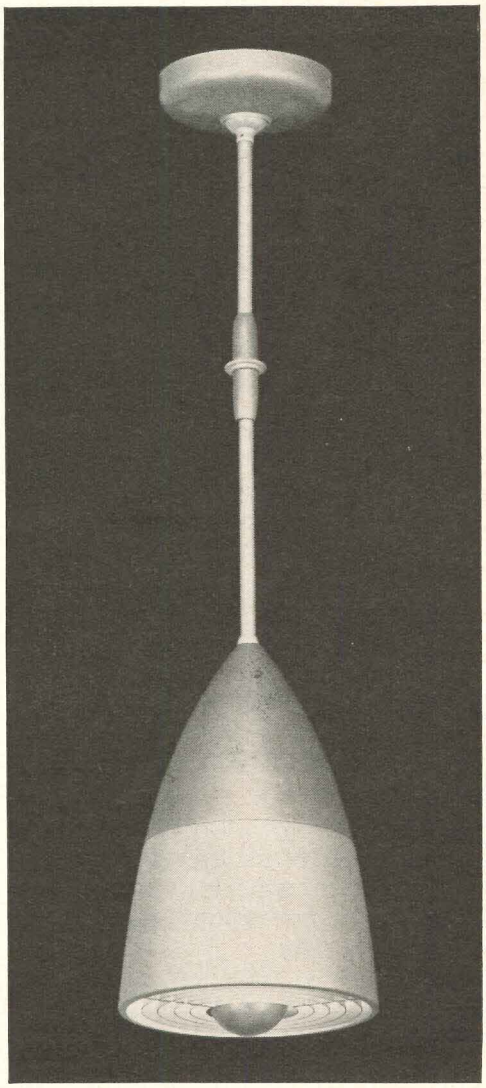


PENDANT SILVER-SPOT #114-#115

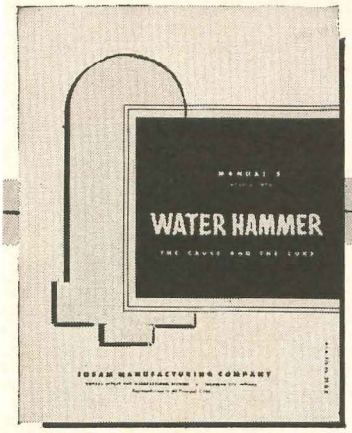
THE RECORD REPORTS

(Continued from page 16)

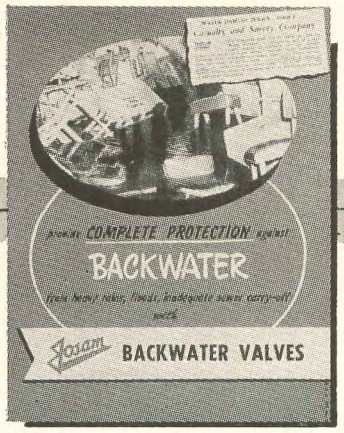
future colleagues, but we believe that this quality, peculiar to each one, should be allowed to develop naturally. No one becomes a genius by following a fixed program. And when one has no creative gift, it is safer to look for inspiration in works already achieved, and in other people's good ideas, than to insist on forgetting that architecture is a utilitarian art, closely linked to a social and economic program. Therefore, architecture cannot merely be considered a plastic problem, solved, once the esthetic point of view of the individual has been satisfied."

Mr. Moreira noted that the competition entries showed "certain general tendencies" and "certain equally common deficiencies" among "schools so far different both in geography and culture." The jury saw with approval a universal "awareness of the social function of architecture," but regretted that this did not always "correspond to a perfect understanding of this fundamental question." Among the deficiencies, Mr. Moreira listed "incapacity to overcome, or at least to compensate for, defects caused to human existence by present-day socio-economic reality" — observing that in their solutions of the competition problem some students appeared "obsessed with the idea of reproducing, in holiday surroundings, the poor lighting, ventilation and lack of tranquility and comfort of the big cities." At the other extreme, said Mr. Moreira: "Those who, in an attempt to follow local traditions, make use of obsolete elements from the past, elements in any case quite unsuited to modern conditions, to solve a modern problem." And finally: "This serious error may only be paralleled in the freedom with which certain forms are suggested and developed in a strange manner, based on no other reason than the arbitrary judgment of their inventors."

On the subject of the premiated entries, the jury called the Havana project "a concise and correct solution of the problem" and commended the presentation itself as "first class — both clearly and beautifully set out." The Japanese entry was called "a plan which, both taken as a whole and in its details, in its forms, constructions, in its urbanization and architecture, is coherent, legitimate and beautiful"; the link to tradition, without "neos" or "isms," was also commended."



7. Manual "S" describes causes and cure for water hammer in supply lines.



8. Manual "BW" on Backwater Controls, describes the hazards of backwater and methods of control.

9. Manual "SP-5" — latest data on Swimming Pool circulation and drainage methods.

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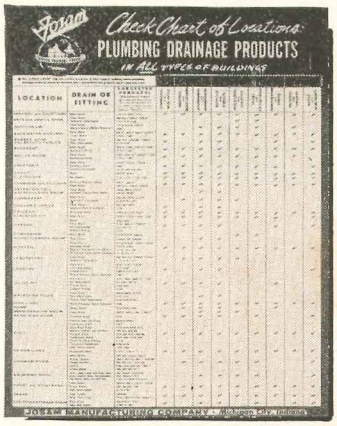

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8. ☐ Manual "BW" on Backwater Controls
9. ☐ Manual "SP-5" on Swimming Pools
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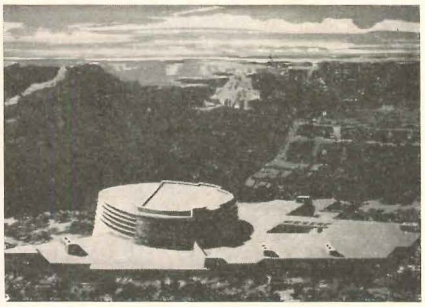
CITY ..... ZONE ..... STATE .....

THE RECORD REPORTS

(Continued from page 338)



RIM OF THE GRAND CANYON WILL BE SITE FOR SHRINE

The Shrine of the Ages Chapel, designed to overlook Arizona's Grand Canyon, is a project sponsored by a non-denominational group including a Methodist group at Grand Canyon, a Catholic group at Grand Canyon and national Jewish groups. The main chapel will have three altars, raised as the occasion demands by hydraulic lifts from the basement.

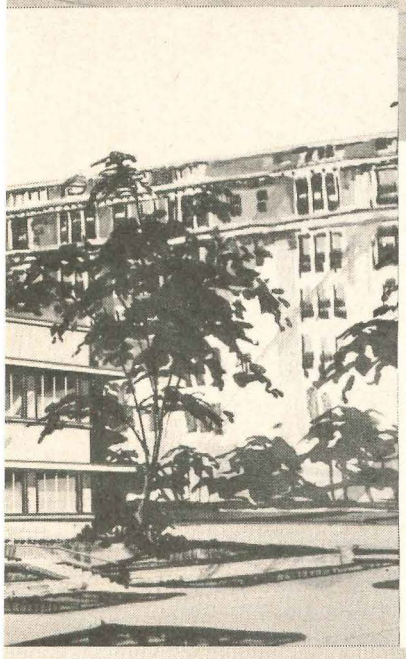
As described by architect Harold E. Wagoner of Philadelphia, the design of the main worship room is based on the circular Hopi *kiva*. The original plan was to cantilever the chapel over the Canyon rim, but this scheme was not approved by the National Park Service, and the plan now puts the chapel 200 ft back from the rim. This site has been used for years for the Easter Sunrise services at Grand Canyon. A large circular window will look east over the Canyon.

In addition to the main chapel, which will seat 350, the project also calls for three clergy studies, each accessible from the interior and from an outside court, a wedding chapel and lounge room, sacristies and administration space. Varying light conditions in the main chapel will be controlled by four rows of motor-drawn curtains. Three of these curtains will be composed of thin rods of magnesium suspended vertically; the rods will be irregularly spaced. By arranging these curtains in a number of different ways, it will be possible to vary the opacity. The fourth curtain will be of fabric.

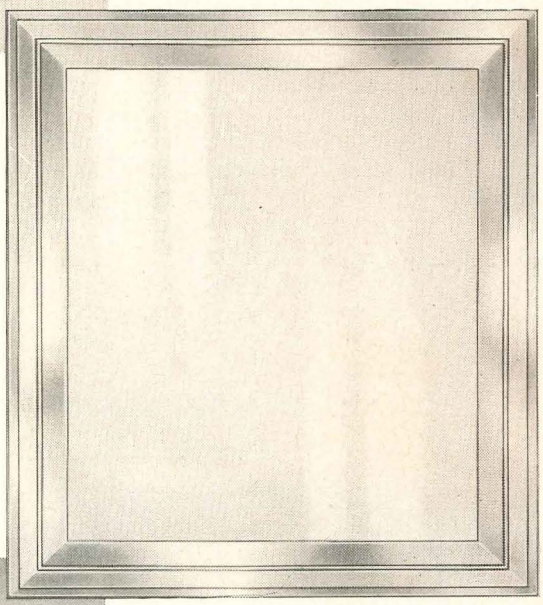
The roof over the main chapel will be constructed of cantilevered prestressed concrete trusses with a local stone compression member. Walls will be of local stone combined with a reinforced concrete skeleton, and the concrete floors will be finished with Arizona flagstone.

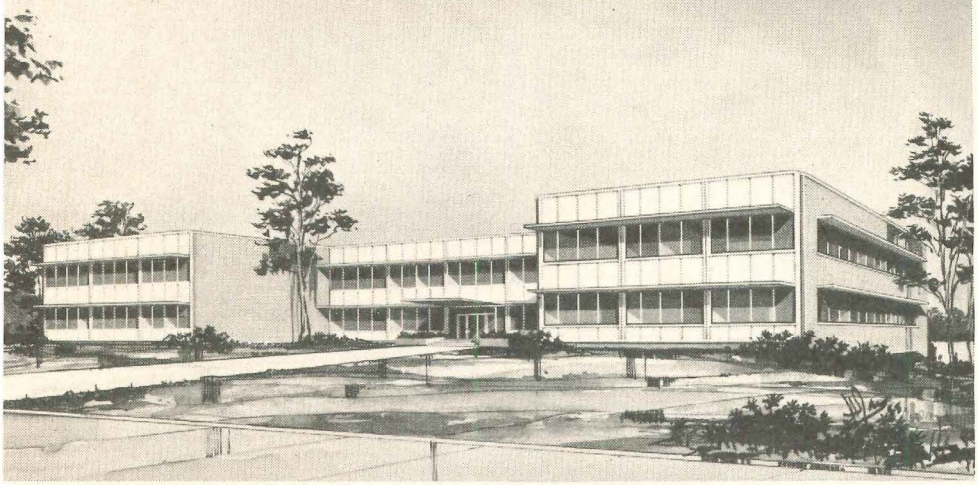
(More news on page 346)

St. Louis Building
General Contractor:
Murch Jarvis Construction Co.,
St. Louis, Mo.



These two buildings feature Reynolds Aluminum Fixed Windows —with site lines equal to pivoted windows.





Minneapolis Building
General Contractor:
Naugle-Leck, Inc.,
Minneapolis, Minn.

Architectural Metal Fabricators & Erectors:
Crown Iron Works,
Minneapolis, Minn.

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ALUMINUM

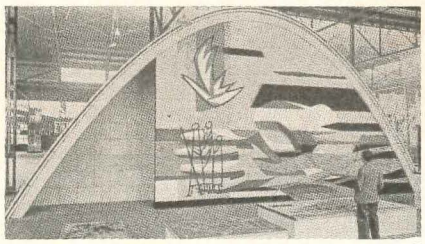
THE RECORD REPORTS: VIEWS OF CURRENT PERIODICALS

(Continued from page 342)

FORUM, No. 10, 1955 (Netherlands), reviewed the architectural efforts at E55, the "national exhibition" at Rotterdam which was somewhat lost last summer in the shuffle of international interest in Sweden's H55. The architects for the exhibit were Van den Broek and Bakema.

1

Neither of the two critics writing on the exhibit was very favorable to the building design at Rotterdam. A. Komter expressed regret, in the English translation, that no new buildings of distinction had been designed for the exhibit, and deplored the fact that the two permanent buildings, while they occupied a site which had formerly been



2

city green, added nothing of architectural value to the city.

B. Hendriks, who shared Heer Komter's disappointment in the architecture, said he was particularly discouraged by the lack of unity of art and architecture, but nonetheless praised Karel Appel's outside murals (1) and the "glass in concrete" window by Daan Wildshut (not shown, although another mural in the acoustics center, by Wildshut and Ger van Iersel, is shown in 2).

ARCHITECTURAL DESIGN, November 1955 (British), celebrated the magazine's 25th anniversary with, to begin, a lead article by Max Bill titled "The Beginning of a New Epoch in Architecture." Granting that we live in an age of diversity, Herr Bill said that nevertheless this is a "diversity of mediocrity," amplified by the architectural profession which, at the start of the modern movement supplanted reason with thesis and manifesto, and has become more and more slave to a modern academism.

"It is a good thing," he said, "that one has the freedom to write that it is of no importance now whether Palladio's Rotunda was ever a serviceable house to live in or whether Michelangelo's Porta Pia ever fulfilled a practical use, and that therefore one may allow a present-day architect to build unsuitable houses because they are beautiful. One can and may do anything. All standards have seemingly gone up in the air — seemingly, since two standards have remained which were overlooked for some time by all that architecture and carefully hidden self-expression: the human being and the economy.

"These two forces started to build, to some extent without architects, as the latter were preoccupied with higher aims: the economy, because it has to be active otherwise it perishes; the human

(Continued on page 348)

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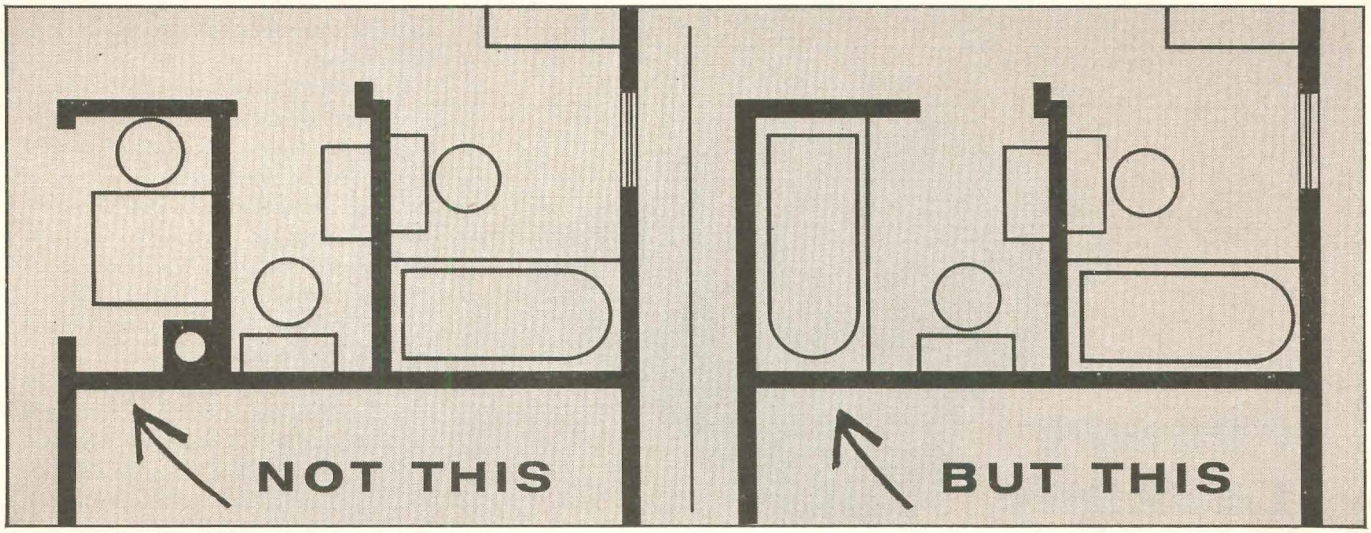

3-BEDROOM RANCH HOUSE GETS BONUS OF SECOND BATHROOM INSTEAD OF SMALL POWDER ROOM WHEN G-E WEATHERTRON IS INCLUDED IN THE PLANS. INSTALLATION: IN THE GARAGE!

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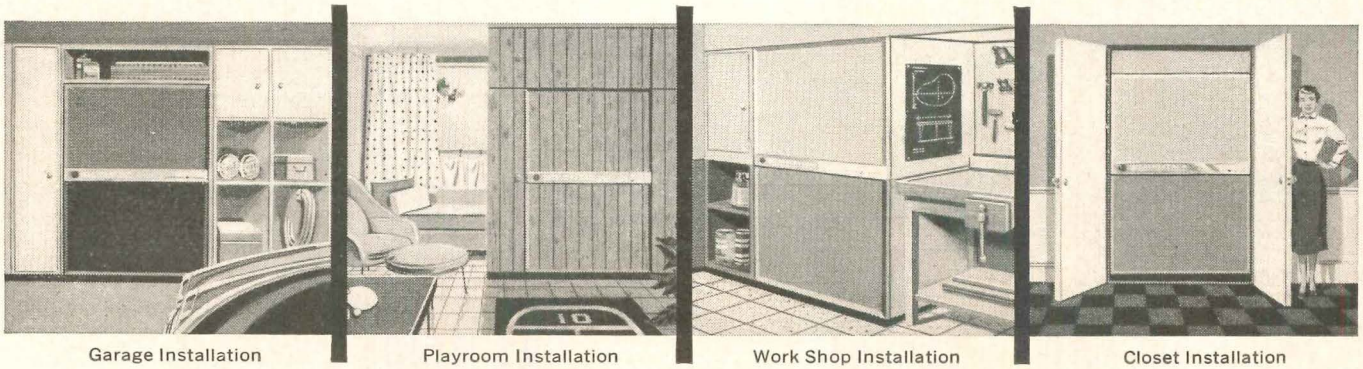


Garage Installation | Playroom Installation | Work Shop Installation | Closet Installation

THE RECORD REPORTS

CURRENT PERIODICALS

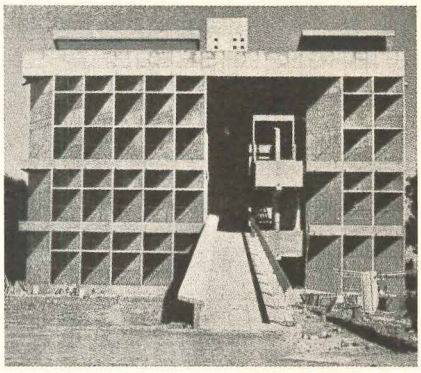
(Continued from page 346)

being because he has to live, otherwise he too perishes. These forces have created something which they jointly consider desirable, but which has chiefly benefited the stronger partner, the economy."

Herr Bill, in arriving at some admittedly pessimistic conclusions, declared that architects must reassess their art posthaste. "If we are not in a position to analyze the real needs of man with scientific method, instead of accepting the habits and imaginary necessities, then we do not progress. We have to find new, better and more careful methods of analysis. If we are not in a position to organize these new analyzed needs without making an ant-like organization out of the multitude of mankind, any discussion about the future of architecture is superfluous. If we are not in a position to create a functional unity by analysis and organization, which is more convincing than all that has gone before, as well as being economically feasible, we cannot get any further. If we do not renounce modernistic academism and if we cannot replace it by objective shaping of the functions of life, then modern architects had better pass over to a different hobby. . . . We stand today more than ever on the threshold of a new epoch. We have to revise everything, to examine afresh and to arrive at new achievements. That for the present has seemingly little to do with architecture as an art; but perhaps just this strict limitation to essentials is the great art."

Maxwell Fry, who was, so to speak, in on the ground floor of the British modern movement, reviewed "Twenty-Five Years of Modern Architecture in England" from the early work of Welles Coates and of the Tecton group to the Smithsons and their "New Brutalism." The magazine showed international examples of current work, mostly that of "the younger generation."

Again with *Architectural Design*, its January 1956 issue featured two new buildings by Le Corbusier in Ahmedabad, India — the Mill Owner's Association Building (below), with its angled fins, was called "a cool statement"; the other building is "a spiral museum."



THE VIRGINIA RECORD, November 1955 (United States), was the magazine's third annual Architectural Arts Edition, in which examples of work of architectural firms of members of the Virginia Chapter of the American Institute of Architects were shown. So far from deserving the "Williamsburg blight" epithet, coined by Prof. Marshall Fishwick to describe current Virginia architecture that looks backward rather than ahead, were most of the examples given that two stores recently built *at* Williamsburg were justly described as "contemporary."

In an editorial introduction to the

(Continued on page 350)

Thousands of Bethlehem High-Strength Bolts were used to join structural members in framework for new Prudential office building in Jacksonville, Fla. *Architects:* Kemp, Bunch and Jackson. *Contractor:* Daniel Construction Company of Alabama. *Fabricator and Erector:* Ingalls Iron Works Company.

High-Strength Bolting Speeded Erection of New Office Building in Jacksonville

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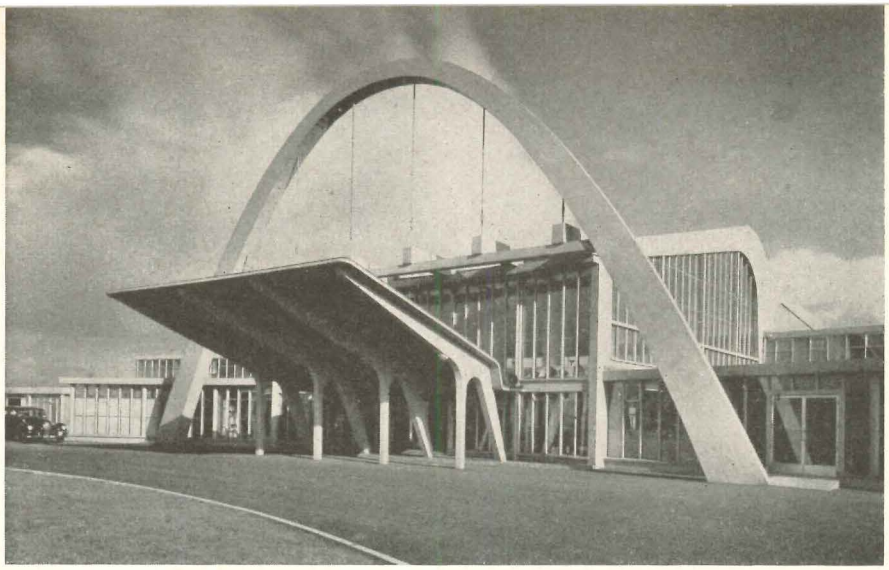
THE RECORD REPORTS

(Continued from page 350)

GLASGOW'S AIR TERMINAL EMULATES A WATER SPIDER



Renfrew Terminal, the airport recently opened in Glasgow to handle domestic air traffic, was the first air terminal to be commissioned and erected by the British Ministry of Civil Aviation, and was designed with the express direction from the Ministry that it should offer a definite contribution to airport design.

Starting with a site that offered no solid foundation as far down as 60 ft, where test boring was given up, the architects, Rowand Anderson, Kininmonth & Paul, decided to "float" a light reinforced concrete frame on concrete "pads." As the architects phrased it, "The principle adopted has a somewhat similar counterpart in aquatic insects such as the water spiders, which do not break the surface tension of the water on which they rest."

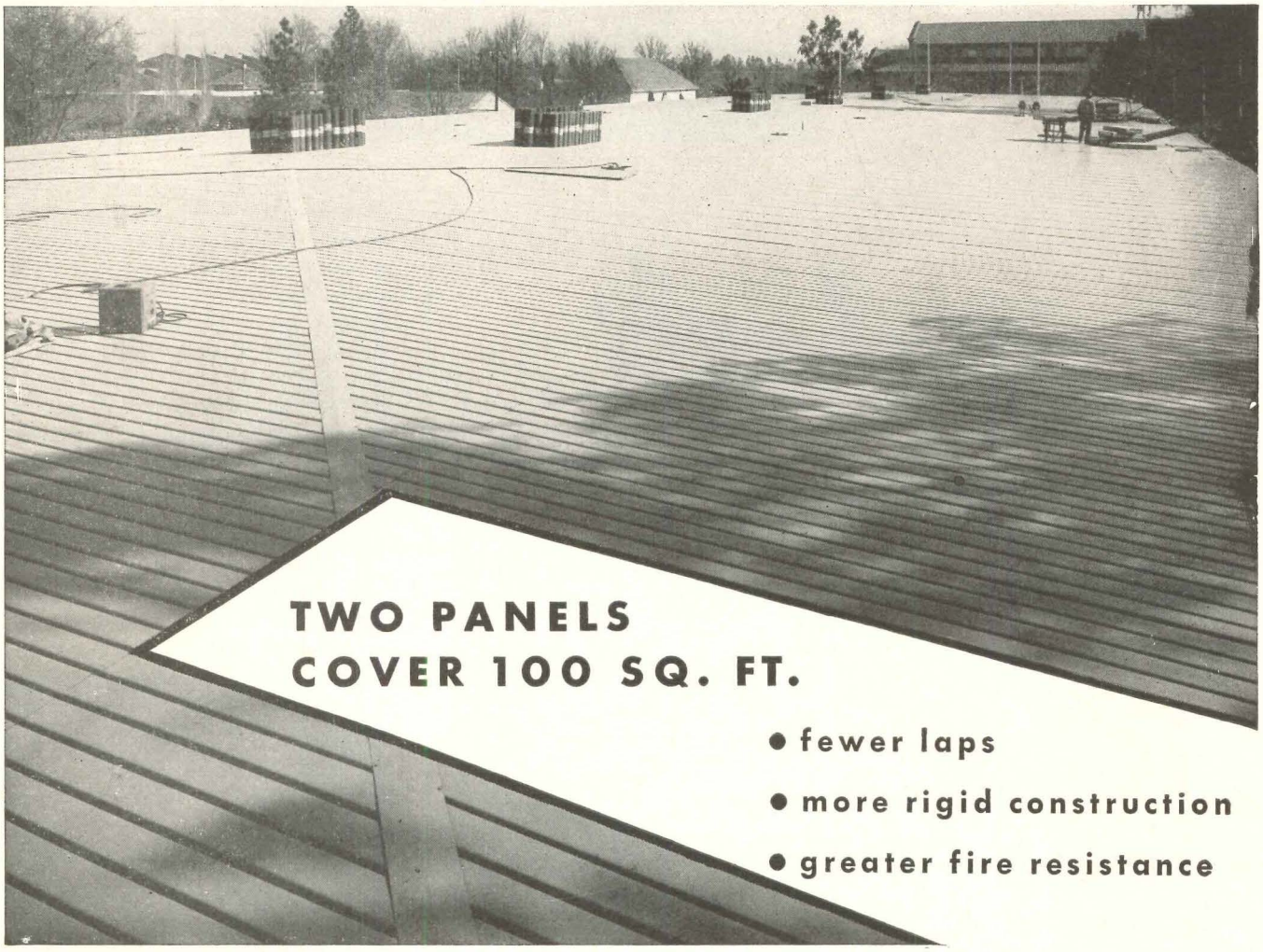
"It is for this reason," they continued, "rather than for dramatic effect, that the bowstring arch is used to support and steady the front of the concourse roof. It can be fairly claimed that in general the design, although unusual, did not take its form because of idiosyncrasies on the part of the designer, but is the logical outcome of conditions which seemed to imply the use of reinforced concrete and glass for the structure, combined with the maximum prefabrication of individual parts."

Nonetheless the architects added: "It is not claimed that this is a purely functional building. Pictorial effects and arrangements of light and shade were studied. The fluid nature of concrete as a building material in its own right is expressed by silhouette and natural form, while the extensive use of glass walls is an attempt to integrate the building with its surroundings by day and at night. When a choice could be made between esthetics and utility, preference was given to the former. . . . The architect considered it more important to impress a strong design, firm on the mind of ground and air observers, than to provide a purely utilitarian method of enclosing a given volume of space."

The terminal consists of three buildings — the passenger building, a mete-

(Continued on page 354)

LARGE SIZE AIRTHERM ROOF DECK REDUCES COST 10%



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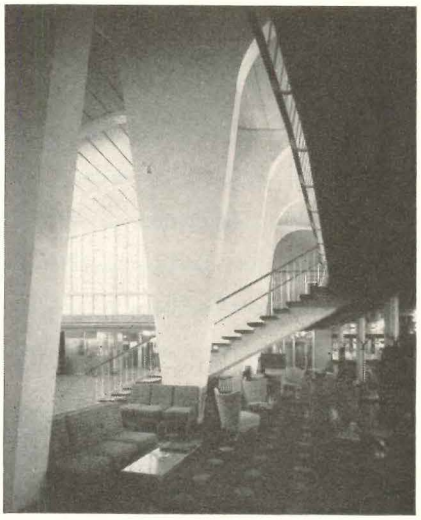
(Continued from page 352)

orological and operations building with control tower, and a small building for the staff of British European Airways. Facilities in the passenger building include waiting rooms, a customs hall, kitchens, dining room, buffet and bar. A reinforced concrete canopy was cantilevered over the driveway at the entrance to the building.

Besides the soil conditions and a site predetermined by the position of the runways and the economic requirement of siting the building adjacent to an existing paved area, the design was affected by a national Schedule of Accommodation issued by the Ministry of Transport and Civil Aviation setting out facilities to be provided, and by international regulations controlling the height of the buildings. Other problems presented to the architects were the necessity for extreme economy in first costs, for flexibility with a view to future expansion, and for speed of erection.

The consulting structural engineers were Blyth & Blyth.



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New WARE

weatherstripped AWNING WINDOW

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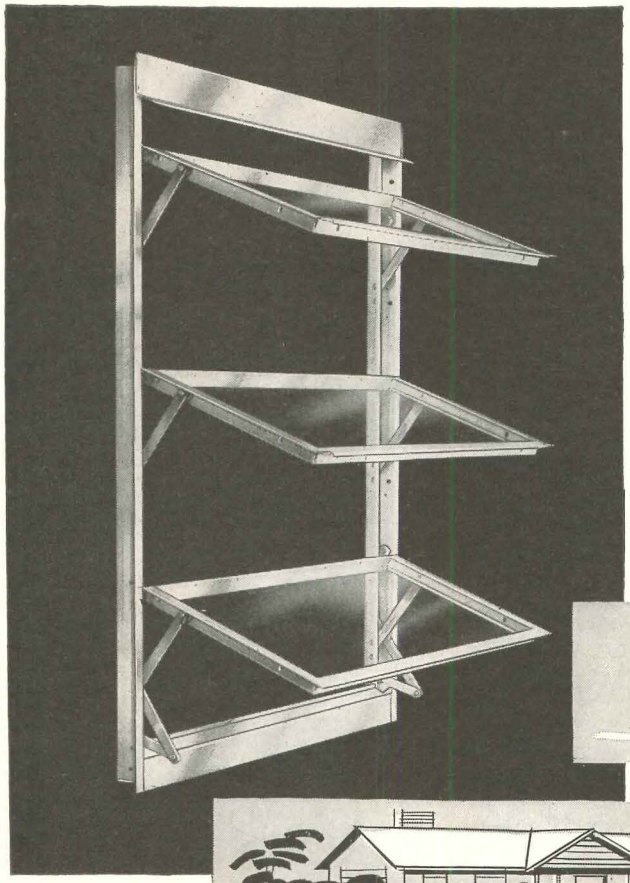

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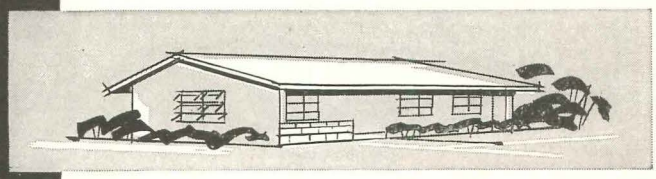

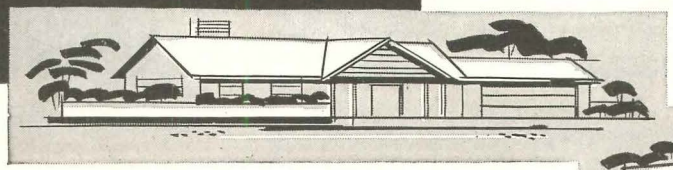

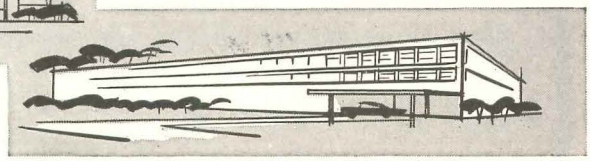

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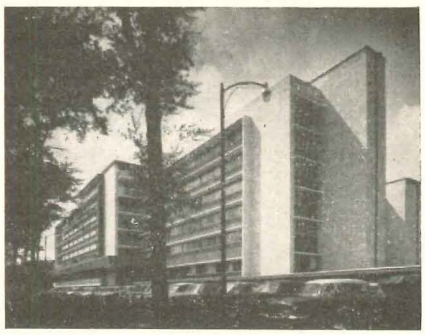
(Continued from page 354)

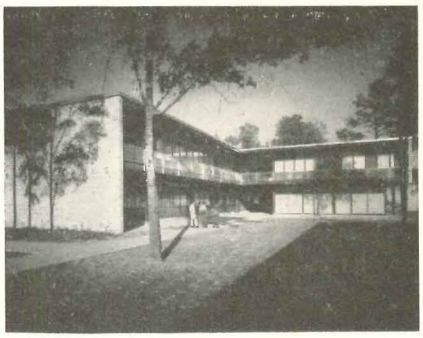
HOUSTON A.I.A. EXHIBITS ITS 1955 HONOR AWARDS

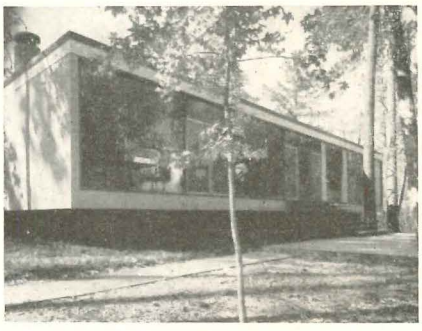
As part of its activities during Texas Architects Week last April, the Houston Chapter of the American Institute of Architects held simultaneous exhibits of its annual honor awards program in the lobby of a downtown bank and at the Contemporary Art Museum.

The chapter presented four Medals of Honor winners (shown on this page) and six Awards of Merit: the Herbert Blum residence — Beaumont, Bolton and Barnstone, architects; Magnet Cove Barium Corporation Building — Pierce & Pierce, architects, with O'Neil Ford and Richard Colley, consultants; Durham Clinic — Pierce & Pierce, architects; Sally's Sandwich Shop — Robert W. Maurice, architect; Texas Children's Hospital — Milton Foy Martin, architect; and the Chapelwood Methodist Church — Hamilton Brown, architect.



Medals of Honor went to architects Mac Kie & Kamrath for the M. D. Anderson Hospital and Tumor Institute (above) and to architects Cato, Austin & Evans, with associate Edmund Furley, for the Engineering Office and Classroom Building at the University of Houston (below)





Two houses received Medals of Honor in the Houston competition — a house for Miss Nina Cullinan, designed by architects Cowell & Neuhaus (above), and the Liese residence, designed by architects Lloyd & Morgan (below)

(More news on page 358)

Designing for maximum return from an investment in high-cost space is an ever-recurrent architectural problem. The plan of the Rockefeller Center office of The New York Savings Bank represents an outstanding solution, packing a quarter-billion dollar deposit capacity into 4000 square feet.

PL *ii-TV*® as a planning tool

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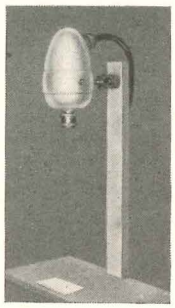

As the photograph shows, the open, attractive, uncluttered lan of the new uptown office of The New York Savings Bank ıakes available most of the space for customer service. No files t records clutter the banking floor. This plan is possible ecause with GPL *ii-TV*—the GPL *industrial-institutional TV* ystem—records need not be kept physically accessible. GPL -*TV* connects each teller directly to a central record file ocated in low-cost space at the main bank, two and a half iiles downtown. When a balance or signature is needed, a call ia intercom brings it instantly over the closed *ii-TV* circuit to small GPL bank monitor set inconspicuously into the counter t the teller's station. The whole operation takes only a few econds—actually only half the time required when tellers must efer directly to files on the same floor.

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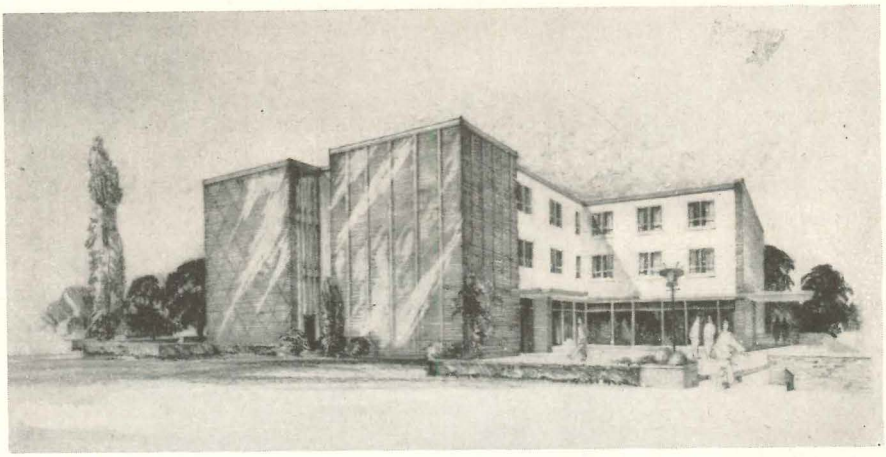
(Continued from page 356)

CARNEGIE FRATERNITIES GET ONE BUILDING, TWO HOUSES

The Carnegie Institute of Technology and two of the fraternities on the campus have under construction, as a joint project, the first of five proposed buildings planned to alleviate the shortage of fraternity housing at the school.



The new building will consolidate the two organizations under one roof; each of the groups will occupy one of the two L-shaped houses, which will be separated by a solid wall. This solution, proposed by Pittsburgh architect Lawrence Wolfe, satisfied both the university and the fraternities, who were anxious to preserve the individuality of each group, but willing to cooperate on the financing. An earlier plan to buy and convert private houses was turned down on the grounds that most of the suitable buildings were too far from the campus and had not, in any case, been designed for group living.

Each organization will have its choice of the brick pattern to be used on the façade, which will be identified in each case by Greek letters. The front and rear court areas can also be landscaped according to each group's preference.

The units will each house 36 men, and will provide dining space for 50. Dining facilities and kitchen, lounge room and trophy room will be located on the first floor. Also on the first floor, a suite of rooms with a private entrance may be used as an apartment for the housemother or as powder and cloak rooms for women visitors.

Recreation rooms, a snack bar, chapter room and storage area will occupy the basement.

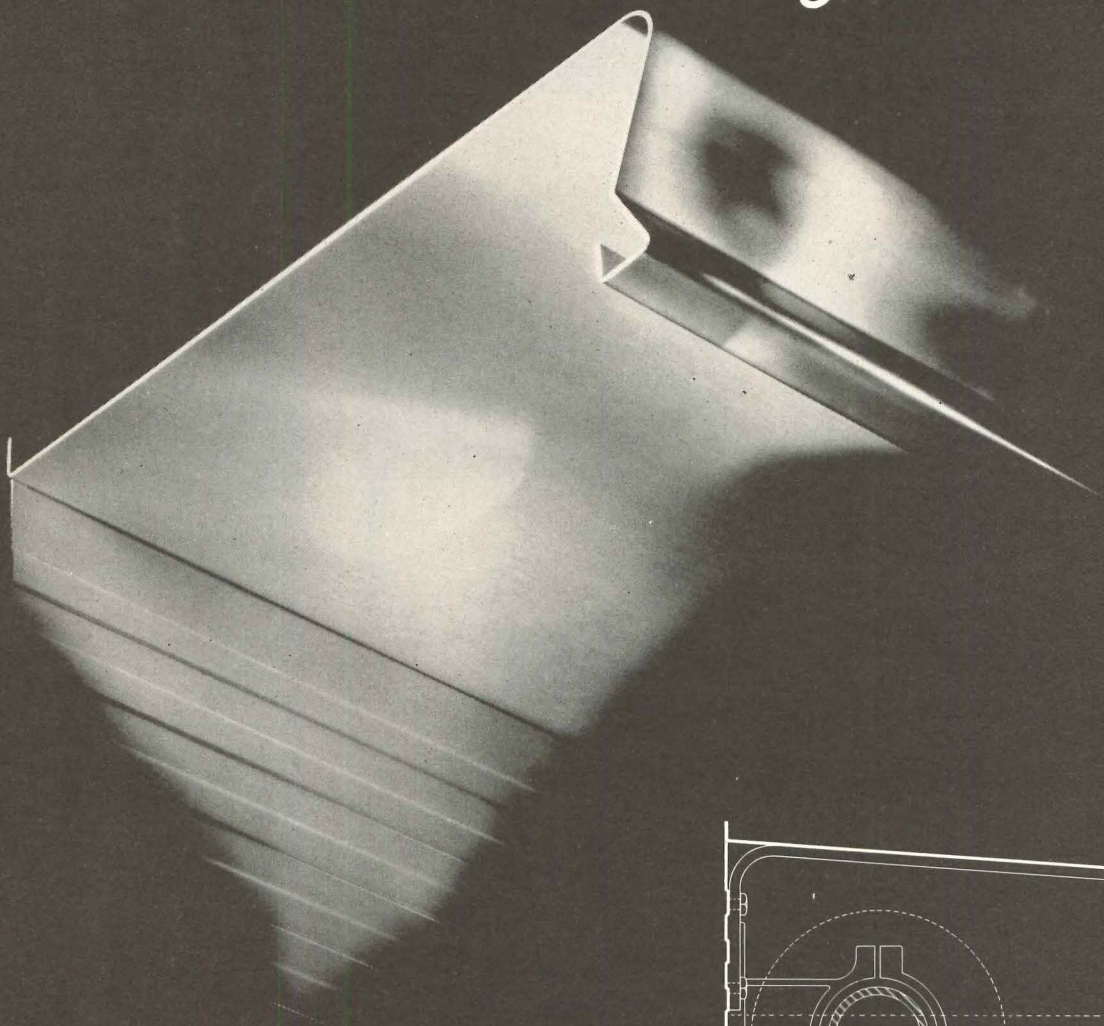
The second and third floors will be taken up by sleeping and study quarters. Here again the groups have their choices of plans — these floors can be arranged for rooms assigned for study and sleep to two men, or might have larger areas designated for four-man studies with common sleeping facilities for 18.

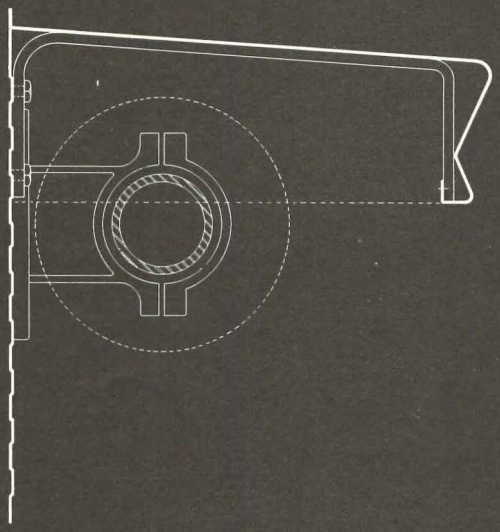
A driveway encircling the building will provide parking space for 50 cars, and the court areas could be converted to parking space if necessary.

The total cost of the building will be $312,000. Occupancy is scheduled for September of this year.

(More news on page 360)

New Pittco NO. 84 Awning Hood





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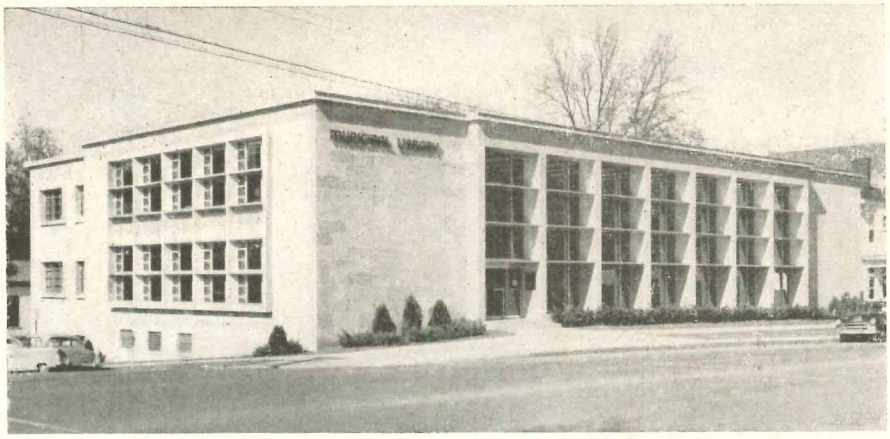
(Continued from page 358)

NEW BUILDING REFLECTS EXPANDING LIBRARY USES

More than the shelving capacity was enlarged (from 50,000 to 200,000 volumes) for the Jackson, Miss., Municipal Library when that building was dedicated. Among the expanded facilities was an assembly hall seating 150, with entrance from the outside as well as from the main library so that it can be used for after-hour functions. A microfilm room, and two record listening rooms in the art and music department, are additions to the library's facilities, as are separate work rooms for each department, a book-lift, and inter-communication system. Scattered browsing and reading areas include an outdoor reading terrace.



Above: main façade of glass and limestone. Below: on main floor, view leads past charge desk and card catalogs to reading area

The main floor, visible through the glass façade, is illuminated by cove lights at night to display the library, which faces on one of Jackson's major business streets.

Located on the main floor are separate reading areas for adults, young people and children, browsing areas, card indexes, reference department, the main charge desk and the outdoor reading patio. On the second floor are the art and music department, the microfilm room, a "local history" room to house books and documents of the region, a business and technology department and staff rooms. The ground floor, which can be entered from the 26-car parking lot as well as from a side street, contains a stack area, mechanical and staff service rooms, public rest rooms, assembly hall and conference room.

N. W. Overstreet, Jackson, was the architect.