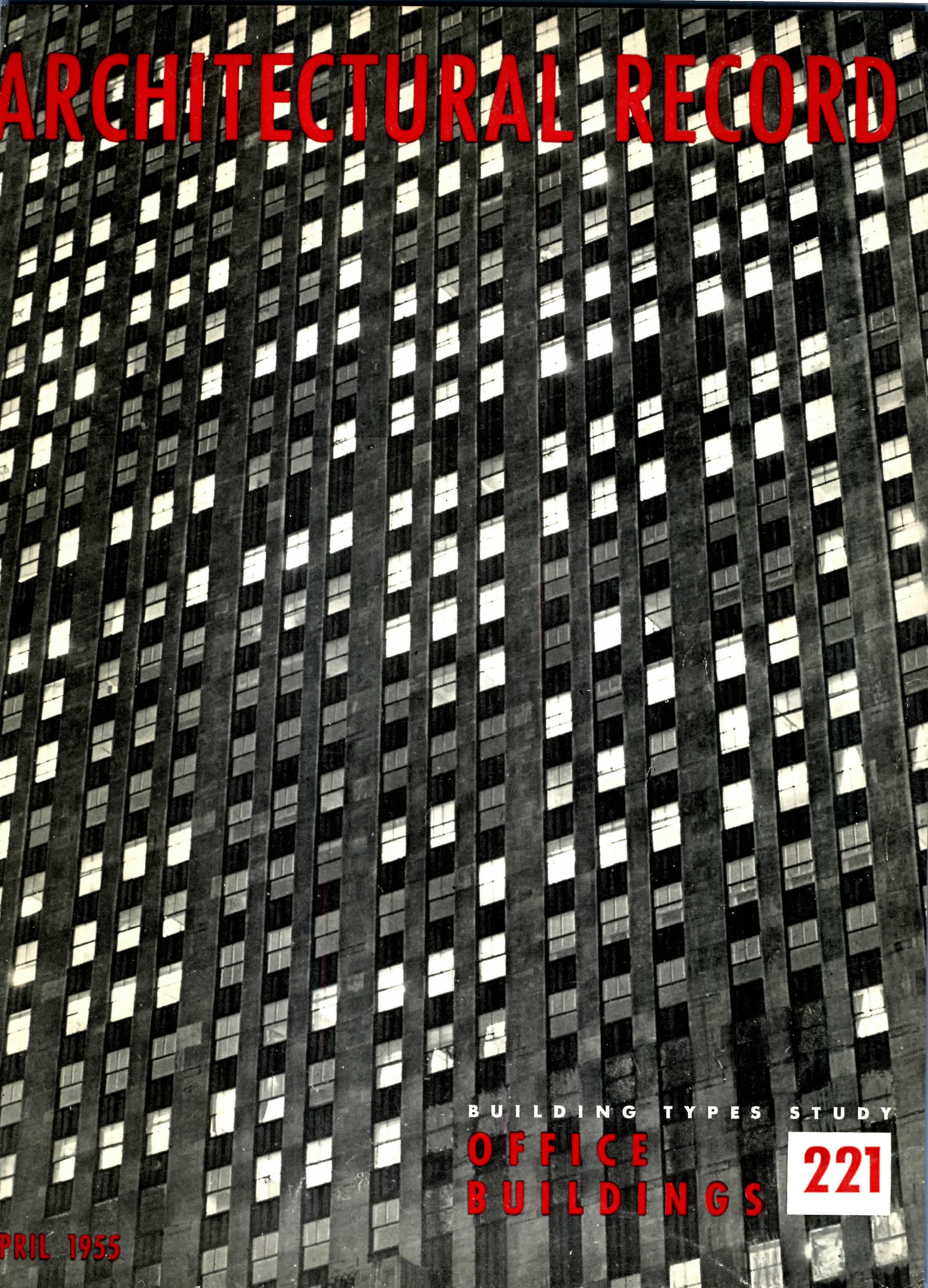
ARCHITECTURAL RECORD



BUILDING TYPES STUDY

OFFICE BUILDINGS

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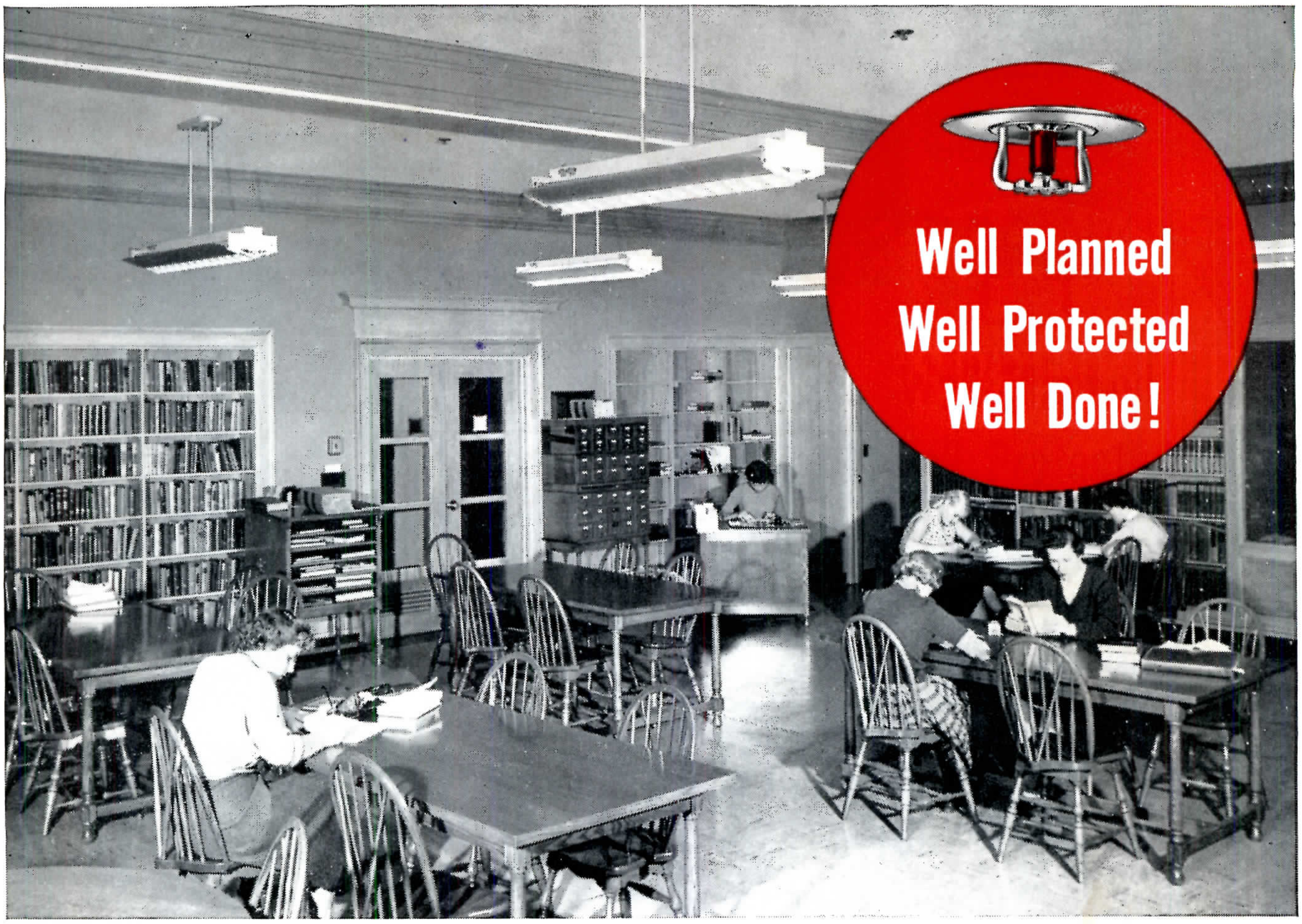
PRIL 1955



Library at Westbrook Junior College. Grinnell Ceiling Sprinklers afford inconspicuous, around-the-clock protection.

Westbrook Junior College looks to

GRINNELL SPRINKLERS

Typical dormitory room, showing regular Grinnell Quartzoid Bulb Sprinkler.

Arts and Crafts room has more than the average number of fire hazards. Here, too, Grinnell Sprinklers are constantly on guard.

To make them completely fire-proof, Westbrook Junior College, Portland, Maine, installed Grinnell Sprinklers in many of its older buildings. The work was done so efficiently, and with such minor interruption to normal campus life, that Grinnell Sprinklers were again specified when a new building was planned in 1951.

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GRINNELL

PROTECTION AGAINST EVERY FIRE HAZARD

ARCHITECTURAL RECORD (Vol. 117, No. 4, April, 1955) is published monthly by F. W. Dodge Corporation, 10 Ferry Street, Concord, N. H., with editorial and executive offices at 119 W. 40th St., New York 18, N. Y. $5.50 per year; Foreign, $20.00.
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PERSPECTIVES

THE TROUBLE WITH ARCHITECTS, said the paper-company-sales-executive-met-by-chance-in-a-dining-car, is that they've got to be both businessmen and artists, and most of the ones I know are so busy being businessmen that they forget all about the artist part. . . . A *profession?* Now, that's interesting, how do you figure that?

ARCHITECTURAL EDUCATION may not be another subject, and maybe everybody hasn't just been re-reading *Kindergarten Chats* the other day. John Shear's recent series on architectural education, and all the discussion about *The Architect at Mid-Century*, prompted Buford Pickens a while ago to send along a series of excerpts from the Sullivan classic with the suggestion that they might be "seen as related" to some of these things. Here they are. . . . "The true function of the architect is to initiate such buildings as shall correspond to the real needs of the people. I hereby waive aside from the inquiry the hybrid-architect: the architect who believes himself an engineer, a carpenter, a merchant, a broker, a manufacturer, a 'business man' or whatnot — and never stops to inquire if he is or is not an architect. If the merchant, broker, etc., were architects they would be called architects. They are not architects and that is why they are not called architects. Conversely, the architect who deems himself merchant, broker, etc., ceases to be architect and becomes hybrid, just to the extent that he believes it." . . . "The most important ingredients of architecture are: 1. Poetic imagination 2. Broad sympathy, humane character, and a thoroughly disciplined mind 3. A perfected technique 4. An abundant and gracious gift of expression." . . ."The great bulk of contemporary American architects, as their characters are reflected in the buildings made by them, are not good citizens, and still further must it follow in reverse from this, that the duty of our architectural educators must be to make of their pupils good citizens; and this never can be accomplished so long as they continue to utterly ignore their own land and people, their own duty toward them and the duty toward them of the young architects they are making." . . . "It is only the conventional teacher of architecture who could tell you that you are a dullard by birth, and an imbecile by predestination. You have powers of which you are not aware; every lad has, and might develop them if his parents did not ask him every five minutes how much he is 'getting.' Money grabbing will defeat any kind of education." . . . So, first learn to think, then to act. Learn to think as an architect should think, then act as an honest architect should act. The so-called average mind has vastly greater powers, immeasurably greater possibilities of development than is generally supposed. But we need teachers — we need teachers of the right sort." . . . "An art of expression, resembling all true growth, must proceed from within, it must be the gathered and stored force seeking an outlet. It is not a garment to be worn or not worn; it is inseparably a part of life, a phase of life, the tangible symbol of life. Hence an art of expression should be the earliest constructive element to enter the curriculum of the genuine education. It should grow as the body grows, and mature as the body matures. Any other scheme of education is a caricature on the human faculty and human possibility. If you seek and express the best that is in yourself, you must search out the best that is in your people; for they are your problem and you are indissolubly a part of them." . . . *Kindergarten Chats*, it will be remembered, was first published as a series in *The Interstate Architect and Builder* in 1901.

NEVER BEFORE TODAY," J. Robert Oppenheimer told the closing convocation of Columbia University's bicentennial celebration late last year, "has the integrity of the intimate, the detailed, the true art, the integrity of craftsmanship and the preservation of what is familiar, humorous and beautiful stood in more massive contrast to the vastness of life, the greatness of the globe, the otherness of people, the otherness of ways and the all-encompassing dark." The artist and the scientist, for all their increasingly divergent lives, share a special problem and a special hope, Dr. Oppenheimer said. "Both the man of science and the man of art live always at the edge of mystery, surrounded by it; both always, as the measure of their creation, have had to do with the harmonizing of what is new and what is familiar, with the balance between novelty and synthesis, with the struggle to make partial order in total chaos. They can, in their work and in their lives, help themselves, help one another and help all men. They can make the paths that connect the villages of arts and sciences with each other, and with the world at large, the multiple, varied and precious bonds of a true and world-wide community. This cannot be an easy life. We shall have a rugged time of it to keep our minds open and to keep them deep, to keep our sense of beauty and our ability to make it, and our occasional ability to see it, in places remote and strange and unfamiliar; we shall have a rugged time of it, all of us, . . . in keeping open the manifold, intricate, casual paths, to keep these flourishing in a great open windy world; but this is, as I see it, the condition of man; and in this condition we can help, because we can love one another."

Above: new officers, Church Architectural Guild — Harry B. Warren, treasurer; Anthony Ferrara, recording secretary; Harold E. Wagoner, first vice president; Edwin F. Jansson, president; H. Walter Damon, secretary; and Dr. Arland Dirlam, retiring president. Below: the Rev. Darby Betts, chairman of the Guild awards jury

CONTEMPORARY CHURCHES TAKE TOP HONORS

For the first time in the 15-year history of the Church Architectural Guild of America, all of the winners in its annual awards program were of contemporary design. Commenting on the absence of Gothic and Colonial churches from the winning group, the jury report said, "The basic principle underlying the decisions was that good church architecture is simply good architecture designed for church use."

The awards were made at the Annual Joint Conference on Church Architecture, held in Cincinnati by the Church Architectural Guild of America and the Bureau of Church Building of the National Council of Churches of Christ in the United States of America, February 23 through 25.

The jury declared in its report that it "was looking for dignity, the sense of mystery which properly belongs to a place where man meets God, forthrightness and practicality.

"All of these," the report continued, "are vital to the worship and educational functions of the congregation. The jury felt the designs submitted in 90 per cent of the cases indicated not only a willingness to take advantage of 20th century materials and techniques but an awareness of the concern of church members.

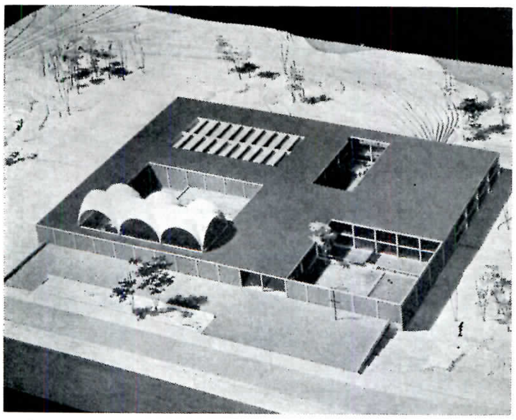
"It is not surprising, in view of this, to find flat *and* steeply pitched roofs, and adaptations to older vault forms. This freedom in the use of form characterizes all of the winners and a great majority of the other excellent designs that were submitted."

The awards were given in three categories: churches seating under 300; churches seating over 300; and hypothetical churches (viz., churches not completed or not yet in use).

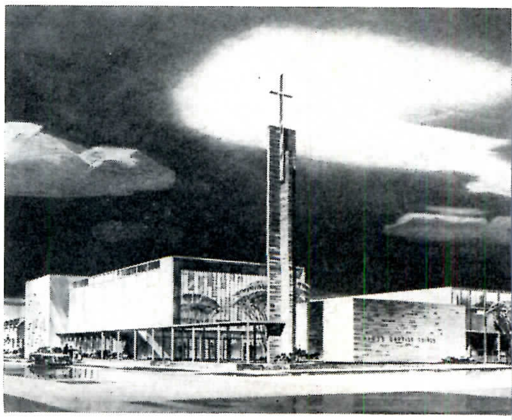
Members of the jury, headed by the Rev. Darby Betts, canon precentor of St. John the Divine, included Robert L. Durham, A.I.A., Seattle; the Rev. Marvin P. Halverson, executive director, Department of Worship and the Arts, National Council of Churches, New York; Edward F. Jansson, architect and new president of the Guild, Chicago; and John Knox Shear, editor-in-chief of Architectural Record.

Honorable Mention (seating over 300): Chapelwood Methodist Church, Houston, Tex.; Hamilton Brown, architect

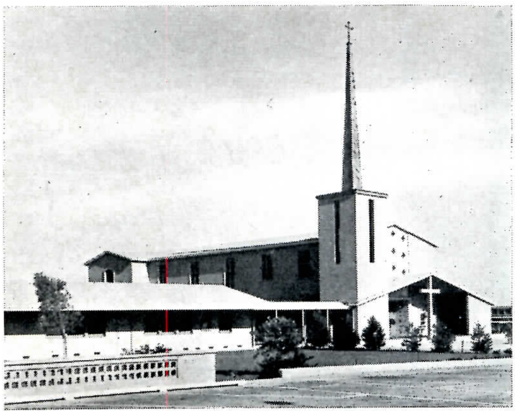
First Place (seating under 300): St. George's Church, Durham, N. H.; John A. Carter, architect



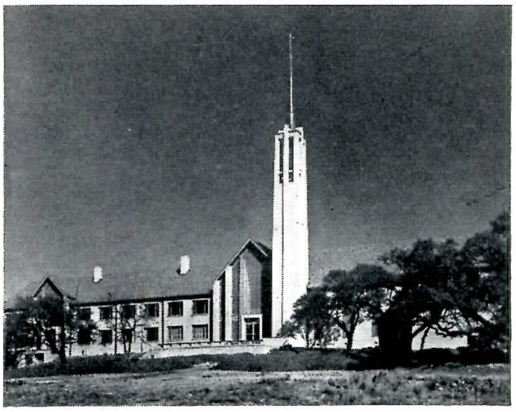
First Place (hypothetical churches): Grace Lutheran Church, Teaneck, New Jersey, Paul Schweikher, architect



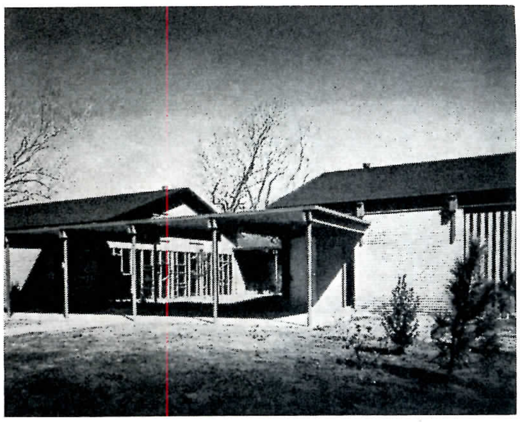
Second Place (hypothetical churches): First Baptist Church, Everett, Wash.; Durham, Anderson and Freed, architects



Honorable Mention (seating over 300): Emmaus First Lutheran Church, Alhambra, California; Culver Heaton, architect

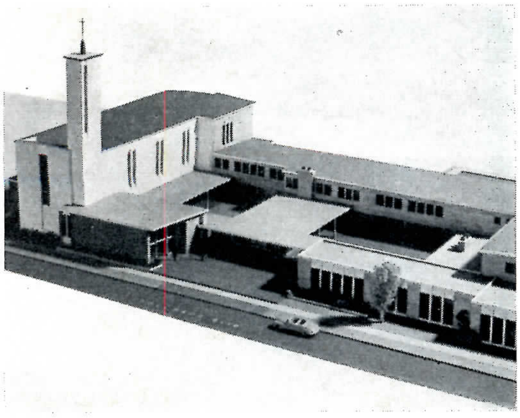


Honorable Mention (seating over 300): St. Luke's Episcopal Church, San Antonio, Texas; Henry Steinbomer, architect

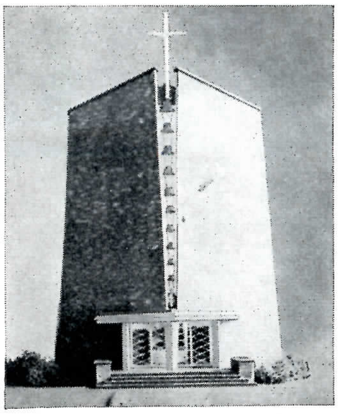


Second Place (seating under 300): St. Bernard Methodist Church, Chalmette, La.; Dinwiddie, Lawrence and Saunders, architects

Third Place (seating under 300): Church of the Holy Nativity, Aina Haina, Honolulu, T.H.; Law and Wilson, architects



Honorable Mention (hypothetical churches): First Lutheran Church, Glendale, Cal.; Orr, Strange and Inslee, architects



Honorable Mention (hypothetical): Chapel, University of Connecticut; Huntington & Barbee, architects

SCHOOL EXECUTIVE NAMES WINNERS IN ITS ANNUAL COMPETITION

THE FOURTH ANNUAL Competition for Better School Design, sponsored by the magazine *The School Executive*, produced five top award winners chosen from a field of 107; nine honorable mention citations and two special feature citations. Of the 16 winning entries, eight were elementary schools, six were secondary schools, one was a college building and one a transportable four-classroom unit. Photographs of all the winners are shown on this and following pages.

Members of the five-man jury were R. Franklin Outcalt, of the Cleveland architectural firm Outcalt, Guenther and Associates; Walter Bogner, professor of architecture at Harvard University; Willard S. Hahn, of the architectural firm Wolf and Hahn, Allentown, Pa.; Richard L. Howland, formerly consultant on school buildings for the Connecticut State Department of Education and now of the firm Sibley, Sibley and Howland.

The jury's observation of the quality of the entries submitted, which were judged on "the excellence of the design to solve the problem," was that elementary schools on the whole exhibited better planning than did secondary schools and college buildings. It also noted that few innovations had taken place in elementary school design, and that the general trend in educational architecture was one of improvement and refinement of earlier gains. *The School Executive* commented that the quality of the designs submitted was generally higher than in the past, but that the entries "did not have the extremes, either high or low, of previous years."

Among specific design trends, the jury observed that architects were more widely utilizing the outdoors in all climates. Site selection, it noted, seemed to be rather overlooked as a part of the

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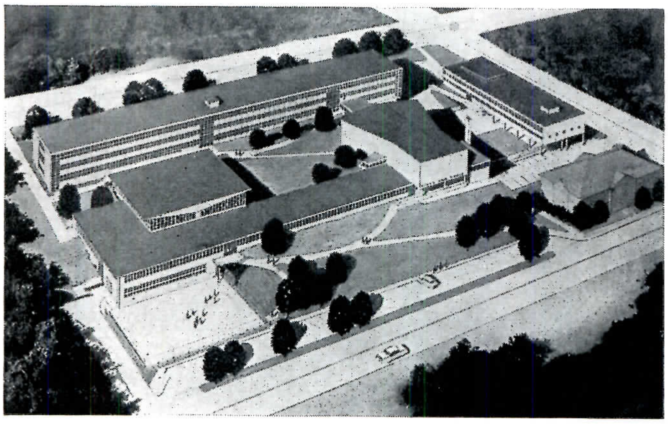
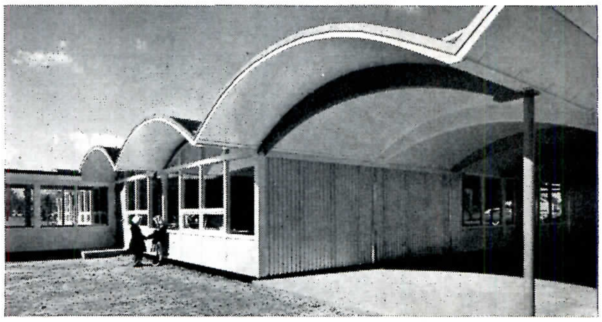
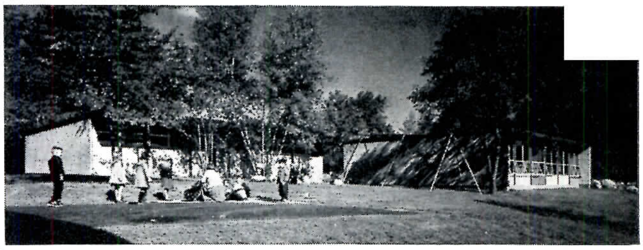
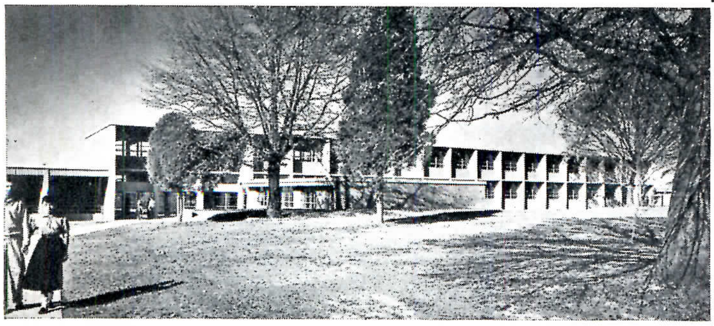




Top Award: (above) Transportable Four-Classroom School, Dearborn, Mich.; architects, Eberle M. Smith Associates. Jury's comment: "Ingenious solution which shows study and research"

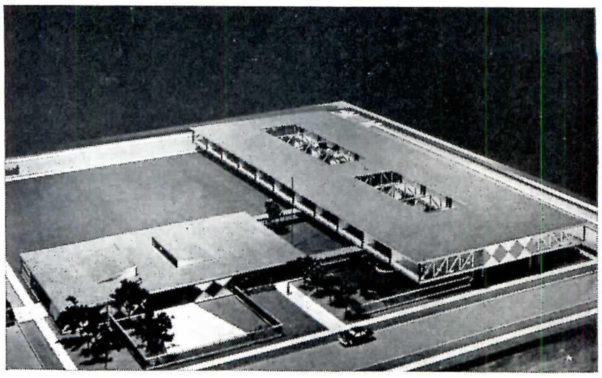
Top Awards — Above: Passaic High School, Passaic, N. J.; Kelly & Gruzen, architects. Jury's comment: "Good utilization of small site, auditorium is well related to music and instructional facilities and well located for educational and civic uses." Right: Hollow Tree Elementary School, Darien, Conn.; Ketchum, Giná & Sharp, architects. Jury's comment: "Good uncluttered design, nice handling of classroom entrance areas where wash basin and toilets are available"





Top Award: (above) West Charlotte High School, Charlotte, N. C.; architects Graves and Toy, Charlotte. Jury's comment: "Well composed campus type plan, designed on a good scale for youth"

Top Award: (below) Phillis Wheatley Elementary School, New Orleans, La.; architect Charles R. Colbert. Jury's comments: "Good use of cantilever system in which classrooms are elevated over play space, providing playgrounds on a small site"

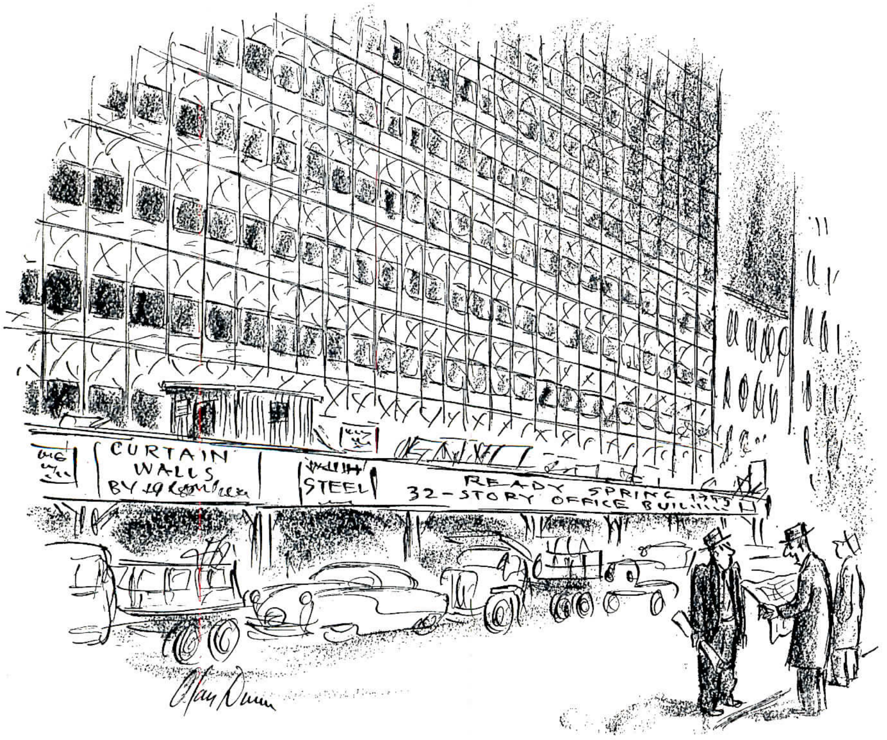


The State of Construction

The trend is still up. Latest figures from F. W. Dodge Corporation show all three major construction categories — residential, nonresidential and heavy engineering — setting new records, both for the month and for the year as so far reported. For details, see page 402.

Minneapolis 1955

It's the Hotel Radisson in Minneapolis June 20–24 for the 87th annual convention of the American Institute of Architects. "Designing for the Community" will be the convention theme, and the subject of several of the seminars; others are scheduled on chapter and regional affairs and on office practice (including cost estimating and modular measure). Keynote speaker is Housing Administrator Albert M. Cole; James W. Follin, commissioner of the Urban Renewal Administration, will also be among the speakers. Richard W. E. Perrin, A.I.A., executive director of the Milwaukee Housing Authority, will moderate a seminar on "Rebuilding the City" and Norman J. Schlossman, F.A.I.A., of Chicago, a former first vice president of the Institute, will lead another, on "Architecture of Community Expansion." The pre-convention outing, on Monday, June 20, has the provocative title of "Cold Spring Cannonball Trip" — a special train will take participants through scenic lake country to Cold Spring, Minn. (which explains *that* part of the title), where they will be guests of the Cold Spring Granite Company. A visit to a granite quarry and a tour through the company's plant will present the story of granite production and fabrication in complete continuity from the rough blocks to the finished products. This and other special events are being arranged by the convention committee of the host chapters, Minneapolis, St. Paul and Duluth, under the chairmanship of G. Clair Armstrong of Minneapolis. An 11-day post-convention trip to Glacier and Jaspar National Parks, Banff and Lake Louise, is being planned by the U. S. Travel Agency to start from Minneapolis on Saturday, June 25, the day after the convention wind-up. Election of officers (George Bain Cummings, the present secretary, is so far the only candidate for the presidency), presentation of the Gold Medal, the Fine Arts and Craftsmanship Medals and the Edward C. Kemper Award, the Annual Exhibition of Outstanding American Architecture and the display of new building products and equipment will as usual be features of the convention. A.I.A. Honor Awards for Current Work, usually selected and announced at the convention, will this year be announced in advance; the jury meets this month.



— *Drawn for the* Record *by Alan Dunn*

"Very good — 14 hours flat — but they're all upside down!"

Hurrah for Conventions!

The American Institute of Decorators will hold *its* annual conference this month and next — on a 40-day cruise aboard the T.S.S. *Olympia*, sailing from New York April 22 and returning May 31. The "program" includes Lisbon, Athens, Naples, Rome, Florence, Venice, Milan, Genoa, Nice, Paris and London. William Pahlmann is Conference Travel Committee chairman.

Solar Energy Adviser: FLW

Frank Lloyd Wright is the single architect named to the recently announced technical advisory committee for the World Symposium on Applied Solar Energy to be held in Phoenix, Ariz., November 2–5. The 14-member committee also includes Dr. Maria Telkes, research associate, New York University College of Engineering. Lewis W. Douglas, chairman of the Board, Mutual Life Insurance Company of New York and former U. S. Ambassador to Great Britain, is general chairman of the symposium, which is co-sponsored by Stanford Research Institute and the Association for Applied Solar Energy.

How About the Housing Market?

Last year there were prophets of doom; this year, besides Senator Fulbright and his "friendly" study of the stock market, there are some very sober bankers and real estate economists asking how long the present rising rate of home building can be maintained in the face of a declining rate of new family formation and a spiraling home mortgage indebtedness total for the nation. These questions are giving rise to some new skepticism about the propriety of Federal Housing Administration activities and particularly the liberal mortgage credit terms provided for FHA-insured mortgages in the Housing Act of 1954 — although both Housing Administrator Albert M. Cole and Federal Reserve Board Chairman William McChesney Martin express themselves as quite satisfied with the soundness of the U. S. credit structure. Dr. George Cline Smith, F. W. Dodge Corporation economist, believes the demand for new single-family homes will remain strong despite the current low level of new household formation. Addressing the annual savings and mortgage conference of the American Bankers Association in New York last month, Dr. Smith said he would expect housing demand to be sustained at well over a million new

(Continued on page 16)

nonfarm units a year, so long as the general economy of the nation remains prosperous. Acknowledging that availability of financing is an important "permissive factor" in making possible today's high level of homebuilding, Dr. Smith cited four factors which he feels will strengthen the demand for single-family owner-occupied houses even while new household formation is temporarily at a low ebb. The four factors: 1. the fact that it is frequently cheaper to own than to rent, especially when income tax deductibility of interest on mortgage and property taxes is taken into account; 2. the rapid increase in the aged population, which has the highest percentage of home ownership; 3. record numbers of children being born, resulting in more families with children, and larger numbers of children per family; 4. the shorter work-week and the growth of leisure time, making a "house-and-yard" more attractive to many. Dr. Smith said he saw no signs of a speculative boom in construction similar to that of the 1920's. "To draw a fair comparison," he said, "we can take private construction outlays, the area most subject to possible speculative dangers, deflate these outlays by using an index of construction costs, and then adjust for growth of the country by putting them on a per capita basis. If we do this, we find that today's volume of private construction is approximately three fourths as high as the 1926 peak."

Education and Practice

A NEW KIND OF LIAISON between student and practitioner may be found in the plan of the A.I.A. national Committee on School Buildings to hold one day of its April 27–29 meeting in New York City at Columbia University's School of Architecture. According to present plans, the entire School of Architecture will join invited representatives of Columbia Teachers College concerned with school building and of school boards, parent-teacher organizations, citizen school committees and teachers' organizations from New York and surrounding communities, for an all-day symposium on schools conducted by the Committee on School Buildings. Members of the Committee will show slides and present critical analyses of a number of school buildings in the context of the basic problem of how to develop good architecture for a specific philosophy of education. Discussion from the floor will be freely encouraged.

Mumford on Nowicki Wins A.I.A. Journalism Award

LEWIS MUMFORD's four-part article, "The Life, the Teaching and the Architecture of Matthew Nowicki," which appeared in the June, July, August and September 1954 issues of ARCHITECTURAL RECORD, has been selected in the American Institute of Architects' second annual journalism competition as the best article pub lished in a professional architectural magazine during 1954. Mr. Mumford receives a Certificate of First Award and a cash prize of $250.

In the same category, a special commendation went to the editors of *Architectural Forum* and Clarence S. Stein, Albert Mayer, Julian Whittlesey, Roger Wilcox and Lois B. Murphy for the article "Kitimat: A New City," published in *Architectural Forum*, July 1954.

In the only other of the six categories of the competition open to professional architectural magazines, J. Alex Langley of New York won the First Award for his photograph of a nightclub in Havana designed by Max Borges Jr., showing thin shell concrete vault construction, published in *Progressive Architecture* in June 1954.

First Awards also went to William T. Cullen Jr., of *The Scranton (Pa.) Times;* Lilian Jackson Braun, of the *Detroit Free Press;* Clarence W. Hall, executive editor of the *Christian Herald* (for his article "The Churches Rise Again," in McCall's, December 1954); and Thomas D. Stephens, *The Providence (R. I.) Journal-Bulletin.*

The annual journalism competition was inaugurated last year by the A.I.A. "to recognize and encourage writing . . . that will further the public understanding of architecture and the architect." An article published in ARCHITECTURAL RECORD in October 1953, "The Spirit of the New Architecture," by Pietro Belluschi, also won last year's First Award for the best article published in a professional architectural magazine.

Keeping Up with Automation

THE NEWEST ADVANCES in materials handling will be discussed at a conference to be sponsored by the American Material Handling Society at the International Amphitheatre in Chicago May 16–18, the first three days of the five-day showing of the Sixth National Materials Handling Exposition, also at the Amphitheatre. Sessions of the conference will consider how to use new systems of materials handling, one of the principal factors in automation, in today's increasingly "automatic" factories. There will be two sessions which might be of particular interest to architects: "Analyzing the Materials Handling Problem: Its Relationship to Plant Layout, Production and Production Controls"; and "Integrating the Materials Handling System with Plant Facilities" — plant layout for proper handling, problems of old and multi-story buildings, new building design for modern handling equipment. The exposition will demonstrate all types of materials handling equipment under simulated factory conditions; more than 200 companies will exhibit. Information is available from: Clapp & Poliak Inc., 341 Madison Avenue, New York 17, New York.

A.S.C.E. Meets in San Diego

THE AMERICAN SOCIETY OF CIVIL ENGINEERS, holding its national convention in San Diego February 9–11, heard a report on how "earthquake design" is meeting the test of earthquakes. Donald F. Moran and Karl V. Steinbrugge, members of the Society and structural engineers with the Pacific Fire Rating Bureau, noted that recent earthquakes in the western United States, although not as severe as can reasonably be expected to occur, have provided the first test of many structures specifically designed to resist earthquake forces, and that engineering studies of these 'quakes have provided valuable data. "Minor damage to one- and two-story buildings," they said in a paper, "can generally be traced to faulty construction and/or lack of attention to design details. However, non-structural damage to tall buildings even some distance from the epicenters indicates a need for a reëxamination of present practices wherein lateral force factors are reduced considerably for the lower stories. Simple framed structures, such as elevated water tanks, all-steel buildings and refinery type structures, suffered a type of damage which indicates that present design methods should be revised somewhat. Recent research has provided a more precise method of estimating stresses in simple structures due to actual earthquake motion."

Housing and Architects

The architect and the Evolution of Housing" will be the title and "Housing 1945–1955" will be the main theme of the Fourth Congress and Assembly of the Union Internationale des Architectes, to be held July 9–16 at The Hague. Developments in and the results of housing programs in the postwar period in the various countries, the problems, the methods, the part played by the government and the influence of the architect in solving the housing problem will be extensively discussed. In addition to this main topic, consideration will be given to the general problems of training architects and their social position. There will be exhibitions of housing in U.I.A. countries, of Netherlands architecture, and of solutions submitted by students and young architects in the international competition for redesigning a city district. The Congress is being organized by the Netherlands section of the U.I.A. and will be under the leadership of Prof. J. H. van den Broek, who is the author of the documentary work "Housing 1945–1955," to be published before the Congress opens. Ralph Walker, F.A.I.A., of New York, a past president of the American Institute of Architects, is a U.I.A. vice president and member of the managing committee.

Alliance in Seattle

Architects in Seattle have done more than mourn the passing of the grand tradition in architecture and its lost relationship with the allied arts. Under the leadership of the Seattle Chapter of the A.I.A., in an effort enthusiastically led by John S. Detlie during his presidency of the chapter last year, they have sponsored the formation of a city-wide organization which unites not only groups and individuals concerned with the visual arts but those concerned with music, literature, theater arts and the dance as well. Allied Arts of Seattle, which has elected Mr. Detlie as its first president, proposes a broad program. "The purpose of this organization," say the by-laws, "shall be to further the arts by: 1. Uniting the common interests of existing organizations of the arts for greater strength and effectiveness. 2. Formulating specific objectives into a vital overall program which will bring the arts to a position of prime importance in the life of the city of Seattle. 3. Speaking out on all matters which affect the arts to insure that the city of Seattle will increase in beauty as it increases in size. 4. Stimulating greater public interest in and understanding of the arts." Allied Arts offers both organization and individual memberships in the fields of architecture, city planning, crafts, education, landscape architecture and gardening, literature, museums and galleries, music, painting, sculpture, theater arts and dance, graphic arts and interior design. An Allied Arts Congress is planned to be held annually in the fall. Although organization of Allied Arts of Seattle was completed only in December, its public impact was already sufficient at the beginning of this year to evoke the comment from *The Seattle Times*' art reviewer, Kenneth Callahan, that its formation was "perhaps the most significant single event in the local art world during 1954, certainly in its potential contribution to the city's cultural future."

Honors

Pietro Belluschi, F.A.I.A., has been elected to lifetime membership in the National Institute of Arts and Letters. Mr. Belluschi, who is dean of the School of Architecture and Planning at the Massachusetts Institute of Technology, was one of 14 Americans so honored for creative achievement in art, music or literature. He was the only architect among this year's new members.

The 1955 gold medal of the Royal Institute of British Architects has been awarded to John Murray Easton, of the London architectural firm of Easton and Robertson. Mr. Easton, designer of many public, commercial and hospital buildings, is a past president of the Architectural Association and was vice president of the R.I.B.A. in 1945–47. He is a partner of R.I.B.A. Past President Sir Howard Robertson.

Certificates recognizing their exceptional skill as craftsmen were presented by the West Virginia Chapter of the A.I.A. at a recent dinner meeting to Sherel A. Waldo, electrical and refrigeration mechanic; Pete Zando, stonemason; and Vaid O. Lee, plaster. Middle Atlantic Regional Director Marcellus Wright Jr. of Richmond made the presentations.

Which Issue Was That In?

The architectural index for 1954, just published, is the latest edition of a very useful little booklet which has been coming out annually since 1950. It provides, in 39 pages, a composite index to the 1954 issues of seven publications — *Arts and Architecture, Architectural Forum*, Architectural Record, *The Bulletin of the American Institute of Architects, House & Home, Interiors*, and *Progressive Architecture*. Articles are indexed by building or subject and cross-indexed by architect or author. Compiled and edited by Ervin J. Bell, himself an architect, the *Index* is available at four dollars a copy from The Architectural Index, 5532 South Kenwood Avenue, Chicago 37, Illinois.

Correction

The Record regrets the errors in the caption accompanying the photograph of the Trinity University dormitory on page 153 of the January issue. Trinity is in San Antonio, Tex. The architectural credit should have read: Bartlett Cocke and O'Neil Ford, Associated Architects; William Wilson Wurster, Consultant. Cost of the dormitory — exclusive of architects' and engineer's fees, site improvement and landscaping — was $401,880.

After 45 Years, a New Address

The relentless New York cycle of building to tear down to build again (etc.) which has caught up with the

Tilden Building at the southwest corner of Fortieth Street and Avenue of the Americas has forced Julian Clarence Levi, at 80, to abandon the offices he occupied for 45 years. There will be no duplicating the setting he and his late partner, Alfredo Taylor, created — the chestnut paneling, the leaded glass windows, the hooded cast iron fireplace, the tiny entry that led from a workaday New York office corridor to the special world of the architect. But Mr. Levi has taken a small office at 11 West Forty-second Street; and — like the veritable ambassador he has been these many years for American architects — leaves next month for another summer in Europe.

More news on page 18)

The night after accepting Wisconsin's handsome apology, Mr. Wright seemed thoroughly at home at convention of Wisconsin Architects' Association in Milwaukee, where he addressed dinner meeting. At left, he is addressing Association Secretary Fritz von Grossmann and President Julius Sandstedt

WISCONSIN MAKES PEACE WITH WRIGHT

FRANK LLOYD WRIGHT will not abandon his native state after all. Following a testimonial dinner in Madison at which he heard glowing accolades of his life and work from an array of distinguished Wisconsin citizens headed by the Governor himself, not to mention a special tribute read by American Institute of Architects Past President Ralph Walker and innumerable messages of esteem from admirers across the country, Mr. Wright decided he had been mistaken when he interpreted a Wisconsin court decision that for tax purposes Taliesin is a business, not an educational institution, as an indication the state did not appreciate his work. The testimonial included presentation to Mr. Wright of a check for $10,000, the sum of contributions from 15 states besides Wisconsin, to help him pay his taxes. There was also a suggestion, loudly cheered by the nearly 400 diners, that a special act of the Legislature be passed to declare Taliesin tax-exempt.

"What should I say, overwhelmed as I am by the beauty of this testimonial, the finest I have ever received?" asked Mr. Wright. "I never would have known the fine esteem of my fellow citizens, if it had not been for the adverse tax decision . . ."

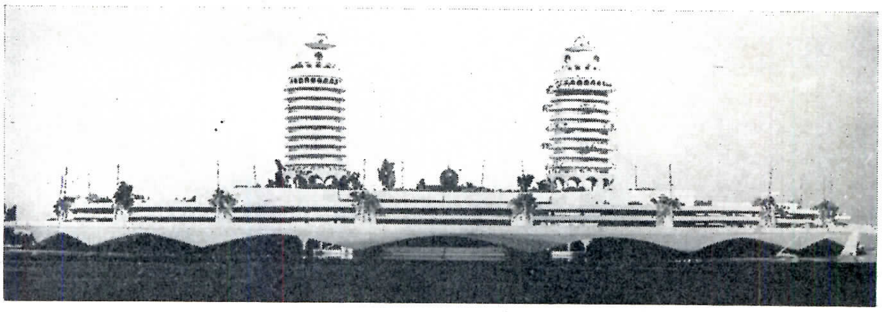
Mr. Wright went on to attack "equalitarianism" and to urge a democracy based on the supremacy of talent and ability. He said the phrase in the Constitution about all men being free and equal was "probably a clerical error" and that the founders probably intended to say that all men were equal before the law and had freedom for self-improvement.

In the major speech of the occasion, Mr. Walker hailed Mr. Wright as "a true individual" of courage and integrity "in a world which more and more demands anonymity."

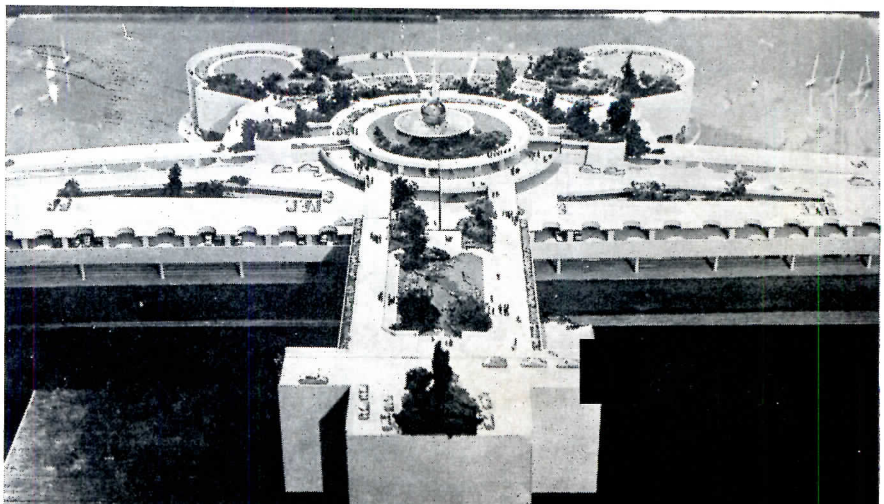
"Probably the most remarkable thing about Frank Lloyd Wright," said Mr. Walker, "has been the amazing fertility of his mind." And each design, he added, seems to stand as "a symbol of what the will to create may bring forth for the happiness of man.

"It is this symbol of life, of the architect as the creator, of a man who not only believes he can mold his civilization, but who actually tries to do it, of a man who refuses to abdicate to the ignorant mores of the 'group spirit,' and of 'collective thinking,' and of 'integration,' all modern terms denoting submission in a fear for security, that we admire in Wright."

Other speakers included Governor Kohler ("He is as much a part of Wisconsin as the beautiful Wisconsin River which winds by Spring Green"); Walter K. Johnson, planning director of the city of Milwaukee, representing Mayor Forster; Emeritus Dean George Sellery of the University of Wisconsin; Mrs. Iovanna Wright Peiper, daughter of Mr. Wright, who read messages from persons unable to attend the dinner; Cary Caraway, a former Wright apprentice now with the University of Illinois (who presented the $10,000 check); and Mrs. Herbert Jacobs, who told about living in the two houses designed for her family by Mr. Wright ("I don't know anything more exciting than seeing a Wright building grow, unless it is to watch your own children and family begin to grow in a "Wright house"). Master of ceremonies was William J. Evjue, editor and publisher Madison's *The Capitol Times*.



Model of Mr. Wright's Monona Terrace Plan for a civic center for Madison, approved last fall by voters and now considered fairly certain to be executed, was exhibited at dinner. Model photo below shows "minimum plan" (estimated cost, $4 million) with 3750-seat auditorium in center, a little theater, an art gallery, space for union railroad station, parking for 1500 cars. Above: maximum plan (estimated cost, $17 million); circular towers could be added, for another $1.5 million, as "moneymakers," Mr. Wright says



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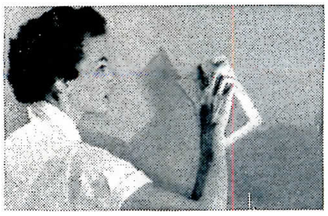

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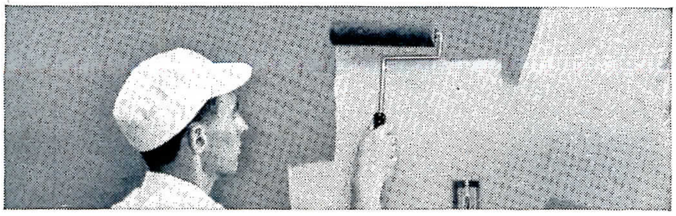

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ONE QUARTER SCALE is published bi-annually by the School of Fine Arts, University of Cincinnati. This 26-page issue includes articles on the work of Nakashima and by Gyorgy Kepes on "Space and Vision." 11 in. by 8½ in.; letterpress; halftones; ads; 75¢

THE STUDENT AS A PUBLISHER: A SURVEY

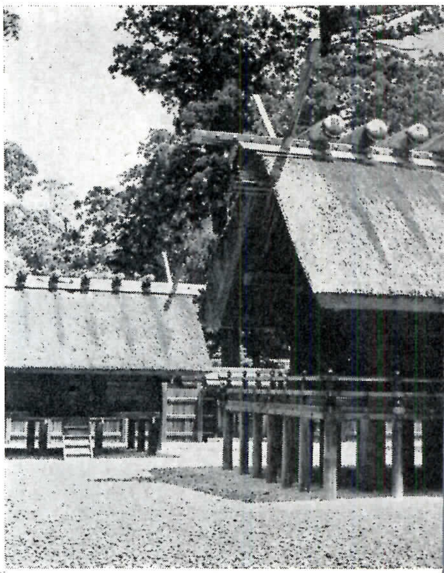
THE INCREASING INTEREST of architectural schools in student publications may offer one way to bridge the much discussed gap between school and profession. In an effort to evaluate the extent of this interest the RECORD sent letters to 64 accredited architectural schools and schools of fine arts requesting information about their student publications.

There were 45 responses; 11 reported existing student periodicals and nearly half the others expressed interest in starting them. The major barriers mentioned were, of course, finances and time. Also expressed was a lively curiosity about the organization of existing publications.

One response, from John W. Lawrence, Assistant to the Dean, School of Architecture, at Tulane University reports: "We are now trying to get such a publication started at our school and we feel the need to contact those schools which have had experience in such a venture."

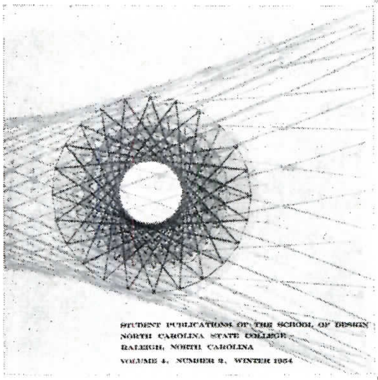
Paul Weigel, head of Kansas State College Department of Architecture, wrote that "We have given this subject serious thought on various occasions but

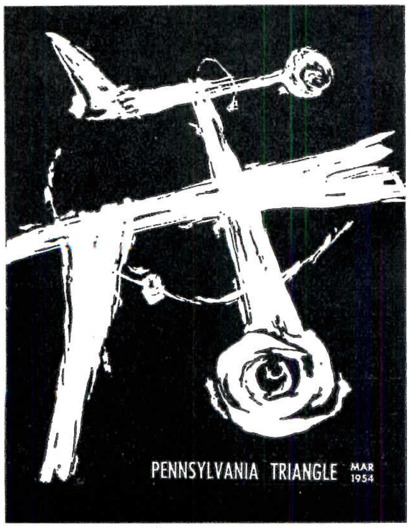
(*Continued on page 352*)



PERSPECTA is the architectural journal of Yale. This year's issue includes an article on Japan by Gropius as well as articles by Nakashima, Sybil Moholy-Nagy and Philip Johnson. 9¾ by 11¾ in.; 70-page; letterpress; halftones, 4-color illus.; ads

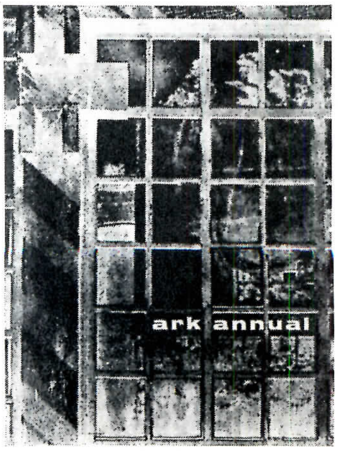
The STUDENT PUBLICATION of the School of Design, N. C. State College is published three times a year. This issue includes "Introduction to Thin Shells" by Atilio Gallo, as well as articles by Nervi and Fuller, and student work. 8¼ by 8¾ in.; 50 pages; offset; halftones; no ads; $2.00

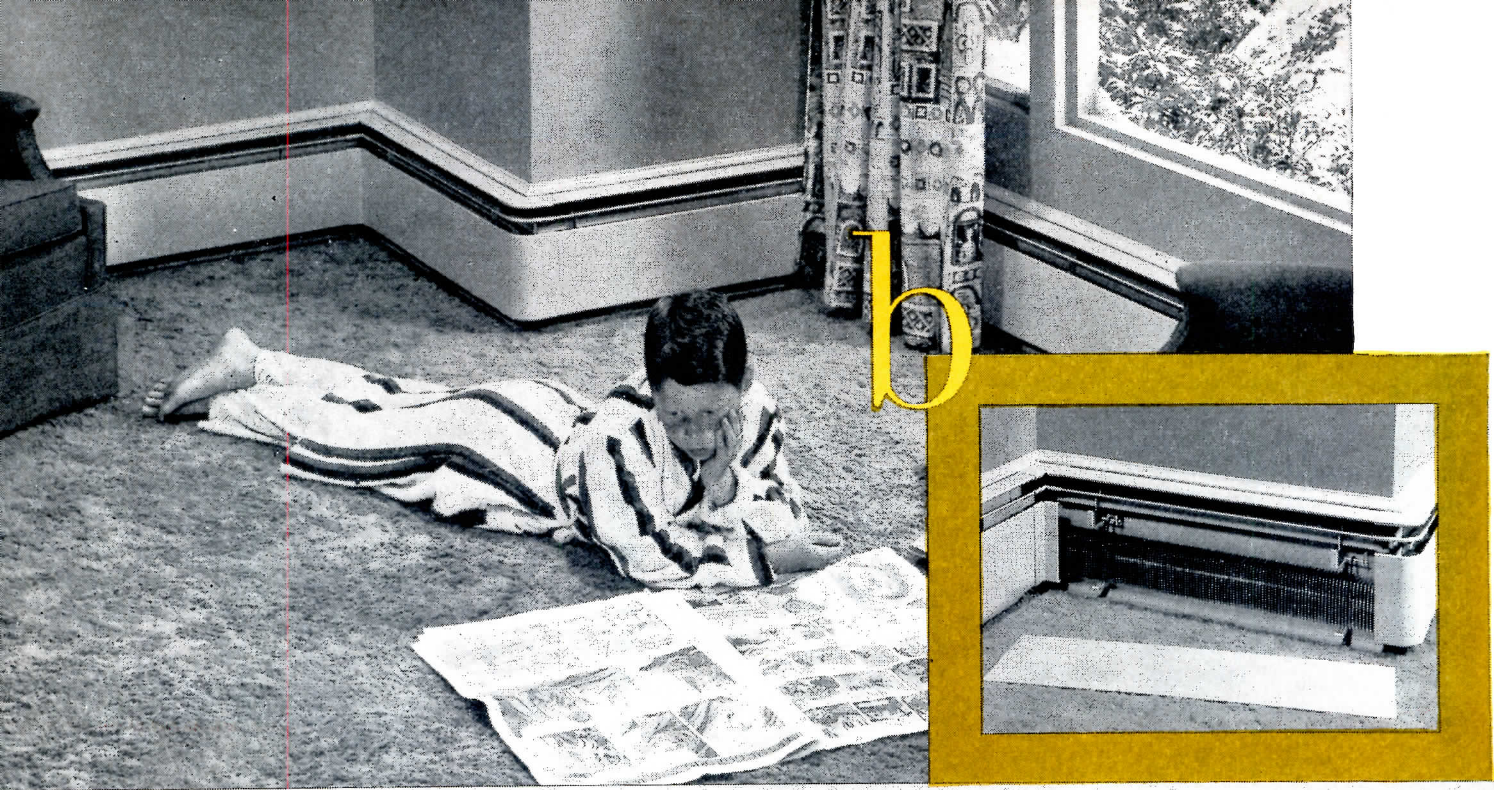




ARK ANNUAL is published yearly by the Student Chapter of the A.I.A., U. of Calif.; the 1954 issue includes an article by James Ackerman on "Public Architecture," and illustrations of student work. 7½ in. by 10 in.; 36 pages; offset; halftones

PENNSYLVANIA TRIANGLE is the joint effort of the engineering and fine arts schools of the U. of Pa. This 46-page edition shows interior views of the home of Mrs. Stanislawa Nowicki and includes a student article on elastic plastics. 8½ by 11½ in.; monthly; letterpress; halftones; ads; 25¢





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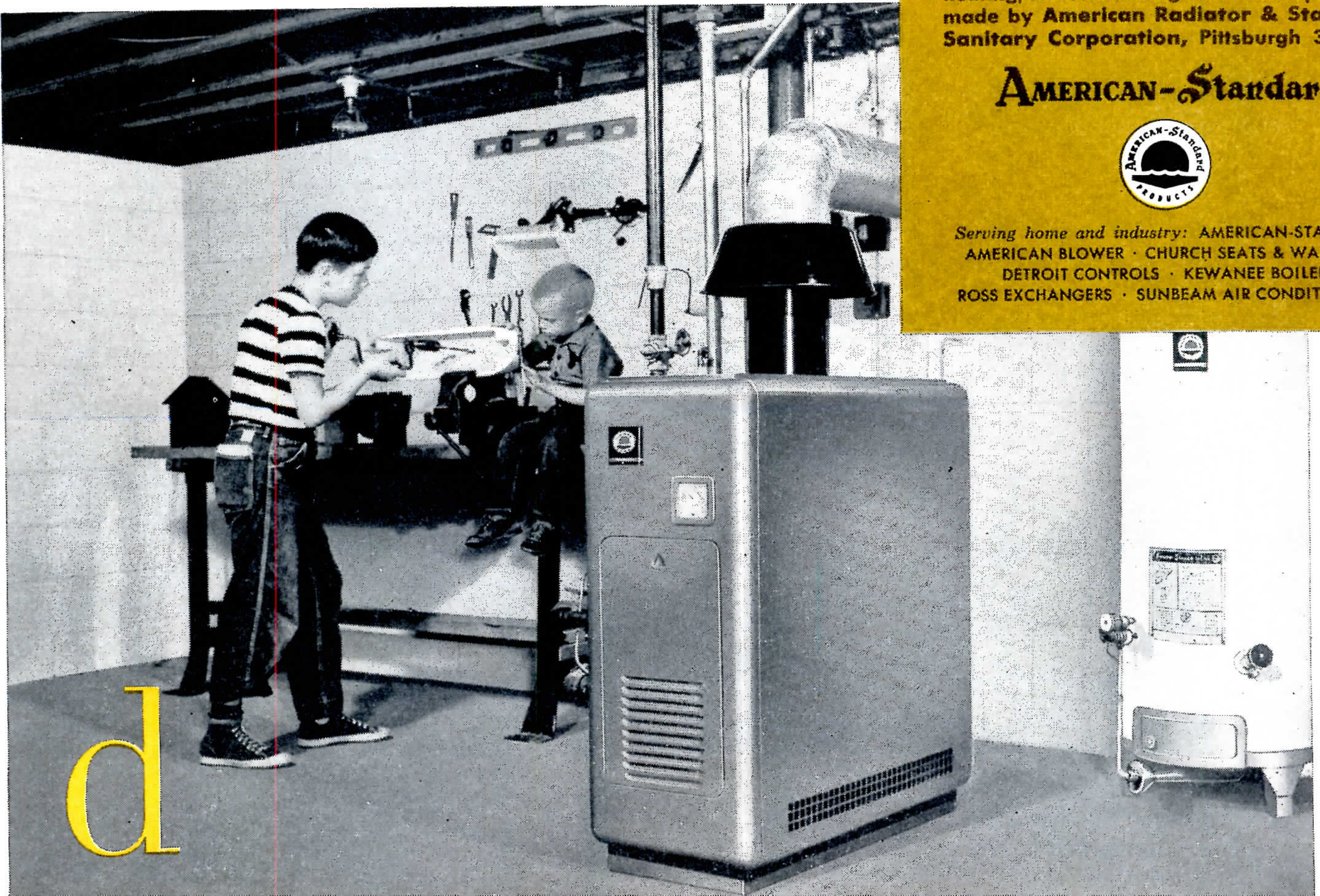

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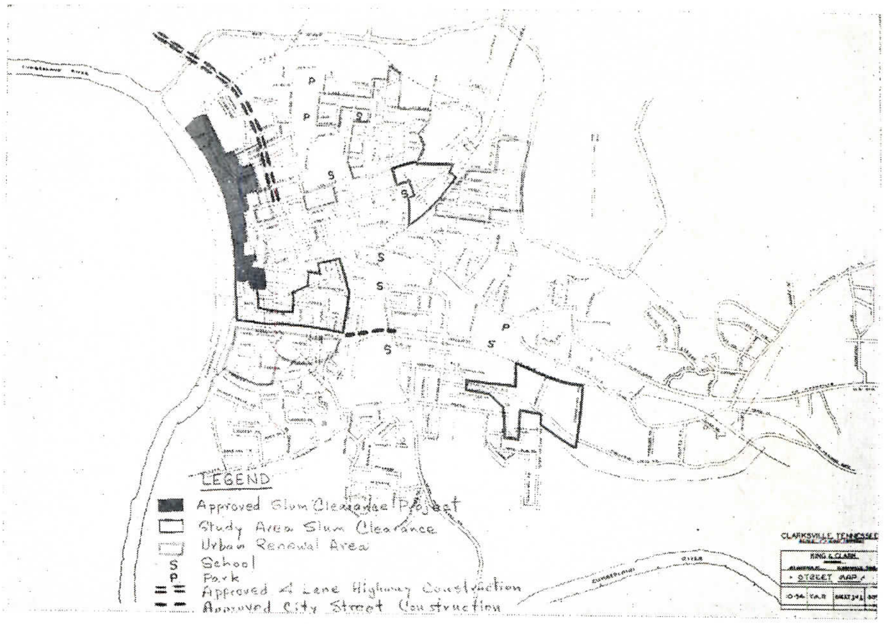
URBAN RENEWAL: CLARKSVILLE LEADS THE WAY

THE GREATER EMPHASIS on local responsibility in the Housing Act of 1954 is unmistakably expressed in the requirement that any community wanting to qualify for Federal financial aid under it submit to the Housing and Home Finance Agency along with its application for funds a "workable program" embodying a long-range plan for coping with the problem of urban decay. The workable program requirement also reflects the emphasis in the new legislation on an "integrated" approach which stresses conservation and rehabilitation as much as slum clearance. Although some cities had expressed early misgivings about the possible complications of the workable program scheme, by last month 84 cities had workable programs "in process" and 11 of them had been approved. And, as if to shame the hesitant, the first city to have a workable program approved was Clarksville, Tenn., pop. 22,000 (Chamber of Commerce estimate).



Clarksville street map with blighted areas indicated (in various colors on original). At bottom of page: photos show typical conditions workable program seeks to eliminate

Clarksville had a head start, because under the leadership of the Clarksville Housing Authority, the Clarksville Planning Commission and the City Administration, an intensive planning program got under way in 1952, so that its presentation to HHFA contained a record of performance as well as promise.

The "workable program," submitted last September 14, just 43 days after President Eisenhower signed the new housing act, was summarized as follows (italics indicate the seven "essential objectives" HHFA says must be covered):

1. *Adequate Codes and Ordinances.* During 1954 Clarksville improved the system of Building Code enforcement and made plans for the preparation and enforcement of a Housing Code scheduled for adoption by June of 1955.

2. *Comprehensive Community Plan.* A time schedule was established for the completion and adoption of the three major elements of the general plan by December 1954. In addition, important work in studying needs and planning for additional schools and recreational facilities has been scheduled for the year starting Jan. 1, 1955.

3. *Detailed Neighborhood Analyses.* Preliminary work was completed in selecting eight areas (including the first redevelopment area now in final planning) for Urban Renewal and/or Slum Clearance and Urban Redevelopment considerations. A survey of the areas has been completed to record existing housing conditions.

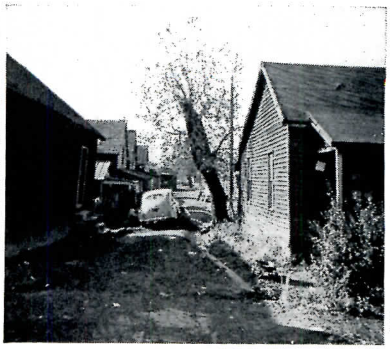
4. *Adequate Administrative Organization.* The administrative machinery through which the urban renewal processes will be carried out include the Housing Authority, the Planning Commission, and the official departments of the City government.

5. *Financing Ability.* The preliminary projections of the budgets of the City Departments indicate that the City can supply its proportionate part of the costs of Urban Redevelopment and Urban Renewal Projects.

6. *Housing for Displaced Families.* Efforts are being made to create additional private housing and low-rent public housing to make feasible the relocation of all families displaced through the operation of the urban renewal processes. Sufficient public housing is planned for the next three years, supplemented by private housing, to carry out the Urban

(Continued on page 344)



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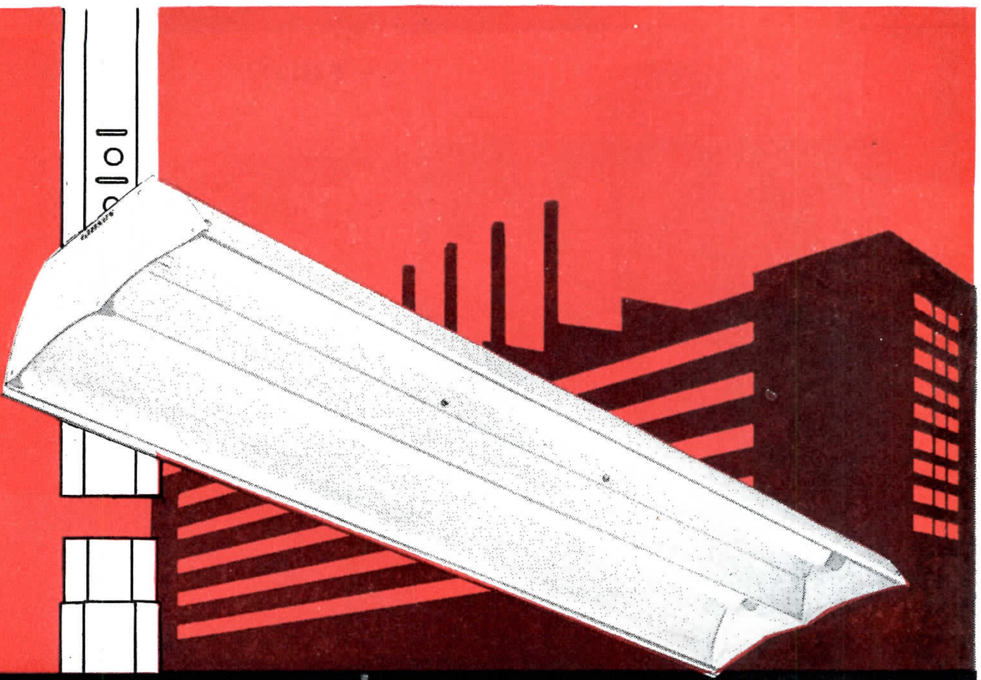

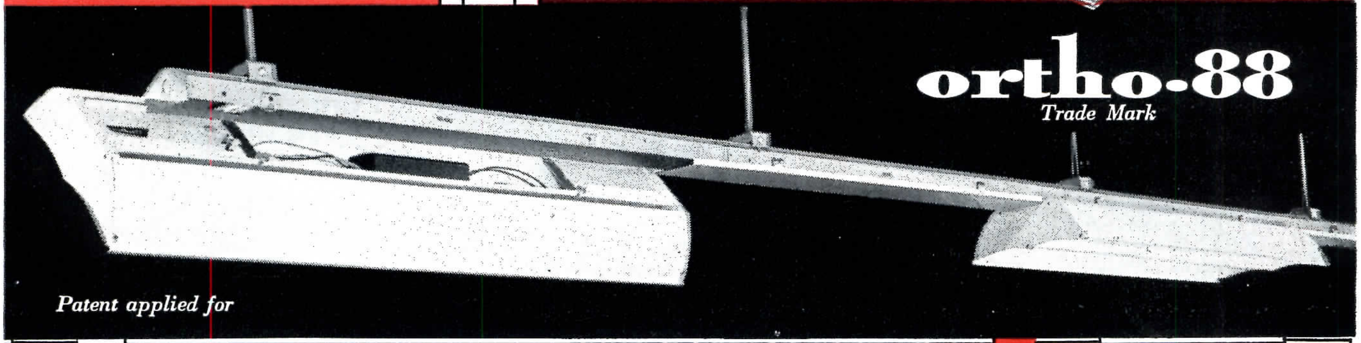

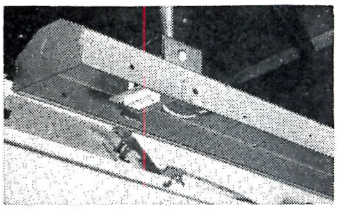

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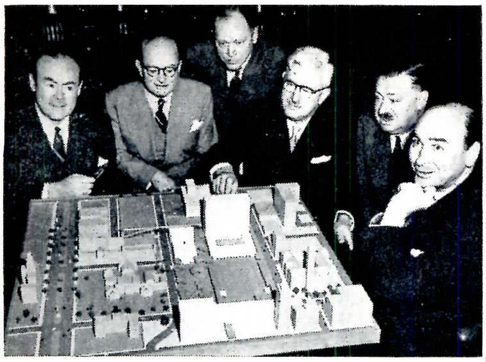
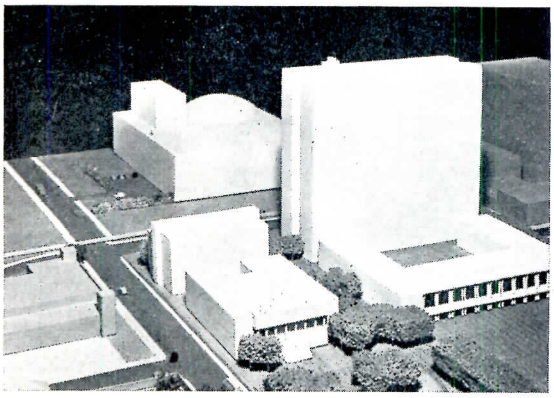
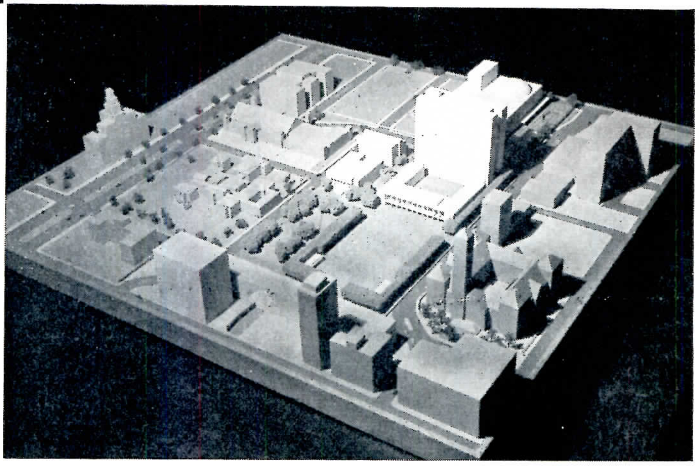
NEWS FROM CANADA *by John Caulfield Smith*



Viewing model of proposed plan for new civic square, from left to right: Toronto architects R. S. Morris, F. H. Marani, L. E. Shore, Mayor Nathan Phillips, and architects A. S. Mathers and Robert R. Moffat





TORONTO UNVEILS ITS SCHEME FOR A CIVIC SQUARE

A PRELIMINARY PLAN for Toronto's projected civic square was exhibited recently to Mayor Nathan Phillips and the city's Board of Control. A team of three Toronto architectural firms — Marani & Morris, Mathers & Haldenby and Shore & Moffat — collaborated on the design.

The center of the development will be the city hall, which will be a 12-story building if city administrative offices alone are to be housed, but which can have 20 stories if the Metropolitan Council decides to share the building. A low building in front of the city hall and connected with it will contain offices for the Mayor and for the Metro chairman, as well as City Council and Metro Council chambers.

In back of the city hall will be a bubble-topped civic auditorium.

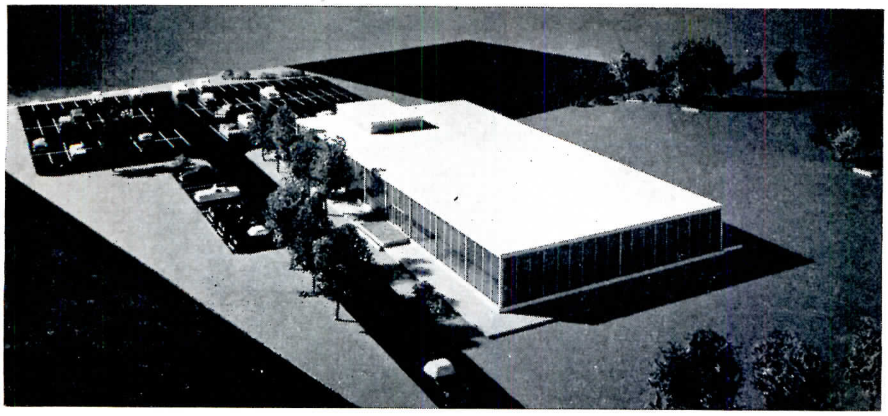
An underground parking garage, which will be large enough for 1000 cars, will service workers during the day, auditorium crowds at night.

Other government buildings to be incorporated in the square include a three-story registry office and a four-story building containing the Magistrate's Courts and offices for a police station.

A possible addition to this plan is a courthouse for Metro on the site of the present armory (to left of registry building in photograph).

No cost estimates have been made, nor has there been any suggestion of when construction might be undertaken.

(*Continued on page 30*)



PARKIN ASSOCIATES PLAN DON MILLS HEADQUARTERS

HAVING OUTGROWN their offices in downtown Toronto, John B. Parkin Associates have designed for themselves a new headquarters building to go up in Don Mills Village. The blue-glass building, to be ready for occupancy in June, will provide 18,000 sq ft of office space. Facilities include parking space for 113 automobiles, a drafting room for more than 100 tables and desks, a lunchroom and small kitchen.

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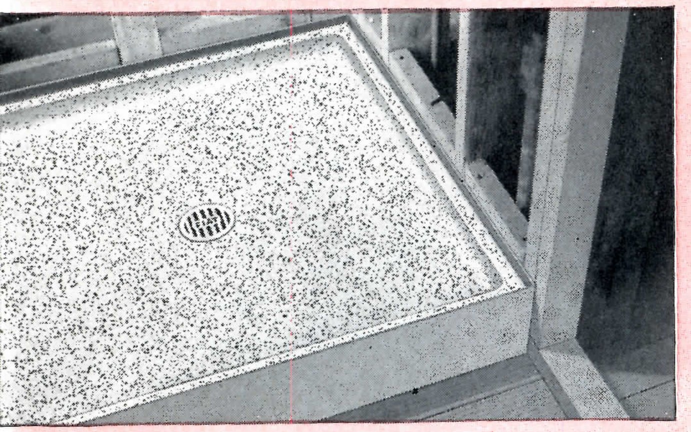

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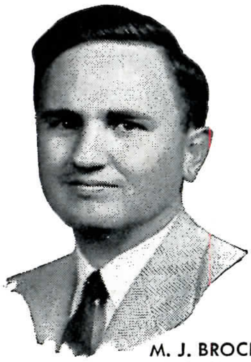

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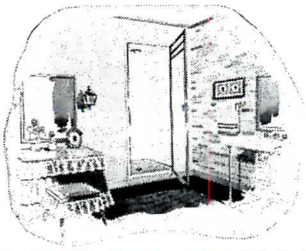

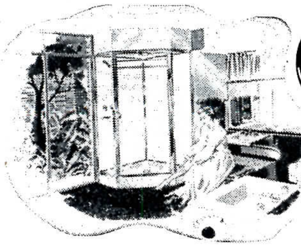

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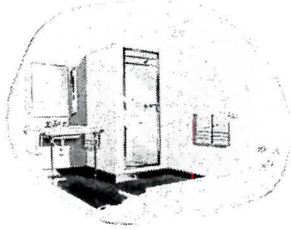

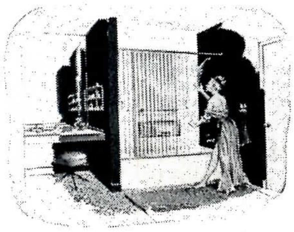

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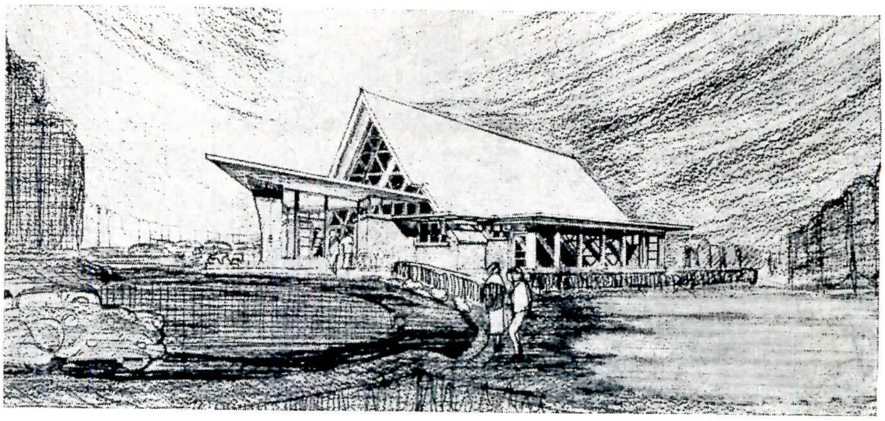
CANADA

(*Continued from page 26*)

TRADE MINISTER EXPECTS CONSTRUCTION RISE IN '55

The Rt. Hon. C. D. Howe, Minister of Trade and Commerce, predicts a 10 per cent increase in 1955 construction expenditures in comparison with those of 1954. In a white paper on projected private and public investment outlays for this year, submitted recently to the House of Commons, Mr. Howe announced that construction spending planned for 1955 totals $4064 million. All major categories, he said, should be involved in this rise. Housing expenditures, it was predicted, would increase 10 per cent over 1954, with 116,000 starts against the 113,000 for last year. A 10 per cent increase was also forecast for non-residential and engineering construction, while a rise of 19 per cent is expected in institutional building.

The paper, which was based on a survey of "some 16,000 business establishments across Canada" and of proposed expenditures by governments, institutions and private house builders, forecasts a total investment of $5.8 billion in new construction, machinery and equipment, a figure about six per cent higher than that for 1954.



The Alexander Graham Bell Memorial Museum, to be built at Baddeck, N. S., uses tetrahedral motif to recall Bell's use of tetrahedron in his studies of mechanical flight; architects are A. Campbell Wood, Hugh W. Blachford and Harold Ship, with O. Howard Leicester as consulting architect

ALBERTA ARCHITECTS CONVENE IN CALGARY

K. C. Stanley was elected president of the Alberta Association of Architects for 1955 at the annual meeting of the organization held in Calgary recently. Mr. Stanley is a partner in the firm of Dewar, Stevenson & Stanley of Edmonton.

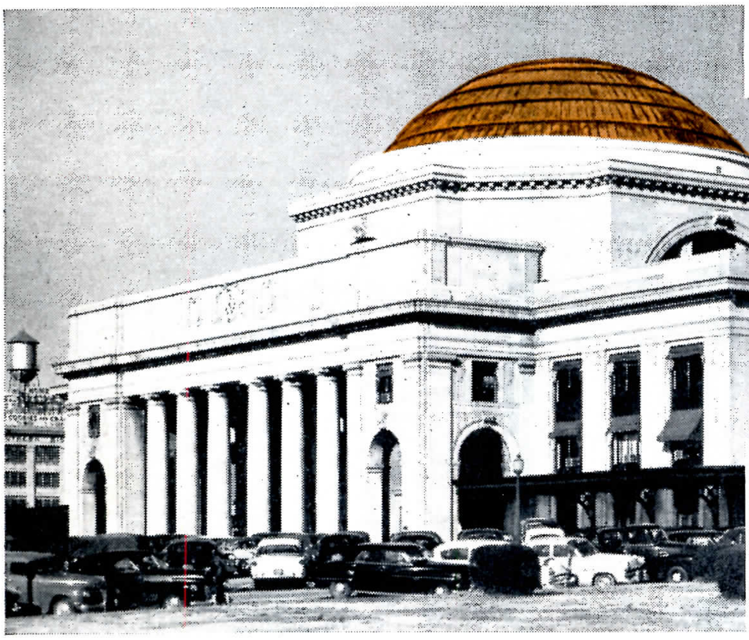
Other officers are: George W. Lord, Edmonton — first vice president; W. G. Milne, Calgary — second vice president; H. L. Bouey, Edmonton — honorary

(*Continued on page 32*)

Re-roofing a dome with copper

ROOFING PANS preformed from 20″ x 96″ x 20 oz. gage cold rolled copper sheets were used for the batten seam construction. →

COMPLETED COPPER-COVERED DOME which is 94′ 6″ in diameter and 28′ high. Architect: Carneal & Johnston. General Contractor: James Fox & Sons, Inc. Sheet Metal Contractor: N. W. Martin & Brothers. Anaconda Distributor: Gordon Metal Company. All are located in Richmond, Va. ↓



NETWORK OF COPPER ALLOY BARS and angles suspended from the crown help to hold in place the additional structural surfacing required to form the new contour. Angles 3″ x 5″ bent to the radius and curvature of the dome produced the desired shadow lines. →

New roof uses 45,000 lb. of Anaconda Sheet Copper... assures owner of low upkeep, long service

When the Richmond Terminal Railway Company's Broad Street Station at Richmond, Va., was built, the dome was roofed with a nonmetallic material. Structural movement of the roof covering made frequent repairs necessary. As it appeared this trouble would continue to mount, the owner authorized an extensive study by its architect-engineers resulting in the selection of copper.

Only this time-tested material could economically match the durability of this handsome building, for copper measures its economy by *generations* of service. It requires little attention or maintenance. And, as it grows older, a copper roof acquires a beautiful green patina.

Construction details

Placing a new copper covering over a concrete spherical surface called for special designs which dictated that the major portion of the copper roof be of batten seam construction using cold rolled copper sheets of 20 oz. gage, 20″ x 96″. Inverted bronze channels were employed for the battens. For the crown of the dome, flat lock seam construction was employed using 16″ x 18″ roofing squares of 20 oz. gage cold rolled copper. Edges were pretinned to a depth of 1½″.

When roofing must *last*, ANACONDA Sheet Copper costs *less*. Good design and proper application insure its enduring service. Anaconda building engineers were privileged to assist with the design of this important roofing job. Their counsel is equally available to you in all problems involving sheet copper design and construction. 5457

FREE file of drawings—Do you have the FREE Anaconda file of drawings? Nearly fifty drawings show new or improved ways to apply sheet copper. Each is printed on a separate 8½″ x 11″ page, handy for quick-reference filing. This entire series may be obtained absolutely FREE by writing for Portfolio S to: **The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.**

for better sheet metal work use

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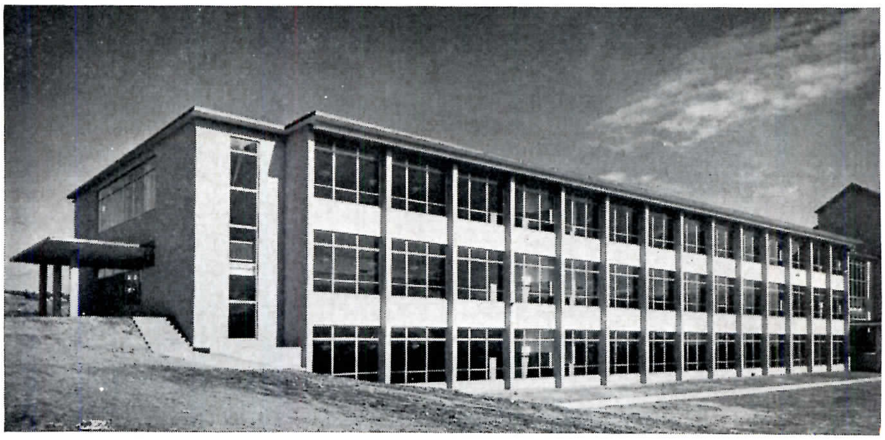
COPPER

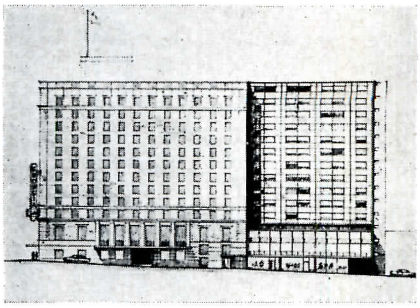
CANADA

(*Continued from page 30*)

secretary; G. B. Ascher, Edmonton — honorary treasurer; and J. B. Bell, Edmonton; J. H. Cook, Calgary; D. G. Forbes, Edmonton; and H. A. Henderson, Edmonton — councillors.

Architect Paul Thiry, of Seattle, was the banquet speaker.





Current projects in Vancouver include (above) the Sir James Douglas School, designed by Vancouver architect E. D. King, and (below) addition to Hotel Georgia, by Sharp & Thompson, Berwick & Pratt, architects

NEW OFFICERS ELECTED BY ONTARIO ENGINEERS

The new president of the Association of Professional Engineers of Ontario is John R. Montague of the Ontario Hydro Electric Power Commission, Toronto. Vice presidents are Merritt W. Hotchkin, Kirkland Lake, John H. Fox, Toronto.

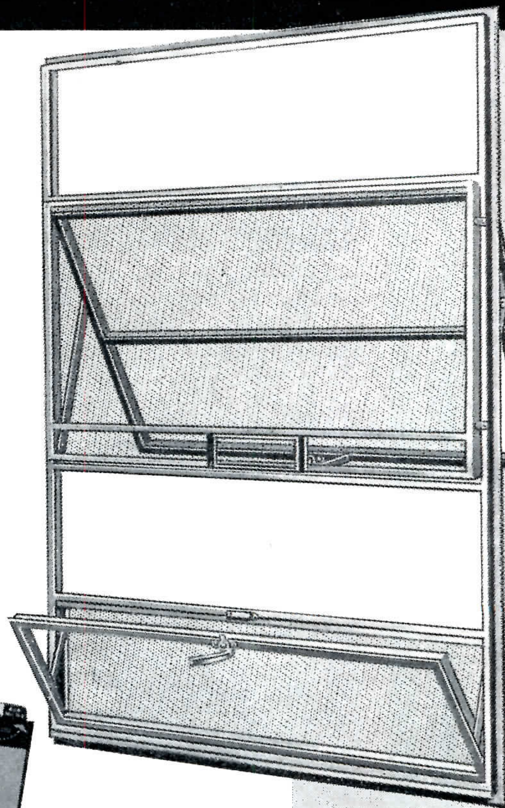
NEWS NOTES

A special bulletin on **"Icicles and Icedams"** has been prepared by the Small House Architectural Service of the Ottawa Chapter, Royal Architectural Institute of Canada; copies are available from the chapter secretary, Walter C. Sproule, 74 Sparks St., Ottawa. . . . The year-old **Specification Writers Association,** which was formed to establish better standards of terminology for specifications writing, and which has its headquarters in Toronto, is making efforts to acquire a national membership; inquiries are sought by president A. W. Harper of Govan, Ferguson, Lindsay, Kaminker, Langley & Keenleyside, Toronto. . . . **Siegfried Giedion,** of Harvard University's Department of Architecture, recently addressed the Architectural Society of the University of Toronto.

(*Continued on page 36*)

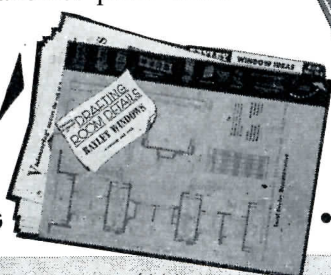
KEEP PACE WITH MODERN TRENDS

...IN SCHOOLS, COMMERCIAL AND PUBLIC BUILDINGS, HOSPITALS AND INSTITUTIONS



With Bayley's sub-frame designs you can achieve distinctive, individualized curtain wall treatments, of almost unlimited variety, without the costliness of special window designing. Standard Bayley Aluminum Projected Windows, with heavy channel frames and a choice of ventilator arrangements, serve as the basic unit . . . and at the same time afford the maximum in air, light and vision. Combining the flexibility of these units with 30 years of curtain wall experience, Bayley can help you accomplish some surprising and exciting things if consulted in the early stages of your project. Also, by giving Bayley this opportunity to properly pre-engineer your job you will be assured of maximum ultimate satisfaction in both design appearance and integral building construction. It's another place where Bayley's extra pre-planning service counts!

See Bayley's catalogs in Sweet's . . . aluminum windows 16a/Bay; and steel windows 16b/Ba; or ask us for individual reference-file copies. **Write for special file on Bayley Curtain Wall Ideas, Designs and Details.**



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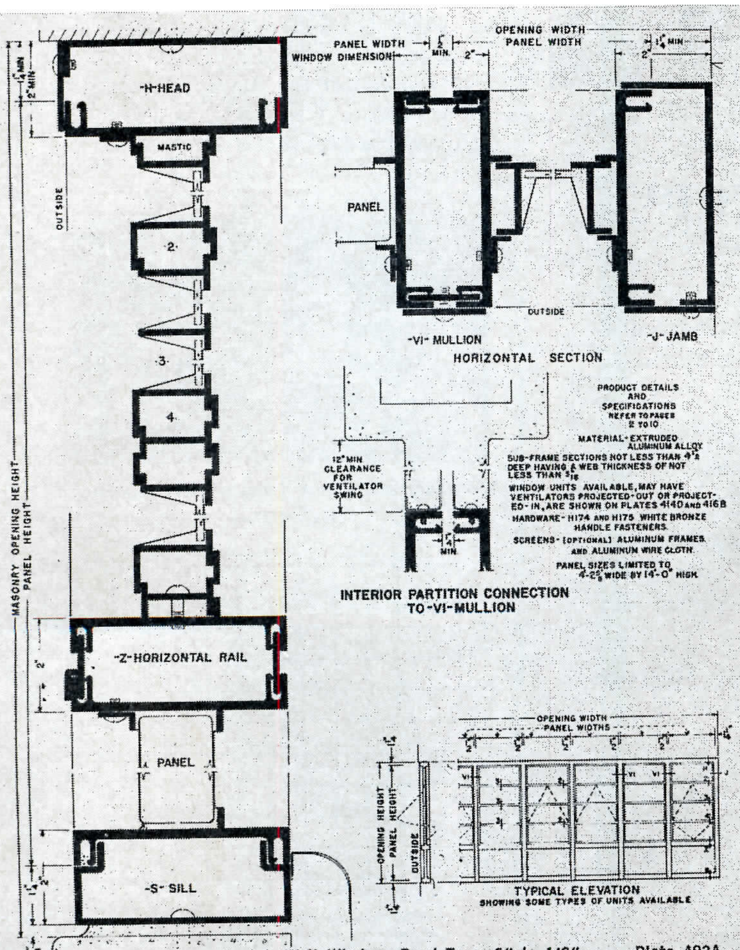
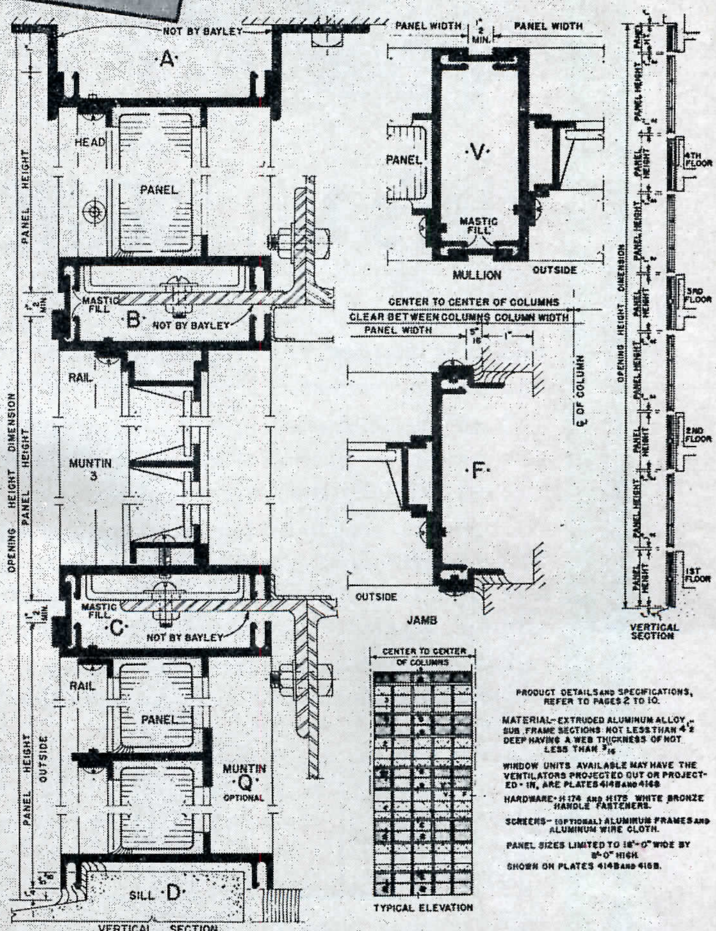


Bayley Aluminum Curtain-Wall Window—Band Type—3" to 1'0" Plate 493A



Bayley Aluminum Curtain-Wall Window—Tier Type—3" to 1'0" Plate 494A

Full size details of these plates available on request.

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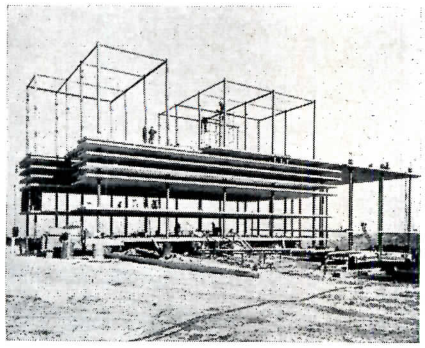
CANADA

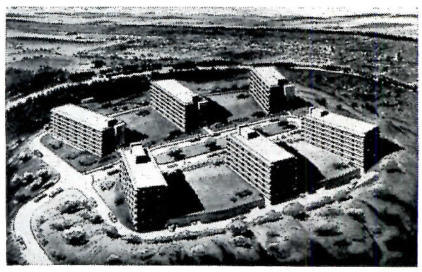
(*Continued from page 32*)



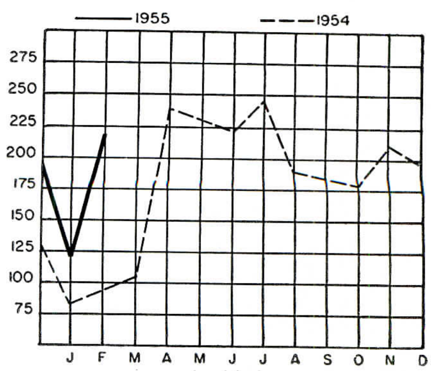
"TALLEST" LIFT SLAB JOB UNDER WAY IN CALGARY

Two of the six Rideau Towers apartments now under construction in Calgary are being built with the lift slab method; the seven-story buildings are believed to be the tallest lift slab jobs so far attempted. The engineers for the project claim that more than 30 per cent of the usual structural costs were saved, and cite as a further advantage of the system the possibility of casting the concrete floors at temperatures as low as −30° F.

The architect for the apartments is Peter Caspari, F.R.I.B.A., of Toronto; structural engineers are W. V. Zinn & Associates Ltd. of Toronto.



Contracts Awarded: Comparative Figures*
(in $ million)



* Compiled by the editor and staff of *The Building Reporter*, from information collected by MacLean Building Reports

(*More news on page 38*)

IKE'S SCHOOL AID BILL DECRIED BY EDUCATORS

COMMITTEE HEARINGS in both houses of Congress last month left little doubt that (1) there is serious opposition in the school field to President Eisenhower's proposed program of Federal aid to states and municipalities to help them finance school construction (AR, March 1955, pp. 10–11); and (2) there is a possibility aid to school construction in this session of Congress will be caught in the crossfire of those who think the President's program doesn't go far enough and those who think it goes too far.

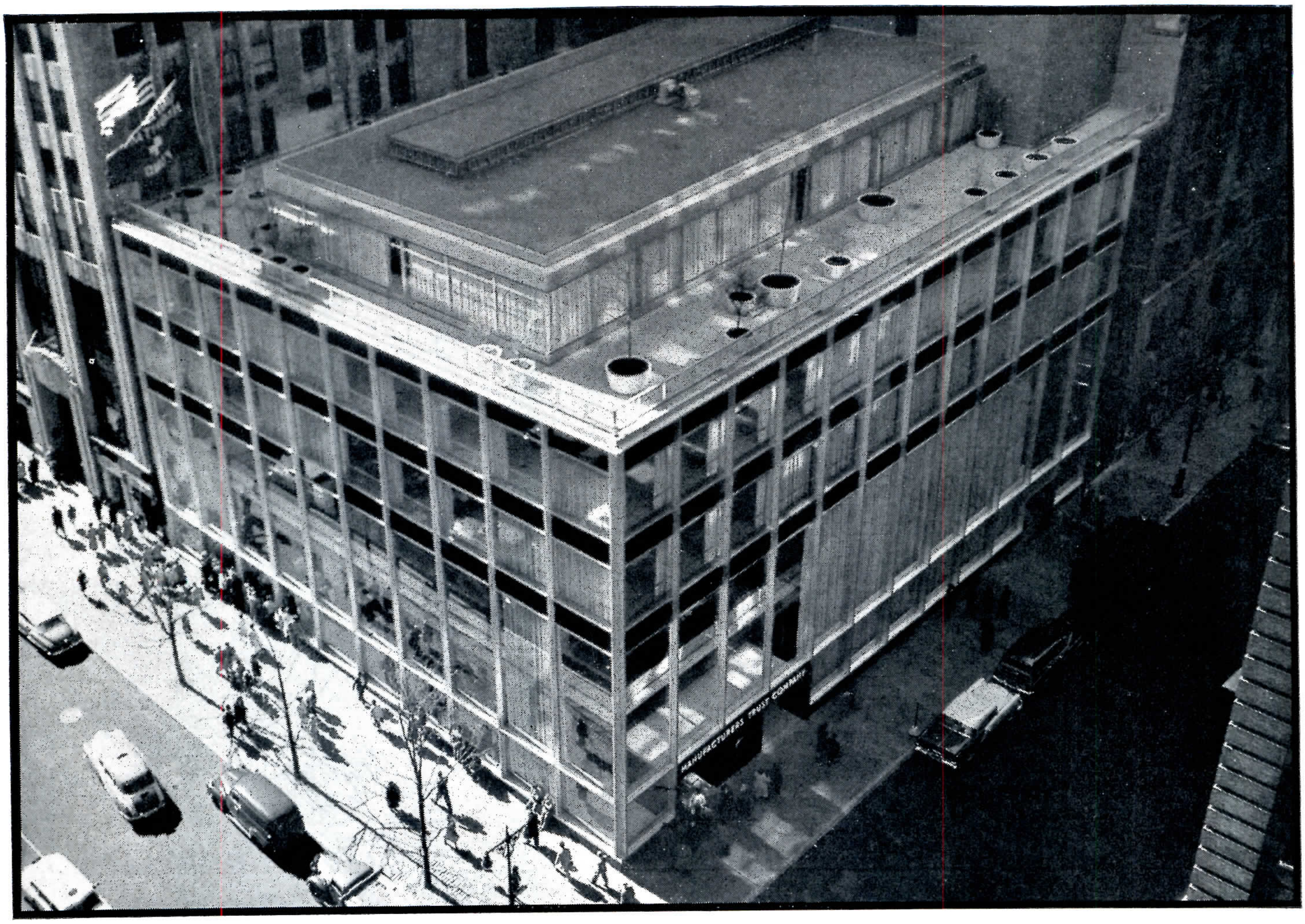
The Senate Committee on Labor and Public Welfare, headed by Senator Lister Hill (D-Ala.), held full-dress hearings on the Administration bill (S-968) introduced by Senator H. Alexander Smith (R-N. J.); and a long list of witnesses from the field of education presented a unanimous front in opposition — "too little aid and too much control" was the burden of their objections.

The American Institute of Architects registered objection to the section encouraging establishment of state school building authorities. While it refused to take a stand on the issue of financing methods, the A.I.A. said architects foresaw a considerable waiting period before construction could be started under Title II of the proposed legislation. (Title II provides for Federal assistance to states in establishing special school building agencies to build schools for local school districts on a lease-purchase basis.) Lee Cochran, of the Chicago architectural firm of Perkins and Will, testifying for the A.I.A., cited the number of reviews and approvals already required in current practice, noted that even the existing systems are subject to considerable delay and pointed out that an additional step would slow down the process even more. The A.I.A. testimony was prepared by the A.I.A. national Committee on School Buildings, which met in Washington to consider the implications of S. 968. Members at this meeting were Henry L. Wright, Los Angeles, Chairman; John W. McLeod, Washington, vice chairman; Mr. Cochran; and Richard L. Aeck, Atlanta.

It was William G. Carr, executive secretary of the National Education Association, who used the "too little aid and too much control" phrase that seemed to sum up educators' reaction. Mr. Carr had high praise for the principles enunciated in the President's special message on education, but insisted the bill did not embody them. "The purpose of the bill is stated as being 'to provide assistance of a substantial and effective nature,'" Mr. Carr noted. "It will not provide such assistance."

Dr. Edgar Fuller, executive secretary of the Council of Chief State School Officers, said also the Council was completely in accord with the President's purpose, as stated in his special message, for "a plan of Federal cooperation with the states, designed to give our school children as quickly as possible the classrooms they must have," but asserted that the Administration bill could not achieve this end. "On the contrary," said Dr. Fuller, "the authors of

(*Continued on page 322*)



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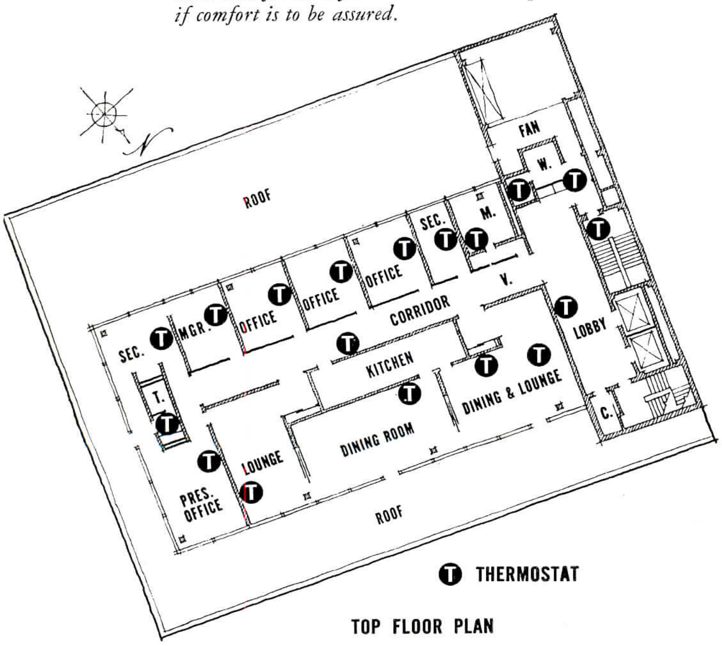

TOP FLOOR PLAN

Skidmore, Owings & Merrill, architects. Weiskopf & Pickworth, structural engineers. Syska & Hennessy, mechanical & electrical engineers. George A. Fuller Co., builders.

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CONSTRUCTION COST INDEXES

Labor and Materials **U. S. average 1926–1929=100**

Presented by Clyde Shute, manager, Statistical and Research Division, F. W. Dodge Corp., from data compiled by E. H. Boeckh & Assocs., Inc.

NEW YORK

Period	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel
1930	127.0	126.7	124.1	128.0	123.6
1935	93.8	91.3	104.7	108.5	105.5
1939	123.5	122.4	130.7	133.4	130.1
1946	181.8	182.4	177.2	179.0	174.8
1947	219.3	222.0	207.6	207.5	203.8
1948	250.1	251.6	239.4	242.2	235.6
1949	243.7	240.8	242.8	246.4	240.0
1950	256.2	254.5	249.5	251.5	248.0
1951	273.2	271.3	263.7	265.2	262.2
1952	278.2	274.8	271.9	274.9	271.8
1953	281.3	277.2	281.0	286.0	282.0
1954	285.0	278.2	293.0	300.6	295.4
Nov. 1954	285.8	278.5	294.2	302.3	296.8
Dec. 1954	285.8	278.5	293.1	301.6	294.6
Jan. 1955	286.5	279.4	293.2	301.7	294.8
	% increase over 1939				
Jan. 1955	131.9	128.2	124.3	126.1	126.5

ATLANTA

Period	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel
1930	82.1	80.9	84.5	86.1	83.6
1935	72.3	67.9	84.0	87.1	85.1
1939	86.3	83.1	95.1	97.4	94.7
1946	148.1	149.2	136.8	136.4	135.1
1947	180.4	184.0	158.1	157.1	158.0
1948	199.2	202.5	178.8	178.8	178.8
1949	189.3	189.9	180.6	180.8	177.5
1950	194.3	196.2	185.4	183.7	185.0
1951	212.8	214.6	204.2	202.8	205.0
1952	218.8	221.0	212.8	210.1	214.3
1953	223.3	224.6	221.3	221.8	223.0
1954	219.6	219.1	223.5	225.2	225.4
Nov. 1954	220.3	220.0	224.3	226.1	226.7
Dec. 1954	220.9	220.6	225.1	226.7	227.3
Jan. 1955	221.0	220.8	224.9	227.0	227.6
	% increase over 1939				
Jan. 1955	156.0	165.7	136.4	133.0	140.3

ST. LOUIS

Period	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel
1930	108.9	108.3	112.4	115.3	111.3
1935	95.1	90.1	104.1	108.3	105.4
1939	110.2	107.0	118.7	119.8	119.0
1946	167.1	167.4	159.1	161.1	158.1
1947	202.4	203.8	183.9	184.2	184.0
1948	227.9	231.2	207.7	210.0	208.1
1949	221.4	220.7	212.8	215.7	213.6
1950	232.8	230.7	221.9	225.3	222.8
1951	252.0	248.3	238.5	240.9	239.0
1952	259.1	253.2	249.7	255.0	249.6
1953	263.4	256.4	259.0	267.6	259.2
1954	264.6	257.9	263.7	273.3	266.2
Nov. 1954	266.2	259.7	265.2	275.0	268.4
Dec. 1954	266.2	259.7	265.3	275.1	268.6
Jan. 1955	266.6	260.2	265.4	275.1	268.7
	% increase over 1939				
Jan. 1955	141.9	143.1	123.5	129.6	125.7

SAN FRANCISCO

Period	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel
1930	90.8	86.8	100.4	104.9	100.4
1935	89.5	84.5	96.4	103.7	99.7
1939	105.6	99.3	117.4	121.9	116.5
1946	159.7	157.5	157.9	159.3	160.0
1947	193.1	191.6	183.7	186.8	186.9
1948	218.9	216.6	208.3	214.7	211.1
1949	213.0	207.1	214.0	219.8	216.1
1950	227.0	223.1	222.4	224.5	222.6
1951	245.2	240.4	239.6	243.1	243.1
1952	250.2	245.0	245.6	248.7	249.6
1953	255.2	257.2	256.6	261.6	259.7
1954	257.4	249.2	264.1	272.5	267.2
Nov. 1954	260.0	252.0	266.0	275.4	269.7
Dec. 1954	260.6	252.6	266.9	276.1	270.6
Jan. 1955	260.8	252.8	267.2	276.3	270.8
	% increase over 1939				
Jan. 1955	146.9	154.5	127.5	126.6	132.4

The index numbers shown are for combined material and labor costs. The indexes for each separate type of construction relate to the United States average for 1926–29 for that particular type — considered 100.

Cost comparisons, as percentage differences for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.:

index for city A = 110
index for city B = 95

(both indexes must be for the same type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

$$\frac{110-95}{95} = 0.158$$

Conversely: costs in B are approximately 14 per cent lower than in A.

$$\frac{110-95}{110} = 0.136$$

Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926–29.

Material prices and wage rates used in the current indexes make no allowance for payments in excess of published list prices, thus indexes reflect minimum costs and not necessarily actual costs.

These index numbers will appear regularly on this page.

CHART FOR HOME WIRING SYSTEMS

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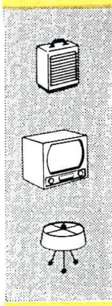
Typical Outlets	Notes
	Use of more than one outlet is permitted, but not recommended.
	Appliance may be direct connected.
	Appliance may be direct connected.
	These appliances may be direct connected on a single circuit. *Grounded receptacles* required, otherwise.
	Heavy duty appliances regularly used at one location should have a separate circuit. Only one such unit should be attached to a single circuit at a time.
	Separate circuit serving only refrigerator and freezer is recommended.

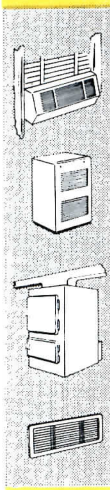
	Notes
	Grounding type receptacle required.
	May be direct connected—must be grounded.
	Grounding type receptacle required.
	Consider possible use in other locations.
	Consult Utility Co. for load requirements.

LIVING AREAS



	Typical Wattage	Preferred Circuit	Volts	Wires	Breaker or Fuse	Number Outlets	Typical Outlets	Notes
WORKSHOP	1500	2 KW.	120	2 #12	20A.	2 or more		Separate circuit recommended.
PORTABLE HEATER	1300	2 KW.	120	2 #12	20A.	1		Should not be connected to circuit serving other heavy duty loads.
TELEVISION	300	2 KW.	120	2 #12	20A.	2 or more		Should not be connected to circuit serving appliances.
PORTABLE LIGHTING	1200	2 KW.	120	2 #12	20A.	2 or more		Provide one circuit for each 500 sq. ft. Divided receptacle may be switch controlled.

FIXED UTILITIES



	Typical Wattage	Preferred Circuit	Volts	Wires	Breaker or Fuse	Number Outlets	Typical Outlets	Notes
FIXED LIGHTING	1200	2 KW.	120	2 #12	20A.	2 or more		Provide at least one circuit for each 1200 watts of fixed lighting.
AIR CONDITIONER ¾ H.P.	1200	2 KW.	120	2 #12	20A.	1 or more		Consider 4 kw 3-wire circuits to all window or console type air conditioners. Outlets may then be adapted to individual 120 or 240 volt machines.
AIR CONDITIONER 1½ H.P.	2400	4 KW.	120/240	3 #12	20A.	1 or more		
CENTRAL AIR CONDITIONER	5000	6KW.	120/240					Consult manufacturer for recommended connections.
SUMP PUMP	300	2 KW.	120	2 #12	20A.	1 or more		May be direct connected.
HEATING PLANT	600	2 KW.	120	2 #12	20A.	1		Direct connected. Some local codes require separate circuit.
BATHROOM HEATER	1500	2 KW.	120	2 #12	20A.	1		Direct connected.

TYPICAL POWER CENTER AND CIRCUIT REQUIREMENTS

6 ROOM HOUSE 1500 sq. ft.

20-kw Service	main	100 amp 3w	240/120 volts	Dish Washer	1-2 kw	20 amp 2w	120 volts
10-kw Range	1-10 kw	50 amp 3w	240/120 volts	Oil Burner	1-2 kw	20 amp 2w	120 volts
3-kw Water Htr.	1-6 kw	30 amp 3w	240/120 volts	Freezer—Ref.	1-2 kw	20 amp 2w	120 volts
5-kw Dryer	1-6 kw	30 amp 3w	240/120 volts	Heater	1-2 kw	20 amp 2w	120 volts
1½-hp Cooler	1-4 kw	20 amp 2w	240 volts	T.V.	1-2 kw	20 amp 2w	120 volts
Clothes Washer	1-2 kw	20 amp 2w	120 volts	General Purpose	4-2 kw	20 amp 2w	120 volts
Ironer	1-2 kw	20 amp 2w	120 volts	Portable App.	3-2 kw	20 amp 2w	120 volts

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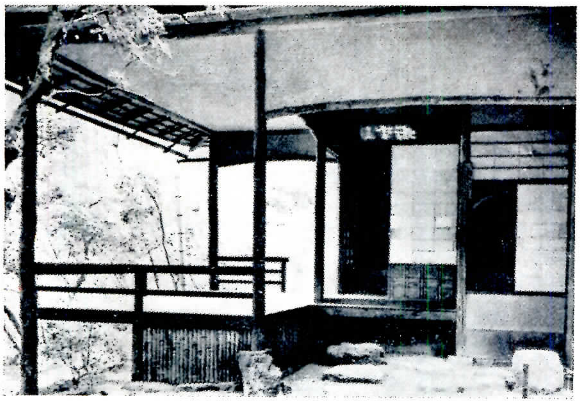


From Pageant of Japanese Art — Vol. 6

The Lesson of Japanese Architecture. By Jiro Harada. Charles T. Branford, Co. (Boston, Mass.) 1955. 192 pp, illus. $6.50

This is the revised edition of Mr. Harada's original work of 1936 and is a welcome addition to the current flow of books on art and architecture of the Far East. The purpose here is to briefly state the architectural principles involved, their application and evolution in the history of Japanese architecture, and then to give them full meaning to the Western viewer through photographs of the Japanese house as a complete and mature form of architecture.

The text material of this book is refined to less than twenty percent of the total volume but it is a comprehensive statement

Continued on page 48

From The Art and Architecture of Russia

The Art and Architecture of Russia. By George Heard Hamilton. Penguin Books (Baltimore, Md.) 1954. 320 pp, illus. $8.50

The Moscow Kremlin: Its History, Architecture, and Art Treasures. By Arthur Voyce. The University of California Press (Berkeley and Los Angeles) 1954. 147 pp, illus. $10

"I have never heard of nor saw men so sumptuous," said the English Richard Chancellor in 1553, after viewing the army of Ivan the Terrible. "Sumptuous" pretty well describes the art and architecture, particularly the religious art and architecture, of Moscow, Kiev and Novgorod, the cities of ancient Russia. St. Petersburg, founded early in the 18th century by the Europeanized Peter the Great, presents an almost Western aspect in comparison with the older cities, but the architecture is marked with the same vitality that characterizes the medieval buildings farther south.

While much of the building — a large portion of St. Petersburg and much of the Moscow Kremlin — was the work of imported architects (many of them Italian), these transplanted artists seemed to augment but not to change an architecture already based on the early masonry building of Kiev and Novgorod, Russian wooden forms and the art of Byzantium. In Moscow,

Continued on page 48

From L'Habitat au Cameroun

L'Habitat au Cameroun. Publication de L'Office de la Recherche Scientifique Outre-Mer (20, rue Monsieur, Paris) 1952. 151 pp, illus. $12. (*George Wittenborn & Co., New York — American distributors*)

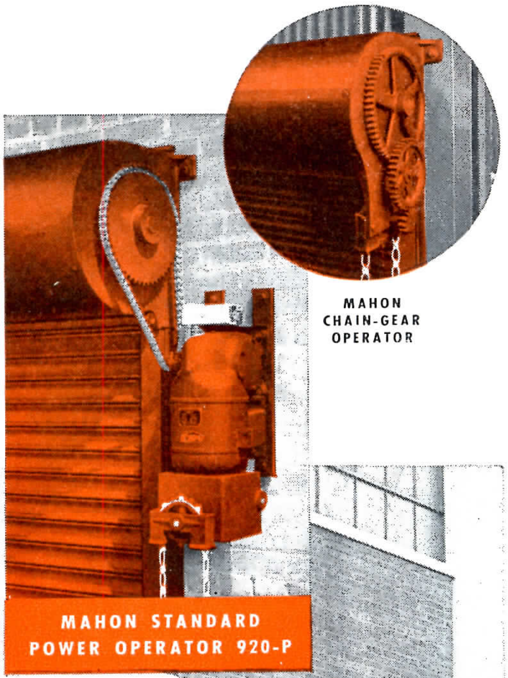
It is not very often that we think of the tribal architecture of South Africa, much less have the opportunity to study it. *L'Habitat au Cameroun* offers a beautiful presentation of some most unique forms of architecture and city planning.

The Cameroons, located on the Atlantic coast, are part of Equatorial Africa, and are divided into distinct cultural areas by geographical boundaries. The northernmost territory is divided into mountains and arid plains inhabited by aristocratic fair-skinned Moslems who have imposed their law on the native herdsmen. The mountain villages are composed of acorn-like houses constructed of poles with thatched straw roofs arranged in fortified circular groups. Stone walls surround each grouping. The total effect of rich surface patterns and circular planning expresses tremendous vitality. The people of the plain live in these thatched roof huts and in beehive-like huts of baked mud

Continued on page 386

Rolling Steel Doors

Manually, Mechanically, or Electrically Operated



MAHON CHAIN-GEAR OPERATOR

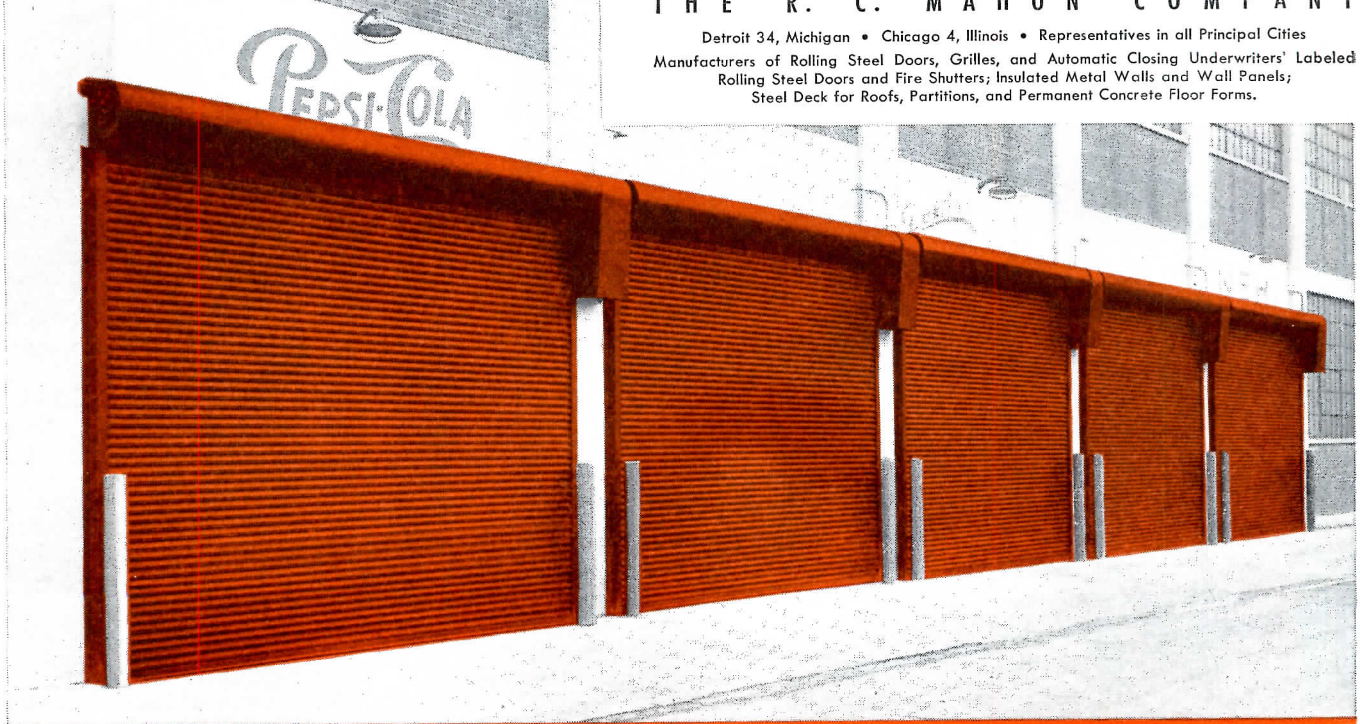
MAHON STANDARD POWER OPERATOR 920-P

Rolling Steel Doors in exterior openings provide greater security than any other type of door. When these doors are closed, their interlocking steel curtains assure maximum protection against both intrusion and fire. In the installation shown below, where five new Mahon Power Operated Rolling Steel Doors provide access to an enclosed loading dock, it is impossible to open any of the doors from the outside. They can be opened only through use of normal operating controls located inside the building. Rolling Steel Doors have many other advantages . . . they are very compact—their vertical roll-up action permits use of floor space to within a few inches of the door curtain on either side. And, there are no overhead tracks or other obstructions to interfere with crane handling adjacent to door openings. A Mahon electrically operated, quick-opening, quick-closing Rolling Steel Door will save valuable space and valuable time in any type of opening. In addition, Mahon Rolling Steel Doors are permanent—their all-metal construction assures a lifetime of trouble-free service. When you select a Rolling Steel Door, check specifications carefully . . . you will find extra-value features in Mahon doors—for instance, the galvanized steel material, from which the interlocking curtain slats are rolled, is Bonderized and dip-coated with synthetic enamel which is baked on at 350° F. prior to roll-forming. You will find other Mahon features in both design and materials that add up to a greater over-all dollar value. See Sweet's Files for complete information, or write for Catalog G-55.

T H E R. C. M A H O N C O M P A N Y

Detroit 34, Michigan • Chicago 4, Illinois • Representatives in all Principal Cities

Manufacturers of Rolling Steel Doors, Grilles, and Automatic Closing Underwriters' Labeled Rolling Steel Doors and Fire Shutters; Insulated Metal Walls and Wall Panels; Steel Deck for Roofs, Partitions, and Permanent Concrete Floor Forms.



ROLLING STEEL DOORS, SHUTTERS AND GRILLES TO MEET EVERY REQUIREMENT

Five of Seven Mahon Power Operated Rolling Steel Doors installed at Dossin's Food Products Plant, Detroit, Michigan. The Five Doors illustrated are in openings to an enclosed loading dock. All seven Mahon Rolling Steel Doors in this plant replaced exterior wooden doors of various types.

MAHON

REQUIRED READING

(*Continued from page 46*)

which always remained the religious capital of the country, European architects were of course required to adopt the church form prescribed by the Orthodox Church.

Russian art until the 18th century concentrated almost entirely on the painted icon — particularly exciting examples of this form are the works of the 14th century Theophanes the Greek and the 15th century Andrei Rublev. In the realm of the decorative arts, the love of early Russian princes for dazzling colors and jewels produced resplendent ecclesiastical and royal regalia. That this fondness for splendor has endured is exhibited by a room like St. George's Hall in the Grand Kremlin Palace, built in the mid-19th century and just recently refurbished by the Soviet government.

George Heard Hamilton's *The Art and Architecture of Russia* is the fifth volume in Nikolaus Pevsner's Pelican History of Art. Covering the history of Russian architecture from the beginning of Russian Christianity in the 10th century until the 1917 revolution, the book shows the results of a very elaborate research job. The history, unfortunately, never quite transcends the scholarship, a situation attributable, perhaps, to the fact that Mr. Hamilton, as far as can be gathered, has never visited Russia. If the book sometimes seems rather heavy going, however, it must be stated in fairness to the author that he intended no panegyric to Russian art, but rather a compact review of the facts of the case.

Arthur Voyce's *The Moscow Kremlin: Its History, Architecture, and Art Treasures* seems a livelier account, due in part, no doubt, to the more limited frame in which the author has worked; and his personal acquaintance with the Kremlin allows him to write about it in three dimensions, so to speak.

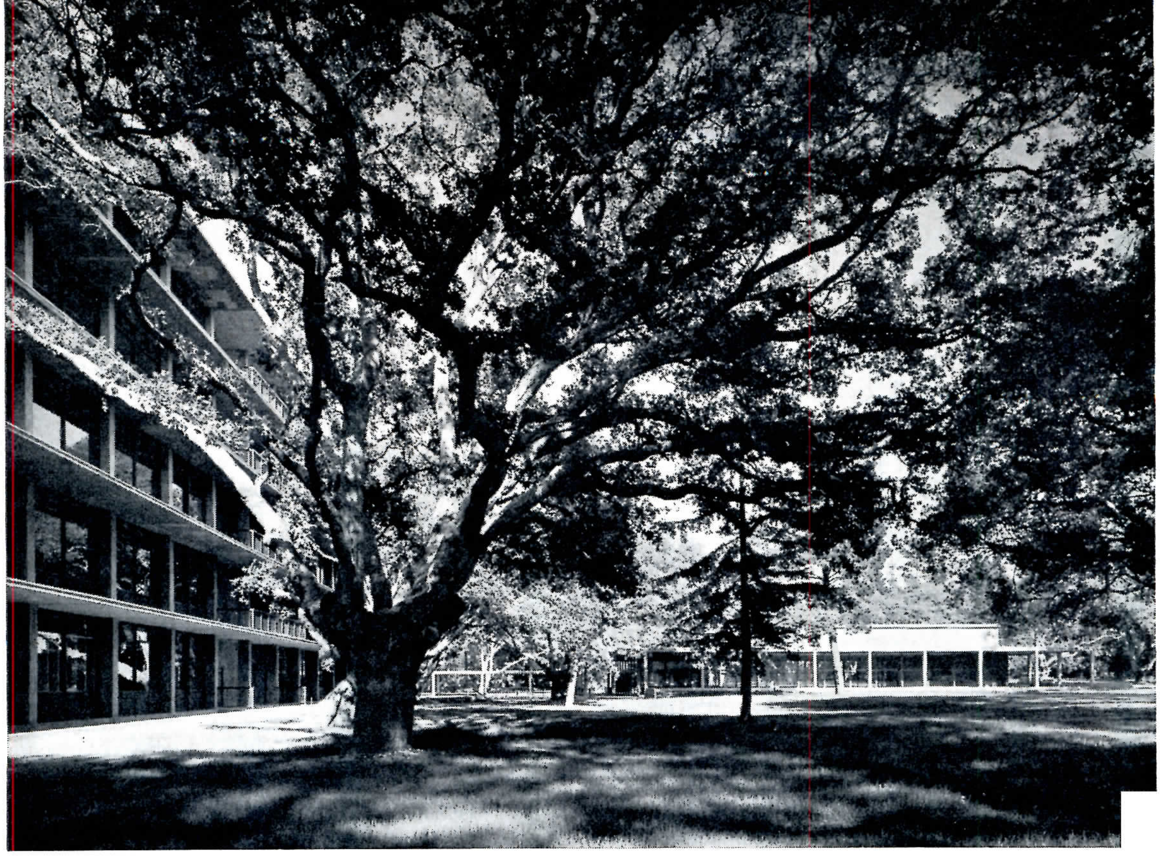
The illustrations in both books are generous and seem particularly excellent in view of the problems with which the authors must have had to deal in assembling them. **Grace M. Anderson**

JAPANESE ARCHITECTURE

(*Continued from page 46*)

of the universal principles we admire in Japanese architectural expression and seek to use in our own. The remainder of the book is filled with large photographs and illustrations demonstrating

(*Continued on page 382*)



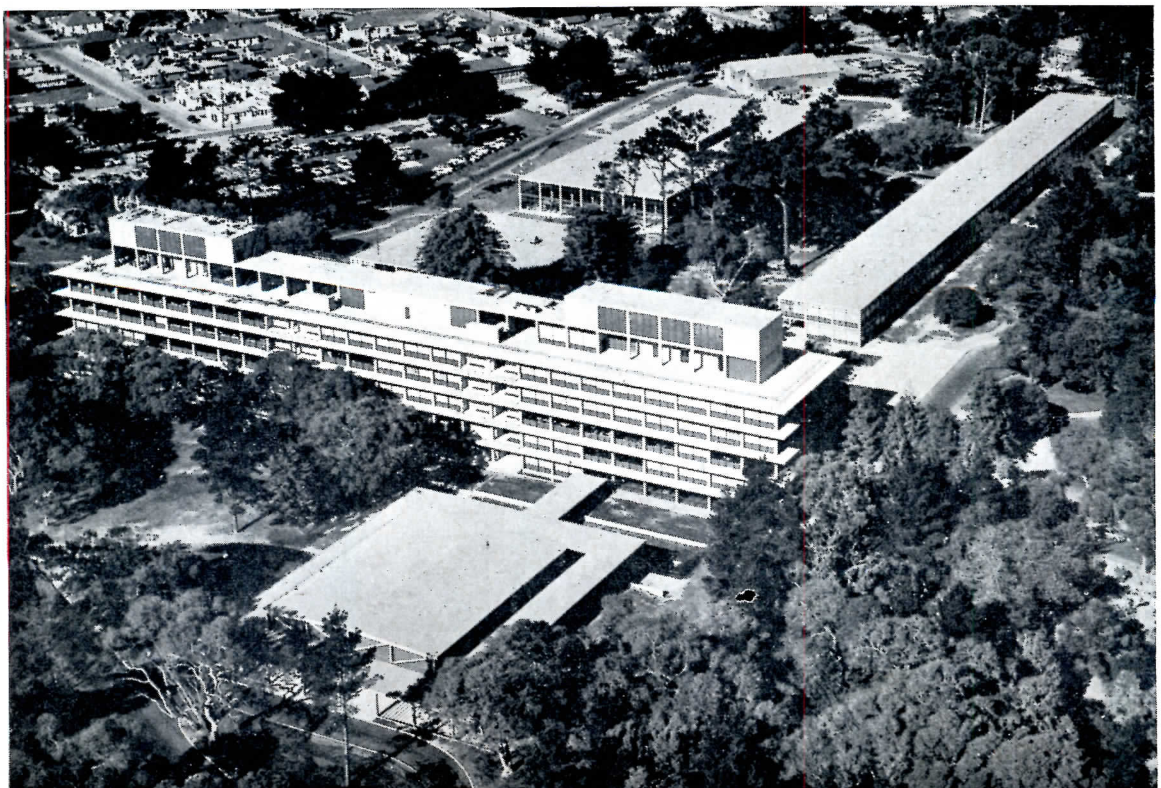
All Photos by Morley Baer

THE NAVY'S GRADUATE ENGINEERING SCHOOL

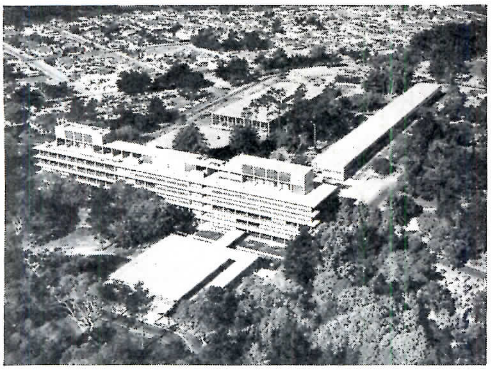
At the U. S. Naval Postgraduate School, Monterey, California

Skidmore, Owings & Merrill Architects

Walter A. Netsch, Associate Partner in charge of design; William E. Dunlap, Architect in charge of construction; Isadore Thompson, Structural Engineer; Keller & Gannon, Mechanical Engineers; Dariel Fitzroy, Electrical Engineer; Charles M. Lee, Consulting Engineer, Soils



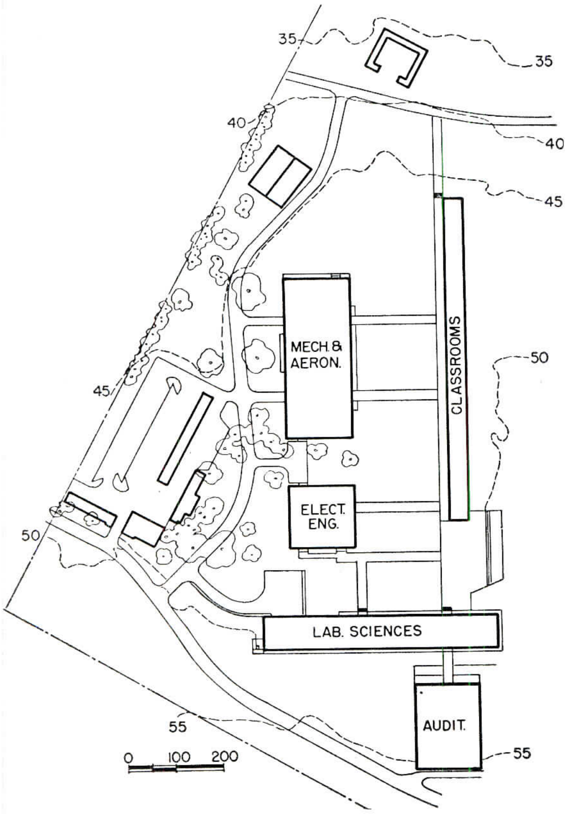
Official Photograph U. S. Navy



Official Photograph U. S. Navy

This project, sponsored by BuPers and BuShips of the U. S. Navy, was built under the contract authority and administration of the Chief of the Bureau of Yards and Docks, represented by the District Officer in Charge of Construction, Twelfth Naval District

THE U. S. NAVAL POSTGRADUATE SCHOOL

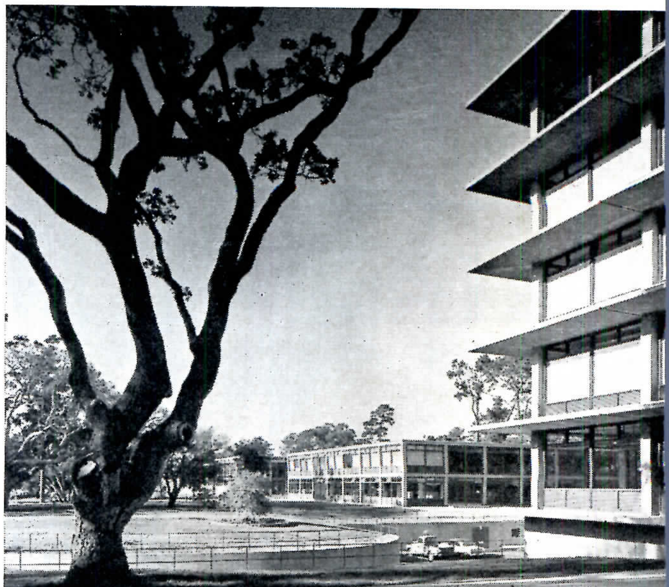


Integration of buildings with site's natural beauty to produce environment stimulating to spirit as well as mind, and satisfy functional and visual standards, was site planning basis

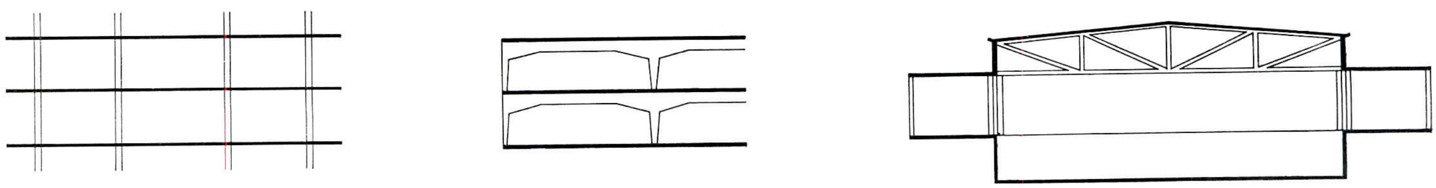
When the Navy decided in 1948 on Monterey, Calif., as the new site for its Postgraduate School, housed in quarters at Annapolis inadequate to a contemplated enrollment expansion, it chose the old Hotel Del Monte property for the buildings. Funds for the Engineering School were appropriated in 1951 and these buildings are now complete; no funds have yet been allotted to the School of the Line. However, since the Line School's needs would have considerable effect on the Engineering School design, studies for it were included in the master plan.

Curriculum needs in type and amount of space, interdepartmental relationships and budget were primary problems to be solved. (The programming and analysis which led to the design solution were described in Architectural Record for June 1954.) Less tangible but as important were the goals of providing an environment both intellectually stimulating and visually satisfying, and of achieving a harmony between buildings and region through relation of building mass and volume to site rather than by following local architectural tradition.

Meeting the budget — project cost was slightly under $15 per sq ft, low for this type of construction in the area — meant economy in every design phase: structure, modular column spacing, prefabrication of wood window units, repetition of elements, stacking of laboratory units, multi-use of classrooms, were all factors in economy. Although each building maintains its own individual character, relation to other buildings and to site unifies the group as a single design expression.

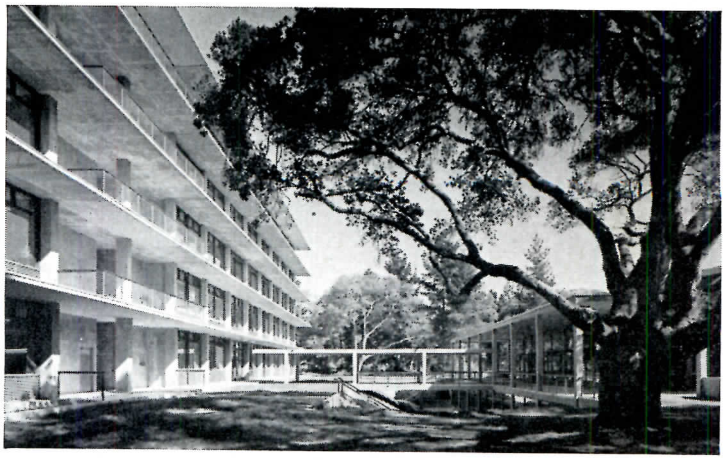


Between Laboratory Sciences and Classroom Buildings (above, center and extreme right) is Court. Across page are (left) Electrical and Mechanical-Aeronautical Engineering and Classroom Buildings; (right) Mechanical-Aeronautical, Electrical Engineering, Laboratory Sciences Buildings



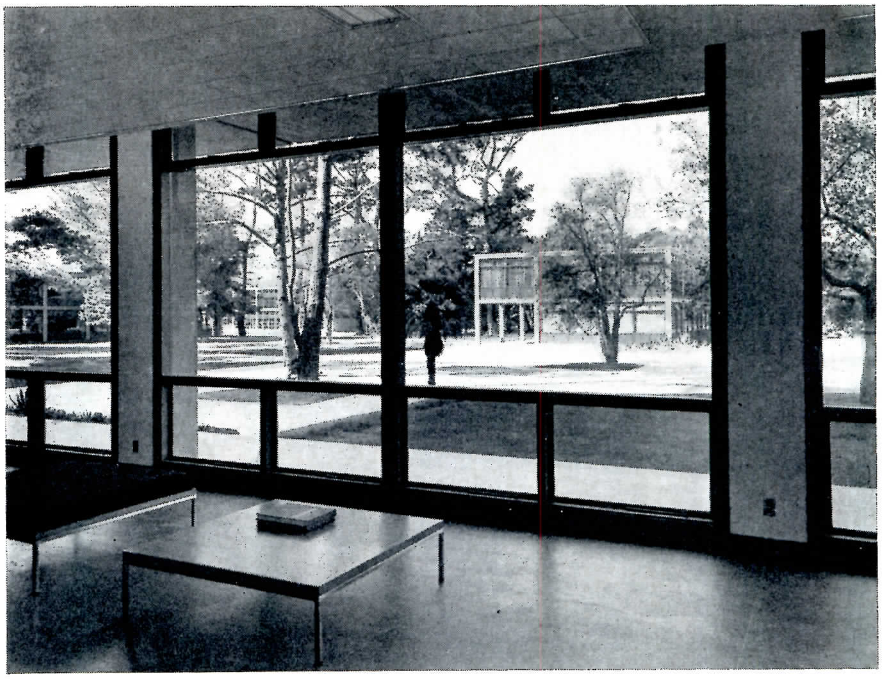
Three basic structural types provide variety of teaching space: left, flat plate for Laboratory Sciences and Classroom Buildings; center, long-span reinforced concrete arches for clear space in the two engineering lab buildings; right, reinforced concrete trusses framed into deep concrete girders for Lecture Auditorium Building

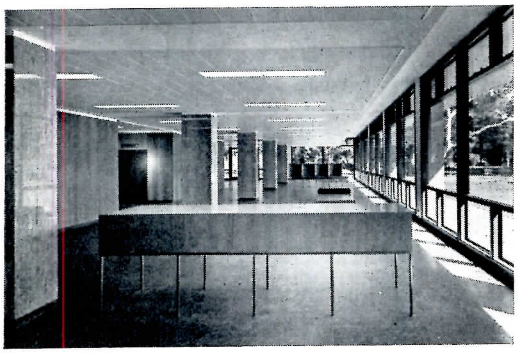
Cantilevered canopies continue around building as expression of flat plate construction, provide sun control, ease building maintenance; structure is dramatically revealed at night. Covered walk (below, right) between lab sciences and auditorium bridges sunken terrace outside cafeteria



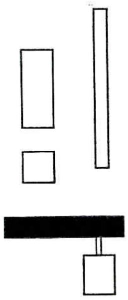
LABORATORY SCIENCES BUILDING

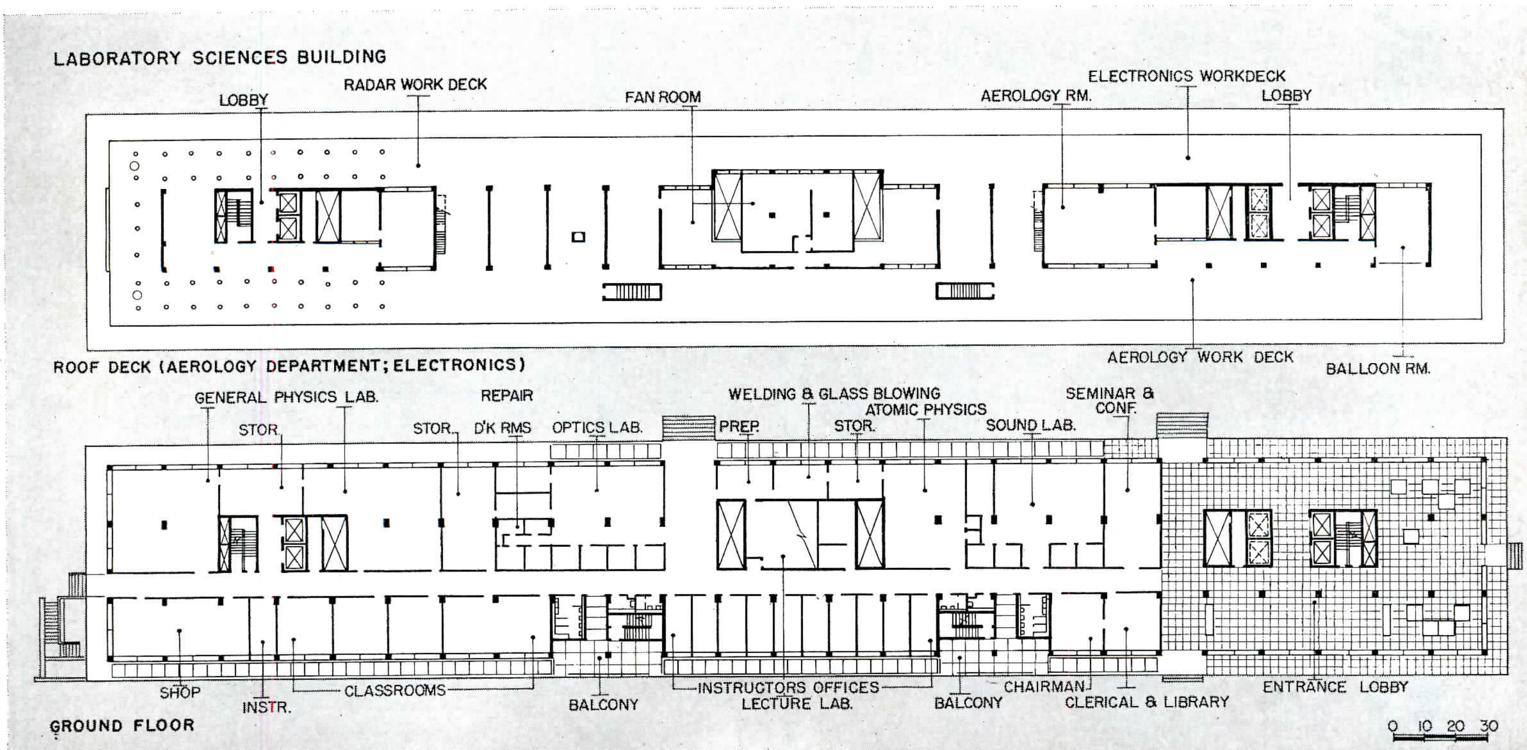
Physics, Chemistry, Metallurgy, Electronics, Aerology

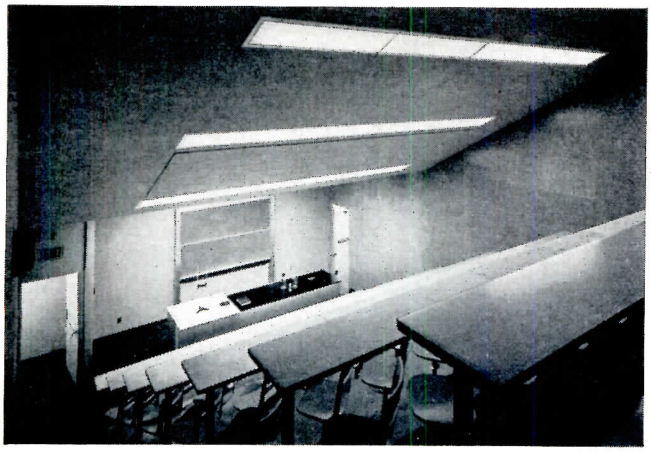


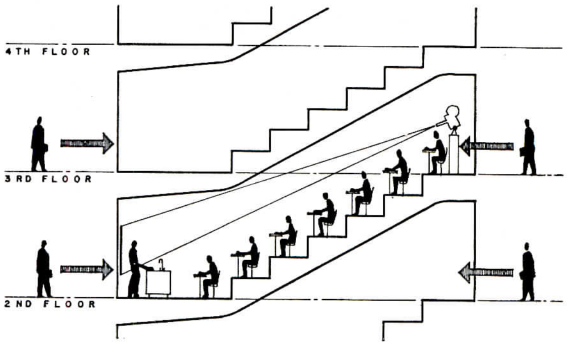


From glass-walled lobby, outlook on one side is to Court; on other, where information desk, phone booths are (left), to auditorium and terrace. Building has administration offices besides teaching, research labs. Modular window units are prefabricated. Aerology and electronics departments, needing high elevation, are on roof

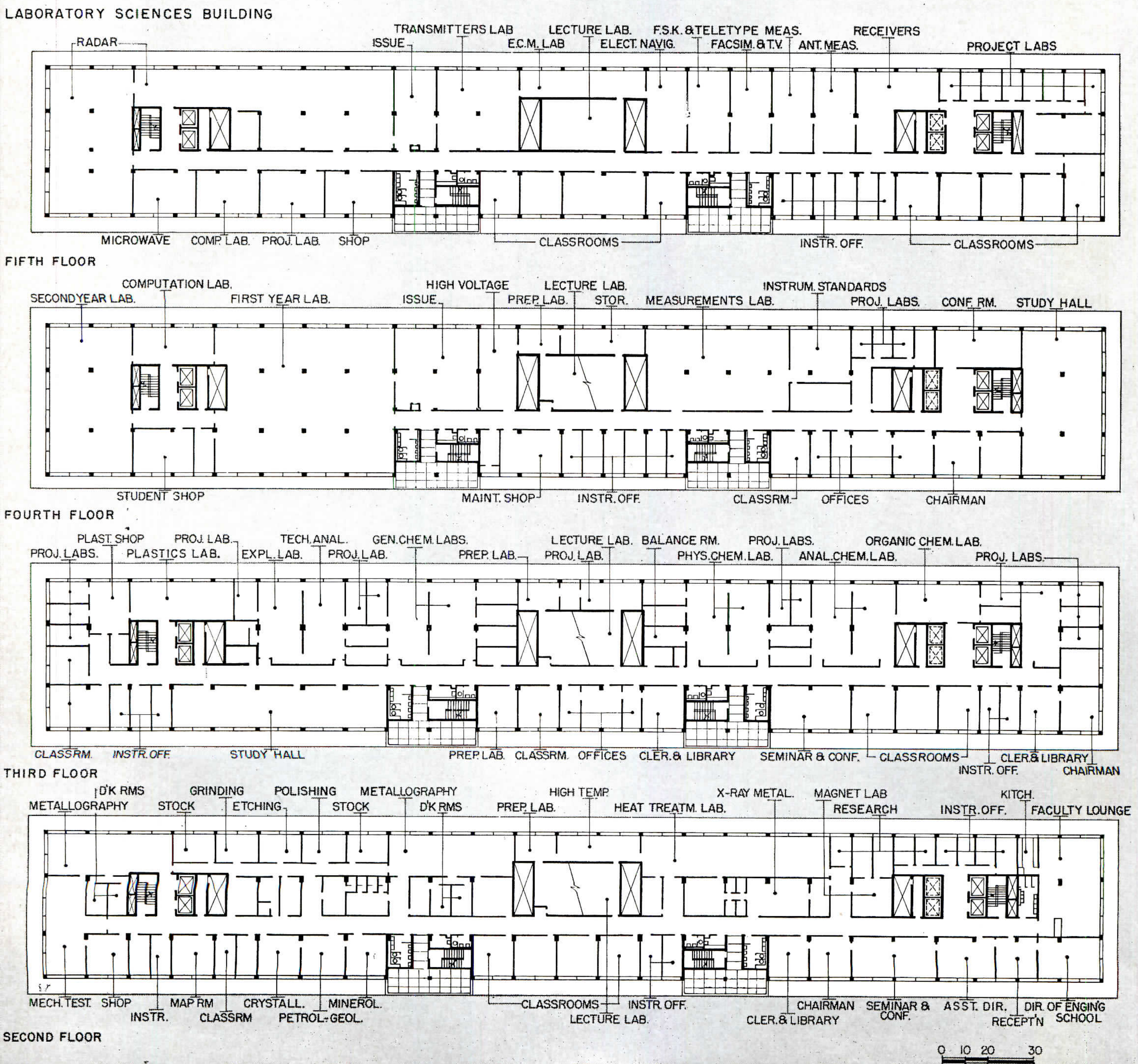


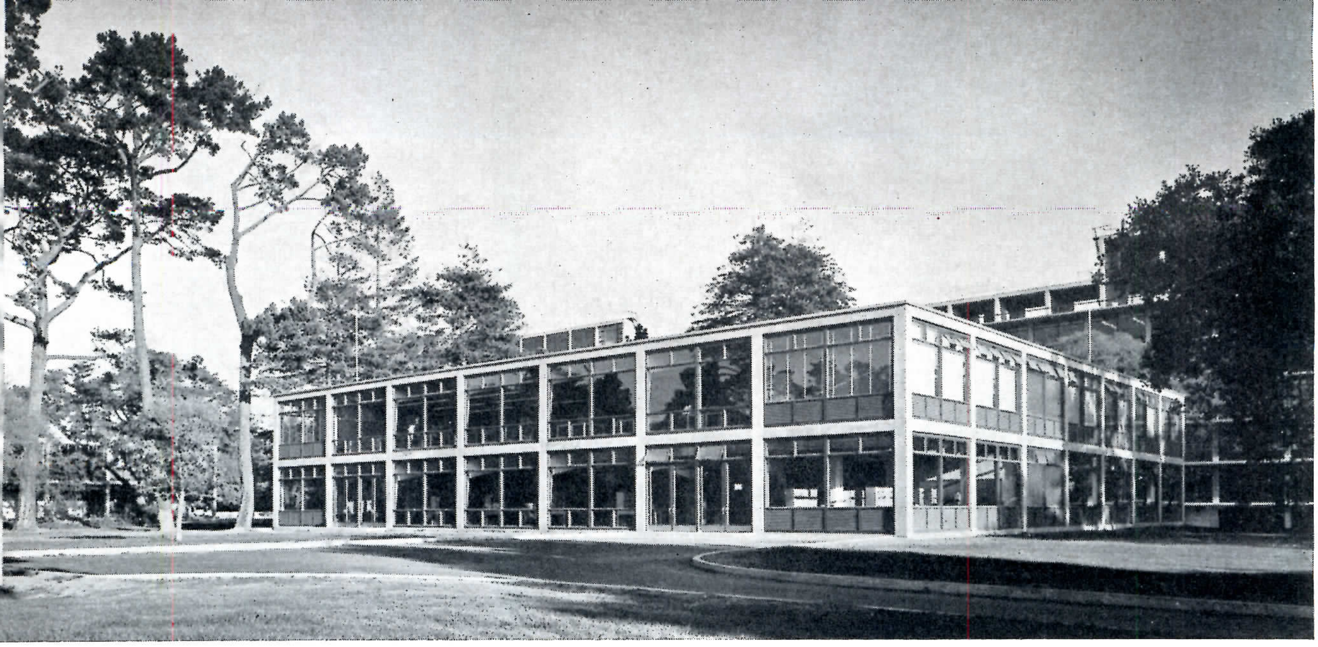






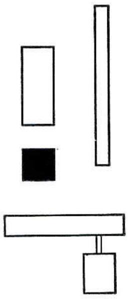
Lecture laboratories run between floors, provide amphitheater seating, act as additional vertical circulation and can be used by departments on either floor

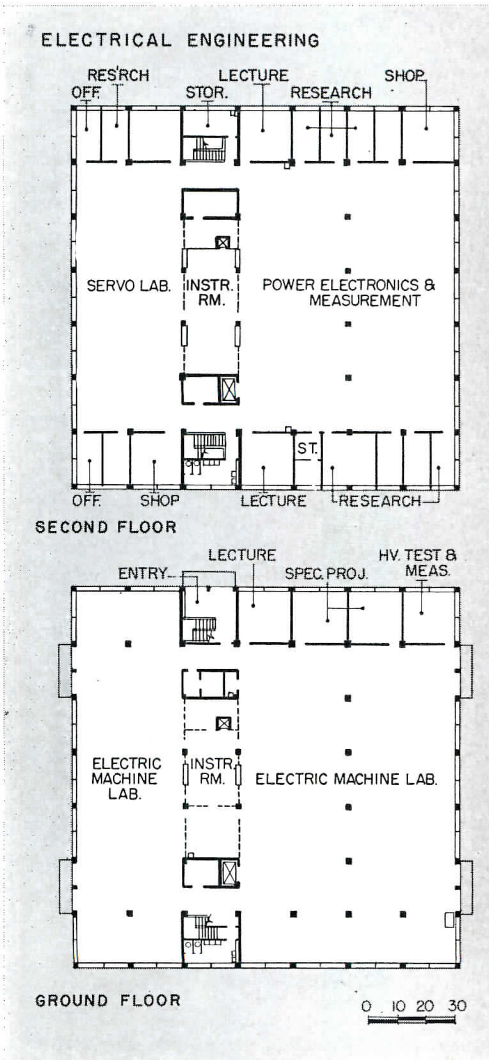


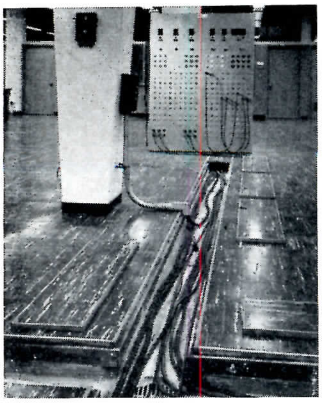


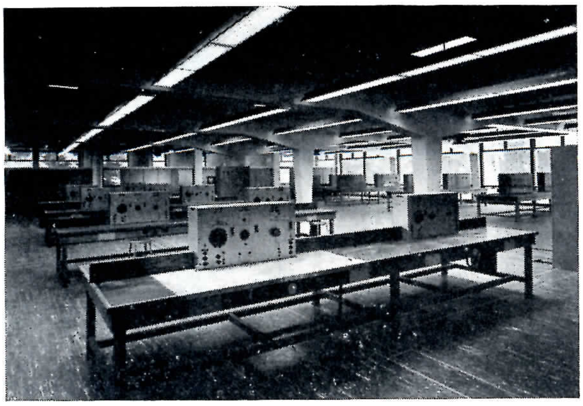
ELECTRICAL ENGINEERING BUILDING

While in the Laboratory Sciences Building a number of departments with similar requirements in space, utilities and services are combined, the Electrical Engineering Building contains a single department which, because of its special needs, could not be combined with any other department. The solution to these needs was a square, two-story building with unobstructed floor space and provisions for flexibility in arranging the equipment — much of it heavy, all of it needing electrical connections — in the various laboratories. Between the columns of the building's concrete frame are prefabricated modular wood-and-glass window wall units, used also in the Laboratory Sciences and General Classroom Buildings. Window units are designed on the basic column module of 18 ft 8 in. Repetition of such elements and use of a module were factors in maintaining the project's economical construction cost.

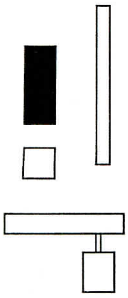


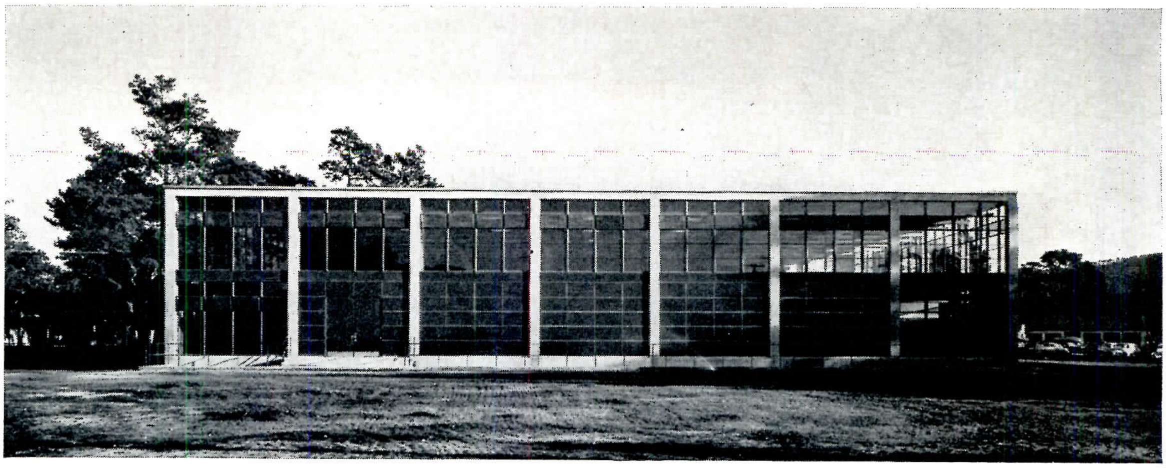




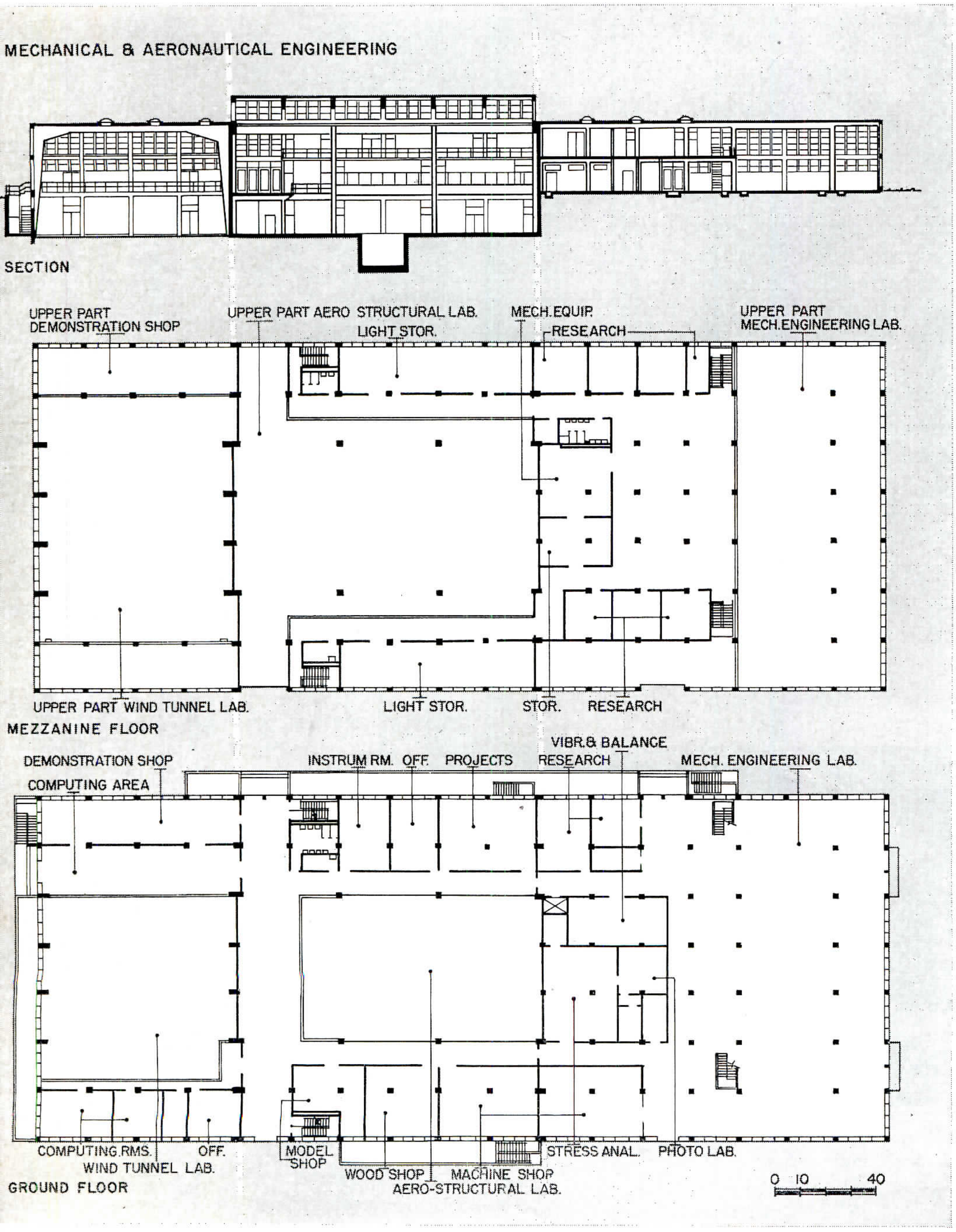


Large, unobstructed floor areas needed for electrical engineering labs are provided by long span reinforced concrete arches; under-floor trenches for electric wiring make possible flexible equipment arrangement. Piped services are in racks hung from ceiling, walls

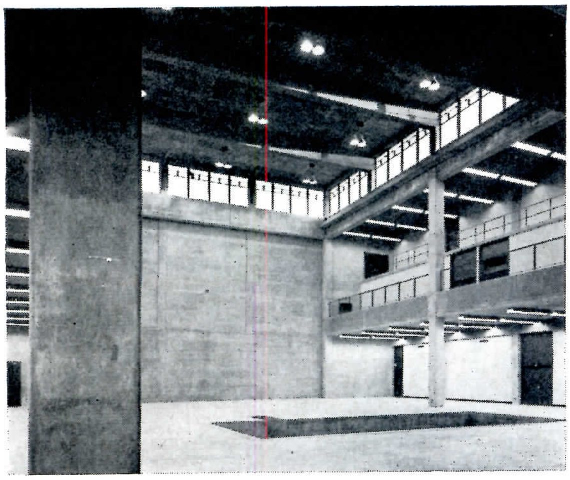


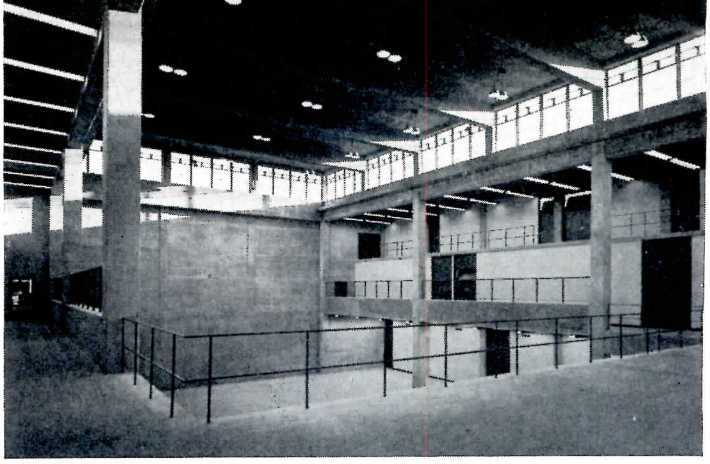


MECHANICAL &



Building's three units are separated by expansion joints (indicated by white line on drawing) to prevent vibration transmission. Building is concrete framed, with modular column spacing; precast concrete panels fill between columns

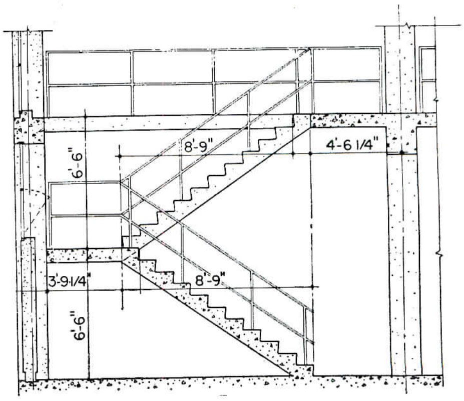




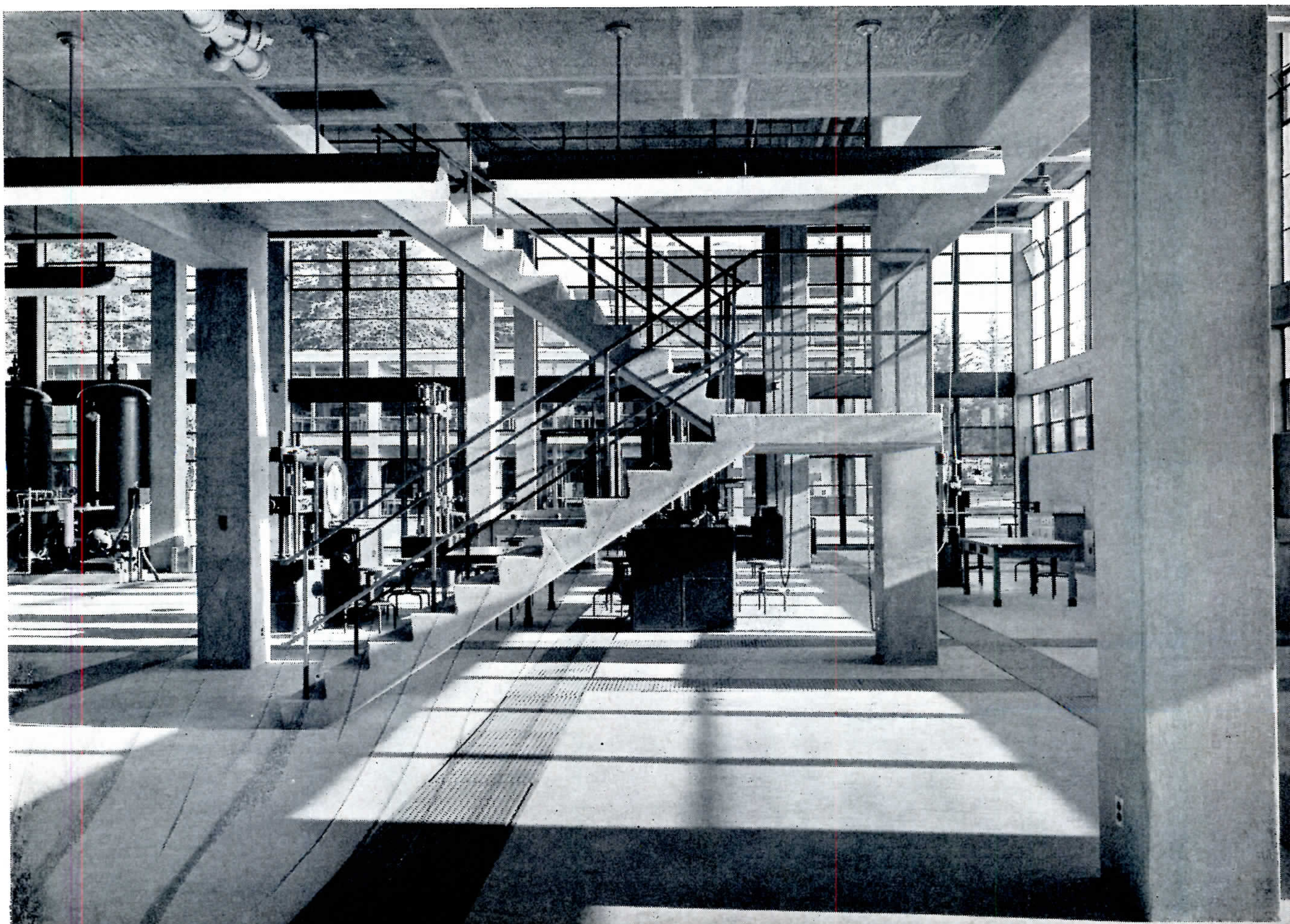
Aerostructural lab, three and a half stories high, will eventually have 1,000,000 lb testing machine in specially designed pit at basement level. Long-span concrete arches in this lab and wind tunnel frame large, clear spaces for testing machines, wing and fuselage parts

AERONAUTICAL ENGINEERING BUILDING

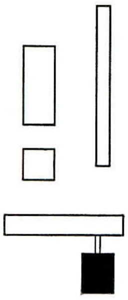
Although a common need for long-span laboratory space combined the Mechanical and Aeronautical Engineering Departments under one roof, the building's three laboratories are separate units providing for the special requirements of each department. Mechanical Engineering's two-story lab has a high crane for moving heavy equipment; the huge testing machines and airplane sections used in the Aerostructural lab and wind tunnel needed three stories. Plastic skylights daylight central areas of the building.



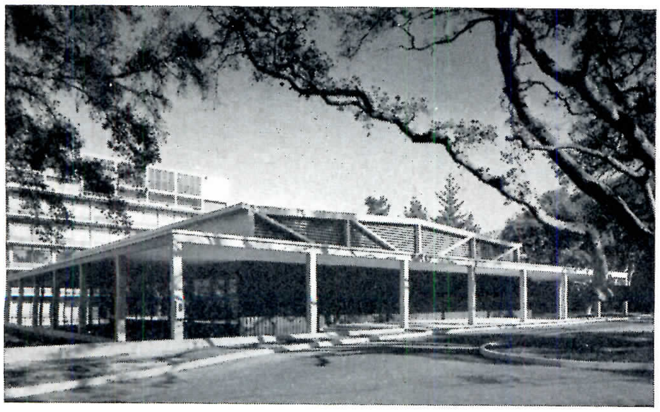
Concrete stairway in Mechanical Engineering lab is cantilevered. Extensive floor trench system, large water basins, crane were special department requirements



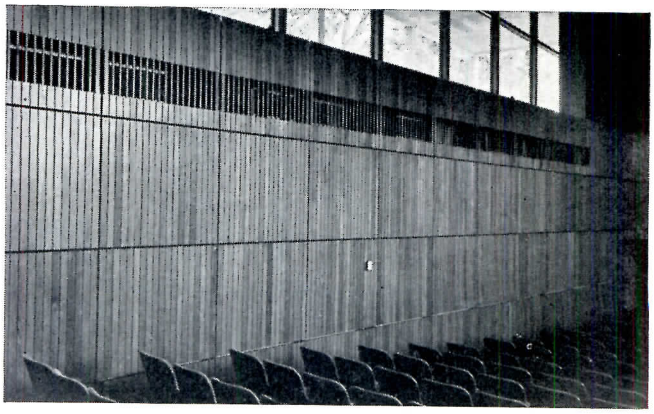
LECTURE AUDITORIUM BUILDING



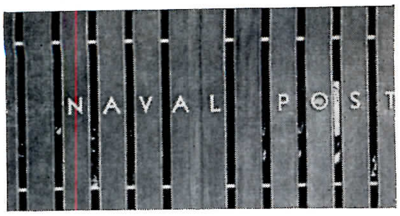
The below-ground level of the auditorium meets the practical need for a 1200-seat hall for lecture and study use by day and for such special occasions as commencement, faculty and student conferences, etc., and also makes possible a cafeteria on the lower level. It solves some esthetic problems too: the low building height contrasts with the five-story Laboratory Sciences Building behind; in a subtle acknowledgement of the site's beauty as well as the need for daylight in the auditorium, glass-panelled side walls permit a view through the building to opposite side; from inside, every seat has a view out to the surrounding trees.

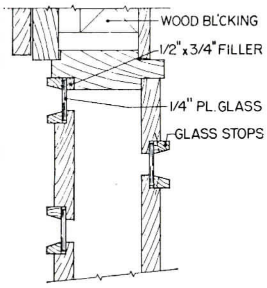


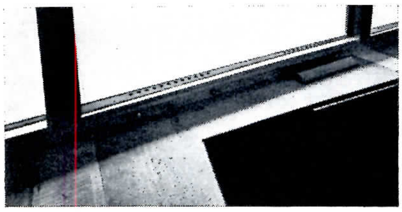
Concrete trusses framed into deep concrete girders supported on four cross-shaped columns proved most economical fireproof solution to clear span for auditorium. Covered walks surround building, provide the only circulation. Cafeteria is on lower level

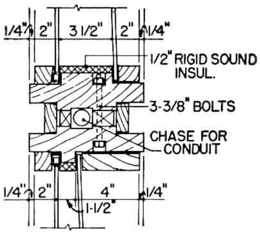


Below grade, auditorium side walls act as resonators; some of the narrow wood strip panels are acoustically treated, others are blank, backed with cement asbestos board. Walls at grade are double glazed for sound insulation

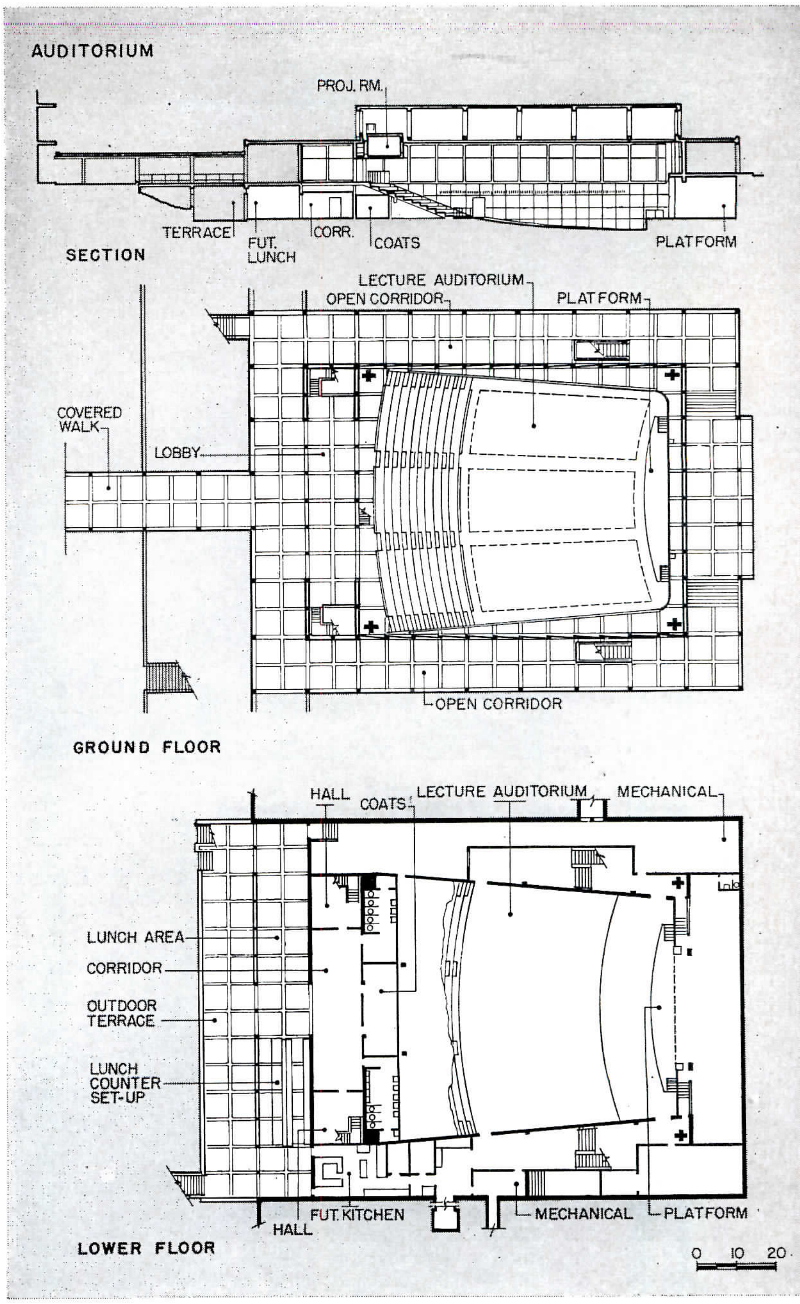


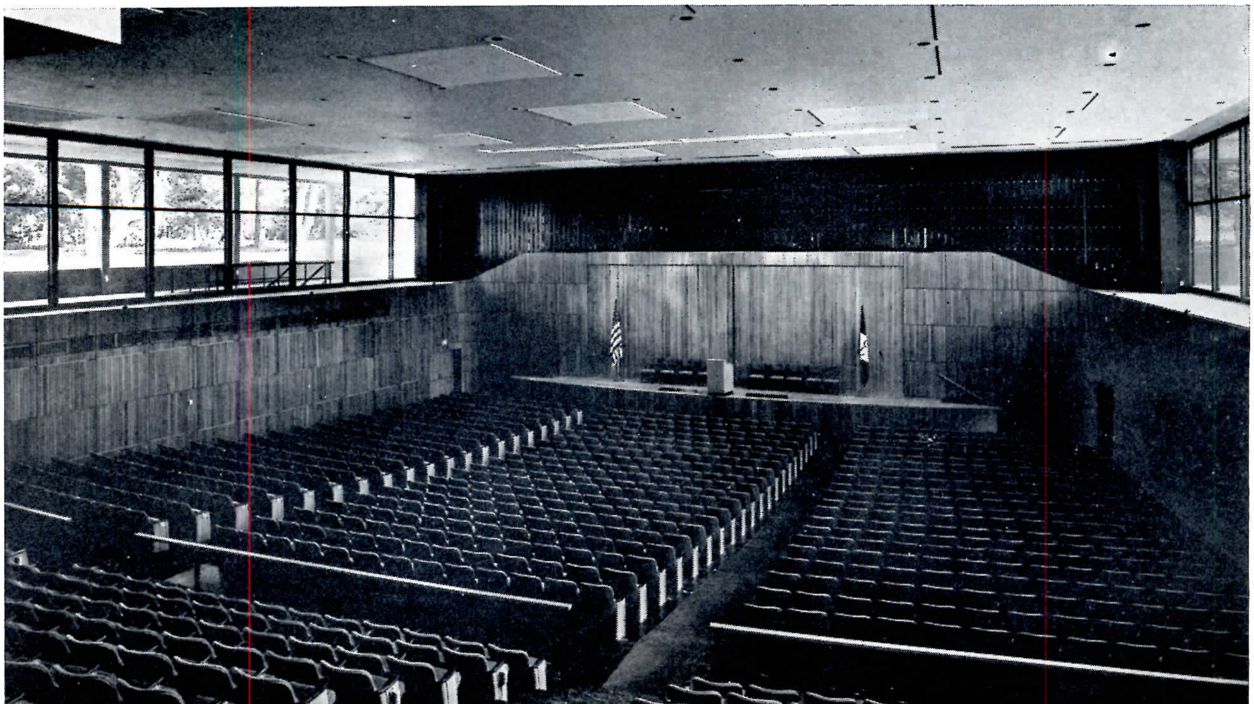


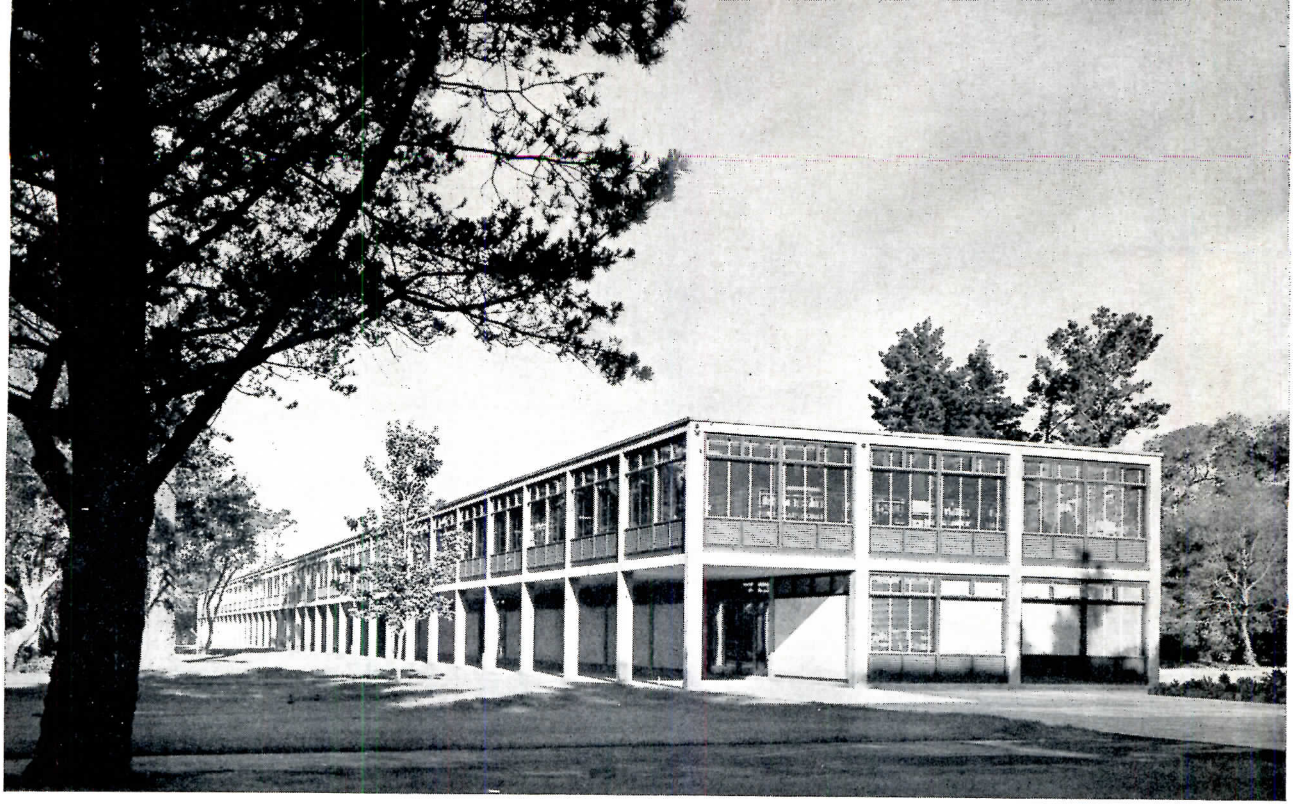


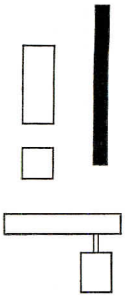


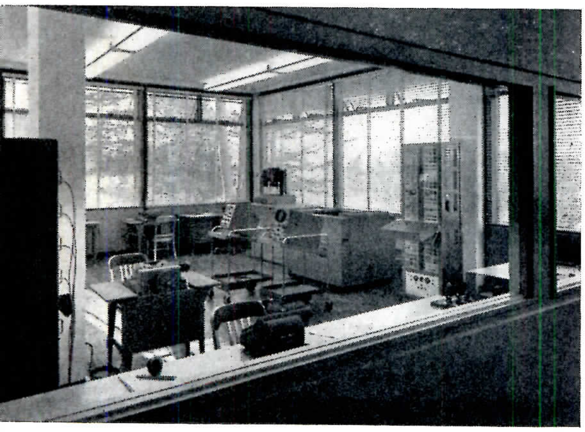
Front wall (top) is screen of dark wood battens and lavender Belgian glass strips. Double glazing (bottom) insulates for sound; for acoustic reasons one panel is angled







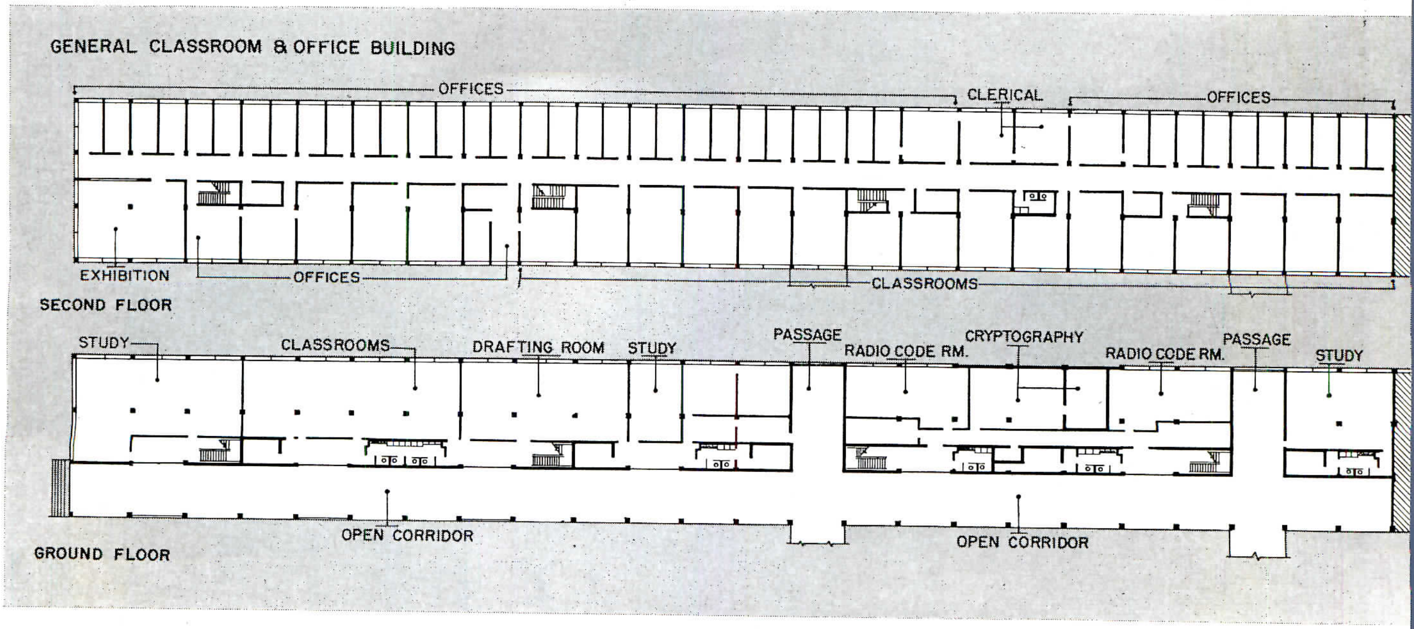


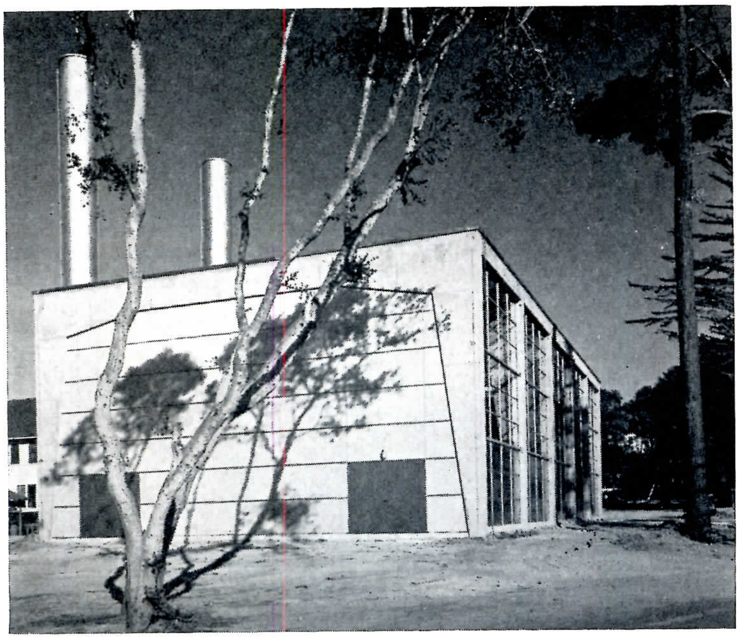


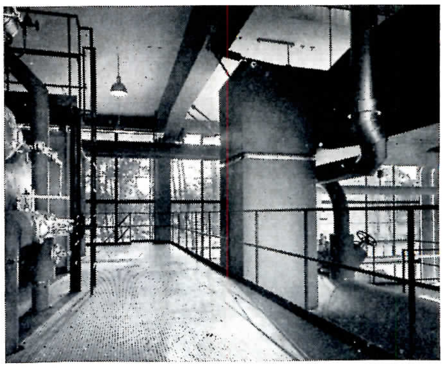
Corner classroom is used as laboratory; typical classrooms vary in width but conform to basic module. For economy and resistance to salt air action, wood is used on prefabricated window units

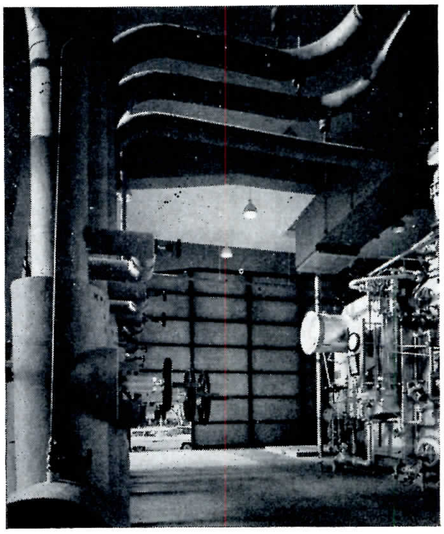
GENERAL CLASSROOM AND OFFICE BUILDING

Classrooms in this building are particularly needed for general teaching by departments whose laboratory operations are noisy, but they can be used by all departments. This flexibility in use derives from the fact that students come to it from all parts of the school; a direct relationship between it and other buildings is essential. The 655-ft length of the classroom building, in effect, links the engineering laboratory buildings with the Laboratory Sciences Building and, through it, with the Auditorium. In the original plans, covered walks made actual physical connection between buildings; the need for economy eliminated all but one (from Lab Sciences to Auditorium).





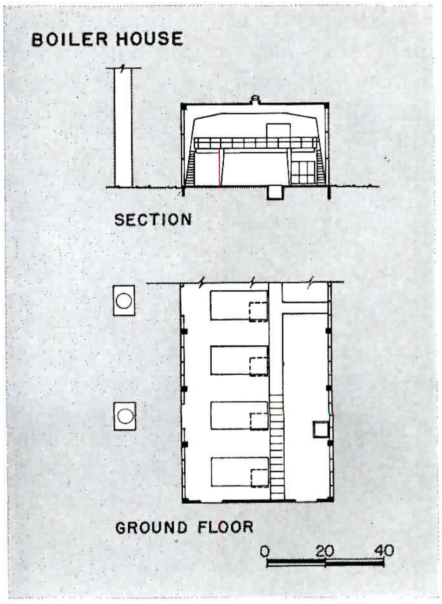


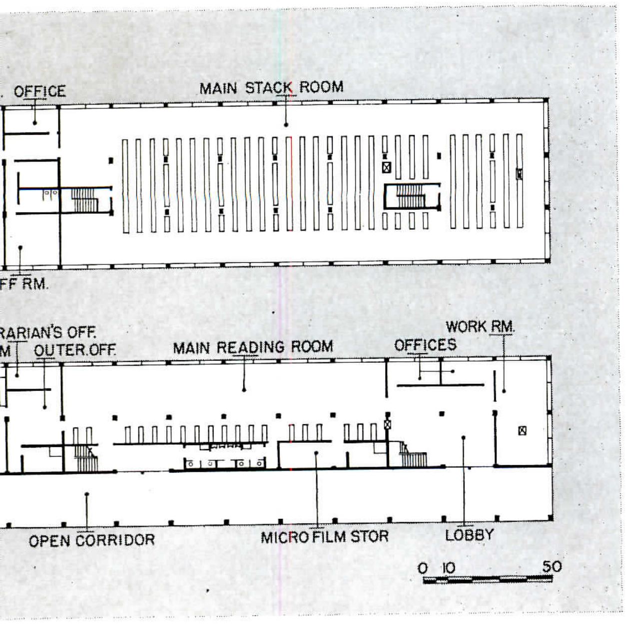


Designed in 20-ft bays, boiler house can be expanded easily by knocking out cement-asbestos panels in end wall (bottom); mezzanine (top) adds floor space at opposite end

BOILER PLANT

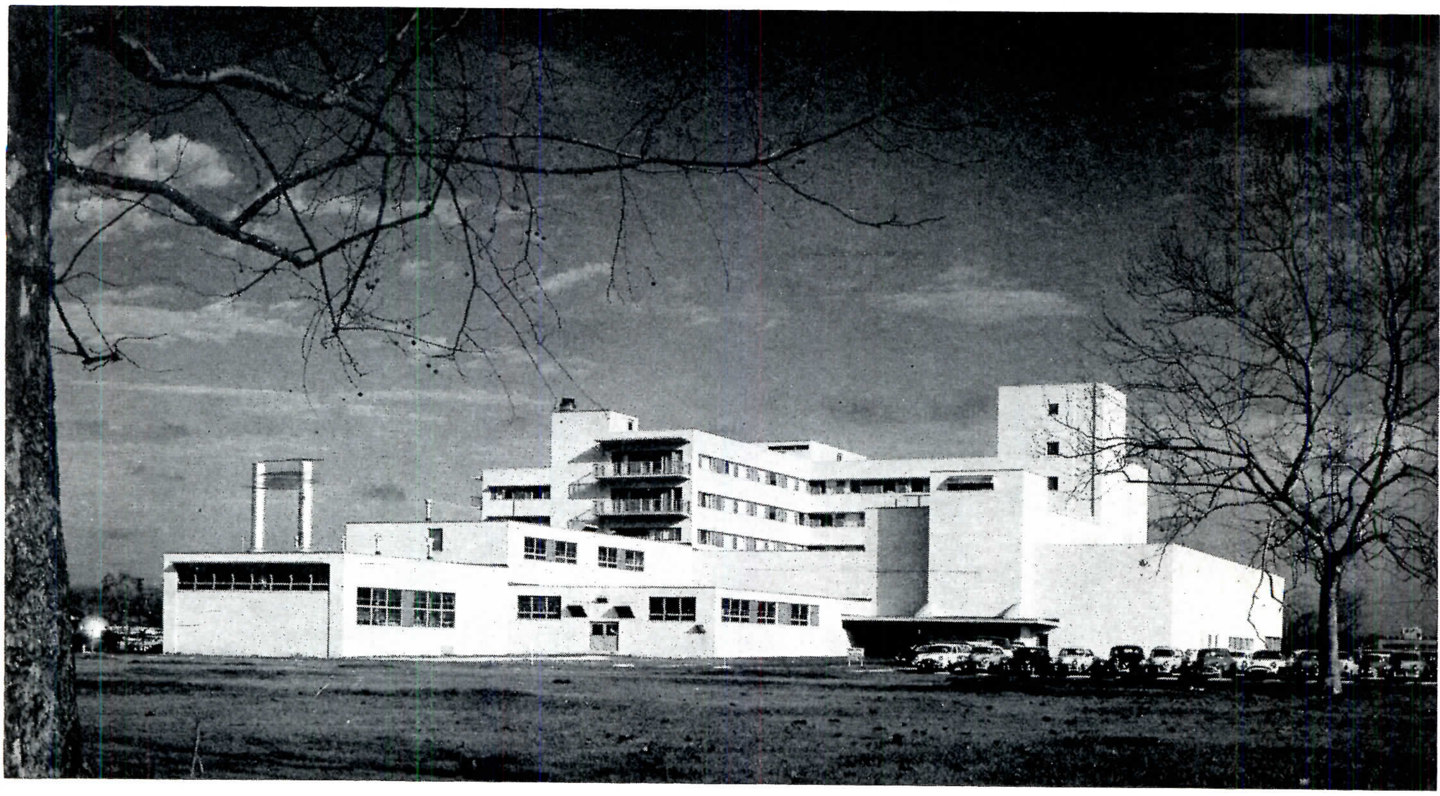
Like the master plan for the development of the site at Monterey, the boiler plant design was influenced by the then contemplated new buildings for the Postgraduate School of the Line (for which no appropriations have yet been made). An easily expandable structure was needed so that, as the heating and laboratory load increased, the plant's capacity could grow accordingly. Rigid concrete bents, designed in 20-ft bays with a span of 50 ft, can be added, and cement-asbestos panels in the end wall can be knocked out. Plant, enlarged before construction, now serves the whole station. Sash in this building are steel.





HOSPITAL FOR ADVANCED TECHNIQUES

Ochsner Foundation Hospital, New Orleans, La.
Ellerbe and Company, Architects and Engineers



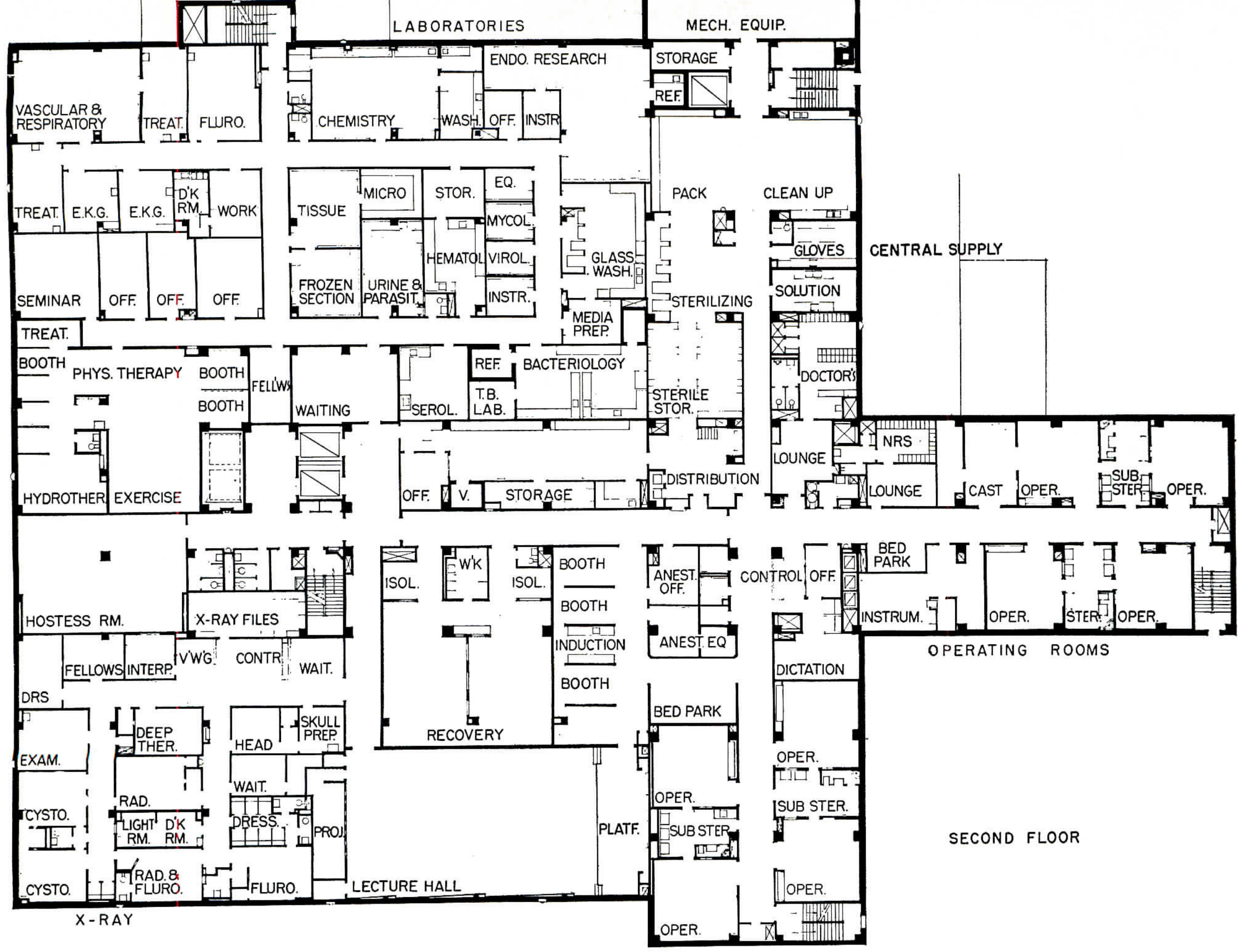
As medical practice becomes more and more complicated — it is, and it will — hospital planning will necessarily follow the same course. This is a hospital building with an exceptionally complex program, matching the requirements of an institution which specializes in highly involved procedures.

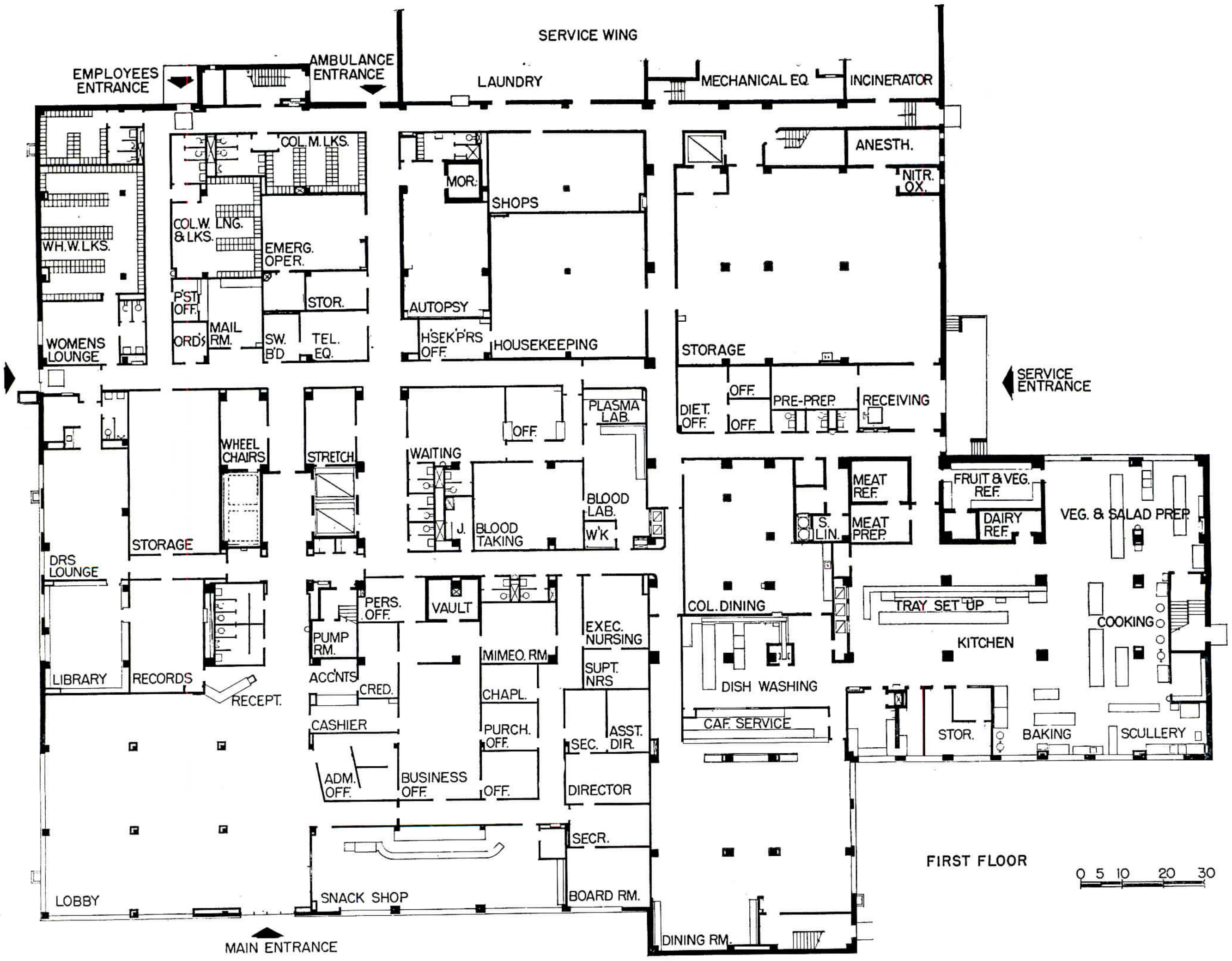
The hospital group, the Alton Ochsner Medical Foundation, is a fairly recent development, begun only in 1940. It began modestly with a group of five physicians banding together in a clinic operation. The group practice, filling a real community need, rapidly expanded until it has become a permanent research, education and charitable operation. Its $5,500,000 new hospital will eventually be supplemented by a nurses' home (already built), a convalescent pavilion with guest accommodations, a hoped-for new building for the Clinic, and an also-hoped-for new building to replace present research facilities.

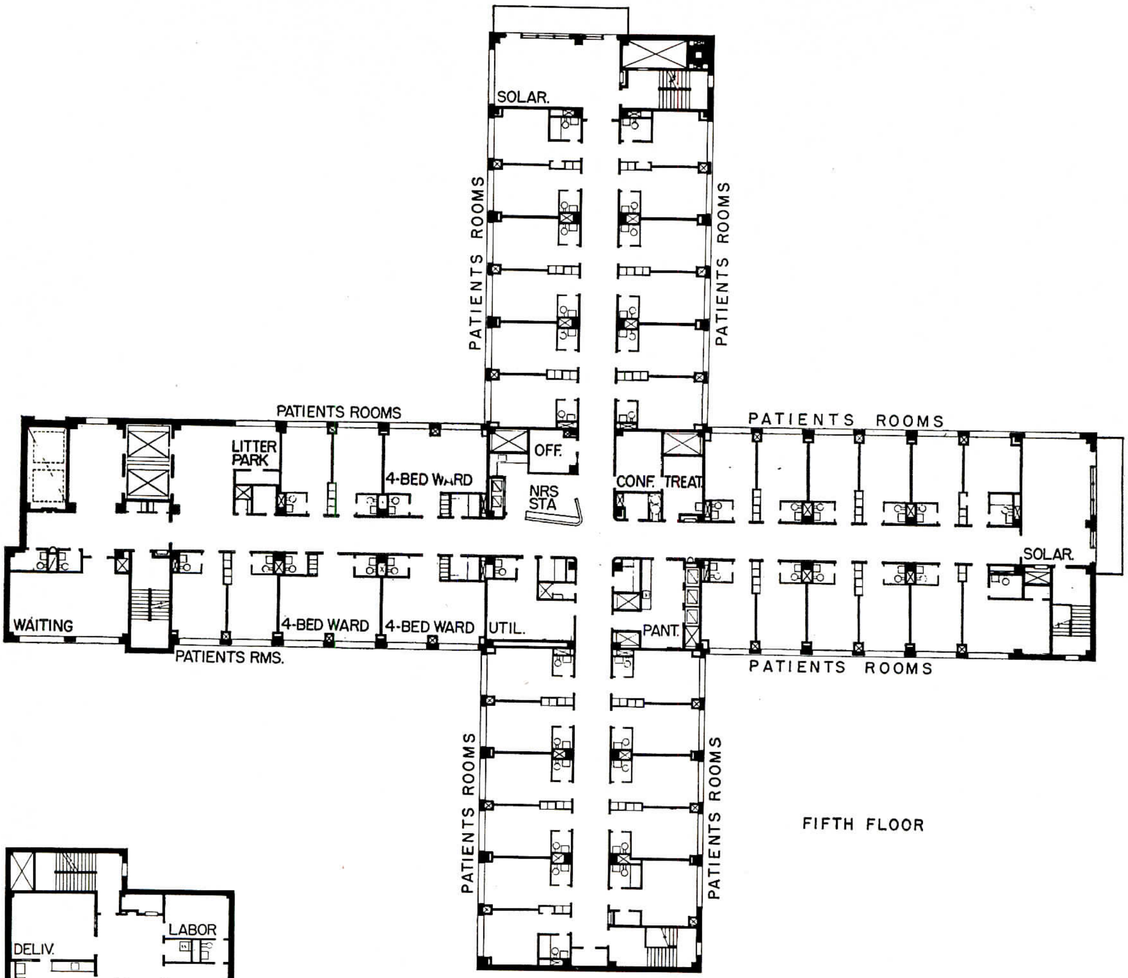
Frank Lotz Miller

The high technical level shows first in the outsize surgical department — eight major operating rooms, with a very complete anesthesia induction area, for a hospital now containing 250 beds. This capacity eventually will be raised to 500 beds. Radiology and other ancillary facilities are also uncommonly large, as advanced medical practice, along with the complex surgery, requires full diagnostic and therapy equipment.

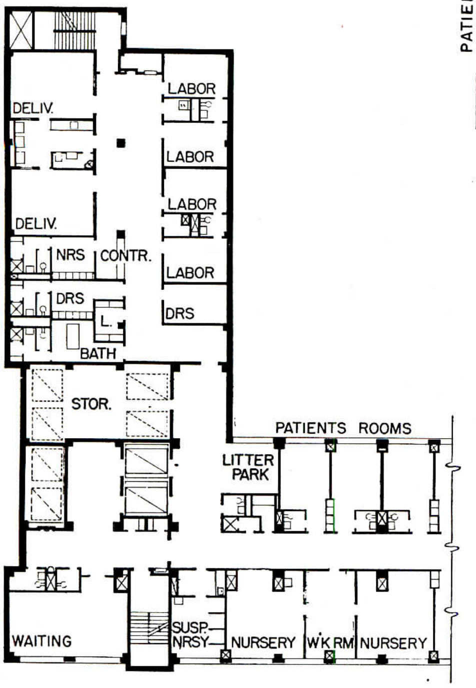
In the planning the architects started with patient rooms and nursing units, and developed a fairly conventional cruciform scheme. This determined the basic plan of the building, and also the arrangement of all ancillary facilities on the greatly enlarged first and second floors, circulation naturally having to focus on the elevators leading to patient rooms. Incidentally, such problems here were complicated by the fact that in the New Orleans area soil and water conditions prevent the usual basement; here in effect the first floor becomes the


LABORATORIES
MECH. EQUIP.
ENDO. RESEARCH
STORAGE
REF.
VASCULAR & RESPIRATORY
TREAT.
FLURO.
CHEMISTRY
WASH.
OFF.
INSTR.
PACK
CLEAN UP
TREAT.
E.K.G.
E.K.G.
D'K RM.
WORK
TISSUE
MICRO
STOR.
EQ.
MYCOL.
HEMATOL.
VIROL.
GLASS WASH.
GLOVES
CENTRAL SUPPLY
SEMINAR
OFF.
OFF.
OFF.
FROZEN SECTION
URINE & PARASIT.
INSTR.
MEDIA PREP.
STERILIZING
SOLUTION
TREAT.
BOOTH
PHYS. THERAPY
BOOTH
BOOTH
FELLWS
WAITING
SEROL.
REF.
T.B. LAB.
BACTERIOLOGY
STERILE STOR.
DOCTOR'S
HYDROTHER.
EXERCISE
OFF.
V.
STORAGE
DISTRIBUTION
LOUNGE
NRS
LOUNGE
CAST
OPER.
SUB. STER.
OPER.
HOSTESS RM.
X-RAY FILES
ISOL.
W'K
ISOL.
BOOTH
BOOTH
INDUCTION
BOOTH
ANEST. OFF.
CONTROL
OFF.
ANEST. EQ
BED PARK
INSTRUM.
OPER.
STER.
OPER.
OPERATING ROOMS
FELLOWS
INTERP.
V'W'G.
CONTR.
WAIT.
DICTATION
DRS
EXAM.
DEEP THER.
HEAD
SKULL PREP.
RECOVERY
BED PARK
OPER.
WAIT.
CYSTO.
RAD.
LIGHT RM.
D'K RM.
DRESS.
PROJ.
PLATF.
OPER.
SUB STER.
SUB STER.
CYSTO.
RAD. & FLURO.
FLURO.
LECTURE HALL
OPER.
X-RAY
OPER.
SECOND FLOOR


SERVICE WING
EMPLOYEES ENTRANCE
AMBULANCE ENTRANCE
LAUNDRY
MECHANICAL EQ.
INCINERATOR
COL. M. LKS.
ANESTH.
MOR.
NITR. OX.
SHOPS
WH. W. LKS.
COL. W. & LKS.
LNG.
EMERG. OPER.
STOR.
AUTOPSY
P'ST OFF.
ORD'S
MAIL RM.
SW. B'D
TEL. EQ.
WOMENS LOUNGE
H'SEK'P'RS OFF.
HOUSEKEEPING
STORAGE
SERVICE ENTRANCE
OFF.
PLASMA LAB.
DIET. OFF.
OFF.
PRE-PREP.
RECEIVING
WHEEL CHAIRS
STRETCH.
WAITING
FRUIT & VEG. REF.
MEAT REF.
DAIRY REF.
VEG. & SALAD PREP.
J.
BLOOD TAKING
BLOOD LAB.
W'K
S. LIN.
MEAT PREP.
STORAGE
DRS LOUNGE
PERS. OFF.
VAULT
COL. DINING
TRAY SET UP
PUMP RM.
EXEC. NURSING
COOKING
MIMEO. RM.
KITCHEN
SUPT. NRS
LIBRARY
RECORDS
ACC'NTS
CRED.
RECEPT.
CHAPL.
DISH WASHING
CASHIER
PURCH. OFF.
ASST. DIR.
CAF. SERVICE
STOR.
BAKING
SCULLERY
SEC.
ADM. OFF.
BUSINESS OFF.
OFF.
DIRECTOR
SECR.
FIRST FLOOR
0 5 10 20 30
LOBBY
SNACK SHOP
BOARD RM.
DINING RM.
MAIN ENTRANCE



FIFTH FLOOR



THIRD FLOOR

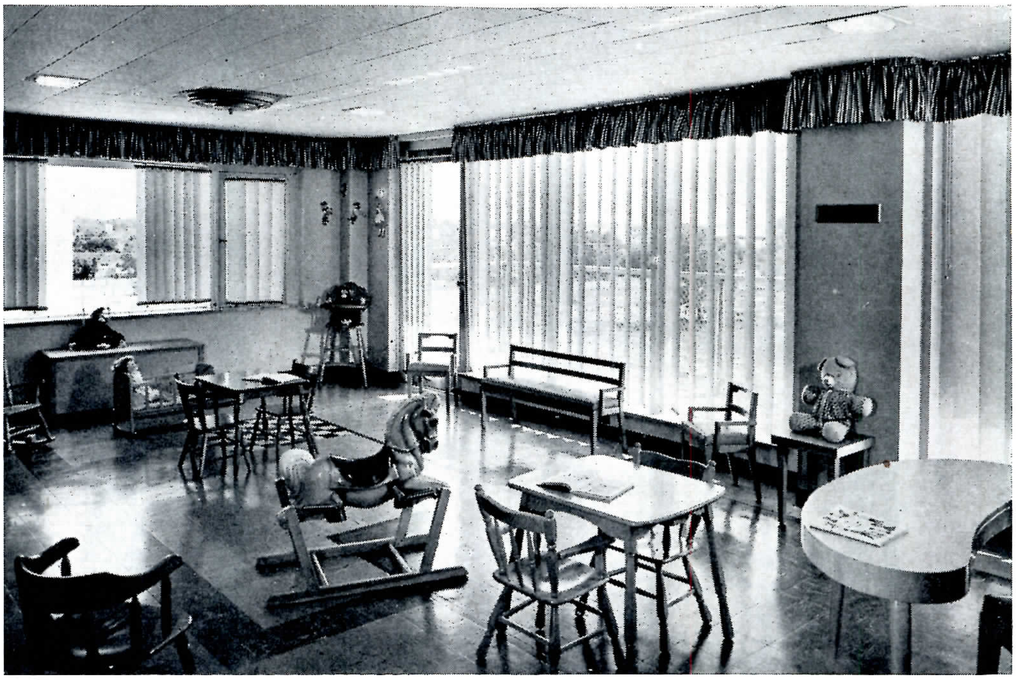
basement. This in part explains the lack of windows on first and second floors, though more to the point is the fact that the building is completely air conditioned and these two lower floors are largely taken up with facilities which have very little use for daylight.

Patient rooms are large; each has a large picture window as the views of the Mississippi are quite attractive. Special attention was given to color schemes and handsome materials to make the rooms both appealing and psychologically salutary. All rooms have private toilets equipped with bedpan cleaning facilities.

All rooms in the building are fully air conditioned, with provisions for individual room control. The air conditioning supply, return and exhaust duct systems are designed on an orifice basis for calculated design flow to each room, which eliminates the almost impossible job of balancing the air flow after the installations are completed.

The architect is careful to explain that architectural effect was virtually ignored in the fenestration — "where glass is used it is used for light and vision, for the comfort of the patient and visitors, and not for architectural effect."

Solariums overlook Mississippi River

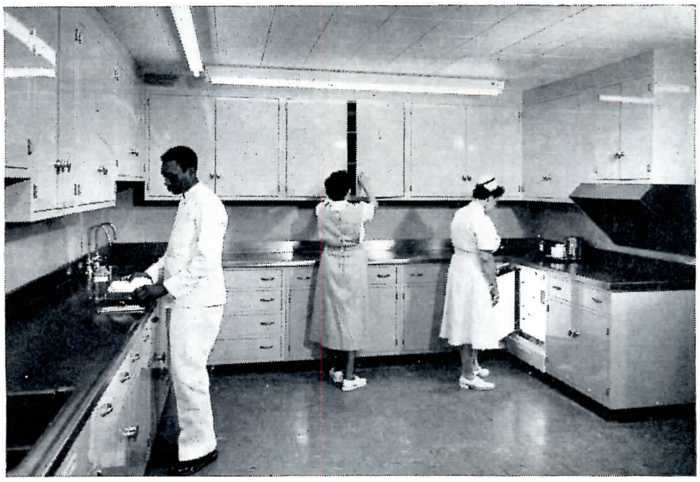


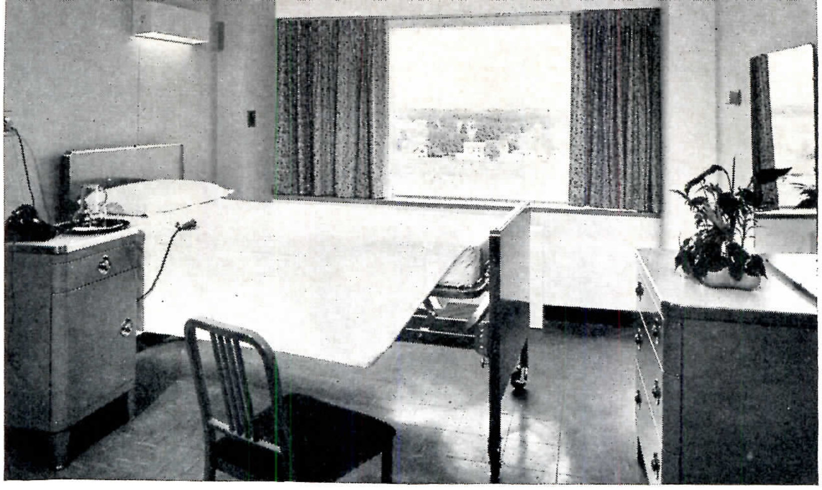
Pediatrics playroom, fourth floor

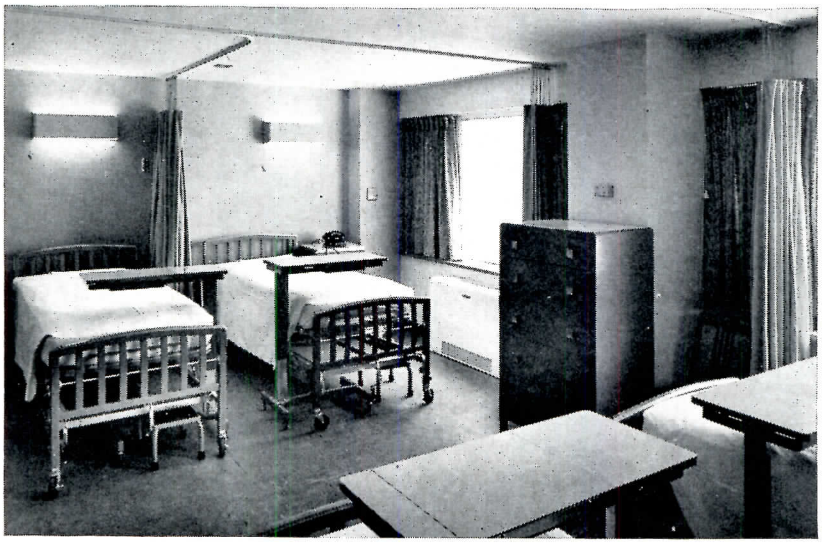
Frank Lotz Miller

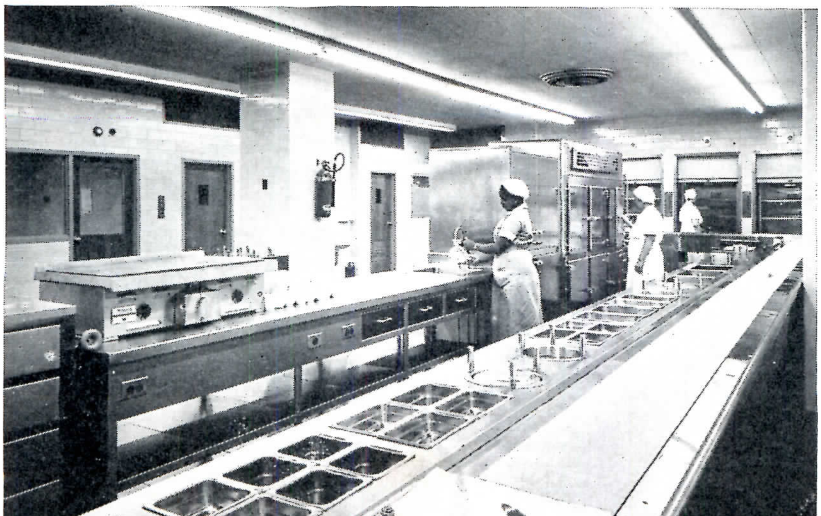
Typical nurses' station

Nurses' utility room

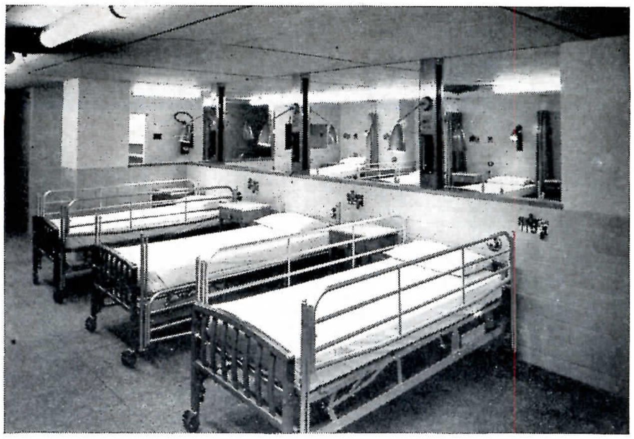


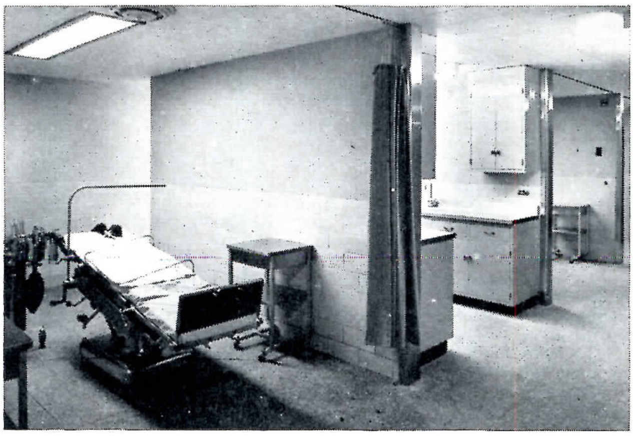


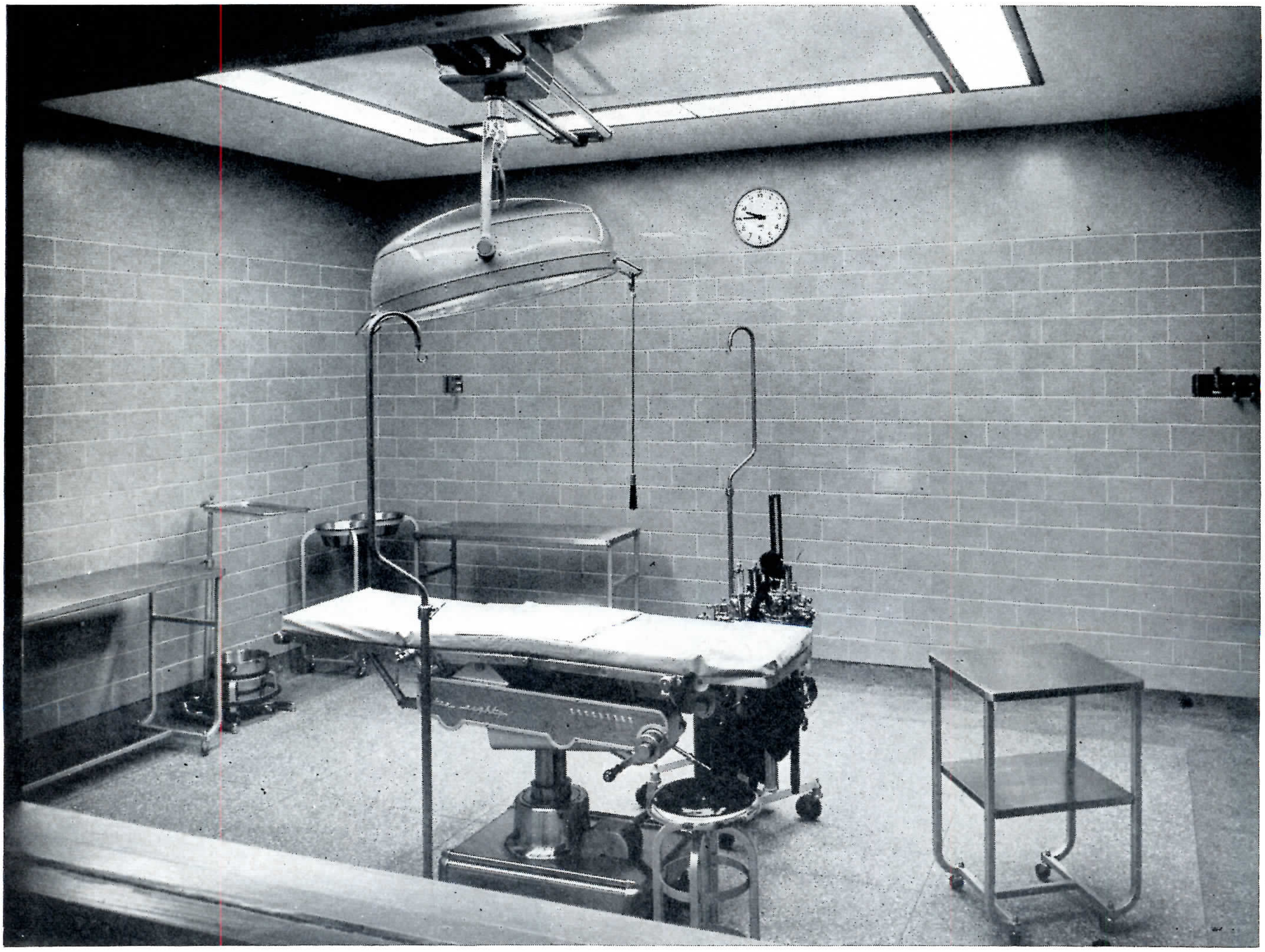




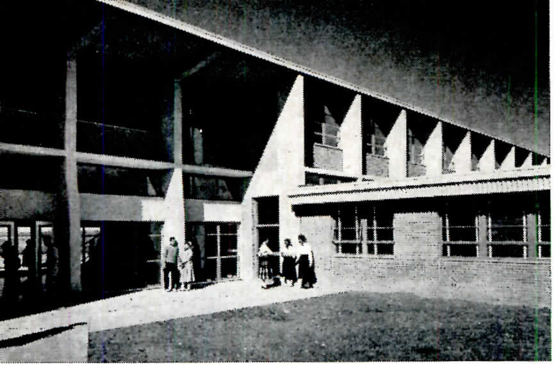
Left, above: typical single room and, next, typical four-bed ward. Patient rooms have large picture windows. Color schemes in patient rooms were carefully studied, with delicate tones in walls and drapes. Dining room and kitchen are on first floor, there being no basement story because of water conditions. Opposite page, above: post-operative recovery room and anesthesia induction booths in surgical suite, second floor. Opposite page, below: one of the eight major operating rooms







Frank Lotz Miller



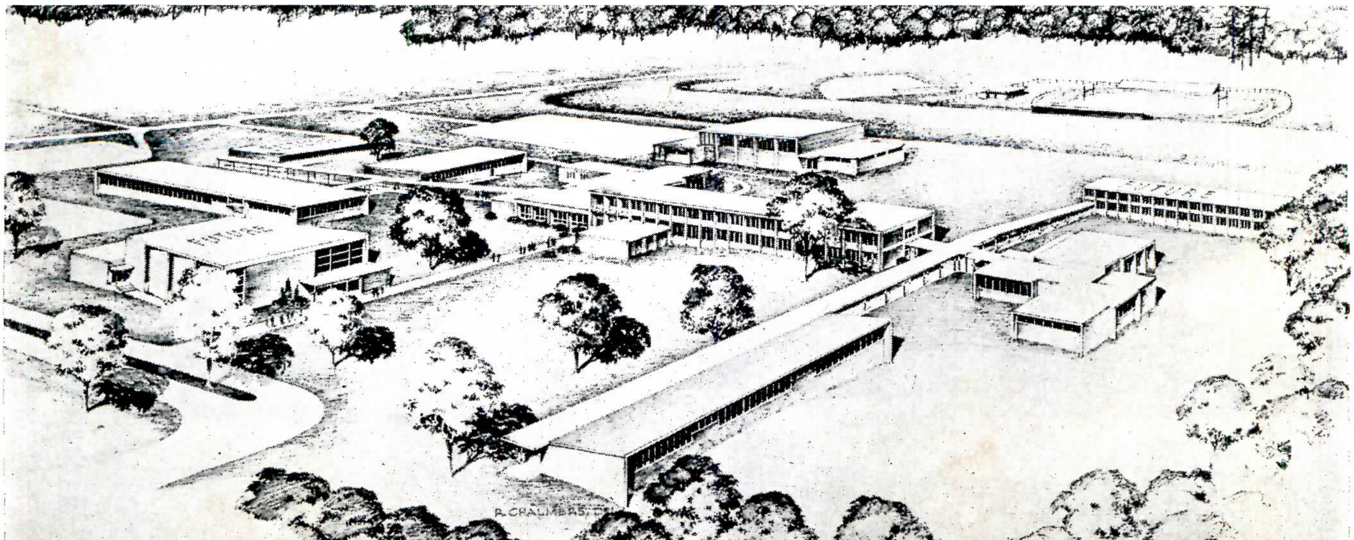
Joseph W. Molitor

WEST CHARLOTTE SENIOR HIGH

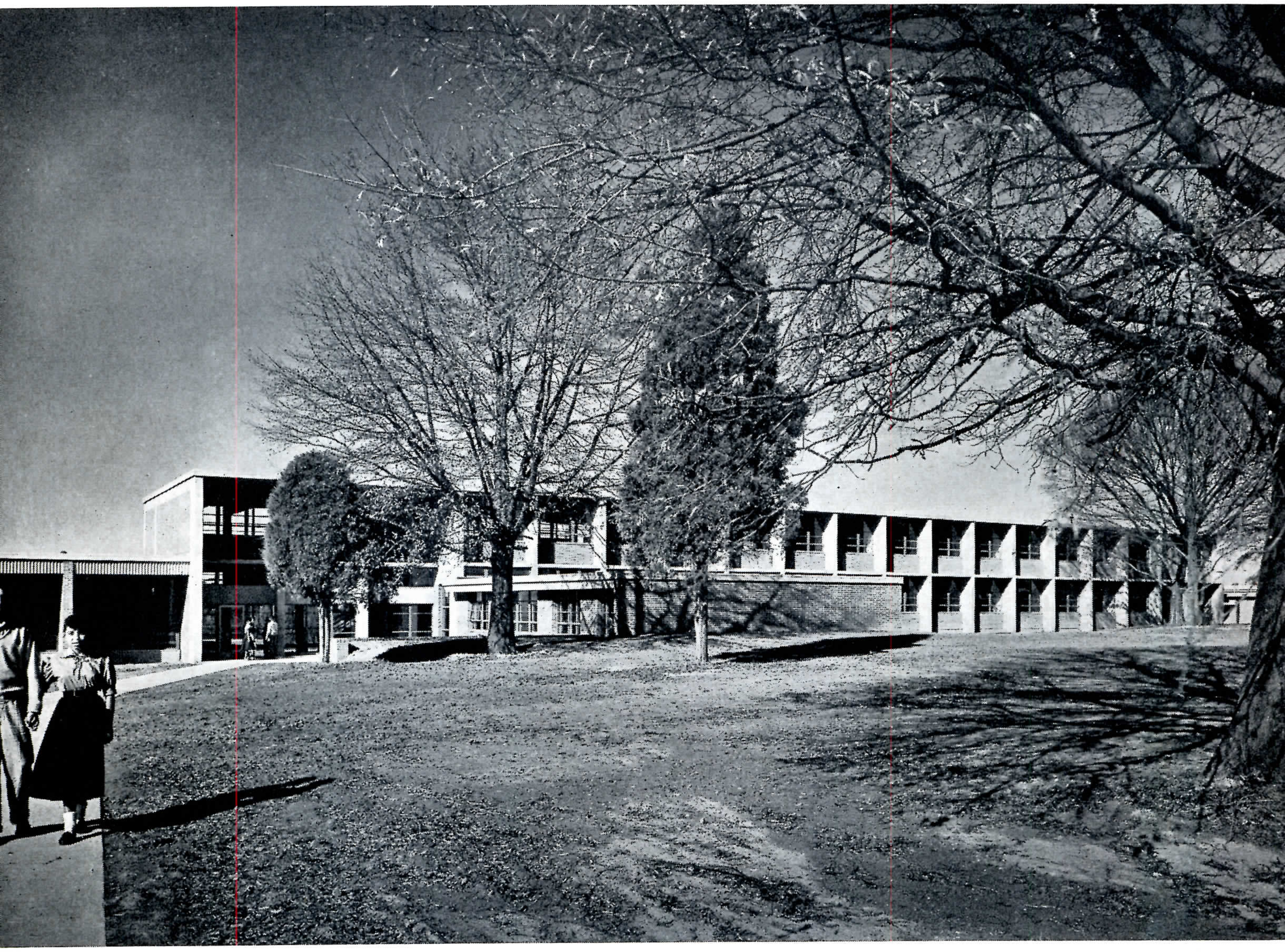
THE CITY OF CHARLOTTE, N. C., has long had a comprehensive plan for developing the many school plants which house its educational system. The plan is based on population studies, on recognizable trends of development, foreseeable population shifts, etc. It is a tribute to the reliability of these forecasts that, although some of its schools have anticipated growth, in none have facilities yet proved in excess of the need. Of course residential increase is stimulated by building a new school. The responsibilities which careful planning entails — for directing urban growth, among others — as well as the advantages accruing (economical site acquisition, opportunities to design buildings in comparative calm rather than under intense pressure, etc.) are apparent.

It is natural, then, that ARCHITECTURAL RECORD should have presented in March, 1953, the conclusions reached by a group of educators and architects who had met two months previously at Charlotte's Myers Park High. Last year we presented the Double Oaks Elementary School, winner of an A.I.A. Honor Award and of a *School Executive* top award. On these pages appears the city's newest prize-winner, the West Charlotte Senior High School, which received a first award in the 1955 *School Executive* competition, and an A.I.A. award of merit in its own state. Each has been designed by a different architect, which demonstrates the policy of Charlotte's school authorities in spreading the work among the capable local offices. Each school plant is different in response to the local requirements of neighborhood, site and curriculum variations.

The west side of the city had needed a school for some time. When a local developer decided to build 2800 family units in that section, the new West Charlotte High became an immediate necessity. A fifty-acre site was selected, a choice one of high elevation, with several fine old oak trees and an adjacent wooded tract dedicated to park purposes. The educational program provides rich opportunities not only in the academic field but also in the vocational and technical. There is a strong adult program, and the school is already serving as a community cultural, recreational and social center. It is expected to be a vital influence in elevating standards of home construction and maintenance in this new area. The school campus is consequently pleasantly inspirational; its central Academic Building, two stories high, achieves a dignified importance which enhances community pride.



SCHOOL: PREPLANNING PRODUCES RESULTS



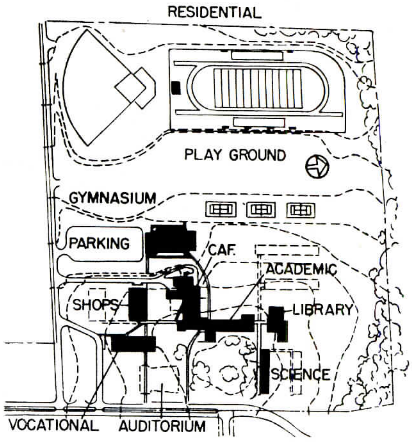
Graves & Toy, Architects

Engelhardt, Engelhardt & Leggett, Educational Consultants

Mechanical Engineers, Inc., Heating Engineers

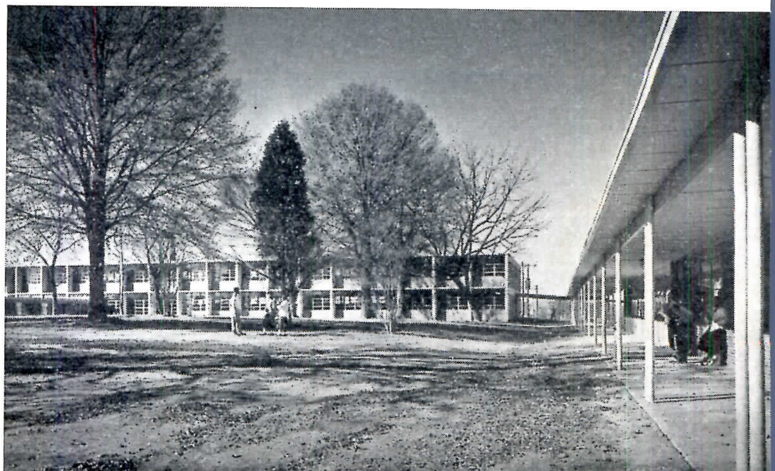
Alexander Springs, Electrical Consultant

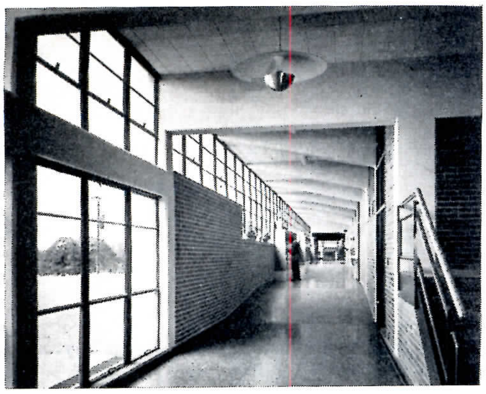
CHARLOTTE, N. C., HIGH SCHOOL

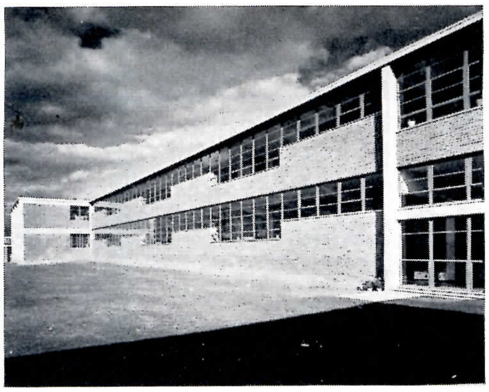


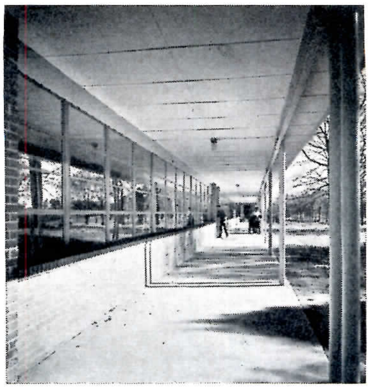
Joseph W. Molitor

Student Center (photo above) is more than a focal point for student life; community pride in the school is great, and a community organization is undertaking the job of furnishing this room appropriately. Photos at right: Science Building has covered exterior corridor leading to Academic Building. Library (facing page) has three distinct, large areas for reading and research, two small conference rooms where small groups can privately discuss educational projects, etc.

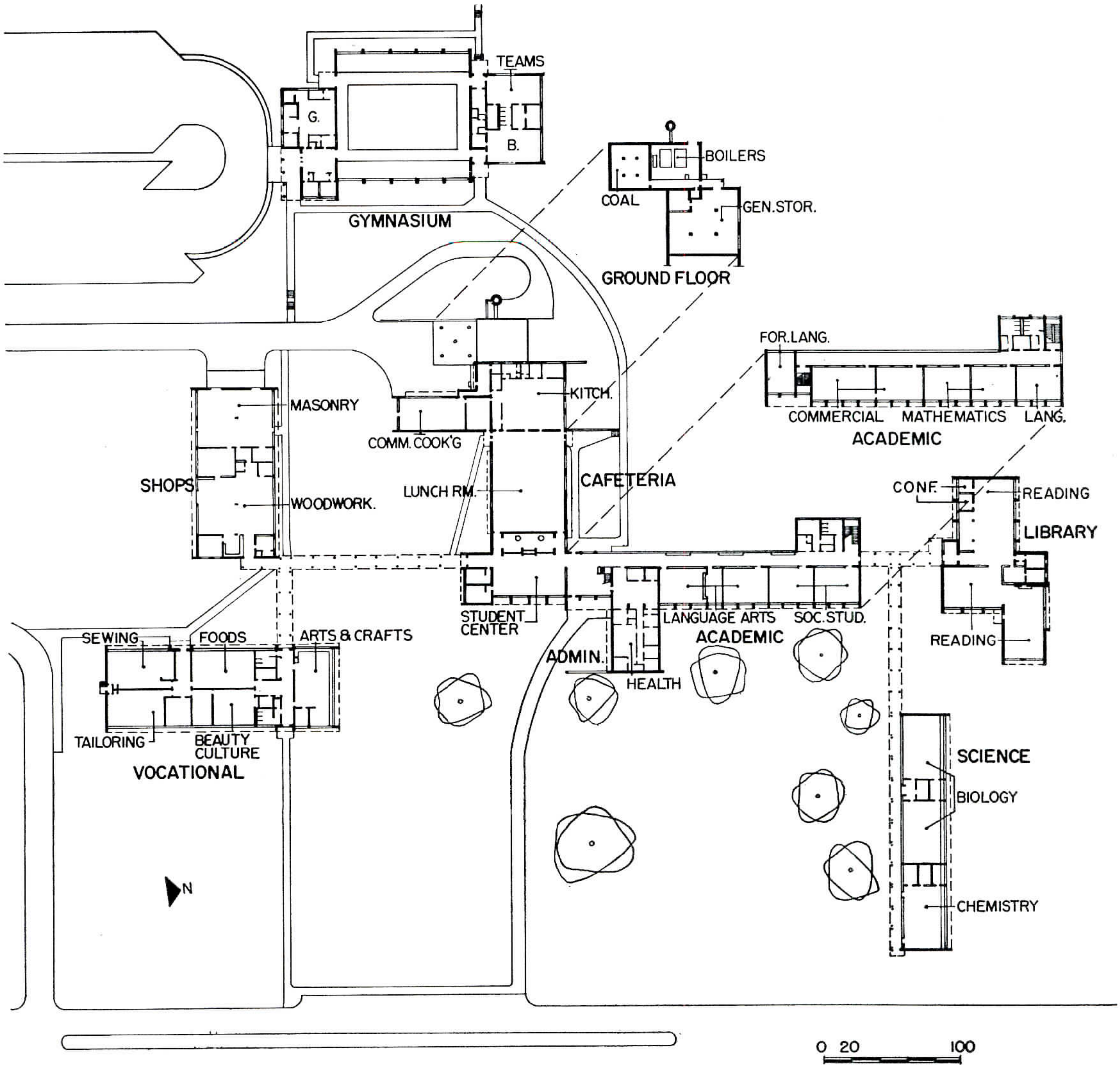


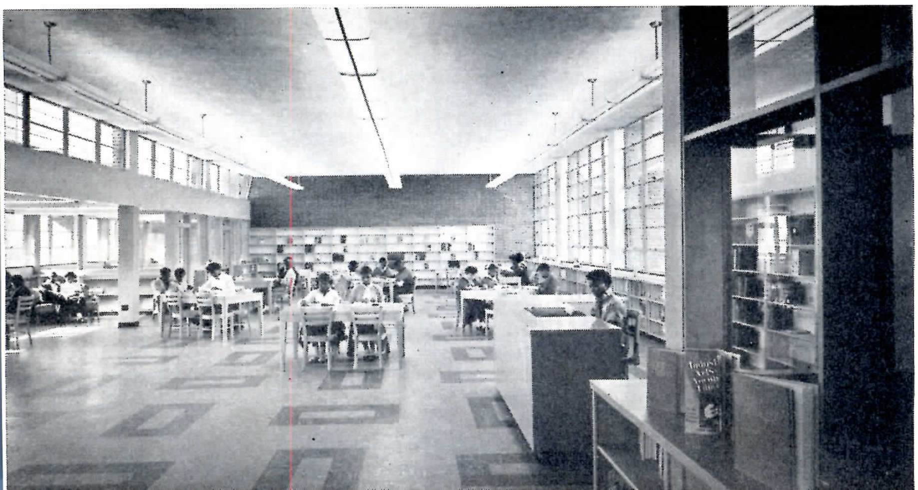


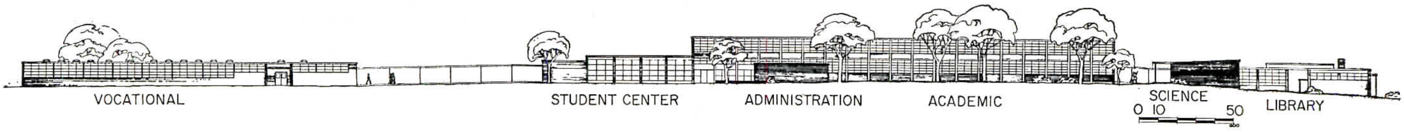




Indoor and outdoor circulation take into account inevitable expansion as well as present needs. As the school population grows, more academic and science classroom space can be added in buildings surrounding the Library, which is a research and resources center for classroom work and projects. The future auditorium (see plot plan at top of facing page) is to be located close to the arts and crafts shop in the Vocational Building; the beauty culture and tailoring suites are also convenient. Scenery, costumes and make-up for stage work in the expected auditorium can thus be closely correlated with vocational studies. Photos at top of page: corridor, Academic Building, will have lockers grouped at high portions of spandrel walls; low sills between permit view of the pleasant site, relieve monotony of long corridor, admit additional light to classrooms through clerestories in partition. Right, outdoor corridor



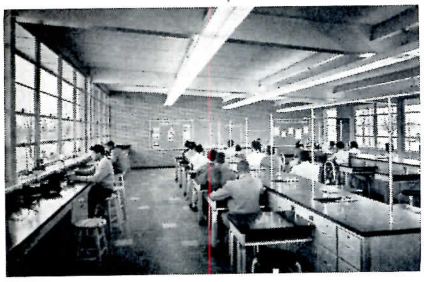




Joseph W. Molitor

Classrooms in concrete-framed Academic Building (above) have window walls to the east, receive additional natural light through clerestories on the west, where corridors act as sun shades. There are ten classrooms in this building; it is notable that the Shop and Vocational Buildings also have a classroom each. Thus twelve of the twenty-five teaching stations are in classrooms, the remainder in shops, laboratories, and specialized vocational rooms

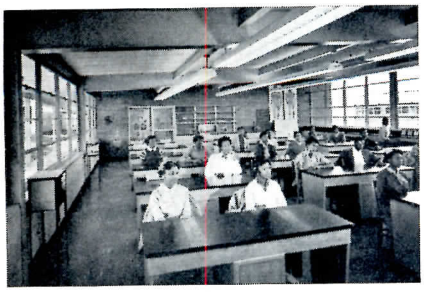
While the initial student population of West Charlotte High School was expected to be 600 pupils (grades 10, 11, 12), population studies indicated an increase averaging 200 pupils per year, up to an ultimate 1500 to 2000. It seemed appropriate to adopt a cumulative building program, which the open



Chemistry-Physics Lab

campus plan facilitates. Some of the present areas will meet the needs of the ultimate school plant; others will be supplemented by construction of new units or additions. Examples are the projected classroom and auditorium building (noted on preceding pages) and enlargement of the Cafeteria Building by adding a lunch room wing to the north of the present kitchen, increasing the kitchen by incorporating in it an enlarged area where commercial cooking is now taught, and providing new adjoining space for this subject.

Though the school plant is developed as a campus it is a relatively compact disposition of departmentalized units, each — as we have seen — susceptible of expansion, to permit maximum flexibility and variety in growth. By negotiation with the developer of surrounding residential property, the street pattern was coordinated to eliminate roadways or drives through the site. The street center was located on the property line, so the school's cost for paving was halved, more usable land was re-



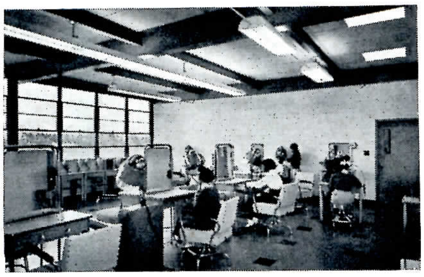
Biology Lab

served for the school, the amount of service drive was reduced, and neighborhood amenity was increased since surrounding residences will face the pleasant school compound. This is expected, here as it has in other comparable situations, to raise the quality of the adjacent houses.

There is about equal emphasis in the curriculum upon preparation for continuing education and vocational and technical training; this is truly a comprehensive high school program. Vocational subjects tie closely to community needs: there is a strong local tradition of high quality masonry construction; carpenters are in great demand; commercial cooks have virtually been guaranteed work in Charlotte's hotels and restaurants; the same need exists for tailors and beauticians; Charlotte is noted as a distribution center for products manufactured elsewhere.

The buildings are so designed and located on the hillside that, at reasona-

Arts and Crafts



Beauty Culture

ble cost — and without bulldozing into anonymity the agreeable terrain — floors are at or near the same level. Minor changes in elevation are made by comfortable ramps. The Gymnasium and Shop, now under construction, are expected to be completed this spring. Future building construction can tie economically into services as planned extensions of facilities now installed.

The two-story Academic Building is of "fireproof" construction, with a reinforced concrete frame that cantilevers to support the corridor floor and roof. The bays are uniform. The gymnasium roof construction is carried on post-tensioned precast concrete girders and

Tailoring

columns. The one-story buildings have steel framing, steel joists and poured gypsum roof deck on exposed fiber board forms carried on bulb tees. Exterior walls are concrete block with brick facing. Floor slabs are concrete on grade, radiant heated. Interior partitions are concrete block generally; ceilings, attached to steel joists or suspended, are acoustic plaster. Walls in toilets and kitchens are structural facing tile; finish floors, asphalt tile generally, terrazzo in toilets and corridors, quarry tile in kitchens and service rooms.

Building Costs

Academic (Language Arts), Cafeteria, Vocational, Science and Library buildings now completed:

Area	77,865 sq ft
Cubage	874,620 cu ft
Total Cost*	$665,622.00
Cost per sq ft*	$8.54
Cost per cu ft*	$ .76

* Including approximately 840 ft water and sewer main to city connection as well as building services on the site; not including kitchen equipment ($16,737), science laboratory equipment ($25,491).

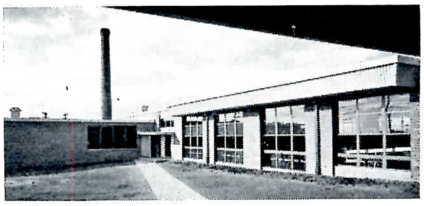
Gymnasium and Shop buildings now under construction:

Area	24,493 sq ft
Cubage	449,236 cu ft
Total Cost*	$216,078.00
Cost per sq ft*	$8.82
Cost per cu ft*	$ .48

* Including lockers and outside utilities but not bleachers.

In addition to above items, grading, storm drainage, paving, flood-lighting, fencing, 3000-seat bleachers and concession stand have been provided for approximately $80,000.00.

Cafeteria, Kitchens; boiler room below

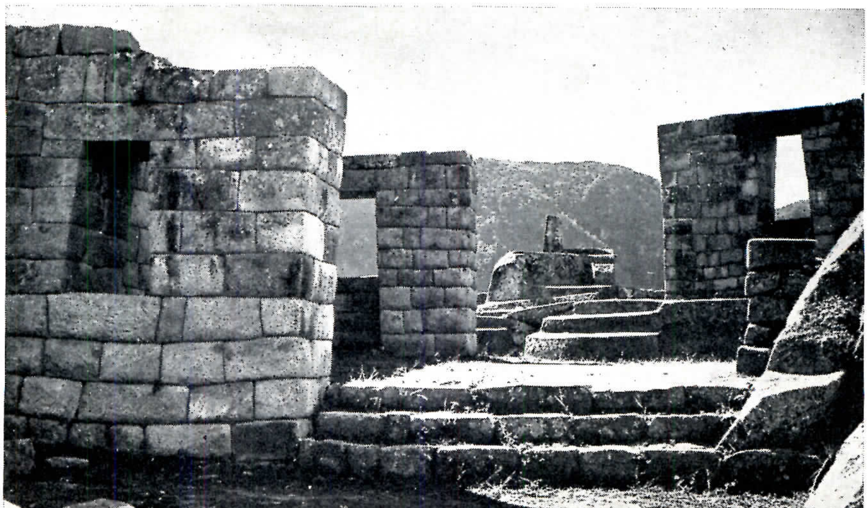


John Sayle, Jr.

PROPOSED TOURIST HOTEL AT THE

Burton Holmes

H. Guillen M.



HIGH IN THE PERUVIAN ANDES, at 10,300 ft., lie the ruins of Machu Picchu, fabled "city in the sky." Here was the shrine and last home of the ancient Inca rulers, nobles, priests, and their chosen handmaidens — the vestal virgins of the sun. Never found by the invading conquistadores in 1532, the city was lost for three centuries, discovered in 1911. The site is 70 miles from Cuzco, now a city of 53,000; in the 15th century the capital of the powerful Inca empire.

The awesome setting looks down 2,000 ft into the canyon of the Urubamba River and is guarded by twin peaks towering above it. Intensive agriculture — a highly developed Inca skill — was served by walled terraces linked by stairs, the longest serving as the city's main thoroughfare. Building walls were of granite ashlar, beautifully fitted without mortar and with joints a knife blade cannot penetrate. On a rise was the "intihuatana" — temple to the sun (bottom left).

The constantly increasing number of visitors makes the present small lodge (top left) inadequate. The proposed hotel would be built higher — by two "camel backs" — up the mountainside. The path to the ruins would be downhill and provide a favorable entering view.

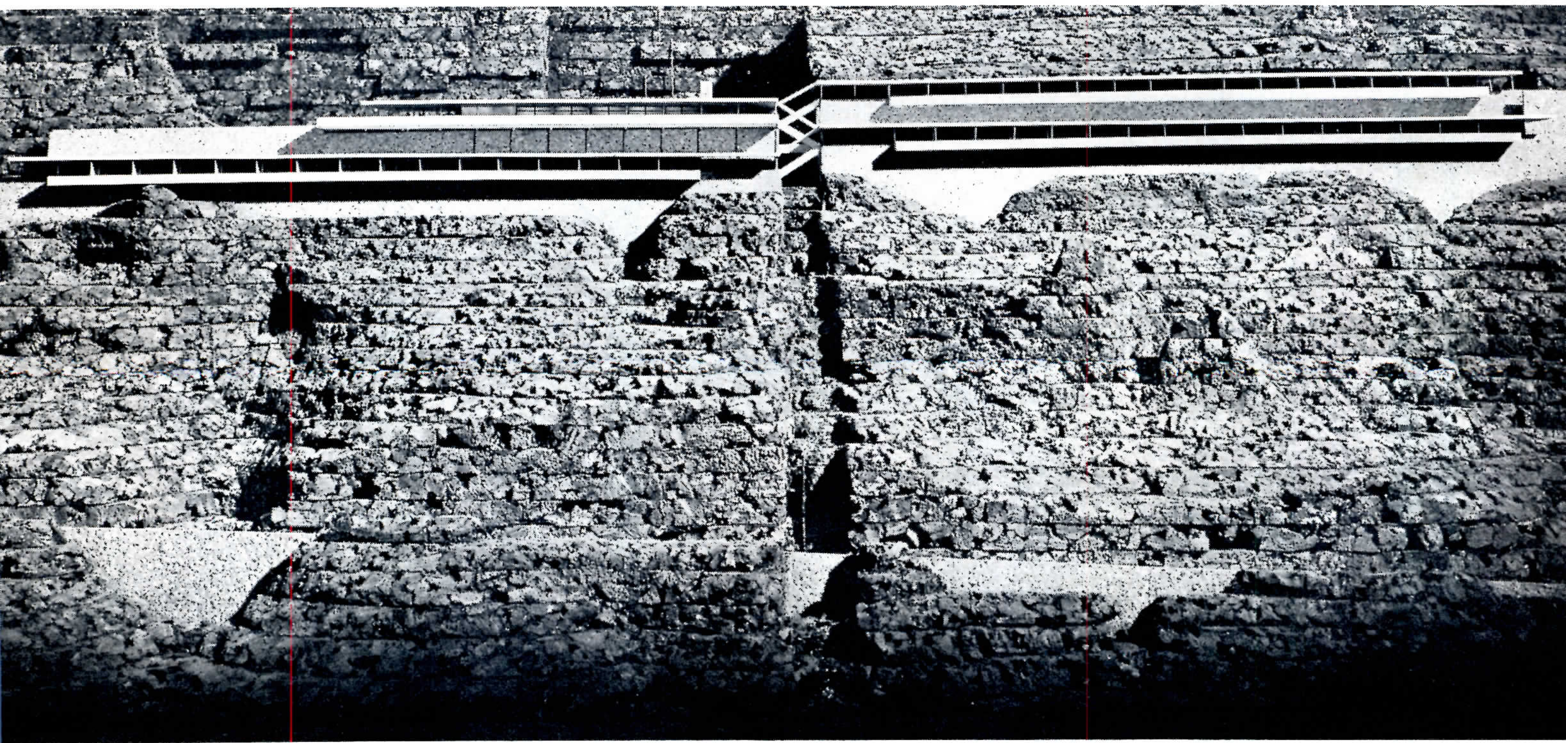
Alpaca. Inca. Silver, 9⁹⁄₁₆ in. high
Collection: American Museum of Natural History

ANCIENT CITY AND SHRINE OF THE INCA

Project for a Hotel at Machu Picchu, Peru

Schweikher and Elting, Architects

Bill Hedrich; Hedrich-Blessing

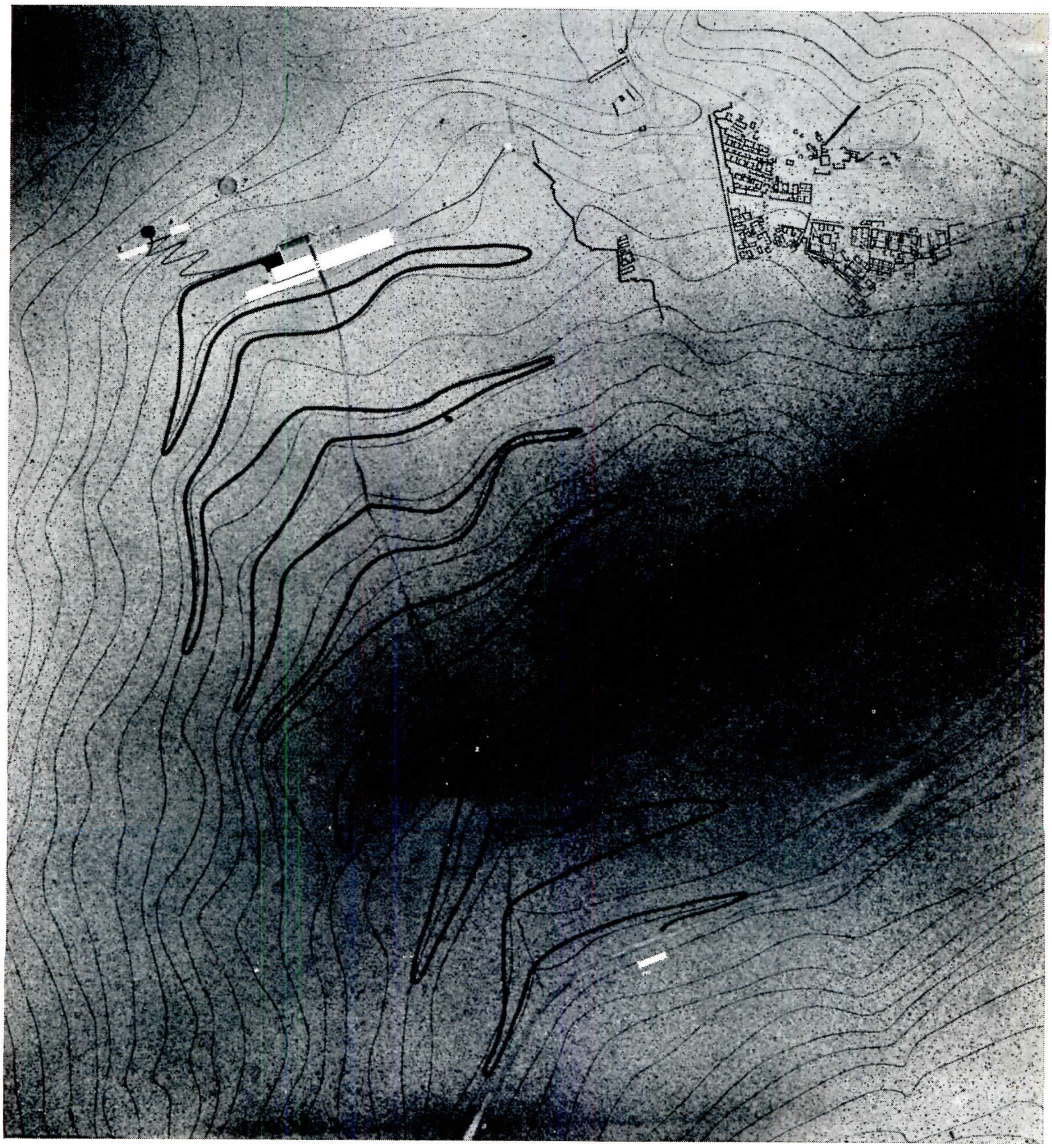


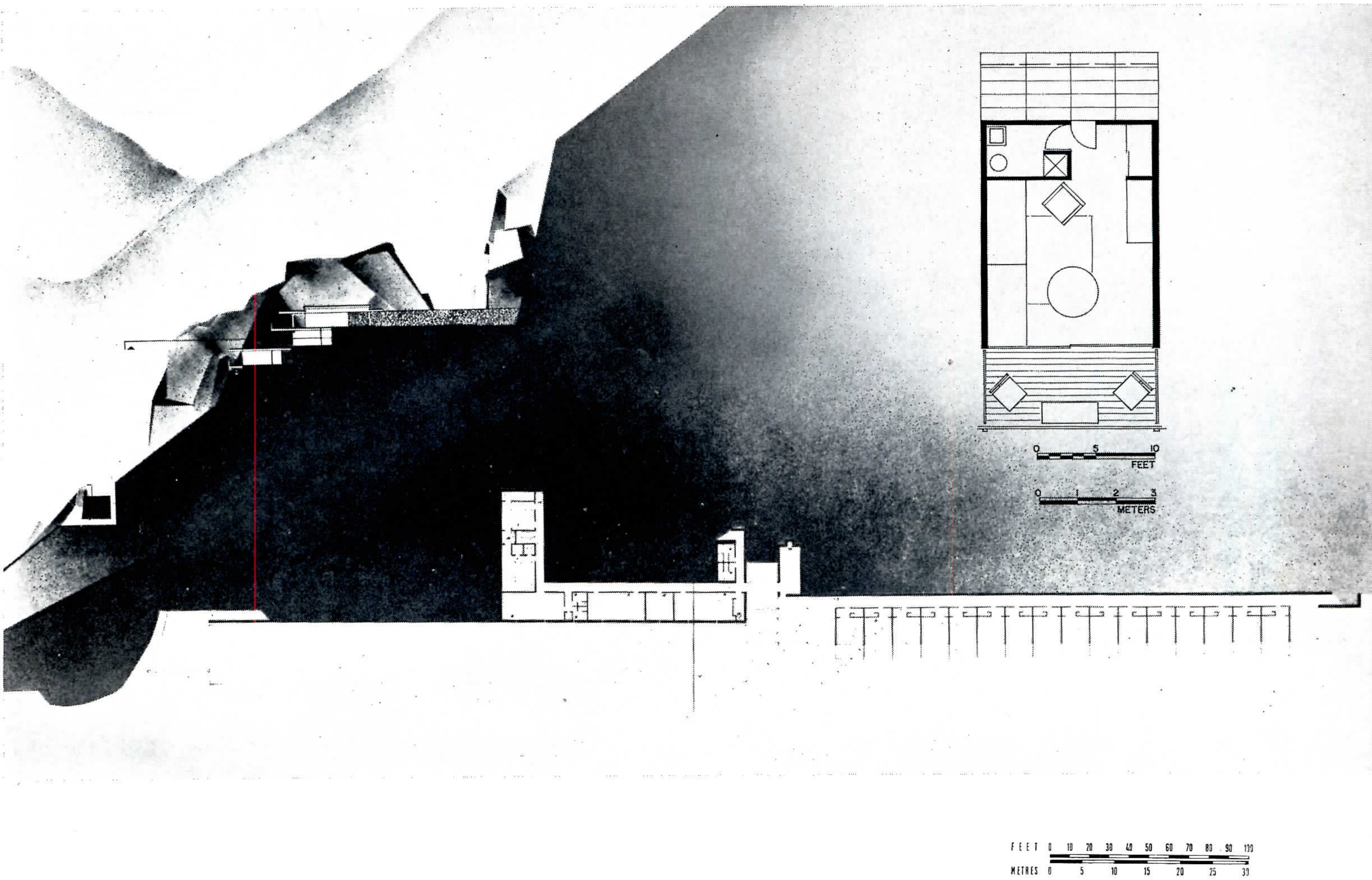
THE SITE PLAN, below, shows the winding road up the mountain from the rail-bus station (bottom). The new hotel is positioned to exploit the magnificent view of the Urubamba Valley and the mountains beyond. A trail leads uphill to a stable, riding ring, corral, and servants' quarters (left of hotel). A second trail to the nearby ruins ends at a gatehouse museum (right of hotel) — a restoration of one or several Inca dwellings. From this point, one gains an impressive view of the ancient city from above.

THE CONCEPT contemplates cutting levels into the mountainside, then using material obtained for stone retaining walls and backfill. This method, well known to engineers, was probably used by the Incas for their terraces. Reinforced concrete slabs would be laid on the cut and fill, cantilevering over the walls to form balconies. Only four basic materials would be transported to the site; cement, reinforcing steel, wood, and glass. Piers and walls of mountain stone will support floor slabs and wood roofs. Interior partitions and cabinets will be wood; glass will be used sparingly; only where shelter from wind, rain, or sudden temperature change demands.

THE PLAN shows the approach, bottom right, through a courtyard leading to a covered terrace overlooking the view and then to the lobby. From the lobby, access is by stair to the guest rooms above or below. A large fireplace separates dining and lounge areas from lobby — the bar is between lounge and terrace. The kitchen has direct access to the service court and to a service area below — see top plan. Dining may be indoors or in the garden overlooking the pool. The pool will be fed by directing several springs into a stream down the mountain; may also be used for swimming.

The scheme contains 48 guest rooms, each with private bath and balcony overlooking the view. The three guest floors are at staggered levels, thus allowing for future additions above or below.




0 5 10
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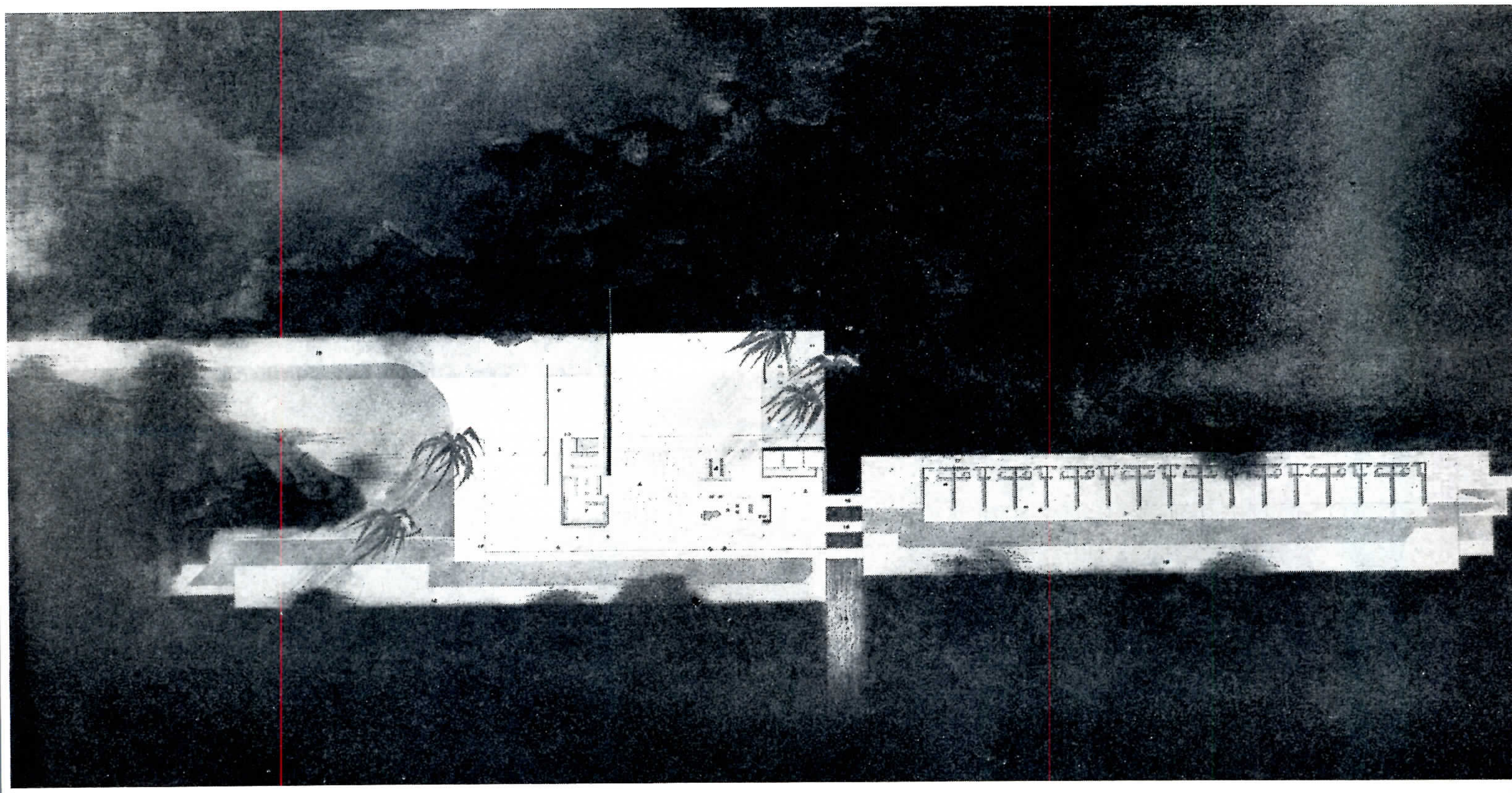


WATER SUPPLY, in the opinion of the architects, can be obtained from spring water running down the rocky mountainside, although a reservoir may be required. The pool and reservoir should provide necessary fire protection, in addition to the safety factor furnished by isolating sections of the building. Sewerage can be treated and formed into a stream directed to reach the river in the valley below.

ELECTRIC POWER could be generated either by water or diesel motor, the latter cheaper to furnish and maintain. A 200 KW generating station would fill the estimated need for both lighting and heating. In the ideal climate of Machu Picchu, individual electric room heaters would provide any needed tempering.

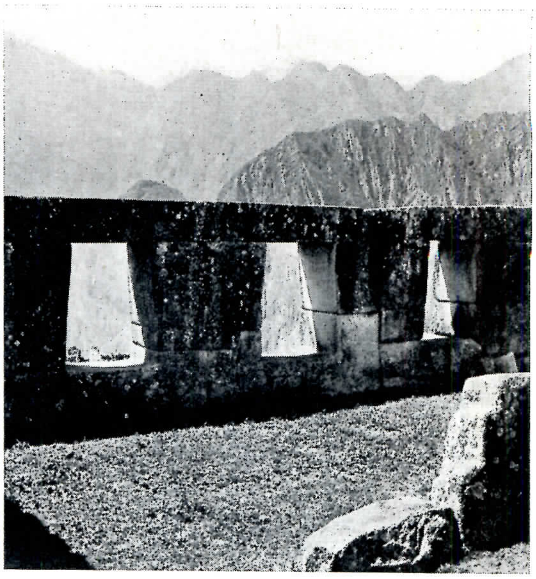
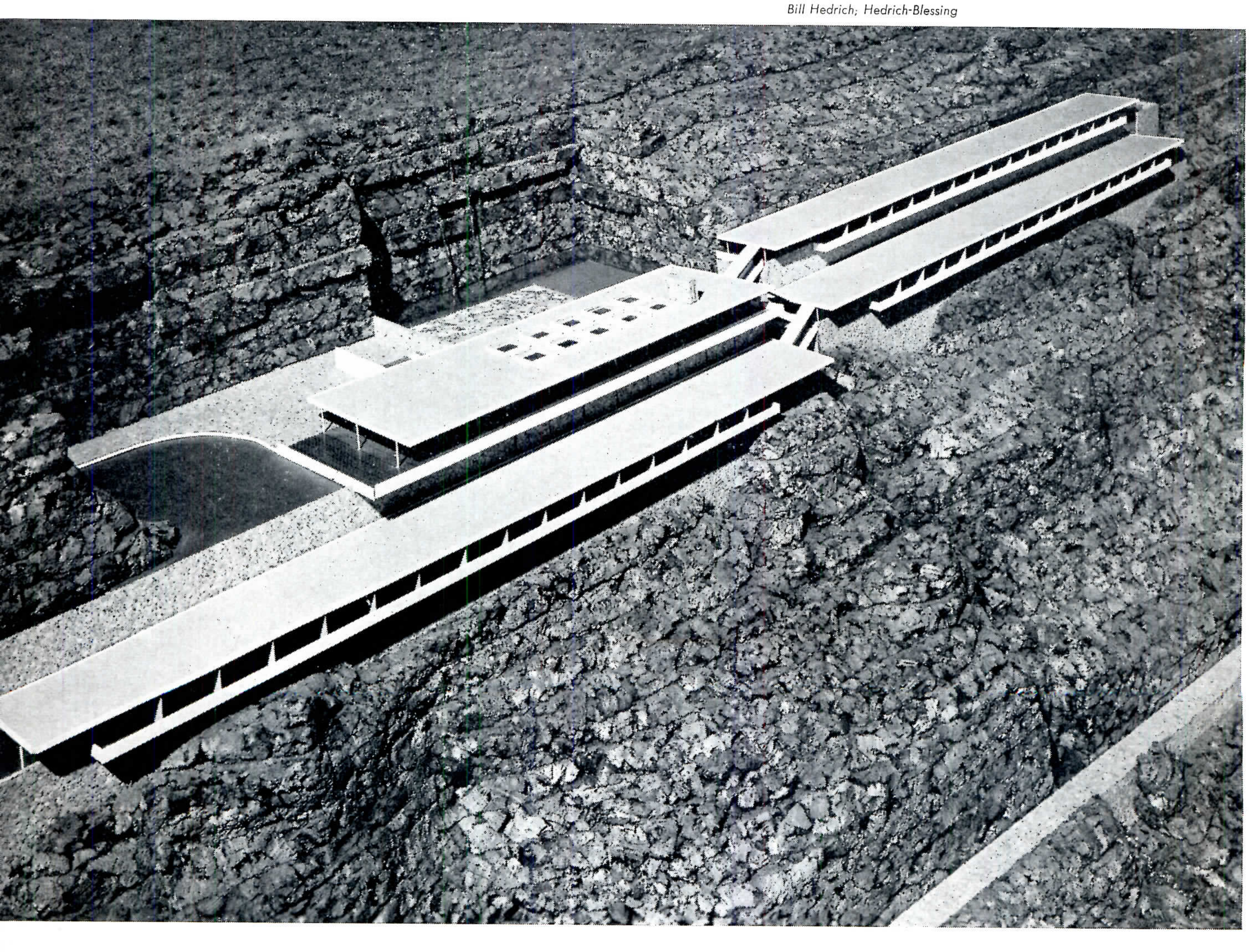
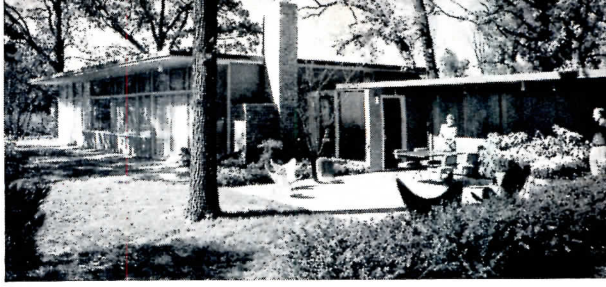


Photo Courtesy Museum of Modern Art

Bill Hedrich; Hedrich-Blessing

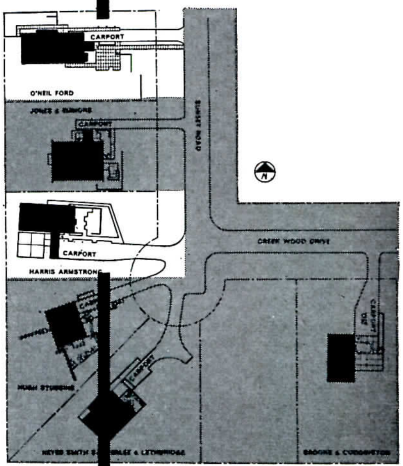




HOUSES THAT RESEARCH BUILT

Six architect-builder teams show that materials and methods new to residential construction can be used in small, low-cost houses. Here are two of them

SOME NEW THINKING — new, that is, in the field of low-cost housebuilding — has evolved from a research village in Barrington, Ill. Six selected architects, asked to contribute some new design and construction ideas for the project home-builder, have stepped outside the familiar bounds of residential construction and adopted materials and methods commonly used in industrial and commercial building. The results of their experiments, which indicate that there is no inflexible formula for small, low-cost houses, have attracted widespread interest and much enthusiastic comment. The village reflects the ingenuity of the six architects and the merit of the research itself.



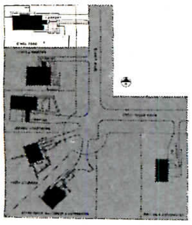
The project was conceived over a year ago by officials of the United States Gypsum Company who felt that housebuilding needed some competitive merchandising to attract the consumer dollar. As a result, they decided to sponsor a "research project" to produce six low-cost "idea" houses, which could be duplicated in part rather than in their entirety. In essence, they were to serve as pilot houses of multiple project developments. U.S.G. stressed their basic interest in the promotion of better residential construction.

As one of the first steps in developing the "United States Gypsum Research Village," U.S.G. set up an architectural advisory board composed of L. Morgan Yost, FAIA, Kenilworth, Ill.; John Root, FAIA, of Holabird & Root & Burgee, Chicago; and Richard Bennett, FAIA, of Loebl, Schlossman & Bennett, Chicago. The board selected six architects from a field of 36 who accepted out of 40 who were approached. An NAHB builder advisory panel appointed six "teammate" builders. It was felt that teams representing every region of the country would show how design need not be a barrier to construction in one climate area. Morgan Yost acted as supervising architect at the site, and the actual building was done by the Maxon Construction Company, Barrington. The teams were given free license to use the materials of all manufacturers, then were presented with these objectives:

1. To contribute new design and construction ideas, particularly for the project homebuilder.
2. To create new uses for building materials.
3. To create more livability, comfort, safety and value for the homeowner.

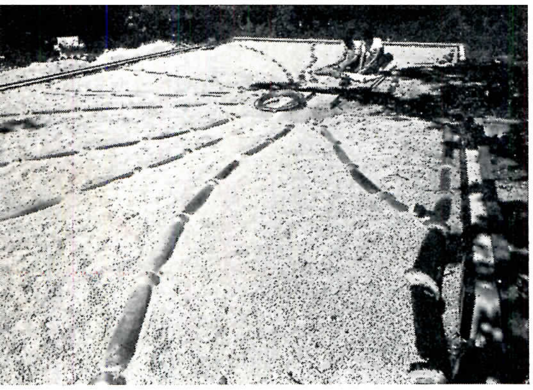
That the objectives have been achieved is apparent in the combination of comfort and attractiveness with such seemingly incompatible factors as steel and exposed concrete. Even in comparatively small houses, as these are, there is a definite feeling of spaciousness and easy flow.

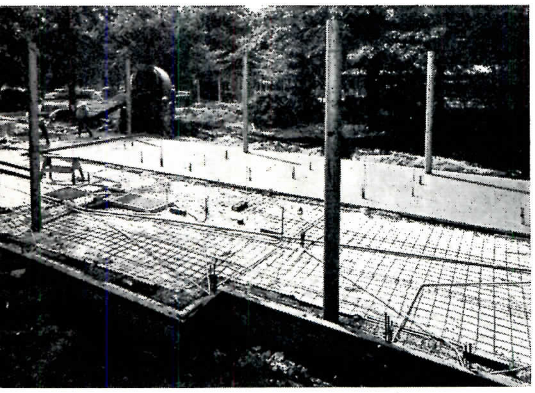
The big question is: Will the prospective homeowner be receptive? The sponsors, extremely happy with the results, think so. The architects, professionally self-critical but on the whole well satisfied, think so. And apparently the NAHB thinks so. Its new president, Earl Smith (when he was chairman of the technical committee), said, "These are the kinds of houses we will be building ten years from now."

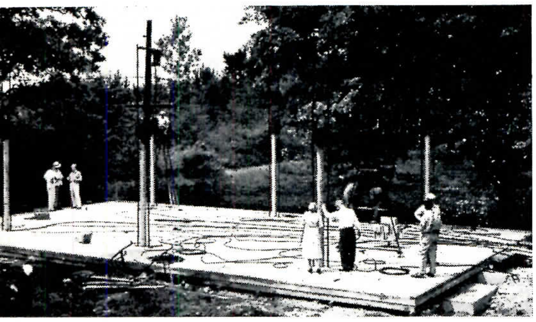


LIFT-SLAB ROOF FLOATS ON SIX COLUMN SUPPORTS

Designing Architect: O'Neil Ford, San Antonio, Texas
Teammate Builder: Frank Robertson, San Antonio, Texas



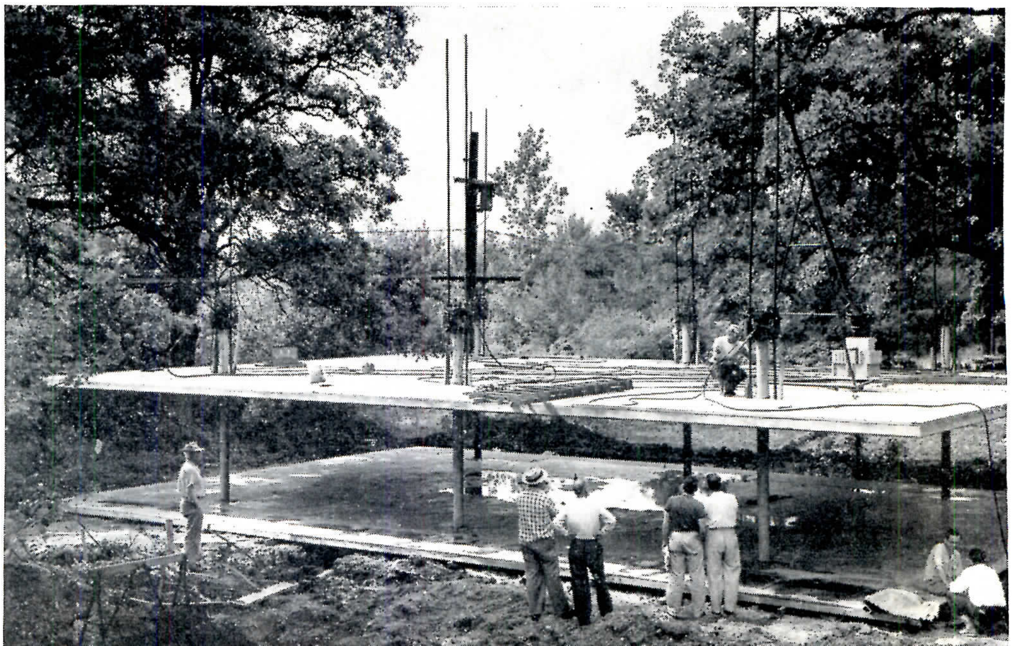




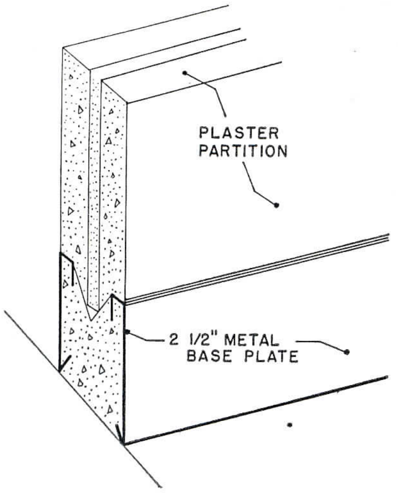
LIFT-SLAB CONSTRUCTION is the most revolutionary feature of this 1624-sq-ft house. Although an established structural system for commercial buildings in many sections of the country, and even in some of Mr. Ford's high-priced Texas homes, it has never before been attempted in low-cost house construction. Even though this house proves that the roof-slab method is uneconomical for one house, results indicate that it would be economical for 10 or more houses. It is conceivable that in the future one control system may lift the roofs of several houses simultaneously.

After the roof was raised to its full height, it was locked permanently in place by steel collars welded to the columns. Since the columns carry the full weight of the roof, all exterior walls and interior partitions are non-load-bearing, making possible another structural feature previously used mostly in industrial and commercial construction — open-web steel studs. They are easily installed, do not shrink or warp, offer complete freedom for mechanical installations and compare favorably with wood studs in price per lineal foot.

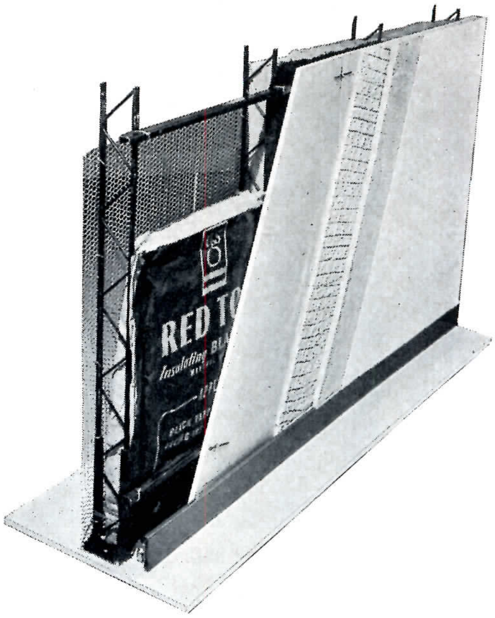
The combination of concrete, steel, plaster and stucco adds up to a house that is almost incombustible. Glass curtain walls on the south side, and a glass strip under the roof overhang on the north side, add to the brightness and openness of the house. These large glass areas can be used without danger of large temperature differential from floor to ceiling because diffusers located in the floor about 10 in. from the outside walls blanket them with warm air in the winter and cool air in the summer. One width of acoustical tile along the perimeter of the ceiling deadens some of the sound, which travels toward the outside walls and then up to the ceiling, and also adds to the decorative effect of the house.



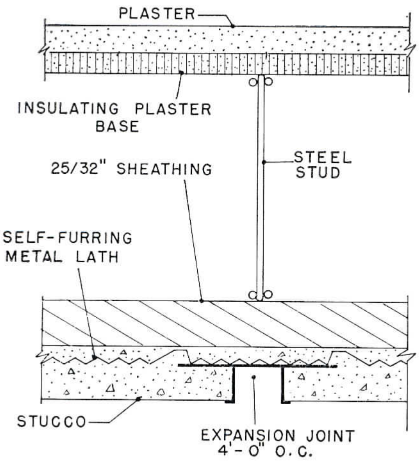
Literally "raising the roof," six hydraulic jacks lift the 9-in.-thick, 35-ton concrete slab into place. Progress photos above show air ducts laid in gravel fill, steel columns placed in concrete floor slab and hydraulic equipment installed, one on each column. After the concrete was cured to 3000 lb in approximately 21 days, and built-up asphalt roofing applied over rigid roof insulation, it was raised evenly to a height of 9½ ft in less than 3 hr. Vinyl tile flooring covers the concrete floor slab throughout the house



Interior Wall Construction

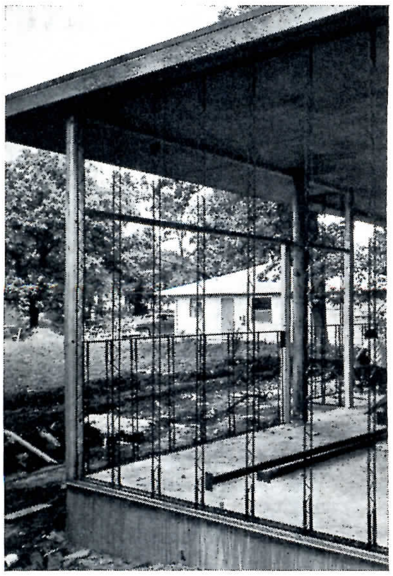


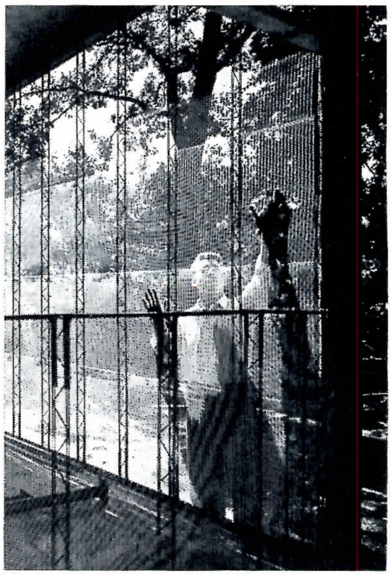
Exterior Wall Construction

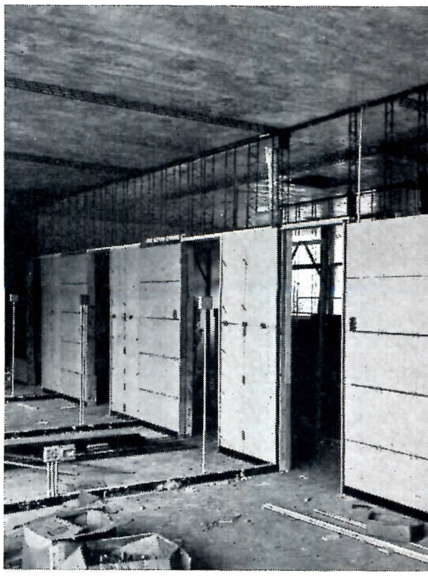


Expansion joint, functional and pleasing, cuts into exterior stucco at 4-ft intervals to interrupt cracks

Hedrich-Blessing Photos

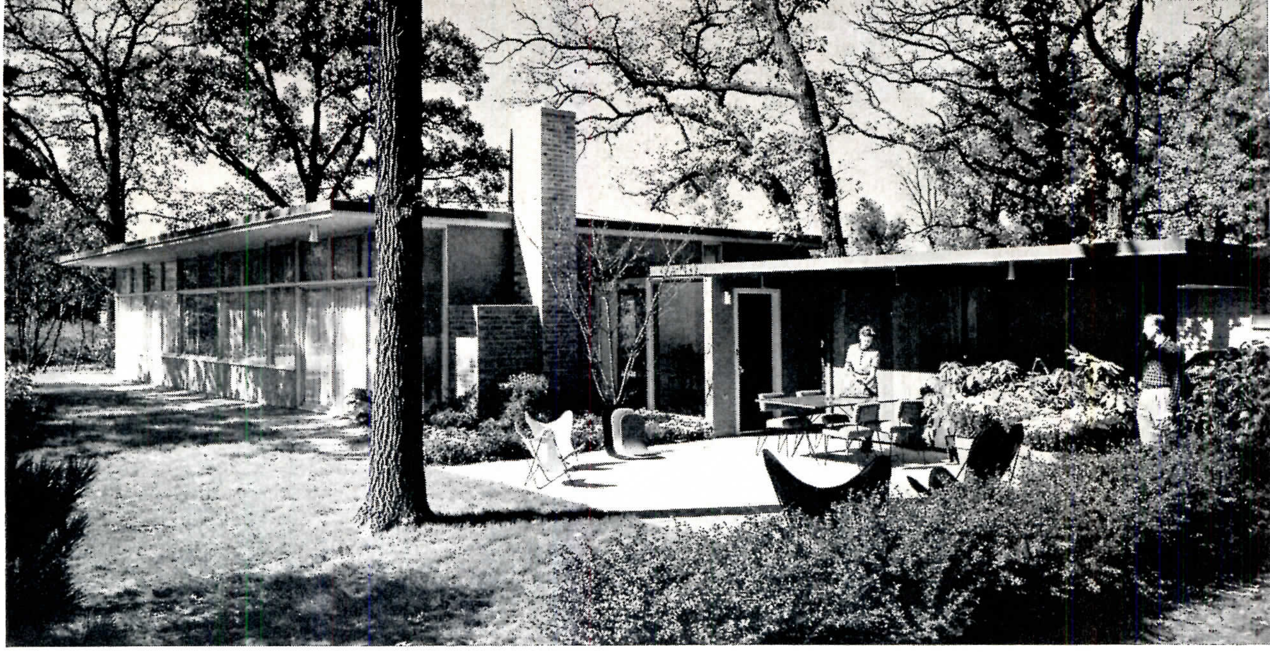


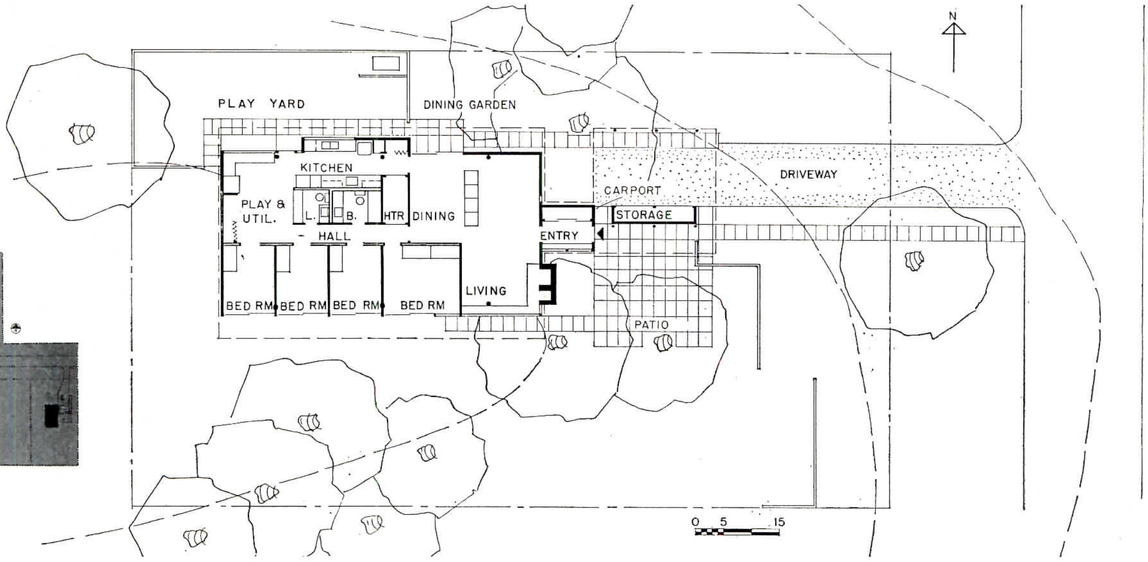


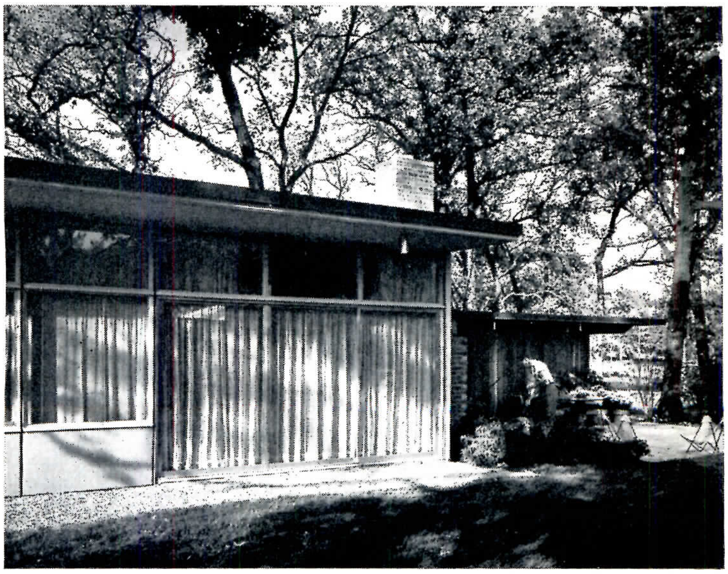


Open-web steel studs, spaced approximately 16 in. o.c., snap into "shoes" clipped onto steel floor and ceiling runners, leave an open core for installation of plumbing and conduit. Shoes offset unevenness in floor elevation. Clips attach metal lath to studs

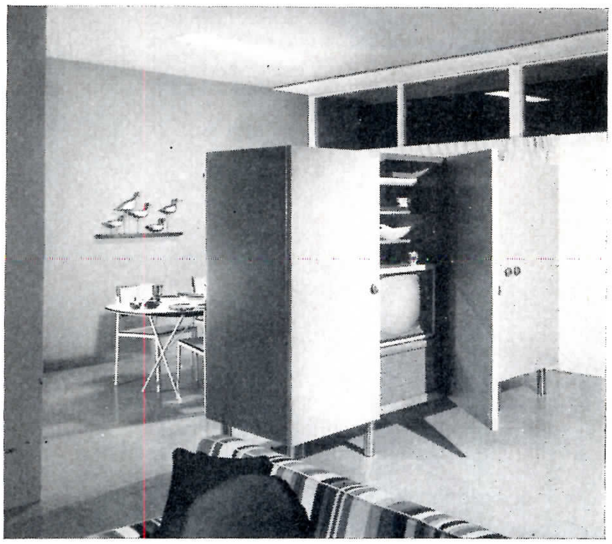
Hedrich-Blessing Photos



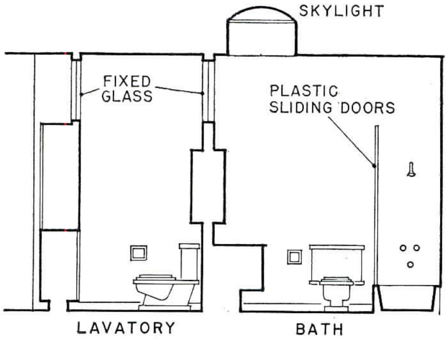




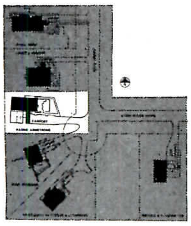
Storage area separates the steel-decking-covered carport from the outside patio. The patio can be reached through a door in the main entry or through sliding glass doors from the living room. A play yard is located on the other side of the house so that children can go in and out through the activity room



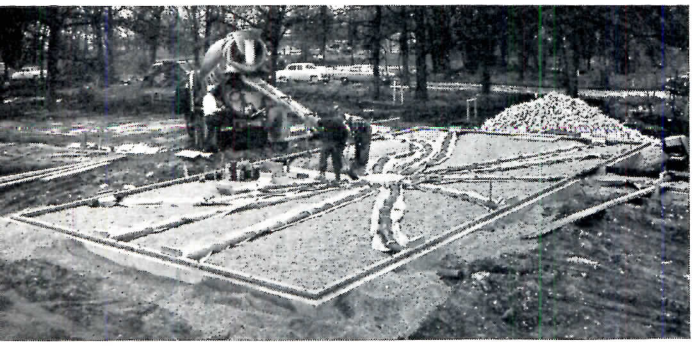
Living room is divided into two parts: "fireplace focus" (below) and "TV focus" (above). Catch-all cabinet separates living and dining areas, with table and drawer space on both sides. Daylight from activity room enters adjacent bathrooms and lavatory through glass areas in walls

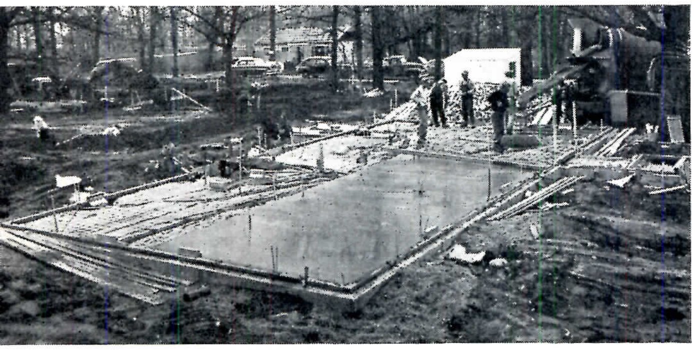


Small bedrooms are adequate for children if they have an activity room in which there is also plenty of storage space. Master bedroom acts as a buffer between living area and the three children's bedrooms and activity room. Mother can watch children from kitchen while they are in the activity room or the play yard outside



TERRACES AND ROOF DOUBLE SIZE OF SMALL HOUSE





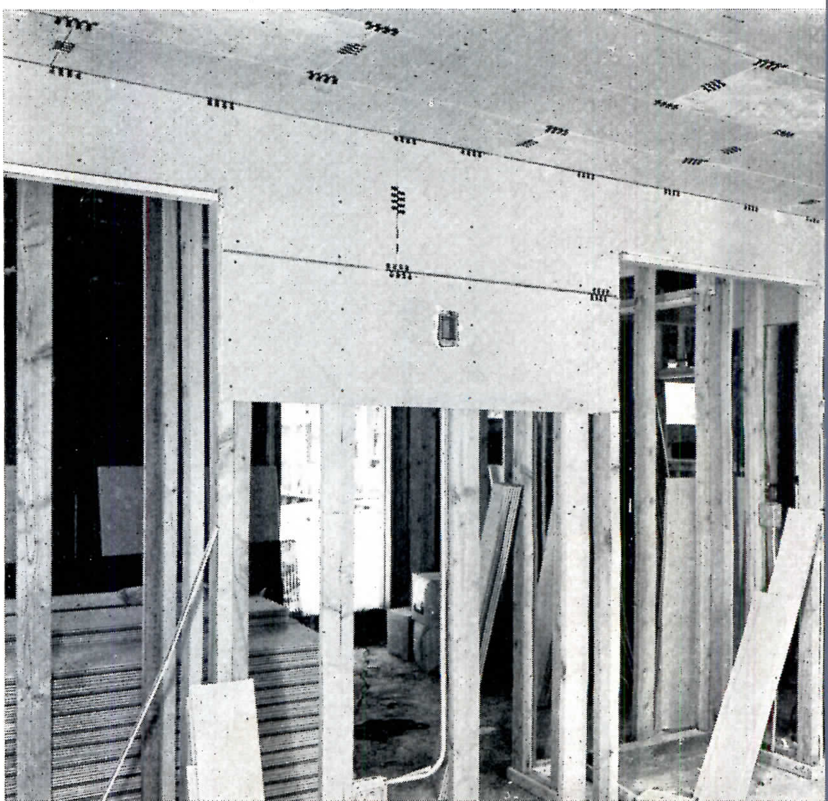
Foundation is the same as in the Ford house, concrete slab over crushed stone, with warm air ducts embedded in the slab. Furnace location is at edge of slab, so warm air has to be shot into center of slab through pipe from furnace and then disbursed through pipes leading to outlets at perimeter of slab. Location of furnace, outside bathroom and lavatory, permits access from outside. Vinyl tile and cork tile are applied directly over the concrete floor slab throughout the house

THE SMALLEST of the six houses provides three bedrooms in only 1178 sq ft of space. The conventional wood framing is extended beyond the limits of the house itself to semi-enclose a patio which appears to enlarge the living room considerably.

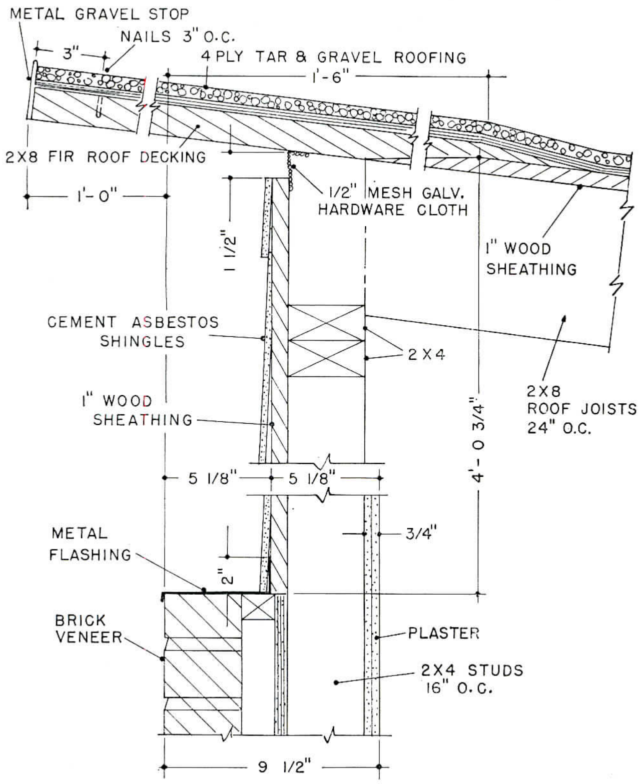
The ceiling of exposed wood decking and cross beams slopes upward toward the south side of the living room and then down again over the carport, almost doubling the apparent size of the house. The effect of bringing the outdoors into the house by using natural materials and colors in the living room is contrasted with one exposed steel I beam in the middle of the ceiling. Built-up asphalt roofing over rigid roof insulation is applied over the wood decking.

The large glass areas facing on the patio are kept warm and moisture-free, as in the Ford house, by means of warm blankets of air from floor registers about 8 in. from the walls. This system cuts costs in two ways: (1) Single-plate glass can be used, thus obviating more expensive double-glazed windows. (2) The furnace load is decreased because warm air which is dissipated in rooms is returned to the top of the furnace, filtered and recirculated.

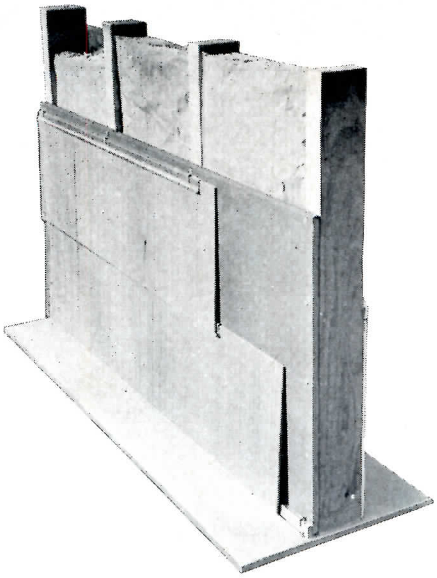
Dry-wall plaster base sections on 2x4 wood studs are connected with special clips, shown below, which hold the lath ends between the studs and float them away from interior corners, thus giving the walls complete rigidity and cushioning the shock of structural movement.



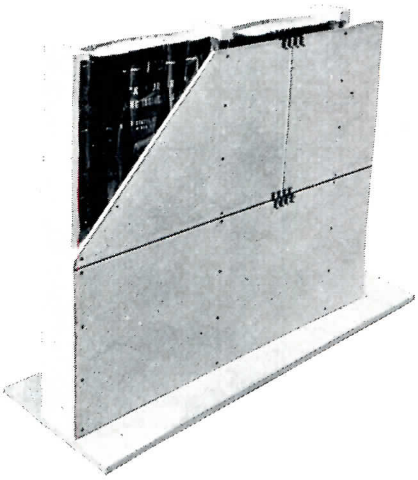
Designing Architect: Harris Armstrong, Kirkwood, Missouri
Teammate Builder: Donald H. Drummond, Kansas City, Missouri



Roof and Outside Wall, South

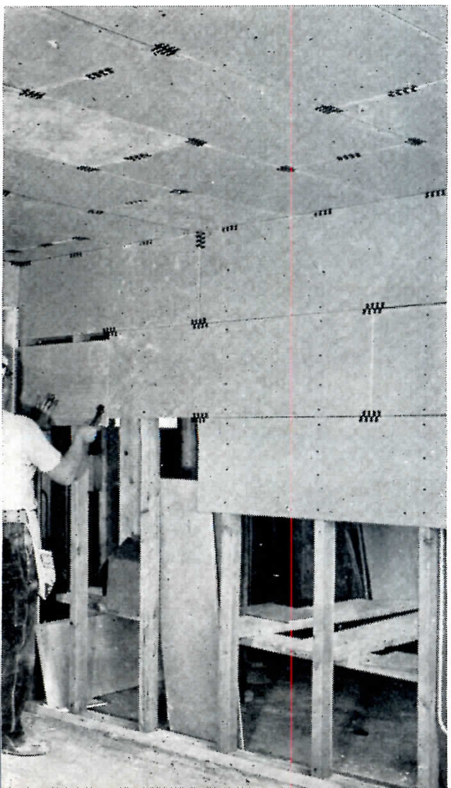


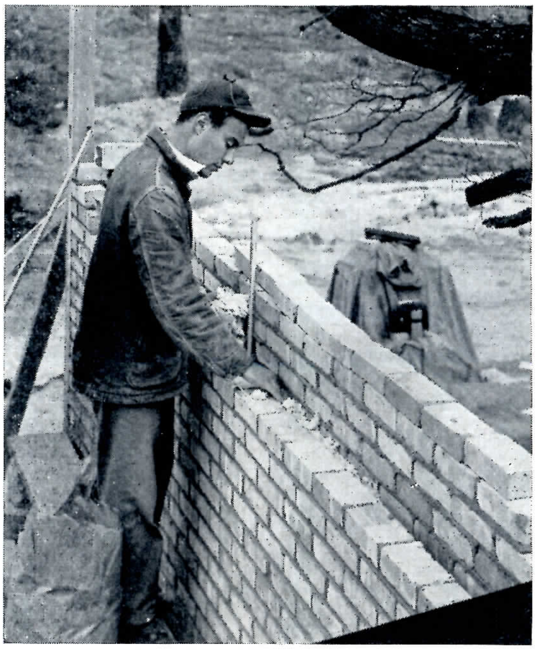
Exterior Wall Construction, above Brick Veneer



Interior Wall Construction

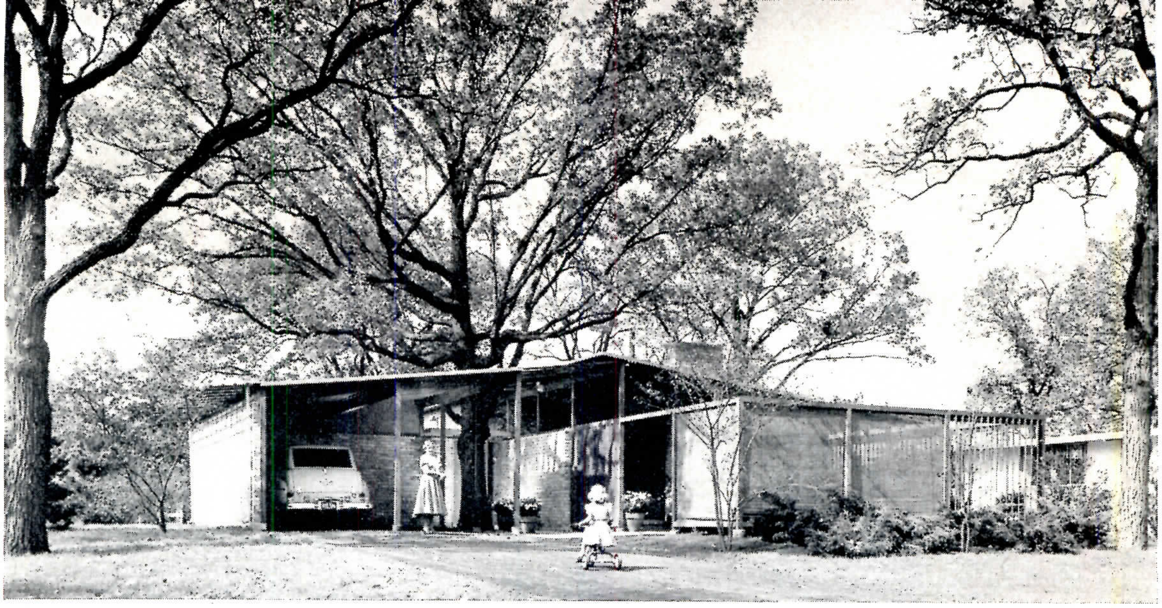
Hedrich-Blessing Photos

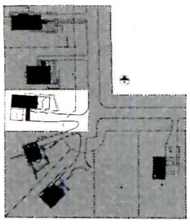


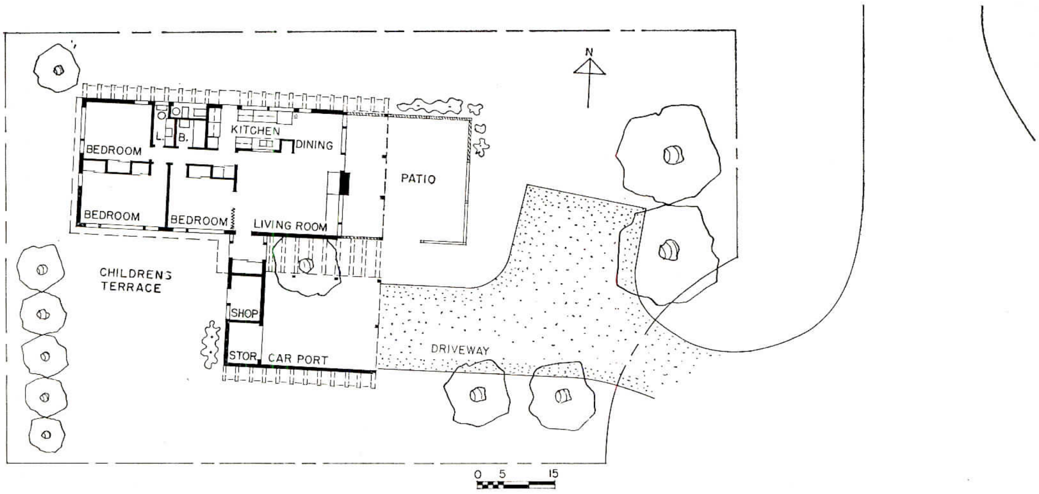


A 10-in. brick cavity wall, filled with insulating wool, accents outside-inside motif of living room. Lower portion of other exterior walls are brick veneer. Upper portion, shown top of page, is faced with striated, ceramic-finished, asbestos cement siding

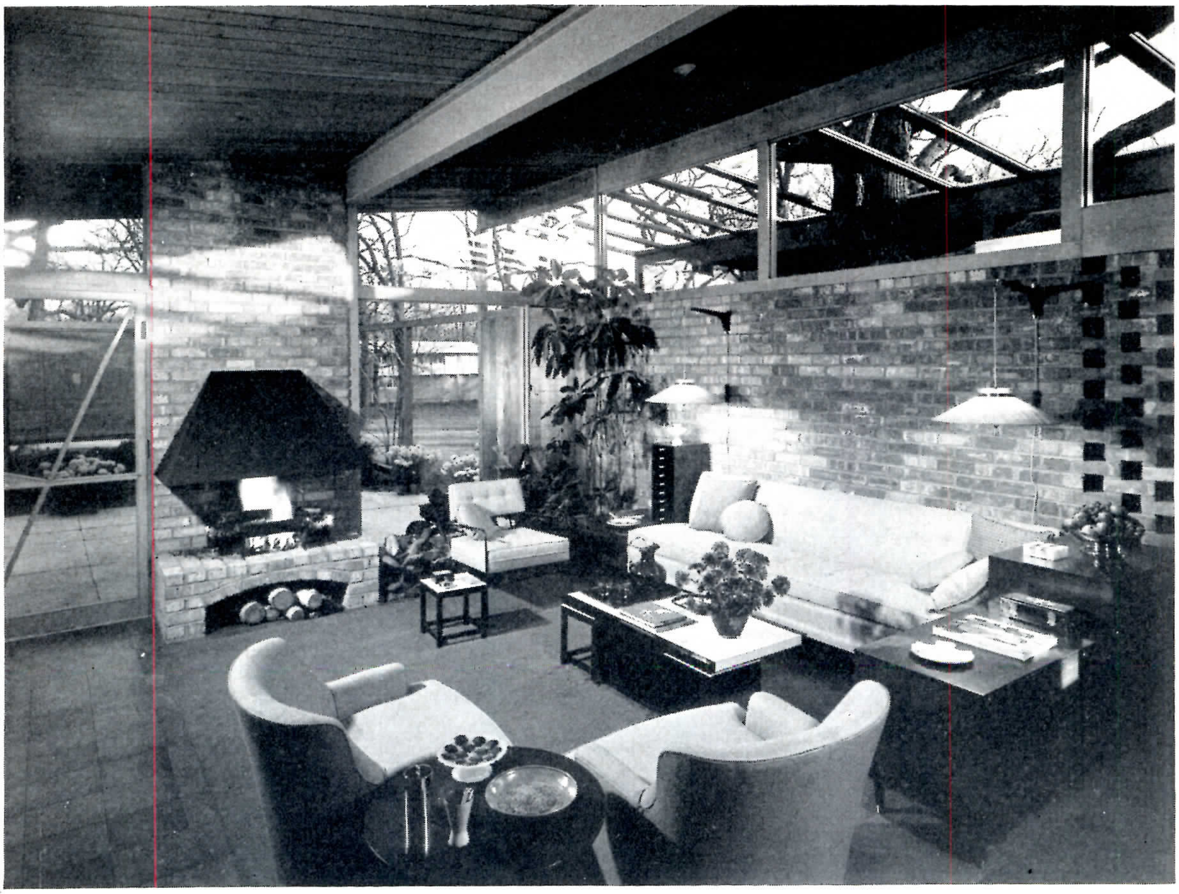
Hedrich-Blessing Photos



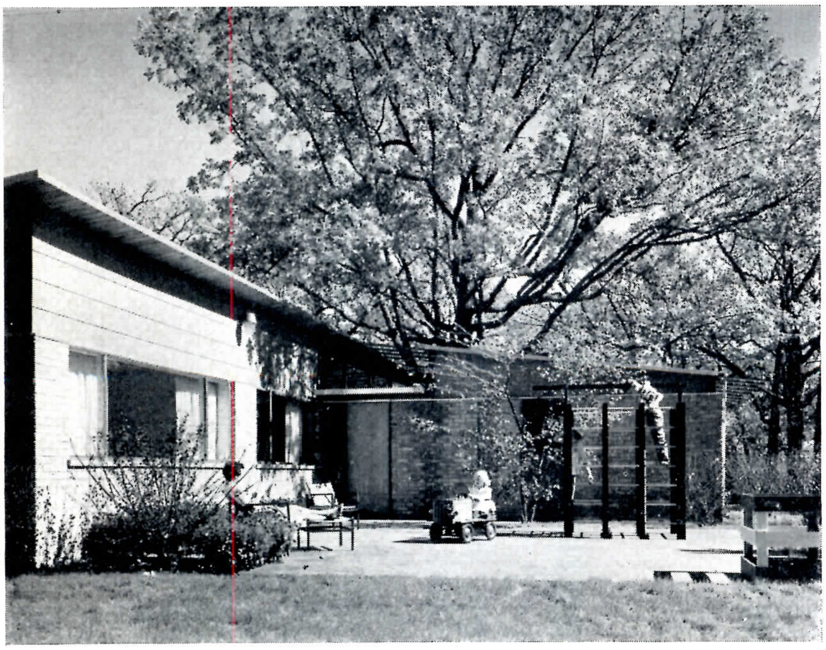




Outdoor living areas add to the illusion of spaciousness. An adult terrace, hidden from street by stationary vertical wood louvers and roll-up bamboo blinds, adjoins living room. A beautiful old oak tree adds a dramatic touch to trellis-covered passageway leading to main entrance between house and carport



Floor-to-ceiling glass curtain walls bring terrace right into living room. Inside garden accentuates outdoor feeling. Light filters through oak tree and trellis into living room above brick walls. Living room is enlarged even more by opening folding doors of bedroom-study. Sliding window opens kitchen to living room



A children's terrace on the other side of the house is separated from the double carport by a storage area and shop. This area keeps children away from the street and from the adult living areas

BUILDING TYPES STUDY NUMBER ® **221**

OFFICE BUILDINGS

FENESTRATION

WHEN THE ARCHITECT with a commission for a new office building arrives at a decision on fenestration he has brought into focus most of the problems of design. Whether he starts with fenestration — certainly a temptation — or with any of a half dozen major design considerations, the window will be a pivotal element.

The arrangement and proportioning of windows will certainly be a determinant in esthetic design. Fenestration will also largely determine the flexibility of space near the windows, perhaps throughout the building; this fact alone may establish the rental value of the space for the life of the building. Fenestration may also set the pattern for the structure or for the air conditioning, for the skin of the building, or for the comfort and composure of the people who will spend so many hours there.

Fenestration thus becomes the theme of this Building Types Study, prepared with the assistance of Max Abramovitz, of Harrison & Abramovitz, acting as mentor and master of ceremonies, though some other architects have contributed their own notes on their own decisions as to fenestration. Few architectural firms have done so many large office buildings, in so many different locations, for so many varied clients, as Harrison & Abramovitz, beginning back with Rockefeller Center (in association with others), on through U N, Alcoa, U. S. Steel, and others. If their buildings seem to exhibit many differences in end result, both partners would cheerfully acknowledge the truth of that observation. They might, in fact, make rather a point of it. Variety, then, becomes part of the fenestration theme of this study. If there is any dogma to be preached in the ensuing pages it will be merely that there is no one window solution that suits all conditions of function, climate, location, notions of clients, or personal vocabulary of architectural genius.

If there is any trend visible today, it will be the broad effort to reexamine the purpose of the office building window in relation to other factors in design, then to find esthetic inspiration in the functional criteria, rather than the other way 'round. In this laudable resolution, the modern clichés will have to hold their acceptance on merit. Floor-to-ceiling glass or strip windows or glass spandrels will win, if they win, on demonstrable values in the given instance. The Rockefeller Center fenestration, the classic example of provision for economical space division which seems to hover over all office building design, will hold sway to whatever extent it fits the individual circumstances.

This matter of window modules and placement of partitions is thoroughly analyzed in this study; other factors are touched on rather more lightly, as they contribute in some instances to fenestration decisions.

The analysis tends to demonstrate that the skyscraper, America's distinctive contribution to architecture, is not now, if it ever was, a standardized package. For all of the inventiveness already poured into its progress, there is room still for a great deal of cleverness, to fit that inventiveness to the changing needs of big business and its big and little people.

U. S. Embassy Building
Rio de Janeiro, Brazil
Harrison & Abramovitz,
Architects

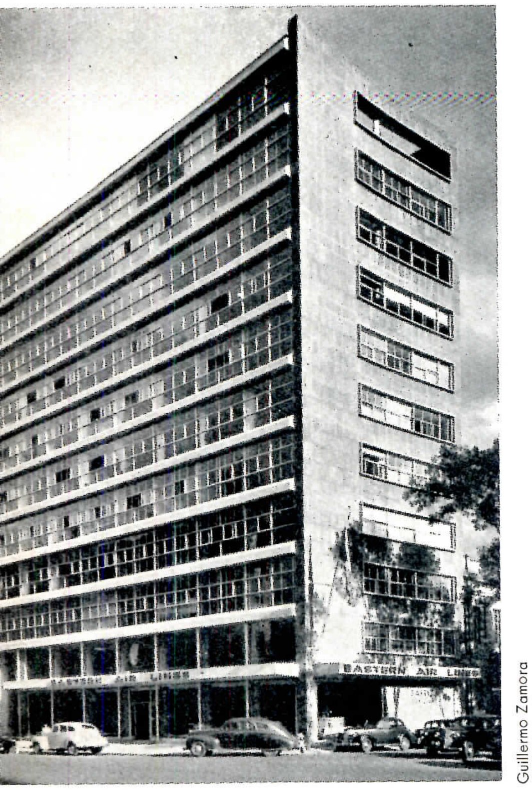
THE DISCIPLINES OF FENESTRATION

A Study Prepared with the Assistance of Max Abramovitz, Harrison & Abramovitz, Architects

THE AMERICAN OFFICE BUILDING reached a high state of development back in the Twenties, at least from a functional point of view. Perhaps it is more accurate to say from a commercial point of view. In this era the office building was thoroughly analyzed as an investment. Management and rental of multi-tenancy buildings was an established science, and building skyscrapers for rental was big business. All this might be said to have culminated in the building of Rockefeller Center, in the planning of which the business approach was finely developed.

Analytical minds in management were agreeing in those days that column spacing for rental buildings should be from about 16 ft 6 in. to 18 ft. The basic idea was that 8 ft was the minimum for a private office with one window; and of course, that tenants paying

THE TREND TOWARD GLASS



An office building in Mexico City by Juan Sordo Madaleno & Augusto H. Alvarez, architects, from Mexico's Modern Architecture, *by I. E. Myers, Architectural Book Publishing Co., Inc.*

WITH fenestration in the lots-of-glass family, the grid module determines the spacing of partitions. If the module is 4 ft, the variety is limited to 8, 12, 16 or 20 ft, and no intermediate partitions are possible. Similarly, of course, a 3-ft module would give more variations, starting at 9 ft wide. If the module were made something like 4 ft 8 in., it would be possible to achieve the minimum 8-ft-in-the-clear office, but large units of space would be larger accordingly.

Columns may be set back from the wall, in the wall, or on the exterior to keep the inside flush. In some instances it has been possible to use struts in the wall in place of columns, so that the wall is smooth inside and out, and no problems of columns protruding into partitioned space need arise. Columns outside the wall are, of course, better than those in interior space, but even in this location they will frequently interfere with interior design effects.

Windows may be fixed if the building is air conditioned. With all windows fixed, cleaning becomes a problem; they must be washed by means of some exterior device. If certain sections are of double hung or projected type, they can be washed as normally from the outside, provided there is a sill or sunshade for the window cleaner to stand on. If the window is of a reversible type it can be washed from the interior.

Having a low sill, or perhaps no sill at all, can result in attractive and pleasant space, particularly if the building location enjoys a good view. If space for desks is at a premium, however, the low sill can present problems of furniture placement. The lower light can be of opaque glass to block unpleasant views into the office space from the outside. It is well to remember that some people are overly sensitive to heights, and in a tall building too low a sill might be psychologically disturbing.

Depending on the climate, heat loss will be a factor to reckon with in determining the glass area. One of the examples here shows a glass wall scheme from Mexico, where heat loss is of small consequence. Similarly, excessive glass can mean a great load on the air conditioning system. Glare is always a factor, and leads to a variety of sun control devices, or the simple device of lowering the head of the window and reducing the glass area.

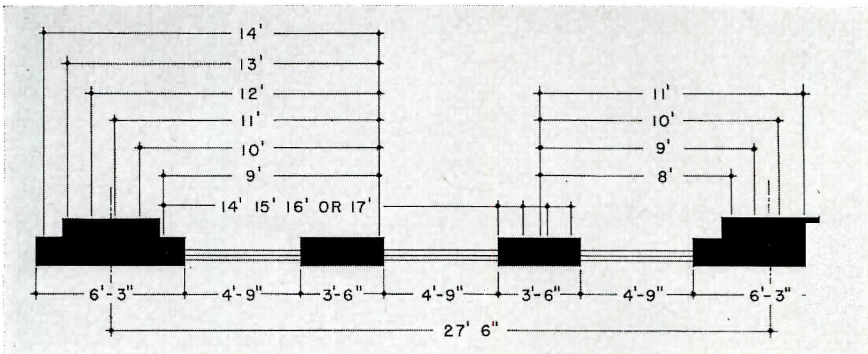
In one of the examples on this page the strip window is quite narrow; this fenestration was used for the Alcoa Building in Davenport, Ia. (Harrison & Abramovitz, page 206), and for the Esso Building in Bayway, N. J. (Lathrop Douglass, page 215). In the first instance it was designed to minimize the heating load; in the other, to provide some vision strip while keeping interior absolutely free for head-high partitioning. In the Alcoa Building the window head is kept down to 7 ft to combat sky glare, the window strip being for vision only, not for daylighting.

It is worth noting that one reason for the popularity of the now-common strip window in New York City is that it can be done quite economically under the building code.

the high rentals asked for new buildings in those days would want to cut up their space into minimum offices. Buildings which could provide 8-ft offices could offer maximum efficiency in the use of space, especially in competition with buildings with column spacing of 10, 12 or 14 ft, these tending to become indivisible modules.

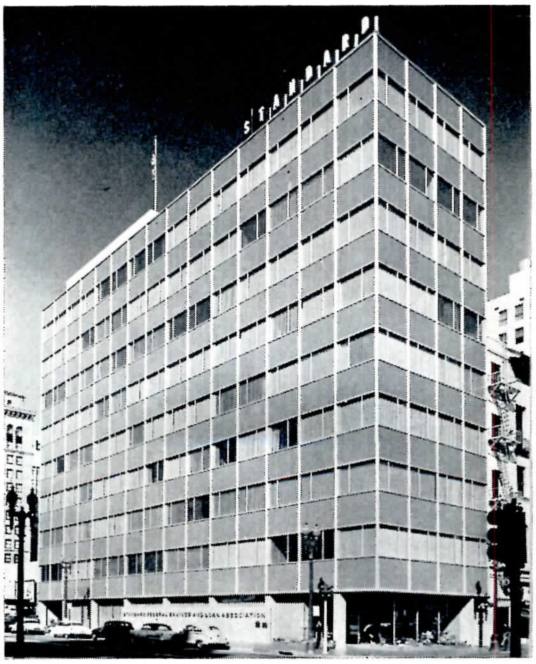
Today it is still agreed that the 8-ft-in-the-clear office is about as small as can be. In the U N Secretariat, with a 4-ft module, the width of partitions takes off just enough so that two modules make the minimum office a trifle small. A great many office buildings have used a 4-ft module, but Harrison & Abramovitz prefer, where a module is appropriate, a larger dimension.

The architectural staffs for Rockefeller Center carried the minimum office idea into a scheme since considered a classic in this regard. The columns are spaced at 27 ft 6 in.; the intervening wall has three windows of the "punched hole" variety, with the width of the window a little greater than that of the piers. The C-to-C module is then about 9 ft, each typical division having one window, and one radiator. The extra dividend, however, comes in the ability to put the partition at any point between windows, so that any given office may have any desired width — 8, 9, 10, 11, 12, 13, 14, 15, 16 or 17 ft (see diagram). Naturally this encroachment on the module must be taken up somewhere, but usually this works out quite easily.

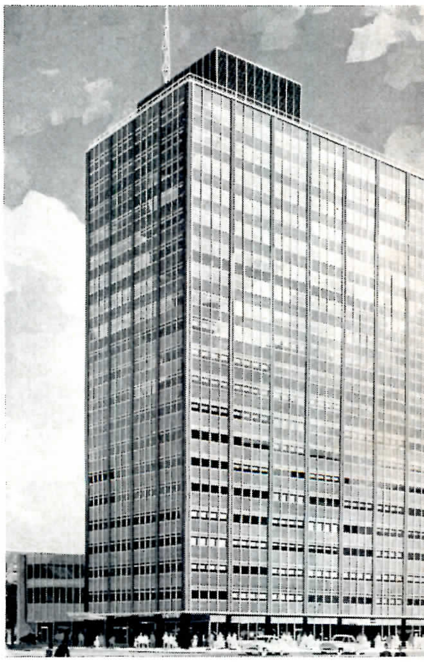


Partitioning possibilities at RCA Building, Rockefeller Center

© Ezra Stoller



Douglas M. Simmonds



Inside column, top: Universal Building, New York City, Kahn and Jacobs, architects; bottom, Lever House, New York City, Skidmore, Owings & Merrill, architects. Above, left: Standard Federal Savings and Loan Association Building, Los Angeles, Welton Becket and Associates, architects; right: Henry C. Beck Building, Shreveport, La., Neild Somdal Associates, architects

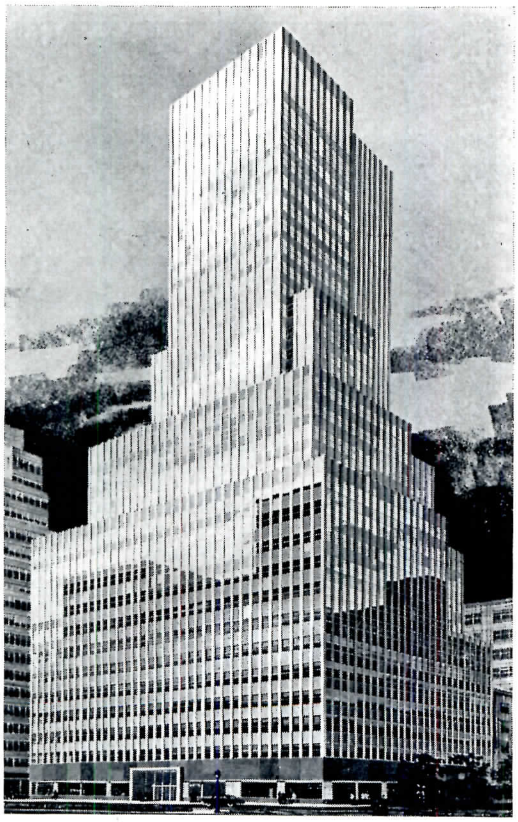
Of course design did not stop dead at the Rockefeller Center scheme, but the flexibility of its space still challenges architects who are called upon to design multi-tenancy buildings for competitive rental markets.

One important development since the twenties is the increasing number of office buildings for single occupancy, most of them away from the pressure of high land values. In such cases, industrial management tends to have its own ideas of office arrangements and dimensions, ranging from no private offices at all, or no windows at all, up to full glass walls and 12-ft office widths. Sometimes it is important for organization and standardization that the company management can enforce a standard width without exception; frequently it is desirable that there be no physical possibility of variation. Thus the discipline of the module might be desirable, and the appropriate module can be based on office requirements.

Technology has wrought many changes also, and architects have experimented with and developed a great many ideas — air conditioning, sunshades, eyebrows and vertical fins, heat resisting glass, new cladding ideas and materials, new structural systems, sometimes using struts in place of columns at the exterior

WINDOW-AND-PIER FENESTRATION — A NEW TREND?

Swoger Studio



Left: Mellon-U. S. Steel Building, Pittsburgh, Pa., Harrison & Abramovitz, William York Cocken, associate architects. Right: proposed office building for Park Avenue, 55th to 56th Streets, for George J. Engler and associates, Kahn and Jacobs, architects

THE window-and-pier group of fenestration ideas enjoys its greatest popularity, of course, for multi-tenancy buildings, though it is well not to forget that sometimes a single-occupancy building is really in that class, since its use of space may be fully as varied as in the rental building. The number of recent buildings falling in this fenestration class might be taken as an indication of increasing popularity. It would probably be overdoing it to call this a return to traditional punched-hole window treatment, but it certainly indicates a consciousness of wall space between windows as providing flexibility within.

In this type of window solution, the column spacing is not always as traditional as the fenestration. Two of the buildings here illustrated have column spacing of about 28 feet, one with five windows to the bay, one with four.

The wall spaces are not necessarily uniform, some piers being quite wide, some being little more than wide mullions.

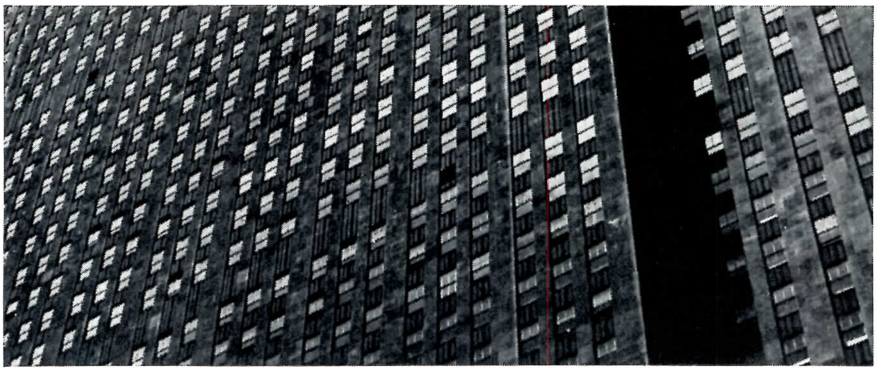
Sills tend to run, in these buildings, to the normal height, for naturally if the planners are seeking maximum use of space they will be conscious of the usefulness of space close to the windows. In some buildings, nevertheless, the window might have a high head and a low sill, perhaps where views are good and weather not too insistent a factor (Havana Embassy, page 205). It has been suggested that this type of window might be used also where daylighting was not the principal purpose, but rather merely vision outward. The idea seems conducive also to pleasant proportions and wall textures.

wall, sometimes with cantilevers, new ideas about site development and setbacks, improved lighting, and so on, not to mention new developments in the realm of esthetics. Any or all of these may introduce new disciplines affecting the fenestration.

As for the discipline of space, contemporary fenestration seems to divide into two general groups. One group includes the many variations of the glass wall or the continuous band of windows. The other group is, of course, the alternate window and wall system, no matter what kind of wall.

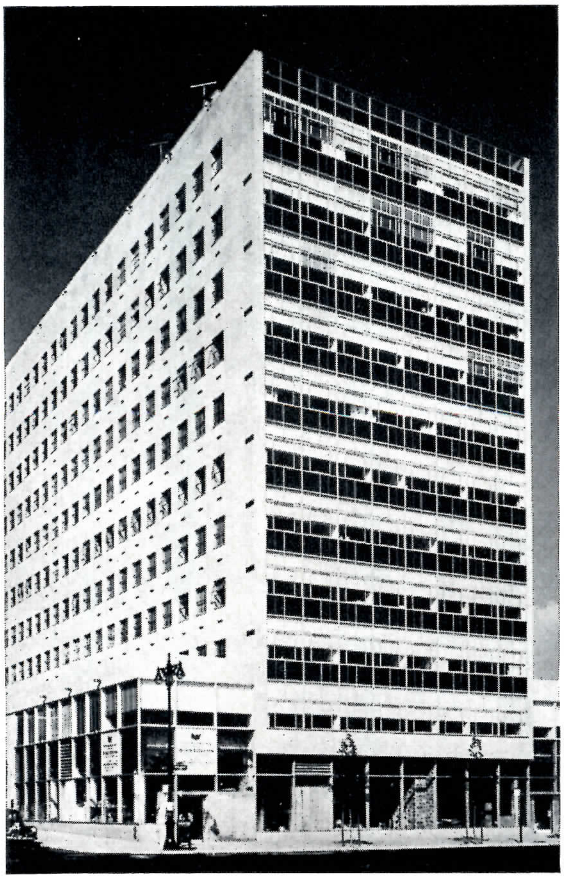
Spacewise, the essential difference between the two groups lies in the rigidity of the module, assuming that any partitioning is done only at a mullion or some other interruption to the glass.

One other idea, mentioned a bit tentatively by Mr. Abramovitz, is that one might begin thinking more of different fenestrations on different exposures of the same building. This would certainly seem logical where orientation is a factor on four sides of a building. Of course nobody claims there is anything new about this idea, but it would seem that it might be much further developed than it has normally been. It would seem, too — and perhaps this is as important as orientation — that it would produce some handsome and interesting architecture.



Samuel Chamberlain

Fenestration of RCA Building, Rockefeller Center; Reinhard & Hofmeister; Corbett, Harrison and MacMurray; Hood and Fouilhoux, architects



Jay-Bee Studio

Above: Sinclair Building, Chicago; Holabird & Root & Burgee, architects. Right: Carnegie Endowment for International Peace Center, New York City; Harrison & Abramovitz, Goldstone & Abbe, architects. Far right: Alcoa Building, Pittsburgh, Pa.; Harrison & Abramovitz, Altenhof & Bown; Mitchell & Ritchey, associated architects

Beginning a series of one-page presentations of office buildings, with text notes on fenestration problems supplied by the architects themselves — six by Harrison & Abramovitz, two each by Carson & Lundin; Skidmore, Owings & Merrill; and Lathrop Douglass

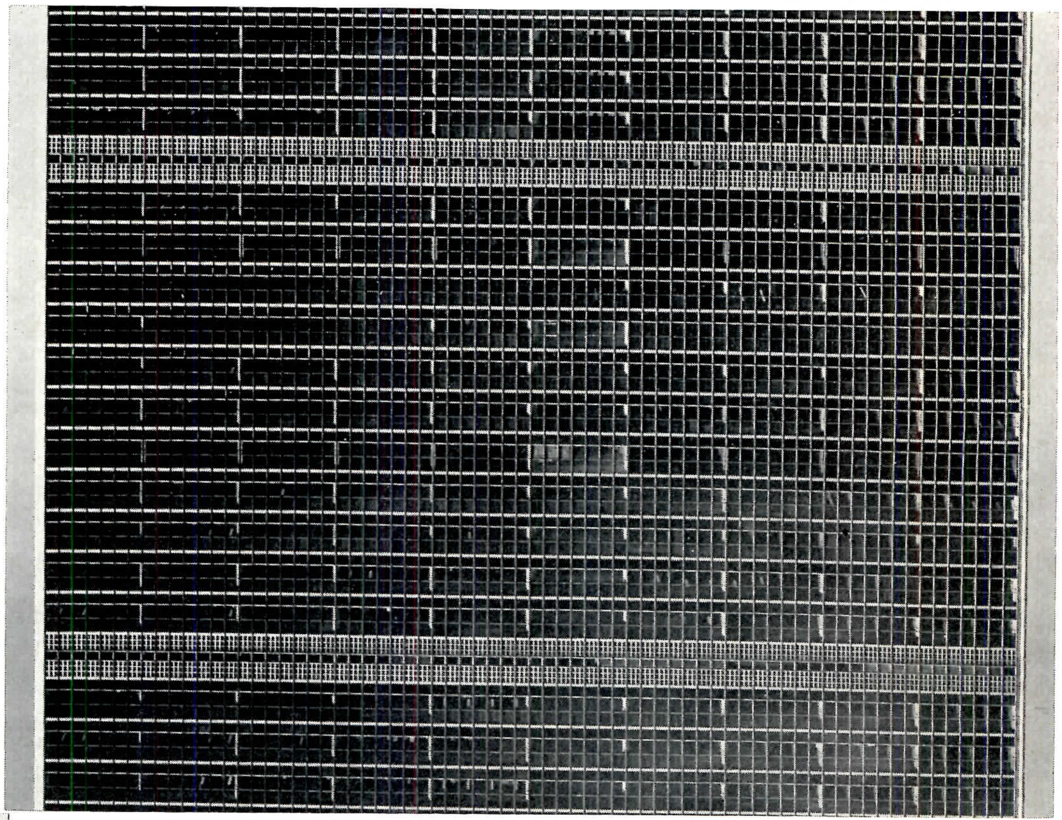
UNITED NATIONS SECRETARIAT

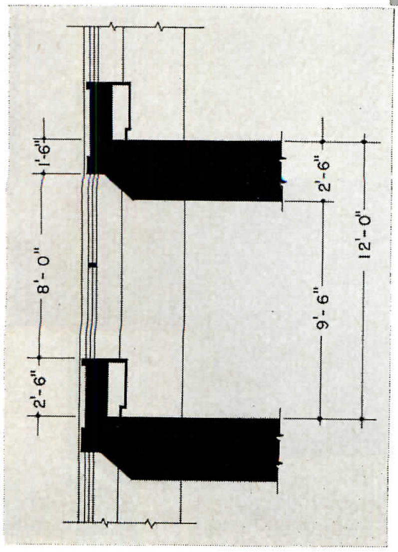
New York City

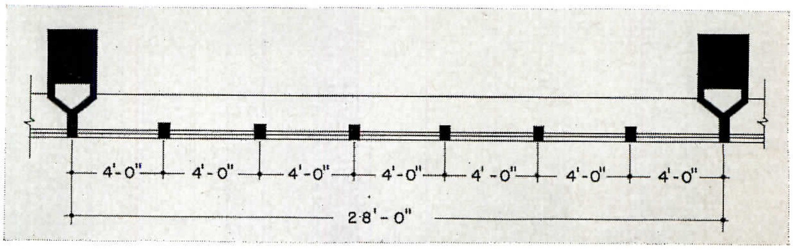
Wallace K. Harrison, Director of Planning

Herein the glass and metal facade was developed in an office building with the elimination of all piers on the exterior and its column spacing wider than that at Rockefeller Center to become 28 ft 0 in. A double hung window was used and made of aluminum, designed to a 4-ft module thought best at that time. Since then, we feel that the 4-ft module when doubled produces an office less than 8 ft after partitioning and that is considered too small an office for standard furniture. Sill heights were 2 ft 6 in. The head of the window was at the spandrel line but made to fit the grid. Columns were placed at the inside of the wall. The spandrel was for the first time completely covered by glass, back up was still of masonry due to the prevailing N.Y.C. code. Glass was chosen for economical reasons as well as appearance. The reversible window had not yet been fully developed and tested. Floor to floor height 12 ft 0 in.

Joseph W. Molitor





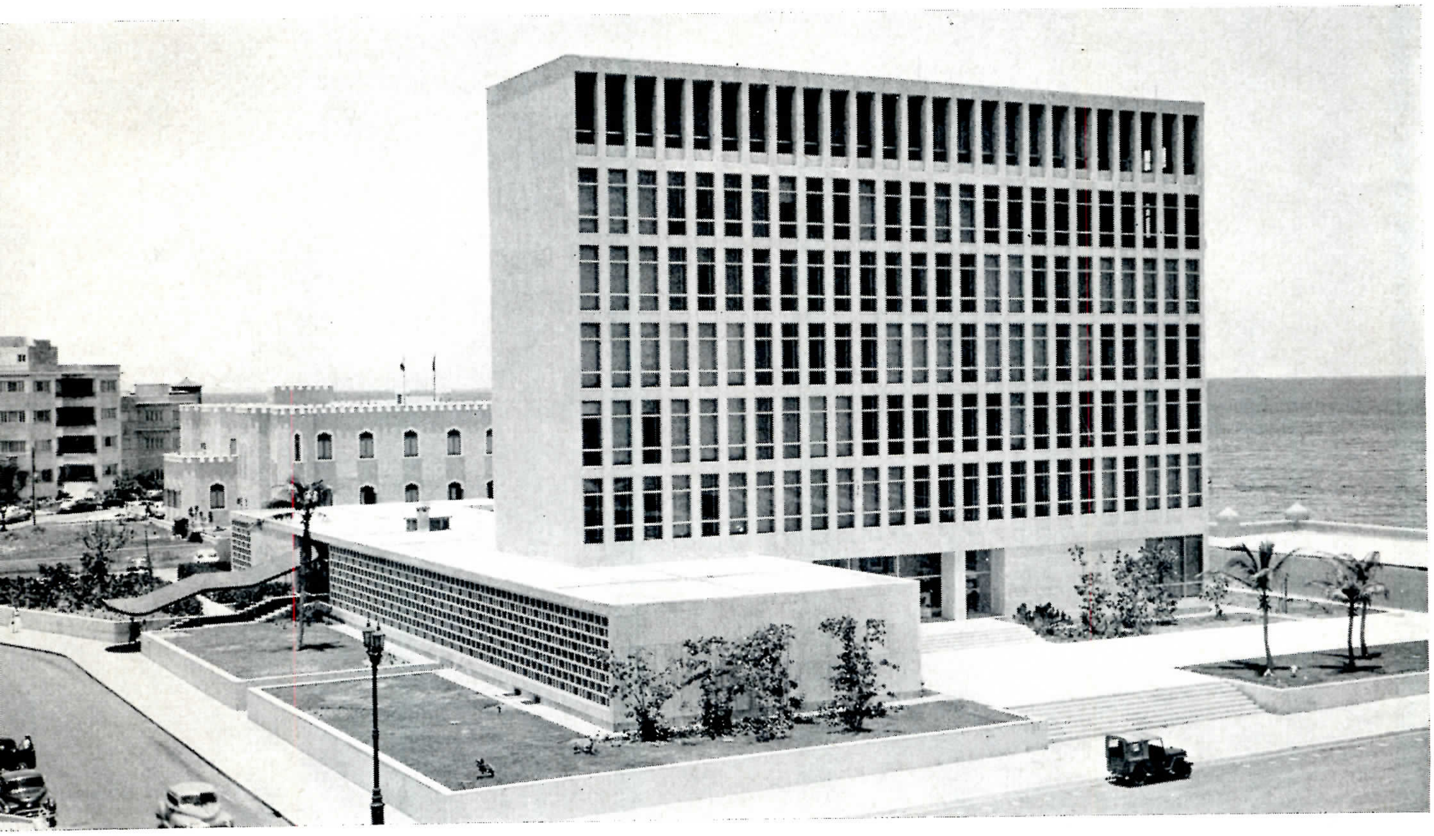


U. S. EMBASSY BUILDING

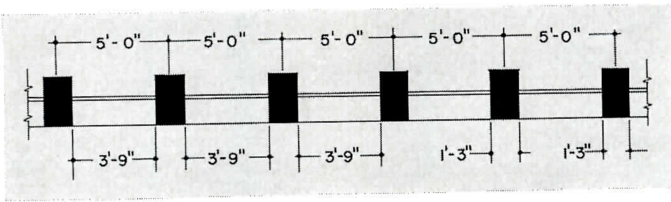
Havana, Cuba

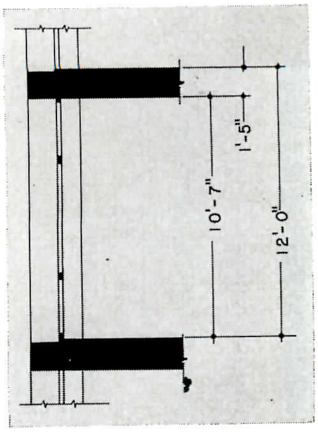
Harrison & Abramovitz, Architects

The office building tower of this building was oriented favorably and the narrow end walls made solid against undesirable sun and weather. Since cold is not a factor, and the view very attractive, maximum window space was sought for. Here windows start just above the floor and go to ceiling. The small piers between windows in the scheme were the result of a structural system which eliminated interior columns and floors were supported by small concrete piers faced with travertine on the outer walls. The building is air conditioned, but window parts are moveable to take advantage of fair weather when air conditioning system is to be shut off. The small structural pier system permitted a uniform interior wall free of protruding columns. Floor to floor height is 12 ft 0 in.



J. Alex Langley



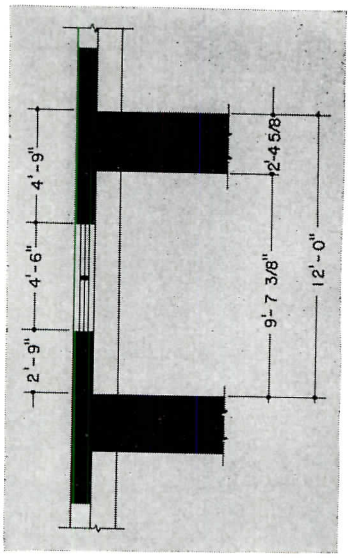


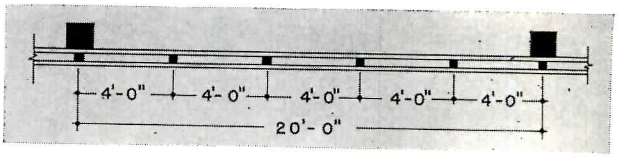
ALCOA ADMINISTRATION BUILDING

Davenport, Ia.

Harrison & Abramovitz, Architects

THIS was one of the first serious attempts at an all aluminum facade for an office building. The exterior was cast aluminum. Since this was a factory office building with few private offices and in a part of the country that has severe extremes in climate, the end result was a continuous window for the maximum effect on the open space within but the window height was kept to a minimum. The sill at 2 ft 9 in., the head at 7 ft 3 in., produces a window of 4 ft 6 in. in height. This controlled height of window has reduced sky glare and permitted the use of a radiant heating wall and ceiling system, the elimination of wall units and the capability of placing desks very close to the walls. The column spacing was 20 ft o.c., windows 4 ft on center. Floor to floor height is 12 ft.

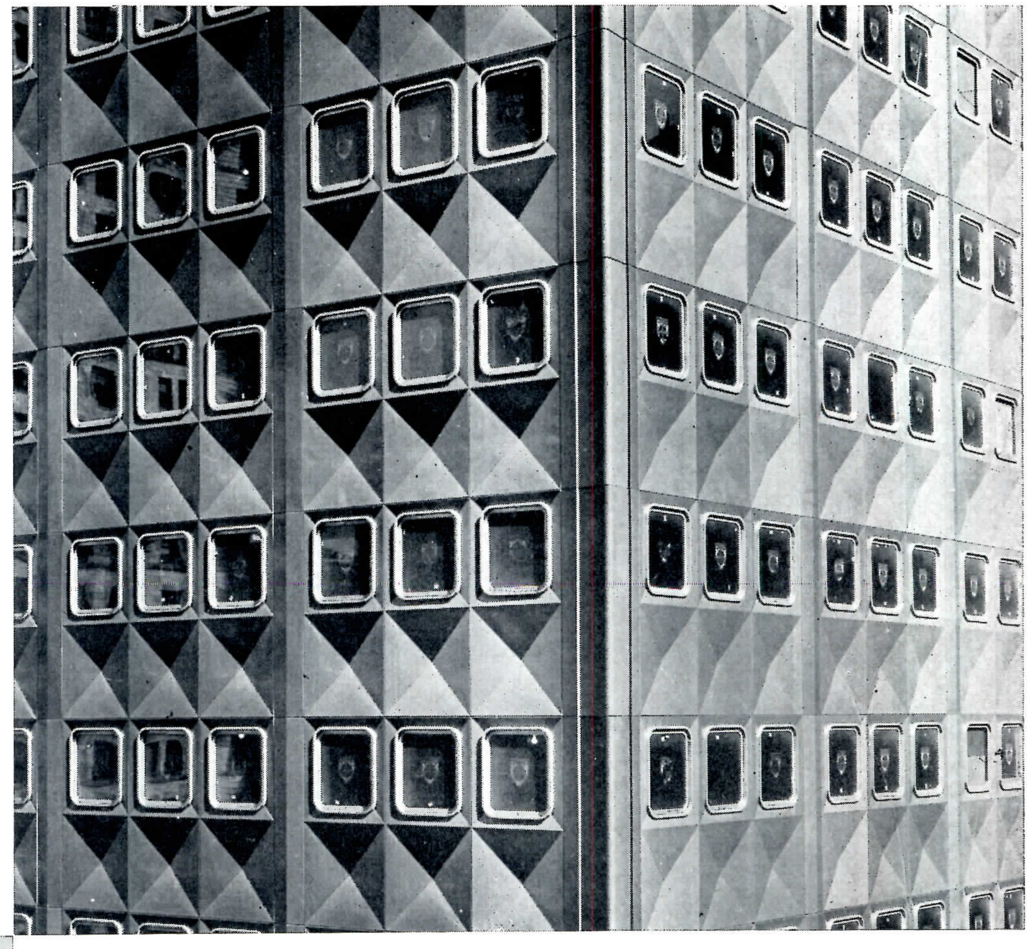


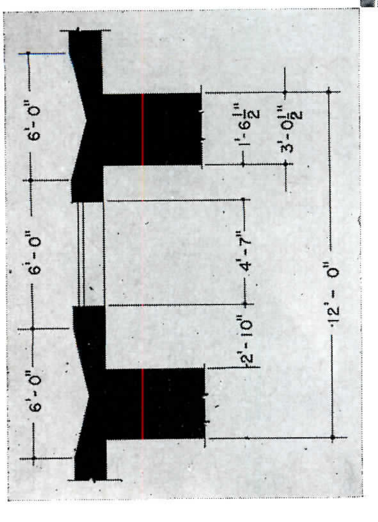


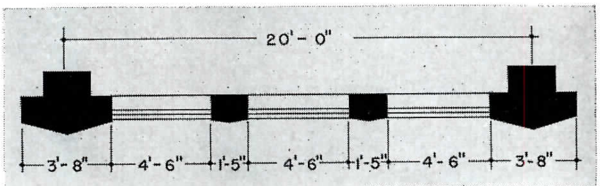
ALCOA BUILDING, ***Pittsburgh, Pa.***

Harrison & Abramovitz, Altenhof & Bown, Mitchell & Ritchey, Associated Architects

THE owners were desirous of developing a weather-tight, maintenance building using the maximum amount of metal economically with reasonable and sensible consideration for the use of natural light. It was their conviction that aluminum had the potential and from there the program developed. The building was to be designed for office space of varying office sizes. The windows developed had a head of 7 ft 5 in., slightly more than that successfully experienced on the earlier office building in Davenport for Alcoa. The sill is 2-ft 10-in. high. The search for a window capable of being cleaned from the inside developed the first completely and now popular reversible or pivoted window. In order to develop a thin wall within modern progressive building codes wherein requirements are controlled by performance standards instead of fixed materials or thickness standards our research produced a metal skin backed up by a thin layer of perlite with the proper fire rating. Window heating and cooling units on the outer wall were eliminated to produce maximum floor space. The air conditioning system in this instance developed into a combination radiant heating and cooling system in the ceiling. Floor to floor height is 12 ft 0 in.





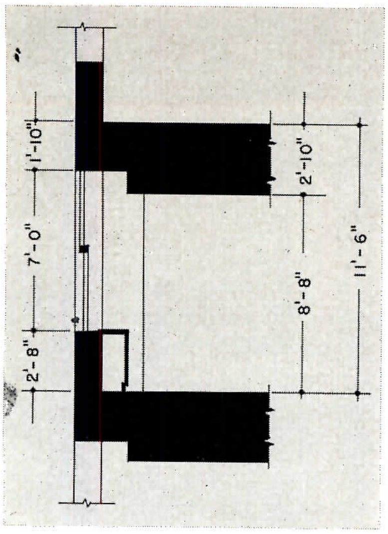


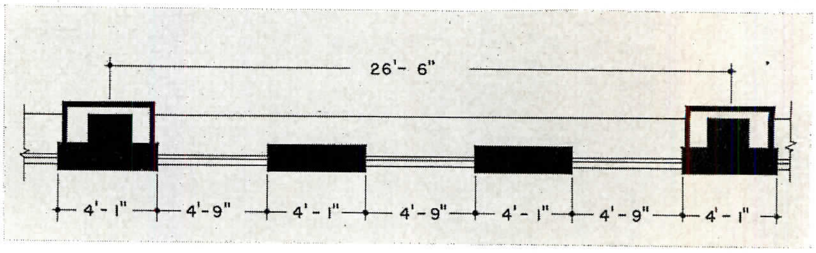
U. S. RUBBER COMPANY BUILDING EAST

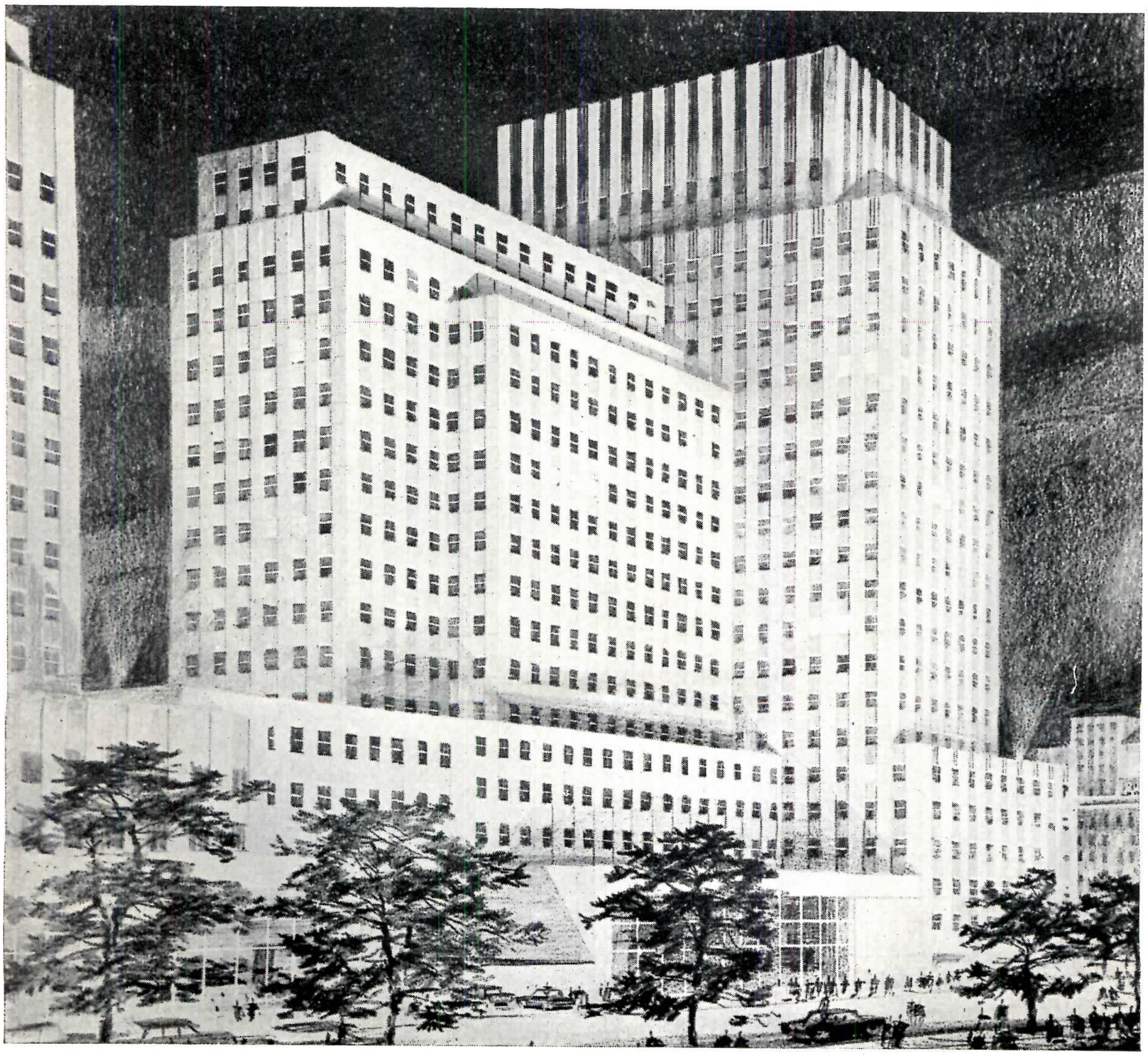
Rockefeller Center, New York City

Harrison & Abramovitz, Architects

THE addition to the U. S. Rubber Building now under construction carries out the original window spacing of Rockefeller Center which is essentially a 4 ft 9 in. window with a 4 ft 1 in. pier within column spacing of 26 ft 6 in. It has continued to prove successful in Rockefeller Center since it creates one of the greatest number of different office sizes for the numerous different tenants of different room requirements. Floor to floor height is 11 ft 6 in. with air conditioning — 12 ft 0 in. is now desirable.







MELLON-U. S. STEEL BUILDING

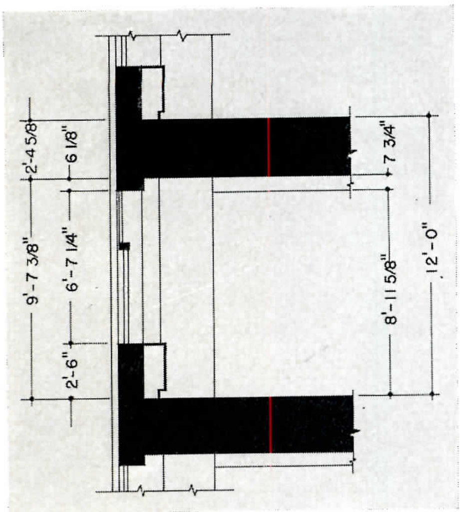
Pittsburgh, Pa.

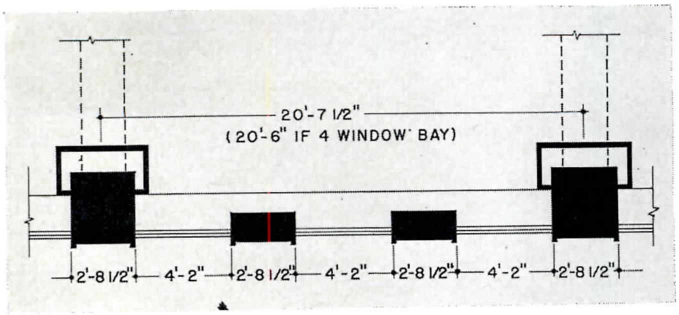
Harrison & Abramovitz,

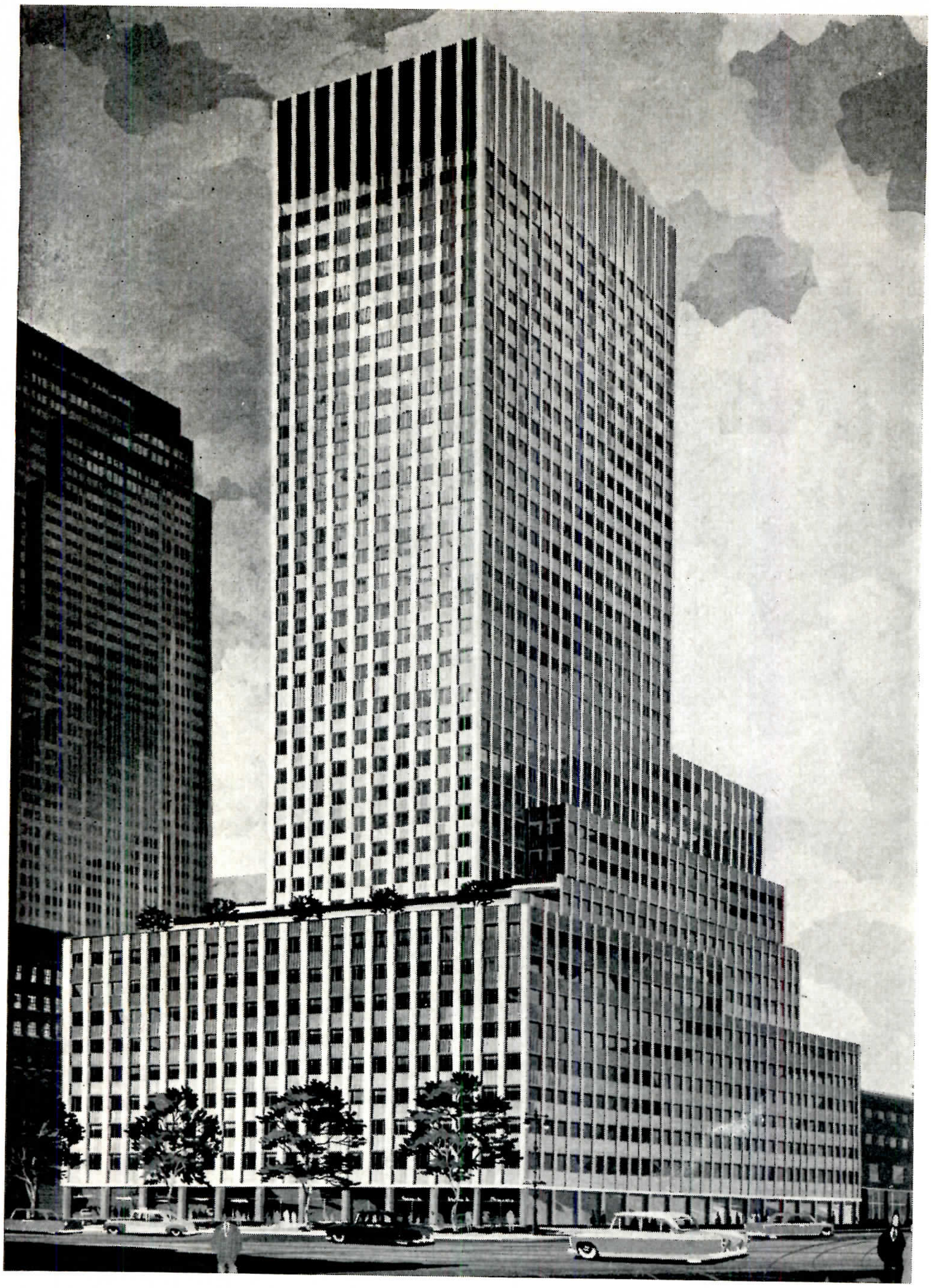
William York Cocken, Architects

HEREIN the user — U. S. Steel — set up a requirement of 14 ft and 21 ft offices, i.e., a 7 ft 0 in. module with windows 4 ft 2 in. and the remainder of solid wall. Windows were double hung with the top member fixed, locked, but lower member can be opened for cleaning purposes. This building was planned before the pivoted window had been fully developed. The sill was at 2 ft 6 in. high. Floor to floor height is 12 ft 0 in.

Swoger Studio







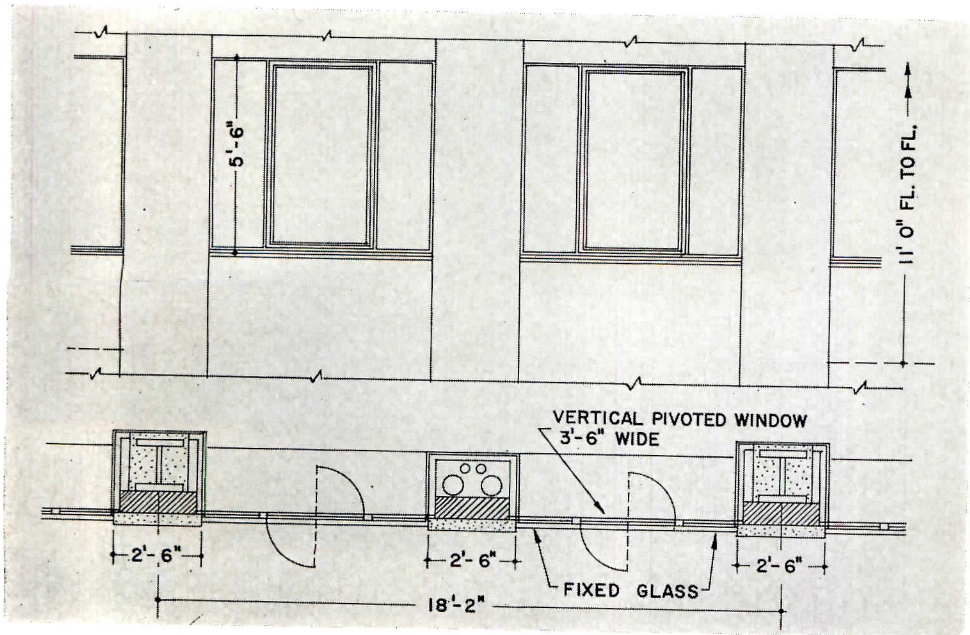
NEW BUILDING FOR TISHMAN

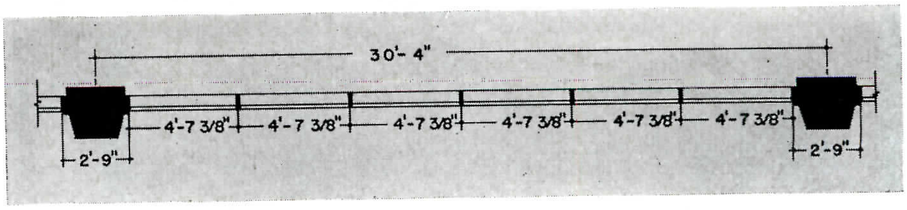
666 Fifth Avenue

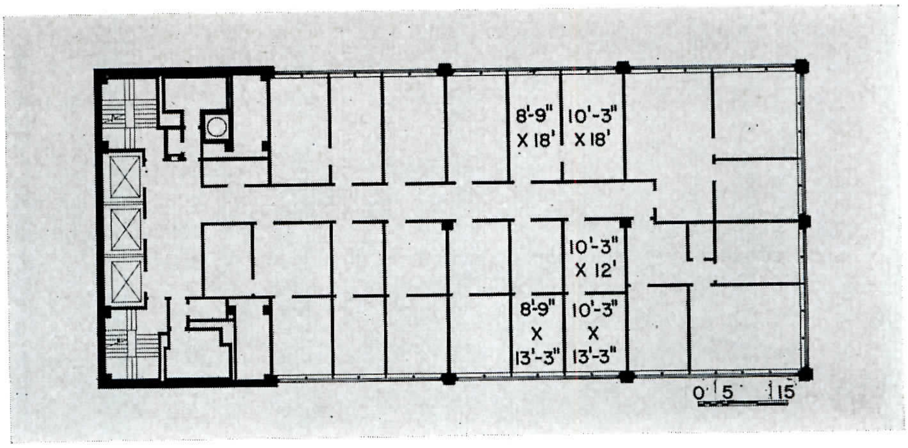
New York City

Carson & Lundin, Architects

Close proximity of this new building for the Tishman interests to Rockefeller Center seemed to suggest a certain harmony with the Center fenestration, but there was a definite desire to have larger glass areas, along with flexibility in partitioning of space. The scheme alternates six-foot windows with two-foot-six-inch piers, so that a considerable variety of office dimensions can be obtained. Windows, which are 5 ft 6 in. high, will have two narrow fixed sash and a center section pivoted vertically, so that all window washing can be done from the inside. Column spacing is kept to from 17 to 18 ft, in order to keep floor to floor height to 11 ft, with air conditioning as a factor.







OFFICE BUILDING FOR A SOUTHERN CITY

Carson & Lundin, Architects

THE client for this proposed office building wanted to be able to offer some deep space, some shallow, with a variety of office widths, a set of requirements which has probably been heard of before this. As the plan shows, the scheme provides for one row of offices at normal 25 ft depth, one row at only 18 feet. The window module is approximately 4½ ft, with a column adding about 2 ft to vary the office width wherever columns occur. Typical offices are around 8 ft 9 in. wide, with some 10 ft 3 in., or, of course, larger by any added number of modules. Column spacing is 26 or 30 ft, and all columns are kept outside the building. Notice that there are only two interior columns in the whole rental area.

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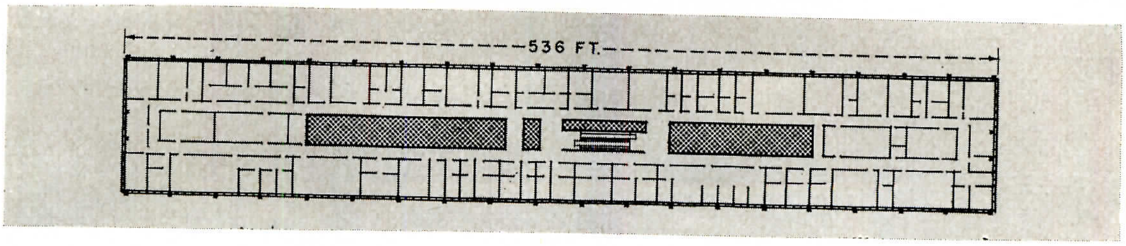


TWO NEW OFFICE BUILDINGS BY SKIDMORE, OWINGS & MERRILL, ARCH.

Administrative Headquarters, Ford Motor Company, Dearborn, Mich.
Connecticut General Life Insurance Company Building, Bloomfield, Conn.

THE fenestration of the two buildings considered here clearly reflects the very different purposes for which they have been designed.

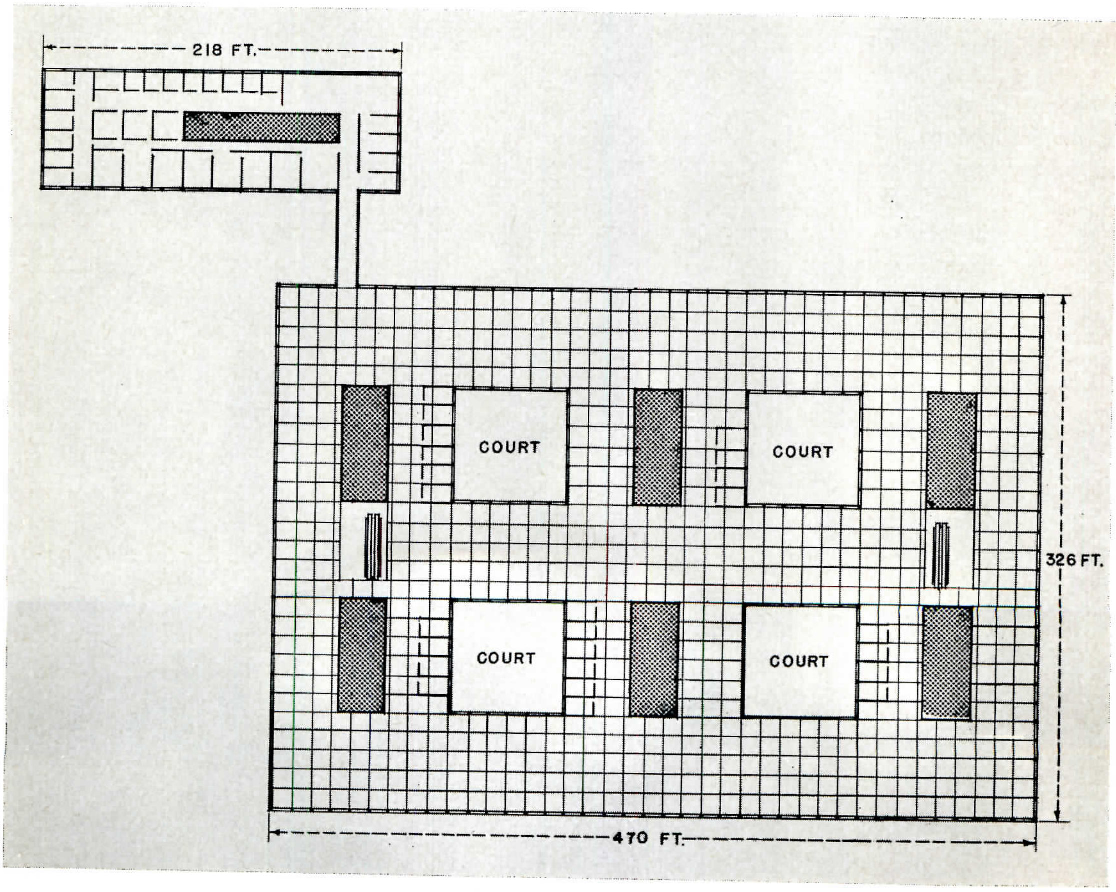
The Administrative Headquarters for the Ford Motor Company, now under construction in Dearborn, is primarily planned for accommodation of the executive functions of the company with intensive subdivision into private offices.

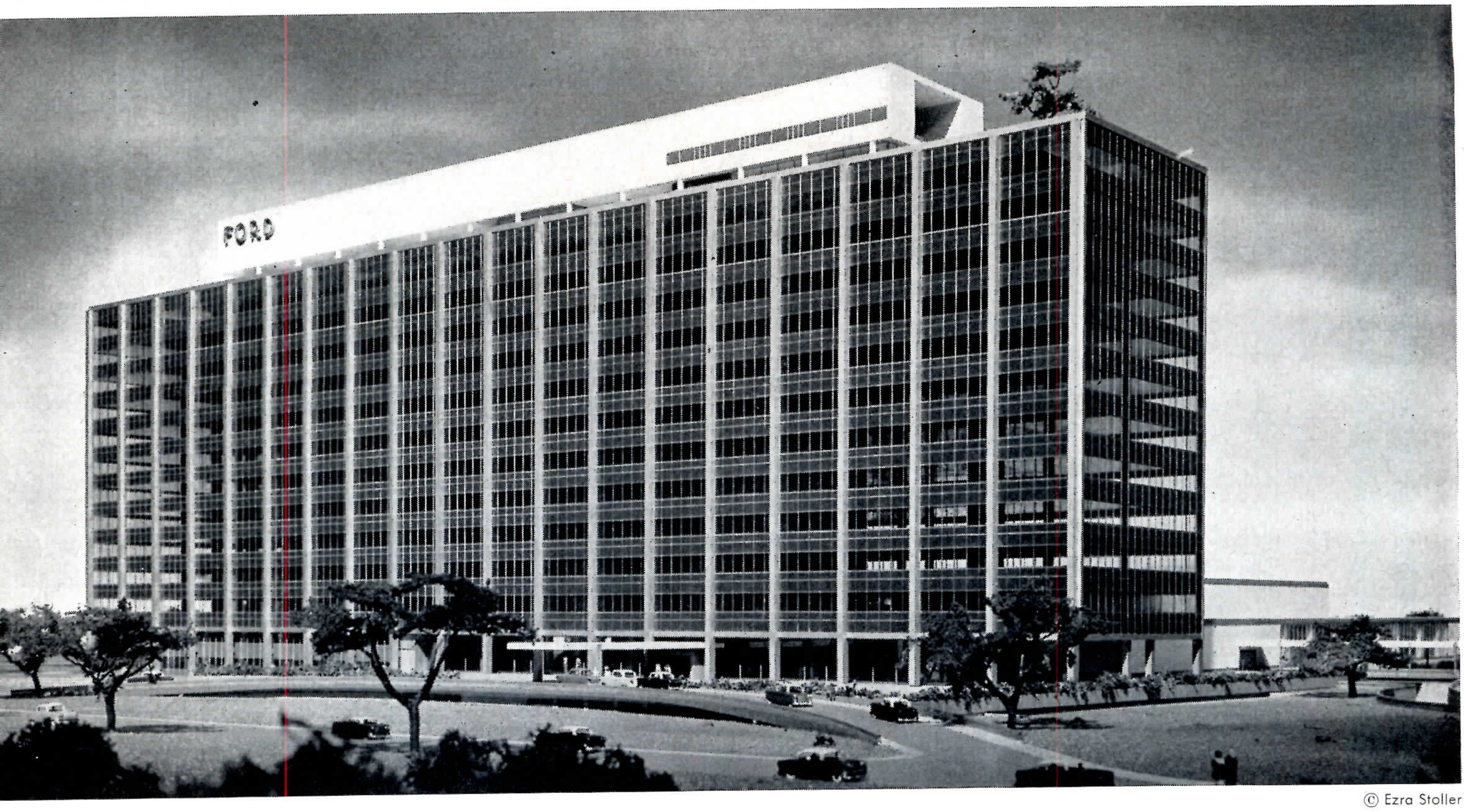
The design of the Home Office Plant for Connecticut General, now being built outside of Hartford, has been largely determined by requirements of large clerical groups whose functions demand flexibility in departmental arrangement and freedom in adjustment of inter-relationships. Little need for private offices or other subdivided space, therefore, exists on these floors.

Both buildings have been designed for full air conditioning with fixed glass. Both sites are large and every reason exists for providing full visual access to the green lawns and trees that will surround them.

Framing and windows of the Ford Motor Company headquarters are governed throughout by a 4-ft 8-in. module, providing optimum spacing for private office subdivision. Since such requirements are very limited in Connecticut General's main building, advantage has been taken of maximum glass sizes based on divisions 12 ft on centers. Spacing in one wing, however, where more intensive subdivision will be required, is reduced to 6 ft. The difference between this relatively generous basis for partition layout and Ford's closer 4-ft 8-in. module reflects somewhat larger standards for top level offices generally accepted in insurance practice.

In the Ford Building, columns 28 ft on centers are located outside the exterior line of the building's skin to preserve a smooth interior surface. Columns in Connecticut General's Building are located only in exterior walls 12 ft on centers, spanning up to 60 ft over work areas. These smaller columns can therefore be absorbed in the depth of the wall and serve as mullions.





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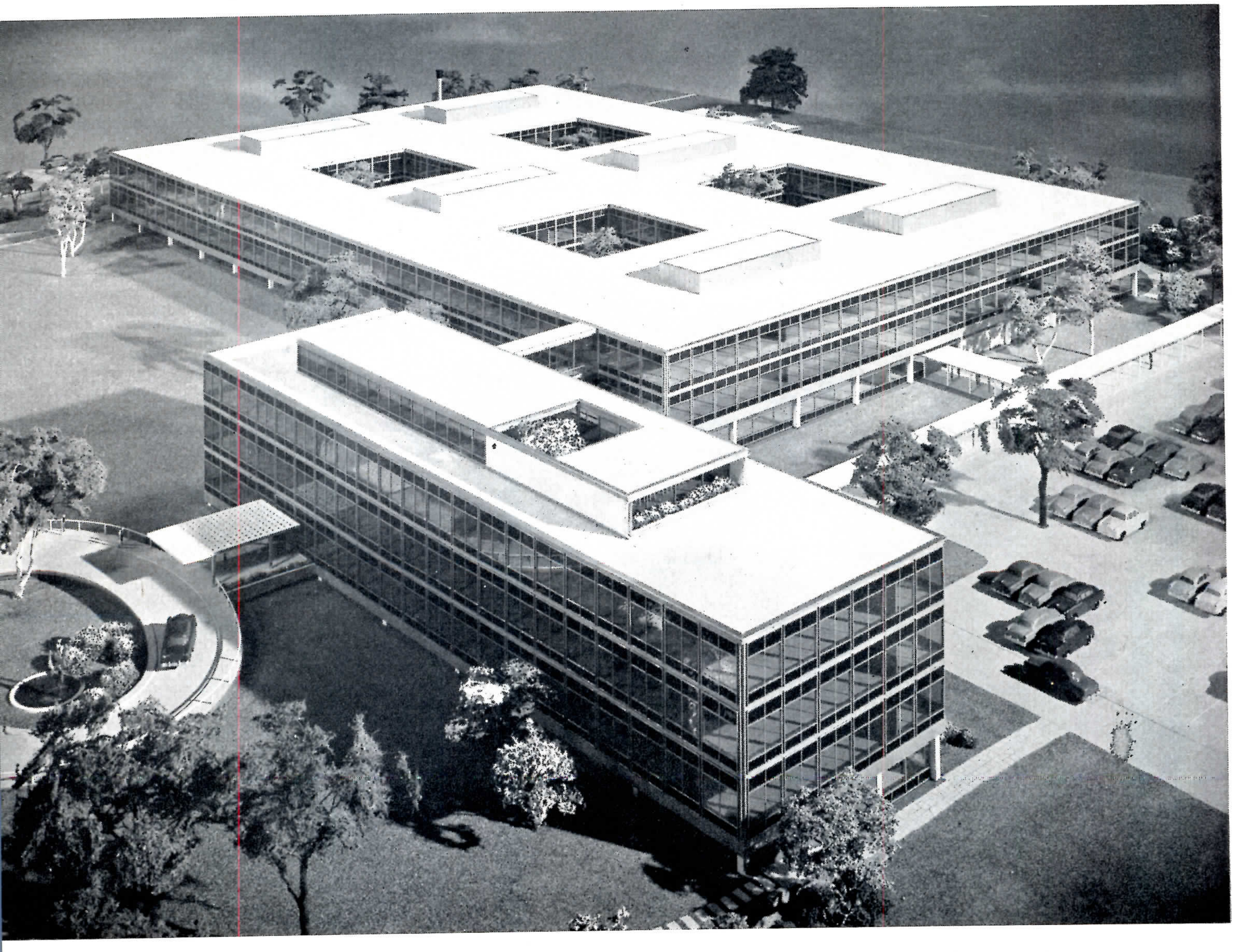
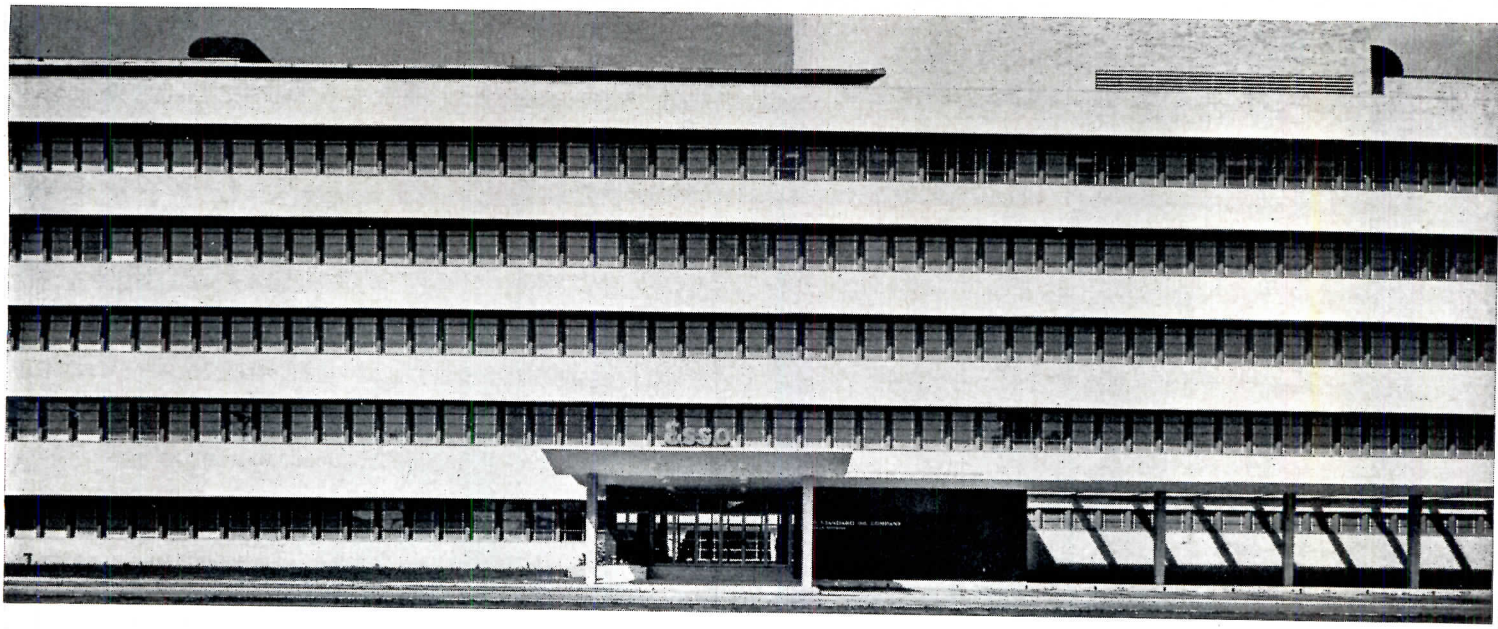




Gottscho-Schleisner

ESSO STANDARD OIL COMPANY

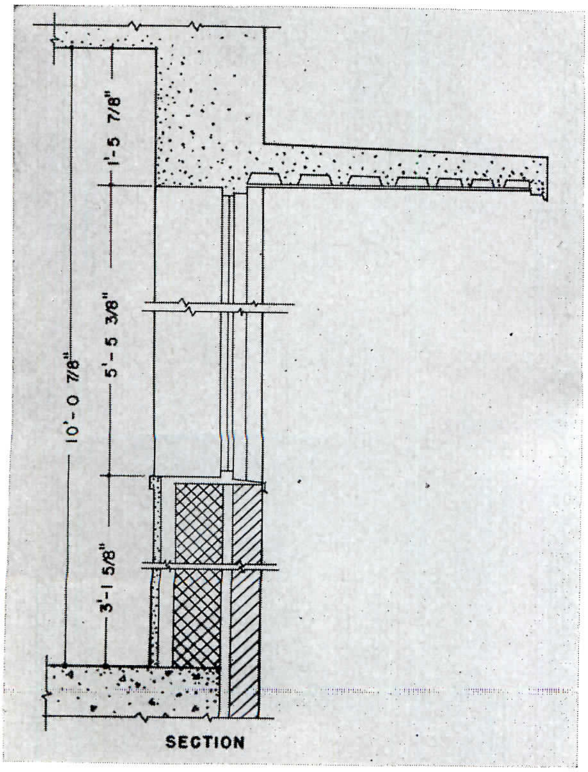
Baton Rouge, Louisiana

Lathrop Douglass, Architect

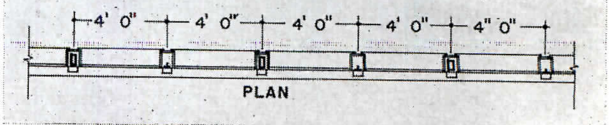
Carson & Lundin, Associate Architects

PROBLEM: Provision had to be made for a large amount of space devoted to engineering departments. In past, these had been inefficiently crowded into bull pens. Criteria for the new building called for maximum privacy. Minimum engineering office for one man was set at 8 ft; minimum for two, 12 ft. This indicated a module of 4 ft which was adhered to in every facility in the building. Because of constant changes in departmental requirements, maximum flexibility was mandatory, with minimum time loss in changes, together with complete standardization of facilities for each category of employee.

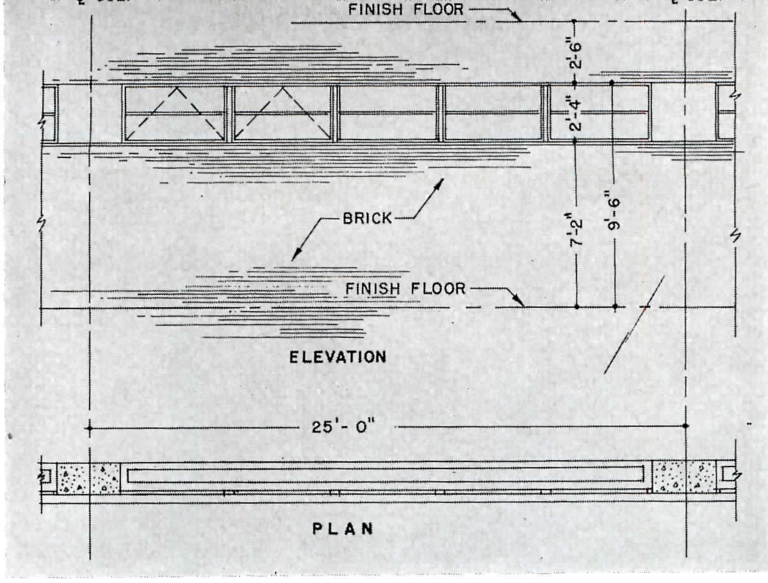
SOLUTION: Four-ft module windows; no projecting and obstructing columns in exterior walls, achieved by use of channels imbedded in alternate mullions; 4-ft module ceiling duct heating and cooling so no radiators or pipes in exterior wall; 8-in. window mullions, plastered and flush with plastered exterior wall so that standard module movable partitions could be set against mullion at any 4-ft point with ease and with every space unobstructed and identical in dimensions. The windows after much study were made openable for economical washing but with handles removed to avoid opening by others than maintenance staff. Employees now wash exterior, however, while standing on the sun canopies not originally designed for this purpose; this permits exterior washing without opening windows and disturbing sash.



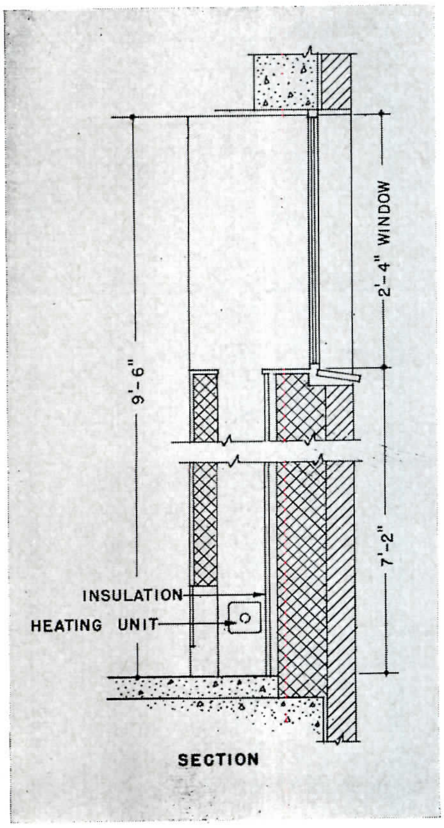
SECTION

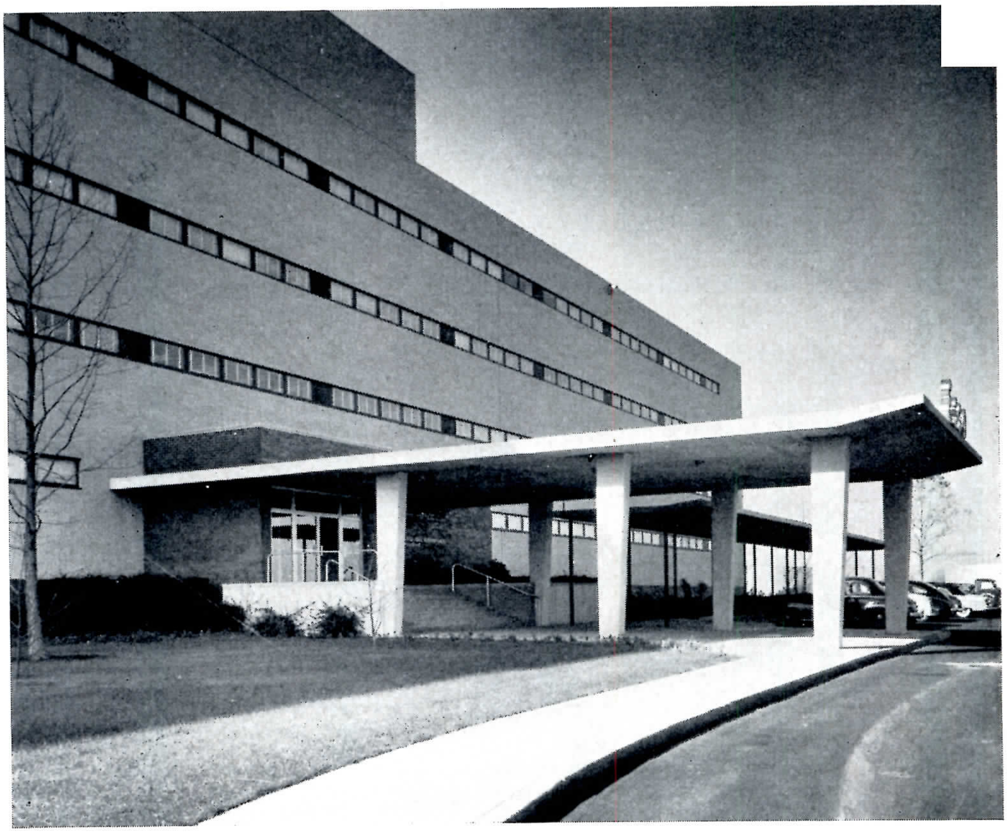


PLAN



Gottscho-Schleisner



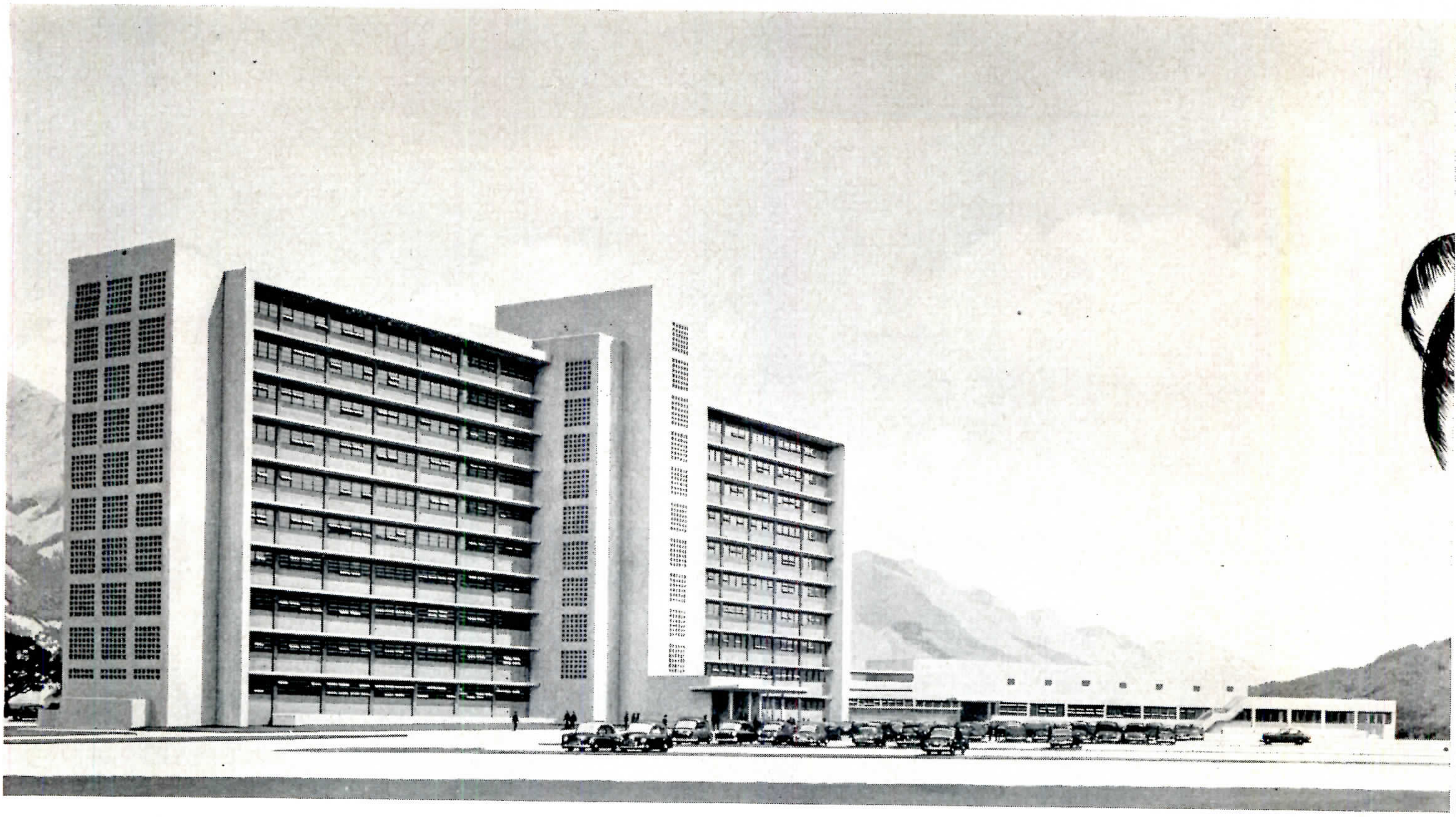


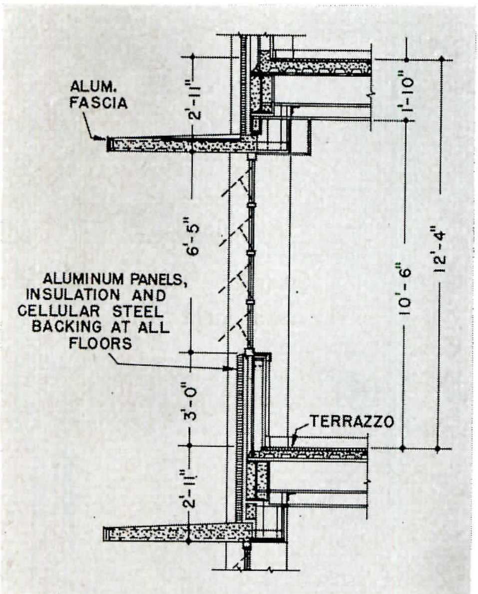
ESSO STANDARD OIL COMPANY, ***Bayway, N. J.***

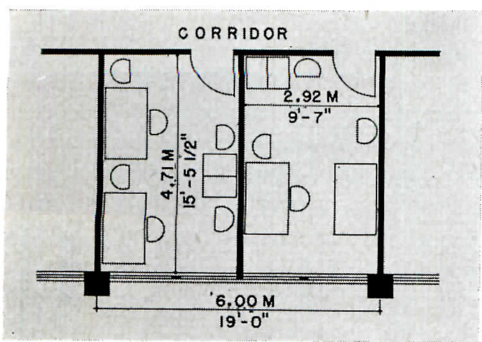
Lathrop Douglass, Architect

PROBLEM: Again a large part of the building had to contain engineering groups. Experience in Baton Rouge indicated that private offices greatly upped employee efficiency but that supervision and collaborative group action were hampered. Program therefore called for privacy, supervision and encouragement of collaborative action, all on basis of 80 sq ft maximum per person.

SOLUTION: Use of functional furniture, i.e., 6-ft high movable partitions, semi-private offices with no doors and separated into intercommunicating groups of 6 to 12 engineers. This set-up on one side of the building corridor, typical private offices on opposite side. As offices for economy had to be at least 4 offices deep (transverse to building axis), the windows on the functional furniture side were set with sills 6 ft 6 in. above floor; columns were made rectangular with long axis parallel to exterior wall. Convectors were set behind a 6 ft 6 in. plastered panel reaching to the window sills (a radiant panel in reality). Thus the entire exterior wall is smooth, flush and capable of taking the furniture literally at any point without complications due to windows, columns or radiators, or without causing one man to have more heat or light than another. Windows are openable for washing only.







CREOLE PETROLEUM CORPORATION

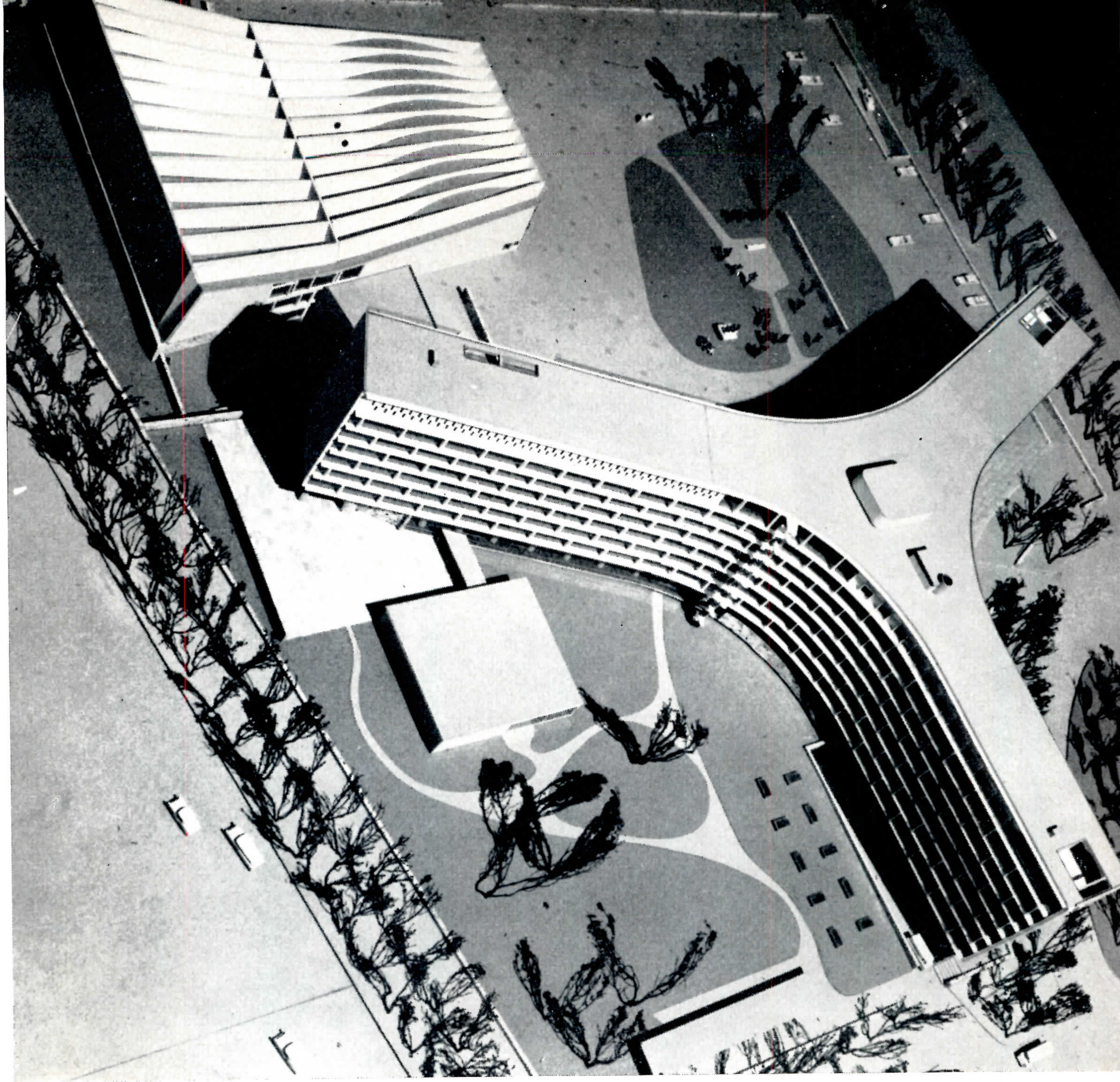
Caracas, Venezuela

Lathrop Douglass, Architect

PROBLEM: Maximum standardization of facilities, avoidance of sun heat, unobtrusive earthquake bracing.

SOLUTION: All offices face north or south. Because of the 12 degree latitude it was possible to provide cantilevered overhangs in sun canopies keeping sun out of windows all hours of the day, every day in the year.

Four equal sized windows placed between 20-ft center to center exterior columns. A deliberate effort was made by this means to force a standardization of only two office sizes, 10 ft for typical, 20 ft for department heads and management (to minimize staff jealousies, etc.). A 15-ft office would be impossible, and the nearest to it could not be made without ordering special panels for the movable metal partitions. Columns had to project beyond the wall both inside and outside because of required earthquake connection details. Diagonal steel earthquake bracing set in hollow aluminum faced spandrel panels. Sash to ceiling and 100 per cent openable awning type to provide maximum ventilation and rain protection when open. Unglazed open camboge in lieu of windows at east and west end of building where sun is blocked from offices by stairs and toilets and glazing is unnecessary.



UNESCO

HEADQUARTERS DESIGN MODIFIED FOR BUILDING

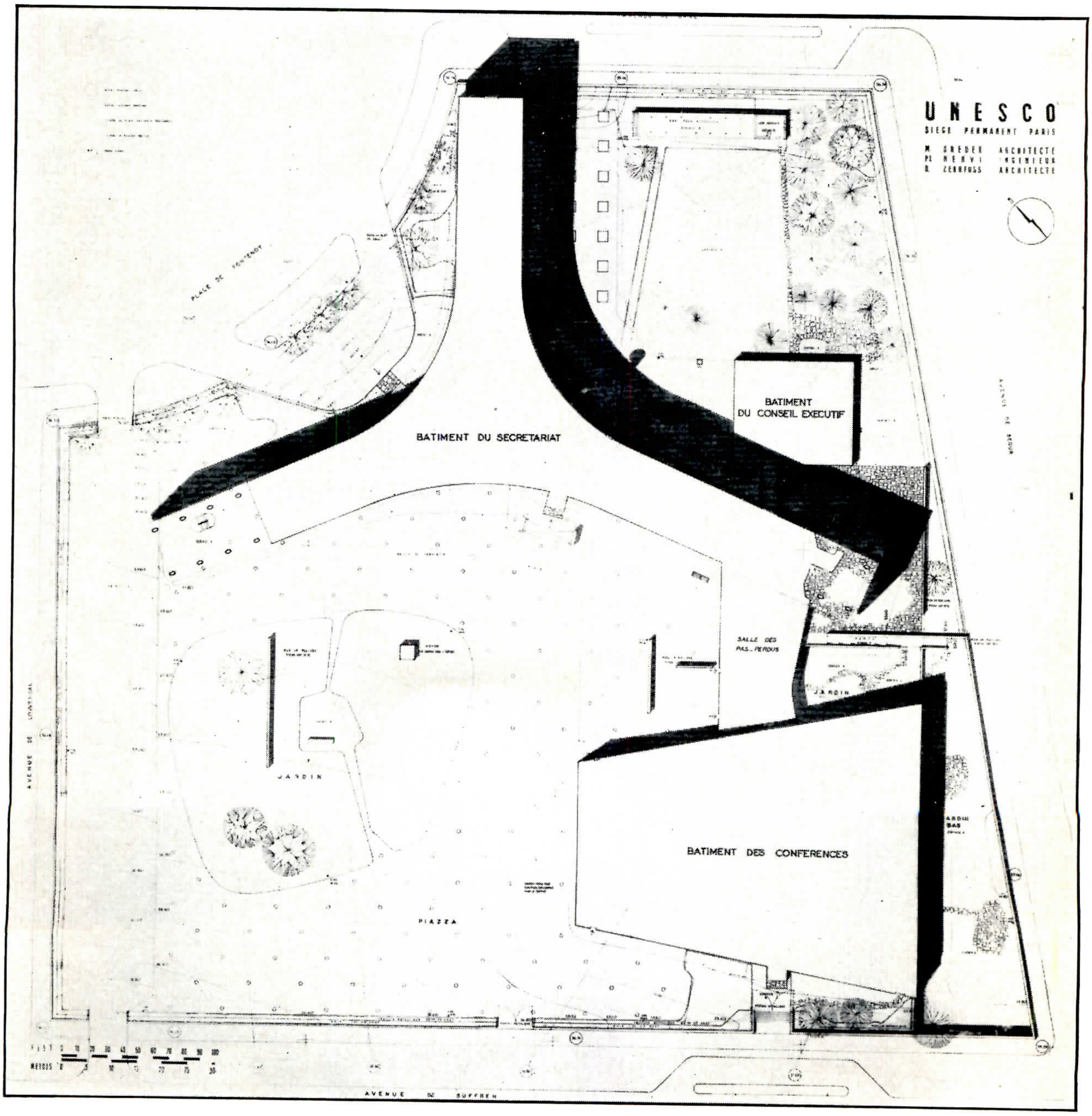
Place de Fontenoy, Paris

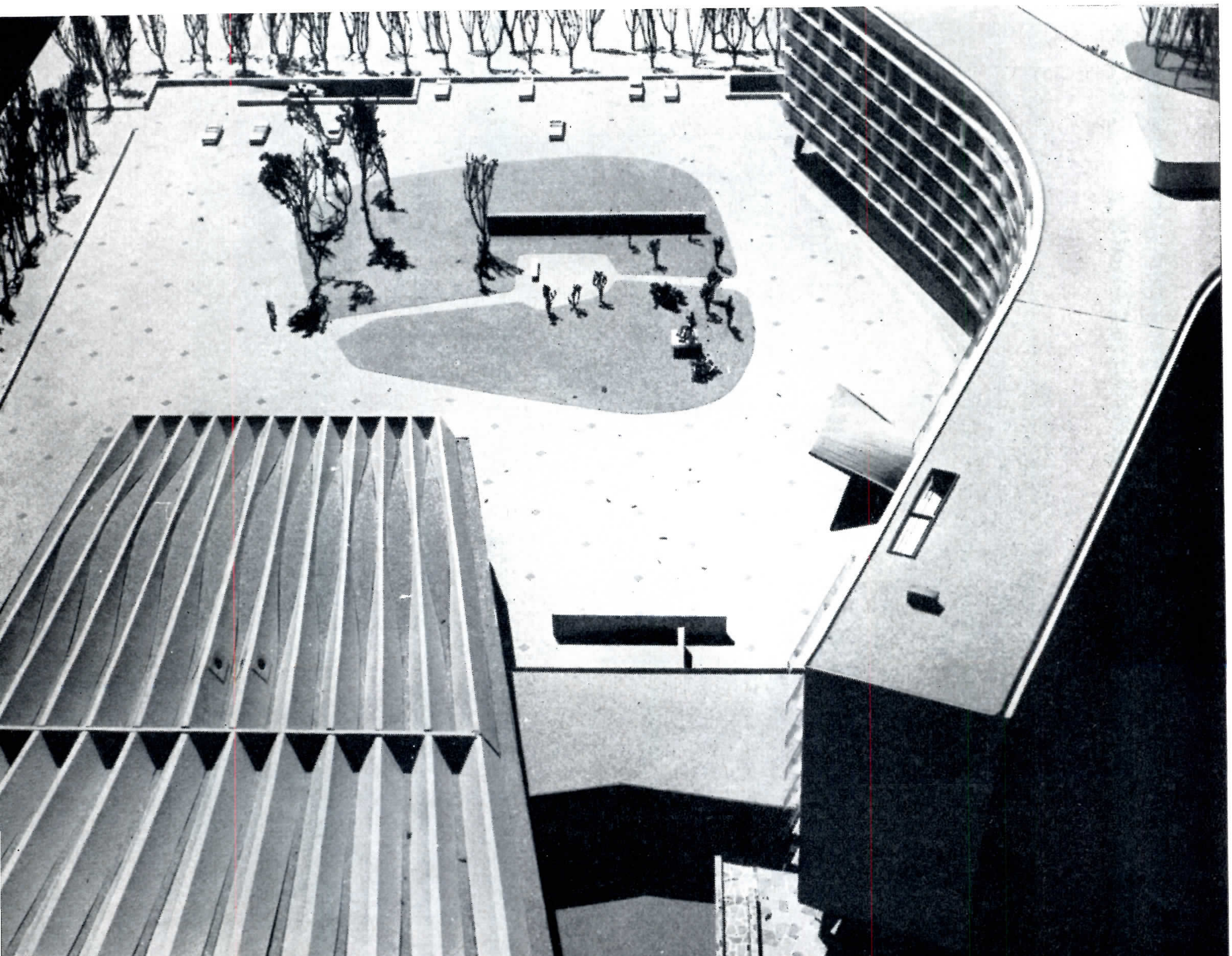
Marcel Breuer, Architect
Bernard Zehrfuss, Architect
Pier Luigi Nervi, Engineer

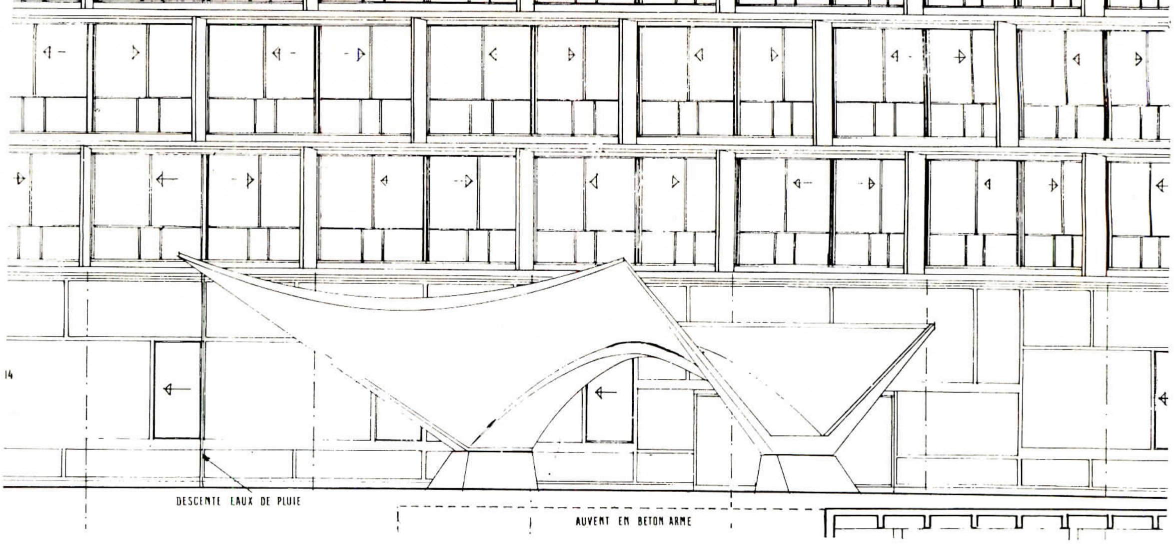
After the city of Paris had rejected two schemes for UNESCO headquarters, the third design — in preliminary form — was approved in May, 1953. Since then, the scheme has been modified, working drawings and details have been developed, and construction is now proceeding. Broadly, the scheme consists of four elements disposed on an open piazza: an eight-story, Y-shaped Secretariat, largest of the group; a folded-slab Conference and Assembly building; a one-story Executive Council building; and a Main Lobby link, known as the "*Salle des Pas-Perdus*," which serves as a common meeting ground and functional center for the entire group.

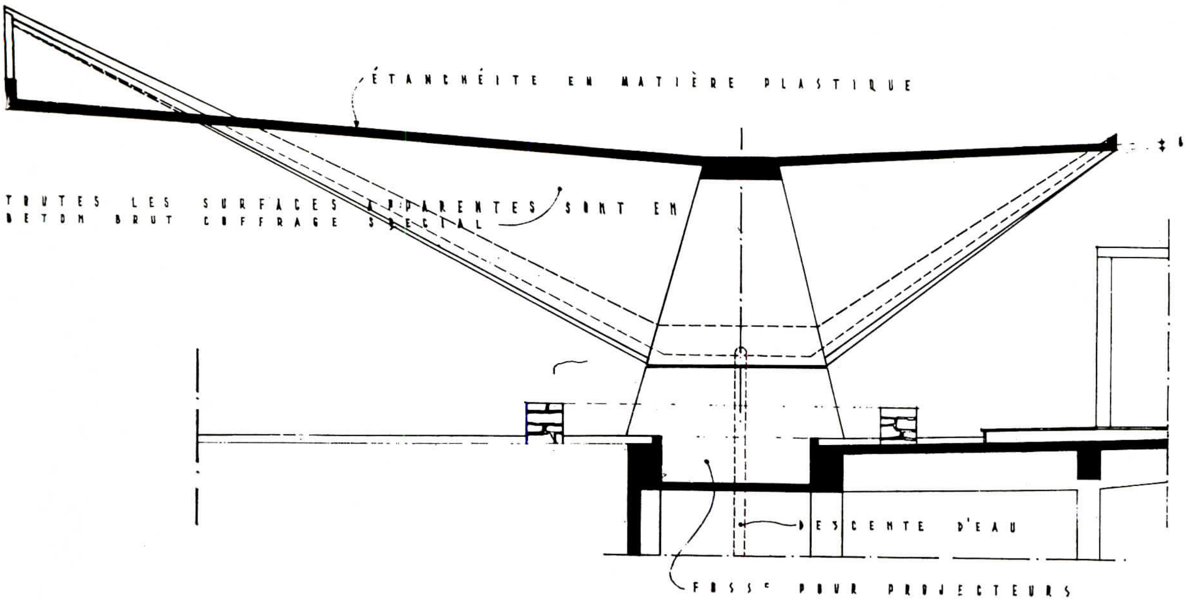
Refinements and modifications have resulted from development of the preliminary idea. The piazza, formerly an unbroken paved area, now contains a garden of interesting shape near its center — an improvement that interrupts the view toward the Avenue de Suffern and the blighted area beyond. In order to simplify construction, the formerly tapered wings of the Secretariat have been made rectangular in plan so that their cross-section is uniform — except where the three wings conjoin. Interestingly formed entrance canopies have been added to the two main Secretariat entrances; the central Main Lobby has been considerably enlarged.

When the UN was built, some questioned the architectural symbolism of Secretariat dominating Assembly; others praised it as a proper expression. In Paris today, a tall building is prohibited by the authorities. The UNESCO Secretariat bows to the past and its Parisian setting in carrying out the curve of the Place de Fontenoy, yet is at the same time a highly functional office building. Its graceful horizontality and changing fenestration pattern create a new kind of expression for public buildings.






DESCENTE EAUX DE PLUIE
AUVENT EN BETON ARME


ÉTANCHÉITE EN MATIÈRE PLASTIQUE
TOUTES LES SURFACES APPARENTES SONT EN BETON BRUT COFFRAGE SPECIAL
DESCENTE D'EAU
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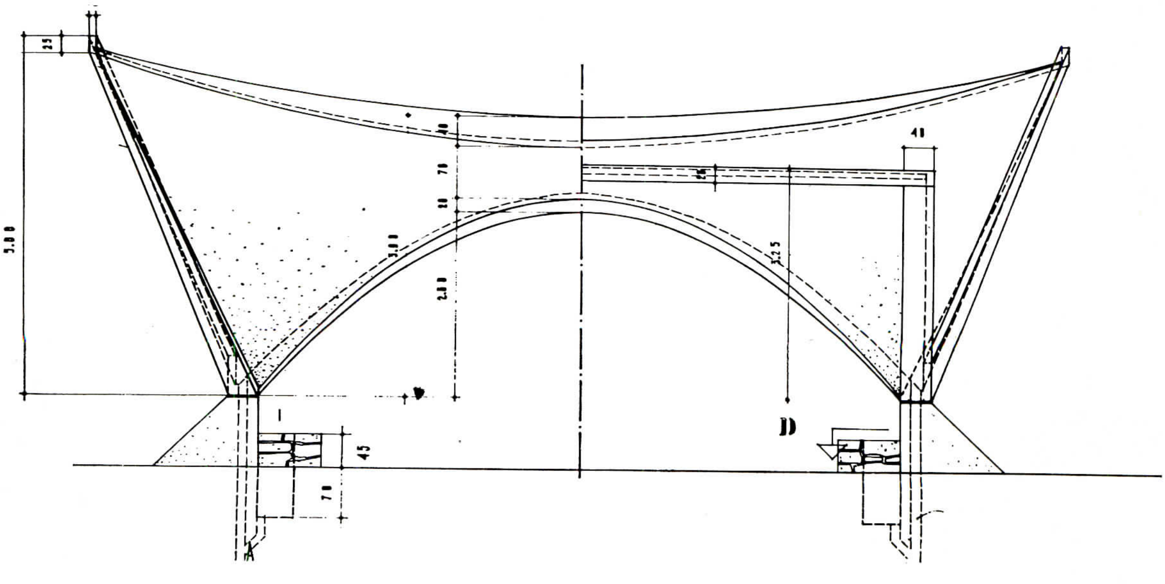
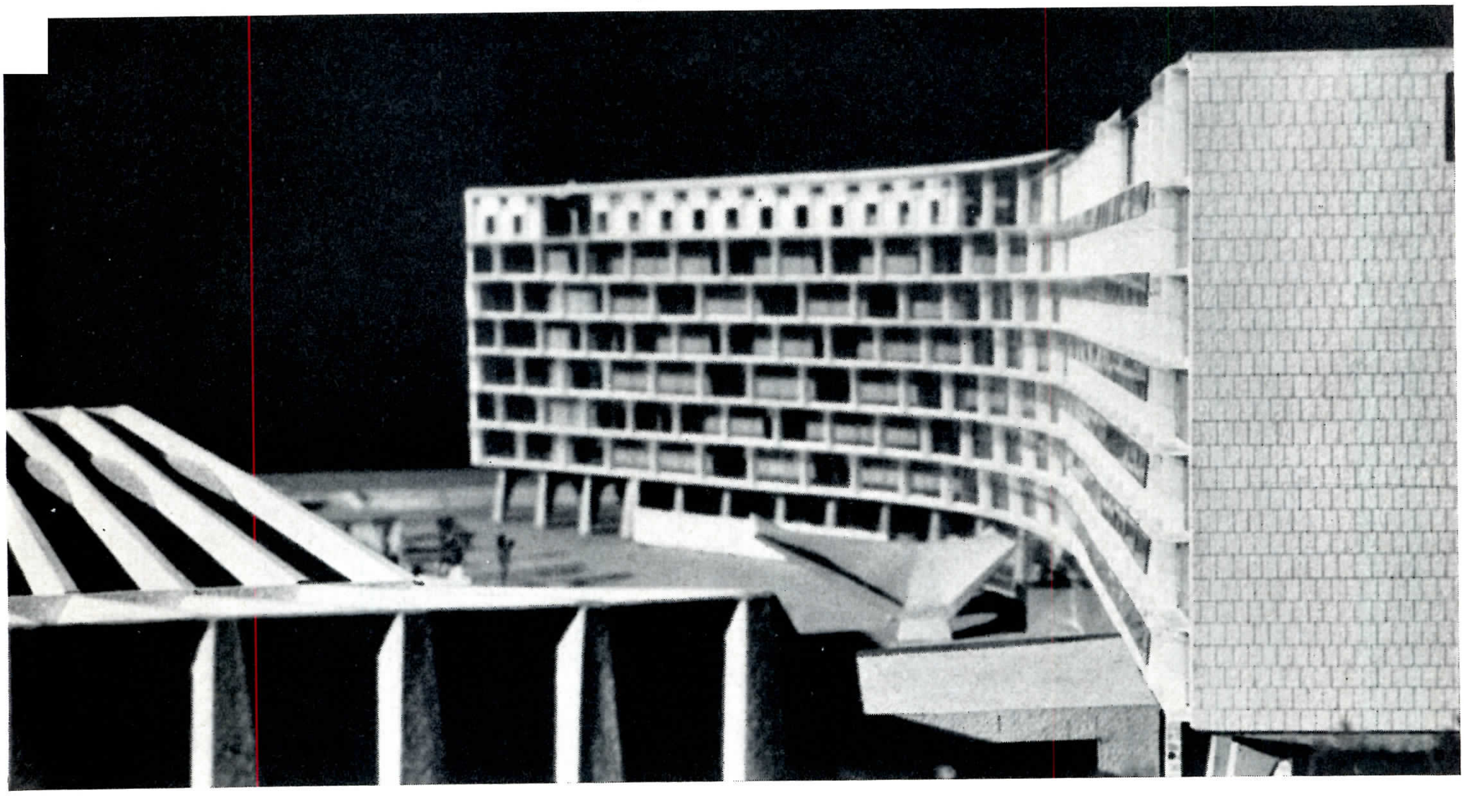
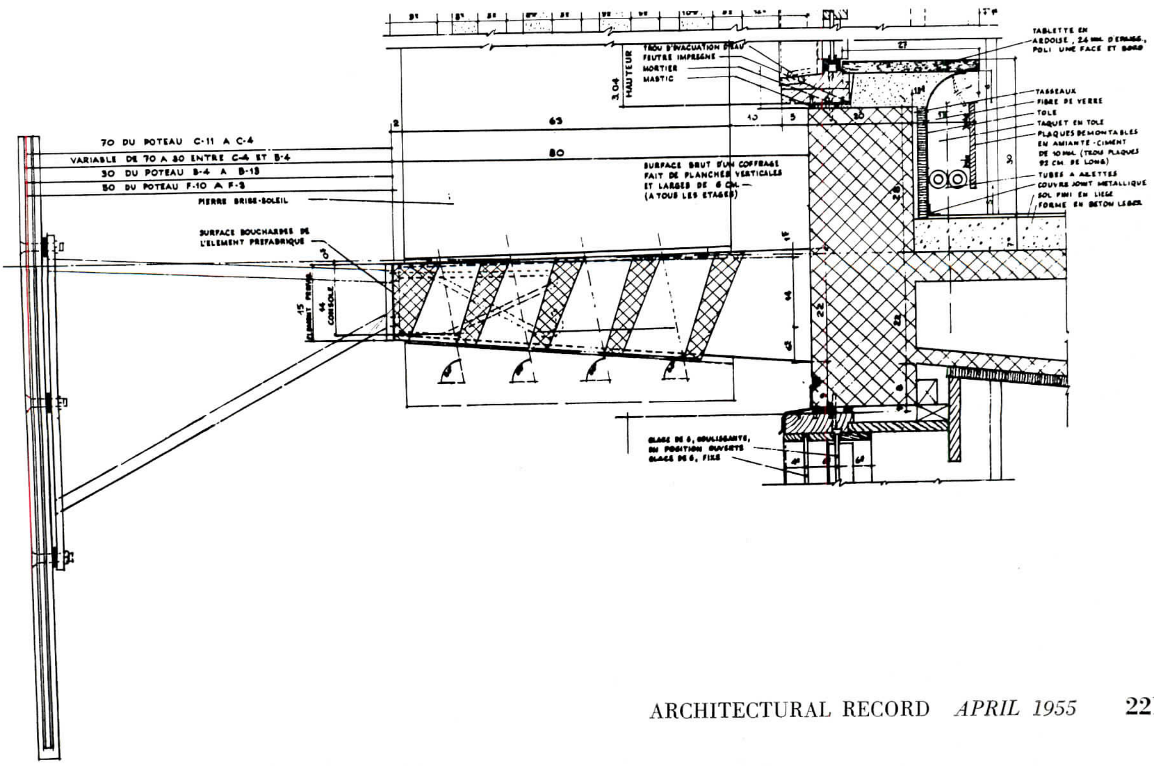


On the left page is shown a partial elevation of the southwest façade of the Secretariat, facing the piazza and garden. Also shown, in detail, is the newly designed entrance canopy for this side — an interesting form reminiscent of the canopy idea for the rejected design. Unlike the other Secretariat elevations — which have simple slab projections or vertical louvers for sun control — this façade features *brise-soleils* consisting of sheets of blue-green, heat-absorbing glass hung outside the slab projections. According to calculation, radiant heat from the sun will be absorbed by the outer glass and then dissipated into the air before reaching the building, thus cutting the heat load by more than half. A detailed section is shown below.

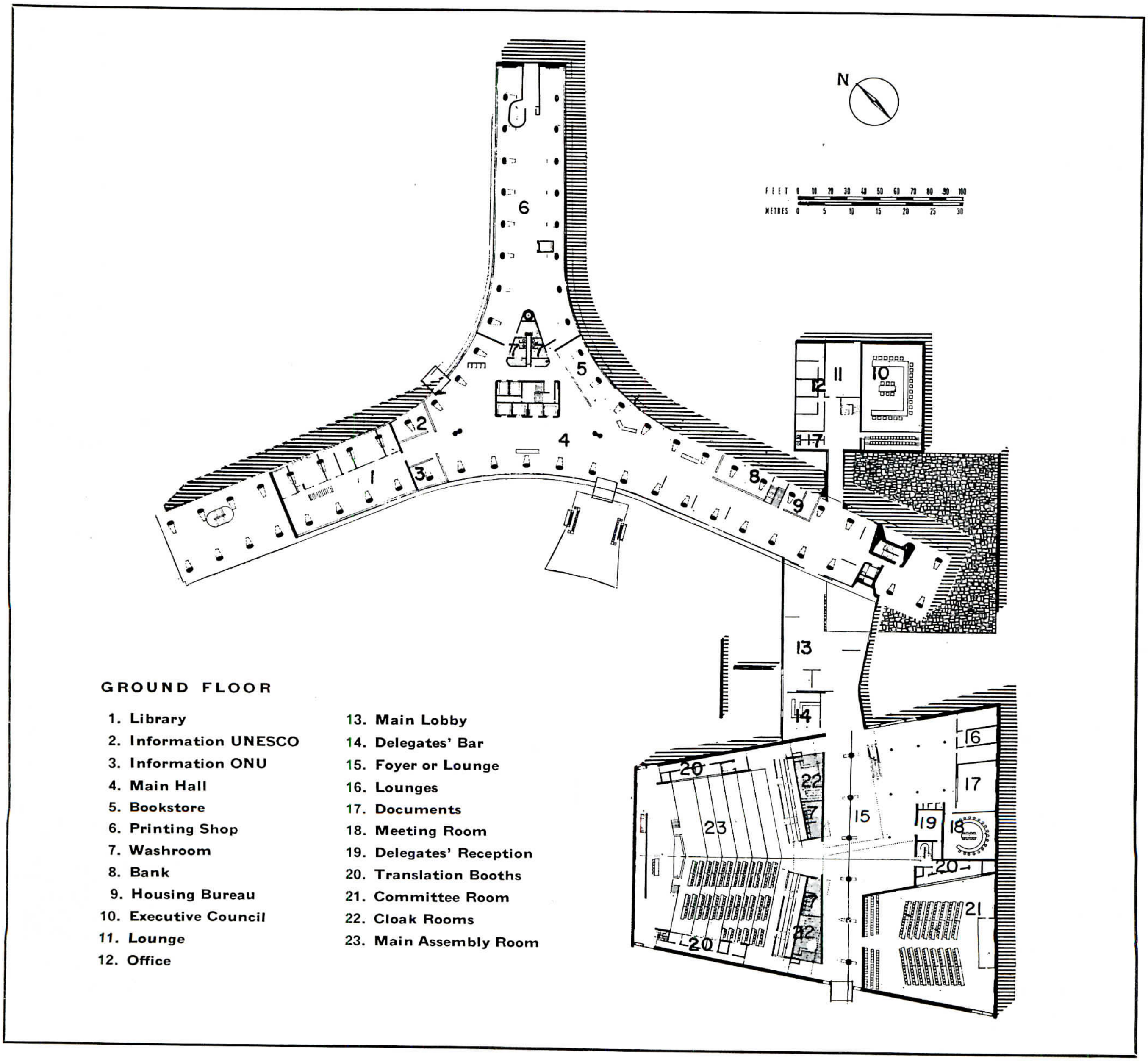




Although the Secretariat has been modified in various important aspects, its basic functional arrangement remains. The ground floor is devoted to public space and circulation; the next five floors are office space; the two top floors comprise staff social and recreational areas, including a restaurant, bar, cafeteria, library, roof gardens, etc. The Y-plan is no longer symmetrical and the wings have been straightened; the central arrangement of stairs, elevators and toilets has been simplified.

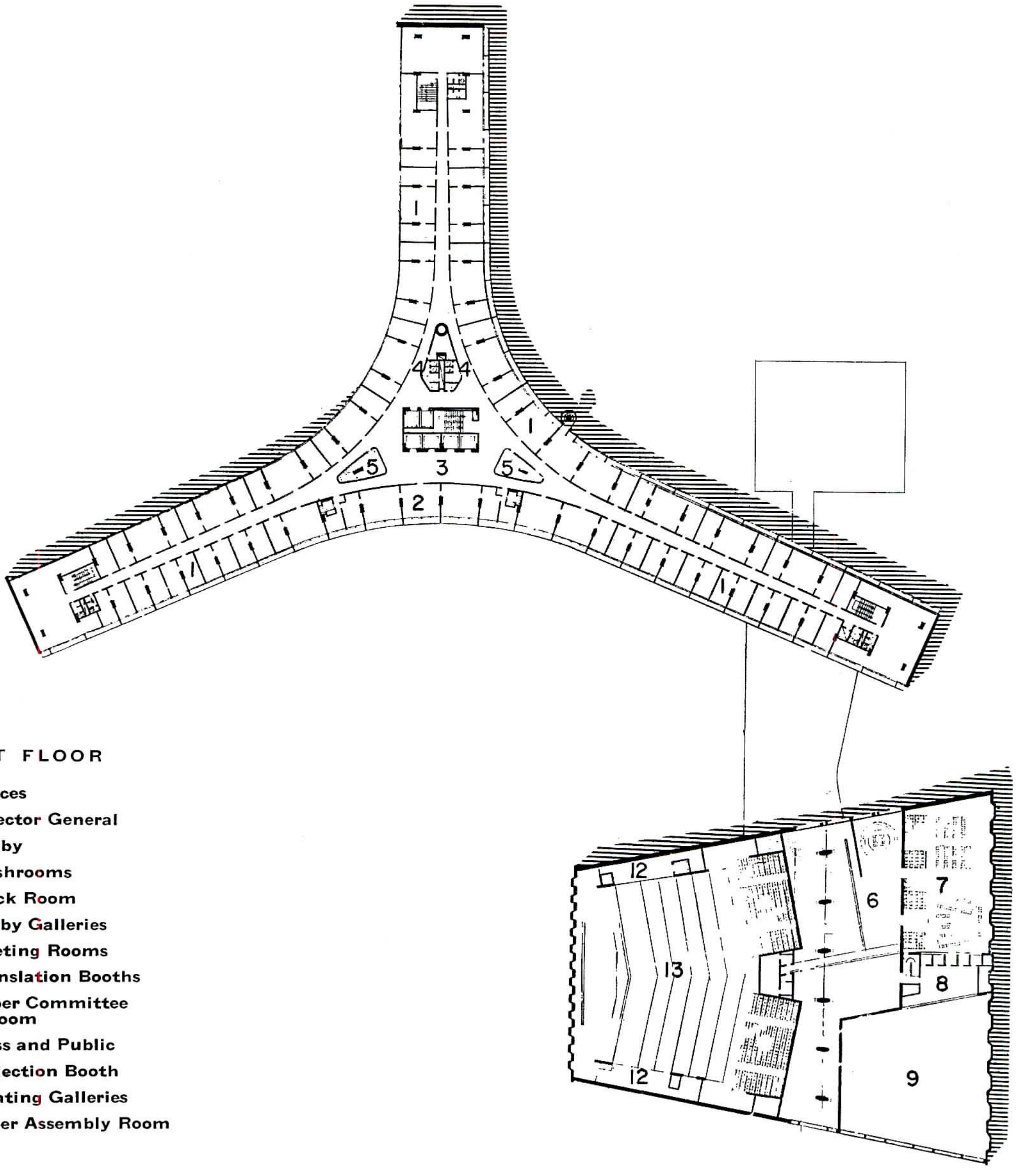
Unlike the UN scheme (and program) which separates delegates, staff, press and public into three more or less isolated groups, the idea here of the Main Lobby, or "*Salle des Pas-Perdus*," is to provide a functional hub where these groups may mingle — a center of gravity for the entire plan where all will pass.

The total cost will be about 2,000,000,000 francs, from which tax and custom exemptions of 300,000,000 francs can be deducted. Over 40,000,000 francs have been allotted for painting and sculpture, the details of which have not yet been announced.



GROUND FLOOR

1. Library
2. Information UNESCO
3. Information ONU
4. Main Hall
5. Bookstore
6. Printing Shop
7. Washroom
8. Bank
9. Housing Bureau
10. Executive Council
11. Lounge
12. Office
13. Main Lobby
14. Delegates' Bar
15. Foyer or Lounge
16. Lounges
17. Documents
18. Meeting Room
19. Delegates' Reception
20. Translation Booths
21. Committee Room
22. Cloak Rooms
23. Main Assembly Room

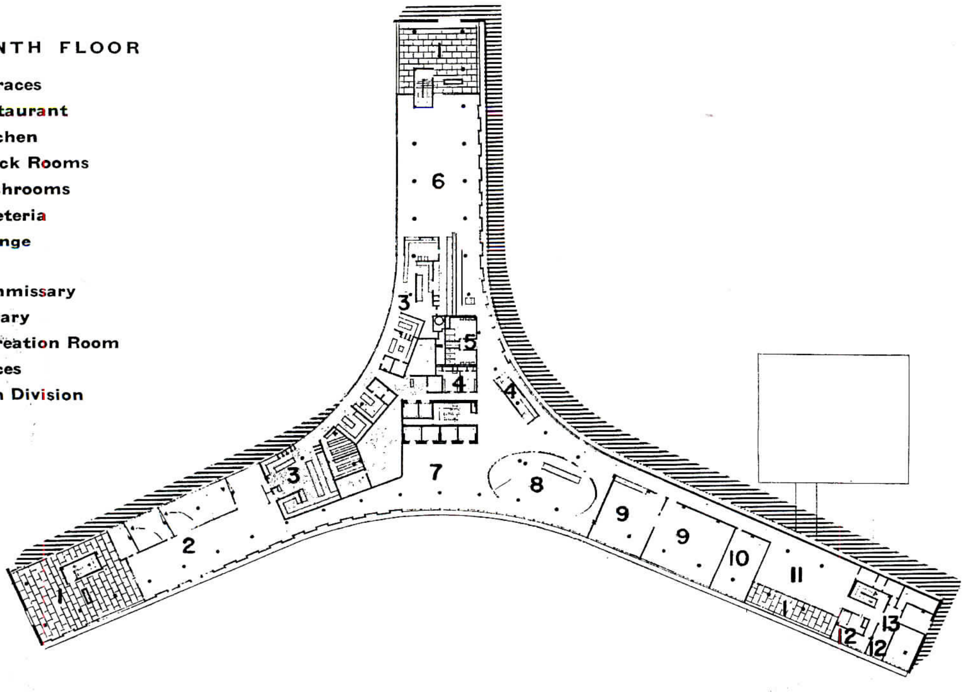


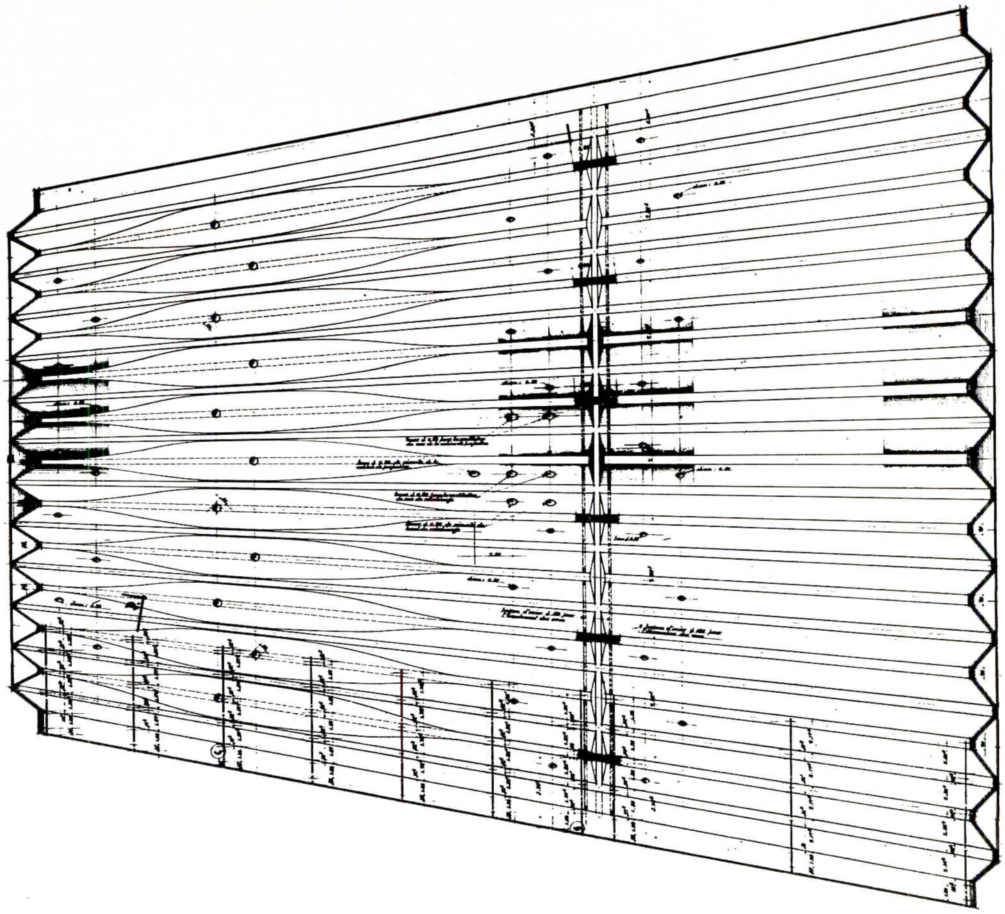
FIRST FLOOR

1. Offices
2. Director General
3. Lobby
4. Washrooms
5. Stock Room
6. Lobby Galleries
7. Meeting Rooms
8. Translation Booths
9. Upper Committee Room
10. Press and Public
11. Projection Booth
12. Lighting Galleries
13. Upper Assembly Room

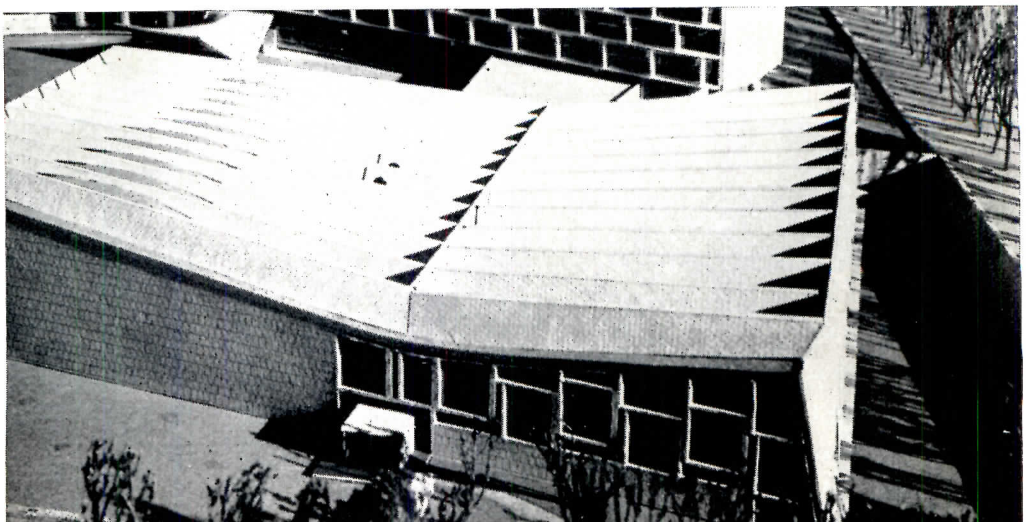
SEVENTH FLOOR

1. Terraces
2. Restaurant
3. Kitchen
4. Check Rooms
5. Washrooms
6. Cafeteria
7. Lounge
8. Bar
9. Commissary
10. Library
11. Recreation Room
12. Offices
13. Film Division





Both the end walls and roof of the Assembly and Conference building are of continuous corrugated reinforced concrete. The roof, shown above in plan and at right in section, is supported by a single row of columns under a lateral member that receives the corrugations. The folded frames are stiffened by an undulating horizontal membrane that rises to the top at mid-span and falls to bottom chord position at the supports. The resulting ceiling form is visually exciting and should result in outstanding acoustical qualities for the Assembly chamber.



SELECTING PLASTICS FOR BUILDING USES

By Albert G. H. Dietz*

Five years ago in this section Professor Dietz wrote that "The next five to ten years may be expected to bring out new materials, modifications of the old and further applications." While this has happened, perhaps more significant is the fact that architects are using plastics with much greater confidence and are more actively exploring new applications. To aid in the appraisal of plastics for building, present and future, this article discusses the physical properties of plastics, describes fabrication methods and outlines the types of plastics—all of this being related to actual and potential uses in buildings. The article also identifies the various building components that today are being made of plastics

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There is no one type of plastic that can be formulated so that it has universal application to building components. While it is true that new ways are constantly being found to modify them chemically, or to alter their physical characteristics through addition of non-plastic material, the fact remains that their fundamental characteristics still govern how they may be used in building. Before considering a plastic for a particular application, an architect or engineer should know how their physical properties compare with the better known building materials, something about how they are fabricated, and the nature of the various families of plastics, factors which affect size, shape and cost.

PROPERTIES

Properties peculiar to plastics must be kept in mind when designing for building applications. Within their own limits plastics have a great range of physical and mechanical properties which govern their use. A few of the important properties of plastics are discussed briefly and compared, insofar as comparisons are possible, with other building materials. The properties of greatest importance in building are strength, stiffness, thermal expansion and contraction, thermal conductivity, maximum use temperature and durability, especially when exposed outdoors. Comparisons among different materials are of limited value, because each material has its own set of properties which make it useful or not, depending upon the application. This is as true of plastics as it is of any other material.

Strength. Strength varies from low to high depending on the plastic, any fillers or reinforcing materials used and ambient conditions, particularly temperature. Chart 1 compares tensile strengths of various plastics with tensile strengths of metal, flexural strength of wood and compressive strength of concrete. As the chart shows, the relatively soft plastics like polyethylene are comparatively weak, whereas some of the high-strength, highly directional laminates and reinforced plastics, especially those incorporating continuous glass filaments, compare favorably with the high-strength metal alloys. Fishing rods, for example, fall in the high-strength categories; corrugated sheets are in the lower middle range. Similarly, if drawn into fine filaments, such plastics as nylon and vinylidene chloride are exceptionally strong. The run-of-the-mill molding plastics cover about the same range of strengths as wood and concrete. Compressive and flexural strengths of most plastics run higher than the tensile strengths shown. All strength properties are strongly influenced by fabricating methods as well as by composition.

Stiffness. By and large plastics are low in stiffness, or modulus of elasticity, as Chart 2 shows. Most rank below wood, although the phenolics may range fairly high, depending on the fillers employed. Laminates and reinforced plastics, of course, can run quite high if a high proportion of high-modulus reinforcement, like glass fiber, is used. Even these are less stiff than aluminum. Low stiffness of the material can be largely offset by designing sections with high inherent stiffness, such as ribs and corrugations; I-sections; arched, domed and vaulted shapes; and pyramids. Corrugated panels for luminous ceilings, dome-shaped skylights, pyramid-shaped light covers, sandwich wall panels with lightweight cores and thin faces are all examples of such design. The readiness with which plastics can be formed to almost any desired shape allows the designer wide latitude in the selection of forms to overcome the low inherent stiffness of plastics. Coupled with low specific gravity, the formability of plastics can provide highly efficient, lightweight structural shapes.

Thermal Expansion. Compared with most building materials the thermal expansion of plastics is high, as is brought out in Chart 3. This must be allowed for in design of building components, especially where plastics are used in conjunction with other materials, as when transparent sheets are set in window frames. If unduly restrained, they will buckle, break in tension, tear or otherwise fail. Here again, the ready formability of plastics is a help, because corrugations, bends, loops, fillets and other devices which accommodate dimension change can be used to offset expansion and contraction. Flexible pipe and tubing, for example, can be laid in a snaky pattern, or may have bends and U-turns incorporated to take up expansion and contraction. The tendency of plastics to creep under continuous load, and to lose their initial stresses when kept under a constant deformation, can be a help in this respect. This is especially true of thermoplastics at elevated temperatures.

Creep is a disadvantage if allowed to become excessive, because it leads to bulging, sagging and warping, as in piping under excessive pressures and insufficient supports and sheets spanning too great distances. Creep is largely a question of stress levels. If stresses are kept within reasonable limits, creep need not be serious. Stress levels depend upon duration and temperature, especially with thermoplastics. Thermosetting materials are less subject to creep, especially when laminated or reinforced.

Thermal Conductivity. Compared to metals, plastics are all thermal insulators. Their rate of heat conduction, as shown in Chart 4, is in the same range as wood and concrete and depends on both the plastic itself and the fillers employed. When foamed, heat conduction is in the same range as other bulk-type insulators.

Temperature Tolerance. It is one of the most difficult aspects of any material to evaluate. The maximum temperature at which a material may be used is highly dependent upon the particular use, and in some instances higher temperatures can be tolerated than in others. Chart 5 presents suggested upper temperature ranges for continuous use. Intermittent use often goes higher. This is strongly influenced by the load of stress on the plastic, especially if thermoplastic. Creep at the upper temperatures may become excessive if stresses are high.

These temperatures are compared with temperatures at which metals and concrete lose about half their strength and wood chars. The silicones and fluorinated plastics are best. In the form of coatings, both of these are often used at still higher temperatures. Most building uses seldom require temperatures higher than about 180 F, even when exposed to the hot sun.

Any plastic can be destroyed by fire. Some burn readily, others with diffi-

PROPERTIES OF PLASTICS AND OTHER BUILDING MATERIALS

Tensile strength of plastics is comparable to wood and concrete, but increases to the range of metal alloys when reinforced or laminated with other materials or when drawn into fine filaments (as with nylon and vinylidene chlorides). Although plastics are inherently low in stiffness, when reinforced they range higher even than wood and concrete. Forming into structural shapes also increases stiffness.

These same structural shapes accommodate dimension changes resulting from the high thermal expansion of plastics. Thermal conductivity is lower than concrete and about as low as wood, making plastics excellent insulators, especially when foamed. Although most plastics are damaged above about 200 F, many do not support their own combustion or burn with difficulty.

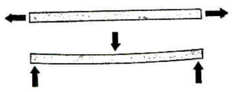
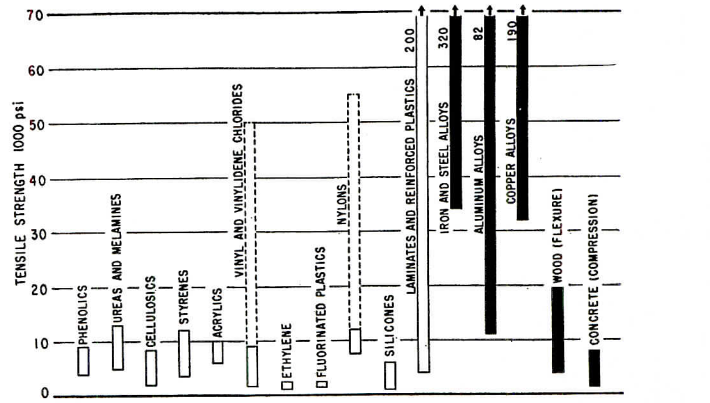


CHART 1—TENSILE STRENGTH

Strength of plastics varies from low to as high as strong alloys. Flexural (beam) strength is generally greater than tensile strength shown, and compressive strength is still higher. Filaments like nylon and saran have exceptionally high strength. Laminates and reinforced plastics utilizing fine glass filaments are strongest of all. Strength of molded materials is in the same range as concrete and wood. All strength properties are strongly influenced by molding or other fabricating methods. Thermoplastics are markedly influenced by temperature, especially in creep.



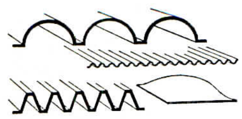
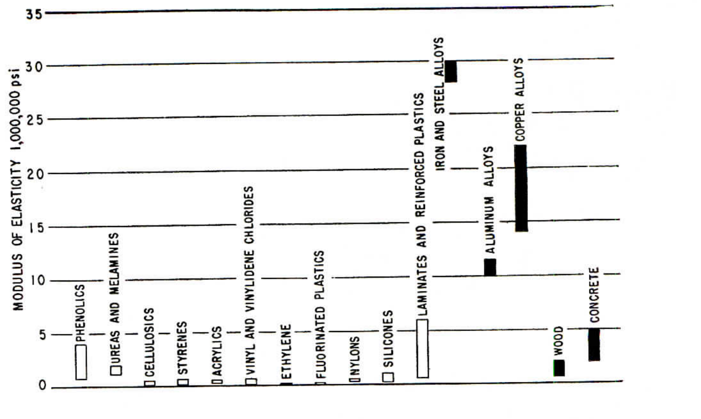


CHART 2—STIFFNESS

Stiffness of plastics, as measured by modulus of elasticity, is low compared with other construction materials, although laminates and reinforced plastics may range well above wood and concrete. Stiffness is enhanced by using structural shapes of high inherent stiffness. These include corrugations, vaults, domes, pyramids, sandwiches, ribs, I sections and other stiff sections. The ready formability of plastics makes such shapes practical and can lead to lightweight, strong, rigid forms.



culty, and some do not support their own combustion.

Transparence. Transparence ranges from completely opaque to a high value of close to 90 per cent for such plastics as acrylics. This covers the same range as completely opaque structural glass to water-white plate glass. Pigmentation, dyes, fillers and reinforcement all alter the light-transmission characteristics. The principal plastics used for light-transmission in one form or another are acrylics, vinyls, polystyrene, cellulosics, ureas and melamines, cast phenolics, and polyesters and epoxies, the latter mostly in the form of reinforced plastics. No plastic is as hard or scratch-resistant as glass, but toughness and resistance to breakage are generally considerably greater.

Durability. Long histories of use, especially of outdoor exposure, are lacking for most plastics but are available for some. The acrylics have been used for 20 years or more for aircraft canopies and windows, and some test specimens have been on exposure racks for periods of approximately 20 years. There is reasonably good assurance, therefore, that these materials will have good service lives.

The phenolics, likewise, have been in use, both indoors and outdoors, as moldings and laminated panels for periods well over 20 years, and reasonably good assurance of durability is available. Weathering may bring about fading and alteration of appearance, just as it does in wood, stone and other materials.

Other plastics are not yet old enough to have proved histories of durability outdoors, but the story is gradually developing. Some of the vinyl formulations, especially when pigmented with materials like carbon black to prevent penetration by the actinic rays of the sun, have given good accounts of themselves for periods of 10 to 15 years outdoors as gaskets and similar applications. Some of the styrene formulations appear to

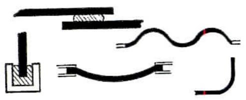
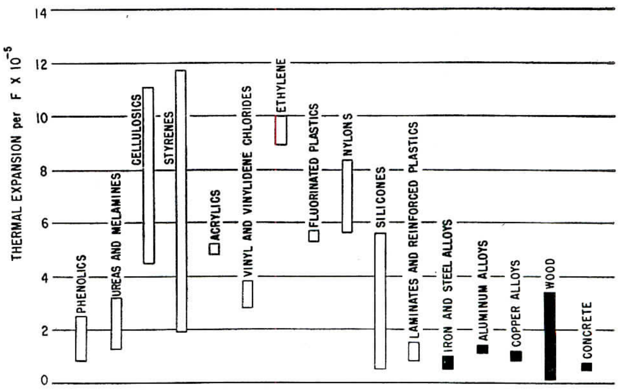


CHART 3—THERMAL EXPANSION

Thermal expansion of plastics is generally high and is considerably higher than most other construction materials. The sheet stocks used in laminates and reinforced plastics help to reduce the thermal expansion and bring them into the range of aluminum and copper. In wood thermal expansion is less important than shrinking and swelling with moisture changes. High thermal expansion in plastics is offset by using shapes such as bends, corrugations and snaky configurations, by bedding in soft gaskets and by overlapping.



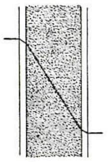
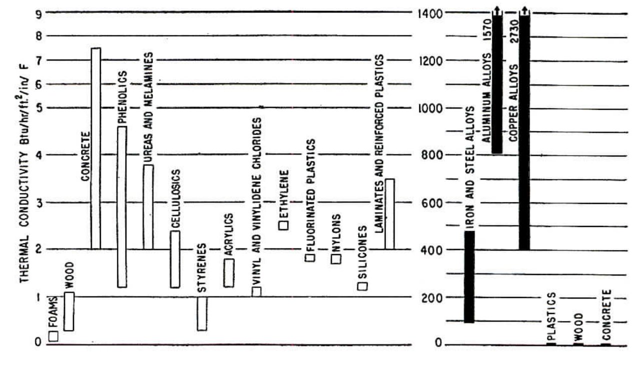


CHART 4—THERMAL CONDUCTIVITY

Thermal conductivity of all plastics is low compared to metals. For many plastics it is intermediate between wood and concrete, depending on the density of the plastic as influenced by fillers and fabricating methods. Plastic foams are low in density and have correspondingly low thermal conductivity. When used in wall sandwiches, the hard, dense facings bring about a moderate temperature drop, but the foamed cores develop a steep temperature drop. Some foams are unicellular and inherently resistant to vapor passage. Some can be foamed in place.



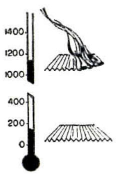
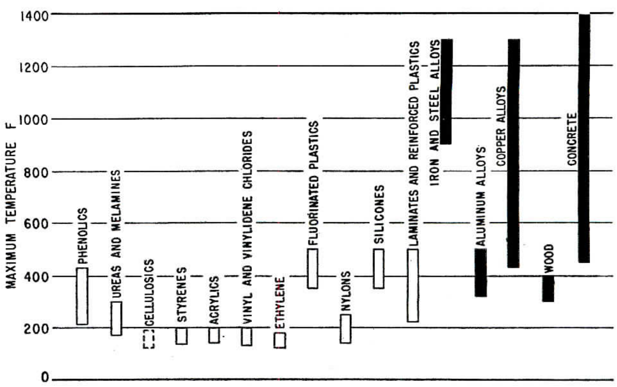


CHART 5—TEMPERATURE TOLERANCE

Maximum recommended temperatures for continuous exposure are relatively low but are generally well above the maximum temperatures likely to be met in building, even on surfaces exposed to the sun. Silicones and fluorinated plastics have highest temperature resistance. Laminates and reinforced plastics may be similarly resistant if made with resistant resins and fillers. All plastics can be destroyed by fire, some readily and others with difficulty. Temperatures shown for metals and concrete are those at which half of strength is lost; for wood the charring temperatures are shown.



behave similarly. Melamine may be expected to do well.

The silicones and fluorinated plastics should be outstanding in outdoor uses considering their water repellence and their proved ability to withstand temperature extremes, intense ultraviolet and infrared irradiation, ozone and electrical attack. Silicone rubber gaskets and expansion joints have stood up well.

Reinforced plastics and laminates, when made with the durable types of resins and with durable fillers, reflect the behavior of their constituents.

There is no absolutely reliable accelerated test which will accurately predict the behavior of plastics over a long period of years based upon short-time laboratory exposure. Weather is itself extremely variable, and the complex interactions of all the factors entering into the weather over the seasons and over the years cannot be reproduced in the laboratory. Short-time tests can help to screen materials, but the final test is actual use over a long period of time.

FABRICATING METHODS

The accompanying chart shows diagrammatically the most commonly employed methods of fabricating plastics, together with the plastics usually fabricated by these methods and representative articles produced by them.

Compression molding is the most versatile method of fabrication. All thermosetting and thermoplastic materials can be molded by this method; this includes laminates and reinforced plastics. However, for thermoplastics the method is too slow, because the charge first has to be heated to the softening point and then cooled, and so they are usually molded by injection molding. In this method the hot, soft plastic is rapidly forced into a cool mold where it quickly hardens. Thermosetting materials are compression-molded or transfer-molded. In compression molding the loose or pelletized material is put into a heated mold which, upon closing, forces the initially heat-softened material into all parts of the mold where it heat-hardens. In transfer molding the plastic is first heat-softened in a pot and is then forced by a ram into a mold where it heat-hardens.

Compression, transfer and injection molding all require carefully made dies, usually employing tool steel to withstand the high pressures. Presses are large and sizes of parts are limited. The largest compression-molded parts made at present are television cabinets, and among the largest thermoplastics are the breaker strips around refrigerator doors. Because of the cost of molds, items made by these methods must be produced in large numbers to be economical. For large quantity production these are the fastest and cheapest methods.

Continuous thermoplastic profiles, like tubing and architectural trim, are extruded. Although length is unlimited, maximum diameter is about 8 in. and usually runs much less. Wide, thin profiles, like corrugated shapes, are made in widths up to approximately 2 ft. Greater widths are in prospect.

Liquid plastics can be cast into molds and allowed to harden. The clear plastic blocks with various embedments are made in this fashion. Standard rods, tubes and blocks up to several inches in diameter and several feet long can be had for machining into finished parts. Acrylics, polyesters, phenolics and epoxies are the commonly used casting resins.

Calendering, or passing hot thermoplastic between heavy rolls to produce sheet and film, with or without fabric backing, produces most of the flexible upholstery, shower curtain stock and similar material. Film may also be made by casting on a moving belt or by extruding a cylinder, expanding by internal air pressure and slitting. Sheet and film up to 8 ft wide are made by these methods.

Bubble-shaped transparent parts like skylights are easily formed by stretching a heat-softened thermoplastic sheet over a suitably shaped opening in a vacuum tank and sucking the soft sheet into the tank space. After the plastic cools and hardens, the vacuum is released and the part removed. Positive air pressure can be used to help force the sheet into the desired shape. The only size limitation is the size of sheet available. Parts up to approximately 10 ft square are made.

All plastics can be machined, with varying difficulty. The softer materials can be handled on woodworking equipment, but the harder ones, especially those incorporating mineral matter like glass, either dull such tools quickly or require metalworking equipment. For best results the cutting edges and rates of machining must be adjusted for the particular plastic.

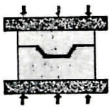
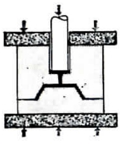
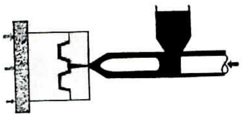
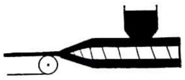
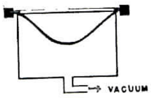
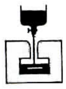
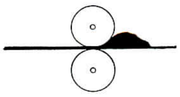
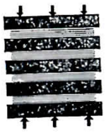
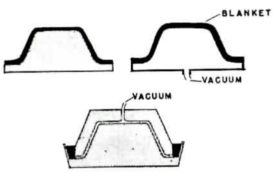
Laminates are made by stacking impregnated sheets and pressing heavy heated-platen presses at 1000 to 2000 psi and about 275 to 325 F. Decorative sheet, for example, has an overlay of melamine, the decorative printed paper or wood veneer, and a number of backup layers of phenolic-impregnated kraft paper. Press sizes usually limit these shapes to a maximum of approximately 4 by 8 ft.

Reinforced plastics are made in a variety of ways. The simplest is a hand layup of reinforcing mat or fabric on a male or female mold, with liquid resin sprayed, brushed or poured on. This may be densified by laying a rubber blanket over it and drawing a vacuum inside the blanket, applying fluid pressure to the mold, or both. Many small boat hulls are made this way. For smooth finish on both sides on the part, matching molds may be used of wood, sheet metal, stone plaster or reinforced plastic. Dry reinforcing mat and fabric are laid over the male mold, the female mold is closed, and liquid resin is introduced into the mold by pouring it into a trough around the periphery and sucking into the mold by vacuum. For large quantities of relatively small parts, like trays and boxes, regular matching steel molds in a compression press are used. The reinforcing is customarily roughly preformed to shape outside of the mold and simply dropped into the mold along with the required amount of liquid resin. Closing the mold forces the resin into all parts of the mold where it is combined with the reinforcement. Pressures and temperatures required are less than for regular thermosetting moldings, consequently lower capacity presses and less expensive molds can be employed.

Larger plastic parts can be made with reinforced plastics than with any other types. Sections for domes up to 50 ft in diameters have been constructed in this manner. For large-sized building components to be made in relatively small lots this method is most attractive.

As is true of all materials, plastics must be applied with discretion to the solution of any given problem. Their physical and mechanical properties and methods of fabrication, as presented in these pages, have an important effect on their applications in building. Properly used, they can add greatly to the range of materials at the disposal of the architect, but improper use can lead to unhappy results.

METHODS OF FABRICATING PLASTICS

		PLASTIC USED	TYPICAL PRODUCTS
COMPRESSION		Alkyds Epoxy molding Melamine Phenolics Polyester molding Silicones Urea (Thermoplastics)	Light diffusers Cabinets Drawer pulls and other hardware items One-piece drawers Small molded parts of all kinds
TRANSFER		Alkyds Epoxy molding Melamine Phenolics Polyester molding Silicones Urea	Fluorescent light supports Switch plates Dispenser housings Small molded parts of all kinds
INJECTION		Acrylics Cellulosics (except nitrate) Chloro-fluoro ethylenes Nylon Polyethylene Polystyrene Vinyl chloride Vinylidene chloride	Wall tile Housings Knobs Escutcheons Small molded parts of all kinds
EXTRUSION		Acrylics Cellulosics Fluorinated plastics Nylon Polyethylene Polystyrene Silicones Vinyl butyral Vinyl chloride	Corrugated sheet Pipe and tube Table and counter edging
VACUUM FORMING		Acrylics Polystyrene Vinyl chloride	Skylights Illuminated signs Canopies Shaped windows
MACHINING		All plastics	Turned knobs, buttons
CASTING		Acrylics Epoxies Phenolics Polyesters Styrene Vinyl acetate Vinyl chloride	Embedments Trim Rods and tubes
CALENDERING		Cellulosics Vinyl butyral Vinyl chloride	Floor covering Wall covering Film and sheet Upholstery
LAMINATING		Alkyds Melamine Phenolics Silicones Urea	Utilitarian and decorative sheet, counter tops, wall covering Shallow trays and pans Punched sheet
REINFORCING		Epoxies Polyesters (Phenolics)	Domes Corrugated sheet Canopies Kick plates

THE BASIC PLASTICS GROUPS HAVE A WIDE RANGE OF APPLICATIONS

All plastics can be divided into two major classes—*thermoplastic* and *thermosetting*. Thermoplastics can be softened any number of times by heating, and hardened by cooling. In general, the colder they become, the harder and stiffer they are. Some eventually become brittle when cold enough. Thermosetting plastics soften only once upon heating, then harden upon further heating and do not soften again. Changes in temperature thereafter have relatively little effect, although they may become harder and stiffer at low temperatures and soften slightly at elevated temperatures. They are truly plastic only once, and that is during the original fabricating operation.

THERMOPLASTICS

Acrylics. Used in lighting, outdoor illuminated signs, windows, skylights, and in a variety of molded and cast objects, especially those containing embedments like flowers, these are the clearest and most transparent of all plastics. They can also be pigmented and dyed to any desired color or hue. They can be cast as plain, figured or corrugated sheets in sizes up to approximately 10 ft square, or they can be molded. Frequently the sheets are vacuum-formed into bubbles, domes and similar shapes.

Cellulosics. These are characterized as a group by toughness (as exemplified by cellulose nitrate tool handles), transparence and ready colorability by pigments and dyes, ease of molding, ability to be formed into sheet and film, and a wide range of hardness and flexibility. Cellulose acetate and acetate-butyrate are extruded into a wide range of profiles such as edgings for table and counter tops, pipe and tube, and terrazzo divider strips. Cellulose forms the base for many lacquers.

Polyamides. Nylon is the common name for these plastics. They are most familiar as textiles but are becoming increasingly important for tough, wear-resistant rollers, bearings and strikers for low-noise hardware components and for similar parts such as cams and gears. Molded nylon is naturally cream color and fairly translucent; it can be colored with some difficulty by dyeing.

Polyethylene. Tubing made of this waxy-feeling, soft, tough, flexible material is finding considerable use for cold-water lines and has also been used for radiant heating lines embedded in concrete as well as for refrigerant lines in ice-skating rinks. It is used as sheet, film, tubing and molded articles where its flexibility and toughness recommend it in addition to its resistance to solvent attack, especially at ordinary temperatures. It softens at relatively low temperatures and is therefore not recommended for hot water or other applications involving similar temperatures, but it retains its flexibility at temperatures well below zero. It has been rather widely used for buried lawn and golf-sprinkling lines. Irradiation raises the heat-softening point considerably.

Polystyrene. Low moisture absorption and ease of molding recommend polystyrene for plastic wall tile and similar applications. It is also widely used in illumination. It can be transparent or it can be colored by pigments or dyes. Compared with the cellulosics and polyethylene, it is relatively hard and brittle, but it is easily molded when hot.

Polyvinyl butyral. In building applications this is mostly used as the coating on heavy-duty upholstery. Because of its toughness it is interlaid in safety glass.

Polyvinyl chloride. Transparent and pigmented sheets are widely used in illumination. Semi-rigid filled formulations provide floor tile and sheet. The rigid formulations are extruded and molded into pipe and fittings useful particularly for handling corrosive fluids at moderate temperatures and pressures. The softer flexible formulations are used for shower curtains, inflated objects and wall coverings and upholstery. As is true of the cellulosics, hardness, strength and flexibility are controlled by the addition of plasticizers. Resistance to breakdown under exposed conditions is aided by stabilizers and pigments.

Polyvinylidene chloride. This tough plastic is useful for film, is formed into fine filaments, woven into fabrics and flyscreen cloth, and is extruded as insulation on electric wiring. The extra chlorine in its composition makes it more fire-resistant than many other plastics.

Fluorinated plastics. Ethylene can be modified by incorporating fluorine or fluorine plus chlorine. Extreme resistance to highly corrosive conditions like hot concentrated acids results. In chemical plants in particular, pipe, gaskets and fittings are especially useful in handling corrosive materials. Inertness to moisture and outstanding electric characteristics are other attributes. The materials are stable at much higher temperatures than most other plastics, but retain flexibility at very low temperatures. Strength and toughness are only moderately high. Cost is the major limitation.

Copolymers. Many plastics can be copolymerized by combining several basic plastic types, much as metals are alloyed. Polystyrene is copolymerized with rubber and rubberlike polymers to produce parts tougher than polystyrene alone. Vinyl chloride is copolymerized with vinyl acetate to produce tough, flexible film and sheet. The cellulosics are copolymerized for increased toughness and moldability. Acrylics are similarly copolymerized. This phase of the plastics industry is developing rapidly, and a large variety of copolymers may be expected in the future. They should greatly expand the range of properties available.

THERMOSETTING PLASTICS

Phenol formaldehyde. Probably more different things are made of the phenolics than any other single plastic. Drawer pulls; molded cabinets for radio, TV and small portable refrigerators; molded, round-cornered cabinet drawers; ash trays; telephone handsets; switch plates and switches; electric plugs; and a great variety of other objects are all molded of phenolics. A wide range of strength, toughness, electrical characteristics and resistance to various exposures is available depending on formulation. By and large phenolics are hard and inflexible. Like the other thermosetting resins, properties are largely controlled by various fillers: wood flour for ease of molding, asbestos for heat resistance, chopped fabric and filaments or cord for strength and toughness. Color is limited to relatively dark opaque colors, except the casting-type phenolic, which can be brilliant as in juke boxes and buttons.

The best waterproof adhesives are phenolic and the closely related resorcinol formaldehyde. Waterproof plywood and waterproof laminated wood, such as boat ribs, are made with them.

Melamine formaldehyde. The melamines have many of the same attributes as the phenolics plus the advantages of practically unlimited colorability, greater hardness, some better electrical characteristics, but greater cost. Their biggest application is as the hard, transparent waterproof finish on decorative laminates. They provide colorless waterproof adhesives having the same high quality as phenolics. The best plastic dinnerware is made of molded melamine.

Urea formaldehyde. Urea is used mostly for molded articles like light diffusers, dispensers and similar applications. It has the same colorability as melamine but is less costly. Its resistance to moisture is inferior to the phenolics and melamine, but it is entirely adequate for indoor use.

Alkyds. These thermosetting molding materials are used mostly for parts of electrical gear. They harden rapidly in the mold and therefore lend themselves to rapid production.

Polyesters. These resins, with the related allyls, make possible the production of large plastic parts on relatively simple molds, unlike the other thermosetting resins described above, all of which require heavy molds and presses. The polyesters are the base resins for large reinforced plastic parts such as the corrugated sheets, facings for sandwich panels, long adjustable louvers and similar parts which have begun to find their way into building. The polyesters begin as liquids and harden as they cure. They can therefore be cast, combined with fibrous reinforcements, and formulated into molding materials with various fillers like clay and silica.

Epoxies. These are similar to the polyesters in general use. They are superior in bonding quality to glass filament reinforcement, shrink less than polyesters upon curing, but are trickier to handle and more costly.

Silicones. Where resistance to temperature extremes, moisture, extreme exposure to sunlight or ultraviolet light, and outstanding electrical characteristics are required, the silicones enter into the picture. In building they form the basis of masonry waterproofing treatments and have found some use as soft rubber formulations for setting glass. They can be had as molding, coating, greases and oils. Their cost is high, but their durability recommends them for exposed conditions. Silicon rather than carbon is the basic element of silicones.

FOAMS

Foamed plastics provide lightweight bulk materials having good heat-insulating values. Foamed polystyrene boards, planks and blocks have found use as roof and refrigerator insulation. Cellular cellulose acetate is similar. Both have been used as cores of sandwich panels. Phenolics and isocyanates are often foamed in place, as in irregularly shaped refrigerator walls. Expanded polyvinyl chloride can be made hard, medium and soft, as in cushions. Other plastics, such as mixed copolymers of styrene and synthetic rubber, are also available as foams. Cost and ease of placement must be considered when comparing plastic foams with other lightweight materials. Cost is relatively high for many plastic foams, but other advantages, such as low moisture penetration or ease of foaming in place, may offset the cost factor.

LAMINATES AND REINFORCED PLASTICS

Laminates are becoming increasingly common in building for counter tops, furniture construction, wall covering such as dadoes, surfacing for doors, and a variety of other purposes. Reinforced plastics have become common as flat and corrugated translucent sheets for daylighting, illumination, facings for sandwiches and similar applications. The dividing line between these two classes of materials is hazy because both consist of combinations of synthetic resin and a reinforcing material in the form of sheet, fabric or mat. The term *laminate* customarily refers to combinations in which the resin is phenolic, melamine, silicone or other resin requiring relatively high pressures and temperatures to effect a cure. The reinforced plastics employ polyesters, epoxies or similar resins which can be molded at low pressures and may be cured at room temperatures. There is considerable overlap in the temperature-pressure combinations employed in making laminates and reinforced plastics.

Sheet stocks employed fall into the following categories:

Paper. This includes kraft, sulfite and various finished papers with printed designs for decorative purposes.

Fabric. For greater toughness and strength, fine-weave or coarse-weave cotton fabrics are preferred to paper but cost more. Nylon is still tougher and stronger.

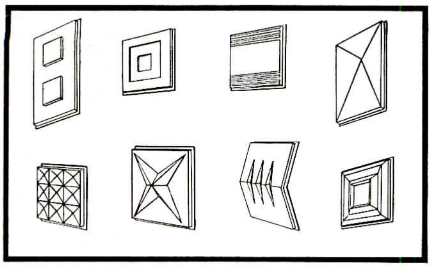
Asbestos. Felted and woven asbestos increases heat resistance.

Wood veneers. Fine wood veneers are widely used as decorative finish layers in laminates.

Glass filaments. The great majority of reinforced plastics, such as the corrugated and flat building sheets, employ glass fiber in some form. When drawn into filaments several hundred-thousandths of an inch in diameter, glass becomes phenomenally strong and exceeds high-strength metal alloys, especially on an equivalent weight basis. Glass filaments are chopped and made into mats or twisted into yarns and woven into fabrics; or the continuous filaments are used as parallel-laid bundles and ropes for rod reinforcement, or are woven into a variety of fabrics such as square-weave, satin-weave and unidirectional, in which most of the yarns run in one direction.

In building, the most common use for laminates is as decorative material incorporating a layer of wood veneer or printed paper overlaid with transparent water and alcohol-proof melamine and backed with phenolic-impregnated paper. If a sheet of aluminum foil is incorporated directly under the decorative sheet, the "cigarette-proof" variety is obtained. The aluminum conducts heat away so fast that a cigarette burning on the surface does not char it.

USES OF PLEXIGLAS



Advantages and limitations of Plexiglas together with assembly and installation details of Plexiglas lighting fixtures, dome skylights, partitions, signs and store display fixtures are presented in a 16-page, illustrated booklet. A page from the booklet illustrating some uses of Plexiglas is shown above. *Rohm Haas Co., Washington Sq., Philadelphia 5, Pa.**

LIMESTONE SPECIFICATIONS

A 20-page specification manual lists physical characteristics, grading, surface finishes and cut stone fabrication of Indiana Limestone. *Indiana Limestone Co., Inc., Bedford, Ind.**

BATHROOM PLANNING

•Information on area planning, fixture selection and design trends for single and multiple bathroom installations is offered in the 24-page, illustrated American-Standard bathroom planning manual. 25¢. *American Radiator and Standard Sanitary Corp., P.O. Box 1226, Pittsburgh, Pa.**

• Toilet compartments, shower and dressing rooms, shower units and hospital cubicles are described and illustrated in a 16-page catalog which also includes a color chart and specifications. *Mills Metal Compartment Co., 997 Wayside Rd., Cleveland 10, Ohio.*

DUCT FLOORS

Electrified reinforced concrete joist floors are described and illustrated in detail in a 16-page booklet issued by *The Fireproof Products Co., Inc., 138 Bruckner Blvd., New York 54, N. Y.*

**Other product information in Sweet's Architectural File, 1955.*

ALUMINUM PRODUCTS

• *Alcoa Aluminum in Architecture* contains information, illustrations and charts and includes a discussion of colored aluminum exterior surfaces and basic types of aluminum finishes available from *Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.**

• A 16-page brochure contains wrought aluminum alloy and casting alloy selection guides and explains aluminum fabricating and finishing methods. *Reynolds Metals Co., 2500 S. Third St., Louisville, Ky.**

• A wall chart listing aluminum products includes sizes, estimated weight per foot, alloys and a conversion table from old to new alloy designations. *Industrial Service Div. 10, Kaiser Aluminum & Chemical Sales, Inc., 1924 Broadway, Oakland 12, Calif.*

• The availability, properties, advantages and methods of joining and bending aluminum electrical bus conductors are detailed in a 12-page publication from *Kaiser Aluminum and Chemical Corp., 1924 Broadway, Oakland 12, Calif.**

CORK TILE FLOORING

• Design data, specifications, installation instructions and information on care and maintenance of cork tile are included in an 8-page catalog as well as full-color charts illustrating available patterns and colors. *Dodge Cork Co., Inc., Lancaster, Pa.**

INSTITUTIONAL KITCHENS

• A file folder consisting of specifications, drawings and illustrations of commercial refrigerators for hotels and restaurants describes normal temperature reach-in, reach-through and walk-in refrigerators as well as low temperature reach-in and walk-in models. *The C. Schmidt Co., Dept. A, 1712 John St., Cincinnati 14, Ohio.*

• Wall-type fixtures and greaseceptors for institutional kitchens are described in a 4-page folder. *Zurn Mfg. Co., Plumbing Div., Erie, Pa.*

• Specifications, descriptions and photographs of custom-built soda fountains and equipment are included in a 12-page booklet from the *S. & R. Soda Fountain Mfg. Co., 1314 Southern Blvd., New York 59, N. Y.*

SOIL-TESTING EQUIPMENT

Apparatus for engineering tests of soils, concretes, asphalt and construction materials as well as suggested laboratory layouts is shown in a 104-page catalog available from *Soiltest Inc., 4520 W. North Ave., Chicago 39, Ill.*

FLOOR, ROOF SLABS

• Properties and uses of monolithically cast floor and roof slabs, are listed in an 8-page catalog which also includes diagrams of basic structural and mechanical details. *The Flexicore Co., Inc., 1932 E. Monument Ave., Dayton 1, Ohio.*

PAINT SPECIFICATION MANUALS

• *Painting specifications* covering all types of exterior and interior work on residential, institutional, commercial and industrial construction are presented in the 8th edition of the *Pratt & Lambert Architectural Specification Manual.* In addition to general conditions and master specifications, the book includes color planning, color relationships, safety color codes and light reflection. *Pratt & Lambert, Inc., Architectural Service Dept., 3301 38th Ave., Long Island City 1, N. Y.* (or Buffalo, Chicago or Fort Erie, Ontario.)

• A 12-page paint catalog presents a complete line of paint, texture paint, joint cement and tape, sprackling putty, paint and varnish removers and liquid brush cleaner. *Luminall Paints, Div. of Nat'l Chemical & Mfg. Co., Chicago, Ill.*

(Continued on page 310)

PREFABRICATED CONCRETE WALL PANELS CUT COSTS IN SWEDEN

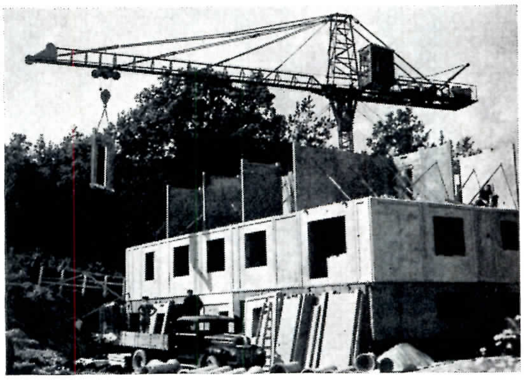
Construction time and costs are being cut in half in Sweden by a new method of prefabrication in which both inner and outer concrete wall panels are completely assembled in various designs and sizes in a factory or at the building site ready for installation.

Outside walls, in which door and window moldings are pressed, consist of two layers of concrete separated by a rock-wool insulation. The high insulating properties of these outside walls make it possible to use panels thinner than conventional walls and thus save considerably on floor space. Triple-pane windows also provide adequate insulation against the winter cold.

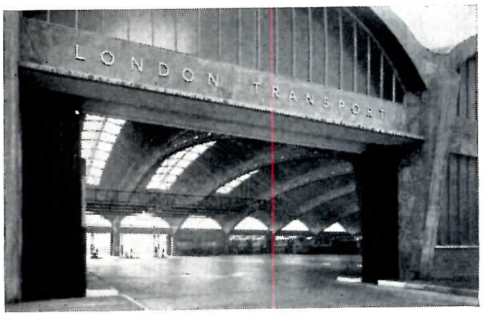
Inside walls are only 4 in. thick, except where high sound insulation is required, where they measure 5 in. They are covered directly with special plastic paints with a synthetic putty content.

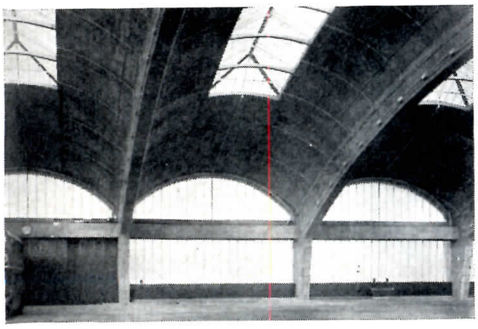
The wall panels, prenumbered according to the design of the architect, are lifted into place by means of traveling cranes and fastened together and to floors by tenons and mortices. The panel numbering system saves much time in assembly, since a supervisor equipped with an ultra-shortwave transmitter gives instructions as to placement.

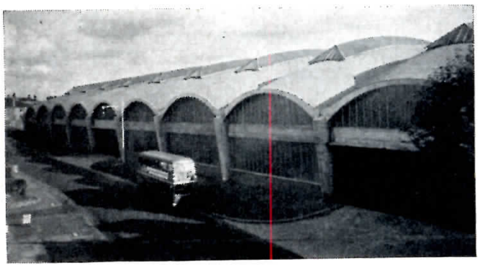
The "Nabohus" method, at present being put to the test in municipal housing projects in several Swedish cities, is expected to produce "more housing units at lower rents," says Stockholm architect Hans-Ancker Holst, who conceived the system. Mr. Holst points out that the method is as well suited for schools, hospitals and similar structures as it is for houses.



CONCRETE ARCHES SPAN 194 FT IN LONDON GARAGE







Reinforced concrete arches which span 194 ft in a London bus garage make possible an area of 73,350 ft entirely unobstructed by internal columns. Built for the London Transport Executive, which needed a covered parking area for 200 double-decker buses, Stockwell Garage is divided into nine 42-ft bays along its 392-ft length.

Reinforced concrete vaults, which cantilever from the arch ribs, form the main roof covering. A natural lighting area 140 ft long by 14 ft wide opens into each bay. Reinforced concrete ribs 6 in. wide on 10-ft centers span the lighting area to support out-of-balance loading resulting from snow or other loads and thus prevent torsion on the main arch ribs.

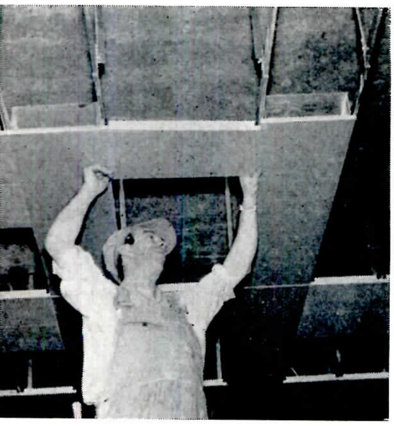
The only longitudinal tie between the arch frames is an H beam along the sides of the garage, the location of which was determined by a headroom of 16 ft. Within the H beam are concealed a 9-in. cast-iron rain disposal pipe, a 6-in. sprinkler main, compressed air and water ring mains and electric lighting and clock conduits. From it also are hung the main entrance doors and those to the docking area. Expansion joints are provided in the H beam on each side of the garage.

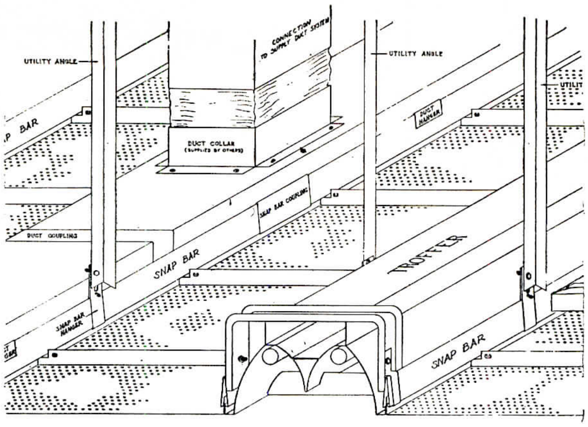
The arch ribs, 26 in. wide, are 7 ft deep at the crown, increase to 10½ ft at the H beam level and decrease again to 6 ft at ground level. Below floor level the rib sections are widened out to provide increased stability. Each of the two end frames is further strengthened by an external member 18 in. wide connected to it by 12-in. slabs top and bottom to form a reinforced concrete box 8 ft wide. This section is designed to withstand any out-of-balance thrust arising from live loads.

The arch ribs are carried on pile foundations sustaining a load of approximately 400 tons. Where they sit on the pile caps, special hinges are provided, and the thrust arising from arch action is taken by steel ties connecting opposite pile caps.

Vertical glazing fills the spandrels of the barrel arches to supplement the natural lighting provided by the open roof areas. Artificial lighting comes from fluorescent fittings along the arch of the main ribs.

Architects: Adie, Button & Partners, London, in association with Thomas Bilbow, chief architect of the London Transport Executive





CEILING INTEGRATES HEATING, VENTILATION, ACOUSTICS, LIGHTING

The American Telegraph and Telephone Company's new building in White Plains, N. Y., gets its heating, ventilation, acoustical treatment and lighting, and can get its air conditioning, from one ceiling unit. Aluminum ducts, integrated with the ceiling construction and flush with the bottom of the ceiling, have bottoms which become radiant panels as heated air is passed through them. The same air continues the heating job when it is discharged into rooms through the holes in standard Simplex acoustic panels.

Air enters the ducts at a temperature about 30 F higher than that desired at the outlets and has lost half its differential by the time it reaches the panel holes. There is no concentrated draft from the ceiling, because of the diffused discharge of air and the fact that the radiant panel effect cuts down on the amount of room air that is required. Return air is picked up at registers above the windows and behind slots in the ceiling and carried back in return ducts between the ceiling and the floor slab above.

Snap bars attached to lengths of utility angles form the only framework for the suspended ceiling. Anodized aluminum duct bottoms and acoustic panels and recessed light troffers are snapped into the bars. The acoustic panels, occupying about 75 per cent of the ceiling area, are topped by $1\frac{1}{4}$-in. rockwool pads wrapped in flame-proof envelopes to provide a noise reduction coefficient of 65 per cent.

Lorimer and Rose, New York, were architects and engineers. Richard P. Goemann, Head of the Mechanical Dept. of this firm, designed the system while in the same position with John D. Dillon, consulting engineer.

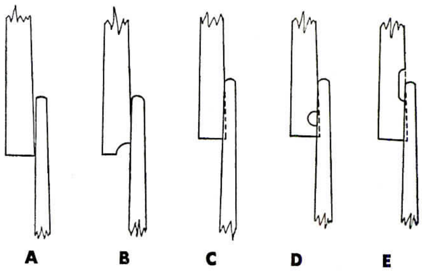
PAINT BLISTERING REDUCED BY WATER REPELLENTS

Paint blistering as a result of the entry of rainwater through wood siding can be minimized or eliminated by such methods as applying a water repellent and dressing the back of standard-pattern siding. Results of laboratory tests conducted at the Forest Products Laboratory, Forest Service, U. S. Department of Agriculture, show that rainwater is as important a source of paint difficulties in wood-sided houses as water that accumulates by cold-weather condensation. They are reported by L. V. Teesdale, engineer, under the title, "Water Repellents Reduce Rain-caused Paint Blistering on Wood Siding."

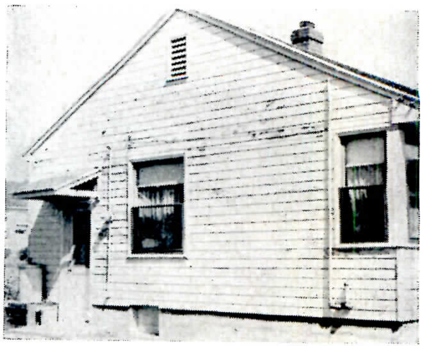
Some rain has always got behind siding, driven in by the wind or drawn up in back by capillary action, even in old houses which were protected with good overhangs and narrow-pattern siding. However, there was little trouble with paint blistering in old houses because the paint used was much less sensitive to moisture than modern paints. Many modern houses show paint failure, according to Mr. Teesdale, because they are designed with no overhang at the gables and very little at the eaves and are coated with moisture-sensitive paints.

The Laboratory, in coöperation with the Weyerhaeuser Timber Company, set up a number of tests at Madison, Wis., to simulate various causes and effects of paint failure. Panels of 8- by $\frac{7}{16}$-in. standard-pattern bevel siding were assembled so that both the back and the front could be observed and then were examined before and after treatment and under exposure to spray and to wind-driven spray. Laps were varied in the panels to determine the effect of overlap on wetting, and several modified patterns were tested to determine the effect

(Continued on page 246)

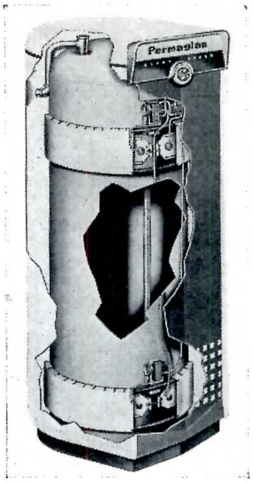


Siding patterns tested in exploratory studies: A — Standard pattern. B — Standard pattern with drip. C — Back-dressed. D — Horizontal groove (back-dressed). E — Wide horizontal groove (back-dressed).



Limited overhang of gable end of house shown at right did not prevent frequent wetting from rains that damaged the siding and paint

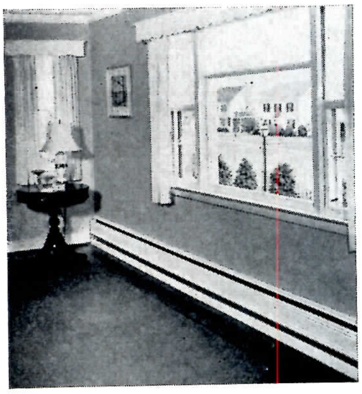
HOME WATER HEATER IS BODY- AND COLOR-STYLED AS "VISIBLE" APPLIANCE

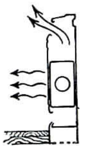


The home water heater has been dressed up to move out of the cellar and into the kitchen or utility room where it will be closer to the many appliances which are putting such an increasingly heavy load on it. The kitchen installation at right shows the new Permaglas PG Deluxe gas water heater, which features a removable front panel of aqua, a new square look, "Eye-Hi" temperature control in the copper-toned hood, and a new closed-end tank structure which lowers the over-all height of the heater. Available in 30-, 45- and 65-gal models, the heaters incorporate all the features of the Permaglas line. A 10 per cent increase in hot water delivery in the 30-gal model was accomplished by boosting its heat input rating to 33,000 Btu per hr.

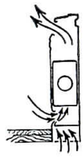
The cutaway drawing to the right shows one of the new PE Deluxe electric water heaters, which are styled just like the gas heaters except for the "Eye-Hi" control, which on these models is purely decorative because of utility regulations. A flexible wrap-around heating element, which can be removed or inserted in a matter of minutes, extends to the electric line the Heetwall principle of heat-reflecting action against the tank wall. The PE Deluxe heaters are available in 50-, 66- and 80-gal models. The conventional lines of Permaglas heaters feature improvements also, the most important of which is rear flue take-off. *A. O. Smith Corp., Milwaukee 1, Wis.*

YEAR-ROUND BASEBOARD HEATING-COOLING SYSTEM





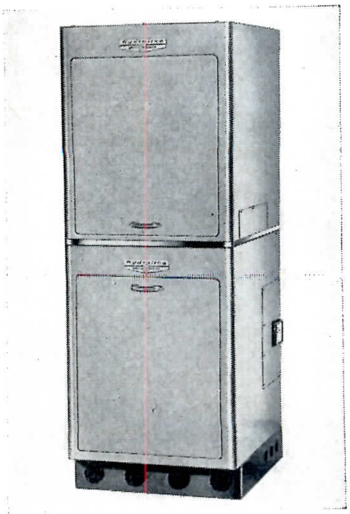
HEATING



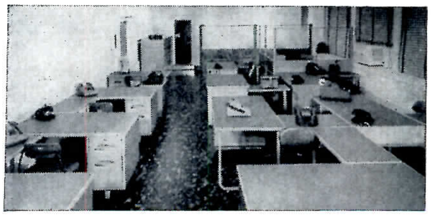
COOLING

A year-round baseboard heating-cooling system was exhibited to architects, engineers and contractors for the first time in January at the International Heating and Ventilating Exposition in Philadelphia. The new system incorporates a chiller that provides chilled water through the same baseboard facilities as those used for heating. A central blower distributes a controlled quantity of air via built-in ducts which extend parallel under the entire length of each baseboard element. The air circulates around the cooled pipe and fins and flows out of the top aperture and over the wall areas. The boiler, which can be operated independent of the system in the summertime, supplies hot water to the baseboard pipe in the winter. Note that convection and radiation apply in winter. *The Vulcan Radiator Co., 775 Capitol Ave., Hartford, Conn.*

Hot-water Boiler and Water Chiller Combined in One Unit

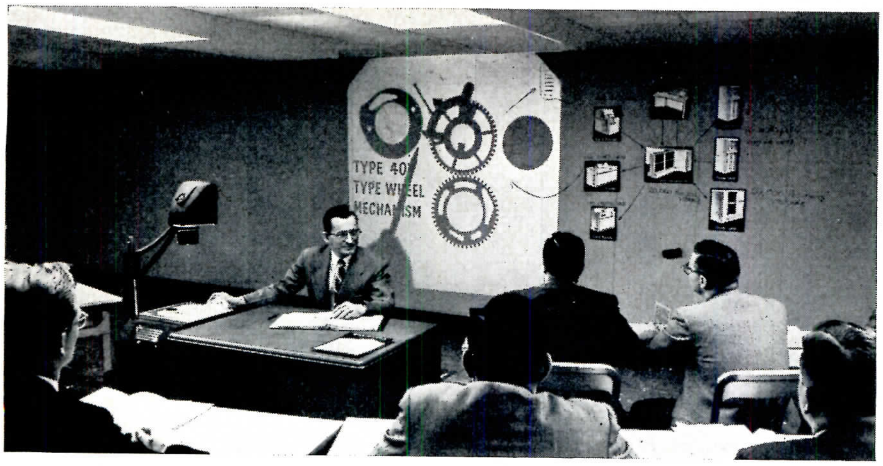


A gas-fired hot-water boiler and water chiller combined in one unit has been designed for year-round forced-water air conditioning systems in medium-sized homes and small commercial structures. Engineered for the Hydraline central heating-cooling system, the Hydraline boiler-chiller combination takes up only 2 sq ft on the floor in its vertical position and is 66⅜ in. high. If desired, the package can be placed with chiller and boiler side by side, in which position the unit measures 36 in. high by 48 in. wide by 24 in. deep. The unit is self-contained and is shipped fully assembled ready for connection. *Hydraline Products Div., Borg-Warner Corp., 18538 Mack Ave., Detroit 36, Mich.*



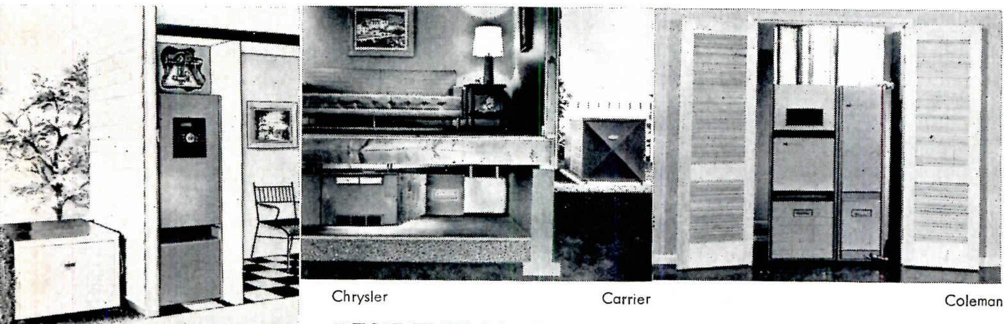
Integrated Office Furniture

"Office-ettes," integrated modular office furniture, can be assembled in an unlimited number of arrangements. Made of steel or wood, with linoleum or vinyl tops and finished in standard or decorators' colors, this equipment can save up to one-third of the floor space in an office, says manufacturer. "Partition-ettes" provide semi-privacy for supervisory personnel. *Arnot-Jamestown Div., Aetna Steel Products Corp., Jamestown, N. Y.*



CHALKBOARD PARTITION SERVES MANY PURPOSES

A *multi-purpose chalkboard partition* has been produced which serves also as a projection screen, bulletin board and sound barrier. Effective in visual education, the *Armorply* panels can combine large screen projections, illustrations held to the surface by magnetic disks and chalk-written explanations, as shown above in the first installation at the New York Training Center of International Business Machines. The incombustible wall panels are constructed of a 2-in.-thick gypsum core to which is bonded on one side a sheet of 18-gauge steel with porcelain surface and to the other side a sheet of paint-grade steel. They are anchored to floor and ceiling with metal angles. After many tests with color, it was found that a rose-tinted gray surface served best in the I.B.M. classroom both for esthetic and for practical reasons. *U. S. Plywood Corp., 55 West 44th St., New York 36, N. Y.*



Chrysler — Carrier — Coleman

RESIDENTIAL AIR CONDITIONING SYSTEMS

• The *Airtemp Spacesaver* provides air conditioning with no loss of floor space, requiring only 14½ in. of additional height above a forced air furnace. A water-cooled condenser located outside the house, in the garage or in a crawl space or basement is connected to a new "V" coil above the furnace. *Airtemp Div., Chrysler Corp., 1600 Webster St., Dayton 1, Ohio.*

• *Carrier's Conversion Weathermaker* model for 1955 is designed for addition to horizontal forced warm air furnaces, usually installed in attic or crawl spaces of basementless homes. The coil package inserted in the ductwork at the discharge end of the furnace adds cooling, dehumidifying and air cleaning. A weatherproof and tamperproof air-cooled refrigerating unit installed in the yard eliminates water use. *Carrier Corp., Syracuse, N. Y.*

• The *Blend-Air heating-cooling system* distributes air that is balanced properly to supply the temperature requirements of every room in a house. The key is a vertical cooling unit used in conjunction with a plenum cooler mounted on top of a furnace. The vertical cooler is started by a thermostat and sends cool air through its own supply duct system to mix with air from the furnace ducts in proportionate amounts in each room. *Coleman Co., Wichita, Kan.*

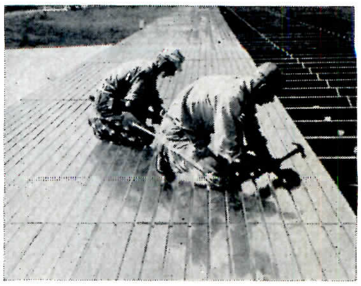
Automated Plants Possible With Central Control System

A *central control system* automatically switches on or off up to 40 groups of remote operations including lights, heating and air conditioning, signs, signals, pumps, valves and motors and starting and stopping production line machinery in automated plants. The system uses carrier current signals and operates over existing electrical conduits so that separate transmission wire does not have to be installed.

The basic components of the system are its central operations panel, transmitter and coded relays. The central operations panel is the source of the system's "commands." A supervisor can check on his many remote-controlled services merely by glancing at the indicator lights on the panel. He can also depart from the preset program on the panel, to stop motors in a particular section of the plant or turn on facilities for a special night shift. Through relays and an electronic transmitter, the "command" pulses are sent to coded relays, which reject all pulses other than those to which they are preset to respond. The system is designed so that it can be expanded easily at any time with additional circuits, pluggable relays and pluggable programming units. *International Business Machines Corp., 590 Madison Ave., New York 22, N. Y.*

Galvanized Steel Roof Deck

Galvanized steel roof deck, designed specifically for use with Stran-Steel framing, is nailed to joists and can be topped immediately with lightweight insulation board and built-up roofing. Total weight of the system, including insulation, is less than 3 psf. The decking, which has great strength-to-weight ratio, is 24 in. wide and comes in lengths of 8 ft 2 in., 10 ft 2 in. and 12 ft 2 in. *Great Lakes Steel Corp., Stran-Steel Div., Detroit 29, Mich.*



(*More products on page 258*)

THERMAL INSULATION—9: U Factors for Masonry Walls

By Laurence Shuman, Consulting Engineer

Legend:

Interior Finishes		Furring Space Treatment
A No finish, plain wall	**E** Gypsum lath, ⅜″, plastered	**1** No furring
B Plaster, ½″, direct on masonry	**F** Insulation board, ½″, plain or decorated	**2** 1″ nominal furring, faced with ordinary materials
C Metal lath and plaster	**G** Insulation board, ½″, plastered	**3** Same, faced with reflective coated paper 1 side
D Gypsum board, ⅜″, decorated	**H** Insulation board, 1″, plastered	**4** Same, faced with aluminum foil 1 side
		5 Same, space filled with flexible insulation

Masonry Material	Masonry Thickness	Furring Space	A	B	C	D	E	F	G	H
Stone	8″	1	.70	.64	..	..	..	..	..	..
		2	..	..	.38	.37	.35	.25	.24	.17
		3	..	..	.28	.28	.26	.20	.19	.15
		4	..	..	.24	.23	.22	.18	.17	.13
		5	..	..	.23	.23	.22	.18	.17	.14
	12″	1	.57	.53	..	..	..	..	..	..
		2	..	..	.34	.33	.31	.23	.22	.17
		3	..	..	.25	.25	.24	.19	.18	.14
		4	..	..	.22	.22	.21	.17	.16	.13
		5	..	..	.22	.21	.21	.17	.16	.13
	16″	1	.49	.45	..	..	..	..	..	..
		2	..	..	.30	.30	.29	.22	.21	.16
		3	..	..	.23	.23	.22	.17	.17	.13
		4	..	..	.20	.20	.20	.16	.15	.12
		5	..	..	.20	.20	.19	.16	.16	.13
	24″	1	.37	.35	..	..	..	..	..	..
		2	..	..	.25	.25	.24	.19	.18	.14
		3	..	..	.20	.20	.19	.16	.15	.12
		4	..	..	.18	.18	.17	.14	.14	.11
		5	..	..	.18	.18	.17	.15	.14	.12
Cut stone veneer plus hollow block	4″ stone 8″ gravel block	1	.47	.44	..	..	..	..	..	..
		2	..	..	.30	.30	.28	.21	.21	.16
		3	..	..	.23	.23	.22	.17	.17	.13
		4	..	..	.20	.20	.19	.16	.15	.12
		5	..	..	.20	.20	.19	.16	.16	.13
	4″ stone 8″ cinder block	1	.36	.34	..	..	..	..	..	..
		2	..	..	.25	.25	.24	.19	.18	.14
		3	..	..	.20	.20	.19	.16	.15	.12
		4	..	..	.18	.17	.17	.14	.14	.11
		5	..	..	.18	.18	.17	.14	.14	.12
	4″ stone 8″ light-weight block	1	.32	.30	..	..	..	..	..	..
		2	..	..	.23	.23	.22	.18	.17	.14
		3	..	..	.18	.18	.18	.15	.14	.12
		4	..	..	.16	.16	.16	.13	.13	.11
		5	..	..	.17	.17	.16	.14	.14	.11
Cut stone veneer plus poured concrete	4″ stone 6″ concrete	1	.63	.58	..	..	..	..	..	..
		2	..	..	.36	.35	.33	.24	.23	.17
		3	..	..	.26	.26	.25	.19	.19	.14
		4	..	..	.23	.23	.22	.17	.17	.13
		5	..	..	.22	.22	.21	.17	.17	.13
	4″ stone 8″ concrete	1	.57	.53	..	..	..	..	..	..
		2	..	..	.34	.33	.31	.23	.22	.17
		3	..	..	.25	.25	.24	.19	.18	.14
		4	..	..	.22	.22	.21	.17	.16	.13
		5	..	..	.22	.21	.21	.17	.16	.13

Masonry Material	Masonry Thickness	Furring Space	A	B	C	D	E	F	G	H
Cut stone veneer plus hollow tile	4″ stone 6″ tile	1	.37	.35	..	..	..	..	..	..
		2	..	..	.26	.25	.24	.19	.18	.14
		3	..	..	.20	.20	.19	.16	.15	.12
		4	..	..	.18	.18	.17	.14	.14	.11
		5	..	..	.18	.18	.17	.15	.14	.12
	4″ stone 8″ tile	1	.36	.34	..	..	..	..	..	..
		2	..	..	.25	.24	.24	.19	.18	.14
		3	..	..	.20	.20	.19	.16	.15	.12
		4	..	..	.18	.17	.17	.14	.14	.11
		5	..	..	.18	.18	.17	.14	.14	.12
Hollow concrete blocks, gravel aggregate	8″	1	.56	.52	..	..	..	..	..	..
		2	..	..	.33	.33	.31	.23	.22	.16
		3	..	..	.25	.25	.24	.18	.18	.14
		4	..	..	.22	.22	.21	.17	.16	.13
		5	..	..	.21	.21	.21	.17	.16	.13
	12″	1	.49	.46	..	..	..	..	..	..
		2	..	..	.31	.30	.29	.22	.21	.16
		3	..	..	.23	.23	.22	.18	.17	.13
		4	..	..	.21	.20	.20	.16	.15	.12
		5	..	..	.20	.20	.20	.16	.16	.13
Hollow concrete blocks, cinder aggregate	8″	1	.41	.39	..	..	..	..	..	..
		2	..	..	.27	.27	.26	.20	.19	.15
		3	..	..	.21	.21	.20	.16	.16	.13
		4	..	..	.19	.19	.18	.15	.14	.12
		5	..	..	.19	.19	.18	.15	.15	.12
	12″	1	.39	.37	..	..	..	..	..	..
		2	..	..	.26	.25	.24	.19	.19	.14
		3	..	..	.20	.20	.19	.16	.15	.12
		4	..	..	.18	.18	.17	.14	.14	.11
		5	..	..	.18	.18	.17	.15	.14	.12
Hollow concrete blocks, light-weight aggregate	8″	1	.36	.34	..	..	..	..	..	..
		2	..	..	.25	.24	.23	.19	.18	.14
		3	..	..	.20	.19	.19	.15	.15	.12
		4	..	..	.17	.17	.17	.14	.14	.11
		5	..	..	.18	.18	.17	.14	.14	.12
	12″	1	.34	.33	..	..	..	..	..	..
		2	..	..	.24	.24	.23	.18	.18	.14
		3	..	..	.19	.19	.18	.15	.15	.12
		4	..	..	.17	.17	.16	.14	.13	.11
		5	..	..	.17	.17	.17	.14	.14	.11

NORTH AMERICAN BUILDING STONES—14

Presented through the cooperation of the International Cut Stone Contractors' and Quarrymen's Association

INDEX OF BUILDING STONES

50 ROCKWOOD STONE
Company Name: Alabama Limestone Co.
Quarry Location: Rockwood, Russellville, Ala.
Geological Designation: Oolitic Limestone
Texture: Extremely fine-grained
Color: Gray with heavy veining, cream
Chemical Composition: Calcium carbonate—98%
Physical Tests: 4.4% in 25 hr
Strength: Crushing strength—4553 psi
Weight: 145 pcf
Furnished As: Dimensional, Splitface
Surface Coverage: Splitface—100 sq ft in 2.3 tons
Other Facts: See also Clouded buff, Veined gray

51 STE. GENEVIEVE LIMESTONE
Company Name: Ste. Genevieve Building Stone Co., Inc.
Quarry Location: Bloomsdale, Ste. Genevieve County, Mo.
Geological Designation: Dolomitic Limestone (joachim formation)
Color: Cream
Physical Tests: Specific gravity—2.46%
Weight: 155 pcf
Furnished As: Ledgestone: Heights—2″–10″. Lengths—12″–36″. In rough and semi-rough finishes
Surface Coverage: 40 sq ft per ton

52 SANDY STONE
Company Name: Wilford H. Hansen
Quarry Location: Sandy, Utah
Geological Designation: Nugget Sandstone
Texture: Fine-grained
Color: Buff to gray, red to purple
Chemical Composition: Tests not completed
Physical Tests: Specific gravity—2.33%; absorption of moisture—1.50%
Strength: Crushing strength—12,400 psi
Weight: 145.2 pcf
Furnished As: Splitface, Ledgestone: Heights—1″—13″. Lengths 6″–48″
Surface Coverage: 40 sq ft

53 SANTA MARIA STONE
Company Name: G. Antolini and Sons
Quarry Location: 18 miles northeast of Santa Maria, Calif. (Mail address: 131 Gutierrez St., Santa Barbara, Calif.)
Geological Designation: Dolomitic Limestone
Color: White, cream, rust
Chemical Tests: Silica—22 millimols; reduction in alkalinity—150; ratio *Sc: Rc*—0.147; indicated quality—innocuous
Physical Tests: Specific gravity—2.487%; absorption of moisture—3.35%; sodium sulphate soundness test loss—2.5%
Strength: Compressive strength, parallel, dry—21,700 psi, wet—22,000 psi; perpendicular, dry—16,300 psi, wet—11,300 psi
Furnished As: Dimensional, Splitface, Ledgestone, Flagstone. Heights—1″–9″. Lengths—10″–4′
Surface Coverage: 40 sq ft per ton ashlar veneer; 100 sq ft per ton flagstone

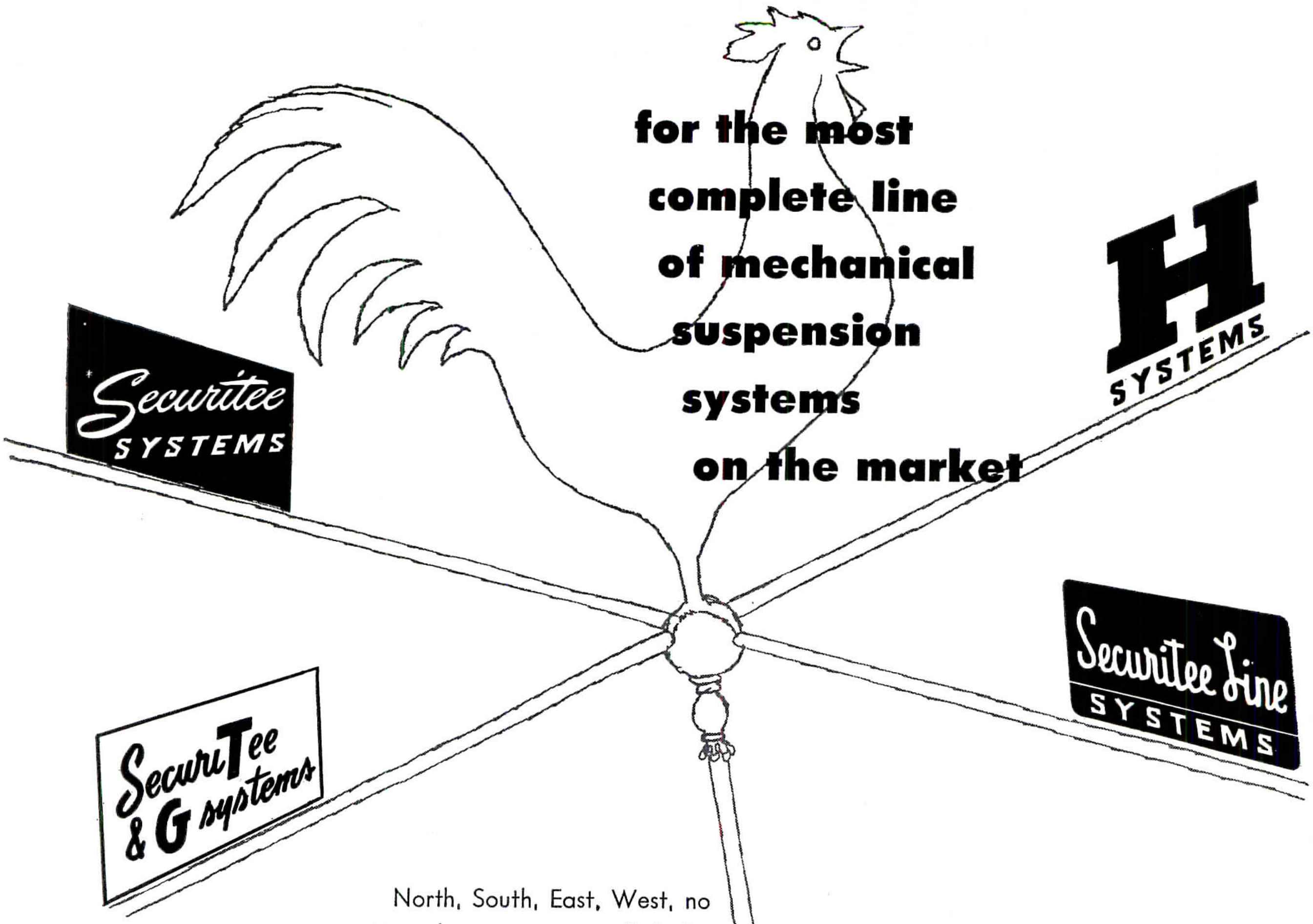
54 SILVERDALE STONE
Company Name: The Silverdale Cut Stone Co.
Quarry Location: Silverdale, Kan.
Geological Designation: Oolitic Limestone
Color: Buff
Physical Tests: Absorption of moisture—16.50%; weathering, freezing to cause failure—316
Strength: Shear by punching test—1725 psi; modulus of rupture—1055 psi; dry compression—6500 psi
Furnished As: Dimensional, Splitface: Heights—2¼″, 5″, 7¾″

55 SUNSET STONE
Company Name: Burlington Quarries Corp.
Quarry Location: Burlington, Wis.
Geological Designation: Dolomitic Limestone
Texture: Fine-grained
Color: Variegated
Chemical Composition: Silica—12.78%; aluminum oxide—22.50%; calcium carbonate—31.72%; magnesium carbonate—30.00%
Physical Tests: Specific gravity—2.78%; absorption of moisture—3.26%; freezing and thawing did not affect stone
Strength: Crushing strength—16,078 psi
Weight: 159.15 pcf
Furnished As: Heights—1½″–8″. Lengths—10″–48″
Surface Coverage: 40 sq ft per ton

56 TENNESSEE STONE
Company Name: Loeffler Quarries
Quarry Location: Crossville, Tenn. (Mail address: 14501 Hamilton Ave., Detroit, Mich.)
Geological Designation: Quartzite
Color: Gray, pink, tan, buff, variegated
Furnished As: Ledgestone. Heights—1″–6″. Lengths—random 8″ to 4′
Surface Coverage: 40 sq ft per ton ashlar veneer

57 TENNESSEE VARIEGATED STONE
Company Name: Turner Brothers Stone Co.
Quarry Location: 4 miles east of Crossville, Tenn.
Geological Designation: Quartzite
Color: Pink, tan, buff, gray, variegated
Physical Tests: Absorption of moisture—1–1.27%; abrasive hardness—wear per 10,000 revolutions—1.52%
Strength: Crushing strength—20,850 psi
Weight: 162 pcf
Furnished As: Pitched Face (Strip rubble): Heights—1″–8″. Lengths—from 6″. Strataface, Ashlar Strips: Thickness—2″–3½″, 3⅝″–5″. Flagging: Heights—½″–3½″. Treads and coping
Surface Coverage: 33 sq ft per ton
Other Facts: Nonslip, impervious, nonfading

for the most complete line of mechanical suspension systems on the market



North, South, East, West, no matter where you go you'll find a W. J. Haertel suspension system in use. Five top brands, eight different styles —all quality products, carefully engineered, accurately fabricated. It's the most complete quality line of mechanical suspension systems, for the erection of acoustical tile, on the market. See Sweets Architectural File or write direct for complete technical data.

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NORTH AMERICAN BUILDING STONES—15

Presented through the cooperation of the International Cut Stone Contractors' and Quarrymen's Association

INDEX OF BUILDING STONES — (To be continued in a later issue)

58 TENNQUARTZ STONE

Company Name: Tennessee Stone Co., Inc.
Quarry Location: Crab Orchard District, Tenn.
Geological Designation: Quartzite
Color: Pink, tan, buff, gray, variegated
Chemical Composition: Alumina—2.98%; iron oxide—0.72%; titanium oxide—0.25%; calcium oxide—0.10%; magnesium oxide—0.42%; silica (by difference)—94.88%; loss in ignition—0.60%
Physical Tests: Specific gravity—2.57%; absorption of moisture—1.53%; coefficient of hardness, with strata—18.06%, against strata—16.8%; toughness test (blows to fracture), with strata—14%; against strata—20%
Strength: Compression test, dry condition, with the strata—26,833 psi, against the strata—17,366 psi; saturated condition, with the strata—25,667 psi, against the strata—13,950 psi
Weight: 162.4 pcf
Furnished As: Ledgestone (rubble veneer): Heights—1″–10″. Lengths—random from 8″ to 4′. Masonry bed approx 4½″. Flagstone: Heights—½″–5″. Lengths—1′–8′
Surface Coverage: 1 in. thick—140 sq ft per ton. 2 in. thick—70 sq ft per ton

59 VEINED GRAY STONE

Company Name: Alabama Limestone Co.
Quarry Location: Aday, Russellville, Ala.
Geological Designation: Oolitic Limestone
Texture: Extremely fine-grained
Color: Pearl gray with a regular darker pencil-width vein
Chemical Composition: Calcium carbonate—98%
Physical Tests: Moisture absorption—4.4% in 25 hr
Strength: Crushing strength—4553 psi
Weight: 145 pcf
Furnished As: Dimensional, Splitface
Surface Coverage: Splitface—100 sq ft in 2.3 tons
Other Facts: See also Clouded buff, Rockrange, Rockwood

60 VICTOR GREY—VICTOR—VARIEGATED STONE

Company Name: Victor Oolitic Stone Co.
Quarry Location: Bloomington, Ind.
Geological Designation: Oolitic Limestone
Texture: Fine
Color: Gray, gray-buff
Chemical Composition: Calcium carbonate—approx. 98%
Strength: Crushing strength—5500 psi
Weight: 175 pcf
Furnished As: Dimensional

61 VICTOR HURO STONE

Company Name: Victor Oolitic Stone Co.
Quarry Location: Bloomington, Ind.
Geological Designation: Oolitic Limestone
Texture: Fine to medium
Color: Buff
Chemical Composition: Calcium carbonate—98.6%; magnesium carbonate, silica, iron oxide—2.0%
Physical Tests: Absorption of moisture—1–2%; abrasive hardness—9 plus
Strength: Crushing strength—10,000–17,500 psi
Weight: 185 pcf
Furnished As: Dimensional

62 VICTOR ROUGE BUFF STONE

Company Name: Victor Oolitic Stone Co.
Quarry Location: Bloomington, Ind.
Geological Designation: Oolitic Limestone
Texture: Medium to medium coarse
Color: Rouge coloration combined with buff
Chemical Composition: Calcium carbonate—approx. 98%
Strength: Crushing strength—5500 psi
Weight: 180 pcf
Furnished As: Dimensional

63 VICTOR TRAVERTINE STONE

Company Name: Victor Oolitic Stone Co.
Quarry Location: Bloomington, Ind.
Geological Designation: Oolitic Limestone
Texture: Very coarse
Color: Buff
Chemical Composition: Calcium carbonate—approx. 98%
Strength: Crushing strength—5500 psi
Weight: 170 pcf
Furnished As: Dimensional

64 WHITE-TO-GREY GEORGIA MARBLE

Company Name: The Georgia Marble Company
Quarry Location: Tate, Ga.
Geological Designation: Marble
Texture: Large sparkling crystals
Color: White to light gray with random dark gray veining and marking
Chemical Composition: Calcium carbonate—98.2%; magnesium silicate—1.03%; silica—0.48%; alumina—0.09%; oxide of iron—0.04%; moisture—0.16%
Physical Tests: Specific gravity—2.71%; absorption of moisture—0.09%; abrasive hardness—15.9; carbonic acid test—slight roughening but no granulation
Strength: Crushing strength—10,356 psi. Crushing strength unaffected by freezing and thawing 30 times
Weight: 170 pcf
Furnished As: Splitface. Heights—⅞″, 2¼″, 5″, 7¾″. Lengths—3′ average, 5′ max., 1′ min.
Surface Coverage: 40 sq ft per ton—2¼″, 5″, 7¾″ ashlar veneer (more when higher proportions of low risers are used)
Other Facts: Insulation factor similar to that of marble chip roofing

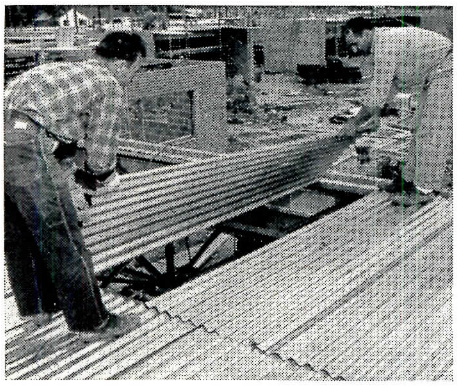
 

Roofing-Contractor's Superintendent (at left)
JACK OWEN says, "You've got a roof of superior strength when Corruform and Tufcor are used. Big savings in time and labor costs because these materials are easy to place and weld."

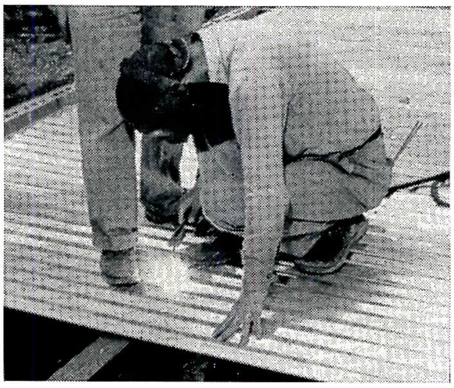
Contractor's Representative (at right)
HAROLD HERES says, "Corruform and Tufcor keep the entire job moving ahead on schedule. That means savings in construction costs."

TUFCOR SPEEDS COMPLETION OF MODERN BATON ROUGE SCHOOL

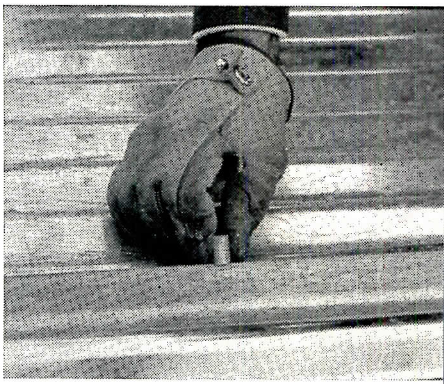
30,000 SQUARE FEET OF TUFCOR



Quickly Placed. Tufcor and Corruform sheets are delivered to job site pre-cut to fit framing. A crew of two or three men can easily place 5,000 to 10,000 square feet, in a single working day.



Lightweight High-strength Steel Deck is welded to purlins. Deep-corrugated Granco *tough-temper* steel has high load carrying capacity—permits wider joist spacing, reduces framing costs.



Vent Clip Prevents Vapor Pressure Build-up Granco vent clips, inserted on lip of each sheet one between each support, prevent vapor build up in roof slab under intense summer sun.

Granco Products keep job on schedule, reduce labor costs, save time.

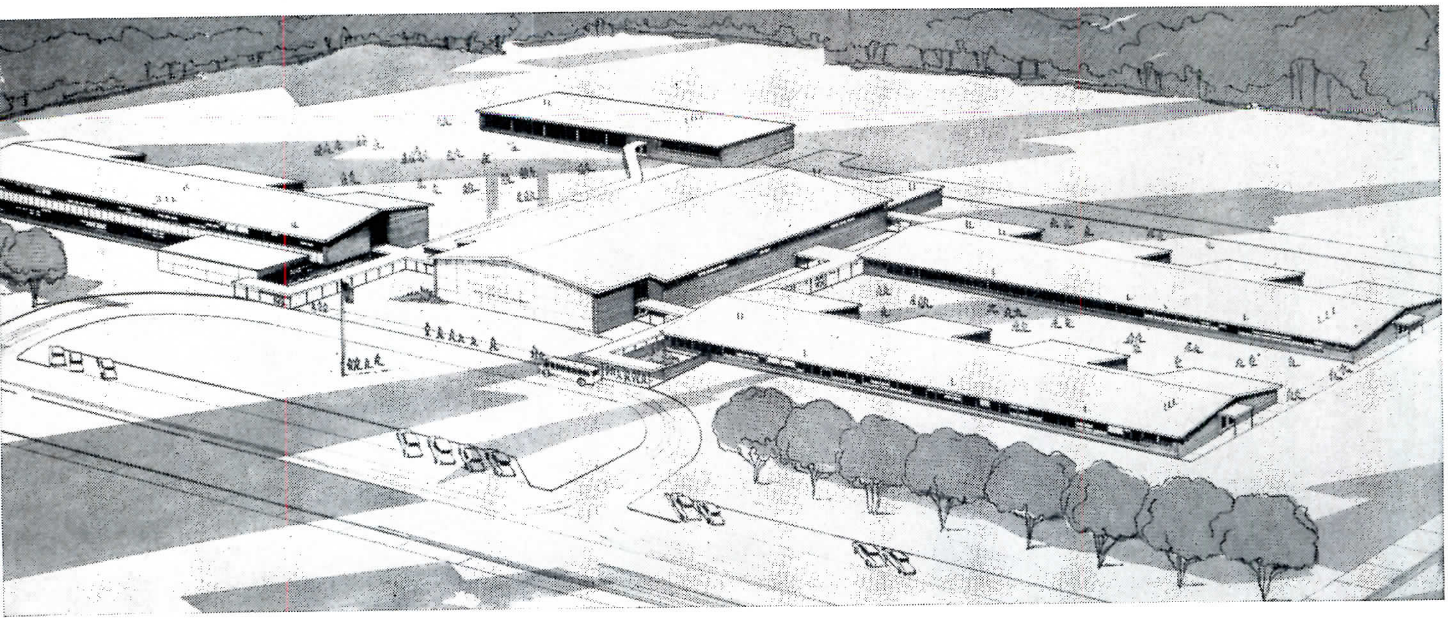
BATON ROUGE, LOUISIANA—One of Louisiana's most modern schools is scheduled for fall completion. Situated on the northern edge of this capitol city, the Glen Oaks School consists of five buildings, connected by covered walks.

Heavy Duty Corruform and Tufcor, specified for the buildings' roof slabs, contributed to substantial savings in time and labor costs. For example, on two of the Glen Oaks buildings, 30,000 square feet of Tufcor was laid in 30 hours.

Harold Heres, Vice President of Caldwell & McCann, contractors on the new Glen Oaks School, says, "there are no unexpected slow-ups when Tufcor or Corruform are specified. That's what we like about these materials—you can be sure you've got a tough, strong roof and construction is much faster."

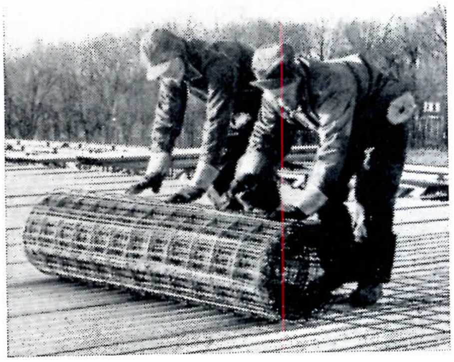
Pre-cut to fit the building frame, Tufcor and Corruform sheets arrived at the Glen Oaks building site ready for placing. As soon as structural steel frame was completed, crews were able to place and weld units to frame and the concrete placing operation started immediately.

Tufcor and Corruform make roof construction a simple, fast operation resulting in time and material savings. For information, estimates of costs on your building plan, contact home or district office, attention Dept. R-2.



Glen Oaks School, *Baton Rouge, Louisiana* • Architects: *Manson and Thompson, Baton Rouge, Louisiana*
Associate Architects: *Goodman and Miller, Baton Rouge, Louisiana* • Contractor: *Caldwell & McCann, Baton Rouge, Louisiana*

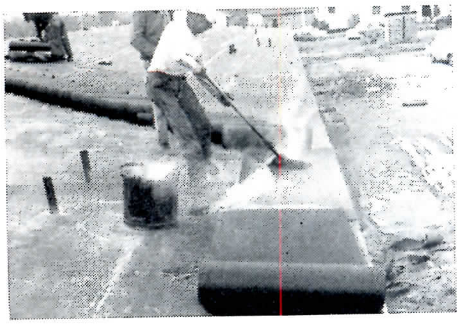
ROOF DECK LAID IN 30 HOURS



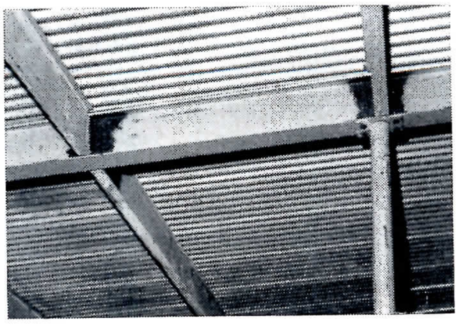
Immediate Working Platform. In place, Tufcor and Corruform provide an immediate safe, usable working surface. Light mesh is added for shrinkage control of lightweight insulating concrete.

Insulation Placed on Tufcor in fast operation. Lightweight insulating concrete (4-5 lbs. psf) on steel deck provides insulation. Bond occurs between concrete slab and galvanized sheets.

Permanent, Incombustible Roof Deck is provided by cast-in-place slab. When concrete is screeded to depth of 2½"-3", load tests show safety factors of 6 to 8 for finished deck.



Ideal Base for Built-up Roof. This deck is ideal from two standpoints — a good deck for the roofer to work on—more important, throughout the life of the building, it is an inorganic permanent base for the built-up roof.



An Economical, Fire-Safe Roof. Finished roof offers maximum in permanence, fire safety. Bright galvanized surface gives lasting protection; affords light reflection when left exposed. However, any normal ceiling treatment may be applied.

see our catalog in S or write for copy

GRANCO
STEEL PRODUCTS CO.
Also manufacturers of Cofar and Roof Deck
Subsidiary of GRANITE CITY STEEL CO.
Main Office: Granite City, Illinois
District Offices: Dallas • St. Louis • Kansas City
Chicago • Minneapolis • Atlanta
Distributors in 80 principal cities

(*Continued from page 234*)

PAINT BLISTERING (*Continued*)

of drip cuts, grooves and back dressing on capillarity.

Panels which were dipped for 3 min in a water-repellent preservative, painted, exposed in a dry kiln to cause shrinking and then wetted showed no sign of wetting on the back regardless of the pattern. However, in spite of good results on treated, standard-pattern bevel siding, back dressing seemed desirable to obtain a better and tighter joint at the lap to reduce openings through which wind-blown water could enter. Also, paint would provide a better seal at the lap and back dressing would give better support for nailing and should reduce splitting in both the butt edge and the thin edge.

Good results, although not equal to those of dip-treated panels, were obtained with panels of standard-pattern, untreated material that had been previously tested and then brush-treated with a water repellent at the lap and again exposed to wetting.

Tests on untreated siding showed that a material reduction in water ingress can be obtained by the use of back dressing and grooving. Back dressing at the butt to provide a smooth surface in the same plane as the face of the siding was effective in reducing capillarity and in making a tighter joint at the lap, so that the paint offered some mechanical resistance to moisture entrance. A horizontal groove on the back in the area covered at the lap also reduced capillary flow. The best results were obtained with a combination of back dressing and the horizontal groove.

. . . .

• **An experimental boiling water reactor** is being constructed by the Argonne National Laboratory near Chicago. Part of the AEC's 5-year program for development of competitive electrical power from nuclear fuel, the reactor will be designed to produce 20,000 kw of heat and 5000 kw of electricity.

• **"Super-finishes" for genuine hardwoods** emerged unmarked after two days of being subjected to such tests as burning cigarettes and spilled drinks at the 21st Annual Meeting of the Fine Hardwoods Association in Chicago.

A-E ROUNDUP

ELECTRIC HEATING *Installations Increasing in Residential Building*

A slow but steady growth since 1949 in the number of Detroit homes using electric radiant panel heating was reported at the Winter General Meeting of the American Institute of Electrical Engineers by A. E. Bush and R. P. Woodward, both of The Detroit Edison Co., in a paper entitled, "Residential Electric Space Heating in Detroit for 1952–1953 Heating Season."

The paper reported exhaustive data on 29 new homes designed and insulated for electric heating and concluded that electric space heating at current residential rates, even with the small and well-ventilated home, is in the neighborhood of $275 per season, with some larger homes running as high as $600. Although this does not compare favorably with the present cost of other forms of heating, they observed that many average income families minimize the differential in operating costs because of the advantages of electric heating.

Utilities are welcoming the electric heating power load during the winter to balance the increasing load of summer air conditioning, said Stuart L. Forsyth, manager of the Westinghouse Electric Heating for Homes Dept. As a reflection of the interest in electric heating, the National Electrical Manufacturers Association has formed an electric house heating equipment section.

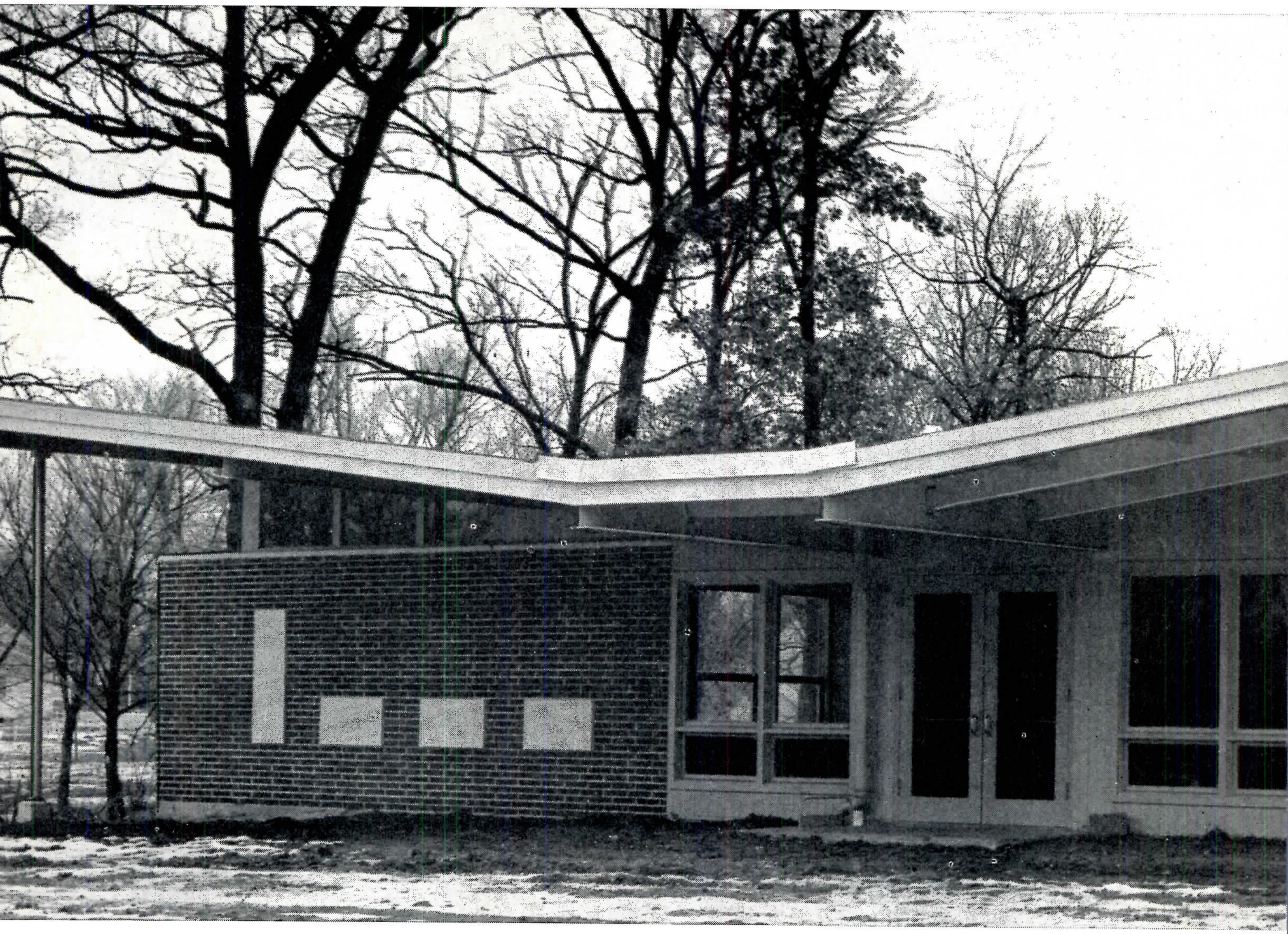
. . . .

• **Precast concrete grade beams** saved about two weeks construction time per building on a 54- by 40-ft compressor station and a 54- by 30-ft auxiliary structure built for a natural gas utility at Adaline, W. Va. The precast method, used before on larger jobs, minimized form building, since multiples of one standard form could be used; limited excavation, since no room for workmen was required; and facilitated working methods.

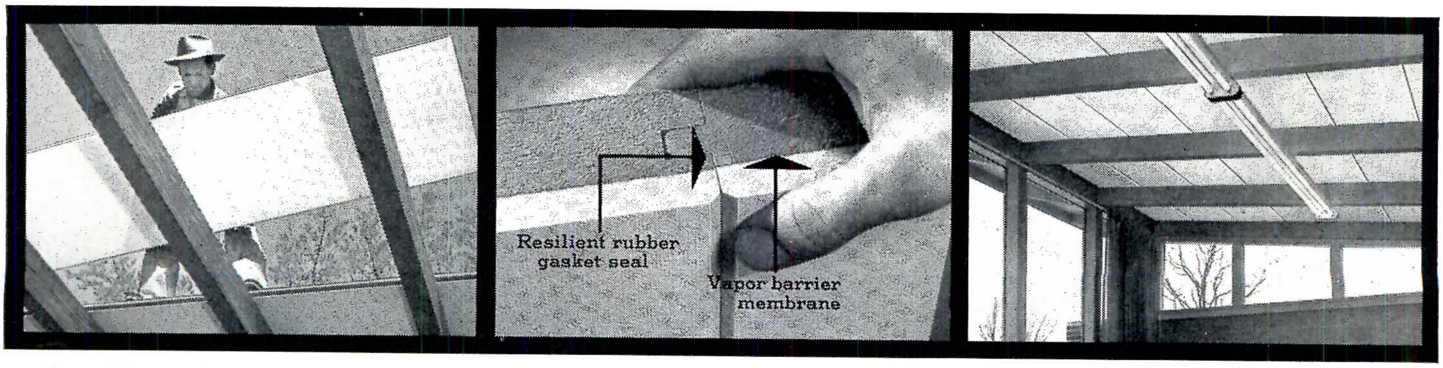
• **The National Clay Pipe Association's** research activities are being expanded so that various projects will be conducted by leading universities and research corporations as well as by the Association.

(*Continued on page 251*)

New 3 in 1 Roof Deck costs to $7.94



Cedar Heights School, Cedar Falls, Iowa. Architects: Thorson, Thorson and Madson, Waterloo and Forest City, Iowa.



1. It's roof deck . . . Two by eight foot unit cuts application time as much as 45%. Only one material to handle. New Insulite Roof Deck eliminates need for separate roof boards, insulation, lath and plaster and ceiling finishing. Roof Deck can save 12 man-hours per 1,000 sq. ft. of surface compared with 2" x 6" D&M roof sheathing.

2. It's insulation with vapor barrier . . . No need for other insulation. Two-inch Roof Deck is comparable to 2" wood deck plus 1" fiberboard insulation and meets heat loss requirements for roof and ceiling construction. Absorbs sound better than wood or plaster. Exclusive vapor barrier protects against condensation within the unit.

3. And finished ceiling. The underside of Insulite Roof Deck is finished with a white flame-resistant surface at the factory. Lay Roof Deck over pre-finished beams and ceiling is done. No need to plaster, paint, stain or wax. Reduces labor and material costs. Available in 2'x8' units, 1½", 2" or 3" thick with or without exclusive vapor barrier.

helps h ld school per sq. ft.

He held costs to $7.94 per sq. ft. O. H. Thorson, A.I.A., of Thorson, Thorson and Madson, Waterloo and Forest City, Iowa, took advantage of Roof Deck's money-saving features to help hold costs to $7.94 per sq. ft. on this 8700 sq. ft. elementary school. How this 3 in 1 product—roof deck, roof insulation and finished ceiling—can save $80 to $300 per M sq. ft. on exposed beam ceiling jobs is shown in the pictures at left.

Send for complete information now! Actual on-the-job pictures and construction details show how to use new Insulite Roof Deck to build better for less. Write Insulite, Minneapolis 2, Minnesota.

Build better and save with

INSULITE

Made of hardy Northern wood

INSULITE IS A REGISTERED TRADE MARK

INSULITE DIVISION, Minnesota and Ontario Paper Company, Minneapolis 2, Minnesota

Listed by Underwriters' Laboratories

Series 1250

HERE'S THE NEW LOOK IN FIRE — PROTECTION!

Functional — of course! Efficient — naturally! This new Edwards Fire Alarm is all that and more. Smartly designed, sleek, streamlined. Truly modern. Tear drop design hugs wall. Projects only 1⅞ inches. Nothing extends to cause accidental false alarms. Smallest coded station available today. Single-action operation — simple, dependable, foolproof. No glass to break. One pull and release . . . the warning call is placed! No chance of a non-alarm due to haste or panic.

Edwards Fire Alarm Systems protect many of America's schools, hospitals and modern buildings . . . like the U.N., Lever and Chrysler buildings. How about yours? For further information and illustrated bulletin, write Edwards Company, Dept. AR-4, Norwalk, Conn.

EDWARDS®

Reliable Time, Communication and Protection Products

A·E ROUNDUP

(*Continued from page 247*)

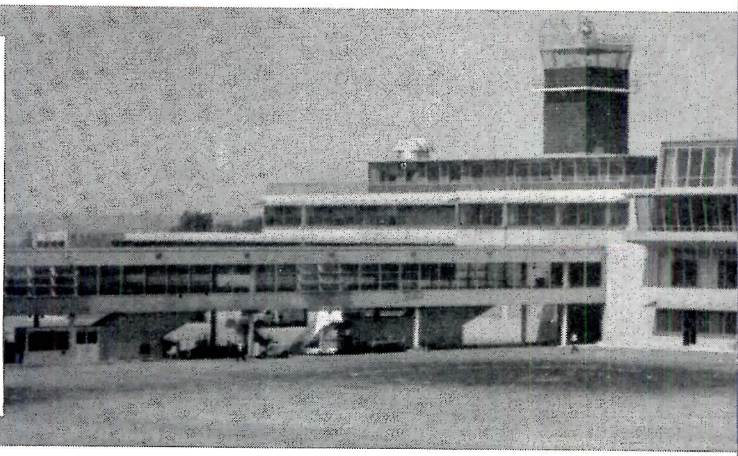
Modular measure as a principle of construction has been endorsed by the Bricklayers, Masons and Plasterers International Union, which, as a result of the action, has been hailed by the A.I.A., Producers' Council, Associated General Contractors of America, National Concrete Masonry Association, Structural Clay Products Institute, and Mason Contractors Association of America.

"Built-in" sound systems in homes, offices and auditoriums will be an important development in acoustics in the next year, forecasted Drs. Howard C. Hardy and Robert W. Benson, two "sound" experts at the Armour Research Foundation of the Illinois Institute of Technology, Chicago. The two scientists have been experimenting with new acoustical tests in which sound waves will be sent through materials to detect flaws so that defections can be anticipated before they occur. Applications of the tests will be broad, they reported, because sound waves propagate easily through most materials and so will give architects and engineers a better insight into their composition. Hardy predicted that architects will give increased attention to acoustical design in homes and other structures.

"To build or not to build" is a question of importance in industrial buildings of today, said W. E. Chandler, plant engineer with Monsanto Chemical Corp., at the Plant Maintenance and Engineering Show in Chicago. With modern techniques of continuous processes and automatic controls, the architect should so design a plant that a minimum of enclosed structure is required. Where a whole plant cannot be dispensed with, Chandler suggested, such elements as doors and windows can be eliminated.

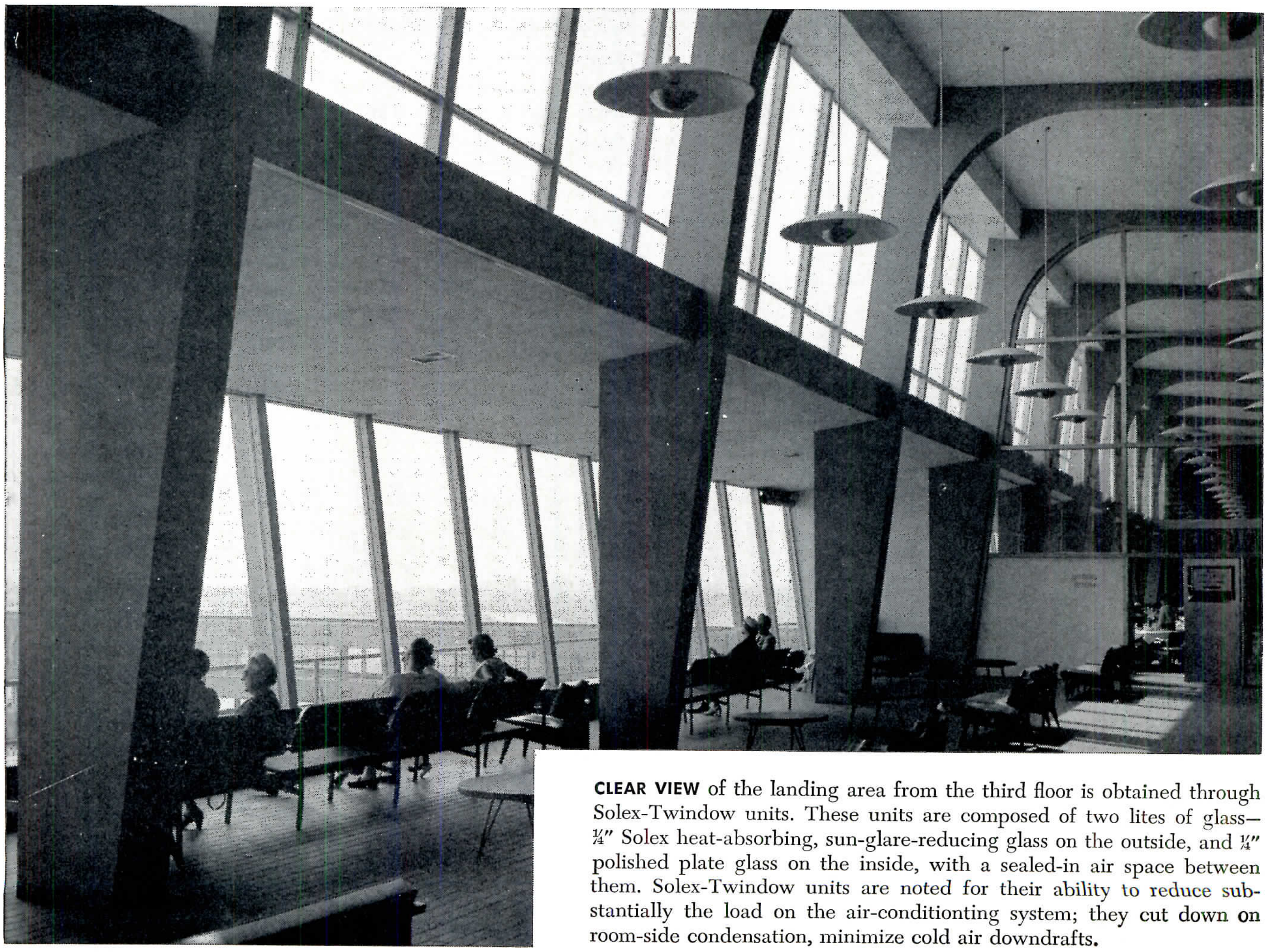
• ***The use of standard parts*** wherever possible by the military services in accordance with industrial practice saved American taxpayers $65,000,000 during the first six months of 1954, reported R. V. Vittucci, Standardization Planning Engineer of the U. S. Navy Dept. Bureau of Ships, at the Third Annual Meeting of the Standards Engineers Society in Atlantic City.

(*Continued on page 254*)



BASICALLY CONSTRUCTED in the form of a modified "F"—with the two short arms representing the passenger loading piers—the main part of the new Philadelphia International Airport terminal building is three stories high, topped by a small fourth floor and control tower. This view shows the over-all field side of the terminal building, with its impressive application of Pittsburgh Glass. Architects: Carroll, Grisdale, and Van Alen, Philadelphia, Pennsylvania.

New Terminal Building at the makes extensive use

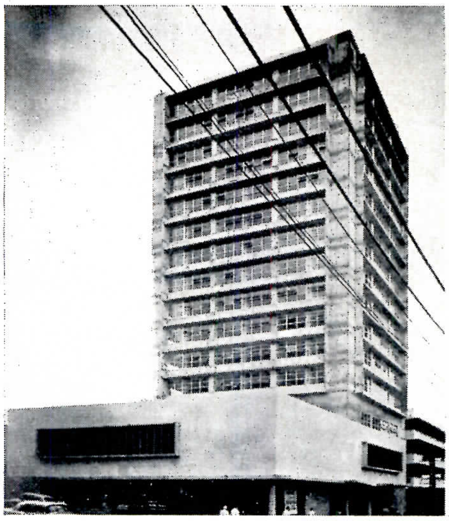


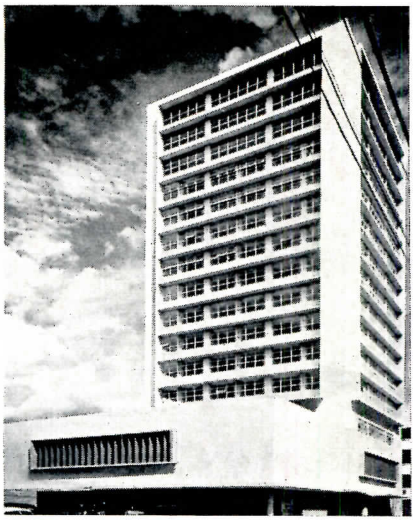
CLEAR VIEW of the landing area from the third floor is obtained through Solex-Twindow units. These units are composed of two lites of glass—¼" Solex heat-absorbing, sun-glare-reducing glass on the outside, and ¼" polished plate glass on the inside, with a sealed-in air space between them. Solex-Twindow units are noted for their ability to reduce substantially the load on the air-conditionting system; they cut down on room-side condensation, minimize cold air downdrafts.

Design it better with

Pittsburgh Glass

(*Continued from page 251*)





PLASTIC COATING *Sprayed on New 15-Story Concrete Hotel in Texas*

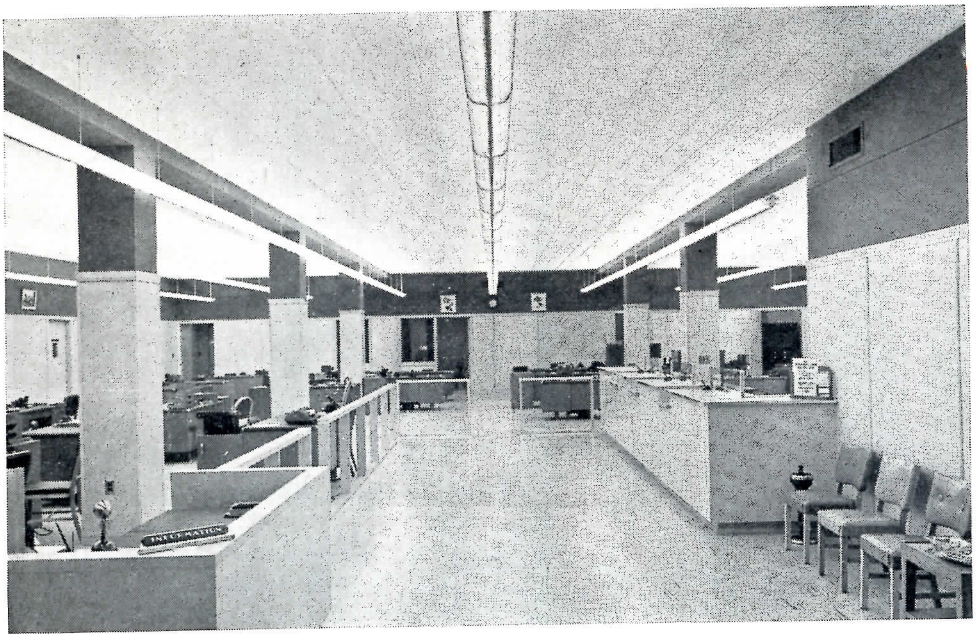
A flexible vinyl plastic film, weatherproof and non-combustible, covers the new 15-story Carlton Hotel in Tyler, Tex. Sprayed directly on 40,000 sq ft of reinforced concrete to form a continuous, jointless sheeting 0.030 to 0.035 in. thick, the liquid plastic coating eliminated the need for flashings, copings, facia and painting ordinarily used on such a structure.

The veneer applied to the Carlton Hotel is light gray with dark green ledge tops to reduce heat reflection. It was applied in six weeks by four sprayers and three helpers. The architect, Design Inc., of St. Louis, specified the plastic skin to allow simplification of detailing and construction on the outside. The two photos above show the hotel before and after application of the spray.

The liquid plastic coating is considered a permanent material with only three or four maintenance treatments required during the normal life of a building. This maintenance consists of injecting plasticiser into the sheeting by covering it with a new top layer. Otherwise the only maintenance required consists of simply washing the surface. This method of coating was introduced by Designer Guy G. Rothenstein, formerly with Skidmore, Owings and Merrill and now architectural consultant to Liquid Plastics Corp., manufacturer of Plastispray. It is an outgrowth of the wartime method of mothballing ships.

• •

"Modern Designing with Steel," a new series of monthly semi-technical reports, will present ideas for the use of steel with emphasis on economy of material and esthetic appearance. Published by Kaiser Steel Corp. for more than 8000 architects, engineers and construction men throughout the West, the papers will include engineering data, design samples and pictures of finished projects where new techniques are involved.



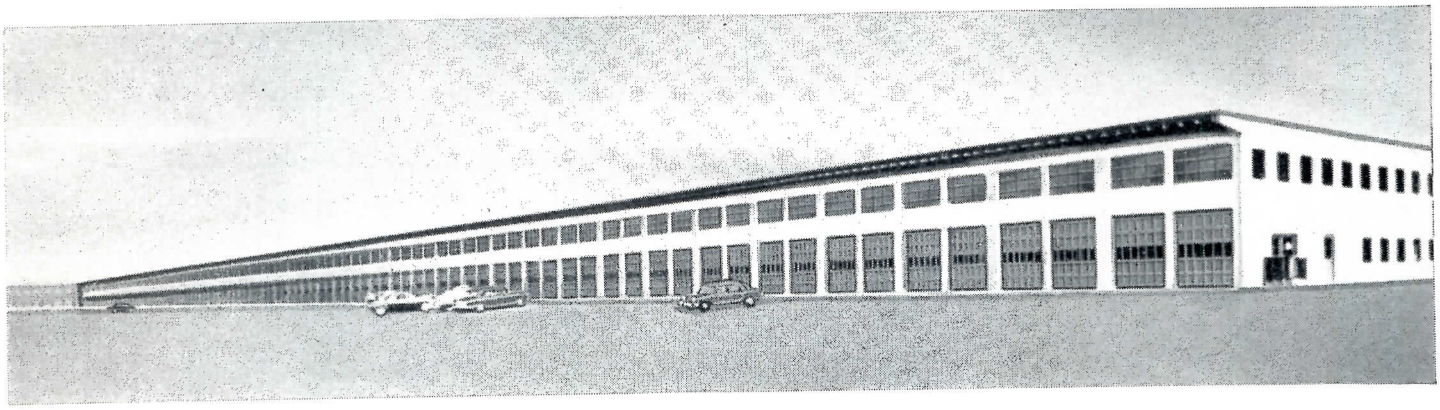
Home Mortgage & Investment Company, Oklahoma City, Oklahoma; Albon W. Davis, A.I.A., Architect; Southwestern Electric Company, Electrical Contractors.

SPACIALITE

***A**rchitecturally Engineered*
***B**rightness Controlled*
***C**onstruction Distinctive*
Quality Lighting —
Fixture Efficiency 80%
Ideal 3:1 Brightness Ratio

THROUGH the interflection technique of equalizing overhead brightness and fixture brightness Spacialite gives natural, sight-saving, comfortable light at reasonable costs. Available in Preheat, Rapid Start and Slimline. Complete data in Brochure — write

Ainsworth Lighting Inc. 38-12 29th Street Long Island City 1, N. Y.



St. Louis Produce Association, Inc. Market Building

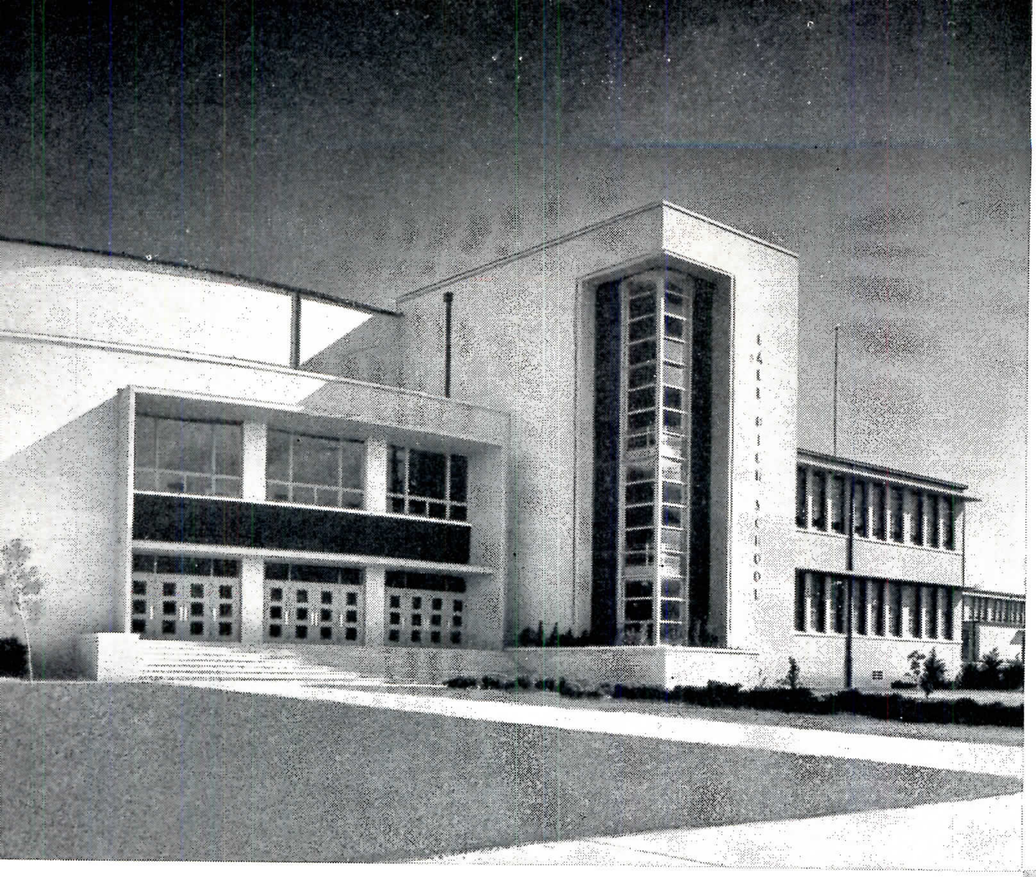
Architects: L. ROY BOWEN & ASSOCIATES, St. Louis, Mo.
Contractors: ROBINSON CONSTRUCTION CO., St. Louis, Mo.
Crawford Doors by CRAWFORD DOOR SALES CO. of St. Louis

M. R. Zumwalt, President, Crawford Door Sales Co. of St. Louis

Crawford MARVEL-LIFT Doors

SEE OUR CATALOG IN SWEET'S

1930 • CRAWFORD'S 25th ANNIVERSARY • 1955



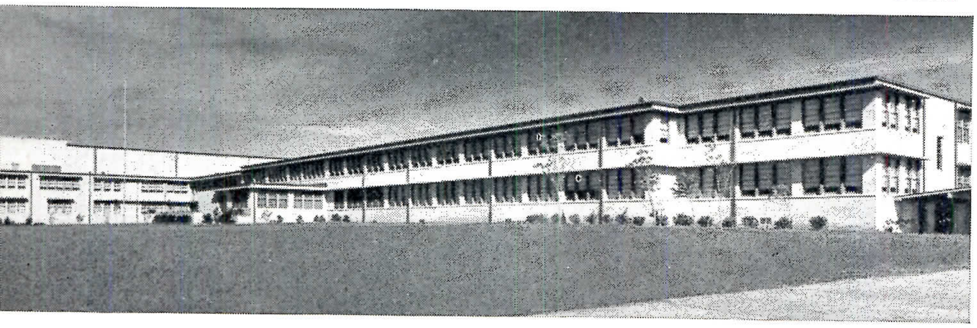
Architects for both buildings
PRESTON M. GEREN,
Fort Worth, Texas
R. R. RAPP,
Galveston, Texas

Mechanical Engineers
YANDELL, COWAN & LOVE
Fort Worth, Texas

Plumbing and Heating Contractor
A. J. WARREN
Galveston, Texas

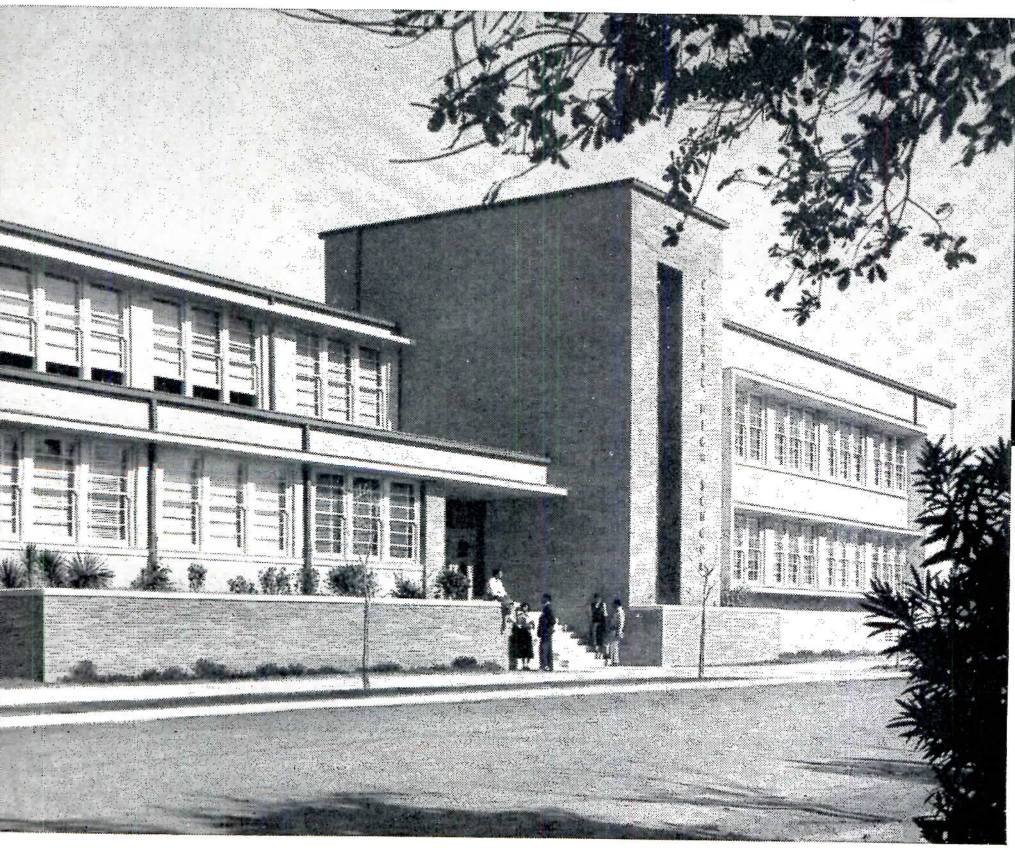
Powers automatic temperature control is used throughout both schools which are alike in facilities and general design. Both have modern gym, cafeteria, swimming pool and showers. Photos below indicate excellence of interior design.

BALL HIGH SCHOOL, GALVESTON, TEXAS • See Rear View Below



Drama and Public Speaking Classroom

Below: CENTRAL HIGH SCHOOL, GALVESTON, TEXAS



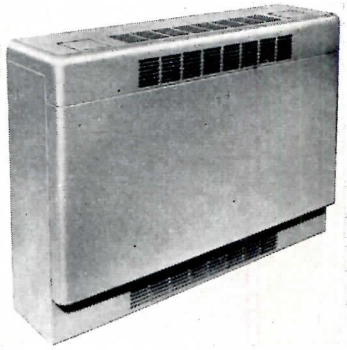
Relaxation Area near Cafeteria Entrance

Maximum
Schoolroom Comfort and
Fuel Economy is
Assured by Powers Control

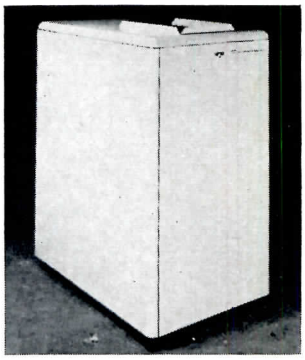
A·E PRODUCTS

(*Continued from page 236*)

AIR CONDITIONING SYSTEMS

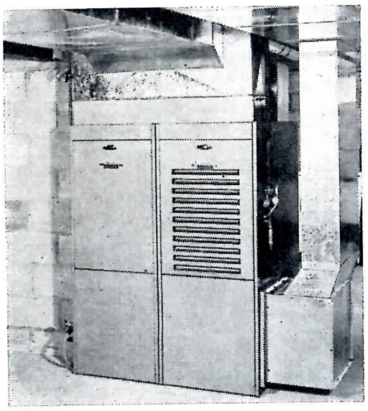


• "*Roomaire*" *Conditioner* is a remote-type room air conditioning unit for multi-room installations. Subject to individual room control, the services incorporated into this unit are cooling and dehumidifying, heating, ventilating, cleaning and circulating air. Water supply, water return, drain and electrical connections are made directly to the unit. Control of water flow is made by a manual valve or an automatic valve operated by a temperature control device. *Young Radiator Co., Racine, Wis.*

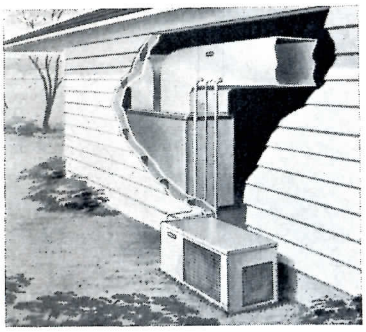


• A new *Frigidaire "add-on" air conditioner line* can be installed in conjunction with any forced air furnace. The units, in 2-, 3- and 5-ton capacities, can be placed in the basement next to the furnace, in a utility room, or in the attic. The coil and fan sections can be lifted out of the compressor section shown above and installed separately. *Frigidaire Div., General Motors Corp., 300 Taylor St., Dayton 1, Ohio.*

• The new *Dual-Vector* provides year-round air conditioning by means of forced hot and chilled water in new or existing houses. The twin fan in the Dual-Vector can be controlled either thermostatically or by manual setting. *Union Asbestos & Rubber Co., Heating & Cooling Div., 332 So. Michigan Ave., Chicago, Ill.*



• The *usAIRco year-round conditioner* combines a gas-fired warm air furnace with 2- or 3-ton cooling capacity. The combination unit uses a single duct system to cool, heat, dehumidify and circulate the air. In the summer a bypass damper prevents the flow of cool air over the heat exchanger so that there will be no condensation or rust formation in the furnace. Designed for installation in the basement, utility room or closet, the unit measures 44 in. wide by 37 in. deep by 57 in. high. *U. S. Air Conditioning Corp., 3300 Como Ave. S. E., Minneapolis 14, Minn.*



• The *waterless Remote Marvair* is offered in 2- and 3-ton sizes capable of air-conditioning homes up to 2000 sq ft. A weatherproof, soundproof cabinet outside the house holds the condenser section, which has an extra large air coil and a 15-in. sirroco-type silent blower fan. High and low lines lead inside to horizontal-flow evaporator located in duct above furnace. Evaporator can also be placed adjacent to furnace, in the attic with its own special duct-work to rooms or through a drop-ceiling arrangement. *Marvair Div., Muncie Gear Works, Inc., Muncie, Ind.*

(Continued on page 262)

CLEAR PRISMATIC GLASS

AMCOLENS®...

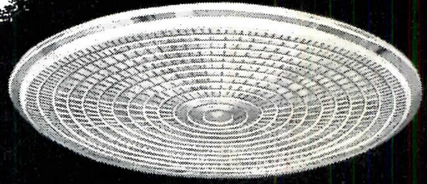
tomorrow's lens lighting TODAY!

AMCOLENS, an advanced concept in lighting, is the ultimate for the improved illumination of tomorrow.

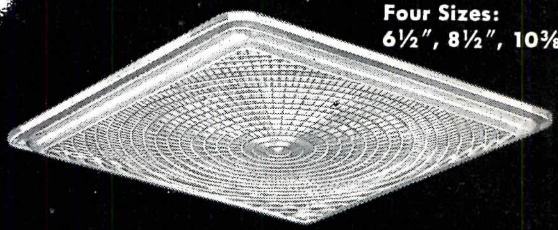
The precision engineering of AMCOLENS clear prismatic glass lens offers you the lighting of the future with all these unique advantages:

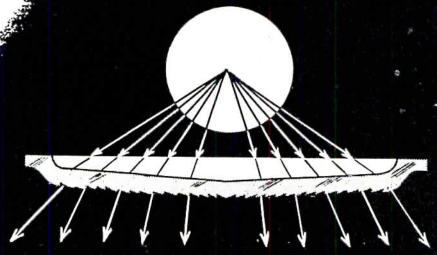
- **Crystal clarity**
- **Undiminished light transmission efficiency**
- **Unaltered white lamp light transmittance**
- **Precise light direction control**
- **Predetermined light distributions**
- **Minimum brightness in glare zone**
- **Edge-light on ceiling for contrast relief**

SEMI-FLUSH
Three Sizes:
8⅜", 10⅜", 13½" Dia.



SEMI-FLUSH SYMMETRIC
Four Sizes:
6½", 8½", 10⅜", 12" Sq.





AMCOLENSES are the result of original ART METAL lens research and are available only in ART METAL complete lighting equipments.

This enlarged segment of Amcolens illustrates prism detail. AMCOLENS utilizes clear glass prisms, the most exact means known to science for controlling the direction of light.

A cross section of a typical Amcolens shows control of light. Precision engineering achieves multiplied useful light utilization below 60° with minimized glare zone brightness.

AMCOLENSES ARE ANOTHER *Lighting Research* DEVELOPMENT OF ART METAL