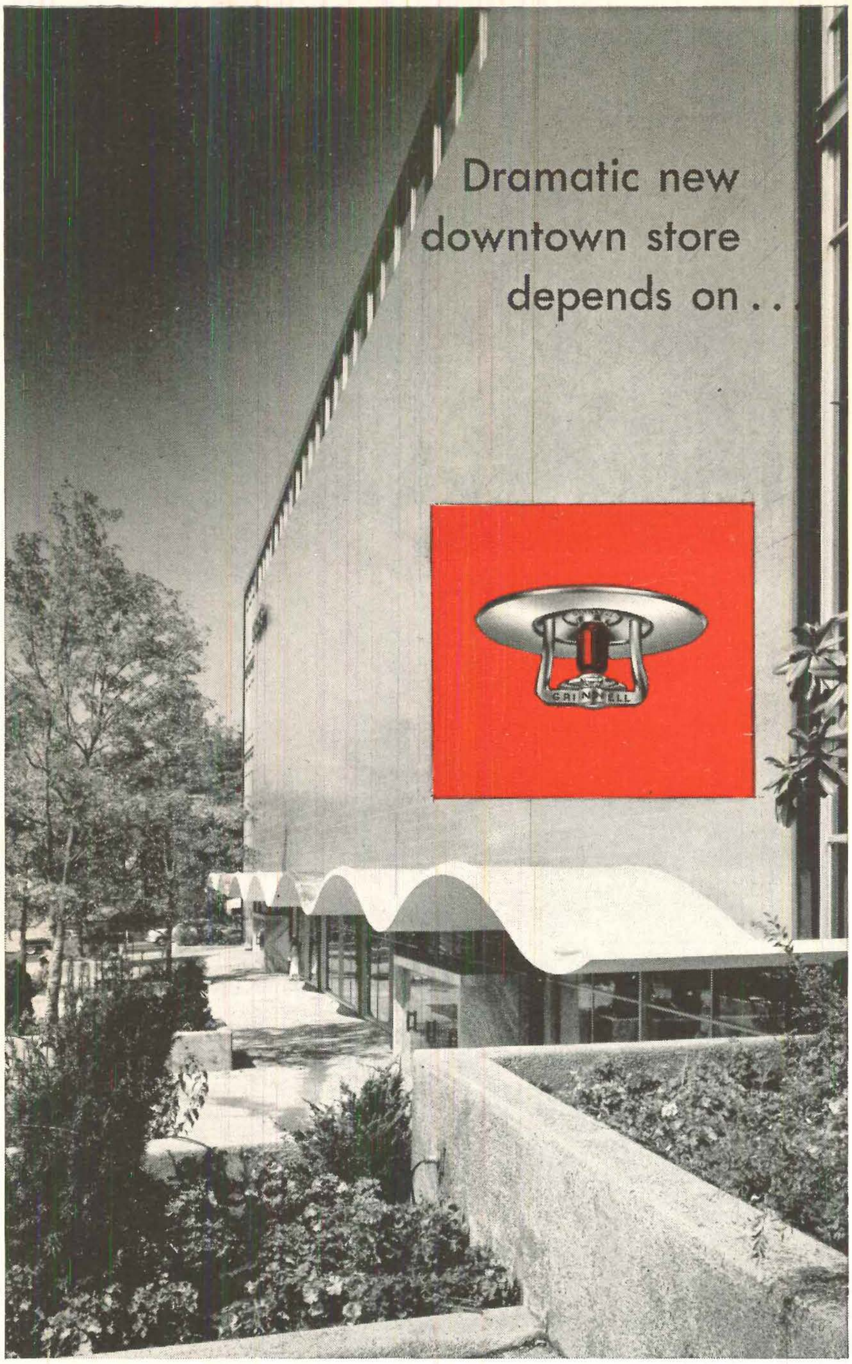
RCHITECTURAL RECORD

BUILDING TYPES STUDY

SCHOOLS 233

RIL 1956



GRINNELL
Ceiling-Type
SPRINKLERS

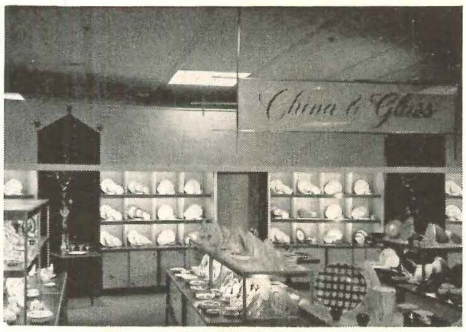
When the management of Rich's, Inc., decided to construct its new department store "downtown" in Knoxville, it was a momentous decision — one taken in the face of a strong, continuing move to the suburbs. But experience has proved the wisdom of that action.

Of course, no small factor in the success of Rich's new store were such design innovations as a 450-car attached garage; outside pool and planting area; and a built-in warehouse. The installation of Grinnell Sprinklers was still another move taken to create a relaxed atmosphere and to build customer confidence.

Grinnell Ceiling-Type Sprinklers are unobtrusive. They do nothing to mar the decor of modern interiors. And yet, should fire occur, they operate quickly, automatically to strike fire at its source, anywhere — anytime, night or day. Moreover, they make impressive insurance savings possible.

The time to plan Grinnell Protection is while your buildings are in the blueprint stage. For advice on the best system, for you, invite a Grinnell Fire Protection engineer to call. Grinnell Company, Inc., 269 W. Exchange St., Providence, R. I.

◀ Rich's Department Store in downtown Knoxville. Long, undulating canopy of concrete heightens the dramatic quality of brick and glass construction.



Modern lighting and automatic ceiling sprinklers give a clean, uncluttered appearance to various departments.

GRINNELL
PROTECTION AGAINST EVERY FIRE HAZARD

Manufacturing, Engineering and Installation of Automatic Sprinklers Since 1878

ARCHITECTURAL RECORD (Vol. 119, No. 4, April 1956) is published monthly, except May 1956 when semi-monthly, by F. W. Dodge Corporation, 10 Ferry Street, Concord, N. H. **Editorial and executive offices: 119 West 40th Street, New York 18, New York.**
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ARCHITECTURAL RECORD

April 1956 Vol. 119 No. 4

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Members of Audit Bureau of Circulations and Associated Business Publications. Architectural Record is indexed in Art Index, Industrial Arts Index and Engineering Index.

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THE RECORD REPORTS

PERSPECTIVES

The architect and public relations: a need for "reappraisal" of the American Institute of Architects' three-year-old public relations program was recognized by the A.I.A. Board of Directors last month with appointment of a special "liaison" committee to study operations of the program (see page 15). At the grass roots level, as indicated by reports from public relations sessions across the country, architects continued to wonder how to get their names in the newspapers. At one such session, arranged by the New York Chapter of the A.I.A., the editor of this magazine offered an appraisal of his own: the judgment that architectural public relations would benefit more from a "program of concentration" on specific *groups* of the public identifiable as actual client factors than from any kind of effort which takes as its target "a general, undifferentiated public." The trouble with focusing on the general public, Mr. Shear said, is that "the total force of available effort is spread so thin that it is unnoticeable. It spends equal effort and money on those who have nothing to do with retaining architects and on those who do make such decisions. . . . We simply haven't got the time and money to fight on this extended kind of front." Instead, Mr. Shear suggested, the profession should decide which parts of the public it is most concerned to reach, and concentrate its efforts on those who decide for or against retaining architects in such specific fields as might be suggested by relative activity of various building types and architect activity within them. On the matter of the means to be used, Mr. Shear thought there could be a more effective development of the service theme than has so far appeared, and noted that on the publicity side, the special publics must be reached through their own media — the journals and magazines they read and use in context with their work. "I am confident," Mr. Shear concluded, "that the recognition of the individual architect as well as the broad educative processes will develop eventually from such a program — but as by-products — not ends in themselves."

Hic labor: "If our buildings are monotonous," writes Robin Boyd in the February issue of the *Architectural Review*, "it is because our ideas are generally confined within a narrow range. Structure is approved as a stimulus by our unwritten architectural morality code rules; ideas based on shell-concrete or exposed steel cantilevers are always well accepted, but ideas based simply on the enjoyment of living, or springing from a sense of humor, or gaiety, or reverence, or mystery, or awe, are suspect, because we cannot bind them into a specification. They worry us; we wonder if they can be functional. Yet the question of functionalism should not enter until after the idea is formed. Then it will never let down the idea. It is never to be questioned; only our own lack of ideas is responsible for the coldness, the monotony of atmosphere, the constancy of mood, the limited range of expression in modern architecture."

Architecture wins an election: The March issue of *The American City* has a story about a successful mayoralty campaign largely based on the candidate's proposed plan for improving his community — a development program he engaged two architects to help him prepare. Glen Cove, Long Island, population 15,000, is the astute community, Joseph Suozzi the new mayor, and Dean Olindo Grossi and Professor William Breger of Pratt Institute's School of Architecture were the architectural consultants. Mr. Suozzi's approach, said *The American City*, "highlighted the growing role that planning is assuming in local elections."

Joke: The next time, in this long election year, somebody tries to tell you the one about Eisenhower and his running mate Ferris (*you* know, the big wheel from Coney Island), you might reciprocate with the following, which has already been reprinted in half a dozen A.I.A. bulletins since its (not exactly pristine) appearance in the Westchester Chapter's *Blueprint* a few months ago — "After 30 years' practice in New York City, an architect with a medium size office recently retired to Westchester and deposited $50,000 cash in a local bank. When asked for the secret of this financial accomplishment, he said: "I attribute my ability to retire with $50,000 after 30 years at architecture to close application to duty, always hewing to the mark and letting the chips fall where they may, the most vigorous rules of economy, never taking a vacation but everlastingly keeping at my job with enthusiasm, and the death of an uncle, who left me $49,999.50."

Architecture and politics again: President Eisenhower has been called an architect before (usually with victory in Europe the subject edifice) but to the best of a recollection stretching all the way back to 1952, never, until last month, by Adlai Stevenson. Mr. Stevenson's comment on the President's decision to seek a second term credited him as "the Administration's chief architect" — an accident of political rhetoric which put the word "architect" on every front page in the country simultaneously for perhaps the first time in the history of the profession. The President's obligation is clear — he will need to do more — and his opportunity dazzling: *he* could say architect and mean *architect!*

THE RECORD REPORTS

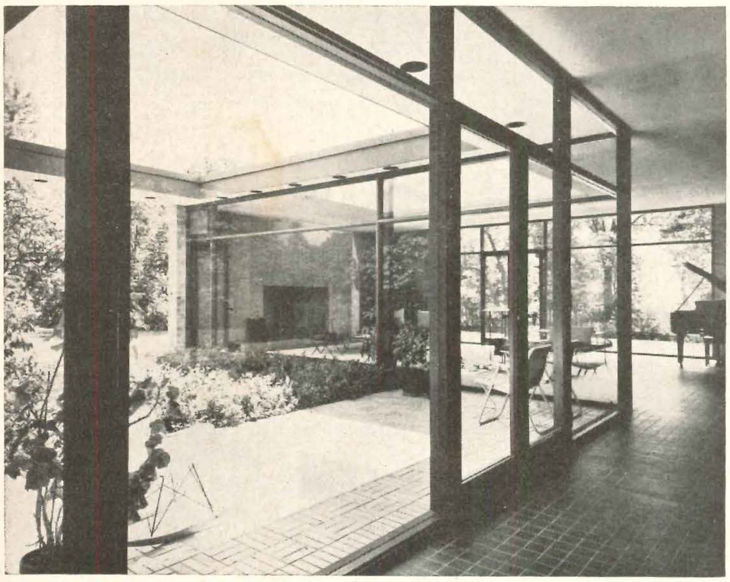
BUILDINGS IN THE NEWS

"OUTSTANDING AMERICAN ARCHITECTURE": A.I.A.'S EIGHTH ANNUAL COMPETITION

1956 Jury Met in Washington, D. C., March 5–6; Members — Pietro Belluschi, dean of M.I.T. School of Architecture and Planning; Eero Saarinen, Bloomfield Hills, Mich.; Paul Thiry, Seattle; Donald S. Nelson, Dallas; George B. Allison, Los Angeles

FIRST HONOR AWARDS

Lambert St. Louis Municipal Airport Terminal Building, St. Louis — Owner, City of St. Louis; Architects, Hellmuth, Yamasaki & Leinweber, St. Louis and Detroit; Engineers, Edgardo Contini (structural, for preliminary work), William C. E. Becker (structural), Roberts & Schaefer Co. (consulting structural), Ferris & Hamig (mechanical); General Contractor, L. & R. Construction Co. *(see this issue, pages 195–202)*



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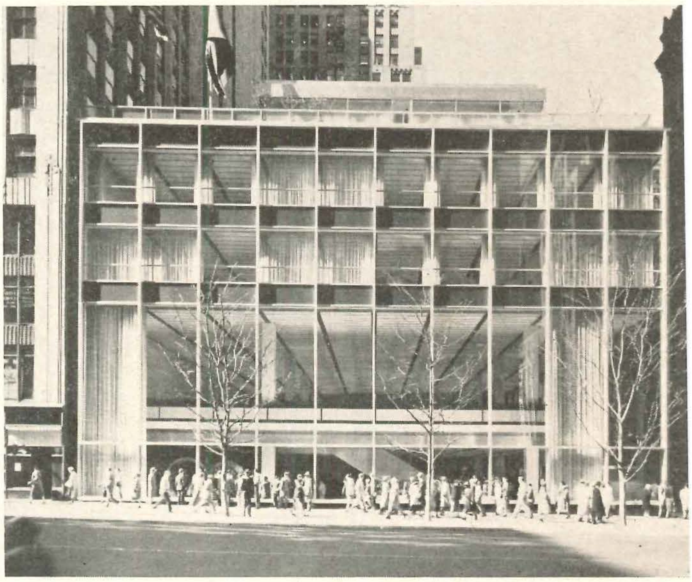
The Hodgson House, New Canaan, Conn. — Owner, Mr. and Mrs. Richard Hodgson; Architect, Philip C. Johnson, New York; Engineers, Eipel Engineering Company; Contractor, John C. Smith (AR, March 1953, pages 156–161)



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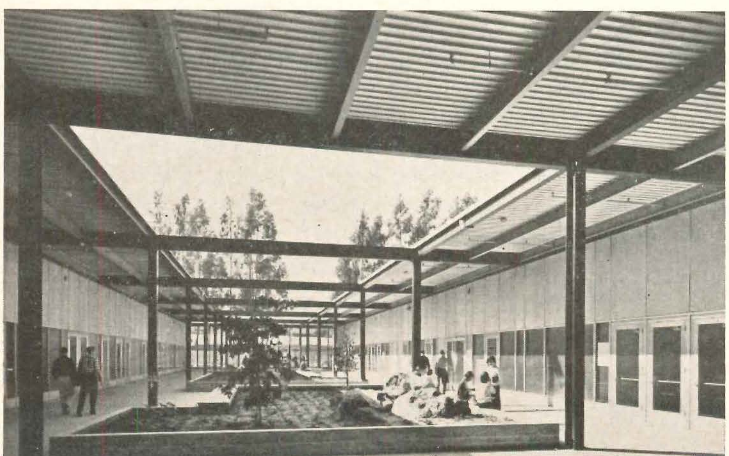
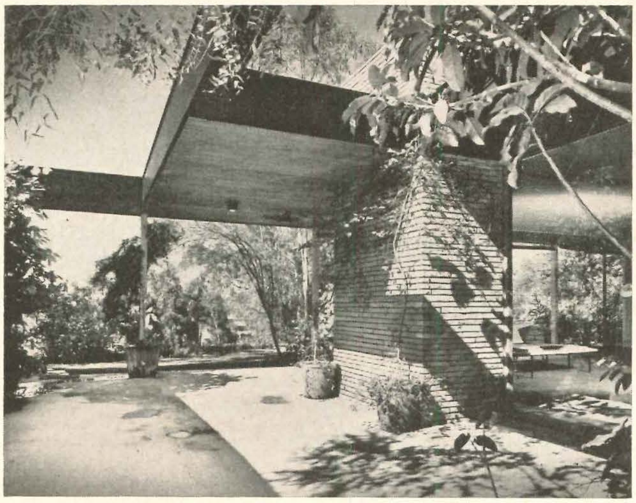
Manufacturers Trust Company Fifth Avenue Branch, New York City — Owner, Manufacturers Trust Company; Architect, Skidmore, Owings & Merrill, New York; General Contractor, George A. Fuller Company (AR, November 1954, pages 149–156)

Hillsdale High School, San Mateo Union High School District, San Mateo, Cal. — Owner, San Mateo Union High School District; Architects, John Lyon Reid & Partners, San Francisco; General Contractors, Rothschild, Raffin & Weirick, Northern Constructors

Roger Sturtevant



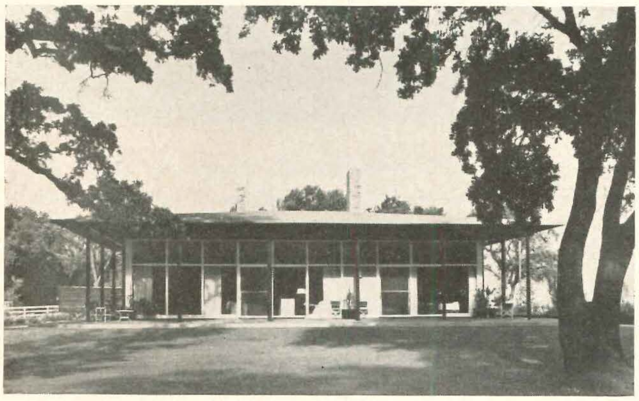
Center for Advanced Study in Behavioral Sciences Inc., Stanford University Grounds near Palo Alto, Cal. — Architects, Wurster, Bernardi & Emmons, San Francisco; Landscape Architect, Thomas D. Church; Consulting Engineer for Structural Design, William B. Gilbert; Contractor, Swinerton & Walberg



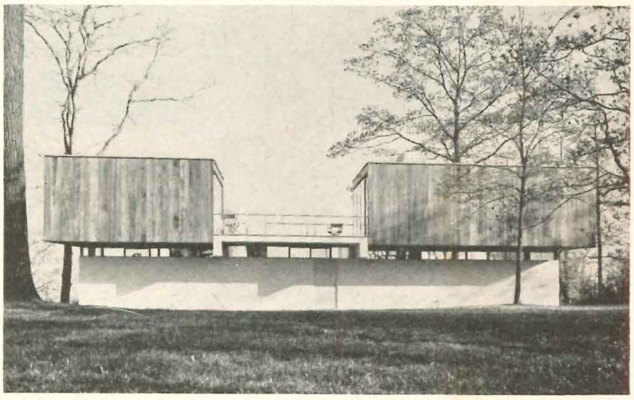
Julius Shulman

Residence, Whittier, Cal. — Owner, Mr. and Mrs. Edwin Krause; Architect, Raphael S. Soriano, Tiburon, Cal.; Contractor, J. Basso

House for Mr. and Mrs. Theodore Bernardi, Sausalito, Cal. — Architects, Wurster, Bernardi & Emmons; Consulting Engineer — A. V. Saph Jr.

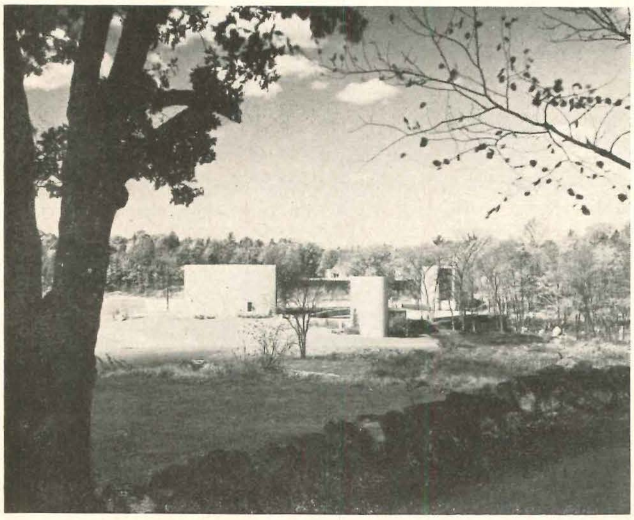


House for Mr. and Mrs. Nelson T. Nowell, Stockton, Cal. — Architects, Wurster, Bernardi & Emmons; Landscape Architect, Thomas D. Church; Contractor, T. E. Williamson Inc.



Residence for Mr. and Mrs. Walter P. Swain, Jr., Plainfield, N. J. — Architect, Reginald Caywood Knight, Jasper Dudley Ward III, Associate; Structural Engineer, Strobel & Salzman; General Contractor, Adam Valentine

Interfaith Center, Brandeis University, Waltham, Mass. — Architects, Harrison & Abramovitz, New York; Structural Engineers, Eipel Engineering Company; Mechanical Engineers, Sears & Kopf; Contractor, Lilly Construction Company (AR, September 1954, pages 9–11, and January 1956, pages 147–157)



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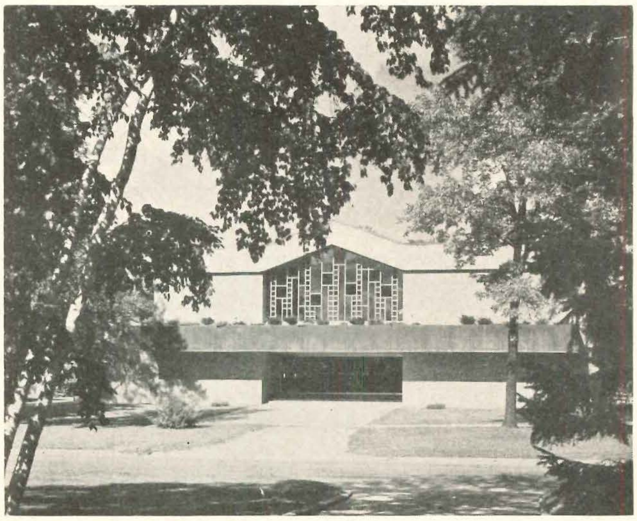
First Methodist Church, Midland, Mich. — Owner, First Methodist Church; Architect, Alden B. Dow, Midland; Mechanical Engineer, Hyde & Bobbio Inc.; Contractor, By Owner



Hedrich-Blessing

BUILDINGS IN THE NEWS

(Continued from page 11)

AWARDS OF MERIT

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Istanbul Hilton Hotel, Turkey — Owner, Turkish Republic Pension Fund; Architect, Skidmore, Owings & Merrill, Sedad H. Elden; Structural Engineer, Prof. Said Kuran; Interior Design, Jane Kidder, Director; General Contractor, Julius Begger, Dyckerhoff Widman (AR, January 1953, pages 103-116)

Morley Baer

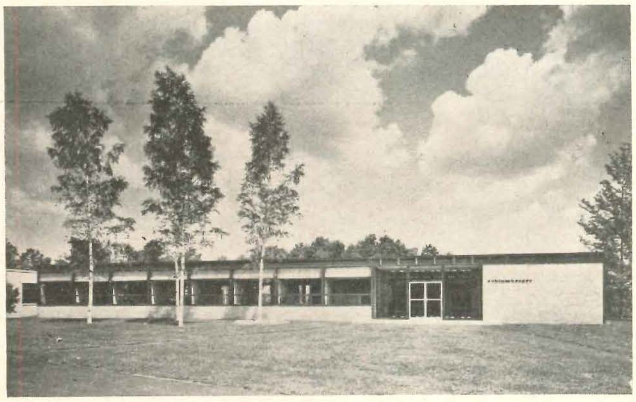
Mark Thomas Inn, Del Monte, Monterey, Cal. — Owner, Delcorp Inc.; Architect, John Carl Warnecke, San Francisco; General Contractor, Haas & Haynie

Ulric Meisel

Building for Oak Cliff Savings & Loan Association, Dallas, Tex. — Architect, Prinz & Brooks, Dallas; Mechanical Engineer, Arnold Gaynor; Contractor, Burgher Construction Company

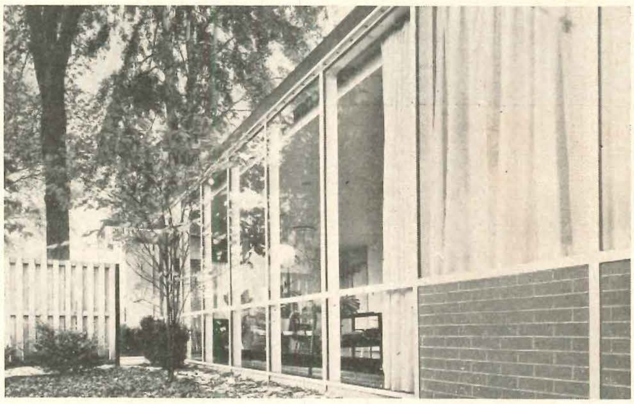
Marvin Rand

Architectural Office for Killingsworth, Brady and Smith, Long Beach, Cal. — Architects, Killingsworth, Brady and Smith; Structural Engineer, C. Gordon DeSwarte; Landscape Architect, Edward Lovell; Decorator, Stan Young; Contractor, Stromberg & Son



Ben Schnall

Schlumberger Administration Building, Ridgefield, Conn. — Owner, Schlumberger; Architect, Philip C. Johnson; Engineers, Eipel Engineering Company; Contractor, John C. Smith

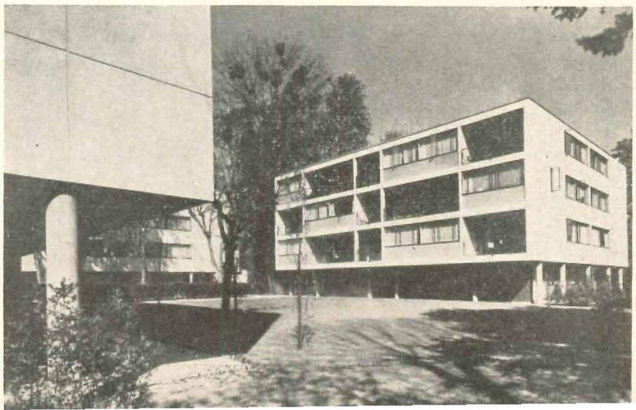


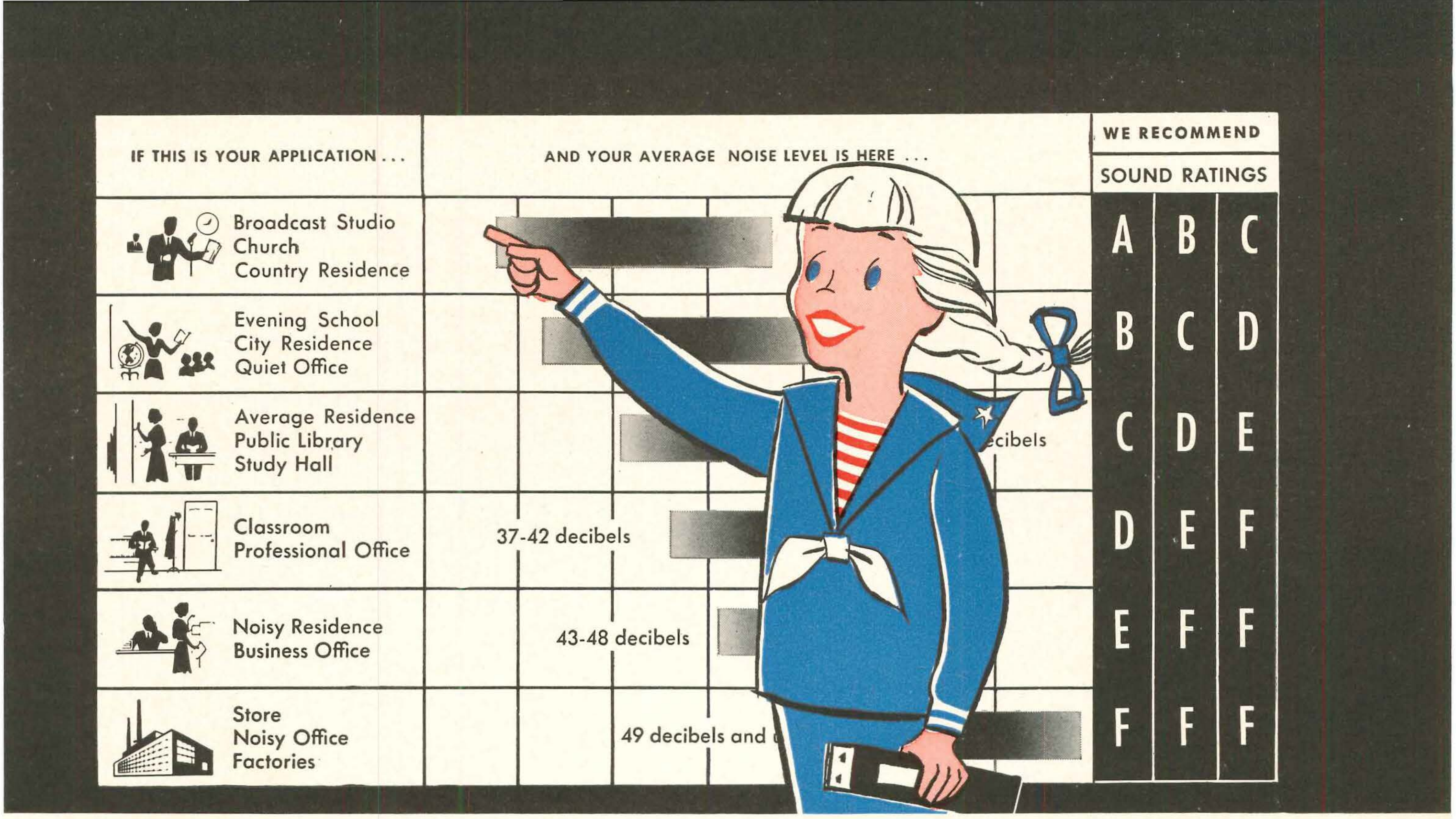
Feld Clinic, Detroit — Owners, Doctors H. Weisberg, D. Feld, J. Weisberg; Architects, Yamasaki, Leinweber & Associates, Royal Oak, Mich.; Contractor, Trowell Construction Company

Police Facilities Building, Civic Center, Los Angeles — Owner, City of Los Angeles; Architect, Welton Becket & Associates, J. E. Stanton Associated; General Contractors, Ford J. Twaits Co. and Morrison-Knudsen Co.

Julius Shulman

U. S. Embassy Staff Apartments, Neuilly and Boulogne, Paris, France — Owner, U. S. Department of State, through Foreign Buildings Operations; Architects, Ralph Rapson, John Van der Meulen, John Greenwood, in charge of construction





FLORA SHOWS YOU how easy it is to select a G-E ballast to meet your noise level requirements. For example: in a library installation where noise levels must be extremely low, or in a quiet office where ballast noise could interfere with work, G.E. has a ballast to do the job.

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General Electric Sound-rated Ballasts Help You Save Lighting Dollars

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Next time you specify equipment for a fluorescent lighting installation, make sure you get the best . . . specify General Electric sound-rated ballasts. Look for the sound rating on the nameplate. A G-E ballast tag or sticker on your fixture is proof that it's equipped with the best in ballasts. It's the easy way to be certain. For further information on G-E ballasts, write Section 401-8, General Electric Company, Schenectady 5, New York.

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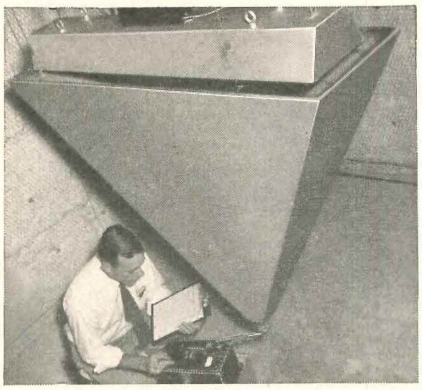

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(Continued from page 12)

17 BUILDINGS CITED IN 1956 CATHOLIC INSTITUTIONAL DESIGN AWARDS

The second annual Professional Competition for Better Catholic Institutional Design, sponsored by the magazine *Church Property Administration*, has produced awards to 17 buildings in the five categories of the competition — four First Awards and 13 Distinctive Design Awards.

Five architects comprised the jury of award — Brother Cajetan Baumann, O.F.M., A.I.A., New York; Frank Montana, A.I.A., head, School of Architecture, Notre Dame University; Paul C. Reilly, A.I.A., New York; George B. Beatty, A.I.A., Brooklyn; George J. Sole, A.I.A., New York.

The four First Awards are shown on this page. Distinctive Design Awards were given as follows:

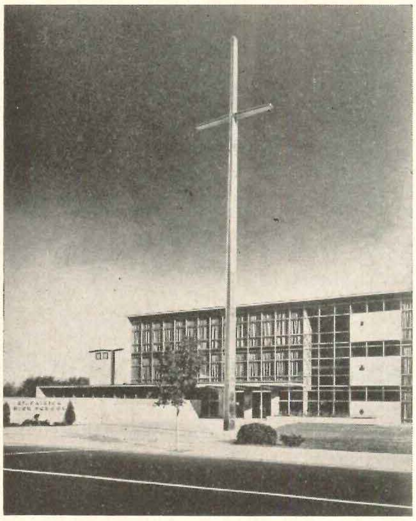
A church seating less than 400 — St. Mary's Church, Milton, Wis., John J. Flad & Associates, architects; Church of the Annunziata, Ladue City, Mo., Maguolo & Quick, architects; St. Anthony's Church, Agassiz, B.C., Gardiner, Thornton, Gathe & Associates, architects.

A grade school accommodating 350 or more — Sacred Heart Parish School, Covina, Cal.; Chaix & Johnson, architects; St. Philip the Apostle School, Clifton, N. J., Arthur Rigolo, architect.

A high school accommodating no more than 1000 — Academy of the Sisters of Mercy, Gwynedd Valley, Pa., Nolen & Swinburne, architects; Benedictine High School of St. Scholastica's Parish, Detroit, Diehl & Diehl, architects; Mount Carmel High School, Auburn, N. Y., Beardsley & Beardsley, architects.

A parish rectory — Rectory for St. Therese of the Child Jesus Parish, Philadelphia, Nolen & Swinburne, architects; St. John of God Rectory, Norwalk, Cal., Armet & Davis, architects; St. Philip the Apostle Rectory, Clifton, N. J., Arthur Rigolo, architect.

A parish convent — St. Mary Magdalen's Parish convent, San Antonio, Charles Blomfield, architect; St. Hilary Parish Convent, Pico, Cal., Chaix & Johnson, architects.



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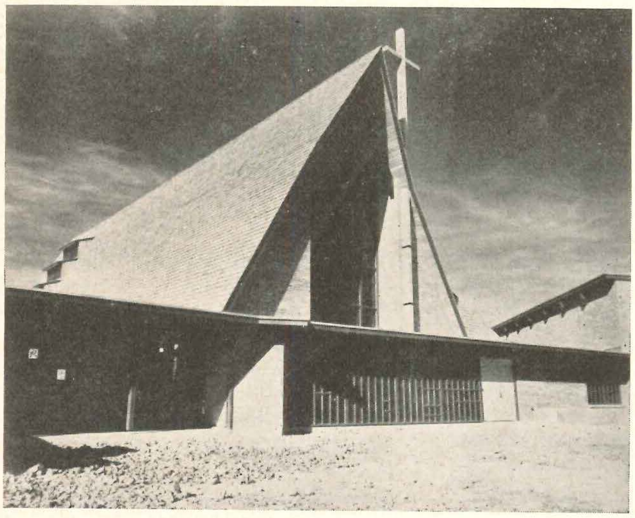

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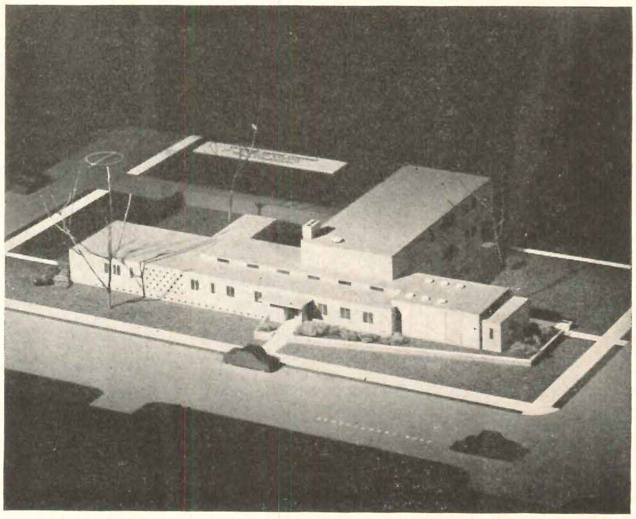


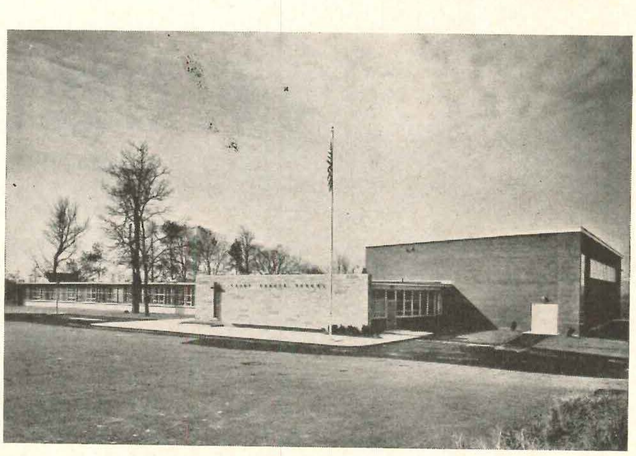
3

1. FIRST AWARD — "A high school accommodating no more than 1000." St. Patrick's High School, Chicago, Ill.; Belli & Belli, architects. The school is run by the Brothers of the Christian Schools

2. FIRST AWARD — "A church seating less than 400." St. Gabriel's Church, Chinook, Mont.; Bordeleau-Pannell, architects. "Powerful in its simplicity, with excellent use of structural materials"

3. FIRST AWARD — "A parish convent." St. Brigid Parish Convent, Detroit; Diehl & Diehl, architects. The convent accommodates 20 nuns

4. FIRST AWARD — "A grade school accommodating 350 or more." St. Teresa School, Trumbull, Conn.; J. Gerald Phelan, architect. The school contains 16 classrooms "excellently planned to conform to the bi-level possibilities of the sloping terrain"



4

(More news on 16B)

New suspended furniture (Italian concept) couldn't hang above an easier-to-clean floor.

B. F. Goodrich
introduces

Agatine

a new, exclusive and highly superior concept in floor tile!

No other tile like it: Made by a *unique* B. F. Goodrich process, "Agatine" is a homogeneous composition of tiny gems of color that go the full thickness of the tile. Its unusual appearance gives floors a clean sweep of distinctive and durable beauty.

Greatly reduces maintenance cost: "Agatine" is super-dense. Its non-porous surface will resist dirt, nicks and scratches; the design itself hides footmarks. A minimum of waxing preserves its lustrous factory finish. Even with the heaviest foot traffic "Agatine" will outlast the building.

For commercial or home use: "Agatine" has the quiet and comfort of rubber tile. It can be installed on or above grade, over wood or concrete—with or without radiant heating. 9″ x 9″ tiles come in 16 colors—.80 gage (for homes and light traffic areas) and 1/8″ (for commercial use).

World's easiest-to-clean room (shown left) features "Agatine."

B.F.Goodrich

FOR SPECIFICATIONS:
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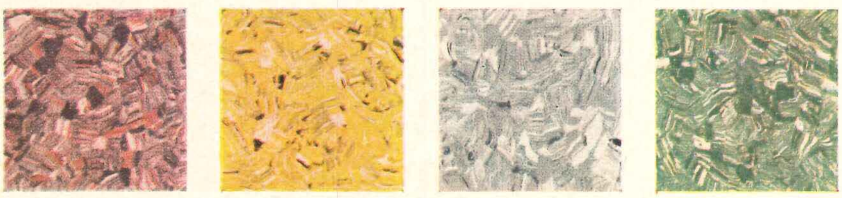

4 OF THE 16 BEAUTIFUL AGATINE COLORS

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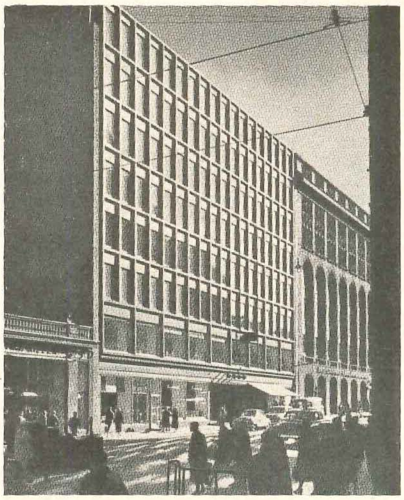
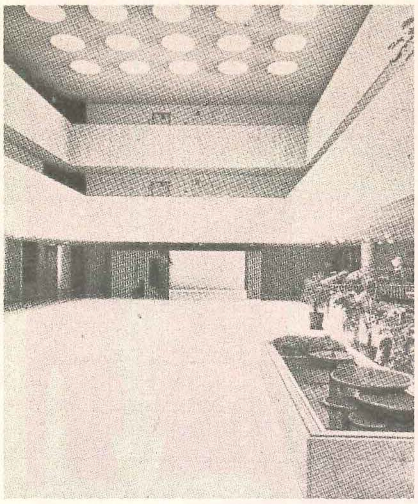
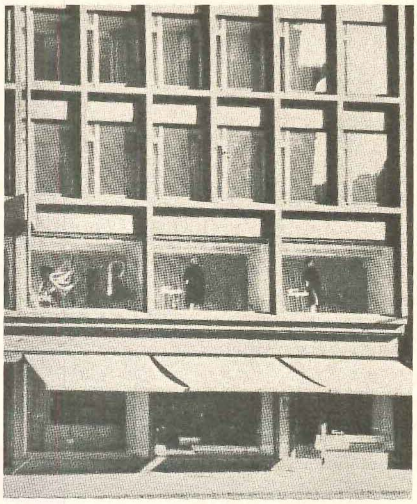
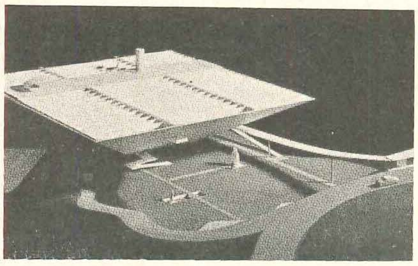
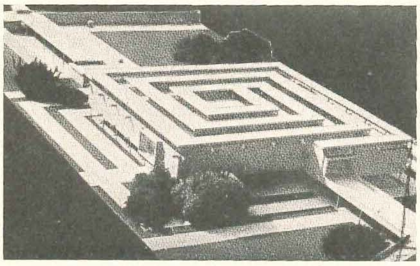
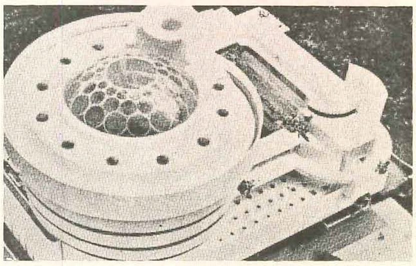
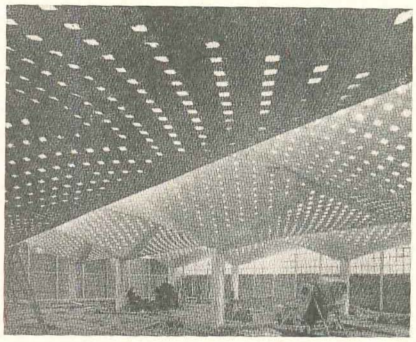
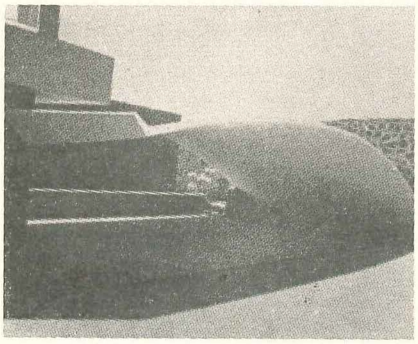
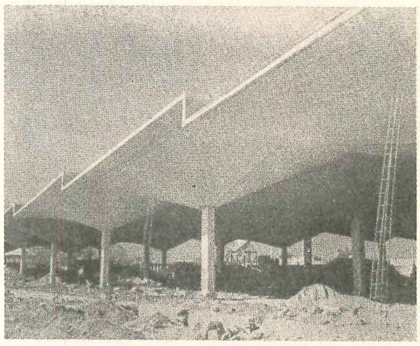




CASABELLA, *No. 208 (Italy), showed photographs of Alvar Aalto's recently completed Rautatalo Building in Helsinki. Eight stories high, it was designed around a central well, which is roofed at the fourth floor to create the entrance hall. The roof is pierced for illumination by "monolithic cones of sheet glass" serving as skylights. The external facing of the building is copper sheeting, placed over a concrete frame. Shops and a cafe occupy the lower floors; the upper floors are for office rental. The original design, selected by a competition, was changed slightly to conform with existing buildings in the neighborhood, including the thirty-year-old building next door designed by Eliel Saarinen*

INTEGRAL, *December 1955 (Venezuela), in an article devoted to Oscar Niemeyer's project for a Museum of Modern Art in Caracas, displayed three contemporary approaches to museum design: Niemeyer, at left; Le Corbusier, center; and Frank Lloyd Wright, at right. Neimeyer's Caracas museum will be built as a sort of square bowl, designed this way to make the most of natural light. The roof will have aluminum louvers to control illumination. Corbu's museum, designed for Ahmedebad, India, has a spiral plan, is under construction. Wright's Guggenheim Museum is still hanging fire*

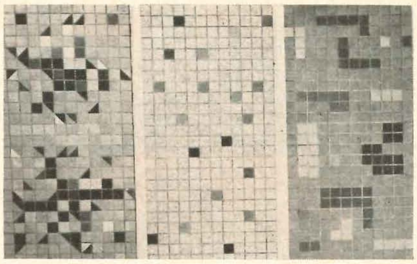




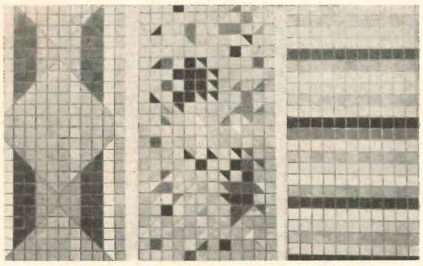
ARQUITECTURA MEXICO, *December 1955 (Mexico), featured a critical study by architect Giovanni Maria Cosco on the work of architect Felix Candela. The examples shown of Mr. Candela's work in thin shells included photographs of a clothing factory at Coyoacán, D. F. (left); a garage for a house in the Pedregal district of Mexico City, done with architect Horacio Almada (center); and an industrial development, also in the Mexico City region*

(More news on page 30)

The State of Construction

As the latest figures on contracts awarded in the 37 eastern states were announced by F. W. Dodge Corporation, the year 1956 had two legs on a new annual record — like January, February set new records for the month in all three major categories (see page 450 for details). Dr. George Cline Smith, Dodge vice president and economist, noted that new contract trends for the first two months of the year indicate the construction industry got off to a much better start for the year than most analysts expected. Addressing the Boston Chapter of the Producers' Council last month, Doctor Smith said that the most striking feature of the current upsurge in construction was the strength of industrial, utility and public works contracts. But he also called attention to the upturn in residential contracts — "Almost everyone," he said, "expected the housing downturn which began late in 1955 to continue for several more months at least. But residential contract awards in the first two months of this year, as compiled from Dodge Reports in the 37 eastern states, actually ran six per cent ahead of the same period last year. The total of $1.5 billion of residential awards was a new record for any January-February period. It is true that the number of housing units involved was slightly below the same period a year ago. However, the difference, especially in February, was so slight as to indicate that the decline had leveled off. And it is important to remember that houses are increasing in size, in equipment and in cost, so that the dollar volume of residential awards has been increasing substantially in spite of the small drop in number of units." Doctor Smith thought the strength of business investment, as it shows up in the industrial, commercial and utility figures, "indicates a high degree of confidence that today's record levels of production and sales are not a peak, but merely a step toward higher levels ahead."





TILES BY MAX SPIVAK (examples shown above) are the latest entry in the field of commercial products designed by top-rank fine artists — a coordinated group of nine patterns for the Cambridge Tile Manufacturing Company executed in unglazed tiles mounted on one- by two-ft paper sheets for quick installation. Colors and patterns were planned for use in various combinations as well as singly

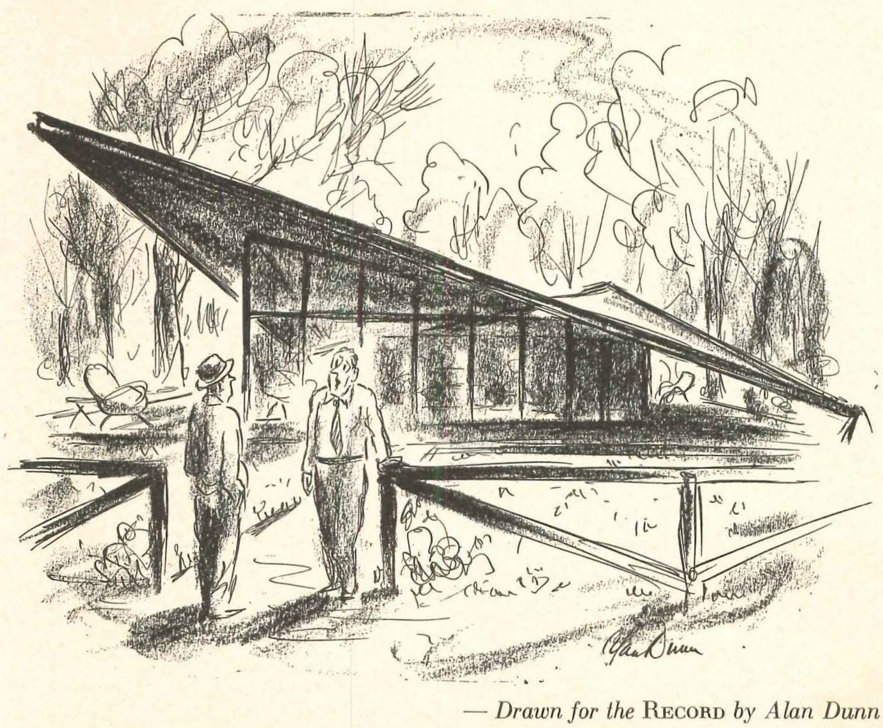
Stein Gets A.I.A. Gold Medal

The 1956 Gold Medal of the American Institute of Architects, highest honor in the gift of the profession to one of its number, will be awarded to Clarence S. Stein of New York in traditional ceremonies at the annual banquet at the A.I.A. national convention in Los Angeles next month. The award honors an American architect who is known around the world for his pioneering work in city planning. Other major 1956 A.I.A. awards will be given to Hildreth Meiere, New York painter, who will receive the Fine Arts Medal, and Harry Bertoia, also of New York, who will receive the Craftsmanship Medal.

The State of the Profession

Selection of 1956 honors recipients was one of innumerable items on the agenda of the A.I.A. Board of Directors at its annual meeting in Washington last month. In addition to hearing and acting on the many reports of national A.I.A. committees, the Board gave special attention to the public relations program at this meeting, but the only immediate result was appointment of a "liaison committee" consisting of A.I.A. Secretary Edward Wilson and Regional Directors Austin Mather and Donald Beach Kirby "to enter immediately into consultation with the PR Committee and the staff to study and work out details of changes to accomplish necessary improvements that will strengthen the methods of coordinating and integrating the program," as the A.I.A. *Memo* reported it. The Board has asked for a report on this study at its Fall 1956 meeting. The Board "confirmed its previous decision to engage Ketchum Inc., which will be retained as PR counsel for the remainder of the year," said the *Memo*. Additional appointments to the Public Relations Committee, to expand it, as the Board voted last Fall to

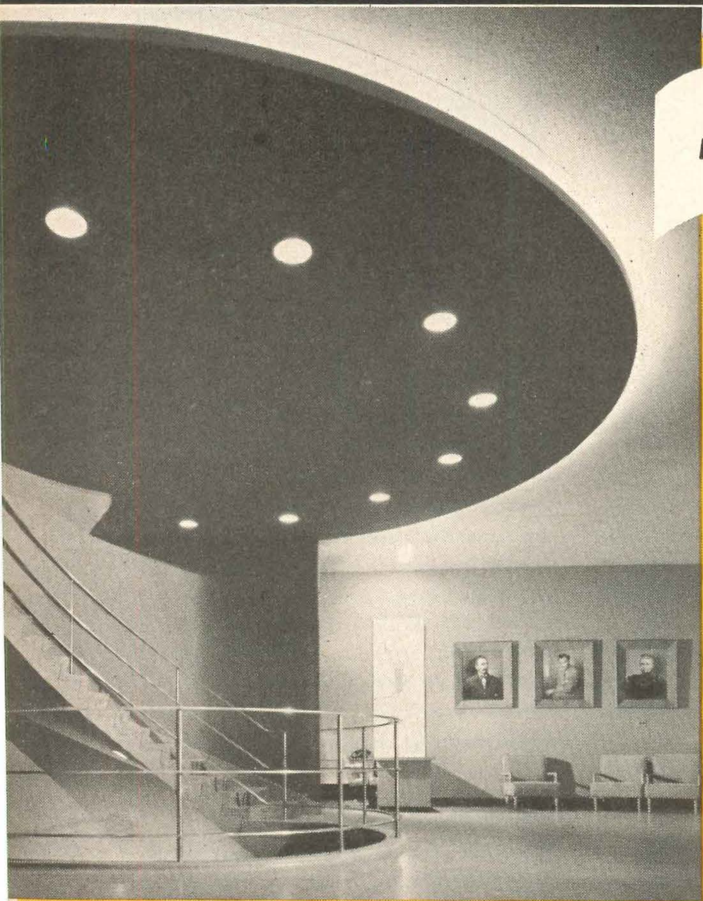
(Continued on page 24)



— Drawn for the RECORD *by Alan Dunn*

"She's gone — said she wouldn't live under the same hyperbolic paraboloid with me —"

LATH and plaster fo



MODERN DESIGN

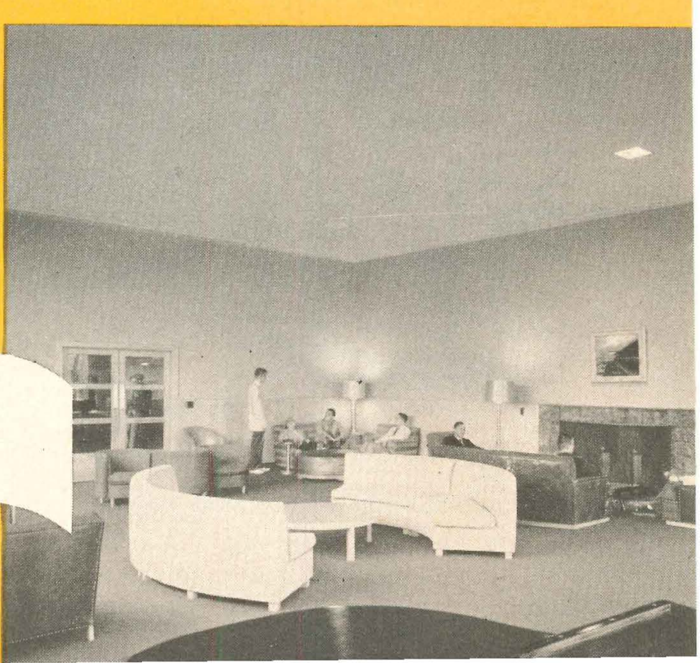
Only Lath and Plaster can provid effects like this staircase and lightin canopy at the Miller Brewing Compan Milwaukee, Wis.

SAVES $60,000, 30 DAYS

Simplified construction techniqu using lath and plaster reduced fram ing costs and completion time a John Wanamaker store, Wynne wood, Pa.

HELPS SELL HOMES

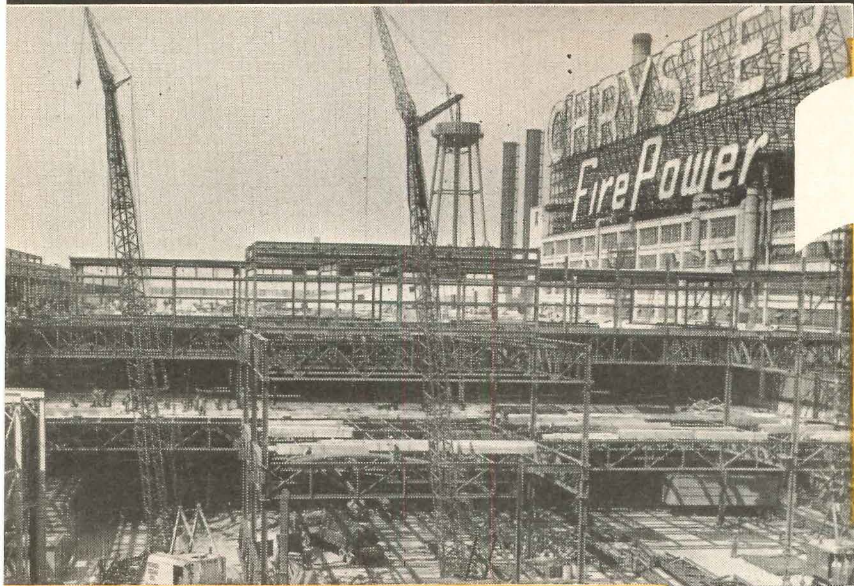
By serving as an assurance of quality construction throughout, lath anc plaster boosts sales for builders lik Joseph Lupowitz & Sons, Inc., Phila delphia, Pa.



ACOUSTICAL TREATMENT

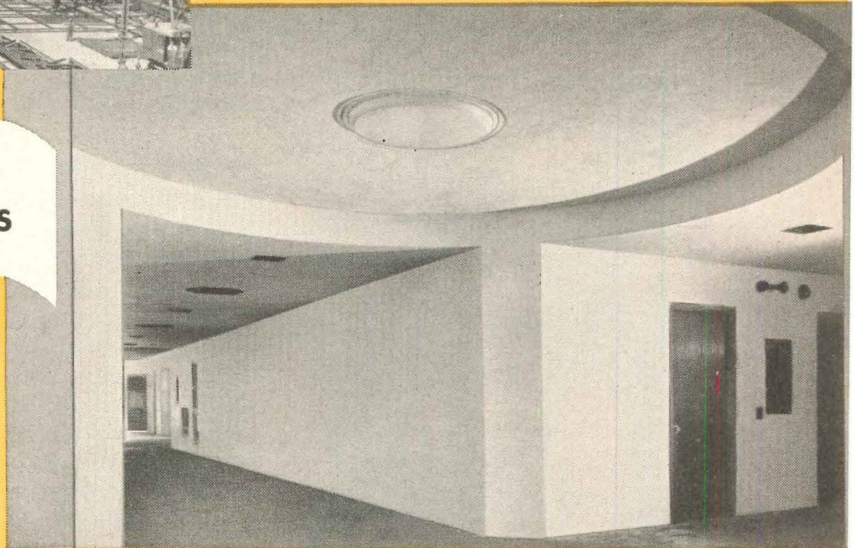
Acoustical Plaster provides quiet, restful surroundings in applications like this new dormitory at Michigan State University, East Lansing, Mich.

So Many Reasons...



FIREPROOFING

Lath and plaster economically provides the fireproofing needed in structures like Chrysler Corporation's new body paint and finishing plant.



LOW INSURANCE RATES

Substantial savings in insurance rates are made through use of lath and plaster in many buildings like Deerpath School, Lake Forest, Ill.

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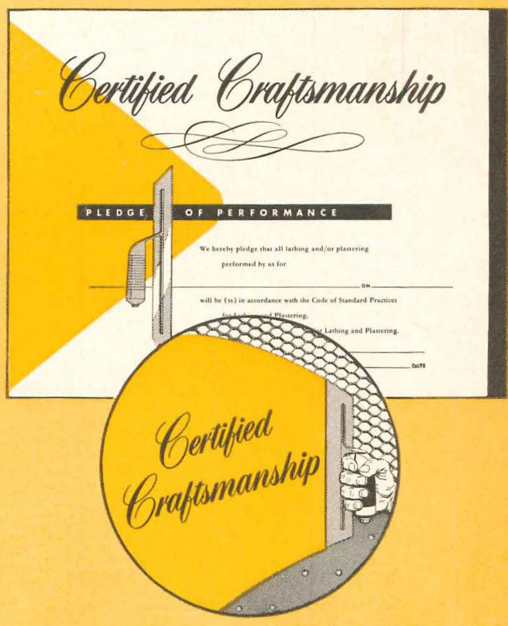
We suggest a thorough reading of the Code of Standard Practices which appears on the back of every certificate. Ask your lathing and plastering contractor for a copy, or write National Bureau for Lathing and Plastering, 1401 K Street, N.W., Washington 5, D. C.



This is the emblem of the National Bureau for Lathing and Plastering. It symbolizes high standards of job performance and responsibility.

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THE RECORD REPORTS

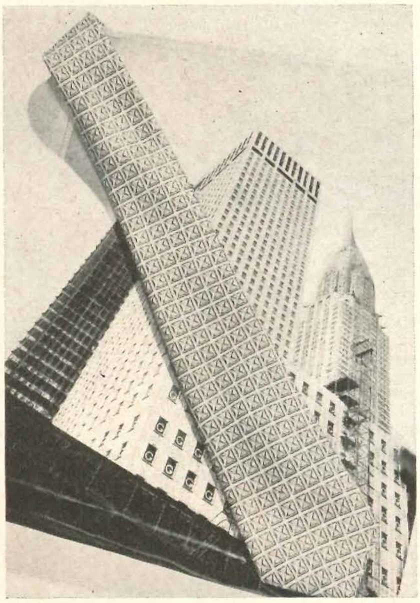
MEETINGS AND MISCELLANY

(Continued from page 21)

do, to 13 members representing all A.I.A. regions, have now been made. John W. Root continues as chairman.

Setting a Precedent

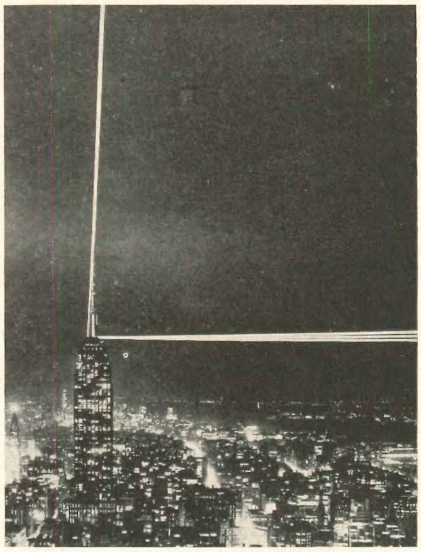
The A.I.A.'s hardworking president, George Bain Cummings of Binghamton, N.Y., who is just completing his first one-year term, has announced that he will not be a candidate for reelection in the balloting at the annual convention May 14–18. Mr. Cummings said he was stepping down in a deliberate effort to set a one-term precedent so that in future potential candidates for the presidency need not feel they must be prepared to give two years of service or refuse nomination. In his year as president, Mr. Cummings estimates that he has devoted a third of his time to the job. Reversal of the general expectation that, as has been customary with A.I.A. presidents, Mr. Cummings would seek and receive a second term, left the field wide open. At the time of Mr. Cummings' announcement the first week in March, there was nobody else officially *in* the field — no nominations had been received at A.I.A. headquarters for any of the five offices (besides president, first and second vice presidents, secretary, treasurer) which must be filled at next month's election. The only name publicly mentioned in connection with the presidency (in a rather offhand reference in an *Architectural Forum* article about something else) was that of Hugh Stubbins Jr., of Lexington, Mass., who was last year a candidate for the A.I.A. second vice presidency. Mr. Stubbins, however, expressed himself as completely unaware that his name had even been mentioned and said that if there had been any activity in his behalf he hadn't heard about it. Pre-convention nominations close April 4.



ARCHITECTURAL TIE — Comes now what the release caption describes as (above) "Picture of a Happy Marriage" — a tie called "Perennial Classic," newest of posh Manhattan haberdasher Bronzini Ltd.'s "Graeco-Roman Collection," which has been copied "almost intact," Bronzini reports, "from the newest glamour girl on Manhattan's skyline, the 45-story Socony-Mobil Building." Architects Harrison & Abramovitz will be interested to know that Bronzini president W. D. Blackwell's study of their stainless steel façade convinced him that the basic design elements are "unmistakably Greek and Roman" though he found their handling of "this classic theme" in this building "strictly 20th century American"

Happy Contractors

The Associated General Contractors of America, Inc. conducted the business of their 37th annual convention in New York a few weeks ago against a background of continuing optimism. The annual preconvention telegraphic survey of member chapters had indicated that contractors look forward to brisk business during the next half year at least. A $60 billion volume for 1956 — including all new construction and improvements to existing structures — was confidently anticipated. The 1955 total, a record, was $42.25 billion in new construction alone, a 12 per cent increase over 1954. The annual report of H. E. Foreman, A.G.C.'s managing director, called attention to the fact that construction last year accounted for 15 per cent of all goods and services produced in the nation, and was responsible for 15 per cent of all employment. He mentioned recent Federal government studies that show a very bright future, particularly in the public works field. Surveys of state and local public works needs put these at $200 billion over the next 10 years. The present rate of outlay will have to be doubled if this requirement is to be satisfied. The more than 1600 attending the New York meetings installed Frank J. Rooney of Miami as 1956 president. He succeeded George C. Koss of Des Moines. The new vice president is Lester C. Rogers, president of Bates & Rogers Construction Co., of Chicago. His father, Walter A. Rogers, in 1920 was the second president of the A.G.C., and preceded his son as president of the Bates & Rogers organization, a heavy construction and railroad firm. The general contractors spent quite a bit of time discussing methods of combating efforts of specialty contractors to secure new Federal legislation which would force the separate listing of subcontractors on government work exceeding $100,000 per contract. The specialty contractors are again trying to persuade Congress to pass the Federal Construction Contract Bill, S. 1644. The generals look upon this as a foot-in-the-door effort which would lead to the inclusion of state and other types of construction if enacted by Congress. A.G.C. determined to try to block the legislation before it could reach the House floor. The building division expressed its satisfaction with plans of the American Institute of Architects to revise its architects' practice handbook. Not consulted when the handbook first was prepared, the general contractors now are conferring with A.I.A. on the revision and on standards specifications.— *Ernest Mickel*

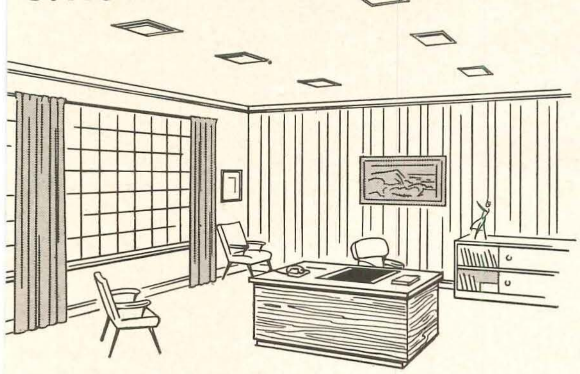


SO SYMBOLIC — After all these years, they're going to make the Empire State Building a symbol. What will do it? — an "electronic tiara of four super-powerful revolving and elevating night beacons" to be installed (photo above) 1092 ft above Manhattan streets. These, with their "eight position cycle of dramatic sky-sweeping movement," will be visible in six Eastern states, on the ground from 80 miles, and from the air 300 miles. Federal Sign and Signal Corporation is engineering, building and installing the addition to the Shreve, Lamb & Harmon skyscraper

mcolens in ndustry

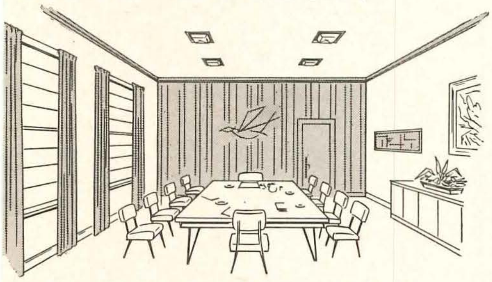
Designers of incandescent lighting for modern offices and executive suites have discovered a new tool, the Art Metal AMCOLENS. The AMCOLENS makes it possible to design incomparable efficiency as well as contemporary beauty into lighting systems. Installed in Art Metal recessed eliptisquares, AMCOLENS builds prestige among customers and employees. For dramatic, advanced lighting for conference rooms, lobbies, alcoves, reception rooms, lounges, offices and laboratories, AMCOLENSES are your contemporary keys to better lighting designs.

OFFICES



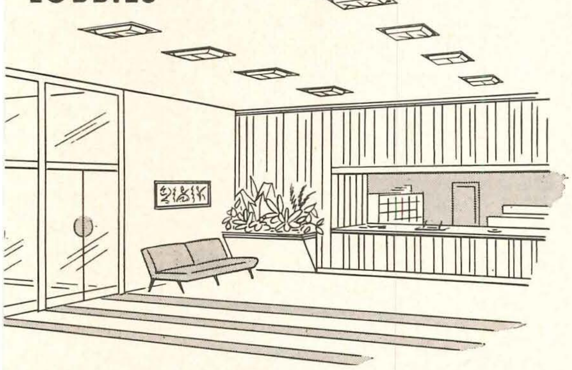
:OLENS creates a cheerful office environment re employees enjoy working. Warm, colorful t is multiplied and directed to desks and cabinets lear glass prisms, the most exact means known cience for controlling the direction of light.

CONFERENCE ROOMS



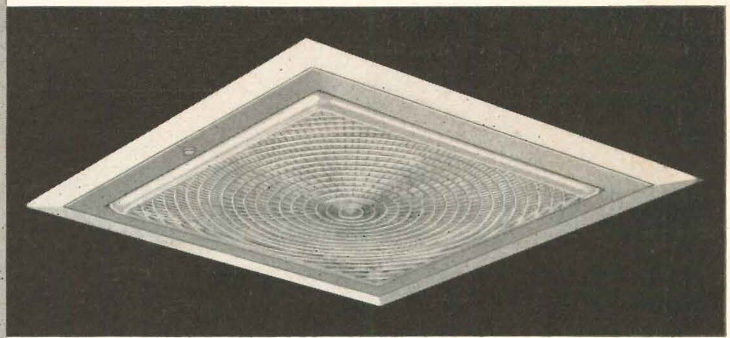
ndsome, deep AMCOLENSES provide diffused dowless illumination and blend with the overall r scheme.

LOBBIES

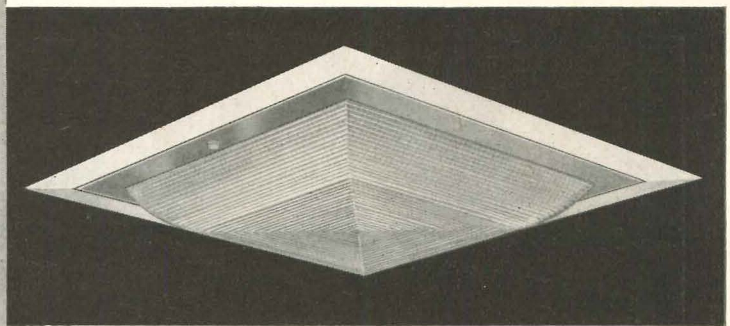


rich subtle effect of the two-light deep COLENS enhances the decor of any business hering place. In terms of lighting efficiency and cticality, clear prismatic AMCOLENS has no al.

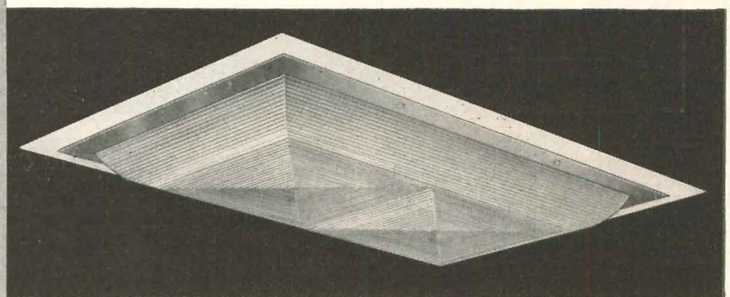
TYPES of recessed ELIPTISQUARES



Recessed Flush Eliptisquare—Four eliptisquare sizes accommodate 6½", 8½", 10⅜" and 12" AMCOLENSES. The eliptisquare reflector multiplies light output.



Deep Eliptisquare—Three sizes utilize 8½", 10⅜" and 12" AMCOLENSES.



Two Light Eliptisquare—Accommodates one 9½" x 16½" AMCOLENS which incorporates two symmetric lens elements each with its own lamp and eliptisquare reflector. All eliptisquare units have separate hinged doors which rotate open on two spring pin hinges.

AMCOLENSES ARE ANOTHER *Lighting Research* DEVELOPMENT OF ART METAL

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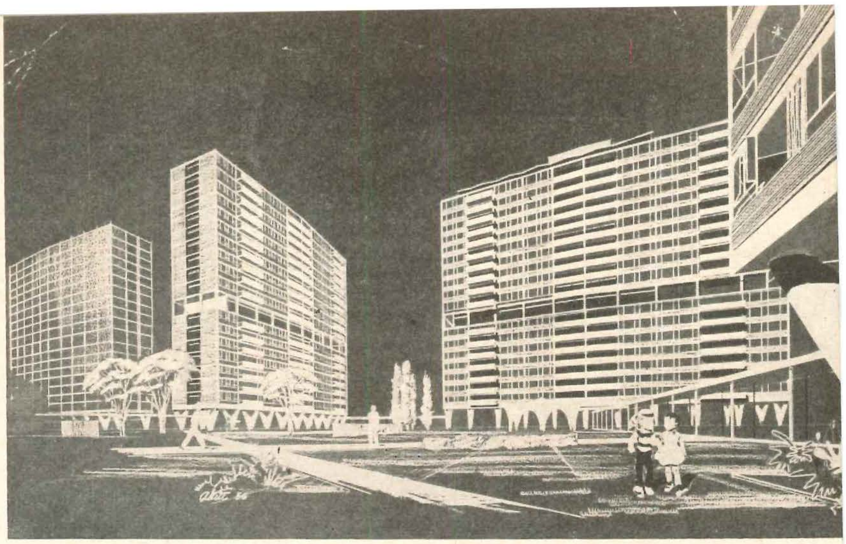
NEWS FROM CANADA

(*Continued from page 36*)

P.Q.A.A., discussed "The Duties and Obligations of the Architect," and urged that architects give enough detail in their preliminary drawings and specifications to permit accurate estimates.

A. J. C. Paine, president of the Royal Architectural Institute of Canada, at the same session advocated greater use of official contract documents.



A $21 million redevelopment projec has been proposed for Toronto. T be composed of six 19-story apart ment buildings, it was designed b Weir, Cripps and Associates, Toront

On Saturday, the last day of the co vention, the architects toured the ci but returned to the hotel in time to he the chief speaker, Msgr. Alphonse Ma Parent, rector of Laval University, the annual luncheon. Monsignor Pare called for greater concentration on t liberal studies in universities, but sa that before this could be done univer ties would have to put in order th faculties in the speculative sciences, li eral arts, "pictorial" arts and "mo sciences."

Delegates elected Henri Mercier, Fellow of the Royal Architectural I stitute of Canada and member of t Montreal firm of Crevier, Lemieux Mercier, to the presidency. Other ne officers include: H. A. I. Valentin Montreal — first vice president; Géra Venne, Quebec — second vice pres dent; Randolph C. Betts, Montreal - honorary secretary; Georges de Va rennes, Montreal — honorary treasure and Richard E. Bolton, Francis Nobbs, C. Davis Goodman, Pier Morency, Paul E. Brassard, Chrystie Douglas, Robert P. Fleming, Paul Trepanier, Edouard Fiset and Luci Mainguy — members of the Council.

PROVINCIAL OFFICERS NAME AT B.C. ARCHITECTS MEETIN

At the 36th annual meeting of t Architectural Institute of British C lumbia, held recently in Vancouve J. L. Davies was reelected presiden Clive D. Campbell, deputy minister public works and chief architect for th provincial government, was elected vic president. Councillors include Pro Fred B. Lasserre, Murray Polson, C. Pratt, Keith B. Davison and R. W Siddall.

(*Continued on page 44*)

b

esign by American-Standard

These are just a few of the many plumbing, heating, cooling and kitchen products manufactured by the AMERICAN-STANDARD PLUMBING AND HEATING DIVISION, P. O. Box 1226, Pittsburgh 30, Pa.

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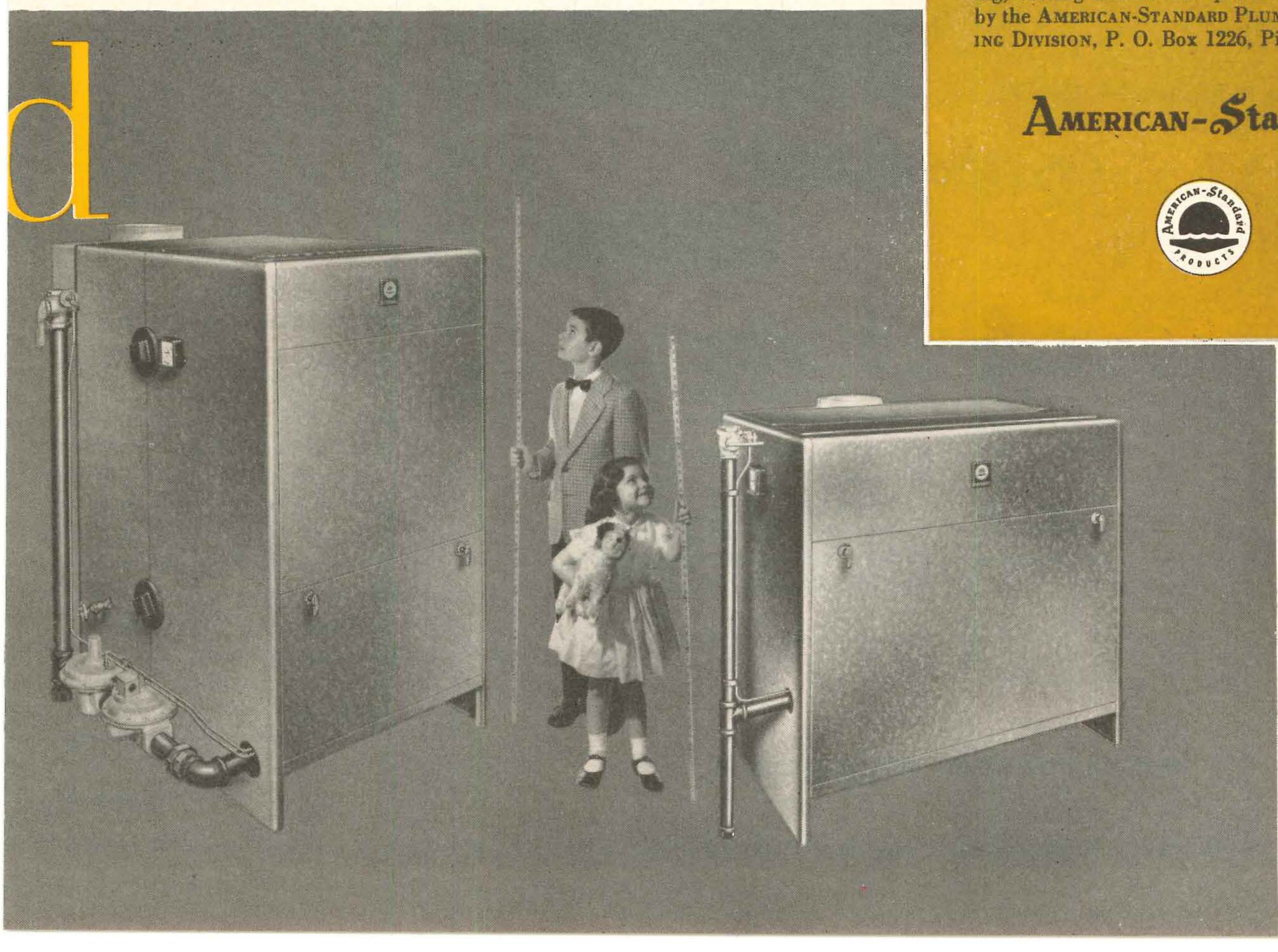


NEWS FROM CANADA

(Continued from page 40)

FEAR U. S. COMPETITION FOR CANADIAN ENGINEERS

At its Toronto hearing, the Royal Commission on Canada's Economic Prospects was told by J. M. Thompson, vice president of Canadian Westinghouse Ltd. that modifications in U. S. requirements for military service may aggravate Canada's shortage of graduate engineers and technicians. Such changes in the draft law will increase the attractiveness of employment in the U. S. for young Canadian engineers, he said.

Fort Harrison Apartments, Victoria, B. C., contains 11 one-bedroom units, six of them with full balconies; Clack, Clayton, Pickstone, of Victoria, are the architects

The Westinghouse executive was one of many speakers who stressed the gravity of the shortage of skilled personnel. The implication was that unless this shortage is remedied, Canada's prospects for the next 25 years are going to suffer a severe setback.

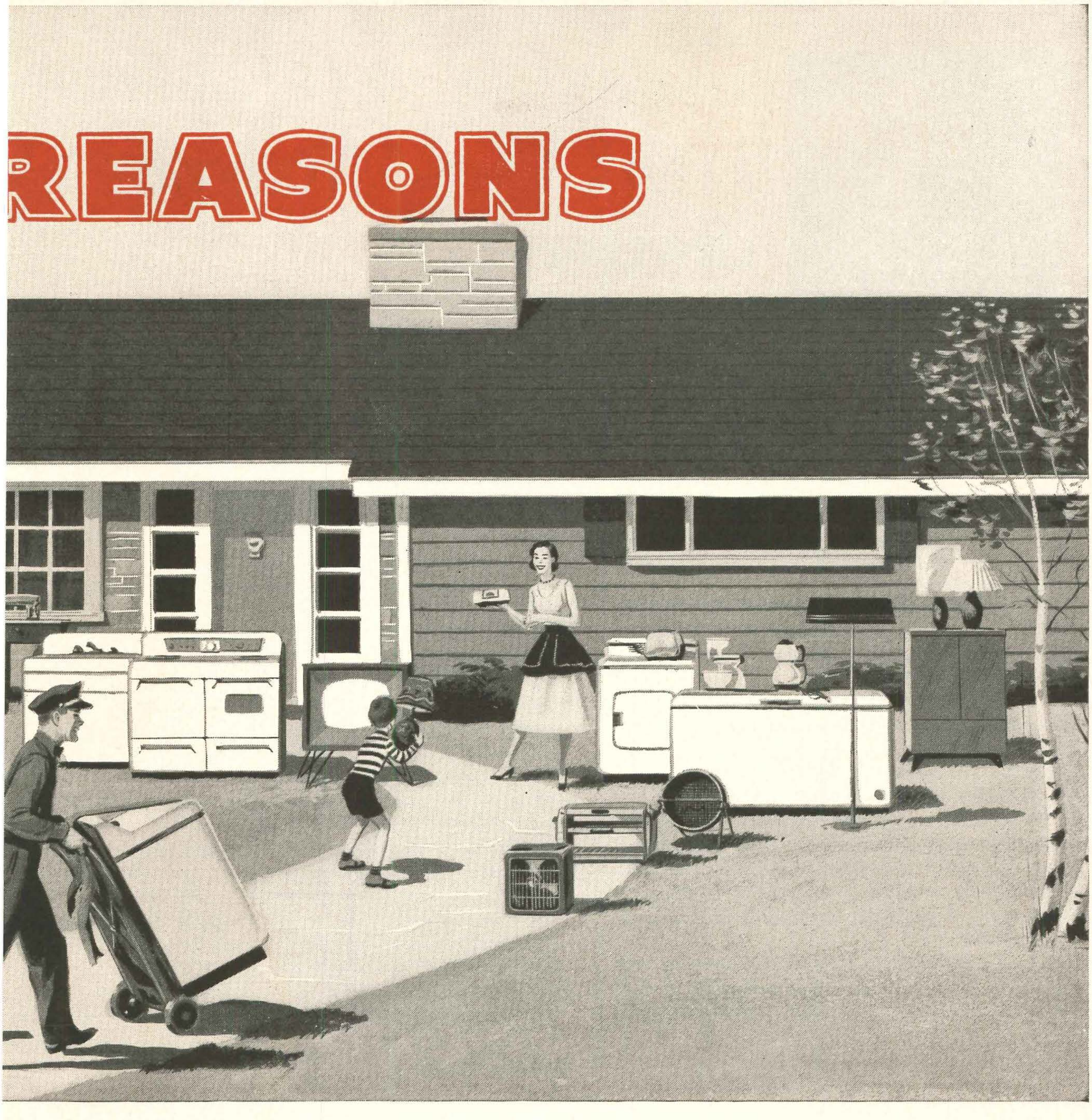
H. M. Turner, chairman of the board of Canadian General Electric Co. Ltd., had some statistics for the situation. Against an expected 1800 engineering graduates in 1956, there is an annual need of 2500 to 3000 a year. There must be new facilities for training engineers, he said, or greater use made of existing facilities. He suggested also that Canadian universities study the American practice of dividing university classes into two groups, one group working in industry half the year while the other group is studying.

McGILL EXPERIMENTS WITH ARCHITECTURAL EDUCATION

For the past two years, the McGill School of Architecture and the Ecole des Beaux Arts of Montreal have been cooperating, under the title Laboratoire d'Etude Technico-Architecture, in a new method of instruction for architectural students. The system calls for the students to construct in the laboratory key sections of a full-scale building, using the same materials as would be used in actual construction.

The technique, which is also receiving support from the Montreal Building Trades Center, was initiated by Chicago architect Howard Fisher at the invita-

(Continued on page 46)



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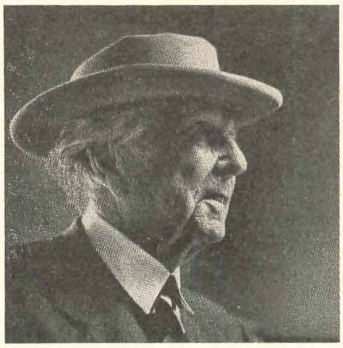


Frank Lloyd Wright discusses . . .

AN AMERICAN ARCHITECTURE: Frank Lloyd Wright. Edited by Edgar Kaufmann. Horizon Press (New York) 1955.

BY ALINE B. SAARINEN

IT TOOK THIRTY YEARS before America recognized Frank Lloyd Wright as a great man. Now he has fame, admiration, adulation, high TV appeal and a host of rather superficial followers. But the astonishing fact remains that he has had very little influence on the best architects or the best architecture of following generations.

One explanation is that his contribution is so formidably personal that although it may invite imitation, which is a specific and superficial thing, it cannot exert influence, which is a general and creative one.

But this is to confuse effects with principles. Wright's *style* is indeed personal and with many idiosyncracies. It is personal and grandiose and audacious, often even rude, as is Michelangelo's sculpture. The attempt to follow Michelangelo's style led only to imitation of his effects and thus to virtually nothing. But the development of Michelangelo's principles led, in large measure, to the dynamic sculpture of the Baroque. As Wright himself says: "No man's work need resemble mine. If he understands the working of the principles behind the effects he sees here, with similiar integrity he will have his own way of building."

Another explanation for Wright's lack of influence is that because he does not share the prevailing preference for what Dean Hudnut in a brilliant article recently called the purist or "Engineer's Esthetic," * he is not sympathetic to younger architects. But this assumes that because he does not subscribe to the "Engineer's Esthetic," nor believe dogmatically in the expression of structure carried to its ultimate conclusion, he is unaware of and disinterested in its challenges.

To hold this view is, I believe, to admit a nearsighted view of his work. It is also, more tragically, to admit that the vision of architecture has become so threadbare it can recognize the acceptance of these challenges only in the most limited and conventional terms.

All of which is, perhaps, a long-winded way of saying that Wright's basic principles are, in a profound sense, very little understood. If they are visually lost for many in the overwhelming forcefulness of his personal style, they are intellectually lost for others in the exuberant, repetitious and often extraneous muchness of his writings.

What Edgar Kaufmann has undertaken in this volume, then, seems to me to fulfill an important need. He has, in a sense, panned away the gravel and delivered only the gleaming, golden nuggets. For he has extracted from Wright's voluminous writings, speeches and interviews, what he considered the most succinct, trenchant and yet colorful of the architect's statements on the general and the particular. He has then ordered these statements into meaningful groupings

(*Continued on page 66*)

* ARCHITECTURAL RECORD, *Jan. 1956, pp 139–146.*

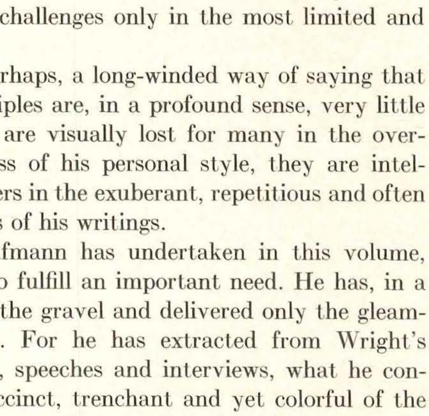
BUILDER OF GREAT BRIDGES

Robert Maillart. By Max Bill. Verlag Girsberger (Zurich) 1955. 184 pp, illus. American distributor: George Wittenborn & Co. New York City, N. Y.

In the January 1st, 1938 issue of "Schweizerische Bauzeitung," Robert Maillart, the late Swiss engineer, wrote, "Reinforced concrete does not grow like wood, is not rolled like steel, and has no joints like masonry. It is most easily compared with cast iron as a material cast in forms, and perhaps we can learn something directly from the slowly discovered cast iron forms regarding the avoidance of rigidity in form by a fluid continuity between the members that serve different functions. The condition of this beautiful continuity is the conception of the structure as a whole."

This attitude toward the materials and their use was largely responsible for perhaps the most beautiful structures of their kind ever built. Conceiving structures in a completed sense rather than an assembly of components was the prime factor on attaining this success. This can be seen in Maillart's bridges where the roadways or railways are an integral part of the structure rather than

(*Continued on page 66*)

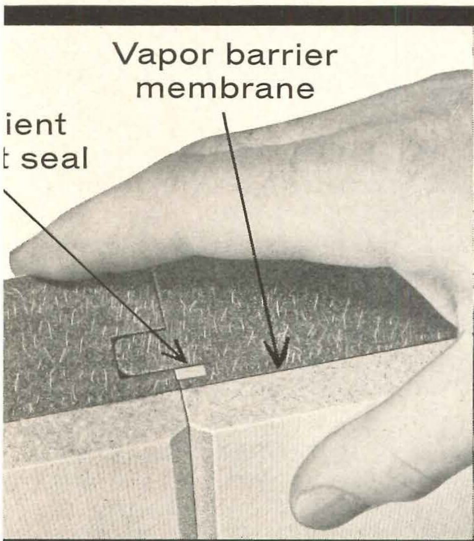


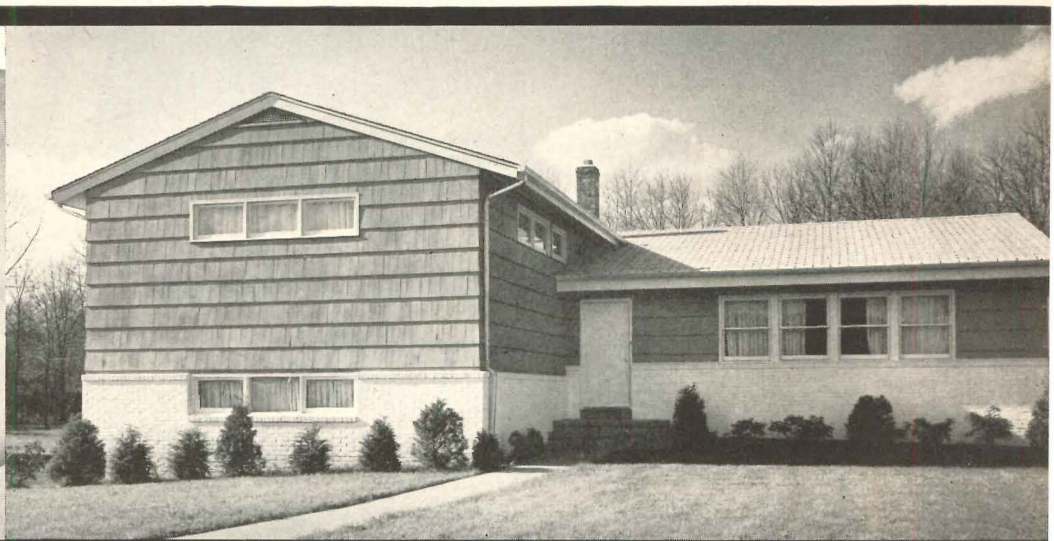
Insulite Roof Deck design outsells others 3 to 1 in New Jersey project

Homes designed with Insulite Roof Deck are out-selling all others in the Mountainside Park project. "Out-selling them three to one," reports Mr. Lester Robbins, president of the Robbins Co., Union, N. J., the builders.

Insulite Roof Deck displays quality and beauty to the prospective home purchasers. The white, pre-finished underside adds to the "cathedral" effect. See, at left, how Insulite Roof Deck contributes to the free and open look the architect, the late Sam Glaberson, A.I.A., wanted in this exposed beam ceiling.

All over the country builders report Insulite Roof Deck reduces costs \$80 to \$300 per home. Goes up fast. Roof Deck is three products in one. A single operation does three jobs. Send for pictures and construction details now! Write Insulite, Minneapolis 2, Minnesota.





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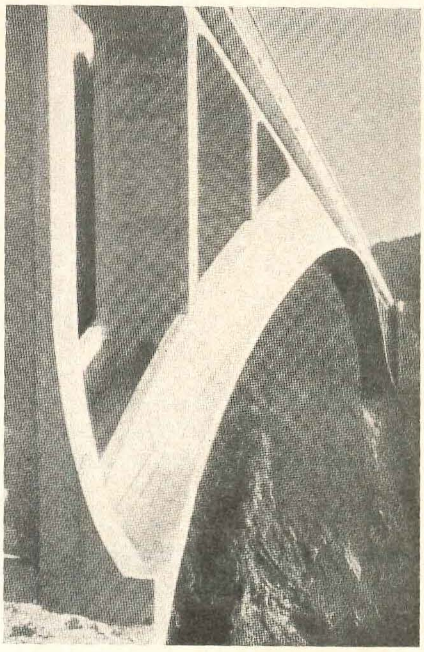
REQUIRED READING

(*Continued from page 62*)

MAILLART



a supported load. In his buildings, columns, beams, and floors are all combined into a monolithic column with slab. Max Bill's book shows a love for his subject material uncommon in similar works. This, the second edition, contains several works that were omitted in the first edition. It is accompanied by excerpts of Maillart's writings and excellent photographs and drawings of his projects, both completed and uncompleted. Equal emphasis is made of Maillart, the Engineer and Maillart, the Artist. He is more than worthy of both titles. **John C. Martin**

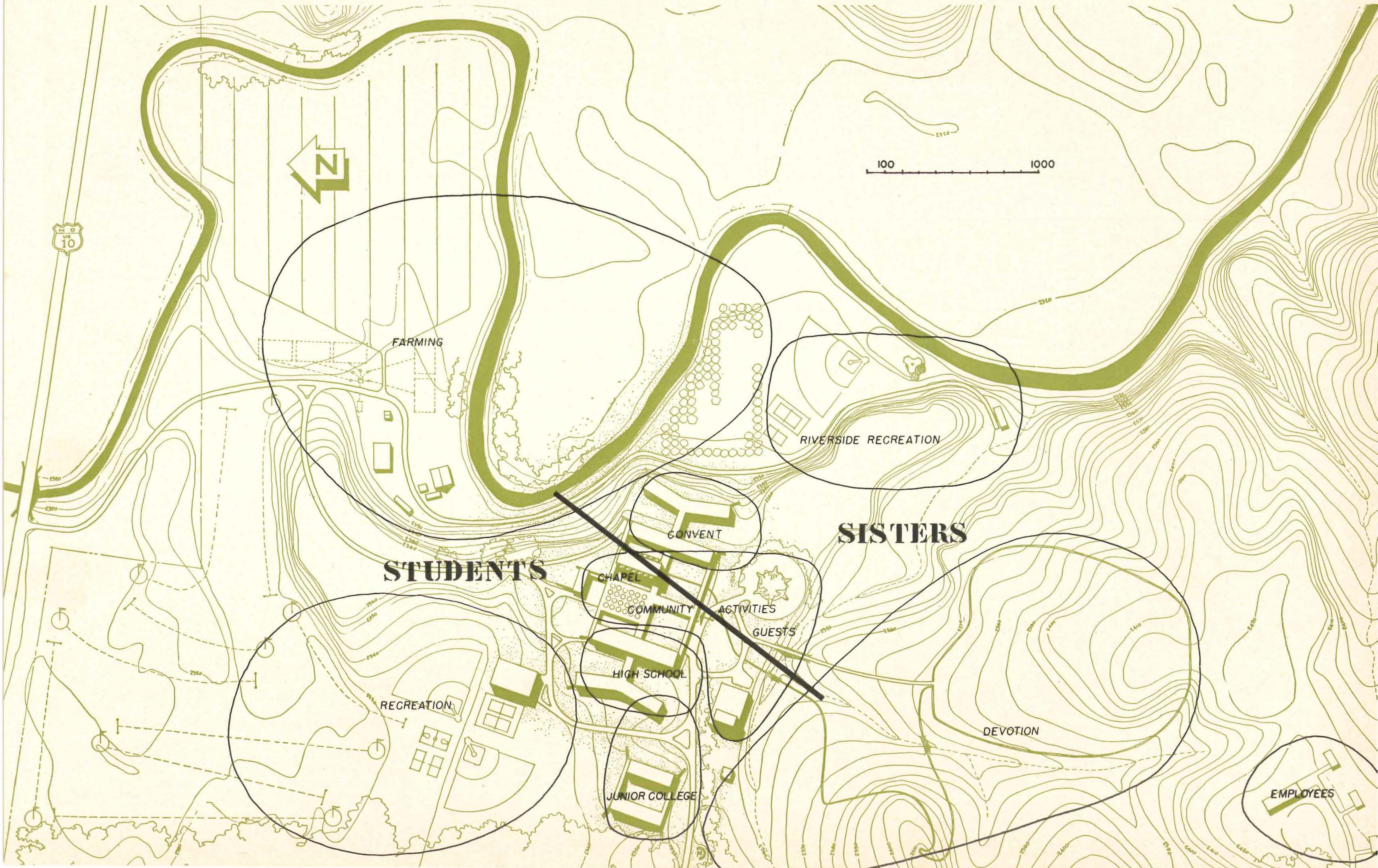
WRIGHT

and illustrated them with examples of Wright's work. Thus this book becomes both an updating and a new organization of the somewhat similiar service performed by Frederick Guthiem's "On Architecture" of 1941. The job is so good that arguments about the particular selections, in which, of course, specialists and disciples will indulge, seem to seem to me to be mere carping.

The value of the book is, naturally, that the isolation of the statements gives them added clarity. The concept of technology being a means toward a liberation of space; the belief that the harmonious interrelation of parts must result not only in a solution but also in an expression; the insistence on the orderly growth and wholeness of a con-

(*Continued on page 446*)

BREUER DESIGNS A CONVENT



CONVENT OF THE ANNUNCIATION *Dickenson, North Dakota*

Marcel Breuer, Architect

Traynor & Hermanson, Associate Architects

Slocum & Fuller, Consulting Engineers

Last month architect Marcel Breuer and his associate Hamilton Smith sat down with Record editors John Knox Shear and James Hornbeck to discuss the design for this convent. Their conversation follows:

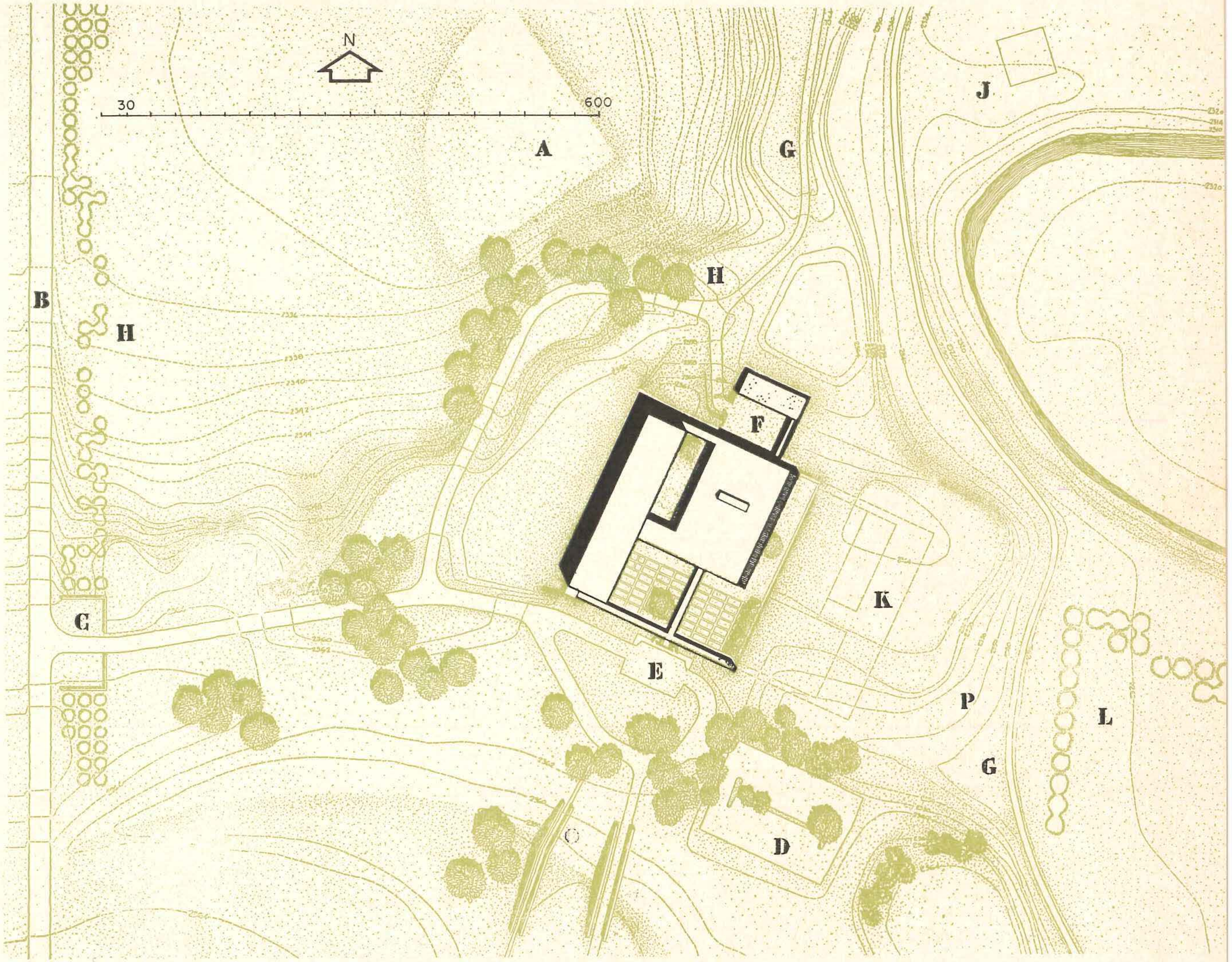
Q: Should the matter of the budget and its influence be introduced now or later during our talk?

A: Well, people naturally think in terms of money and how much buildings cost; perhaps more so in the case of women than men. The sisters took a realistic attitude; they were budget conscious. The result was, that whether we liked it or not, cost influenced us on every question. It was almost as though our thinking had been thrown into a certain gear for the trip. Within this discipline, the comprehensive plan was conceived as generously as possible with the thought that the budget would become the bridge between it and that part now proposed for the first stage of construction.

Although the budget assumed great importance at first, it carried less weight once the sisters understood its effect upon the planning process.

Q: In what respect was the site and the general environment a dominating factor in the design?

A: This is an empty piece of land; a hillside in a vast wilderness . . . in the foothills of the Rockies . . . often raked by violent winds from the



SITE PLAN, STAGE ONE

A Student Recreation
B County Road
C Entrance Gates
D Parking
E Main Entrance & Parking
F Service Yard, Garage & Pump House
G Service & Farm Roads
H Screen & Windbreak Planting
J Existing Farm Buildings
K Second Stage Dotted
L Orchard
M Convent Outdoor Recreation
N Cemetery Processional Way
O Stations of the Cross Way
P Vineyards

north and west so that trees grow easily only in the ravines. The character is harsh, wild, western — and impressive for those very qualities.

Here you must make a strong statement or it will be lost in a tremendous wasteland. Despite nearly limitless areas all about, their state capitol is vertical; evidence of the need for a positive kind of building.

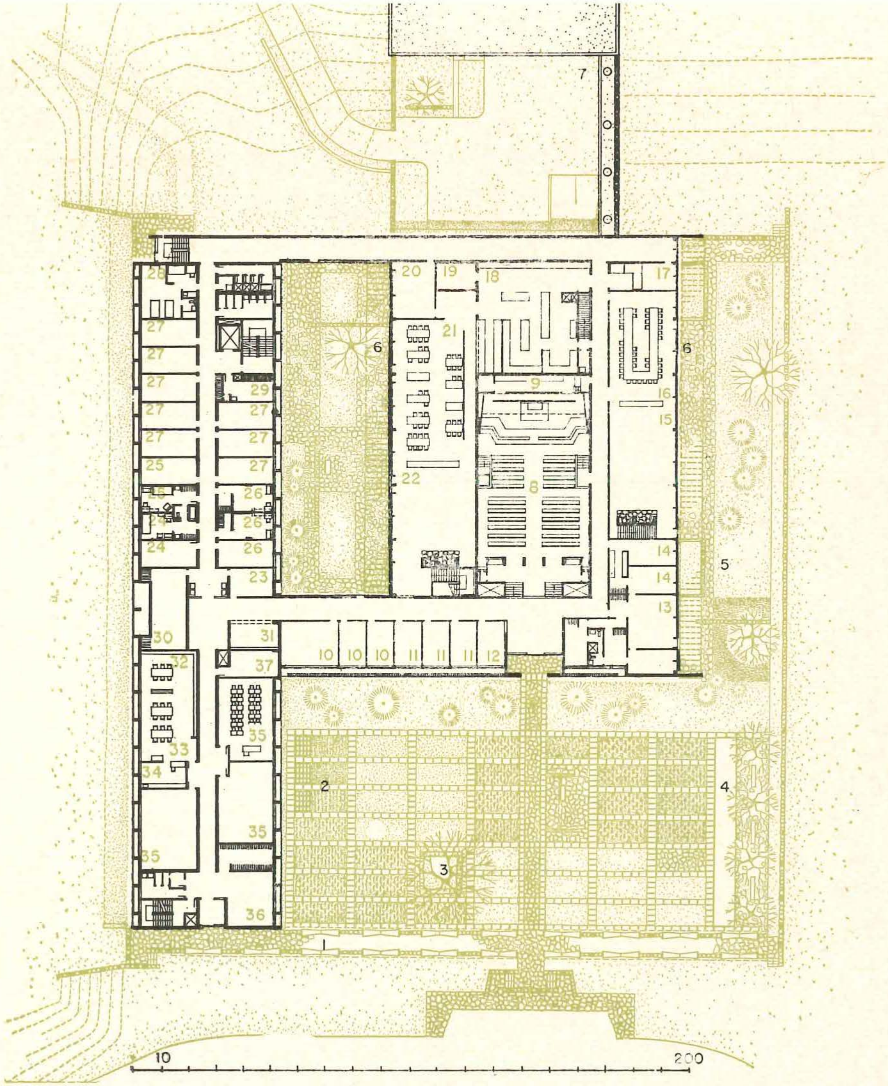
This building group should be a social island in such a land; a cultivated area, landscaped and controlled; a retreat. And this island should have a bold shape if it is to contrast effectively with the wilderness.

Q: Was there a distinguishing characteristic in the traditions of the Benedictine order that exerted any particular influence on the design?

A: Yes, a positive attitude which is primarily optimistic in nature. These nuns are not of a cloistered order; they are outgoing; operate schools, hospitals, etc.

Q: Were there any significant or influential elements in the social traditions or architectural attitudes of the people in the region?

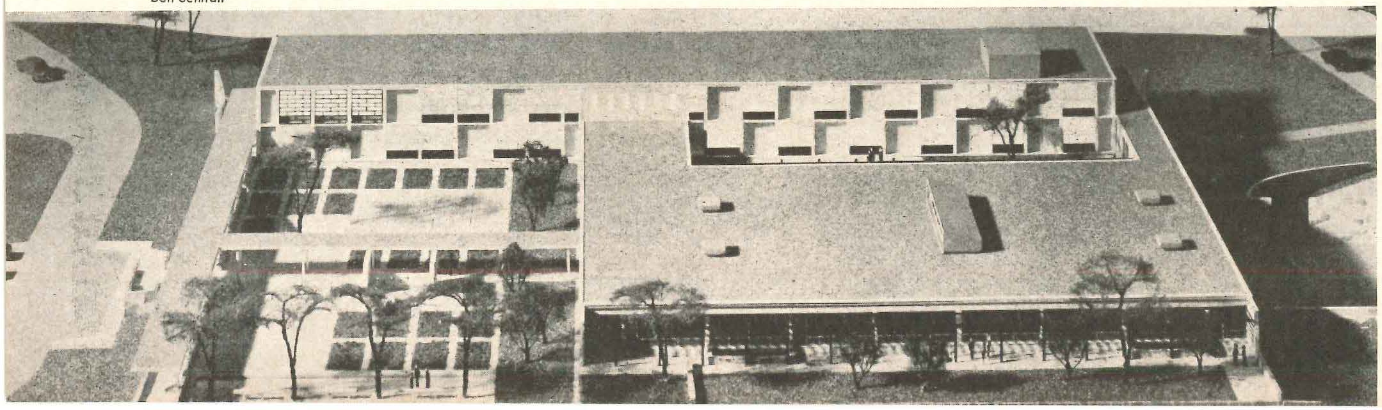
A: Not importantly; the attitude of the clients was a weightier factor. We did choose local brick, which we liked and felt was appropriate. It is rough textured and light buff in color; contrasts nicely with concrete. We also chose local field stone.

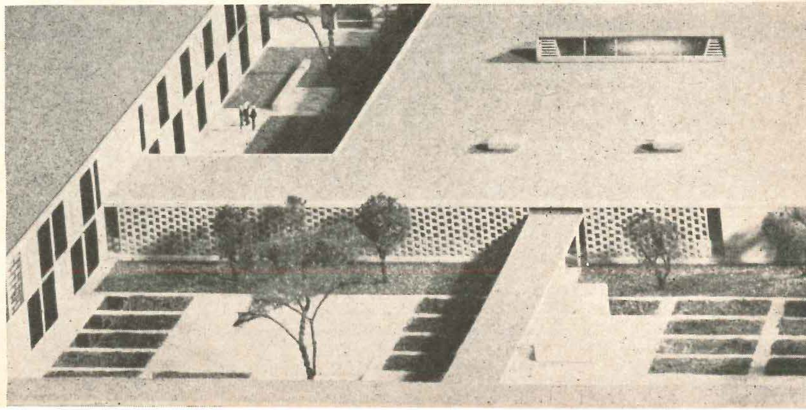


MAIN FLOOR, STAGE ONE

1 Open Cloister
2 School Garden
3 Outdoor Classroom
4 Pool
5 Convent Garden
6 Terrace & Arbor
7 Service Court
8 Chapel
9 Sacristy
10 Administration
11 Reception Rms.
12 Portress
13 Chaplain's Apartment
14 Guest Dining & Serving Kitchen
15 Community Room
16 Refectory
17 Employees' Dining & Serving Pantry
18 Main Kitchen
19 Dishwashing
20 Aspirants' Dining
21 Student Dining
22 Student Lounge
23 Community Reception
24 Prioress' Office & Bedroom
25 Reverend Mother's Office & Bedroom
26 Secy's Office & Bedroom
27 Sisters' Rooms
28 Infirmary
29 Pressing Room
30 Community Library
31 Bookshop
32 Faculty Study
33 School Library
34 Library Workroom
35 Classrooms
36 School Entrance & Cloakroom
37 Audio-Visual Storage

Ben Schnall





Q: Among the varied functions, did one in particular exert an overriding effect upon the design? Is there a key that unlocks the plan?

A: In terms of plan, we had to have a centrally located joining and interlocking of the convent and student facilities, which had to be — at the same time — clearly separate. There was also the idea that this was to be a community center.

Q: What led to this arrangement of elements?

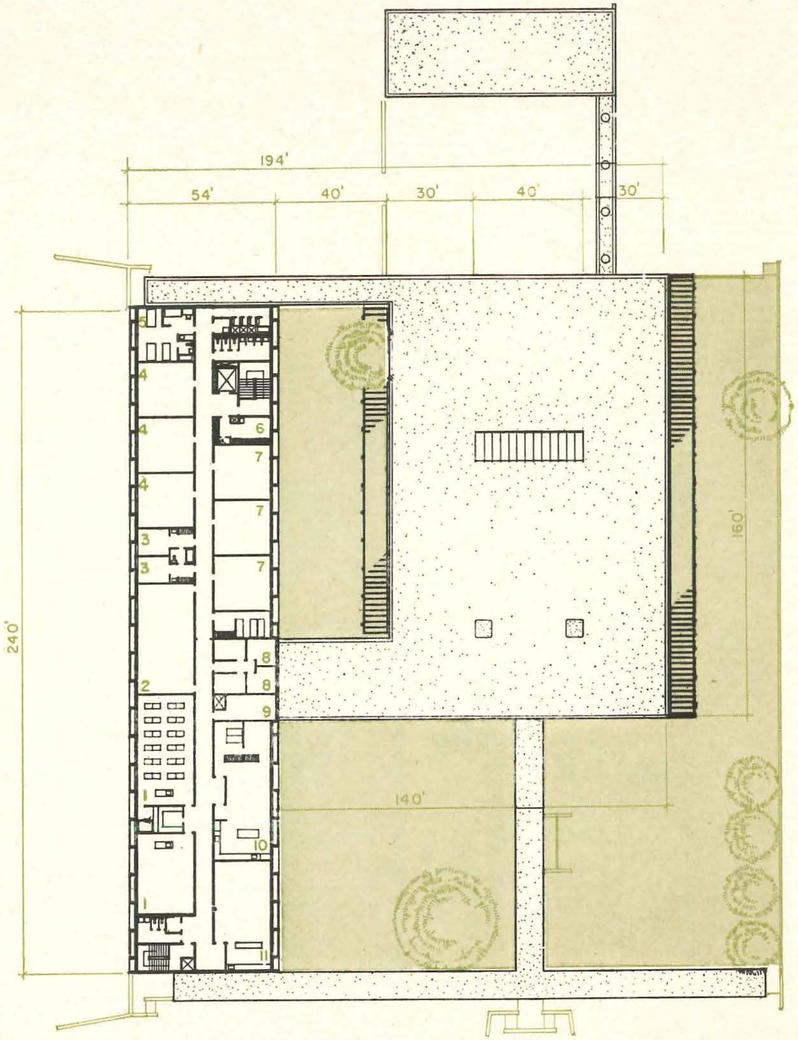
A: The planning process here compares with city planning in that it must take into account a step-by-step development, always respecting the existing complex that changes with reluctance.

This is actually a dynamic plan, which constantly changes but must constantly work. The changing aspect influenced the choice of materials and structure; brought about the system of bearing walls with non-bearing partitions for flexibility of use. The flexibility requirement caused us to develop a façade pattern which can collect partitions for a variety of room sizes, apportioned in 3, 4, or 5 ft units.

The traditional monastery plan comprises a single-loaded corridor and a central courtyard, which gives one a sense of his relationship to the whole; whereas in a double-loaded corridor scheme one tends to lose his sense of orientation. In North Dakota, the severe climate precludes the use of a central court for circulation. Here, we grouped the elements functionally, connected them by cloisters, and produced several courtyards (or gardens) for various public spaces, such as the dining court, the Convent cloister, the visitors' garden, etc.

Q: What determined the selection of the principal materials that one will see?

A: The buildings must be fireproof and permanent; must have the character of "lasting one hundred years."



UPPER LEVEL, STAGE ONE

1 Science Classroom & Lab
2 Study & Recreation: Novices & Postulants
3 Novice Mistress & Assistants
4 Postulants' Dormitories
5 Infirmary
6 Pressing Room
7 Novices' Dormitories
8 Music Practice Rooms
9 Music Teaching Studio
10 Home Economics Rm.
11 Art Room

In expressing concrete column and slab construction, one is led easily into the monastic idea of cells or cellular expression. Another important factor was local experience in handling certain materials.

Q: What was your thinking in regard to the use of color for the various buildings?

A: We selected — for the exterior — a combination of white concrete, light buff brick, blue window bulkheads, terra cotta colored quarry tile, creosoted wood (dark), and natural field stone.

Q: Is that a Breuer blue?

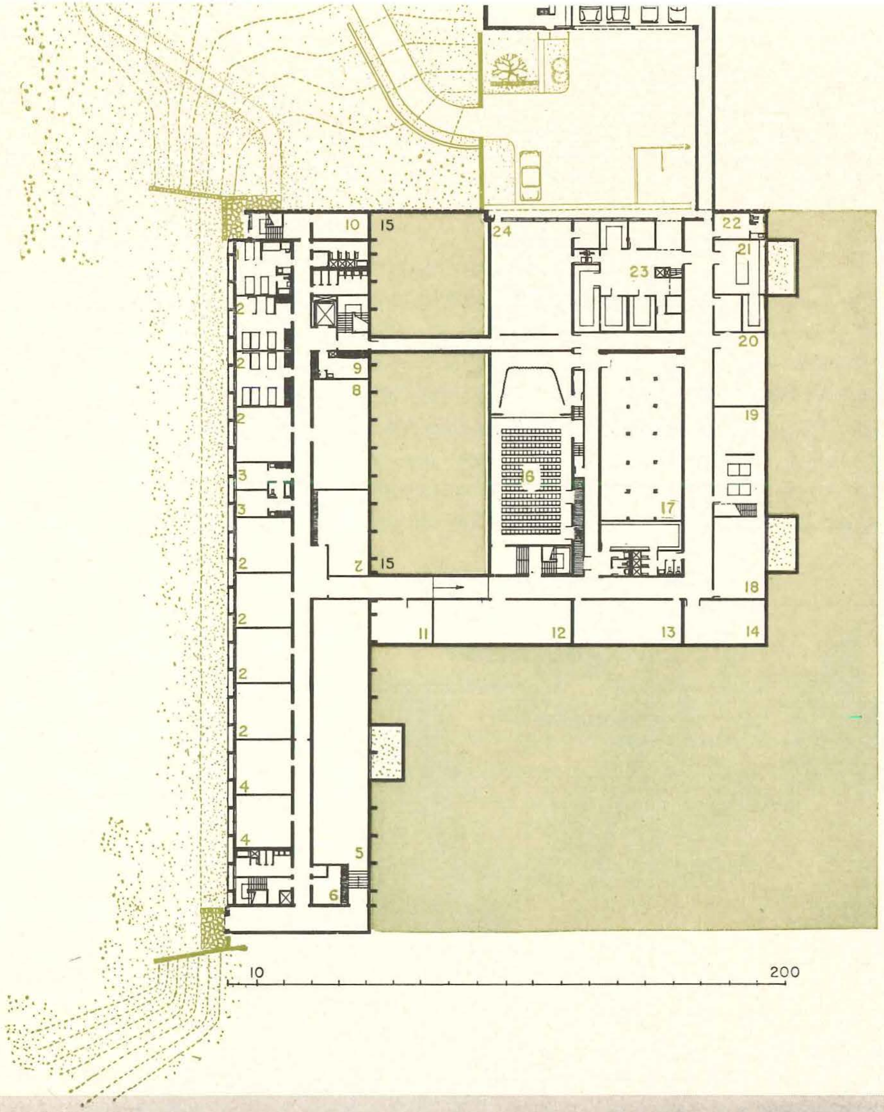
A: You might say so. It is a mixture of ultramarine and cobalt, which yields a blue that is almost pure and not too hot or too cool. The result is a clear color, not one muddied or grayish.

Q: Will you use this for the interior as well?

A: Interior colors are not determined yet. We want to present a studied selection to the occupants for their individual choice. We have done this before (for the Monastery) and were rather surprised and pleased at their choices, which were predominantly strong, gay colors. We expect more or less the same result here.

Q: The entrance seems to have been considerably played down. Why is this?

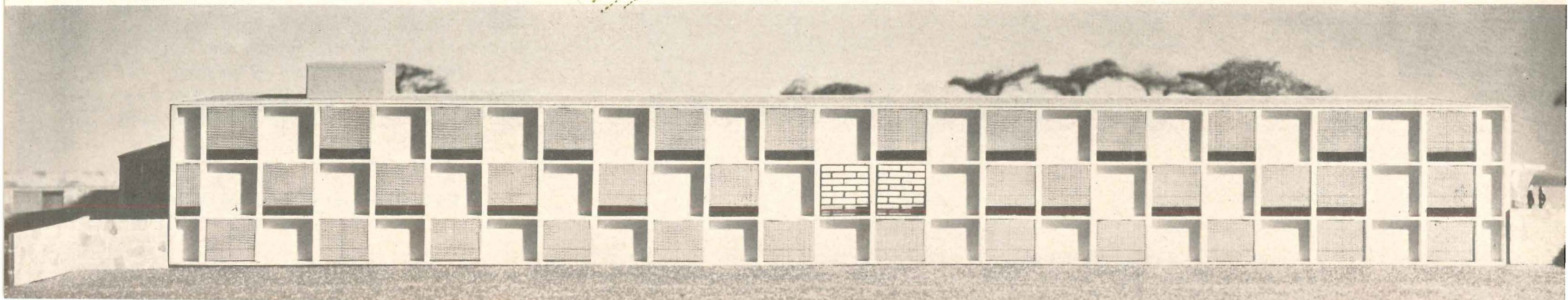
A: The present entrance that you see in the model photographs will eventually be a secondary one.



LOWER LEVEL, STAGE ONE

1 Infirmary
2 Student Dormitories
3 Mistress & Assistant
4 Aspirants' Dormitories
5 Mechanical
6 Aspirants' Pressing Rm.
7 Students' Game Rm.
8 Trunk Storage
9 Pressing Rm.
10 Outdoor Furniture Storage
11 Temporary Archives
12 Office Storage
13 Mechanical
14 Storage
15 Unexcavated
16 Student Activities & Auditorium
17 Drama Equipment & Storage
18 Sewing
19 Convent Games & Crafts
20 Linen Storage
21 Altar Bread & Stock
22 Employees' Lounge
23 Kitchen Receiving & Storage
24 Laundry
25 Caretaker's Apartment
26 Maintenance & Garage

Ben Schnall



Q: In the present stage most of the rooms for students and visitors face west. Could you explain your provisions for heat and glare control?

A: There are certain advantages in a western orientation. For example, it picks up summer breezes and in winter offers the benefit of radiant heat from the sun. Here, glare control is provided by the 24 in. deep concrete cellular gridiron as well as by the infilling screening, which consists of small, tilted horizontal slats. In my own house in New Canaan, where there is provision for the sun, we have found the west rooms very cool and comfortable in the summer.

Q: Could you tell us something about the cloister walkway supports; why you used that shape for them?

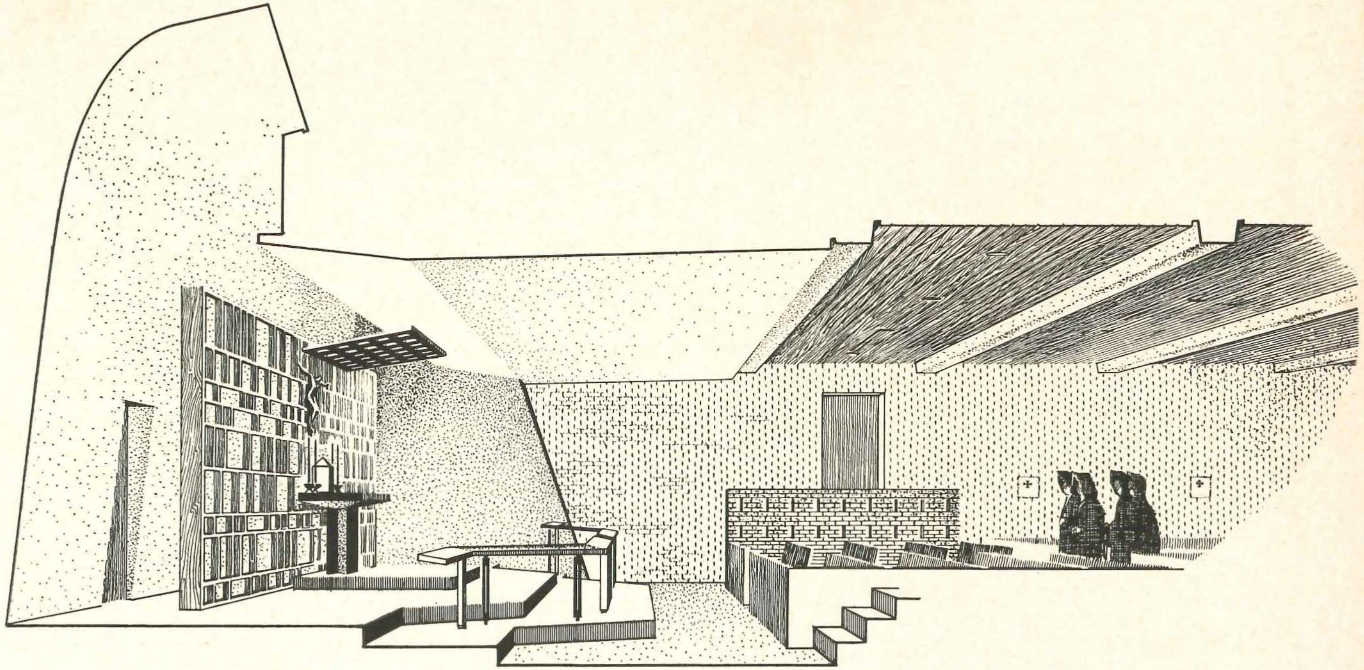
A: First, because we get two supports by using only one concrete form. Also, they provide a kind of counterpoint to the verticality of the rest of the design.

Q: What kind of heating and ventilating system will be used?

A: It was decided to use natural gas as the fuel because it is readily available, easy and economical to install and to maintain. Also, no great chimneys are required as in some other systems and each new building as it is added can have a separate unit. There will be a forced warm air heating system with artificial ventilation in public spaces.

Q: Will you explain the construction stages you have mentioned several times?

A: The comprehensive plan is the long range one which, due to cost, will be built over a span of years. At present, stage one will be built. We have, for convenience, grouped further developments — although several in number, into what we call stage two.



The chapel will provide a dramatic focus for the scheme; will follow Benedictine tradition, yet be contemporary in feeling. The side walls will be brick, painted white, while the cycloramic shaped north wall will be finished in gold leaf applied over rough-troweled plaster. This surface will glow in a wash of light coming from the concealed skylight by day or the troffer by night. The reredos screen, altar railing, benches, and ceiling planks will be of dark stained wood; the floor of natural quarry tile. The perforated baldachino will be painted a vivid Chinese red and the curtain back of the screen — in symbolic color — will be changed with the season, as is the custom. Pin-point spots concealed by the ceiling boards will provide congregation lighting.

Architecture of Brazil

By Dr. Carleton Sprague Smith

THE BRAZILIAN PAVILION at the New York World's Fair in 1939 indicated that there was a new architectural movement in Portuguese-speaking America, and soon afterwards Philip L. Goodwin's comprehensive study *Brazil Builds*, published by the Museum of Modern Art (1943) supplied an excellent account of it. The present bird's-eye view recalls the past quarter century and summarizes this development as it now stands.

At the outset, it is well to remind ourselves that Brazil is larger than the United States plus another Texas, and that it has a tropical climate with a population of 55,000,000 inhabitants, concentrated primarily along the sea-coast. The architecture of colonial days was a development of Portuguese baroque, the plantation life and mining cities producing rambling rural fazendas, graceful administrative buildings and two-story town sobrados. The churches were pleasantly decorated, the white stucco walls with carved stone and doorways and window moldings and blue tiles contributing to the variety of the scene. The contrast with the English colonies was striking, as the writer tried to point out a number of years ago in an article comparing Williamsburg and Ouro Preto.

In the early 19th century a French mission headed by Lebreton (1816) brought in a neo-classic style, Grandjean de Montigny and Louis Vauthier being its chief architectural exponents.

The late 19th century was dominated by a Beaux-Arts eclecticism — many of the architects were actually Germans and Italians — and the first quarter of this century saw the mushrooming of bungalows, pseudo colonial private dwellings — an American mission style — and pretentious academic public buildings too often unsuited to the scene.

The famous São Paulo Semana de Arte in 1922 — the parallel of our New York Armory show of 1913 — marked the beginning of Brazilian artistic independence and soon afterwards two Paulista architects, Gregori Warchavchik and Flavio de Carvalho, started the movement which has had such an astonishing growth. An article by the former "About Modern Architecture," published in the Correio de Manhá, November 1st, 1925, laid down functional principles which today are commonplaces.

Warchavchik's house in Vila Mariana opened in 1927 is one of the earliest landmarks of modern architecture in Brazil. A two-story structure with square simple lines and glass doors leading out onto stone terraces, it brought a new note into Brazilian architecture. Surrounded by a palm and cactus garden designed by his wife, Mina Klabin, the house came to identify itself with the local scene, and in 1929 Le Corbusier called it among "the best adaptations of modern architectural constructional tendencies in the tropical landscape." Some reservations were made about details but the ice had been broken, and when a casa moderna by Warchavchik was exhibited in the Rua Itapolis in the suburb of Pacaembu (1930) it received enthusiastic encomiums from the avant garde critics. Everything was carefully worked out — the furniture being designed by the architect — and sculpture by Lipschitz, Brecheret, Brancusi and Celso Antonio was featured. The house, however, did not consciously try to be Brazilian — simply modern. When a conservative architect attacked the casa moderna saying it would devaluate the land around it, he was challenged by an adherent of the new movement to build a house as original himself.

Warchavchik had been trained in Italy at the Instituto di Belle Arti, while Flavio de Carvalho had studied at Durham University. The versatile painter and civil engineer, however, was really self-taught in architecture, and his designs were largely conceived out of his own head. Both men were considered extremists. Meanwhile in Rio de Janeiro the sensitive Lucio Costa, educated in England and France, inspired great confidence by his gentle manner and innate good taste. Nineteen-thirty was the year that Getulio Vargas took over; at first as a liberal, forward-looking president who promised to give the people more equitable government and modernize Brazil. It was in this spirit that Lucio Costa was named Director of the Escola de Bellas Artes in Rio de Janeiro and being conscious of the need for a shot in the arm he invited Warchavchik and A. S. Buddeus to join the faculty. The conservative Instituto

Paulista de Arquitetos formally protested the nominations of "futurist professors" and ultimately both men were forced to leave since they had not been appointed in open competition. Meanwhile Warchavchik and Lucio Costa set up an office in the Federal Capital and a Salão de *Arquitetura Tropical* was attended by Frank Lloyd Wright. Among the draftsmen working for the new firm were Carlos Leão and Oscar Niemeyer.

Added impetus was given to the movement by the foundation of a Sociedade Pro Arte Moderna (SPAM) inspired by Warchavchik and a rival group CAM (Clube dos Artistas Modernos) led by Flavio de Carvalho. This healthy division of opinion kept people talking and thinking and, since the painters were strongly represented in both organizations, Brazilian architecture tended to develop a plastic sense, one of its most characteristic features. During this period Rino Levi's Columbus office building (1932) attracted a great deal of attention and was symbolic of the change being felt in many quarters.

The great turning point of Brazilian architecture was Le Corbusier's visit of 1936; it was he, together with Lucio Costa, Niemeyer, Jorge Moreira, Alfonso Reidy and others, who made plans for a new Ministry of Education, although the finished product, a modification of the original idea, was carried out exclusively by Brazilians on another site. The result, at any rate, in the words of Philip Goodwin, was "the most beautiful government building in the Western Hemisphere." The movement, therefore, which had started in the industrial city of São Paulo, was given official encouragement in the federal capital, and this marked a real step forward. Having a Minister of Education sympathetic to the new principles helped enormously. Also, after the opening of Rio's Santos Dumont Airport (designed by the Roberto brothers and featuring an attractive hydroplane station by Atilio Corrêa Lima) many converts were made.

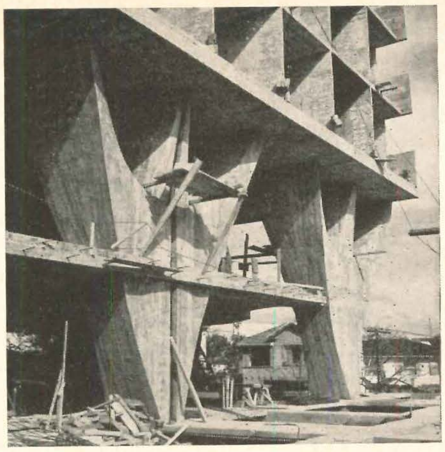
In 1939 the New York World's Fair was recognized as an architectural opportunity by the Brazilian government, and Lucio Costa and Oscar Niemeyer were chosen to erect a pavilion on the Flushing Meadows which would embody the new principles of the country's architects. This design showed some of the features which characterize the contemporary movement: purity of style, a subtle curved façade, an open ground floor on pilotis capable of accommodating large crowds, a wide ramp leading to the second floor, honey-combed louvers to keep the sun out, attractive tropical plants in and outside of the building, a coffee bar, an outdoor restaurant, a mural by Portinari, and an aviary.

A wave of construction followed, inspired by the new principles, and although unimaginative constructor-architects are found in Brazil, one is impressed by the dominant role of the contemporary school. Part of this is due to the fact that many of the designs for buildings are chosen on a competitive basis, and the judges, professional and governmental, are imbued with the philosophy of the contemporary style.

During the past twenty years in Rio, São Paulo and

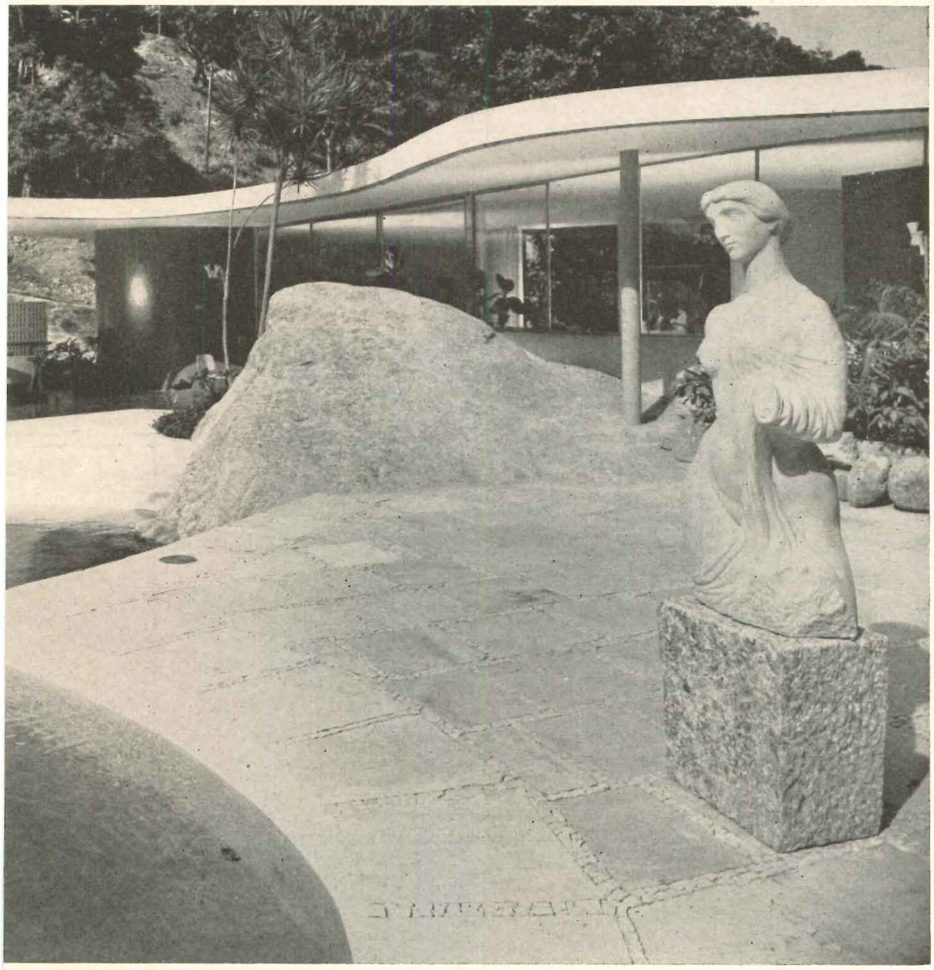
Ewing Galloway

Brazilian Pavilion; N. Y. World's Fair, 1938. Niemeyer



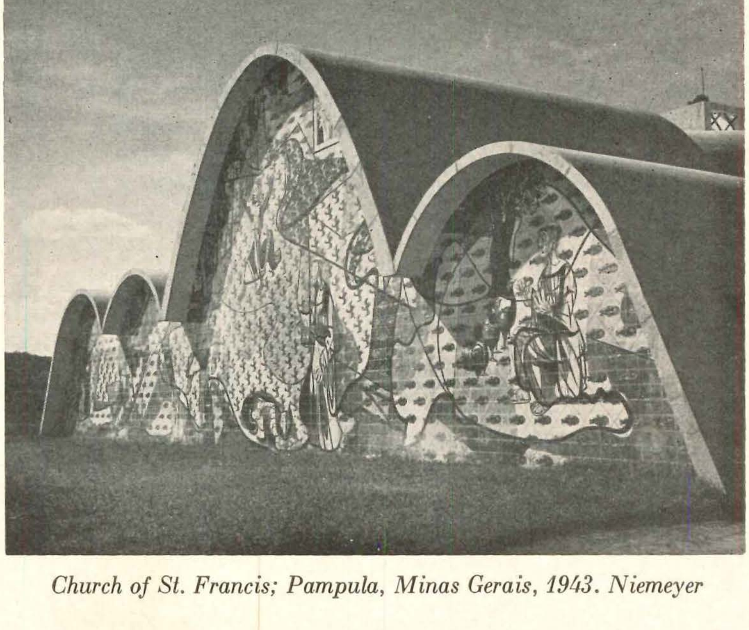
Marcel Gautherot

Construction detail. Niemeyer



R. Maia and Francheschi

House for the architect; Rio de Janeiro, 1953–1954. Oscar Niemeyer



Church of St. Francis; Pampula, Minas Gerais, 1943. Niemeyer

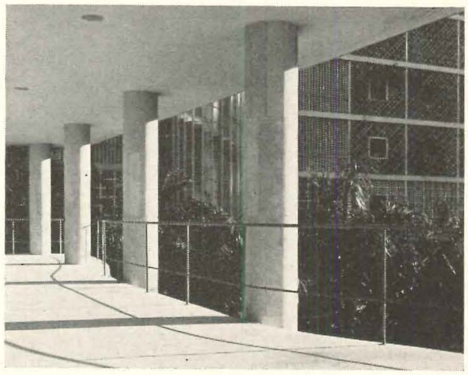
Belo Horizonte there have been such administrators as Gustavo Capanema, the Minister of Education who employed Le Corbusier; Prestes Maia, the engineering Mayor of the coffee capital, also active in town planning; and Juscelino Kubitscheck, former Mayor of Belo Horizonte, Governor of Minas Gerais and now President and still a champion of modern buildings.

Mario de Andrade, who headed the Departamento de Cultura in São Paulo in the 1930's, was one of the most brilliant intellectuals in the Americas, and his influence was felt in architecture as well as in literature and music. He had the ability to gather people together and make them talk and justify their principles. An article about Portinari's frescoes of neo-Byzantine saints for a modern chapel at Brodowski or an essay on *The Plastic Arts in Brazil* for *La Nacion* of Buenos Aires — these were things he tossed off brilliantly. In explaining how Brazilian architecture came of age the role of this critic was unique and must not be overlooked. The frequent time out for a cafezinho (a small cup of black coffee) may disturb American efficiency experts but it leads to clarification and artistic results. In short, aesthetic theories and the question of what a national architecture should be are discussed more by Brazilians than Americans. Architects in Rio and São Paulo today have their own professional organizations, the leading one being the Instituto de Arquitetos do Brasil. In São Paulo the Instituto has its own building where many of the members have installed their offices, and its dining room brings them constantly together. As in the United States, the profession has begun to work more and more in teams. In 1953 the Fourth Brazilian Congress of Architects was held in São Paulo, and about fifty of the 470 people attending the sessions were from abroad. Most distinguished, perhaps, among those taking part in the proceedings were Walter Gropius and Alvar Aalto. Some people complained that concrete goals were not attained — relatively few theses were presented — but others opined that a congress is primarily a "get-together," and that if people come to know one another, that in itself is a step forward.

Not everyone approves of what Brazil is building. A lecture by the Swiss architect Max Bill given in June of '53 at the Faculdade de Arquitetura in São Paulo took the national school to task for excessive pictorialness, and his remarks were instantly published and widely debated. In other words, a great deal of thought goes into modern architecture in Brazil, and there seems to be a desire to develop a school which will, for better or worse, be recognized as Brazilian.

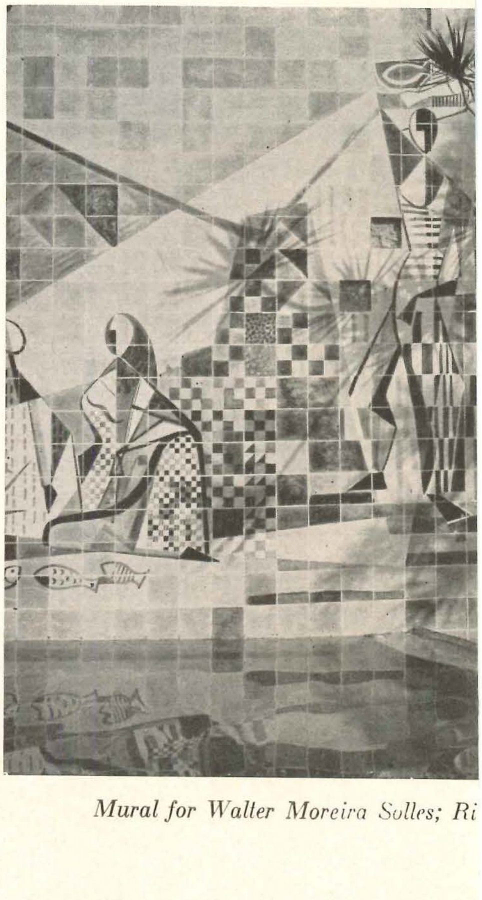
Lightness

What are some of the chief characteristics of Brazilian architecture? First and foremost, the general lightness of the buildings. Whether one looks at a single story dwelling or a skyscraper, there is a desire to get away from stolidness. Reinforced concrete construction does not require large beams, and the combination of stucco, glass and tile can give an airy effect. The heat of the sun calls for covered walls, particularly those exposed to the

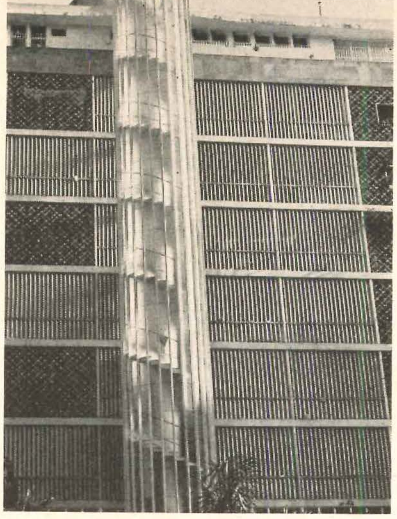


Rollie McKenna

Detail, Apartment Houses; Rio de Janeiro, 1947–1953. Lucio Costa



Mural for Walter Moreira Salles; Ri



Rollie McKenna

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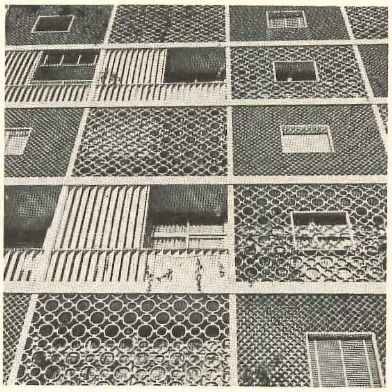

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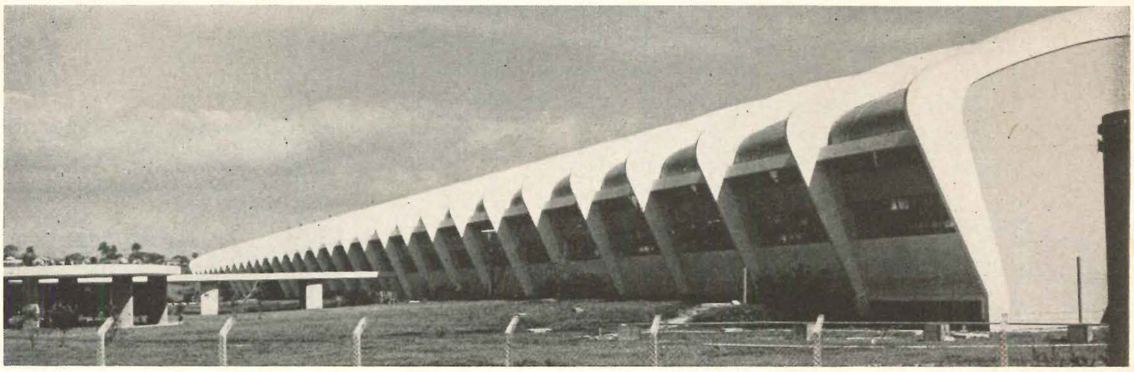
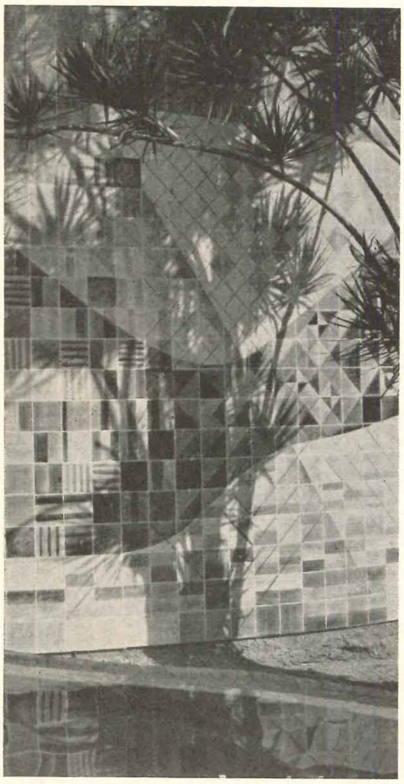
Detail, Apartment Houses; Rio de Janeiro, 1947–1953. Lucio Costa



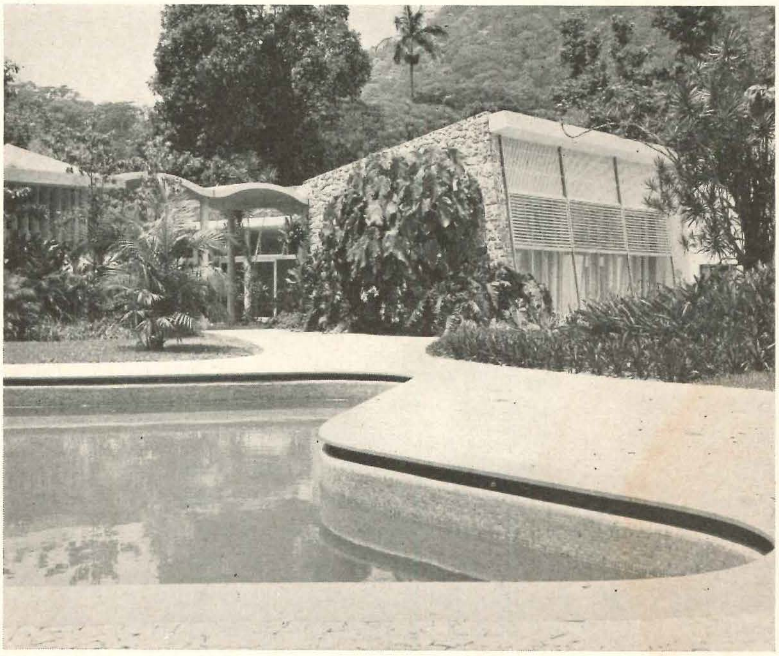
Rollie McKenna

Duchen biscuit factory; near São Paulo. Oscar Niemeyer



Marcel Gautherot

Janeiro, 1953. Olavo Redig de Campos



Marcel Gautherot

Garden residence for Walter Moreira Solles. Olavo Redig de Campos north (everything is turned around below the equator) but southern exposures feature glass walls covered with screens or brise-soleils, both movable and static, and counterbalance excessive massiveness. In order to take advantage of the shade, a major part of the ground floor is often left open, particularly on larger buildings, and this enables people to walk underneath and experience a pleasant feeling of spaciousness. The normal structural column or piloti is somewhat heavier in aspect but stronger and therefore fewer are required. This feature might also be called a Brazilian trademark today.

Color

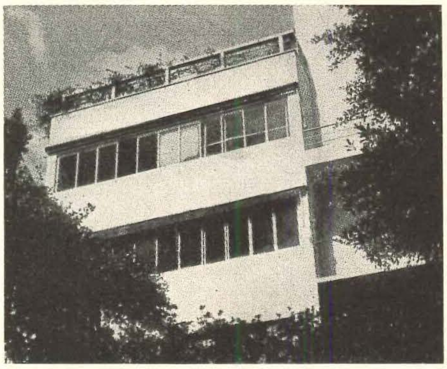
The average skyscraper in the United States is rather drab looking. In Brazil such colors as pink, blue and yellow have long been used to decorate stucco walls. Water towers on the tops of roofs today may be painted blue, glass windows tinted green, a whole wall or column built of pinkish-gray granite. Roof gardens, tiled patios and flower beds surrounding buildings add further gaiety, and Brazilian flowers and plants planted in banks of color like a modern canvas are very effective. Combining these features with stone or metal sculpture makes for an eye-filling experience.

Materials

As everyone knows, Brazil has specialized in the use of reinforced concrete. Lacking steel girders (though this is less and less so as the country has tremendous iron deposits, and during the war a huge steel mill was erected at Volta Redonda) the country turned to other solutions. Reinforced concrete has much to recommend it; it is cheaper there than steel and more malleable. There is plenty of good sand in Brazil, and several companies are making cement. The ingenuity of Brazilians was seen a few years ago when a corner of a large skyscraper in São Paulo started to sink. Nothing daunted, the engineers froze the unstable soil and the building was jacked up and put on an even keel.

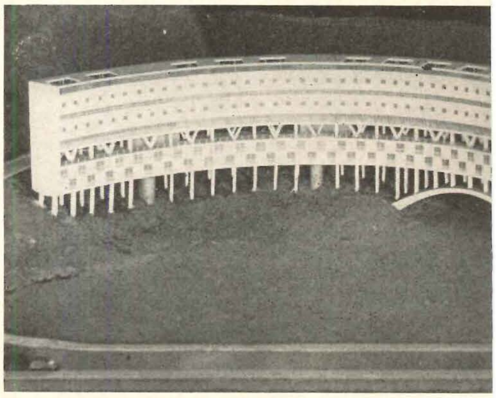
Once the skeleton of a building is finished, walls of stucco are applied around the door facings and windows, frequently of stone. Sometimes the wall surfaces are covered with thin slabs of native pinkish gray granite, brown itacoloni sandstone, marble from Italy or Argentine travertine. Chromium and glass are also featured, while tiles (generally blue and white) are used both for utilitarian and artistic reasons. They are easy to keep clean and lend a bright note to the architecture of the country.

Sometimes simple patterns are chosen but the tendency today is to have painters design a whole wall after which the tiles are especially baked, a practice not unlike the cartoons of Rubens and Jordaens for woven tapestries. The outstanding tile designers are the artists Candido Portinari and Roberto Burle Marx, the best known firm with kilns Matarazzo. The effect of these imaginative panels is often thrilling and, whether the designs are concrete or abstract, they are always decorative. Vitreous blue tile is also used for covering roofs and terraces of buildings and has proved most serviceable.



George E. Kidder Smith

House; São Paulo, 1927. Gregori Warchavchik

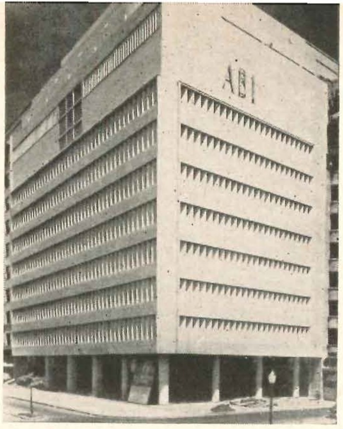


Fritz Neuberger

Apartment Housin

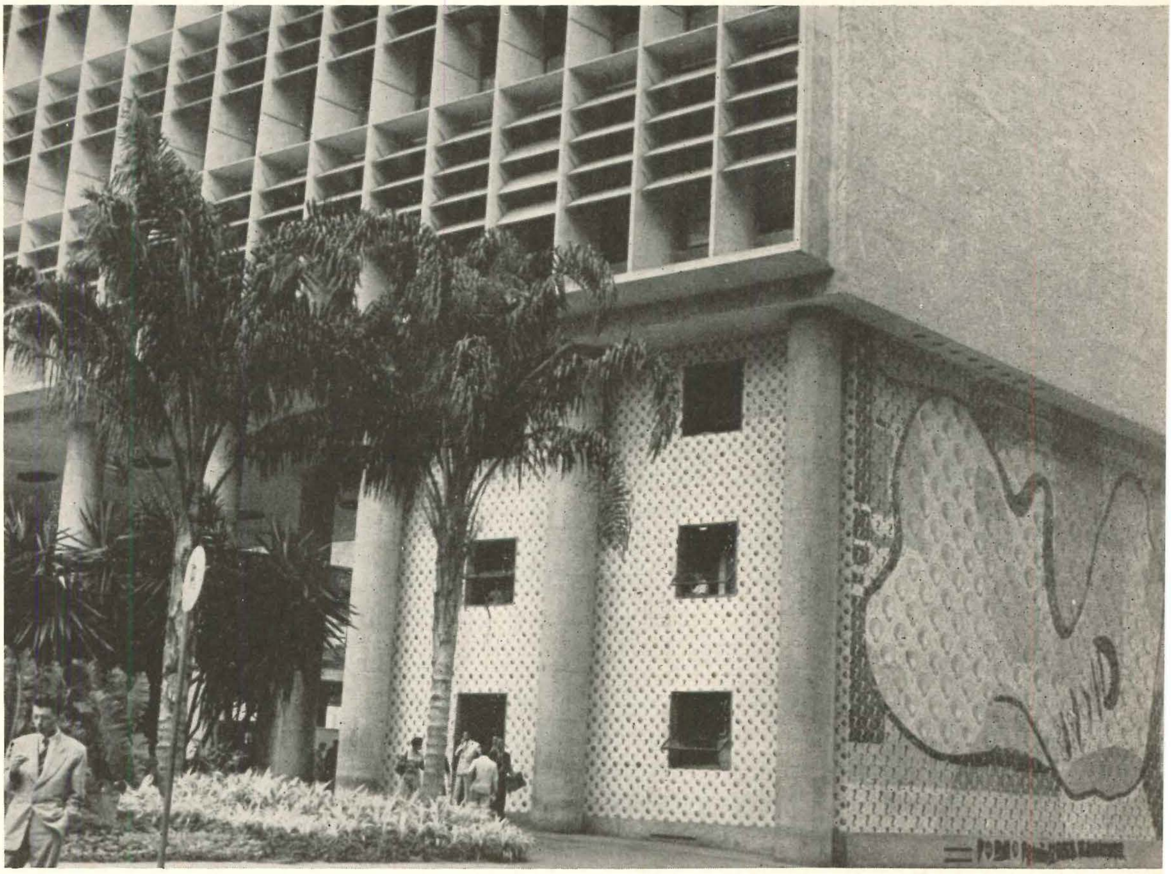
Marcel Gautherot

Garden for Mme. Odette Monteiro. Roberto Burle Marx



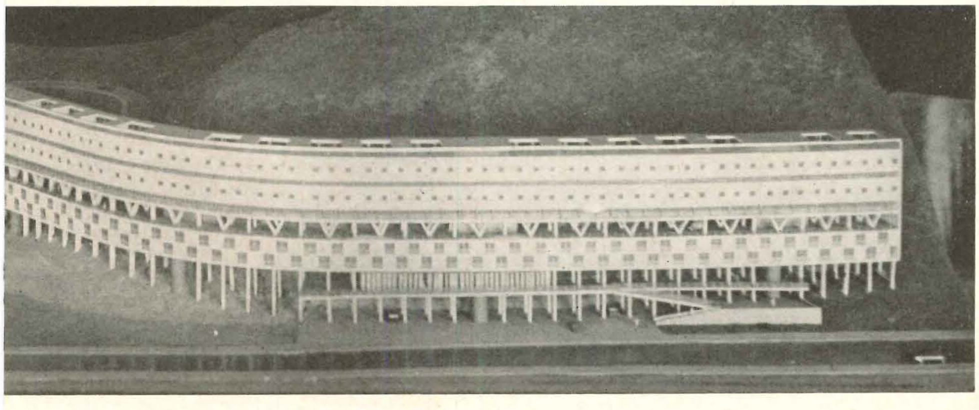
Stefan Rosenbauer

Brazilian Press Assoc. Building; Rio de Janeiro, 1947. Marcel and Milton Roberto

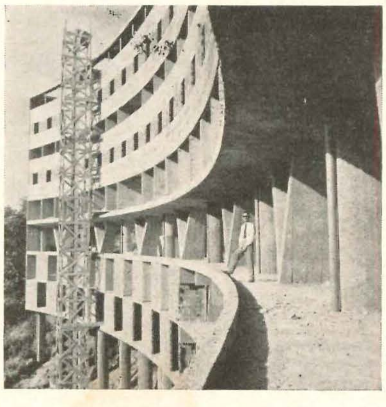


State Secretary of Foreign Relations

Ministry of Education and Public Health; Rio de Janeiro, 1937–1942. Lucio Costa and others



'e Janeiro, 1948–1950. Alfonso Eduardo Reidy



Detail of Apartments

Although there is excellent wood for building, tradition has been against its use. Masonry has been preferred, and because of the damp tropical climate there is a general fear of termites. One does find interior woodwork and furniture — the remarkable working of Jacarandá in colonial times for sculpture and decorative chairs, tables and highboys was particularly impressive — and some of the best modern buildings gain greatly by taking advantage of the riches of the forest. The arbor-like lattices which served as shutters in the 18th and 19th centuries — perhaps deriving from the Moors — are continued today by numerous designers. We may expect more results in the future from the experiments being carried out with Brazilian wood.

Workmanship

In any discussion of materials mention must be made of local artisans. Obviously their taste is an element to be considered and the care with which they carry out assignments is of tremendous importance. A good number of stone workers are Spanish, Italian or Portuguese, and in general emigrant workmen are highly prized. Brazilian architects think well of the carpenter trade but complain that the wood-workers do not cure lumber long enough, and it sometimes warps because it is not sufficiently dry. Tile layers and stucco pourers are generally sloppy, it is claimed, and lack of thoroughness is one of the great building problems in the country. It is not uncommon to see a structure several years old with holes in the plaster near the ground.

The *acabamento* (completion) of a job is perhaps the weakest link in the architectural chain today. All buildings require a certain amount of upkeep, and this is not fully realized in Brazil. Cheap materials and poor construction can hurt the reputation of a national architecture, and while there has been improvement in this field, there is room for more.

Plasticity

Brazilians have a sense for curves and undulating forms and a delight in rhythmic patterns — witness the samba. If architecture can be described as frozen music, some of the buildings being put up in Brazil today are related to the art of Euterpe. The undulating marquees and sunshades, the gay ceramic floors, the decorative sidewalks with their dancing patterns made up of small stones (paralelipipidos — the onomatopaic word is extremely expressive), the designs of the gardens treated like mosaics and the small splashing fountains in which one finds anything but static pieces of sculpture give a richly plastic effect.

I would like to close by quoting from Lucio Costa:

"Architecture belongs both to the science of construction and to the plastic arts, for from the conception of the project to the presentation of the finished work, there is always a margin of choice within certain limits — maximum and minimum — determined by calculations, prescribed by techniques, conditioned by the situation, made necessary by the function, or imposed by the project program. It is therefore to his feelings that the architect must appeal when he chooses within the extremes, in the scale of values, the plastic forms appropriate in every detail to the uniting of the projected work. The plastic intention or aesthetic orientation which such a choice presupposes is precisely what distinguishes architecture from ordinary construction. On the other hand, architecture also depends fundamentally on its epoch, its physical and social situation, the materials it employs and the techniques derived from them; and finally it is dependent on the objective in view and the amount of financial support, i.e., the all-over project program.

"One may thus define architecture as construction conceived with a particular plastic intention and function within the framework of an epoch, a milieu, a technique and a program."

Lucio Gosta stresses the fusion of the two concepts: the plastic-ideal and the organic-functional. "If more architects," he says, "with this ever-expanding knowledge and technique, were to study the problems of architectural expression, participate in discussions of contemporary art and recognize the plastic principles underlying all the arts, and then, like painters and sculptors, create with passionate conviction, their work would take on a noble dignity which would lead them to a new concept of the monumental. This monumentality would include the graceful presence of trees, bushes and fields because the main characteristic of modern city planning, stretching from the heart of the city through the suburbs into the country, is that it abolished the picturesque as it incorporated the tricolor into the monumental. It is taken for granted that this monumentality appears not only in such predictable places as city centers but also in other structures such as factories, industrial buildings, stations, bridges, highways and even in such unexpected places as hangars, silos and administration buildings on industrialized farms for the rural population."

The coming age of an architecture is worth studying, and Brazil's rapid growth can be a lesson to us all. There have been ups and downs — many buildings which win competitions are never built for lack of funds. The city of Bahia has a magnificent municipal plan for solving transportation problems in its precipitous terrain; it has never been carried out. While the Avenida Presidente Vargas in Rio is broader than the Champs Elysées and a really handsome and extremely useful artery, the skyscrapers being erected on it are without interest and mere contractors' speculations. On Copacabana beach apartment houses are packed in next to each other like sardines, and the opportunity to build graceful structures surrounded by luxuriant tropical gardens has been missed completely. Fortunately, however, the zoning laws are being improved, although "special interests" generally find ways of circumventing them. Brazilians have made mistakes but their cities are still vastly more attractive than the majority of those in the United States. Let us hope that our neon signs and other hallmarks of progress will not descend upon them.

TERMINAL BUILDING, LAMBERT-ST. LOUIS AIRPORT

Hedrich-Blessing

Architects: Hellmuth, Yamasaki & Leinweber; Minoru Yamasaki, partner in charge of design; completion of building under direction of St. Louis office, now Hellmuth, Obata & Kassabaum. Structural Engineer: Wm. C. E. Becker; shell consultants, Roberts & Schaefer; consultant during preliminaries, Edgardo Contini. Mechanical Engineers: Ferris & Hamig. Airport Consultants: Landrum & Brown.

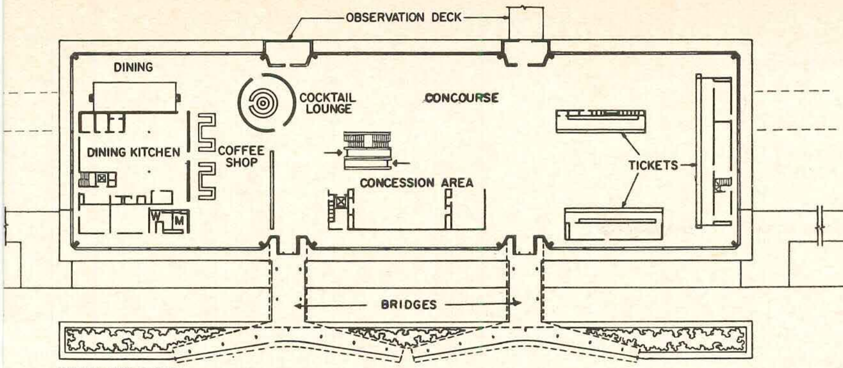
PROUD ARCHITECTURE AND THE SPIRIT OF ST. LOUIS

by *Buford L. Pickens*, *Dean, School of Architecture, Washington University*

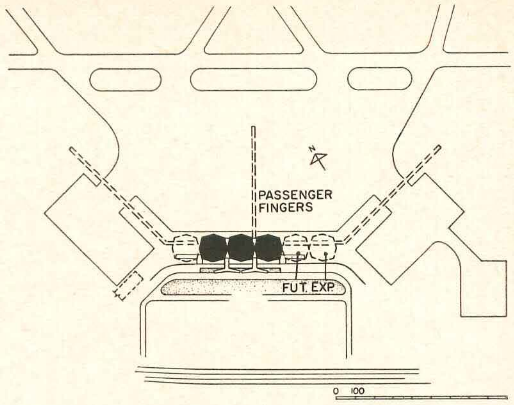
"The people of this area may be excused a little anticipation. They have waited a long time for this. . . . Even a passing look at the three soaring domes of the new terminal should convince anyone that St. Louis intends to progress with the air age. The new building is both beautiful and practical, for the three arches can be increased to six, and comfort and convenience can grow as air travel grows. The clean lines and clean vistas prophesy a building to be kept clean. Here is imaginative and proud architecture!"

— Reprinted with permission from an editorial in the St. Louis Post Dispatch, written three weeks before the dedication of the new air terminal building at Lambert-St. Louis Municipal Airport

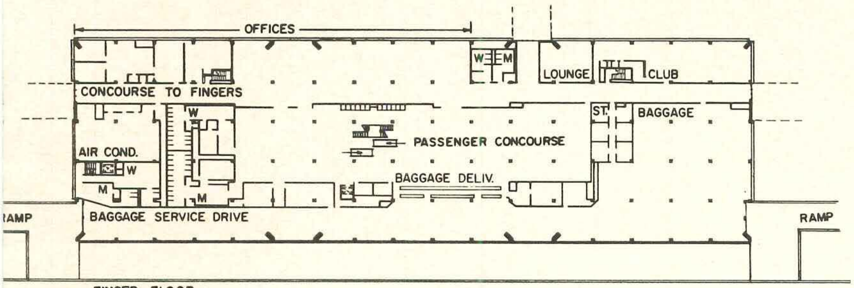
Discerning architects will detect in this editorial preview something more than the usual civic pride. It expresses typical citizen reaction to the suggestive form of this rhythmic new thin-shell concrete struc-



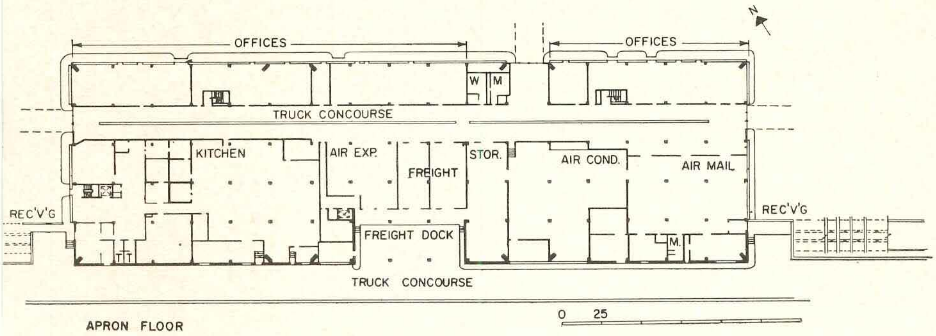
PASSENGER FLOOR



SITE PLAN



FINGER FLOOR



APRON FLOOR

TERMINAL, LAMBERT-ST. LOUIS MUNICIPAL AIRPORT

Winner of a First Honor Award, the American Institute of Architects, 1956

Hedrich-Blessing

ture.[1] No concern here for the common custom of boasting about mere bigness and impressive cost, even though both of these statistics could be cited. Somehow, the essence of the architecture itself reaches the average citizen through a language that is immediately understandable — an architectural symbol whose appropriateness needs no elaboration, but is communicated directly through controlled visual forms. Here, perhaps for the first time, an airport looks, feels and even acts like it belongs amid aircraft — whether you view it from the inside, outside, or circling the field above.

As with many an adventurous project there are skeptics (mostly professionals) who ask: do the ribs support the shell? will the new-fangled system for baggage handling work? what about the acoustical reverberation under the triple vaulted smooth ceiling? and how will the 32-ft high windows stand the sun, wind and rain?

Only time can prove the predictions of the editorial writer quoted above. However, the terminal is worthy of study for it *is* architecture whose bid for greatness does not come from novelty, nor from a technical tour de force. There have been many other large airport buildings and many other thin-shell concrete structures built in recent years. Indeed, the form of the three intersecting barrel vaults is about as traditional as history can provide for "great halls" in public buildings. What then is the significance of this new St. Louis achievement which already ranks beside the Eads Bridge and the Wainwright Building as an architectural landmark? Perhaps the answer is suggested in the comparison with these other structures, viz., the dedication by its architects to a bold and imaginative concept which, once stated, was carried through despite conflicting pressures to compromise.

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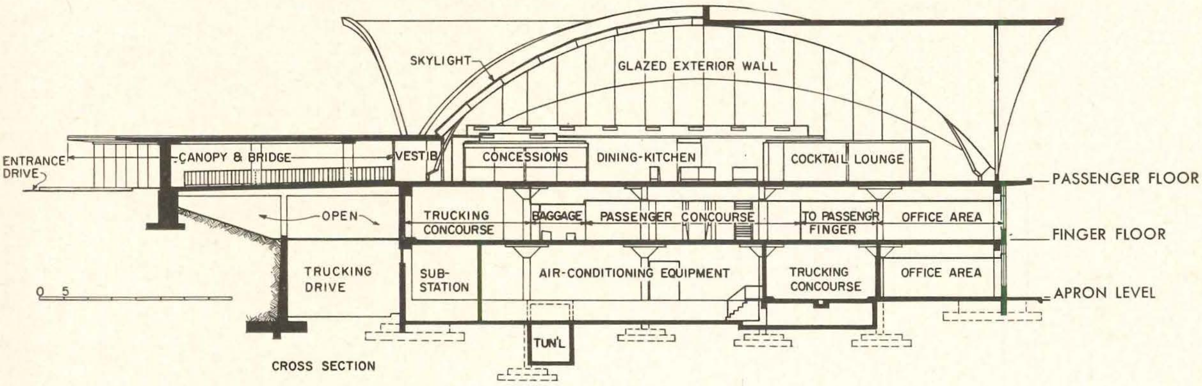
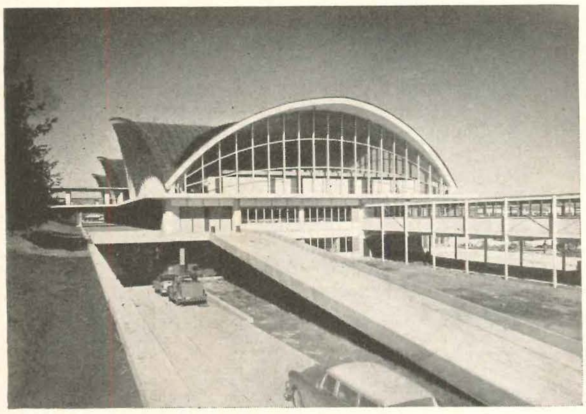
[1] *The current trend to the plastic form of concrete shells for a variety of architectural building types suggests the change from the Greek post and lintel to the Roman arch, dome and vault. Once again vaulted arcades replace trabeated stoae. If the M.I.T. Auditorium reincarnates a Pantheon, the Raleigh amphitheater a Colosseum, then the St. Louis Terminal could be the air age version of the tepidarium in the Baths of Caracalla. (Even the editorial writer must have sensed the connotation of cleanliness)*



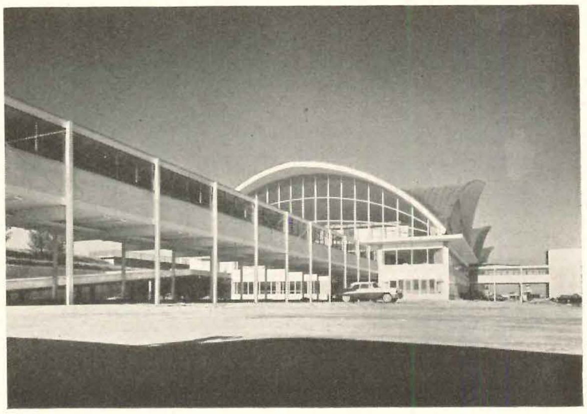
CROSS SECTION

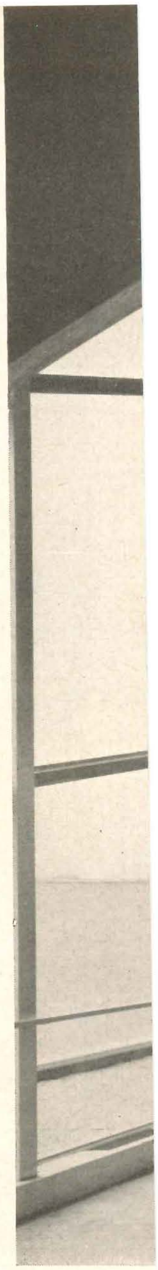
ST. LOUIS AIR TERMINAL

Section above and two photographs below show 3-level organization: passengers, ticketing, general public at top; passengers and baggage, separated, on middle level; service and operations on lower level. Note in photograph opposite that window mullions carry no structural load; they are designed with slotted connections to the concrete shell above



Hedrich-Blessing

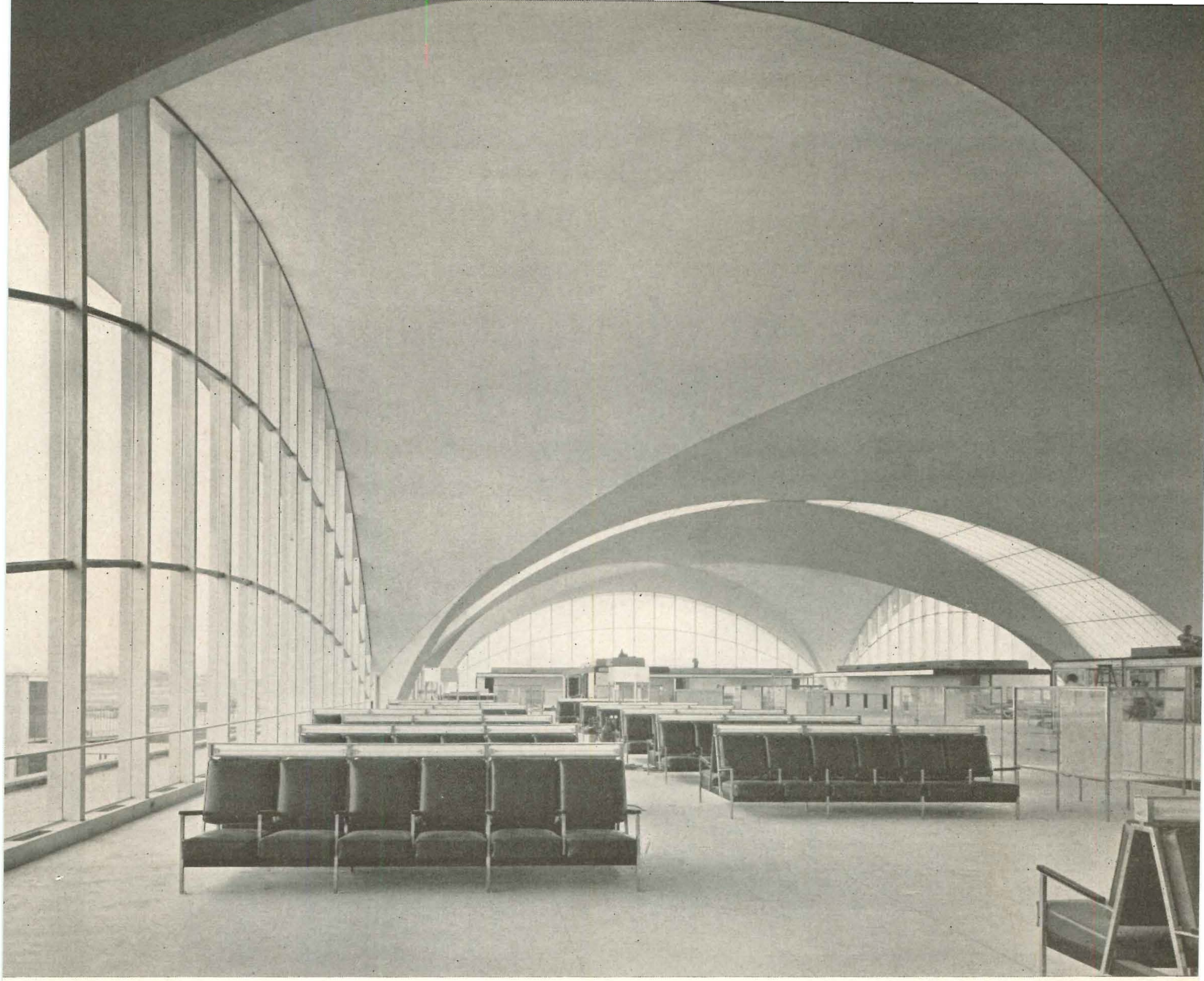




THE PROBLEM posed was similar to that in many other municipally owned airports, i.e., to house and valve the complicated circulation of people, baggage and equipment, where time is the essence and where *most importantly* the whole operation must be financially self sustaining. The sloping site was unusual; and the multi-client relationships were complicated — involving the 8-man airport commission, the seven air lines, the concessionaires, in addition to the usual red tape in dealing with and through the municipal engineering department, Bridges and Building Section.

BASIC SCHEME DERIVED FROM ANALYSIS OF SITE. The architects exploited the natural grade differences on the site for their basic centralized plan arrangement; by using elevators, escalators and ramps, the complexities of crisscross circulation were clearly articulated on three levels: (a) the upper level, connected directly with the parking approach, for passengers and general public, with waiting room, tickets, dining, etc., (b) the middle or "finger" level for baggage pickup, ingress and egress of passengers to the planes and (c) the bottom or "apron" level for complete separation of all operations and services, planes on the field side and trucks on the other. Once the three-level plan scheme was set up, the program for the superstructure required two major mandatory features: (a) a great open concourse for maximum ease of circulation, visibility and sense of space and (b) because of the predictable growth of air travel, a means of harmonious expansion as much as one hundred per cent.

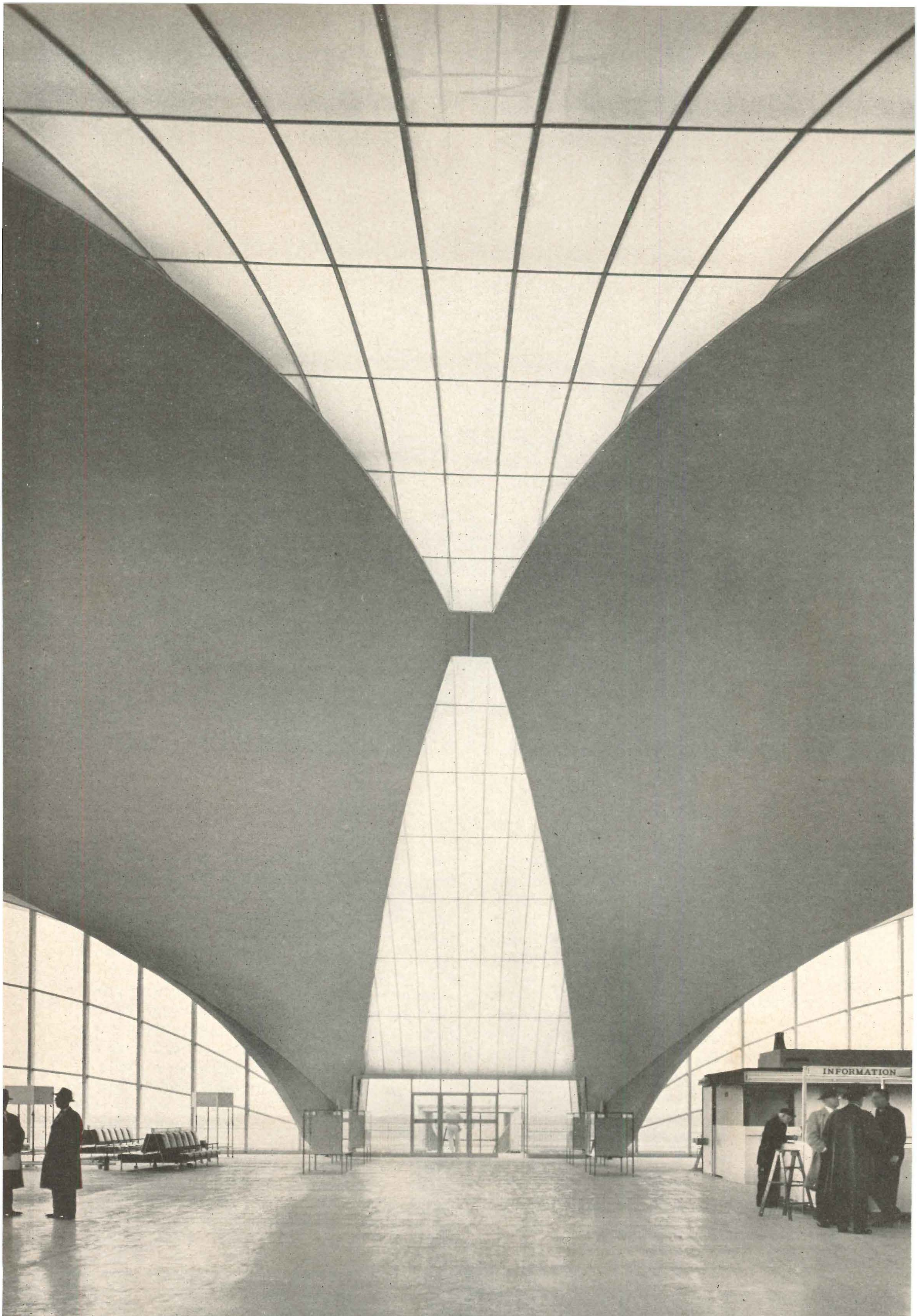
DESIGN OF THE "GREAT ROOM." The architects are proud to admit the kinship of their vaulted ceiling and roof form to Grand Central railway station in New York. For, although it left them other problems to solve, it offered a structural unit which more than satisfied the requirements — to span the 120-ft width and to be repeated organically and in rhythmical sequence. The designers found that a new

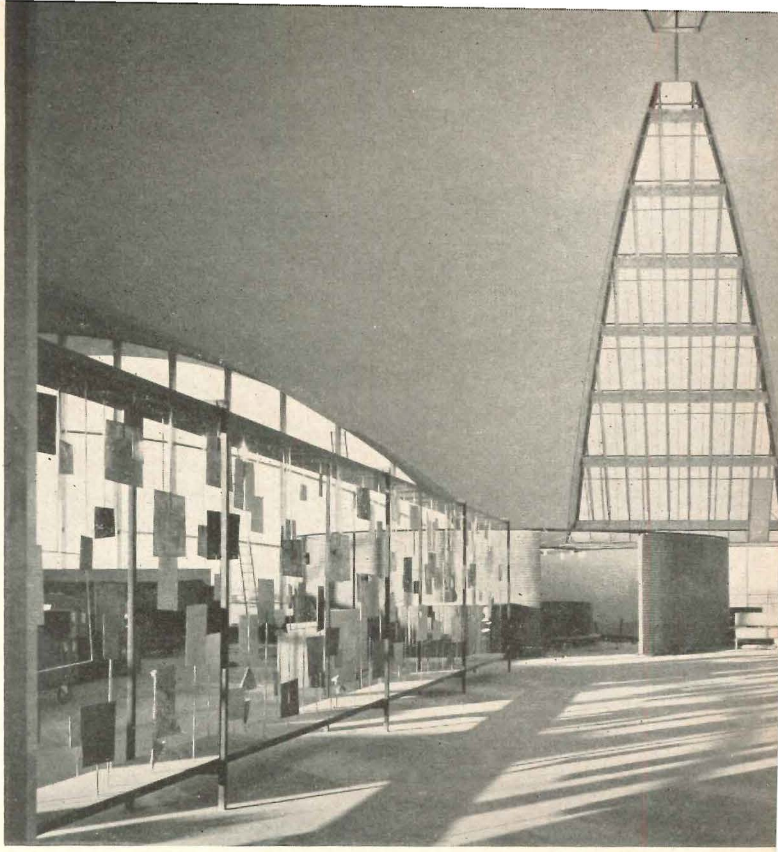


proportion of the low-sprung vaults would reach a height of 32 ft at the center and that the resultant form conveyed no association with heavy locomotives or massive bus depots. Instead, the new arches had a combination of lightness and tension which, when supported on the square base, seemed to float like bulbous clouds or to suggest symbolically the graceful cross section of an airplane wing from which the "lift" is actually derived. The full height of each of the eight archways is glazed (with heat absorbing glass) for light and visibility. Additional lightness comes from the glass and plastic skylights which fill the triangular roof segments at the juncture of the central vault with the other two. Viewed from above, the enormous shells retain their plastic effect like great open parachutes or strange tripartite bras with their diagonal stiffening ribs.

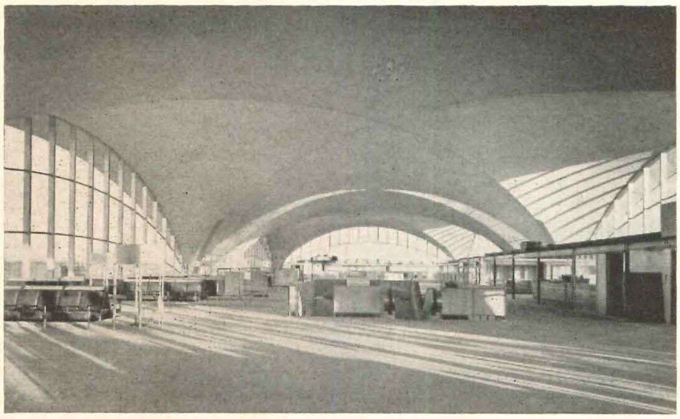
COORDINATION OF VISUAL FORMS. The success of any building as architecture depends in large measure on the degree to which the architects have been able to follow through with subordinate features as carefully controlled as the basic structure. The various facilities in the 412-ft-long concourse, such as the ticket kiosks (east), concessions and waiting areas (center), dining room and restaurant (west), are all kept low to avoid blocking the open arches, and free-standing to simplify the traffic flow. Wherever possible the forms of fixtures and furniture are open and transparent, giving one the feeling of being suspended in an open platform above the field and overlooking the main runway at a position where even the largest planes, airborne, pass by almost close enough to touch. Both the waiting room and the dining room have full view of the field; the enormous height (32 ft) and width (120 ft) of the glazed arches enable one to follow the planes throughout 360 degrees as they circle the field.

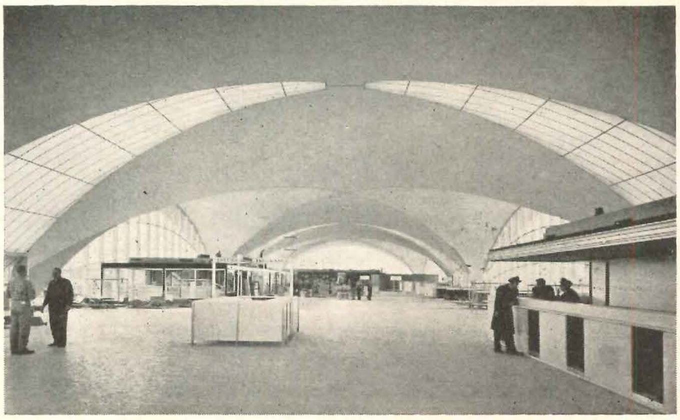
Color, furniture and signs as part of architectural form are carefully controlled by the guiding hand of the architect to keep the unity of visual effect. Sep-


INFORMATION



Colorful metal screen (sculptor: Harry Bertoia) defines dining area



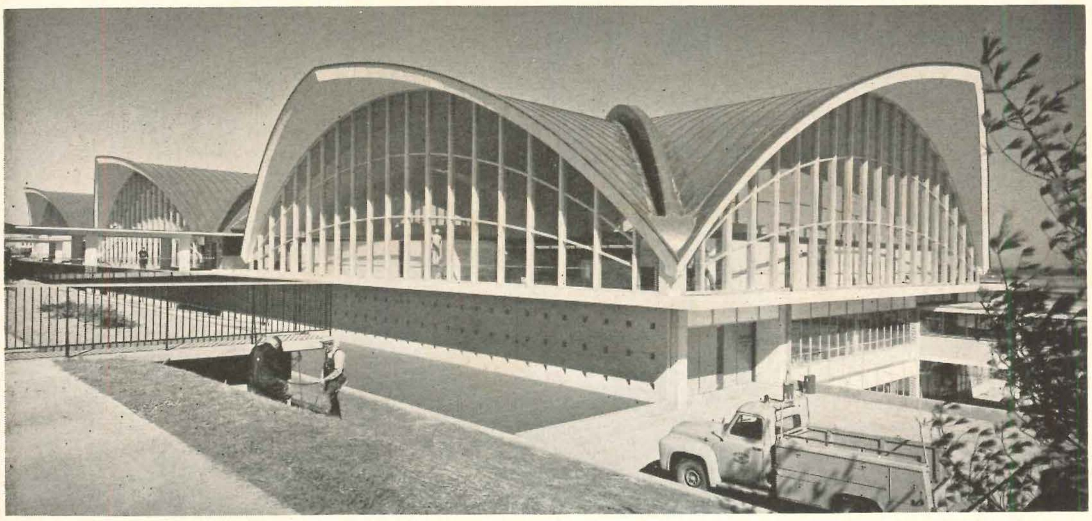


Hedrich-Blessing

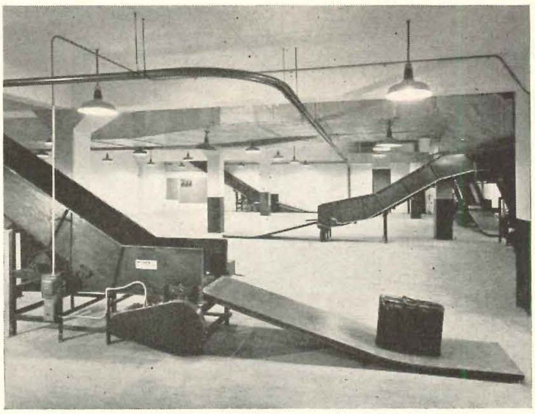
arating the dining area under the west vault from the rest of the concourse is the colorful screen, 48 ft long, 8 ft high and 2 ft deep, designed by sculptor Harry Bertoia. The suspended metal panels are painted in bright, warm hues on the concourse side and in subdued, cooler colors facing the dining room. All large surfaces, ceiling, floor and walls, are nearly neutral, either very light or very dark. The kitchen wall which forms the background for the Bertoia screen is gray, nearly black, and the crisp steel-cage framework of the concession booth is painted black.

CIRCULATION. As one approaches the terminal from the landscaped parking area, the entrance is to the right and the exit to the left of the central vault; the interior circulation is based on this divided traffic. If you are an outgoing passenger you leave the bus or taxi, step under the low, sweeping canopy, cross the 40-ft bridge and enter the building at the right hand entrance. Turning once more to the right, you will then face the ticket kiosks arranged beneath the eastern shell. Each airline has a baggage conveyor (not a chute) which lowers bags after weigh-in to truck pickup on the floor below (thence via ramp to plane). Having checked in, you may then proceed through a waiting and concession area in the central unit. As departure time nears, passengers take an escalator to the lower concourse and out to sub-waiting rooms (with seats) near the 16 active gates along the fingers. When your flight is called, you are checked through the gate to the waiting plane.

If you allow yourself ample time or if you are a visitor, you would probably drop in at the bar or restaurant and dining room overlooking the field on the upper



Truck ramp enters (right, photo above) finger level; trucks pick up baggage (photo below, right) from conveyors from airline counters on floor above. Emplaning passengers descend to finger level by escalators



floor (a total of 547 seats is provided for dining patrons); or you might utilize the many hotel-like facilities within the middle level, viz., toilets, lockers, barber shop, post office, game area, nursery, Western Union, and luxury airline service-club rooms.

The deplaning passenger comes through the finger into the middle level concourse and up to the 70-ft-long baggage counter. He picks up baggage and steps on the conveniently placed escalator which deposits him on the main concourse near the exit to the left of center where he can go out to the auto park unless, of course, he is attracted by the Bertoia sculpture and pauses to shop. Complete separation of incoming and outgoing passengers would be possible but not profitable. Thus the planner must carefully blend the talents of an efficiency engineer with those of the sales psychologist (52 per cent of the building is rentable).

From the human interest viewpoint, by far the most exciting, unique feature of this air terminal is the 40-ft-wide spectator deck which extends 565 ft straight out toward the major runway. Here the airplane "bug" — and who isn't? — can witness the take-off from an intimate distance with neither danger nor interference with operating personnel or the traveler. A portion of this deck is roofed; here it is planned to serve liquid refreshments at tables during the summer.

BAGGAGE. In studying this problem the architects found that where baggage was transferred to elevators, as at Washington National Airport, handling was slower than at terminals where the truck was able to tow the loaded cart directly into the baggage room, as at Willow Run. For this reason, ramps were introduced on either end of the building to enable trucks to pull the carts up to the finger level and into the delivery space. On return trips they pick up outgoing baggage from the lower end of conveyors as it comes down from the weigh-in counters on the floor above.

(Continued on page 278)

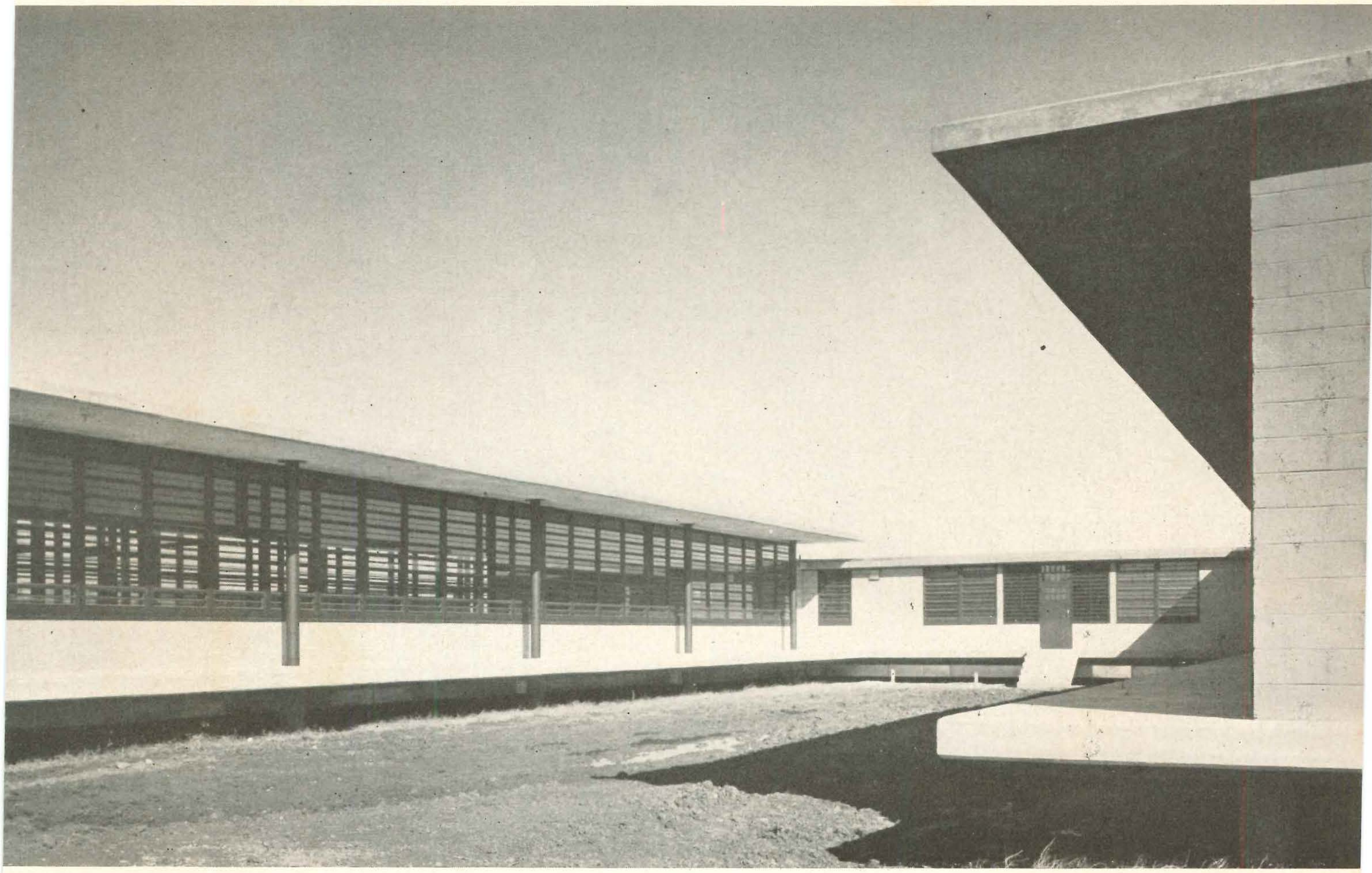
SHOULD PRISONS BE MERELY DUNGEONS?

By REED COZART, Pardon Attorney, U.S. Department of Justice; formerly Assistant Director, Department of Institutions, State of Louisiana

DURING THE PAST FEW YEARS prisons have been severely tested. Disastrous, destructive riots and strikes in many states have caused investigations by public authorities and have created much doubt in the minds of the press and the public as to the validity of the underlying philosophy and the nature of the buildings.

It has become popular to accuse prisons of failure. Within the last year or two, their very existence has been condemned more than once. One book, *Break Down the Walls*[1], written by a prominent journalist, and another, *Diary of a Self-Made Convict*[2], written by an ex-prisoner, charge prisons with utter failure. United States prisons are described in a recent monthly publication[3] as a $215,000,000 blunder.

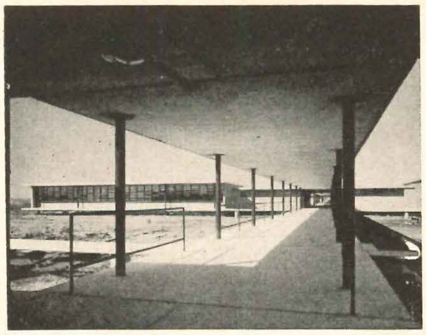
It is undoubtedly true that these books and articles have revealed some shameful facts, and to a certain degree



Dormitories, Louisiana State Penitentiary, Angola, La.; Curtis & Davis, Archts. (Photo: Ulric Meisel)

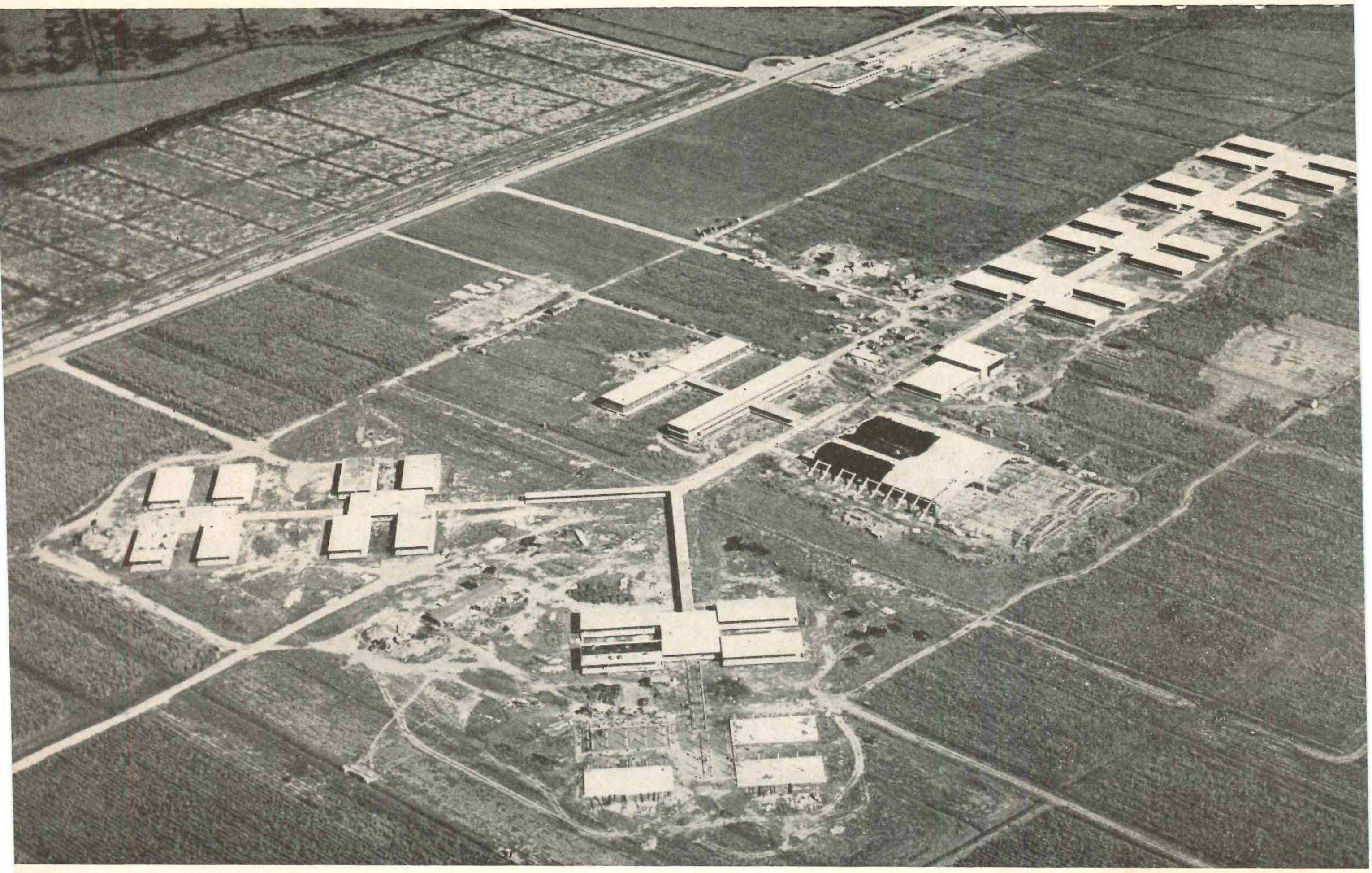
The author explores the close relationship between penal philosophy and prison design. His constructively advanced ideas, based on years of prison administration and building programming, grow from a belief that our American society cannot afford longer to ignore rehabilitation of its unfortunates, and that a new type of prison structure is evolving.

1. Break Down the Walls, *by J. B. Martin; Valentine Books, N.Y. 1953. Paper bound, 25¢*
2. Diary of a Self-Made Convict, *by Alfred Hassler; Henry Regnery, Chicago 1954. $3.00*
3. Nation's Business, *December 1954*



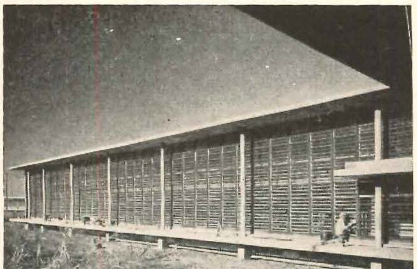
Outdoor corridor, medium security wing, Louisiana State Penitentiary, Angola, La.

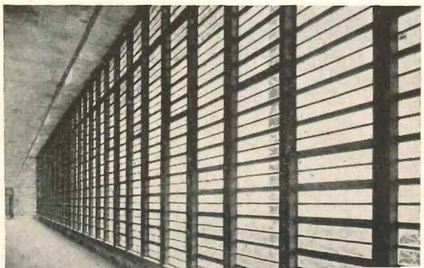
have made out a prima-facie case. Conclusions reached in them are not wholly justified, however. The authors have not built up a seriously damaging case against prisons that are properly constructed and operated, though they have pointed out some weaknesses due to bad management. Surely, the time has come when each warden must examine his prison — the philosophy behind it, the physical plant, the program in operation — and see if it is functioning at the best possible level.



Air photo, Frank Lotz Miller, all others, Ulric Meisel

Air view of Louisiana State Penitentiary, taken late in 1954, shows minimum security dormitories in foreground outside fenced enclosure; similar medium security wings far right, inside enclosure; 2-story maximum security cell blocks and twin dining halls, double-arch-roofed, in center — both also enclosed in fence; administration unit at top of photo. Below, detention windows in dormitories instead of small barred openings





The total picture is not altogether dark. There are many bright spots, hopeful signs that prisons may yet prove worthwhile. Some of these often referred to are the men's institution at Chino, California, the very progressive institution at Wallkill, New York, and the Federal Institution at Seagoville, Texas.

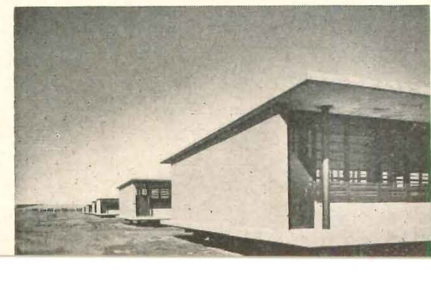
Whether our prisons will ever meet the test successfully depends upon the philosophy behind their planning and administration; upon their being staffed with sincere, trained, capable specialists in dealing with human behavior problems; upon the degree to which they receive public support of, and community participation in, their programs; and upon the extent of courageous leadership available. This leadership must be willing to experiment with new techniques in the field of human relations just as management in the business world is seeking to find better ways to handle personnel problems. And we cannot overlook the importance of the physical plant. It must be planned in keeping with the objectives of each institution.

Progress in prison construction has fallen far behind progress in other fields. This is pointed out very well in a recent book on prison design and construction.[4] The tendency has been to build fortresses, bastilles similar to the ones constructed more than a century and a half ago. Consequently, in spite of any advances in philosophy concerning the treatment of criminal offenders, no suitable physical surroundings have been provided to make advances in treatment possible. Most prisons have been built primarily for the purposes of keeping the prisoners securely and preventing their escape, without regard to rehabilitative functions.

Now that prison administrators are on the defensive, the whole philosophy of prison design and construction and prison programs must be re-examined. We may as well face the fact that there are three choices facing us. In the first place, we may choose to patch up our outmoded, inefficient plants and continue the battle of wits with the unfortunates incarcerated in them; or, second, we may build new, clean, livable, fireproof, sanitary fortresses and frankly admit we are doing no more than holding prisoners for their stated terms; or, third, we may decide to discard all the things that time has proved unsuccessful and set up real rehabilitation programs in a physical setting that will make these programs possible. Let us first re-examine briefly our prison philosophy.

Prison administrators have, through the years, been operating upon the theory that two distinct obligations are placed upon them by society. First of all, it is expected that prisons will safely keep prisoners until they are legally released; secondly, the public expects improvement on the part of the prisoner while he is undergoing confinement. The prisons have done a fairly good job as far as the first objective is concerned. In spite of many claims to the contrary, however, most prisons have been woefully weak in successful rehabilitation. Too many prisons have been used as instruments for punishment, some of it even cruel and inhuman. There has been entirely too much lip service given to rehabilitation programs rather than to sincere efforts to put such programs into practice. Too many wardens, subordinates, and prison employees have not been, by their personality and prior training, qualified to help solve human behavior problems. Too many persons enter prison work because it gives them the opportunity to exercise authority over others. Some wardens have believed sincerely that they were doing a good job and have advertised it as such to the public, when actually they have missed the boat entirely. Some who know better do not have the courage to do what they know should be done because they do not wish to face possible failure and ultimate adverse publicity and criticism. It would appear that, although the dual objective, safekeeping and rehabilitation, is still valid, if the latter half of the objective is to be carried out, new approaches and motivations are going to be necessary.

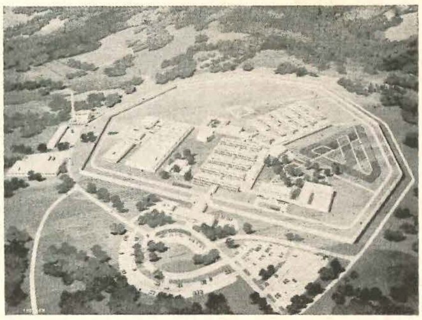
Dormitory units, Louisiana State Penitentiary



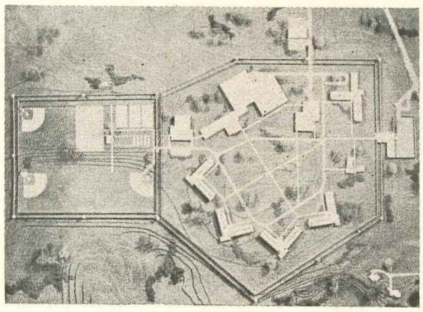
A few years ago, the Director of Prisons of Finland spent approximately six months studying federal and state prisons in the United States. After he had returned to his country, he made a report to his government in which there was a very significant statement. He said that in his own country a prisoner was considered to be a fallen brother and that it is the obligation of the State or Brotherhood to restore the prisoner to the Brotherhood, but he found that in America the prisoner is regarded as an enemy of society, a veritable outlaw.

To an extent this observation is true. There is a very real, oftentimes wide gulf between the prisoner and the prison keeper. So long as this gulf exists, rehabilitation cannot be expected. The time has come when we must recognize that men and women committed to prisons are people, and that they are representative of the community from which they come. Prisoners are not a group of odd, queer, strange, animal-like creatures. Instead, you will find an average state prison to contain a fair sample of the state's population. This is true with respect to intelligence and educational levels, to the type of home background, marital status, race, religion, prior trade, professional training, etc.

For the most part, these people are normal. Many are in prison because of economic reasons, because they committed an offense in a moment of passion, or because they were misled or forced into some unfavorable circumstance. Many are there just because they failed to adjust to some of the complexities of normal living. It has been said that there are actually more

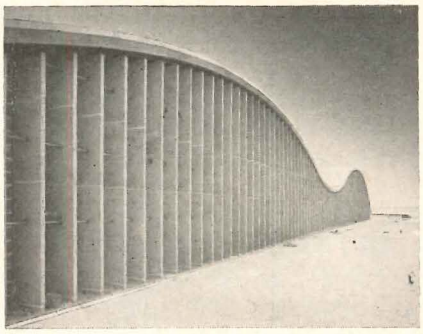


Two other state institutions now under way: above, Connecticut State Prison, Enfield, Conn., Sherwood, Mills & Smith, Archts.; below, medium security institution, Ionia, Mich., J. & G. Daverman Co., Archts.



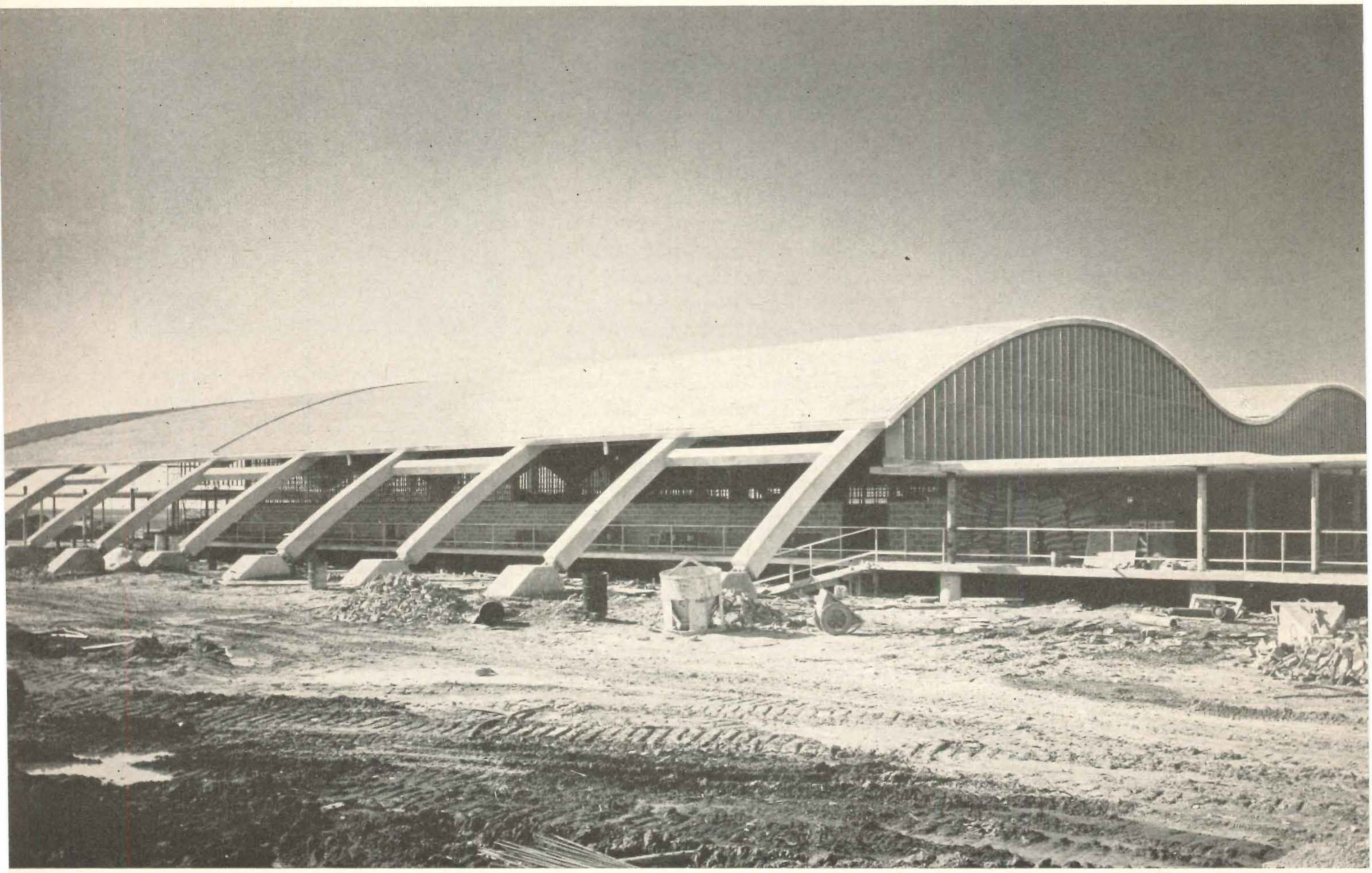
law violators outside prison than inside prison. Surely, the prison administrator must realize these facts, and further realize that prisoners will react to incentives and to humane treatment just as people outside prison react. It has also been proved that no more than fifteen to twenty per cent of prisoners need close supervision from a security standpoint. Many prisoners are merely emotionally disturbed and need understanding. Some are financially insecure and are disturbed over the welfare of their families and loved ones. Of course,

4. New Handbook of Correctional Institute Design and Construction. *R. D. Barnes, 1949. U.S. Bur. Prisons. $7.50*



some prisoners are mentally or emotionally unbalanced to the point where they need restraint, close observation and segregation from the remainder of the population.

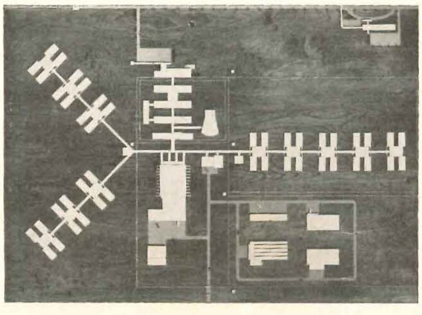
Furthermore, it is found that people will not be rehabilitated unless they realize they need it and have the desire for it. Many prisoners rationalize their wrongdoings to the point that they feel they have done no wrong, or feel that they have done no worse than anyone else they know. Even those who are will-



Model photo, Frank Lotz Miller, all others, Ulric Meisel

ing to recognize their weaknesses and failures are not always ready to do something about correcting them. Again, they are not always so sure that they wish to be corrected by people paid to correct them in an authoritarian setting. This makes prison work very difficult, and it is here that the real challenge comes and calls for the highest type of leadership ability. And *leadership* rather than *drivership* must be used. The prison administrator must have a staff of personnel who will screen the institution's population, properly classify it as to degree of suitability for

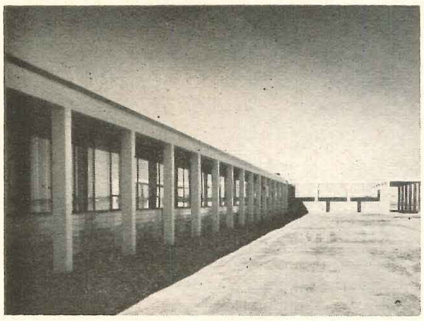
Above, double dining hall, Louisiana State Penitentiary, Angola, La. Below, model



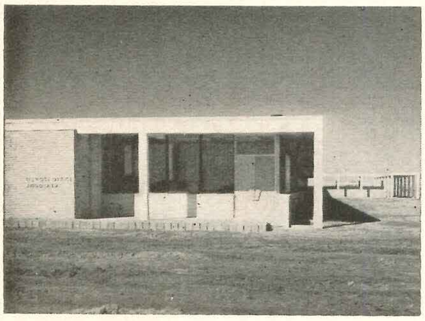
treatment, and provide a program to meet these needs.

Every program for rehabilitation must have the complete support and total participation of all personnel from the lowest-paid guard to the top administrator. The personnel must, in addition, have sufficient training and the right kind of background; and *every* employee must be sold on the program and have complete confidence in its integrity.

It is just as important that the inmate population also be sold on the program and participate in it. It is important that the inmates actually participate in the planning of the program. A wise warden will use an ad-



Above, Administration Building, Louisiana State Penitentiary; below, Post Office



visory council selected by the inmates as their representatives, and other committees, in planning and carrying out inmate programs, particularly for their spare-time activities.

In view of the fact that the average prison environment is an abnormal one anyway, a program will not succeed unless community, public, and private agencies support it and participate in it. Such organizations as Alcoholics Anonymous, Toast Masters Club, and various other service organizations willing to conduct forums or study groups and to promote athletic events and other types of competition, play a tremendous part in the matter of helping prisoners make social adjustments, learn fair play and accept responsibilities.

And, of course, as far as the prison program itself is concerned, it is basic that all prisoners be assigned to work. This work should be both beneficial to the institution and rewarding and challenging to the prisoners. Training opportunities should be available to all who are unskilled, and a well directed, supervised, constructive leisure-time activity program is a must. It is during periods of idleness that individuals stagnate, deteriorate and degenerate.

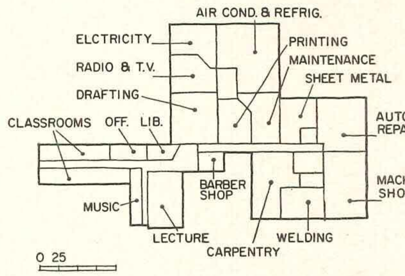
For a program to be successful, the institution must operate with as few rules and regulations as possible. Nothing will discourage improvement more than anything humiliating or degrading imposed upon prisoners, particularly by people who consider themselves to be spiritually and morally superior to the inmates. Nobody can pick a "phony" more quickly than a prisoner. Drastic regimentation is inconsistent with a program to train people to become self-reliant, self-confident and emotionally stable. This type of regimentation cannot be absent from a traditional fortress type of prison, which brings us to a consideration of the physical plant.

The institution known as Louisiana State Penitentiary has consisted of a series of worn-out, unsanitary, overcrowded, firetrap barracks buildings known as camps. There were eight of them housing approximately 2900 prisoners, situated on a large Mississippi River delta plantation, comprising 18,000 acres which cover an area of approximately 30 square miles. These camps are being replaced by a central penitentiary housing approximately 2400 men; a new youthful offenders institution housing approximately 450, located at a separate site; and a separate women's institution for approximately 150, located on the plantation but some four or five miles from the penitentiary. Negotiations are under way to join with neighboring states to build a regional institution. If this project goes through, the women's unit at Angola will be converted into a pre-release unit or honor camp for the penitentiary.

It would have been better to build three separate men's institutions for the penitentiary population: one for approximately 350 male prisoners who need close or maximum supervision, one for approximately 1000 men who need medium supervision, and another for approximately 1000 men who need the open, minimum-custody institution. Due to lack of sufficient capital, it was decided to combine the three institutions into one unit under one central supervision with one feeding facility, heating plant, laundry etc. However, the housing for the prisoners is divided into three separate units and the minimum-custody prisoners eat in a separate dining room from those requiring close supervision.

Four dormitory buildings, each containing four separate, independent dormitories housing approximately 60 men, are provided to house approximately 1000 medium-custody men within the wire fence enclosure. Four other dormitories of similar character and capacity are provided outside this enclosure for minimum-custody prisoners. Space is provided for future expansion in each of these units. The dining rooms and kitchen are within a double wire fence enclosure.

Two two-story cell block buildings, each housing 120 men, are under construction, and space is left for a third



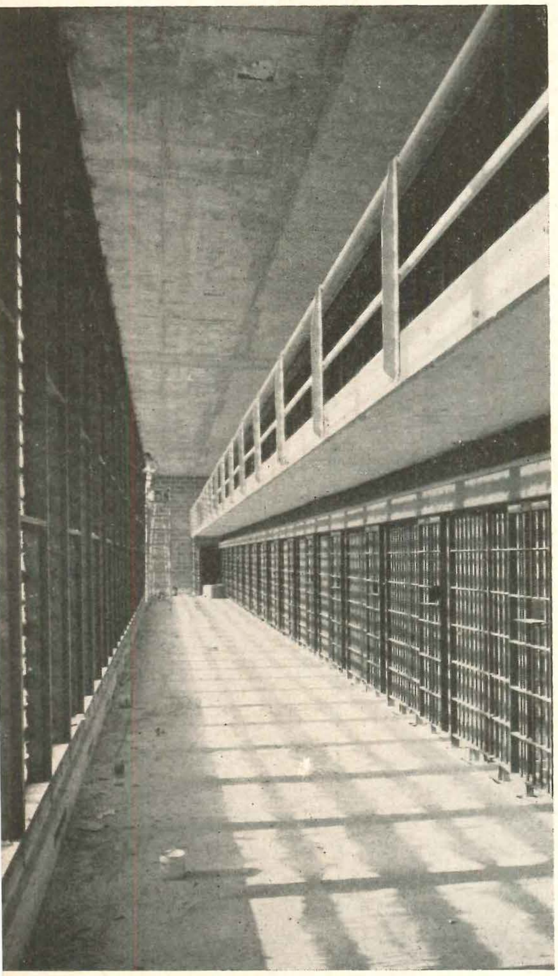
Michigan's medium security correctional institution will also contain a school and shops; schematic plan above

such building in the future. This unit will house the men needing maximum supervision. In the hospital and receiving building already existing at the penitentiary approximately a mile and a half from the new institution, 100 similar single cells are provided.

Also in the enclosure for the two new cell blocks is the two-story control and training center building which will house the academic school, library, associate warden's office, record room, control center, and offices for the classification personnel who contact the men daily. In front of the close-custody unit is a small building serving as a visiting room for the prisoners and a lounge for the correctional officer personnel. A small, completely air conditioned, one-story administration building is located at the approach to the new institution. In it are housed the warden's office, business offices, post office, a conference and training room, interview rooms for visiting attorneys, etc.

To the rear of the kitchen will be a new cannery, and also at the rear of the medium-custody dormitory buildings will be industrial shops including the metal shop, mattress factory and garment factory.

Outside the institution at already existing locations are the sugar mill, a modern meat packing plant, soap factory, farm implement repair shops, automotive repair shops, and other maintenance repair shops in which the minimum-custody prisoners will work. They will also be employed in operating the tremendous farm and livestock facilities. For the most part, the men housed in the buildings inside the enclosure will work in the industrial shops, kitchen and dining rooms, laundry and other facilities within the enclosure.



Ulric Meise

As far as construction is concerned, almost all the buildings are one-story and consist of roof and floor slabs of a light-aggregate concrete lifted into place and supported by metal columns filled with concrete — the lift-slab system. The walls, partially of concrete block, are for the most part metal detention windows, which provide ample cross ventilation and very adequate natural light. The roof overhangs approximately four feet entirely around the buildings, and not only protects them from rain in this very damp climate but also permits leaving the windows open for ventilation nearly all year. It also provides opportunity for security personnel to supervise the men in the small dormitories.

At the present time the interiors of the dormitories are open, but in the future they can be converted into squad rooms, cubicles or individual rooms by the addition of partitions. No walls will be load-bearing.

All buildings are connected with wide covered walks that provide shelter from inclement weather as men move to and from the various facilities. All floors have been raised three feet above the ground, and the under-floor area will be walled in (with plenty of ventilation) to protect the heat ducts and other utility lines anchored underneath the floors of the buildings and the walks. Two large dining rooms have arched roofs; the supporting columns were eliminated so the dining rooms can be used for other purposes such as exhibiting movies and putting on programs for the entire group pending the building of an adequate auditorium.

The architecture is contemporary, a drastic departure from the traditional fortress prison. At first glance, the average citizen would probably think the buildings very insecure from the standpoint of escape-risk. It must be recognized, however, that the main security feature of any prison is an alert, well trained personnel. The strongest sort of fortress is not safe from escapes if the prisoners are permitted to smuggle in firearms, hacksaw blades, cutting torches, or any other type of equipment that could be used to bridge the security features.

At Angola, dependence is placed on the alertness of all personnel, particularly those manning the guard towers outside the ten-foot-high security fences. The absence of very obvious security walls, gates, etc., adds more to a proper climate for rehabilitation than it detracts from a security program.

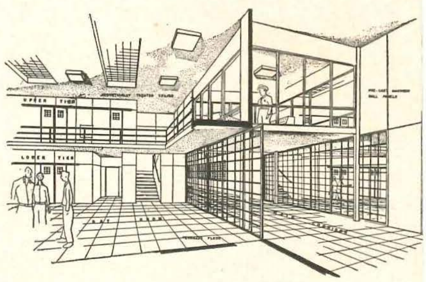
Inexpensive materials are used in the construction, and the lift slab method of construction was chosen because it lends itself well to the use of unskilled prison labor. A substantial part of this prison is being built by prisoners. The over-all cost will be less than $4000 per man as compared with the ordinary $8000 to $12,000 per man in the traditional type of prison. The buildings will be easily maintained. Since all utilities are underneath the buildings, without the necessity for tunnels or trenches, they are easily available for maintenance. The appearance of the buildings is not forbidding; there are no dark, dirty corners. The quarters are livable; the buildings are spaced widely apart and will not be overcrowded.

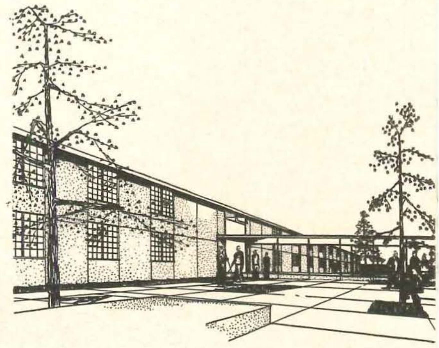
A tremendous recreational area is provided for each unit. Added to the present housing and feeding facilities will eventually be hobby shops, chapels and other facilities that will be used in the total treatment program.

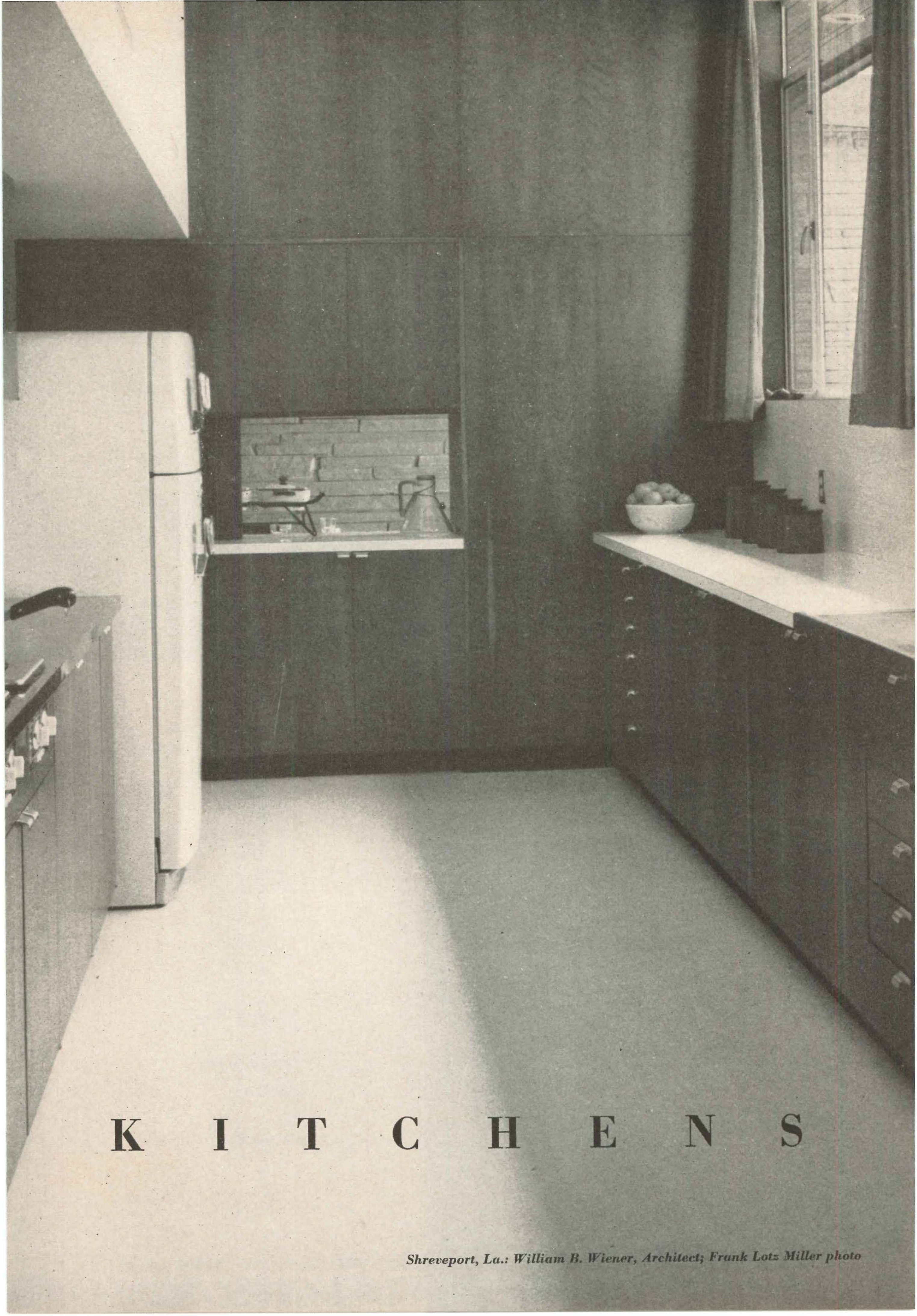
It is believed that the design of this institution is unique. It is also believed that it is in keeping with the terrain and the climatic conditions of the area in which it is located, and that it will adapt itself well to the total over-all treatment program planned for the institution.

The present penitentiary was described in a magazine article a few years ago as America's worst prison. It is to be hoped that when the new program is well under way, Angola will be regarded as one of the best in the country. It must not be overlooked, also, that another institution of a similar type for the younger, lesser offenders is being constructed at another locality and that the women prisoners will also be adequately cared for under a separate program.

Cellblocks: photo at left, for maximum security prisoners, Louisiana State Penitentiary; below, interior and exercise yard, Connecticut State Prison

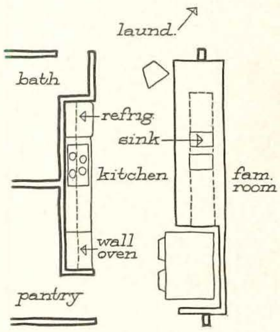






K I T C H E N S

Shreveport, La.: William B. Wiener, Architect; Frank Lotz Miller photo



Mt. Airy, N. C.

Cecil D. Elliot
Architect

Joseph W. Molitor photos

K I T C H E N S

Palm Island, Fla.

Rufus Nims

Robert B. Browne

Associated Architects

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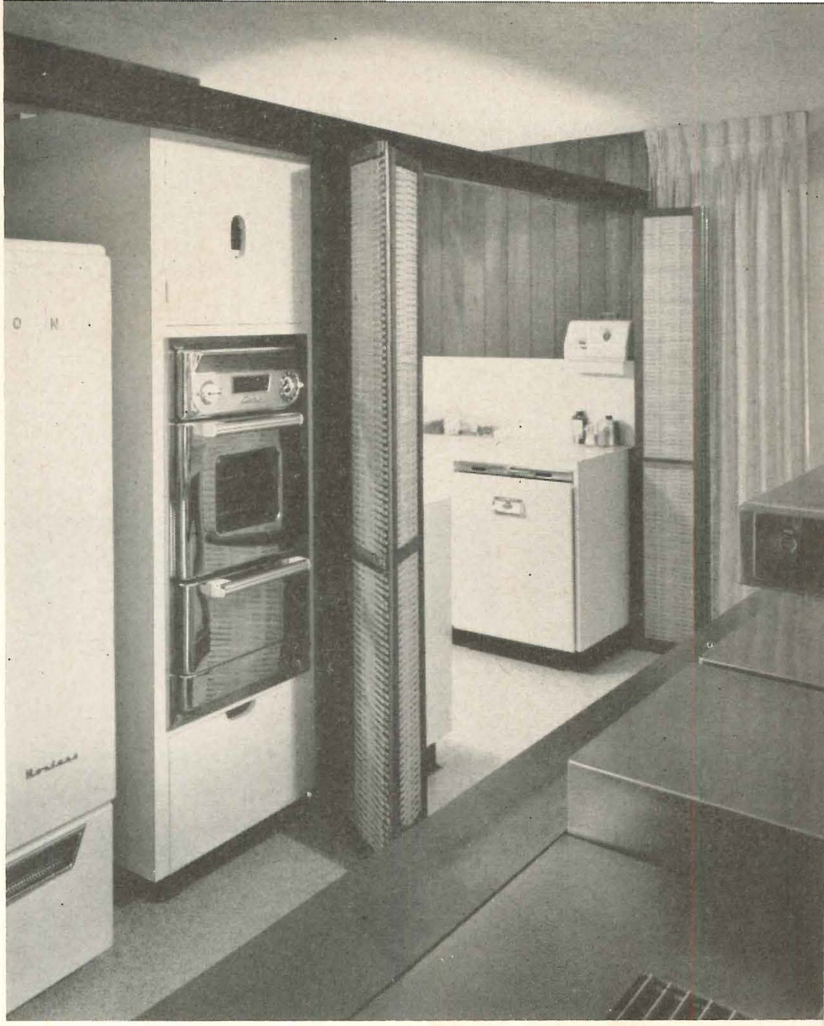
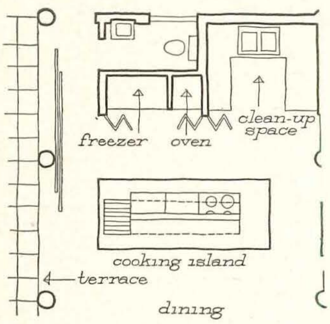
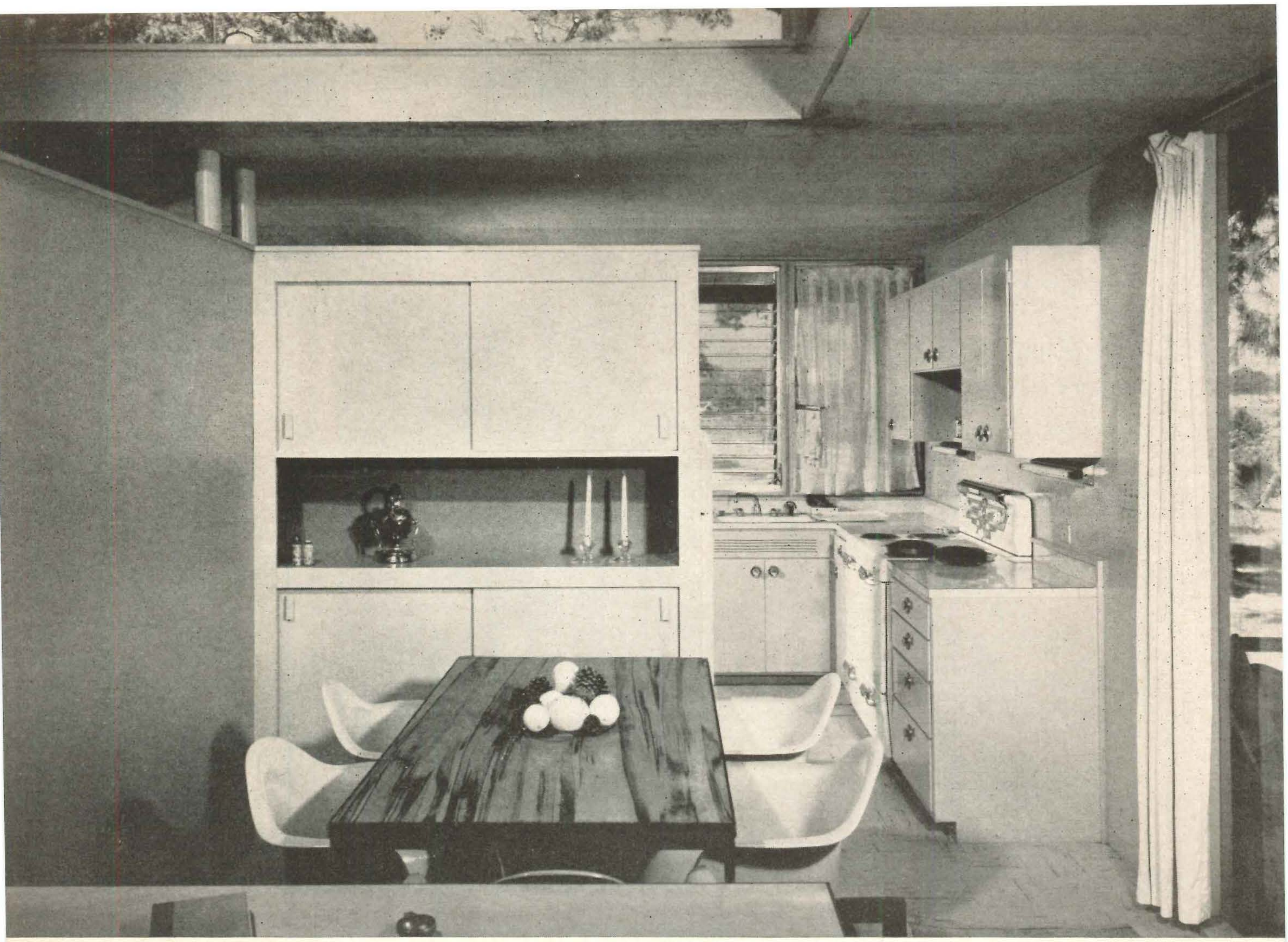
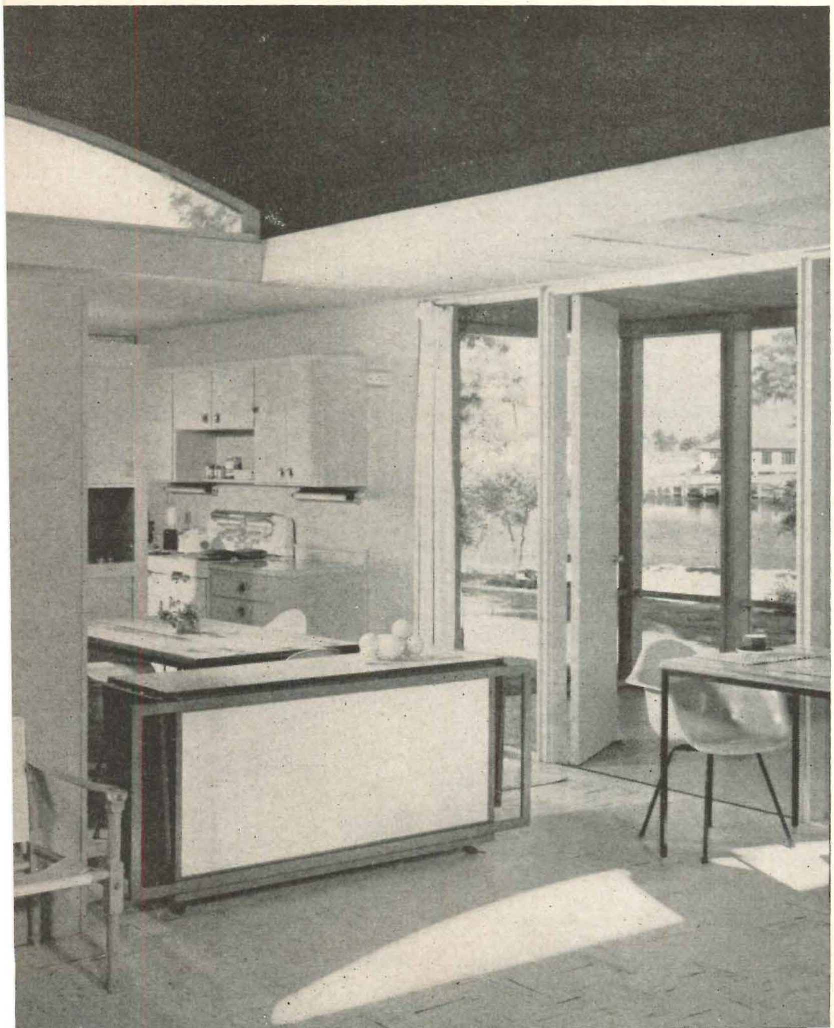
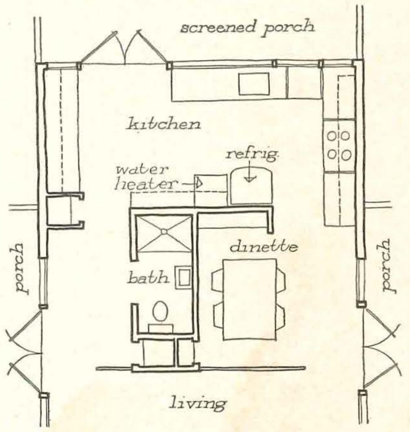










Bradenton, Fla.

Paul Rudolph
Architect

K I T C H E N S

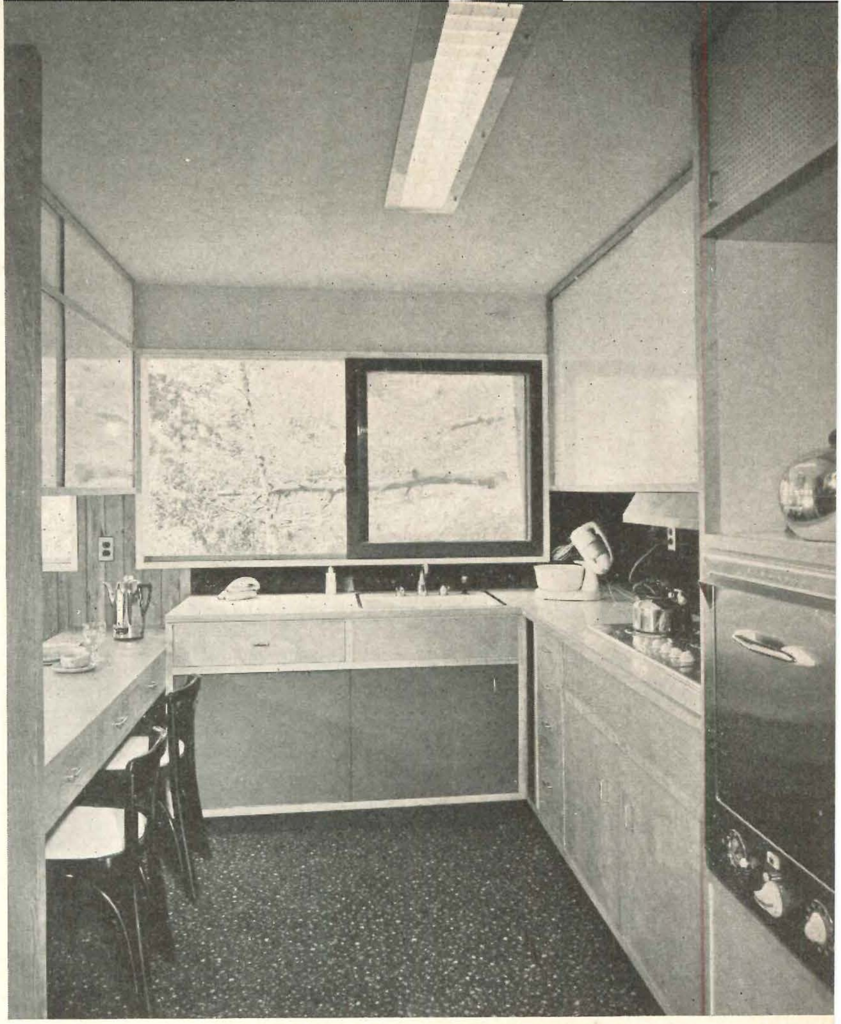
Sherman, Conn.

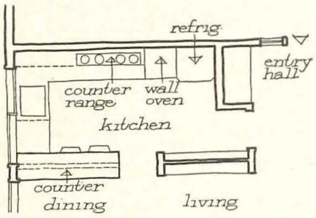
Herbert Beckhard

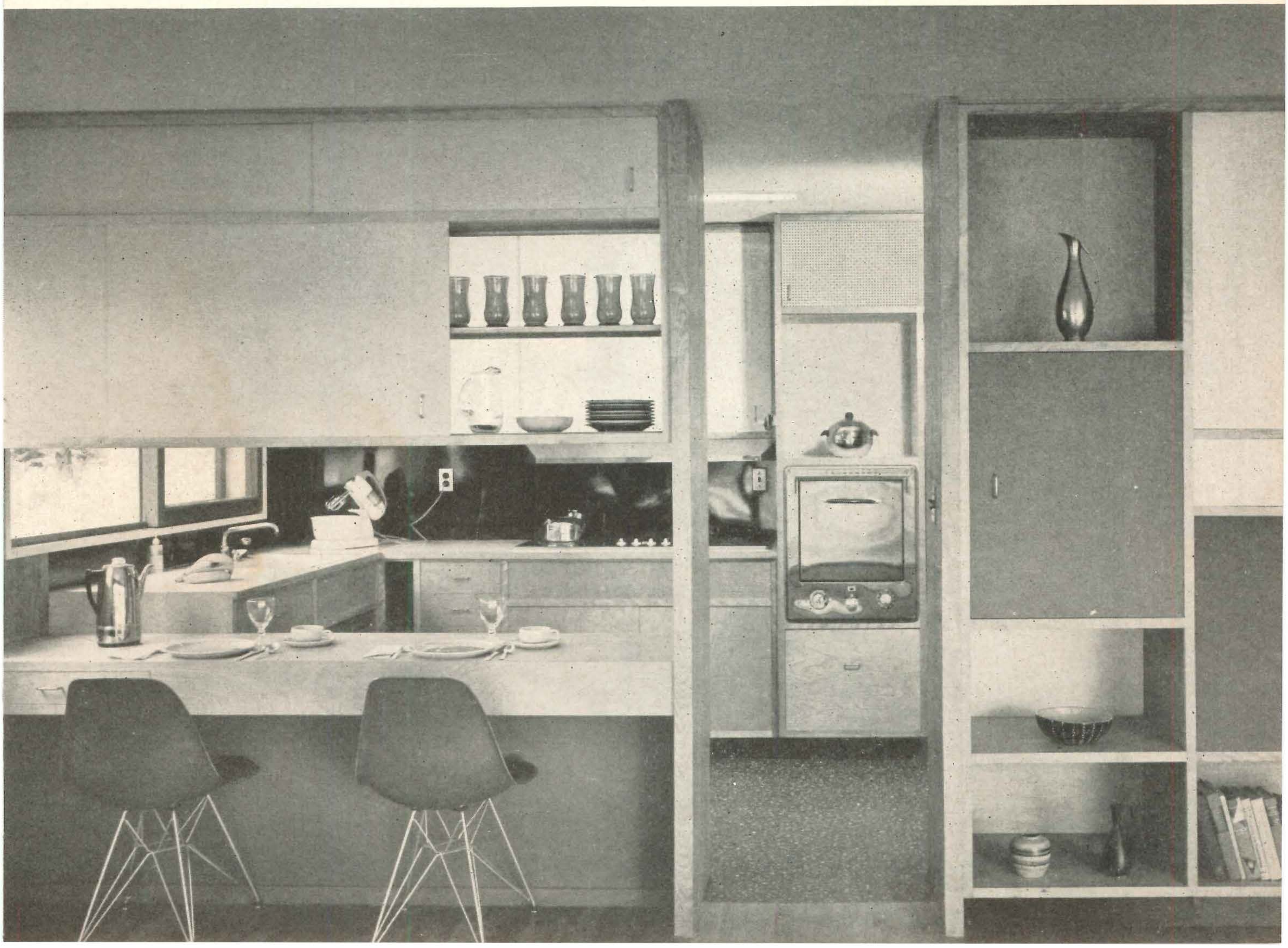
William W. Landsberg

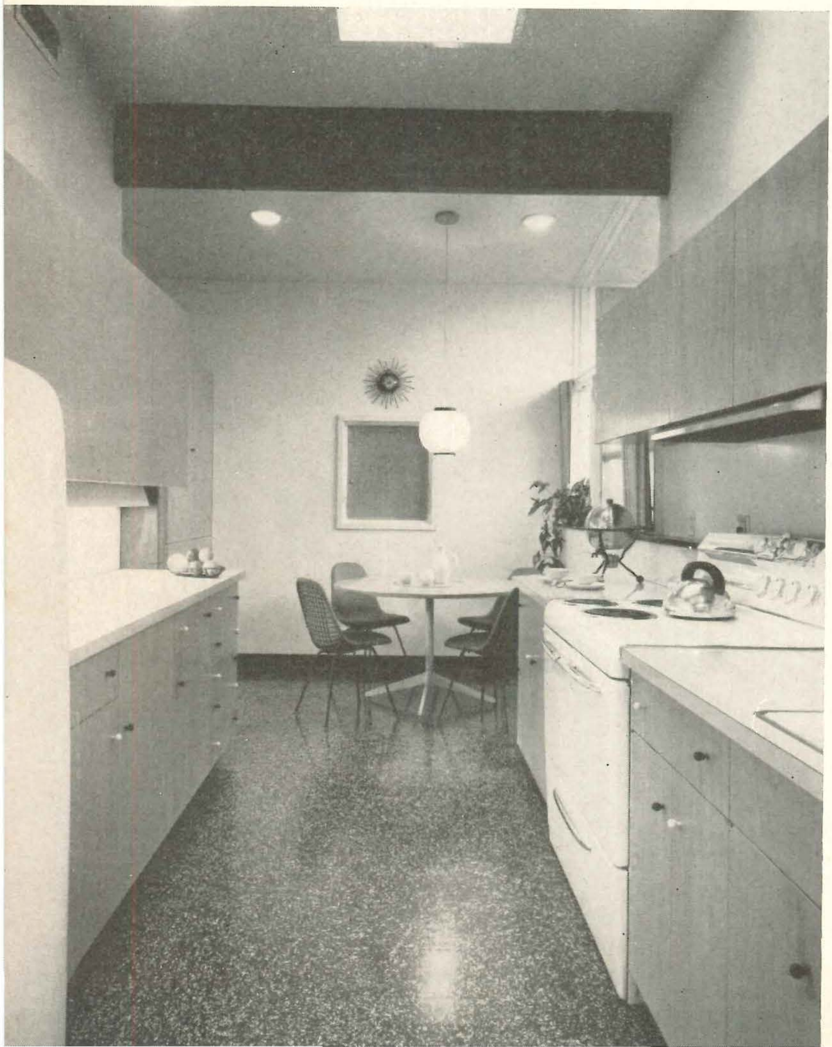
Architects

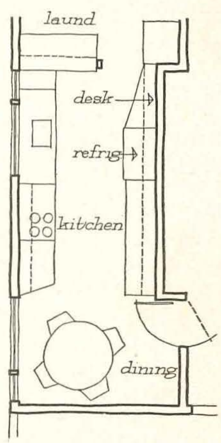
Joseph W. Molitor photos











Maplewood, N. J.

Kramer and Kramer

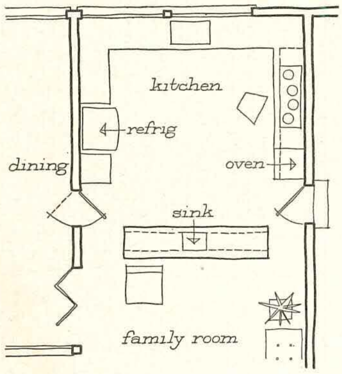
Architects

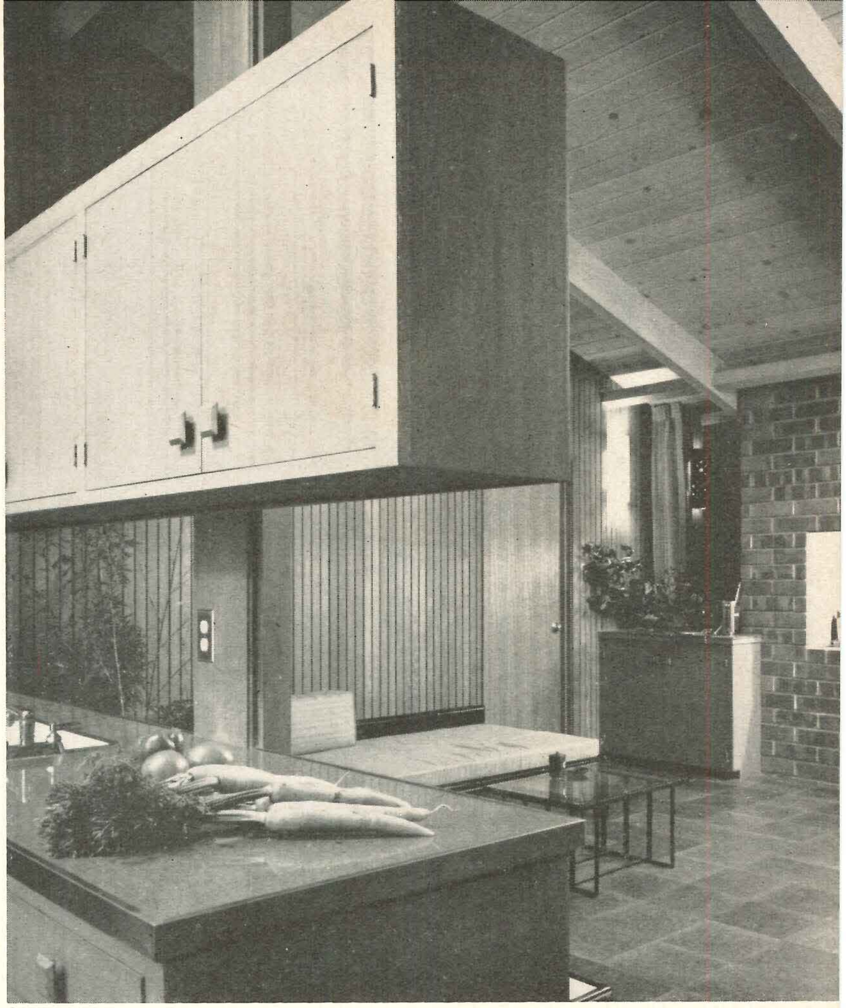
Lionel Freedman photos

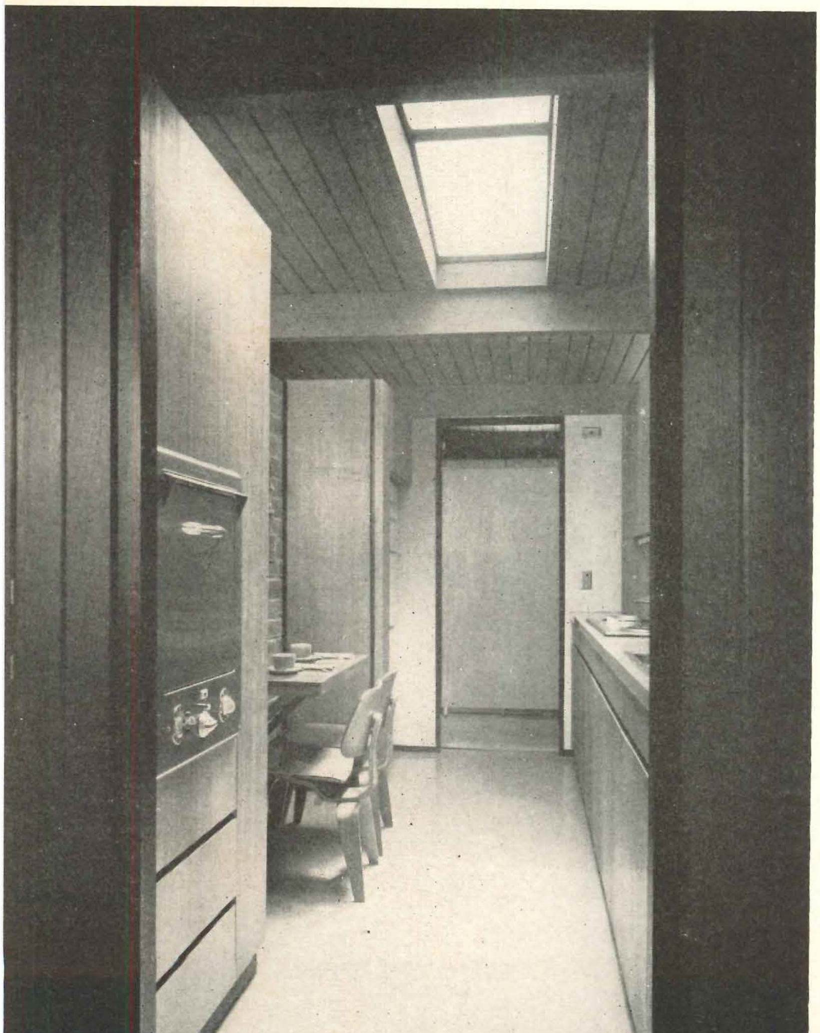
San Francisco, Calif.

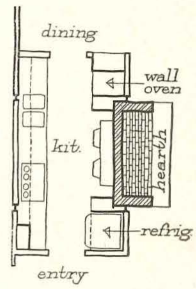
Anshen & Allen
Architects

Rondal Partridge photos









West Los Angeles, Calif.

Craig Ellwood

Designer

Marvin Rand photos

K I T C H E N S

Buckminster Fuller and the Brooklyn Dodgers made headlines last Fall with the announcement that the expert in light-weight domes had been retained to develop the world's largest clear span roof for the world championship team's projected new stadium.

Bucky completed the initial study of a 750-ft. dome during a period as visiting critic to Princeton graduate architectural students who developed and constructed a 6-ft model under his direction.

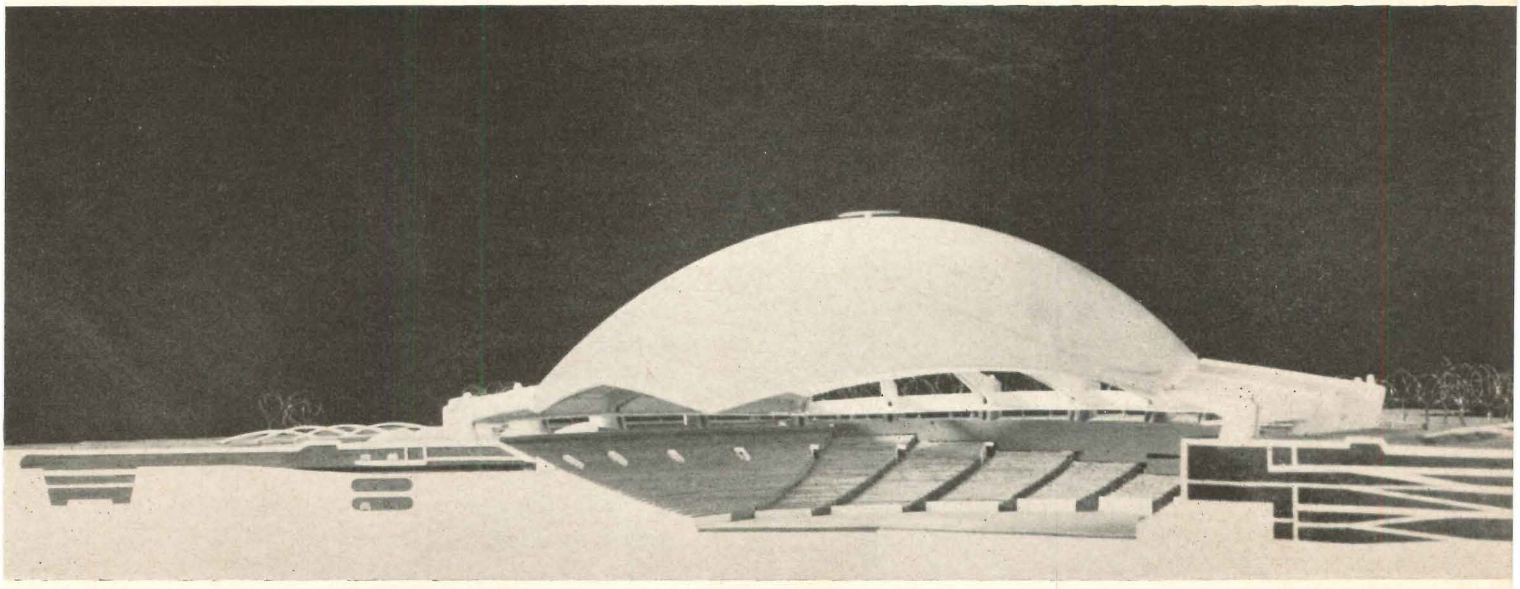
While Dodger president Walter O'Malley studied the problem of site acquisition with City officials and Bucky continued detailed investigation of materials and performance, one of the Princeton group — Theodore W. Kleinsasser — with the guidance of Jean Labatut, pursued the problem of integrating the dome into an overall proposal for seating, circulation, traffic, parking, rapid transit, and the redevelopment of areas adjacent to the site.

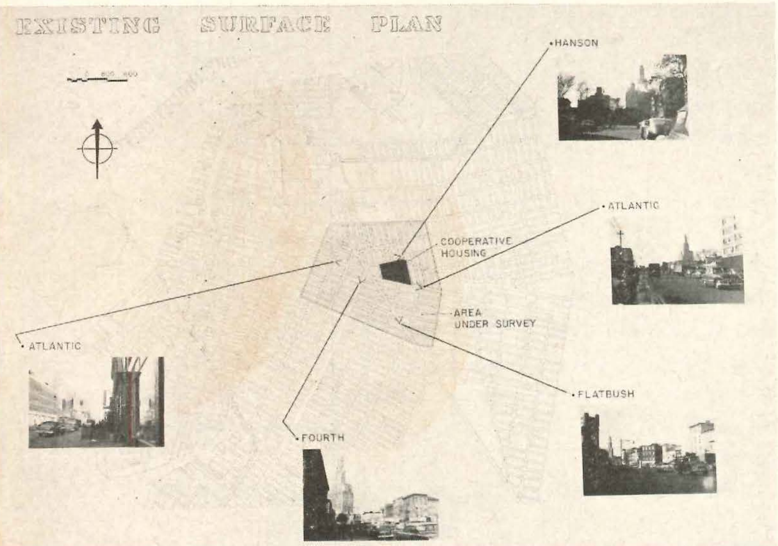
This scheme was recently presented to a Master's degree jury, whose members included Paul Frankl, Buckminster Fuller, Kenneth Kassler, Jean Labatut, John C. B. Moore, Walter O'Malley, Robert Oppenheimer, Emil Praeger, Robert Le Ricolais, John Knox Shear, Canon Edward West. In the Princeton tradition, the non-architects were on the jury in the role of "potential clients" for the several projects presented on the occasion.

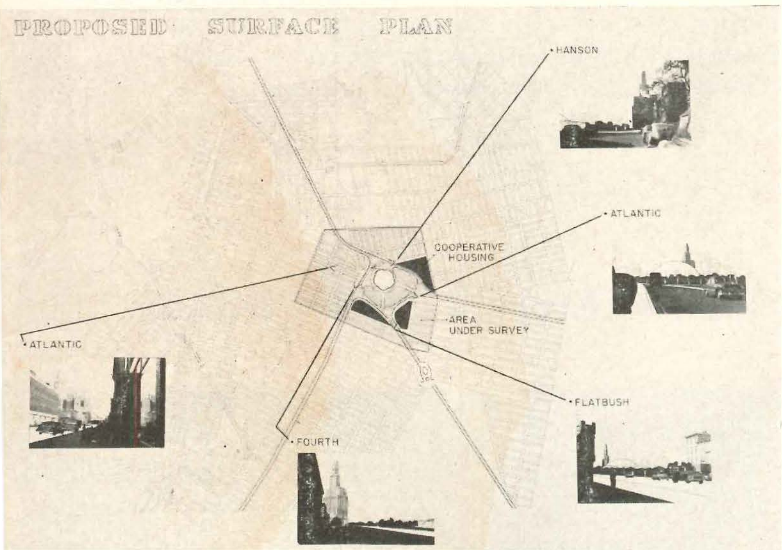
In each case, the degree candidate was queried by the jury following his oral and graphic presentation.

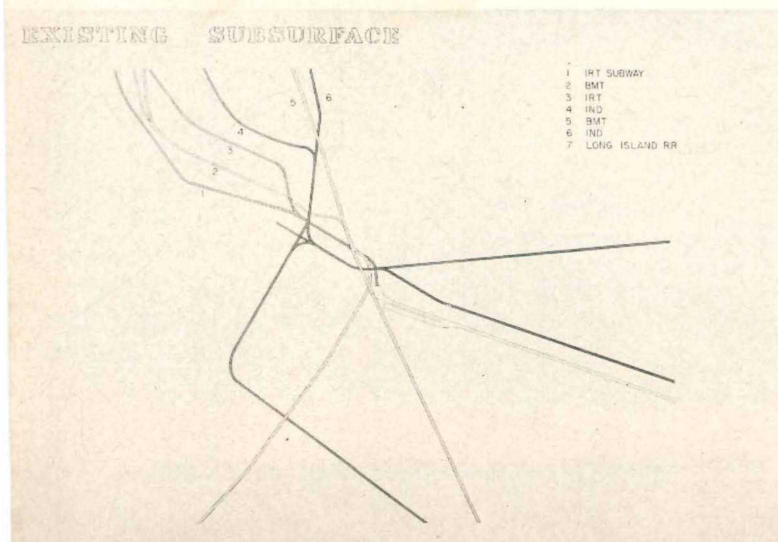
After explaining that his interest in the Dodger Stadium grew out of his interest in the "joint" and its articulation in architectural and planning problems, Kleinsasser's presentation developed in this way:

DODGER DOME GENERATES CITY CENTER PROPOSAL









MR. KLEINSASSER: Because of lack of parking space, the Dodgers are losing money . . . they also lose money because they do not have a covered stadium. The only structure known to man at this time that will span such a space feasibly is the dome of Mr. Fuller.

Also in Brooklyn, the Long Island Railroad is confronted with the problem of having brand new equipment and a station too small to take care of it. There must be adequate facilities for parking with adequate access and egress . . . which involves traffic. This is a concern not only of the Dodgers but of Brooklyn as a whole. Mr. Cashmore, the Borough President, has allotted this site to be surveyed.

There is also the problem of housing in this particular area . . . all of it is obsolescent and some of it is definitely of the slum variety.

▪ ▪ ▪

I am concerned with this site, at the intersection of Atlantic, Flatbush and Fourth Avenues . . . it is the hub of many arteries of travel. There are seven subway stops within two blocks of this site and four highways cross exactly at this corner, each going to major areas. It is also the center with respect to four airports as well as the Long Island R.R. terminal. And it is the site for Mr. Robert Moses' cooperative housing project.

MR. O'MALLEY: Excuse me. Mr. Moses had selected that site, which is also the site we had in mind for the stadium, as a place to build a cooperative housing project. . . . I think he realizes that the serious interest in the Railroad station and the market area and the traffic problem and the baseball park is such that he will very likely find another site.

▪ ▪ ▪

MR. KLEINSASSER: In my proposed surface plan, traffic is changed so that there is no longer a collision at this corner, but a constant flow around, with tangential highways leading off. I have not changed any highways . . . I've simply made a large traffic circle . . . The whole area is well within Mr. Cashmore's allotted area . . . My proposed cooperative housing would be around the stadium rather than congested in one spot.

In the existing sub-surface plan the IRT line, the BMT line and the Independent line all have stations on the same corner and there are four more stations in the immediate vicinity. I have not changed the plan or the depths of any subway . . . I have linked the scheme to the subways as they are now.

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The surface plan involves a parking arrangement which could be utilized by other business establishments in this vicinity and has a park-like nature. I have arranged the parking so that the progression is to drive around the one-way circle, pass by each parking lot, look in, and turn in and go either there or there, to the areas of parking. As speed changes, fast here, slow here, the size of the roads and the size of the curves change also. Pedestrian approaches are all down these arteries from the triangles on the four major streets. There are pedestrian bridges there so that no one need cross traffic.

In the subsurface plan, the concourse includes the BMT subway stop and the Long Island Railroad . . . both of which are connected by tunnels to the other two subways in the immediate vicinity. The underground parking is entered from the circle . . . branches into three lanes, and converges into one lane underground at three levels. Roadways go directly to the parking lots which are on the second level and the third and fourth level. As the ramps go up into the air, clearance under them becomes greater and there is access to the stadium at the vomitory level.

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In the plan diagram of the stadium itself one sees the relationships among the five levels. The first level is the level of the vomitories and the outfield section of seats. The second plan segment is the second level, which is also the concourse and railroad level. The third is the ground plan, which includes the grass barrier and to which the pedestrian bridges come from the parking areas. The fourth segment is a reflected, suspended seating box plan. These boxes will be fed by elevators which rise up each structural cantilever. The cantilevers are flat enough so that one can walk up in ramp-like fashion and branch out on either side. The total number of people enclosed in the suspended boxes then will be about 2000 and the grandstand will seat 53,000. The fifth segment is the top view showing the dome and the top of the structural cantilevers supporting the dome.

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The dome itself weighs approximately 1,000,000 pounds. The diameter is 550 feet from point of support to point of support. The height of the dome from the playing field is 250 feet. The thickness of the dome is approximately eight feet and is comprised of four-foot aluminum struts. The exterior of the dome will be covered with plastic fiber glass and the interior will accommodate inserted triangular plastic panels. The panels will cut down the glare from sunlight and also will be the reflecting surface for artificial illumination, originating along the balcony here and serviceable by means of these elevators and ramps. The light shines up, hits the panels and is reflected down on the field. There is an amusement train that has its beginning at one of these low cantilevers, runs up and across the open top of the dome. I thought that the people who take this ride will really get into the spirit of the dome as they come up to the top, cross the opening, and look straight down 250 feet over second base.

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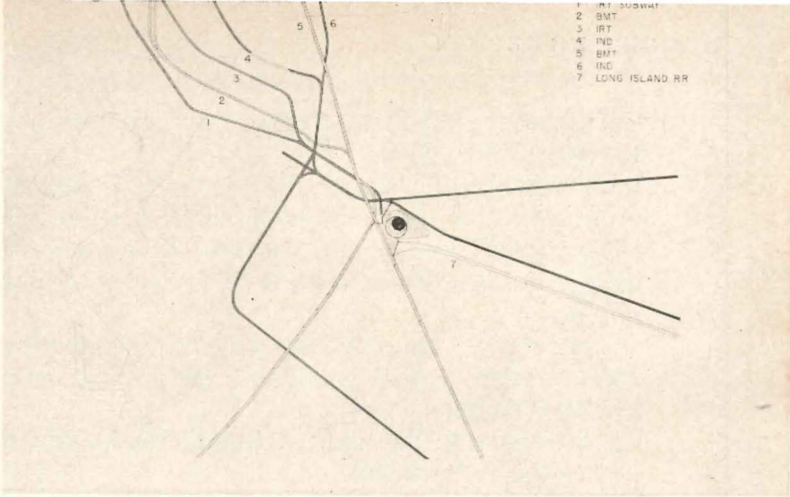
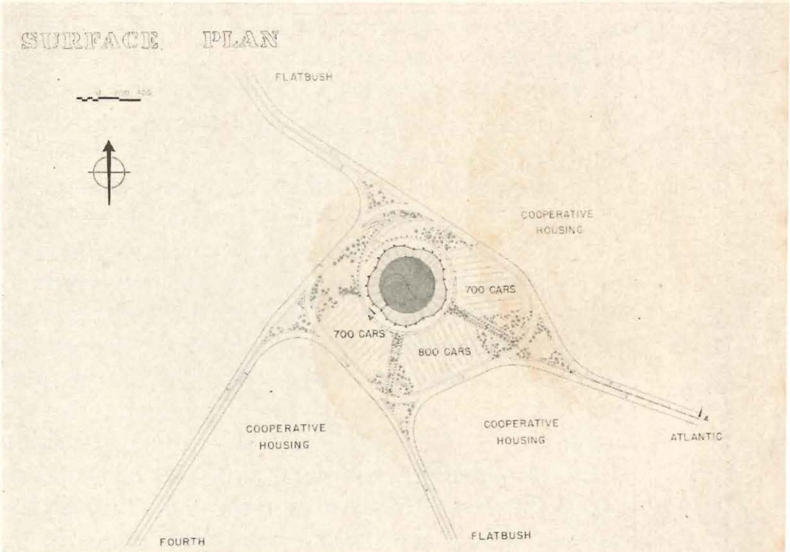
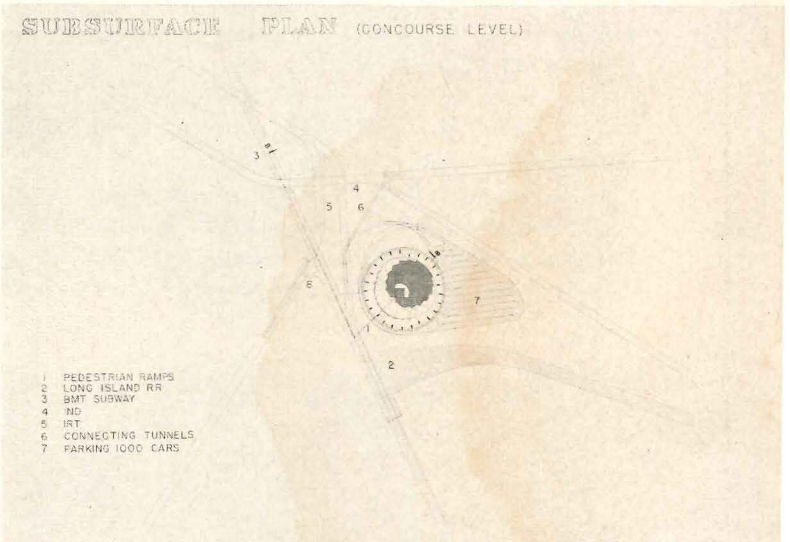
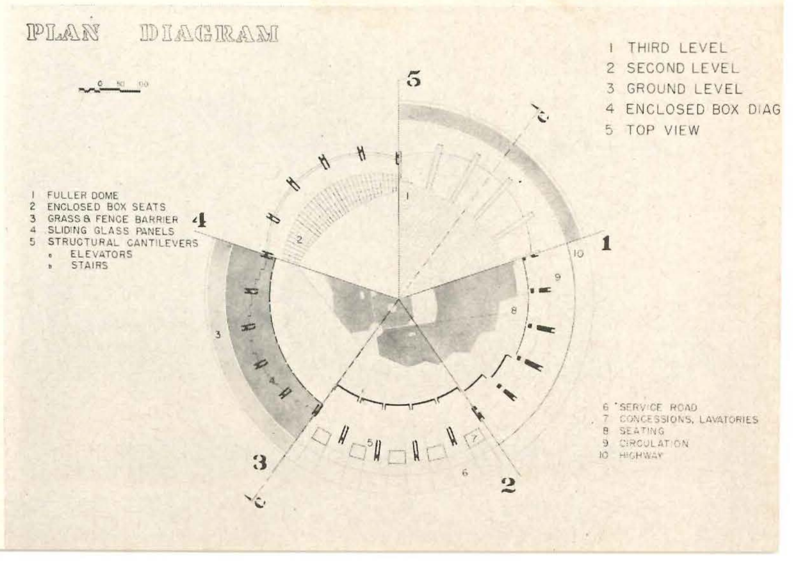
MR. O'MALLEY: Concerning this train . . . with this stadium one that has potential use all year-round, it means also that there will be sightseers, and we know that the Empire State Building takes in a million dollars a year just in sightseeing fees. The income from this train during those occasions when games or contests or shows are not taking place would bring in a substantial amount of income which could help to amortize the cost of the roof.









MR. LABATUT: Did you mention the sound absorption by the panels of the dome?

MR. KLEINSASSER: The panels which are to be inserted in a pattern into the tetrahedron dome structure will allow sound to penetrate the thickness of the dome and dissipate. Hence the dome would be a sound deadening area also.

MR. SHEAR: Are you counting on the open-top lantern effect to induce natural flow of air to carry off cigarette and cigar smoke?

MR. KLEINSASSER: Yes, sir . . . I think Mr. Fuller can explain this better than I.

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MR. FULLER: We discovered that with the dome, when we have openings at the bottom . . . quite wide open . . . during the hot season, when there's heat on the outside of the dome and an opening at the top, that these compound curved surfaces do very extraordinary things with respect to motions and shapes of atmosphere. In this case, the dome itself being of compound curvature, the exterior surface tends to diffuse the radiation of heat. The dome gets so hot that it not only tends to radiate the heat outwardly, but it also heats the air next to it so that the air rises toward the top on the inside of the dome very close to the skin. At the same time there is a tendency in the dome during the hot season to send the still air to make a thermal-column of the atmosphere rising from it so the air being drawn in from the outside of the area of the dome through the openings around the bottom rises again above it. So during the hottest of the summertime, with the sun coming down, they tend to be about 10 per cent cooler on the inside than the outside.

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MR. LABATUT: Mr. Kleinsasser, can you speak of the horizontal openings you have around . . .

MR. KLEINSASSER: Yes. I thought of this project when I started as being a very difficult problem of integrating this dome, which is a very rational and fixed thing, into the scheme as a whole. I found, since I had to have a system of suspended box seats, that I could integrate those box seats with a supporting system for the dome. As the accommodation of another force, pedestrian flow, I raised the first suspended box seat level up high enough so that people could come directly in from the street on all sides.

MR. MOORE: Could you explain the reason for the variable length of the cantilevers in this five-foil arrangement?

MR. KLEINSASSER: I tried keeping the cantilevers in a constant circle and the formulation of the levels become so complicated and irregular that I thought this better.

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MR. LABATUT: Will you explain the green wall in the outfield?

MR. KLEINSASSER: This green wall is against the opening leading to the parking areas . . . which makes it possible for circuses to park here and come right into the stadium. Around the wall there will be space for advertising which pays a lot of bills. Rather than to allow slapdash, disorganized advertising, I chose to make this wall of aluminum tubing so it could house an electronically controlled advertising device: a controller up in one of the suspended boxes could push buttons and cause signs to flop down.

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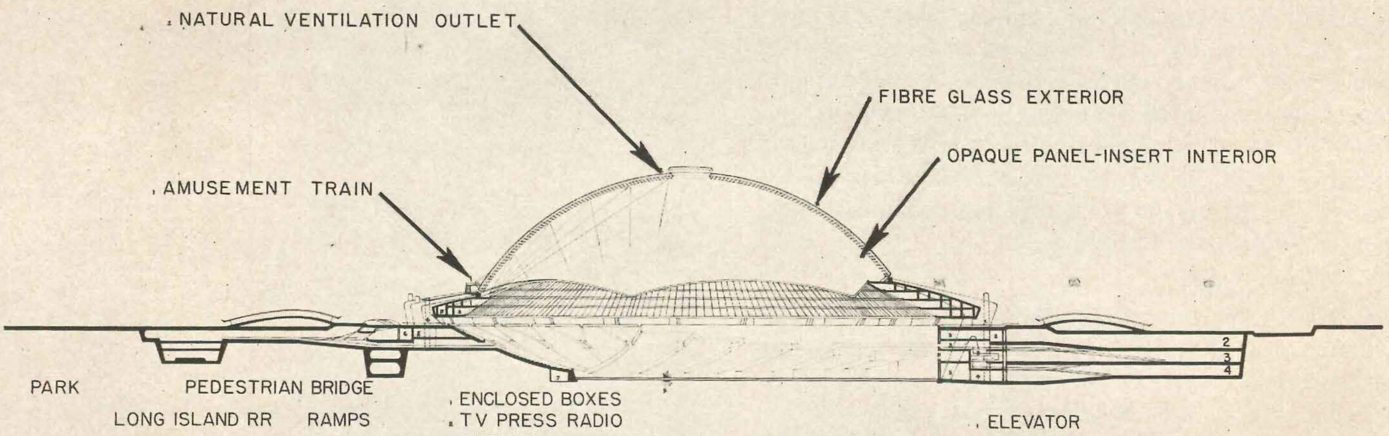
DR. OPPENHEIMER: I have a question. Can one take the intersection of four main highways and put a traffic circle there and use that circle as a way of getting traffic into a stadium? Ought there not be a separate highway system?

MR. KLEINSASSER: That very consideration has led me to provide this long straight stretch before each entrance, the size of which generates the traffic circle as a whole. I feel that this straight stretch is long enough for moving cars to change lanes so that they can leave the circle . . . there is parking for 5,000 cars.

MR. FULLER: When's the opening game?

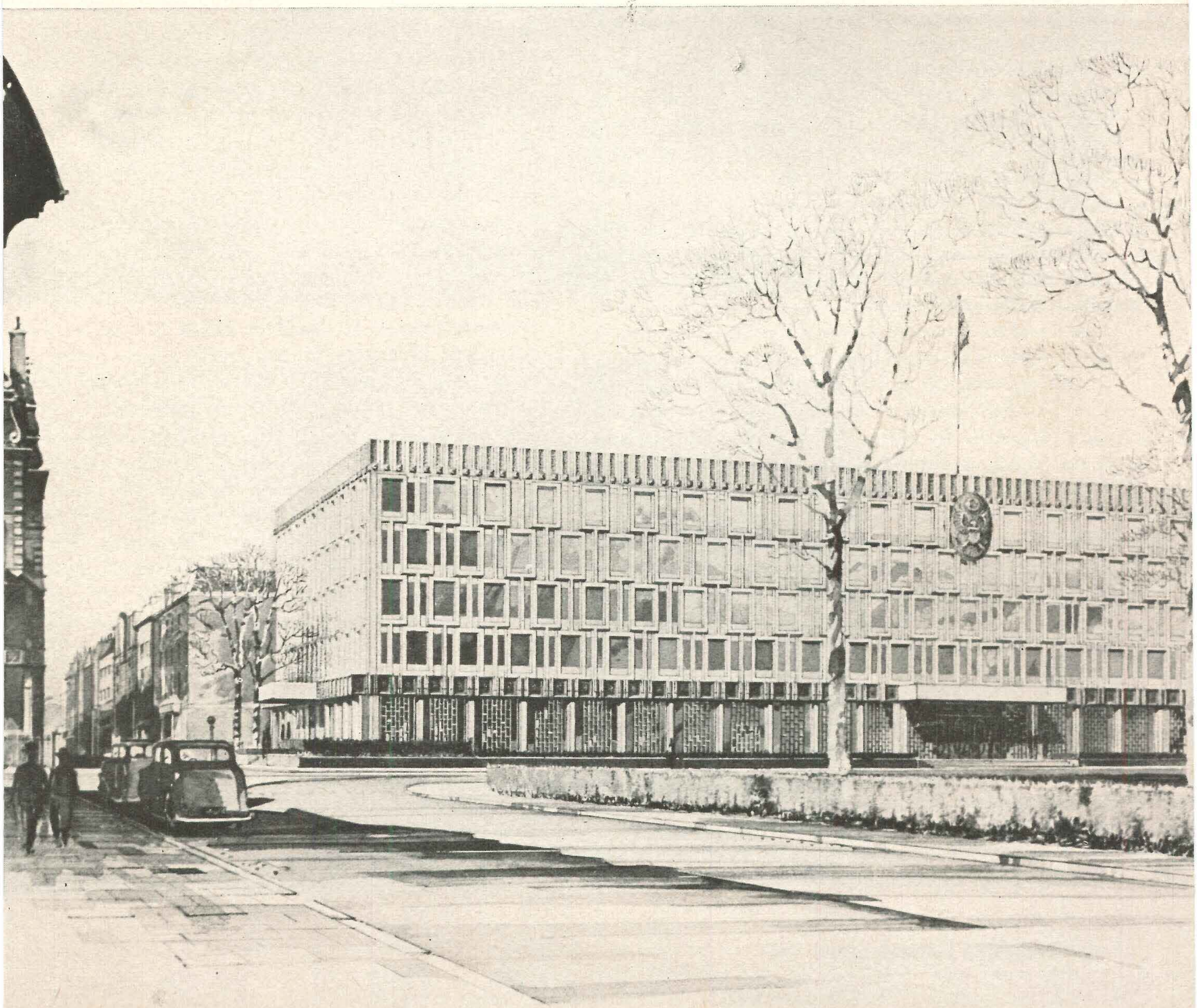


COMPETITION FOR U. S. CHANCERY BUILDING, LONDON

For the design of the most important single project in its current foreign buildings program (AR, May 1955, pages 187–192), the State Department chose the most punctilious and time-honored method of selecting an architect for a great public project. With the concurrence of its distinguished advisory panel of private architects — Pietro Belluschi, Henry Shepley and Ralph Walker — it invited eight leading American architects to participate in a limited competition. Duration of the competition, which had the approval of the Committee on Competitions of the American Institute of Architects, was three months; each competitor was paid a fee of $4000 for a design, to cover in addition his expenses for a mandatory visit to the site. As professional adviser for the competition, the State Department appointed Professor Robert W. McLaughlin, head of the School of Architecture at Princeton University. The jury was comprised of the three members of the architectural advisory panel listed above, plus George Bain Cu president of the American Institute of Architects, a representatives of the State Department — Loy W. He Deputy Under Secretary of State; William P. Hughes, of Foreign Buildings; and Livingston T. Merchant, A Secretary of State.

The ten-page program emphasized relationship to ment — a historic site on the west side of Grosvenor S London's Mayfair section — but specifically added does not mean copying anything." It also stated: "Thi ing should represent the United States at this time." noted that a minimum of detailed planning of interna was required "to permit maximum study of the fo character of the American Embassy in London."

The eight designs submitted are shown in rendering and the following pages.



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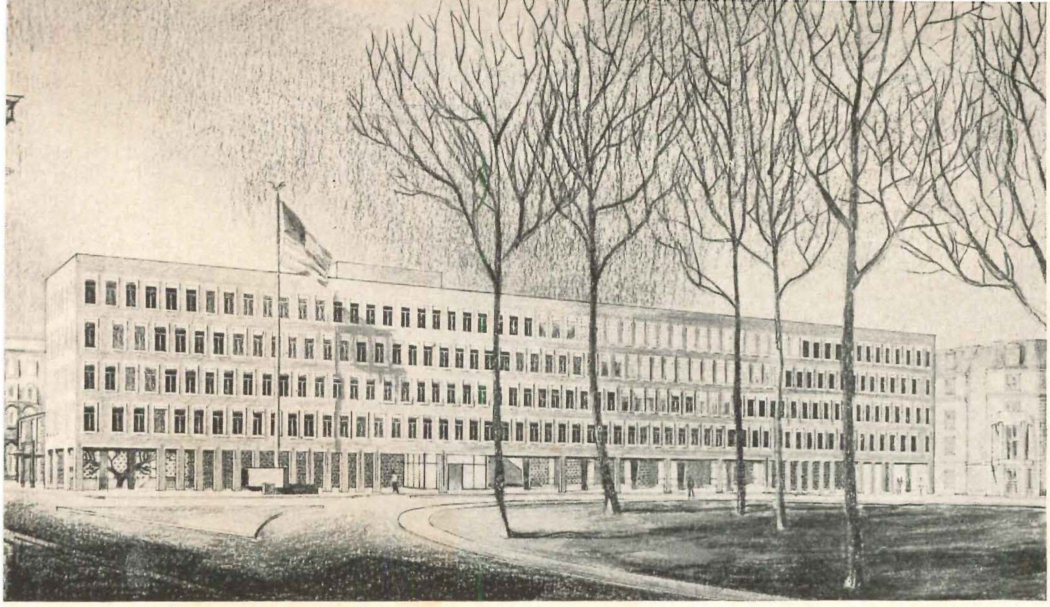
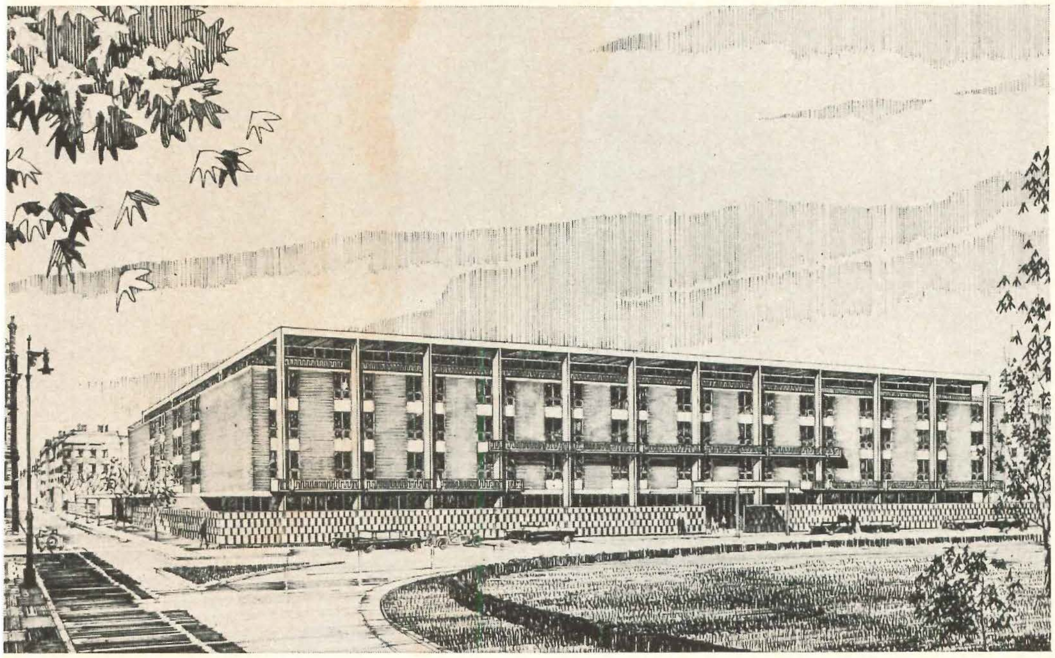
EERO SAARINEN is the winner. His competition design features a great stone grille whose perforations repeat the rhythm of window spacing on surrounding buildings; above ground floor level, the pattern of the façade comes from the structure, an English system of precast columns which involves coupling two columns and casting them together for ease of erection. The major material is Portland stone, used in all London's "official" buildings and noted for its dramatic black-and-white weathering qualities; the cornice is black bronze. *The Times* of London thought the design should be a "welcome acquisition" to the area. Noting the difficulty and importance of harmonizing with the existing façades (neo-Georgian product of rebuilding during the last 20 or 30 years) to preserve the unity of the Square, *The Times* said: "This Mr. Saarinen appears to have done conscientiously, without detriment to the freshness of his own design, regarded as an architectural composition in its own right. His building is strictly symmetrical, thereby retaining the traditional formality of the London Square, but he has not created too strong a cross-axis, so that the continuity of the Grosvenor Square façade will not be interrupted as it would be by a highly centralized design."

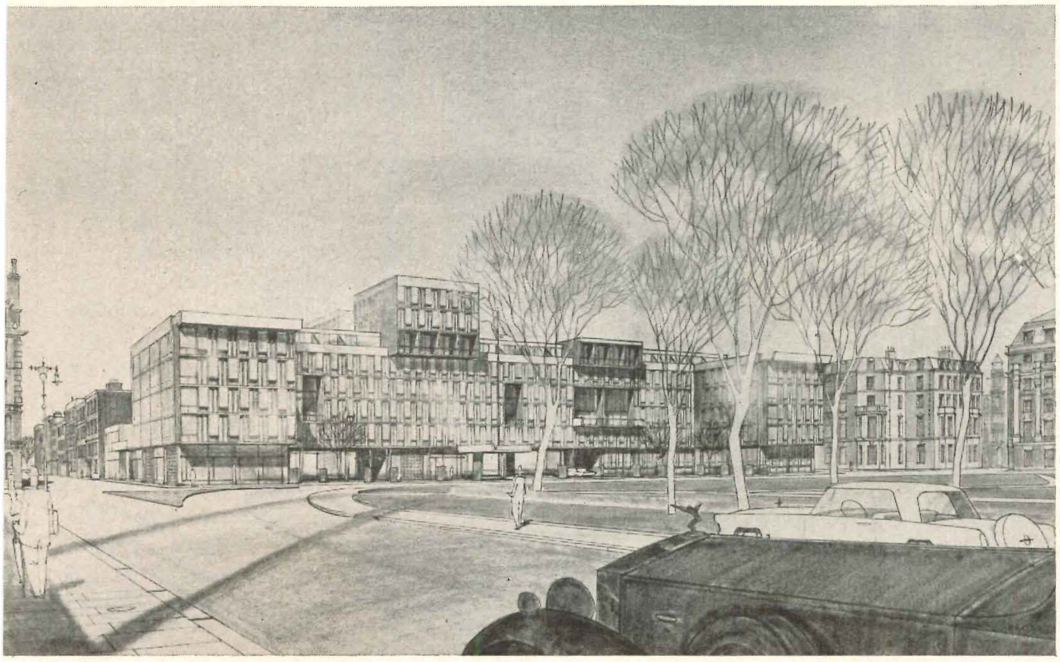


ANDERSON & BECKWITH — "Obviously the choice and arrangement of windows was of critical importance in making such a large building seem to belong here. . . . Vigorous shape definition or abrupt contrasts of materials are needed to escape drabness" in London's feeble winter daylight; thus Portland stone, for its black and white weathering qualities. "The heavy oval of trees in the park makes it impossible to see the façade from a distance except as filtered by the trees. Traffic moves around the Square and develops foreshortened views of the façades. We were led to avoid emphasis on a central motif and to think in terms of an uninterrupted fabric. . . ."

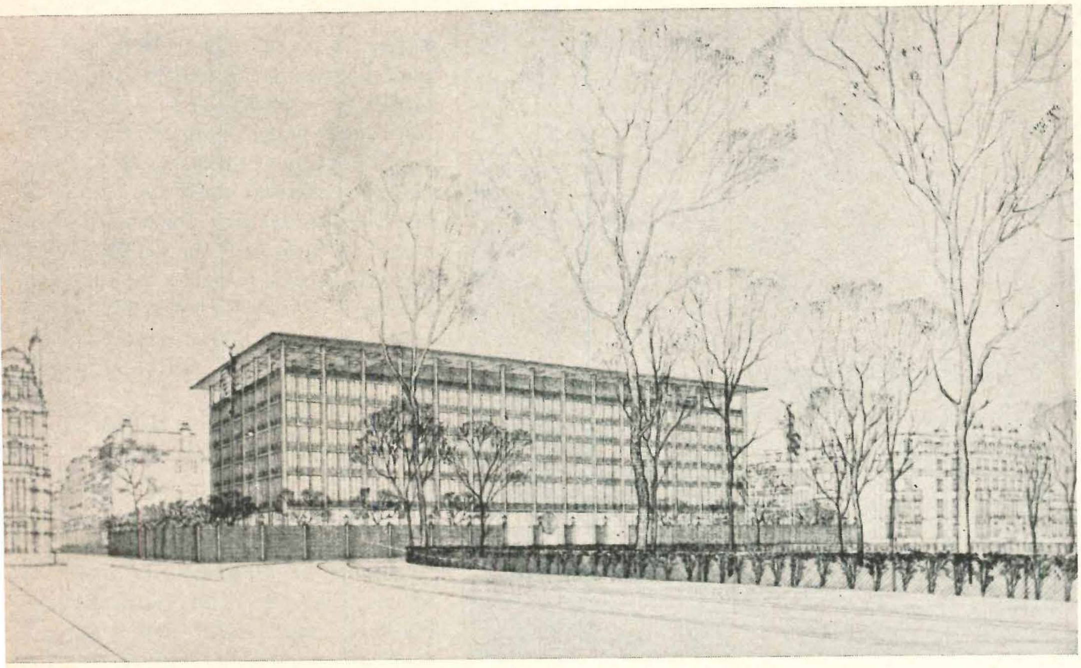


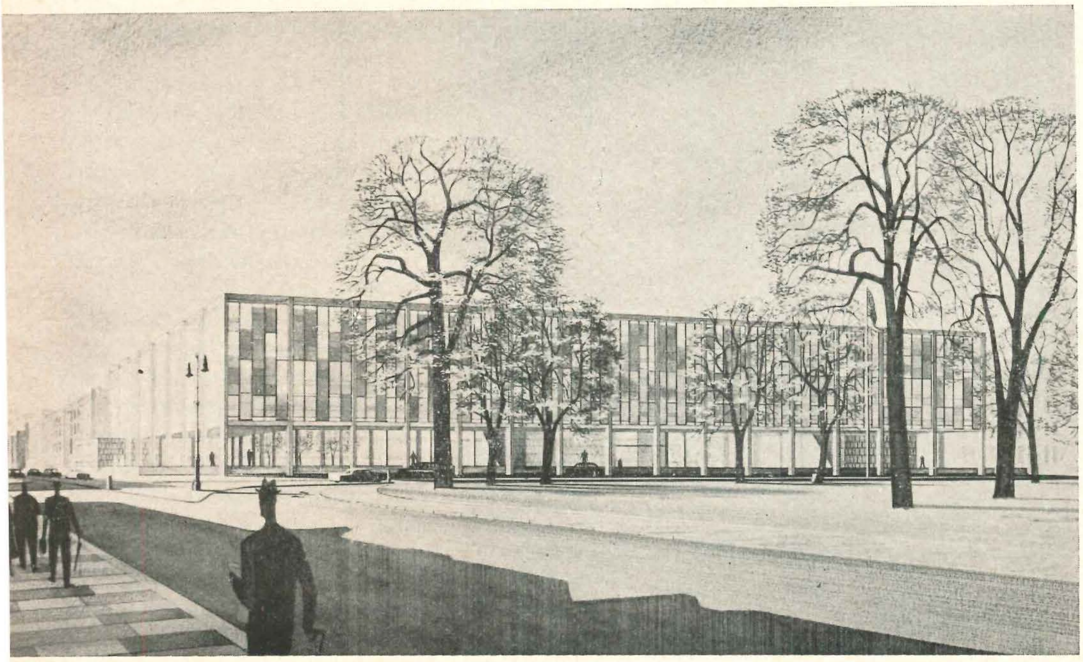
ERNEST J. KUMP — With a parti chosen to "complete" the Square by enclosing the entire site, this scheme sought harmony with existing façades in matters of architectural strata, horizontal profile, color and texture. The pierced stone screen around the building and the recessed walls of the ground floor were a response to the rather heavily modeled masonry ground floors of the older buildings; the setback top story attempted to recognize without copying the surrounding mansard roofs. The vertical pattern of the façade facing the Square, visually reinforcing the ribbons of structural columns, was for deliberate contrast. As an American building, the design "says the U. S. has reached a maturity as a world power that lets it be itself without shouting, recognize and join hands with its setting"

PULL OUT



JOSÉ LUIS SERT — The spatial rather than the façade relationship of the new with the old buildings around the Square was the key consideration in the development of this design, seen first of all as an enclosure unifying the space around the square. So the scheme is slightly U-shaped, and the two end wings are advanced to emphasize the street entrances. Use of "a double square as a system of proportions" established the pattern of the façade; the shape "recalls Georgian windows in proportion." Its contemporary building character was thought to give it its representative American quality





EDWARD D. STONE — "In deciding on the character of the exterior, we chose the simplest form of expression, with the structural columns reflected on the exterior in order to have column space uninterrupted by column projections. . . . Most of the London squares, including Grosvenor Square, are combinations of brick and limestone buildings — limestone we deemed more appropriate. . . . The iron balconies were a unifying note in that all buildings on the Square had used ironwork in some form or another. The resulting exterior of the building would perhaps resemble, in a way, the office buildings of Sullivan with the columns expressing great horizontal plans terminating the entire building. It is not dissimilar either to the Italian palazzo in fundamental and with the characteristic loggia at top"

HUGH STUBBINS — "The size and proportion of the Square, with its narrow entrances, has a rightness about it which in the end, we felt, should not be tampered with. . . . The view through the arcade, under the building into the court, leaves no doubt as to the 'U' shape of the superstructure. . . . The expression of the façade was the most difficult part of the problem. . . . We tried what we think is a new concept of fenestration — one that permits flexibility of office partition arrangement and at the same time produces a contrapuntal rhythm in the pattern of materials. . . . We felt that the building should be expressive of the latest American construction techniques, hence the modular system of the elevation. . . . *It should not be unduly self-assertive. . . .*"

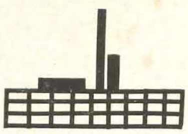
The Individual School

by Frank G. Lopez, A.I.A.

Ideographs designed and executed by Marjorie Blake

GLANCE THROUGH almost any current American book or article on educational principles and you will find an emphasis placed on the importance of the individual student, on full development of the capabilities of each. It is as if, in this age of mass produced baked beans, babies, Jaguars and gray flannel suits, the herd instinct was being denied, paradoxically at the time of life when the urge to conform grows increasingly strong, the years spent in elementary and secondary schools.

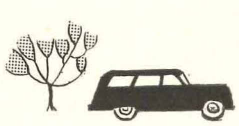
Not to argue the merits of this principle, we know from personal inspection



that some schools, among them several of great architectural interest, do so concentrate on the individual. We know also that many schools, beset by huge enrollments, by tradition, by the expanding endlessness of suburbia or the facelessness of the city, find it difficult to concentrate on individuals en masse. Yet the tenet prevails. It has given rise to numerous educational and architectural devices aimed at increasing the stature of the individual. From it derives an architectural urge which may be the reason why so many school buildings have a positive character while in the general run of hospitals, houses, stores or office buildings something often seems lacking. Just as a cup of lunch-counter coffee in Duluth or San Francisco or Miami Beach tastes of the same unwashed muslin coffee bag, so many recent buildings, faced with stainless steel, aluminum, glass, or good old-fashioned brick, have a rather monotonous flavor. The few that do not, we cherish.

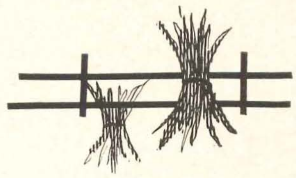
Does this mean that to produce good school buildings one must ignore the mass-produced, rationalized building materials and equipment that are widely available? Of course not! We have said as much in a discussion of prefabrication as applied to schools (Feb. 1956, p. 209). We lack the skilled artisans, time and money needed to build entirely by hand. Instead we can select what is appropriate from a variety of framing, walling and roofing components, from many types of heating, lighting and ventilating systems, gaining the benefits of precision manufacture and thus producing better buildings than we used to, for a variety of local needs. Sometimes a new problem arises in designing a school or an old one is freshly attacked, and the manufacturer finds a new product to produce and sell.

Besides educational insistence on the dignity of the individual student, what circumstances foster the individually designed school building? It is difficult to say whether locale, cost, site, climate, the detailed educational program or availability of materials and equipment dominates. Sometimes one, sometimes another or several concurrently guide



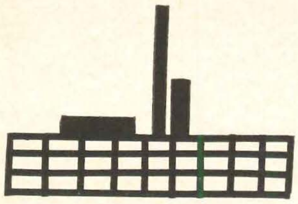
the design. If any of these factors (or of many more specific) is neglected, the school building is likely to be less than the best that can be achieved for its particular purposes; and its cost is very likely to be excessive. To the layman this is hard to understand. Why should not a repeated design save money? The long discussion that follows such a question is familiar to the professional.

The city school is designed in the face of serious handicaps: land values, taxes and construction costs all high and rising; strict building laws to protect health and safety in a congested locale; and always some form of political pressure. The suburb can usually find more land for its schools, but there land prices, taxes and construction costs



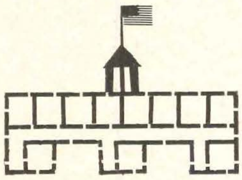
are also rising, and the cage of law and custom within which suburban schools, too, must be built is rapidly constricting as suburbs mushroom. The rural school faces fewer of these problems, but it has been consolidated almost to death; yet a few are being built. Each community, urban, suburban or rural, makes certain demands: here for specialized training, there for recalling tradition; now for adult education, again for full community participation.

The site — shall a hilly one be bulldozed level or shall the contours shape the building pattern? Is the subsoil firm; is there rock; does the soil require pile foundations? Is one structure indicated or several, one story or many? And the climate — sunny or cloudy, cold, hot, rainy, dry, snowy, windy, airless — how do these elements begin to give the buildings form and substance, to afford protection against this and exploit that? Is the outdoor scene pleasant, can it be employed to extend the building's usefulness and does the educational program take this into account? Some states have fairly rigid regulations — or recommendations that gain the force of rules as they are ever more strictly interpreted — governing building orientation and the use of sun control devices; these come into effect whenever the state's funds are drawn

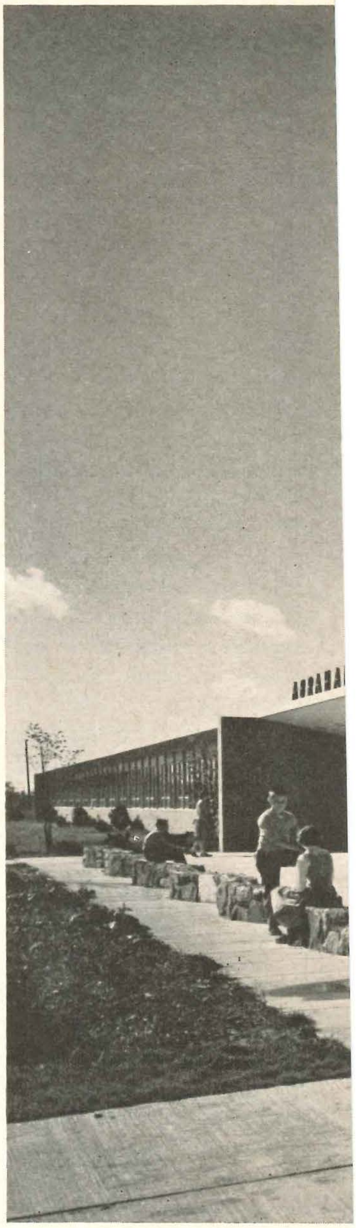


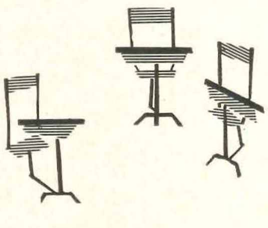
upon to eke out local resources. Some state codes are reasonable, others appear to have been drawn for the express purpose of strait-jacketing the community, the educator and the architect. This side of a state line, circular wash-fountains of the industrial type may be highly recommended; on the other, they may be frowned on.

But the big battle is always to keep cost of construction within bounds.

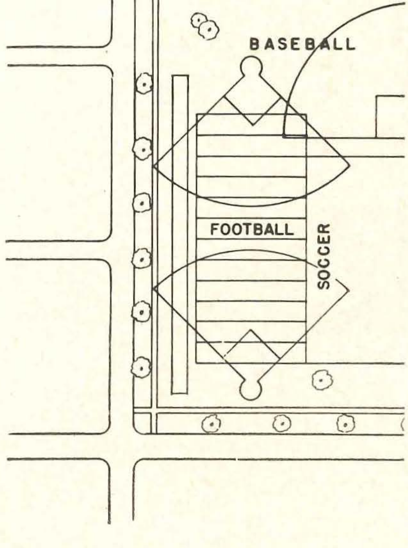


Construction entails a large capital outlay, all at one time. The cost of operating and maintaining a school bulks large over a span of years, but it is paid piecemeal and besides it lies in the future. The reduction in maintenance and operating costs, the success of the school's functioning, that might be improved by a little more money initially spent here or a few more square feet provided there, seldom count for much when bids are being received. At that moment one would think the architect was out to rob the community purse, when actually in a fair appraisal of school building costs he has something to be proud of. According to U. S. Office of Education data, the average cost of school construction has about doubled in recent years, while over the same period the cost of other types of buildings has about trebled. While this was happening mechanical and electrical work was rising, engineers tell us, from 10 or 15 per cent of the total





contract to 30 and sometimes 40 per cent; the structures themselves have been improved and their design is more closely tuned than ever to educational needs. No stock idea, no magic formula has wrought this miracle. It has come through painstaking attention to all the detailed requirements of each individual school plant.



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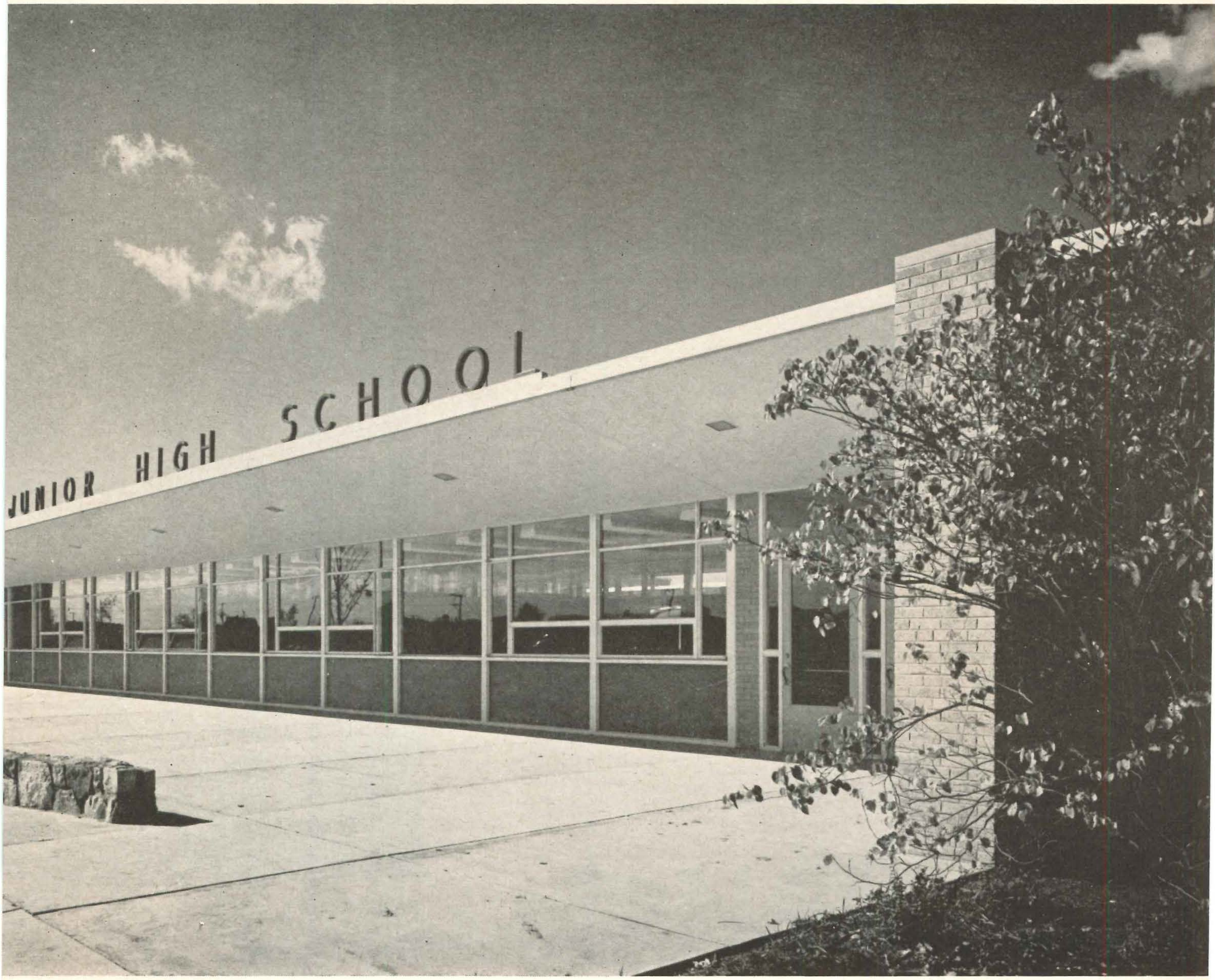
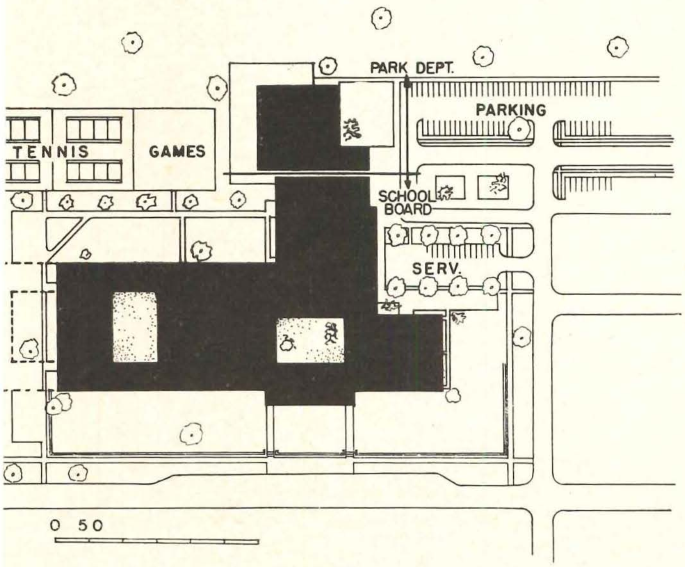
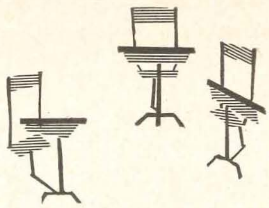




Abraham Lincoln Junior High School, Wyandotte, Mich., Eberle M. Smith Associates, Architects-Engineers; Jonathan Taylor, J. A. Wilson, A. T. Bersey, Associates. Wyandotte, an industrial city of about 45,000 in the Detroit area, is a business and cultural center for 100,000 or more people. It has more than 30 industries. Its people are of many national origins; they attend 28 churches, they have 12 public and 7 parochial schools including two Catholic high schools. They are supporting a $10,050,000 school building program, part of which is this junior high, occupied September 1955; its educational planning was initiated in 1951 by a group of 40 teachers.

Educational Specifications and The Individual School



We have in preceding pages stressed the importance of educational requirements. It would seem obvious that full development of what some schoolmen call "educational specifications" would inevitably precede the design of a school plant. How many architects know otherwise! The Wyandotte junior high school here shown was selected for publication as an example of what *can* be achieved. Wyandotte educators think a good school building is a basic encouragement and a continuing stimulus to learning. The following paragraphs, abstracted from a report by Peter J. Jenema, Wyandotte's Superintendent of Schools, help explain what educational specifications are.

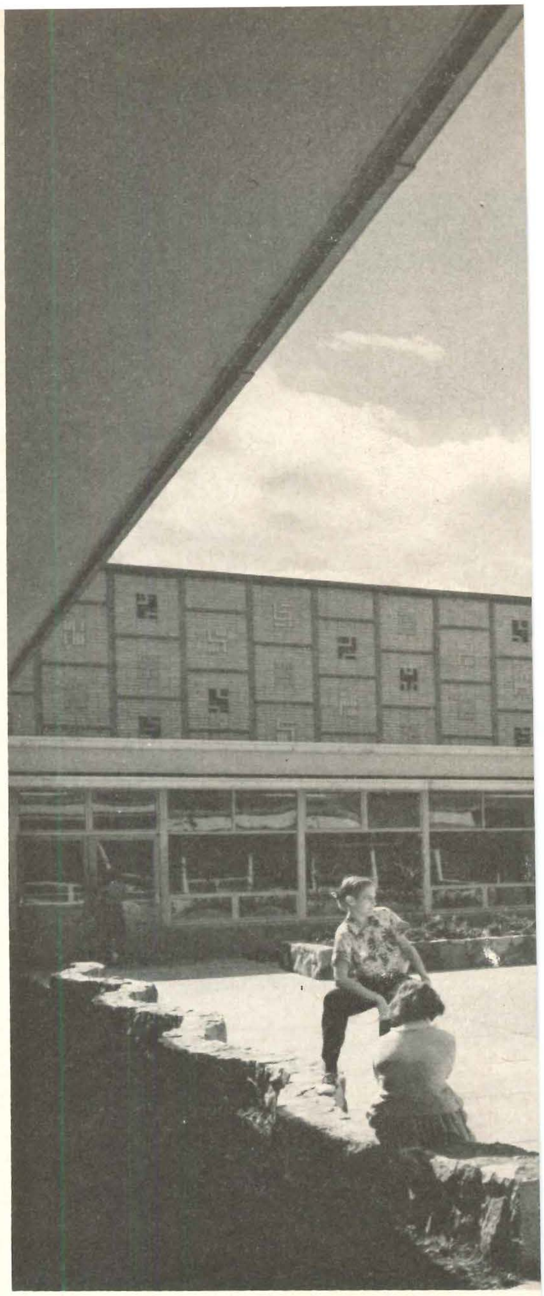
When Wyandotte decided to build two new junior high schools, Abraham Lincoln among them, school people there became enthusiastic at the opportunity to re-evaluate the existing curriculum. Nearly 40 high school teachers and administrators participated in a Curriculum Workshop which in June 1952 presented a report, "Planning for Effective Learning in the Junior High School," which resulted in official adoption of a statement of a philosophy of education:

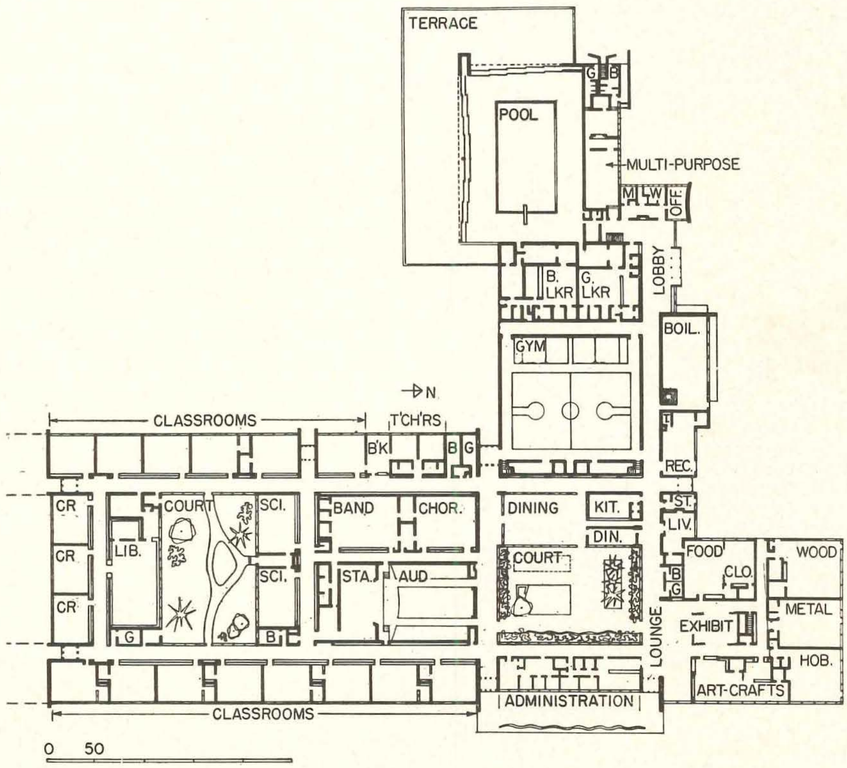
"The responsibility of the junior high school is to provide a program in which the needs of the individual and the needs of a democratic society are served. These young adolescents face unique problems at this stage of their development. This period is characterized by: adjustment to physical changes; adjustment to others in own age group; growing independence from parents; progression toward adulthood; acquiring self-confidence; acquiring a system of values, i.e., honesty, integrity, self-respect, right thinking.

"In addition to the basic skills, a democratic society is perpetuated through developing: critical thinking; civic responsibility; dignity of and respect for the individual; understanding of other nations and societies.

"On the basis of the foregoing, the functions of the junior high school are:
1. Common learnings which include reading, arithmetic, writing, spelling, oral communication, and listening
2. Exploration which will lead each pupil to discover and investigate his specialized interests, aptitudes, and abilities and to stimulate and develop a continually widening range of cultural, social, health, civic, avocational, and recreational interests

(Continued on page 228)





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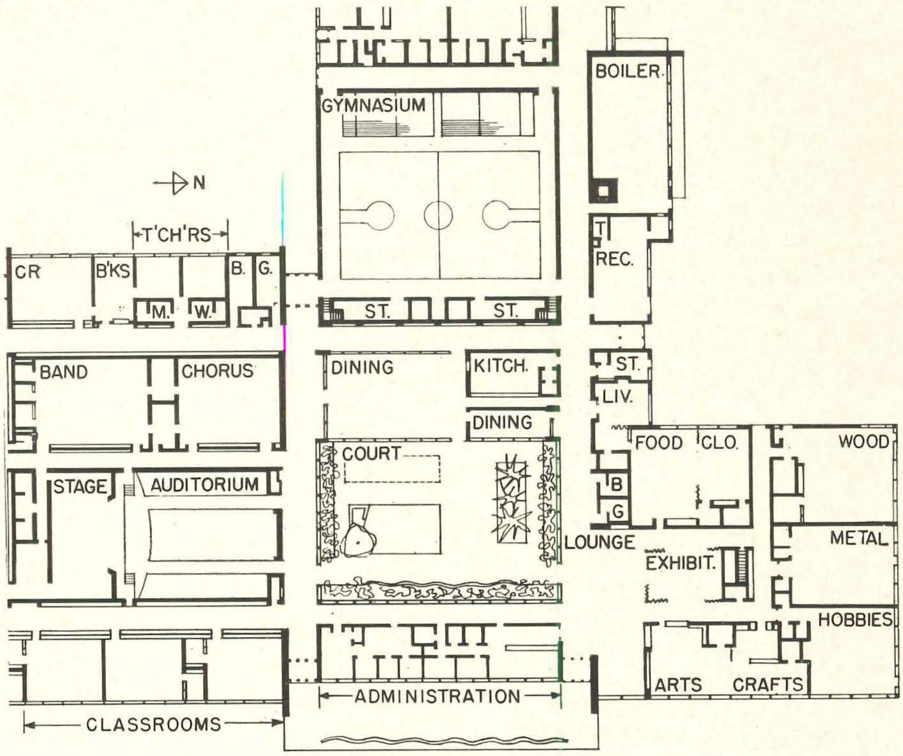
Abraham Lincoln Junior High, we have said, is the result of a thoroughly considered educational program. In September 1951, about 40 teachers began meeting two evenings a week, receiving no pay for the extra time, to re-evaluate their curriculum under the direction of Dr. Edgar G. Johnston of Wayne University (incidentally, the Board of Education paid the director's salary). At the end of the school year this group published a report defining goals (see facing page) in reference to integration, exploration, guidance, differentiation, socialization and articulation. The following September virtually the same group reassembled under their new superintendent, Peter Jenema, to write educational specifications. By February 1953 they had published a 31-page document, "Building and Classroom Design," which defined areas, equipment and many functional aspects. At this time the architects were first called in, and from then on a committee of six teachers worked with the architects. In addition, the Board of Education and the city's Department of Parks and Recreation collaborated on some portions of the work.

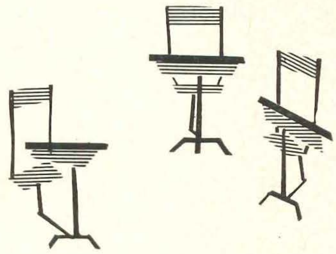
In direct fulfillment of the clear statement of educational requirements, the school is organized in two principal parts, each organized around a landscaped courtyard: one social, serving as a student forum, and one academic, with library and classrooms grouped around it. The social court (in full color on the cover of this issue and also above) contains a tower housing the school bell which for 50 years summoned students to classes in the old Lincoln school which the new one replaces. Trees planted on preceding Arbor Days were retained.

Lens-Art Photo



Wyandotte's Abraham Lincoln Junior High, during the months of preliminary planning, became a school for an ideal enrollment of 700 (later stretched to 800 and with an actual maximum of 900, indicating the effects of community expansion). An area for an addition is provided to the south, though the educational staff feels present enrollment is as large as it should be for the most effective teaching. Another major decision was to develop a 7–9 grade program instead of the 7–8 system previously used. Two unusual aspects of the school resulted from cooperation between city agencies. After some difficulty, the Board of Education acquired a 13-acre site adjoining a 35-acre city park. First, it was agreed that recreational and parking facilities would be shared.

Second, although the educational specifications had stated that no pupil should leave junior high without learning to swim, the building budget could not be stretched to include a pool; and at the same



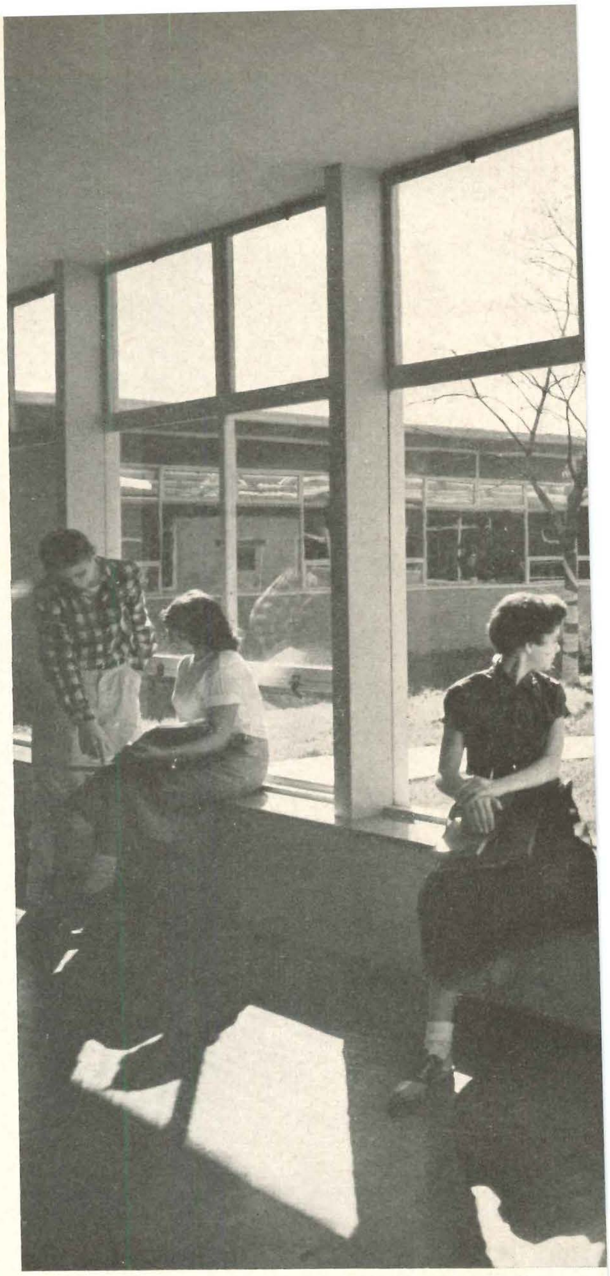
time there was pressure from a group of citizens on the city administration for a veteran's memorial in the form of a city pool. In the end an excellent pool was built with sliding glass walls opening to the outdoors for summer use. Financed by the city, maintained by the school board, utilizing the school locker rooms, it is used by the school during the school day and as a city-operated public pool at other times. The pool's architect, Robert L. Svoboda, worked closely with the school's architects.

Above are pictured some of the elements clustered around the social court or student forum. Reading clockwise from the left they are: auditorium, the court itself; dining room seen through a multi-colored glass corridor wall; gymnasium; exhibit area (used for many functions); and student lounge. In these colorful areas, where every architectural element even to skylights and bulletin boards is integrated into a whole neither coyly homey nor coldly institutional, all the social activities center.

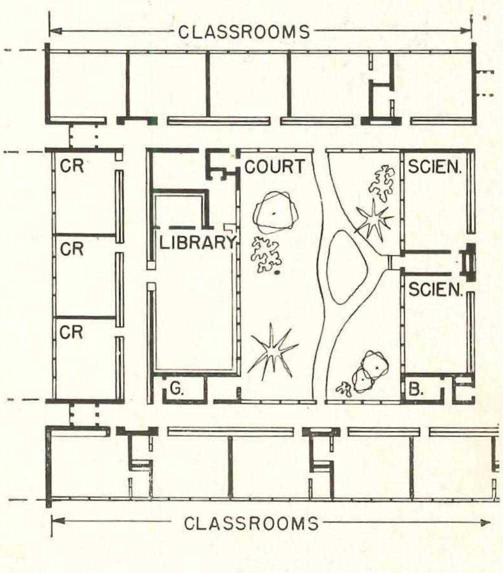
(Continued from page 224)
3. Guidance in making intelligent decisions regarding present and future educational and vocational opportunities, in making satisfactory emotional and social adjustment, and in stimulating participation in learning activities
4. Recognition of individual differences with the realization that provision for these would be considerably limited
5. Social understanding which provides for effective participation in the present complex social order and adjustment to future developments and changes
6. Evaluation by pupil and teacher of the effectiveness of the program in terms of individual and group growth."

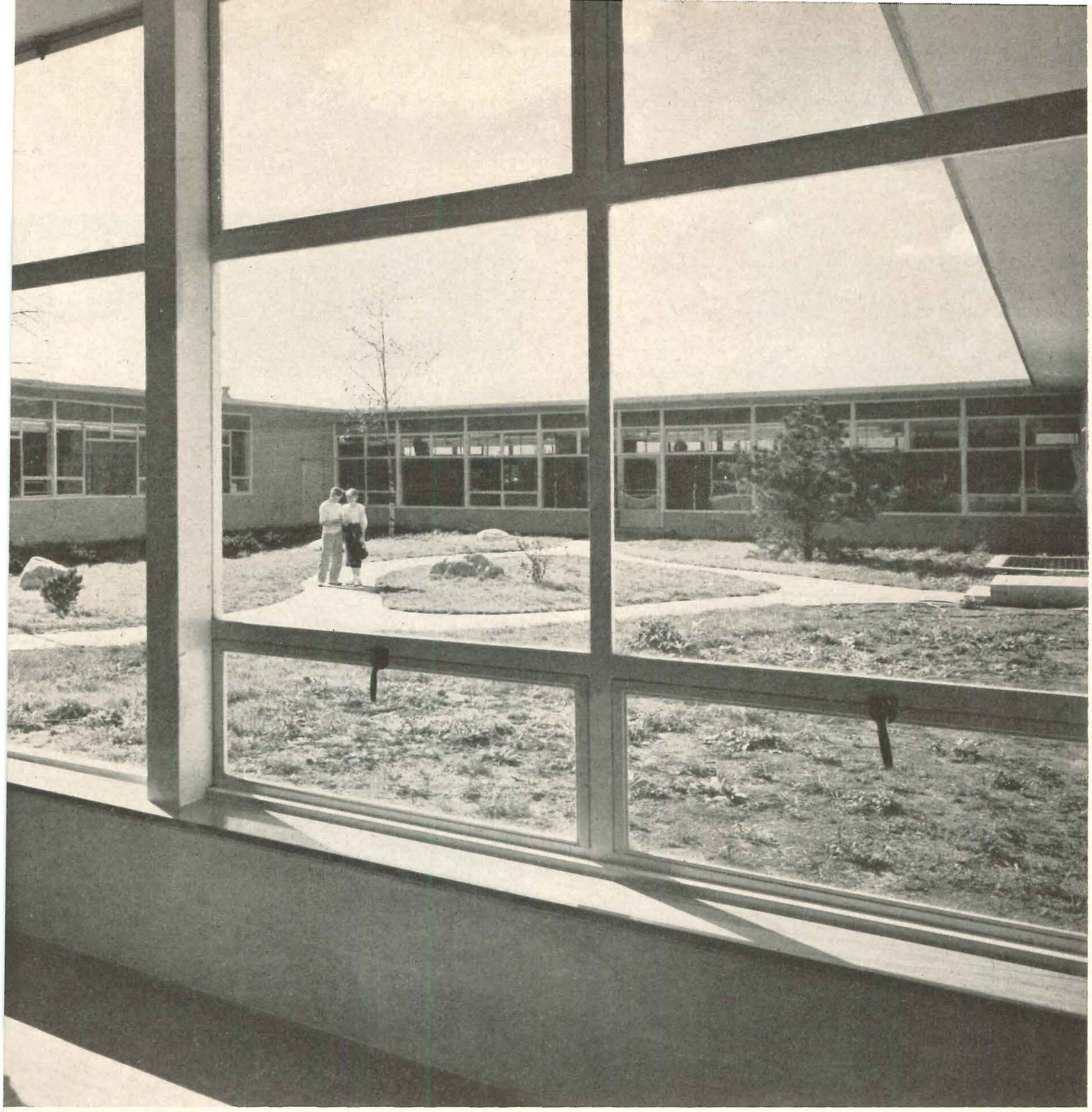
After a summary, the group got down to specific recommendations:

"1. Provide adequate room space—25 to 30 square feet per pupil, exclusive of storage; allow for minimum room size of 26 feet by 34 feet.
2. Design shape of rooms that will facilitate supervision and provide adequate lighting.
3. Lighting should be adequate and evenly provided to every pupil's advantage. Dark curtains and electrical outlets are desirable for all classrooms.
4. Acoustical treatment is needed to allow a maximum of classroom activities yet provide a well-controlled situation for work concentration.
5. The construction of ventilation systems should prevent the transmission of sound and odors.
6. The modern classroom has need of a much higher percentage of tackboard space than of chalkboard.
7. Conference rooms adjacent to classrooms are needed in nearly all instructional areas: social studies, commercial, science, library, languages.
8. Ample storage space, files, book cases, cabinets, and display cases should be built into wall areas of classrooms.
9. Both in room equipment and building plan, flexibility is essential to accommodate instructional and activity needs of the educational program.
10. Work areas such as library and classrooms should be shielded from noisy activities such as gymnasium, music, and shop.
11. Orderly pupil traffic flow with a minimum of congestion is essential.
12. Pupil safety should be planned for in entering and leaving the building."

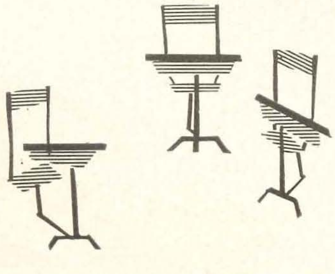


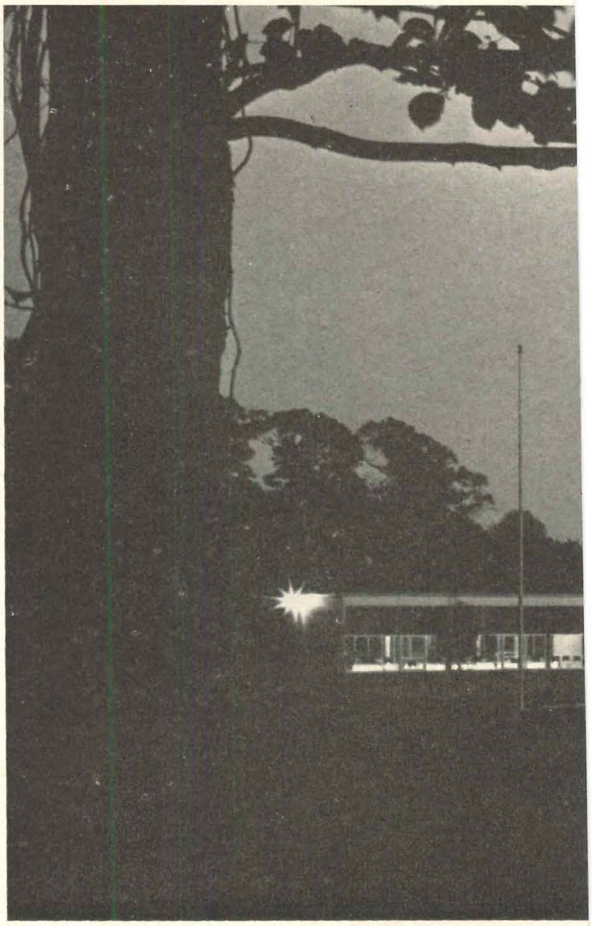
Lens-Art Photos



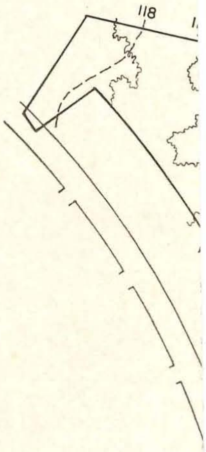


Abraham Lincoln Junior High has 17 classrooms (some of them which do not appear in the plan, left, form a link to the adjoining social areas), two science labs and library. This is a school without study halls or homework; each class period is used partly for study, and the ideal is to make the work so engrossing for students that they will pursue it voluntarily. This was an important factor in designing the library which, together with the adjacent court, forms the nucleus of this academic area. Sometimes students use the library individually; sometimes an entire class moves into it for a special project; sometimes by using portable carts, books, phonographs and records, the library goes to the students. Audio-visual equipment in particular is thus used. The classrooms are large, fully equipped, colorful, and in effect bilaterally lighted by means of continuous glass in corridor walls above door height. The courtyard serves as project area for science classes, and on occasion entire classes move outdoors. Small conference rooms adjoin many of the classrooms.





Abraham Lincoln Junior High has many noteworthy features in addition to the library (above), classrooms (below) and those shown on preceding pages. In fulfillment of one requirement of the educational specifications there are noon-hour clubs—newspaper, dancing, drama, Red Cross, cheerleading, singing, etc.—organized so the third of the student body who go home by bus will not be denied participation. Another requirement was possible variation of classroom size to accommodate future curriculum changes. For this purpose the school has a continuous radiant ceiling formed of perforated, "snap-on" metal pans suspended from heating pipes; above is thermal insulation which is also an acoustical absorbent. The space between is an air plenum which supplies all ventilation; partitions, non-bearing, can be relocated; ceiling wiring and piping can be easily changed.



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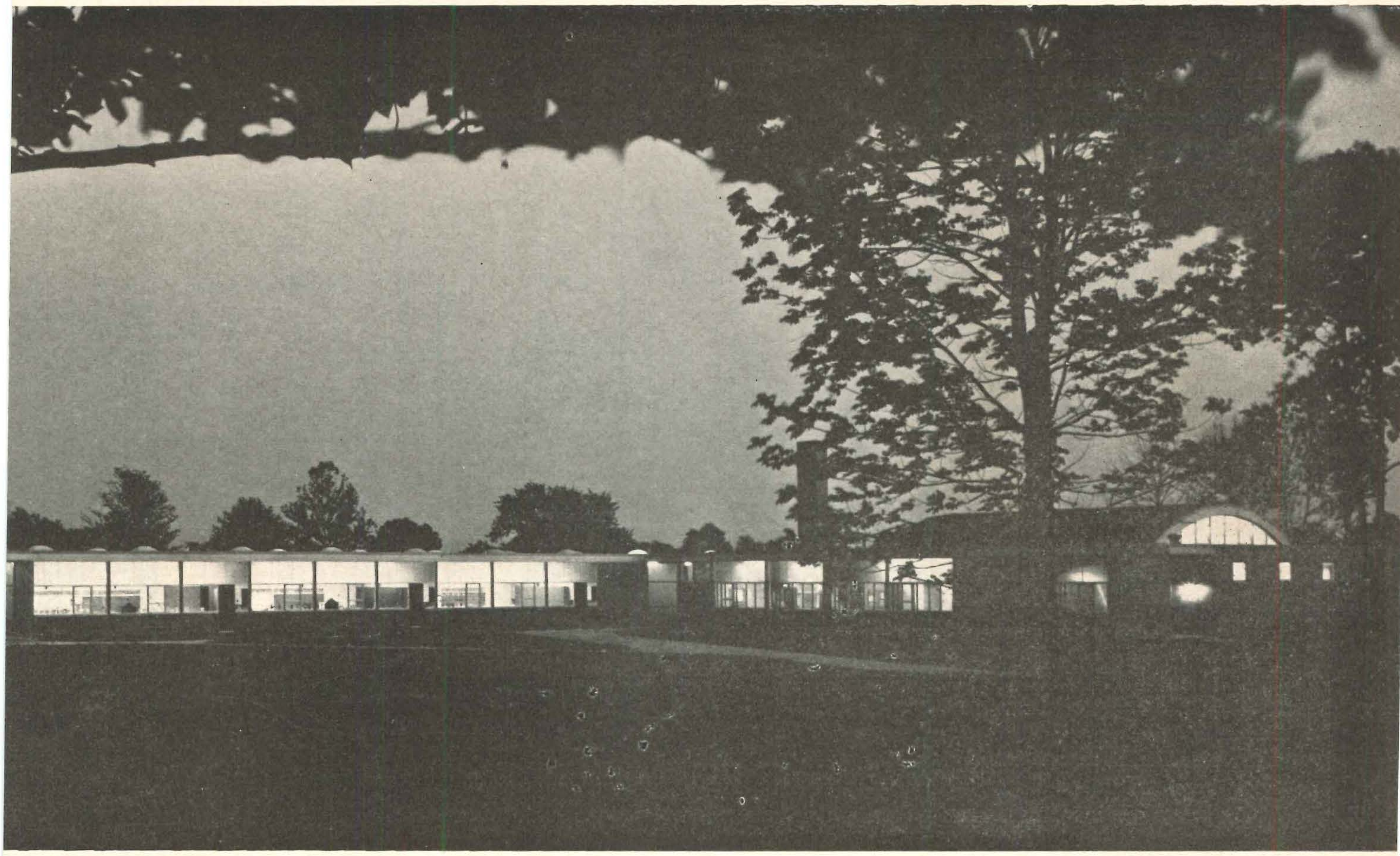
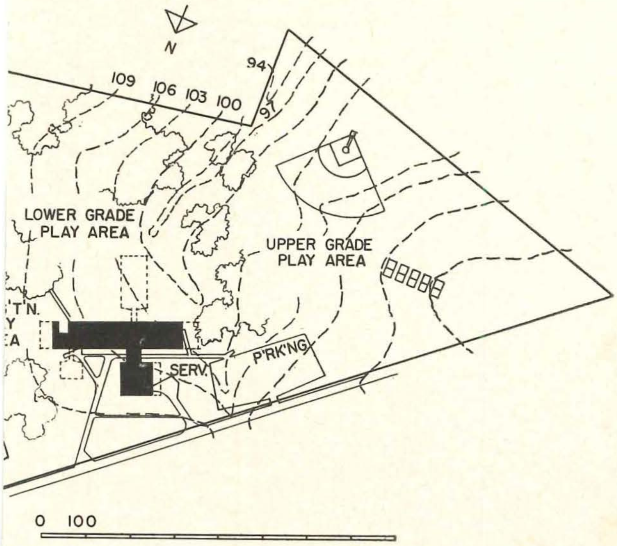


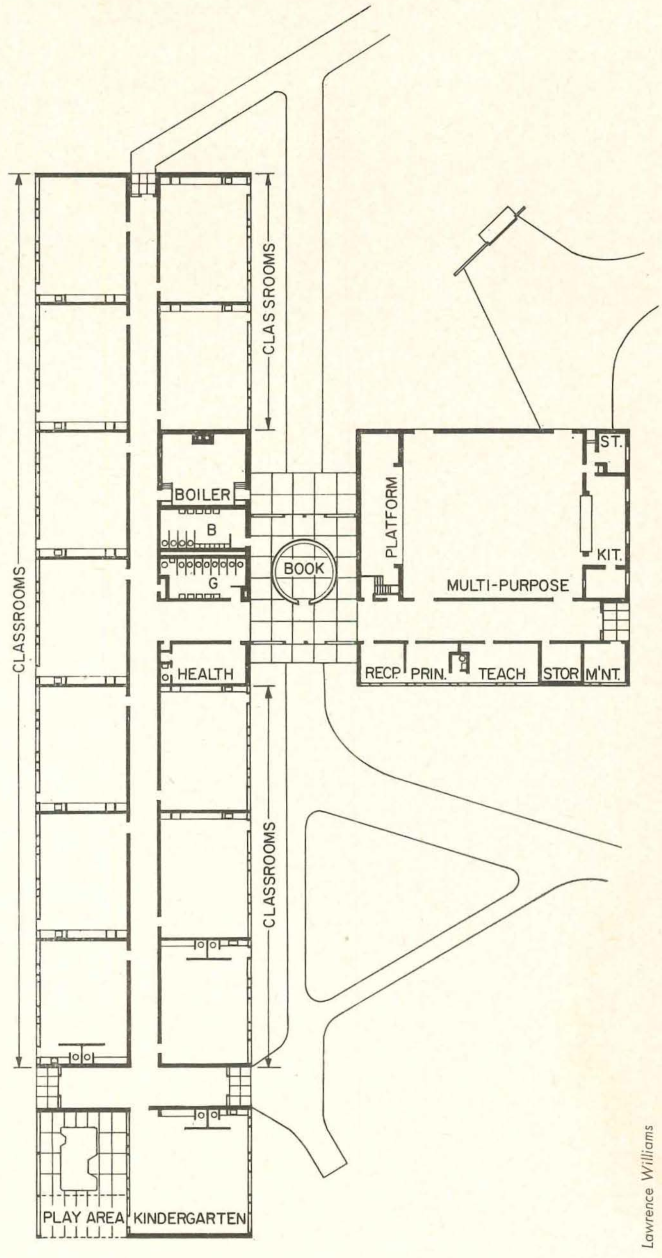
Lawrence Williams

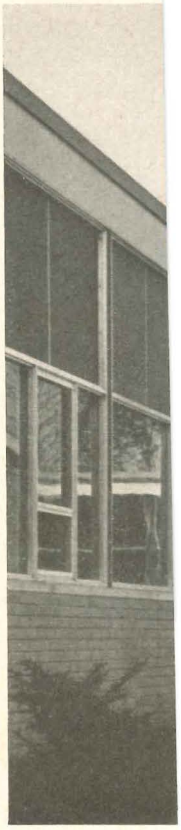


Thomas Coeburn Elementary School, Brookhaven, Delaware Co., Pa.; Clifford E. Garner, Architect; A. B. White, Associate; Keast & Hood, Structural Engineers; Ewald & Miller, Mechanical Engineers. State-aided schools in Pennsylvania, it is generally known, follow a rather strict set of regulations formulated by the state Authority. Within those limits, the first requirement the architect had here to meet was to produce a low-cost and low-maintenance structure, although the two seem hardly reconcilable. By ingenious use of a structural module and complete discipline of the design, both were achieved despite high site costs such as long service lines, new access road, slow-draining hardpan soil, etc. Construction costs were kept to \$11.75 per sq ft or \$.83 per cu ft; the basic costs were \$315,088, less than the state allocates for such a building on a more favorable site.

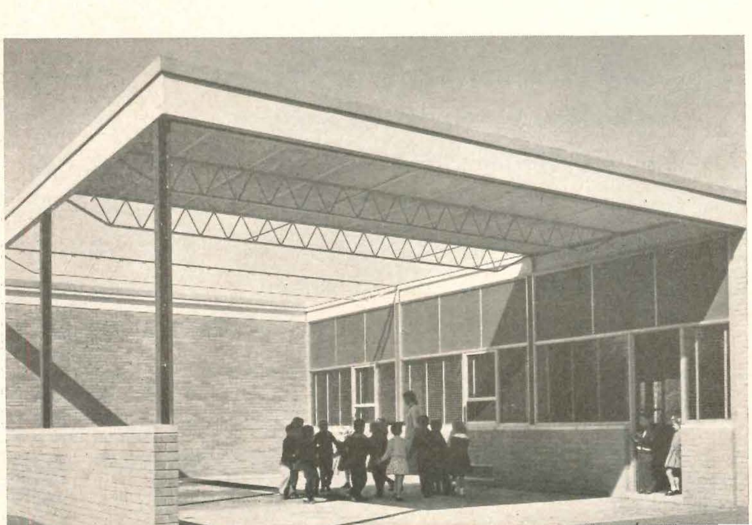
State Regulations and The Individual School

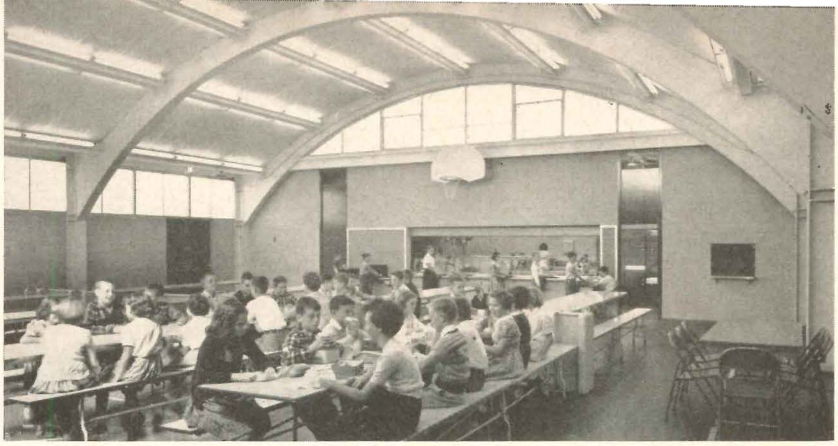
State school building regulations range from the exceedingly strict to the virtually non-existent. Generally, regulatory codes and bodies are most fully developed in the states which provide the most financial aid to individual localities and are strongest, as might be expected, where the principle of state aid has been long established. Several types of agencies are involved, and when all the regulatory bodies having jurisdiction are considered, it can be seen that the paper work required to get a school built can become exceedingly complicated. Furthermore, many state laws governing school financing have been modified at intervals and are by now pretty much of a garbled mess — which is no index of their worth, for the rationally organized school code may be one enacted years ago and not kept up to date, or it may be so thoroughgoing that the architect and the educator become thoroughly stymied. Some people point with pride to California's school laws, which provide varying degrees of "aid" for the varying financial capacities of municipalities; they set forth admirable general "standards" for orientation, sun control, plan organization, etc. The results, excellent during early years of reforming an inferior general situation, have latterly been a series of finger-plan schools with only the differences that one wrinkled pea shows from the next in the pod. Add to this the multiple clearances necessary from state financial, public safety, fire and other agencies and it is easy to see why an advanced school building concept has little chance in such a milieu except when state aid is not required, or when the school is part of a Federal program (which requires only one blanket clearance), or after exhaustive argument.

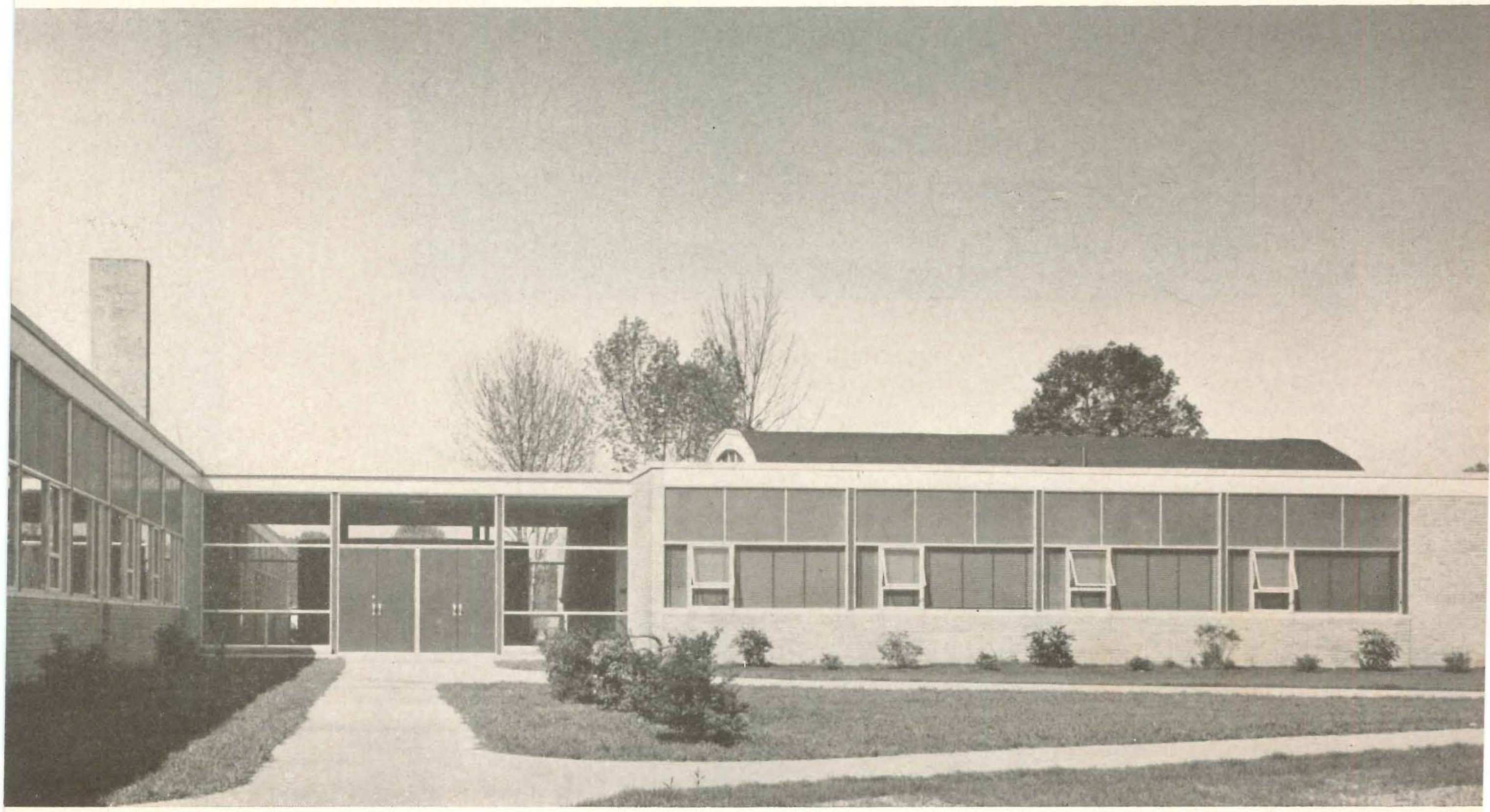


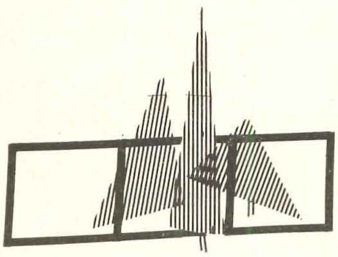


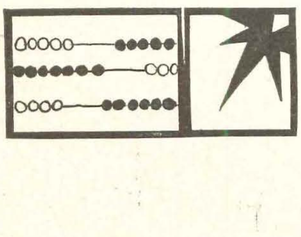
Lawrence Williams



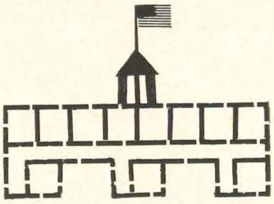


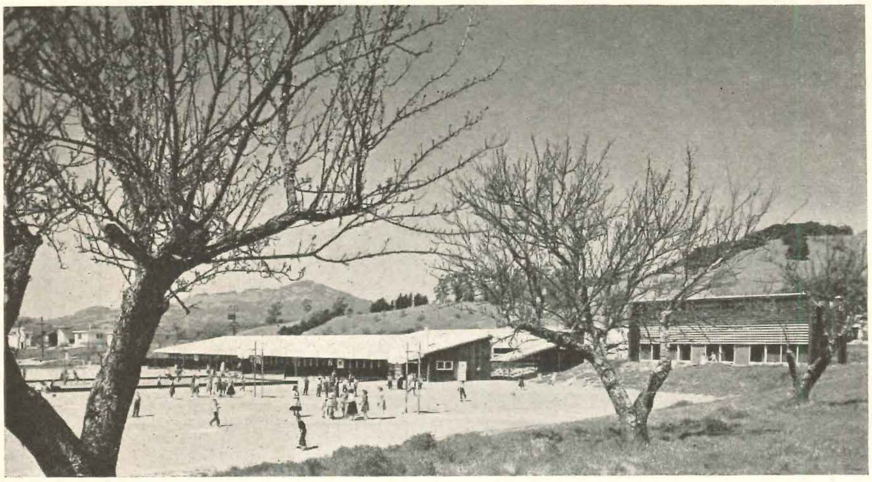


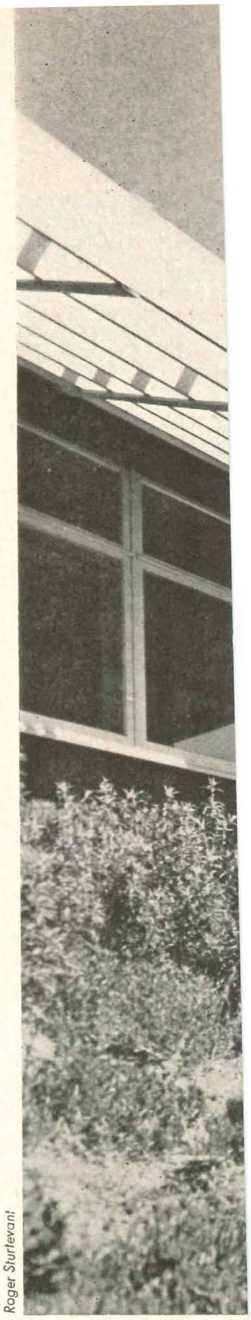




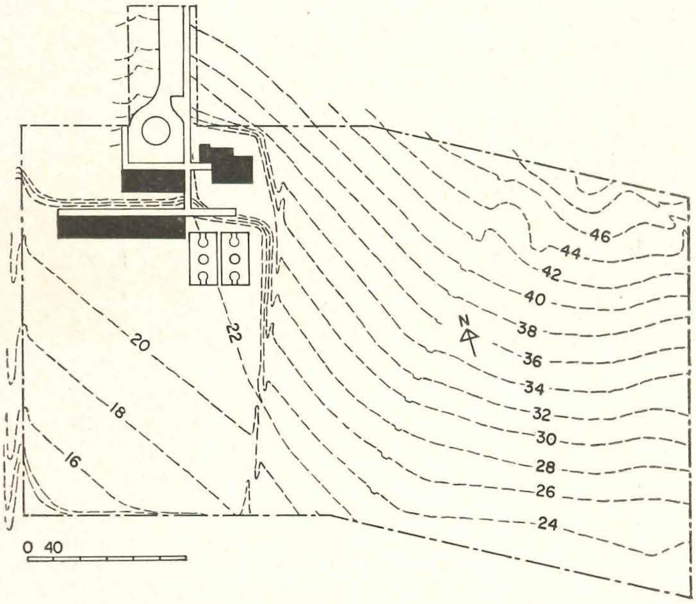
The Coeburn School in Brookhaven, Pa., was, we have said, required above all to be extremely economical. Low construction and maintenance costs were achieved through use of a structural module of 12 ft, which permitted use of standardized structural elements throughout. This resulted in economically light steel framing, economically spaced steel joists and fibrous roofing panels and an almost universal metal window unit: fixed and ventilating lights in a panel 12 by 8 ft, repeated 47 times with extensions for door jambs the only variation from standard. The building's rather severe esthetics and visual unity were a natural result. Another: the manufacturer who supplied the window units has now added them to his line.

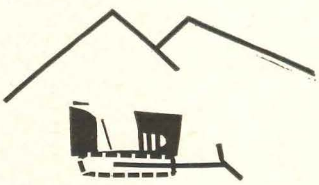


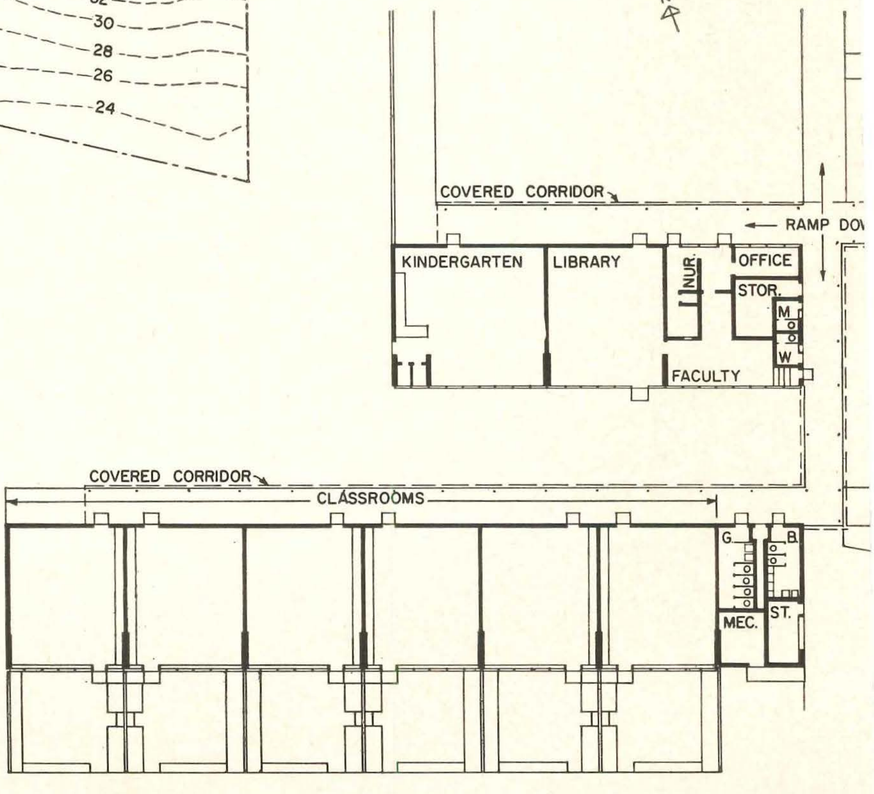


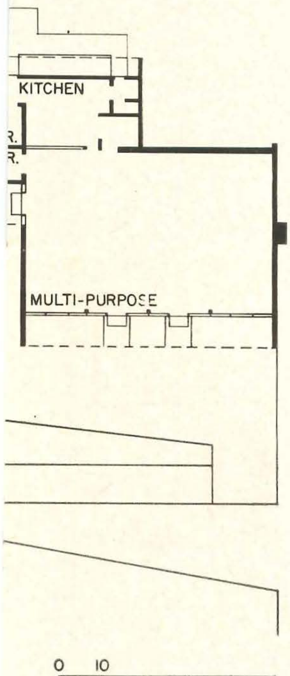


Roger Sturtevant









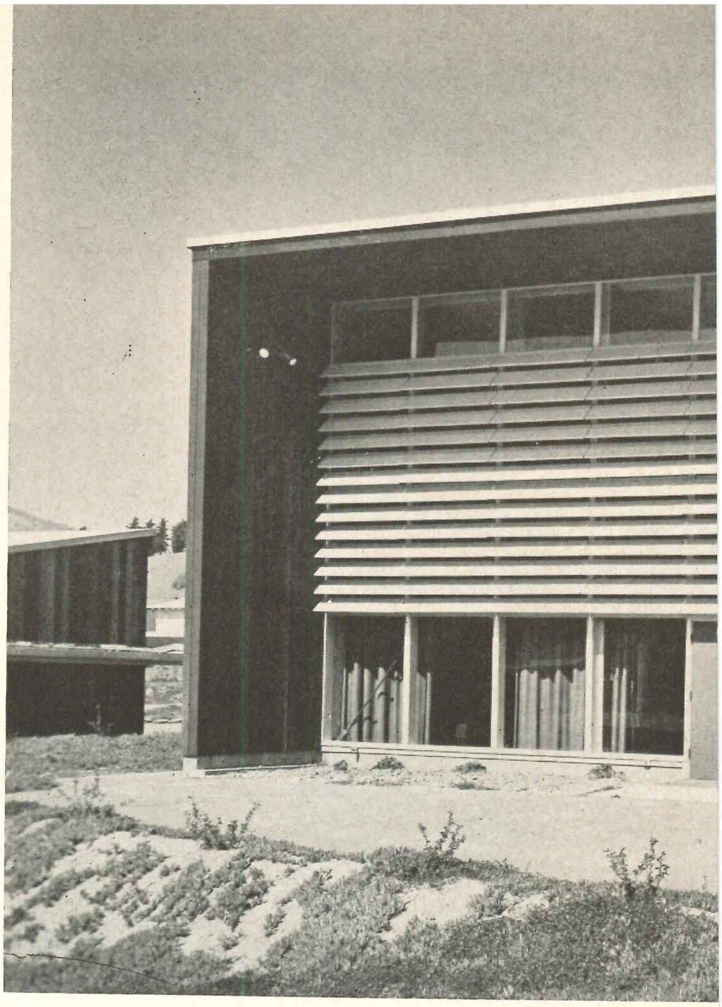
Olive Avenue School, Novato, Calif.; John Lyon Reid & Partners, Architects. This can be said in favor of comprehensive state school building controls: They greatly simplify design; they answer all questions; the busy office or the plan factory that knows the rules finds it easy to produce an acceptable job. Occasionally the superior architect can rise above the constriction of law and interpretation. Olive Avenue's architect, he tells us, found it hard to realize this job had been in his office when the time came to turn the buildings over to the school district. Everything had gone smoothly following the decision that on this hilly site there was only one suitable position for the buildings. The architectural individuality, vigor, warmth and surety of the buildings are the result of talent applied to make strong controls produce the best possible results.

More on Regulations and the Individual School

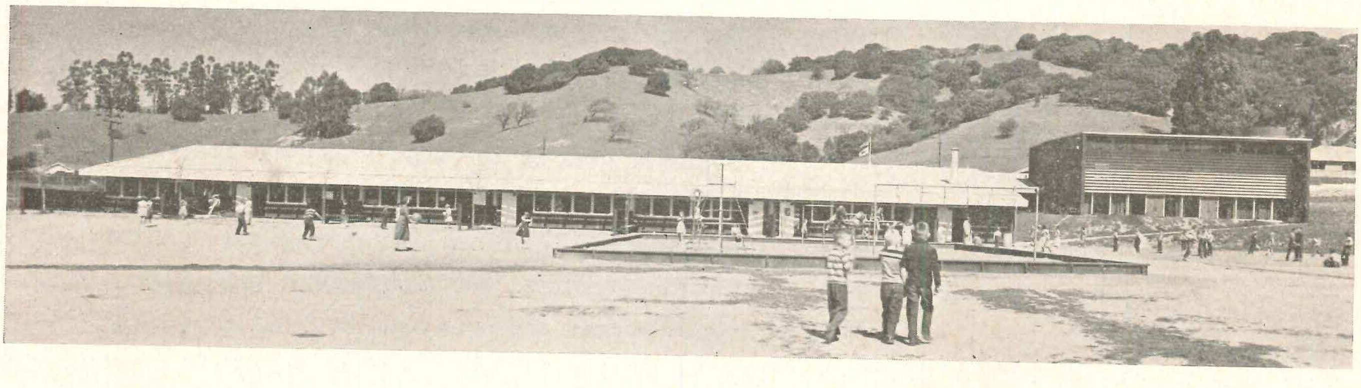
Recently we asked John Lyon Reid, F.A.I.A., for his considered opinion of his state's school building regulations. His reply: "California has been fortunate in having approximately $600,000,000 of state money made available for the construction of schools to districts that do not have local funds available. This large sum of money has great significance as evidence of a state assuming responsibility for assisting local districts to finance an educational program. When such vast sums of money are made available, it is inevitable that controls over its expenditure become more complex and rigid. California has been contributing state funds to school construction since 1948.

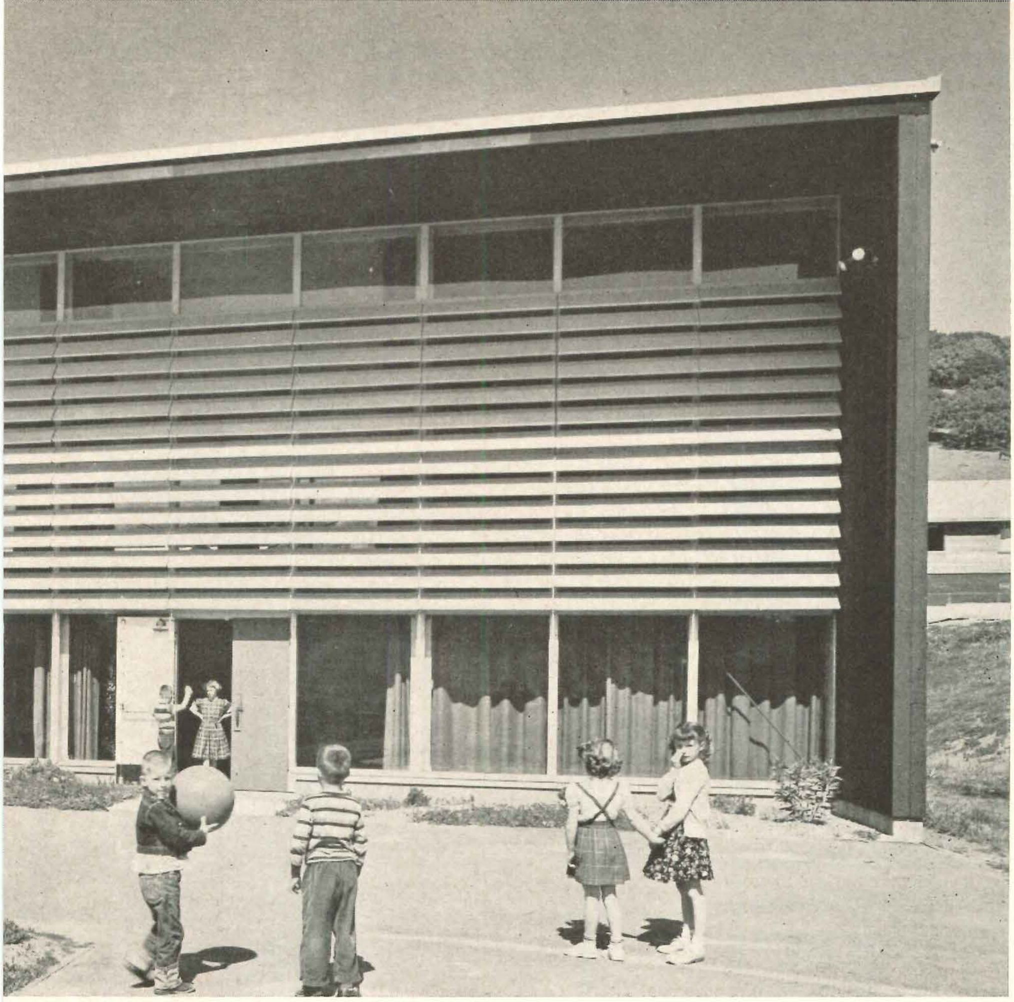
"At that time schoolhouse design followed a pattern of finger plans and single-loaded corridors with bilateral lighting. The growing body of controls was based on this concept of school design. Since then, controls over design and costs have grown into a vast unwieldy obstacle to an inventive and creative approach to architectural design. It seems difficult now to do any more than polish the old clichés. The basic criticism is that these controls have been imposed by non-educational agencies — I think that is the root of the trouble. The Tierra Linda School in San Carlos, somewhat conventional in building concepts (although quite unconventional in educational program) required much discussion to persuade the state agencies to make even a minor departure from conventional standards. What has been called the 'umbrella' plan used at Hillsdale is impossible when financed by state funds.

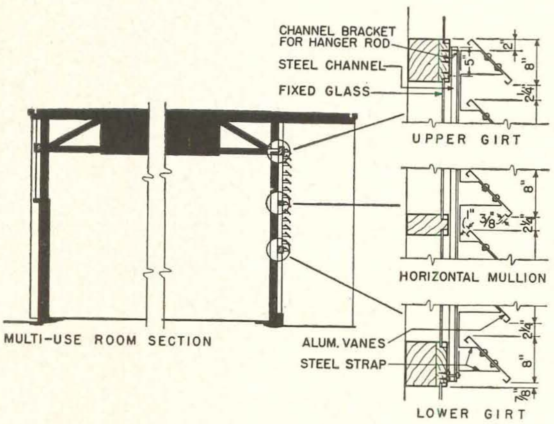
"I am deeply concerned about this situation."



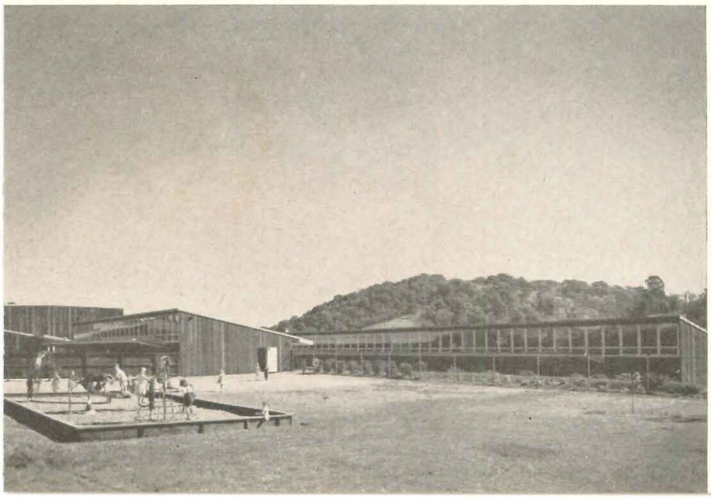
Roger Sturtevant

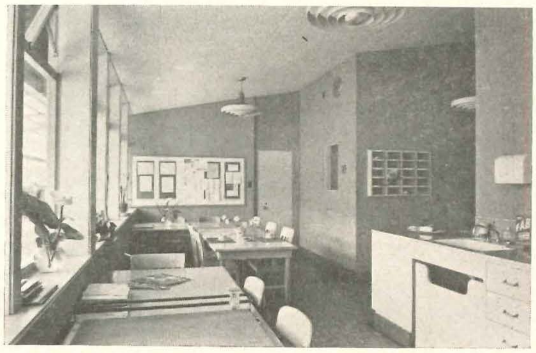


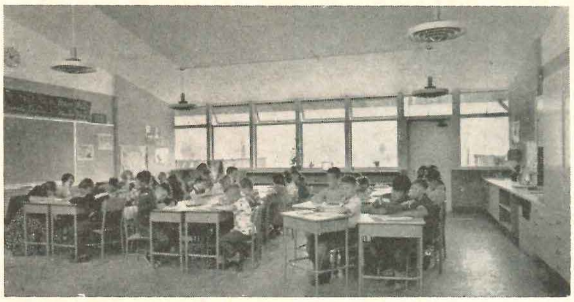




Olive Avenue School in Novato, California is constructed of familiar wood framing, redwood siding and built-up roofing in the familiar finger plan; it sits in the familiar California hills that are burned brown except for occasional patches of green eucalyptus trees during most of every year. The school is a product of the same phenomena of population growth that prevails generally in the country, accentuated here by the state's attraction as a never-never land, which has made in-migration a serious problem; and its design was found quite acceptable by the many state supervisory bodies. The architect gave his multiple client much more than could have been expected.

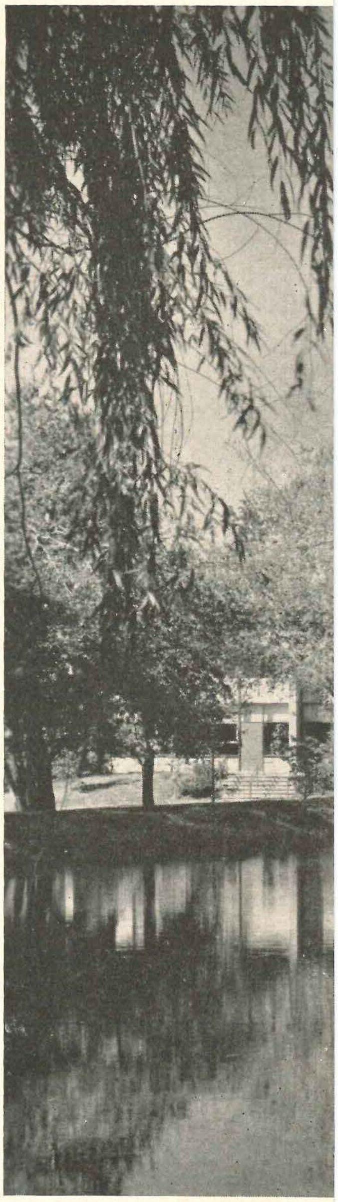






Roger Sturtevan

The Olive Avenue School in California has conventional California classrooms, bilateral natural lighting carefully sun-controlled, single-loaded corridors, a finger plan. The tilted site did not take the finger plan kindly; the land drops from the entrance —curiously, from Plum Street; Olive Avenue access is prohibited by a steel fence!—some 34 ft to the rear, so a series of building terraces and a playfield were bulldozed into it. One wing is thus 5 ft above the other; the multipurpose building is 2½ ft higher still. The changes in level have been turned to architectural advantage.



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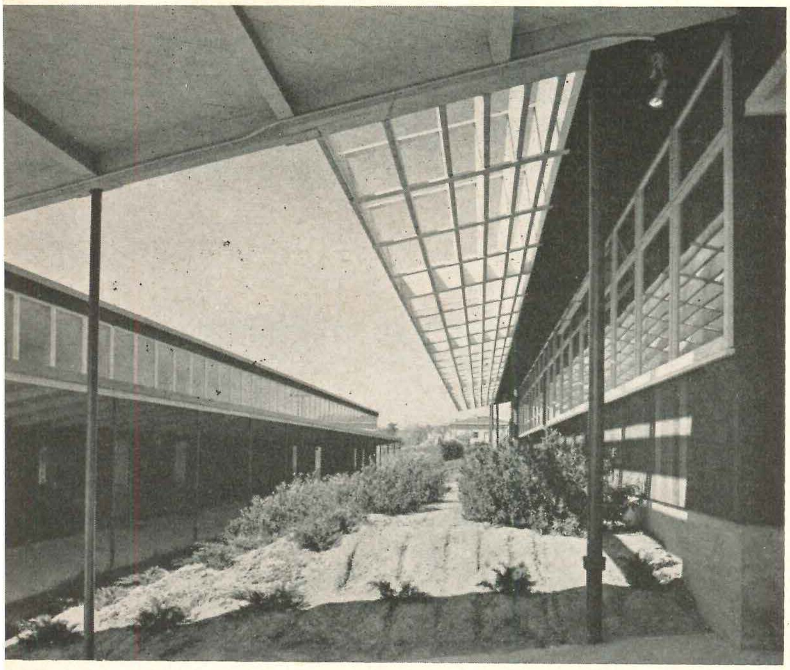
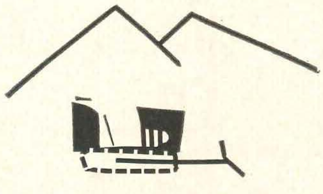
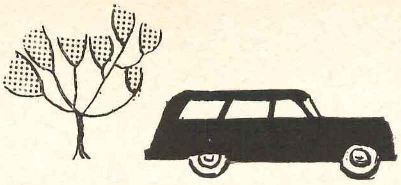
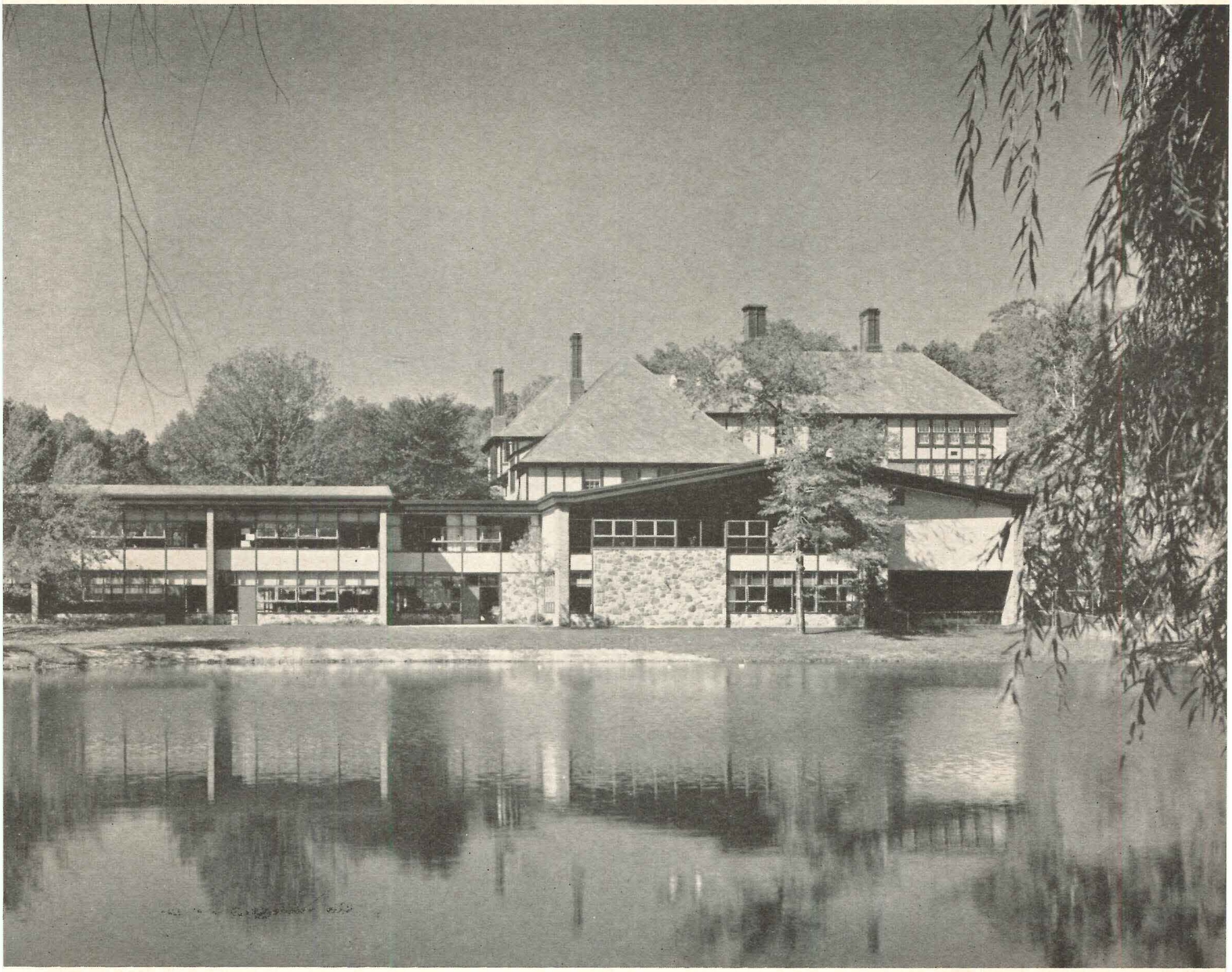
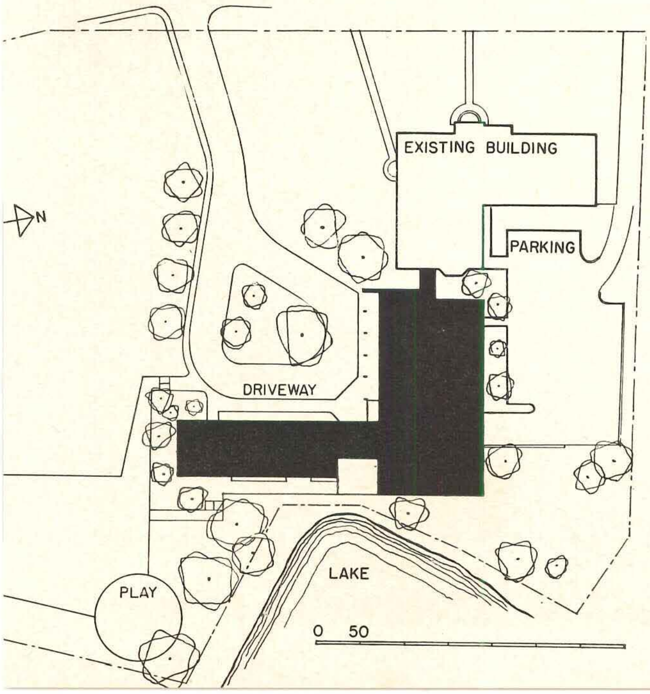










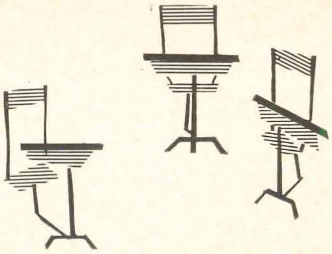
Pocantico Hills Central School, Pocantico Hills, N. Y.; Perkins & Will, Architects; Severud-Elstad-Krueger, Structural Engineers; Slocum & Fuller, Electrical Engineers. The well-to-do suburb which this school serves has an area of some 6000 acres, all in small residential neighborhoods and several estates—the largest, the Rockefeller holding, contains about 2500 acres. The only sizable tract that might be developed residentially is owned by a large corporation which at one time planned to erect on it a home office building. However, the corporation changed its plans; the existing school was extensively added to without benefit of the increased tax revenue which had been anticipated.

The Locale and the Individual School

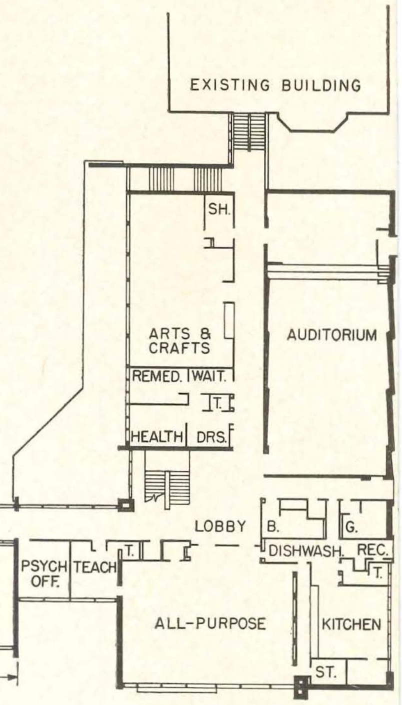
Under the heading, "Locale," we may consider several factors all directing design strongly toward individuality. These are the factors, too, that often have the most marked effects on cost. What is the community's general attitude: conservative, liberal, middle-of-the-road? Has it a generous pocketbook, or does it pinch pennies? Is there a strong local tradition to be respected; should tradition be disregarded; is the school district new and in need of getting off to a good start?

Stepping closer to the building, we come to the site itself, and to the questions explored briefly in previous pages. One not there considered is the value of landscaping — which is useful for much more than esthetics, important as esthetic quality may itself be. How many taxpayers eager to cut out all frills and nonsense — must keep within that budget! — realize that in eliminating planting they are losing foliage which is one of the simplest means of equalizing temperature, controlling humidity and outdoor noise, and stopping the wind? How many know that deciduous trees properly located can become the best sunshades of all, losing leaves to let the sun through in winter, gaining them to prevent insolation in early summer and fall?

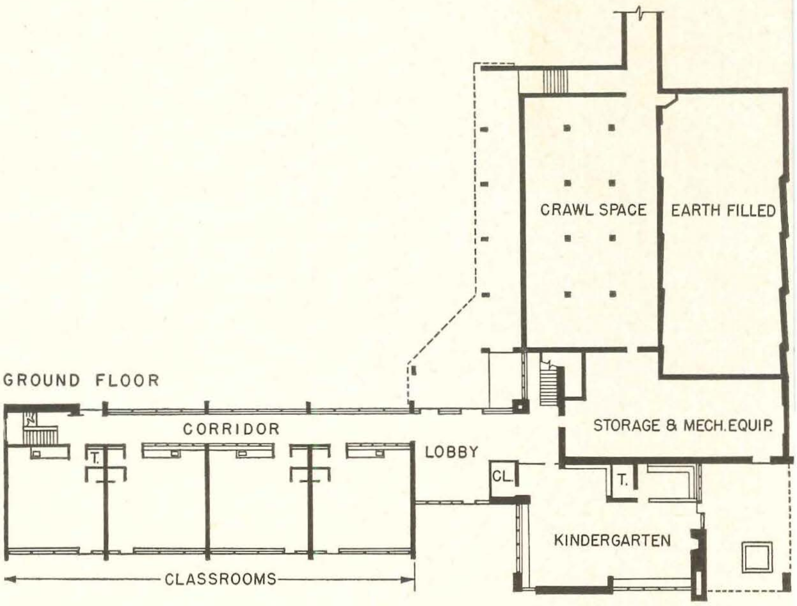
And always we come back to the shape of the land. How far it should be judiciously molded by man to contribute to the excellence of the entire project, what lies immediately beneath the surface, what part the contours play in controlling the micro-climate, and how all these characteristics can best be dovetailed into the complex of requirements dictated by the demands of the educator, the feelings and the purse of the taxpayer and the needs of children — these are questions rarely satisfactorily answered.

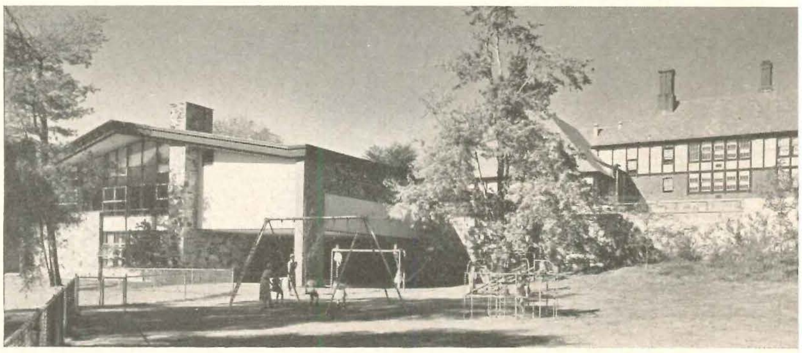


FIRST FLOOR

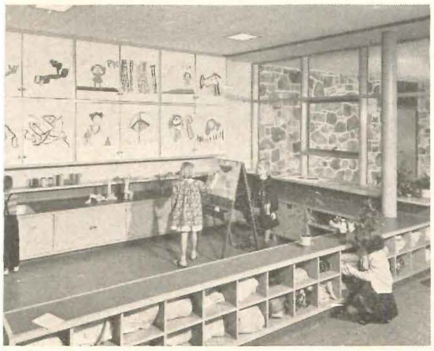


GROUND FLOOR

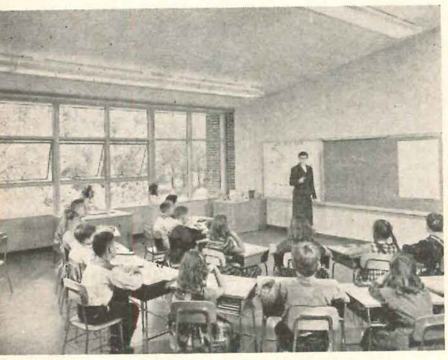


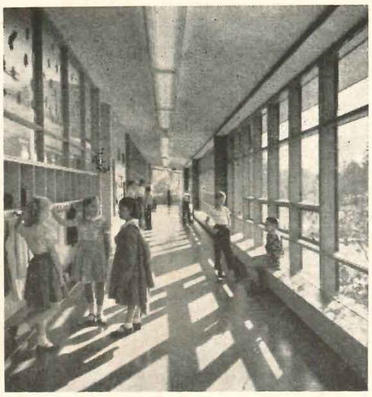


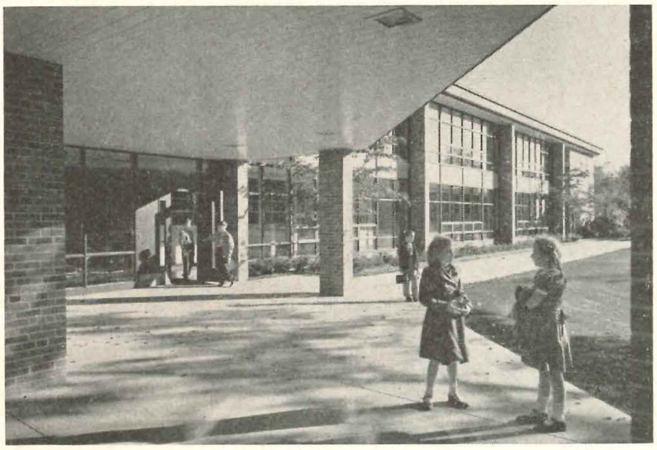
The Pocantico Hills School resolves a number of questions and in so doing achieves a distinct personality. The community is intelligent and financially more capable than many. The school district is a recent consolidation of three small ones. A survey made by several members of the staff of Teachers College indicated a fairly rapid increase in school population (which, to date and partly because certain anticipated developments did not materialize, has lagged behind estimates). Rather than build a whole new central school it had been decided to enlarge extensively the existing structure, which was designed many years ago by Carl Clark of Syracuse, N. Y., and remained quite sound though in need of some modernization. The lake, a community institution dredged out of a spring-fed bottom, and the steep site existed; excellent landscaping was in prospect and eventually materialized.

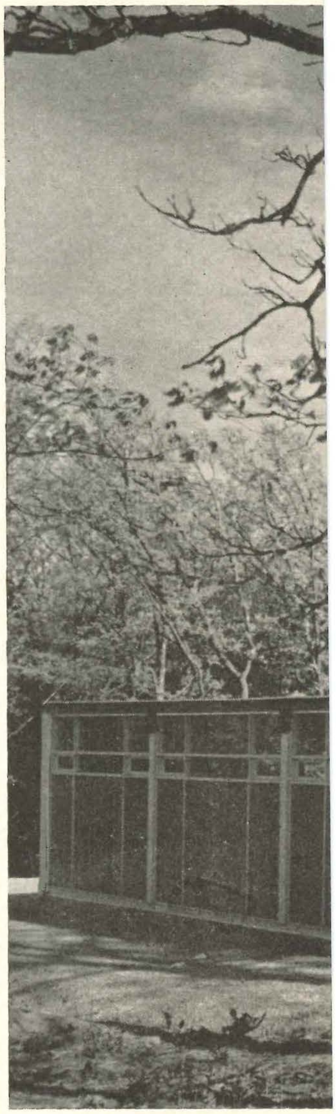


The old school had some partitions and fixtures re-arranged, its lighting was modernized and it was repainted. The addition became a two-story unit so a connection to the old building could be easily made, and the repetitive elements of half-timbering in the old were echoed in the more rationalized new building materials; stone masonry was used for its solidity and warmth of color. In such fashion were the site utilized, the new harmonized with the old and the desire for quality and tradition respected.

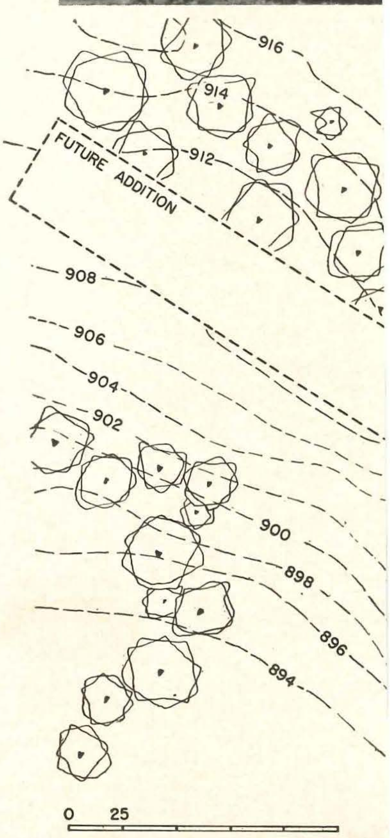




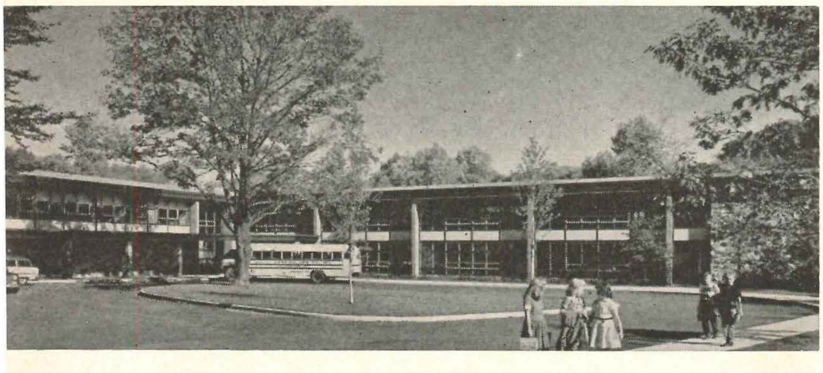


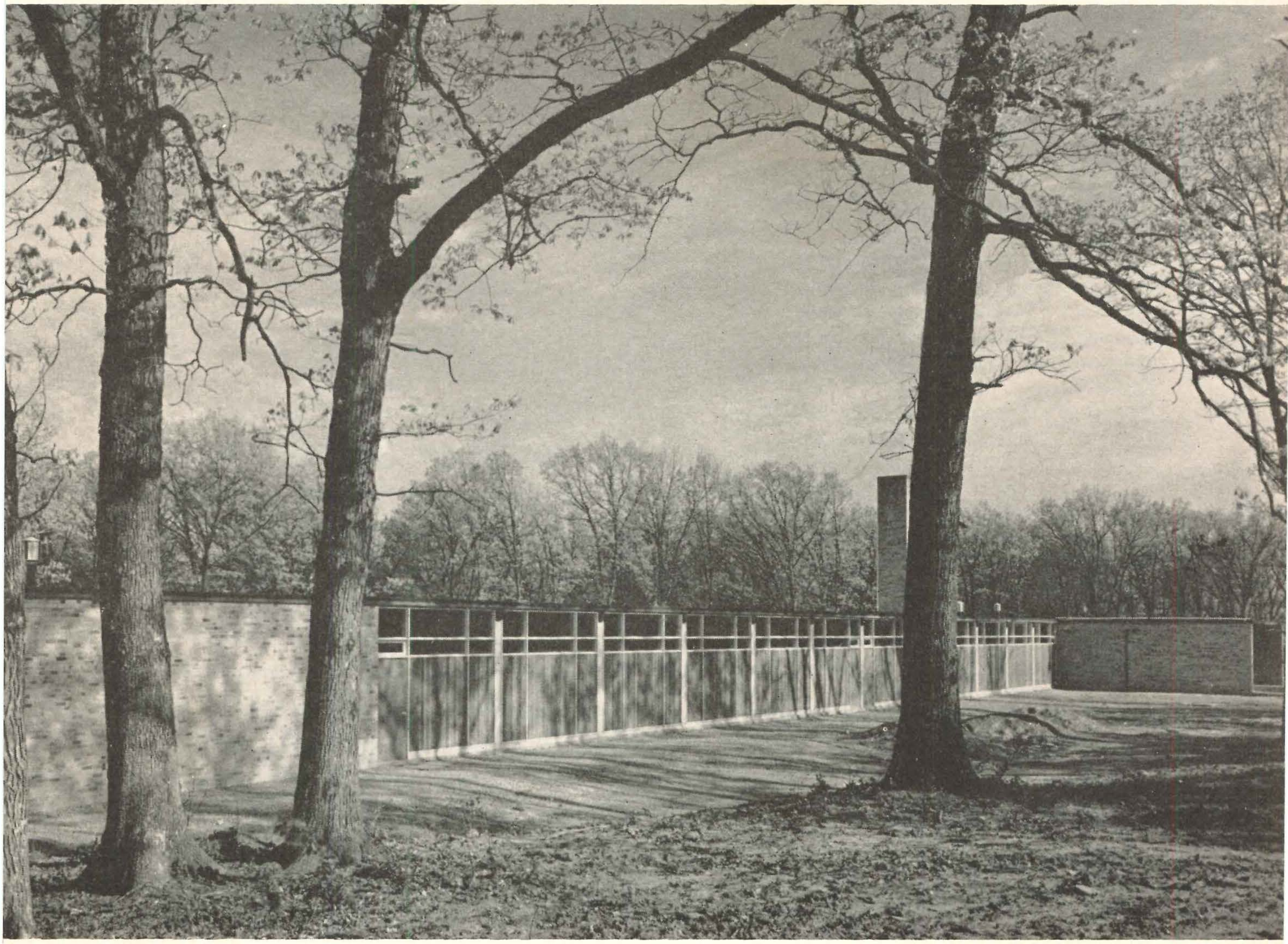


The Pocantico Hills school, whose corridors and classrooms appear above and below, was not overly expensive though its quality is high in many respects. The new building cost just over $524,850. It contains 28,944 sq ft ($18.13 per sq ft) and 329,462 cu ft ($1.59 per cu ft)—extremely reasonable figures for a very high-construction-cost area. Mechanical and electrical costs came to $133,320 of the above total; all these figures include cost of connecting the new to the old, improving the heating plant, etc. Modernizing the old building came to almost $20,500 more; site work added another $36,000. All was completed by September 1955.

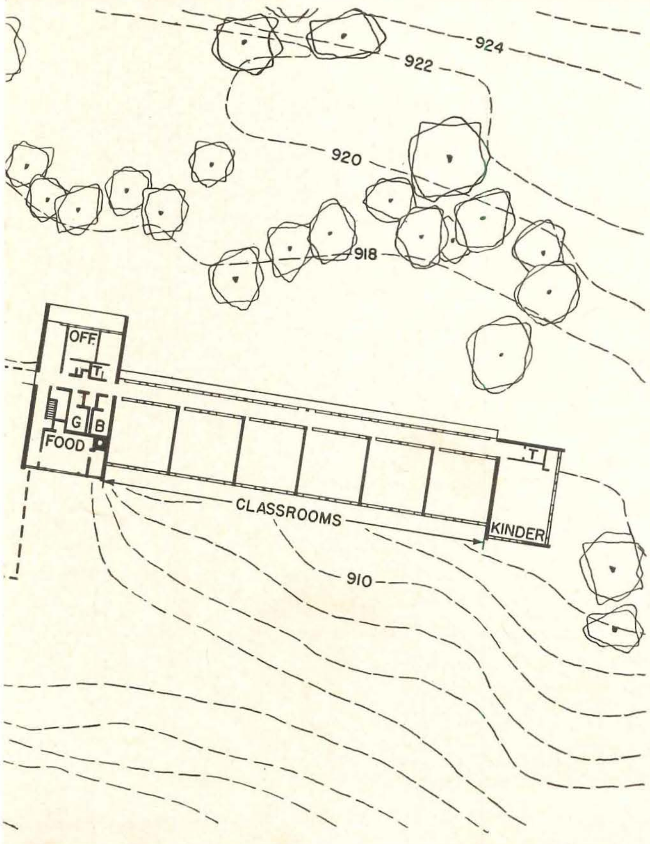


Hedrich-Blessing





William Wollin

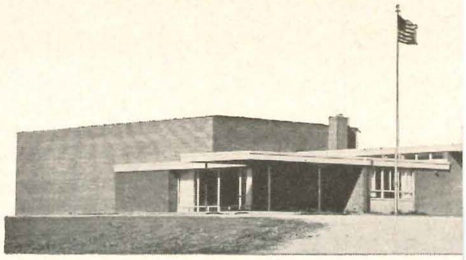


Sauk Trail School, Middleton, Wisc.; John J. Flad & Associates, Architects; Edward Pressly, Design Associate in Charge; J. L. Casey, Mechanical Engineer. Virtually every ounce of material that enters into the structure and finish of this school was carefully scrutinized before it was accepted for use. On the wooded site, wood seemed a natural material. The one-story mill-type structure has prefabricated laminated wood beams 14 ft on centers and similar columns 28 ft on centers; the beams are cantilevered 7 ft at each end to support a continuous sunshade on the east and a corridor roof on the west. Two 14-ft bays form each 28-ft classroom. The same module is satisfactory for the 3½-in. wood deck of tongued-and-grooved red cedar plank.

Structural Rationale and the Individual School

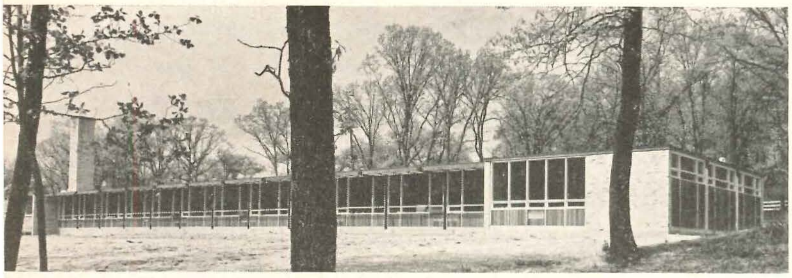
It should be apparent that the design of each school presented in this study is dominated by some principal factor. The Michigan high school grew out of a thorough educational analysis of needs. Economy was the watchword in the Pennsylvania school. A state's regulations guided development of the California plant. The New York school was designed with respect for its locale. The Wisconsin school is a completely rationalized structure. The Kansas school on the next page is a modern version of the little red country schoolhouse, consolidated. Climate strongly influenced the two South American schools that follow.

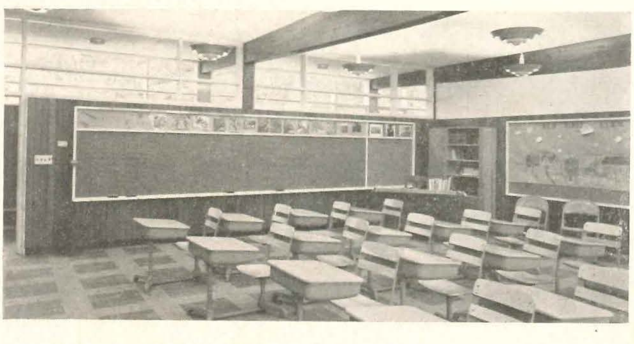
None of them could conceivably be built like the others and achieve its purpose efficiently, complicated though that purpose might be by interwoven factors. In each instance, not only are size, type, number and disposition of spaces different; the structural rationale, which also reflects the other primary and secondary design requisites, is not one but a diversity. Wood, metal, masonry, glass; wall-bearing construction or skeletal framing have been used as circumstances dictate. The results, of course, are highly individual.

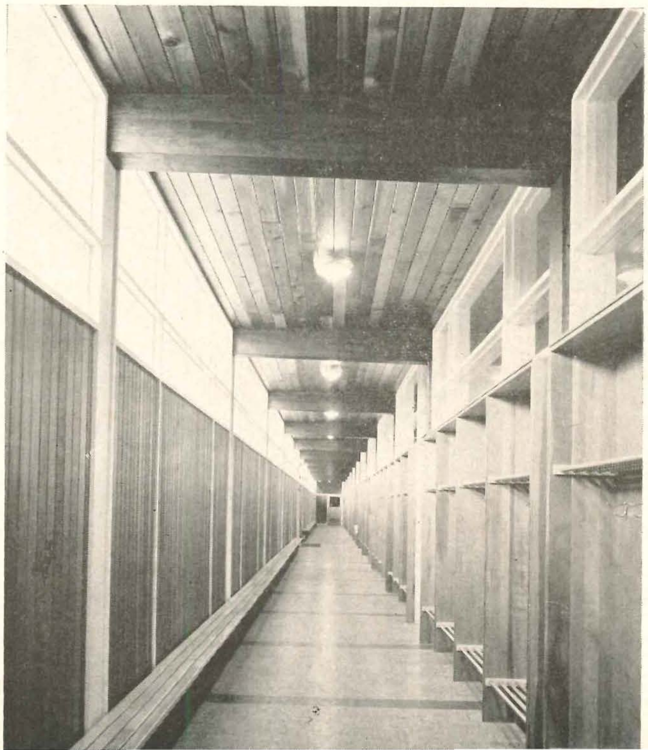


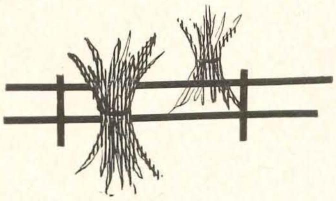
The Middleton, Wisc., school has no bearing walls or partitions, exterior or interior, except that for exterior walls some brick is used where privacy or a sound barrier is required. The classroom wing exteriors are entirely composed of standardized, pre-assembled wood units—panels containing windows and insulated base portions as required. The non-glazed areas are natural redwood, vertical tongued-and-grooved, inside and out. All parts of the structure were designed to perform as many functions as possible; the variety of materials has been kept to a minimum; and every detail was developed to come within the capabilities of local artisans. A single milled shape served for all door, window and panel frames.

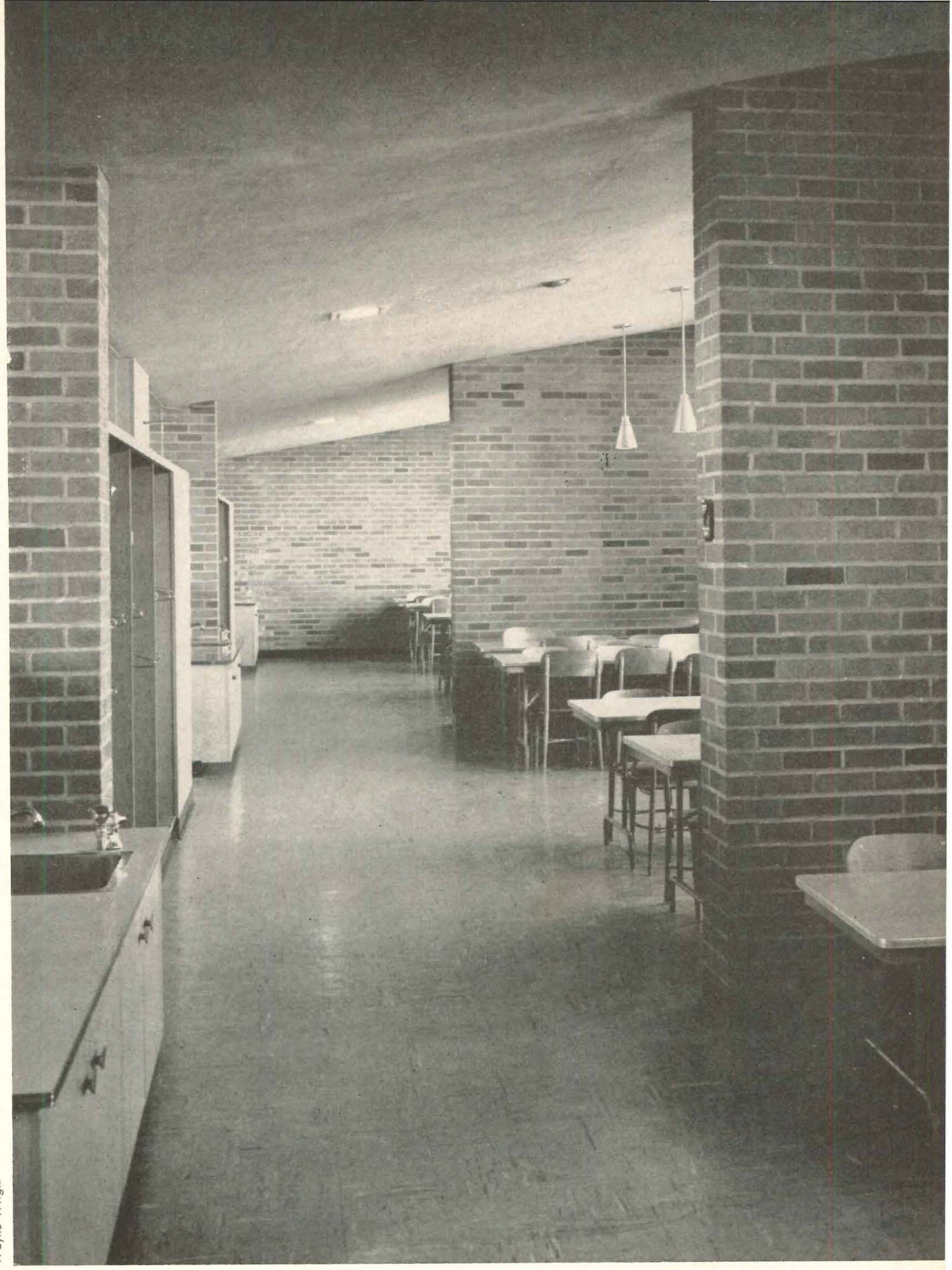
William Wollin



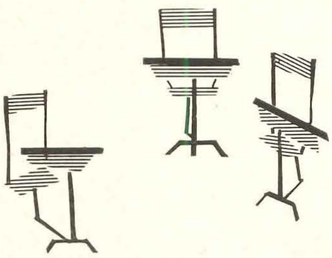




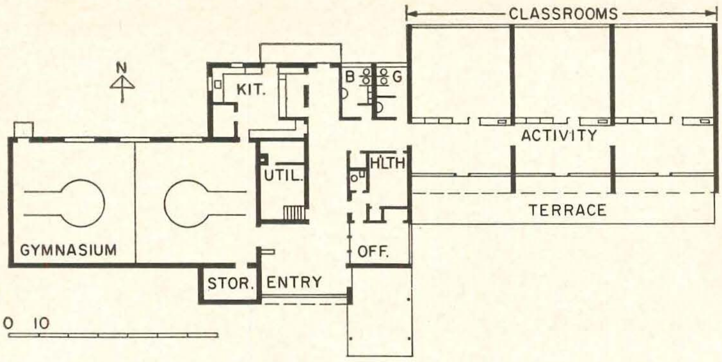


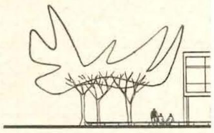


Wayne Wright

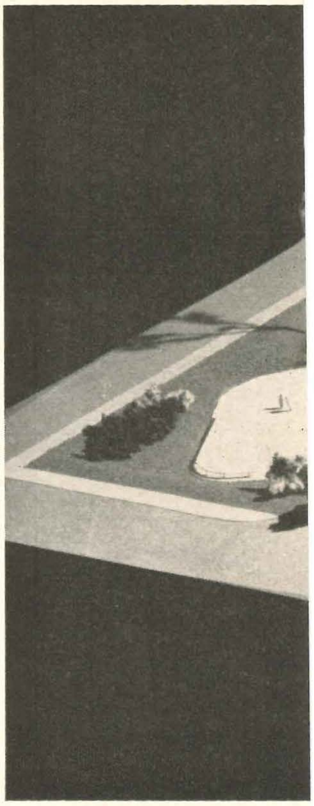


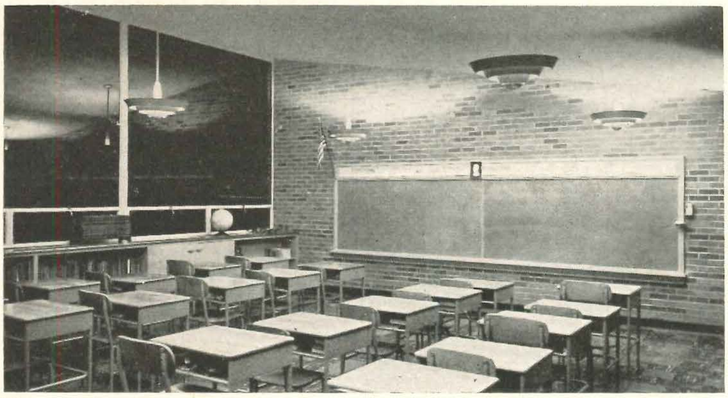
Meadow Lane School, Johnson County, Kan.; Donald R. Hollis, Architect; J. David Miller, Associate. Consolidated School District 108 occupied this school for the fall term in 1953. It replaces five typical one-room schoolhouses, some dating back to the early 1900's. Its setting, on a county road in the center of a former Kansas wheatfield, could hardly be more typical of our rural Central States region. In addition to the three classrooms provided—the corridor (above) is used as class activity space—the people of the district needed space for local Grange, Farm Bureau, Home Extension Group, 4-H Club and Home Economics meetings.

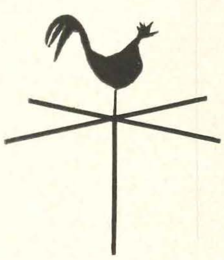


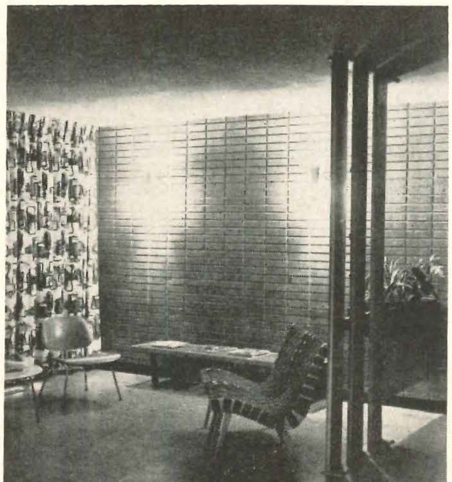


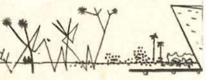
Meadow Lane School in Kansas has classrooms (photo below) which can overflow into corridor activity areas that are easily supervised through partitions composed of wardrobes, closets, counters and sinks, with glass above to the ceiling. Lunches prepared in the adjoining kitchen are eaten in the activity areas. The entrance lounge (photo at bottom) serves both the classrooms and the multipurpose room in which adult affairs are held when school is not in session; the school uses the multipurpose room for music and as a playroom. Construction is masonry throughout, both bearing walls and roof.

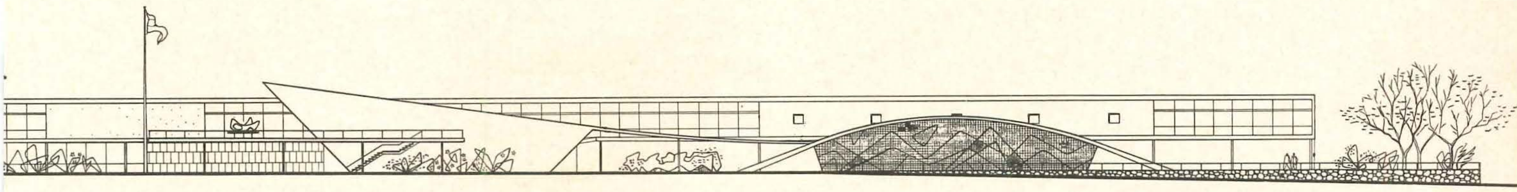


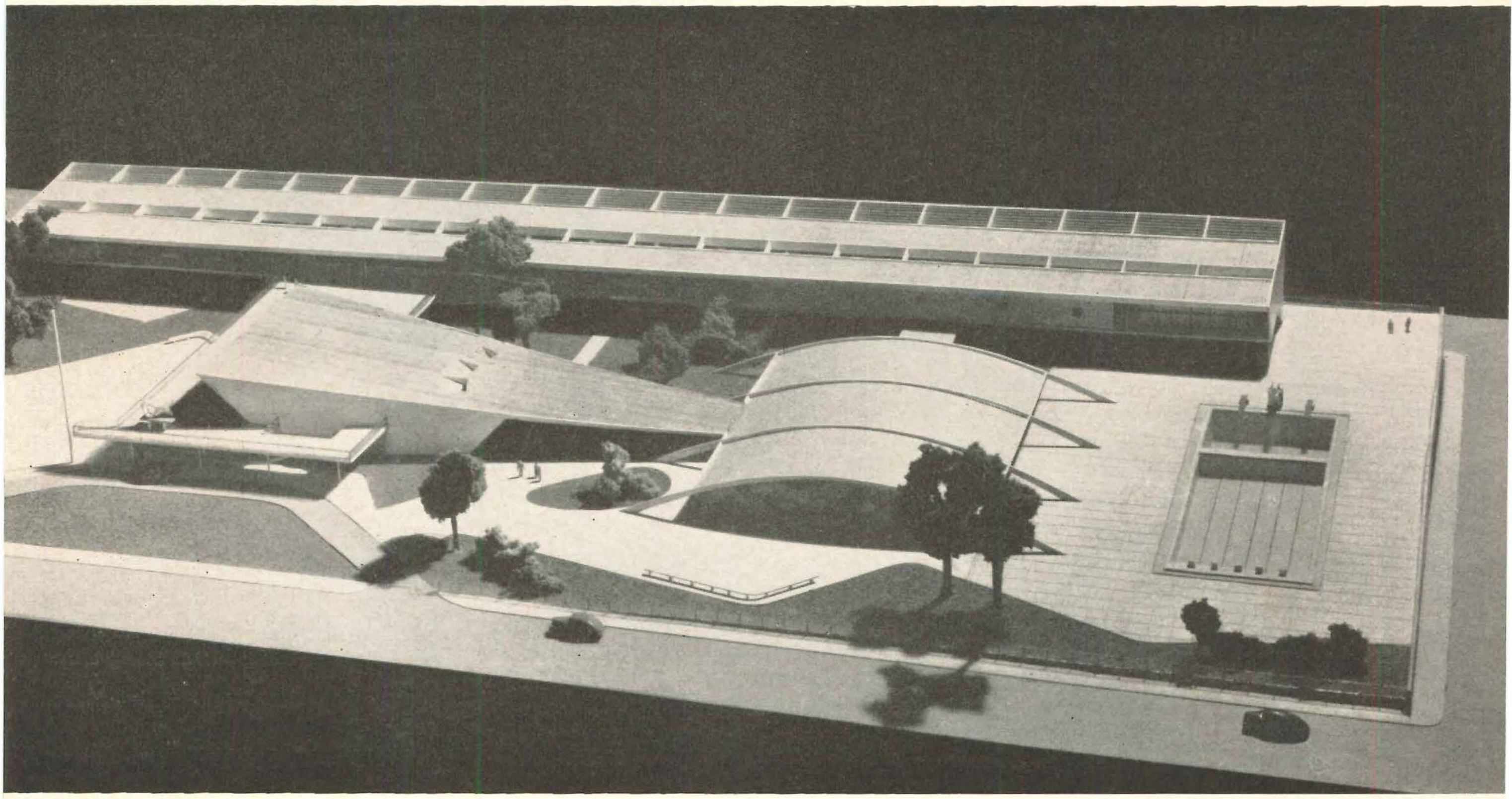

Wayne Wright



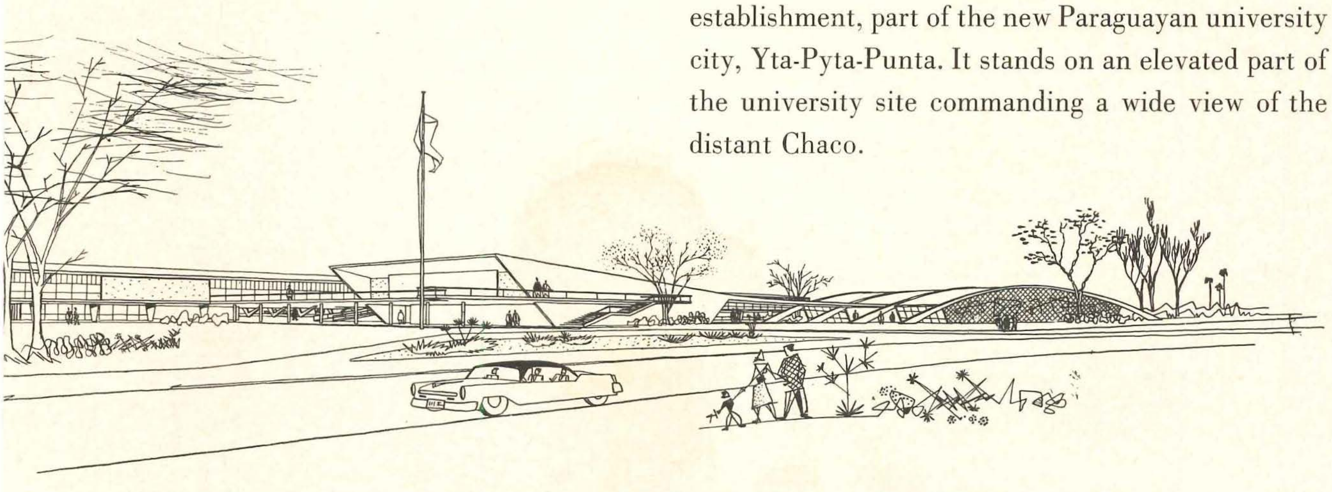




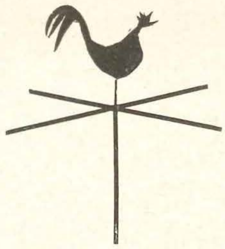




Teacher-Training School, Experimental College Paraguay-Brasil, Assunción, Paraguay, Affonso Eduardo Reidy, Architect. This school, now under construction, is a gift from the Brazilian government to the people of Paraguay. It will function as an experimental teacher-training establishment, part of the new Paraguayan university city, Yta-Pyta-Punta. It stands on an elevated part of the university site commanding a wide view of the distant Chaco.



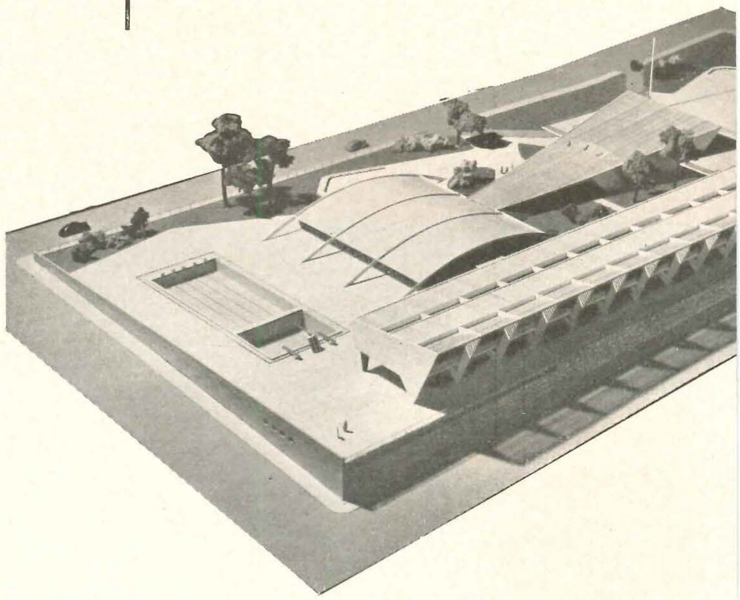
The Climate and the Individual School



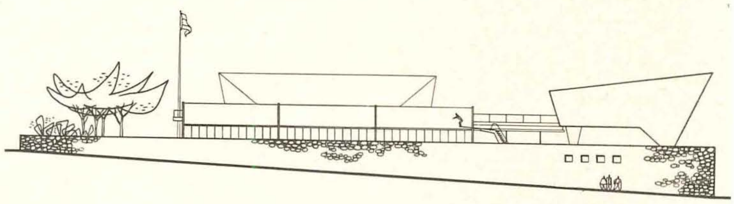
There are all kinds of extremes of weather, and in designing schools we have gone to all kinds of extremes to counter them. Before the 1930's, many state school regulations specified classroom dimensions and fenestration starting with daylight as a basis: such a dimension from window head to ceiling, from jamb to blackboard; such a ceiling height and room width. It was all empirical, the result of imperfect reasoning, and just as dubious in terms of end results as much of what we do today. Have we progressed?

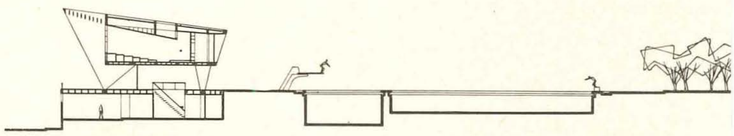
Not so many months ago New York State school authorities, realizing that rules devised for sunny California did not fit very well the cloudy October-to-May skies along the Erie Canal, called an about-face on the practice of building glass school walls and then erecting fearsome contrivances to cut off glare from the sun and the sky. There were other advantages to be obtained, too, by switching from dependence on natural light and putting all bets on artificial light. Much of the time lighting fixtures had to be turned on, anyway, in rural New York — so why not forget completely natural light through windows? With the bugaboo of pre-1930 ceiling height rules finally buried, lower ceilings could be used. That meant less cubage, less wall to construct. It saved money. It produced some very fine results. And it also produced some horribly cramped rooms.

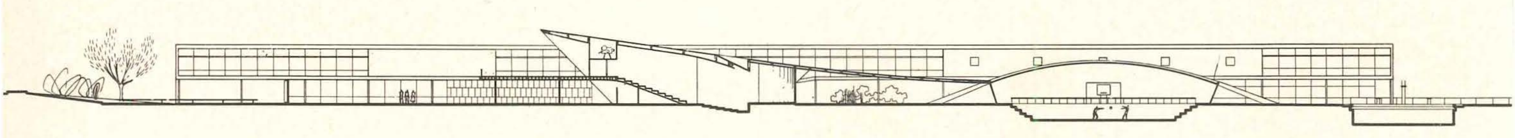
That is of course an entirely unfair example, highly exaggerated. Yet when an architect in Texas has to stand up in meeting to justify letting a little — a very little — patch of sunlight creep into a small corner of a classroom, when a Louisiana architect has to counter newspaper statements as to the unsafety of his schools that are raised on stilts to afford a little blessed shade on their cramped sites — well?

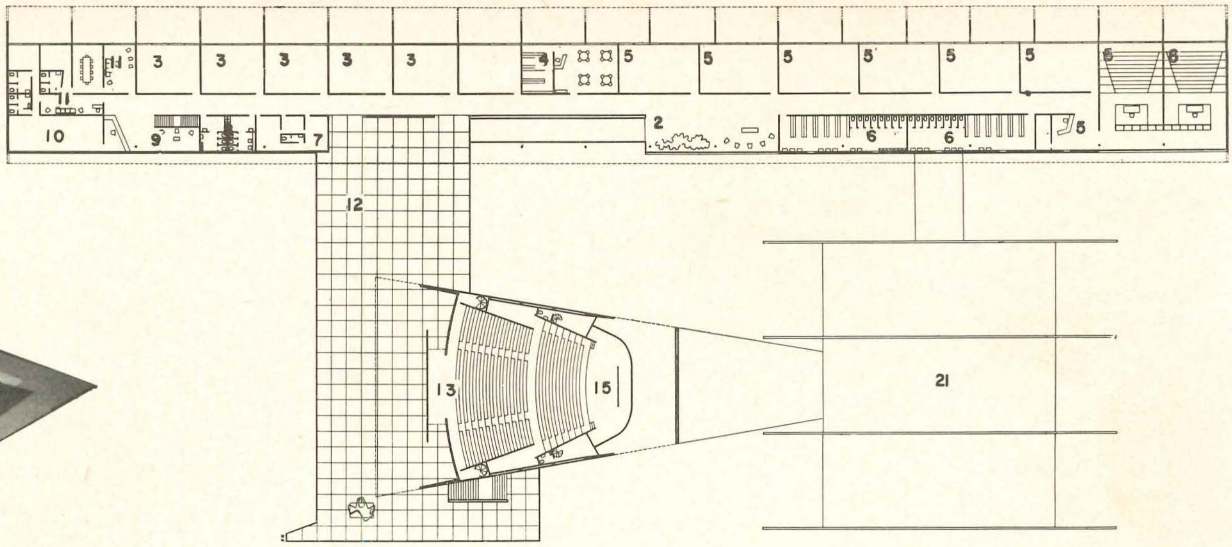


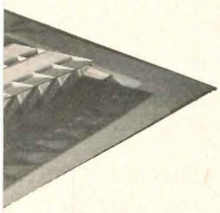
1. Ramps
2. Students' Hall
3. Class rooms
4. Library
5. Special class rooms
6. Changing rooms and lavatories
7. Health
8. Teachers' lavatories
9. Reception hall
10. Secretaries
11. Administration
12. Terrace
13. Auditorium
14. Cloak room
15. Stage
16. Service
17. Control
18. Main hall
19. Ramp
20. Swimming pool
21. Gymnasium
22. Stair to basement
23. Cafeteria
24. Lockers
25. Dressing rooms
26. Machinery
27. Storage
28. Equipment
29. Kitchen stores
30. Tunnel
31. Showers

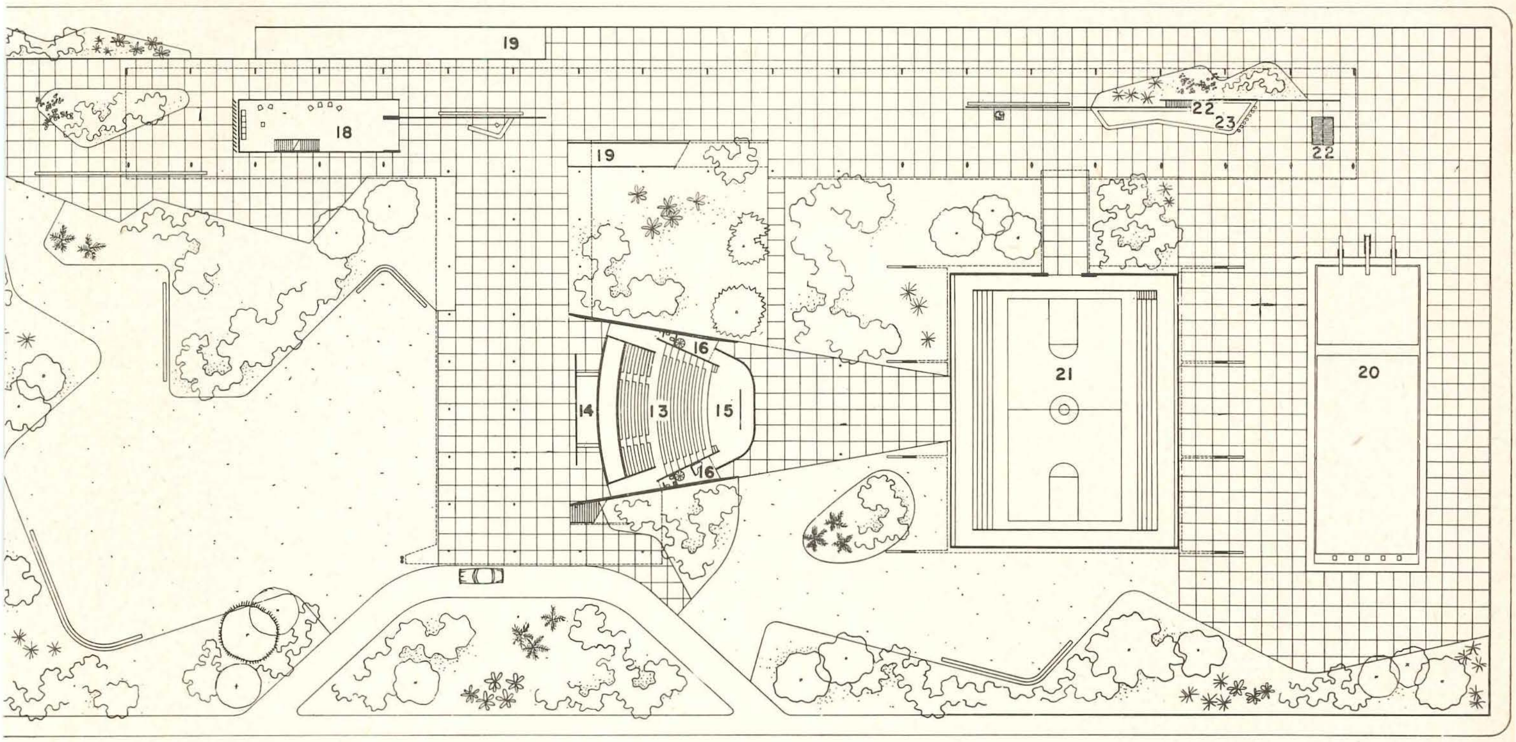






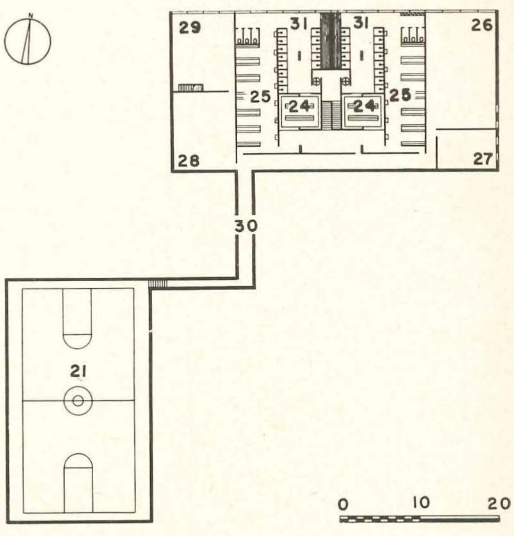


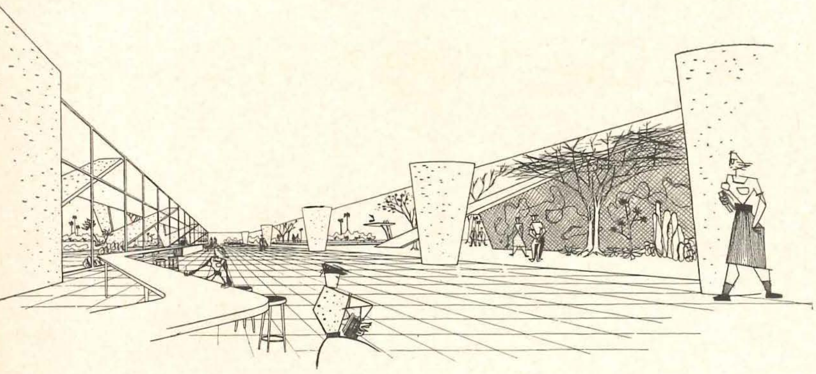




Paraguayan School (*Cont'd*)

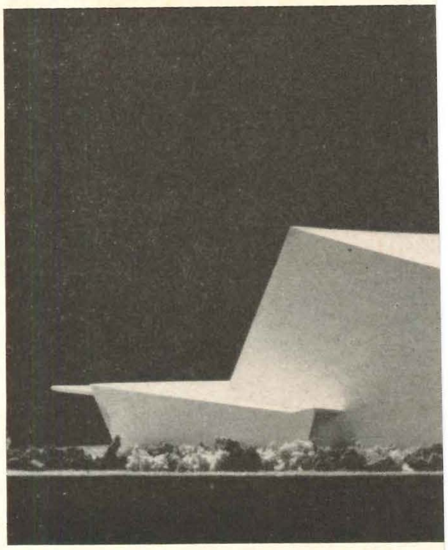
The school will occupy a large rectangle which falls slightly from east to west, with the classrooms in a long block nearly the full length of the northern part of the site, far from the main road in order to enjoy maximum quiet and pleasant view. This is also the side of the site which receives the full force of the sun in winter, although it is otherwise the best from the point of view of the local micro-climate. Protection against the sun is provided by bringing forward the main concrete frames

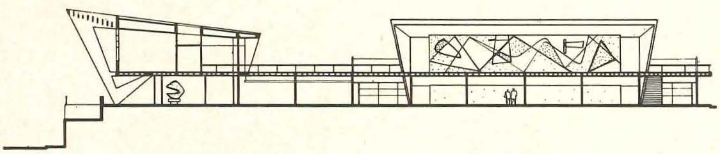


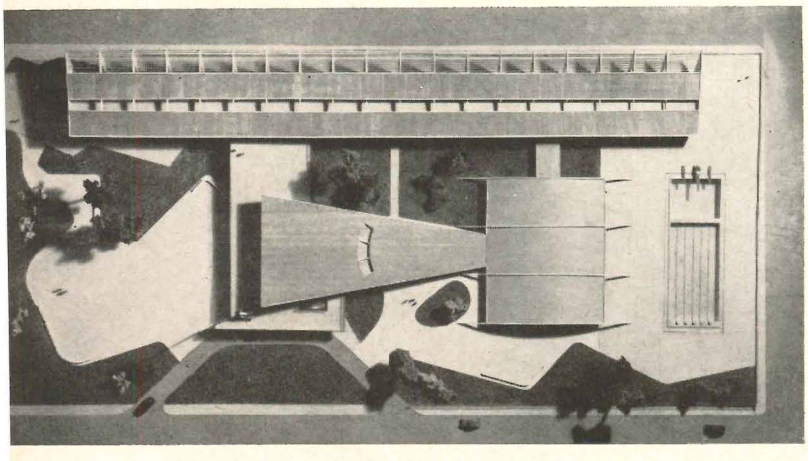


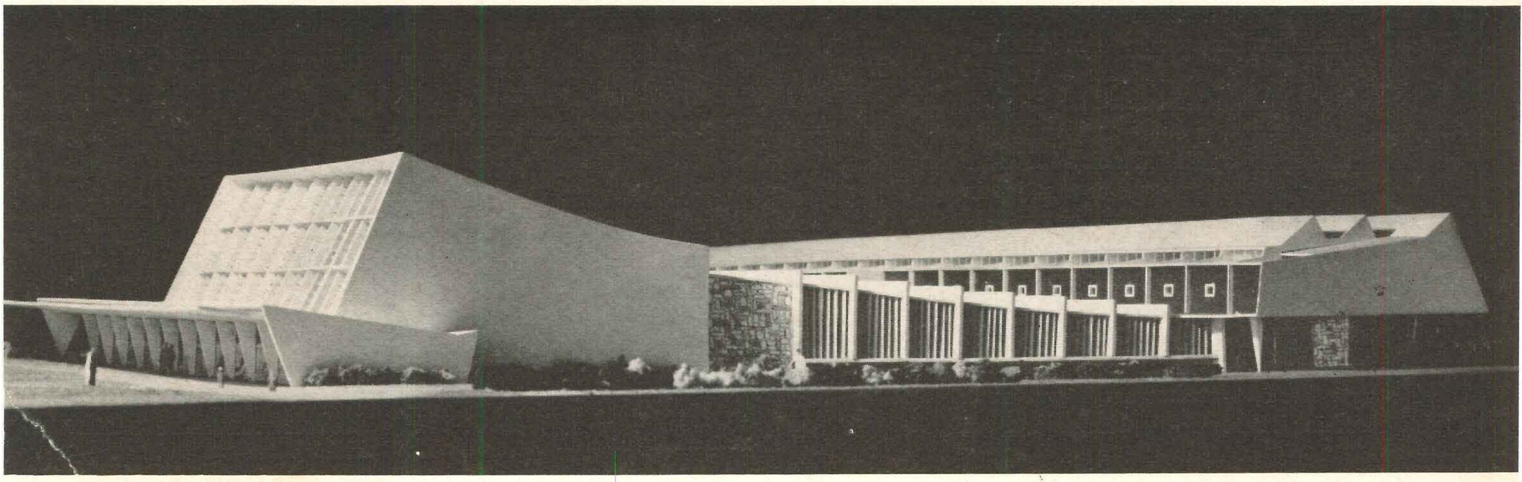
Paraguayan School (*Cont'd*)

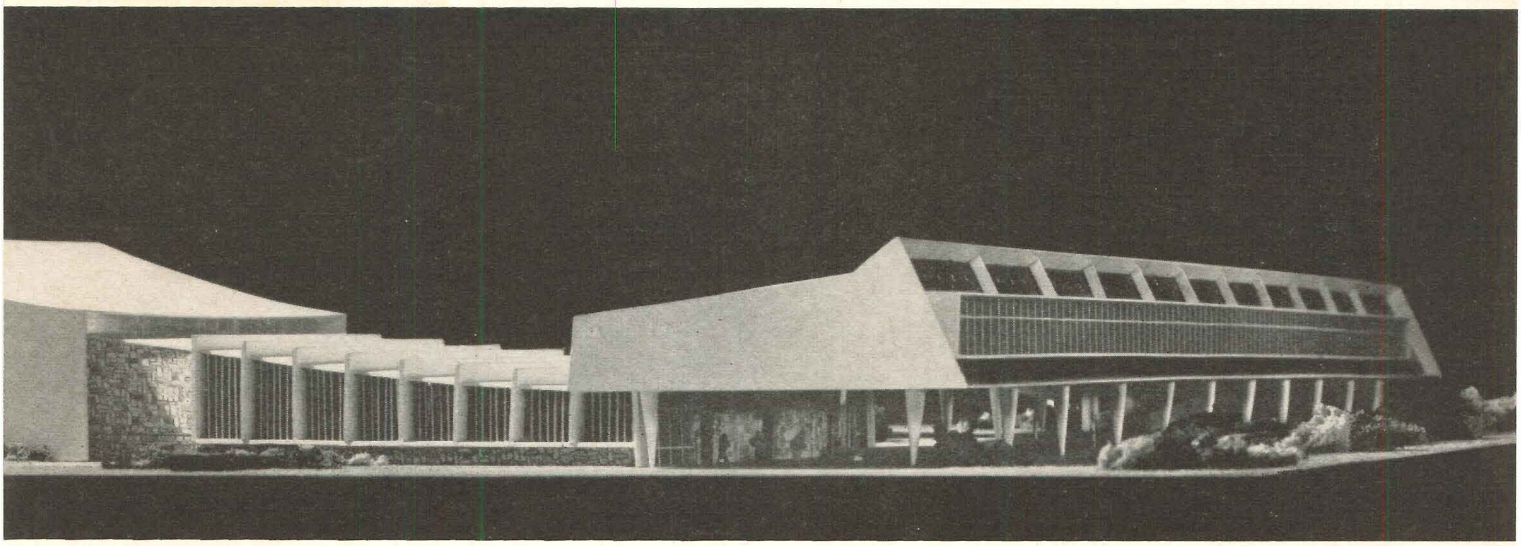
which support classrooms, so that they form projecting fins. These are canted forward to carry a horizontal sunbreaker much like a marquee. Underneath this block of classrooms is a shaded area between the pilotis, above which a large ramp provides access to the classrooms. At both levels circulation passes over and under bridges which connect the classroom block to the other main structures, the auditorium and gymnasium. These and the swimming pool are on the side of the site nearer the main road so they can be reached without causing disturbance in the classroom area. This position also permits full exploitation of the natural fall of the site in such a way as to keep excavation and earth fill to a minimum.

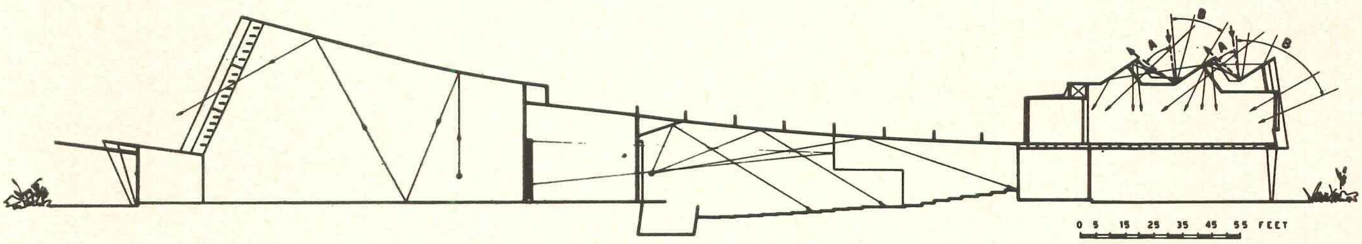










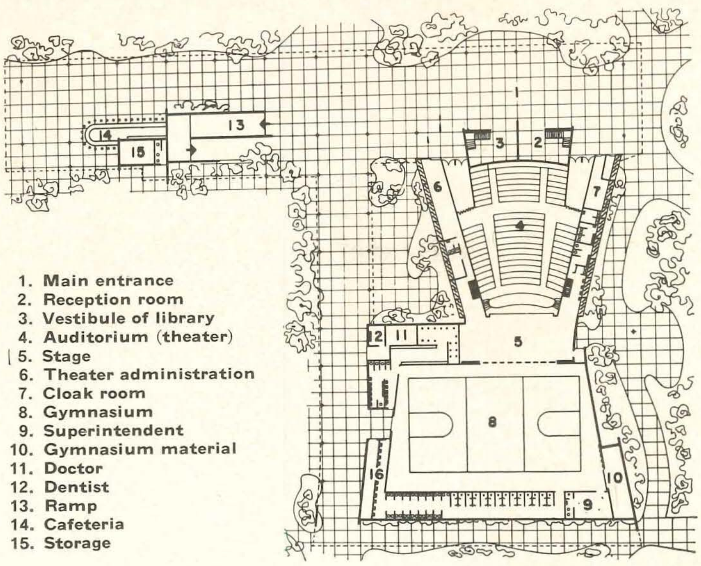


Secondary School, Rio de Janeiro, Brazil; Eneas Silva, Architect. Intense sunlight and high temperatures determined design of certain areas of this school. For one thing, the classroom block (extreme right of section above) is protected by a corridor along its sunny northern exposure—the city is below the equator; for another, neither direct nor indirect sun rays can enter the classrooms (arrows at "A"). In addition, though the classrooms are deep so specialized rooms can be accommodated within the same depth and consequently must be skylighted, glare from the sky vault is dissipated by a louvered inner ceiling. The irregular ceiling here, as well as the sloping and non-parallel walls and ceiling of the gymnasium (extreme left of section) were developed to reduce noise by preventing reverberation. The concept is also intended to induce a maximum of natural ventilation.

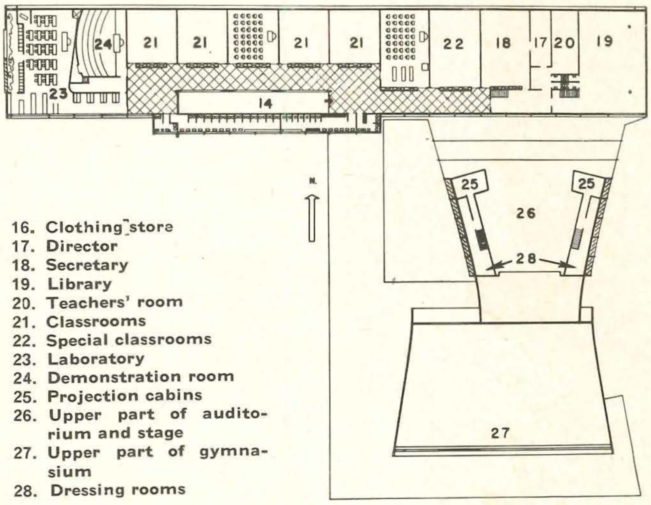
The Individual School

What stock plan can accomplish all the ends that we have enumerated? And by "stock plan" we mean to include not only the standard layouts of the so-called prefabricated school, but also the repeat plan pulled out of drawer number 15 by architect "X" for city "Y" (the school was the same size as that job in city "W", wasn't it?) that he first did "Z" years ago and has successfully re-used — how many times? We mean also to include the stock plan of that school the board of education thinks would be just what they need over here in this new part of town because it worked so well in that town the other side of the state. We mean to include still others (should we whisper some of them?): the conceptions of a school administrator who shortsightedly copies what his opposite number told him worked well in another situation; the state official who applies the same yardstick to every example.

None of this works well. All of it is expensive, usually initially, certainly in the long run, both in dollars and in satisfactory fulfillment of educational demands. Educational programs are alive, if they are any good, that is; which is another way of saying they continually change. Perhaps the worst thing about the stock plan is its prohibition of the new developments educationally, structurally, technically and esthetically, which are not merely in the distant future but imminent, within almost the hour.



1. Main entrance
2. Reception room
3. Vestibule of library
4. Auditorium (theater)
5. Stage
6. Theater administration
7. Cloak room
8. Gymnasium
9. Superintendent
10. Gymnasium material
11. Doctor
12. Dentist
13. Ramp
14. Cafeteria
15. Storage



16. Clothing store
17. Director
18. Secretary
19. Library
20. Teachers' room
21. Classrooms
22. Special classrooms
23. Laboratory
24. Demonstration room
25. Projection cabins
26. Upper part of auditorium and stage
27. Upper part of gymnasium
28. Dressing rooms

0 15

This secondary school in Rio de Janeiro has all the areas and appurtenances essential to American high schools, as the plans indicate. In general, classrooms are on the upper floor, public and administrative areas below. Ground-level outdoor circulation is treated as a covered patio. The rear wall of the stage is movable, so the entire interior of the gymnasium can become stage. The library and auditorium may be operated independently of the classroom wing.

50 YEARS

SWEET'S ARCHITECTURAL FILE IS 50 YEARS OLD THIS YEAR

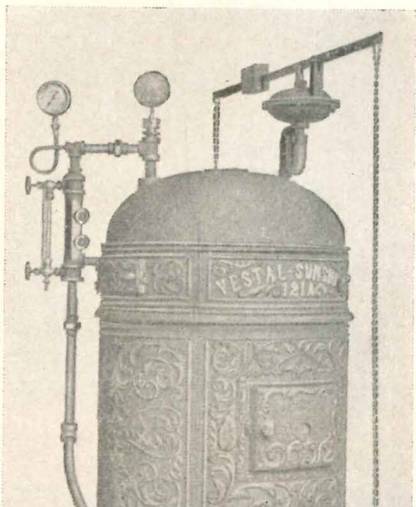
ANYONE TAKING A LOOK at the earliest *Architectural File* and at the latest might well conclude that building materials have not changed so much as they have accumulated.

In 1906, when *Sweet's Indexed Catalogue of Building Materials* was issued for the first time, 760 pages bound in one volume would, it was hoped, provide the catalog-ridden architect with most of the information he needed for writing specifications. Fifty years later it required 10 volumes to hold the 14,216 pages of manufacturers' catalogs in *Sweet's Architectural File*.

Distributing 5000 files may have been a fairly easy job in 1906, when each volume weighed only 10 lb four oz. This year, however, the *Architectural File* weighs 108 lb, and had to be shipped in two cartons — freighted because the parcel post limit is 40 lb. 17,000 *Architectural Files* will be distributed this year. The printing job is also immense, and requires the services of a number of printers, some hired directly by Sweet's, and others hired by clients who "print their own" and deliver them for filing; the Conkey Division of Rand McNally, in Hammond, Indiana, does much of the heavy printing and binding for the *Architectural File.*

Exactly who had the original inspiration to pre-file building manufacturers' catalogs is uncertain — the credit is divided equally between two men: Clinton W. Sweet, who published ARCHITECTURAL RECORD, and whose other business was the manufacture of Sweet-Orr overalls, and Henry W. Desmond, the first editor of the RECORD.

Prior to 1906, the architect's catalog problem, according to descriptions, was one of insurmountable chaos. Thomas W. Nolan, a professor of architecture at the University of Pennsylvania, had tried to find a practical method of handling this abundance of literature; for about a dozen years he had experimented with a number of systems. They all failed. In an introduction to the first file, he reported his findings. "Everything was tried," he said, "arrangements of shelves, bookcases, pasteboard boxes, filing cases, patent binders, filing cabinets, cases of drawers, indexing schemes and 'index-reruns.' At first, all the big books were put together in one place and all the little books in another place; and then all the big and little books were mixed



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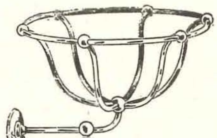
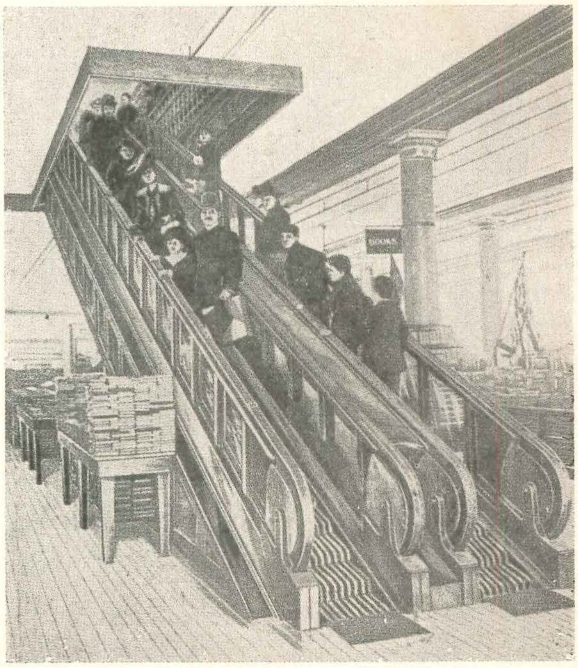


2

(1) Vestal Sunshine Heater — The Reading Stove Works. (2) Nickel-plated Sponge Holder — E. C. Smith Manufacturing Company. (3) Reno Moving Stairway — The Reno Inclined Elevator Co.



3

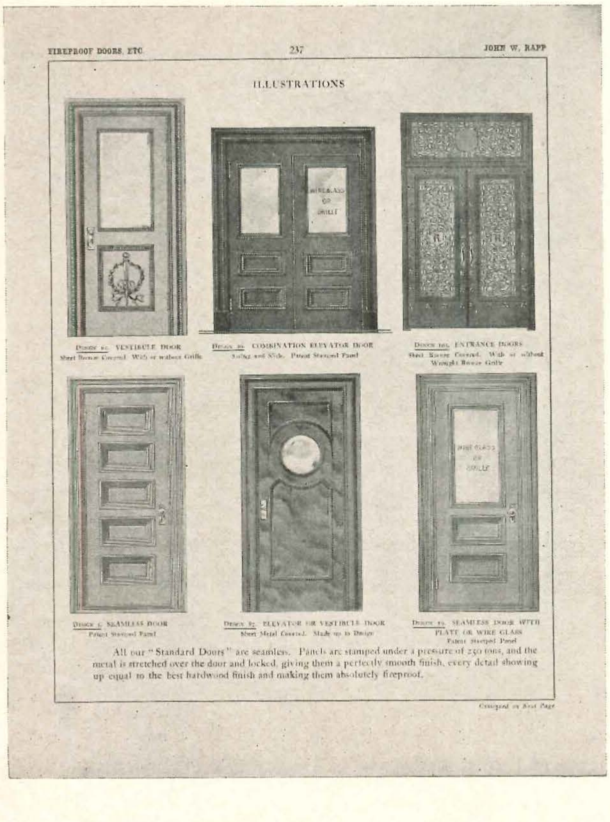
50 YEARS

up together, and indexed according to subject. Some had four pages, and some had four hundred pages. Barely two were of the same shape or superficies. The little ones would not stand up, and could not be gotten at when laid flat. Another elaborate system was introduced, and a voluminous cross-index started, but the big books contained too much useless matter and the little books got lost or mislaid or could not be found just when wanted."

It was a French catalog — actually an index of building materials manufacturers — which Sweet brought back from a trip abroad that provided the key. That, and a survey of three thousand architects who offered their suggestions for a solution. The sum of their suggestions, according to a note in the first file, were: "condense; exclude display advertisements; expunge mere 'trade' talk; adopt a single organic plan for all catalogs; arrange all matter solely with a view to reference; edit strictly with respect to the requirements of the architect; supply a scientific cross-index; employ a legible type."

To comply with these suggestions, Sweet's insisted that the type and format for each entry be uniform — so uniform, as it turned out, that it was a little difficult to discern one catalog from another. Except for the Trent Tile Company's catalog, which had four-color illustrations of the product, the entire file was printed in black and white. Most of the manufacturers filed one-page catalogs.

In following years, however, these early standards were found to be inadequate to the architect's needs and unacceptable to the cataloger's desire for a larger margin of individual expression than was afforded under the requirements of uniformity. One of Professor Nolan's complaints, for instance, had been that manufacturers did not confine their copy to the essential description of the product, but *would* insist on revealing the intimacies of their plant management. The attitude was still apparent in the 1906 file, though mostly limited to mild statements on the modernity of production facilities. (The National Fireproof Paint Corporation, however, made the boast, grammatically rather ambiguous, that its factory was "free at all times from strikes and unfavorable labor conditions, thus insuring the prompt shipment and execution of all orders. Our plant is the only one of its kind in the world.")


FIREPROOF DOORS, ETC. 237 JOHN W. RAPP

ILLUSTRATIONS

VESTIBULE DOOR — Sheet Bronze Covered. With or without Grille

COMBINATION ELEVATOR DOOR — Swing and Slide. Patent Stamped Panel

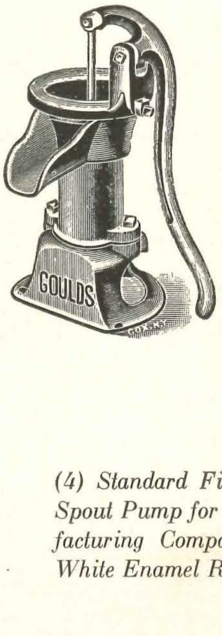
ENTRANCE DOORS — Sheet Bronze Covered. With or without Wrought Bronze Grille

SEAMLESS DOOR — Patent Stamped Panel

ELEVATOR OR VESTIBULE DOOR — Sheet Metal Covered. Made up to Design

SEAMLESS DOOR WITH PLATE OR WIRE GLASS — Patent Stamped Panel

All our "Standard Doors" are seamless. Panels are stamped under a pressure of 250 tons, and the metal is stretched over the door and locked, giving them a perfectly smooth finish, every detail showing up equal to the best hardwood finish and making them absolutely fireproof.



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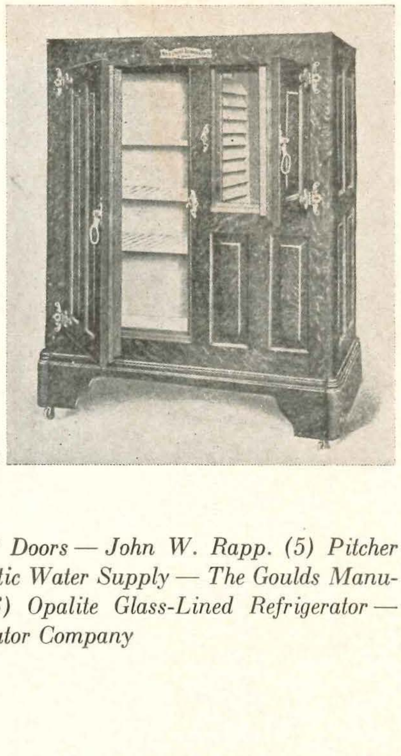
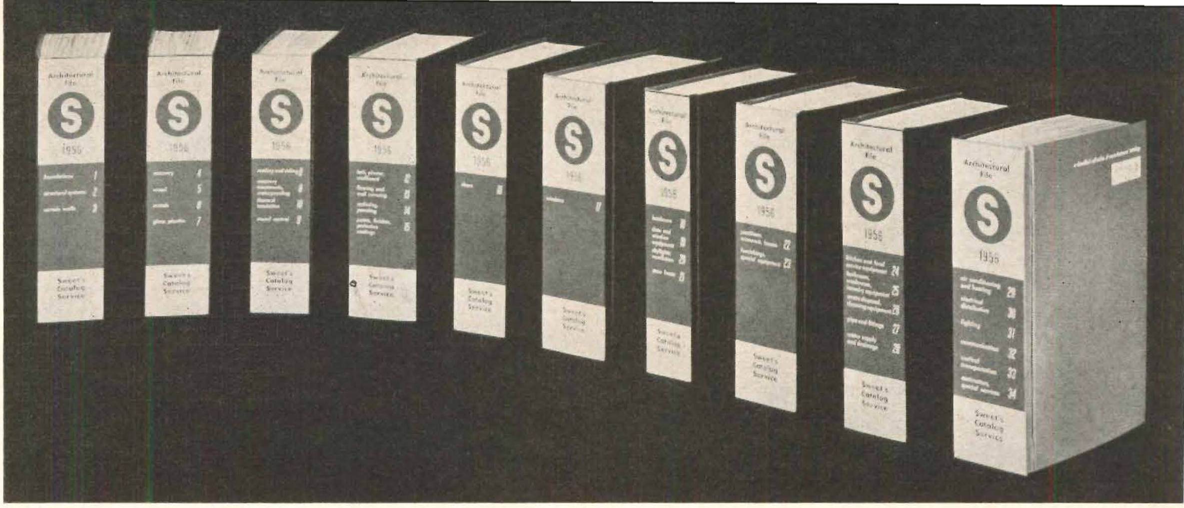

6

(4) *Standard Fireproof Doors — John W. Rapp.* (5) *Pitcher Spout Pump for Domestic Water Supply — The Goulds Manufacturing Company.* (6) *Opalite Glass-Lined Refrigerator — White Enamel Refrigerator Company*



After a great deal of work in its research department, Sweet's decided that after all individuality was not so bad, and under a new set of design standards established in 1943, the *File* not only permitted, but urged, individualization in the interest of both users and clients. At the same time, the minimum folio for catalogs was set at four pages — front and back covers and at least one inside visual unit; anything smaller could not properly be called a catalog. This form, Sweet's research department had determined, would not only make each catalog a visually distinct unit; the information within it would also be organized more effectively for the architect's use. The format and content of most of the catalogs are designed by the consultants, all of them architects and engineers, on Sweet's design service staff.

It is not only the design that has changed the appearance of Sweet's, though. Much of the change has been wrought by a fantastic accumulation of new building materials. In 1906, the year that Professor Nolan bewailed the insupportable technological burden placed on the architect, 498 manufacturers filed catalogs. This year 1291 manufacturers contributed a total of 1558 catalogs to the *Architectural File.* Doors and windows, for example, had 44 pages between them in 1906: this year an entire volume was required for each of them. Stable equipment was one of the 62 categories listed in the first file: it is still listed, and so are aviaries, bird repellents and cleaning equipment for animal cages, none of them offered to the 1906 designer. Bells were of course listed in both the 1906 and 1956 files, but now the category has been expanded by chimes and buzzers. If this should be viewed with alarm as sign of a noisier generation, one can also consider the sizable portion of the latest file devoted to sound control; such comfort was not offered at all in 1906.

The uses of electricity have of course had an incalculable impact on the number and kinds of building equipment. Iceboxes would have been a more appropriate name for the items included in the 1906 refrigerator catalogs, and air conditioning was almost (but not entirely) unknown. A whole range of communications equipment — microphones, public address systems, telephone systems, television systems, signaling systems — was either unheard of in 1906 or not regarded as part of the architect's purview.

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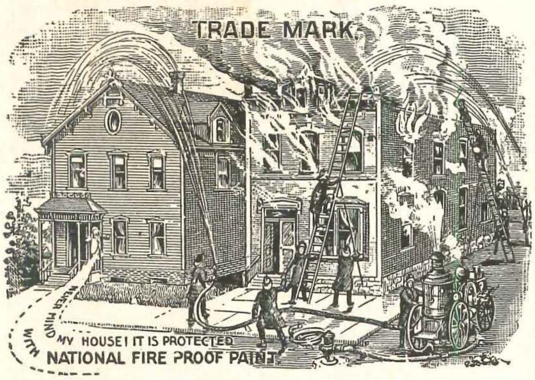

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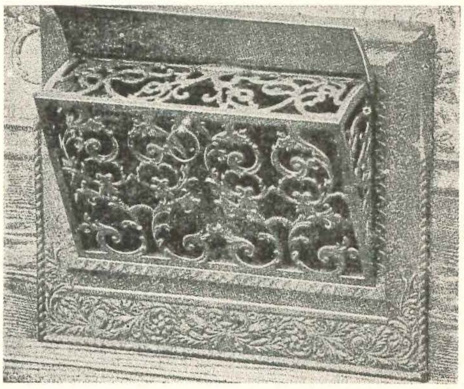
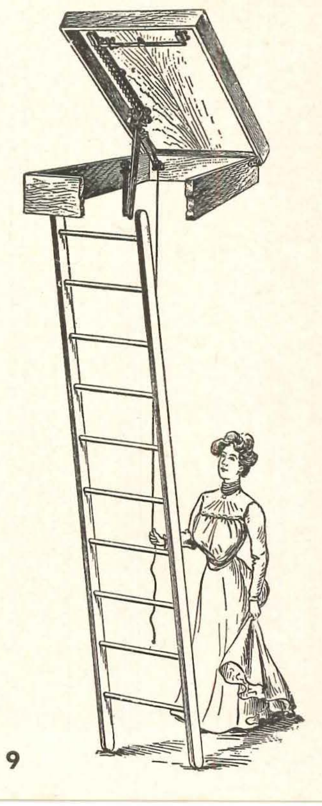
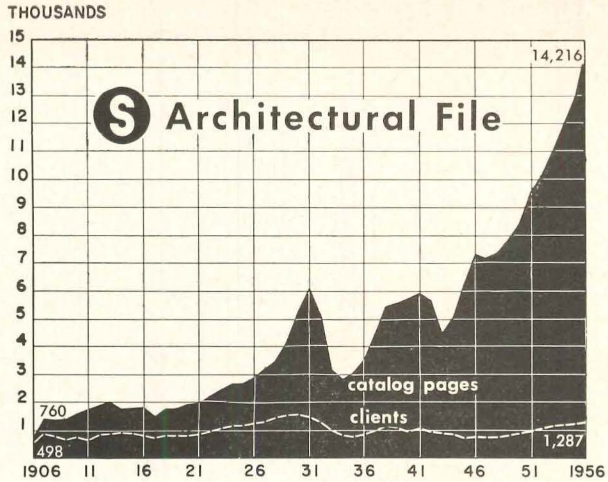




9

(7) Trade Mark — National Fireproof Paint Corporation. (8) Ideal Wall Register, open — Ideal Register & Metallic Furniture Company. (9) Cheese-cake — G. Bickelhaupt Skylight Works

S 50 YEARS



Electric lighting was in use, of course, and information about it was considered germane to the designer's problems, but only Edison's incandescent bulb was around (still with a pointed end), and the uses of light except for illumination simply didn't exist.

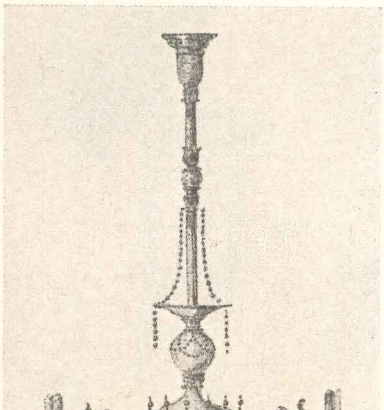
Gas lighting, and for that matter, candle light, was still important enough to rate several inclusions. The Enos Company offered both the Bunsen Socket-Burner — "A small detachable burner closely resembling an electric socket . . . gives a *Gas* fixture the appearance of an *Electric* fixture" — and the Bunsen Candle-Burner — "By means of these candle-burners many new, artistic effects may be obtained hitherto confined to the realm of electric light."

As for the design of equipment, manufacturers barely out of the Victorian years had just begun to face the implications of mass production. Evidence of the craft instinct (c.f., the Vestal Sunshine heater) was still visible. The Enos Company, despite its efforts to make gas fixtures look like electric sockets, nevertheless designed its electric fixtures to look like Louis Quinze candelabra.

Following the example set in the field of building design, Sweet's has instituted catalog services in five other fields fertile for the prefiling of manufacturers' catalogs so as to keep them instantly accessible for use when needed in the thousands of offices and plants as follows: Product Designers — 16,000; Plant Engineers — 30,000; Machine Tool Buyers — 12,000; Industrial Construction — 12,000; Light Building Construction — 25,000.

The total number of pages of market-specialized manufacturers' catalogs in the fields including the architectural is currently 25,676, an increase over the 23,700 included the year before.

Since this file is provided without charge to qualifying architects' offices, architects are often interested in the economics of the service. Sweet's services of designing, printing, filing and distributing catalogs are paid for by the manufacturers who employ these services. The charges for the services are relatively low because of the economies possible in the handling of the catalogs of so many hundreds of manufacturers — for example, the average cost to a client manufacturer for the average size catalog of 11 pages is less than 15 cents a year per office.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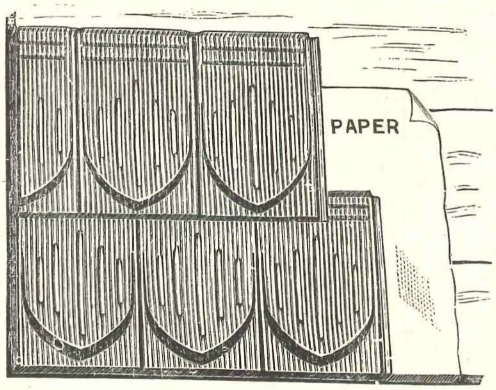

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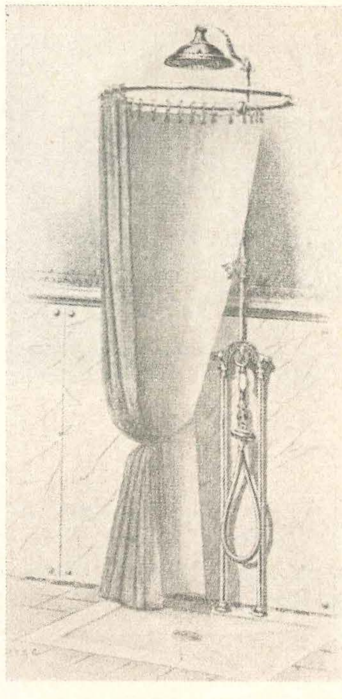

12

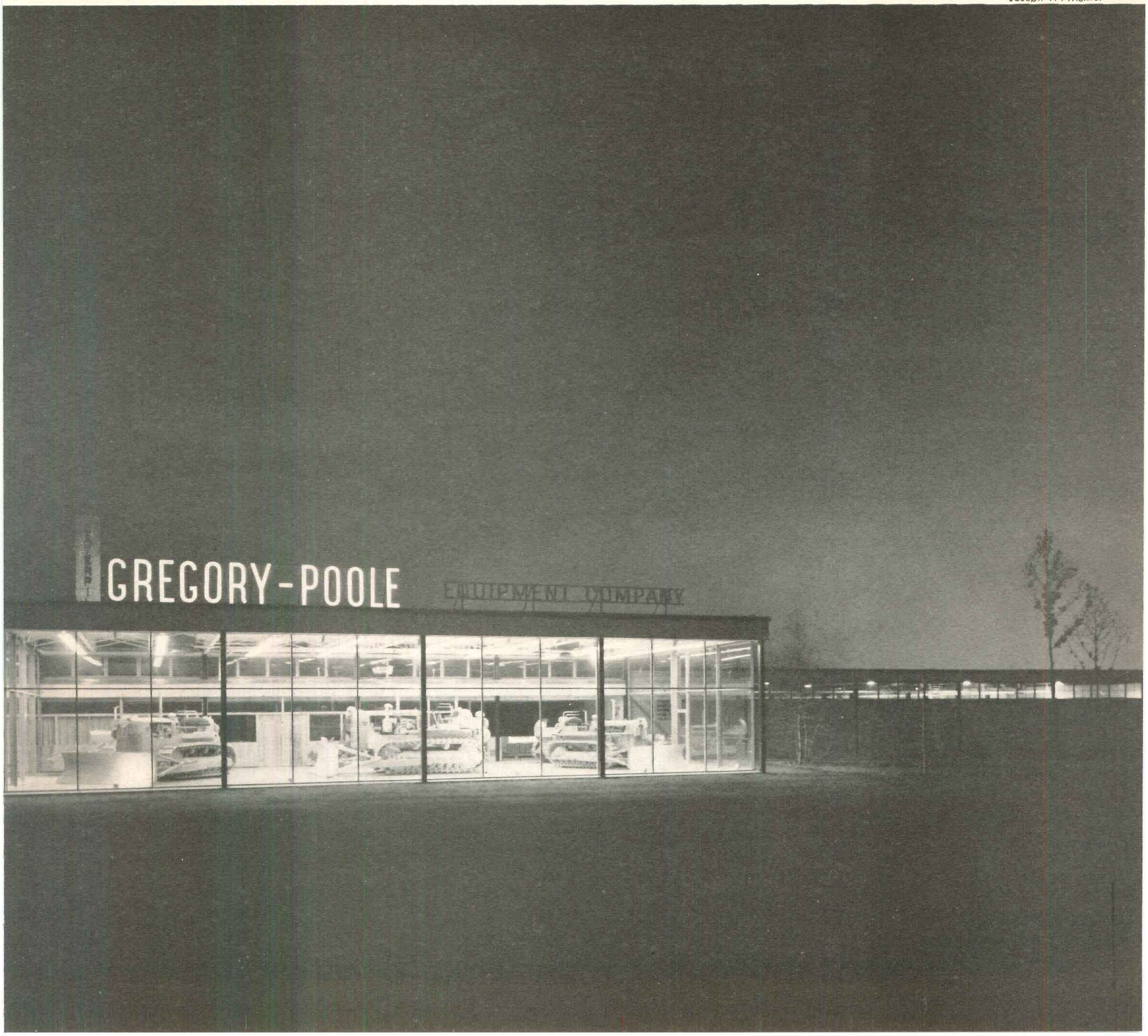
(10) No. C. 249, Chandelier — The Borough Bronze Company. (11) Merchant's Gothic Shingles — Merchant and Evans Company. (12) Complete Shower — Union Brass Works

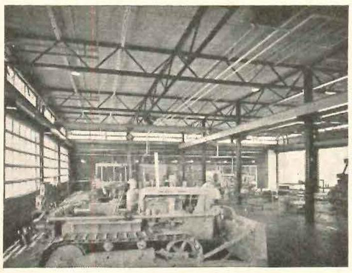
ARCHITECTURE HELPS SELL TRACTORS

GREGORY-POOLE EQUIPMENT COMPANY, ***Raleigh, N. C.***
G. Milton Small and George Matsumoto, Architects Associated

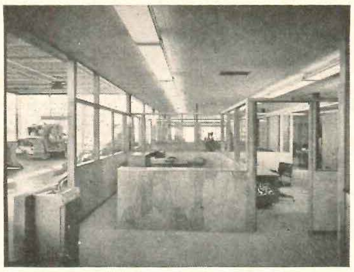
BULLDOZERS AND TRACTORS are usually considered for what they can do to the environment. This display, sales and service building shows what environment can do for them. Though no undue expense has been undertaken, architectural talent has been employed not only in organizing the required spaces (shop, parts storage warehouse, private offices and lounge, sales and general office and the glass-walled display cage shown below) but also in making use of natural grades, in landscaping and interior decoration.

Joseph W. Molitor

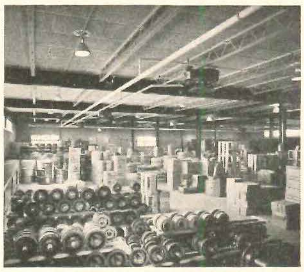




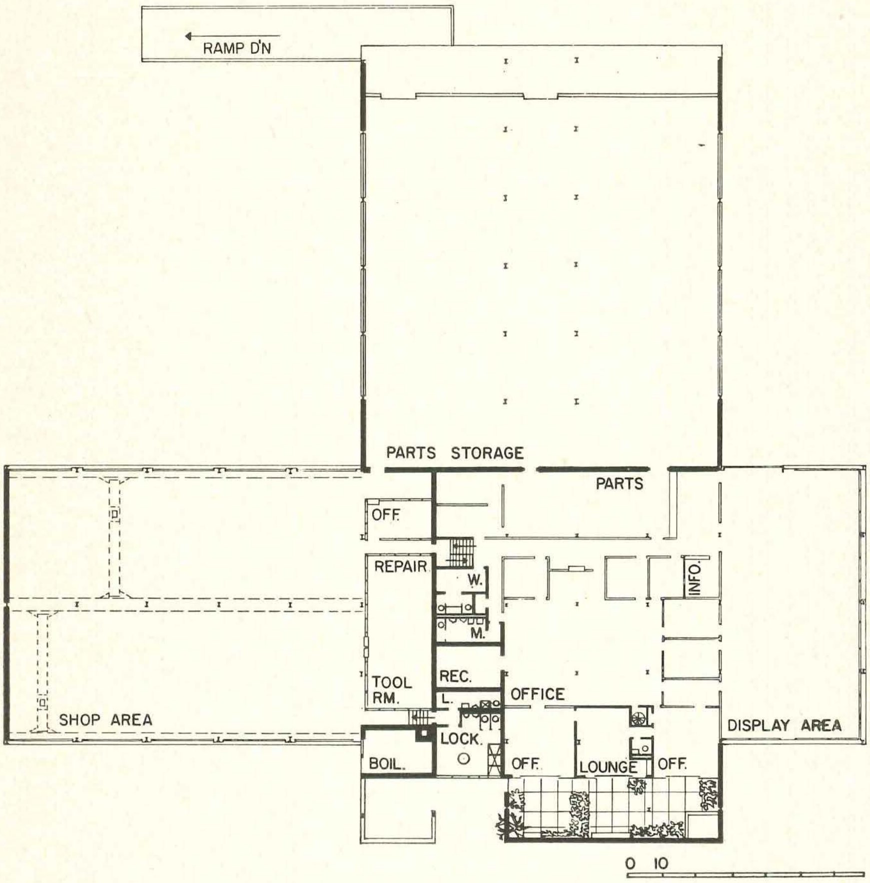
Repair shop

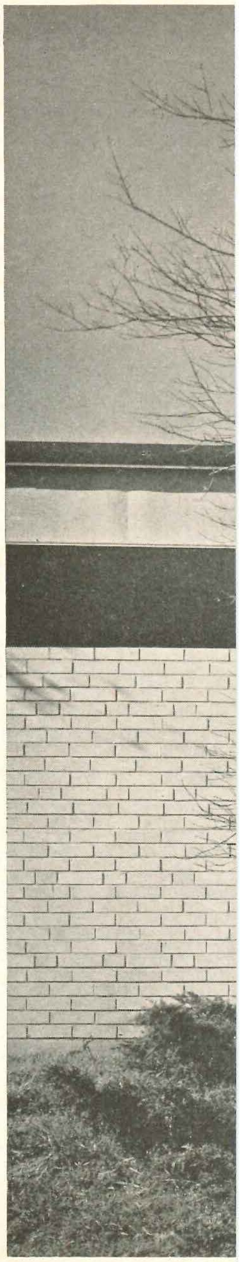


Sales offices



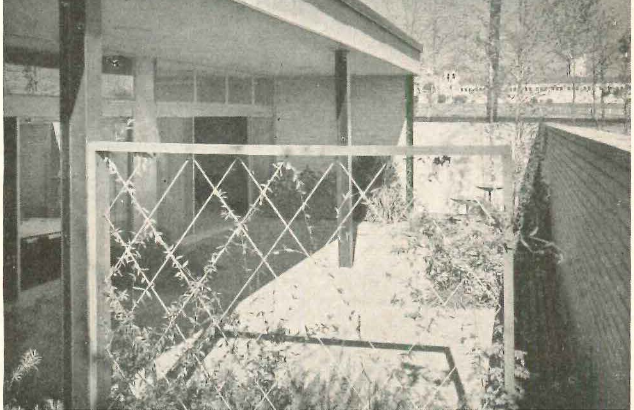
Parts Warehouse



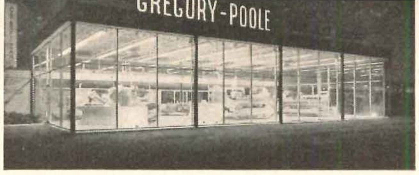


Private office

Patio outside private offices

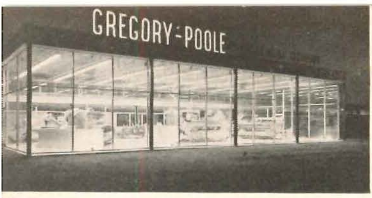


Joseph W. Molitor



THE GREGORY-POOLE BUILDING, *logically designed and soundly-constructed, is characterized by an equally logical, quite satisfactory use of landscaping and color. Green foliage is set against buff brick; steel columns and warehouse roof girders are dark steel blue; shop crane rails are caterpillar-tractor-yellow; movable office partitions are warm wood and glass*

Through the transparent showroom can be seen, across the intervening freight tracks, Raleigh's famous Arena. Showroom, shop and parts warehouse are all laid out in bays 20 by 40 ft except for the center circulation aisle in the warehouse where 20 by 20 bays are used; office space is also laid out in 20 by 20 bays. Site slope was utilized to obtain the height needed in the shop while maintaining the clerestory height established for the showroom

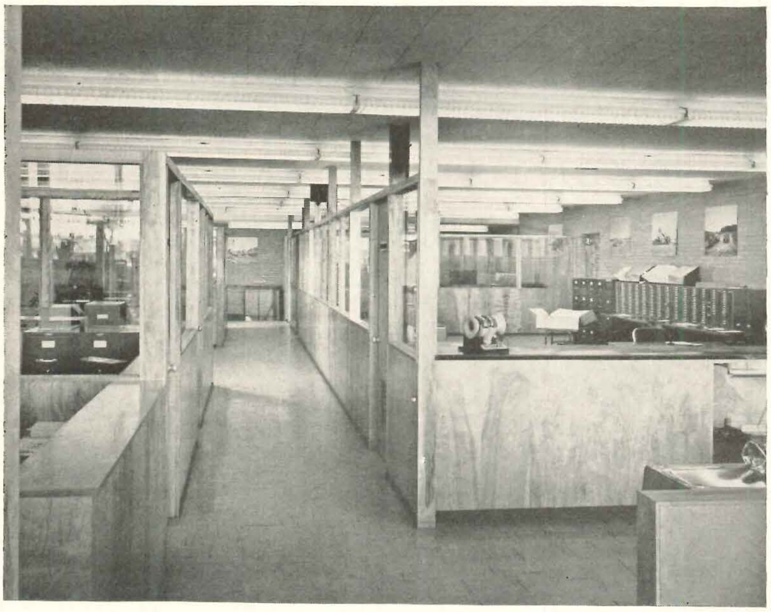


Beneath the entire office section is basement storage area which, because of site levels, required little excavation. The first-floor private offices have a toilet and a small bar accessible from the lounge between them; this entire suite has sliding glass walls to the patio with its pool and planting. In effect the exterior wall of the suite is the farther brick wall of the patio

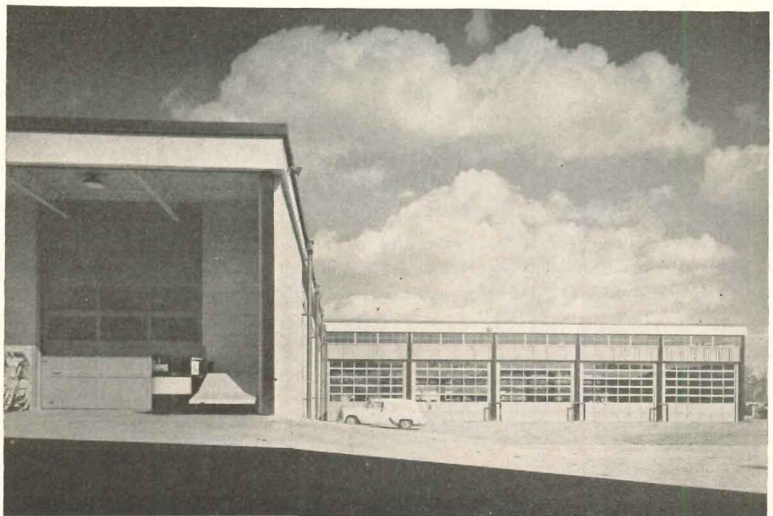
Joseph W. Molitor

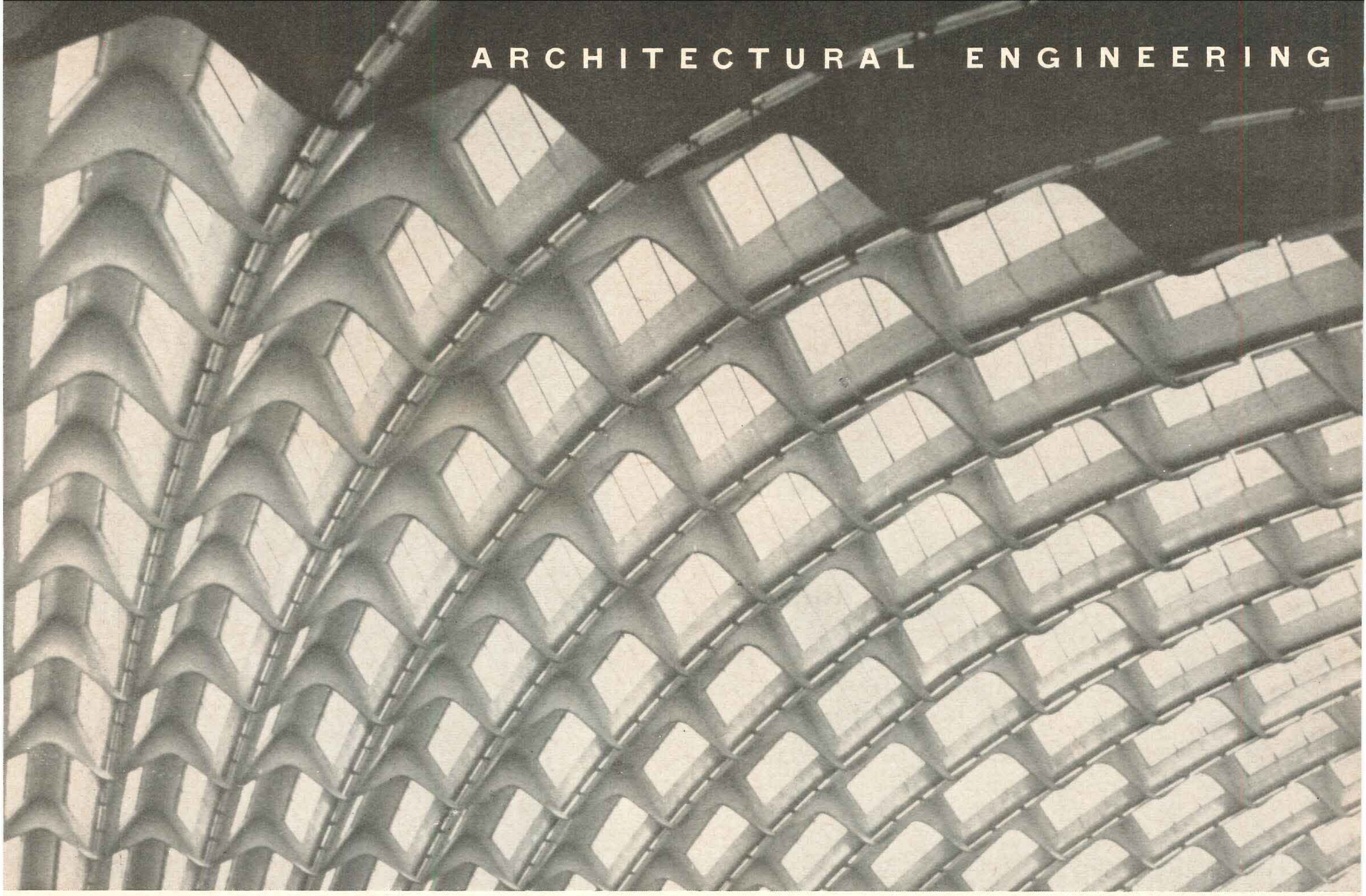
Lounge between private offices

General offices



Shop at right, parts warehouse left





A PHILOSOPHY FOR BUILDING "CORRECTLY"

NERVI

Excerpts from Costruire Correttamente *by Pier Luigi Nervi. This book, translated by Giuseppina Salvadori and prefaced by Mario Salvadori, is to be published in July by F. W. Dodge Corporation.*

MANY DEBATES about architecture have been heard during the last decades and they continue today. But even if debates led to final conclusions, acceptable to the most severe critics, their practical results would be meager unless the client's judgment, the techniques and economics of building, and the academic preparation of the designer were adequate to the solution of the new architectural, structural and economic problems.

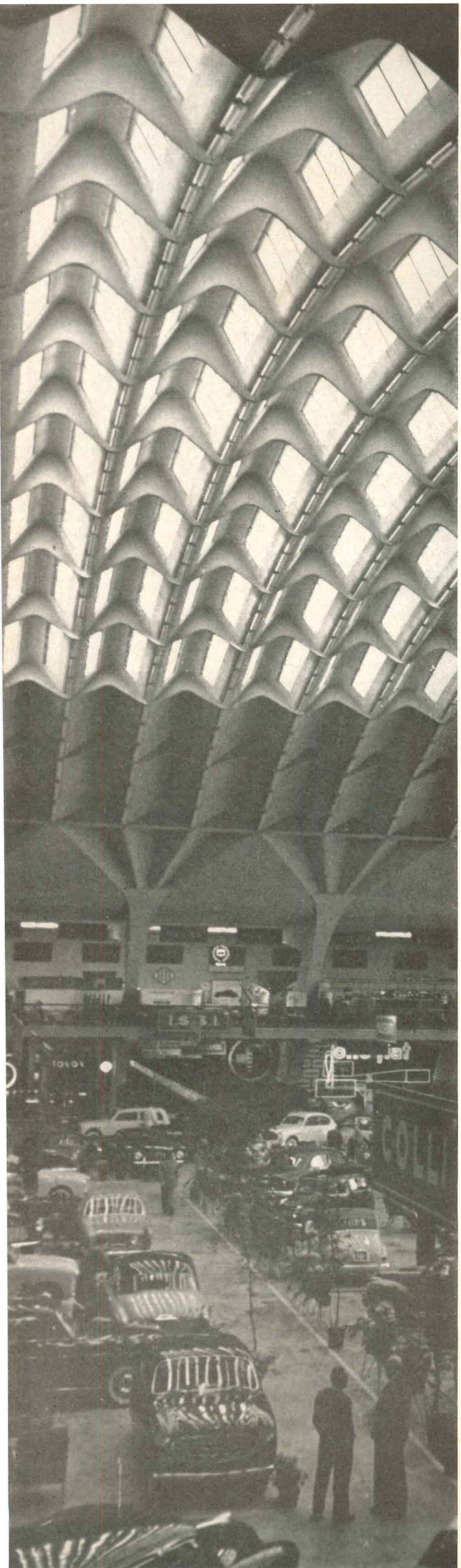
Similarly, the present dynamic development of theoretical research on reinforced concrete will not yield practical results unless we obtain a better knowledge of the actual behavior of this material and learn to relate more strictly the elements of structural intuition, mathematical calculation and construction procedure. Only a perfect synthesis of these factors can realize the unlimited technological and architectural potentialities of reinforced concrete structures.

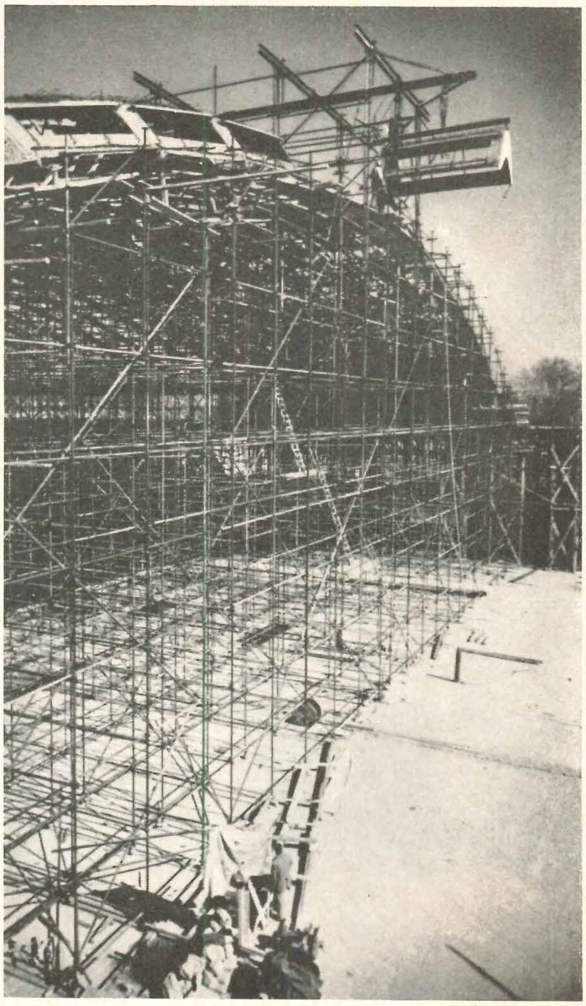
Construction gathers in a unique synthesis the elements of manual labor, industrial organization, scientific theory, esthetic sensibility, and great economic interests. Construction creates our physical environment, and thus exercises a silent but deep educational influence.

On the other hand, we all help to determine its characteristics and the direction of its development by passing judgments, by expressing preferences or dislikes, or by intervening directly in the construction process.

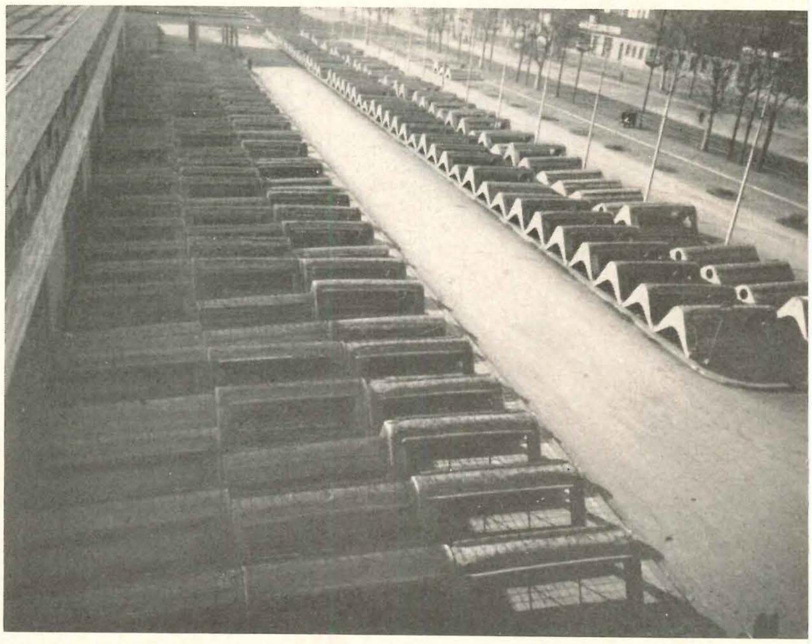
THE ROLE of the client is as important as it is difficult. In my long life as a designer and builder, I have seldom found clients capable of stating their problem clearly, of choosing the designer and his design wisely, or of accepting the responsibility for a daring structural or esthetic solution.

The designer, after a thorough study of the problem and under the impulse of his creativity, is naturally and understandably daring. The courageous decision of the client is to be admired much more, since it must be unemotional and must weigh, on one hand, his desire to build a structure in which he believes, but which will not necessarily be identified with him, and, on the other, his personal loss if it should fail. The client influences the architectural solution directly. Consciously or unconsciously, by defining the general outline of the structure, by choosing the designer, and by accepting or rejecting the designer's project, he becomes a decisive element of the architectural solution.



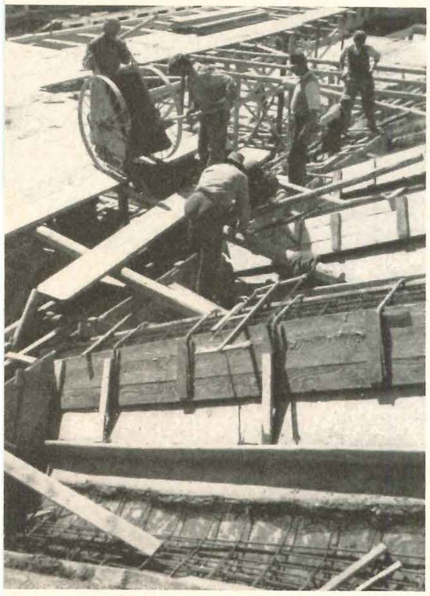


The whole structural concept and visual effect of the famed shell for the Turin Exposition Building were made possible through the utilization of a construction material developed by Nervi called Ferro-cemento. It consists of layers of fine wire mesh, and sometimes small bars, embedded in cement mortar to form prefabricated elements. For this shell they are only $1\frac{1}{2}$-in. thick, and thus comparatively lightweight. They are connected at the top and bottom of the undulations by concrete arches



The average quality of the architecture of a nation is more influenced by the tendencies and the cultural level of the clients than by the knowledge and esthetic sensibility of its architects. Any hope that the modern architect, even if exceptionally capable, may win over the unsympathetic client is completely vain: in a coarse society the refined architect will be permanently unemployed.

THE ACADEMIC TRAINING of designers and builders presents a complex and difficult problem. Our universities lack tradition in the scientific approach to building because the theoretical study of structural and construction problems is only about a hundred years old. As far as an artistic approach is concerned, the revolutionary changes in the basic concepts of architectural esthetics, initiated at the beginning of our century and still



in progress, have not given us clearly defined directives, even if they have succeeded in separating our problem from those of the Beaux-Arts academies.

All fields of knowledge play a role in the field of architecture and must find in it a balance capable of expressing values of an artistic, moral and social character which are neither easily definable nor commensurable. Moreover these values are, in a sense, absolute values that truly represent the essential characteristics of all construction — durability in time.

It is my belief that to express an esthetic feeling through the states of static equilibrium, the satisfaction of functional needs and technical and economic requirements — that is, by such a variety of knowledge — is much more difficult than to express any other kind of feeling by other intellectual means.

The loftiest and most difficult problems arise in architecture from the necessity of realizing a synthesis between opposing sets of factors: the harmony of form and the requirements of technology, the heat of inspiration and the coolness of scientific reason, the freedom of imagination and the iron laws of economy.

DO BUILDING PROBLEMS, even in their most technical aspects (for instance, stability) allow unique and impersonal solutions obtainable by the application of mathematical formulas? Or, on the contrary, can they be solved correctly only through a superior and purely intuitive re-elaboration of the mathematical results, because of the complexity of the inherent deficiency of our theoretical knowledge and, finally, the wide discrepancies between theoretical premises and physical reality?

In this re-elaboration lies the most promising means of penetrating the mysteries of the structural world.

Probably because I have failed to make myself clear, I have often been interpreted as trying to undervalue the results achieved by the mathematical theory of structures. I have thus been both championed and contradicted by people who did not understand my thoughts.

It would be absurd to deny the usefullness of that body of theorems, mathematical developments, and formulas known by the rather inaccurate name of "Theory of Structures." But we must also recognize that these theoretical results are a vague and approximate image of physical reality. We come nearer to this reality only by adding to the mathematical results the results of experiments, by observing the actual phenomena, by establishing a conceptual basis of these phenomena, and above all by understanding intuitively the static behavior of our works.

The fundamental assumption of the theory of structures is that structural materials are isotropic and perfectly elastic. But the most commonly used building materials, like masonry and concrete, are far from being isotropic and elastic.

Theory of structures considers our buildings being out of time, in a kind of eternal stability and invariability. The simple and commonplace fact that all structures decay and, after shorter or longer periods of time, become unstable, or at least show excessive displacements and amounts of damage, proves that this second assumption is also unrealistic.

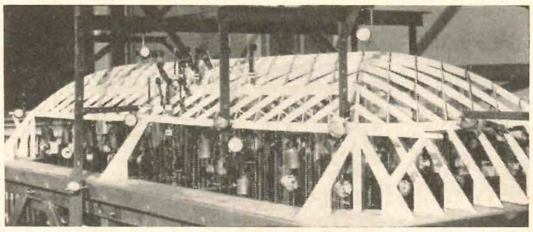
No soil is perfectly stable nor settles uniformly as time goes by. All building materials, but particularly masonry and concrete, flow viscously. The daily and seasonal temperature variations are irregularly distributed in the structure because of prevented displacements, and create stresses of unforeseeable magnitude and direction.

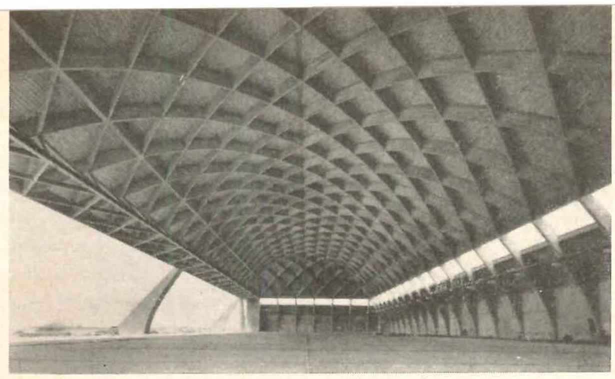
In other words, theory of structures may be compared to a physiology of perfect organisms which are permanently youthful and untouched by disease or functional deficiencies. The programs of our schools of engineering, from which the structural training of our architectural schools are derived, were set up during the second half of the past century. This was a period of great and justified enthusiasm for the developments of mathematical theory of elasticity which clarified the behavior of materials under load and allowed the analysis of statically indeterminate structures. As usual this enthusiasm impaired the objectivity of the engineer, who was led by his mental make-up to believe in the theory even when it was contradicted by facts.

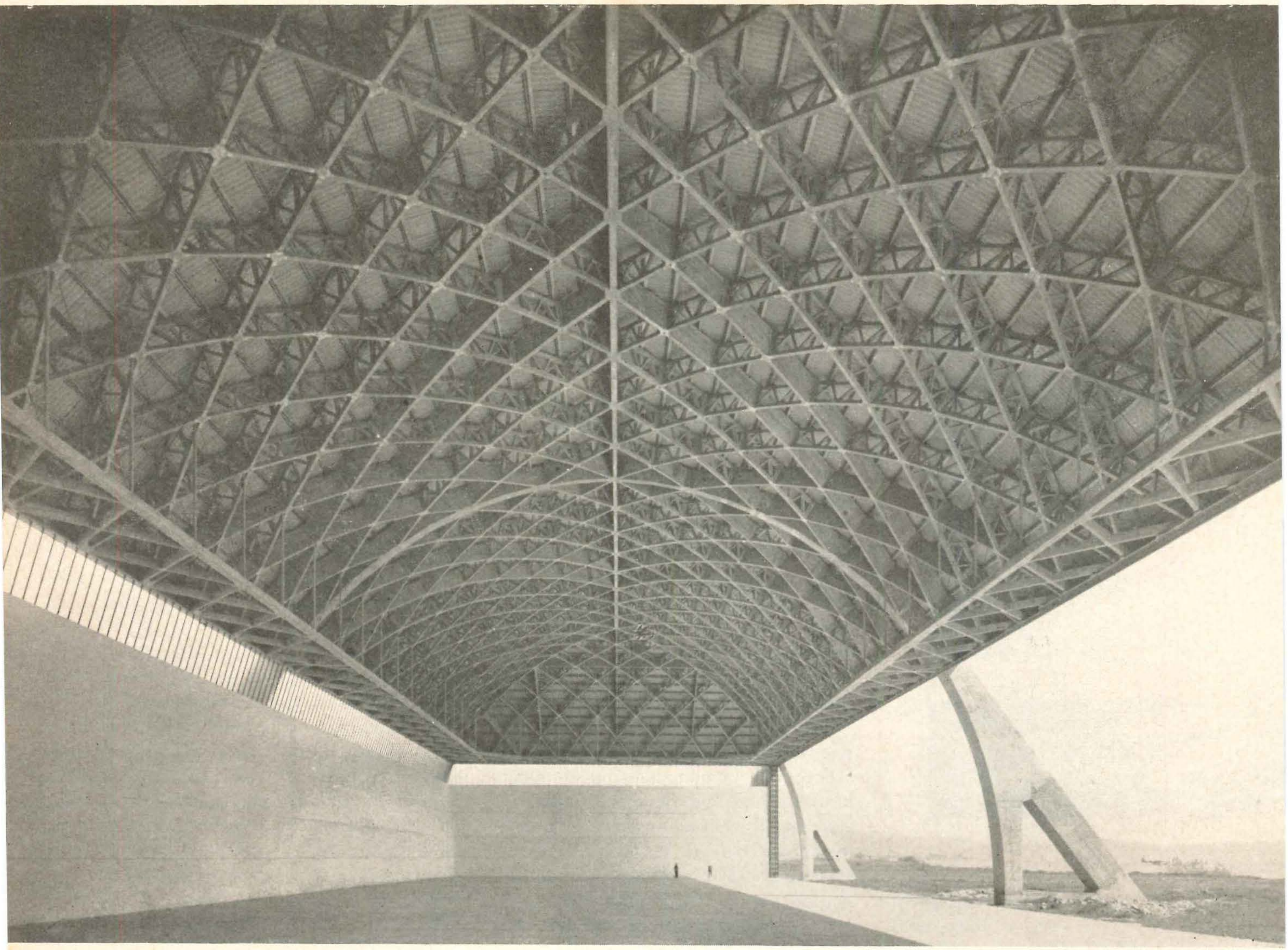
The pre-eminence given to mathematics in our schools of engineering, the purely analytical basis of the theory of elasticity, and its intrinsic difficulties, persuade the young student that there is limitless potency in theoretical calculations, and give him blind faith in their results. Under these conditions neither students nor teachers try to understand and to feel intuitively the physical reality of a structure, how it moves under load, and how the various elements of a statically indeterminate system react among themselves.

We cannot deny that the potentialities of mathematical methods are soon exhausted, even when their application is difficult and complex. Skin-resistant and highly indeterminate structures cannot be analyzed by mathematical theories, although these structures are extremely efficient from a technical, economical and architectural viewpoint.

The formative stage of a design, during which its main characteristics are defined and its qualities and faults are determined once and for all, cannot make use of structural theory and must resort to intuition and schematic simplifications. The essential part of the design of a building consists in conceiving and proportioning its structural system,





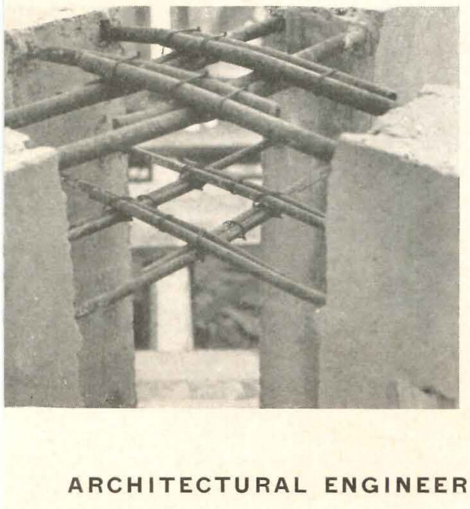


Model analysis in design and prefabricated components in construction are two basic elements in the building philosophy of Nervi. His hangars exemplify both. (There were six, all destroyed by war.) The first hangar, (top) built in 1935, was cast in place, and its design was based primarily on model analysis. A major improvement in later hangars was the use of prefabricated trusses to lighten the structure. Trusses were joined by welding of reinforcing bars and filling space with high-strength concrete in evaluating intuitively the dangerous thermal conditions and support settlements, in choosing materials and construction methods best adapted to the final purpose of the work and to its environment; and, finally, in seeking economy. When all these essential problems have been solved and the structure is thus completely defined, then and only then can we and should we apply the formulas of the mathematical theory of elasticity to specify with greater accuracy its load resisting elements.

The student lacking a thorough knowledge of structures considers an actual building essentially as a form. This attitude fosters solutions which are statically illogical and at times unrealizable, and starts an inner conflict between a desire for structural audacity and the incapacity of its realization, which is common to the great majority of designers today.

Unfortunately, although the present methods of stress analysis are extremely ingenious and one may hope that they will be refined in the near future, their efficiency in solving complicated statically indeterminate systems (particularly three-dimensional systems) is limited in comparison with the creative potentialities of the imaginative designer and the available construction methods. Some of the newer systems cannot be analyzed theoretically, and, therefore, their realization would be impossible without the practically limitless assistance offered by experimental stress analysis.

The only drawback to the experimental procedure is that the preparation of the model, its loading, and the reading of gauges are lengthy and costly operations. Whenever possible, it is therefore more convenient to use a theoretical approach and to limit the use of model analysis to structures of special technical and architectural importance.



What significance can we give, and what limits can we assign, to the word *art* in the field of construction? Can we consider as an artistic fact a structure or a building which is strictly defined by the laws of statics and dynamics, independent as they are of the human will and of our esthetic feelings? Are the parabolic profile of a great bridge, the catenary of a suspension bridge, the aerodynamic shape of an airplane to be considered artistic? Doesn't art require a freedom of form and of expression denied to all human products governed by physical laws? And how are we to establish how much freedom is necessary and sufficient to art?

I believe that art gives more than simple esthetic satisfaction. I think art is to be found in that indefinable quality of work to evoke in our minds the feelings and emotions experienced by the artist in the impetus of creation. If this emotional communication be the test of art, to define its characteristics is obviously impossible and to try to teach art would be negative and fruitless.

I believe, therefore, that the most effective artistic training should not go beyond those limits which in the field of literature are represented by grammar and syntax; that is, beyond the mastering of the means of expression. These means allow one to say what is to be said in correct, understandable, and formally satisfying sentences, or at least sentences which are not unpleasant.

The field of architecture presents the same situations. The real danger to architecture, today as always, is not represented by a simple, humble, and correct approach to its problems, but by an emphasis on rhetoric or by a decorative vacuum. These dangers are of a more fundamental character in architecture than in literature, since one cannot ignore an architectural failure, and one cannot forget the economical losses due to architectural rhetoric.

I believe, therefore, that the schools of architecture should above all teach structural correctness, which is identical with functional, technical, and economic truthfulness and is a necessary and sufficient condition of satisfactory esthetic results. The esthetic results achieved by these means usually suffice even if they do not reach superior heights of art.

I believe that even philosophers interested in esthetics find it difficult to explain the origin of our feelings toward forms which are dictated by the laws of statics or dynamics, since these laws are not intuitively understood, nor are they explainable by the experience of our ancestors. But there is no doubt that any product of high efficiency is always esthetically satisfying.

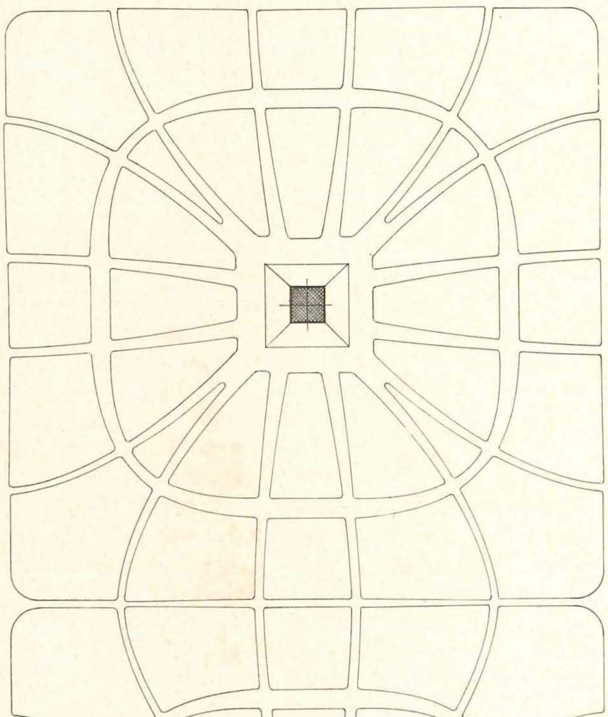
Reinforced concrete is truly the most interesting and fertile structural material available to mankind today because of its high compressive strength, its exceptional weather resistance, its constructional simplicity, and its relatively low cost.

As against these and many other positive qualities, reinforced concrete presents some hidden deficiencies and specific characteristics which make its structural behavior difficult, if not altogether impossible, to foresee exactly. Its high thermal sensitivity, its shrinkage, and above all its plasticity, shatter our hopes of investigating or knowing either before or after construction the real conditions of equilibrium of any statically indeterminate structure.

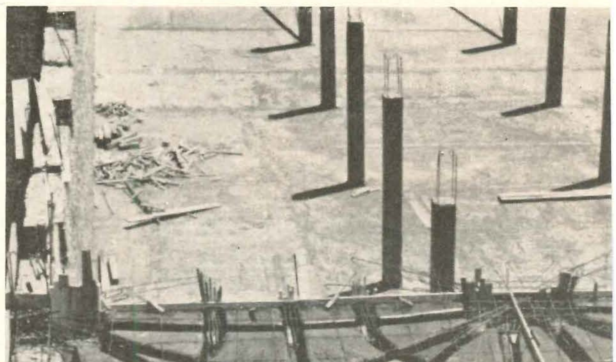
A few days after being poured, a concrete structure, particularly if it is complicated, is strained by internal forces that are independent of the external loads. These forces grow with the shrinkage of concrete and under the influence of thermal variations until the plastic flow of overstressed sections or the development of fine cracks brings about a sufficiently stable condition of equilibrium.

We must frankly confess that neither the designer nor the builder can be entirely satisfied with this final result. Even if the cracks, the excessive stresses, and the plastic flow are not considered dangerous, the solution is obtained at the cost of the structural continuity of the building — that same continuity which was the object of such complicated calculations.

Another factor of great importance to the success of a reinforced concrete structure is good formwork. The lowering of the forms of a concrete structure may well be compared to the critical moment of delivery. Whenever I have witnessed the lowering of the forms of a large structure constituting a single static system, I have noticed the impossibility of lowering all the forms simultaneously and have asked myself with deep anxiety whether the strains and the irregular conditions of loading to which the structure was subjected at the time would not induce stresses far above the allowable limits, or even above the breaking point. The adaptability of concrete structures to unforseen conditions and their capacity to over-



"*The pattern of steel should always have an esthetic quality and give the impression of being a nervous system capable of bringing life to the dead mass of concrete.*" *Amazingly, such a design condition may arise out of the structural requirements, as in the Gatti wool plant in Rome. Slab ribs are set along the isostatic lines of principal stress. These lines depend exclusively on the loading of the floor. Movable forms of Ferro-cemento, cast previously in plaster molds, allow complete freedom of form in the ribs*



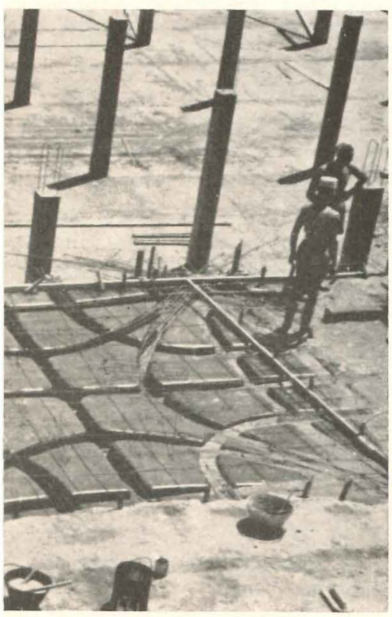
come temporary critical strains always fill me with wonder and admiration.

Although it is difficult to achieve an economical and permanent concrete structure which will remain youthful throughout the years, I shall make a few suggestions on how best to approach the goal.

My first and perhaps most fundamental suggestion is to create structures which are harmonious both in form and in the distribution of steel reinforcement. This quality, which may seem totally abstract and only esthetically important, has a deep correspondence with the physical reality of the structure. As I pointed out above, because of its inherent and unavoidable continuity, a concrete structure is an organism in which stresses spread from one element to another so that all together they withstand the internal or external forces menacing its stability. Almost always these forces are not only those considered as loads in the computations, but also those deriving from shrinkage, thermal variations, and yielding of the supports.

This complicated state of stress in the structure creates singular regions where stress concentrations are bound to arise as soon as the various elements are not well proportioned. Stress concentrations in turn are responsible for both capillary and large cracks. Hence, we must avoid all dimensional discontinuities between adjacent elements and substantial differences in the steel content of the sections of a member or adjacent members.

The steel reinforcement of a complicated structure should be so designed as to form in itself a stable structure capable qualitatively of sustaining the load. The added concrete should then be capable of implementing the equilibrium quantitatively, by connecting the steel bars and by absorbing compressive stresses. The pattern of steel should always have an esthetic quality and give the impression of being a nervous system capable of bringing life to the dead mass of concrete.



THE MOST SPECIFIC characteristic of concrete which usually determines its structural behavior and makes it so difficult to analyze, is the remarkable variability of its stress-strain ratio — that is, its imperfect elastic behavior.

In the first place the elastic modulus of concrete varies due to the problems inherent in mixing, placing and curing. Secondly, the elastic modulus changes due to plastic stresses and the strains or yielding under constant load (viscosity). The structural consequences of these two sets of causes are substantially different.

The first type of variability only gives trouble when it causes the elastic modulus of concrete to differ in two collaborating members of the same structure.

The changes in the elastic modulus due to the second set of causes, including the decrease of the modulus with stress, its increase under repeated loading, and its plastic flow under load, is of greater structural importance.

Due mainly to plastic flow, a concrete structure tries to adapt itself with admirable docility to our calculation schemes, which do not always represent the most logical and spontaneous answer to the requests of the forces at play, and it even tries to correct our deficiencies and errors. Sections and regions too highly stressed yield and channel some of their loads to other sections or regions which accept this additional task with a commendable spirit of collaboration within the limits of their own strength.

What are our present chances of understanding and of mastering such complicated phenomena? At present their qualitative and quantitative determination is out of our grasp. A designer bold enough purposely to increase or decrease the plasticity of certain concrete elements, contributing with others to the strength of the same structure, does not have quantitative data that can lead him to even roughly approximate results. In practice, the importance of this data would be fundamental. For example, by increasing the plasticity of certain parts of fixed arches the pressure resultant due to the dead load could be centered at all sections, thus resulting in great economy for these structures, in which live load is of minor importance.

THE FUNDAMENTAL IDEA behind the new reinforced concrete material Ferro-cemento which I have developed is the well known fact that concrete sustains large strains in the neighborhood of the reinforcement, and that the magnitude of the strains depends on the distribution and subdivision of the reinforcement throughout the mass of concrete. With this principle as a starting point, I asked myself what would be the behavior of thin slabs in which the proportion and subdivision of the reinforcement were increased to a maximum by surrounding layers of fine steel mesh, one on top of the other, with cement mortar.

The square mesh was made out of ductile steel wires 0.02 to 0.06 in. diameter, set 0.4 in. apart. The mortar was made of 0.6 to 0.75 lb of cement to the cubic foot of good quality sand. The slabs were very thin but extremely flexible, elastic, and strong.

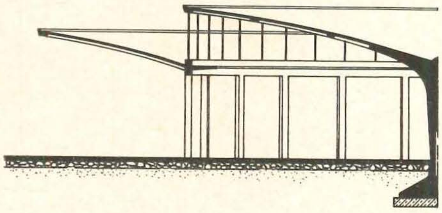
Later on, in order to increase the thickness and the strength of the slabs without using more than 10 to 12 layers of mesh, I tried inserting one or more layers of steel bars 0.25 to 0.4 in. in diameter between the middle layers of mesh, thus attaining thicknesses of 2.5 to 4 in.

The material thus obtained did not behave like regular concrete, but presented all the mechanical characteristics of a homogenous material.

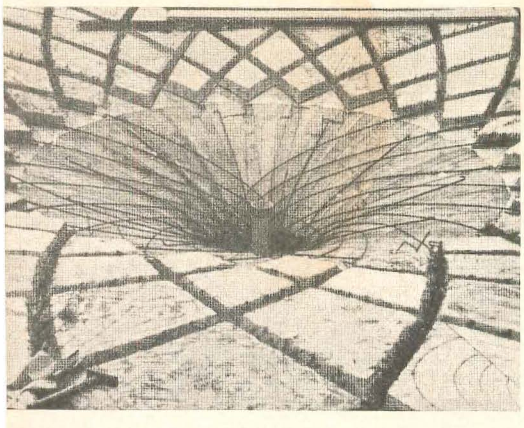
Experiments with the new material demonstrated immediately its most important and fruitful properties: absence of cracks in the cement mortar even with a large amount of strain because of the subdivision of the reinforcement; and elimination of forms since the mesh acted as a lath to retain mortar.

During the last few years I have constructed buildings in which Ferro-cemento was not only conveniently and interestingly applied, but also was a decisive design factor both technically and architecturally.

The most important of these applications is the large undulated shell of the central hall of the Turin Exposition Building, which spans 300 ft. The shell is built with prefabricated elements of Ferro-cemento, connected by reinforced concrete arches at the top and the bottom of the undulations.



A highly expressive geometric pattern was formed in the ceiling of this restaurant designed by A. La Padula through a refinement in Nervi's prefabrication techniques. Precast, coffered sections, about 1-in. thick were assembled on a platform with spaces left between for reinforcing of the stiffening ribs



REINFORCED CONCRETE is the most revolutionary material of our entire building history. The essence of the revolution consists in the possibility of realizing structures in perfect conformance to statical needs and visually expressive of the play of forces within them.

The most elementary structural elements acquire new and expressive interest. Beams lose the prismatic rigidity of wooden struts and of standard metal sections, and may plastically follow the variations of stress. Columns free themselves from the constant cross-section of stone and masonry pillars. Three-dimensional structures, like domes and barrels, acquire a freedom of form unknown to masonry.

The full development of reinforced concrete depends partly on the mental development of the designer, who must consider the concrete structure as the materialization of the most efficient structural system, but also on the refinement of construction procedures. Through study of these construction methods the rigidity of wooden forms can be eliminated, allowing the economic realization of curved surfaces and elements of variable cross-section, as required by the flow of stress.

Architecturally and structurally, concrete is promising in the field of skin-resistant structures, that is, those structures whose strength is a direct consequence of the curvatures and corrugations of their surfaces.

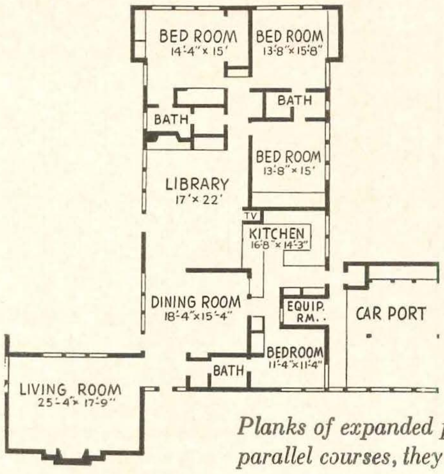
We cannot deny that the practical realization of large form-resistant structures presents great design difficulties. These theoretical difficulties are, in my opinion, neither unsurmountable nor great. Not only is the theory of structures being continuously developed, but even today we can solve satisfactorily the most complicated structural problem by experimental stress analysis. The real difficulty to be overcome is the general lack of intuitive understanding about the structural behavior of these resistant systems, and the difficulty of communicating such intuitive knowledge to others.

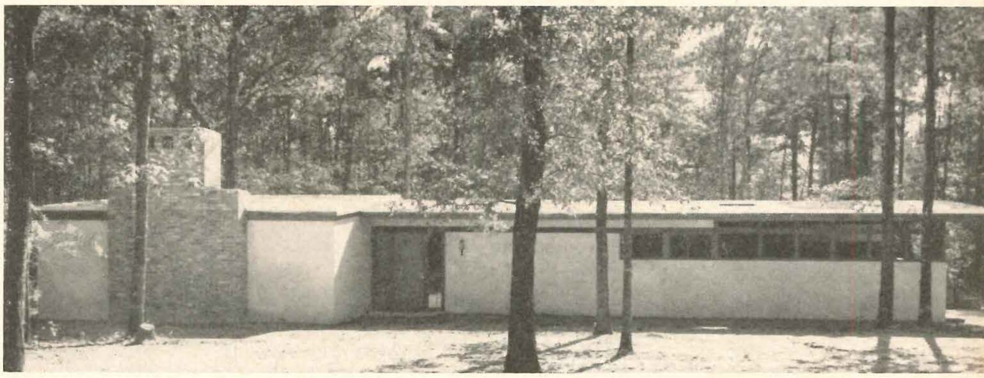
The many examples of form-resistant structures such as flowers, leaves, sea shells, etc., are either too small in scale to involve the weight of our body or the strength of our muscles, or, being decorative, do not suggest a direct structural experience. Other examples of form-resistant structures, like automobile bodies, airplane wings, and ship hulls, polarize our attention exclusively towards mechanical systems and, hence cannot be translated easily into civil engineering structures. Thus resistance due to form, although the most efficient and the most common type of resistance to be found in nature, has not built yet in our minds those subconscious structural intuitions which are the basis of our structural schemes and realizations. In other words, we are not yet used to thinking structurally in terms of form.

HOW CAN WE DEFINE and limit the technical potentialities of a material which in fifty short years has conquered the most varied fields of construction? Its structural limitations are hard to foresee. Although our knowledge of concrete is anything but complete, we are already capable of building concrete bridges spanning over 1000 ft (a few years ago Freyssinet designed a bridge spanning over 3000 ft), thin shell barrels and domes spanning over 1000 ft, framed structures for very tall buildings and dams capable of withstanding the pressure of many hundreds of feet of water.

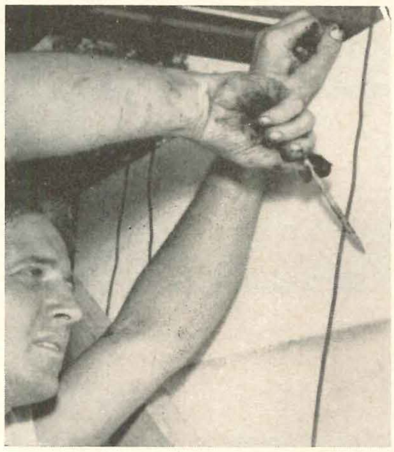
When the actual behavior of concrete under load and in time is better known, when laboratory practices capable of producing 14,000-psi concrete are commonly applied in the field, and when plastic redistribution of stress in complicated structures is foreseeable, the amazing results achieved so far will be easily surpassed.

The shape of things to come is clearly illustrated by the construction of airplane wings of prestressed concrete designed by Freyssinet and built by the Brequet Co. (*See Technique et Science, Aeronautique*, October, 1953). An actual *flying stone* has been realized. What else are we to expect from such a wonderful structural material?





Planks of expanded polystyrene enclose this 8-room house. Laid in parallel courses, they were joined by wooden pegs, inserted by hand



INSULATION BECOMES LOAD-BEARING

INSULATION IS DOING DOUBLE DUTY in a 3200-sq ft ranch-style house just outside of Houston, Texas. Planks of expanded polystyrene are providing not only insulation and a vapor barrier but also almost complete enclosure of the four-bedroom house: walls, roof and even some floors.

The major component of the plastic house is a *Styrofoam* board 9 ft by 12 in. by 3 in. The boards are laid in parallel courses within the wood formwork, with all joints staggered and tightly butted, to form the walls of the house. Treated wooden pegs, which can be inserted by hand, are pushed into the bubble-filled planks to "nail" them together. Vertical seams are filled with a black waterproofing compound, which can be seen in the photograph at right.

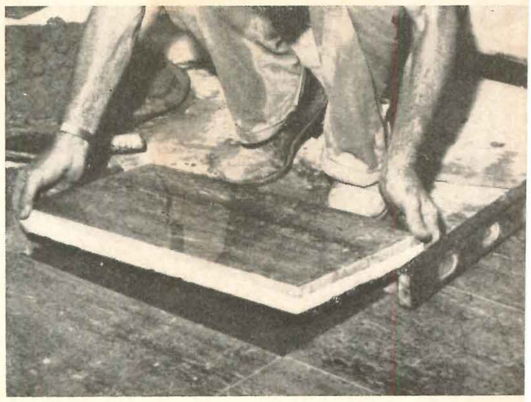
This installation procedure alone does not provide a structural wall, however. Although the strength of the expanded polystyrene planks is such that it can support dead loads like concrete floors, it will not in all likelihood be able to take the loads usually inflicted on a bearing wall. This one inadequacy was corrected by coating the plastic walls on both sides with cement. First the walls were prestressed by stringing wires from ceiling to floor, as can be seen in the photograph at the right, and pulling them taut. Then the walls were sprayed with a 1-in. coat of stucco cement on the outside and a 1-in. coat of cement plaster on the inside, making a 5-in.-thick wall.

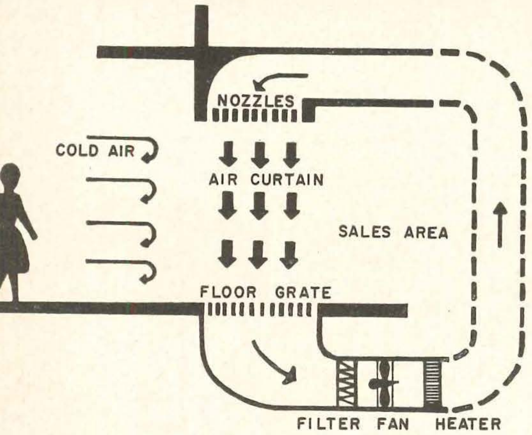
The 4-ply, built-up roof is covered with Styrofoam planks which are 18 in. high instead of 12 in. They are overlapped, and coated with ¼ in. of Portland cement. Even part of the flooring is plastic plank! In two rooms, ⅝-in.-thick marble slices bonded to Styrofoam blocks provide a marble floor which has two major advantages: it costs about one-third of what regular marble flooring costs, and the marble itself remains at room temperature because of the insulating effect of the plastic base.

The house is designed to withstand a uniform wind load of about 70 psf or, according to owner-builder Dean Emerson, a 200-mph gale. In addition, it has a high built-in insulation factor, will not burn easily, will not absorb moisture and is inert, so is resistant to rot and vermin. One of the most attractive advantages of the plastic house, according to Mr. Emerson, is its cost. He estimates that construction costs are 10 to 15 per cent less than they would have been for a house with the same advantages built with conventional material. Part of the cost savings results from the ease of handling of the lightweight planks. Each weighs only 4½ lb and can be cut easily with either a saw or a knife. Operational costs are lower too. Because of the insulating values of the house, it can be heated with an 80,000-Btu unit instead of the 150,000-Btu size which would be necessary in a normal house of this size, and cooled with a 3-ton unit instead of a 5-ton unit.

Architect of the Emerson house was Wilson, Morris & Crain, Houston. Francis J. Niven was the consulting engineer. *Styrofoam* is produced by Dow Chemical Co., which is conducting its own research program on the use of the plastic as a loadbearing member.

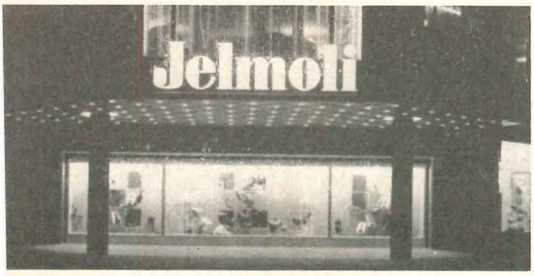
Styrofoam walls were prestressed by wires strung from ceiling to floor, then were strengthened with 1 in. of sprayed cement on both sides. On some floors marble slices were bonded to Styrofoam





AIR: IT'S THE LATEST THING IN "DOORS"

Swiss department store entrance is air curtain by day (above), by night a showcase (below) raised from basement



INDOOR-OUTDOOR LIVING has received another boost — an *Air Curtain* door, especially useful for stores, which acts as an insulating wall that can be penetrated only by solid bodies.

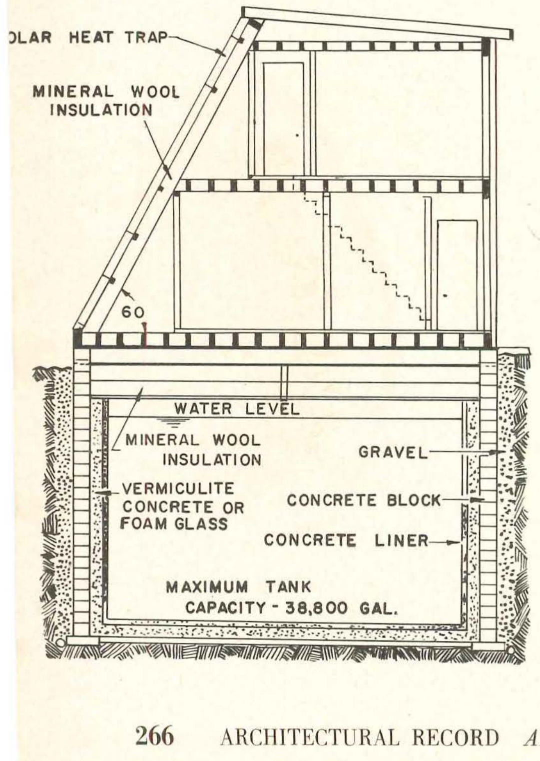
The diagram at the left shows how the *Air Curtain* operates. Air from a plenum chamber is discharged downward in vertical curtains or layers by a number of nozzles. It is returned through a floor grille into a pit, where most of the dust and foreign matter is removed, and then blown back into the plenum chamber. The pit is sprayed with water periodically to eliminate all possible fire hazards and flush out the light dirt.

The multiple curtains of air provide a hermetically sealed opening which cannot be penetrated by insects, dust, wind or rain. Air delivery from the discharge nozzles is variable, to counteract changing pressures and winds, and can be controlled automatically or manually. The air nozzles are also directional, so that they can spill air either outward, to keep the entrance clean and dry, or inward for ventilation. This last advantage is particularly desirable in stores which have been closed over a week end, in that it provides a speedy method of freshening of the air. The air can be either heated or cooled before delivery, depending on the effect desired. It is said that it gives the sensation of a "gentle breeze" at head level. Even when used at maximum velocity during high winds, it is not objectionable, as it is approximately half that of the wind.

The cost of the *Air Curtain*, according to the manufacturer, is slightly higher than conventional closures, averaging about $1000 per foot width of opening completely installed. It is contingent on various design factors, the most important of which is exposure. Costs drop somewhat as width increases, since the blower and motor sizes remain the same. Advantages claimed for the system are that cleanliness is improved, valuable floor space is saved by the elimination of vestibules, and personnel and customer comfort is improved.

The first installation in this country of the *Air Curtain* was in a Kroger supermarket in Dillonvale, Ohio. Three blowers, operated by a 5-hp variable-speed motor, furnish 12,000 cfm air delivery. Heat is furnished by a gas-fired unit heater. The entrance, protected by a pylon and canopy, faces south and is subject only to mild winds. Night closure consists of three swinging doors. Architect of the store was Betz and Bankemper.

UNIVERSITY OF TORONTO PLANS A SOLAR-HEATED HOUSE



CANADA may have a solar-heated house soon.

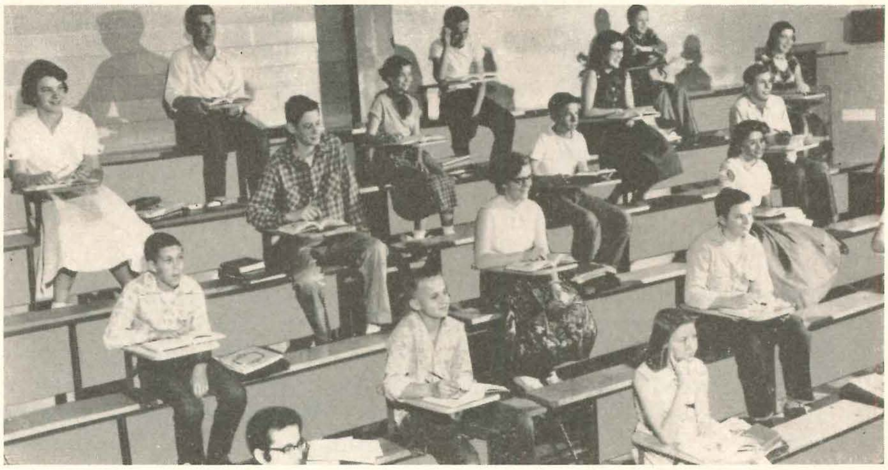
The University of Toronto Mechanical Engineering Dept., under the direction of Prof. E. A. Allcut, has been experimenting with solar energy applications for several years, collecting data on efficiency of glass collectors and on performance under varying weather and temperature conditions. The next step — and it may happen soon — is the construction of a test house which, it is expected, will be operated through several full seasons.

The house which is being planned is a two-story, five-room house — well insulated, of course — in which the entire basement would be used as a 38,800-gal water reservoir. As shown in the section at left, the heat collector (it will probably be one or more sheets of glass and a blackened metallic plate separated by air spaces) covers the south wall of the house, which will be inclined at an angle of 60 deg to catch the maximum amount of sun. A pump will circulate water from the bottom of the storage tank, where it is coolest, through the collector, where it will be heated. The heated water will then circulate down through conventional recirculating blending valves to radiant coils in the floors, ceilings and some walls, which will provide a maximum heating surface for the house. The water will finally filter back to the reservoir. It is estimated that such an extensive heating surface will require a minimum water temperature in the radiant coils as low as 80 F when outdoor temperatures are −10 F.

(More Roundup on page 280)

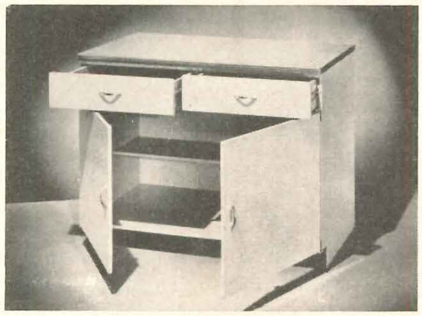
SOME NEW EQUIPMENT AND FURNITURE FOR SCHOOLS

Desks for Bleachers. *Tablet Arms* which attach directly to bleacher seats by means of steel wing bolts make possible the utilization of gymnasiums as extra classrooms to relieve crowded classroom conditions. The portable arms, of hardwood and steel construction, can be set up and removed by students and stored in portable steel racks. They are produced for either right-hand or left-hand use. A *Gymnasium Seating Capacity Calculator*, a handy, pocket-size plastic slide rule, is also available from the manufacturer, *Universal Bleacher Co., Champaign, Ill.*



Lightweight Movable Wardrobe for additional clothing storage in crowded classrooms is also functional as a room divider or as a bulletin board. The wardrobe provides storage for 24 coats by means of 12 fixed hangers and 12 hooks mounted on a bar-and-rack arrangement which adjusts for height within an 8-in. limit. In addition, a full-length wire rack above the overshoe storage space provides for lunch storage. Structural members are metal on honeycomb core. The back panel, which doubles as a bulletin board when it is turned toward the class, is of corkboard. Color is sage gray. Dimensions are 21⅞ in. deep by 47½ in. wide by 54½ in. high. The unit moves easily on full-swivel casters, but it is also available with full-length metal or island-type base. Where hardware is required, metal meets metal. *The Brunswick-Balke-Collender Co., 623 So. Wabash, Chicago 5, Ill.*

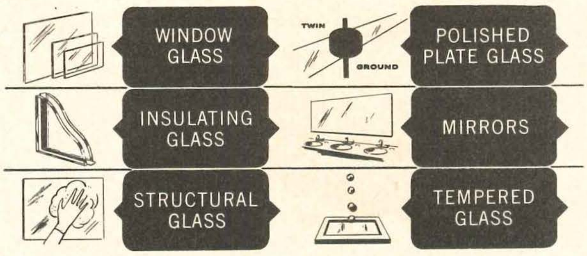
Multi-Purpose Classroom Cabinets, easily movable for use in unlimited combinations and groupings, feature laminated surfaces on both the exterior and the interior. Especially designed for kindergarten and elementary grade classrooms, the cabinets provide a smooth, firm surface for all classroom activities and resist the destructive impulses of lower-grade pupils. Produced in 24- and 36-in. heights, they are styled with plastic nub linen patterns in red, green, blue and yellow. Each unit has an offset base for foot room. *National School Furniture Co., Odenton, Md.*



Nursery Bowl is a vitreous china, flushometer bowl designed specifically for kindergarten and nursery school installations. The rim of the bowl is only 10 in. high. Available colors, besides white, are yellow, blue, pink, green, gray, tan. *Universal-Rundle Corp., New Castle, Pa.*

Plastic and Chrome-Steel Desks have chair seats and backs and desk tops of homogeneous solid plastic on legs of chrome-plated tubular steel. Available in a variety of models and in graded sizes ranging from kindergarten through college requirements, the *Trim-Line* units are said to withstand hard use and abuse, even powerful acids, with a minimum of maintenance. The *Hey-Woodite* plastic, which needs no refinishing, comes in five colors, with book boxes available in five harmonizing shades. The illustration at right shows a hinge-top desk. Open-front desks are also produced. *Heywood-Wakefield Co., School Furniture Div., Gardner, Mass.*

(*More Products on page 298*)



GLAZING SPECIFICATIONS

School Glazing Specifications is a work sheet which contains suggested specifications for *LOF* and *Blue Ridge* patterned glass products frequently used in school buildings. In addition, it includes a cutaway drawing of a typical school building, with space provided for filling in glass specifications for each area, and illustrates specialty uses, as shown at left. The 6-page, 8½- by 11-in. folder was designed to fit into and become a part of a school project job file. Copies of Form M-28 (AIA File 26-A) may be obtained from *Libbey-Owens-Ford Glass Co., Toledo 3, Ohio,** or from its district offices.

Wall Tile. Applications and design data on porcelain on aluminum, enamel on aluminum or steel, clear enamel on polished copper, polished stainless steel and plastic tile are presented in a 4-page brochure (AIA File 23-F) from *Vikon Tile Corp., Washington, N. J.*

Single Handle Mixing Faucets and Valves are covered in a 4-page brochure which gives information on roughing-in dimensions, mechanical construction and special uses. (AIA File 29-H-5) *Moen Valve Co., 6518 Ravenna Ave., Seattle 15, Wash.**

Nurses' Call Equipment. A combination two-way intercom system and light signal for use in hospitals is presented in a 4-page brochure from *DuKane Corp., St. Charles, Ill.**

Office Furniture. Desks, tables, cases and cabinets are cataloged, with dimensions, in a folder from *The Bentson Mfg. Co., Aurora, Ill.*

Architectural Aluminum Doors, Frames and Entrances is the title of a 12-page booklet which presents installation photographs and details and also information on special pushes and pulls, power operators, power devices and standard hardware. (AIA File 16-E) *Variety Mfg. & Engineering Co., 810 W. Fulton St., Chicago 7, Ill.*

Sliding Glass Doorwall Frames. Charts, which contain diagrams of 18 models, will guide selection and specification. Cross section details are also included in a 4-page brochure (AIA File 16-E) from *Steelbilt, Inc., 18001 So. Figueroa St., Gardena, Calif.**

Glazed Facing Tile. A 24-page booklet contains product and application information, a color chart and tables of shapes and dimensions. *Stark Ceramics, Inc., Canton 1, Ohio.**

Floor-Laying System by means of which wood floors can be laid on concrete slabs without the use of wood sleepers, wood subfloor, adhesives or nails is discussed in an 8-page brochure from *Loxit Systems, Inc., 1217 W. Washington Blvd., Chicago 7, Ill.**

Porcelained Enamel Panels in school construction are presented in Data File 300 (AIA File 15H-2), which includes photographs, technical data and architectural drawings on four basic types of installations: double-faced, single-faced, *Vision-Vent* type and corrugated porcelain enameled aluminum panels. *Ingram-Richardson Mfg. Co., Beaver Falls Pa.**

Mouldings and Trim, an 8-page brochure (AIA File 19-E-3) which presents scaled design details and specifications, is the eighth in a series of brochures released by *Architectural Woodwork Institute, 332 So. Michigan Ave., Chicago 4, Ill.*

Ironbound Continuous Strip Maple Floors, consisting of special tongue and groove sections embedded in mastic with sections interlocked by sawtoothed steel splines, are discussed in a 4-page folder (AIA File 19-E-9) from *Robbins Flooring Co., Reed City, Mich.**

Better Daylighting for Schools *with Translucent, Light Diffusing Glass by Mississippi* is the title of an 8-page brochure (AIA File 26-A-3,5,6) which includes research data, installation photographs and transmission data. *Mississippi Glass Co., 88 Angelica St., St. Louis 7, Mo.**

Chalkboards. *Korok* porcelain-on-steel chalkboards for classrooms are discussed in a 4-page folder which contains details, specifications and installation instructions. (AIA File 35-B-1) *The Enamel Products Co., Korok Div., 341 Eddy Rd., Cleveland 8, Ohio.**

Bituminized Fibre Pipe products, including sewer pipe, perforated pipe and couplings, are listed in a new CEFCO catalog which also includes fittings and adaptors made of cast iron especially for use with fibre products. *The Central Foundry Co., Foot of Pacific St., Newark 5, N. J.*

Rust Prevention is the subject of a 1956 catalog which includes 102 color chips showing the many *Rust-Oleum* colors available in primers, short and long oil type coatings, oil field finishes, color group finishes, machinery and implement colors, Galvinoleum coatings, heat- and chemical-resistant coatings, and floor and deck coatings. Form No. 255 can be obtained from *Rust-Oleum Corp., 2799 Oakton St., Evanston, Ill.**

Speedwalk Passenger Conveyor is discussed in an 8-page bulletin which includes photographs of existing installations and design and application data. A *Carveyor*, which proposes to handle passengers in small cars, is also covered. *Stephens-Adamson Mfg. Co., Aurora, Ill.*

Malarkey Plywoods, Doors and Redwood Lumber are presented in a 32-page booklet which includes full-page illustrations showing grain and color with each discussion. (AIA File 23-L) *M and M WoodWorking Co., 2301 No. Columbia Blvd., Portland 17, Ore.**

Adhesives, Coatings and Sealers are tabulated in a catalog which shows characteristics, methods of application, color, base, solvent, solids content, net weight and company formula identification. Another table lists typical applications in major industries, including the building products industry. *Minnesota Mining & Mfg. Co., Adhesives and Coatings Div., 411 Piquette Ave., Detroit 2, Mich.**

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

(Continued on page 354)

FINE HARDWOODS FOR ARCHITECTURAL USES—4

By Burdett Green, Executive Vice President, Fine Hardwoods Association and James Arkin, A.I.A., Consultant, Architectural Woodwork Institute

WALNUT, AMERICAN *(Juglans nigra)*

Better than 95 per cent of all walnut used in the United States comes from one genus, *Juglans nigra,* formerly referred to as American Black Walnut. The wood itself is not black but a light to chocolate brown, sometimes slightly purplish brown. In specifying plywood or veneers, it is not enough simply to indicate "Walnut," or even "American Walnut," because this one species is available in more different figure or grain types than any other wood.

Source: Grows throughout the United States and Southern Canada, but its commercial range is confined largely to some fifteen Central States

Color: Light gray-brown to dark purplish brown

Pattern: Plain to highly figured. Produces a greater variety of figure types than any other hardwood (approached only by mahogany): longwood (flat-cut; half-round; quarters, both plain and figured), crotches, swirls, stumpwood and occasionally burls. Four of the most readily available types are described below:

Plain Flat Cut—Comes in reasonably good widths, from 8 to 18 in., and occasionally in "half-round" to even wider stocks. Flitches (or individual stock) usually contain from 1200 to 1800 sq ft. In lengths, 9 to 10 ft predominate; however, fine architectural logs may be had up to 12 or 14 ft and occasionally to 16 ft long

Figured Flat Cut—Leafy grain character caused by annual growth rings is the same as in "plain flat cut," but, in addition, one or more types of "cross figures," "roll figure" or "mottle" appear, usually distributed more or less evenly over the face. Uniformity over large areas should not be expected, because the figure varies even within one log

Quartered Plain—The growth rings on the sides of flat cut walnut produce a quartered effect. By cutting out the leafy heart (flat) grain, pure quarters result. Certain large logs are often quarter-cut to give the entire sheet a stripe. Quarters, which come from only one-quarter of the log, are therefore much narrower in width, ranging from 5 to 10 in., mostly 5 to 8 in. However, panels of any width may be obtained by matching in either of two ways: book matching or slip matching

Quartered Figured—As explained above, a small percentage of the logs that may be quartered have "cross figure." When book-matched, they produce a "fiddle-back" effect. Other types of cross figure may be had by specifying "slightly figured quarters" or "highly figured quarters"

Characteristics: Moderately heavy; very strong for its weight, exceptionally stable. Even "plain" types are often characterized by dapples (pin knots, which are really not knots) and slight variations in color. When chosen for this informal character, the wood is described as "Enchanted Walnut"

Uses: Architectural woodwork; furniture

Availability: Veneer abundant. Lumber plentiful

Price Range: Medium to costly for highly figured types

WALNUT, CLARO *(Juglans hindsii)*—California Walnut

There is considerable confusion as to the exact species of *Juglans* that produces fast-growing Claro Walnut. Some authorities claim it comes from *Juglans regia.* (Photograph on Sheet 5.)

Source: California and southern Oregon, east of Coast Range

Color: Tannish brown with dark brown

Pattern: Wavy grain; prominent light stripes

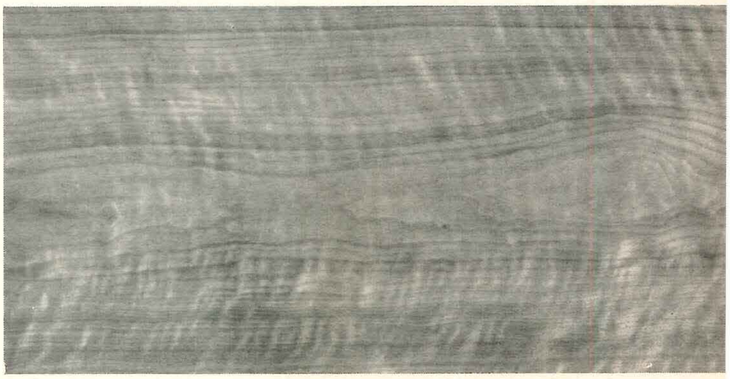
Characteristics: Moderately heavy; hard; rather open-grained

Uses: Highly decorative areas of fine furniture and paneled interiors

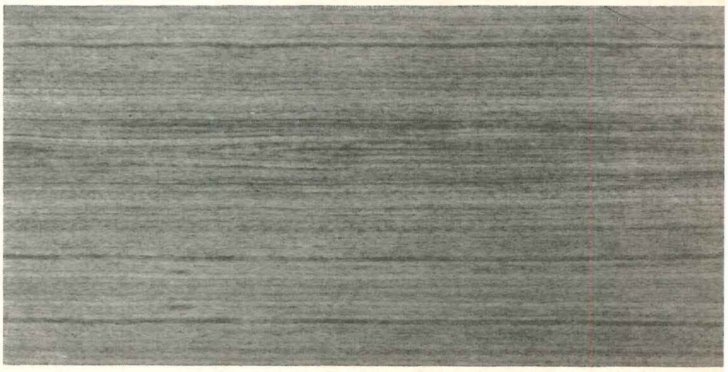
Availability: Quartered veneers rare. Lumber not available

Price Range: Medium to costly

Walnut, American, plain flat cut (1 piece)



Walnut, American, figured flat cut (1 piece)

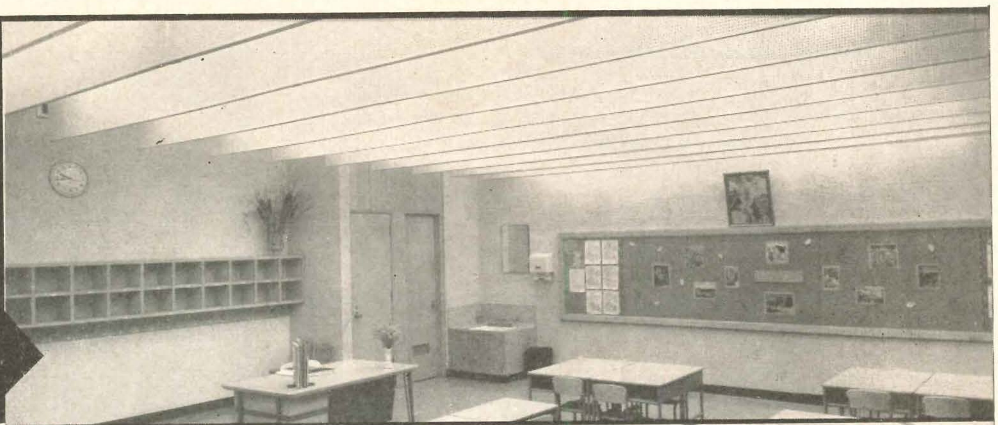


Walnut, American, quartered sliced (2 pieces, book-matched)

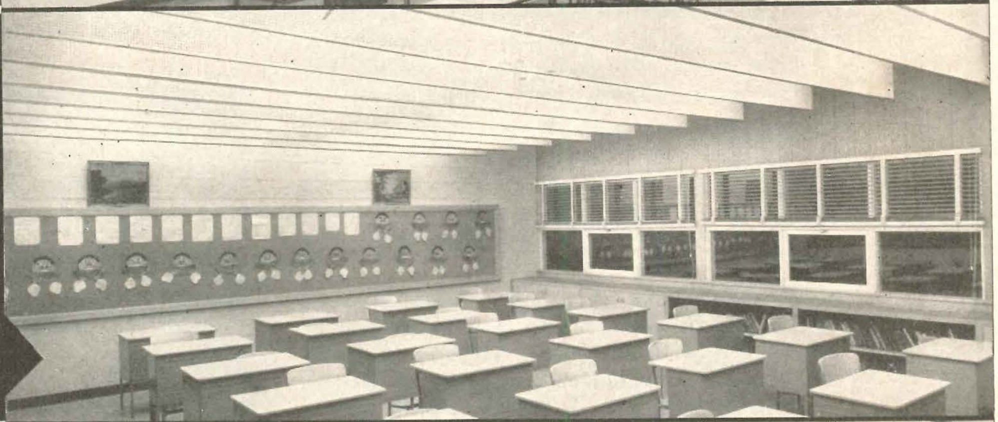
Walnut, American, quartered figured (2 pieces, book-matched)

saved: 62¢ per square foot

saved $560 on this room



saved $560 on this room



saved $560 on this room

plus **$560 on each of 13 more HAWARDEN school rooms**

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FINE HARDWOODS FOR ARCHITECTURAL USES—5

By Burdett Green, Executive Vice President, Fine Hardwoods Association and James Arkin, A.I.A., Consultant, Architectural Woodwork Institute

WALNUT, EUROPEAN *(Juglans regia)*

Although walnut grows rather widely (though sparsely) over most of the world, only a small amount is imported, and it is mainly from Europe. The European walnuts are all from the same genus, *Juglans regia*, or Royal Walnut. Each type normally takes the name of the country of origin. The most important are:

WALNUT, CIRCASSIAN

Source: Europe
Color: Tawny
Pattern: Variegated streaks of black or dark brown (these pigment streaks passing across the growth rings are typical of Circassian Walnut). Occasionally crotches and swirls
Characteristics: Not so strong or hard as American Walnut, but otherwise about the same properties
Uses: Woodwork; highly decorative furniture
Availability: Veneer rare. Lumber scarce
Price Range: Expensive

WALNUT, ENGLISH OR FRENCH

Source: England and France
Color: Soft and quite gray-brown; lighter in color than American Walnut
Pattern: Fine, smooth grain; less prominent growth lines than Circassian Walnut
Characteristics: Very much like Circassian
Uses: Same as Circassian
Availability: Scarce
Price Range: Expensive

WALNUT, PERSIAN

Persian Walnut is the wood of European-Asiatic trees. It is grown in many countries and marketed as English, Italian, Turkish, Bulgarian, Spanish, Austrian and Russian Walnut, according to locale or source

BUTTERNUT *(Juglans cinerea)*—White Walnut

A true walnut.

Source: North Central States and Southern Canada
Color: Pale brown
Pattern: Satiny wood with leafy grain
Characteristics: Soft to medium textured, with occasional dark spots or streaks
Uses: Interior finish of houses; furniture
Availability: Veneer (sliced) and lumber somewhat more than "rare"
Price Range: Medium

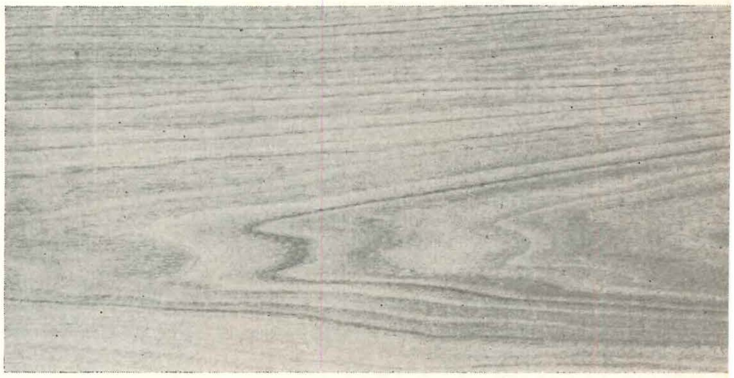
ORIENTALWOOD *(Endiandra Palmerstoni)*—Australian Laurel, Australian Walnut, Oriental Walnut; formerly "Queensland Walnut"

Although this wood was introduced into America in the late 1920's as "Oriental Walnut," it is not related to the walnut family (see botanical names).

Source: Australia
Color: Pinkish-gray to brown
Pattern: Somewhat like plain quartered Claro Walnut but with dark stripes and even broader ones
Characteristics: Medium weight; turns and polishes well; firm to hard
Uses: Furniture; cabinetry
Availability: Veneer (quartered) scarce
Price Range: Costly

Walnut, Claro, flat cut (2 pieces, book-matched)

Walnut, Circassian (one piece)



Butternut, plain flat cut (1 piece)

Orientalwood (2 pieces, book-matched)

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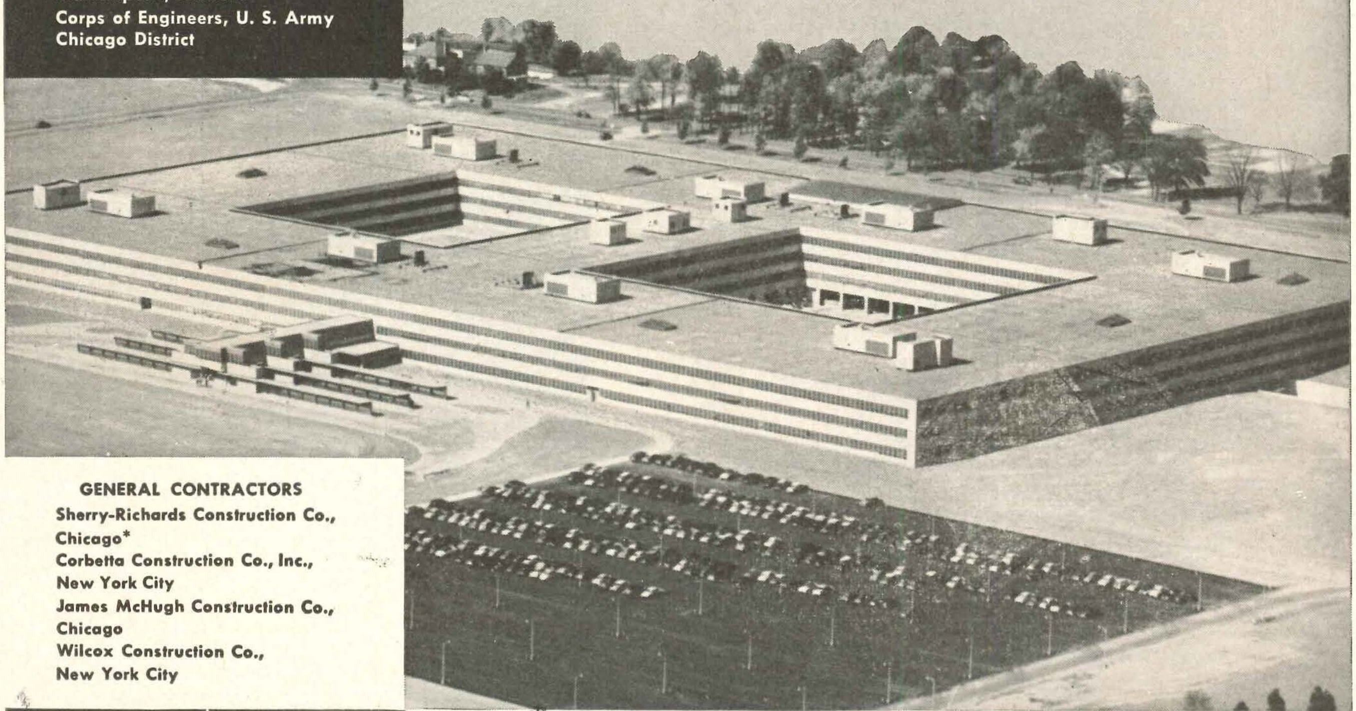

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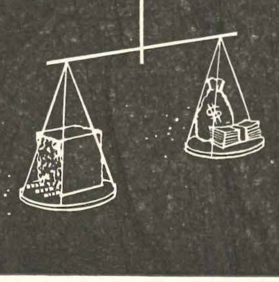

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FINE HARDWOODS FOR ARCHITECTURAL USES—6

(To be continued in a later issue)

By Burdett Green, Executive Vice President, Fine Hardwoods Association and James Arkin, A.I.A., Consultant, Architectural Woodwork Institute

ASH, AMERICAN

There are many American species of ash, but the three major commercial ones are, in order of importance:

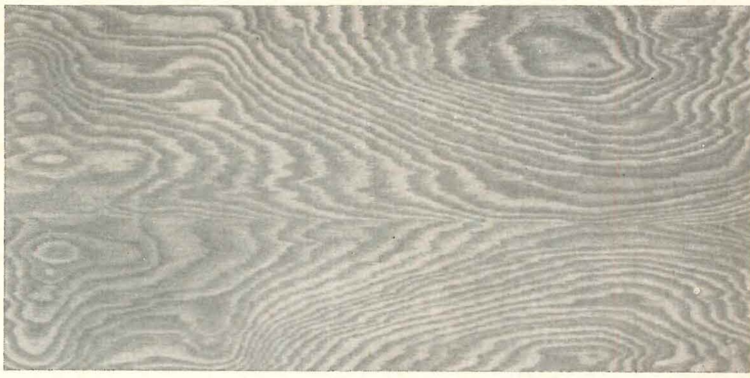
ASH, BLACK *(Fraxinus nigra)*—Brown Ash, Hoop Ash, Swamp Ash
Source: Principally the Lakes States
Color: Warm brown heartwood with a thin white or light brown sapwood
Pattern: Clusters of eyes occasionally scattered over plain wood
Characteristics: Extremely stable; heavy; rather soft; tough
Uses: Veneer for faces of decorative plywood; lumber for solid plank wall panels and for chairs, especially bent frames
Availability: Veneers (largely rotary, rarely burls) rare to plentiful
Price Range: Medium

ASH, GREEN *(Fraxinus pennsylvanica lanceolsta)*—Swamp Ash, Water Ash; lumber sold as White Ash
Source: Principally South Atlantic States and Mississippi Valley
Color: Cream to very light brown heartwood with thick, lighter colored sapwood
Pattern: Both flat-cut and quartered; moderately open grain
Characteristics: Heavy; hard; strong; medium-grained; tough
Uses: Interiors; furniture
Availability: Largely for commercial veneers
Price Range: Medium

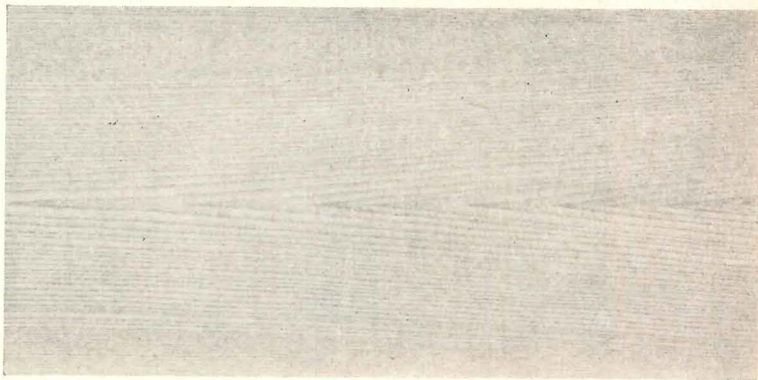
ASH, WHITE *(Fraxinus americana)*
Source: Principally Lakes States, also New England and Central States
Color: Cream to very light brown heartwood with thick, lighter colored sapwood
Pattern: Both flat-cut and quartered; moderately open grain
Characteristics: Heavy; hard; strong; medium-grained; tough
Uses: Interiors; furniture
Availability: Veneer (quartered, sliced, half-round, rotary) plentiful, (butts and figured sliced), rare. Lumber plentiful
Price Range: Medium

ASH, JAPANESE *(Fraxinus sieboldiana)*—Damo, Tamo
Source: Japan
Color: Brownish-tan through gray to almost white
Pattern: Plain to highly varied with swirls, fiddle-back mottle and a "peanut shell" figure. Extreme grain character
Characteristics: Bends easily; lighter weight than American and European Ash; glues well; finishes well; strong for its weight
Uses: Decorative interiors and furniture; inlays and overlays
Availability: Veneer (half-round) scarce
Price Range: Costly

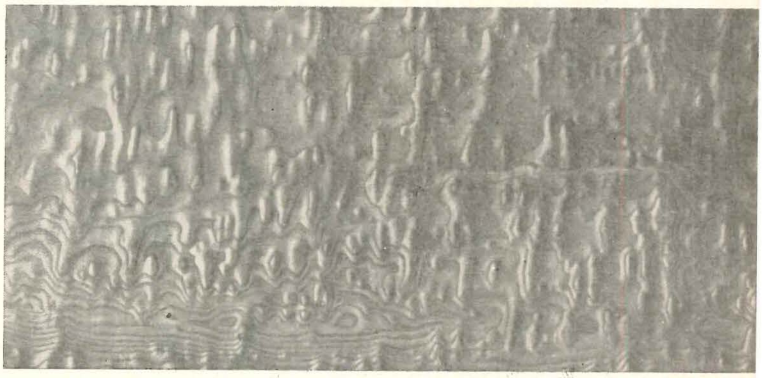
AVODIRE *(Turraeanthus africana)*—Apaya
Source: African Gold Coast, Ivory Coast (Liberia, Cameroons)
Color: White to creamy gold
Pattern: Largely figured with a mottle; crotches and swirls
Characteristics: Medium texture; firm, clean grain; usually wavy or irregularly interlocked; lustrous; moderately hard; weighs about the same as African Mahogany
Uses: Architectural panels; furniture; fixtures
Availability: Veneer (quartered, sliced, half-round) plentiful, also crotches and swirls. Lumber available
Price Range: Moderate



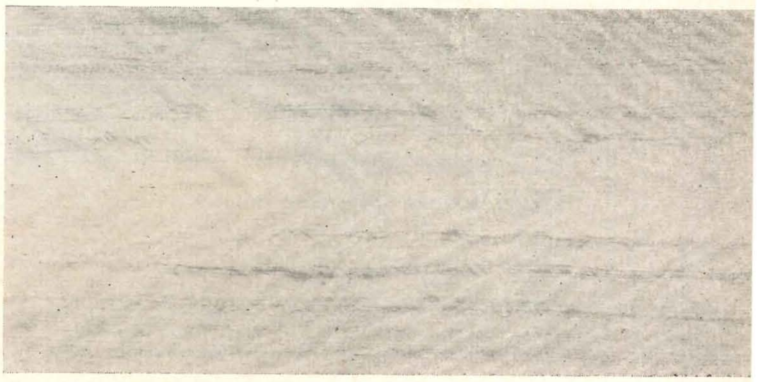
Ash, Brown (2 pieces, book-matched)



Ash, White (2 pieces, book-matched)



Ash, Japanese (1 piece)



Avodire, rope figure (2 pieces, book-matched)

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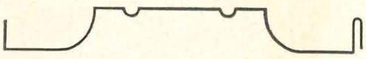
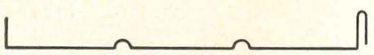
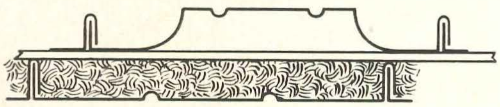


EXTERIOR SHEET



INTERIOR SHEET



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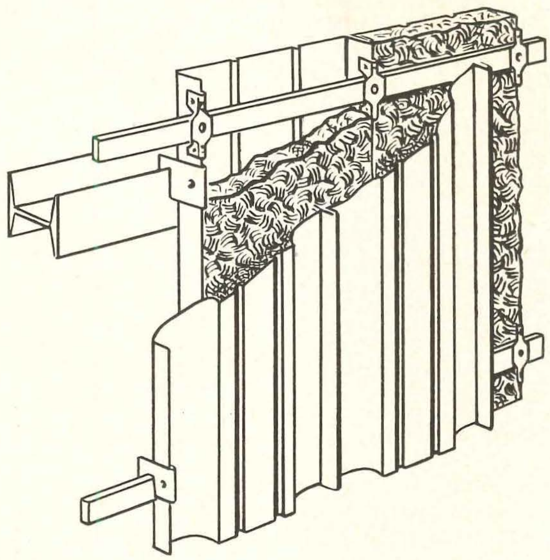

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ST. LOUIS AIR TERMINAL

(Continued from page 202)

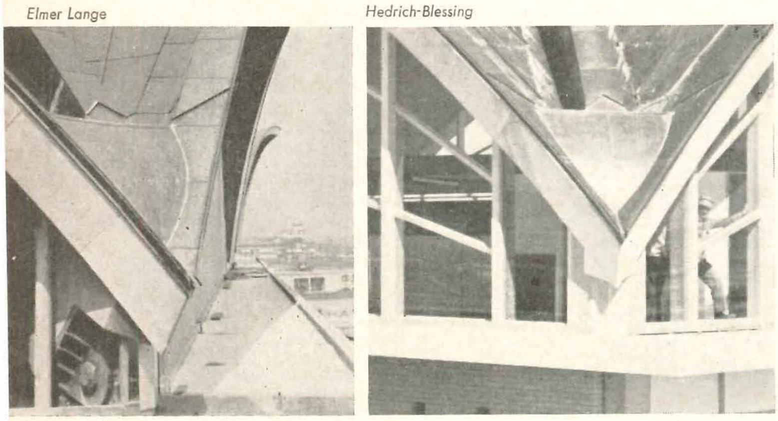
SERVICE AND OPERATIONS. On the bottom floor level are numerous services with no visitor or passenger access. A large catering kitchen, completely separated from that for the dining room and restaurant above, prepares meals for outgoing planes. There are two drives, one on the parking side of the building for service, mail and express trucks, the other on the apron side for tractors carrying loads to planes. Between these drives are the air mail, air freight, and cargo rooms. In this location these sorting rooms separate apron traffic from that on the outside and permit a smooth flow of mail and freight through them. This floor also contains the fan room for the air conditioning and heating systems; the boiler and cooling equipment are housed in a separate building. Along the field side of the lower floor are the operations offices of the airlines.

UNDERGROUND SERVICES TO PLANES. Gas trucks are eliminated from the apron area by a system for refueling planes from underground facilities. Standing planes will be cooled and heated through underground pipes; this also will help to reduce truck congestion on the airport apron.

STRUCTURE. From inside, the ceiling appears as a 412-ft-long barrel vault intersected by three cross vaults of equal height. However, from above, one sees three identical domes each forming an eight-sided figure, and they are joined (or separated) by a skylight kept flush inside and out. The reinforced concrete shells are 4¼ in. thick; the edges have peripheral and the groins diagonal rib stiffeners (18 x 20 in. and 18 x 45 in. at the crown respectively).[2]

Elmer Lange

Hedrich-Blessing



One of the hinges, four per dome, which carry the shells; under construction and with finish completed

These ribs were kept above the shell and are not visible from the inside. Hinged steel bearings receive the rib thrust; and structural steel ties (two 18 x 1 in. plates) were inserted in the upper floor spandrel beams around each 120-ft square. At the center of each arch is a 13-ft triangular roof overhang which is the natural geometrical form of the domical unit and lends the structure a unique esthetic effect. Reinforced concrete is used for the floors and framing of the rest of the structure. A 7-ft-wide concrete deck is cantilevered out from the upper floor level, serving as a window washer's access, and giving a strong horizontal to set apart the shells from the lower story.

MATERIALS. The vaults have glass fiber insulation on the outside surface covered with plywood to receive the copper-skin roof. A metal lath and acoustical plaster ceiling is hung from the shell on monel metal ties cast in the concrete. The floor at the passenger level is terrazzo, except in the restaurant area where the raised dining platform is carpeted. Asbestos vinyl tile is used for floors in the concessions and offices. Acoustical plaster to reduce the noise level of the Great Room, covers the entire underside of the large vaults. Heat absorbing glass is used in the vertical "walls" and in the skylights. The latter have a flush-fitting, translucent plastic interior covering to diffuse the light.

LIGHTING. The underside of the shell is lighted indirectly by color-corrected mercury vapor flood lights mounted on the metal-and-glass ticketing and concession kiosks or islands. The ceiling height in these islands is approximately 7 ft clear, to contrast with the 32-ft height of the dome. All construction on this top floor area was arranged to emphasize the shape of the vaults from below in order that the structure above would completely dominate the whole room. Skylights at the intersections of the vaults are lighted at night by fluorescent tubes concealed behind the light-diffusing plastic. This lighting will aid in dramatizing the overhead vaulting. The only direct lighting from above is a battery of spots over the stairs and escalators.

HEATING AND VENTILATING. The main public areas of the building are air conditioned with design for future expansion. Heating of the building is primarily by hot air with some convectors used in the offices and areas on the first two levels. Air is supplied to the Great Room from below the windows and from the roofs of the concession and kitchen areas, thus freeing the shell of all ductwork. The terminal building contains only fan rooms for the distribution of the heated or cooled air; boilers and air-conditioning equipment are located in a separate building. Supply is through pipes in a connecting tunnel.

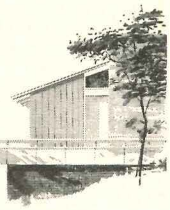
SITE PLAN. The terminal building is 550 ft from Natural Bridge Highway, and the area between the terminal and the road contains a landscaped park strip and parking space for 1,395 cars. Trees are dispersed over the lot, and covered parking for 55 automobiles is provided. A future helicopter field and cargo building are east of the parking area. To the west are the boiler and shops building and airlines service building.

The expanded plan provides a traffic circle and cloverleaf intersection on the proposed Mark Twain expressway. Additional parking for 2,000 cars will be provided across Natural Bridge Highway on city-owned land.

COST. The terminal building and utilities cost approximately $5.9 million dollars.

[2] *Some thin-shell engineers have questioned the exact role played by the large groin ribs. The intended purpose of the ribs is set forth in a paper by William C. E. Becker, Consulting Engineer, in the July 1955 issue of* Civil Engineering, *Vol. 25, No. 7, pp 430–433, "Intersecting Ribs Carry Concrete Roof Shell."*

OR THE GOOD LIFE"

2. 

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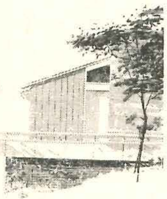
3. 

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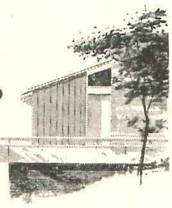
4. 

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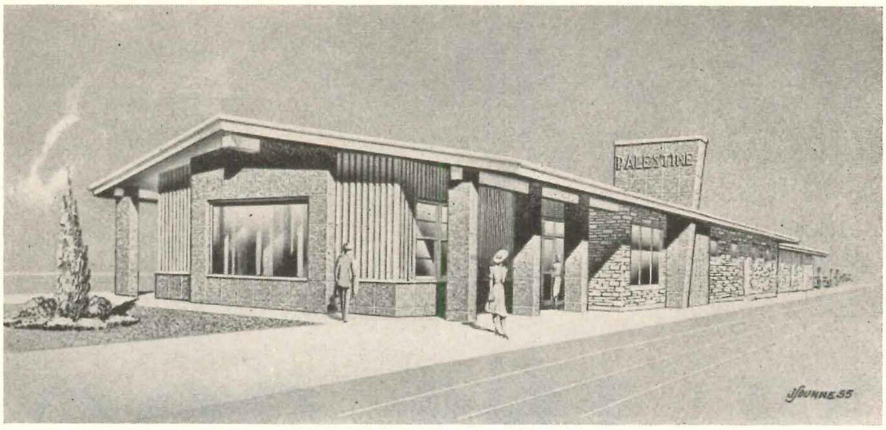
(Continued from page 382)

MODERN PASSENGER STATION REPLACES VICTORIAN DEPOT

The Missouri Pacific Lines, which now have under construction a new passenger station at Palestine, Texas, are making thereby the first move in their plan to replace "the rambling, multiple-story type of structure replete with ornate scroll-work decorations" with "functional, modern buildings." To permit continued use of the station during construction, the old building will be razed in sections, and will be replaced gradually by the new building.



New station (above) will replace Missouri Pacific's present station (below), which was erected in 1891

The interior of the new station, which will be completely air conditioned, will provide, in addition to the waiting rooms, facilities for ticket sellers, clerical staffs of the passenger and freight offices, quarters for the trainmaster, division trainmaster, train dispatchers, telegraph and radio offices, and a room for a switchboard and lockers for trainmen, as well as space for baggage handling, mail storage and the Railway Express Agency.

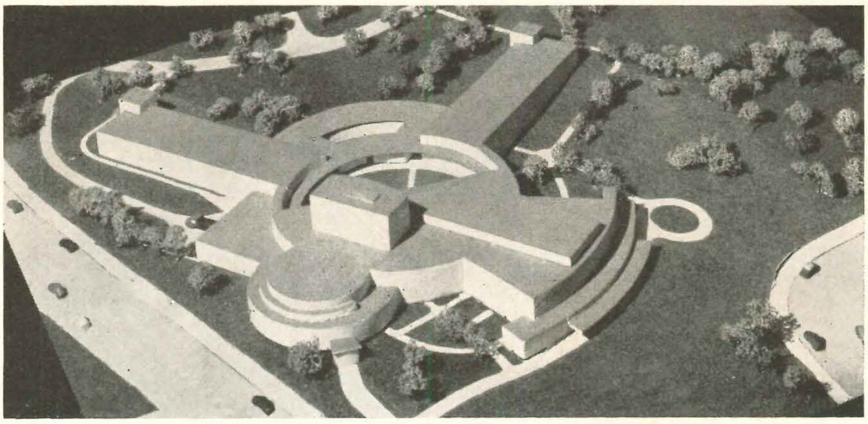
The exterior of the building will be of Colorado red sandstone, extruded aluminum panels and glass. The interior will be finished with tile and brick, with glass partitions in the waiting rooms; movable metal partitions will divide the offices. The roof will be concrete covered with white marble chips.

The total cost of the building is estimated at $200,000. Full operation of the new station is scheduled for early this year.

The architect is O. L. Hazelwood of Palestine.

(More news on page 390)

(Continued from page 390)



QUEENS COLLEGE TO BUILD SPEECH AND MUSIC CENTER

Planned for the use of speech and music students at Queens College and of the New York borough's citizens, the Music and Arts Building will have separate but related facilities for both departments.

The music auditorium, which will seat about 2200, will have a simple concert platform backed by a fixed cyclorama, with facilities, in a small way, for opera and ballet presentations.

The theater, which will seat about 500 spectators, will have a more elaborate stage. A cantilevered balcony around the audience room, connected by short stairs to the stage, can also be used in performances. The forestages in both cases will be demountable to accommodate orchestra pits. The backstage areas of the auditorium and the theater will be mutually accessible.

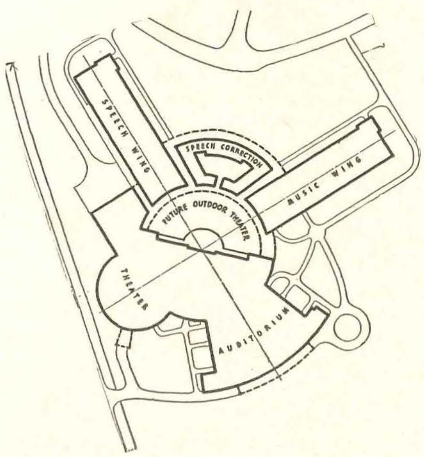
In addition to these indoor facilities, the building will contain an outdoor theater. This stage can be reached from both the auditorium and the theater.

Each of the departments will have its own classroom wing; the stages and backstages will also serve as classrooms, and some of the classrooms will be usable as dressing rooms.

A speech correction unit will be located between the two classroom wings.

The exterior of the building will be finished with light gray brick, in agreement with existing buildings on the campus. Bright colors will accent the concrete soffits and the doors and windows.

The architects for the building are the New York firm of Fellheimer and Wagner, with Henry W. Vikung the designer in charge.



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