PROGRESSIVE ARCHITECTURE

1 january 1956

world's largest architectural circulation

p/a design survey 1956

and third annual awards program

Now in easy to clean vinyl-asbestos tile and low cost asphalt tile

MATICO's great flooring achievement

MATICORK tile flooring captures all the rich handsomeness of true cork flooring, yet is far more economical and practical. Now available in vinyl-asbestos tile as well as asphalt tile, durable, easy-to-maintain MATICORK can be used on, above or below grade...presents no special installation problems. No wonder so many architects and builders are selecting MATICORK for projects of every type. MATICORK is available in light, medium and dark cork shades, in vinyl-asbestos and asphalt tile. Size: 9" x 9" Thicknesses: Asphalt — 1/8" and 3/16"; Vinyl-asbestos — standard gauge and 1/8".

QUALITY CONTROLLED
MATICO PRODUCTS
Guaranteed by Good Housekeeping
REPLACEMENT OR REFUND OF MONEY IF NOT AS ADVERTISED THEREIN

MATICORK

TRADEMARK

TILE FLOORING

MASTIC TILE CORPORATION OF AMERICA

HOUSTON, TEX. • JOLIET, ILL. • LONG BEACH, CALIF. • NEWBURGH, N.Y.

Mfrs. of: Confetti • Aristoflex • Parquetry • Maticork • Asphalt Tile
Rubber Tile • Vinyl Tile • Cork Tile • Plastic Wall Tile

5A318

Mastic Tile Corp. of America
Dept. 9-1, P. O. Box 986, Newburgh, N. Y.

Please send me Free color chart and complete data on MATICORK Tile Flooring.

Name..........

Address..........

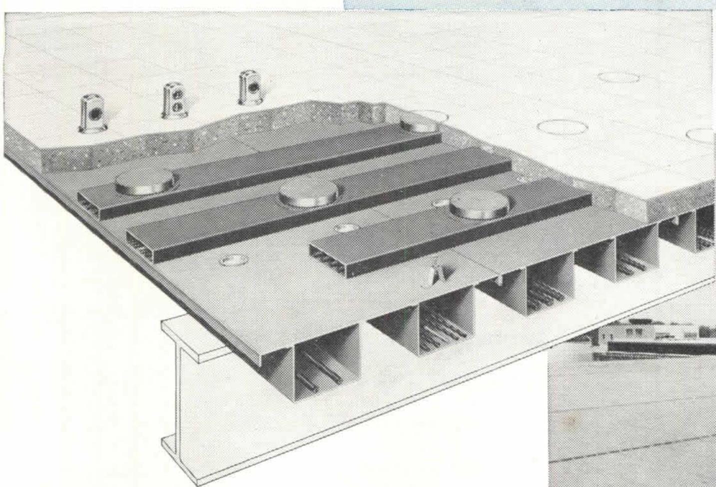
City.......... Zone.......... State..........

p a
PROGRESSIVE ARCHITECTURE

Published monthly by REINHOLD PUBLISHING CORPORATION, 430 Park Avenue, New York 22, N. Y. Second-class mail privileges authorized September 21, 1951 on re-entry at Post Office, New York, N. Y., under Act of March 3, 1879. Professional subscription — $5 (For full data, see page 13.)
Volume XXXVII, No. 1

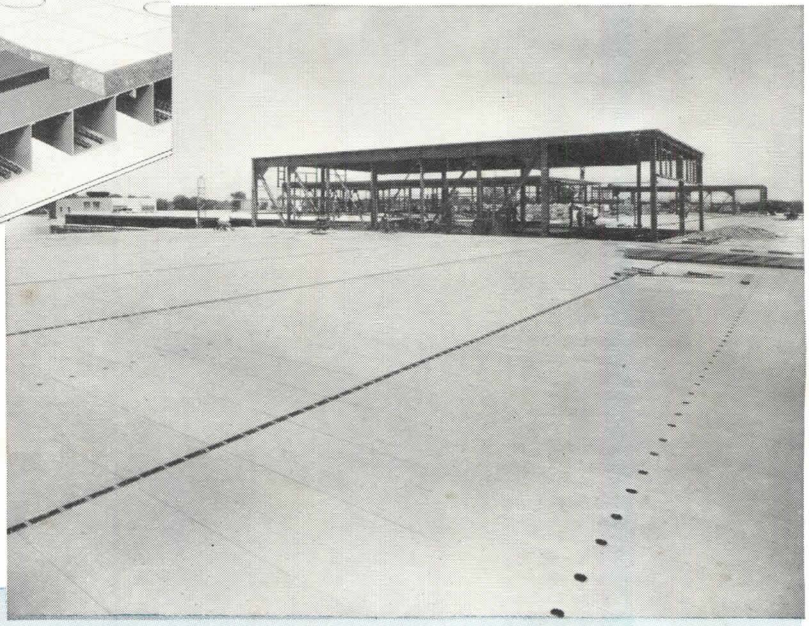
M-FLOORS

and LONG SPAN M-DECKS



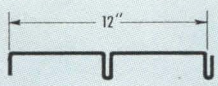
MAHON M-FLOOR

Cellular Steel Structural Sub-Floor constructed with Mahon M-Floor Cel-Beam Section M2. When energized with an electrical distribution system, Cel-Beams are utilized as continuous electrical raceways. In addition, M-Floors have an unusually high strength to weight ratio which, coupled with rapid erection, produces many cumulative and far-reaching economies in both construction time and cost.

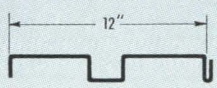


M-Deck Roof Construction. Mahon Long Span M-Deck Sections can be furnished with one, two or three Cel-Beams in various Beam Depths from 1½" to 7½" for Spans up to 32 feet.

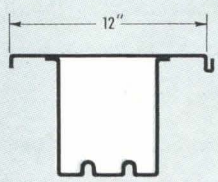
MAHON STEEL DECK and LONG SPAN M-DECK SECTIONS



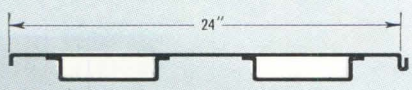
STANDARD DOUBLE RIB



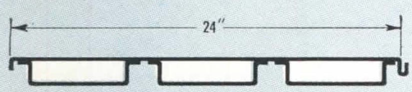
WIDE-FLANGE DOUBLE RIB



LONG SPAN M-DECK SECTION M1-G



LONG SPAN M-DECK SECTION M2-A



LONG SPAN M-DECK SECTION M3-A

New Structural Sections Make Cellular Sub-Floor, Roof, or Combination Roof and Acoustical Ceiling!

Mahon M-Floor Sections and Long Span M-Deck Sections provide designers with a wide range of structural units which have literally dozens of uses in modern construction. In addition to their use in cellular steel structural sub-floors, known as M-Floors, in which the Cel-Beams provide continuous electrical raceways under every square foot of floor surface, these versatile Cel-Beam Sections are used extensively as decking in roof construction. Mahon Long Span M-Deck Sections can be produced with deep Cel-Beam Members to span from truss to truss . . . they can be produced with bottom metal perforated and sound absorbing material inside the Cel-Beams to provide a highly effective acoustical ceiling—in which case, the M-Deck Section serves as the structural unit, the interior finish material and the acoustical treatment all wrapped up in one package. This is the ultimate in economical construction of combination roofs and acoustical ceilings . . . it is permanent, incombustible, indestructable construction which will require no maintenance other than normal decorative painting. For complete information, including engineering data and specifications, see Sweet's 1956 Files, *or write for Catalog M-56.*

THE R. C. MAHON COMPANY • Detroit 34, Michigan

Sales-Engineering Offices in Detroit, New York and Chicago • Representatives in Principal Cities

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

MAHON

Bernard Tomson

It's the Law

P/A Office Practice *column on the legal aspects of architecture and engineering. This month's column supplements Tomson's* Architectural & Engineering Law *(Reinhold, 1951) by reporting summaries of cases decided since publication of the book.*

Chapter 25—Bases for Computing Damages

Ohio. *Sadler* v. *Bromberg*, 106 N.E. 2d 306 (1950). In an action for breach of contract to install certain tiling and fixtures, the Court held that the measure of damages is not the difference in market value of the property immediately before and after the injury, but rather the cost of correction or completion of the work contracted for. The measure of damages is the money paid out to put the building in the condition it would have been in if the work had been well done.

•

Indiana. *Johnson-Johnson, Inc.* v. *Farah*, 108 N.E. 2d 638 (1952). In a mortgage foreclosure action in which the mortgagor counterclaimed for failure to complete construction, the Court granted a new trial, saying that the award of substantial damages was improper in the absence of evidence of reasonable cost of completing construction or of the rental value for the period during which construction was unreasonably delayed.

•

Oklahoma. *Pallady* v. *Taylor*, 242 P. 2d 444 (1952). In an action to recover the cost of repairs necessitated by an explosion, the Court held that, although the plaintiff did the repair work themselves, a Contractor who qualified as an expert could estimate the damage and the cost of repair, although he had no part in repairing the building.

PART VII. RIGHTS OF THE ARCHITECT AND ENGINEER —PROPERTY IN PLANS

Chapter 26—Common Law Copyright and Contract

Kentucky. *Beech Creek Coal Co.* v. *Jones*, 262 S.W. 2d 174 (1953). A Coal Company was required to file certain maps and information to fulfil its statutory obligation and employed an Engineer to make surveys and provide the maps and engineering data. Subsequent to the termination of employment, the Coal Company brought an action against the Engineer for possession of field books, traverse calculation sheets, and base or hardback maps which the Engineer had made. The Court held that, since the material was necessary in order to enable the Coal Company to fulfil its statutory obligation, such material was the property of the Company, not the Engineer and the Company was entitled to possession of it.

MISCELLANEOUS, ENFORCEMENT OF ZONING LAW

A municipality is not estopped from enforcing its zoning law because of the issuance of a building permit.

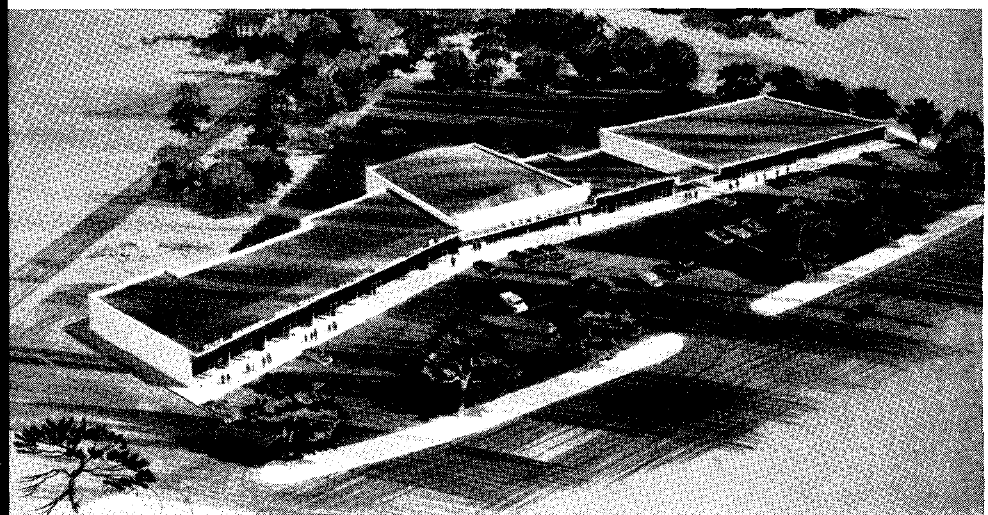
Texas. *Davis* v. *City of Abilene*, 250 S.W. 2d 685 (1952). The City Building Inspector had knowledge at the time of granting the permit that the precise location and intended use of the building to be erected was in violation of the zoning ordinance then in effect, and the City failed to appeal from the granting of the permit within the time allotted. Nevertheless, it was held that the lot Owners were charged with notice of the provisions of the ordinance, and therefore could not rely on the action of the City's employe to raise an estoppel, nor could they assert vested rights even though the construction of the building was eighty percent complete.

•

New York. *City of Yonkers* v. *Rent Ways*, 304 N.Y. 499, 109 N.E. 2d 597 (1952). A garage located in a commercial zone had rear doors which opened on to a lot owned by the garage keeper in a residential zone. Although contrary to the municipal zoning law, the rear entrance was used for many years as a means of ingress and egress to the garage. Later, a permit was issued authorizing the addition of a second story to the garage. The New York Court of Appeals held that the municipality was not estopped, either by the issuance of the building permit or by laches, from enforcing the zoning law many years later. Nor was the garage owner entitled to assert a vested right in his use of the residentially located lot when such use, although continuing for many years, did not commence before the effective date of the applicable zoning ordinance.

"I demand a heating system with proved performance ...I specify Janitrol"

says Architect Herbert Tannenbaum
New York City

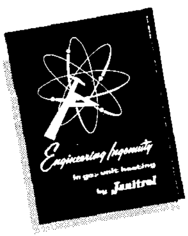


This is the new Douglaston Shopping Center, located at Queens, New York. It's one of 17 in the New York-New England area designed by Mr. Tannenbaum...all use Janitrol heat.

"I feel it is my responsibility to specify more than just a heating system. I must demand proved performance for my clients, so I have standardized on Janitrol for gas-fired heating. I know, from over a decade of experience, of Janitrol's good record of low maintenance and service costs," states Mr. Tannenbaum.

Architects also appreciate Janitrol's unusually compact design. Whether installed overhead, or on the floor, the space savings are substantial.

Janitrol Gas-Fired Unit Heaters are available in five different types, with input capacities from 50,000 to 1,750,000 Btu hr. All are adaptable for use in combination with summer cooling systems, which may be installed either initially, or added at a later date.



NEW A. I. A.
FILE 30-C-43

Just off the press . . . 16-pages of specifications and design data covering the complete Janitrol Unit Heater Line. For your free copy ask for Form JS-215.

Janitrol
GAS-FIRED UNIT HEATERS

Janitrol Heating & Air Conditioning Division
Surface Combustion Corporation, Columbus 16, Ohio
In Canada:
Moffat Heating & Air Conditioning Division of Moffats Ltd., Toronto 15

ALSO MAKERS OF **Surface** INDUSTRIAL FURNACES AND **Kathabar** HUMIDITY CONDITIONING

Mechanical Engineering Critique

by William J. McGuinness

P/A Office Practice ***column on mechanical and electrical design and equipment, devoted this month to the subject, Air Conditioning Research and Development: Installation Speed Schedules.***

For efficiency and economy, sufficient time must be allowed for the design and installation of air conditioning in new and existing buildings. Syska & Hennessey, Inc., New York Engineers, consider five months the minimum period between the decision to air condition and the date for effective operation of the system. If conditioning is planned for 1957, call in your consultant around October 1956—certainly not later than January 1957. You must allow time for him to perform the following:

1. Survey; 2. design; 3. obtain bids; 4. negotiate contracts; 5. select subcontractors; 6. approve equipment; 7. enable subcontractors to negotiate with vendors; 8. permit manufacturers to make and deliver equipment; 9. check equipment shop drawings; 10. check installation shop drawings; 11. co-ordinate general construction; 12. supervise field work; 13. resolve unexpected conflicts; 14. approve the work, field and office; 15. balance the air flow; 16. adjust the automatic controls; 17. start the system; 18. instruct the owner's operator; 19. make final inspection.

flexibility

To condition a space with sparse occupancy largely involves: (1) the removal of heat flowing into the area through exterior surfaces; and (2) the cooling and dehumidifying of the air needed for ventilation. Equipment of relatively small and fixed output will usually be sufficient. Higher output per unit of space and great flexibility for handling varied loads are required, however, when the density of human occupancy is great. An example of having to meet both conditions in the same volume of space on different occasions is found in a recent conditioning installation for a 20,000-sq-ft ballroom and a 16,000-sq-ft lower-level display area at the Sheraton Park Hotel in Washington, D. C. The ballroom, a new two-story extension, must be capable of accommodating relatively small gatherings of 500 or larger meetings of 3000 or more; similar variation of occupancy is expected in the lower-story exhibition area. All controls are completely automatic and the 350-ton central unit adjusts its cooling output automatically between 10 and 100 percent of full capacity. Branches requiring separate and different demand schedules condition the foyer and kitchen. Equipment is by The Trane Company and installation by Morris & Egan.

family patterns affected

Sociologists measure technological advances in terms of their effects on the family. The great benefits to transportation brought by the automobile were thought to be mitigated by the fact that the unity of the family suffered. The much-maligned television has the saving grace that it brought the family together. A similar benefit is claimed for home air conditioning. A study of the "Air Conditioned Village" in Austin, Texas, made by the National Association of Home Builders with the National Warm Air Heating and Air Conditioning Association participating, yielded the following facts. Families with small children spent 25 percent more time together when homes were air conditioned. Couples, as well as families with teen-age children, spent from 50 to 70 percent more time together. Considering the problems of divorce and teen-age delinquency, these must be considered as good signs. Entertaining friends at home increased 300 percent for adults and 400 percent for families with children. The resulting benefits to family life are apparent. Adults and children slept one hour longer and approached the dining table with good appetites.

built-ins

The use of through-the-wall air-conditioning units of ½-ton, ¾-ton, and 1-ton capacities is gaining in popularity. Offering advantages over window units, these built-ins are being installed in all major rooms of many apartments and homes. For installation below windows, a rectangular steel sleeve is provided for embedment in the masonry or other material of the exterior wall. Slipping in the factory-complete conditioner and plugging it in to a nearby electric outlet completes the simple installation. The half-ton size draws 7 amp at 115 v and may be used on a 15-amp general-purpose circuit. Special outlets and adaptation to 208-v use are common for the larger sizes. Some of the models are as thin as 16½ in. They are usually placed flush on the outside and project a minimum distance into the room. The flush, louver-faced exterior is not vulnerable to weather. Other improvements appear in reduced sound level, air tightness when not in use, and high power factors. Amic, Chrysler, General Electric, and Lewyt are active in this field.

sound control

Air-handled cooling and heating has many advantages, but one drawback to its wider acceptance is the fact that it is never completely silent. Some old warm-air systems adapted to air conditioning have sound-producing air velocities because the cfm required for cooling is commonly greater than for heating. Utility rooms placed close to living spaces frequently prove noisy. Excessive fan speeds have often been chosen to overcome the extra air friction of cooling coils placed in series with existing air-heating furnaces. These are abuses which sometimes may be avoided, but even in well-designed new systems, improvements for quiet operation are possible. A study of this subject will be made by the Research Laboratory of the American Society of Heating and Air Conditioning Engineers and endorsed by the National Association of Fan Manufacturers. A basic method of sound measurement will be developed; frequencies as well as decibel levels will be examined; and duct systems, fans, and other equipment will be considered. The work will be directed by the Technical Committee on Sound and Vibration Control of Bell & Gossett Company.

cost control

The Owens-Corning Fiberglas Corporation will attempt to find out whether an average-size house anywhere in the United States can be heated and cooled for $120 per year. Officials of the HHFA have thought that this low cost might be approached in homes of about 1200 sq ft. Five or six homes in each of 20 cities will be selected for this investigation. Their costs will vary from $10,000 to $25,000 and their areas from 900 to 1500 sq ft. Tyler Rogers, technical consultant for the research, states that gas, electricity, and oil will be used in the tests. Builders and buyers must agree to permit the houses to be "comfort conditioned" by experts and to be wired for tests. One might be concerned with the adverse effects on fuel cost caused by the desire of most people for a reasonably free use of glass and some fresh-air ventilation. We can be confident, however, that the tests will result in the establishment of methods by which the lowest possible fuel cost may be achieved.

Free-lance Specifications—Today and Tomorrow

by Joseph A. McGinniss

P/A Office Practice ***article on specification writing as a business.***

Where are the specification writers of tomorrow coming from? As Prof. Goldwin Goldsmith has pointed out in his book, *Architects' Specifications — How to Write Them:* "The writing of architects' specifications is a task approached by many with trepidation, by some with the careless confidence of ignorance and by a few with studious determination to succeed."

Previous surveys have established that the extent of training in specification writing in the architectural schools is relatively meager because of the demands of other subjects in an already crowded and prolonged curriculum. As many of the older and more experienced men leave the scene, it becomes increasingly difficult to replace them. Only adoption of the free-lance type of service will provide adequately for the requirements of many architectural offices.

More than six years have elapsed since P/A covered the subject of specification specialists. There has been a general feeling that the number of such "free-lance" specialists, as well as the number of offices utilizing their services, had increased during that time. However, it is a regrettable fact that specication writers, as such, are becoming fewer; fewer, that is, in proportion to their colleagues in other branches of architecture, and in many cities insufficient in number to keep pace with the demand for them caused by the greatly expanded volume of construction.

To bring P/A's earlier report *("Specification Specialist," by Joseph A. McGinniss, December 1949 P/A)* up to date, 111 of the chapters of the AIA were contacted and replies received from 54. In 44 of these, the response was to the effect that there were there no free-lance specification writers. However, it has been definitely established that this profession does exist and is active in New York, Washington, Detroit, Los Angeles, New Orleans, Chicago, Denver, Atlanta, Columbus, Ohio, and Portland, Oregon.

It is interesting to observe that in several of the cities where there are no free lancers, the opinion was expressed that the field was potentially good for someone establishing such a service. For example, from Duluth: "As principals we find it progressively more difficult to keep up with all phases of this most complicated business, and I'm sure would welcome someone who could take the responsibility of even a small portion of the work." From Shreveport: "I suppose if a professional specification writer were to establish an office here and demonstrate either through experience or capability the value of his services, that he would be of great assistance to the architects in our area." From Mississippi: "Possibly there would be more inclination to take advantage of such a source if it were offered by a specialist in the field, but I do not know that it has ever been offered by anyone in this area." However, from Phoenix a note of caution: "Inquiry among our members discloses that no such service exists and that the demand is too rare to support it."

It would appear that the field of "free lancing" can offer an attractive opportunity for many more individuals not only in those centers which are now without them, but also in those areas which already have from one to five such practitioners.

How successful the idea of using free-lance specification writers has become may be determined from the following comments offered by a prominent Los Angeles specification writer, describing the method of his operation and his observations of the technique in his locality. "For some eight years I have been the only free-lance specification consultant, except for some (employed) specification men who might do a job on the side now and again. This year there are three free-lance specification writers.

"My own volume of specification writing averages about $50 millions worth of construction work annually, exclusive of mechanical and electrical sections, which are always done by consultant engineers. Finish hardware is always done by a hardware consultant. A free-lance specification man could very easily increase his business considerably if he were to aggressively go after work. I operate on the principle of doing all the work myself, eliminating overhead, and the necessity of checking other fellows' work. The architect employs the stenographers.

"There is an opportunity for the free-lance specification writer in all parts of California, as good specification men are scarce.

"Architects who have used free-lance specification services are enthused, especially in receiving the breakdown of the job into a check list of the kind which a skilled specification writer can provide. This check list is given to the job captain and is very helpful in obtaining decisions, and getting the drawings and specifications correlated.

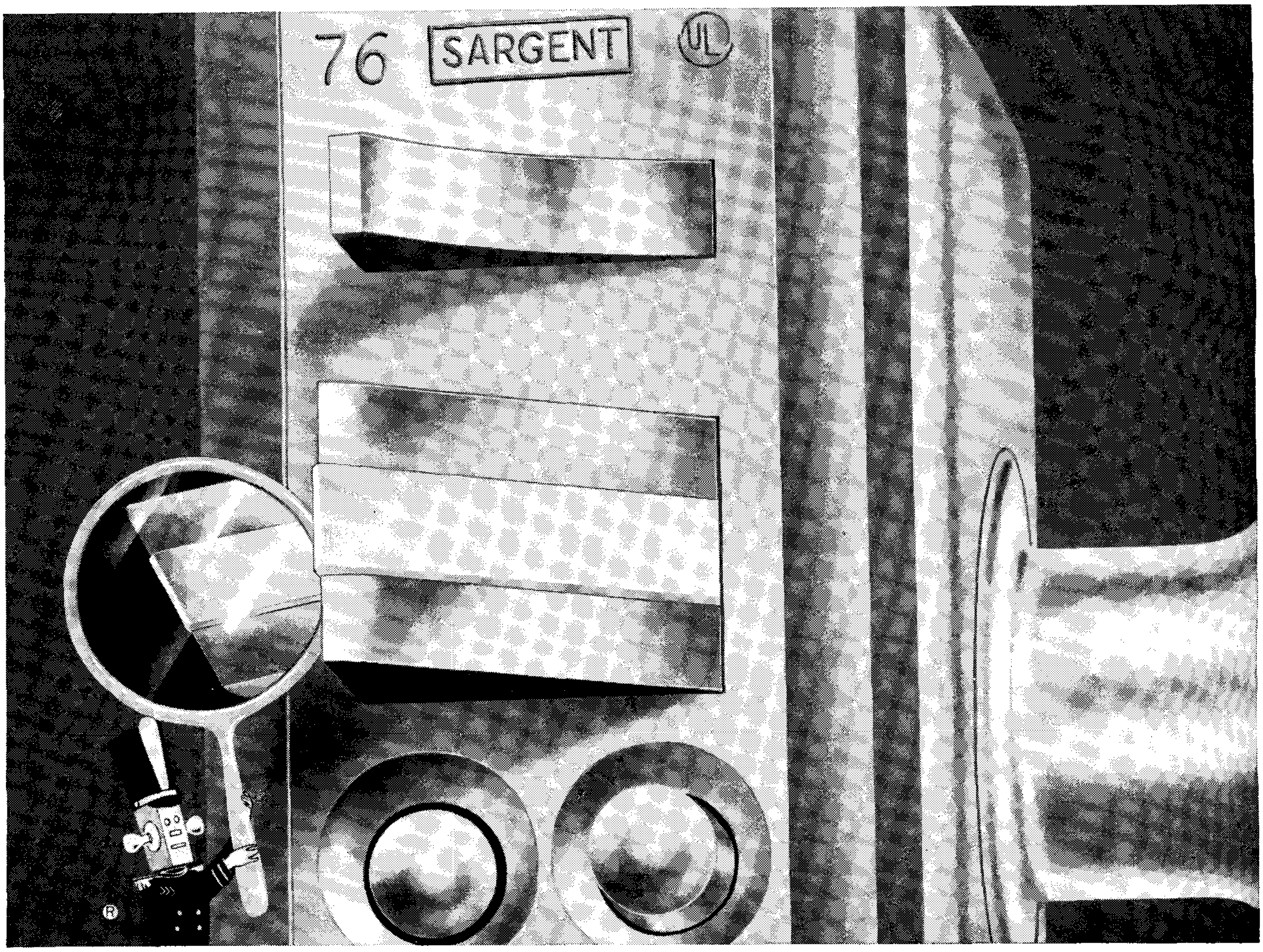
"Regarding the fee, I give a lump-sum estimate before starting a job, a procedure which is satisfactory to the architect. I am able to compete with the architects on costs, even though I work at a much higher rate than an office employe.

"This writer thinks the best opportunities for the free-lance specification writers are in getting overflow work from architects who have their own specification writers and in doing the work of smaller firms who do not usually have a skilled technician in this field."

Detroit is another city where the idea of free-lancing seems firmly established and the concept generally accepted by the local architects. A leading free-lance practitioner there explains that there are six men there who do such work, three full time and the others intermittently. He offers some pertinent and interesting observations on the subject as it relates to his vicinity and some which could have a much wider application.

"It would appear that at present Detroit architects have fewer outside specification writers available than formerly. Also it may be said that most offices are finding few prospective writers among their regular employes in the drafting rooms. In my travels among men in a number of local offices, I have found but one younger man who shows any special interest in writing and particularly in learning more about the general subject; and it happens, he has shown real ability in the field. I should not be at all surprised to find this young man a full-fledged spec man before too long.

"While fewer men are available, it still appears that more offices are seeking outside help in specifications. It seems also that architects are in a position to encourage men in this field and help both themselves and the



See how the Nylon insert goes all the way around the latch bolt! Projects slightly above the metal to absorb all the latching punishment.

Now . . . the Perfect Latch Bolt with a MOLDED NYLON INSERT!

Gives quieter, easier operation! Shows no sign of wear even after a million closings! Yet it sells for no extra cost!

The new Sargent Latch Bolt . . . with its truly amazing Nylon insert . . . is a further improvement for the world's finest lock. The Sargent Integralock.

This Nylon insert greatly reduces friction of the latch bolt on strike areas . . . and on lock front areas, too.

It enables a door to be closed with 35% less force than a solid metal latch bolt. This reduced closing resistance permits the slowest adjustment of door closers. It makes door closing noiseless. Desirable in all buildings. Especially appreciated in hospitals.

It shows no appreciable wear after *one million* test cycles. Its smooth, self-lubricating surface prevents marring of strike plate. An important appearance feature.

This solid latch bolt with its Nylon insert has no small, complicated parts to break.

Yet with all these advantages, Sargent brings you this Nylon insert at *no extra cost!* Ask your Sargent salesman to show you the Sargent Integralock . . . with its sensational new Nylon insert . . . today. Or write Sargent direct, Dept. 15-A.

SARGENT & COMPANY

New York • NEW HAVEN, CONN. • Chicago

Free-lance Specifications—Today and Tomorrow

writers. From comments made to me, as well as some feelings I have in the matter, some views may be set down, briefly, which have to do with the subject.

"(1) Better specifications will usually result when a specialist is used in cases in which small offices have had no regularly employed writer; and there will be actual economy if the final products are compared on a fair basis.

"(2) Place greater value on complete specifications and by their use avoid trouble, which includes extras, and the great danger of law suits.

"(3) Allow sufficient time for proper preparation and call in the writer in the early stages of a job, thus giving him an opportunity to come along with its development.

"(4) Be willing to pay a fair fee for specialized services, much as is done in the case of other consultants. Since there appear to be no established fees for these services, be willing to have enough work done to provide the writer with some yardstick on which to base charges for the work of that office.

"(5) Also permit initial work for an office to be spread over several jobs in order to warrant the time required for the writer to tailor specifications to the needs of that office. (The writer must guard against having specifications, which were written for one job and a single fee, used for subsequent work without receiving any further fee.)

"(6) Be willing to pay for complete services, which will comprise typing, checking, reproducing and binding, and delivery of finished copies ready for bidding. In this way, free the architects' office of much of that last-minute rush, give the writer better control during the writing, reduce longhand writing, have detailed typing instructions more easily handled, facilitate making of changes over a longer period, and obtain copies which are a credit to the office.

"To refer again to the shortage of men available, I might say that architects have discussed the problem with me on a number of occasions recently, and I have been left with the impression the shortage is more acute than in the past. It has been my thought that two courses are open to the average office, both of which happen to be a bit long-range and thus fail to solve the problem immediately at hand—that is, how to come up with good specifications at the time the job has been promised.

"The two suggestions are neither original nor new. The first is to do some scouting and training. This will require constant watchfulness for any young man who shows any interest in this direction, some salesmanship in selling him the idea of putting some of his talents to better use and for more pay, and having him begin work under someone able to bring him along the way. The second, and one which may be used in conjunction with the first, is to have standards written by a competent person for the usual run-of-office jobs, accompanied by guides covering many of the customary variables. I might add that, in my experience, both have been used successfully."

Much of the same reasoning that prompts a draftsman, after registration, to consider launching his own practice would be applicable to the specification writer approaching the free-lance field. He must weigh the possibility of the security and seniority of continuous employment in an office large enough and active enough to maintain a full-time specification writer against the variety of projects, increased individual identification, and ultimately greater (although admittedly more irregular) total annual income.

One major difference is the limitation on the volume of work that any individual can produce in any given period, such as a year. The law of diminishing returns sets in and while there may be intervals between new projects to specify, the overhead will continue. It would be ideal if a constant, steady, even flow of work could be maintained but this seldom happens because often one project is delayed and another advanced. All too often the specification writer is not called in soon enough and there is a ridiculously short length of time allowed for specification preparation. The architect, I am afraid, often procrastinates on this point on the fallacious theory that the less time available the smaller will be the costs. Most free-lance specification writers have reached the stage where, within certain limits, they have reasonably consistent charges for their services, whether on the fee basis or on an hourly rate basis, and also have acquired sufficient experience so that they are able to estimate fairly closely the length of time required to produce the kind of specifications the architect or client requires. If the architect's time schedule is too unrealistic, or his budget too skimpy, they will reluctantly but gracefully decline the assignment and refer the architect to one or another of their colleagues.

A vital aspect of free-lance specification writing, insofar as it was practiced in the State of New York, was brought into question in the summer of 1953. It was held at that time by the counsel of the State Education Department that the preparation of specifications must necessarily involve at least the consultation and planning of construction, if not the evaluation and design thereof, and that such service required the application of engineering principles or of the art and science of construction, and that safeguarding of life, health and property was concerned. If this were the case such work would infringe upon the practice of architecture as defined under Section 7301 of Article 147 of the Statutory Requirements of the New York State Education Law.

Such a ruling, if sustained, would have had extremely serious consequences for those free-lance specification writers who did not hold architectural registration or professional engineering licenses—and would, in effect, have forced them to close their offices and would have deprived them of their accustomed means of livelihood.

In an effort to determine whether the opinion regarding such free-lance specification writing in New York State was widely held, a survey was undertaken of the other 47 States and the District of Columbia. The question was asked whether there was any provision or ruling in their licensing requirements which would prevent a licensed architect or engineer from engaging the services of a person not licensed, to prepare specifications for such architect or engineer, on a lump-sum fee or hourly basis, where such specification writer operates in an office separate from the architects' or engineers' office, but under the supervision of the architect or engineer and where the architect or engineer assumes full responsibility for the documents issued by his office. Only three States failed to acknowledge the questionnaire and 24 States wrote a specific reply. All of the other states forwarded copies of their present regulations governing the practice of archi-

(Continued on page 18)

PROGRESSIVE ARCHITECTURE published monthly by REINHOLD PUBLISHING CORPORATION, 430 Park Avenue, New York 22, N. Y. Ralph W. Reinhold, Chairman of the Board; Philip H. Hubbard, President and Treasurer; Fred P. Peters, Vice-President and Secretary; Alfred E. Fountain, H. Burton Lowe, Merald F. Lue, D. Bradford Wilkin, William P. Winsor, Vice-Presidents; Kathleen Starke, Assistant Treasurer. Executive and Editorial offices: 430 Park Avenue, New York 22, N. Y. Subscriptions payable in advance. Subscription prices to those who, by title, are *architects, engineers, specification writers, designers or draftsmen, or employes of architectural and engineering firms,* and to government departments, trade associations, members of the armed forces, college libraries, college students, publishers, advertisers, prospective advertisers and their employes—$5.00 for one year, $8.00 for two years, $10.00 for three years. Above prices are applicable in U. S. U. S. Possessions and Canada. Latin America and Philippine Republic—$10.00 for one year, $16.00 for two years, $20.00 for three years. All other foreign subscriptions — $15.00 for one year, $25.00 for two years, $30.00 for three years. Single copy — $1.00; special issues — $2.00 per copy. *Printed by Publishers Printing Co., New York, N. Y.* Copyright 1956, Reinhold Publishing Corp. Trade Mark Reg. All rights reserved. Indexed in Art Index, Architectural Index.

REINHOLD

how about the quality?

Dear Editor: Regarding your November P.S., I admit that we architects are entitled to fight for our key position in the construction industry and no one should criticize you for fighting with and for us.

But I would feel better about the fight if the quality of our performance in all the categories of professional responsibility equalled our vigor in asserting our professional rights. Too often it appears we cry harder than we work and lose our prerogatives because we fail to measure up to the requirements of a situation. In fact, we have been known to abdicate voluntarily to the engineer, the builder, the equipment manufacturer, or the decorator who may all be eager to shoulder a part of our professional burden. When we let them we lose status.

Deferring to the client is quite another problem involving a different principle of conduct.

You are right that we should stress the professional character of our services but the other side of that coin is that having assumed a responsibility we must demonstrate that we can discharge it better than others who may wish to encroach. I do not feel the team concept excludes the architect from leadership any more than it guarantees him a position as leader. That must be earned.

Your excellent definitions of the client, the builder, and the architect should be fully supported, by demonstration even more than by declaration. I believe that competent, professional performance is the only firm base for good public relations and broader service.

E. TODD WHEELER
Wilmette, Ill.

project engineers

Dear Editor: November 1955 P/A *(page 94)* listed the Utilities Engineers of Boston along with TAC as engineers for Otis Air Base housing. Actually we *(Fred S. Dubin Associates, Mechanical & Electrical Engineers)* were the prime mechanical, electrical, and utilities engineers—with Utilities Engineers of Boston as sub, under us.

We have recently opened a Cambridge, Massachusetts office at 45½ Mt. Auburn Street, with PETER MYERS, Registered P.E., in charge. We have many other projects in the design stage.

FRED S. DUBIN
Hartford, Conn.

amending a code

Dear Editor: I was much interested in the letter addressed to you by Rush P. Strong, Chairman of the Board of Standards and Appeals of New Orleans which you published in the VIEWS section of November 1955 P/A under the title, "progressive code."

From personal experience I can attest to the fact that the procedure for amending the New Orleans code which has been developed by the Board of Standards and Appeals is, to say the least, unusual and certainly constitutes an important factor in maintaining an up-to-date and modern building code. The important thing about this procedure is that it works.

As an example, in April 1954 we submitted by letter a proposed revision to the New Orleans code covering the use of adhesion type ceramic veneer, together with technical data supporting our recommendation. Our letter was immediately acknowledged (not universal practice in such

(Continued on page 14)

(Continued from page 13)

cases), and we were told that our recommendation would be considered by the Board of Standards and Appeals.

In July 1954 we received copy of a code revision incorporating our recommendation. We were not asked to appear at a hearing on our recommendation nor was it necessary for us to contact personally the Board members.

Incidentally, similar requests to other jurisdictions are presumably still under consideration. At least, they have not been adopted nor have we been informed that they have been rejected. Undoubtedly, personal contacts will be necessary to obtain action.

The courtesy which Strong's board extends to those who propose code changes by taking prompt action on their recommendations is greatly appreciated by members of the construction industry who are concerned with building code revisions and, in my opinion, definitely contributes to the improvement of building regulations for the City of New Orleans.

HARRY C. PLUMBER
Structural Clay Products Institute
Washington, D.C.

the broader view

Dear Editor: Congratulations on your October issue, "General Practice." Have enjoyed reading it after seeing nothing but schools and hospitals and hospitals and schools in some of the architectural magazines for several years. Keep up the good work!

FRED W. GUINN
Houston, Tex.

how to pass design?

Dear Editor: The report on the new NCARB syllabus for certification of architects, and the publicity your magazine (*May 1955 P/A*, OUT OF SCHOOL) gave same, is certainly most timely. I have been enjoying and benefiting from your magazine for over 20 years, since college days.

Are other States handling their registrations like the State of Washington? About two hundred candidates line up for the examination, and only a trickle (number not revealed by the license department) is allowed to pass. Contractors in this area do a large percentage of the plan work on residential and commercial jobs, and the lack of design is noticeable everywhere.

After 20 years of architectural (six years under my own name), I have taken the examination in the State of Washington four times, passing all portions but the design, but failing on the design problem by a few points each time. The Board

(Continued on page 16)

(Continued from page 11)

tecture or engineering. Of all the States which expressed an opinion, with a single exception, the opinions were substantially the same as that of Alabama: "To my knowledge, no such specific case as you described has been brought before the Board and no specific ruling made on the question. However, from my interpretation of Sec. 9, I believe that as long as the specification writer is under the supervision of the Architect and where the Architect assumes full responsibility for the work, he would be well within our law."

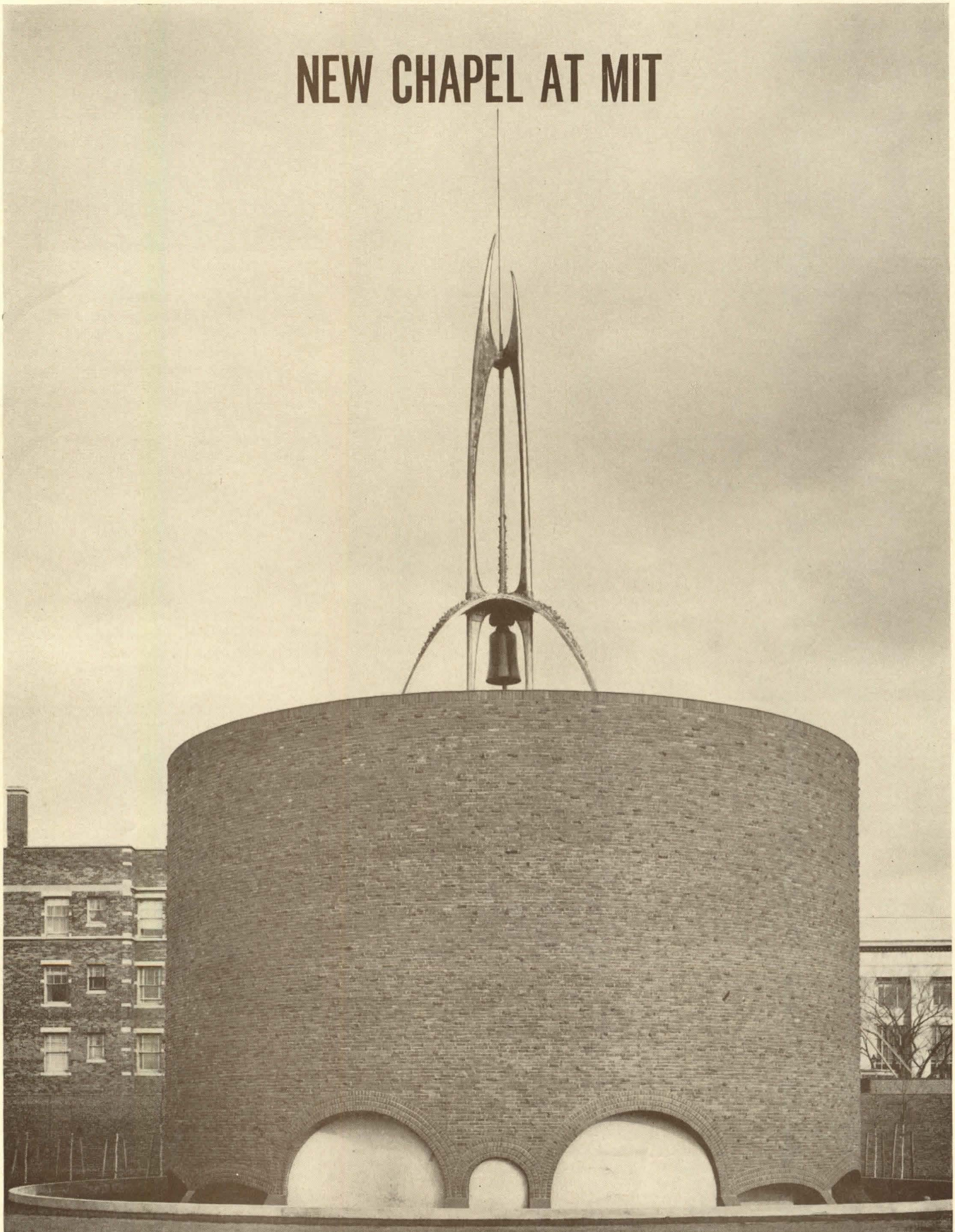
The reply from New Hampshire was especially illuminating: "In view of the Architect or Engineer being responsible for his project, and normally signing and sealing the drawings and specifications, it would appear that it makes no difference whether specification writing is done under contract as a specialist, by the principal himself or by an employe in the principal's office. As a matter of fact, all of the Board members have participated in a joint venture where a specification writer was employed by the joint venture and the work turned in under the joint venture's name. This question has never been raised before the Board."

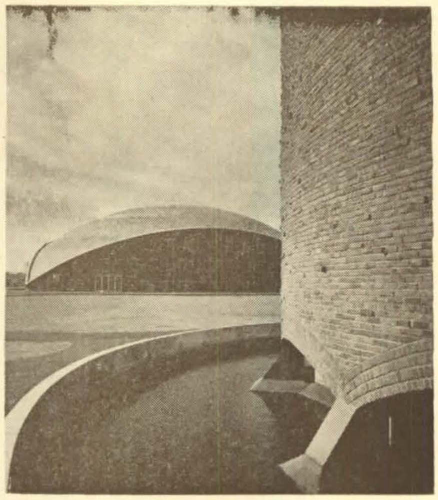
North Carolina summed it up when the Executive Secretary of the Board stated that he had been associated with his Board for nearly 24 years and that to his knowledge no case of this type had ever been brought to the attention of the Board or any ruling had ever been made on the question.

The only dissenting opinion, and at the same time one of the most unequivocal, came from the Secretary of the Indiana State Board of Registration for Architects, who stated: "In Indiana such a practice would be considered by definition the practice of architecture and therefore, illegal regardless of what you call yourself." The moral, if there be one, is not to move to Indiana if you are looking for a receptive climate for free-lance specification writing!

The situation in New York was finally clarified in May 1955 when the same counsel of the State Education Department, in ruling on a Statement of Facts submitted by one of the leading free-lance offices in New York, stated that the firm did not make any independent determination in respect to any matter involving the planning or design of any structure. The reasoning contained in that opinion is so logical and so comprehensive that it deserves quotation in full: "You have advised me that the specification writer examines the architect's plans and attempts to set up specifications of materials, etc., required to carry out these plans. In the course of this, questions arise and these are taken up with the architect to determine the exact intent of the architect on every point. As I understand the matter, from discussions with members of the profession, the specification writer serves an important function in interpreting the architect's plans in terms of specific material requirements but in all instances the language used by the specification writer in describing such requirements is subject to the supervision of the architect and the specifications, when issued, are issued by the architect, after he has examined and adopted them." He very clearly and correctly concluded, on the basis of the facts, that this practice does not infringe upon the practice of architecture.

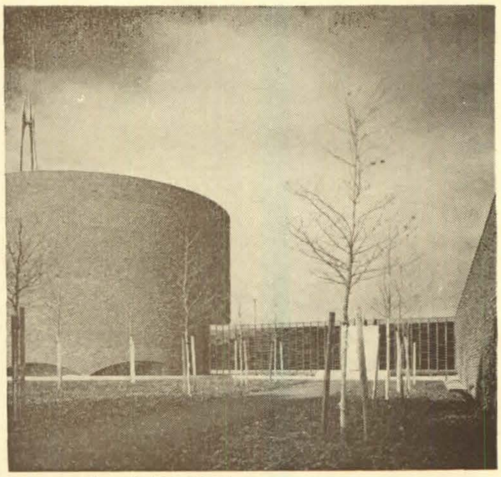
NEW CHAPEL AT MIT





Harry Bertoia's skylight-flooded, gold-metal-flecked screen serves as backdrop or reredos for the Chapel's white marble ceremonial table (left). *The cylindrical structure sits in a water-filled moat, across the new campus plaza from the Kresge Auditorium* (above). *Daylight reflected from the water sifts up into the Chapel through horizontal glazing that occurs between outer and inner serpentine walls of brick.*

The building is entered, from either side, through a metal-framed corridor, whose walls are glazed with bottle-green, not-quite-transparent glass—a calm prelude to the drama of the Chapel proper.



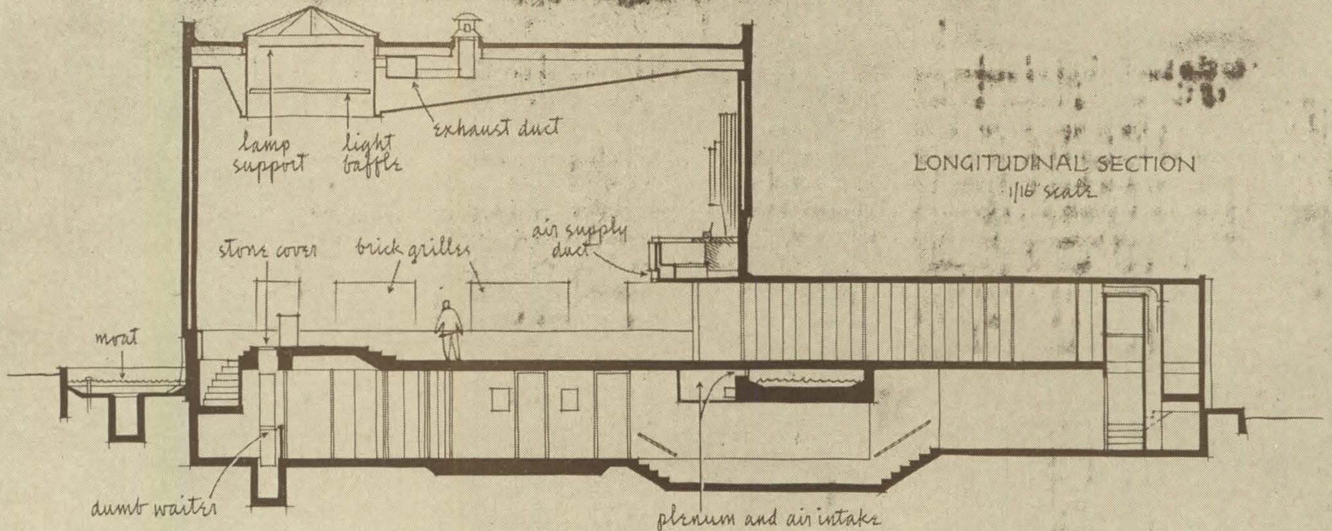
Photos: Joseph W. Molitor

New Chapel at MIT

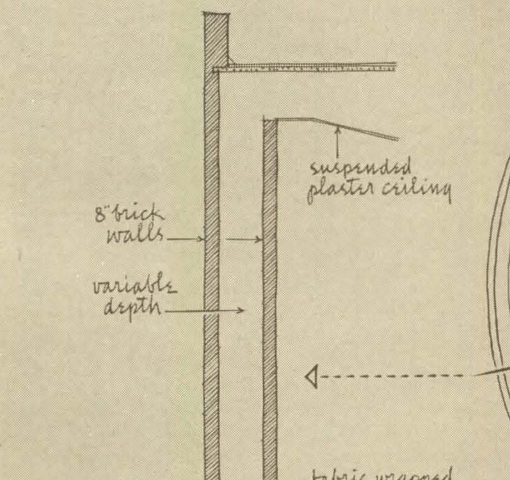
CAMBRIDGE, MASS., Dec. 2 — MIT's new Chapel was recently completed with the installation of the aluminum bell spire, for which Theodore Roszak was the Sculptor. The Chapel was designed by Eero Saarinen & Associates, Architects, and Anderson, Beckwith & Haible, Associated Architects. Acoustical Consultants were Bolt, Beranek & Newman Inc., whose Robert Newman here discusses some of the problems involved:

"The basic philosophy of the reverberation characteristics of the Chapel was that, since it is largely built of masonry, it should 'sound' that way. On the other hand, it should not be so reverberant that speech and music could not be heard clearly and distinctly. . . . From the outset, we were faced with the problems of the circular plan. Had the walls been built to conform with the circular shape of the exterior, there would have been serious concentrations of sound in various parts of the room. The walls were 'broken up' with undulations of varying size to minimize these focusing effects. . . . The audience itself is the chief contributor to the sound-absorbing treatment of the Chapel but, in order to give some control of reverberation even when no audience is present and to bring the reverberation time down to a reasonable value for all types of services, we introduced sound-absorbing material into certain of the lower wall areas *(details acrosspage)*. When the Chapel is empty, the reverberation time at 500 cps is about 3 seconds; with an audience of 115 people, the reverberation time drops to about 1.8 seconds. . . . The hard plaster ceiling gives no trouble, since it is an inverted cone which spreads rather than concentrates the sound."

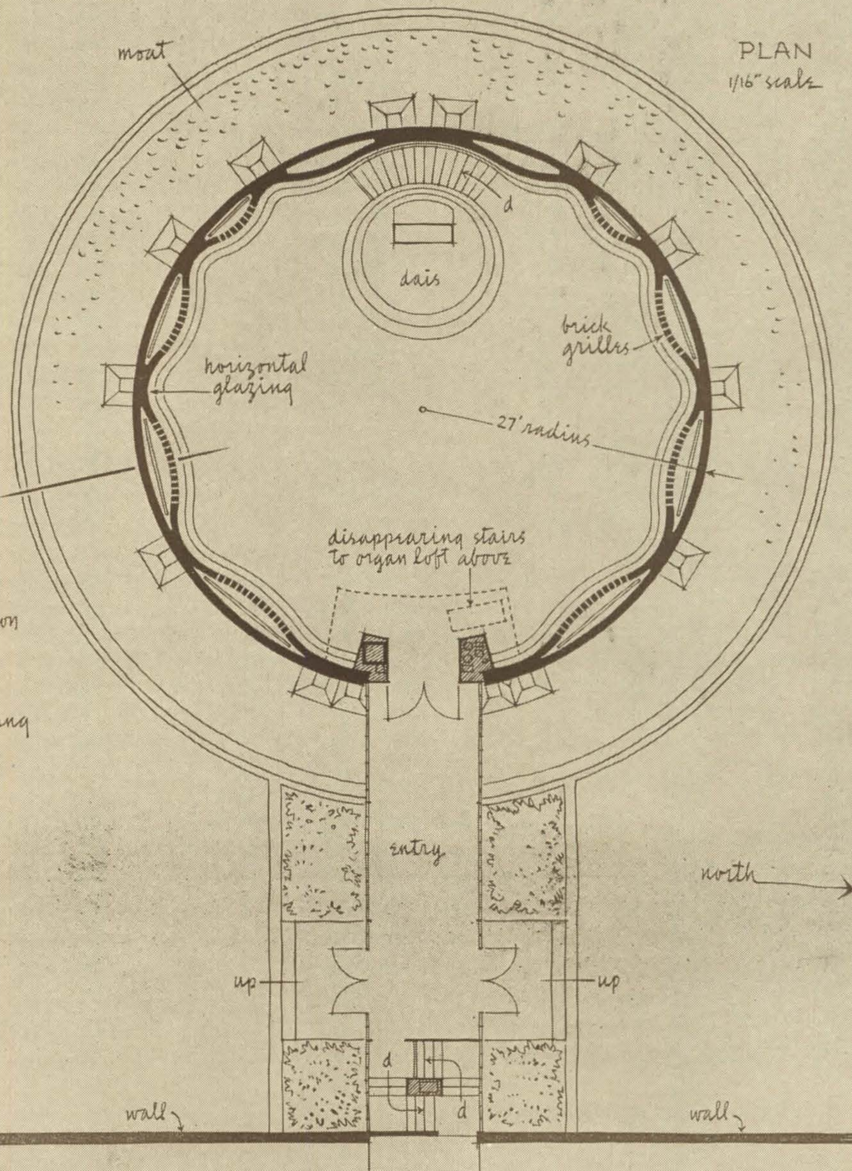
Ammann & Whitney, Structural Engineers; Hyde & Bobbio, Mechanical Engineers; Stanley McCandless, Lighting Consultant; George A. Fuller Co., General Contractor.



LONGITUDINAL SECTION
1/16" scale



SECTION
1/8" scale



PLAN
1/16" scale

P/A BUSINESS FORECAST FOR 1956

According to the predictions of architects in all parts of the United States, basing their estimates on work now in the preliminary stages of design in their drafting rooms, construction will increase by more than 11% next year. Last year at this time, the average architect had $3,526,000 in work on his drafting boards, ready to reach construction stage in 1955. The average architectural office now reports $3,932,000 of 1956 construction in the design stage—an increase of $406,000, or 11.2%.

These figures are from PROGRESSIVE ARCHITECTURE's annual Business Survey of the Architectural profession, just completed. The sampling is made up of approximately 5% of practicing architectural firms, carefully adjusted for regional distribution and size of firm. This is the sixth consecutive year P/A has conducted its survey, the only realistic estimate of building prospects based on actual projects on the drafting boards of the nation's architects.

Optimism of the firms reporting is indicated by the fact that 71% expect 1956 to be a better year for them than 1955 has been, judging by preliminary work in the office; 19% expected the same amount of business; and only 10% foresaw a decline in prospects *(see Table 9)*.

Breaking the results of the survey down by regions (10 national regions, based primarily on AIA regional organization) P/A's Editors find that the Great Lakes area, the Northeast, and the California-Nevada region are the most busy, in average dollar volume of work reported. This sequence is the same as it was in the P/A's 1955 survey. Other areas are fairly similar to each other in average volume of work, with the Northwest trailing *(see Table 1)*.

Educational work is the heaviest, in dollar volume, reported throughout the country. This has been true for the last three years. Commercial design, also for the third consecutive year, is in second place *(see Table 2)*. Educational construction also led in dollar volume totals reported from 7 of the 10 regions—exceptions are the Great Lakes area, with design for industry in first place (with education second) and the Western Mountain and California areas, where commercial work was heaviest (again with education second in each case).

It is interesting to note that types of buildings which lead in dollar volume are not always the types that are occupying most architects. This variation (due to large unit costs of some buildings, such as great industrial structures, and smaller unit costs of others, such as church buildings) was checked in P/A's survey by determining the number of architectural firms engaged in each building category. In this sense, private residential work leads, being on the boards of 63% of the architects (though it was lowest in dollar volume percentage) and commercial design, occupying 62% of the firms reporting, is second. In this respect it might be noted that a great resurgence of religious building is in evidence, with 52% of the architectural firms reporting some church work in the office. This figure substantiates the recent statement of the National Council of Churches that "more people are going to more churches and giving more money for more buildings than ever before." *(See Table 5.)*

Few architects specialize in their practices, the survey indicates. Only 6% of

TABLE 1
Average Dollar Volumes
724 Architectural Firms Reporting

by regions	$ volume
1 Northwest	$1,637,000
2 North Central	2,521,000
3 Great Lakes	6,369,000
4 Northeast	5,292,000
5 Southeast	2,132,000
6 Gulf States	2,715,000
7 Central States	4,302,000
8 Texas	2,593,000
9 Western Mountain	2,908,000
10 California-Nevada	4,520,000
National average	$3,932,000
National median	1,500,000

Comments: The three top regions are in the same order they were last year and the year before: Great Lakes the leader in average dollar volume; Northeast next, and California-Nevada third. Not much difference among remaining regions, except that Northwest continues to have a low average, as it has for the entire period of P/A's annual business surveys.

TABLE 4
Regional Distribution
of Firms Answering Questionnaire

region	% of firms
1 Northwest	5.5
2 North Central	12.5
3 Great Lakes	12.3
4 Northeast	23.7
5 Southeast	11.1
6 Gulf States	5.4
7 Central States	9.7
8 Texas	5.9
9 Western Mountain	3.8
10 California-Nevada	10.1
	100.0

This distribution corresponds so closely to previous P/A surveys, and to the 1950 AIA survey, that it can be taken as a reliable indication of present geographical location of architectural firms.

TABLE 2
Dollar Volume Averages and % Distribution of Work
By Types of Buildings All Regions

type	% of average architect's work	$ volume average office
Education	25	$976,000
Commerce	18	703,000
Industry	12	466,000
Housing (Multiple)	10	403,000
Public Use	9	351,000
Defense	9	336,000
Health	7	292,000
Religion	5	210,000
Residential (Private)	4	155,000
Miscellaneous	1	40,000
TOTAL (average office—all regions)	100	$3,932,000

TABLE 5
Activity of Architectural Firms In Types of Buildings

types of buildings	currently on boards of (%) architectural firms
Commerce	62
Education	60
Health	25
Housing (multiple)	23
Industry	31
Public Use	29
Religion	52
Residential	63
Defense work	3

These percentages will not correspond with $ volume tables, because certain types of buildings are smaller in $ volume average commission than others. This table should be useful to manufacturers and others who wonder how many firms are working on a certain type.

It is interesting, for instance, that religious work, always comparatively low in $ volume, is on the boards of over half the architects in the country.

TABLE 6
Specialization of Architectural Firms

types of buildings	% of firms doing only this type
Commerce	1.0
Education	2.0
Health	.3
Industry	.3
Public Use	.3
Religion	.7
Residential	1.4
Total firms specializing in any building type:	6.0

TABLE 7
What Is The Size of Architectural Firms % By Number of Employes

No employes (principals only)	5.2
1 to 4 employes	48.3
5 to 9 employes	25.5
10 to 19 employes	13.3
20 to 39 employes	4.2
40 to 99 employes	2.0
100 to 199 employes	1.0
200 to 300 employes	.3
over 300 employes	.2
	100.0
Median firm	4.0 employes
Average firm	10.8 employes

TABLE 8
What Is The Size of Architectural Firms % By $ Volume of Work on Boards

Under $1 million	36.2
$1 million to $10 millions	59.8
$10 millions to $50 millions	3.0
$50 millions to $100 millions	.5
Over $100,000,000	.5
	100.0

(Note rough correlation of the two tables. One might say that roughly 36% of firms employ less than 4 people and do less than $1 million of work; 60% employ between 4 and 40, and do between $1 million and $10 millions; 4% employ more than 40 and do more than $10 millions.)

Number of firms up to 4 employes is just about the same as last year. Number of very large firms (40 and more) has decreased from 4.4% in P/A's 1955 survey to 3.5% in this 1956 survey.

TABLE 9

size of firm's business	expect increase in 1956	expect decrease in 1956	expect same in 1956 as in 1955
Under $1 million (36.2% of firms)	67%	9%	24%
$1 million to $10 millions (59.8% of firms)	73%	10%	17%
Over $10 millions (4% of firms)	63%	4%	33%
All firms (100% of firms)	71%	10%	19%

those reporting are engaged exclusively in one type of building design. Of those, the largest number (2% of the total surveyed) specialize in school design *(see Table 6)*.

The median architectural firm has 4 employes (the same figure as last year) but the average has stepped up from 10.5 to 10.8. The reason for this does not seem to be an increase in the number of large firms (percentages of firms with more than 40 employes actually dropped from the year before) but rather the step-up in number of employes in a very few huge organizations. One large Midwest firm, for instance, reported 1040 employes this year, whereas last year's survey showed 700.

The great bulk of the architectural profession remains in the category of 1 to 10 employes; a total of 79% of the firms so report. This year only 1.5% are employing more than 100 people *(see Table 7)*.

Somewhat the same situation is pictured by the dollar volume figures reported; 96% of the architects have $10 millions or less in work on their boards. The median, actually, is close to $1,500,000 (although the average is much higher). If there is a *typical* architectural firm, then, it is one employing 4 people and doing annually $1½ million in business. The *average*, on the other hand, employs almost 11, and does almost $4 millions of design *(see Table 8)*.

Financial News

by William Hurd Hillyer

January looks backward and forward like its legendary patron Janus. Its two-faced perspective lends importance to happenings otherwise unnoted: as for instance the recently altered status of the word "boom." Only a few months ago the term was interdict as applied to the prevailing spate of prosperity ("Financial News," April 1955 P/A). Today, even so sedate a trio as Federal Reserve Bank of Chicago, First National City Bank, and Guaranty Trust Company (both of New York) speak freely concerning "the boom in general business activity," "the boom in business investment," and "dimensions of the boom." This chorus is joined by conservative financial journals such as Commercial West, which headlines "Fabulous '50's In Residential Building Booms."

No great sagacity is required to see in these uninhibited semantics a subtle yet significant change of outlook. The truly spectacular prosperity which was hailed not long since as a return to normal conditions is now admittedly something more. This in spite of the fact that certain major economic sectors, such as residential and business building, do not present overspeculative symptoms. Contrawise, some authorities like Vice-President and Economist Arthur Smith, at First National in Dallas, Texas, are still calling the current era "normal." It is somewhat startling, however, to see that official calmly accept the soaring $32-billions consumer debt as a probably permanent part of our economic structure.

Prudent architects, confronted with an emerging '56, are properly concerned because design itself is influenced by economic factors. Two questions naturally arise: If 1955 staged a boom, will the coming year bring a reaction? Specifically, what effect will 1956 economics have on architecture? Consideration of these matters is governed by certain turn-of-the-year facts.

To begin with, the full-employment ceiling has just about been reached. According to New York's largest trust company this means that "we are flirting with inflation." In other words, production can't catch up with demand if it is already doing its best. Critical shortages are appearing in strategic areas, notably paper and steel—the latter a prime construction necessity. A clear-eyed Wall Street observer reminds us that inflationary price spirals often begin with shortages like these. Chairman Martin of the Federal Reserve Board recently semaphored the presence of similar perils to a Congressional Committee. Oddly enough yesterday's much desired goal of full employment has become a possible danger spot for tomorrow.

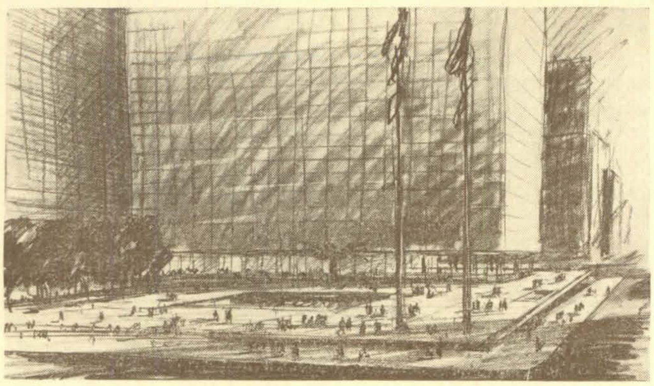
Both business and individuals continue their unabated demand for credit. Here again, with bank reserves at low levels, Martin cautions us that "to meet these demands by

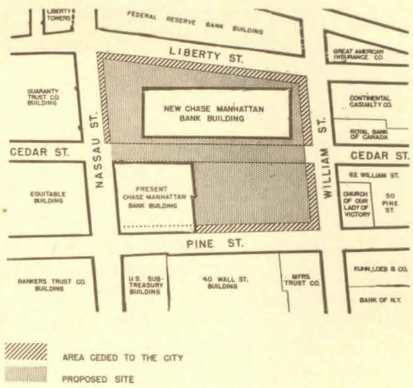
News Bulletins

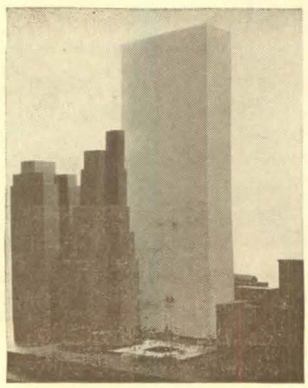
• Most important FBO commission in Department of State's present program for design and construction of U. S. official buildings in foreign countries—the U. S. Embassy in London—will be awarded on the basis of invited competition. Invited contestants are: José Luis Sert, Ernest J. Kump, Eero Saarinen, Edward D. Stone, Hugh Stubbins, William W. Wurster, Minoru Yamasaki, and Anderson & Beckwith. These architects visited the London site in early December, were given the program, and began work on designs to be judged next month.

• Entries for AIA's Eighth Annual National Honor Awards Program are due March 1, 1956. For details write: Committee on Honor Awards, AIA, 1735 New York Ave., N.W., Washington 6, D. C. . . . Awards jury will be composed of: Pietro Belluschi, Eero Saarinen, Paul Thiry, Donald S. Nelson, George B. Allison.

• The Chase Manhattan Bank's plans to consolidate previously scattered facilities into one building also envision an open plaza carved out of New York City's crowded financial district. Preliminary studies by Architects Skidmore, Owings & Merrill show 50-60 story office structure placed on two-square-block site (below left); details of plans and exterior treatment are not yet frozen. Map and block model (below right) indicate relationship to surrounding area. Cedar Street will be closed to vehicular traffic in exchange for widening of other streets; negotiations are under way to sell present bank building on Pine Street to Chemical Corn Exchange Bank.







creating new supplies of money through the commercial banking system with Federal Reserve assistance would invite dangerous inflationary repercussions."

The cost of money continues to rise, paced by the rediscount rates charged by Federal Reserve to its borrowers.

• Residential builders are somewhat fearful lest Government "control" of mortgages precipitate a construction slump before '56 is well under way. This feeling of anxiety may be disposed of without going any further: private nonfarm housing starts are at a near-record 1¼ million annual rate. Allowing for a tendency toward larger family units, the floorspace aggregate is in all likelihood not far below December '54s peak. Great activity, however, has its price. Construction in general is on the point of overtaxing both its physical capacity and the amount of savings available to finance its operations, Guaranty Trust Company of New York believes.

Actual supply of materials and money, rather than a moderate rise of interest rates, will govern the builder's problems, in estimation of astute bankers. Commercial and industrial building dropped somewhat in mid-December, but a rise was reported in private mass housing. Staff Vice-President Slipher of the United States Savings and Loan League sounds an optimistic note: "The year 1956 will turn out to be another good year for home building, and there will be ample funds available." This view is supported by Executive Director Dickerman, National Association of Home Builders, who concedes a possible 200,000 reduction—not attributable to credit actions recently taken.

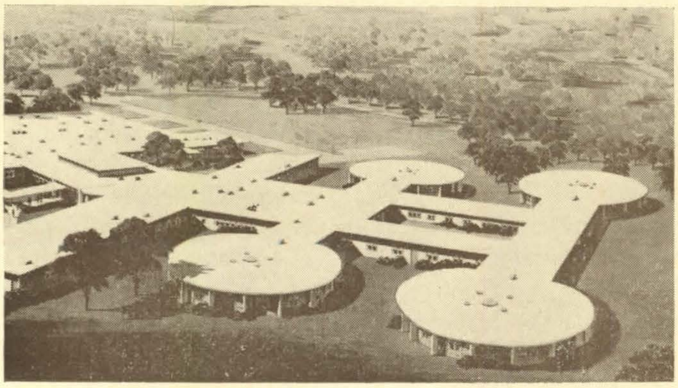
Basic funds for building of all kinds will continue to come from savings, not from bank reserves or commercial deposits as is commonly supposed. With savings of various categories mounting at a better than $16 billions annual rate of expansion, financing is reasonably assured.

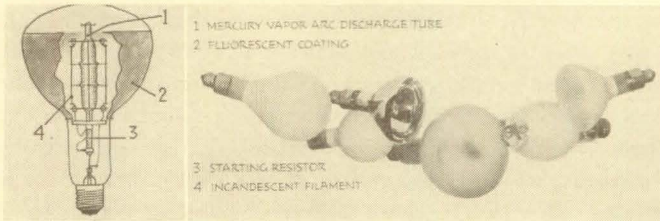
• Comparison between pre-'29 boom conditions and today's good times is largely robbed of its terrors by population analysis, recently completed at Federal Bank of Kansas City. The 1920s and '30s comprised an era of declining birthrate and shrinking immigration, while present circumstances are exactly opposite. "Economic maturity" which raised a disastrous road-block in '29 has been replaced by a justifiable concept of continued growth in which the well-housed family is the standard unit.

Support of a growth outlook may be found in such fundamental analyses as that above cited rather than in a repetition of expansion statistics at this time. The Federal Reserve aptly quotes the British economist J. M. Keynes: ". . . an era of increasing population tends to promote optimism, since demand will in general tend to exceed, rather than fall short of, what was hoped for." Although population growth alone does not ensure high activity, the same bank goes on to say that the stimulus of such demands in this country has been a favorable business influence in the past. It may well exert a like effect in 1956.

• Cognizance of planning anemia that persistently distorts all the forced growth of New York—major urban center of architects and planners where most professional warnings are smeared by politicians-in-saddle as "long-haired twaddle"—is evident in topics announced for lecture series, HOW TO BUILD A BETTER NEW YORK, sponsored by The Cooper Union and Fine Arts Federation of New York. Opening sessions will treat: "Third Avenue, Boulevard or Alley?"—Jan. 5; "City Planning for 2000 A.D."—Jan. 9; and "Problems in Civic Design"—Jan. 13; "The Legal and Real Estate Problem"—Feb. 2; and "The Transportation and Traffic Problem"—Feb. 14.

• Reminder to architects that entry blanks for Exhibit of Church Buildings to be shown at Annual National Joint Conference on Church Architecture are due Feb. 14. Write: Albert C. Woodroof, 1813 Pembroke Rd., Greensboro, N. C.





• New "Fluomeric" light source combining best features of incandescent, fluorescent, and mercury-vapor lamps emits light in three ways: by tungsten filament; by fluorescing of activated-phosphor powders; and by gaseous discharge. Lamp eliminates transformer, operates on ordinary house current, and can be screwed into any socket. It is ideal for practically all occupancies and the color spectrum is said to be superior to anything now in use; present rated life is 12,000 hours. Duro-Test Corp., North Bergen, N. J.

• Atomic medical-research center (left) designed by New York Architects Eggers & Higgins for U. S. Atomic Energy Commission's Brookhaven National Laboratory, Upton, L. I., represents a new type of medical facility. Hospital unit with round nursing stations is intended primarily for research, as are laboratories for medical physics, pathology, microbiology, biochemistry, physiology, and clinical chemistry (square wing, upper left of photo). Scheduled for completion in two years, at cost of more than $6 millions, project will also include an industrial-medicine unit and nuclear reactor designed specifically for medical research and treatment.

Washington Report

by Frederick Gutheim

The Civil Aeronautics Administration will send to Congress this month its construction program for the balance of the 1956 fiscal year. This $63-millions program is selected from a huge backlog of local airport construction accumulated during the past two years when the do-it-yourself policy of the Eisenhower Administration halted Federal assistance toward that "adequate national airport system" Congress has declared we need.

The program also marks the beginning of long-range planning, the first step in a 4-year $252-millions program authorized by Congress last year. This should end forever the stop-and-go character of Federal aid in this field, where local enterprise has been stultified by the prospect of Federal financing—some time. Politically, the program is a milestone in the awakening of the Republican Party to the fact that its 1952 campaign slogans were not workable, and that, far from suspending Federal programs in such fields, the only thing to do was to show that the GOP could do better. Similar developments are to be expected in other controversial fields such as housing, health, and education, in preparation for this year's campaign.

Airport terminals and other buildings are an important part of the new program, in rather sharp distinction to previous years in which runways and other engineering improvements have predominated. Planning aspects are also receiving more emphasis. The rapid obsolescence of airports and their facilities, the need to plan for change and growth, and especially the recognition of the importance of maintaining clear flight paths and of controlling surrounding development, are typical planning problems.

Planning airports for automobiles is another major planning job. The measure of this was recently highlighted at the Los Angeles Airport, where economic studies knocked out a proposed airport hotel when it was determined that a parking structure on the same location would yield more revenue! The multistory parking structure is a very hot item in today's airport planning. One of the best plans of this sort is at Kansas City. Parking problems have also been partially responsible for a revived interest in unitized planning, as at the New York International Airport, rather than *decentralized* planning. Some exceptions may be noted, like Pereira & Luckman's igloo plan for Los Angeles.

Planning airports for the pedestrian has become almost as *important*. The development of terminal concessions of all sorts, from popcorn machines to car rental agencies, has made these commercial uses more profitable than the yield from the airlines themselves. In a business sense, Fort Worth International Airport is a successful demonstration that interest can be sustained by well-planned commercial development while the pedestrian walks quite long distances.

The natural desire of many cities to use their airport terminals for gateway purposes puts the CAA in a position where it has to warn sponsors against "sugar coating" their plans. On the whole, CAA's architectural review, while critical of functional design and standards, allows freedom in design expression. The official manual, "The Federal-Aid Airport Program, Policies and Procedures," released last month states plainly that "terminal buildings should be functional and not monumental." This applies only to the Federal share in the financing, of course, which provides only a skeletonized building in which an airport restaurant, for example, is financed only to the point where plumbing is roughed in. It is up to the locality itself to find ways to pay for "architecture."

• The new year is bringing intensified activity on the architectural scene here. Congress will receive a major report from the Public Buildings Service on new construction needed in Washington. A schedule of outlying office-building centers, and central-area construction to replace the wartime temporary buildings will be proposed. Two dispersed office buildings are already "in the works." The Atomic Energy Commission's $10-millions building, 25 miles northwest of the capital, will be under construction in early spring. The Central Intelligence Agency's $35-millions "campus" is still having site selection troubles, but it should also be under construction this year. Progress on the Southwest Washington redevelopment will be accelerated, now that the major obstacles imposed by the National Capital Planning Commission are overcome. The bold mall proposals by I. M. Pei and a radically new treatment of residential units worked out by Harry Weese make this project of compelling interest for the future of the Capital.

• Congress will also have to face the problem of Federal aid for school construction. This type of aid for public schools clearly emerged from the rather inconclusive White House Conference on Education as one of its few positive ideas. President Eisenhower, Secretary Marion B. Folsom, and the Office of Education will now go down the line for this program, but it has yet to receive a tangible legislative form. Among other projects with a distinct Washington flavor are a reception center for tourists proposed by the National Park Service for a site now being cleared at the west end of Pennsylvania Avenue, and a national cultural center and civic auditorium. A 21-man commission has been studying the latter proposal, which involves design problems of considerable interest. The commission's site committee, headed by Barney Balaban, president of Paramount Pictures Corp., has set up a voluntary unpaid planning group of eight architectural and engineering firms to create an architectural program. The co-ordinating firm will be Pereira & Luckman. The AIA has proposed a national competition for this building after a program has been resolved, but the chance of getting it is a dim one.

P/A Design Survey for 1956

and third annual Design Awards Program

Again the New Year's issue of P/A is almost entirely devoted to reporting on our annual Design Awards Program. With more than 700 submissions, judging was extremely difficult, and the Jury — greatly impressed with the general high level that appeared in the work submitted — had to extend its deliberations longer than in the past in order to reach final conclusions. Elected Chairman of the distinguished Jury was William Lescaze, New York. Other members were Robert E. Alexander, Los Angeles; Alfred L. Aydelott, Memphis; Pietro Beluschi, Dean of the School of Architecture and Planning at MIT; and Paul Weidlinger, New York, Engineer.

Last year, the First Design Award went to a private house; this year, in sharp contrast, the top winner is a noble, large-scale urban redevelopment project for Detroit designed by Yamasaki, Gruen, and Stonorov working together. The Jury had nothing but praise for this concept, from the broad thinking which relates the project to the greater city, through the opened-up, humanized planning within the area itself, to details of the units.

Indications of the direction that design in the United States is taking may well be drawn from the results of the Program. First, there is an obvious concern in many categories of building for *planning* and for relationship of buildings to one another and to the site. Hundreds of isolated buildings were entered, and a number premiated; yet, time after time, the Jury commented on the many *groups* of structures submitted — college campus groups, housing groups, shopping center complexes, industrial communities, and so on — all in addition to the entries in the field of planning *per se*.

Second, there seems to be a more *relaxed* attitude toward the handling of contemporary forms than in the past. There is not so much self-consciousness; not the same reliance on the utterly safe, sure, repetitive rectangular module; more *fun* in playing with plastic forms; more *dignity* in the definition of scale, proportion, and relationships; more *humility*, perhaps, in the freedom with which traditional shapes, a little romanticism here, a bit of color and decoration there, are added to the boldly stated structure.

One misses (not too sadly) the accustomed controversies and clichés: vertical *vs.* horizontal expression, extravagantly open house design, and so on. Instead, one realizes that we are developing design elements which demand new critical criteria: the separated, pierced, true *curtain* wall, for instance, which turns up in various forms. There are here as many pitched roofs as there are flat; there are few pilotis, and where they occur they help solve a problem; there is a great concern with pattern, texture, and enriched surface. These are surely healthy signs — signs of increasing maturity.

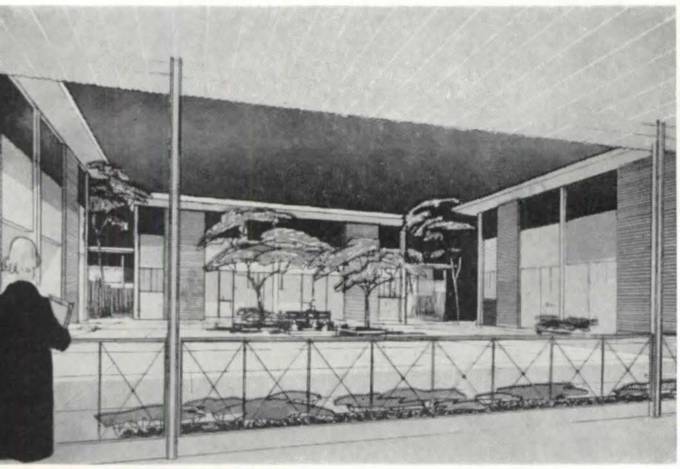
P/A is grateful to all members of the profession who entered this year's Program, and sincerely congratulates those whose work rose to the top.

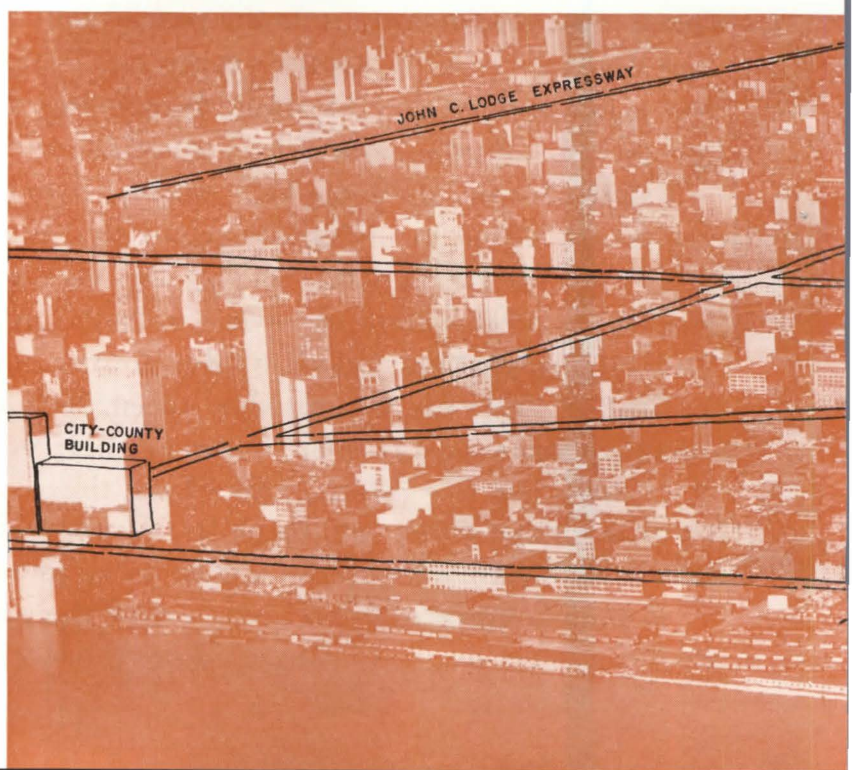
first design award:

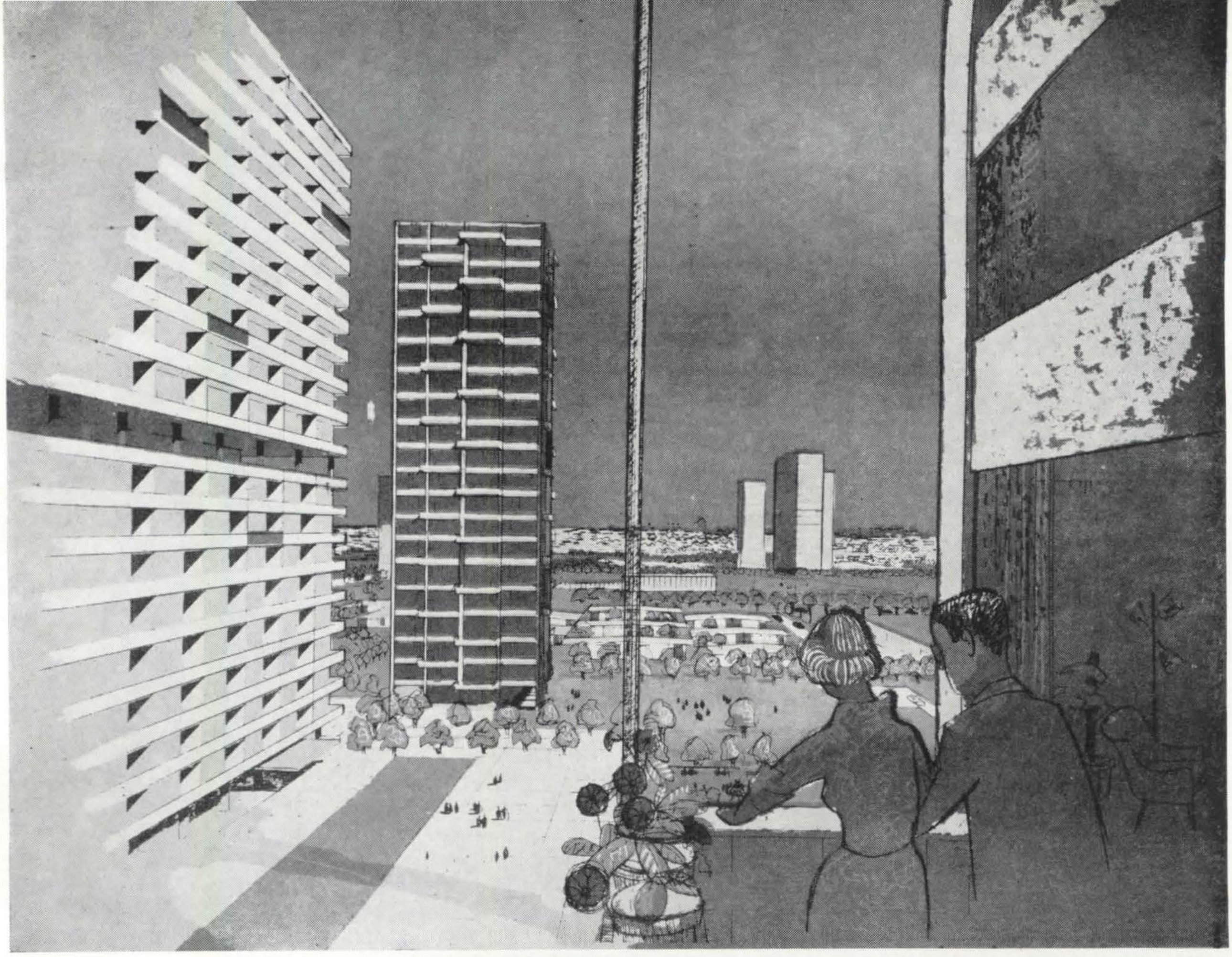
Urban Redevelopment, Detroit, Michigan

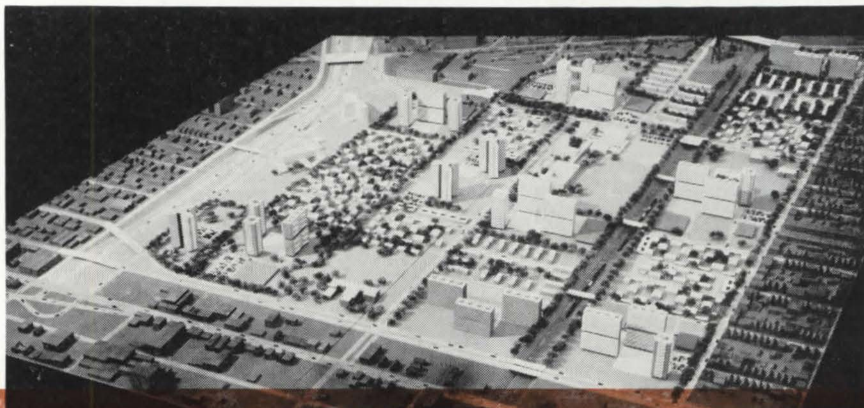
Associated Architects: Yamasaki, Stonorov, and Gruen

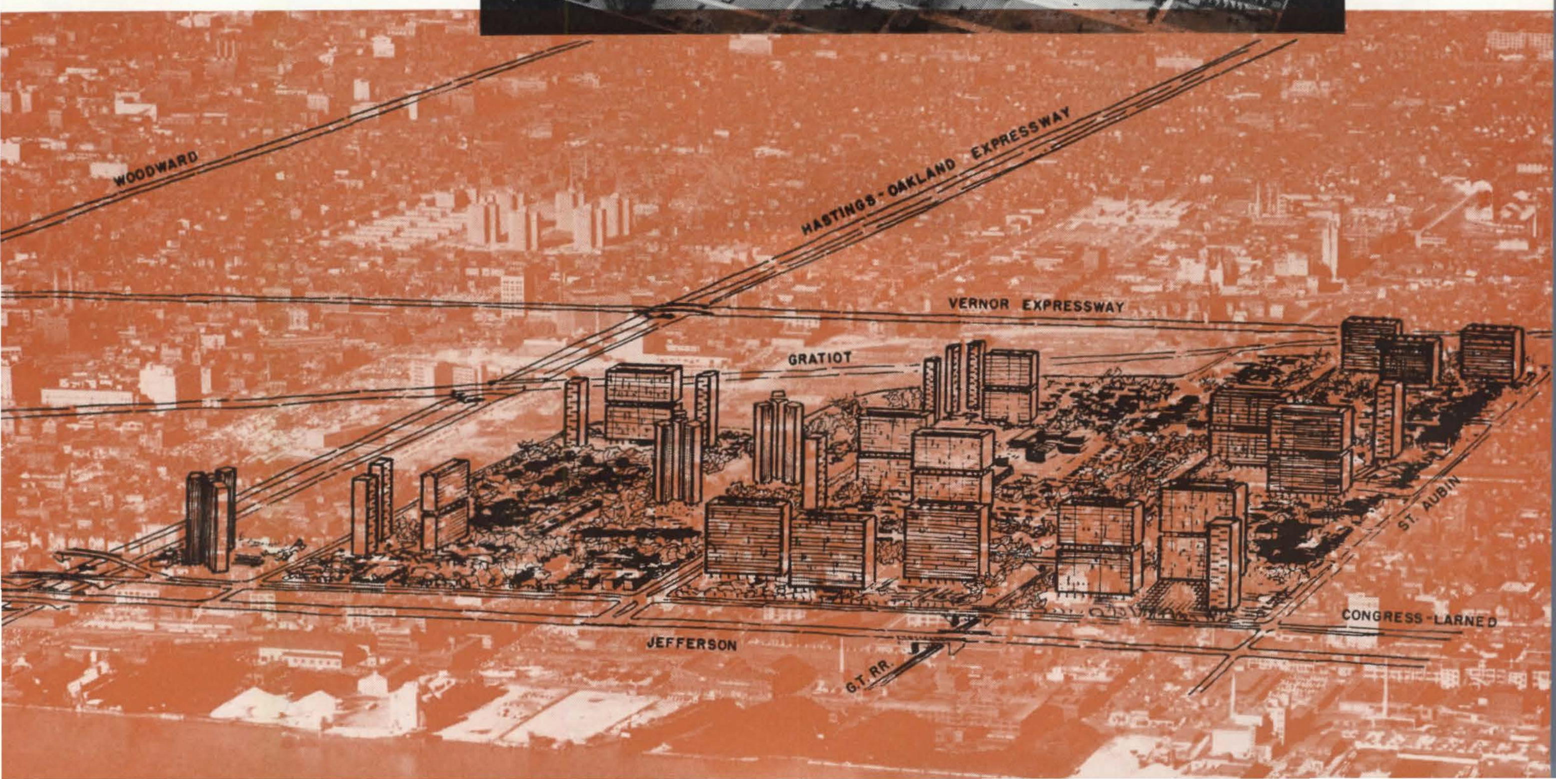
"A way out"—as Albert Mayer headed a portion of his keynote address at the 87th Convention of the AIA—may well be exemplified by this urban redevelopment plan, which won top honors in this year's P/A Awards Program. The Gratiot-Orleans Study was sponsored by Detroit's Citizens Redevelopment Committee, directed by such outstanding Detroiters as Walter J. Gessell, Walter Gehrke, Walter P. Reuther, Foster K. Winter, and many other leaders from the automobile industry and other fields. Architects were selected from three prominent offices: Leinweber, Yamasaki & Hellmuth; Oskar Stonorov; and Victor Gruen Associates. First design objective was the integration of the new community into the over-all plan established earlier by the Detroit City Planning Commission. Within the ultimate scope of this master plan, the Gratiot-Orleans concept will serve as a prototype for some 25 similar-sized Detroit neighborhoods to be redeveloped. As an important factor in this city of automobiles, there will be immediate access to an extensive expressway network linking directly with the open country (also part of the master plan). However, "a way out" passes beyond mere large-scale planning. As Mayer stated, ". . . we must start at the other end too, with the small neighborhood, the super-block, the architectural and living texture out of which the grand new plan will be built. For only by constantly thinking and weighing in the intimate scale, and on the grand scale, can we achieve both the over-all requirement, the continuity of texture and pattern, and the lift of architecture." To P/A's Jurors and Editors the "lift of architecture" is inherent in this solution, and it is this quality which made the Detroit Redevelopment Plan stand above all other entries in the Awards judgment. From the smallest details of a one-room dwelling plan, to the ingenious pattern of the town houses and the distribution of the high-rise apartment towers and green areas *(see August 1955 P/A for detailed plans and photos of these dwelling units)* the architects' sensitivity is apparent. Gratiot-Orleans will be a neighborhood housing approximately 4000 families; a self-contained community with its own schools and service facilities. It will be a community encompassing all income levels, and above all, it will restore the downtown area to its proper importance as focal point of a vast metropolitan area.





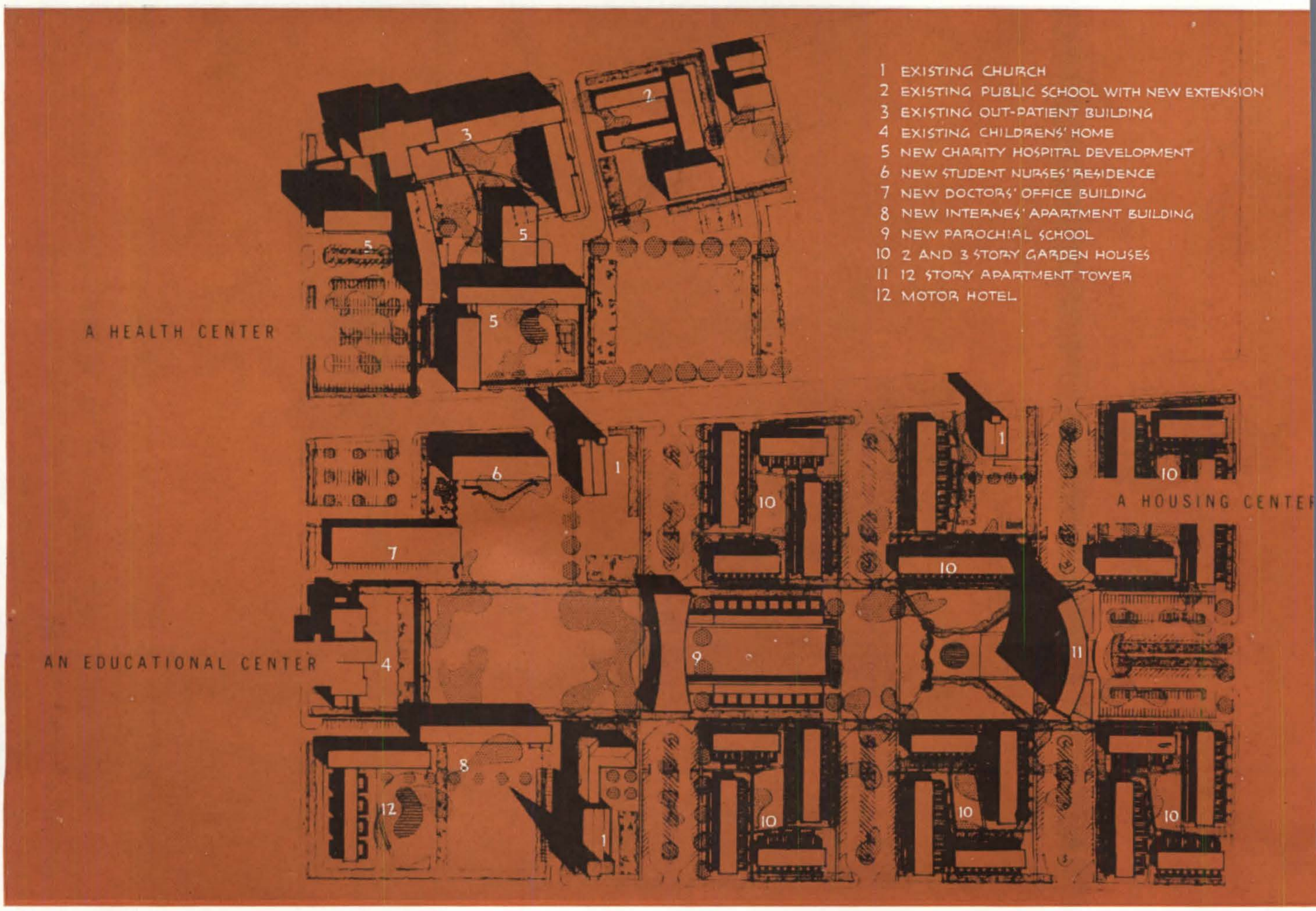


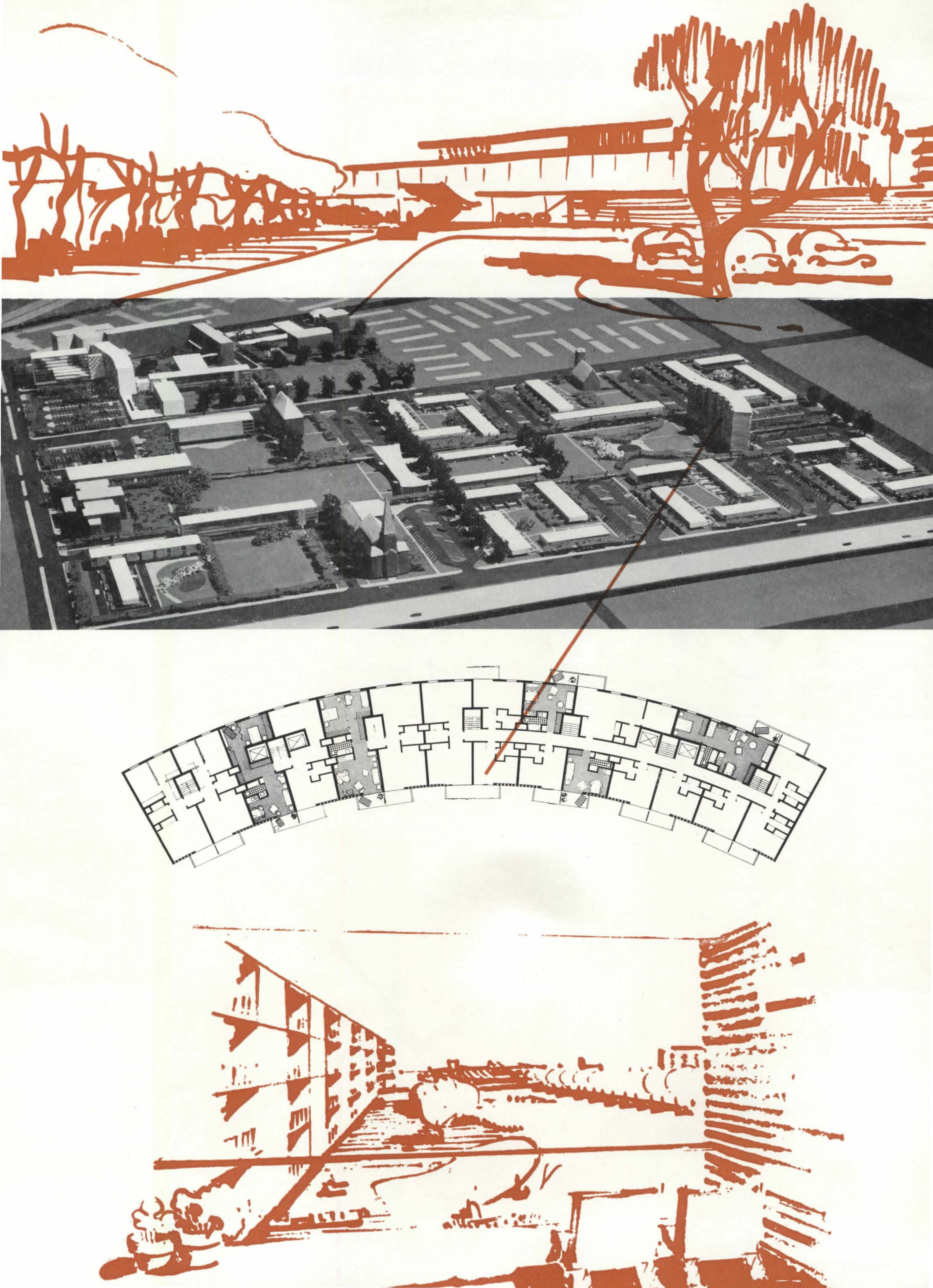



WOODWARD
HASTINGS-OAKLAND EXPRESSWAY
VERNOR EXPRESSWAY
GRATIOT
ST. AUBIN
CONGRESS-LARNED
JEFFERSON
G.T. RR.

Award Citation

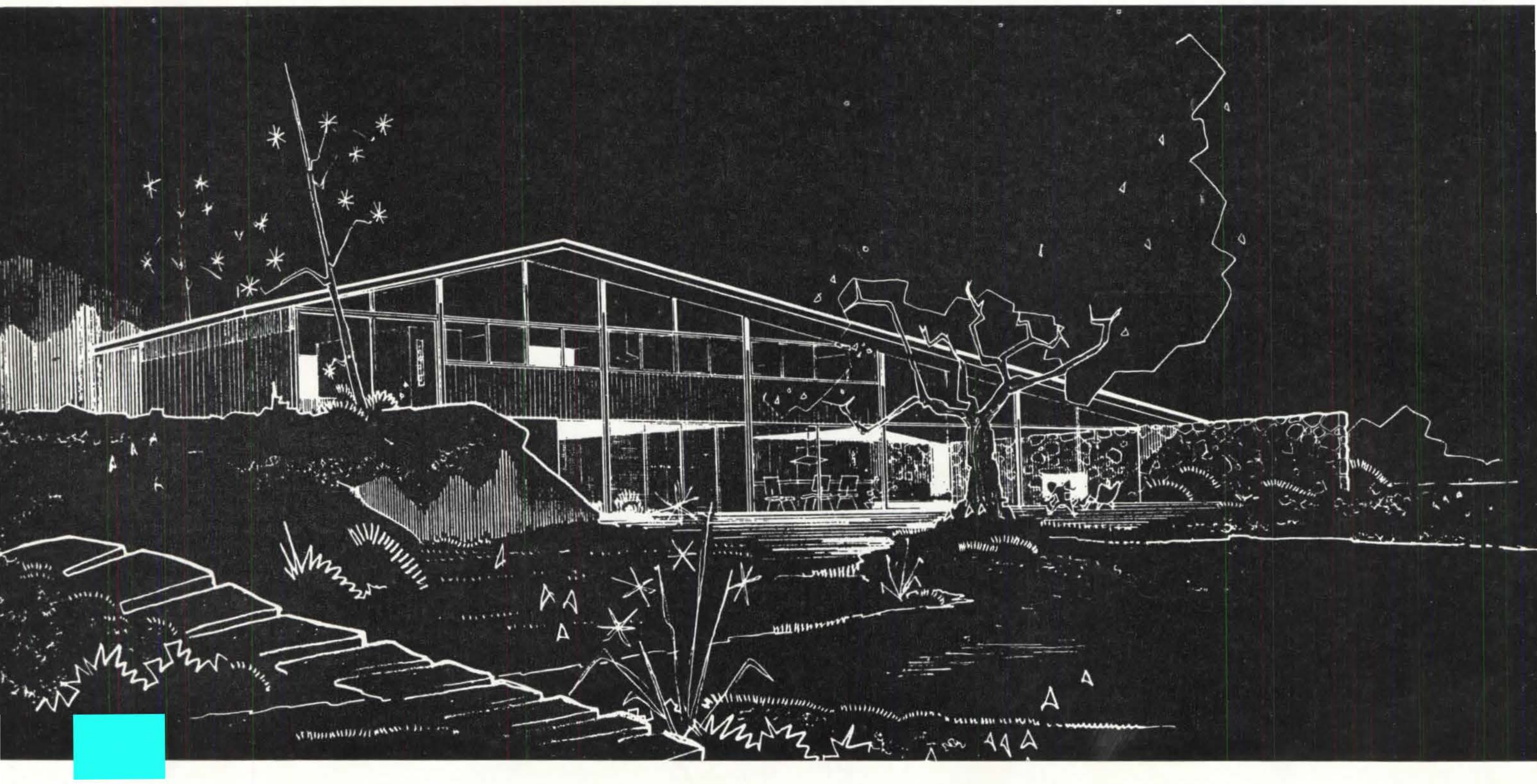
Urban Redevelopment for St. Vincent Charity Hospital, Cleveland, Ohio: Robert A. Little & Associates, Architects; Edward M. Hodgman and Chalmer Grimm, Associates; Cleveland City Planning Commission (Ernest J. Bohn, Chairman; James M. Lister, Director; Leighton Washburn, Planner) and Cleveland Welfare Federation, Consultants. This study, prepared under the sponsorship of the advisory board of St. Vincent Charity Hospital (Charles F. McCahill, Chairman), proposes the revitalization and renewal of downtown Cleveland. A start has already been made with the $2-millions expansion of Charity Hospital which adjoins the site to be redeveloped. A number of existing institutions will form the core of the new St. Vincent Center, to which will be added: an expanded, modern, comprehensive health center for Charity Hospital; a doctors' office building; a student nurses' home, close to hospital training facilities; a motor hotel for out-of-town patients and travelers; a residence for internes; expansion of public education facilities; a new parochial school; and moderate income housing serving primarily young families, single working people, and older persons. Sketches (*acrosspage*) show doctors' building from the north (*above*) and nurses' residence (*below*).

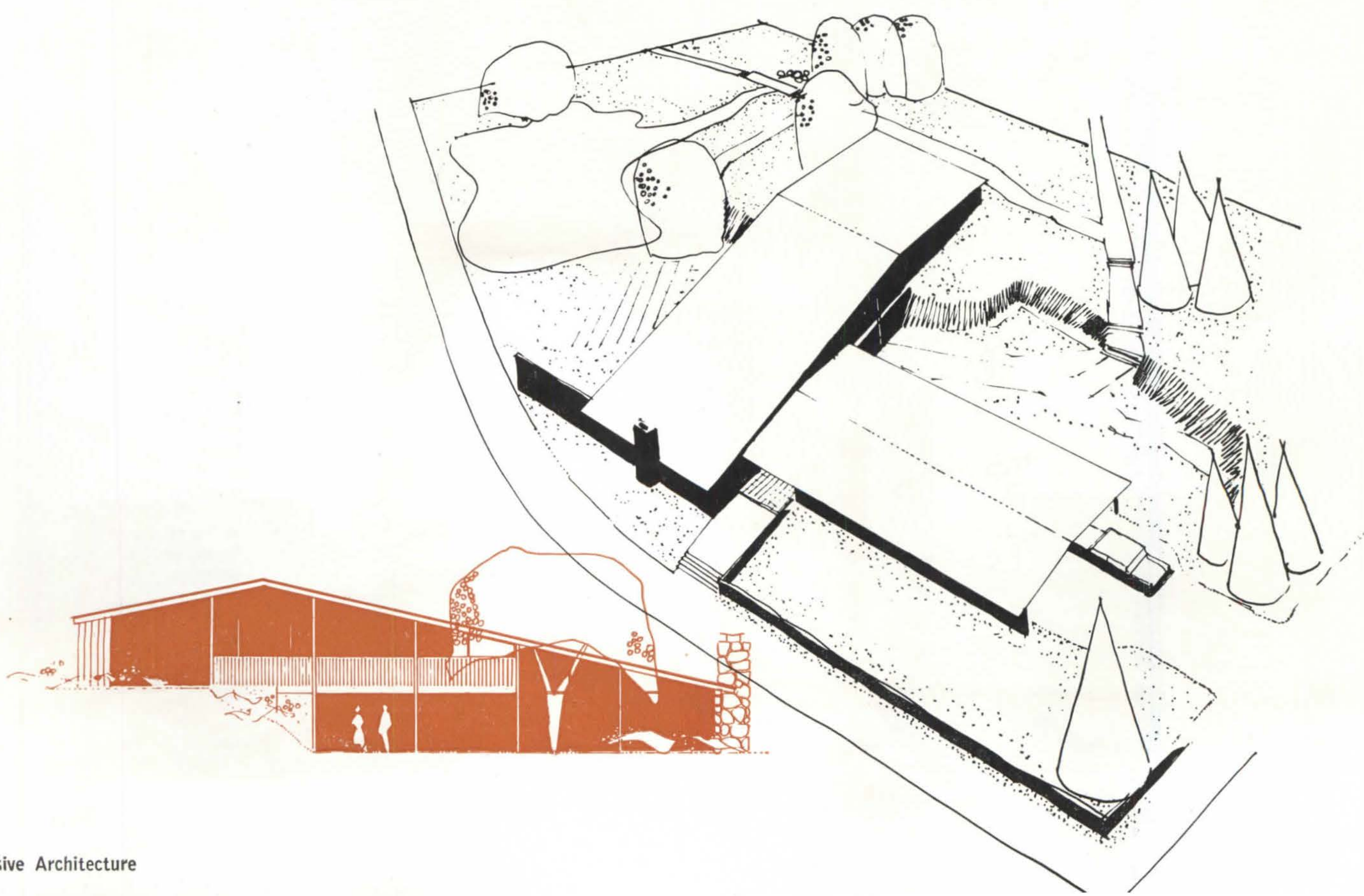


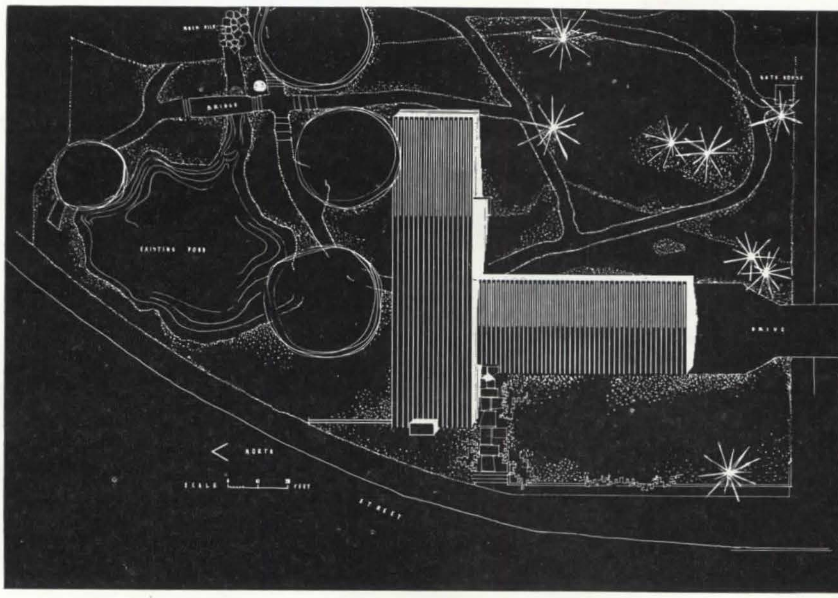


residential design:

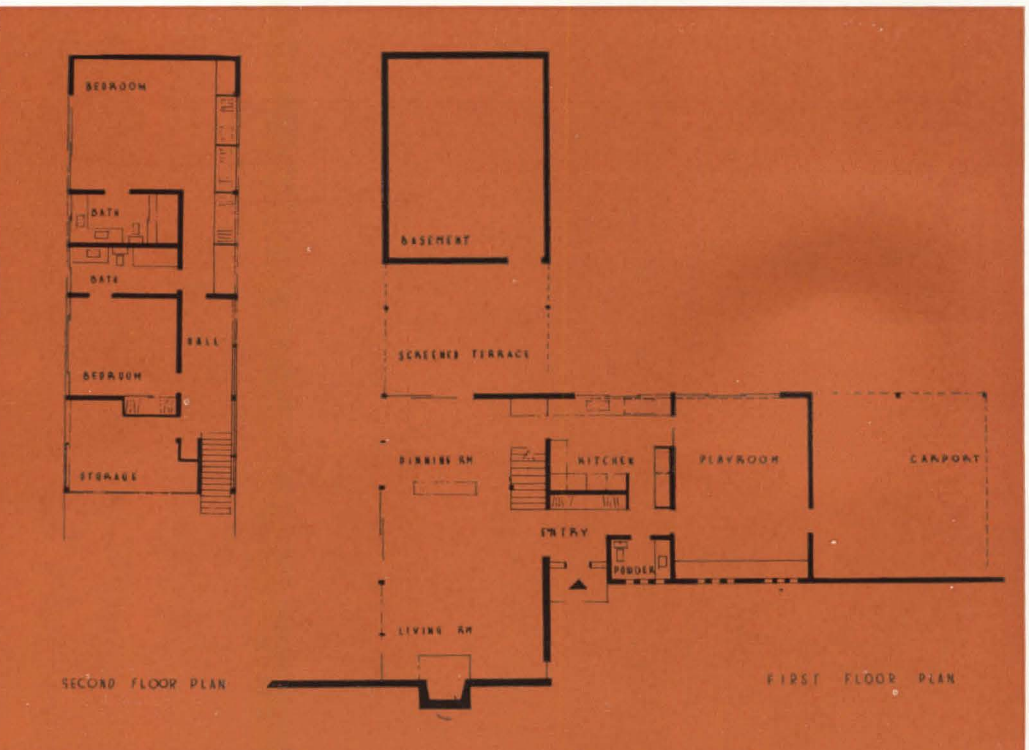
Design Award



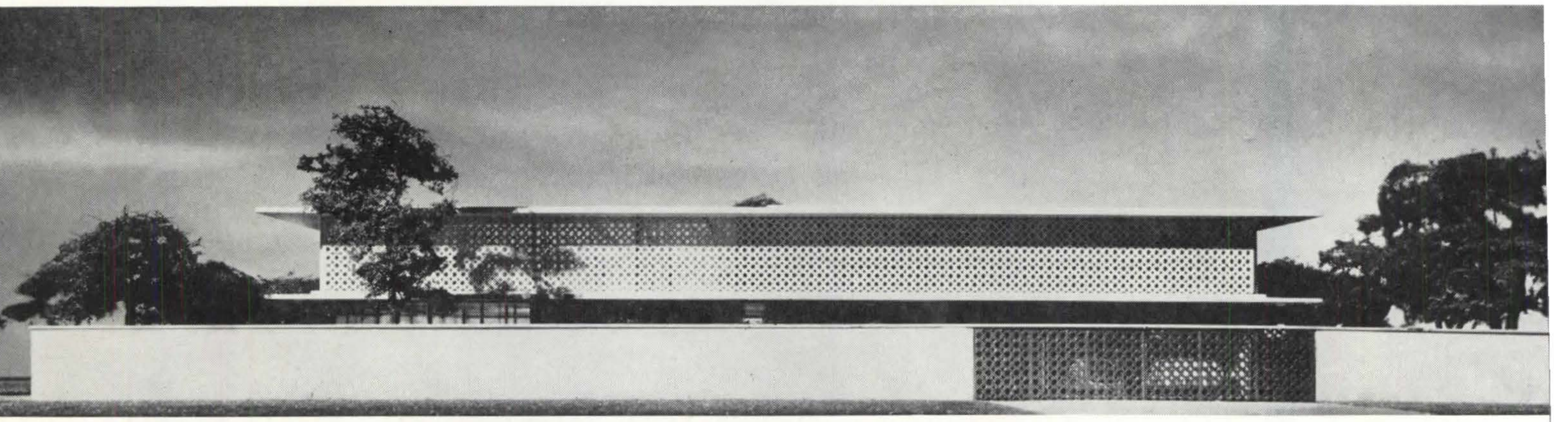


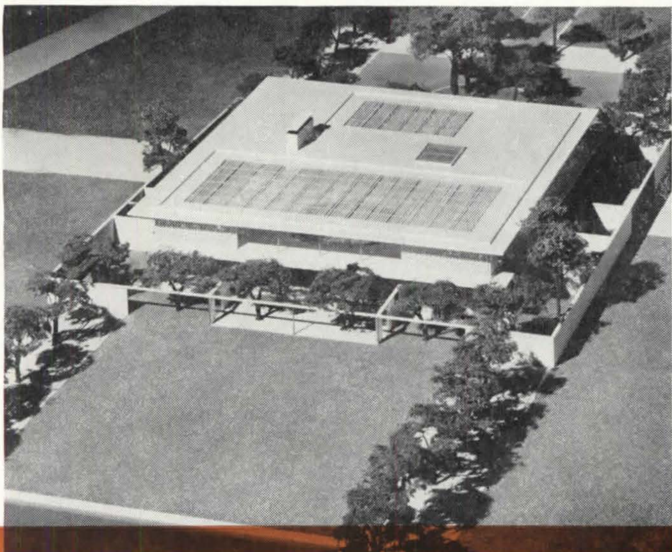


House, Pasadena, California: Carl Louis Maston, Architect; John A. Martin & Louis Gill, Engineers. The site, a famous old estate, was recently subdivided, and has many beautiful existing trees and plants. A mill pond at one end of the property is the outstanding natural feature. Preservation of this lovely setting was the prime design consideration. Bedrooms on the upper floor will have vista of surrounding hills and nearby pond. Living and dining rooms on the lower floor will adjoin a large, screened terrace opening toward pool. "It is hoped," writes Maston, "that my solution of allowing the south end of the bedroom wing to bridge over the dining room terrace will not only provide a pleasant covered and screened area, but also will effect an exciting penetration of the site through the house." The structure will be of wood, employing post-and-lintel framing.

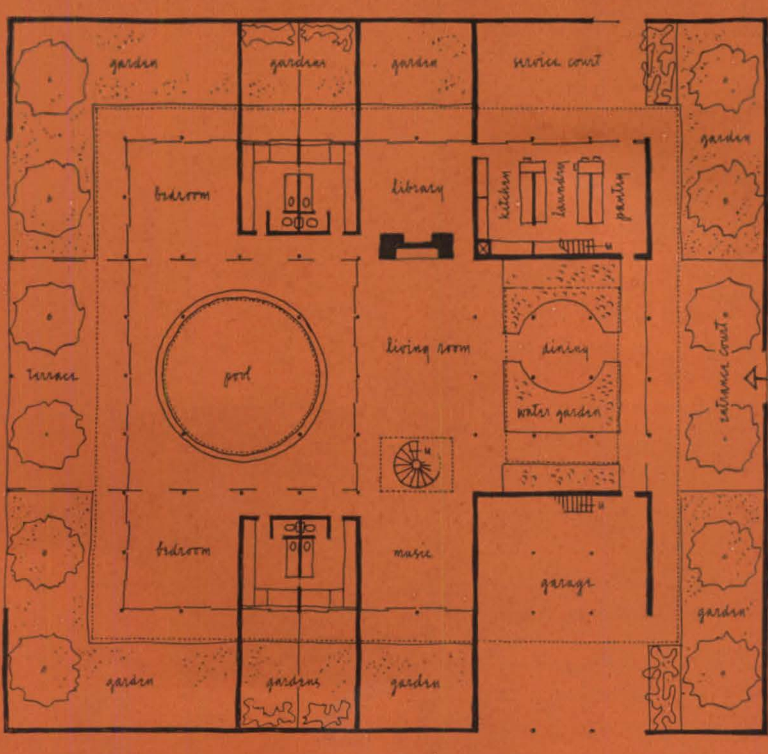


Award Citations with Commendation

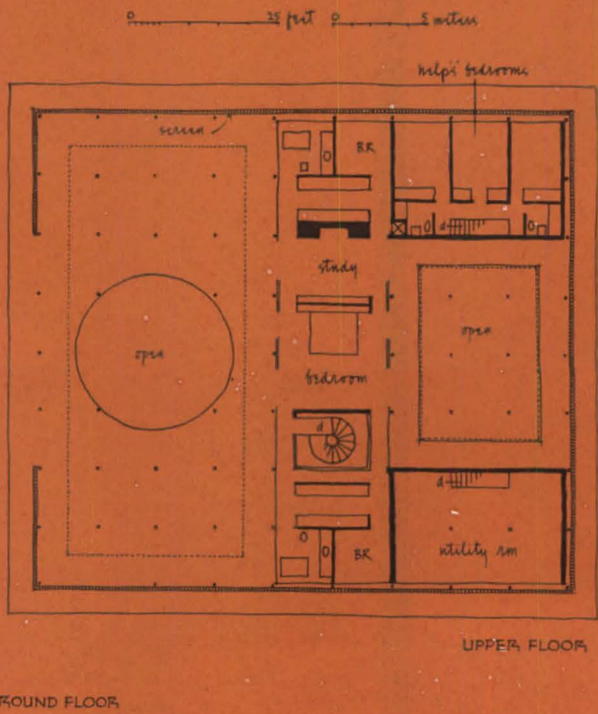




House, Southampton, Long Island, New York: Edward D. Stone, Architect; Stanley M. Torkelsen, Lloyd Flood, Richard W. Snibbe, Associates; Thomas Church, Landscape Architect; Peter Bruder, Engineer. This luxurious house was designed to accommodate a couple, their two married daughters' families, and many guests. The site is flat, bordering on a body of water and suitable for the construction of a boat basin. Requirements were that the house be built around a pool, that it be air conditioned, have built-in hi-fi, and be almost entirely white. It was further specified that the living quarters of the parents be upstairs, for a better view of the water. Walls around the circumference of the house insure privacy, provide hurricane protection, and enclose gardens in which plants will thrive away from the sea gales. "We will build it like a supermarket," say the architects, "with lally columns, steel beams, and wood joists; and then come in with terrazzo, white brick, and acoustical plaster."

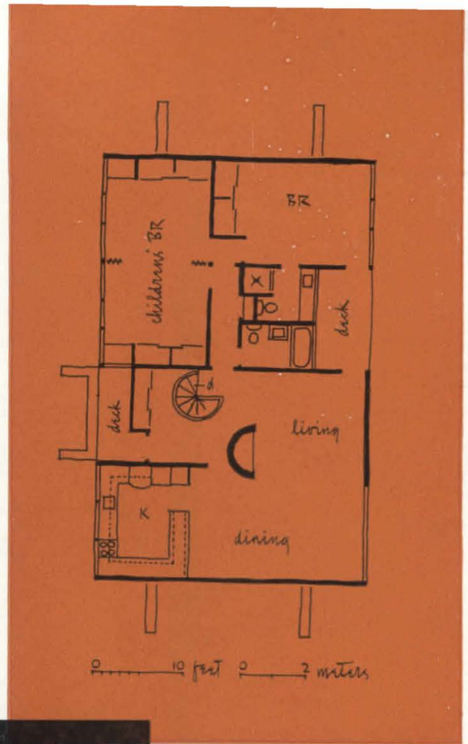


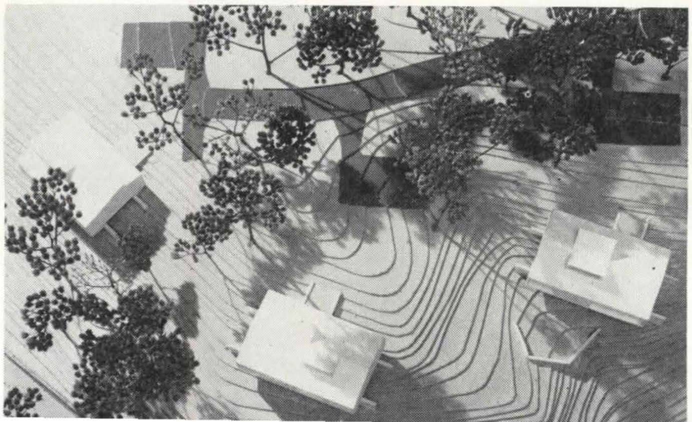
GROUND FLOOR



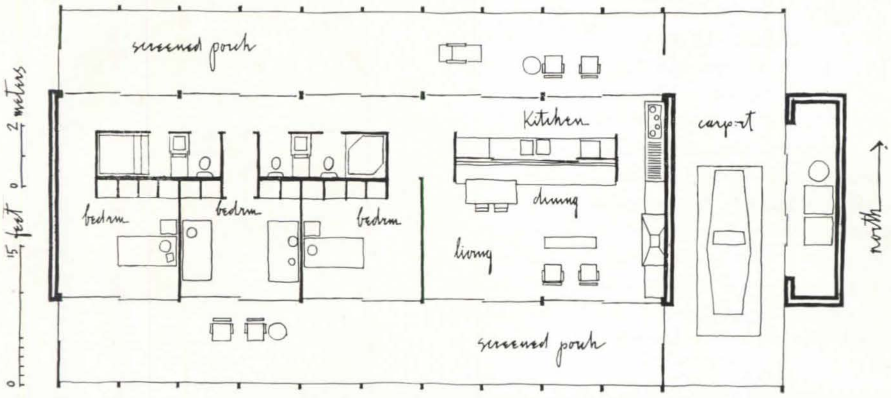
UPPER FLOOR

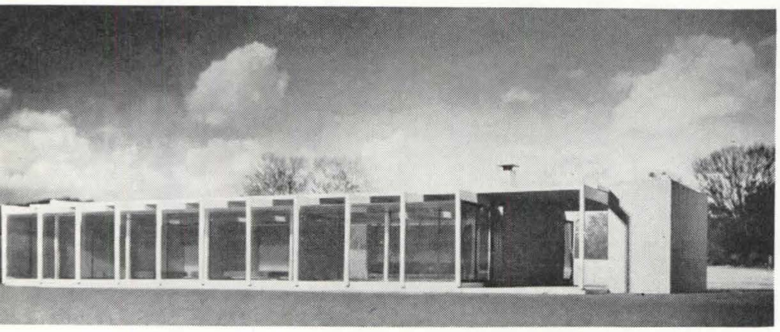
House, Pennsylvania: Robert Geddes & Melvin Brecher, Designer and Architect; Dorfman & Bloom, Structural Engineers. The first unit in this group of houses is for a young couple with two children. The basement area will be left unfinished but plans for the future call for a recreation area and workshop. The major portion of the main floor will be devoted to the living area, which will overlook a valley and stream. South-facing clerestory will introduce natural light over the entry and fireplace area. Exterior vertical siding will be stained dark brown; decks will be painted yellow and white; and roof will be of white marble chips. Masonry walls in all of the houses will be placed parallel to the contours, acting as structural and visual base for the wood superstructure.



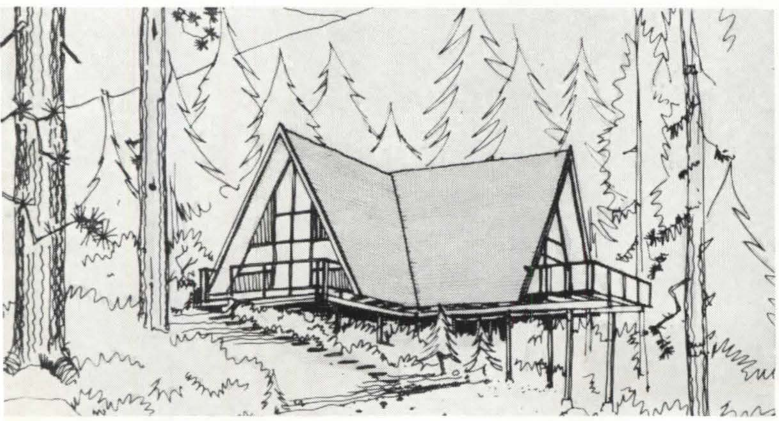


Award Citations

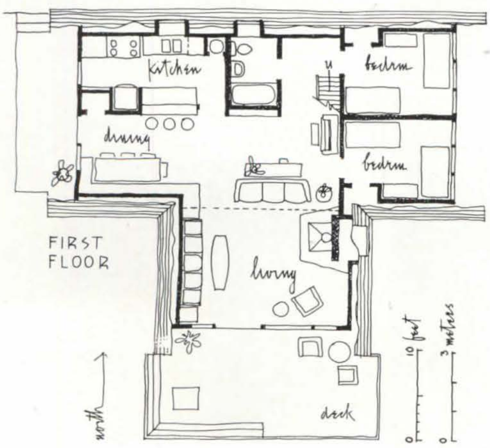


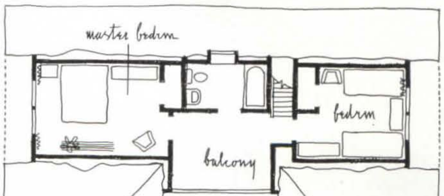


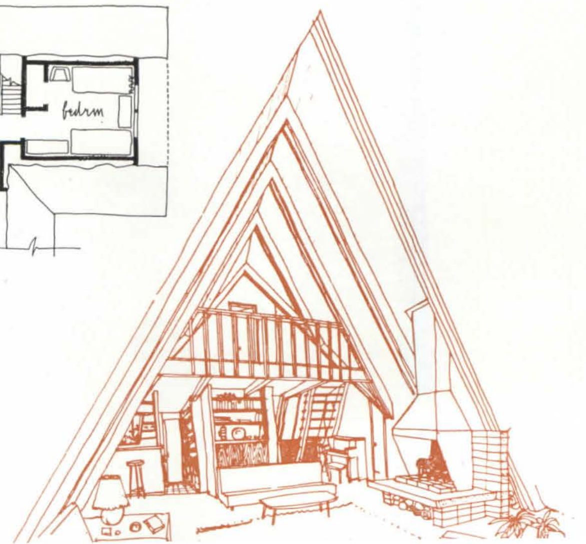
House, Waveland, Mississippi: W. F. Calongne, Jr., Architect. A corner plot on the beach facing the Mississippi Sound is the site for this residence which will be occupied summers and over weekends throughout the year. It was the owners' desire to keep the house as open as possible to the prevailing breezes and view. It will be one room deep, with sliding glass walls and screened outdoor porches on north and south sides. East and west walls are to be solid. For cross ventilation, all partitions will stop one foot below the finished ceiling. For durability and ease of maintenance, flooring will be of sand-colored brick. The structural system will employ wood posts and beams, and exposed wood roof-decking.

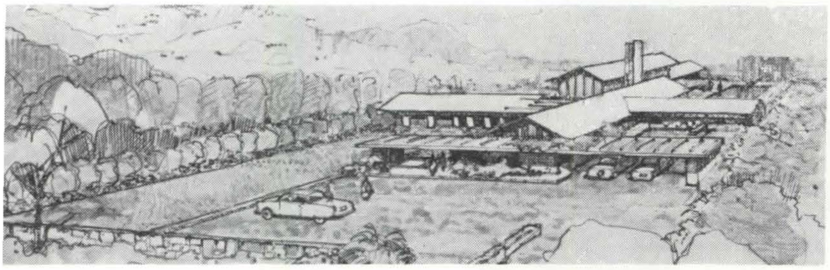


Vacation House, Squaw Valley, California: George T. Rockrise, Architect; William B. Gilbert, Structural Engineer. In spite of strict budget limitations this lodge answers all of the requirements of a family of five and frequent guests. Situated on the north slope of a steep site, the house will be raised off the ground to leave the terrain undisturbed wherever possible. Placed well uphill, the house, will command views in three directions. The living room will open south toward a spacious deck. Kitchen and dining area and second floor master bedroom will face west toward a spectacular view. Rooms to the east will look across wooded slope to valley. Cedar shingles will be left natural; wood fascia, board-and-batten siding, railings and decks to be stained brown. All trim will be painted red, operating sash and doors, blue, and fixed plywood panels, yellow.

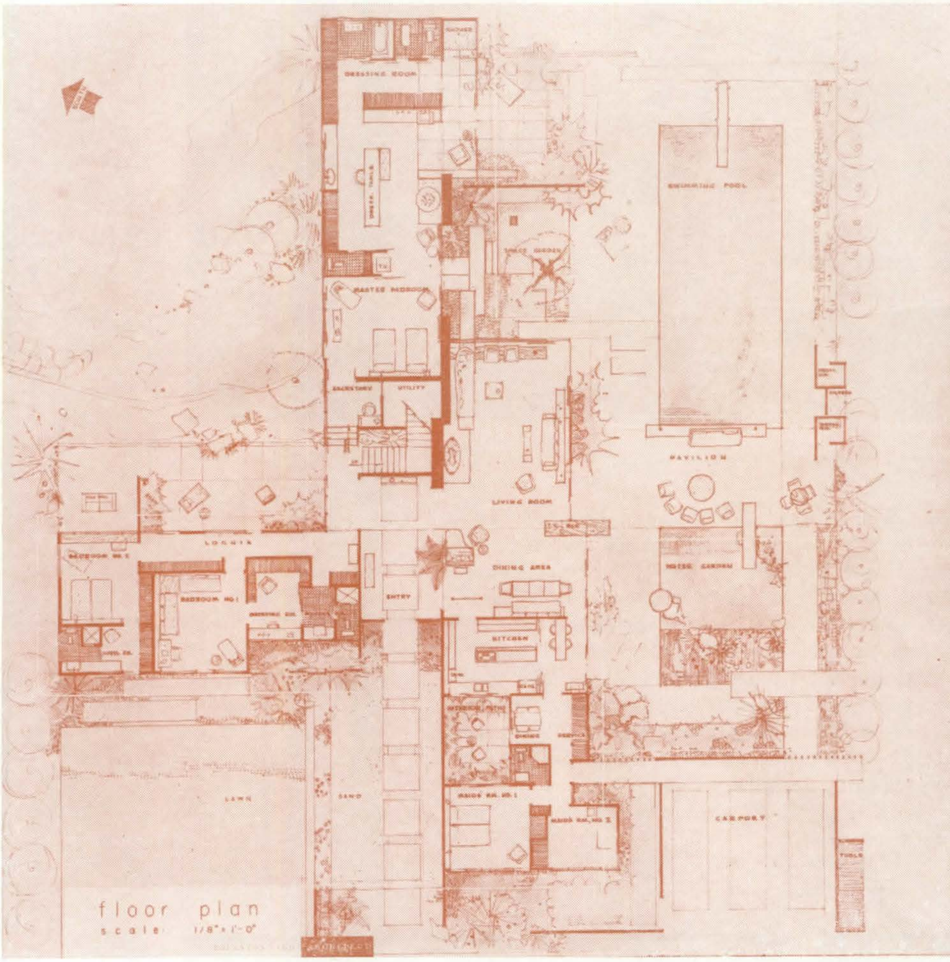


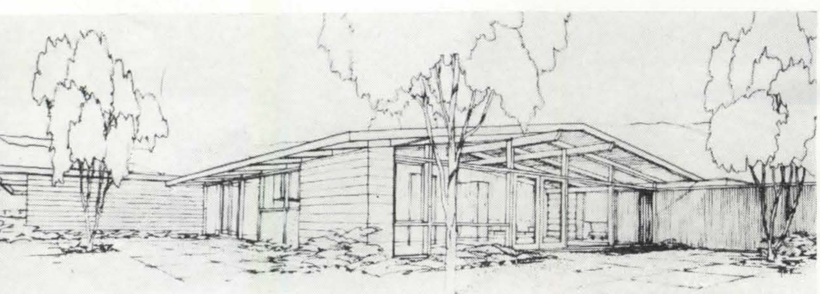




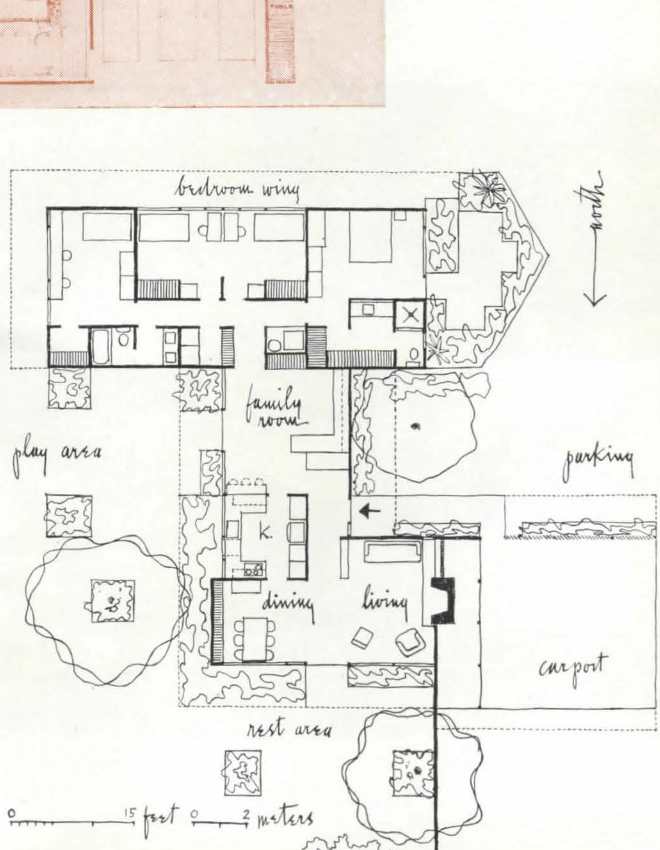


House, Beverly Hills, California: Thornton Ladd, Architect; Paul S. Tuttle, Interior Design; Carl B. Johnson, Engineer. The clients requested a pronounced division of living activities. Thus, bedroom and study area for adults will be in one wing, sleeping area for two children in another wing, staff quarters and kitchen in a third. All of these wings will be joined at the center by the living-dining room. Access to the outdoors will be direct from all points of the house, linked with special consideration for outdoor activities. Entertaining in this house will be both intimate and on a grand scale. Structure will be a western frame with gable roof.

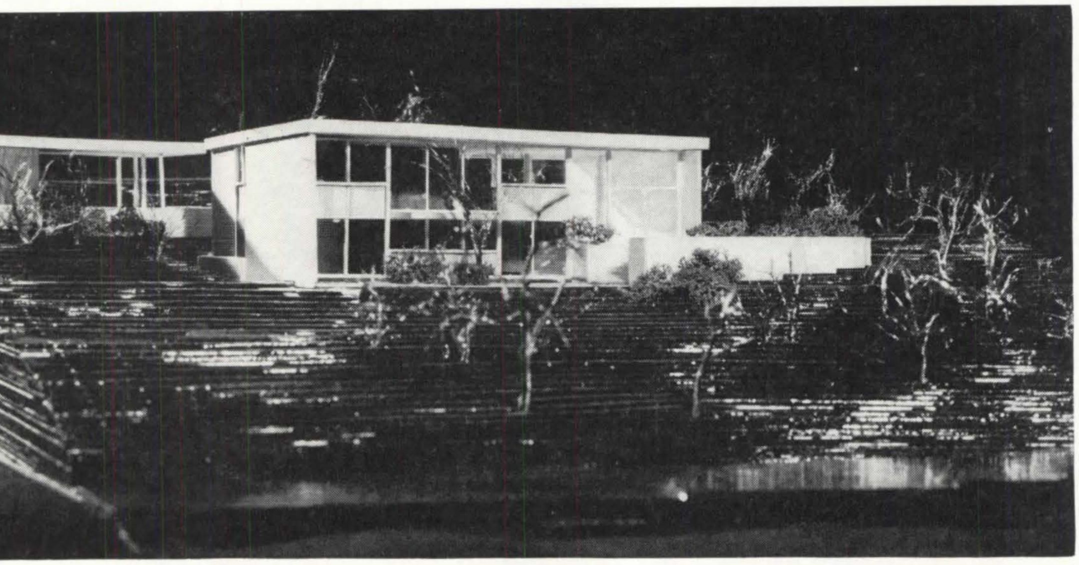


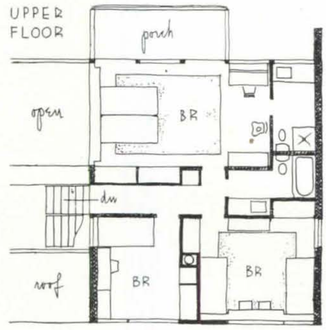


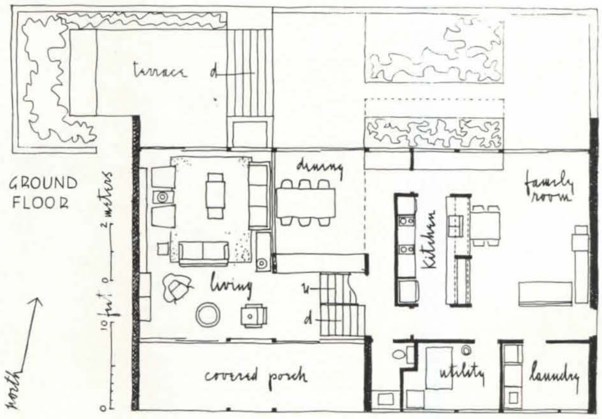
House, San Rafael, California: John W. Kruse, Architect. Due to the warm climate, the main living area will face onto a terrace to the north. The children's play area will be to the east, off the family room and kitchen. The bedroom wing, for four children and parents, will open directly from the family room. This room will be primarily for the use of the children and may be closed off when parents are entertaining in the living-dining room. The structure will consist of a wood frame with plank-and-beam flooring and roofing. Exterior walls will be resawn redwood.



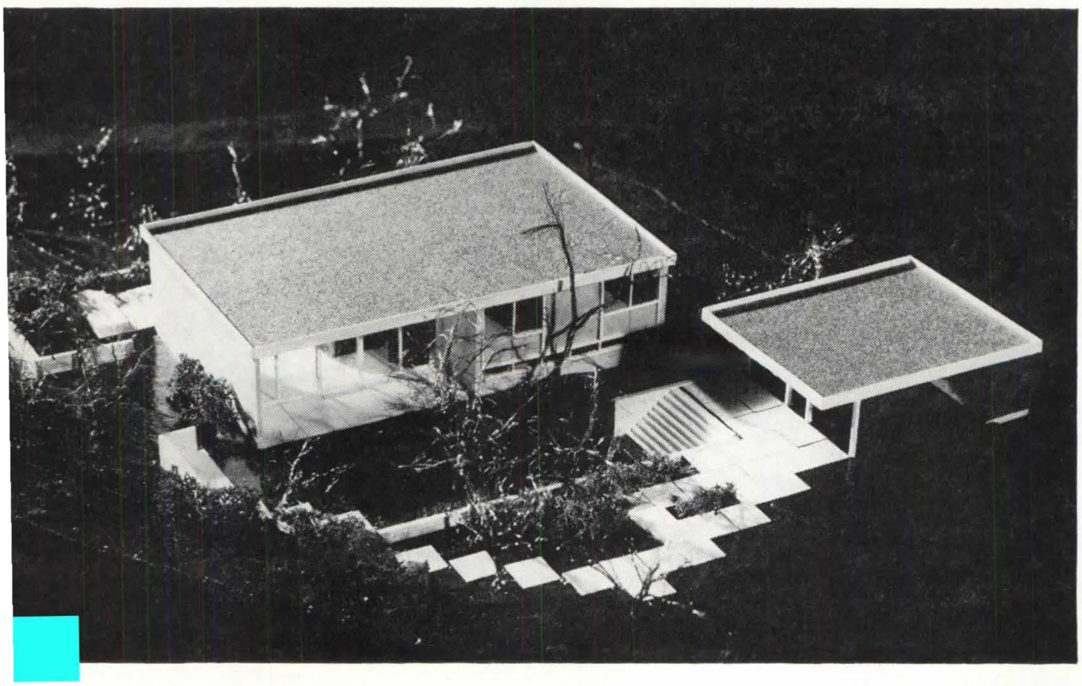
Award Citations

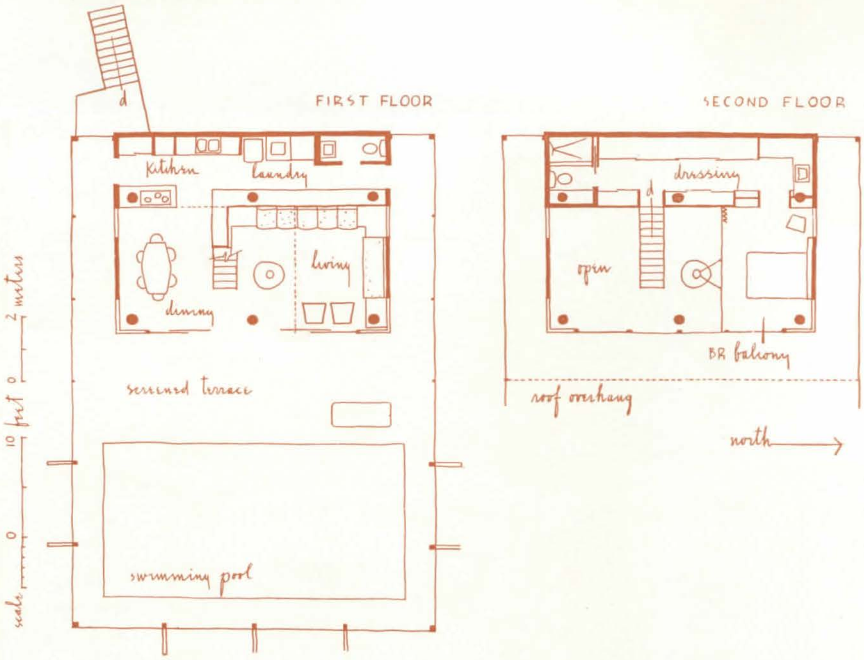




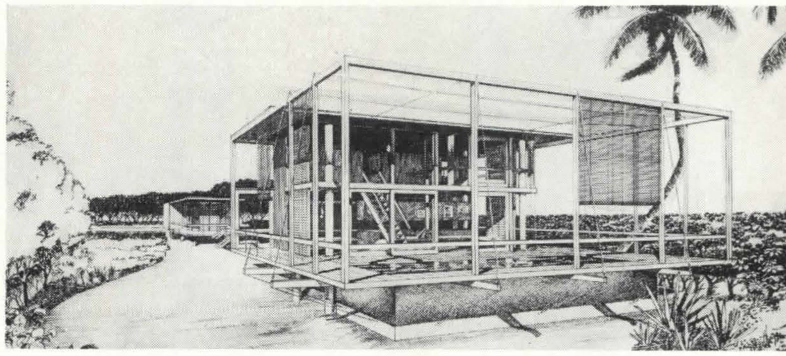


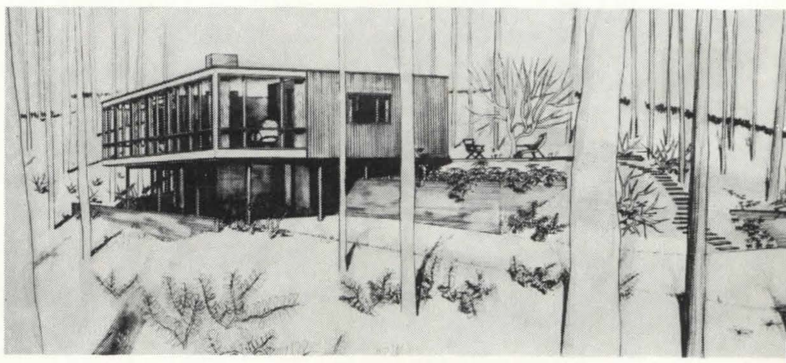
House, Richmond, Virginia: George Matsumoto, Associate Professor of Architecture in School of Design, North Carolina State College, Architect; Wayne F. Koontz, Associate; T. C. Brown, Mechanical Engineer. Access to this hillside house is to be from the south, where a terrace will provide a sunny lawn and play area. The living room will open onto this small cultivated terrace and will contrast with the distant view on the opposite side. The lower floor was designed to accommodate large gatherings and at the same time provide a family room where the two daughters could entertain their own friends. To a great extent, the plan of this house was determined by a number of fine pieces of furniture which the owner wished to place. The Jury commended this plan for a solution to a difficult site.



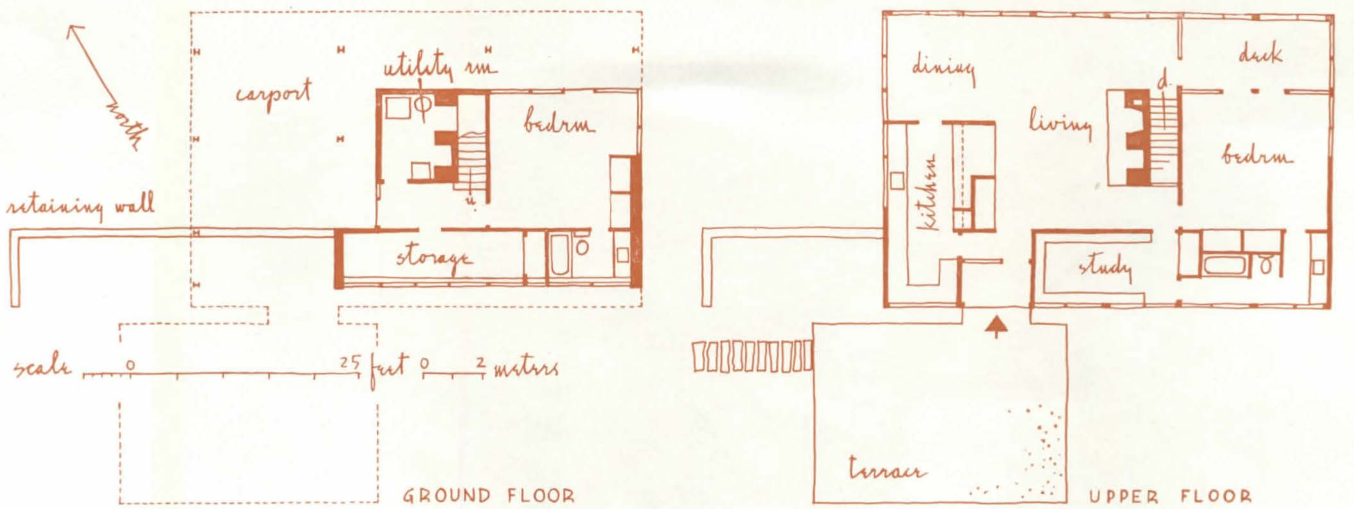


House, Miami, Florida: Robert Bradford Browne, Architect; H. J. Ross & Associates, Structural Engineers. The clients for this house entertain informally but frequently. They required a place to work at home, plus facilities for house guests. To accommodate guests and yet preserve privacy for work or study, the guest house has been isolated in a separate structure. Because of occasional high water, both houses will be raised off the ground. Piles, required in this locale, will extend to serve as supporting elements for the first floor slab and roof slab. The balcony level, of wood, will be suspended from the roof slab by small steel rods. Screening, supported by redwood posts and steel cables in tension, will enclose the entire house and swimming pool.



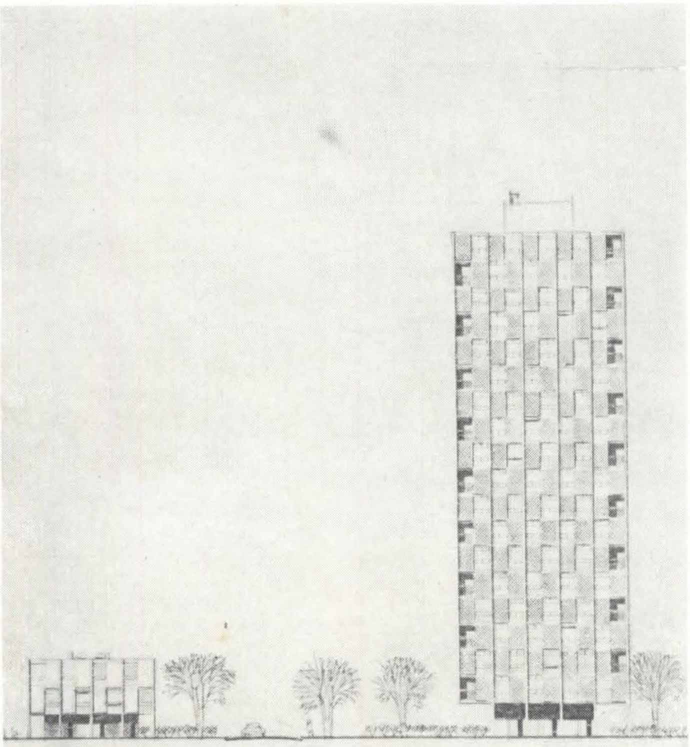


House, Langley, Virginia: Charles M. Goodman Associates, Architects-Engineers. The owner of this house is a woman who leads a very active business life and has many avocational interests. The hilly and wooded site dictated the two-level layout. A special study was required where the owner could practice a musical instrument without disturbing a guest who will also live in the house. Storage space for books, recordings, and built-in hi-fi system is to be integrated into the design. Structural framing will be of steel and wood. Major exterior materials will be used brick on the first floor, and 1"x3" T&G vertical siding on the upper floor.

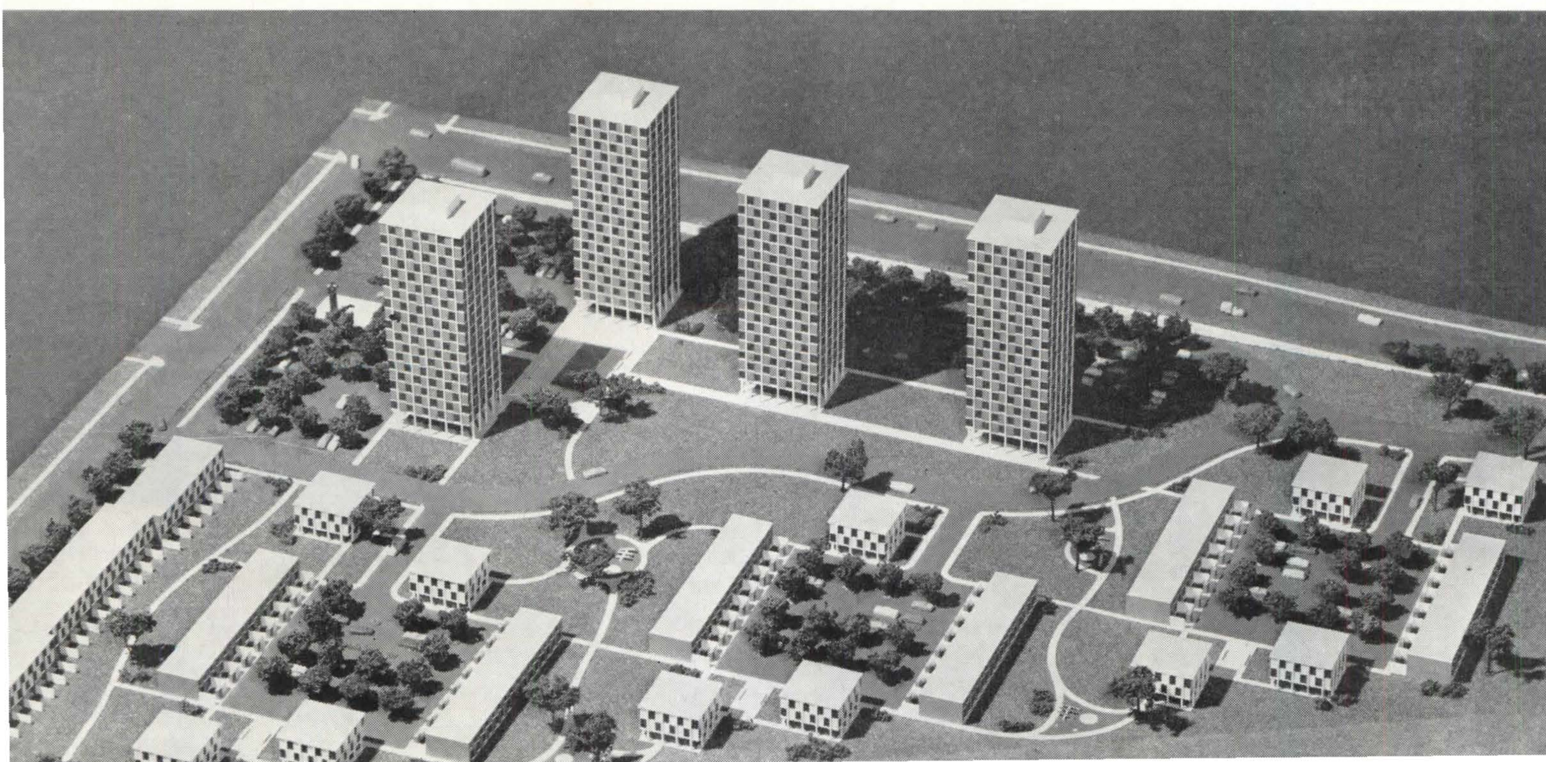


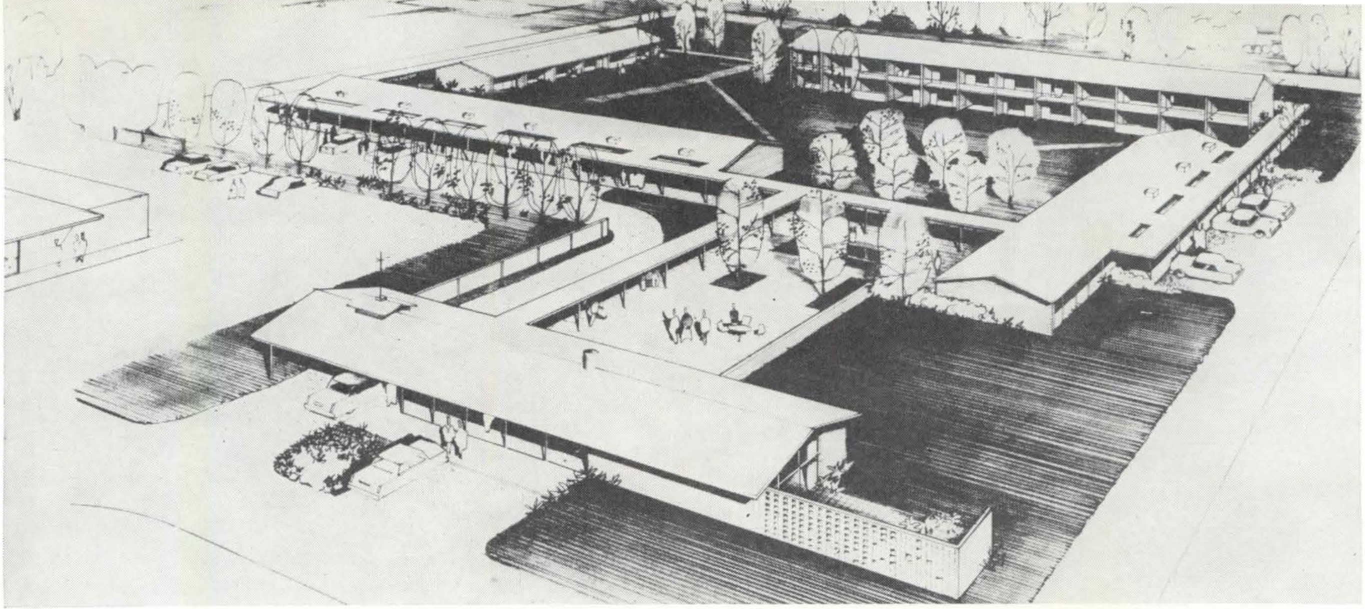
residential design, housing:

Award Citation

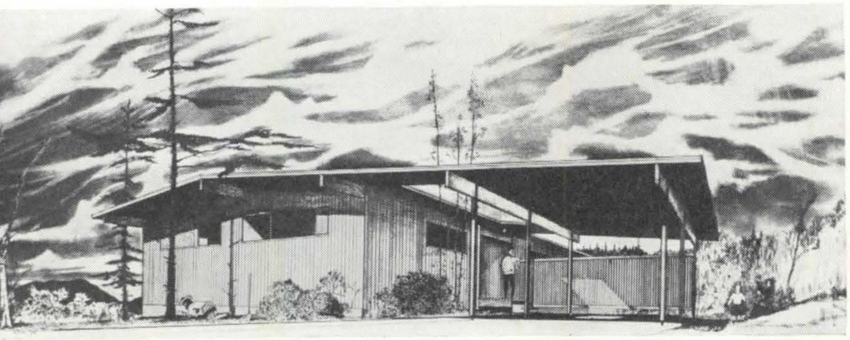


Housing Project for George Payne, Skokie, Illinois; Harry Weese, John van der Meulen, and Bruce Adams, Associated Architects. The 15-acre site is located in a suburb 20 miles northwest of Chicago. Excellent transportation facilities exist from this point to the city. The project will provide 406 rental units distributed in row houses, town houses, and high-rise apartment houses. Row houses and three-story buildings will be arranged in clusters around paved courts, which include parking space. A parking strip along busy Cicero Avenue will act as buffer for the project and provide car spaces for the high-rise buildings.

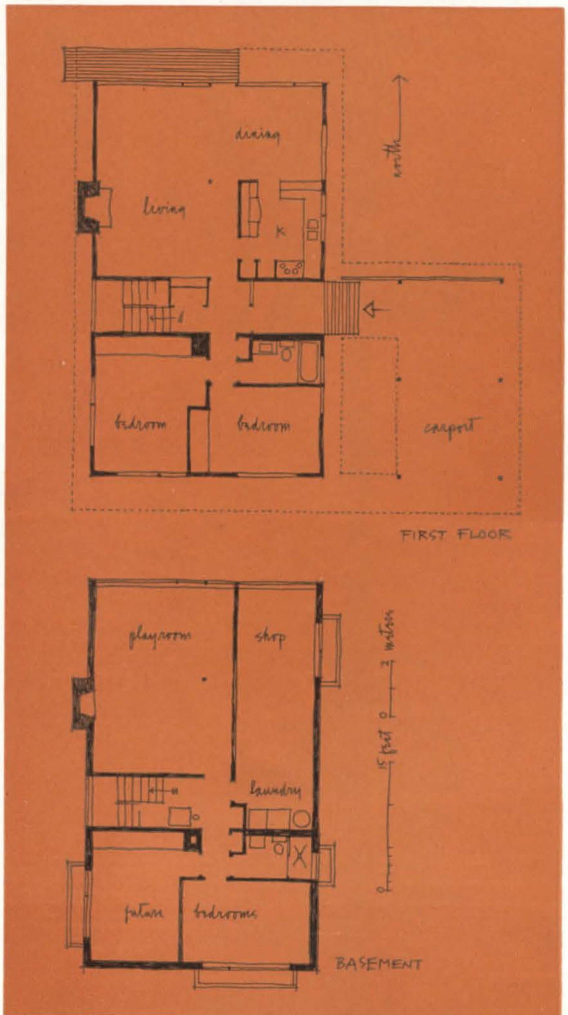




Motor Lodge for Howard Johnson, Elyria, Ohio: Carl Koch & Associates, Architects; Frederic L. Day, Jr., Associate; Robert G. Edwards, Associated Architect. Elyria motor lodge, one of a series designed by Carl Koch & Associates for construction throughout the northern United States, will be located within sight of the new Ohio Turnpike. A gate lodge, where guests may register, and a manager's suite will adjoin a new Howard Johnson restaurant planned by others. Privacy and the preservation of a view were the main considerations in the arrangement of the 48 rental units beyond. Large floor-to-ceiling windows, shielded by brick spur walls, overhangs, and balconies, will face a central court. A connected and covered walk will permit sheltered access and undercover protection for maid service. Rufus Nims, Miami, Florida, will design Howard Johnson Motor Lodges for the South.



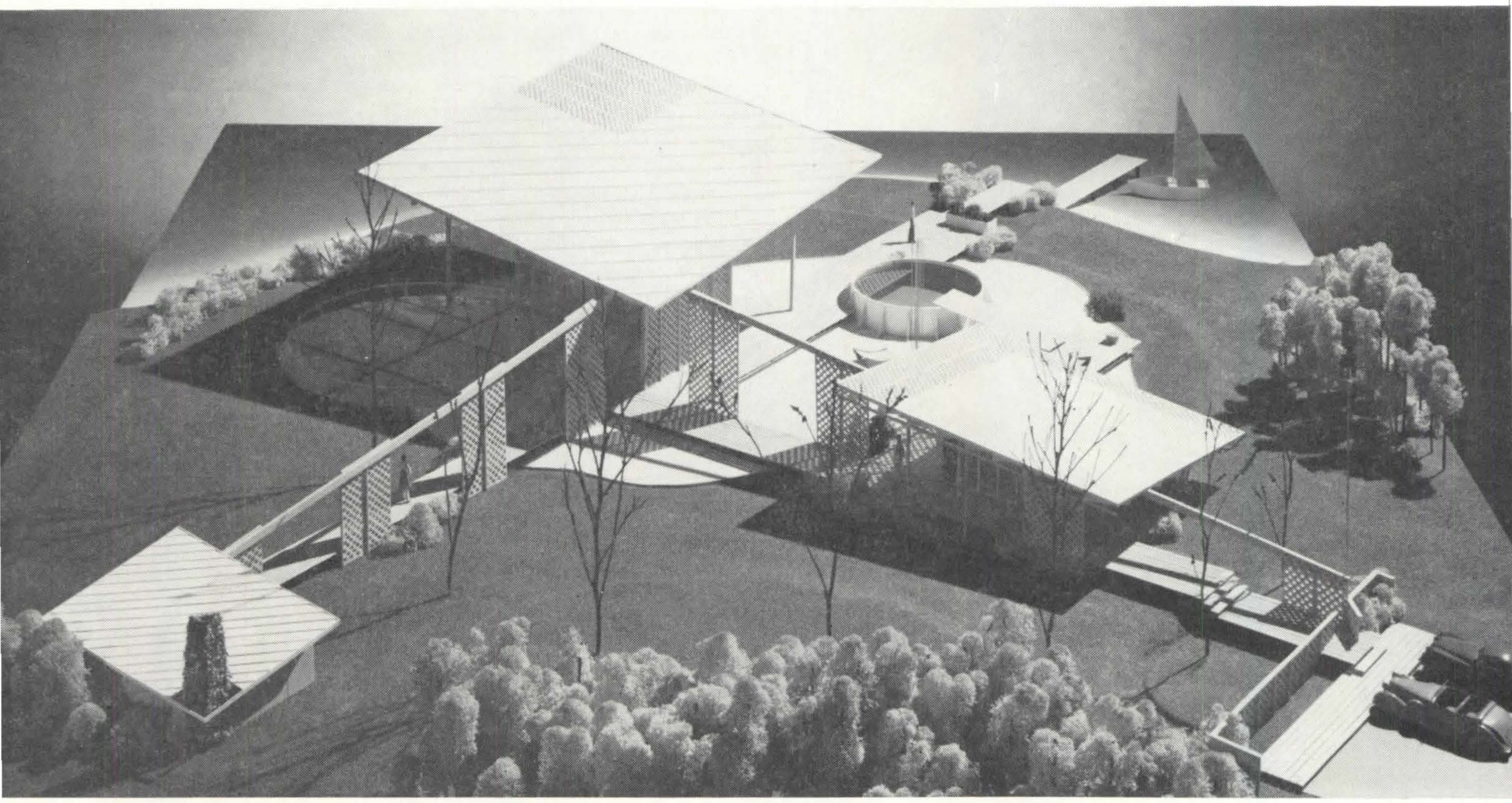
Builder House, Anacortes, Washington: Don L. McKee, Architect. Designed to sell for approximately $17,000 including a $2000 lot, this house will have two bedrooms on the main floor and future living space in the basement. For privacy living quarters are to be placed away from the street and face a partial view over a bay and islands. All circulation will take place at the center of the scheme between living and sleeping areas. This layout will permit roof pitches in various directions and many possibilities for exterior treatment. Wood screens are to be used in conjunction with the cantilevered porches to afford privacy on the narrow lot. The Jury commended the well-organized and compact plan.



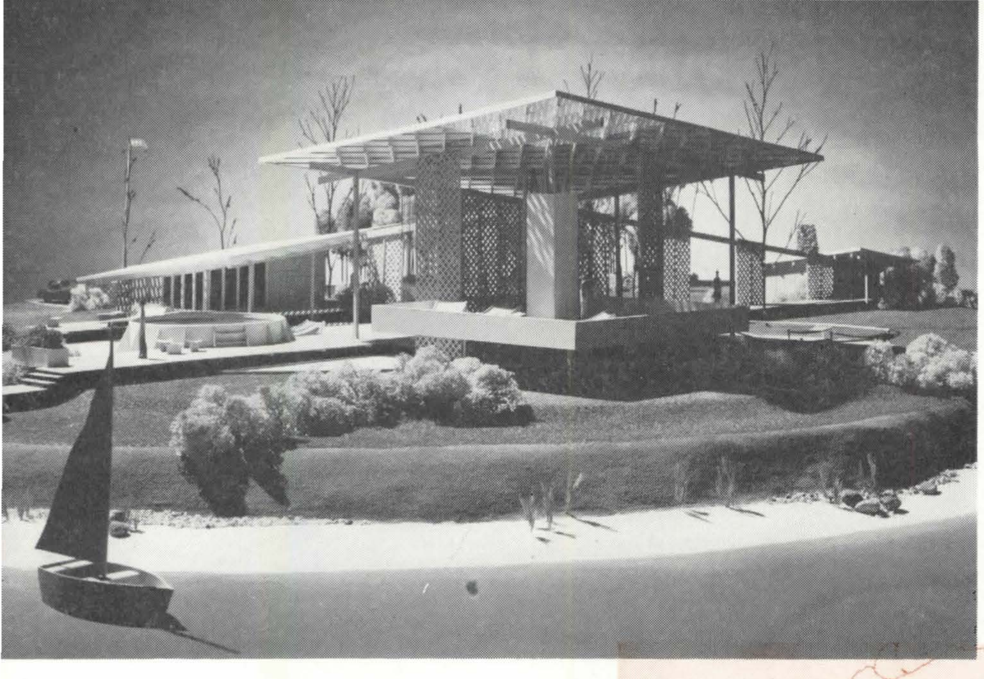
recreation:

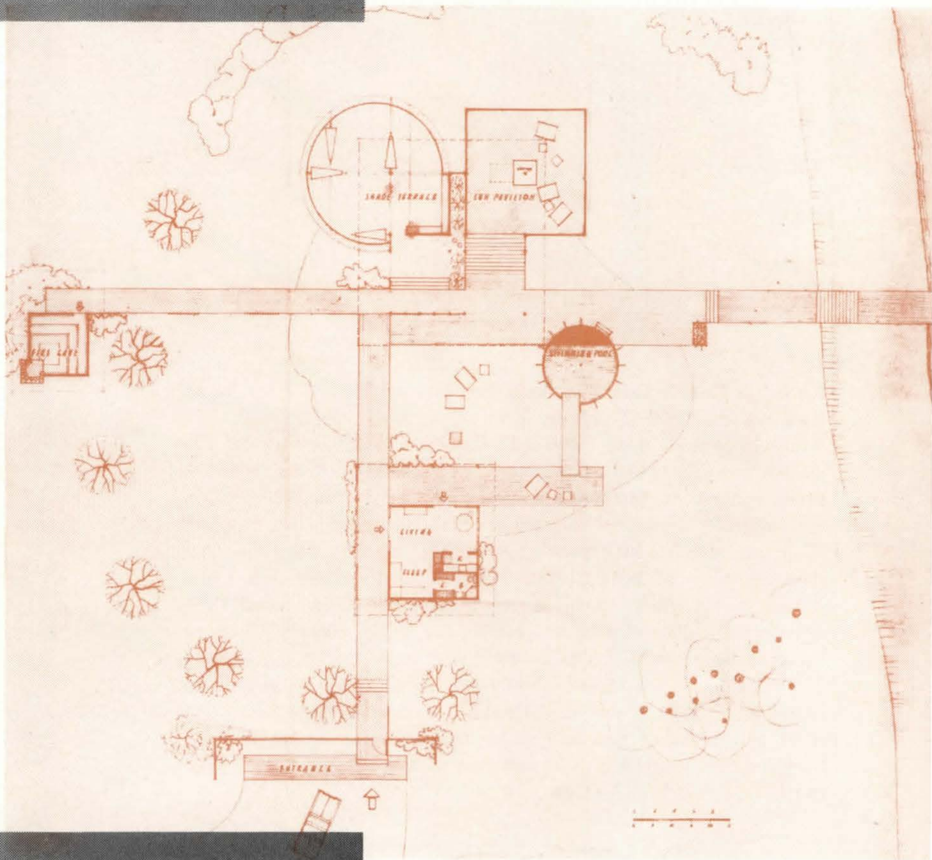
Design Award

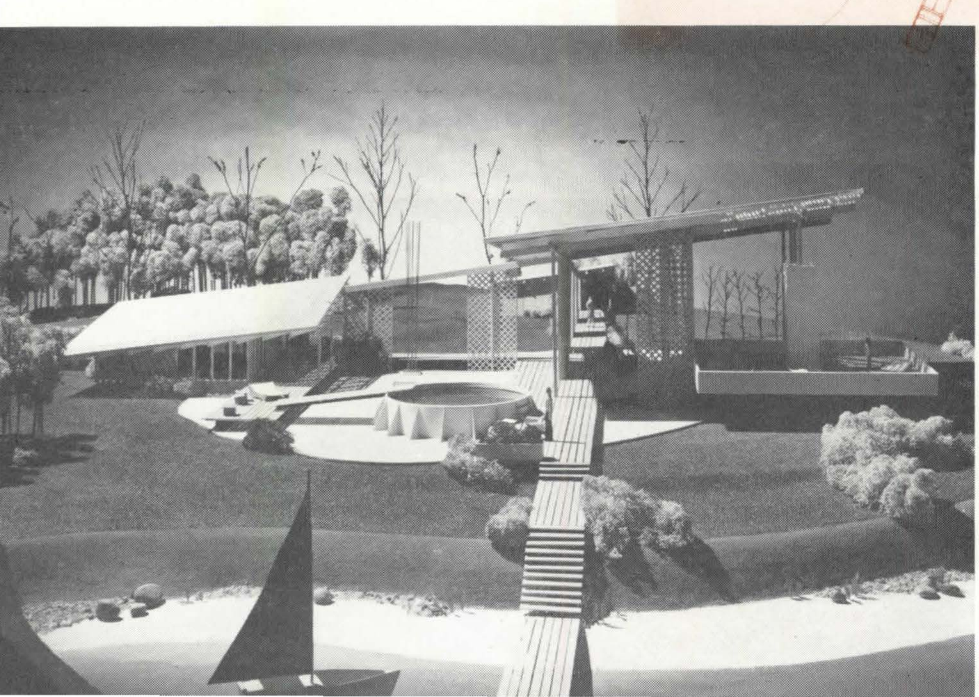
Vacation Camp for Douglas Fir Plywood Association, Sonoma County, California: John Carden Campbell & Worley K. Wong, Designer and Architect; William Gilbert, Engineer; Keith Monroe, Sculptor. This design was developed as an experimental project for the Douglas Fir Plywood Association's Golden Jubilee celebration. Great lightness has been achieved by dispersing the camp into various components and keeping the structures transparent and open. A 24-ft-square plywood building will contain cooking,



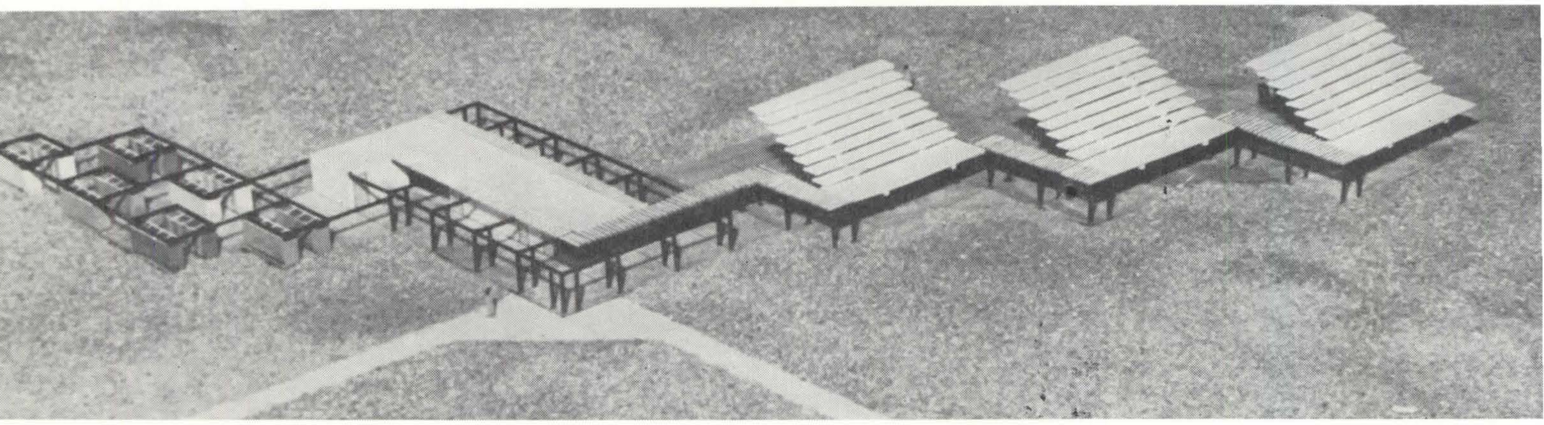
dining, bathing, and sleeping facilities. Another one will serve as sun pavilion with an attached shade terrace. And a third one, called the "fire cave," will center around a fire place. It will be partially dug into the ground and will have a low ceiling to emphasize the cavelike quality of the space. Wood ramps are to link structures, terraces, and swimming pool together. The structural frame will employ wood posts; walls and floors of ¾" plywood; roofs of overlapping plywood panels. Even the swimming pool will be constructed of plywood, reinforced with plywood gussets. Plywood construction is also intended for interior furnishings. The Jurors were divided on the use of the many different roof slopes; however, commended the project for its appropriate gaiety and unpretentiousness.

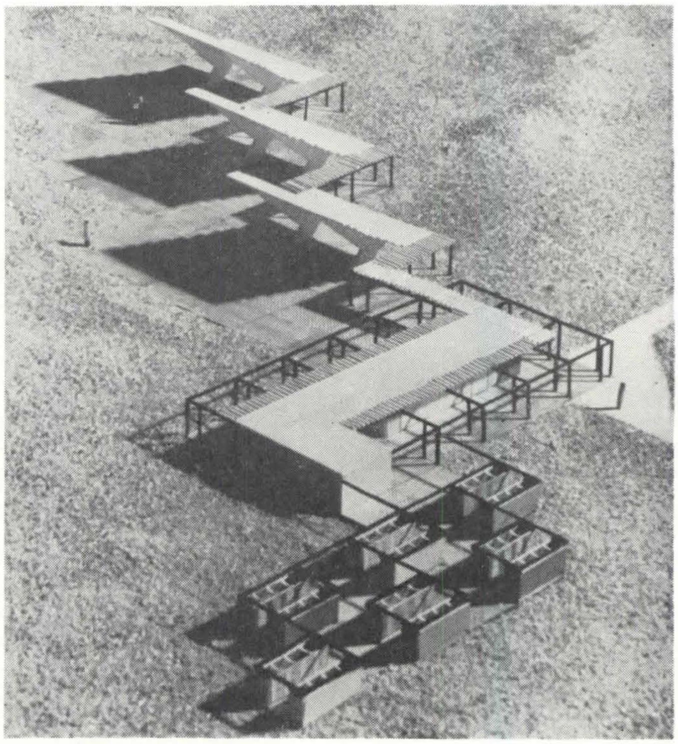



SHADE TERRACE
SUN PAVILION
SWIMMING POOL
LIVING
SLEEP
ENTRANCE

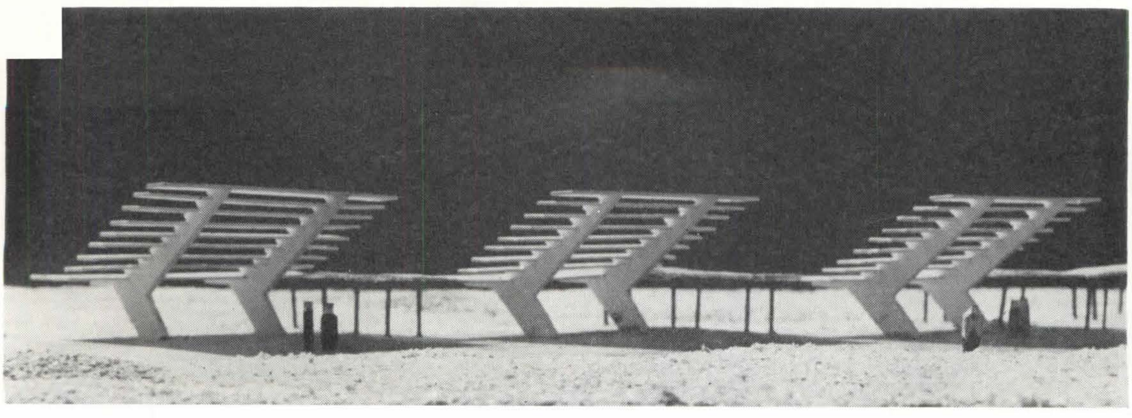


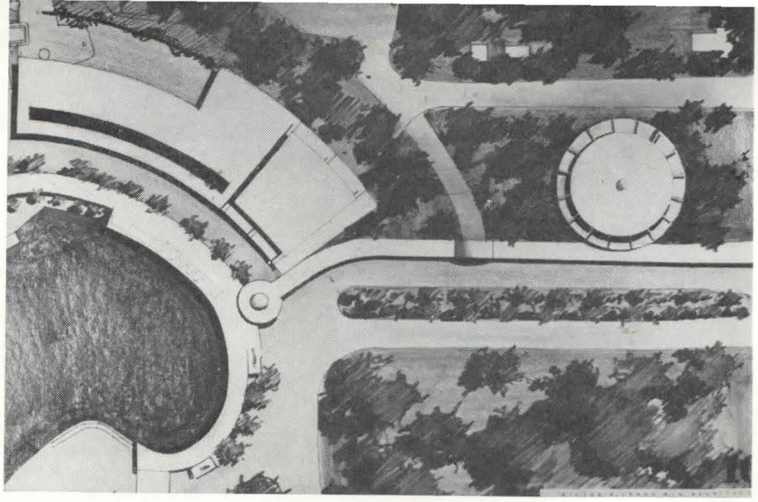
Award Citations

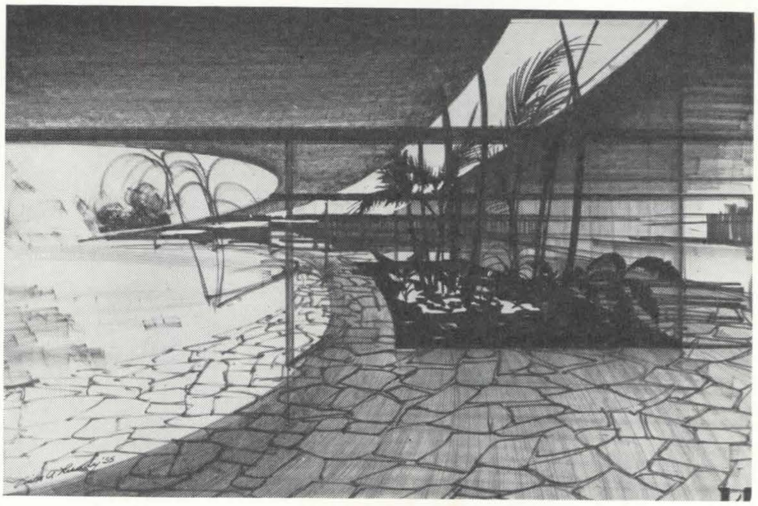




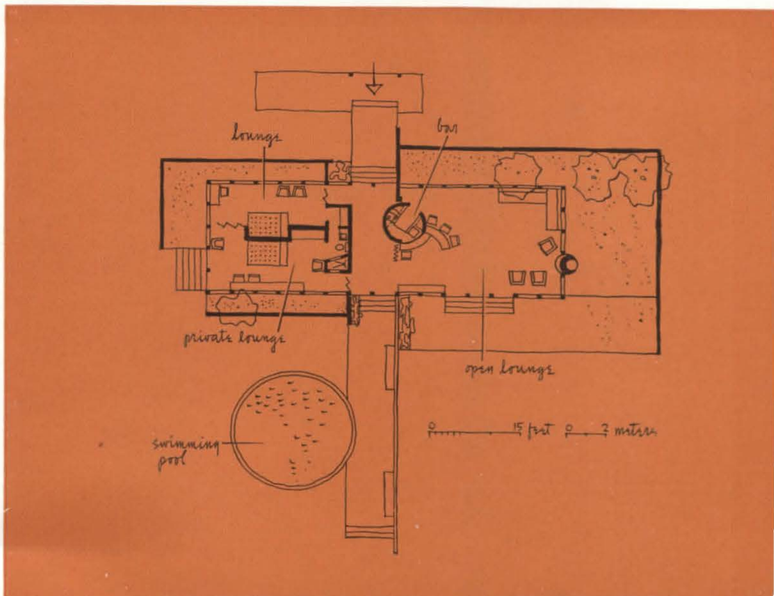
Coquina Beach Day Use Area for National Park Service, Cape Hatteras National Seashore Recreation Area: John B. Cabot, Supervising Architect; Donald F. Benson, Project Architect. The models represent shade structures for picnickers, dressing enclosures, rest rooms, first-aid and lifeguard headquarters, information and control points, and shelters for tools and concession supplies. They are intended for repetition at various intervals along the more than 50 miles of beach front. Not limited by traditional rustic design in this undeveloped area, the architects have based their designs on studies of solar orientation for shade, and the effects of the prevailing winds. A shade screen, with cantilevered and stepped fins allowing winds of even hurricane force to pass through, was found to be most practical. The sides of the buildings facing the wind will be as narrow as possible to keep sand from piling up. Dressing enclosures are to be one foot off the ground, so that sand can blow through underneath.

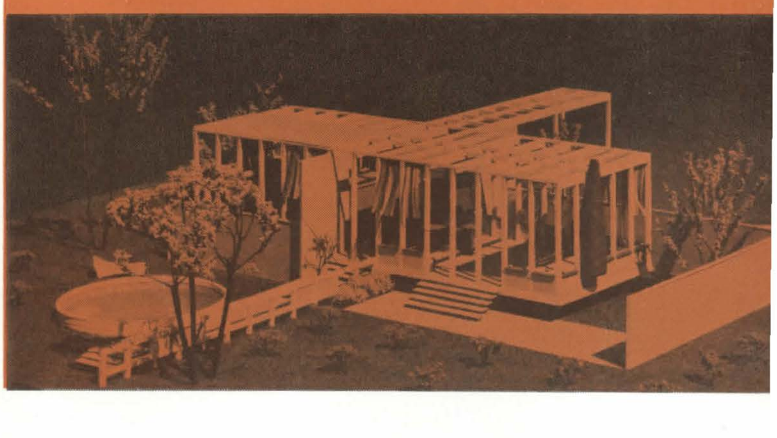






Tourist Center, for Ray, Davidson & Ray, Silver Springs, Florida: Victor A. Lundy, Architect; Nathan Grout, Structural Engineer. Rides in glass-bottomed boats to view the underwater wonders of the river attract over a million visitors a year. To accommodate the sight-seers and to replace earlier structures destroyed by fire, a new tourist center will be erected. The main building—containing administrative offices, a gift shop, rest rooms, photo shop, snack shop, antique shop, etc.—will follow the basin in a continuous curve. The new restaurant, seating approximately 800 persons on two floors, will be a circular structure located close to the highway. Both buildings will be steel framed. Steel members of the circular restaurant, radiating from the center, will be exposed and painted gold. Wide overhangs will protect from sun and rain.

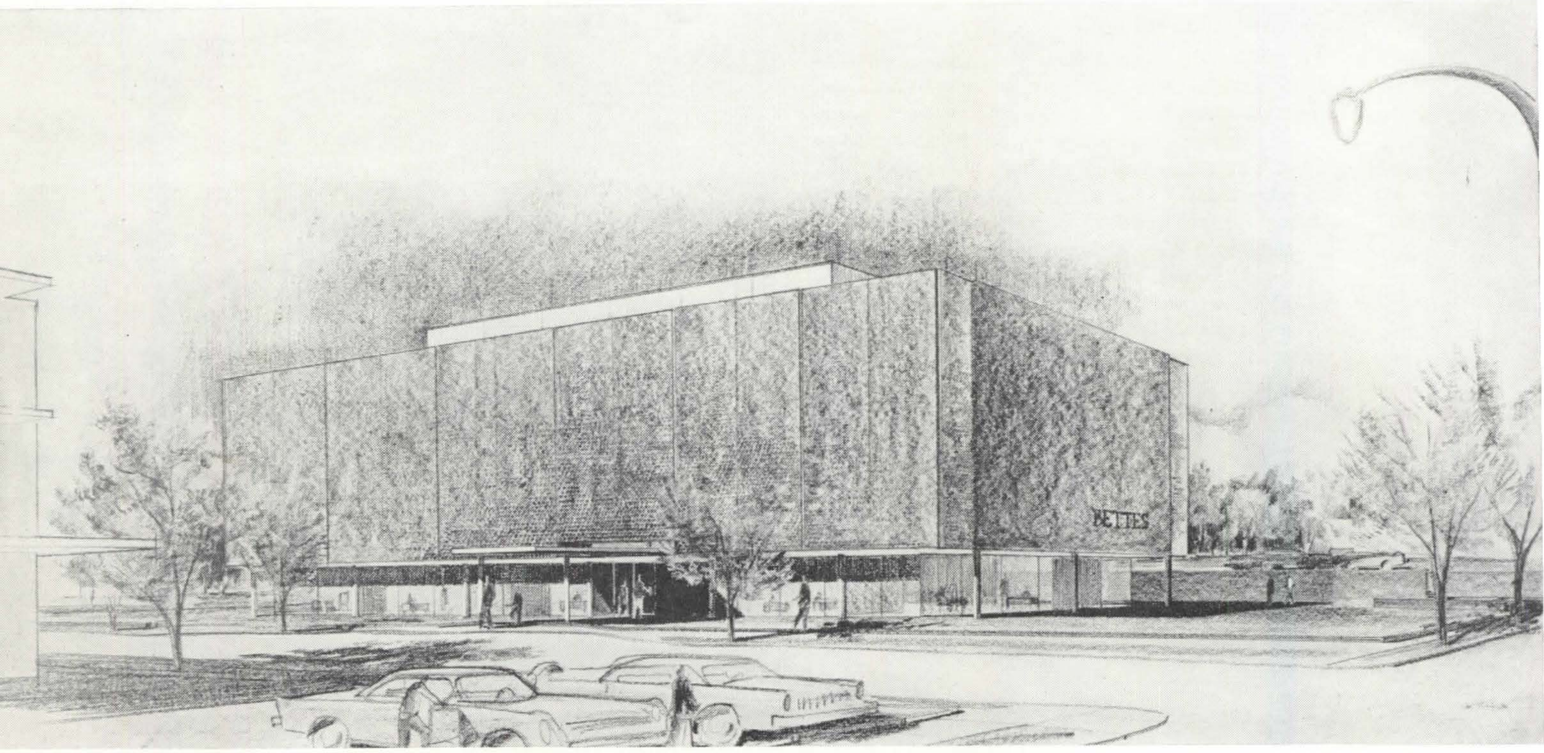




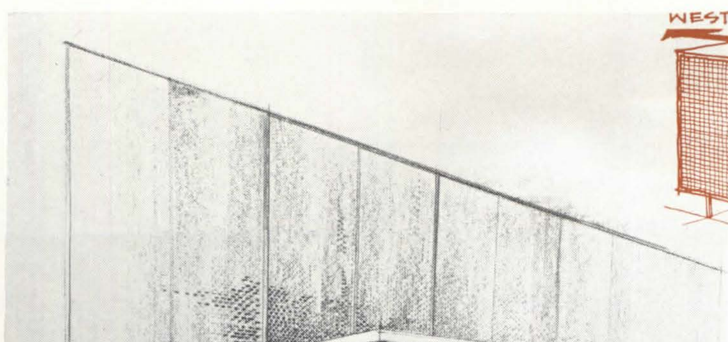
Vineyard Pavilion, Sonoma County, California: John Carden Campbell & Worley K. Wong, Designer and Architect; William Gilbert, Engineer. This structure is designed as a hospitality house for a small winery. Its function is to provide a gracious setting in which visitors may leisurely sample wine. Except for the private lounge, the entire building will be open, in effect a space-cage, for full enjoyment of the climate. Strips of canvas will ward off the sun, and fences will provide privacy and pleasant garden vistas. "Several ideas motivated this open spacious structure," write Campbell & Wong. "The main one was to achieve a luxuriously scaled building without spending a small fortune; to enjoy pure 'waste' space (the entry, etc.) and a feeling of expansiveness." There are three possible uses for this structure: as open pavilion (similar to vineyard pavilion), for warm weather entertaining; as weekend camp, roofed with 2"x6" T&G pine and screened; as full-scale two-bedroom house with windows, finished floors, and all utilities.

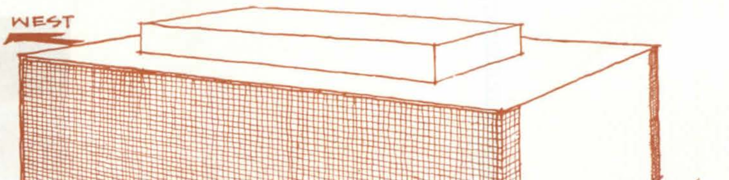
commerce:

Award Citations

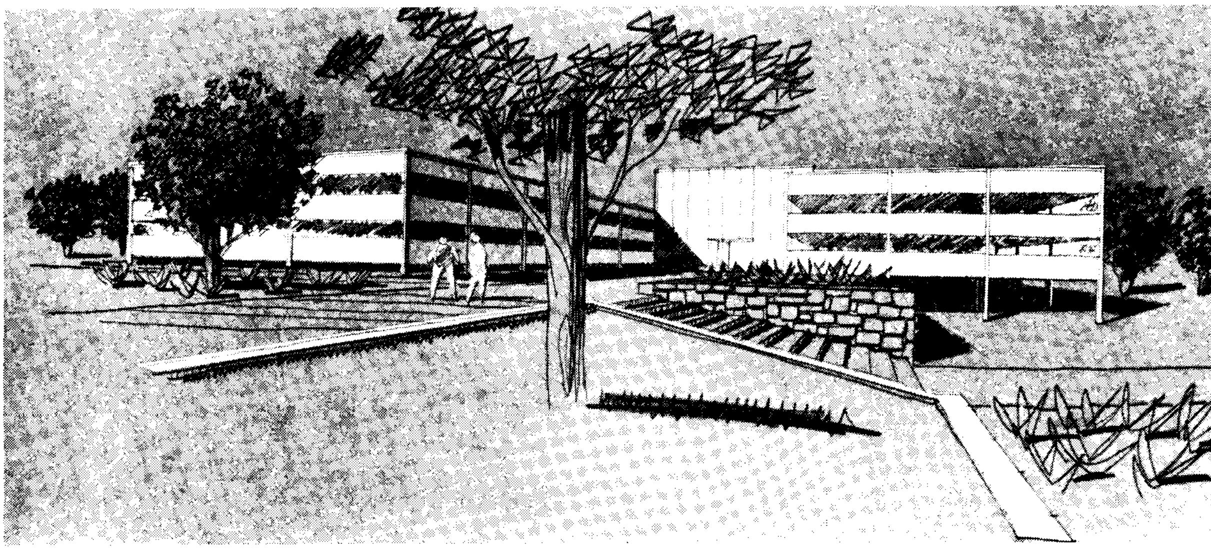


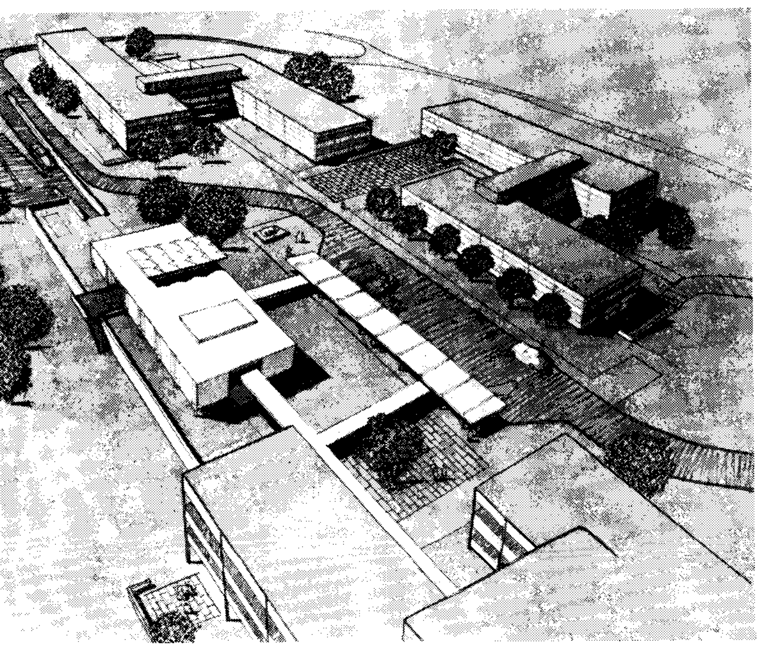
Office Building for William E. Johnston, Oklahoma City, Oklahoma: Caudill, Rowlett, Scott & Associates, Architects; James M. Samis, Consulting Mechanical Engineer; James G. McDonald, Consulting Structural Engineer. Planned to house offices of a major mortgage banking concern as well as to provide flexible rental space, this compact office building will be framed in reinforced concrete. Most remarkable element in the design is the sun-control screen planned to cover both north and south walls. This will consist of stacked, 7½"x7½"x15" terra-cotta flue tile supported on a steel frame attached to ends of the cantilevered floor slabs. The 4-ft depth of the cantilever will provide ample space for maintaining face of building, washing windows, etc. East and west walls will be windowless.

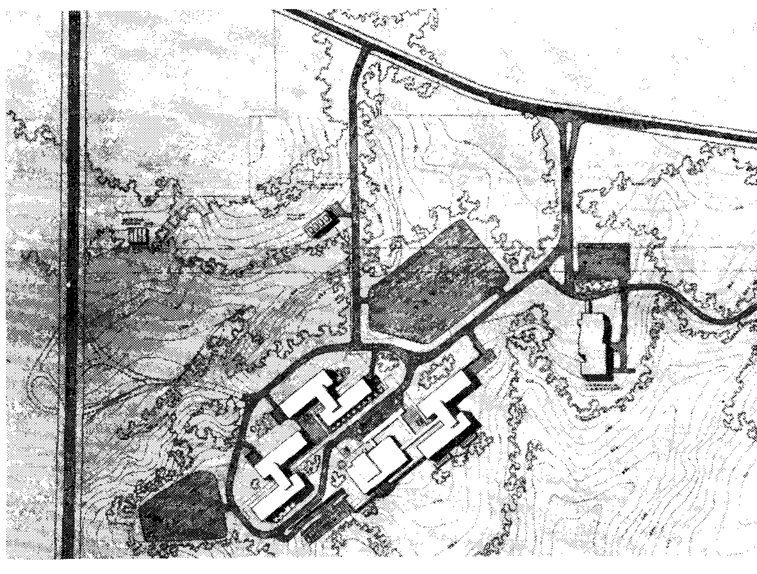




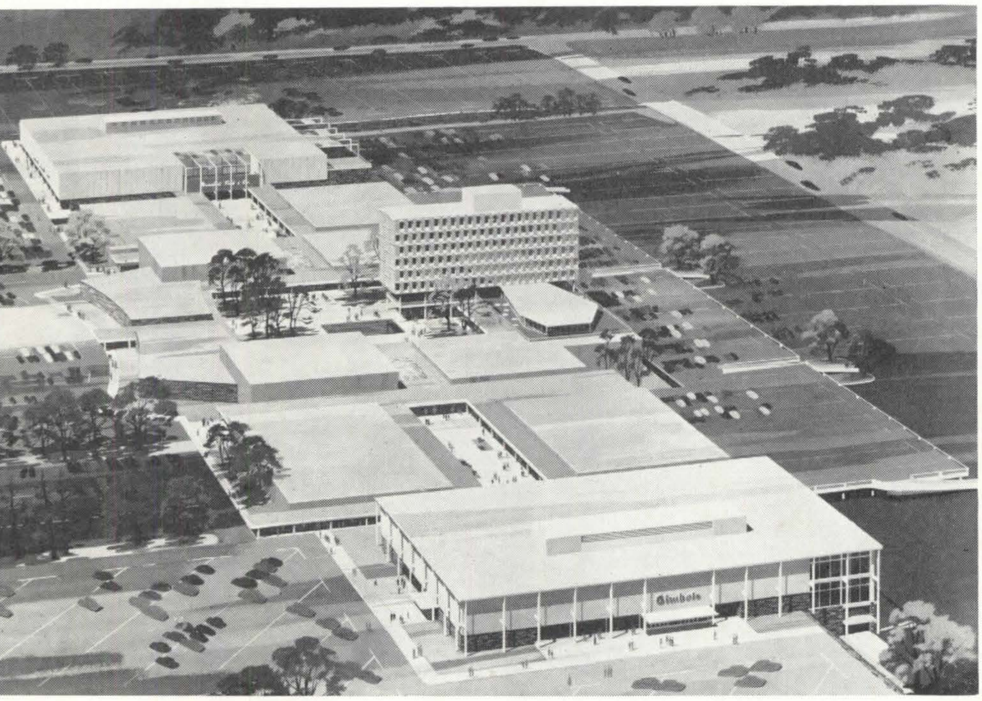
Office Building: Vincent G. Kling, Architect; Frederick M. Fradley, Project Manager; Severud, Elstad & Krueger, Structural Engineers; A. Ernest D'Ambly, Mechanical Engineer. Organized for a beautiful 250-acre country site, this "campus" of office buildings was developed in conjunction with the office-planning division of the Shaw-Walker Company. The initial group will consist of a central executive office building and three related three-story office buildings. The latter, almost identical in scheme, will be made up of two offset office wings joined by a service core. An underground tunnel will join all units.





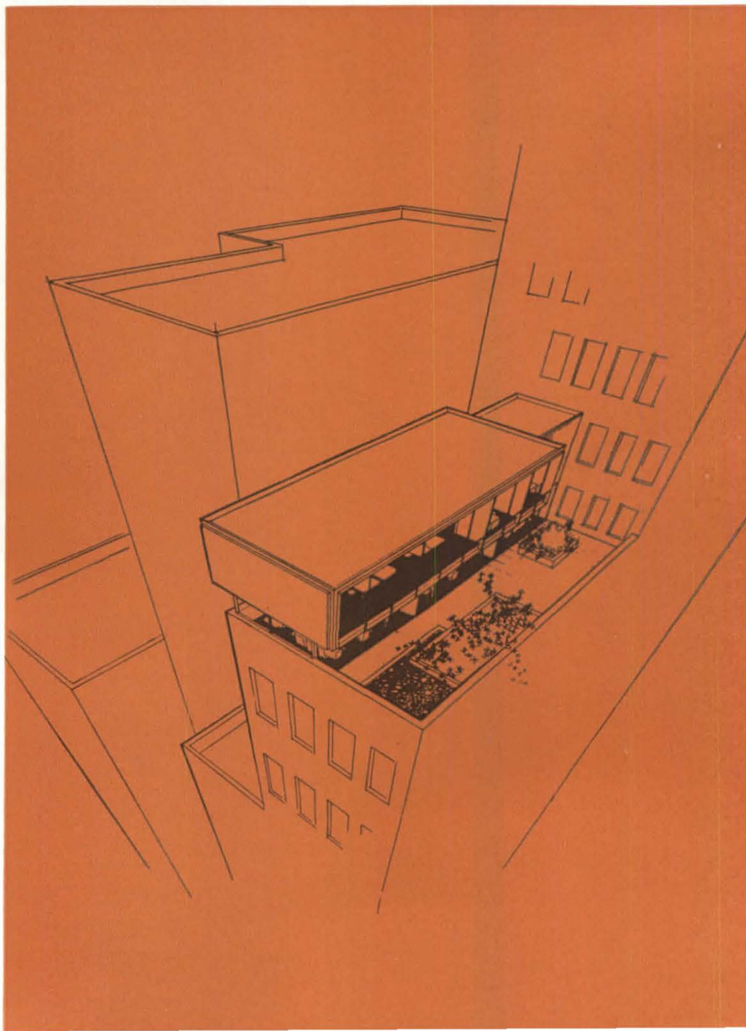


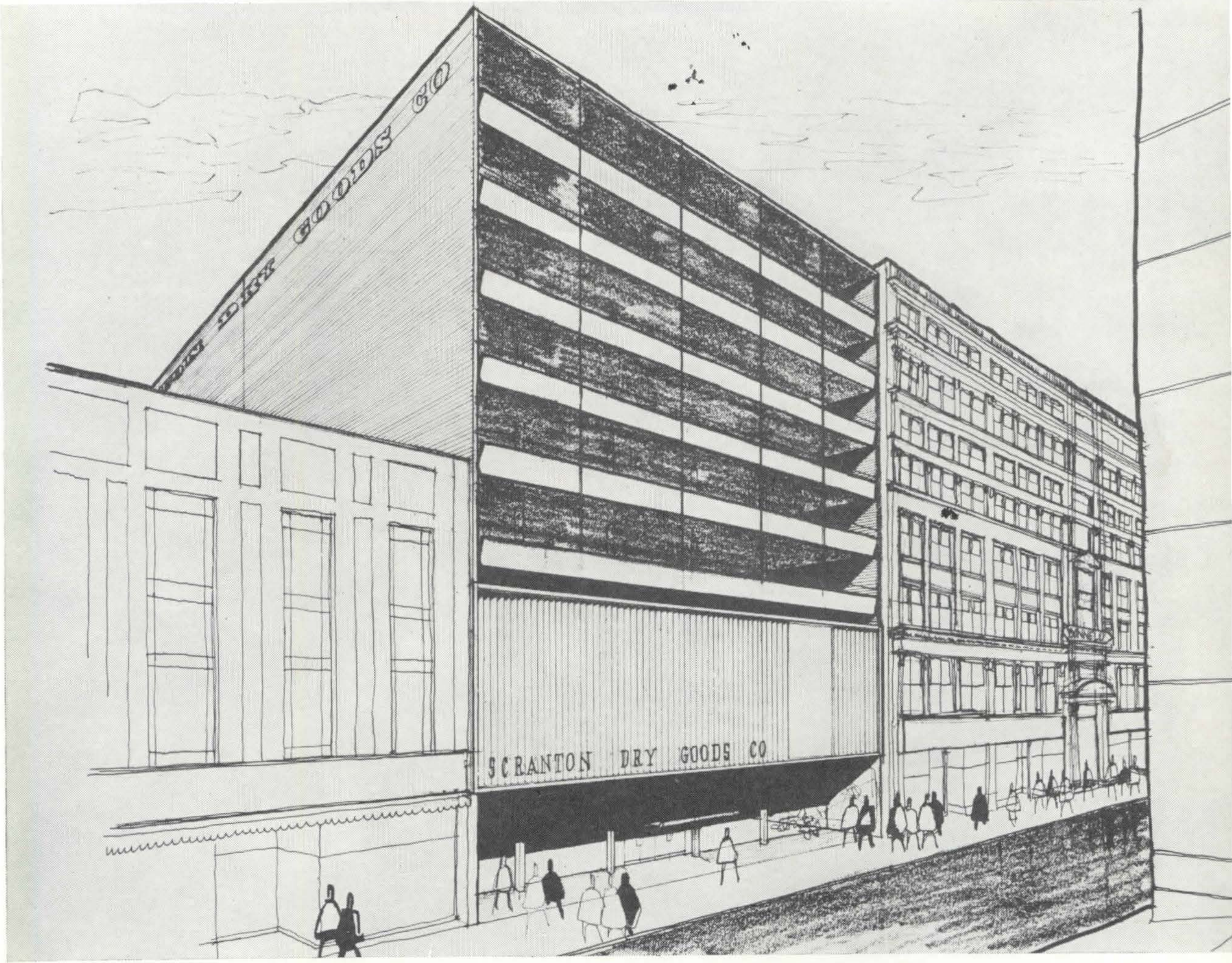
Award Citations

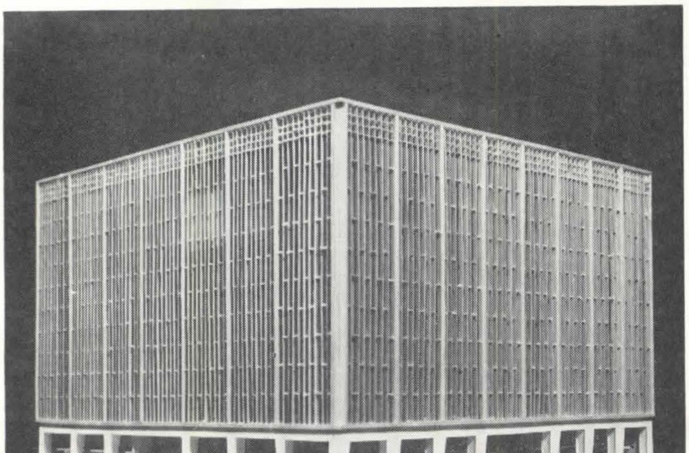


Shopping Center for Froedtert-Mayfair, Inc., Milwaukee, Wisconsin: Perkins & Will (Philip Will, Jr., Partner-in-Charge; Brock Arms, Project Manager) and Grassold-Johnson & Associates, Project Architects; Welton Becket & Associates and Grassold-Johnson & Associates, Architects for Gimbel Brothers; Homer Hoyt Associates, Economic Survey; George Barton, Traffic Consultant. In this huge commercial center, department stores for Marshall Field and Gimbel's are to be placed at either end of the long axis. A mall with a variety of landscaped courtyards along its length will constitute the main axis of this huge scheme, with Marshall Field store at one end; Gimbel's at the other. Centrally located will be a multistory medical-dental office building, fronting on the major court; subsidiary and equal courts adjoin the department stores. Parking for 7000 cars initially.

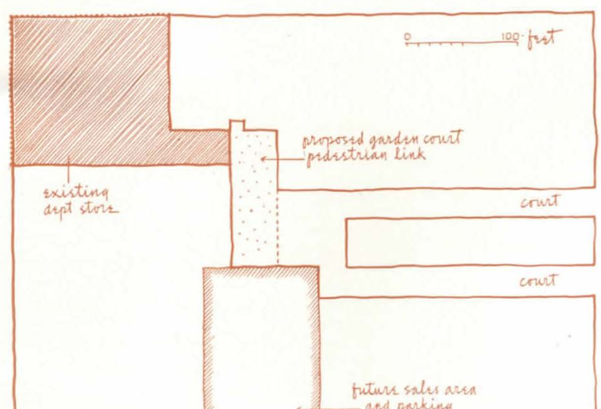
Penthouse Addition to Corn Products Building for Louis J. Glickman, Chicago, Illinois: Edward D. Dart, Architect; Scruggs & Hammond, Landscape Architects; John F. Meissner, Engineer. The lower floor of this two-story penthouse addition will be occupied by the Chicago Association of Commerce and Industry. The space adjoining a private penthouse terrace will be available for luncheon committee meetings. The top floor, which will offer a superb view over the city, will contain the architect's own offices with drafting room, private offices, reception and conference rooms. Materials will include glass and masonry for walls, plaster ceilings, terrazzo floors.





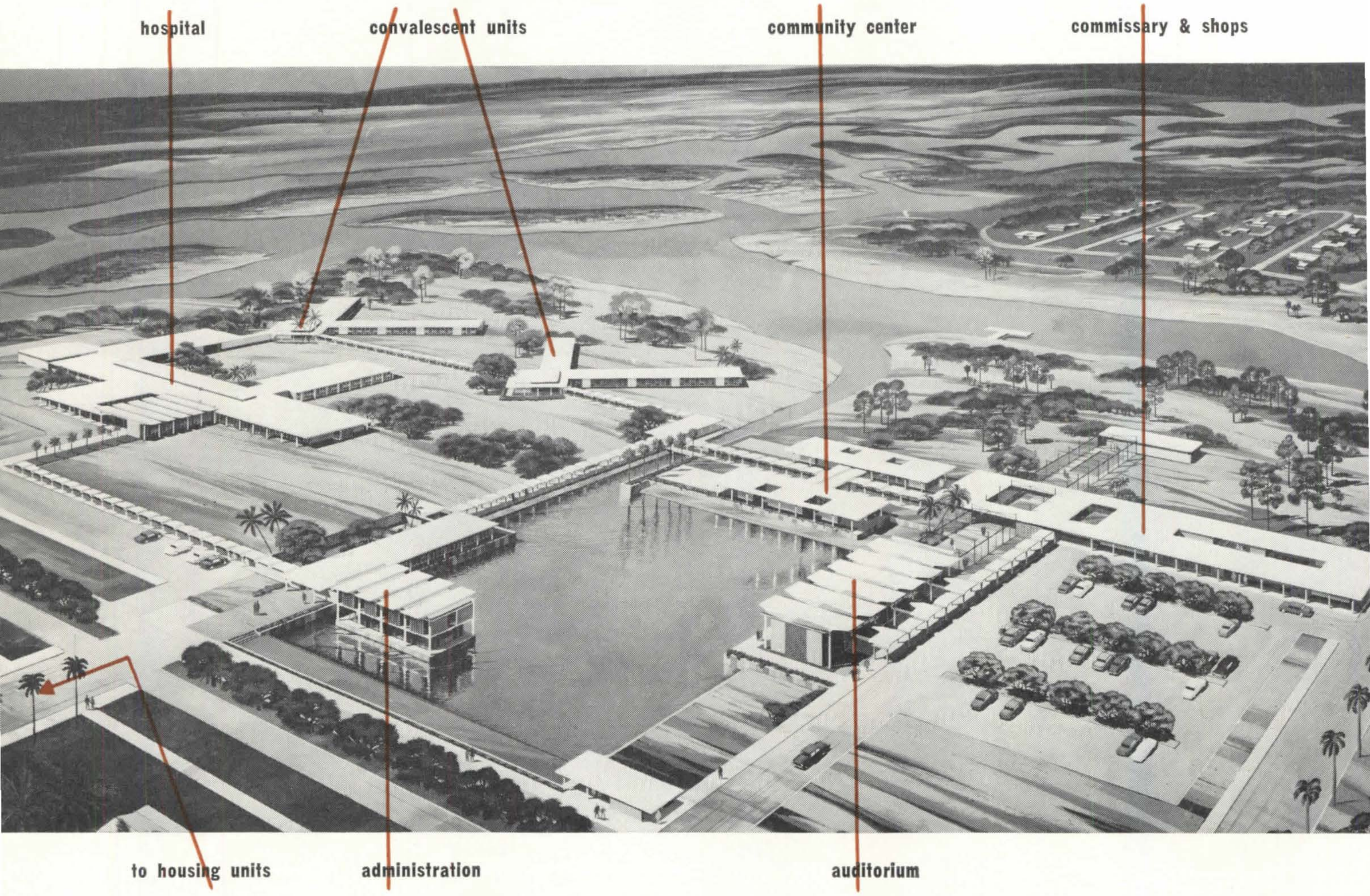


Department Store for Scranton Dry Goods Co., Scranton, Pennsylvania: Gilboy, Bellante & Clauss (Scranton office), Architects-Engineers; Joseph H. Young, Partner-in-Charge; Joseph H. Young and Dennis I. Page, Designers. The diverse problem was to remodel and enlarge an existing, corner, store building; to provide additional store space and car parking in a new building to be constructed on recently acquired property on Washington Street; and to interconnect the two elements. The solution adds two floors to the existing store, the whole being unified in design by an all-over aluminum screen *(model photo)*. First and second floors of the new building *(rendering)* will be used for selling spaces; the levels above will provide parking for 400 cars.

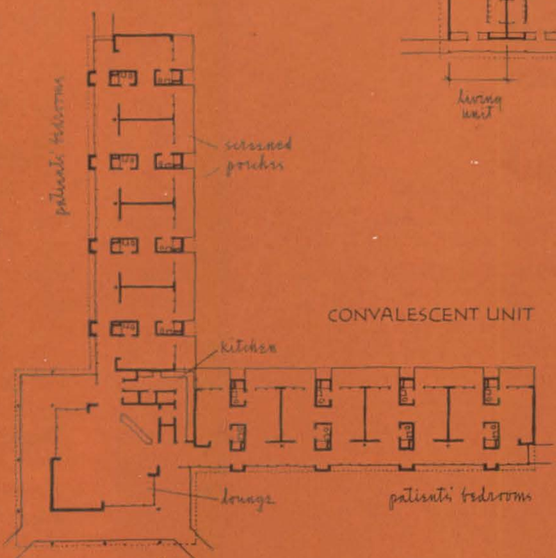


health:

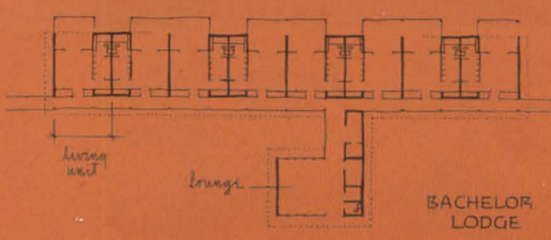
Design Award



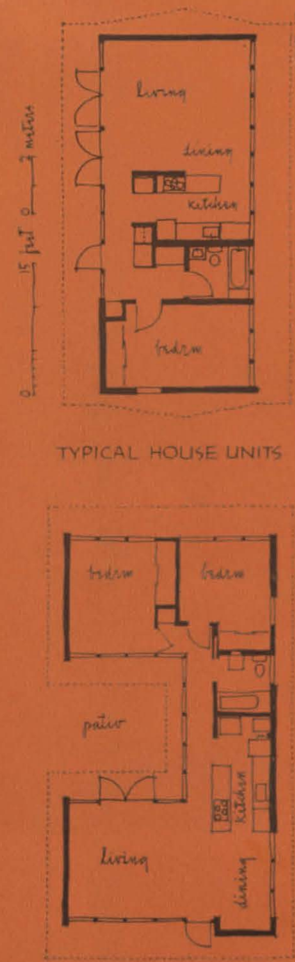
Salhaven Health and Welfare Village for the UIU Health and Welfare Fund, Palm Beach County, Florida: Rufus Nims, Architect; Milton Harry, Designer-in-Charge; H. J. Ross Associates, Engineers; Walter Harry, Project Engineer-in-Charge; Russell Black, City Planning Consultant. "The goal of the Health & Welfare Village," states the architect, "is the creation of an environmental pattern which will enable the worker to spend his retirement years in healthy useful activity." An operating upholstery shop therefore will be included to supply gainful employment within the limitations of the residents. Members are to be housed in lodges for single persons or cottages ranging in size from one to three bedrooms for family groups. Other buildings within this socially important and architecturally distinguished village are a community center *(plan acrosspage)*, comprising many recreational and occupational facilities; medical administration unit; diagnostic therapeutic clinic and convalescent quarters; administrative—shopping—food service—utility and maintenance facilities.



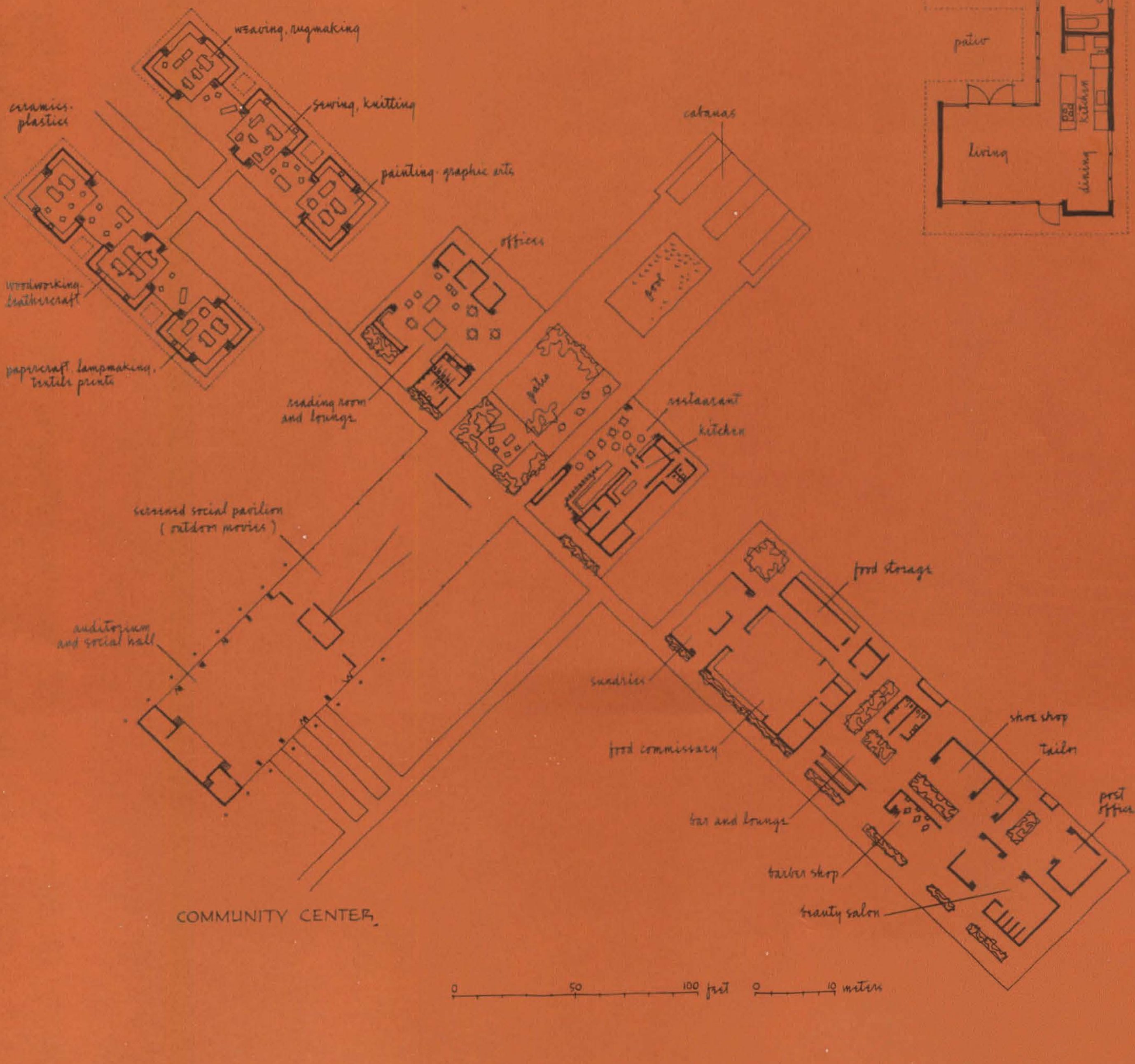
CONVALESCENT UNIT



BACHELOR LODGE

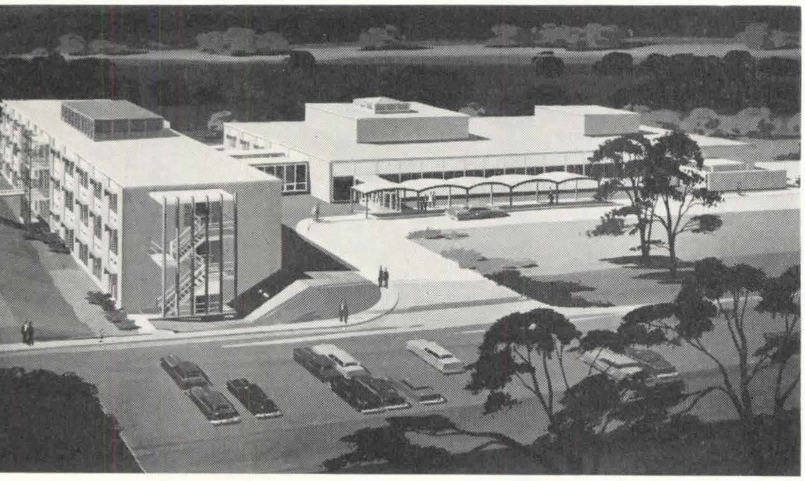


TYPICAL HOUSE UNITS

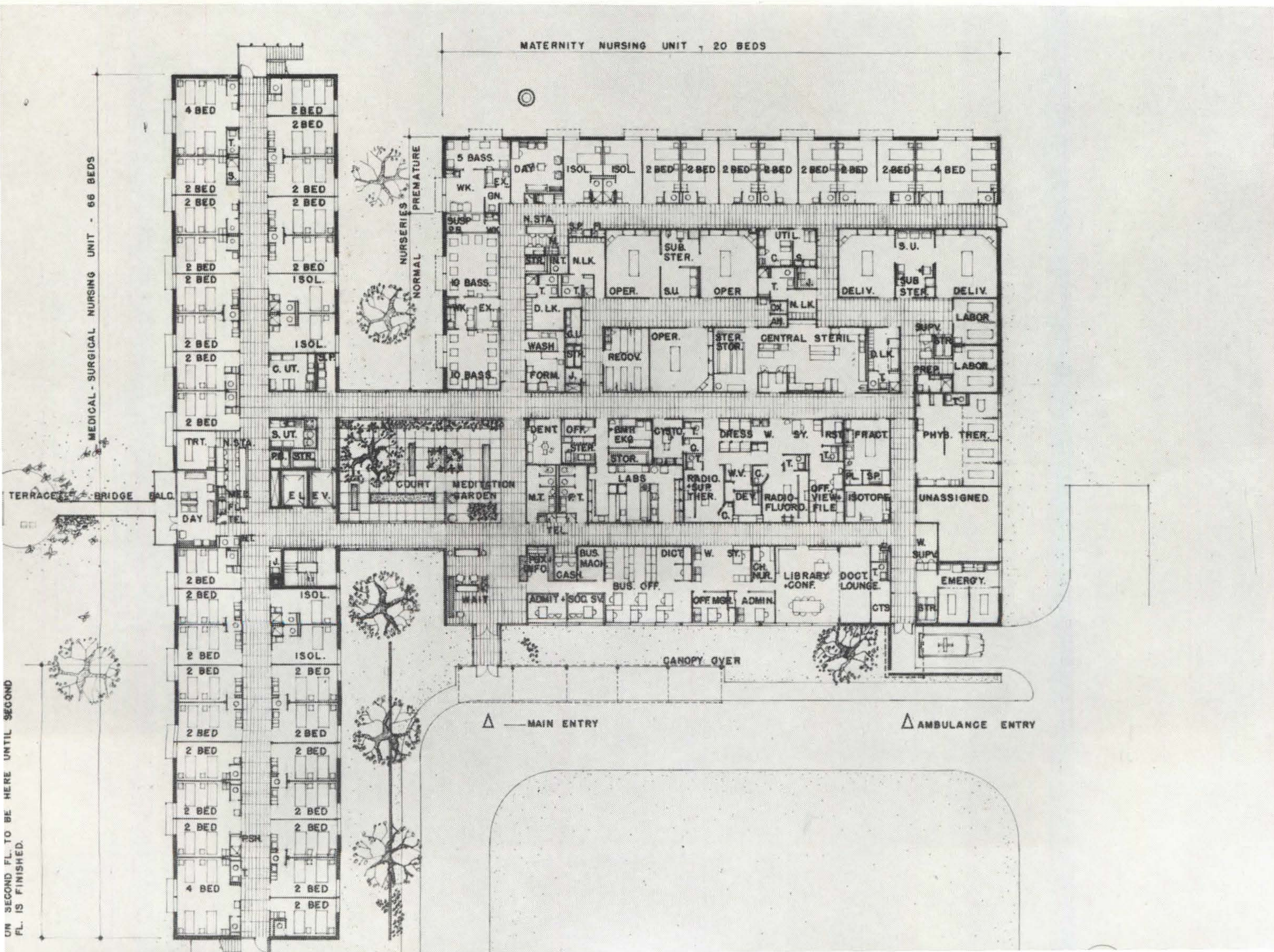


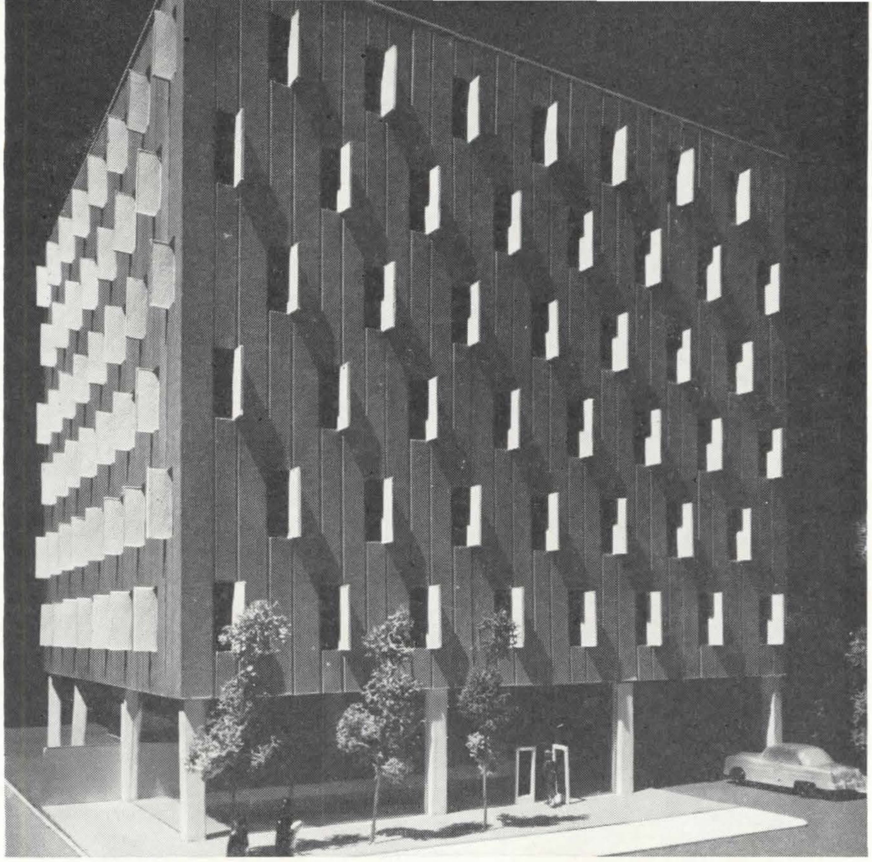
COMMUNITY CENTER

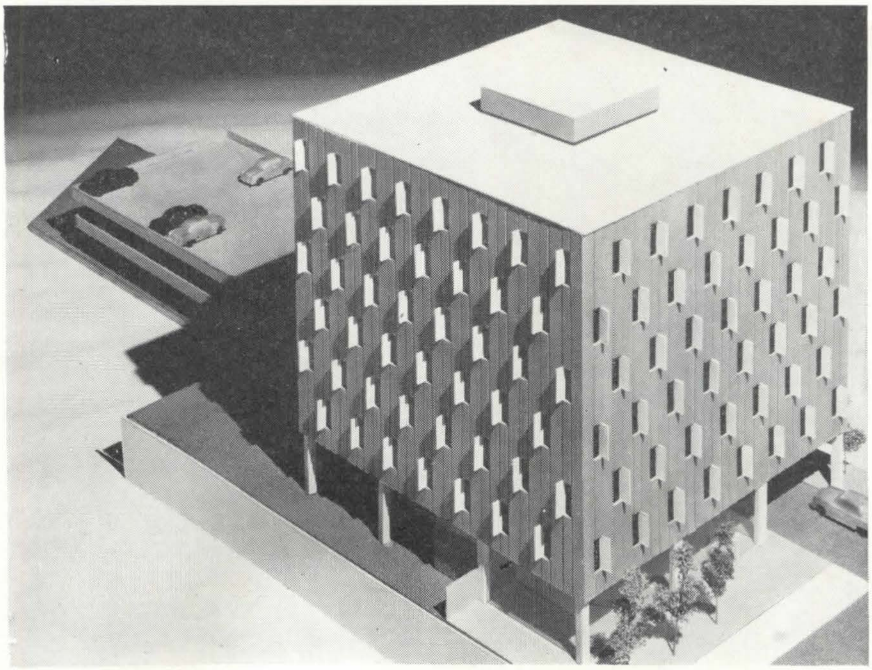
Award Citations



Memorial Hospital for Protestant Hospital Builders Club, Belleville, Illinois: Hellmuth, Obata & Kassabaum and Isadore & Zachary Rosenfield, Architects; Charles E. King, Associate Architect; J. Tom Bear, Project Architect; John D. Falvey, Mechanical and Electrical Engineer; John P. Nix, Structural Engineer. In this hospital a horizontal, rather than vertical, plan solution will achieve (1) low area per bed (420 sq ft per bed for the 154 bed hospital); (2) easy expansion possibilites; and (3) a solution to requirements within a very limited budget. Thanks to the horizontal plan, only three major nursing units with nursing stations and services will be needed. Limiting the nursing area to only two floors has also helped to economize on lobby space, number of elevators, and enclosed stairs. "The separation of nursing units from diagnostic and therapeutic facilities," write the architects, "allows great flexibility in planning." Ancillary and service departments are in the day-lighted basement with short connections to areas served.



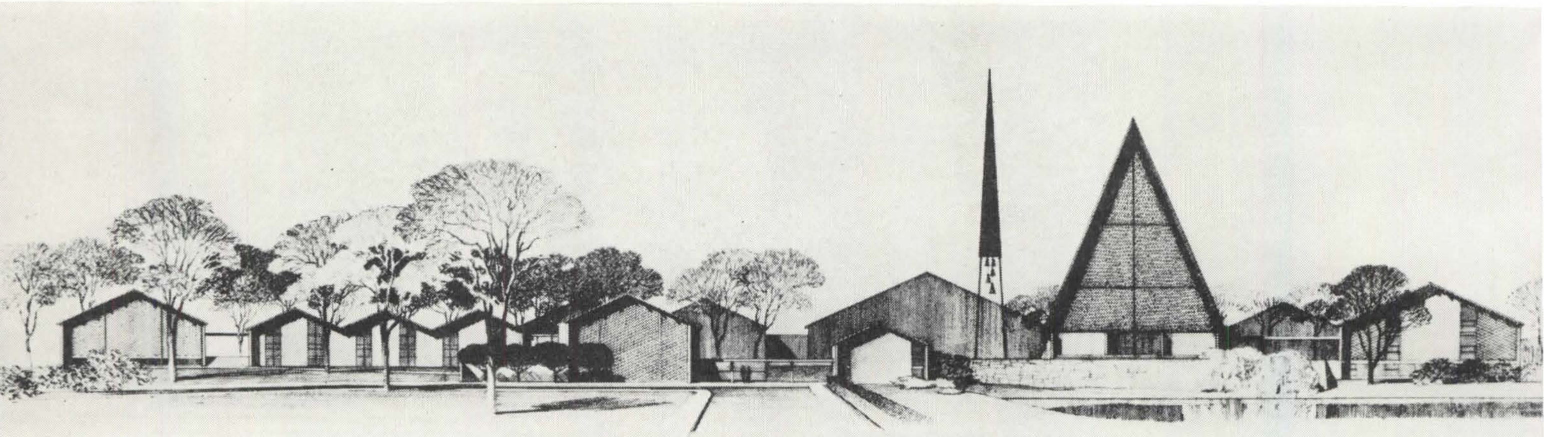


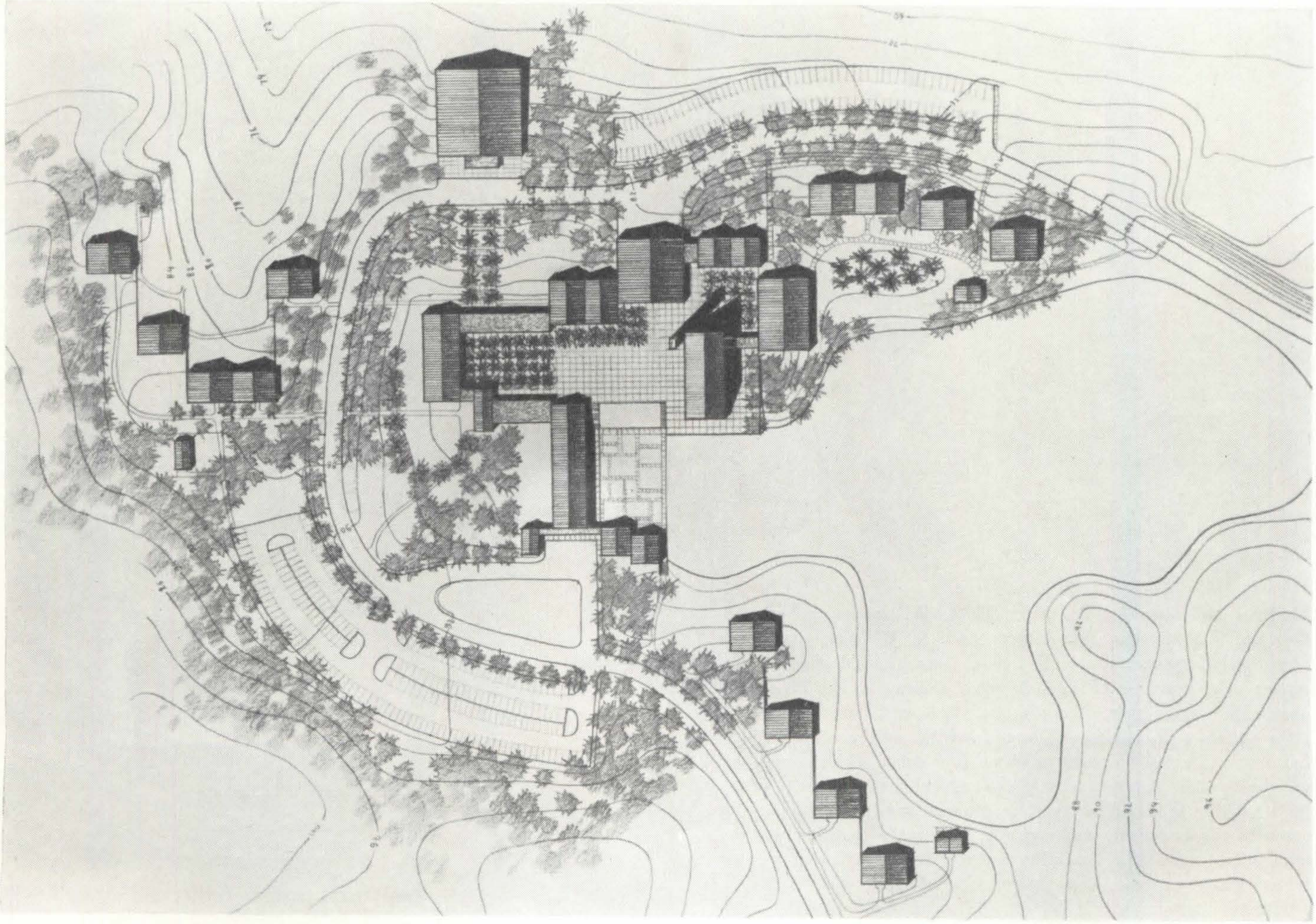


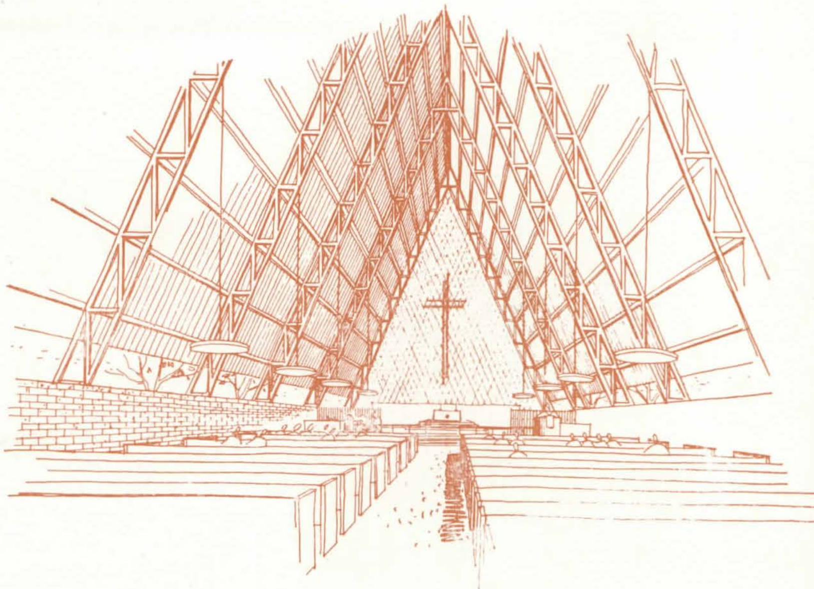
Medical Building for Peachtree Medical Corporation, Atlanta, Georgia: John Portman, Architect; Jack K. Wilborn, Consulting Structural Engineer; Edwin F. Cross, Consulting Mechanical Engineer. The provision of space of equal desirability for all owner-occupants was of prime importance. This will be accomplished by a square plan having common facilities at the center of the building and equal fenestration on all four sides. The ground floor will be devoted to a spacious lobby and car passage to the three-level parking area for patients, in the rear, and doctors' parking space in the basement. Column spacing for the building was determined by maximum flexibility in interior arrangements as well as maximum efficiency for the parking floors below. This air-conditioned structure will be of reinforced concrete with brick exterior walls. Vertical projecting panels of white Georgia marble will ward off early morning and late afternoon sun.

education:

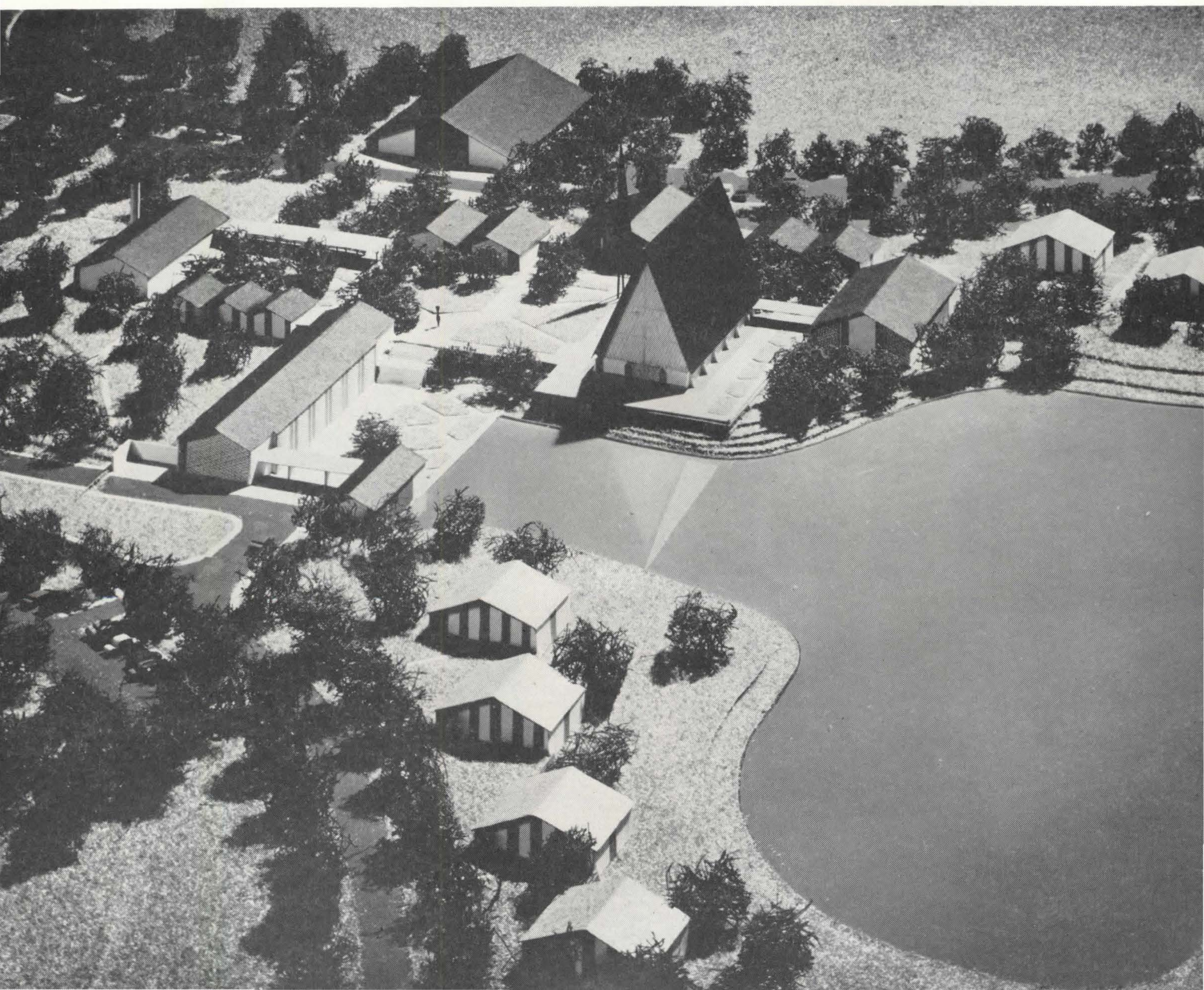
Design Award





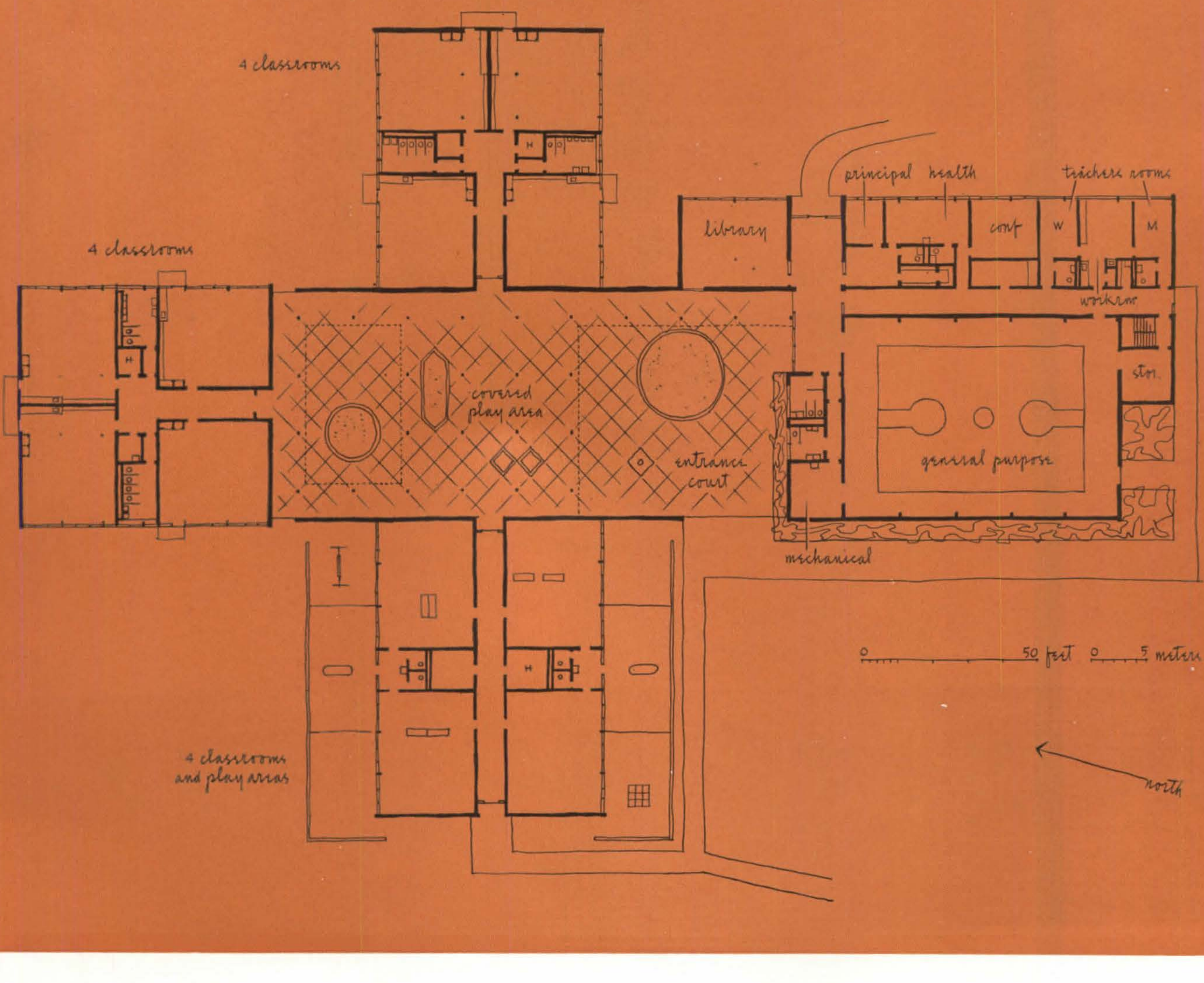


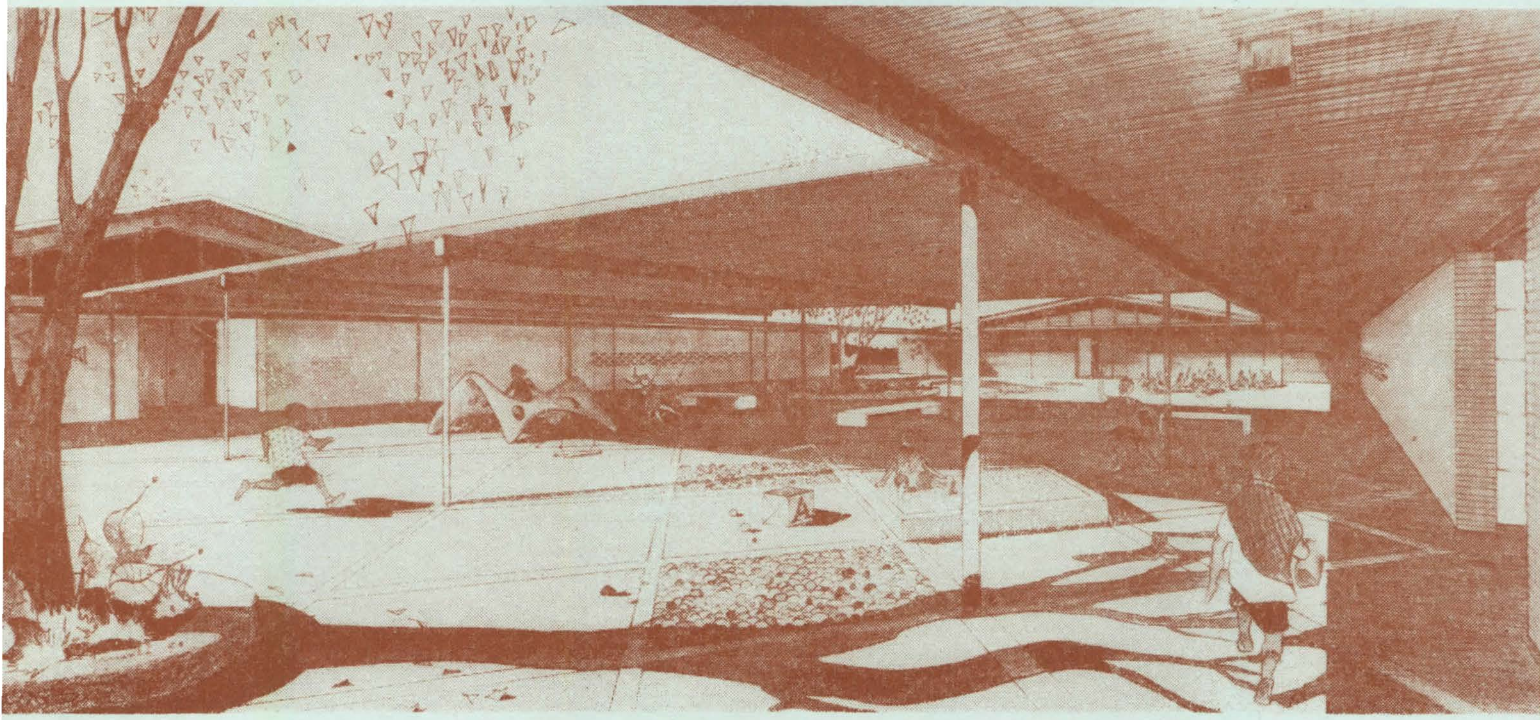
Concordia Senior College for the Lutheran Church (Missouri Synod), Fort Wayne, Indiana: Eero Saarinen & Associates, Architects; Severud, Elstad & Krueger, Structural Engineers; Samuel R. Lewis & Associates, Mechanical Engineers. "The problem," write the architects, "was to design a complete Senior College for 450 students who will ultimately be training for the Lutheran ministry and to provide an appropriately tranquil, unified environment. The site is gently rolling prairie land, framed by green forests. The solution is a village-like concept, with the chapel dominating the highest slope above the man-made lake, the lesser buildings clustered around it, and the student houses radiating outward. In order both to express the dignified yet friendly atmosphere and to achieve greatest economy, unpretentious, natural materials, and ordinary mill construction became the basis of the design."

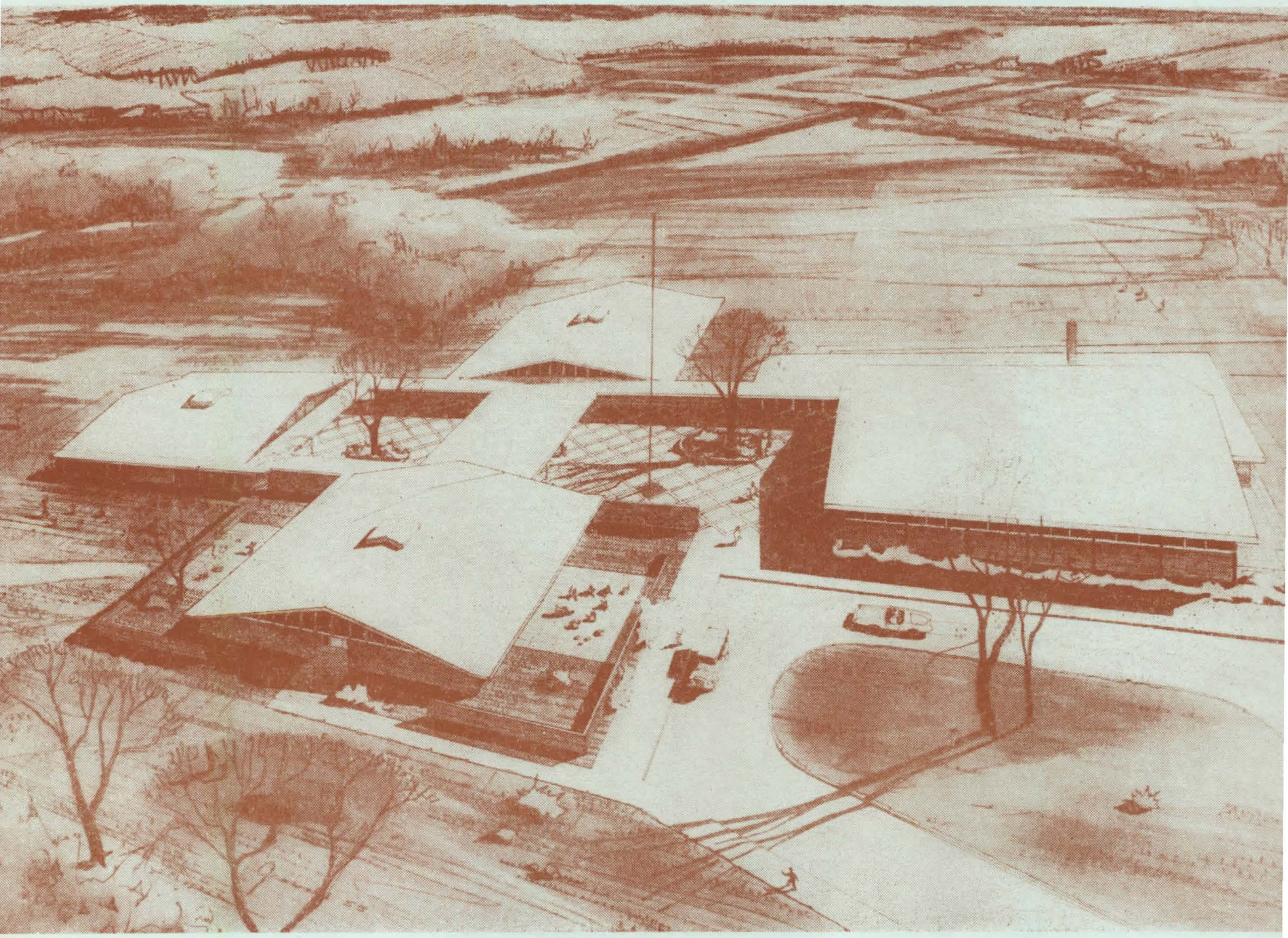


Design Award

Elementary School, Lowell, Massachusetts: Hugh Stubbins Associates, Architects; Chambers & Moriece, Landscape Architects and Site Engineers; Edward K. True, Structural Engineer; Fred S. Dubin Associates, Mechanical Engineers. The site for this new school is a portion of an existing city playground which already has a baseball diamond, tennis courts, and a swimming pool. Three clusters of four classrooms each will be arranged around a central, partially covered play area. The fourth side of this court is to be enclosed by the gymnasium, library, offices, and mechanical equipment room. The structure will have concrete floors on grade, rectangular steel columns, laminated wood beams, brick walls with cinder block back-up. Window walls will be of steel or aluminum panel construction. A central boiler plant will furnish steam to air handling units serving all parts of the school.

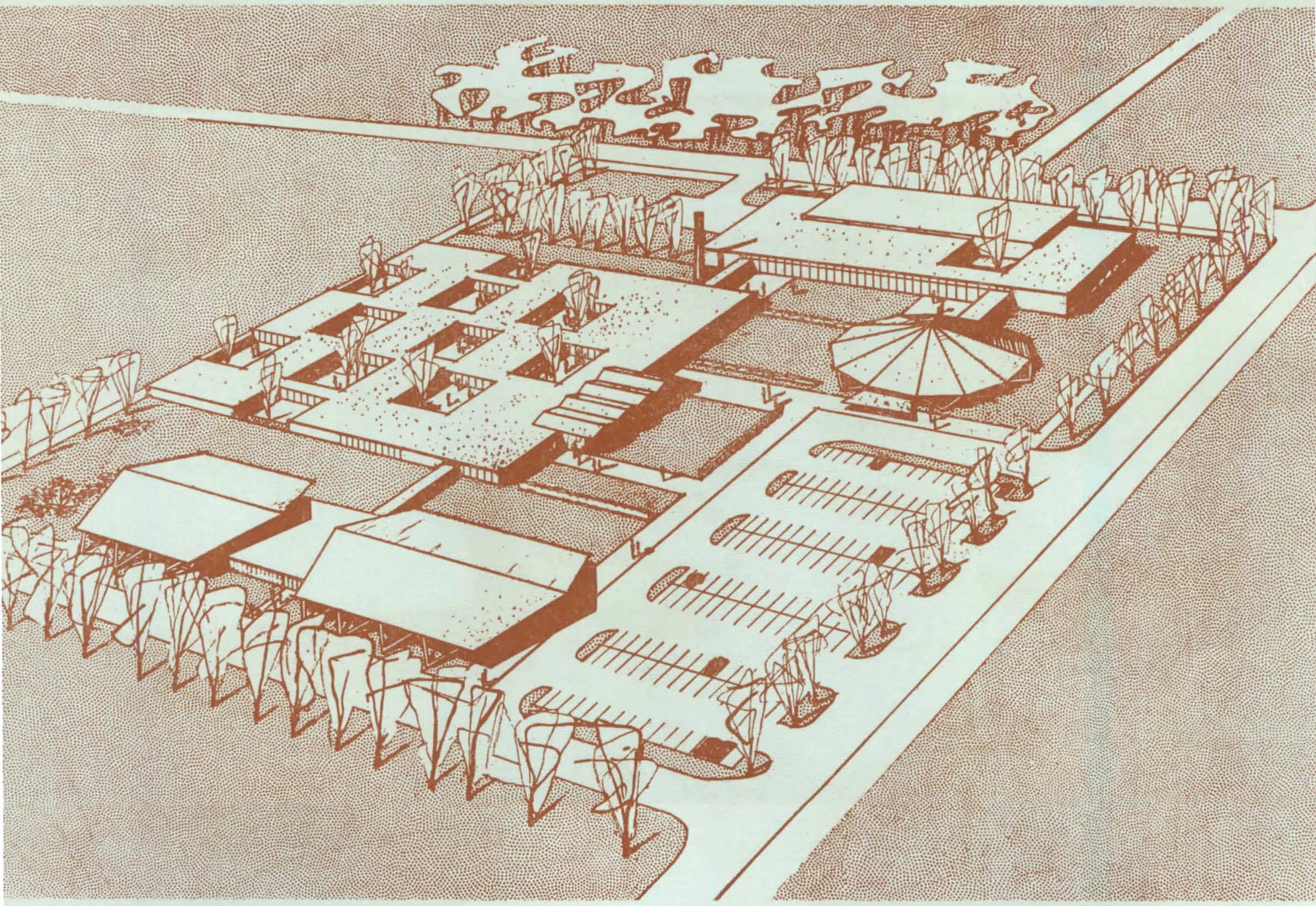


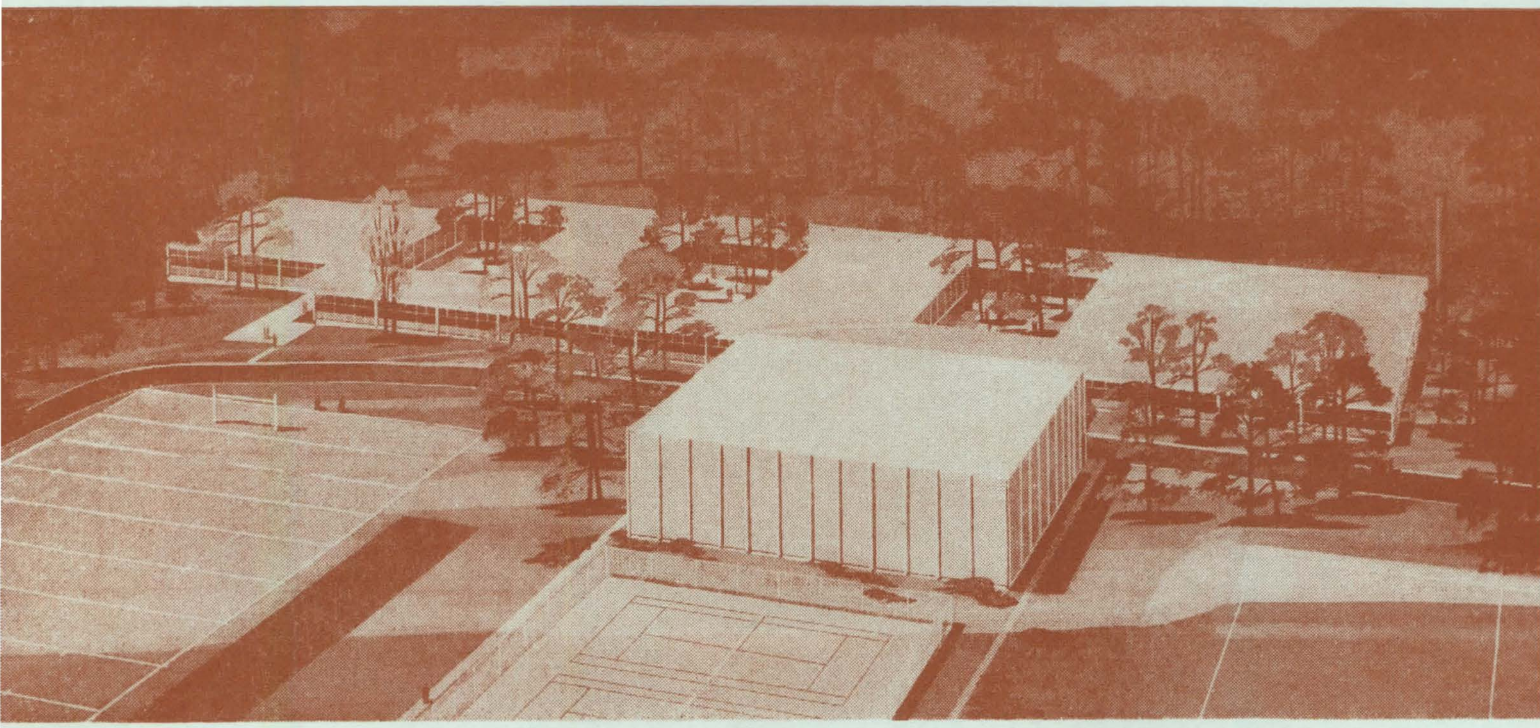




Award Citation with Commendation

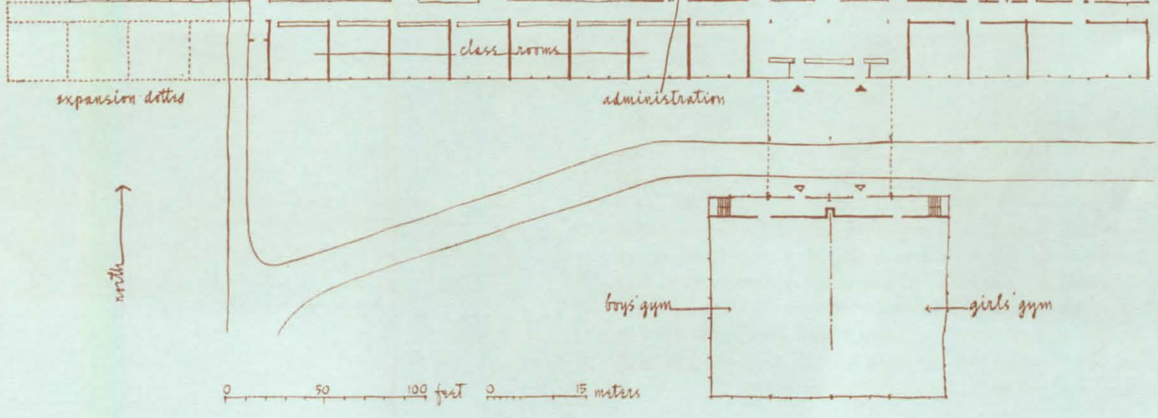
Junior High School, Plymouth, Michigan: Eberle M. Smith Associates, Inc., Architects-Engineers; Peter Tarapata and Mark Jaroszewicz, Designers. This school for 1000 seventh to ninth grade students has been designed for an ample and rather flat site in a residential area. The client wished to adapt the elementary school principle of "Home rooms" for this transitional age group. Home rooms are grouped in pairs sharing common storage and other nonteaching facilities. In one room of the pair humanities will be taught, basic science in the other. After the first third of the day, students in these two rooms change places, then spend the last third in specialized areas such as homemaking, shops, music, or gymnasium. These specialized areas, mostly for noisy activities, are grouped to the west. Quiet functions occupy the central block in which each two-classroom unit has a court. Construction will be of steel. Exterior walls are to be either panel construction or brick; interior walls of cinderblock. A steel space-frame with acoustical-steel deck roof has been specified for the gymnasium.



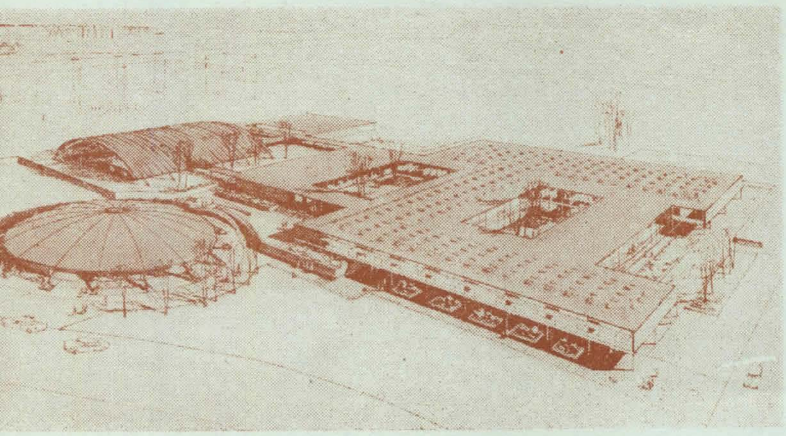


Award Citation

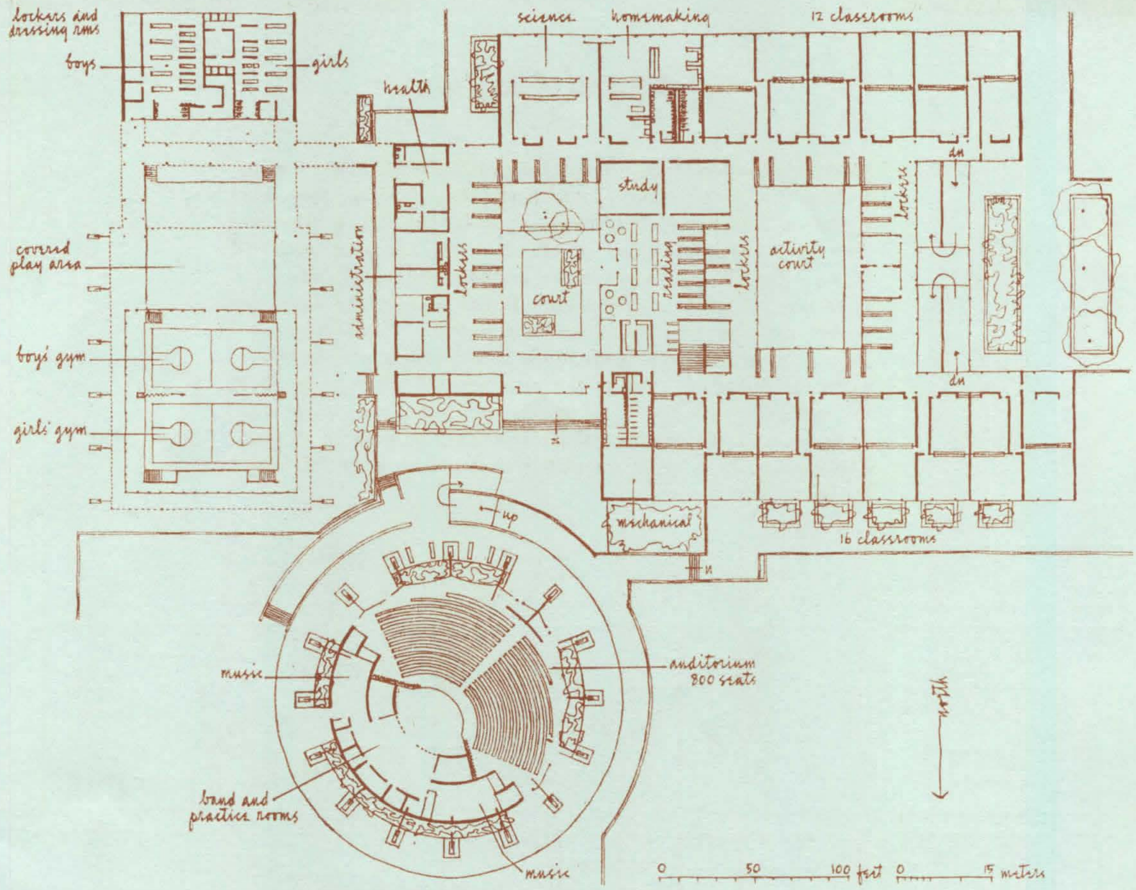
East Side Junior High School, Joliet, Illinois: Skidmore, Owings & Merrill (Chicago Office), Architects; Levon Seron, Associated Architect-Engineer (Joliet, Illinois); Bolt, Beranek & Newman, Acoustic Consultants. Five of the 25 acres are open and will be used for play fields, while the building will be placed in the remaining 20 acres of woodland. Initial school enrolment will be 600 students, later to be expanded to 900. "Desire for a compact plan with ease of circulation and economy of perimeter," write the architects, "led to the plan adopted which is in effect a rectangular pavilion with two large courts, plus a separate gymnasium." All exterior walls of the pavilion will be of glass. The gymnasium is to be completely enclosed by large full-height precast-concrete panels.



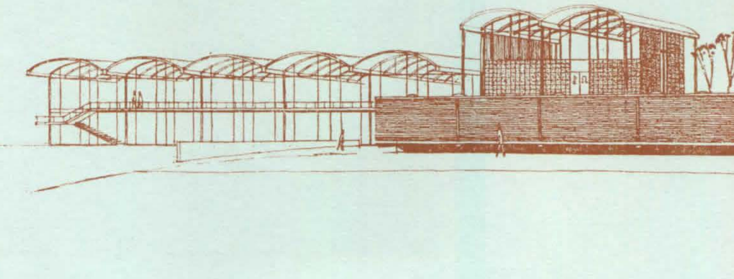
Award Citations

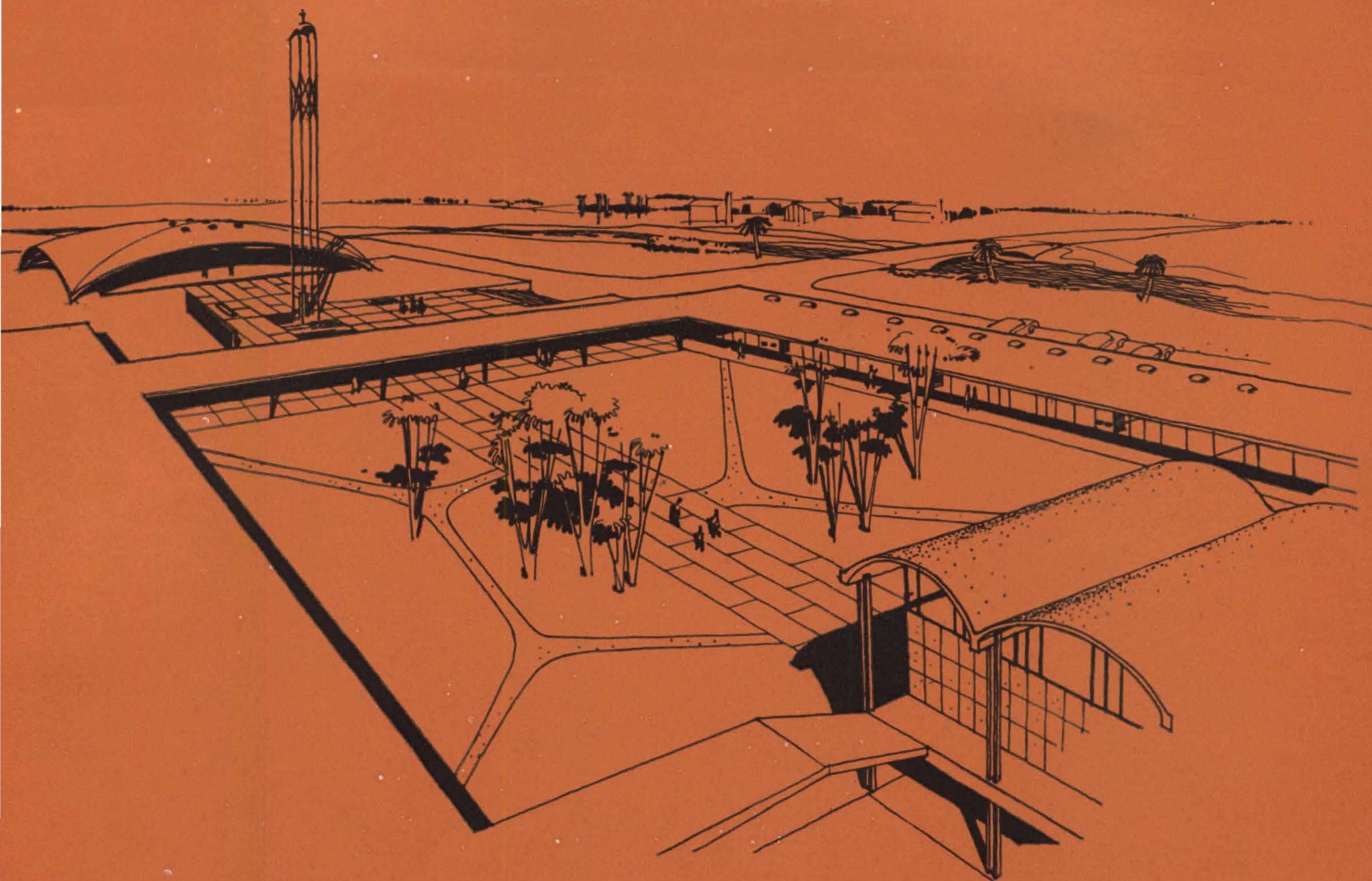


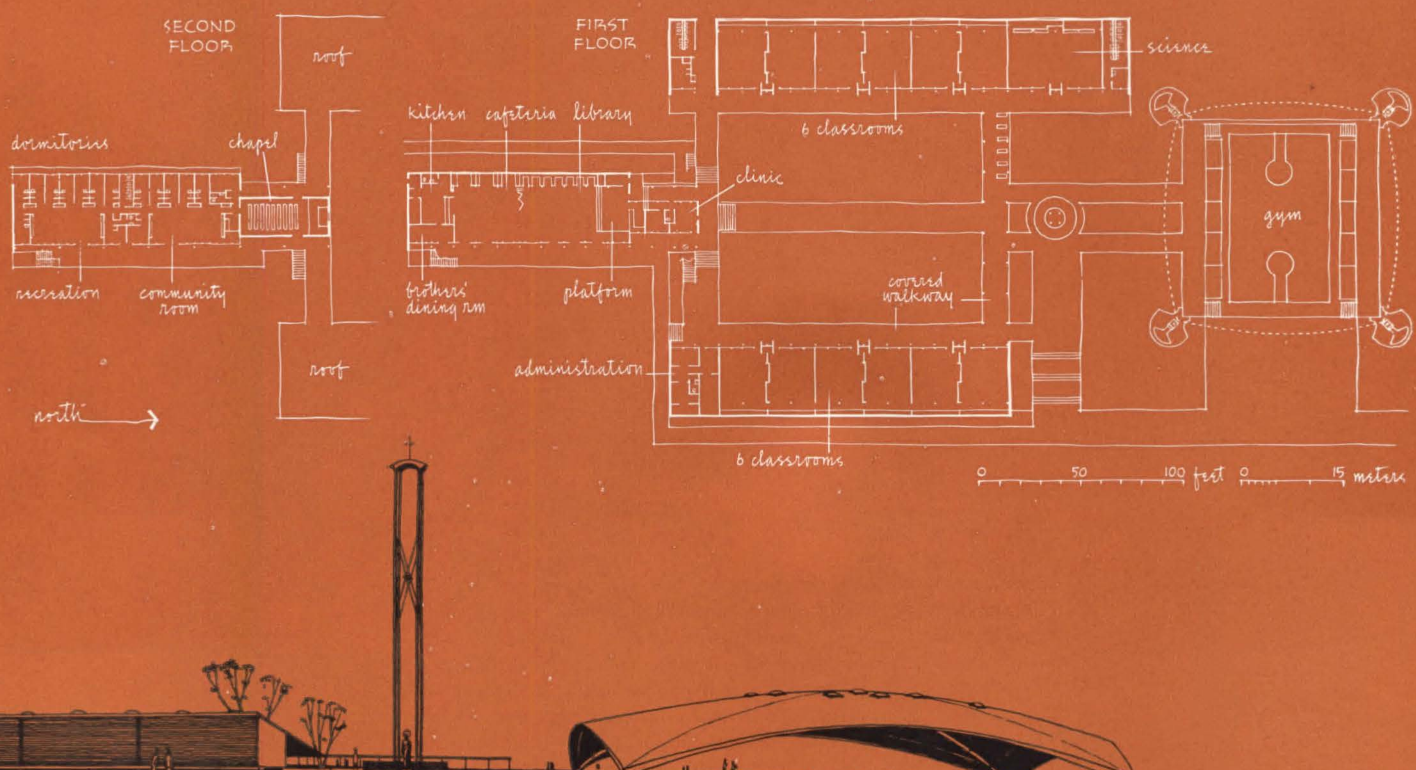
Benjamin Franklin Junior High School for Dallas Independent School District, Dallas, Texas: Broad & Nelson and Caudill, Rowlett, Scott & Associates, Associated Architects; Robert F. White, Consulting Landscape Architect. To give school officials and staff an opportunity for careful analysis and evaluation of their forthcoming school, the architects prepared a complete study reaching into all phases of school planning. Advantage has been taken of a sloping site with a partial two-level scheme in which skylighted classrooms are placed on the second floor. Shops, cafeteria, kitchen are grouped around an activity court below. A structural steel frame based on a 28′x28′ grid has been proposed, and partitions will be nonloadbearing for maximum flexibility. The circular auditorium will employ laminated-wood arches radiating from the center. Final plans are presently being prepared on the basis of this study in co-ordination with the school authorities. The school will serve 1600 students.



St. Joseph's Academy for Franco-American Educational Society, Brownsville, Texas: Caudill, Rowlett, Scott & Associates, Architects; J. W. Hall Jr., Consulting Mechanical Engineer. This building complex *(right* and *acrosspage)* includes a school for boys, and a residence and chapel for a group of Marist Brothers. Classrooms for grades 3 to 12 form two sides of a cloistered court. The outdoor gymnasium, feasible in this semitropical region, may be enclosed at a later date. Living quarters for the Brothers will be located on the second floor for privacy and maximum air circulation. The chapel, also on the upper level, will be primarily for the Brothers' use, yet easily accessible to students.

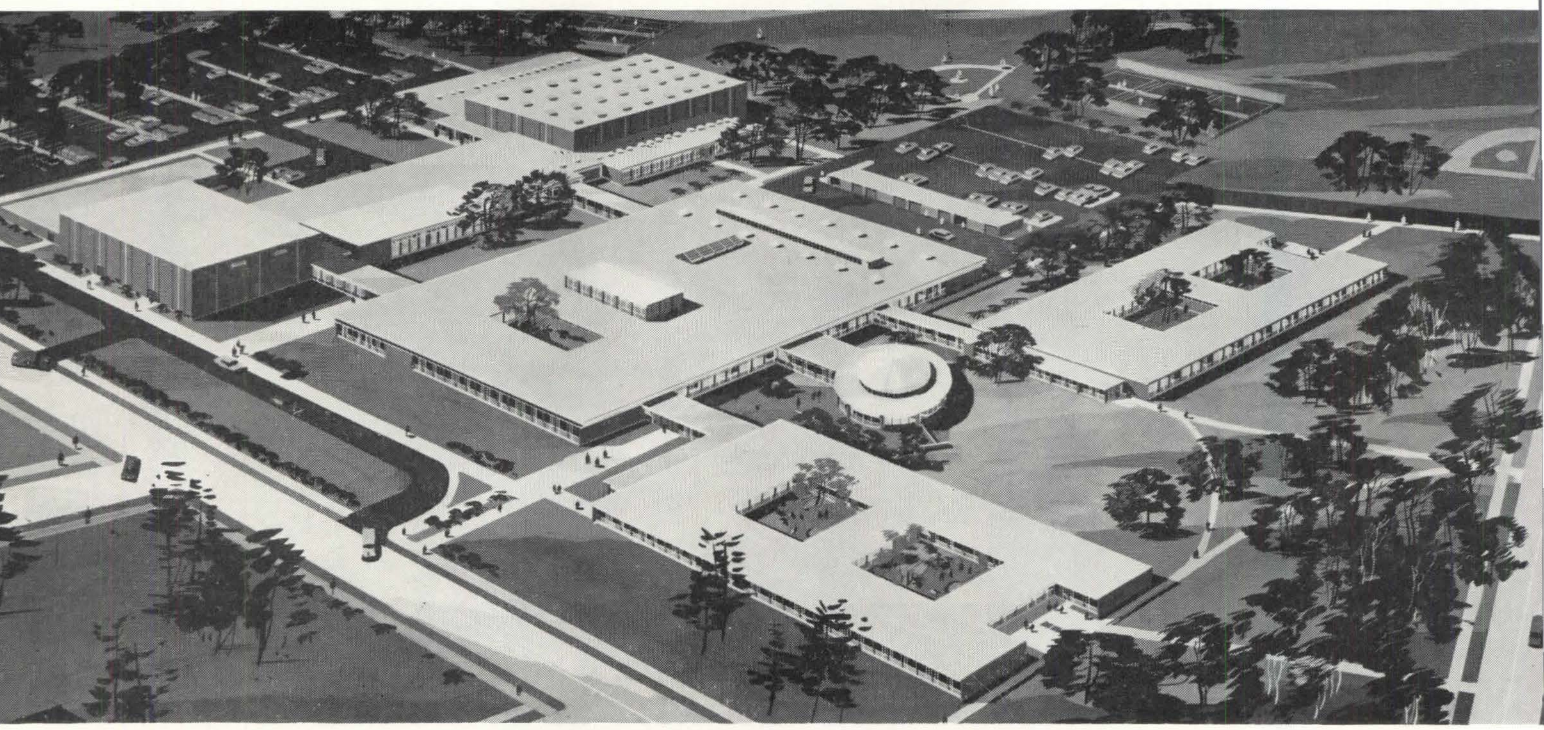


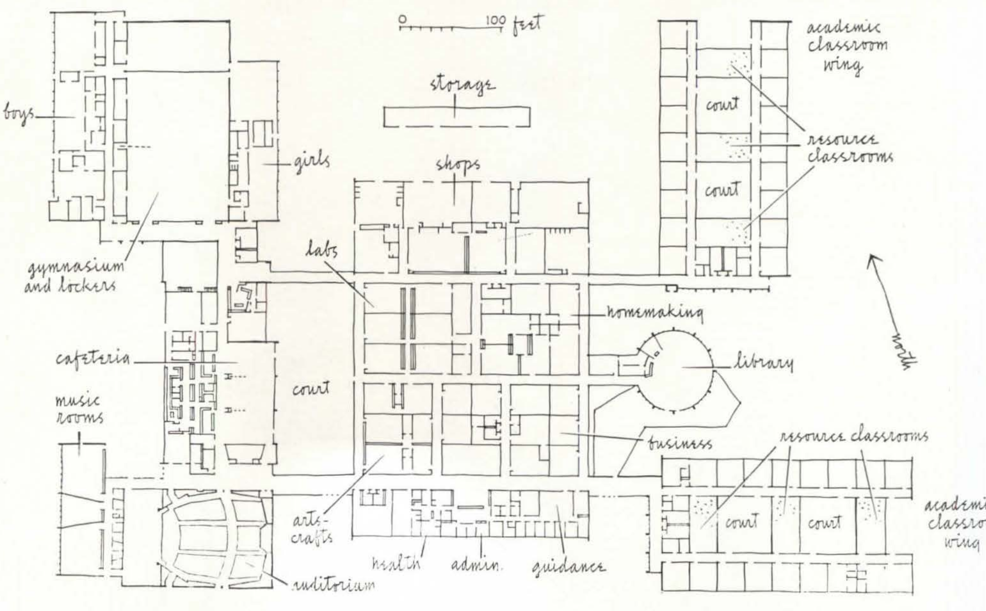




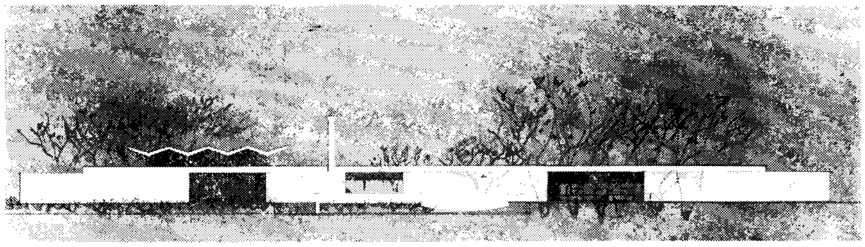
SECOND FLOOR
roof
dormitories
chapel
recreation
community room
roof
north
FIRST FLOOR
science
kitchen
cafeteria
library
6 classrooms
clinic
gym
brothers' dining rm
platform
covered walkway
administration
6 classrooms
0
50
100 feet
0
15 meters

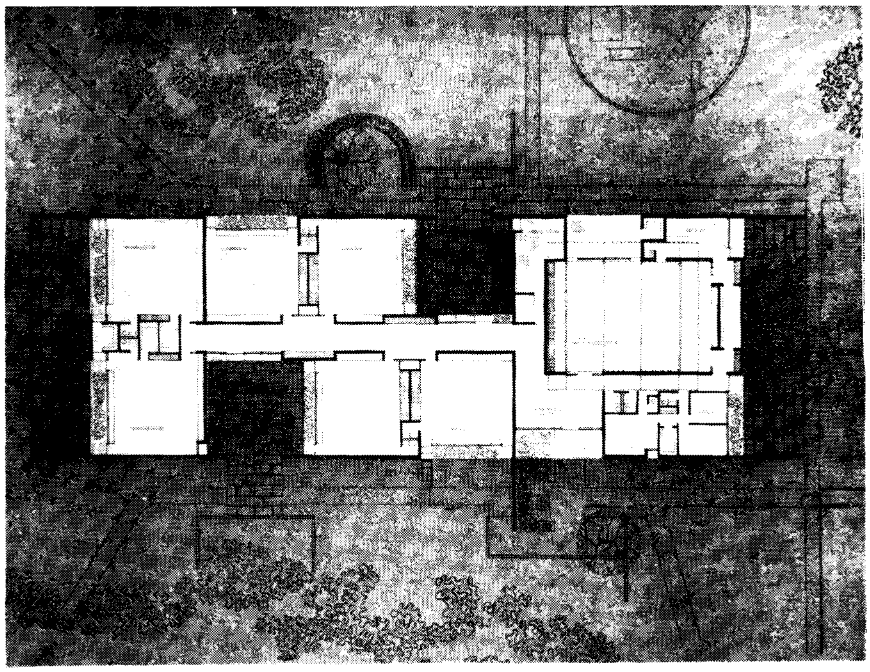
Award Citations



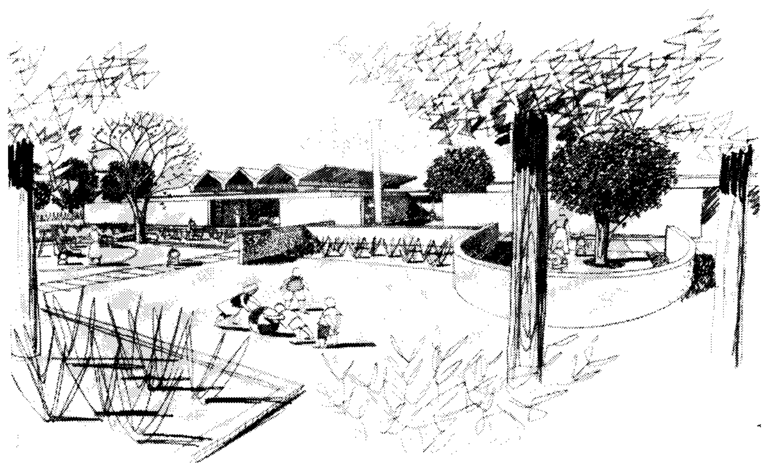


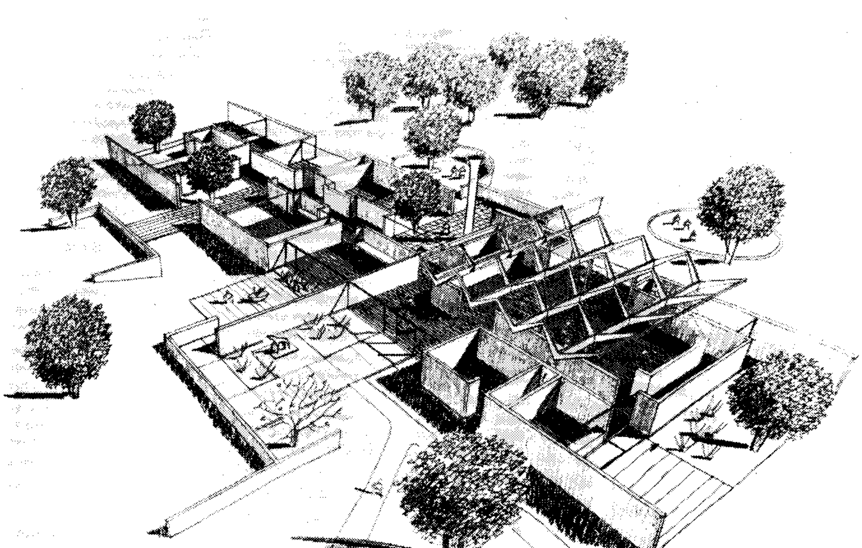
Linton High School, Schenectady, New York: Perkins & Will (Chicago) and Ryder & Link (Schenectady), Architects-Engineers; Robert E. Murray, Superintendent of Schools. A number of major factors affected the design of this high school for 1700 students: (1) School will be offering terminal education for 80 percent of the pupils—therefore emphasis is heavy on vocational and general education; (2) Constantly changing requirements—therefore all special-purpose educational spaces such as shops, laboratories, etc., may be shifted and used interchangeably; (3) Auditorium, music-unit, cafeteria, and gymnasium must answer educational requirements as well as community needs; (4) For continuity of contact with teachers and fellow-students resource classrooms will serve as nuclei for 300 pupils each.



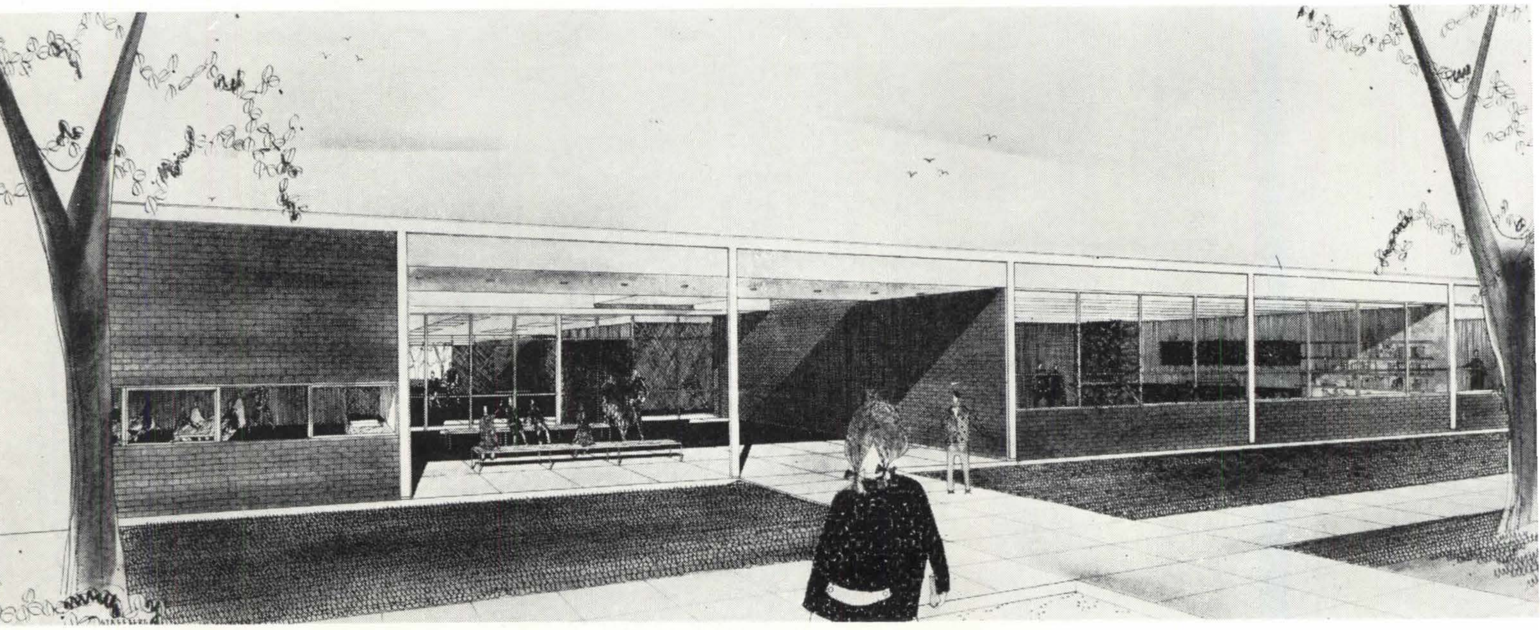


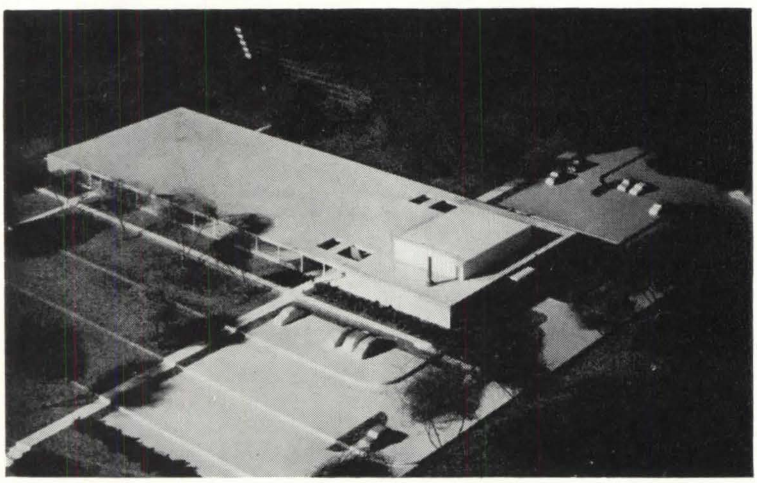
Glen Head Elementary School, Long Island, New York: Vincent G. Kling, Architect; George Qualls, Project Manager; Webel & Innocenti, Landscape Architects; Severud, Elstad & Krueger, Structural Engineers; A. Ernest D'Ambly, Mechanical Engineer. This primary school for children of the first three elementary grades will have 6 classrooms, an all-purpose room, small kitchen, and administrative offices. "An attempt has been made," writes the architect, "to provide a series of spaces in scale with the children who will use them. Planted courts and outdoor class areas have been introduced to provide an environment reminiscent of the home."



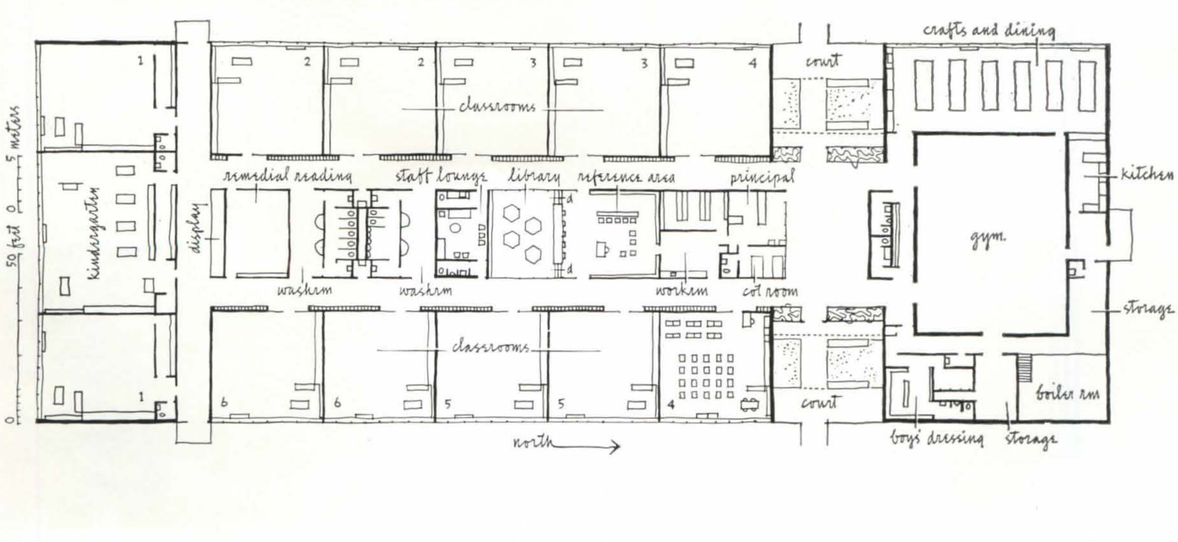


Award Citations

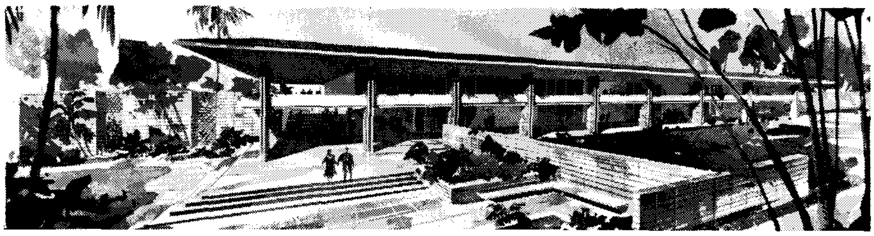


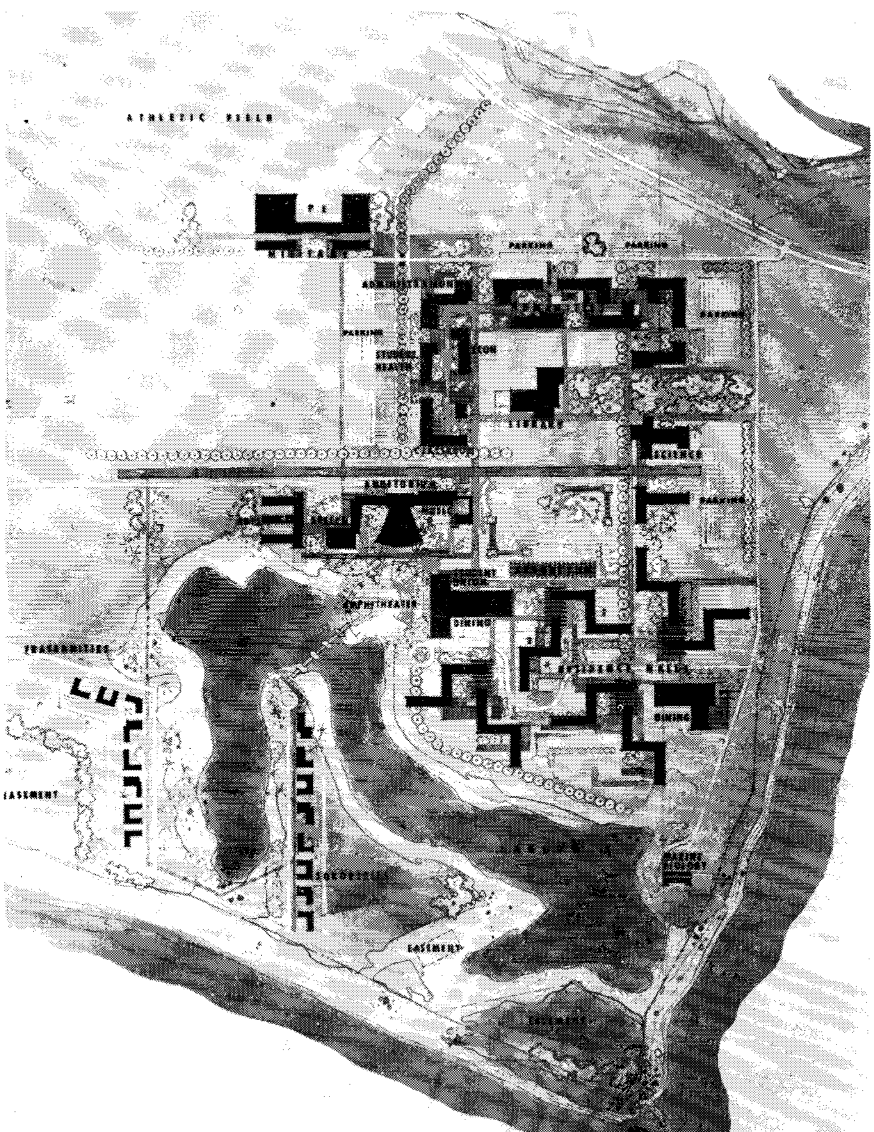


Southeast Elementary School, Albert Lea, Minnesota: Bernard J. Hein and Hammel & Green, Associated Architects; James E. Stageberg, Architect-in-Charge; Ralph D. Thomas & Associates, Engineers. This school's plan, highly recommended by the Jury for its clarity, has achieved a desired separation between the various functions with a high degree of structural simplicity. "In the classrooms the use of bi-lateral lighting has been discarded," explain the architects, "keeping our window walls for psychological requirements and relying for light on a series of low brightness fixtures." The interior library will have glazed walls toward both corridors. During community functions doors between corridors and lobby may be closed off. Construction is to be standard steel framing. Exterior materials will be brick, glass, painted steel, and aluminum.



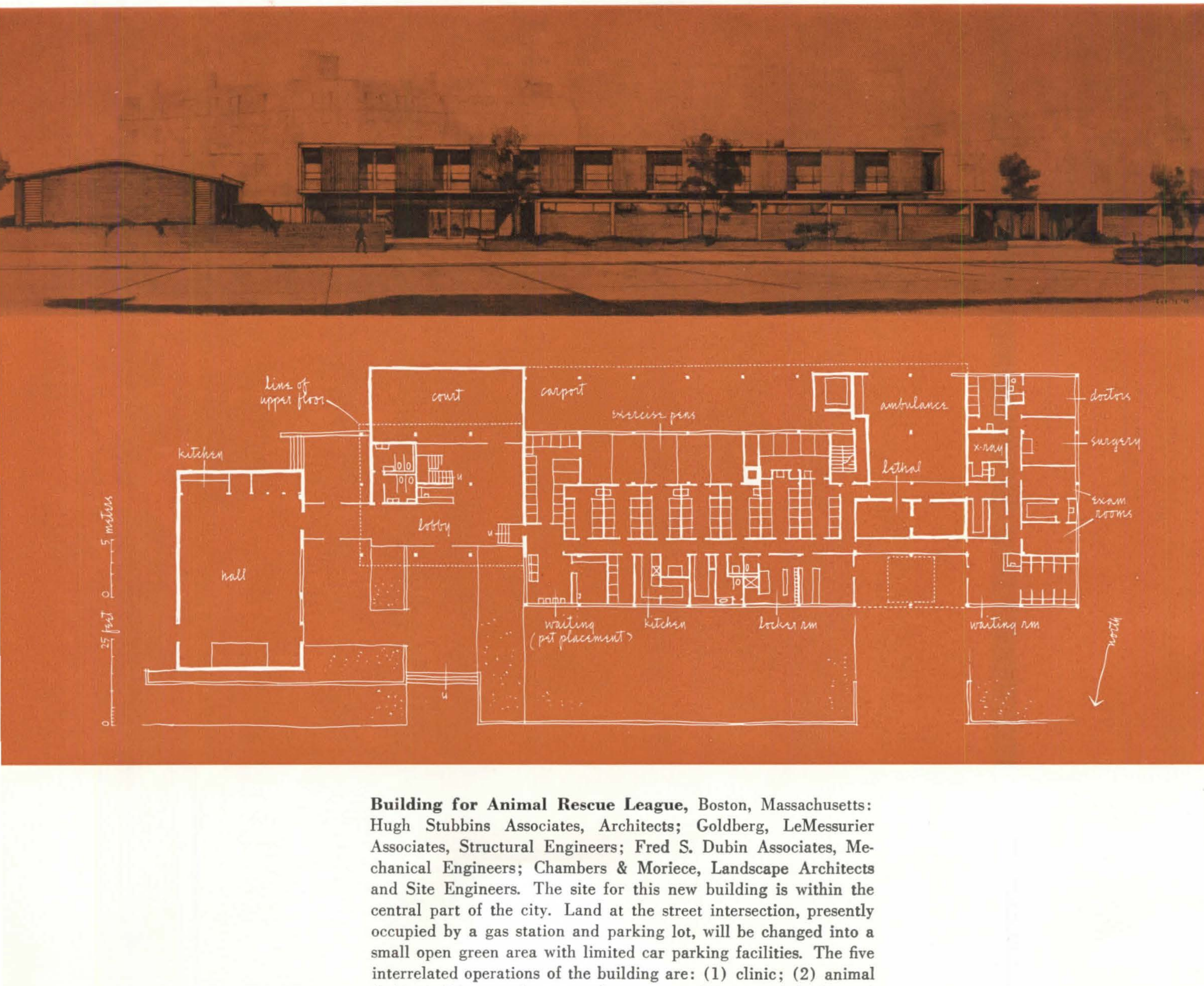
Santa Barbara College of the University of California, Goleta, California: Pereira & Luckman, Supervising Architects-Engineers for the College, and Executive Architects for Residence Hall, Music Classroom Building, Greenhouse, Lathhouse, Animal Shelter, Student Union, and Dining Commons; Eric Armstrong, Landscape Architect; Dr. Vern O. Knudsen, Acoustic Consultant for Music Building. Half of the 3500 students will reside on this new 480-acre campus, which fronts on the ocean and extends to the Santa Inez Mountains. Individual buildings have been planned around patios and will have open circulation, reminiscent of early California architecture yet indicative of current trends. Basic building material, tying all new construction together, will be a cinnamon-colored building block of volcanic ash, lightweight and of high insulative value.



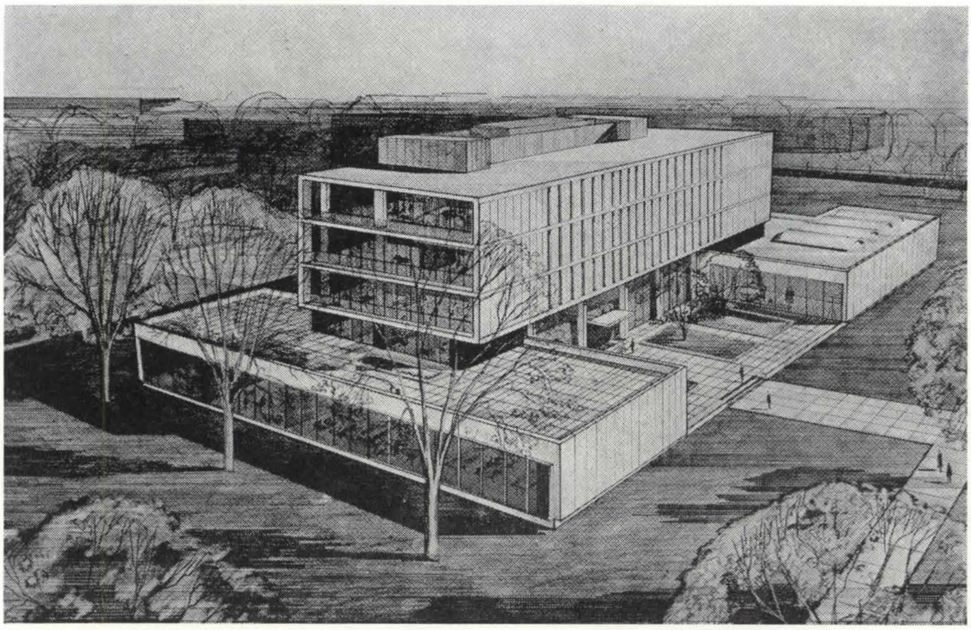


public use:

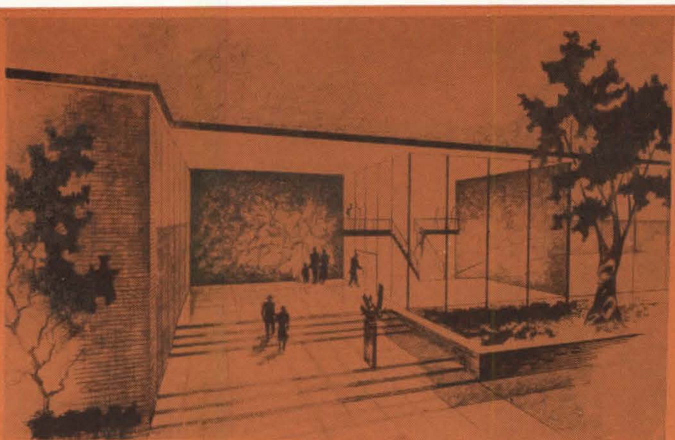
Award Citations



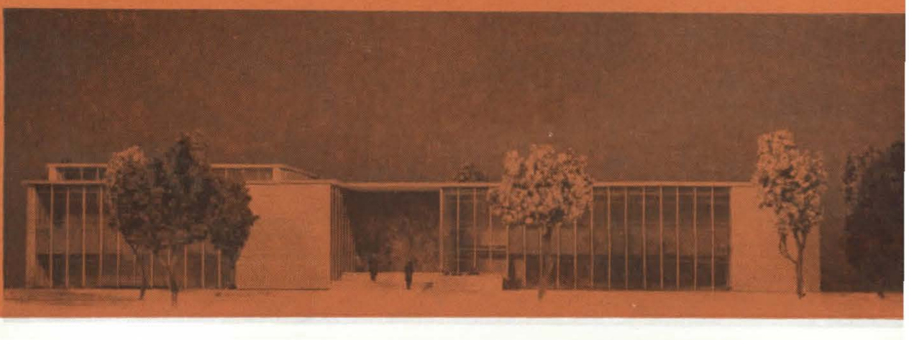
Building for Animal Rescue League, Boston, Massachusetts: Hugh Stubbins Associates, Architects; Goldberg, LeMessurier Associates, Structural Engineers; Fred S. Dubin Associates, Mechanical Engineers; Chambers & Moriece, Landscape Architects and Site Engineers. The site for this new building is within the central part of the city. Land at the street intersection, presently occupied by a gas station and parking lot, will be changed into a small open green area with limited car parking facilities. The five interrelated operations of the building are: (1) clinic; (2) animal shelter; (3) pet placement department; (4) central lobby and over-all administration; (5) public relations and lecture hall. The structure will employ concrete foundations on wood piles, reinforced concrete frame, floors, and roof. Curtain walls will be of brick and glass. The building is to be completely air conditioned.



State Library Building, Baton Rouge, Louisiana: William R. Burk and John J. Desmond, Associated Architects; C. M. Mohrhardt and Ralph A. Ulveling, Consultants; Weil & Moses, Mechanical Engineers; Louis Goodman, Electrical Engineer. This new building, to be situated on the State Capitol Grounds, will be a book distribution center for a statewide system and secondarily function as information center for state capitol personnel and public. Main reading room and administrative area will have view of state capitol and grounds, and optimum light to the north. The structure will be a concrete frame with concrete joists 5 ft o.c., left exposed and painted or used as light troughs. Exterior facing will be white marble.



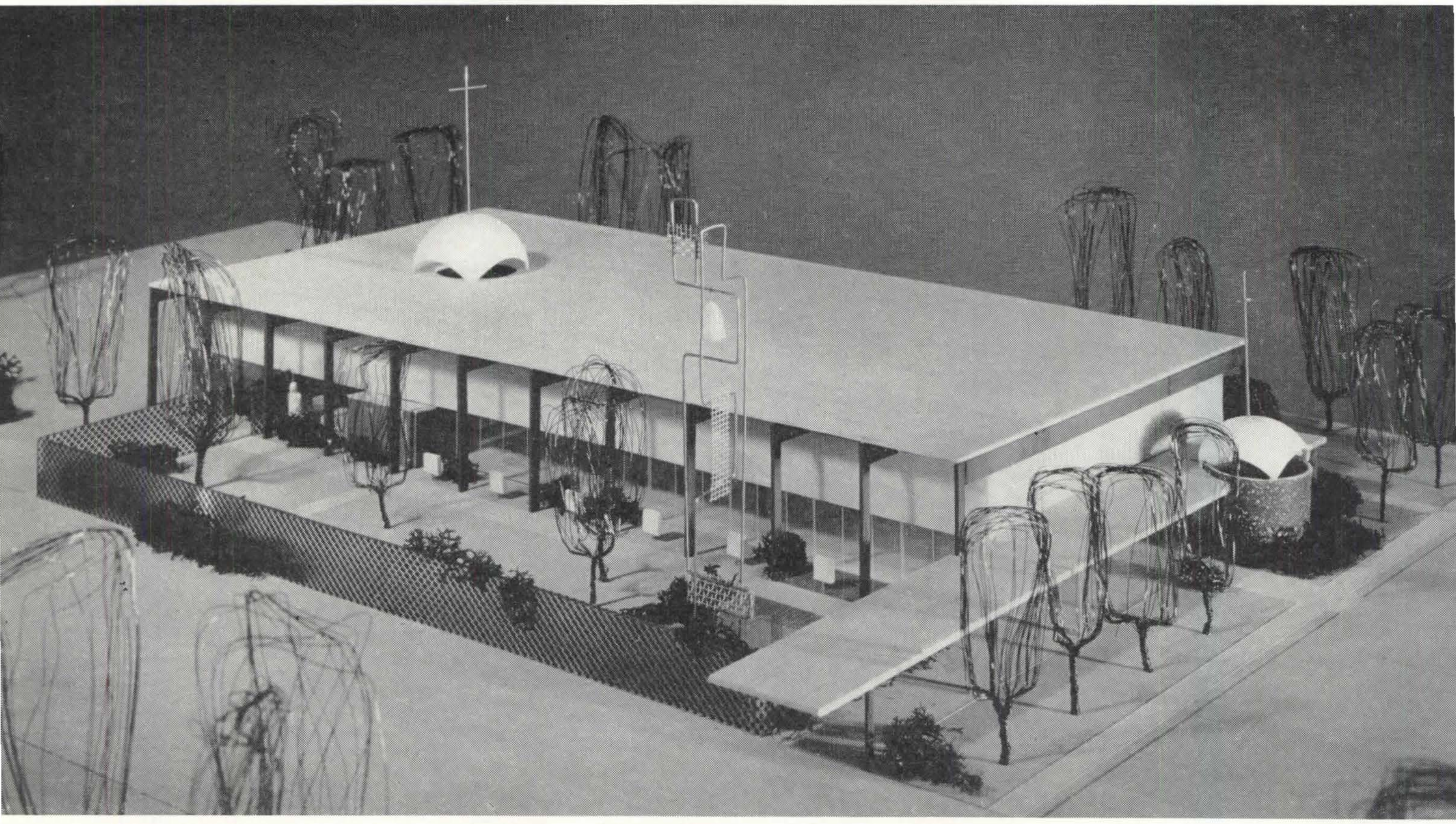
Gilliam County Courthouse, Condon, Oregon: Morrison & Howard and Wesley V. Korman, Associated Architects; John W. Merryman, Mechanical Engineer; Francis Landrum, Structural Engineer. This new building will replace one destroyed by fire. Major requirements were: fireproof construction, use of existing excavation, allowance for future extension to the office wing or for another building to the north with connecting corridor. "Because the Circuit Court meets only twice yearly," write the architects, "it was felt that the court room and adjoining jury room should also serve for community functions." The structural frame will be of reinforced concrete. Exterior walls will be brick; marble at entry hall. Spandrels and window frames are to be of aluminum.



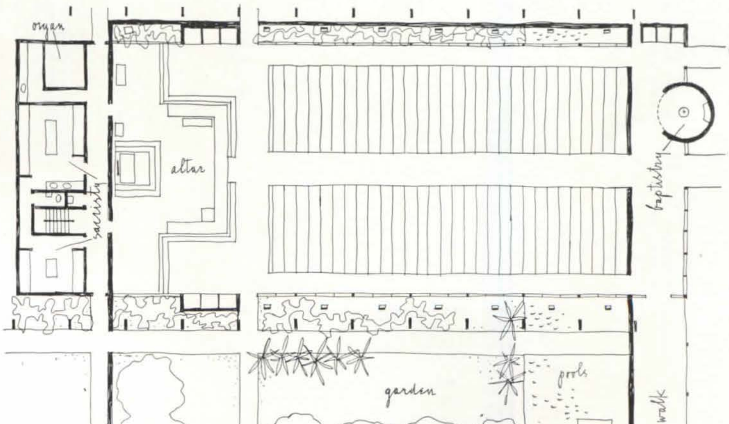
religion:

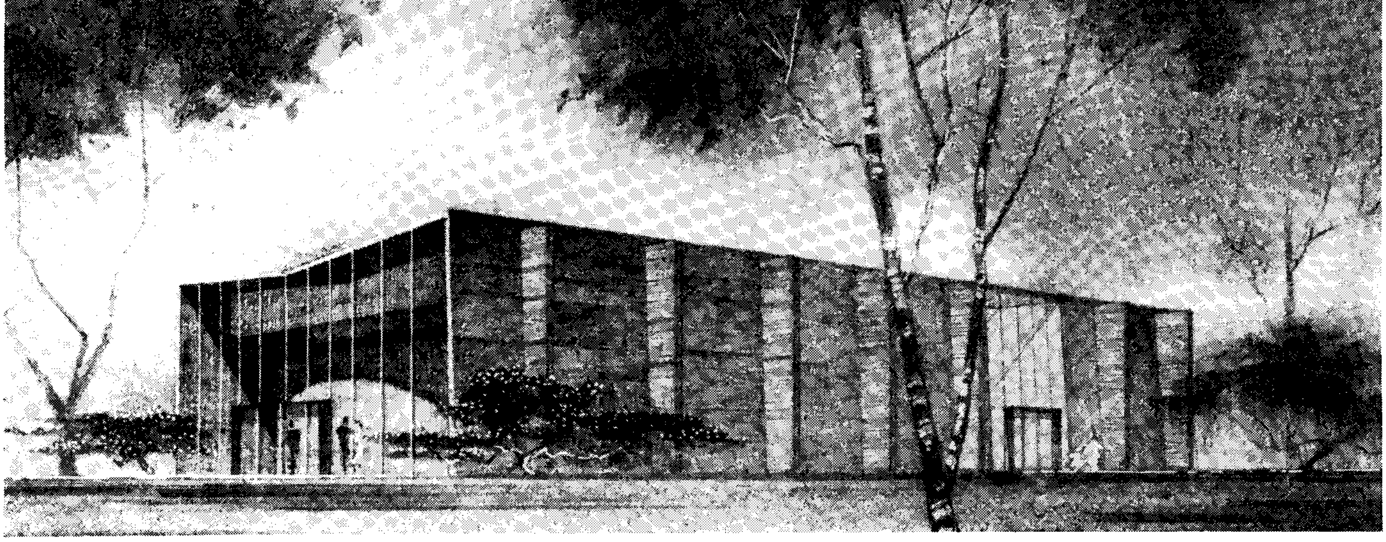
Award Citations

Immaculate Conception Church, Marrero, Louisiana: Curtis & Davis, Architects-Engineers and Harrison Schouest, Architect, Associated Architects; Walter J. Rooney, Jr., Associate-in-Charge. This new church for 800 parishioners will replace an outdated

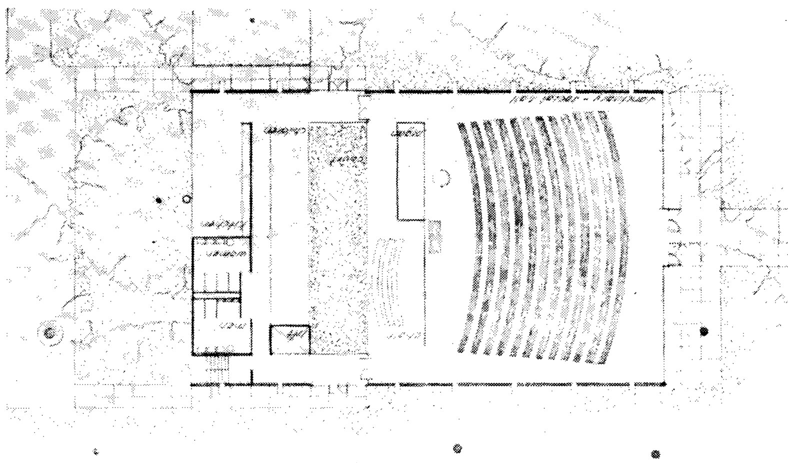


frame structure located in a residential district. To relate the new church to the surrounding houses the ceiling height was kept to a minimum. However, to promote a feeling of spaciousness, a wall of glass was introduced permitting a view into a secluded garden. A decorative masonry wall, 8 ft high, will completely surround church and courtyard. The building will be of steel, marble and glass. Basic structure will be a steel frame.

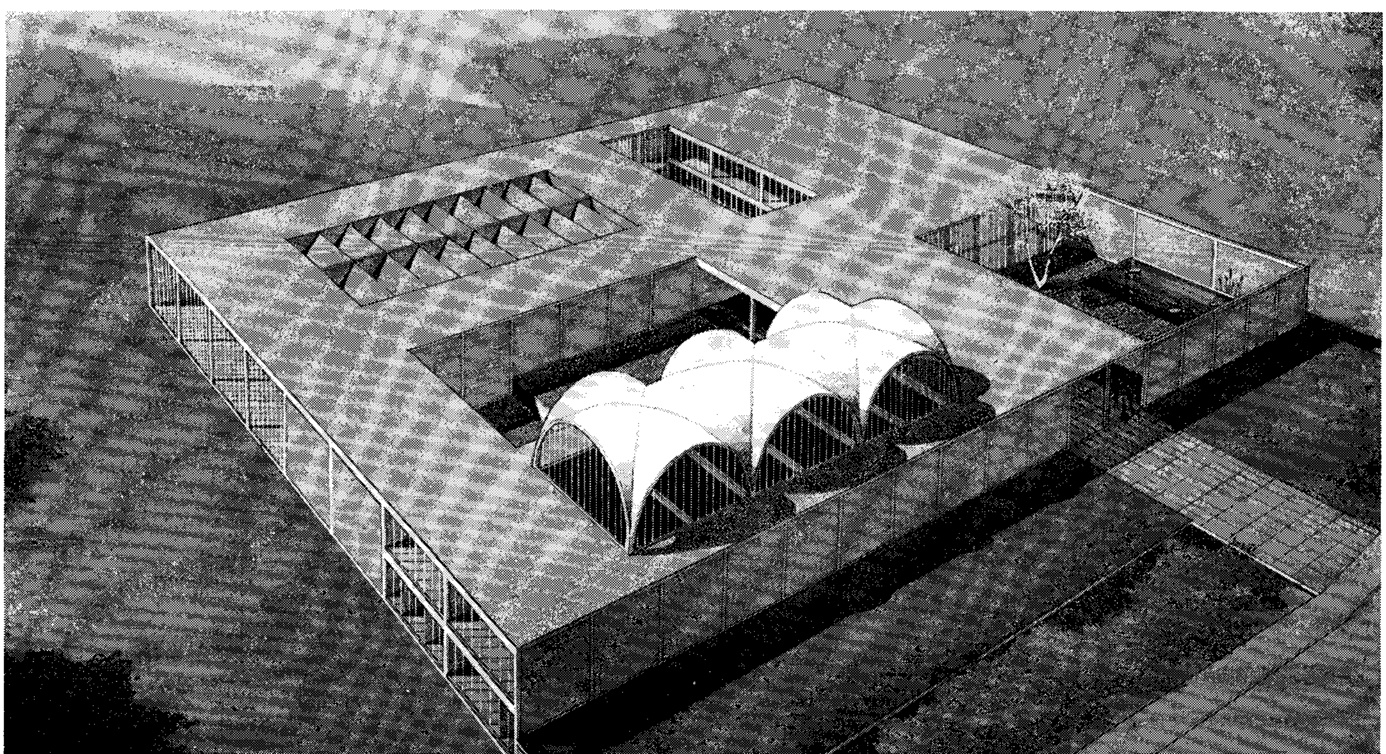




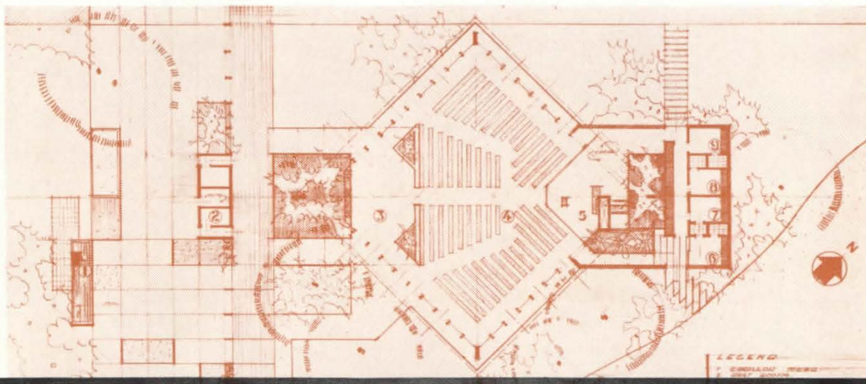
Evanston Unitarian Church, Evanston, Illinois: Schweikher, Elting and Bennett, Associated Architects. Main sanctuary and facilities for social activities and administration will be included in the initial construction program of this church. The sanctuary has been designed level, with auditorium chairs removable for social functions. The long gallery in the administration section facing the interior court is to be used as a nursery during church services. Construction will be of precast, tilt-up concrete bents. Tilt-up wall panels will be supported between these members.



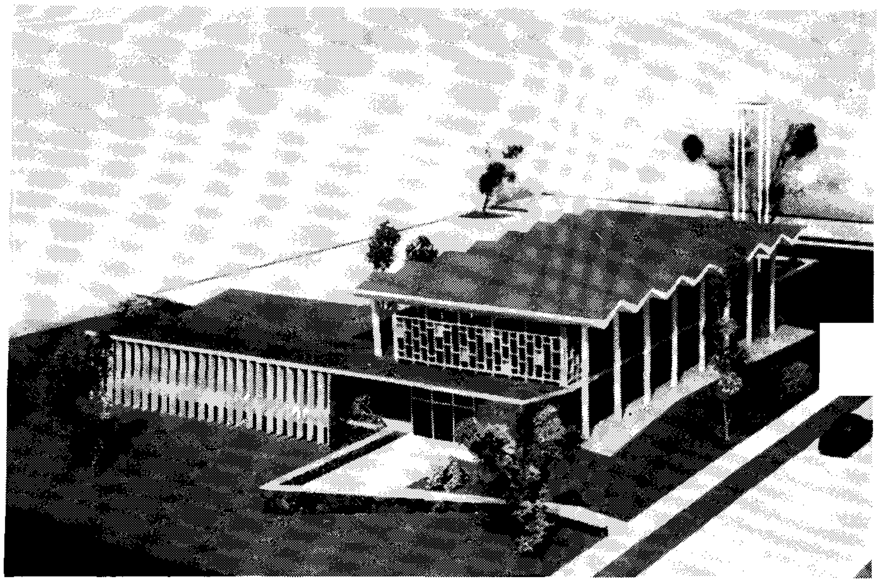
Grace Lutheran Church, Teaneck, New Jersey: Paul Schweikher, Architect; Henry A. Pfisterer, Consulting Engineer; Fred Dubin, Associates, Mechanical Engineers. Contained within one large walled enclosure measuring approximately 52,000 sq ft will be a main sanctuary, a smaller chapel, and a school with gymnasium and cafeteria. Courtyards separate the various elements and provide interior vistas reminiscent of the cloister gardens in medieval monasteries. The structural system is to be an exposed concrete frame with curtain walls of masonry, with glass or metal panels between the columns. The vaulting over the main sanctuary is to be of concrete.

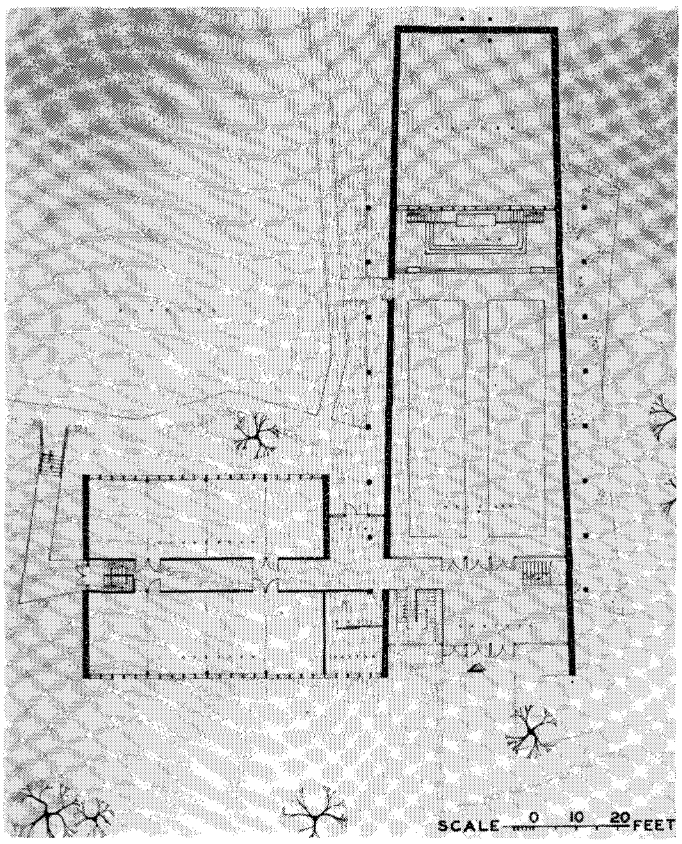


Award Citations

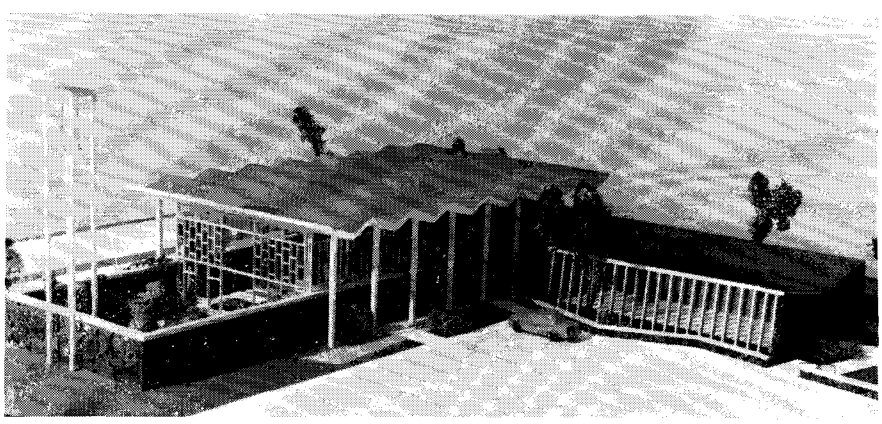


St. Matthew's Episcopal Church and Parish School, Pacific Palisades, California: A. Quincy Jones & Frederick E. Emmons, Architects; Emiel Becsky, Associate; Richard Bradshaw, Structural Engineer; Morton Shields, Mechanical Engineer; Evans & Reeves, Landscape Architects. A 40-acre farm is gradually being developed as a religious and educational center for the parish. "To the southeast," write the architects, "is the site for the new church. The major roof structure is a light steel frame. Two triangular roof elements abut at a ridge with the apex terminating in concrete piers at the ground and with the ridge ends linked to the ground with light tension members. Glass, both clear and colored, will fill the major portion of the open sides." Other structures to be built soon will be a parish hall, a high school, and housing for headmaster, rector, and others.





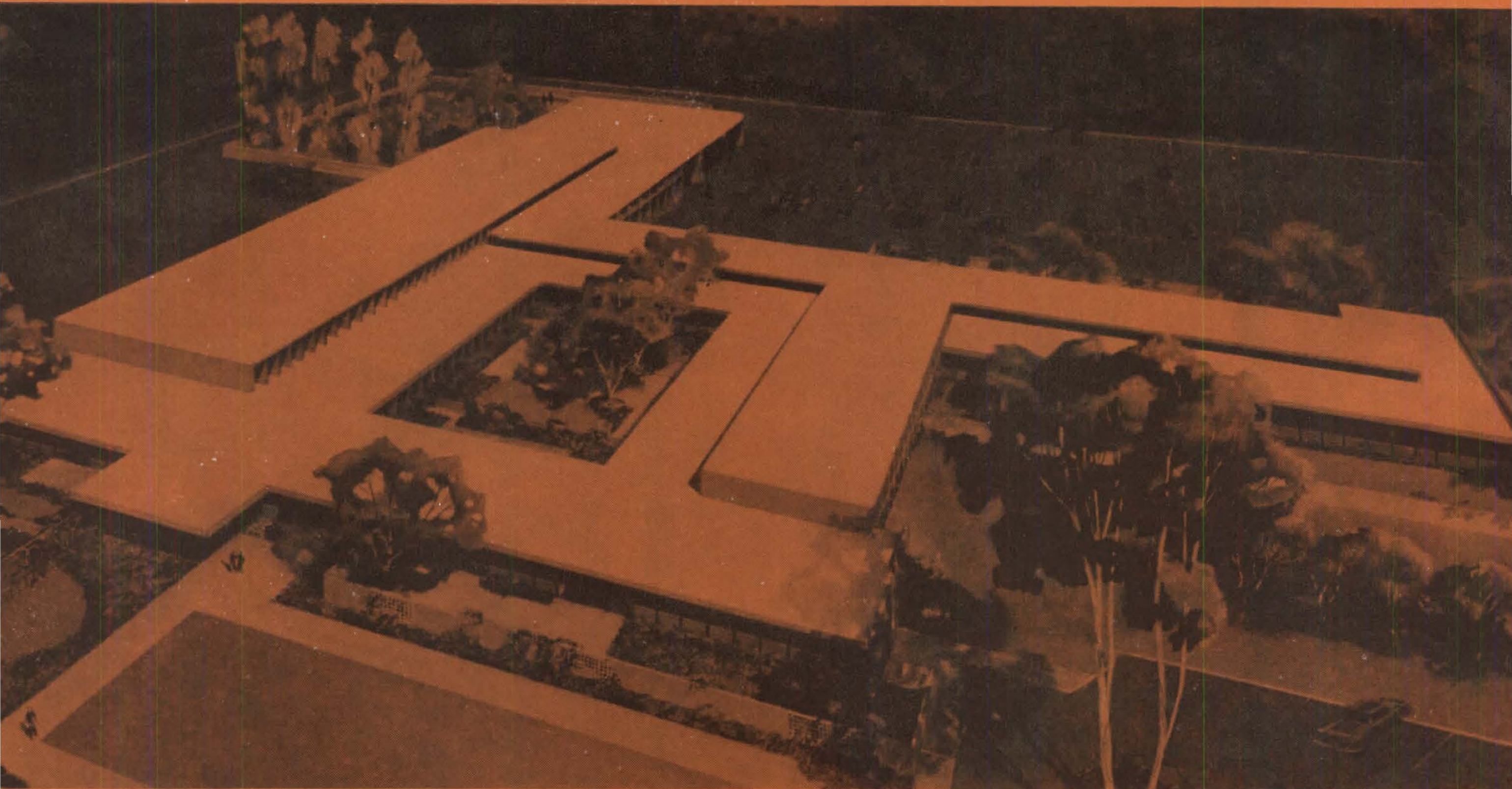
First Lutheran Church, Virginia, Minnesota: Jyring & Whiteman, Architects; L. E. Stegner, Designer; E. M. Peterson, Consulting Engineer; Axel Johnson, Structural Engineer. Situated in the center of the city, this church will seat approximately 400 persons. Room will also be provided for 250 Sunday school pupils and kitchen and dining facilities. Controlling factor in the orientation of the church was the placement of a walled garden to the north of the sanctuary, as it was felt that flowers and plants would be a most appropriate background for the altar. Draperies at the window wall between nave and garden will control the desired amount of light and vary the setting for the altar. Field stone will be used for garden and lower part of the church wall; reinforced concrete for roof. Window walls will have redwood frames double-glazed with colored and clear glass, or insulated opaque panels and clear glass.



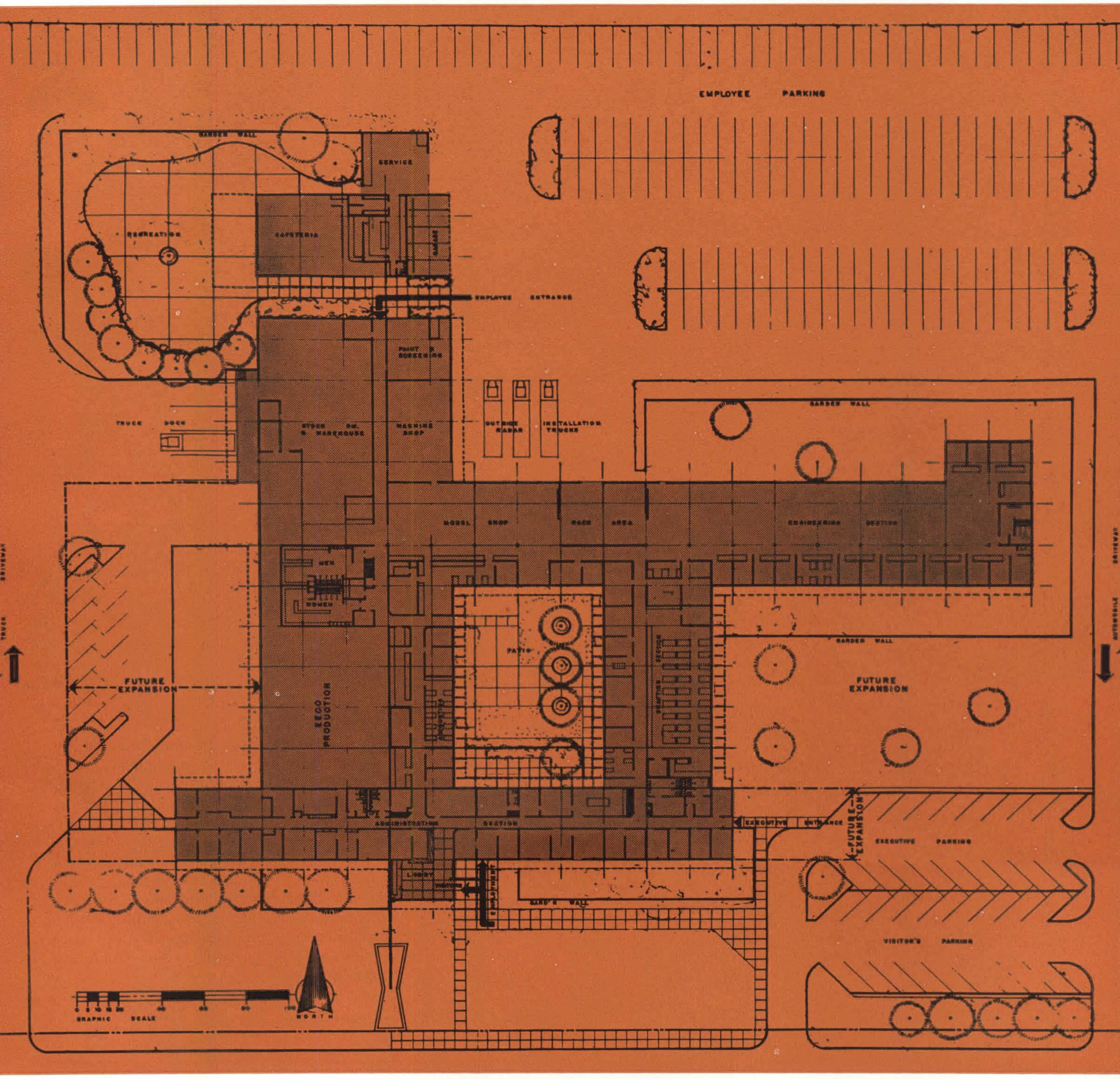
industry:

Design Award

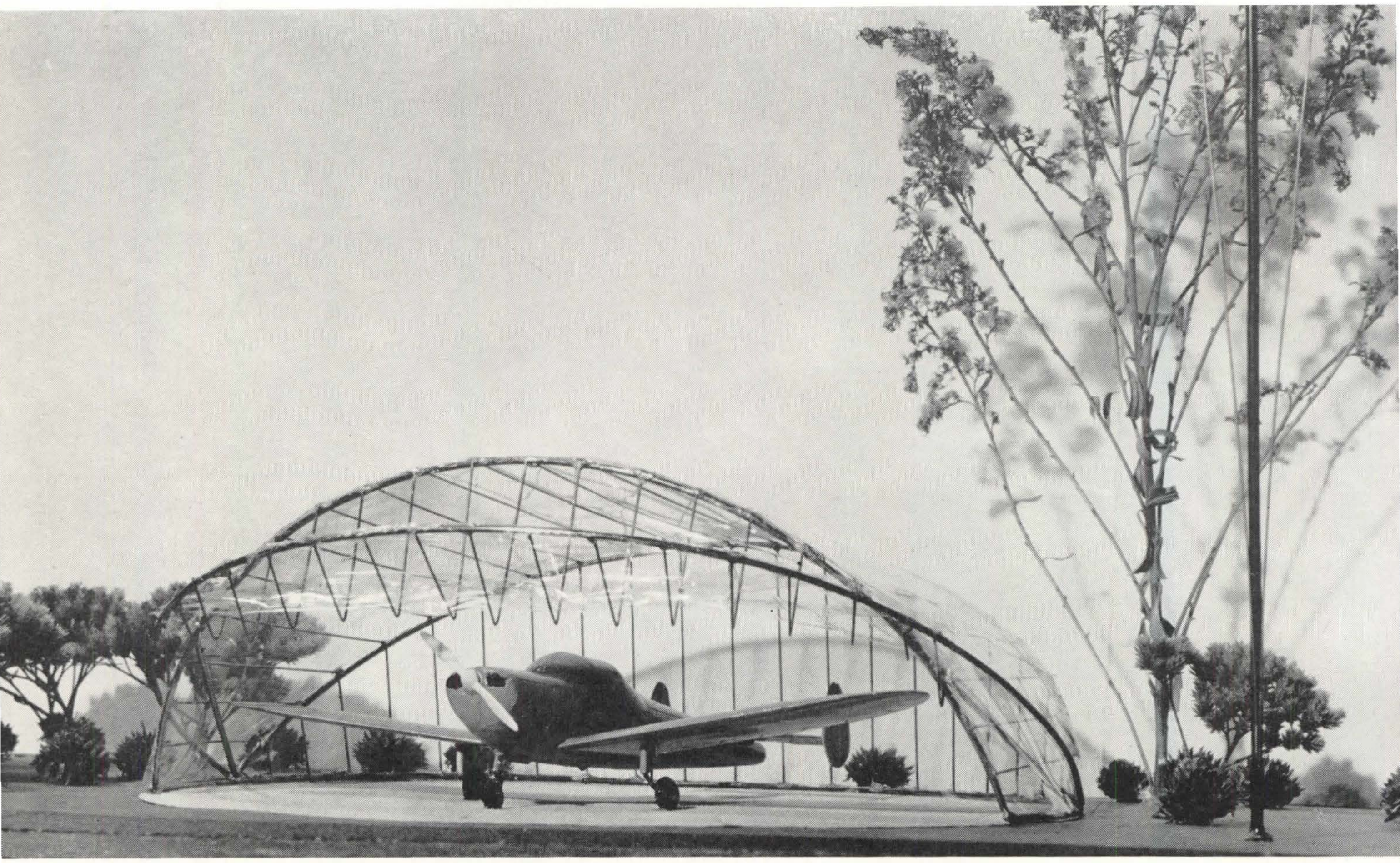
Electronics Plant for the Electronic Engineering Co. of California, Santa Ana, California: George Vernon Russell & Associates, Architects-Engineers; George B. Clapp, Mechanical Engineer; Don Clough, Electrical Engineer. The client is engaged in research, development, and custom production of electronic equipment for defense work and private industry. Management wanted the best possible working conditons for their highly trained and skilled personnel. "Our design," write the architects, "is the result of

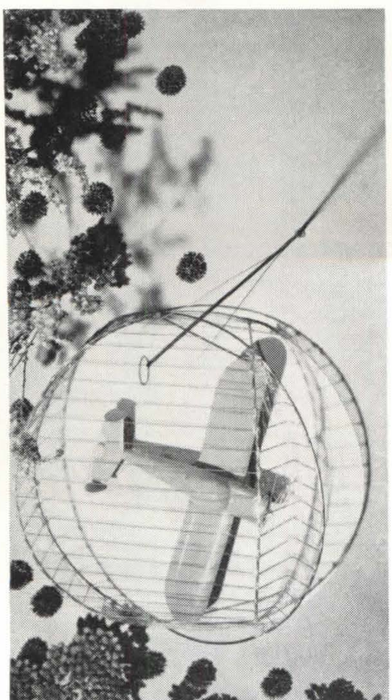


our own evaluation of our client's particular patterns of operation now in evidence and our enthusiastic agreement with the management that good environment is a contributing factor to man's thought processes." Offices will open onto gardens enclosed with screen walls for security and for protection from street noises and other distractions. A pleasant recreation patio and cafeteria for the use of the employes will be located at the north end of the property. The basic structure will be a steel frame. To simplify future expansion precast concrete panels at the west wall will be movable. Other wall materials are to be porcelain-enamel panels and glass.

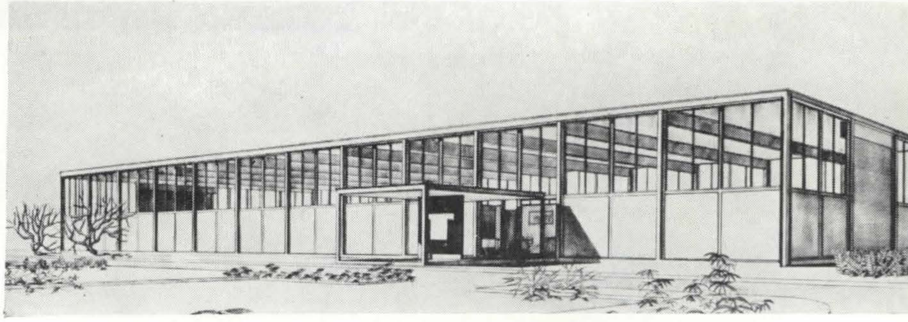

EMPLOYEE PARKING
GARDEN WALL
SERVICE
RECREATION
CAFETERIA
EMPLOYEE ENTRANCE
PAINT & SCREENING
TRUCK DOCK
STOCK RM. & WAREHOUSE
MACHINE SHOP
OUTSIDE RADAR
INSTALLATION TRUCKS
MODEL SHOP
RACK AREA
ENGINEERING SECTION
MEN
WOMEN
PATIO
FUTURE EXPANSION
EECO PRODUCTION
ADMINISTRATION SECTION
EXECUTIVE ENTRANCE
EXECUTIVE PARKING
LOBBY
VISITORS
VISITOR'S PARKING
GRAPHIC SCALE
NORTH

Award Citations

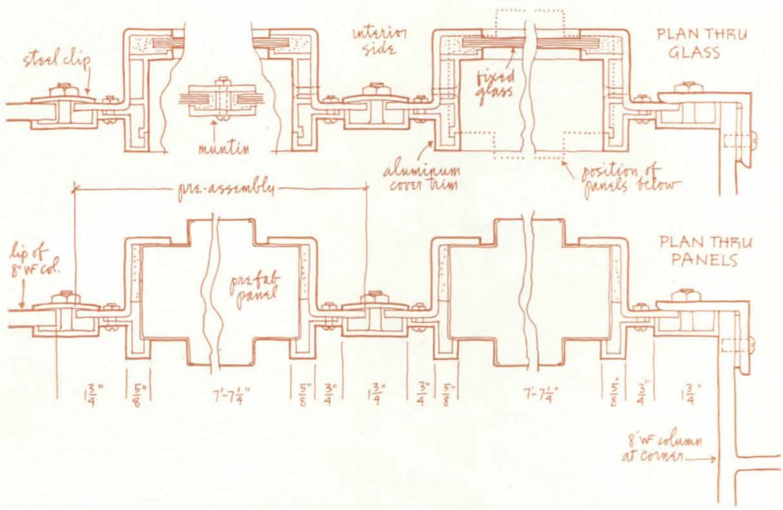




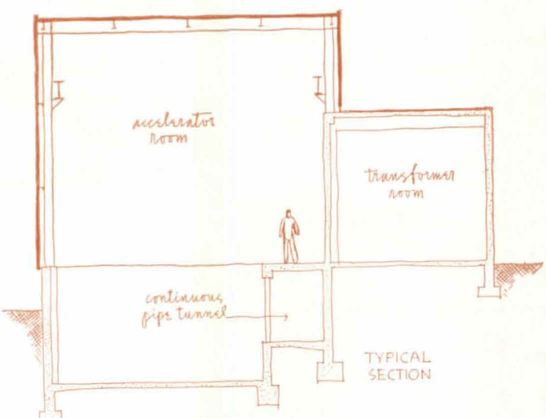
Prototype Aircraft Hangar: Richard T. Acott, Designer. This structure was designed primarily to protect aircraft but it will undoubtedly have many other uses as a shelter building. Fixed and hinged arches will be of cold-rolled steel held in place by tension cables. A lightweight plastic will cover the steel members and be tied to the cables to prevent "wind slap." The stationary horizontal arch will be anchored to steel-fence stacks driven into the ground. By hinging the front horizontal arch off center, as shown in diagram, the required wide opening was made possible while still preserving the balance of the structure. Due to the angular position of the major arches the cross section has resulted in a flat arch, thus effecting a saving of space over the usual dome construction. The demountable shelter will be sold in kit form for approximately $1000 per unit.

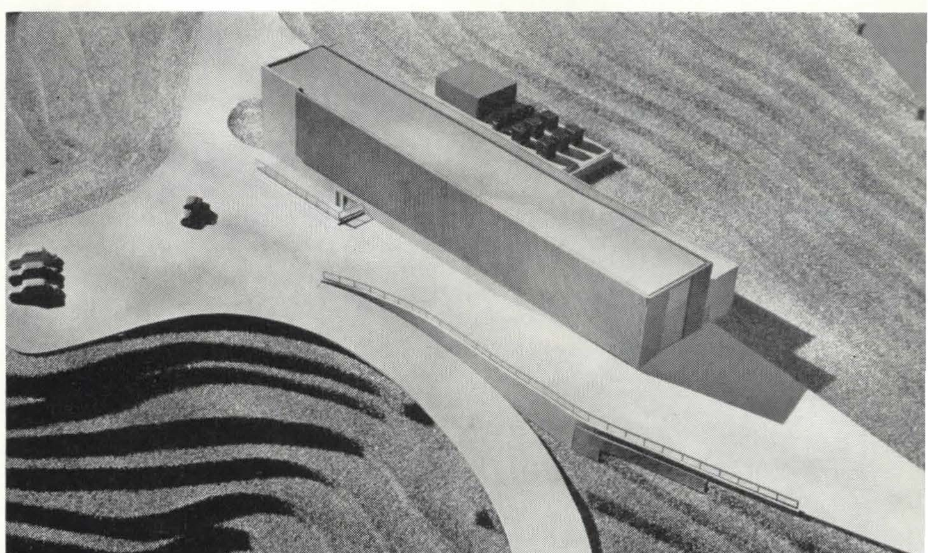


Factory for Tecfab, Inc., Beltsville, Maryland: Charles M. Goodman Associates, Architects-Engineers; Milton A. Gurewitz, Associate, Structural Engineer. This factory will be engaged in the production of prefabricated wall panel systems as well as the manufacture of household appliances. Designed as a showcase for the company's panel system the plant will also demonstrate the great flexibility of this system. "All exterior walls," write the architects, "have been designed for 100 percent reuse as factory expands. Company production men established a clear span of 50 ft as the most desirable for their operational program. All glass to be sealed with positive ventilation through roof systems."



Heavy Ion Accelerator Building for Atomic Energy Commission, Radiation Laboratory, University of California, Berkeley, California: Corlett & Spackman, Architects; Russel Stechschulte, Project Captain; John M. Sardis, Structural Engineer; James Gayner, Mechanical Engineer; Edward Morgan, Electrical Engineer. To house a heavy ion accelerator, its controls, component parts, and servicing facilities, the architects have designed a steel-framed building utilizing concrete walls where electronic shielding is necessary, and corrugated steel siding in nonexposed portions of the building. Access into the new building is from two levels of the steep hill site. Future expansion has been foreseen and allowance made for conveying large equipment. Colors, shades of green and orange, have been chosen to blend with existing university buildings.



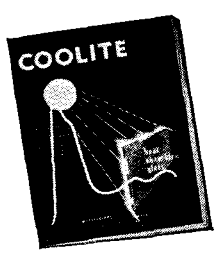


Western Electric Company and Pacific Telephone and Telegraph Company Building, San Leandro, California.
Harry A. Thomsen & Aleck L. Wilson, Architects • Swinerton & Walberg Co., Contractor • East Bay Glass Company, Glazier

Coolite Glass Keeps Production in Better Sight in New California Supplies Center of Pacific Telephone and Western Electric

Mississippi's Coolite wire glass, used in this modern plant, keeps work areas and offices literally loaded with daylight . . . provides plenty of conditioned, natural illumination for easier seeing, greater comfort and added safety. For Coolite, Heat Absorbing, Glare Reducing glass permits use of vast areas of glass without distracting, discomforting glare . . . absorbs up to 50% of solar heat rays to eliminate unwanted heat. The attractive Luxlite pattern diffuses softened daylight deep into interiors, avoids harsh shadows and sharp contrasts. Workers see better, feel better, work better in Coolite-conditioned daylighting. Brighten your production picture with Coolite. When you build or remodel your facilities, consider Coolite. Find out how Coolite, Heat Absorbing, Glare Reducing glass can keep costs down, boost employee efficiency, lighten load on humidification and air conditioning equipment.

Translucent, light diffusing glass by Mississippi is available in a wide variety of patterns and surface finishes, wired and unwired, all "visioneered" to meet any daylighting requirement. Available through leading distributors of quality glass everywhere.



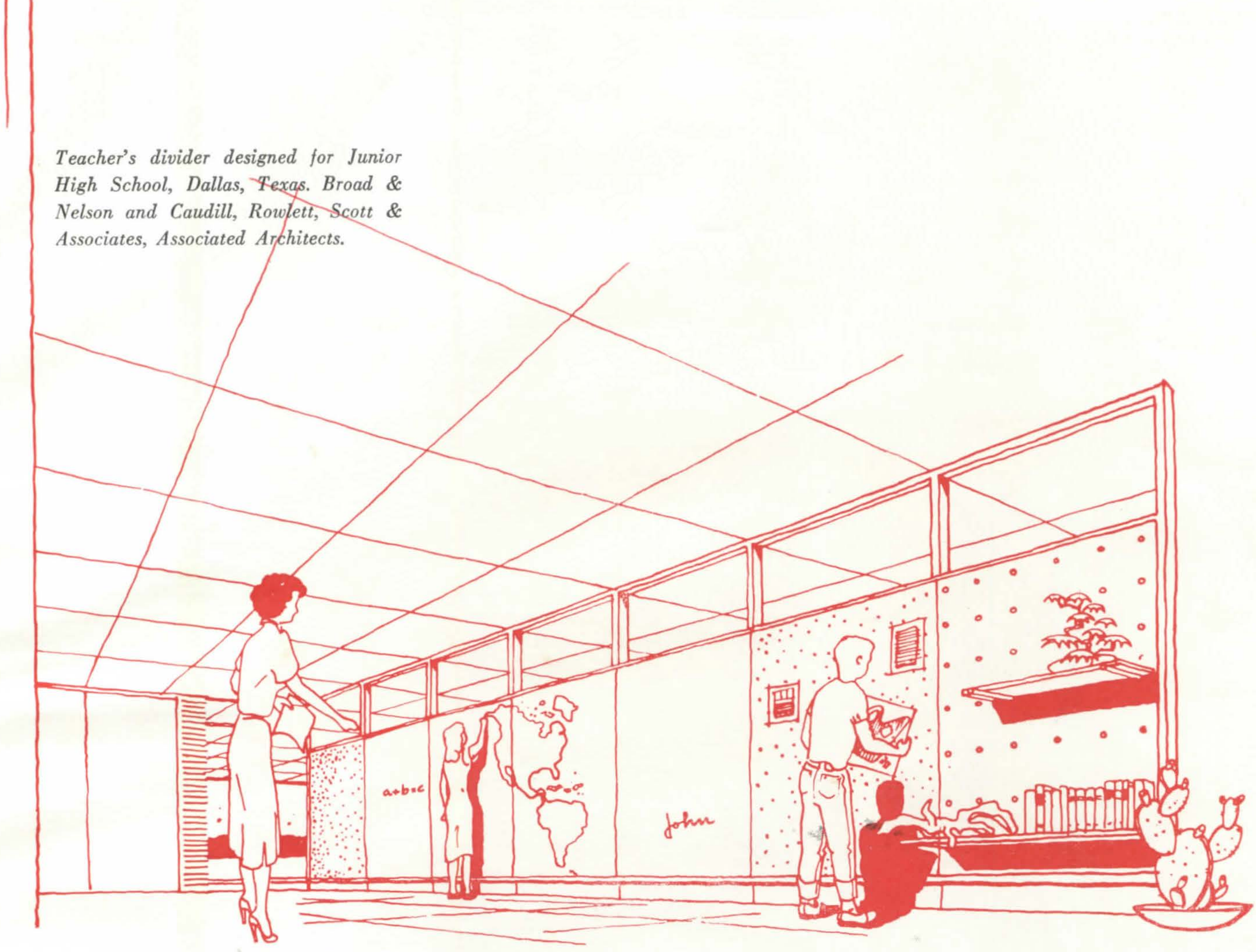
Write for free catalog.
Address Dept. 8.

see our catalog in Sweet's or write for copy

MISSISSIPPI Glass COMPANY

88 ANGELICA ST. SAINT LOUIS 7, MO.
NEW YORK • CHICAGO FULLERTON, CALIFORNIA

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS



Teacher's divider designed for Junior High School, Dallas, Texas. Broad & Nelson and Caudill, Rowlett, Scott & Associates, Associated Architects.

Louise Sloane

projects for 1956

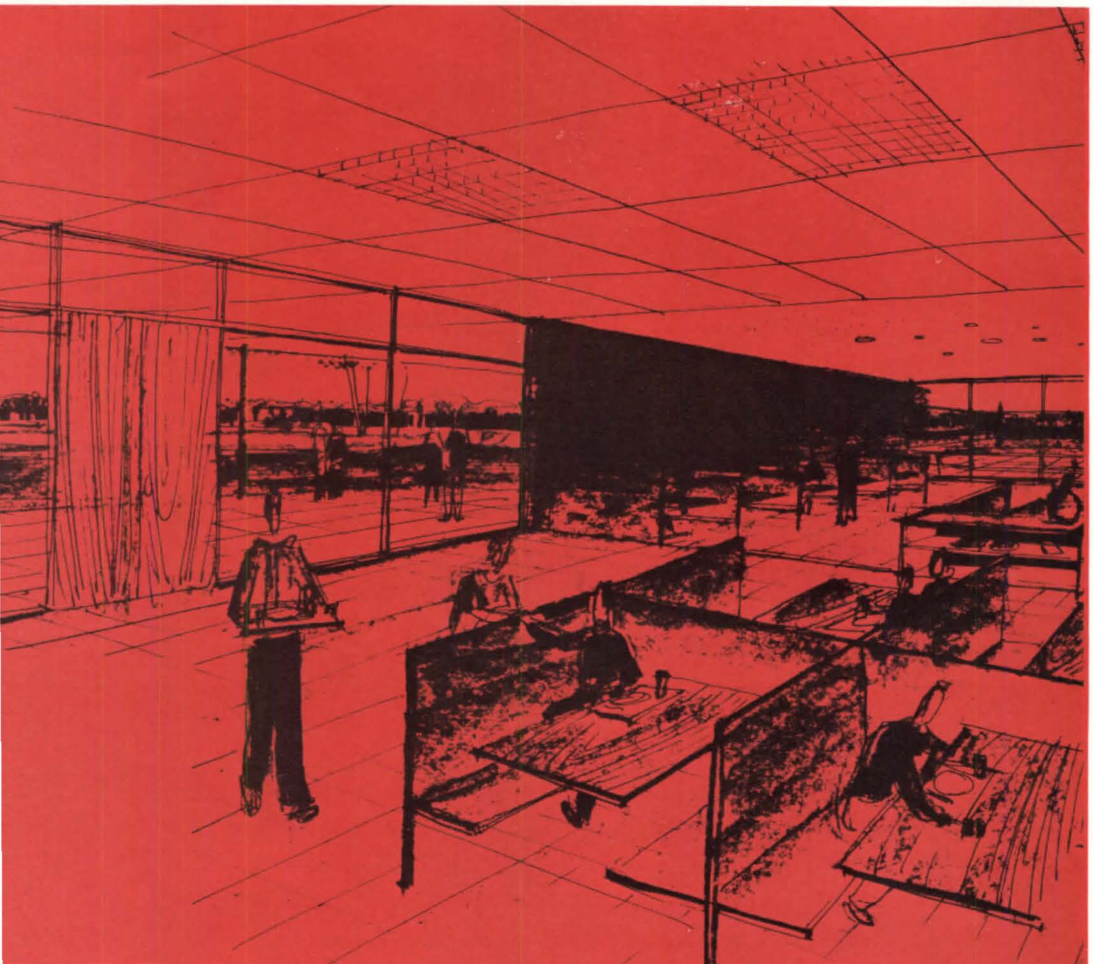
From this year's winners of P/A Design Awards and Citations, we show you interiors of a junior high school, an elementary school, a church, and a motel. We feel that these particular examples show thoughtful, commendable concern for the completion of a work of architecture. The same careful attention was accorded to the interiors as to the buildings themselves.

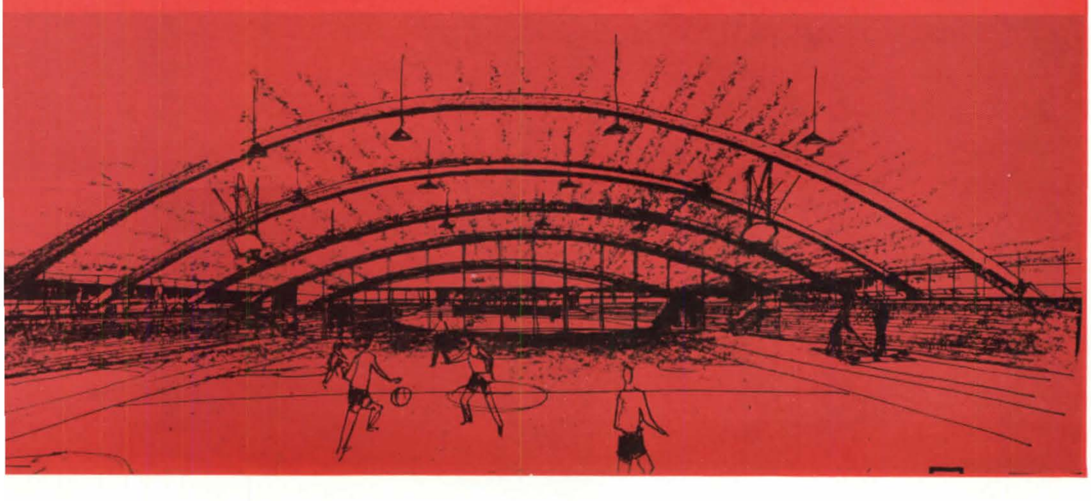
Because of the marked upturn in quantity and quality of interior design by architects, P/A initiated an Interiors category this year on the annual Awards Program and offered a separate Design Award. It was decided by the Jury, after viewing the limited number of submissions in this category, to withhold the Design Award. But the category has been established and architects will again be invited to submit their interior designs in our next annual Awards Program.

Representative of the increasing importance of this field of design, you will find in the projects shown on following pages some brilliant solutions of storage problems, great sensitivity to the colors and textures of interior surfacing materials, and—most characteristic of the architect at his best in interior design—acute consciousness of the human purposes intended for each area.

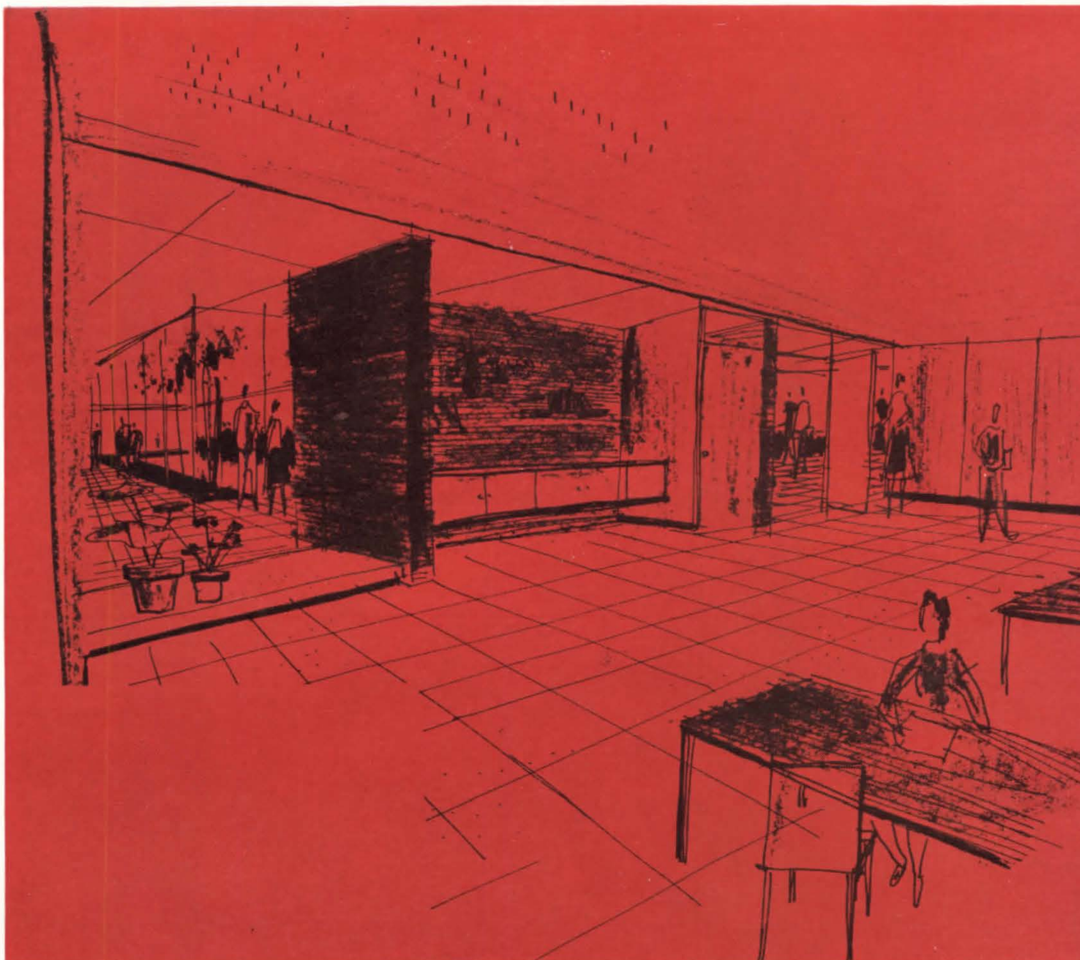
projects for 1956

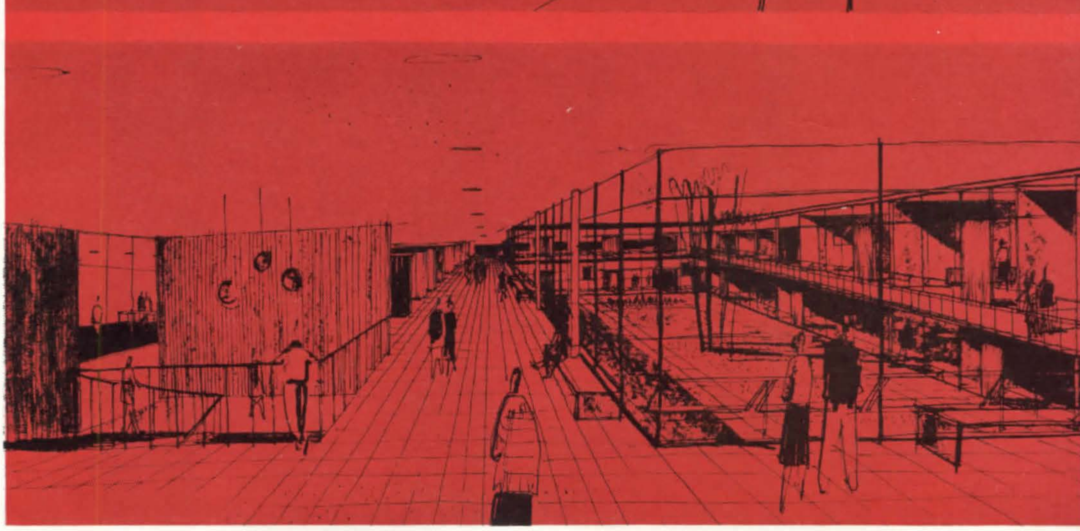
project	junior high school
location	Dallas, Texas
associated architects	Broad & Nelson and Caudill, Rowlett, Scott & Associates
landscape architect	Robert F. White





To create a strong relationship between exteriors and interiors, brick cavity walls and marble curtain walls will be exposed throughout. Brick will be further introduced in corridor walls as a warm and friendly, yet durable material. Interior partitions will be nonloadbearing, allowing economical changes in teaching spaces. Generous use of glass will avoid cell-like classrooms. Color environment will be created through natural colors of materials—brick, marble, woods, corkboard, chalkboard, asphalt tile—accented by bright-painted doors.





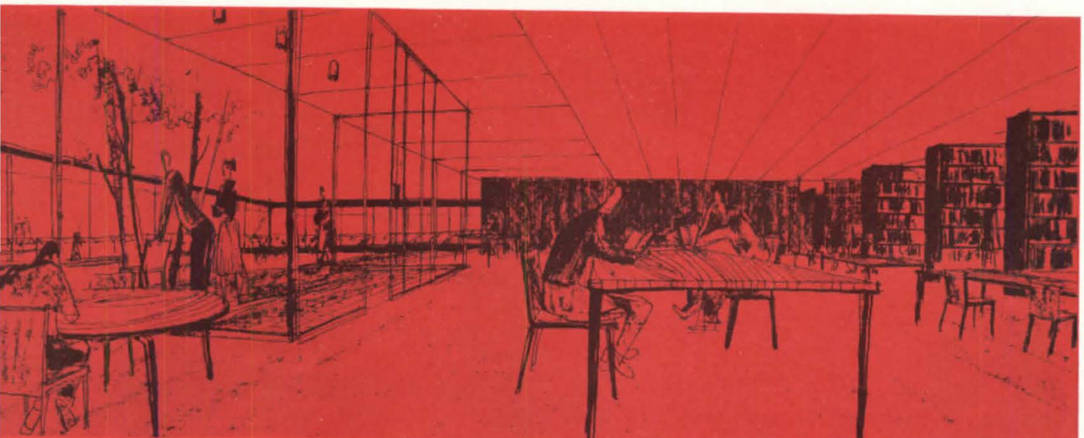
Partitions are to be full-length sheets of chalkboard, corkboard, and dowelboard used directly on wood-stud walls as teaching-space dividers. Some other partitions will employ vertical paneling. Windows will be aluminum-protected or provided with awnings (no shades or blinds required for sun control). Classroom areas will be lighted by silver-bottom lamps over eggcrate ceilings; recessed fixtures being employed elsewhere. Flooring will be asphalt tile on concrete slab except for finished concrete in auditorium and maple in gymnasium. Acoustical tile will be used for ceilings, except in classrooms where (wood) eggcrate ceilings will be sprayed with acoustical materials.

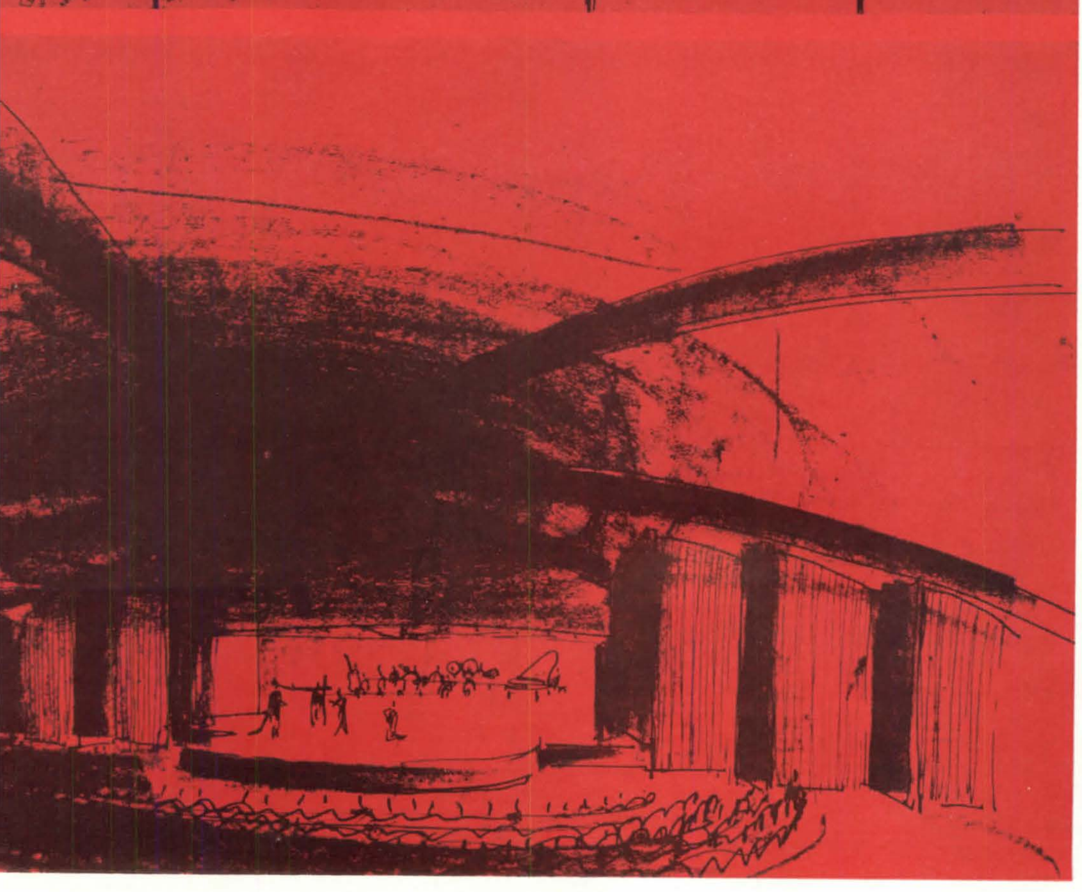
projects for 1956

junior high school

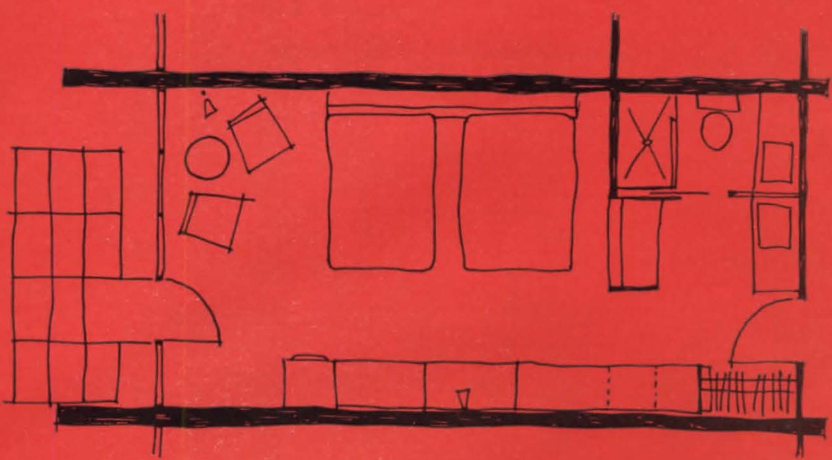
The library (*below*) was designed to be a pleasant work space, opening onto a terrace. Eggcrate ceiling will be used for general lighting; asphalt-tile floor to reduce noise. Vertical wood paneling on far wall will add richness.

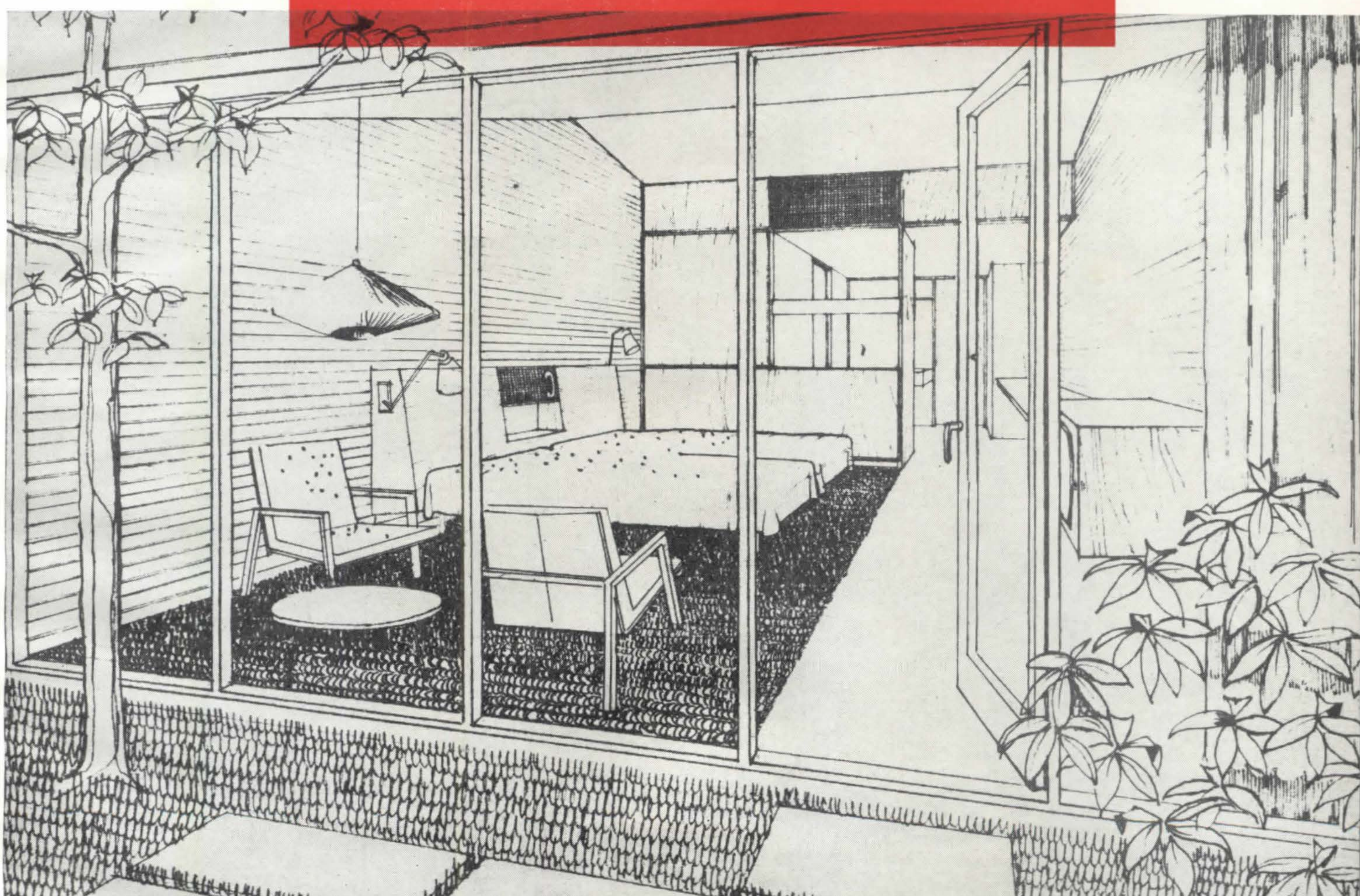
Auditorium (*bottom*) will be tailored to needs of pupils. Pine stage, no puppet platform, will accommodate 200 musicians performing at once. Circular shape will be economical to build.





project	motor lodge
architects	Carl Koch & Associates
associate architect	Frederic L. Day, Jr.
associated architect	Robert G. Edwards
interiors	Contract Interiors

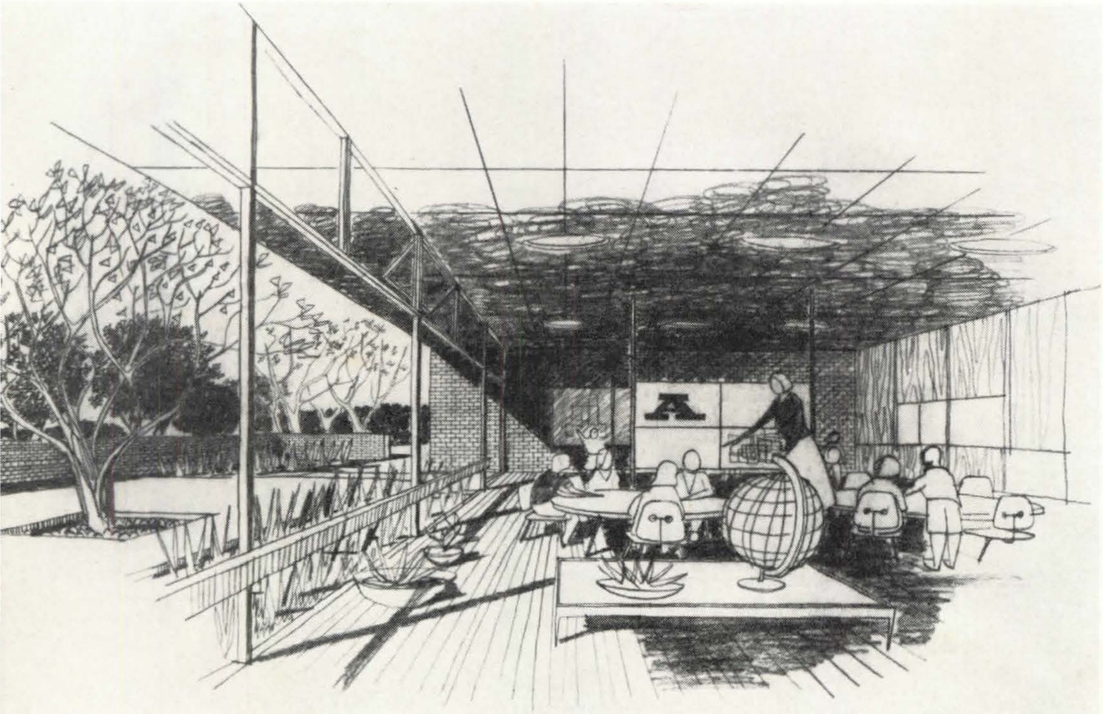


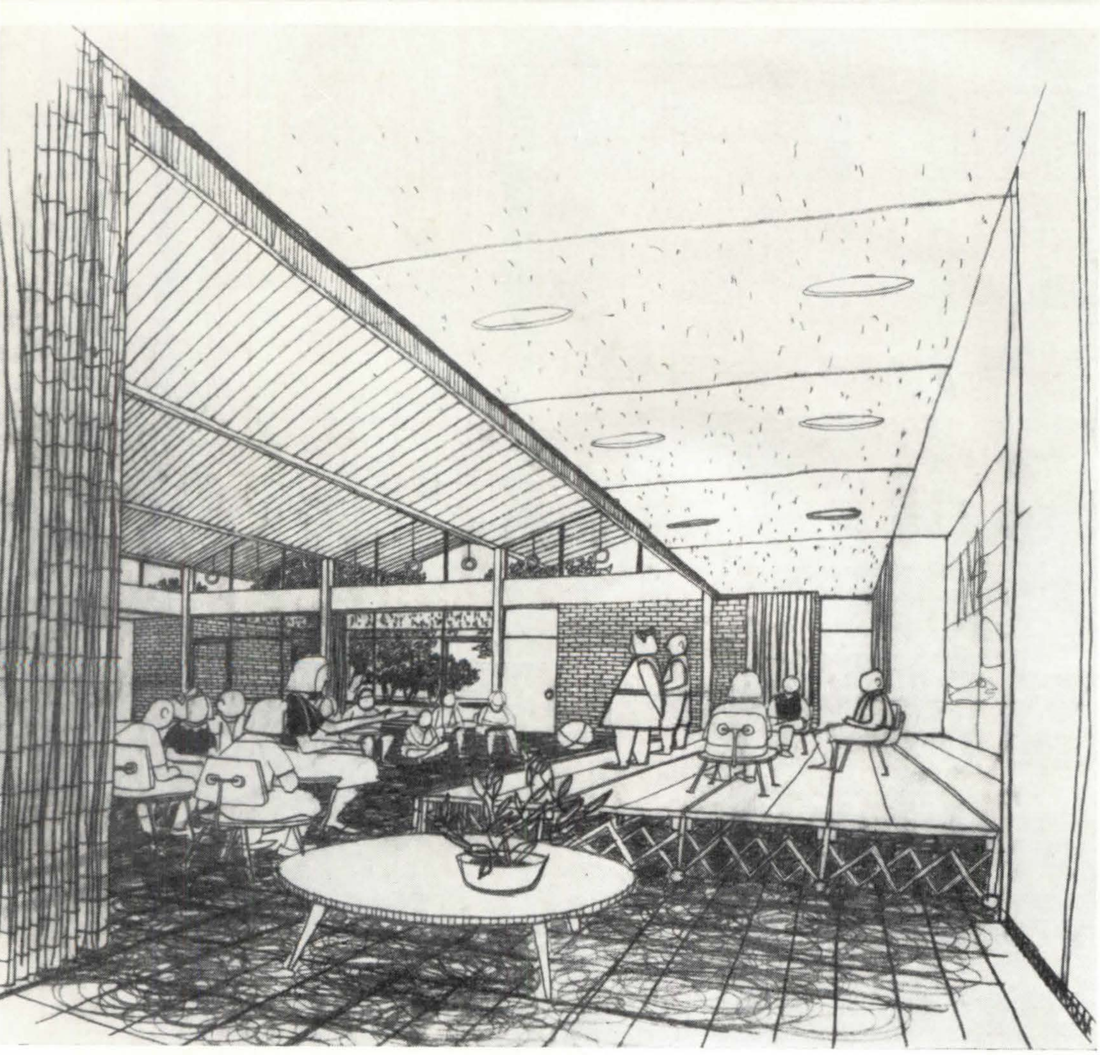


Rental unit designed for comfort and convenience of the motor traveler, with the entering, unpacking, dressing, and bathing facilities located on car side of unit. Luggage racks will be directly inside door, shelving to serve as a room divider with see-through to living and sleeping area and wall-to-wall, floor-to-ceiling window beyond. Woodwork will be natural ash, walls natural brick. Entry floor to be blue vinyl tile; living and sleeping area to be carpeted in brown and gray. Bertoia chairs will have white seats and backs, pads in blue, red, yellow, and black. Bedspreads will be striped in blue-and-black, rust-and-black, and orange-and-black. Curtains will be natural haircloth. Cabinetwork will include a wall-mounted combination desk and luggage unit with protected shelving above, sloping headboard containing telephone and TV control, cabinet for TV.

projects for 1956

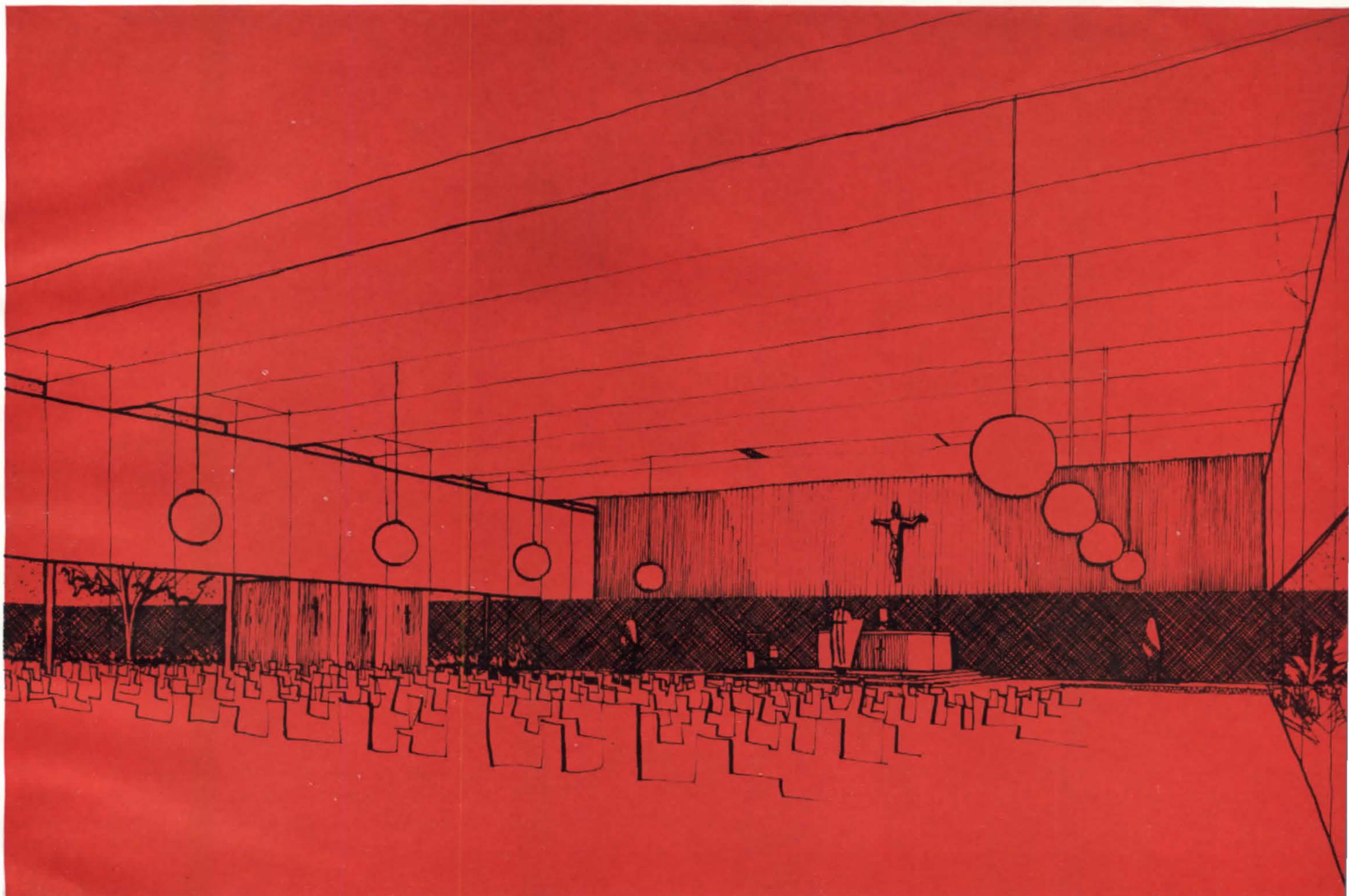
project	elementary school
location	Glen Head, Long Island, New York
architect	Vincent G. Kling
project manager	George Qualls





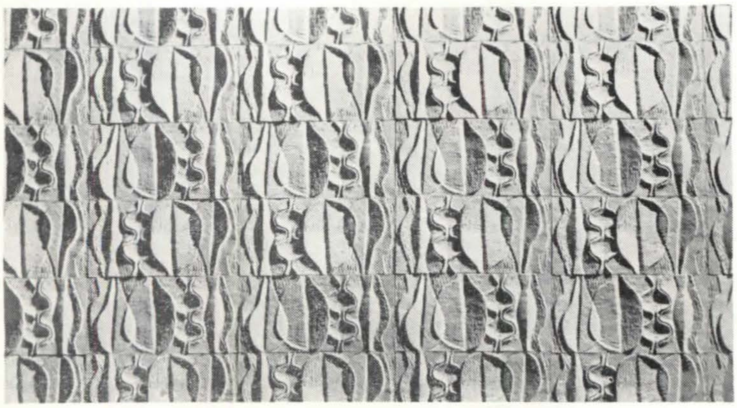
Two classrooms with flexibility their major quality. Brick will be used extensively as interior finish, as well as Fabrikona-on-plywood for tackboards. Floors to be vinyl tile and ceilings of acoustical plaster. Wardrobes and storage cabinets to be of plywood. Free-standing seating, portable stage, and homelike tables will contribute to a relaxed atmosphere. Primary color background will be the light-gray or brown manganese spot of the brick walls.

project	church
location	Marrerro, Louisiana
architects-engineers	Curtis & Davis
architect	Harrison Schouest
associate-in-charge	Walter J. Rooney, Jr.



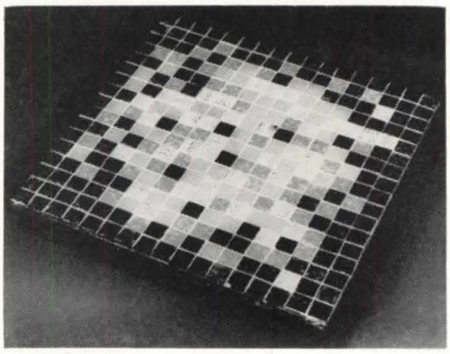
Designed as a spacious, yet protected, area for worship, this church calls for cool colors and natural materials to balance the floods of light through large expanses of glass and the thin, translucent marble slabs that will compose the walls. The terrazzo floors will be a neutral gray and the exposed beamed ceiling will be stained dark gray. Steel columns will be painted a cool blue. Woodwork will be of natural birch and the sliding doors, aluminum. The architect has designed the metal-and-wood pews. The grounds, visible from any part of the nave, will be landscaped and surrounded by a decorative wall.

p/a interior design products



Sculptured Tile: "Light and Shadow"/ ceramic facing tiles suitable for column treatments, complete walls, sections/ natural clay color/ weight less than 2 lb per sq ft/ available in four stock designs, any custom motif/ 1/4" thick/ sizes 4 1/4"x8 3/4" or 12"x12"/ designed by Lee Rosen/ **Design Technics, 4 E. 52 St., New York, N. Y.**

Wallpaper: "Taliesin" collection/ Design #103, with companion fabric 50" mohair casement, 49" repeat/ in palette of 30 colors/ designed by Frank Lloyd Wright/ chair and chest also by Wright/ **F. Schumacher and Co., 60 W. 40 St., New York 18, N. Y.**



Mosaic Ceramic Tile: "Ceramica Venezia P.B.M."/ imported from Italy/ for exterior as well as interior use/ nonabsorbent, craze-proof, frost-proof, fade-proof, shock-proof/ clear, luminous glaze/ 150 colors and textures/ in 3/4"x3/4", 3/4"x1 1/2", 1 1/2"x 1 1/2", mounted on square foot paper sheets/ custom design service available/ sample kit without cost.

Woven-Wood Veneer: "Pliweave"/ actual wood, interwoven strips of hardwood veneers mounted on heavy-canvas backing/ flexible/ may be installed over any dry, smooth surface, curved or flat/ in 4'x8' panels/ two weaves: 4" or 6" diamond or 7" or 9" parquet/ **retail:** $1.32 sq ft/ wallpaper mural "New York," designed by Dong Kingman/ setting by d'Argout-Ferguson, Inc./ **Murals, Inc., 16 E. 53 St., New York, N. Y.**

product announcements continued on page 153

the washburn school problem

The Washburn Elementary School, Auburn, Maine, has undergone the most rigorous series of tests in order to weigh and isolate factors that contribute to an economical school-building solution—in classroom planning; in structure and use of materials; in fenestration; and in equipment. We present here not only over-all findings, derived from a report prepared by Paul Wheeler in the office of Alonzo Harriman, Inc., Architects-Engineers for the school, but also a special study on heating and ventilating conducted by Henry Wright, Technical Consultant, Herman Nelson Division, American Air Filter Co., Inc., whose unit ventilators were tested in the School, and Johnson Service Co., manufacturers of the thermostatic controls.

facts and figures

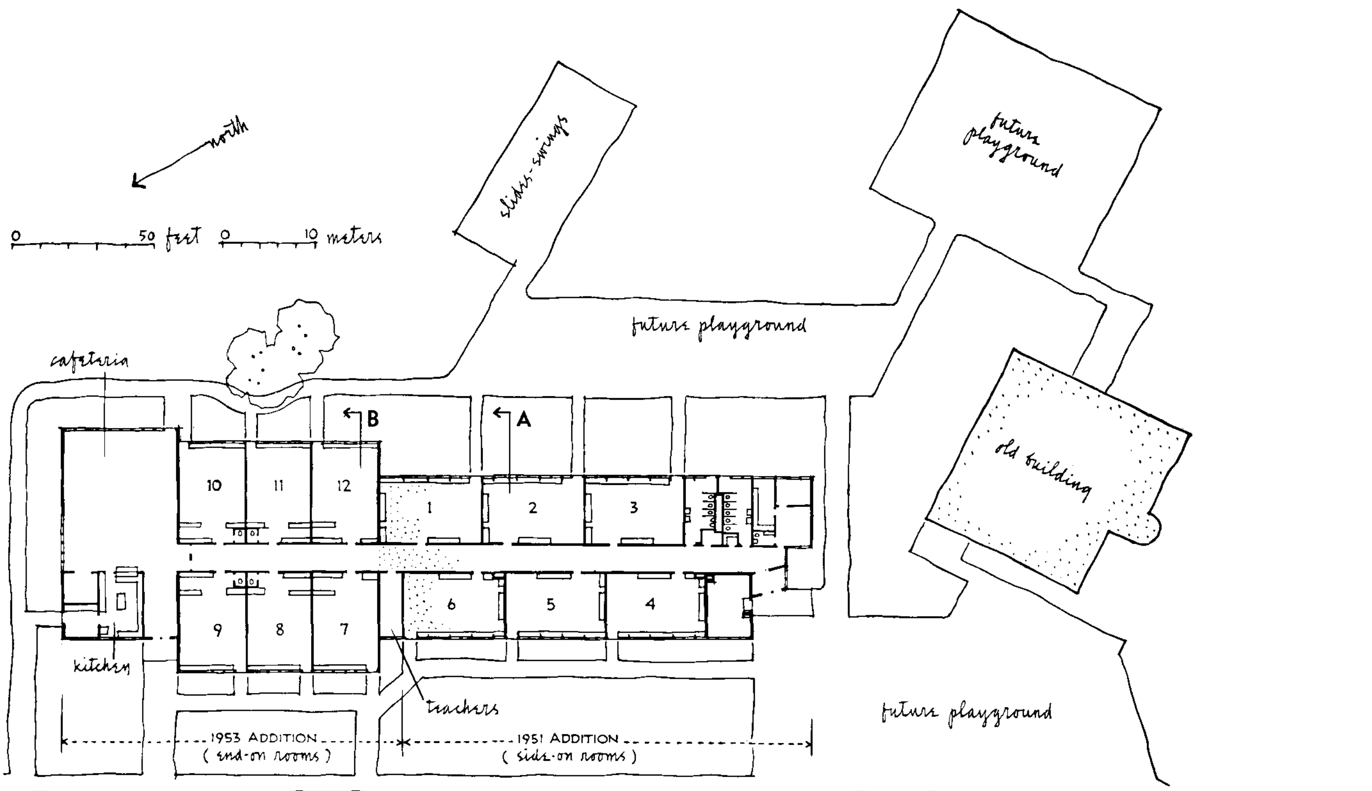
Two factors made the Washburn School ideal for this intensive study—the very real need for construction and maintenance economies in the Auburn School District, and the fact that exact comparisons could be made, inasmuch as the one school contains both side-on and end-on classrooms.

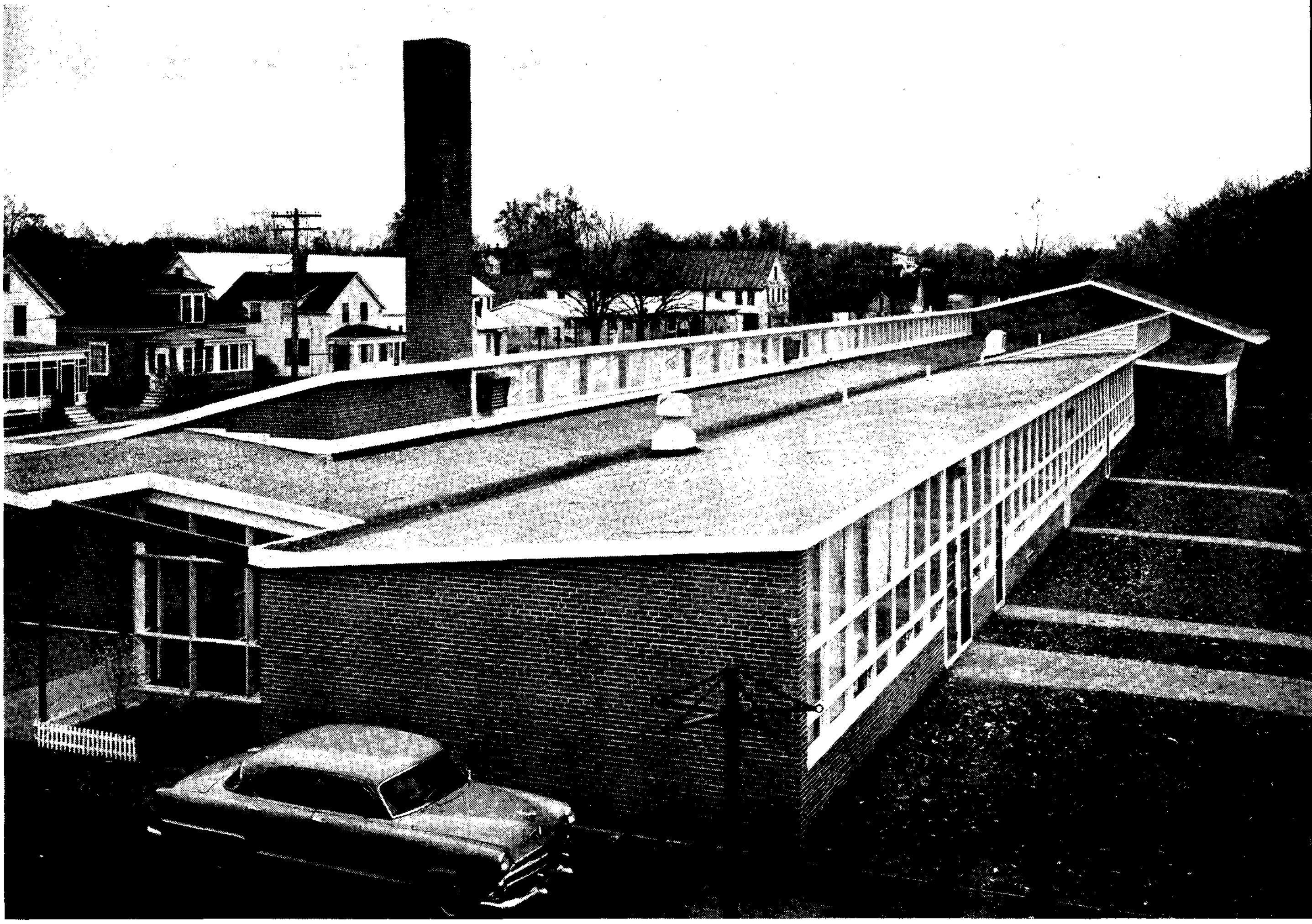
A few facts and figures about Auburn are needed in order to appreciate the pressing need for economical use of the building dollar there. Primarily a residential community of 24,000 persons, it is 64 sq miles in area, has an unusually large rural road mileage to maintain, and a comparatively brisk winter climate (mean temperature from October to April, 30 degrees; average January temperature, 20 degrees; and an average annual snowfall of 80 inches, with snow on the ground from early December to late March.) Obviously, this means that there are considerable heating loads to handle, though the researchers point out that the snow cover proves beneficial in both lighting and solar-heat gain. They emphasize that the conclusions reached are generally valid only for comparable regions and do not necessarily apply otherwise.

Expenditures of total Auburn tax revenue (1953) of $1,600,000 were: 41% for schools; 18% for roads; 9% for fire protection; 7% for police; and 25% for all other. The primarily residential character of the community, the large road-mileage upkeep, and the relatively high cost of school teaching and operation mean that extreme economy must be exercised in school construction. At present, Auburn is using 30% of its borrowing capacity, with nearly 80% of the city debt for schools. As there is a school density of 18% of population, plus serious need for additional high-school facilities, the problem is even more pressing.

present school

The present Washburn school is a three-

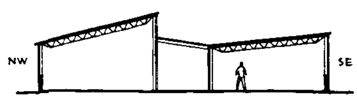




stage plant: an old, frame building; a 6-classroom addition, built in 1951, including principal's offices and boiler room; and a second unit, added in 1953, consisting of 6 more rooms, teachers' room, multipurpose room and kitchen, storage, and toilet facilities. Initially, it was thought that the second addition would be built on the site of the old frame building but classroom needs made it necessary to maintain the old structure. Hence, the new unit had to be added on the north end of the first addition. Due to site limitations, end-on rooms were the only feasible solution. And, as it turned out, this factor made Washburn particularly suitable for comparative study.

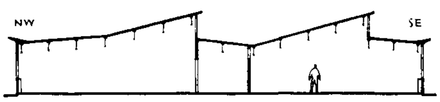
An analysis of the breakdown of the *school building* dollar, as well as the findings of both the Architects-Engineers and the special Technical Consultant, will be found on subsequent pages.

In the 1951 addition, containing the side-on classrooms (*above* foreground) transverse open-web joists, left exposed, are supported on steel columns within the building envelope. For the rooms facing northwest, a clerestory is developed to introduce direct sunlight. The roof over the corridor slopes away from the clerestory and forms a built-in gutter at the opposite corridor partition, thus keeping snow and ice away from the clerestory.

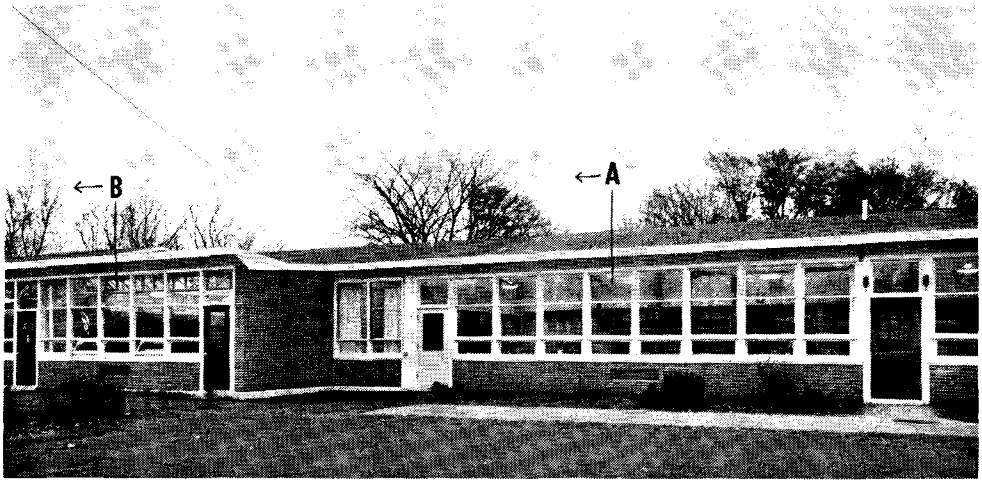


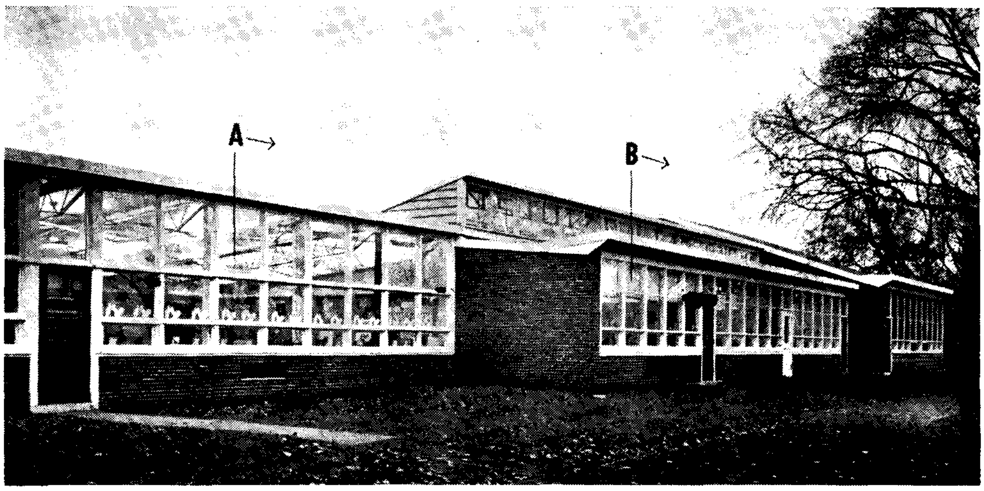
A *1951 Addition—side-on rooms*

In the 1953 addition, with the deeper end-on classrooms (*above* background), the open joists span the shorter dimension of the room and bear on inter-classroom partitions. As in the earlier wing, a clerestory is developed to bring sun into the northwest-facing rooms; but a second clerestory is introduced above the southeast rooms to bring natural light farther back into these rooms and to minimize need for artificial light in these areas. The result? The decrease in use of artificial light more than offsets the greater heat loss through the clerestory glass areas. In all cases, it was observed that snow cover on the ground and roofs made definite contributions to solar heat gain in the rooms, as well as greatly assisting daylighting by a double reflection from



B *1953 Addition—end-on rooms*





The bird's-eye view (acrosspage) *shows the full extent of both 1951 and 1953 additions. Here* (right) *is a detail where the two join on the northwest front (end-on classrooms, left; side-on, right). On the southeast face* (below right) *the additional clerestory band in the 1953 (end-on rooms) addition shows clearly at right of photo.*

Photos: Joseph W. Molitor

snow and ceilings. In fact, the architects feel that it might frequently be desirable to use a white-surfaced roof to simulate snow cover, particularly outside clerestory windows.

In other respects, the structural scheming, selected for economy, is similar in both additions—slab on grade; wood-framed walls; brick veneer; exposed insulated wood plank above the exposed steel joists; asphalt-tile flooring.

analytic method

It is in the different sections of the two additions and the different framing of the side- and end-on classrooms that the greatest distinction occurs, and comparative construction costs are most revealing. The method for establishing comparisons was on the base of a unit length of the classroom portion of each section of the building, the unit being one classroom long, taken at mid-classroom point to include the inter-classroom partition in each case. Take-off was very complete, starting with stripping soil, excavation, foundation, floor slab and flooring, exterior wall and glass, roof framing, plank and roofing, finish and painting, hardware, plumbing, heating, etc. On analysis, it was found that the major savings between these building sections occurred in the roof framing and in exterior, southeast walls. And, in reading the figures, it should be pointed out that the quoted costs are solely for the classroom units considered, the total cost per sq ft of both sections actually being higher, due to expensive areas elsewhere—kitchen, toilets, boiler room, etc.—which were not considered here.

comparative costs

With these factors in mind, it is striking to discover that the earlier (side-on classroom) addition came to $7.73 per sq ft area, while the addition with end-on rooms came to $6.76 per sq ft area. A breakdown of cost of specific portions:

Roof Framing	
Side-on Rooms	$1423
End-on Rooms	813
Southeast Wall	
Side-on Rooms	440
End-on Rooms	221

It is of more than passing interest that the total cost of the two clerestories in the end-on rooms was only $650 per unit classroom length of building (or about $325 per classroom) over a flat roof. This amounts to a little over *two-tenths of one cent* in the total-school-dollar analysis (*overpage*).

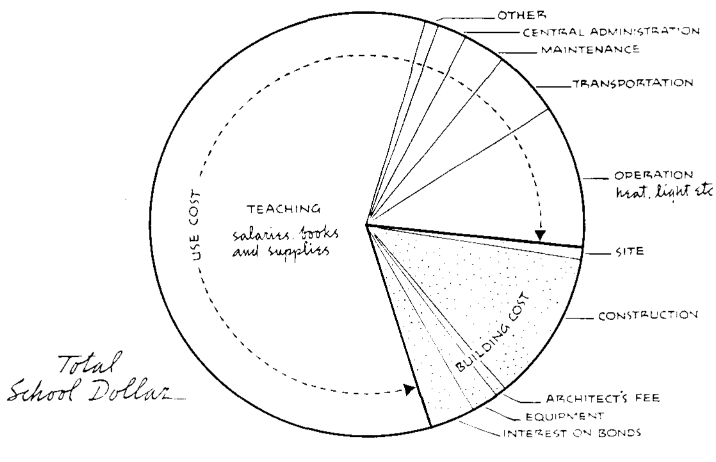
In the typical side-on classroom, the open-web joists are transverse to the room and supported on exposed steel columns. This is a room on the southeast side of the building.

As the Harriman office states it, "a school building, basically, is a specialized building to house and aid an expensive education process." And, as the following analysis of the total building cost of the Washburn School clearly demonstrates, the major expense is in the *process;* hence, all possible aid to that process must be built into the building. "Economies that can be made in initial construction, *if at no impairment of teaching efficiency,* are vital. But equally, if not even more vital, are continuing operation economies; hence the emphasis on more economical use of heating systems, clerestory lighting, etc. And, "patently obvious" is "the worth of design goals of maximum flexibility and maximum anticipation of future needs."

total school dollar

In analyzing construction and other costs of this school, a concept of the total school dollar was utilized. Briefly, this constitutes a balancing of the physical and capital costs of the building, the site and equipment, interest on bonds, etc., against teachers' salaries, cost of operation, and all costs of using the building through an assumed life—in this instance, 25 years. The architects believe that though many schools are actually used 50-60 years after construction, it can be argued that the optimum useful life, in view of curriculum changes, particularly in elementary grades, ought to be nearer 20-30 years; hence, the choice of the 25-year figure in this analysis.

On this basis, a total cost of constructing and using these facilities comes to $1,471,700—the amount referred to as the "total school dollar." The wheel chart shows the relation of each factor in the school's cost and use. To give scale to this chart, it helps to realize that the amount expended for building and equipping the school accounts for but 18½ cents of the total dollar, while 81½ cents is spent in *use*—and nearly 60 cents of the latter goes for teachers' salaries. Which leads again to the inevitable conclusion that "this expensive component of educational cost must be implemented by the most effective building possible, in terms of teaching efficiency and convenience, or the funds spent are largely wasted." And, as a result of the fairly high amount needed for school operation (11¢ of $1 in this analysis), "any method of reducing this by savings in heating, lighting, etc., will be more than repaid." By contrast, the entire interest on the construction, site, and equipment bonds amounts to only 3¢ of $1; architect's fees, 1¢; building maintenance, 3¢; and cost of site, plus grading and landscaping, only 1¢.



In one of the deep, southeast-facing, end-on rooms of the later addition, light from the window wall is supplemented by a clerestory bringing daylight well back into the room.

flexibility

In the second addition to the school, we have already observed the construction costs effected, compared to the earlier addition. But, the architects comment, perhaps even more important is "the extreme flexibility that the end-on rooms have encouraged." For one thing, they note the varied seating arrangements in use in the school, arrangements completely different between different teachers and even between seasons. "It is noticeable that the end-on rooms allow and encourage far more differing arrangements than the side-on ones." Then, too, there is more wall space for tackboard or chalkboard, and these have proved useful in the end-on units.

Flexibility of this sort, the architects remark, "puts a premium on imaginative teaching—the row-and-file type of teacher is perhaps confused with the many choices available. But, by the same token, it permits and inspires imaginative teaching in the imaginative teacher and becomes a powerful instrument in her instruction."

In addition to such specific advantages of the end-on rooms as have been noted, the researchers found that the teachers in general feel that these rooms have a "pleasanter" feeling, to which no specific cause could be ascribed.

Cast of characters (foreground, left to right): *Alonzo Harriman, of Alonzo Harriman, Inc., Architects-Engineers for the Washburn School; Paul Wheeler, of the Harriman firm; and Henry Wright, Technical Consultant for the Herman Nelson Division, American Air Filter Co., Inc.;* (background) *Ed Arenz, Herman Nelson research engineer.*

thermal comfort report

by Henry Wright*

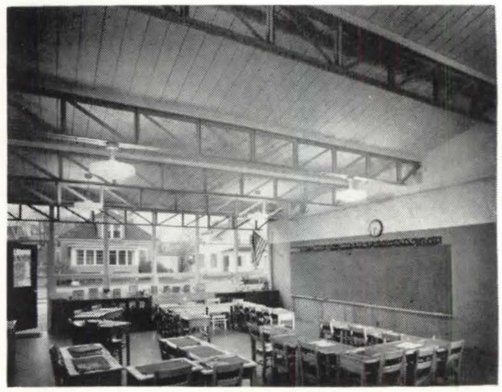


Figure 1—view of end-on classroom with exterior windows facing west-northwest; clerestory windows above corridor, not visible in photo, face east-southeast. Note that exposed open-web beams are perpendicular to long axis of room and direction of air flow.

Photo: Joseph W. Molitor; All others: Myron Ehrenberg

air distribution

Schoolroom unit ventilators are normally located beneath windows on the outside walls, for direct access to outdoor air. In most classrooms, this means that the ventilator is near the center of one of the longer walls—a strategic location for air distribution. In an "end-on" room, on the other hand, it results in the ventilator being at the end, rather than the side of the room. This raises the question: Can good air distribution be achieved from this point in the room? In the case of the Washburn School, it was posed with especial force. The end-on rooms were 24′ x 36′—about as rectangular as classrooms are likely to be *(Figure 1)*. Exposed beams ran crosswise in the rooms, at right angles to the direction of the air flow. At the far end of each room, 36 ft from the unit ventilator and at the highest point, was a bank of clerestory windows which, in the Maine climate, was bound to have a considerable cooling effect on the adjacent air. To make the research opportunity complete, the school contained an equal number of end-on and side-on rooms for comparison.

A great deal is known about the pattern of air distribution achieved in the typical classroom by the high-velocity, vertical-discharge method used with unit ventilation. The air from the unit, striking the ceiling at a slight angle, shoots *out in* all directions in a thin, rapidly moving layer close to the ceiling. As the area of this rapidly moving layer "fans out" on the ceiling, it entrains larger and larger amounts of room air and begins to lose velocity. A thorough mixing action thus takes place in the upper part of the room, well out of the occupied part lower down. Reaching the four walls, the resulting mixture of "old" and "new" air is turned downwards, traveling in a thicker, slower moving layer down the walls and continuing to entrain additional air. Upon striking the floor, it again turns and moves even more slowly out into the center of the room from all four sides, with just enough energy to force the air at the center of the room toward the ceiling. Air movement in the center of the room is held to a barely perceptible level. Since the fans run continuously, all of the air is constantly being mixed and remixed. Stratification is prevented, temperature distribution uniform.

From the standpoint of ventilating technique, it is something of an achievement to distribute air for both heating and cooling from a single point, throughout a space as large as a classroom, without creating drafts or leaving "dead spots." This the unit ventilator normally does—has done in thousands of schoolrooms for over 35 years. What set in motion the research at Washburn was a desire to learn whether the high-velocity, vertical-discharge method produced equally good results in classrooms of unusual shape and cross section.

Very early in the test program it became evident that it did. Air from the units not only reached the furthest parts of the rooms—the high-ceiling portion adjacent to the clerestory windows—but also it reached this point with enough velocity to prevent formation of a "cold pocket" near the windows and any resulting cold "down draft." To guard against this possibility, Architect Harriman had run the steam mains along the wall beneath the clerestory windows *(Figure 2)*; thermocouple readings, however, showed that this was not actually necessary. As in classrooms of more conventional shape, air distribution was excellent and air movement within the occupied area barely perceptible. Smoke tests showed that the open-truss, transverse beams accentuated mixing of room air and discharge air near the ceiling, by creating turbulence, but did not prevent sufficient ventilating air from reaching the end of the room.

The possibility of cold drafts from the main windows was obviated, in the test room, by installing a means of downdraft control not available at the time the school was built. It turned out to be possible to do this by simply installing adapter grills in the top and end of the existing wood cabinet work. The cabinets had been furred out to align with the front of the unit ventilator, creating a continuous horizontal return-air grill and duct beneath the windows and running vertically alongside the exterior classroom door. Temperature records of the air returning to the unit ventilator by this route clearly indicated that air chilled by the windows was being intercepted and prevented from entering the room proper.

Thus the initial purpose of the research was quickly served. Not only were the unit ventilators capable of handling air distribution in the end-on rooms; they passed with flying colors. Fortunately, the studies did not end at this point but went on to a searching investigation of other aspects of heating and ventilation.

nighttime heating

The way school buildings are heated at night and over weekends is unusually important because most elementary-school classrooms are used only about *one-fifth*

* *Technical Consultant, New York, N.Y.*

Figure 2—view of end-on classroom facing east-southeast. Although subsequent tests proved them unnecessary, steam mains were installed below clerestory windows to overcome anticipated cold "down draft."

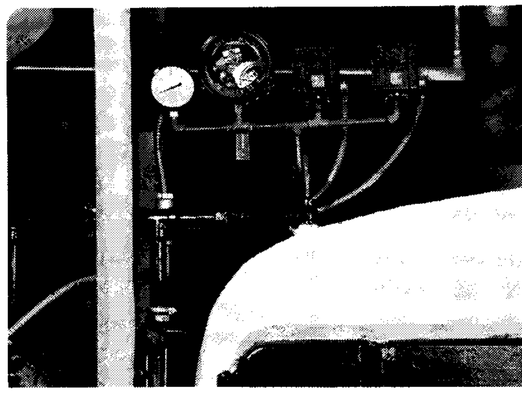


Figure 3 — pressurestat arrangement that controls nighttime heating.

of the school year. Four-fifths of the time they are on a "stand-by" basis and need heating only to prevent damage to the plumbing and structure as well as facilitate warming to the comfort point, prior to use. Since unit ventilators provide a heating means of unusual rapidity, they are well suited to the general practice of allowing school buildings to cool when not in use.

While this practice undoubtedly saves a good deal of fuel, the saving is not very large unless the building is allowed to cool considerably. If, for example, it is permitted to cool only to 60F, so that the *average* overnight temperature turns out to be, say, 65F, while the outdoor temperature remains a steady 40F, five-sixths as much fuel will be needed as to keep the school at 70F. The saving depends, in fact, on reducing the average difference between the indoor and outdoor temperature. Overnight, this reduction cannot be very great unless cooling to 50F, or lower, is permitted. Over a weekend or holiday, when the school cools to the night control setting and stays there a large part of the total time, even a smaller amount of cooling will produce substantial economy.

With nighttime heating in mind, some engineers still prefer "split" systems in which most or practically all of the daytime load is carried by the unit ventilators, but nighttime heating comes from auxiliary standing radiation. One argument in favor of this arrangement in the past was that in the event of power failure making it impossible to operate the unit-ventilator fans, the convective capacity of the auxiliary radiation, plus that of the heating elements of the unit ventilators, might be sufficient to permit use of the building. Another argument has been that special controls for nighttime heating of the "blast" type—as nighttime use of the unit-ventilator fans for this purpose is called—are expensive, whereas with the split system all that was needed was to keep steam in the boiler.

Despite these arguments, the heating system of the Washburn School was designed to rely solely on the unit ventilators for daytime and nighttime heating. The decision to do so was not influenced by the "power failure" argument because the oil-burning boiler required current to operate in any event. The "nighttime control" argument was answered by devising a simple and inexpensive control. Since the resulting system was obviously more economical than a split system, its performance was given considerable study.

The way the nighttime control worked was this (*Figure 3*). When the day control was shut off in the late afternoon, turning off the unit-ventilator fans, a single thermostat located in one of the classrooms took over control of the system. Until the temperature dropped to the setting of this thermostat—at 11 p.m. or midnight or 1 a.m., depending on outdoor wind and temperature conditions—all heating ceased. When the indoor temperature fell to the control point, the "night" thermostat turned on the oil burner. This in turn, filled the mains and the finned heating elements of the unit ventilators with steam. If their convective heating effect was sufficient to satisfy the night thermostat within a fairly short time, this was all that happened. If it was not sufficient and as a consequence the boiler pressure rose above a preset point, a pressurestat in the boiler room turned on the unit-ventilator fans, with the result that heat delivery to the rooms was greatly increased.

Thus in theory, two stages of nighttime heating were provided: convective heating for mild weather, "blast" heating for weather when the nights were cold enough to require it. In practice, it was found, the control settings were such that the second, blast-heating phase, followed so quickly upon the first that the system operated virtually as a blast system. This might easily have been changed by raising the setting of the pressurestat. However, it was decided not to do so in order to accumulate data on the operation of simple blast heating.

One bugaboo that has been raised in connection with blast heating is that it may result in excessive operation of the unit fans, current consumption, wear and tear on the motors, and so on. In actuality, it was found that the quantity of heat delivered by the units on a "blast" basis was so great that the fans operated only one to four times a night (two to six times over weekends), usually running from 10 to 20 minutes each time they were turned on. Moreover, it was concluded that with blast operation the oil burner ran for shorter periods than with convection heating, because of the ability of the unit ventilators, when powered by the fans, to deliver heat to the classrooms almost as fast as it was generated by the burner, thus preventing its accumulation in the boiler, piping, and so on, and subsequently at least partial loss.

The conclusion of the investigators, in other words, was that so-called blast heating is by far the simplest and most economical form of stand-by heating for school buildings and presents no problems not inherent in the practice of allowing the temperature of the school to drop when it is not in use for economy reasons.

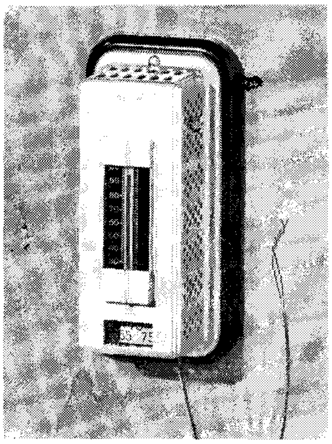


Figure 4—tests indicated that the thermostat—much as the human body—responded almost equally to ambient and radiant conditions.
Photo: Johnson Service Co.

morning warm-up

The heating element of a unit ventilator gets most of its day's work done in the early morning, before the classroom is in use. In this respect, a schoolroom is like a theater; even though it is not as densely occupied. The pupils provide a good deal of the heat needed to overcome its steady heat loss and the balance is often supplied by the lighting system or solar radiation. In fact, what is normally needed during the school day is cooling rather than heating, owing to the effect of these combined heat gains and the fact that outdoor temperatures so often rise during the period of occupancy. But at six or seven in the morning, depending on how cold it has become overnight, the schoolroom usually needs heat in a hurry, to overcome the effect of the nighttime shutdown.

As with any cold room, if all that was necessary was to heat the *air* in the room, the warm-up task would be easy. As the room air is warmed, however, it must in turn warm the walls, ceiling, and floor, as well as the furniture and any other solid objects it touches. This is a good deal harder. Solid substances, as their temperature is raised, absorb heat about in proportion to their weight; the heavier the structure and contents of a room, the more heat it takes to restore a comfortable condition within it after it has been allowed to cool.

Except in one respect, most modern schoolrooms employ lightweight structural materials that are easily warmed. The exception is the floor slab—especially floor slabs in contact with the ground. Moreover, the asphalt-tile flooring used in so many classrooms is a good heat conductor, so that the slab, and to some extent the earth beneath, is thermally "part of the room." As a result, slab-on-grade construction has a substantial "flywheel effect" on classroom heating. At Washburn, for example, it was determined experimentally that if the room air was allowed to cool to 46F at night, and then held at this point by the nighttime heating, the floor, cooling more slowly than the air, reached a minimum of about 50F by 6 a.m. When the heat was turned on a little after six, the air temperature rose rapidly, reaching 70F by 9 a.m. and 74F by 9:45. The floor, on the other hand, warmed much more slowly. At 9 a.m., its temperature was still only 57F; by noon, it had risen to 60.5F; at three in the afternoon, after the class had left the room, it finally attained a maximum temperature of 62F.

In this experiment, the classrooms were allowed to cool much more than normally, and the resulting cold-floor condition resulted in complaints. This checked with experience prior to the testing, when it had been found that it was not possible to allow the building to cool below about 55F without creating dissatisfaction.

To demonstrate that this was more of a structural than a heating problem, the researchers performed another experiment. A 6′x6′ section of the asphalt-tile flooring was replaced with vinyl-cork tile consisting of 1/8 in. of cork topped with about 1/32 in. of vinyl plastic. The insulating effect of even this thin layer of cork was found to have a very important influence on the surface temperature of the floor. At night, because it did not permit heat to escape so readily from the slab, the surface got a good deal colder, except during periods of nighttime heating when its temperature rose sharply. During the morning warm-up, the vinyl-cork flooring warmed rapidly. Thus, when it was allowed to cool to 53F at night, it reached 63F by 9 a.m. In addition—and this was felt to have special importance with respect to kindergartens—the vinyl-cork invariably *felt* a great deal warmer than the balance of the floor. This was not an illusion. But putting thermocouples under the stockinged feet of persons standing with one foot on the vinyl-cork panel and the other on the asphalt tile, it was found that there was a six to eight degree difference in the underfoot temperature, because the cork-insulated flooring did not conduct heat away from the feet as rapidly as the balance of the floor. It was concluded that had a flooring material of such thermal characteristics been used throughout the school, it would have contributed substantially to fuel economy by permitting lower nighttime temperatures without subsequent discomfort. It was also concluded that such a floor finish would make it possible to sit or lie on the floor without discomfort at all times.

Another aspect of the morning warm-up period which was given a good deal of attention was the effect of cooler room surfaces, in the early morning, on the radiant temperature of the classrooms. Efforts to measure the radiant temperature were unsuccessful, owing to the necessity of keeping the globe thermometers out of reach of the children and the turbulent upper-air pattern created by the transverse beams. However, it was found that the room thermostat actually sensed radiation effects and compensated for them by controlling the air temperature

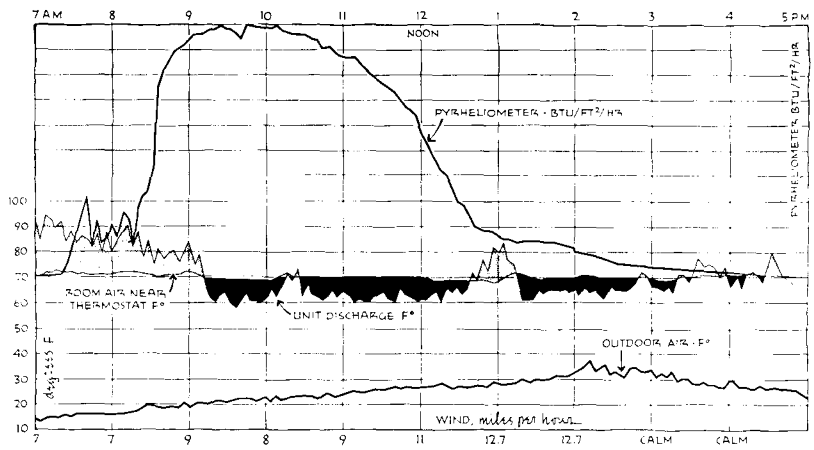


Figure 5—chart indicates periods of heating and cooling, January 5, 1955, for end-on classroom with single glazing.

at slightly higher and lower levels. Thus at the conclusion of the morning warm-up, unless the rooms were receiving a good deal of sun heat, it was typical for the air temperature to rise two or three degrees above the normal control point and then gradually fall as the room surfaces became warmer. On sunny mornings, on the other hand, the thermostats kept the rooms two or three degrees *below* the control point, compensating for the solar radiation entering through the clerestory windows and diffusely reflected from the ceiling.

These differences were registered by a fine-wire thermocouple located an inch or so away from the thermostat and registering the true air temperature (*Figure 4*). As a further check, a second thermocouple was cemented to the sensitive element of the thermostat. The record made by this thermocouple showed that the thermostat, by always opening and closing at the same *element* temperature, responded almost equally to ambient and radiant conditions much as the human body, raising the air temperature when the walls were cool and lowering it when solar radiation was entering the room.

cooling

The tests provided a forceful reminder that even in a rigorous climate the main function of classroom ventilation is cooling. This was so despite the fact that the rooms for which detailed operating records were made faced west-northwest and received midwinter sunshine only by way of their east-southeast clerestory windows. Thus, solar-heat gain was minimized, especially in the case of the end-on room, in which the clerestory windows amounted to only eight percent of the floor area. Another factor which tended to reduce the need for cooling was the photoelectric control of the lighting system, which kept the lights turned off the greater part of the time, eliminating another common source of heat gain.

But even with both of these sources of heat gain below that of the average classroom, there were many midwinter days when a good deal of cooling was needed. January 5, last year, was an outstanding example. The records for this day show that the end-on room required cooling almost the entire school day, frequently at the maximum rate the controls would permit, in spite of outdoor temperatures ranging from 20F to a little above freezing.

The pertinent data for this day is shown (*Figure 5*). Gray areas on chart show periods of heating — i.e., during which the air discharged by the unit ventilator was above room terperature. Black areas show periods of cooling, when the unit was discharging air below room temperature. The line in the upper part of the chart shows the rate of solar-heat gain through the clerestory windows, in Btu/sq ft/hr, and the line in the lower part of the chart shows outdoor temperatures.

The chart provides a very complete picture of the thermal factors affecting the room. As the pyrheliometer record of sunheat shows, January 5 was almost perfectly clear. There was a slight cloudiness—or haziness—in the early morning, but from 8:30 a.m. on, direct solar heat entered the clerestory windows at the maximum value for their particular orientation. The outside temperature, starting at 14F at 7 a.m., rose gradually to above freezing between two and three in the afternoon and fell to about 23F by 5 p.m. During the morning and part of the afternoon, a fairly stiff wind was blowing against the west-northwest end of the classroom.

By seven in the morning—the left-hand margin of the chart—the morning warm-up of the room was complete. Heating between 7 a.m. and 9:10 a.m.—the first and largest gray area on the chart—was thus the result of the room's "steady heat loss," plus the effect of opening of the outside door to admit pupils, and the absence of considerable solar-heat gain and body heat from the class, during most of this period. At 9:10 a.m. with the door no longer being opened, solar heat at its maximum, and all of the pupils in the room, the unit ventilator began to admit outdoor air for cooling. It continued to do so until 10:15 a.m., when the absence of pupils from the room for a midmorning recess is marked by a brief period of heating and a momentary drop in temperature due to opening of the outside door. Then, from 10:25 a.m. the unit continued to cool the room until lunchtime.

During most of the morning, solar heat was entering the room at a rate of about 15,000 Btu per hr. Around 11 a.m., the solar gain began to drop off owing to the angle of the sun's rays to the east-southeast clerestory windows. At this time, reduced heat loss due to rising outdoor temperatures tended to counterbalance the reduced solar gain. But when the pupils left the room for their lunch period, eliminating a substantial source of heat gain, cooling tapered off and a third period of heat resulted, centered around 1 p.m.

Continued cooling during the afternoon is explained by heat gain from the pupils, diffuse solar heat coming in through the windows at both ends of the classroom, reduced heat losses due to higher outdoor temperatures, and the effect of sun shining on the roof.

Steam consumption during the nine-to-three school day amounted to only 36 lb of steam or an average of about 6000 Btu per hour, as compared to the peak solar gain of about 18,000 Btu per hour, and a steady heat gain from the pupils of about 10,000 Btu per hour.

Thus the end-on classroom on this clear January day was in nearly perfect balance with the outside environment, despite its considerable area of single-glazed windows. Owing to the east-southeast orientation of the clerestory glass, solar heat entered the room early in the day and helped to heat it when heating was needed, rather than simply adding to the cooling problem later on, as would have been the case with a south or southwest orientation. Moreover, the quantity of solar heat these windows admitted was just about the maximum the room could "digest," as evidenced by cooling at the maximum rate feasible with a 60F discharge temperature during the period of peak solar gain. Ventilation-wise, the room benefited from solar-heat gain by receiving ample outdoor air for odor control, but not so much as to depress artificially the indoor relative humidity.

Although the end-on room had less east-southeast glass area, it required cooling more consistently and for longer periods than the side-on room. The reason this was so shows in an interesting way how every aspect of classroom design and equipment affects thermal balance. The end-on room—like the rest of the *school addition*—had venetian blinds in the clerestory windows (*Figure 2*). The side-on room—like the rest of the original school—had translucent window shades. To control sun-glare in the end-on room, it was only necessary to lower the blinds, but not to close them, because of the height of the windows. Since the blinds were normally left open, almost all of the sun heat which penetrated the glass came into the room; in the side-on room, where the shades were ordinarily drawn during sunny periods, a good deal of sun heat was reflected back out of the building by the white surface of the shades. Thus the side-on room, with 50 percent more window area in both directions, received only a little more solar heat than the end-on room, but had substantially more heat *loss*. The net effect was to reduce the need for cooling in the side-on room.

It is doubtful whether this should be considered an advantage of the shades over the blinds. In the Spring or early Fall, when overheating of the classrooms due to the sun might be expected to occur, it seems probable that the teachers in the end-on rooms would tilt the blinds and thus reject more solar heat. On the other hand their ability to admit direct sunshine into the upper part of the classroom in midwinter while preventing glare is probably advantageous from a lighting and psychological standpoint.

Any differences between the end-on and side-on rooms on the west-northwest side of the building were slight compared to the differences between these rooms and those on the opposite side of the corridor. The east-southeast classrooms had their entire glass area faced in the direction of the morning sun, and thus required cooling much more of the time than the west-northwest rooms, which had only clerestory windows facing this way. From the point of view of thermal balance, there is no doubt that the west-northwest rooms were superior; the balance of the east-southeast rooms might most easily have been improved by overhangs or other shading devices on the outside of the building.

solar-heat gain

The important influence of classroom fenestration and orientation on the winter-cooling problem was dramatically demonstrated by the various rooms in the Washburn School. The classrooms on the west-northwest side of the building—especially the end-on rooms—were about as good in this respect as schoolrooms relying on natural light can be. Those on the east-southeast side—especially the side-on rooms—were much less so, although not so unsatisfactory as they would have been if the school had faced more nearly south. In all of the rooms, the unit ventilators proved capable of coping with the solar-heat gain, but the quantity of dry outdoor air which had to be admitted to keep the east-southeast rooms from overheating resulted in excessively low relative humidities throughout the school on sunny days.

All winter long, a pyrheliometer inside one of the east-southeast clerestory windows (*Figure 6*), with its sensitive element parallel to the glass surface, made a continuous record of the quantity of sun heat actually entering the building. On January 14, a perfectly clear day, the readings showed that a total of almost 1000 Btu came into the school through *every square foot* of glass facing in this direction. For the entire building, this meant a heat gain of almost two-million Btu. Between 8 a.m. and 9 a.m., the gain was 155 Btu/sq ft/hr. Between 9 a.m. and 10 a.m., the peak period for this orientation in midwinter, the gain was 266 Btu per sq ft, from 10 a.m. to 11 a.m., 240 Btu, and from 11 a.m. to noon, 185 Btu.

On this particular day, and throughout most of the winter, solar-heat gain was considerably increased by reflection from snow on the ground and on the roof outside the clerestory windows. Almost continuous snowcover also greatly increased the effectiveness of natural lighting at the time of year when daylight was at a premium.

The design and orientation of classroom 7 (*see plan on page 137 for classroom locations*), the end-on room on the west-northwest side of the building, was such that it received about the minimum quantity of sun heat possible in a room

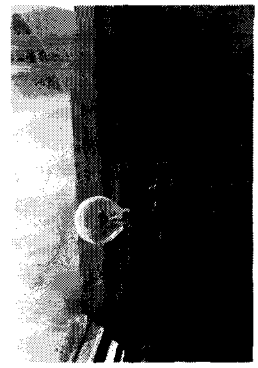


Figure 6—pyrheliometer inside an east-southeast clerestory window measured amount of sun heat entering the building

with bilateral lighting. Nevertheless, its 69.3 sq ft of clerestory glazing facing east-southeast admitted a total of at least 60,000 Btu on a clear midwinter day, allowing for the slight shadowing effect of the roof overhang and the small amount reflected back through the windows by its open venetian blinds. During the peak hour, with shadowing and reflection at a minimum due to the low sun angle, the gain was almost 18,000 Btu. As has already been shown under "cooling," this amount of solar heat, plus heat gain from the occupants, required almost the full cooling capacity of the unit ventilator to maintain the desired indoor temperature in below-freezing weather.

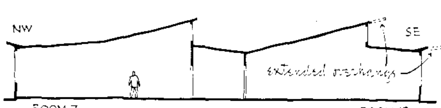
Classroom 1, the side-on room on the opposite side of the corridor, had almost three and one-half times this amount of east-southeast glass. This room had white, translucent window shades, which were probably drawn over most of the window area during sunny periods, and may have excluded as much as 40 percent of the sun heat. Even on this basis, however, the total gain for a clear day in classroom 1 amounted to 145,000 Btu, and the peak between 9 a.m. and 10 a.m. was almost 40,000 Btu. As is true of summer air-conditioning load, this gain was undoubtedly spread over a longer period owing to absorption of heat by the structure. Otherwise, the cooling capacity of the unit ventilator (16,200 Btu/hr at the control settings used) would have been insufficient to cope with it. As it was, enough dry air was brought into the room, for long enough periods, to lower the relative humidity considerably below desirable levels.

These figures, of course, are for an unusually clear day. If midmorning sunshine was a rare midwinter phenomenon in Auburn, peak solar gain for an east-southeast orientation would be unimportant. However, the pyrheliometer records shows that out of 17 school days in January, 7 were days on which the solar gain between 10 a.m. and 11 a.m. was 95 percent or more of the January-14 value.

The over-all amount of sun heat entering the east-southeast windows was 55.7 percent of the maximum possible, and for 10 a.m. to 11 a.m. 60 percent of "possible." During the early morning hours, when sun heat was most valuable in warming the school, it was unfortunately also most erratic: only 38 percent of the possible sunshine was received between 8 a.m. and 9 a.m. The average received during the peak hour of 9 a.m. to 10 a.m. was exactly 50 percent of the maximum.

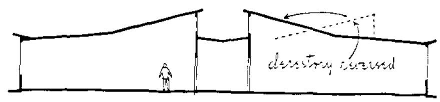
The design of classroom 1 is typical of present-day schoolrooms relying on a single window wall for natural lighting. Only its favorable orientation kept peak solar gain within the capacity of a 1000-cfm unit ventilator set for a minimum air-delivery temperature of 60F. Had the room faced more to the south it would have been necessary, to prevent overheating, either to lower this temperature or to increase the capacity of the ventilator. Because this would have the effect of still further lowering the relative humidity, neither step is as desirable as reducing the solar gain.

Excessive solar heating is thus more an architectural than a ventilating problem. The end-on room on the east-southeast side of the school (classroom 12) suggests how this problem can be solved. The cross-section of this room is such that it achieves better natural lighting than the side-on room with 21 percent less glass area. With this cross-section, the gain could be further reduced by providing more generous roof overhangs, without undue sacrifice of natural light. This

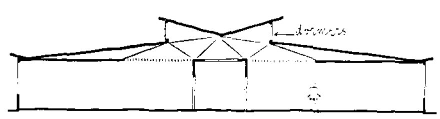


would be especially desirable in the case of a room facing south, and more effective with that orientation.

A better solution would be to reverse the direction of the clerestory windows, creating a symmetrical cross-section and giving the rooms on both sides of the corridor the same balanced solar-heat gain, morning and afternoon, characteristic of classroom 7.



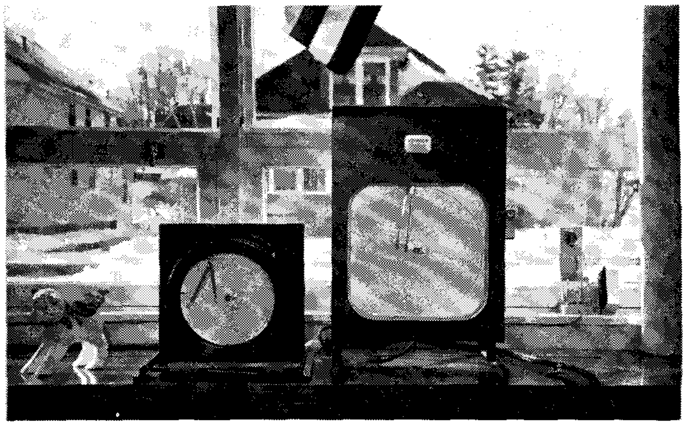
The "snow pocket" created by this cross-section would probably be impractical in the Maine climate, but might be workable farther south. It could be avoided by topping the roof with dormer windows and forming a "lighting plenum" which might be shared by several end-on rooms, and used for access to piping and wiring.



Still another solution would be the use of one or another form of "top lighting" for the inner portion of the end-on rooms, since solar heat can usually be kept within bounds by minimizing the area of top-lighting units.

A flaw in the design as built which was revealed by the research was the lack of any operable windows in the clerestories. It was agreed by all concerned that such windows would be desirable as a means for exhausting sun heat in warm weather and enhancing the "natural" ventilation of the classrooms in the nonheating season.

Figure 7—at right side of window, dew-point controller is mounted in contact with inner surface of glass (cover removed). Other equipment: temperature and humidity recorder (left) ; *pressurestat indicating control air pressures that operate dampers and valves* (center).



dew-point controller

The Washburn tests included an entirely new aproach to ventilation for purposes other than cooling, an approach which promises dividends both in fuel saving and in improved learning conditions. The new approach is based on a method for controlling so-called "minimum ventilation"—the dew-point controller.

Many state codes require that a certain minimum amount of outdoor air be admitted to school classrooms whenever they are in use, regardless of whether cooling is needed. This is called "fixed-minimum ventilation" to distinguish it from the admission of larger, varying quantities of outdoor air for cooling. Even where codes do not make minimum ventilation mandatory, it is usually provided in schools in the northern part of the country when means are available to do so.

Actually, the worst that can happen if this practice is not followed is that the schoolroom may, on occasion, become somewhat smelly and humid. While many people still have the illusion that dense occupancy of a room results in depletion of the oxygen supply, or an excess of carbon dioxide, or the presence of harmful organic adulterants in the air, it has long since been conclusively demonstrated that this never happens in normal aboveground structures. Usually, what gives rise to such illusions is overheating. Once overheating is controlled—by ventilation or otherwise—the only effect of occupancy is to add moisture and odoriferous matter to the room air. Rationally, minimum ventilation is justified to the extent necessary to control these effects, for esthetic and practical reasons, but not for reasons of health. *Fixed*-minimum ventilation, in very cold areas, often results in excessively low indoor humidities which are a health hazard and also have a bad effect on the structure and its furnishings.

Morever, fixed-minimum ventilation can be, and often is, very expensive. Some states still have codes which require that as much as 500 cfm of outdoor air be brought into every classroom in subzero weather. To do this without freezing the pupils requires a great deal of heat, and therefore fuel. And the net effect of the process is to cause drying of the nasal passages, cracked lips, and sometimes to split desks down the middle, owing to the extremely low moisture content of the air introduced from the outside.

Nevertheless, minimum ventilation is sometimes necessary. The most obvious evidence of this need is condensation on classroom windows. If, for example, a unit ventilator is set at "zero minimum" and operated that way during a cold period of little sunshine when no outdoor air is needed for cooling, moisture given off by the pupils (on the order of two qt an hour for the average class) eventually raises the relative humidity above the dew point of the air in contact with the window glass, and some of the moisture condenses-out on the glass surface.

Since there is a necessary connection between this process and the production of odors of human origin, a classroom will almost never be found offensive from an odor standpoint unless and until condensation has occurred on the windows, whereas classrooms in which considerable window condensation has occurred will almost invariably smell somewhat "ripe" to an outsider who has just entered the room. This is accentuated by the fact that odors of all kinds are generally more evident under conditions of high relative humidity.

Thus, window condensation is an index of the real need for minimum ventilation —a need which is not fixed, but varies with occupancy and related circumstances, such as whether the room has recently received a good deal of outdoor air for cooling, as after a period of solar-heat gain. So long as sufficient outdoor air is admitted, at the proper times, to prevent condensation on the windows, the rational purposes of minimum ventilation will be served, without the adverse effects and expense of too much ventilation of this kind.

What was done at the Washburn School was to try out the effect of controlling minimum ventilation on such a *variable* basis. One of the test rooms was equipped with a simple control device, not hitherto used for this purpose, known as a "dew-point controller." Mounted in contact with the inner surface of the window glass at a convenient point (*Figure* 7), the dew-point controller was "cut into" the control circuit in such a way that it caused the outdoor air damper of the ventilator to open whenever the relative humidity of the air close to the glass rose almost to the dew point. The rest of the time, when outdoor air was not needed for this reason or for cooling, the damper closed completely.

With this arrangement, a varying quantity of outdoor air was admitted to the

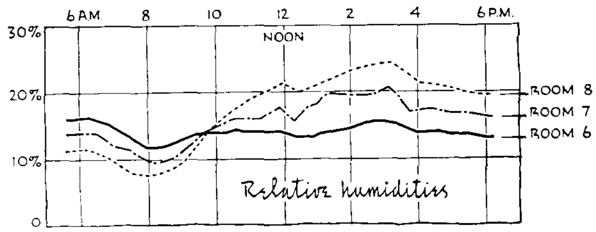


Figure 8—comparison of ***relative humidities in*** *classrooms 6, 7, and 8 on February 3, 1955* (above).

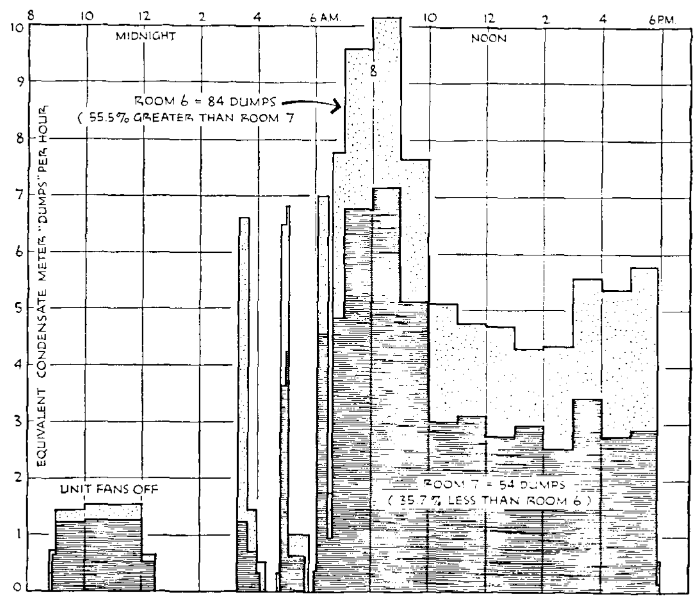


Figure 9—steam consumption in classrooms 6 and 7, February 2 and 3, 1955 (right).

room for odor and humidity control in accordance with the real need, just as ventilation for cooling varied in accordance with the need indicated by the room thermostat. After periods of cooling, when a large amount of outdoor air had just been brought into the room, the outdoor-air damper remained closed until moisture evaporated by the pupils raised the humidity to the critical level; in the same way, morning recess and luncheon periods, when the room was unoccupied and there was no need for ventilation were marked by closing of the damper. At all times, the relative humidity was maintained at the maximum practicable level permitted by the glazing, and at a point considerably closer to the optimum than that which resulted from fixed-minimum ventilation.

The test room in which the dew-point controller was installed was classroom 7. In the second test room, classroom 6, the unit ventilator was set at a fixed minimum of one-third outdoor air (333 cfm) in the conventional manner. At the same time, to provide a further basis of comparison, the ventilator in classroom 8, which was similar in all respects to classroom 7, was set at "zero minimum" without the addition of a dew-point controller.

Comparison of the resulting relative humidities in the three rooms, as shown (*Figure 8*) bears out the theory of the new method of control completely. On the particular day shown, no outdoor air was admitted to any of the rooms for cooling, none being needed owing to a fairly low outdoor temperature and absence of solar gain. In classroom 8, which thus received no outdoor air whatsoever (except by infiltration), the relative humidity rose rapidly after the class convened, and a good deal of condensation took place on the windows. In classroom 7 the humidity rose to the point permitted by the dew-point controller, dropped off when the room was unoccupied during the lunch period, and increased to a somewhat higher level during the afternoon, when an increase in the outdoor temperature raised the glass temperature and the threshold of window condensation. In classroom 6, which received a fixed amount of outdoor air all day long, the relative humidity was held down unnecessarily, never rising above 16 percent.

Steam consumption in classrooms 6 and 7 on the same day is compared (*Figure 9*). During the 24-hour period of February 2-3, classroom 7 consumed 35.7 percent less steam than classroom 6. Much of this saving was due to end-on design and less glass area, also to the fact that the windows of classroom 7 were covered with Milium shades at night. On the other hand, at least half of the daytime savings, or a saving of more than 50 lb of steam, resulted from the elimination of unnecessary and undesirable ventilation by the dew-point controller.

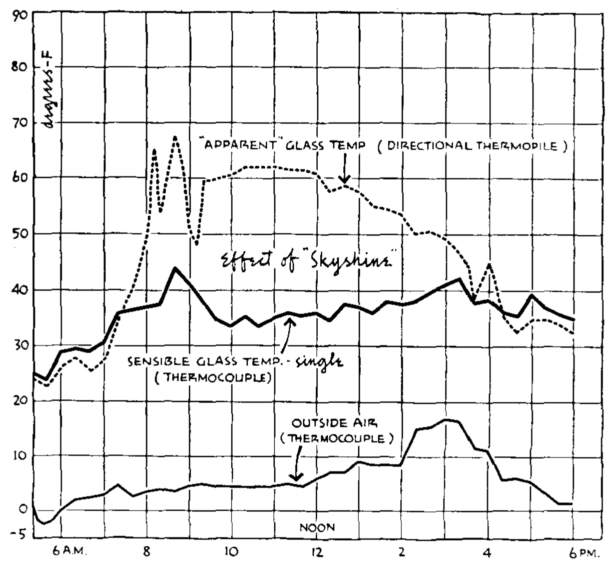
Final conclusions about this new method of controlling winter ventilation will have to await its trial on a school-wide basis. It is not certain that the fuel savings it promises are sufficient to retire the cost of the controller within a reasonable time, nor is it completely established that odor formation will be prevented at all times. In addition, many state ventilating codes, as they now stand, forbid such an approach to minimum ventilation. The results of the test make it abundantly clear, however, that the approach is promising. It may provide a basis for minimum ventilation that is as solidly rational as that on which ventilation for cooling already rests.

An aspect of the operating routine of the Washburn School which indicates the need for rational control of minimum ventilation rather strikingly was the fact that the school was cleaned at night, by a single custodian, between the hours of 9 p.m. and 1 a.m. During this time, as indicated by the "blip" of steam consumption (*Figure 9*) the building was heated to daytime temperatures. In the case of the test rooms shown on the chart, however, the unit-ventilator fans were specially turned off so as not to distort the test; in the balance of the classrooms they were left on. This means that, given standard operation on a fixed-minimum basis, the classrooms would have been supplied with sufficient ventilating air for full daytime occupancy, despite the fact that the building population was only one individual!

This serves to underscore the essence of fixed-minimum ventilation: outdoor air is admitted whether it is needed or not. Given such a method, inconsistencies automatically follow. With the dew-point method, on the other hand, outdoor air would not be admitted unless necessary, thus avoiding manifest wastes of this type.

Figure 10—directional thermopile records surface temperatures from a distance by measuring radiant-heat "output" (above).

Figure 12—effect of "skyshine." "Apparent" and sensible glass temperatures on single-*glazed windows facing west-northwest on clear day, January 31, 1955* (below).



"skyshine"

A significant discovery of previous research under the same auspices was that diffuse and reflected solar radiation coming in through large classroom windows in the form of light is often sufficient to counterbalance any "radiant-cooling effect" of the cold-glass surface. As a result, cold schoolroom windows do not feel cold from a distance during the daytime as they do at night, because they normally admit as much, or almost as much radiation *to* the room as they absorb *from* it due to their low temperature. Cold window glass always has a *convective* cooling effect on the air close to it. Whether it also has a *radiant* cooling effect depends on the quantity of entering radiation available to make up for radiant-heat absorption from the room.

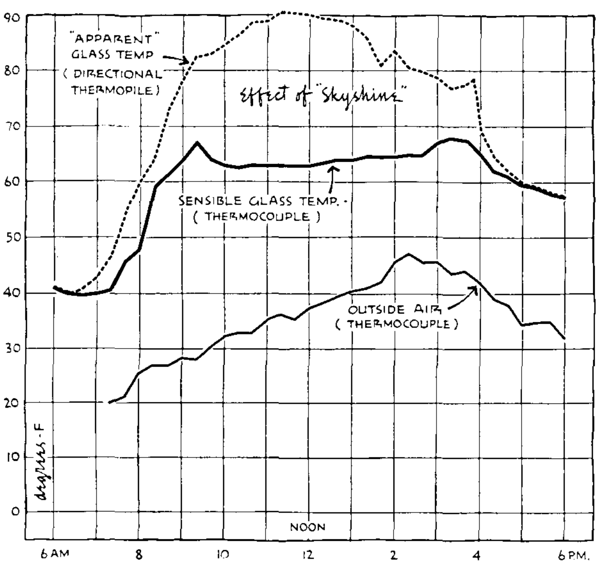
Thus, glass at 30F will absorb by radiation about 40 Btu/sq ft per hour from a comfortably heated room. If, however, it is at the same time admitting 40 Btu per sq ft in the form of reflected solar radiation and diffuse solar radiation or "skyshine" its radiant-heat absorption will be canceled out. When this is so, the "apparent" glass temperature from a radiant-heat standpoint will be the same as the other room surfaces, and body chilling due to radiant cooling will not occur.

To experience the difference between a cold window which is having such an effect and one which is not, all that is necessary is to spend an hour or two in a large-windowed schoolroom at night, with the room heated to a normally comfortable temperature, and again in the daytime. At night, if the windows are unshaded, the room will feel distinctly cold, especially as one approaches the window wall. In the daytime, unless there is air leakage around the sash, or the window downdraft is uncontrolled, this will not occur. The difference in sensation is very pronounced, and leaves no doubt that the thermal problem presented by large windows is distinctly different at night and during the day.

To accumulate further information on this phenomenon, one of the classrooms at Washburn was equipped with a directional thermopile capable of reading surface temperatures from a distance, by measuring their radiant-heat "output." The instrument was hung above the reach of the children and pointed horizontally at a large pane of the window (*Figure 10*). At night, it recorded the true, or sensible temperature of the glass, produc-

Figure 11—actual "field of view" of thermopile illustrated in Figure 10. Note snow on ground and white house which caused intense reflection of sunshine.

Figure 13—effect of "skyshine." "Apparent" and sensible glass temperatures on double-*glazed windows facing west-northwest on clear day, February 25, 1955* (below).



ing readings which corresponded to those made with a fine-wire thermocouple cemented to the surface of the pane. In the daytime, it registered the surface temperature as modified by incoming solar radiation, that is, its net radiant-cooling or radiant-heating effect.

The window where the thermopile was located was on the west-northwest side of the school and at no time, in midwinter, admitted direct sunshine. In the early morning, on clear days, it received a good deal of reflected sunshine from a row of houses several hundred feet away, and especially from one of the houses which was painted white. This particular house was within the "field of view" of the thermopile, with the result that the instrument sometimes read as high as 90F between 8 a.m. and 9 a.m. in the morning, when its reflection was intense (*Figure 11*).

During the month of January, counting school hours only, it was found that the "apparent" temperature of the glass was above 50F almost 95 percent of the time, despite the fact that its actual temperature was often 35F or lower. It was above 60F about 55 percent of the time the room was in use, and above 70F 7 percent. For 2.1 percent of the time the apparent glass temperature was above 75F, indicating that the window was having a net radiant-heating effect on the room. (*Figure 12 shows effect of "skyshine" on single-glazed windows facing west-northwest on January 31, 1955.*)

During February the room was equipped for a time with double glass in the form of inside storm sash. With two glass layers, the inside surface of the inner pane became sensibly much warmer, and its apparent temperature during the daytime was normally well above that of the room, often rising as high as 90F (*Figure 13*).

The conclusion drawn from these findings was that the cooling effect of large classroom windows, during school hours, is almost entirely confined to convective cooling, and the problem created by it confined to the window downdraft. Paradoxically, the downdraft problem itself was found to be greatest during very cold, sunny weather, when the rooms required *cooling*. Under such conditions, the cool air discharge by the unit ventilators to combat solar-heat gain became colder on contact with the glass, and if allowed to escape into the room, produced discomfort. As a result of skyshine, the radiant-cooling effects exerted by the windows were felt to be negligible.

Figure 14—Milium curtains retarded rate of nighttime cooling and intercepted radiant-heat transfer to windows.

aluminum-coated curtains

As an experiment in combating nighttime heat loss, one of the test rooms was equipped with special, heat-reflecting curtains and shades. Both had an aluminized surface intended to reflect heat back into the room, and during the experiment, one or the other was completely closed at night—the teacher lowering the shades or drawing the curtains before leaving the room at the end of the day, and then opening them completely the following morning. Their only daytime use was for room darkening in conjunction with visual aids.

To understand the theory of this experiment, it must be realized that although the heating was turned off in the late afternoon, and remained off until midnight or even later, nevertheless the greater part of the heat supplied by the boiler escaped at this time. During the day, the classrooms normally got as much heat as was needed from the body heat of the pupils, the sun, and to some extent from the lighting system. Thus little fuel was consumed in maintaining the daytime comfort temperature. At night, even with the heating turned off, heat which had accumulated in the structure escaped, and had to be replaced the following morning. This took the greater part of the fuel consumed.

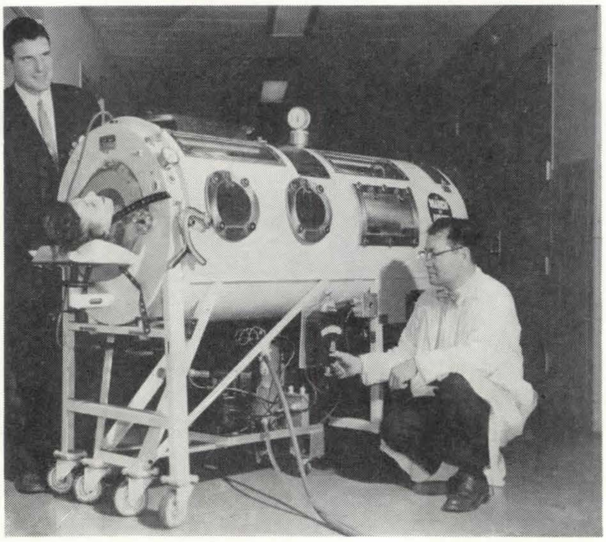
Thus, if a means could be found to slow down the rate of nighttime cooling, fuel would be saved. Milium curtains were installed in an effort to do just that (*Figure 14*).

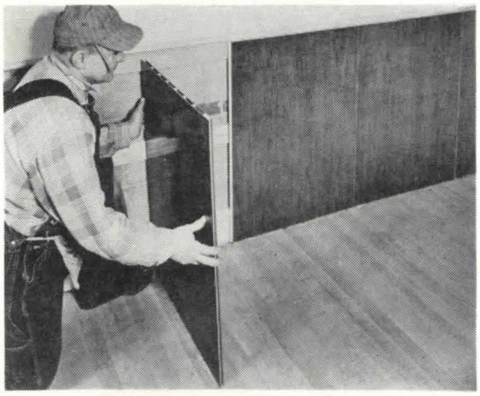
A second point which must also be understood, was that the shades or curtains blocked only one of the two avenues of heat flow to the windows—radiant-heat transfer. That they did so to a striking extent was manifest from the different "feel" of the rooms at night: when daytime temperatures were maintained, the room with the Milium shades was completely comfortable, whereas an adjoining room without them felt a little like a walk-in refrigerator. But heat also flowed to the windows by convection—air leaking around the shades and wiping down across the cold-glass surface. As radiant-heat transfer was reduced, convective-heat transfer increased, considerably reducing the saving actually realized.

To determine the exact proportionate saving achieved proved beyond the capacity of the investigators, who did not realize the complexity of the problem until after the cold weather was over. However, they came up with an "informed guess" that it was on the order of 25 percent of the heat lost through the windows. Since this was the principal form of heat loss from the room, and since the heat lost at night was a large part of that which had to be supplied artificially, it was felt that a schoolwide installation of the heat-reflecting shades or curtains—the two types seemed equally effective—would be economically worthwhile, especially since they proved popular for room darkening as well.

Remotely-controlled basketball backstops (above) *can be raised or lowered simultaneously in only two minutes by pushing a switch at one control point. Although manufactured in standard types, each E-Z Fold installation is in effect a custom job in that supports, clamps, and fastening devices are engineered to suit the individual structure. E-Z Fold, Inc., Spearville, Kans.*

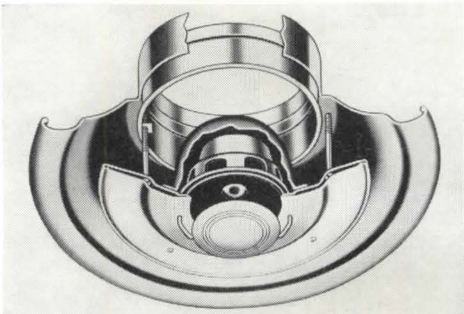
Air conditioning of iron lungs (below) *promises to bring relief to polio patients hermetically sealed in mechanical respirators. This unique development was conceived by Tohru Inouye of the U. of Illinois Research and Educational Hospital. At Inouye's suggestion, an air diffuser was redesigned to a convex shape in order to fit the curved inner side of iron lungs. The idea is said to have come from studying the characteristics of Pyle-National units used in ceiling air diffusers in the hospital. Multi-Vent Division, Pyle-National Co., 1334 N.-Kostner Ave., Chicago, Ill.*





A new kind of hollow-core wall-and-ceiling paneling, tongue-and-grooved at edges and ends, Kore-lock combines two sheets of Masonite tempered hardboard and an interlocking wood core (above). *The face of the panel has a durable plastic finish in plain color or wood pattern. Panels are applied directly over open framing or furring. Marsh Wall Products, Inc., Dover, Ohio.*

Air diffuser designed to accommodate an 8" high-fidelity speaker—recommended for air terminals, plant cafeterias, manufacturing areas, etc.—will deliver air as well as announcements or piped music. This loudspeaker-air diffuser (right) *is available in three neck sizes—14", 16", and 18"—with or without damper; any extended range speaker may be specified. Connor Engineering Corp., Danbury, Conn.*

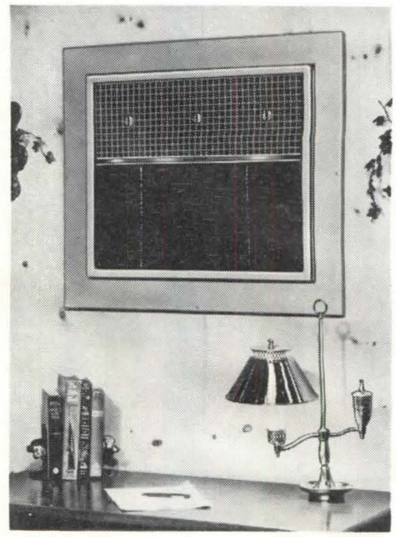


Bake a potato in five minutes? Broil a thick steak in seven minutes? New electronic oven (left) *now available in several of nation's major markets will perform these feats. Neither oven nor dish becomes hot during cooking process! Oven eliminates heat in kitchen; walls remain cool and can be cleaned by wiping with damp cloth. Interior is 18" wide, 14" deep, and 11" high. Operation cost is said to be less than that of conventional electric range. Retail price: approximately $1000. The Tappan Stove Co., Mansfield, Ohio.*

p/a products

(Continued from page 159)

air and temperature control



Thinline Air Conditioner: new air-conditioning unit, suitable for built-in-wall installation as well as window mounting, is only 16½″ deep. Small unit size is accomplished by space-saving propeller-type fan with special air chamber to provide maximum efficiency and minimum noise level; operational features also include exceptionally high dehumidification, ventilation, and exhaust capacities. Cabinet grills of beige polystyrene and brown-textured, perforated aluminum conceal controls and equipment; ½-, ¾-, and 1-ton models all measure 25″ wide x 20⅜″ high x 16½″ deep. General Electric Co., Appliance Park, Louisville 1, Ky.

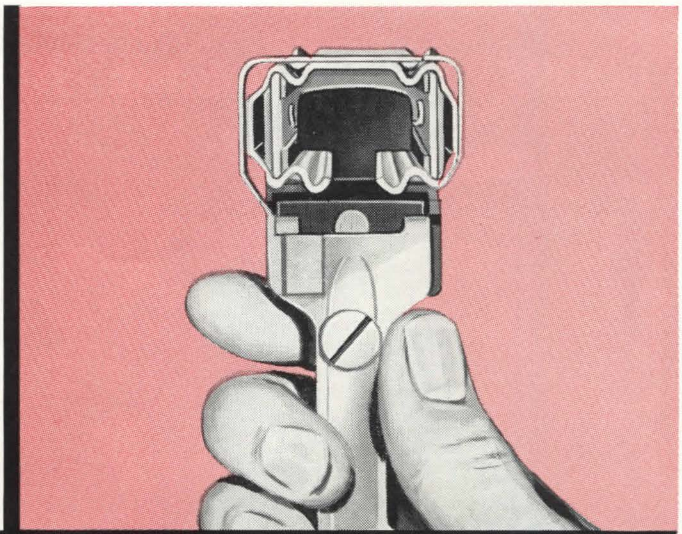
"Custom" Air-Conditioning Unit: new room air conditioner features facilities for heating air as well as cooling it. Unit, designed for window installation, is available with electric-resistance element or reverse-cycle heating; exhaust, dehumidification, cooling, ventilating, and heating are controlled by automatic thermostat or manual dial. Adjustable louvers on cabinet direct air and assure draft-free operation; conditioner may be had in ¾- or 1-hp models. Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago, Ill.

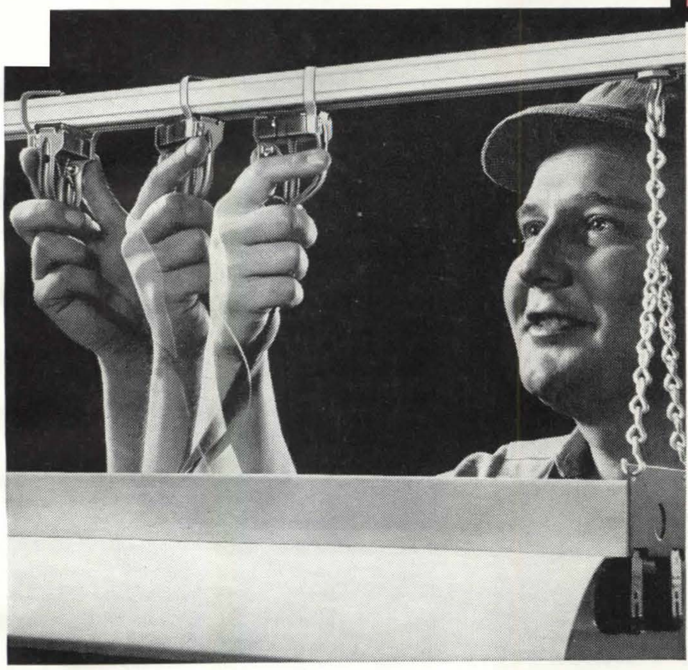
construction

Roto-Trowel Machine: lightweight machine for troweling concrete facilitates higher quality of construction. Machine can be used on horizontal surfaces soon after pouring of concrete; rotating action of blades brings wet cement to surface and delays setting time—permitting use of stiffer concrete mix. Pitch of blades can be adjusted to any degree; machine can work right up to walls or obstructions. Stow Mfg. Co., 443 State St., Binghamton, N. Y.

(Continued on page 162)

TWISTOUT PLUGS engage bus bars with but a simple twist . . . make adding a light safe, easy, fast! Trolleys are also available to give real mobility to small power tools.





BULLDOG UNIVERSAL TROL-E-DUCT

Puts Light Just a Twist Away . . .

Both feeds and supports lights along its entire length!

Here's a *flexible* power source for lights and small power tools . . . one that provides big savings in increased efficiency! Specify BullDog Universal Trol-E-Duct®—the *original*, continuous-outlet system that meets constantly *changing* needs for years to come.

Twistout Plugs give positive, safe connections in seconds. Lights can be rearranged, added or removed without rewiring or downtime. Movable weight supports make it easy to hang lighting fixtures, to shift them anywhere along the duct.

Universal Trol-E-Duct offers impressive advantages over ordinary systems—in longer life, in maintenance, in a variety of ways. See a BullDog field engineer, or write BullDog Electric Products Co., Detroit 32, Mich.

© BEPCO

IF IT'S NEW . . . IF IT'S DIFFERENT . . . IF IT'S BETTER . . . IT'S **BULLDOG**

ELECTRIC PRODUCTS COMPANY

A Division of I-T-E Circuit Breaker Company

Export Division: 13 East 40th Street, New York 16, N. Y. • *In Canada:* BullDog Electric Products Co. (Canada) Ltd., 80 Clayson Road, Toronto 15, Ont.

p/a products

(Continued from page 160)

doors and windows

Yale 5400 Series: new line of heavy-duty locks is designed for buildings where hardware is subject to heavy use. Case for all pin-tumbler, key-in-knob, cylindrical locks is identical; four knob designs, four accessory trims, and seven standard finishes are interchangeable. For increased resistance to wear, all steel parts are rustproofed, bolts are solid brass or bronze, cylinders are solid brass, and exposed parts are solid brass, bronze, stainless steel, or aluminum. The Yale & Towne Mfg. Co., Chrysler Bldg., New York 17, N. Y.

finishers, protectors

Vaportite Coating: waterproof coating is formulated for dampproofing of exterior and interior concrete or masonry walls subject to severe weather conditions. Formula, consisting of inorganic setting powder and liquid-resin emulsion binder mixed at job site, is claimed to give service five times longer than ordinary waterproof paints; coating is also said to save up to 50 percent in labor costs, since it is applied by brush and requires no curing. Allied Compositions Co., Inc., 11-15 44 Rd., Long Island City 1, N. Y.

insulation (thermal, acoustical)

Finnflex Vibration Hangars: heavy-duty, steel-spring vibration isolators are designed to prevent transmission of noise and vibration from suspended equipment or to flexibly supported piping systems. Suspended load is transferred to helical, steel isolating spring enclosed in steel housing; springs will withstand high temperatures without creep and low temperatures without becoming stiff. Rated capacities range from 50 to 1000 lb. Industrial Div., T. R. Finn & Co., Hawthorne, N. J.

specialized equipment

Sacrarium and Basin: stainless-steel combination sacrariaum and basin, for use in church baptistries or sacristies, is made in wall-hung or cabinet-type models. Sacrarium is protected by hinged steel cover with lock and key; basin is equipped with chrome-plated, hot- and cold-water faucets. Cabinet model features wood-grained, laminated-plastic finish and recessed base. L. C. Gooden, Inc., 1 W. 21 St., New York 10, N. Y.

Magic Chef *Built-In* Units: new models in built-in ovens and ranges feature several added conveniences. Broiler tray automatically swings out to position convenient for cooling, turning, or removing food, when door is opened; range units have drip tray to collect spilled foods and small splashback to protect wall. Heavily insulated, chromium-finish oven and broiler unit fits standard 24" cabinets; range units fit in 36" base cabinets. Magic Chef, Inc., St. Louis 10, Mo.