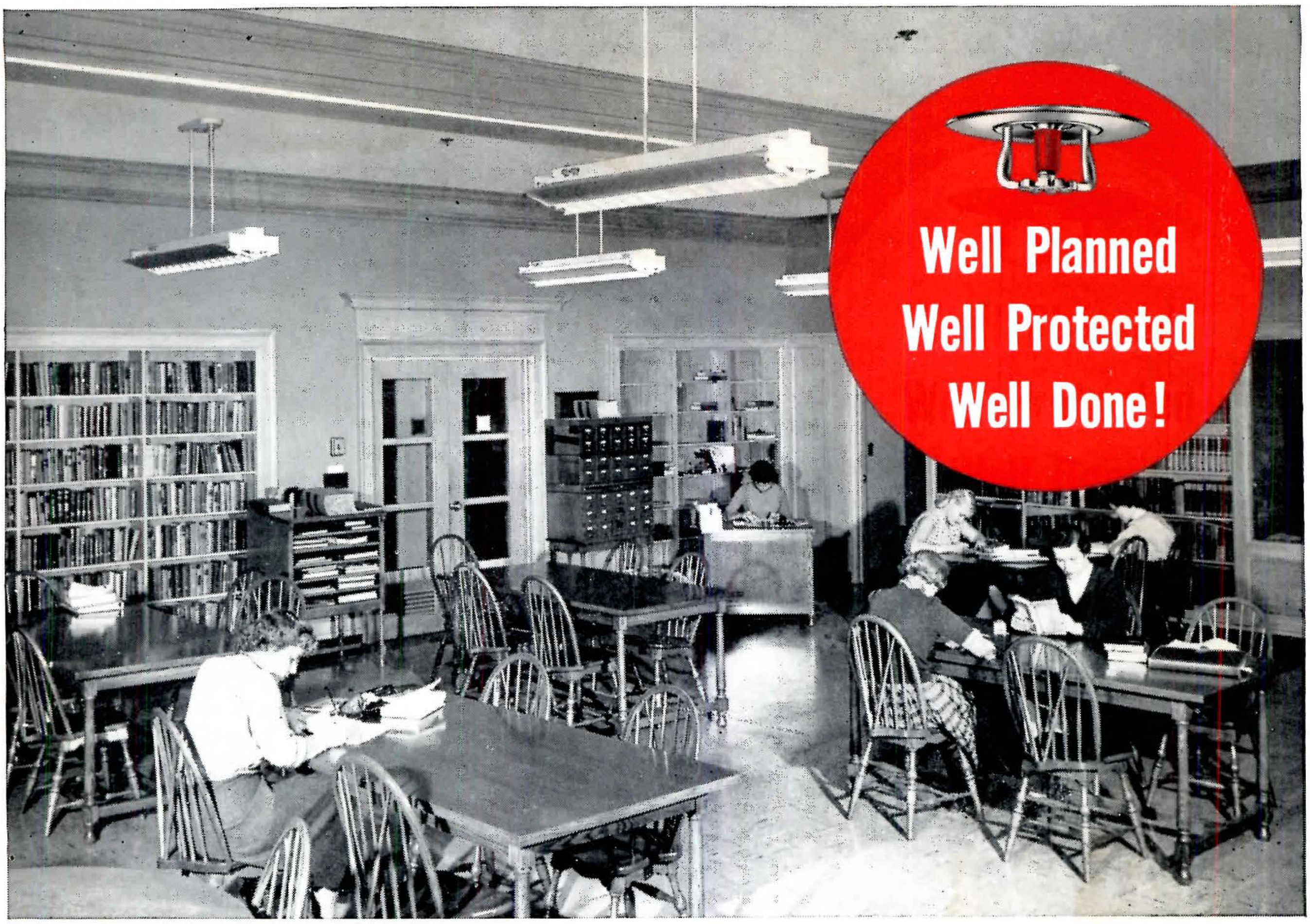
ARCHITECTURAL RECORD

BUILDING TYPES STUDY

SCHOOLS 219

FEBRUARY 1955

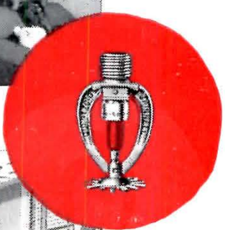


Library at Westbrook Junior College. Grinnell Ceiling Sprinklers afford inconspicuous, around-the-clock protection.

Westbrook Junior College looks to

GRINNELL SPRINKLERS

Typical dormitory room, showing regular Grinnell Quartzoid Bulb Sprinkler.



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

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

Of interest to everyone concerned with smart, modern interiors is the functional way in which the new Grinnell System was handled. Where rooms had to appear particularly attractive and uncluttered, such as the library, Grinnell flush-type Ceiling Sprinklers — extending only a scant inch below the ceiling — were used. But where emphasis could be somewhat less on looks, regular Grinnell Sprinklers served. Either type, of course, is equally effective in quenching fire — quickly, automatically — *at its source.*

Most architects today are aware that there is a moral obligation to see that the buildings for which they are responsible are *completely* fire safe. So call on Grinnell when planning your next school, hospital, theater, office building, factory. There is a Grinnell System for *every* fire hazard. Write for literature on Grinnell Sprinklers. Grinnell Company, Inc., 269 West Exchange Street, Providence, R. I.

GRINNELL

PROTECTION AGAINST EVERY FIRE HAZARD

ARCHITECTURAL RECORD (Vol. 117, No. 2, February, 1955) is published monthly by F. W. Dodge Corporation, 10 Ferry Street, Concord, N. H., with editorial
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ARCHITECTURAL RECORD

February 1955 Vol. 117 No. 2

 ARCHITECTURAL RECORD (combined with AMERICAN ARCHITECT and ARCHITECTURE) is published monthly by F. W. Dodge Corporation, 10 Ferry Street, Concord, New Hampshire, with editorial and executive offices at 119 West 40th Street, New York 18, New York. Western editorial office, 2877 Shasta Road, Berkeley 8, California.

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COVER: Carter G. Woodson Jr. High School, New Orleans, La.; Favrot Reed Mathes & Bergman, Architects. Ulric Meisel photo

Continued on next page

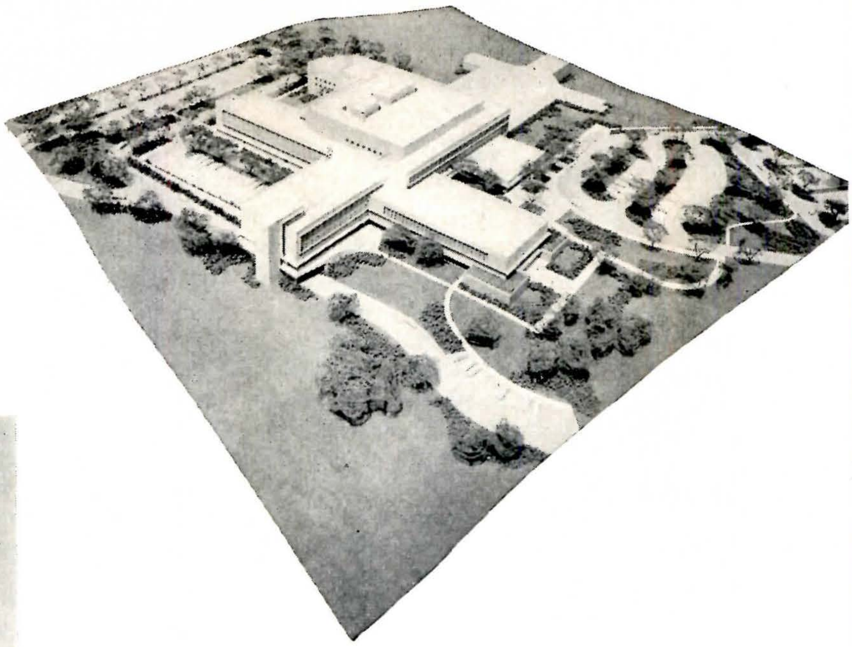
ARCHITECTURE is not listed as a category in the 40-page index of the 1955 *World Almanac*, while *Medicine* and *Law* both are. Architects are a category, and so are *Physicians* (but not *Doctors*); the index lists neither *Lawyers* nor *Attorneys*. Score for the American Medical Association? Score again for the A.M.A. on subheadings: *Medicine* has 24 and *Physicians* two; *Architects* come out ahead of *Law* four to three. As to content, herewith a summary of the information about *Architects* available from the *World Almanac*. The subheading "Associations" refers to listings (one line each) of Alpha Rho Chi, Scarab, Alpha Alpha Gamma, the American Institute of Architects, the New York ... C. Goodhue (1923), Henry J. Hardenbergh (1918), Thomas Hastings (1929), Charles F. McKim (1909), William R. Mead (1928), Robert Mills (1855), Frederick L. Olmsted (1903), Robert S. Peabody (1917), John Russell Pope (1937), George B. Post (1913), Henry H. Richardson (1886), Russell Sturgis (1909), Louis Sullivan (1924), Samuel B. P. Trowbridge (1925) and Stanford White (1906).

MORE THAN A SHELTER: One comment by U. S. Assistant Commissioner of Education Wayne O. Reed in his talk before the most recent A.I.A. Gulf States Regional Conference may have special pertinence in thinking that might well stand as the basic program for the American school. These themes are "that schools should serve the whole citizenry; that they should nurture loyalty to the nation; that they should be supported and controlled by civil government rather than left to private means; that the school program should provide the electorate with knowledge and skills for making intelligent decisions; that liberal education for potential leaders should be open to the best qualified without regard to wealth or social station; and that everything about the school should be geared to produce free men worthy of the blessings of a free society."

Continued from page 5

THE RECORD REPORTS: PROJECTS IN THE NEWS

Right: Basic Sciences Building, West Virginia University Medical Center, Morgantown, W. Va. — C. E. Silling & Associates, Architects; Schmidt, Garden & Erikson, Associate Architects. First unit (foreground) of $25 million medical center, together with teaching hospital (background), to be built next, will provide teaching facilities for 1100 students in medicine, dentistry, pharmacy, nursing and related fields. Contract cost: $10,675,000 — low bid of 10 which ranged up to $11,462,000; architects' pre-bid estimate: "about $11 million." Cy Silling's comment: "Who said 'modular' caused wild bidding? Who said contractors wouldn't bid from 'modular' drawings?"



Above: Citizens National Bank, Abilene, Tex. — George L. Dahl Architects & Engineers. Site 140 by 104 ft in heart of city is being developed as business center. Of 173,200 sq ft of gross floor area, bank will take 46,250 in basement and first two floors, shops 9950 on first floor, parking garage for 250 cars 63,300 on first two floors and roof, and rental offices 49,850 on top six floors. Cost is estimated at $2.5 million. Curtain walls above the first floor will combine cobalt blue porcelain enameled steel with aluminum. Completion: this fall

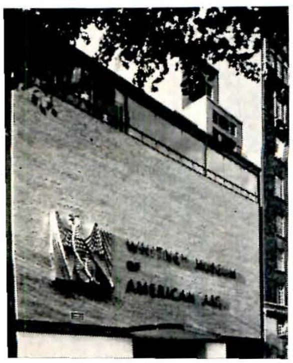
Below: Structural Clay Products Research Foundation Laboratories, Geneva, Ill. — Howard T. Fisher & Associates, Architects. Building of cavity-wall design will consist of two load-bearing masonry cubes placed side by side for maximum use of space and intended — like the massive brick chimney — to symbolize the shape and pattern of structural clay products. Larger section has been arranged to permit construction of full-size experimental buildings the year around, with part of ground to be exposed so foundation construction conditions can be duplicated. The rolling 16-acre site will also be utilized for experimental outdoor construction. Mid-1955 completion is expected

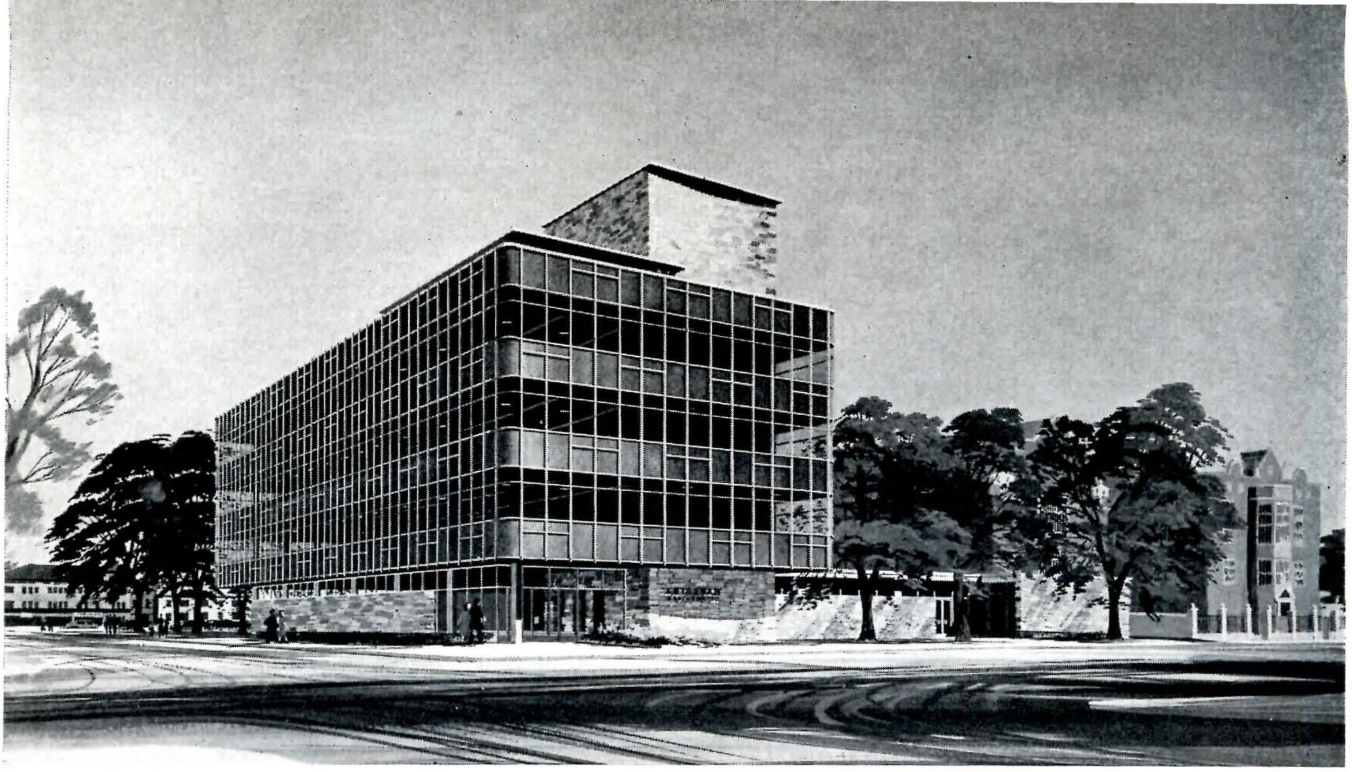
NEW MUSEUMS COAST TO COAST

New York's Whitney Museum opened its new building at 22 West 54th Street (adjoining the Museum of Modern Art) in October. Hung-glass ceiling contains general and directional lighting, free-standing partitions are movable and "exceptionally resilient" composition wood floors were chosen to pamper visitors' feet. Architect: Auguste Noel

Santa Fe's Museum of International Folk Art, a branch of the Museum of New Mexico, is a unit in a group of traditional Spanish-Pueblo buildings and its predominant earth color and mass contours are intended to link a contemporary concept with the old

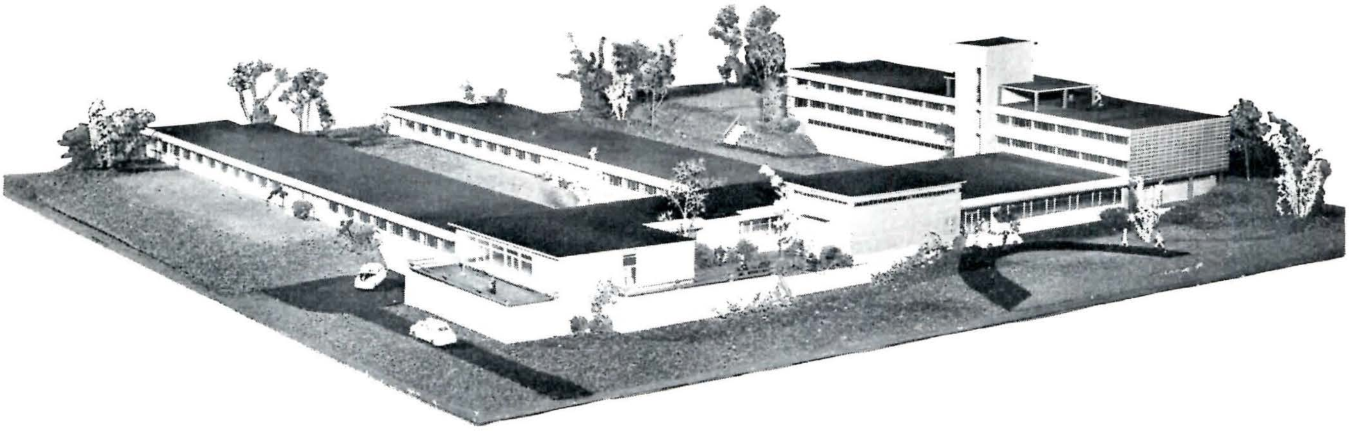
Ezra Stoller





Hedrich-Blessing

Above: Home Office Building of the Lutheran Brotherhood Life Insurance Association, Minneapolis — Perkins & Will, Architects. Brotherhood will occupy five-story main wing, a private insurance agency the one-story element. The two units make an L enclosing outdoor sunken garden which adjoins basement lounge of main wing. Facilities for Brotherhood library and executive offices on first floor, business offices above, dining room, kitchen, 300-seat auditorium and lounge below. Estimated cost: $2.1 million

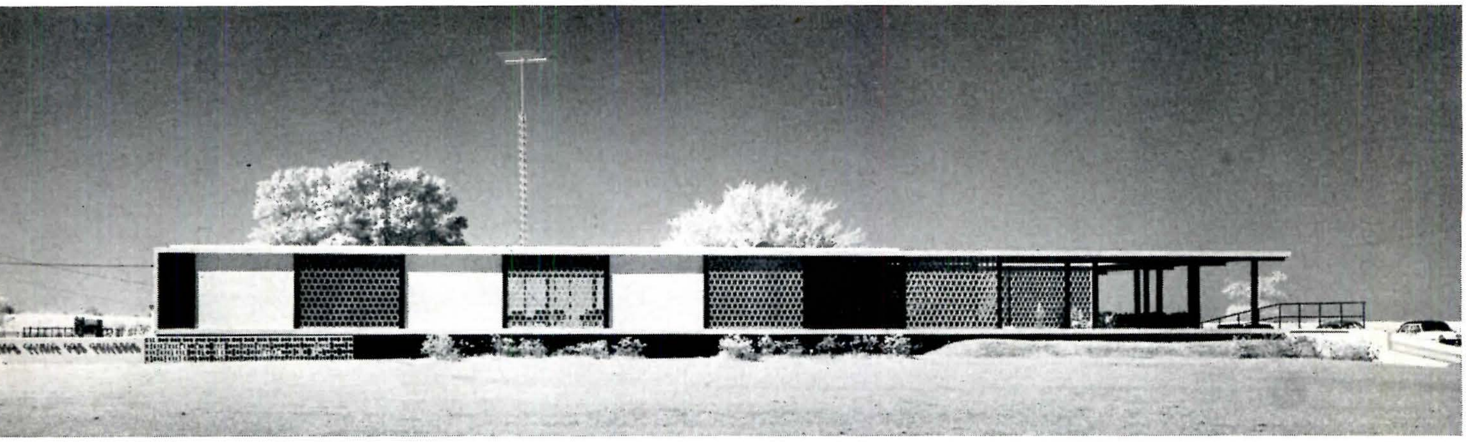


Above: Hebrew Home for Aged, Hartford, Conn. — Kane & Fairchild, Architects. Chapel, as a focal point in the life of the Home, has been made focal point of design. Chronically ill residents are housed in the two-story wing. The ambulatory are housed on one level, with the lounge, dining room, library, meeting rooms, game rooms and chapel; from all-glass south wall of lounge and recreation rooms, sliding doors open on terraces and garden walks; there is a solarium at the end of each wing. Contract cost: $1,509,000

buildings. It won First Award in the public buildings category in last year's A.I.A. Western Mountain Region Honor Awards program. Cost: $374,000. Architect: John Gaw Meem of Meem, Zehner, Holien and Associates

Frank Lloyd Wright's first art gallery was originally designed to house Los Angeles showing last summer of his touring retrospective exhibit, "Sixty Years of Living Architecture," now is maintained as Municipal Art Gallery. Built at a cost of $50,000 because much of the materials and labor (like the design) were contributed, the gallery adjoins Wright's famous "Hollyhock House" on Olive Hill

Rothschild

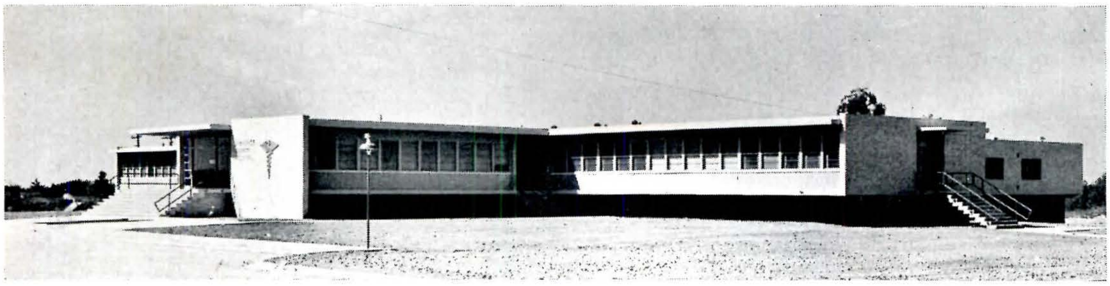


FIRST HONOR AWARD went to architects Curtis & Davis of New Orleans for the Sako Clinic for Children in Raceland, La.

GULF STATES ARCHITECTS BESTOW ANNUAL HONOR AWARDS

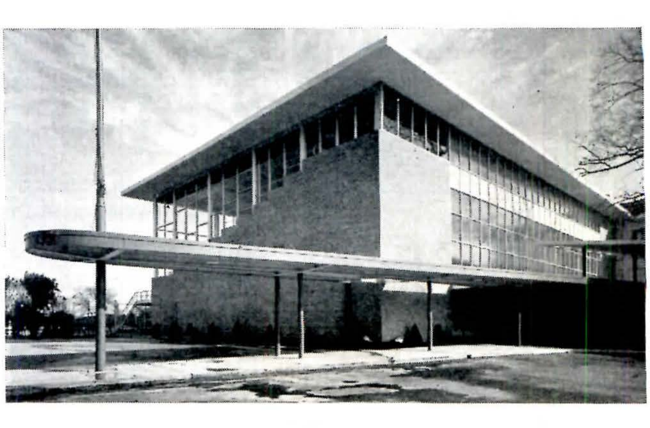
EXHIBITED at the regional meeting held by the Gulf States members of the American Institute of Architects in Little Rock (ARCHITECTURAL RECORD, November 1954, p. 24), winning boards in the organization's 1954 awards program will comprise a traveling exhibition to be circulated by the Gulf States Region. Members of this year's jury were architects Richard Aeck, Atlanta, chairman; Henry Wright, Los Angeles, Donald Edmundson, Portland, Max Flotow, Albuquerque; and Carl W. Clark, Syracuse. Frank G. Lopez, senior editor of the RECORD, was professional adviser to the jury.

AWARD OF MERIT was presented for classroom in the St. Frances Xavier Cabrini School, New Orleans; Curtis & Davis, architects



AWARD OF MERIT was given to the 40-bed Lawrence County Hospital in Moulton, Ala.; architects were Turner & Northington with associates Malcolm E. Smith and Lloyd H. Kranert

AWARD OF MERIT went to Erhart, Eichenbaum & Rauch, architects, of Little Rock, for an addition to the grandstand of the Oaklawn Jockey Club in Hot Springs, Ark.



For Atomic Power

PLANS FOR A NUCLEAR CONGRESS, scheduled to take place in Cleveland December 12–16, have been announced by the Engineers Joint Council's General Committee on Nuclear Engineering and Science. An estimated 2500 people will discuss peace-time uses of nuclear engineering in industry and other fields. The meeting was scheduled to follow the international atomic energy discussion, a United Nations project, to be held this summer in Geneva. E. J. C.'s committee on nuclear engineering is headed by Dr. John R. Dunning, Dean of Engineering at Columbia University; secretary and program chairman of the committee is Prof. Donald L. Katz of the University of Michigan.

Construction in '55

A POSSIBILITY OF $56 BILLION in U. S. construction was forecast for 1955 by the Associated General Contractors of America in their Annual Construction Review and Outlook. This would be $4 billion more than the 1954 total. By categories, the A.G.C. predicted: for residential construction — $15 billion in private expenditures for some 1,300,000 units; for business — $2.5 billion, an increase of one-sixth over 1954; for industry — close to the $2 billion mark for 1954, with chance of a slight decline; for religious and education buildings — a continued high, possibly reaching $700 million in each category; increases are also expected in hospital and institutional construction; for the Federal government — a one-third drop in industrial building because of a projected decrease in atomic energy expansion, and a one-fifth increase in military and naval construction; for state and local governments — $8 billion for highways, schools and other community facilities, with educational building expected to rise by one-fifth to $2.5 billion.

Report on Civil Defense

A SURVEY OF 24 AMERICAN CITIES is reported in a new publication "Status of Civil Defense in America's Largest Cities," issued by the American Municipal Association. The survey, which was conducted in cities with populations over 400,000, covers budgets, staffs, evacuation plans, control centers and shelter programs.

School Exhibits Planned

THREE REGIONAL CONVENTIONS and architectural exhibits have been scheduled by the American Association of School Administrators in its non-national-convention year. The St. Louis conference will be held February 26–March 2; the Denver conference, March 12–16; and the Cleveland conference, April 2–6. The architectural exhibits are co-sponsored by the A.A.S.A. and the American Institute of Architects.

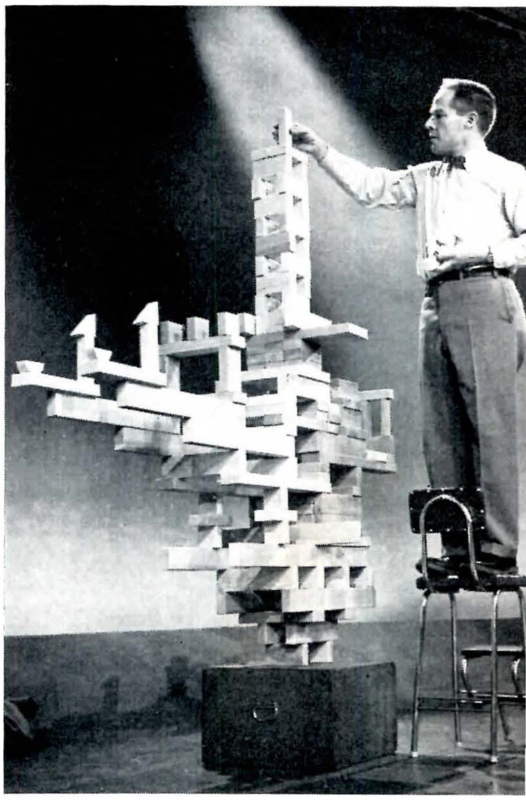
1955 Gold Medals

THE ARCHITECTURAL LEAGUE OF NEW YORK has announced plans for its 1955 National Gold Medal Exhibition, which will be held March 1–25. Preliminary submissions in architecture, mural decoration, design and craftsmanship, sculpture, landscape architecture and engineering were due January 21.

— Drawn for the RECORD *by Alan Dunn*

"And while I was in the States I met a fellow named Bucky Fuller —"

Appearing on the television program "Omnibus," architect Eliot Noyes of New Canaan, Conn., was asked to see what he could do with an assortment of building blocks; for his structural solution, see below. Mr. Noyes returned to the program on January 2 and 9 for more serious discussions of architecture and a plea for the preservation of Grand Central Concourse



ASHACE Honors Leopold

AT THE 61ST ANNUAL MEETING of the American Society of Heating and Air Conditioning Engineers, the society's F. Paul Anderson Medal, its highest honor, was awarded to Charles S. Leopold, Philadelphia heating and air conditioning consulting engineer, for "his outstanding contributions to the advancement of human comfort in the fields of heating, ventilating and air conditioning."

Strauss Award to Grossi

THE SIDNEY L. STRAUSS MEMORIAL AWARD, an annual award given under the aegis of the New York State Association of Architects and its constituent organizations, went this year to Olindo Grossi, Dean of the School of Architecture at Pratt Institute, Brooklyn, N. Y. The award honors outstanding service to the profession, and was presented at the annual dinner of the New York

(*Continued on page 16*)

(*Continued from page 15*)

Society of Architects, held on December 21 in New York City.

On Church Architecture

A CONFERENCE for Architects, Clergymen, and Interested Laymen on Religious Architecture is planned by the Department of Architecture and Architectural Engineering of Iowa State College. The meeting, which will take place in Ames on February 8–9, will be directed by Professors Donald McKeown, Lawton Patten and Richard McConnell, and, for Engineering Extension, G. Ross Henninger.

For School Planning Research

THE INDUSTRY-SPONSORED International Institute of School Planning, to be established at Indiana University, is intended to be a center for research into "all of the environmental factors" affecting students, with the emphasis on lighting, heating, ventilation, sound, decoration, seating and educational aids. The director will be Paul W. Seagers.

Russell Whitehead Dies

RUSSELL F. WHITEHEAD, author of the well-remembered *White Pine Series* on American Colonial architecture and one-time editor of ARCHITECTURAL RECORD, and later of *Pencil Points Magazine*, died December 2 in Albuquerque, N. Mex., where he had in recent years made his home. He was 73 years old. Mr. Whitehead was a member of the American Institute of Architects and a past secretary of the Architectural League of New York.

ARCHITECTS SPEAK UP FOR MODULAR COORDINATION

Hauf

Schlossman

THE ARCHITECTURAL PROFESSION was well represented on the agenda of the Building Research Institute's December conference on "Modular Coordination — It's Value in Contemporary Building." Harold D. Hauf, head of the School of Architecture at Rensselaer Polytechnic Institute, served as conference chairman; architect Norman J. Schlossman, of the Chicago firm Loebl, Schlossman and Bennett, summarized the conference for the design profession.

Seven other architects spoke to the conferees, and contributed these remarks:

John Magney, of Magney, Tusler & Setter, Minneapolis: "The modular system is tailor-made for contemporary architecture. If architects would use the system, their clients would get a building that is designed better, detailed better, and built better, at a lower construction cost."

Max H. Foley, of Voorhees Walker Foley & Smith, New York: "Our buildings are made of the finest materials and the finest, most ingeniously designed equipment, but they are a collection of these materials and these parts which have been laboriously fitted together at the site. . . . A fair analogy would be for an automobile manufacturer to make perfect parts for the engine and the chassis and the furnishings of the modern car and then have all these parts put together by mechanics and laborers using hammer and chisel and saw."

Edward X. Tuttle, of Giffels & Vallet, Inc., L. Rossetti, Detroit: "Designers who are not particularly conscious of the modular scheme produce designs having a standard pattern because of limitations placed upon them by prefabricated *units* which are produced in standard sizes. The modular system and the four-in. module are accomplished facts; the need for proselyting is past; logical development of uses for this tool is taking place."

John Knox Shear, editor-in-chief of ARCHITECTURAL RECORD: "Too many men have been too busy designing buildings to give much thought to how they could design them better. And in those instances where the designer's conscience quivers he has generally been able to calm it either by claiming that an artist can accept no module other than his own genius or by pleading that to change over his system of producing designs and working drawings would be costly through either slowing him up or fouling him up. This seems an instance where *un*familiarity breeds contempt. Many architects seem prejudiced against this change. Prejudice is being down on what you're not up on."

W. S. Kinne Jr., professor of architecture, University of Illinois, speaking on light gage steel building construction: "The potential of industrial standardized production is now beginning to be utilized in the form of a useful and economical building and product. . . . This whole thing is interesting and important because it establishes a sound case for the ability of industry to provide a building type idea that makes sense to the people needing buildings."

Philip Will Jr., of Perkins & Will, Chicago: "Practical standardization is limited to the component parts. Assemblies will probably continue to be largely custom dimensioned."

Gannett Herwig, of LaPierre, Litchfield & Partners, New York: "One reason for the present variations in dimensions of similar materials is the accumulation of past effort on the part of master builders and architects to bring a degree of visual pleasure in the sight of their constructions to the public eye. . . . The architect now faces a problem of whether he shall persist in the maintenance of these variations, having already accepted a large number of non-variable dimensions in many products."

Shear

Tuttle

Kinne

Magney

Foley

Will

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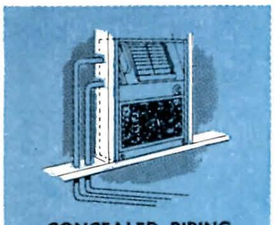

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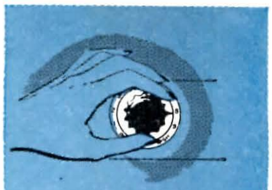

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NEWS FROM CANADA *by John Caulfield Smith*

HOUSING CONSTRUCTION SETS A RECORD IN '54

A TOTAL of $2,154,959,200 in contracts awarded gave 1954 a building volume second only to the record year of 1951, which produced over $2.25 billion in contracts, according to figures released by MacLean Building Reports. Last year's construction total was a slight improvement over that of 1953.

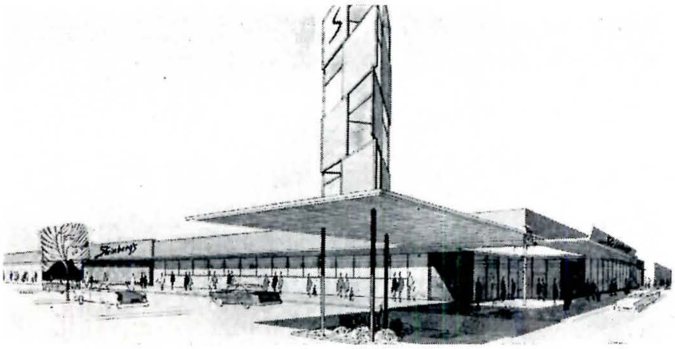
1954 was a record year, however, for housing, which accounted for nearly 45 per cent of the total volume of building. There were about 115,000 starts, of which about 70,000 were carried over into 1955. The explanation given for this increase in housing construction is the more liberal financing allowed under the 1954 National Housing Act, which reduced down payment requirements and lengthened mortgage pay-off periods.

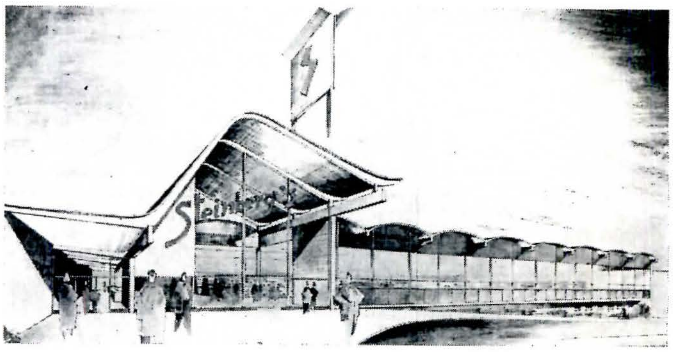
Business and institutional buildings made up the second largest part of building in 1954, and accounted for 25 per cent of all construction. Factory building and engineering work both dropped.

Predictions for construction in 1955 show some uncertainty in the field of housing, where a lowering of the rate of family formation and the possibility of a drop in immigration seem discouraging, although a steadily high birth rate and the demand of some families for larger quarters seem hopeful. In commercial and industrial building a wave of secondary expansion is expected as a result of the completion of some of the country's primary resource developments. The industry also looks to the start of the St. Lawrence seaway and power projects as a boost to construction.

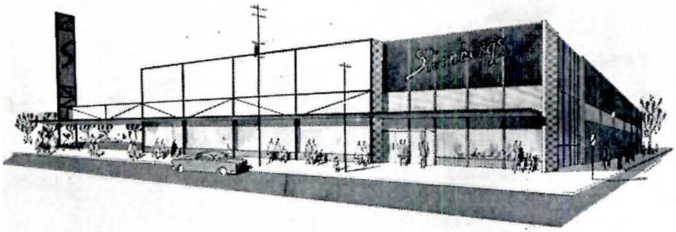
(Continued on page 30)

SUPERMARKETS AND ARCHITECTURE: FOOD CHAIN EXPANDS

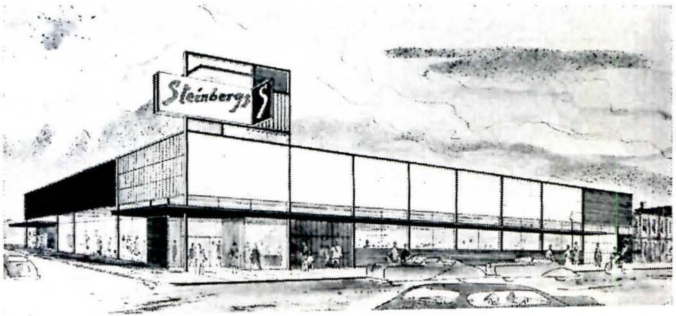


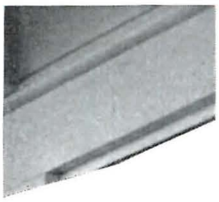


A LARGE EXPANSION PROGRAM projected by Steinberg's Ltd., a food store chain operating in the Montreal area, entails the construction of 12 new stores, two of which have already been opened, while the others are scheduled for completion within the year. The next phase of Steinberg's expansion plans calls for the opening of a new supermarket every 60 days over the next four years.



Some of the supermarkets planned by Steinberg's Ltd.: 1. Montreal — Keith L. Graham, designer; 2. Sherbrooke, Que. — Max Roth, Montreal, architect; 3. Manor Park, Ottawa — Elisasoph & Berkowitz, Montreal, architects; 4. Quebec City — Sydney & C. S. Comber, Montreal, architects; 5. Ahuntsic, Montreal — Keith L. Graham, designer; 6. Montreal — Max Roth, architect





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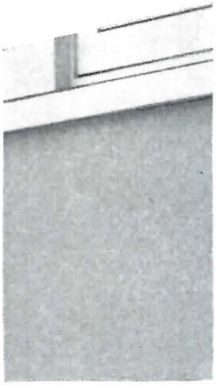
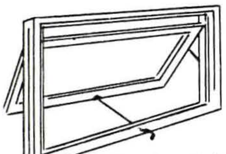


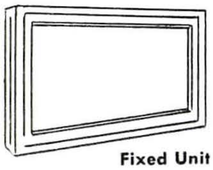
BILT-WELL Awning Windows, at left, are installed in Willoughby School District Field House. Architect: Bruce Huston & Associate, Willoughby, Ohio. Builder: Pontiac Builders, Euclid, Ohio.

Here's why Architect Bruce Huston selected BILT-WELL Awning Windows: "They fitted in perfectly with my design conception, also they provided very good simplified weather control. Other important features are the top quality weatherstripping and the fact that they are easy to install and repair because of their construction. The BILT-WELL Awning Windows are economical too!"

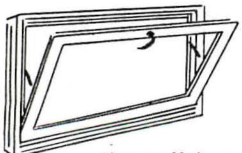
BILTWELL AWNING WINDOW UNITS



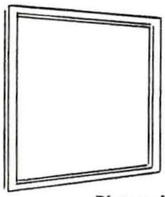
Awning Unit



Fixed Unit



Hopper Unit



Picture Unit

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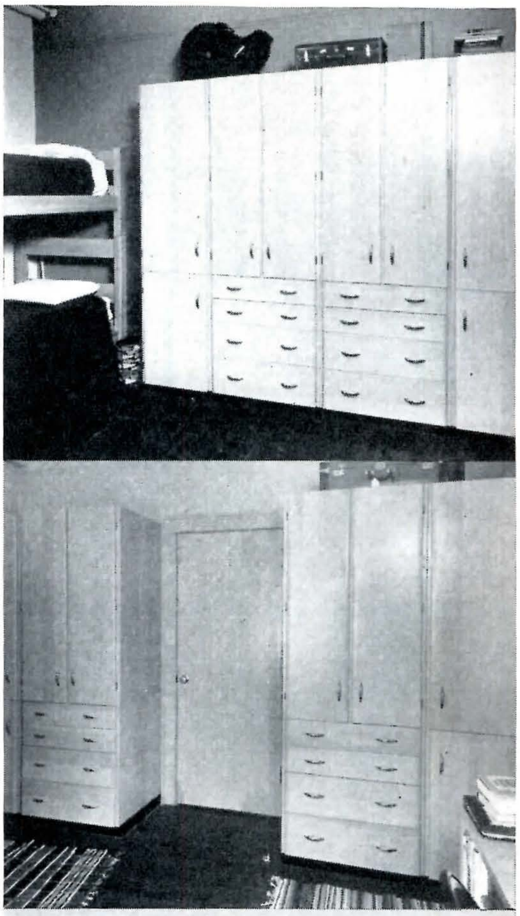
Sturdy utility cabinets to withstand rigorous usage, requiring only a minimum of maintenance.

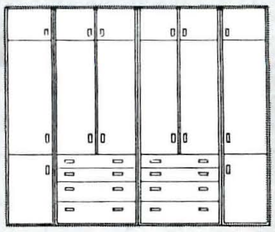
Manufactured of clear Ponderosa Pine, standardized in sectional units from 15″ to 42″, precisely machined, accurately prefitted, semi-assembled and carton packed.

Doors, sides and frames are ¾″ thick solid wood. Shelves are dadoed into sides, and drawer fronts and sides are dovetailed together. Front frames are mortised and tenoned construction. Instructions for assembling and suggestions for various stained natural finishes are included in the carton. All hardware is included.

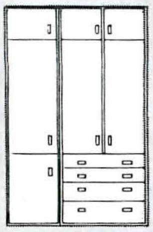
For further information see $\frac{5c}{Ca}$ and $\frac{23b}{Ca}$ Sweets 1955 Architectural File.



Bilt-Well Cabinets in the dormitory, Steffens Hall, University of Dubuque, Dubuque, Iowa.



BASIC 2 PERSON STORAGE

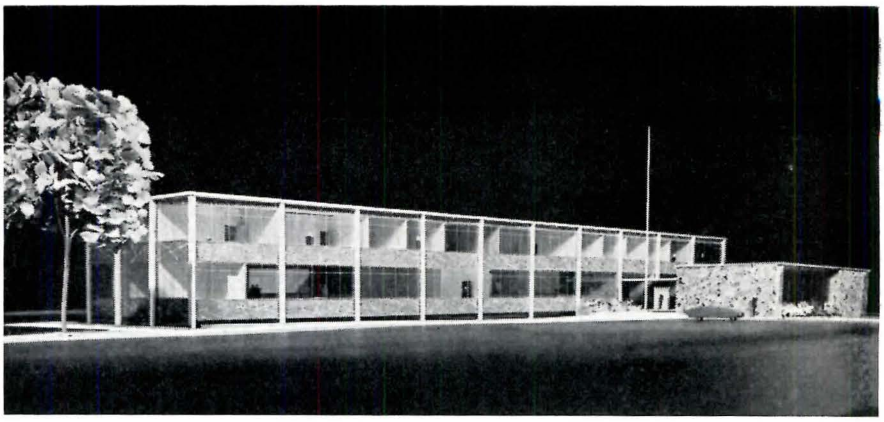


BASIC 1 PERSON STORAGE

Manufacturers of Fine Wood Work for the Home Since 1866.

Build Well with BILT WELL WOOD WORK

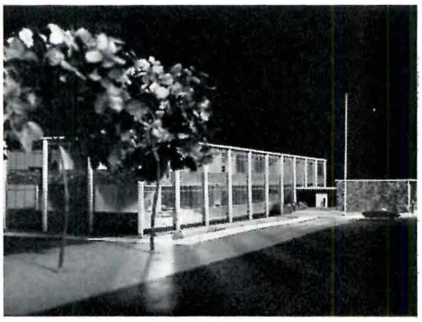
CANADA
(Continued from page 26)



A municipal building proposed for the Township of Scarborough, Ont., was designed by architects Carter, Coleman & Rankin, of Toronto

PLANS ANNOUNCED FOR HOME '55 COMPETITION

The Home '55 competition, this year's edition of the annual contest sponsored by *The Canadian Home Journal*, is open



to all members of the Royal Architectural Institute of Canada. The deadline for submissions is March 1.

Members of the jury include D.G.W. McRae, Toronto architect, as professional advisor and chairman, and George D. Gibson and Charles R. Worlsey, both Toronto architects, as well as Mary Etta Macpherson, editor of the magazine.

NEW C.M.H.C. PRESIDENT APPOINTED BY AGENCY

Steward Bates, former Deputy Minister of Fisheries, has been named president of the Central Mortgage & Housing Corporation, an agency in the Ministry of Public Works. Mr. Bates succeeds David B. Mansur, who recently resigned to take a position in private business.

SUBCONTRACTORS "STRIKE" IN BID PEDDLING FIGHT

In a move to block the practice of bid peddling, the National Association of Master Plumbers and Heating Contractors of Canada has passed a resolution advising its members to refuse to submit bids to general contractors. The association suggests that they bid in-

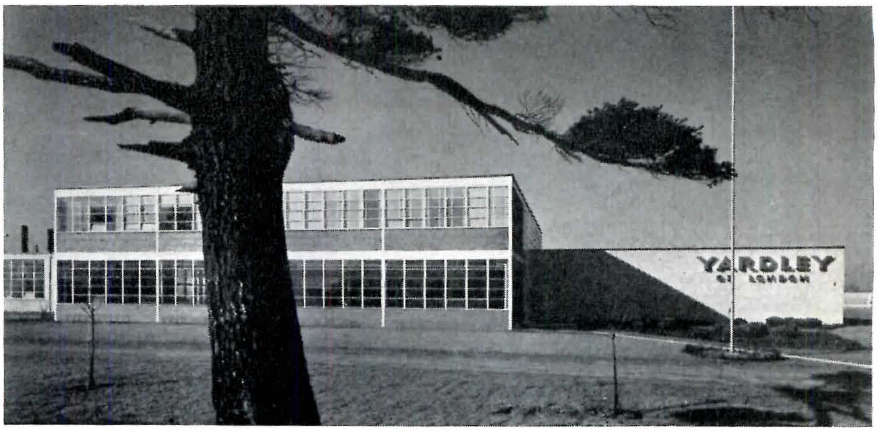
(Continued on page 32)

CANADA

(*Continued from page 30*)

stead to the architect, consulting engineer or owner; it has no objection, however, to the incorporation of subcontracts into the general contract after the bidding.

A meeting to discuss the situation from the architect's viewpoint was scheduled for January 8 by the executive committee of the Royal Architectural Institute of Canada, but no immediate statement was issued on the profession's stand.



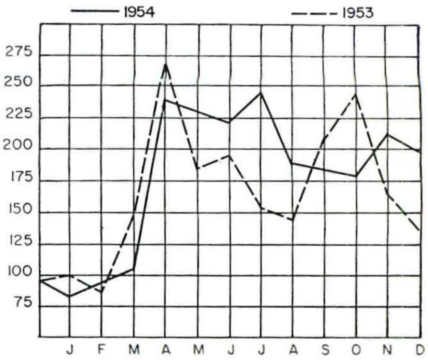
The recently opened factory for Yardley of London (Canada) Ltd. in Toronto was the work of John B. Parkin Associates, Toronto architects

NEWS NOTES

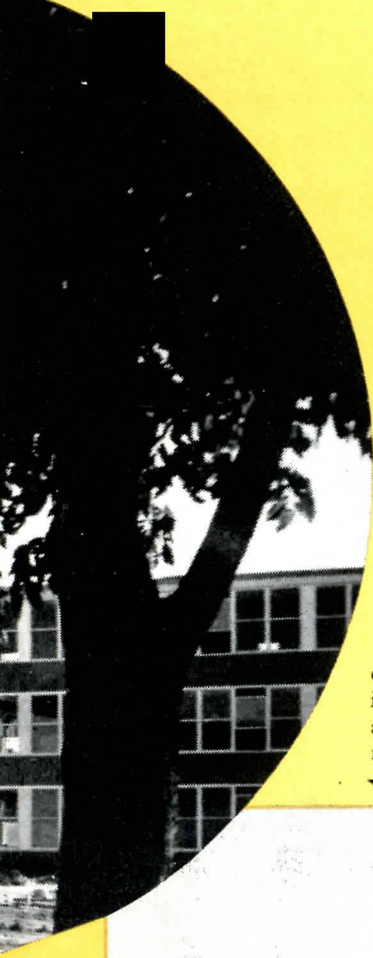
Top award in the **construction thesis competition,** sponsored annually by the Canadian Construction Association, went this year to Peter Glockner, of McGill University; plans have been announced for the 1954–55 competition, open to all Canadian final-year engineering students. . . . New officers of the Ottawa Chapter, **Ontario Association of Architects,** include Eric L. Burgess, chairman; James W. Strutt, vice chairman; Wallace C. Sproule, secretary; Gordon B. Pritchard, treasurer; and A. W. Davison, D. G. Helmer and C. M. Taylor, members of the executive committee. . . . The **University of Toronto** is offering a ten-lecture course on the engineering aspects

(*Continued on page 36*)

Contracts Awarded: Comparative Figures Compiled by MacLean Building Reports (in $ million)



Certified Craftsmanship
in action in Minneapolis



• As in scores of cities across the country, contractors and craftsmen in Minneapolis have formed a local chapter of the National Bureau for Lathing and Plastering. They have subscribed to the Bureau's recently adopted Code of Standard Practices for Lathing and Plastering and are offering Certified Craftsmanship Certificates.

The Certified Craftsmanship Certificate is a written pledge of adherence to work schedules, job co-operation, work of craftsmanship caliber and nationally recognized standards of quality. A certificate is yours for the asking from lathing and plastering contractors adhering to the Code of Standard Practices for Lathing and Plastering.

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

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

A finish plaster which provides an exceptionally rock-hard surface was used in all corridors. Over 63,000 square feet of acoustic plaster provide sound absorption necessary in classrooms and other areas.

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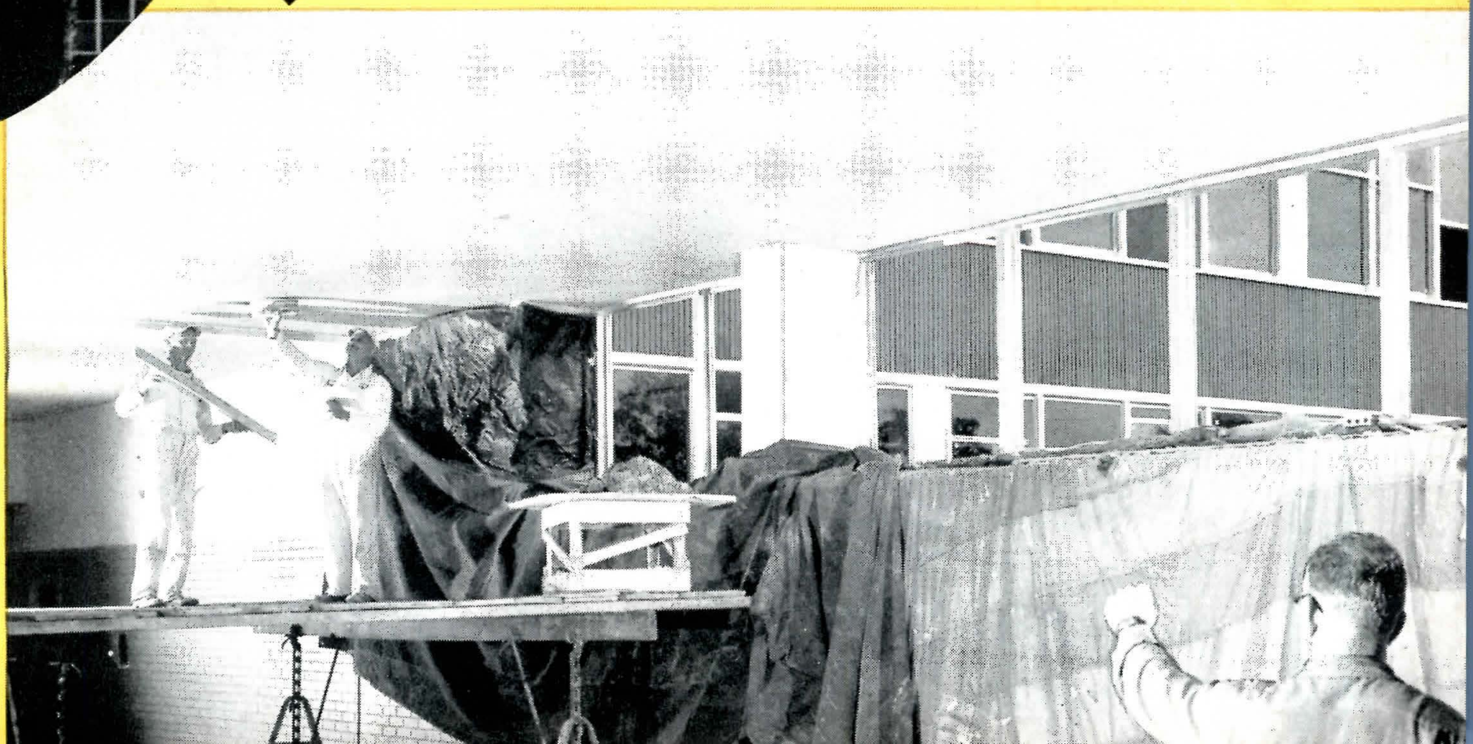
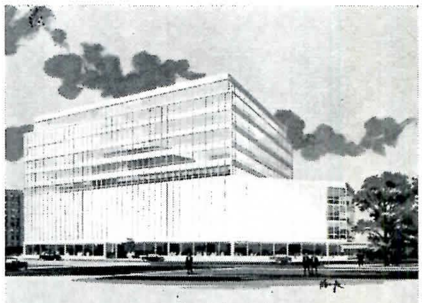


CANADA
(*Continued from page 32*)

of city planning; first speaker was Walter Blucher, consultant, American Society of Planning Officials. . . . Recently elected to the Council of the **Ontario Association of Architects** was Watson Balharrie, who represents the Ottawa District; Alvin R. Prack, of Hamilton, was re-elected to the council by his district. . . . William A. Watson, Belleville, Ont., was elected to **Ontario's Registration Board,** in charge of licensing architects in the province.



WINNIPEG SITE PICKED FOR MERCHANDISE MART

Plans for a $4 million merchandise mart to be built in Winnipeg represent Canada's first venture in this approach to selling; if it is successful, similar trade centers may be built elsewhere in the country.

The Winnipeg project, which is scheduled for completion in the spring of 1956, will provide four floors of display space. In order to provide more wall space, these floors will be built without windows; walls on these floors will be movable. The ground floor of the building will be rented out to specialty shops, and the basement, connected to the main floor by escalators, will contain service shops (barber shop, drugstore, ticket office). Top floors are planned as rental office space.

Architects for the mart are Northwood, Chivers, Chivers & Casey of Winnipeg, in association with John W. Harris Associates, Inc., of New York. The project is being backed by a New York syndicate composed of John W. Harris Associates and Canadian and General Development Corporation.

(*More news on page 38*)

Griggs

Auditorium Seating means easier planning . . . more satisfaction for every school and theater

Griggs Pushback Chair. One of Griggs' many auditorium chairs created to satisfy every auditorium requirement.

For Information and Service Contact Griggs Distributors

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Theater: Griggs chairs for theaters are distributed through RCA. Contact your RCA and RCA theater supply dealers in major film centers.

Let Griggs Experts plan seating arrangements for you! Comprehensive floor layouts, necessary inclines, and other information supplied FREE. Contact your Griggs Distributor.

Griggs Pushback® Chair, the ultimate in luxurious seating, offers comfort and convenience available only in Pushback Chairs. The Pushback Chair provides complete relaxation, uninterrupted comfort throughout every performance. Occupants remain seated throughout—merely push back in their seats when others enter or leave their row. For unequalled satisfaction, always specify Griggs Pushback Chairs. Griggs complete line of auditorium chairs are available to meet every seating need, regardless of space or budget. Available in floor type and riser type chairs and stadium chairs for indoors and outdoors. See them today!

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HOUSE GROUP EXCORIATES NAVY AND MASTER PLANS

A HOUSE SUBCOMMITTEE on defense activities fears following its visit to Spain that the Navy is endangering the huge Spanish air base construction program with needless accounting red tape.

This subcommittee, headed by William E. Hess of Ohio, reported to Chairman Dewey Short of the House Armed Services Committee that architects, engineers and prime contractors on the Spanish job have been operating under letters of intent while some definitive contracts have been arranged with subcontractors.

The delays on the definitive agreements with prime contractors and the architects and engineers have resulted, the subcommittee holds, from Navy's insistence that a cost accounting unit be interposed between the officer-in-charge for the Bureau of Yards and Docks and the architects and contractors. It was understood this insistence came from Navy's Bureau of Supply and Accounts.

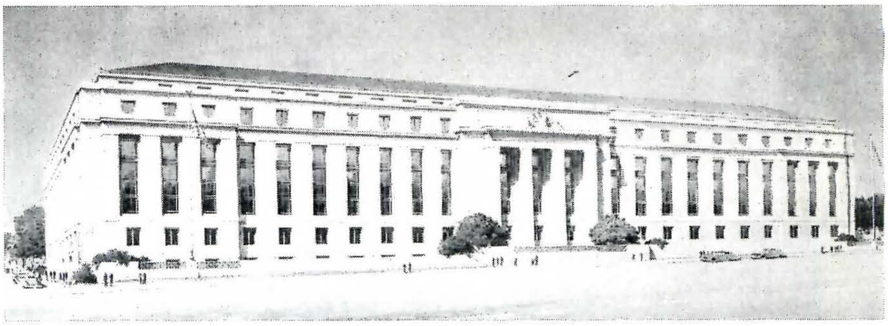
The resulting delays threaten the Spanish base program seriously, according to the Hess report. It said the new procedure would further increase cost, confuse authority and delay decisions.

It was found by the visiting Congressmen that "the penalty of delay in arriving at these definitive contracts has burdened the Bureau of Yards and Docks with this unnecessary encroachment upon its obvious responsibilities."

Navy Denies Charges

Secretary of the Navy Charles S. Thomas categorically denies that cost accounting procedures are "endangering" the Spanish program. In fact, he said there was no Navy cost accounting unit interposed between the Bureau of Yards and Docks' officer-in-charge of construction and the contractors.

(*Continued on page 296*)



Peter E. Juley & Son

SENATE GETS ITS OFFICE BUILDING — The much-postponed additional office building for the U. S. Senate is going ahead this year; photo of rendering above shows main façade of design adapted to present needs by Eggers and Higgins of New York from their original scheme of 1949 (delayed by Korean conflict). Site is immediately east of existing Senate Office Building. Senators' offices will be around exterior perimeter of building, committee rooms will face on court

CONSTRUCTION COST INDEXES

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

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

	NEW YORK					ATLANTA				
Period	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel
1930	127.0	126.7	124.1	128.0	123.6	82.1	80.9	84.5	86.1	83.6
1935	93.8	91.3	104.7	108.5	105.5	72.3	67.9	84.0	87.1	85.1
1939	123.5	122.4	130.7	133.4	130.1	86.3	83.1	95.1	97.4	94.7
1940	126.3	125.1	132.2	135.1	131.4	91.0	89.0	96.9	98.5	97.5
1946	181.8	182.4	177.2	179.0	174.8	148.1	149.2	136.8	136.4	135.1
1947	219.3	222.0	207.6	207.5	203.8	180.4	184.0	158.1	157.1	158.0
1948	250.1	251.6	239.4	242.2	235.6	199.2	202.5	178.8	178.8	178.8
1949	243.7	240.8	242.8	246.4	240.0	189.3	189.9	180.6	180.8	177.5
1950	256.2	254.5	249.5	251.5	248.0	194.3	196.2	185.4	183.7	185.0
1951	273.2	271.3	263.7	265.2	262.2	212.8	214.6	204.2	202.8	205.0
1952	278.2	274.8	271.9	274.9	271.8	218.8	221.0	212.8	210.1	214.3
1953	281.3	277.2	281.0	286.0	282.0	223.3	224.6	221.3	221.8	223.0
Sept. 1954	285.4	278.0	294.1	302.3	296.7	219.7	218.9	224.6	226.5	226.9
Oct. 1954	285.4	278.0	294.1	302.3	296.7	220.2	219.7	225.0	226.6	227.1
Nov. 1954	285.8	278.5	294.2	302.3	296.8	220.3	220.0	224.3	226.1	226.7
	% increase over 1939					% increase over 1939				
Nov. 1954	131.4	127.5	125.0	126.6	128.1	155.2	164.7	135.8	132.1	139.3

	ST. LOUIS					SAN FRANCISCO				
1930	108.9	108.3	112.4	115.3	111.3	90.8	86.8	100.4	104.9	100.4
1935	95.1	90.1	104.1	108.3	105.4	89.5	84.5	96.4	103.7	99.7
1939	110.2	107.0	118.7	119.8	119.0	105.6	99.3	117.4	121.9	116.5
1940	112.6	110.1	119.3	120.3	119.4	106.4	101.2	116.3	120.1	115.5
1946	167.1	167.4	159.1	161.1	158.1	159.7	157.5	157.9	159.3	160.0
1947	202.4	203.8	183.9	184.2	184.0	193.1	191.6	183.7	186.8	186.9
1948	227.9	231.2	207.7	210.0	208.1	218.9	216.6	208.3	214.7	211.1
1949	221.4	220.7	212.8	215.7	213.6	213.0	207.1	214.0	219.8	216.1
1950	232.8	230.7	221.9	225.3	222.8	227.0	223.1	222.4	224.5	222.6
1951	252.0	248.3	238.5	240.9	239.0	245.2	240.4	239.6	243.1	243.1
1952	259.1	253.2	249.7	255.0	249.6	250.2	245.0	245.6	248.7	249.6
1953	263.4	256.4	259.0	267.6	259.2	255.2	257.2	256.6	261.6	259.7
Sept. 1954	265.5	258.8	265.1	274.9	268.2	259.9	251.7	266.7	275.9	270.1
Oct. 1954	265.5	258.8	265.1	274.9	268.2	260.6	252.6	266.8	276.0	270.3
Nov. 1954	266.2	259.7	265.2	275.0	268.4	260.0	252.0	266.0	275.4	269.7
	% increase over 1939					% increase over 1939				
Nov. 1954	141.5	142.7	123.4	129.5	125.5	146.2	153.7	126.5	125.9	131.5

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

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

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

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

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

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

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

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

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

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

These index numbers will appear regularly on this page.

Gymnasium Grille

Here's a grille that's been especially customed for school and institutional application. It features *special built-in durability* to withstand gymnasium use and abuse. Made to give long efficient service under the most rugged conditions of bouncing basketballs, baseballs, jarring kicks, and bumps. Has smooth contours, no sharp corners or points. Is safety approved for school use. *Is simply so rugged it stops damage and replacement costs.*

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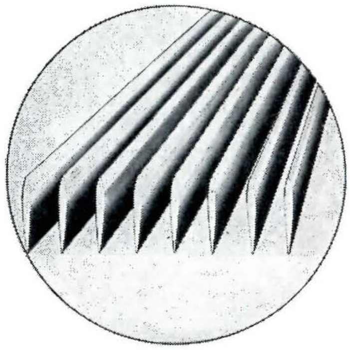
The Volume Controller features the famous solid section, extruded aluminum, streamlined Airfoil louvers. Noise and turbulence are cut to a minimum. At the same time, perfect, draft-free air distribution is assured.



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PLANNING LAND FOR INDUSTRY

Cover photograph shows aerial view of Airlawn Industrial District, Dallas, Texas

Organized Industrial Districts, A Tool for Community Development. By Theodore K. Pasma. Area Development Division, U. S. Government Printing Office. Superintendent of Documents, Government Printing Office (Washington, D. C.) 1954. 111 pp, illus. 65¢

Reviewed by DOROTHY A. MUNCY, A.I.P.

Mrs. Muncy is a consulting City Planner who has written several articles on industrial planning problems

The core of our industrial society — the factory — is at last being recognized as a legitimate occupant of urban land. Man's place to work, just as his place to sleep and play, has its own special problems of location, space needs and site planning. These problems cannot be solved by shunting the factory off to some abandoned corner, for, in our rapidly expanding society, no corner is long remote.

Under the tightening pressure of municipal finance, communities are paying increased attention to the site problems of those tax-paying, wage-supplying structures. A new field of endeavor, called Area Development, is attempting to provide a more enlightened approach toward industrial growth. Municipal and state offices, civic groups and foundations, formed for the sole purpose of attracting more industries, are experimenting in organizing, site planning, financing and guiding industrial growth. Slowly, a body of technical literature is replacing the promotional blurb. A major contribution has just been made by Theodore K. Pasma, Area Development Division, United States Department of Commerce.

Organized Industrial Districts, a Tool for Community Development is a guidebook recounting the experiences and techniques in establishing 122 organized industrial districts, located in 84 communities, within 34 states. These data were gathered through a national questionnaire to principal chambers of commerce, railroads, utilities and industrial realtors, and supplemented by personal inspection of a number of well known industrial districts.

Organized industrial districts are not a new phenomena. The Clearing Industrial District and the Central Manufacturing District were begun in 1899 and 1905, respectively. Most districts, however, have been formed since 1945. More than half the districts are in communities of 100,000 population or more. Small cities in the peripheries of growing metropolitan areas, however, can develop industrial districts to meet the demand for industrial space outside the crowded centers. Railroads own 38 per cent of the districts; private developers, building contractors and industrial realtors control 25 per cent; municipal agencies, 9 per cent; industrial foundations, 5 per cent; chamber of commerce, 3 per cent; with the remainder in combination ownership. The average tract contains 454 acres; but for the largest ten districts, the average is 1,182 acres.

Architects, city planners, landscape architects, builders, realtors and bankers, as well as lay civic leaders, can read with profit this impressive assembly of statistics and case histories of industrial districts. Well illustrated with aerial views, exterior photos of plants, and plans for sewers and water mains, this book also includes scaled site plans of five districts: Airlawn and Trinity in Dallas, the Wichita Industrial Addition, Los Angeles Airport Industrial Tract and Fresno Industrial Sites. (Those of us who would be satisfied only by complete site plans for all 122 districts must consider the modest price of this government publication.)

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for INDUSTRIAL and COMMERCIAL BUILDINGS

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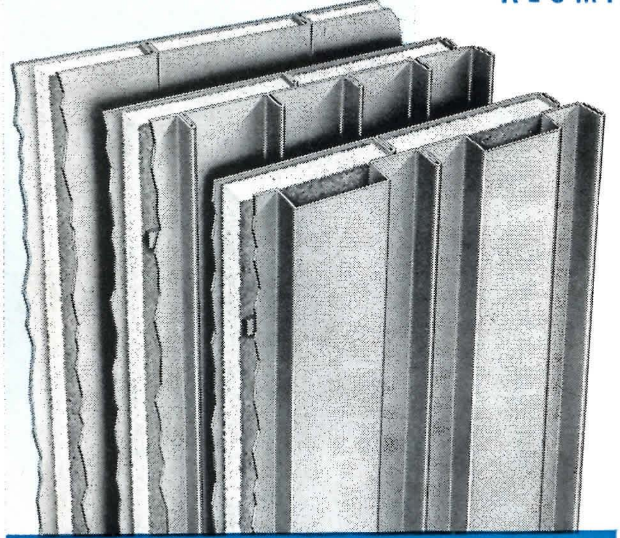

Metal curtain walls are now being employed extensively in new buildings of virtually every type . . . modern, permanent structures with bright aluminum or stainless steel exteriors are appearing all over the country. Enterprising architects are not only giving their clients the benefit of this low-cost, light weight curtain wall construction, but are achieving striking design effects in over-all metal wall exteriors as well as in combinations of metal wall and brick, glass block, and other materials. In this type of construction, important building economies are realized through lower material cost, lower labor cost, and the cumulative advantages deriving from reduced construction time . . . buildings can be quickly enclosed with Insulated Metal Walls—even under low temperature conditions which would preclude masonry construction. Mahon Insulated Metal Walls are available in the three exterior patterns shown at left ... the Mahon "Field Constructed" Fluted or Ribbed Wall can be erected up to sixty feet in height without a horizontal joint—a feature of Mahon Walls which is extremely important in powerhouses, auditoriums or other types of buildings where high expanses of unbroken wall surface are common. See Sweet's Files for complete information, or write for Catalog B-55-B.

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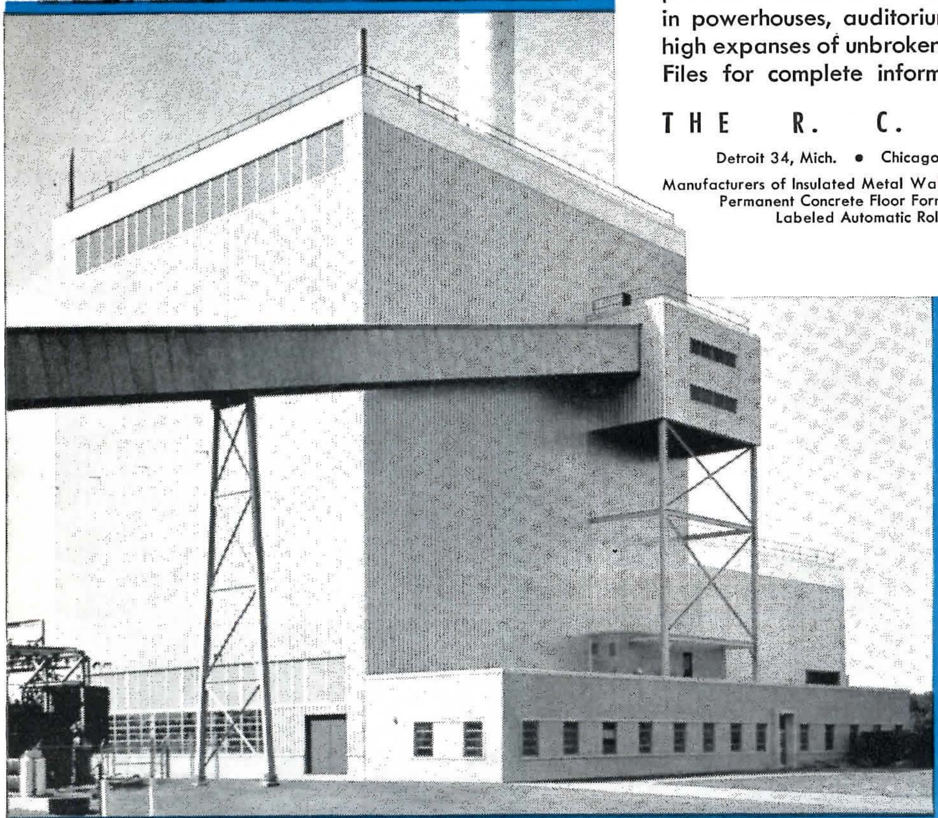
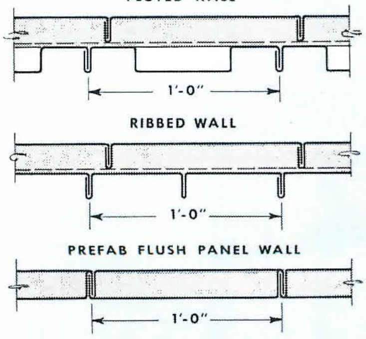


THREE EXTERIOR PATTERNS



The Over-all "U" Factor of the various Types of Mahon Insulated Metal Walls is Equivalent to or Better than a Conventional sixteen inch Masonry Wall.

New Powerhouse for the Wisconsin Public Service Corporation located at Rothchild, Wisconsin. Mahon Aluminum Insulated Metal Walls were employed for all exterior wall surfaces. Designed and Engineered by Pioneer Service and Engineering Company.

MAHON

REQUIRED READING

(Continued from page 46)

Organized Industrial Districts is a worthy successor to the pioneer publication *Planned Industrial Districts, Their Organization and Development* by Milburn L. Forth and J. Ross McKeever, published by the Urban Land Institute in 1952. Mr. Pasma provides not only specific data on site planning, but discusses solutions to important legal, financial and organizational problems that arise in the large-scale development of industrial tracts. Readers will find the Appendices as helpful as the text. All districts surveyed are listed geographically by name, owner, year begun, acreage, rail facilities, restrictions, and type of industry. Specimens of a protective covenant, conditions for listing property with real estate brokers, and the articles of incorporation of an industrial foundation are also provided.

Major conclusions of this treatise are:

(1) Comprehensive land-use planning is essential
(2) Well-designed tract layout is important
(3) Original land should be inexpensive, held as one or a few tracts at time of purchase, and assessed relatively low
(4) Development costs are high, but manufacturers are willing to pay for good location, facilities and services
(5) Suitable location requires good transport and marketing facilities, favorable taxes, adequate supply of soft water, facilities for industrial waste disposal, storm sewers, and available gas and electricity
(6) Developers must be willing to make long-term investment
(7) The appearance, efficiency and land values of these "garden-type" industrial districts must be preserved through covenants and zoning codes requiring building setbacks, off-street loading docks, parking facilities and performance standards

Mr. Pasma has not assumed the role of critic of the space planning or architectural standards of these industrial districts. However, sufficiently detailed data and scaled illustrations have been provided to enable the discerning reader to make comparisons, and to come to the conclusion that some of these industrial districts fall short of the high standards which enlightened industrial management has set for its new plants.

Because this guidebook has covered so adequately many problems involved in

(Continued on page 346)

A NEW HIGH IN THE SKYLINE OF DALLAS

Republic National Bank and Office Building Is Now Completed and In Business

THE SIGNIFICANCE of this handsome 40 story bank and office tower lies more in its total design than in the fact that it is "tallest in the Southwest." Of interest is the manner in which structural, mechanical, and electrical systems have been considered — from the beginning — as powerful factors in determining the architectural design. As a result, the finished building is an integrated expression of these and the many other influences, legal, economic, etc., that shape commercial architecture today.

Architects:
Harrison & Abramovitz; Gill & Harrell

Structural Engineers:
Edwards & Hjorth

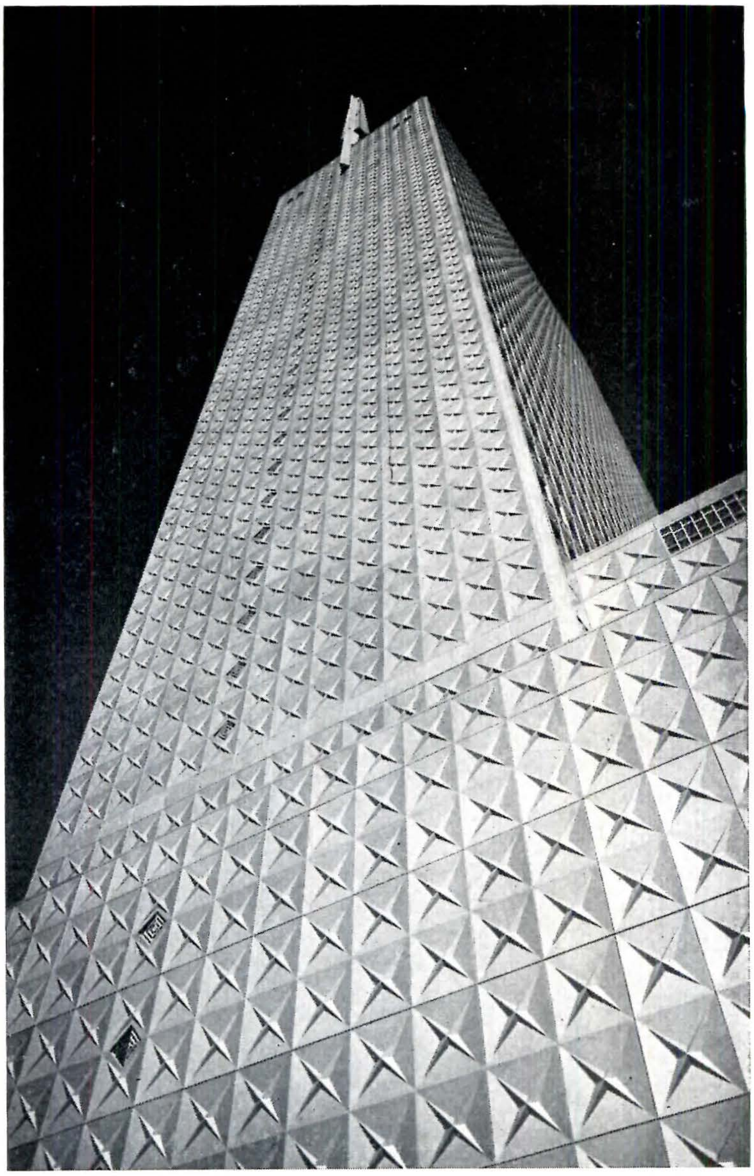
Foundation Engineers:
Moran, Proctor, Freeman & Meuser

Mechanical Engineers:
Jaros, Baum & Bolles

Electrical Engineers:
Zumwalt & Vinther

Readers are referred to Architectural Record's *Feature of April, 1954 (published during construction) for the technical story of the design. That article discusses the design and some of the thinking that led to it; dwells at some length on the problems of the exterior and how they were solved; and points out how structural, air-conditioning and curtain wall systems were coordinated to good effect.*

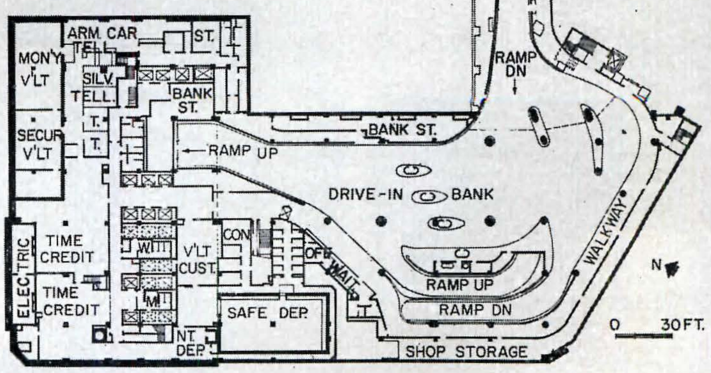
Ulric Meisel



Except for extensive rental space at street level, the bank occupies the lower eight floors (horizontal block in photo above) and the first basement; the tower is office rental space; three basement levels park 1,250 cars. The building contains 872,000 sq ft. Total cost for building and land was approximately $25 million.

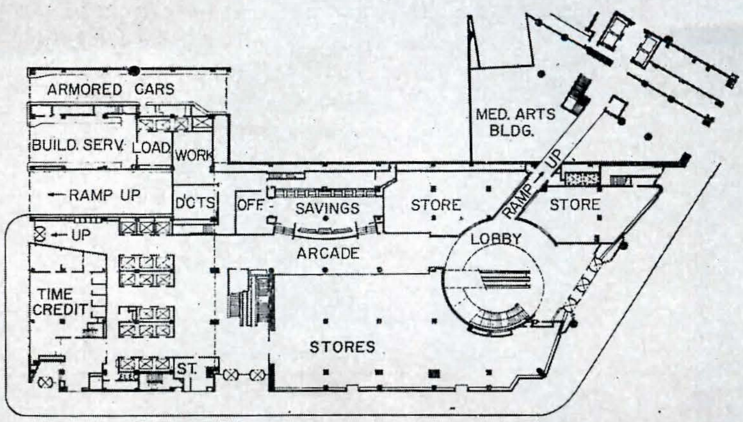
The windowless. southwest facade is aluminum faced for heat reflection, while the other three sides of the shaft are windowed. Here the skin is ⅛ in. aluminum cold formed in prismatic patterned sheets, backed up by 1½ in. of glass wool and aluminum foil. The sash are vertical pivoted for inside cleaning; are glazed with blue-green heat absorbing glass.

The mullions and surround for the huge (75 by 120) windowed facade of the bank (right) are White Cherokee Georgia marble

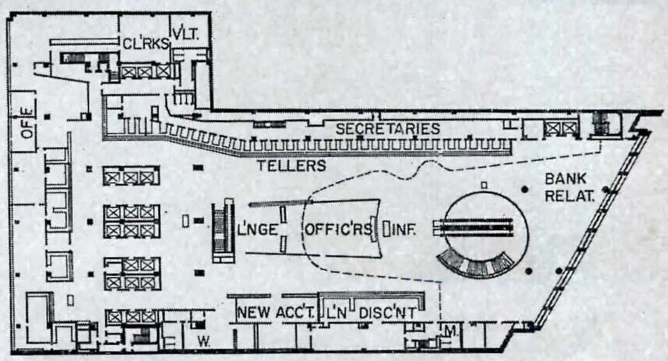


FIRST BASEMENT: DRIVE-IN BANK

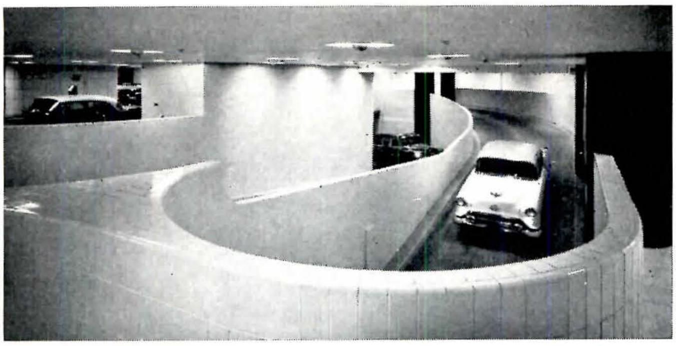
Ulric Meisel



GROUND FLOOR: SHOPS



SECOND FLOOR



Ulric Meisel

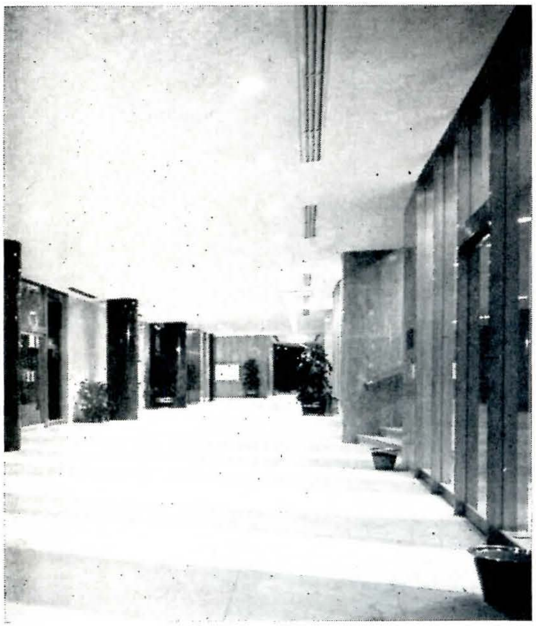
DRIVE-IN BANK: This unique feature, almost unheard-of in a city as large as Dallas, enables customers to make deposits without leaving their cars. The through traffic flow is one-way, with entrance and exit by ramp from adjacent streets.

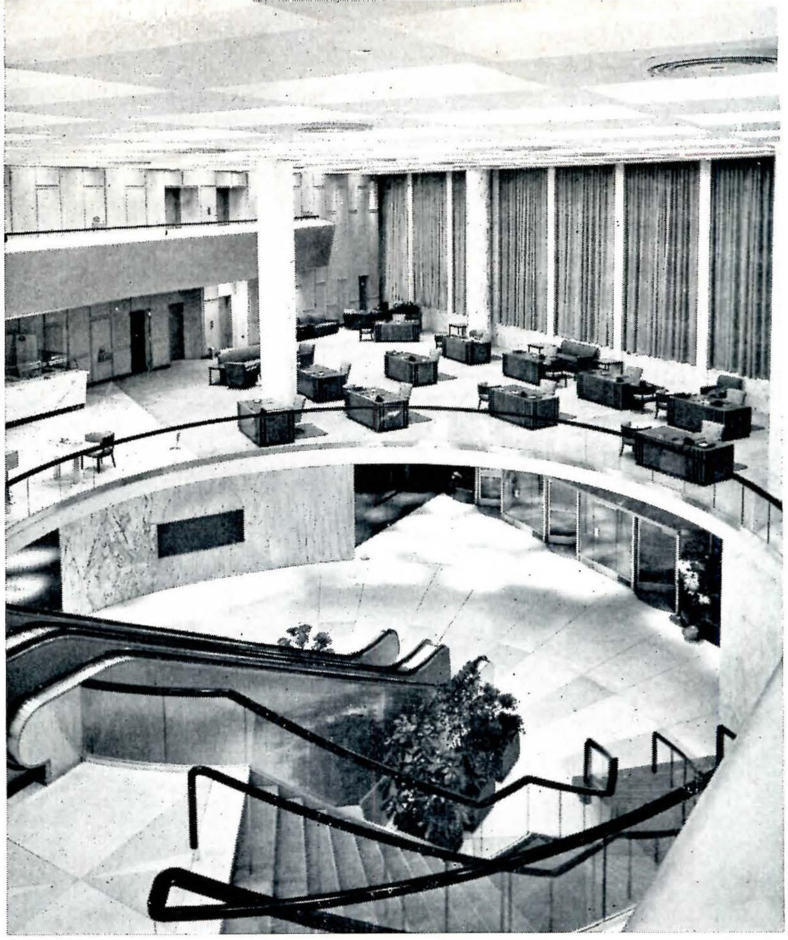
There are four banking windows, below, which are available as a stock item. The bullet-proof glass is stainless steel framed; lighting is by two 48 in. tubes. The driver's voice is picked up by a microphone at the top of the unit, and the teller's voice is relayed to the customer via a speaker below the counter top. The teller operates the horizontally sliding drawer, which contains a deal tray and larger package receiver below. The window unit is here built into a glazed tile clad island.

The lobby, above and right, leads to ground floor arcade and to second floor banking room (see plans, p. 149).

The shopping arcade, running through the block to the next street, serves both shops opening on it and the compact, self-contained savings department of the bank. Arcade walls are Roman Travertine; columns are finished in Nero Nube marble. The entire ground floor is surfaced in gray and white terrazzo.

Lobby feature is the circular opening containing escalators and circular stair to the banking room above. Lobby walls are golden and black veined creamy white Calacatta; electric stairway cheeks are finished in gold

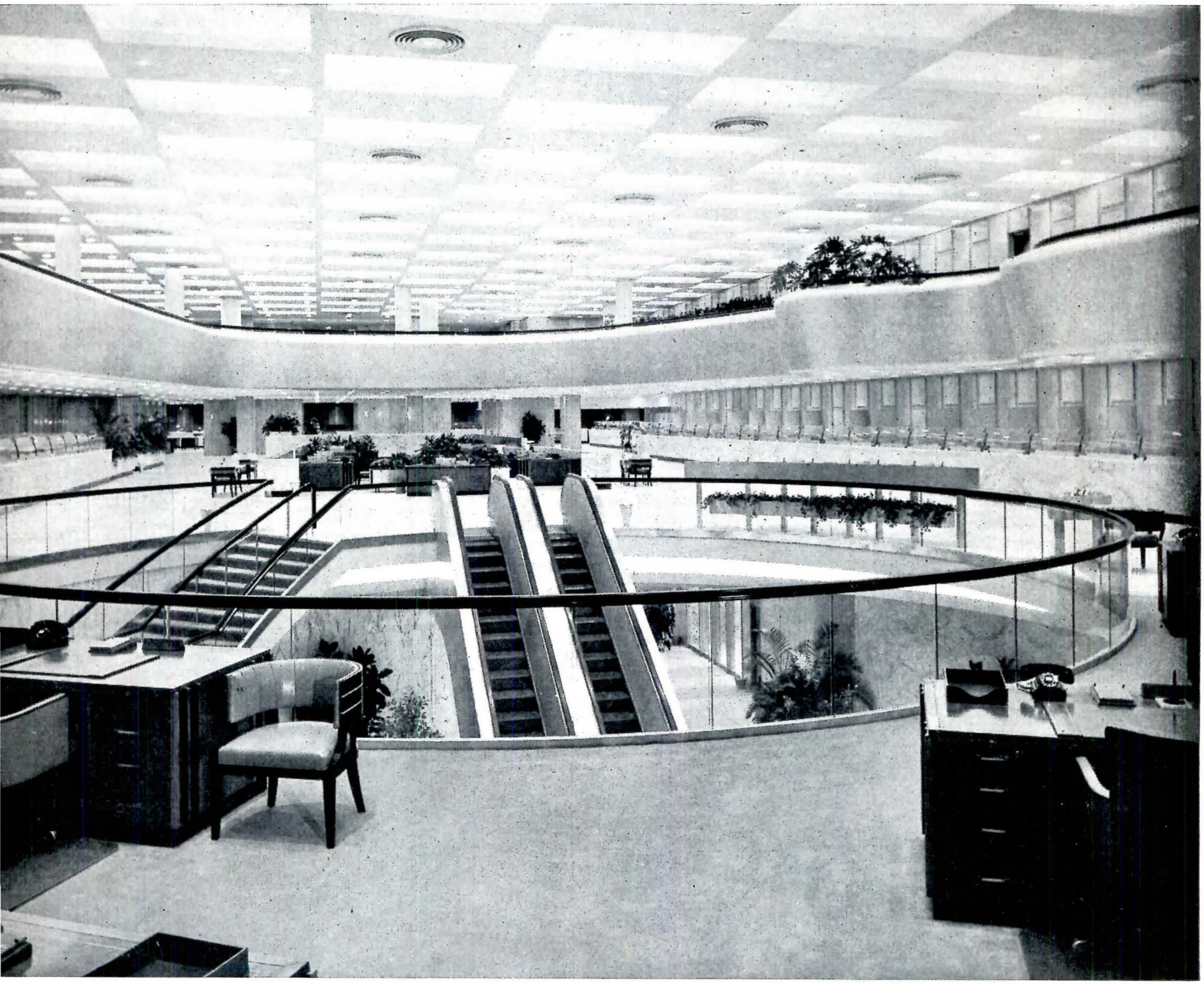




REPUBLIC NATIONAL BANK, DALLAS

The vast banking room (290 ft. long, 23 ft. high) is at once an exciting and dignified space for business. There is excitement in the great curving sweep of the mezzanine — a 333 ft. gold-leaf covered ribbon topped with the positive line of an ebonized wood rail — and in the ceiling pattern, the floor design, the circular cavity dropping to ground level; yet there is restraint in color and material; discipline in overall linear organization.

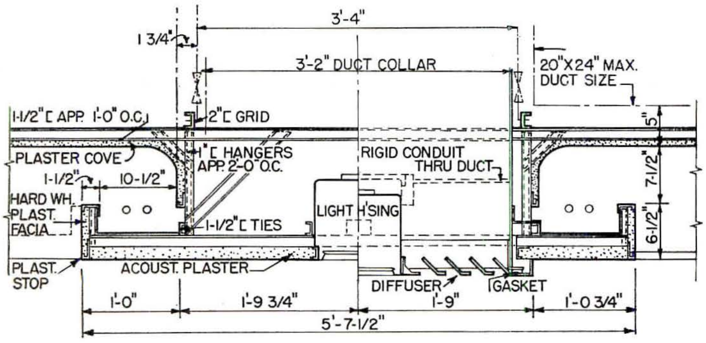
The light gray and white terrazzo floor brings the exterior pattern inside by way of the golden brass strips; the marble counter die repeats the gold, black and creamy white of the



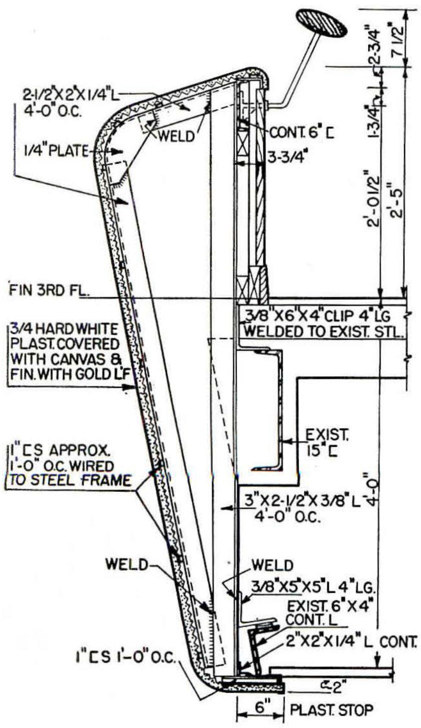
Ulric Meisel

lobby below; the officers platform is gold carpeted; wall panelling is natural curly maple, with stiles in line with the ceiling checkerboard overhead.

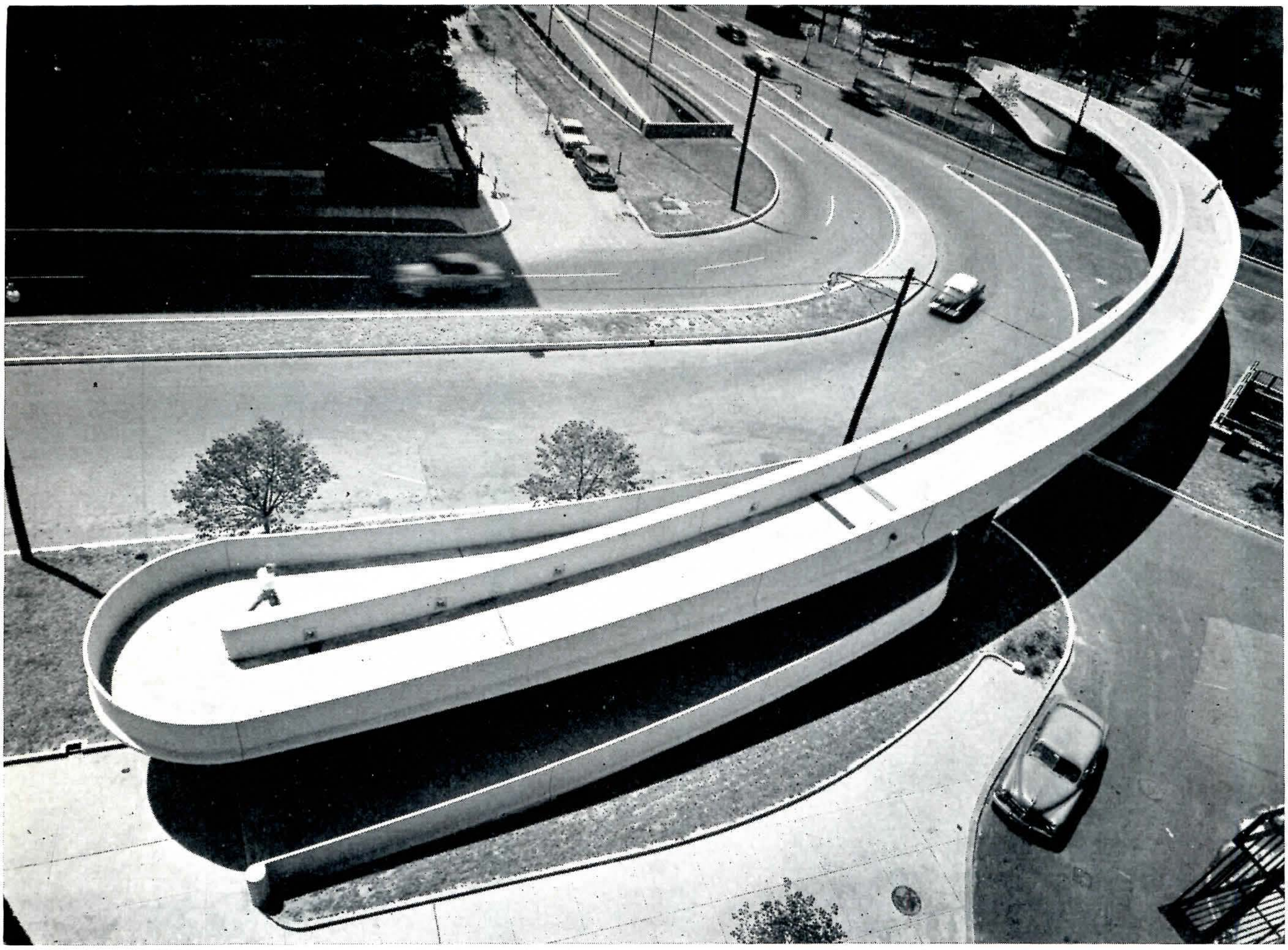
The off-white ceiling is notable both as decoration and because it serves as a vehicle for lighting and air conditioning the large room; scale details on the next page



Banking room ceiling, detail above, incorporates lighting and air conditioning in its design. Direct light from the over-all pattern of downlights; diffused light from the coves (square in plan). Air is supplied through circular diffusers which also contain downlights. Upper plane is hard smooth plaster for light reflection; lower plane is acoustic plaster. Detail of mezzanine fascia below; gold leaf applied to canvas cemented on the plaster



Ulric Meisel



Joseph W. Molitor

THE ARTHUR FIEDLER FOOTBRIDGE

Erected by The Metropolitan District Commission of Boston; Mr. Benjamin W. Fink, Director of Park Engineering

Shepley Bulfinch Richardson and Abbott, Architects

Arthur A. and Sidney N. Shurcliff, Landscape Architects

The Brask Engineering Company, Structural Engineers

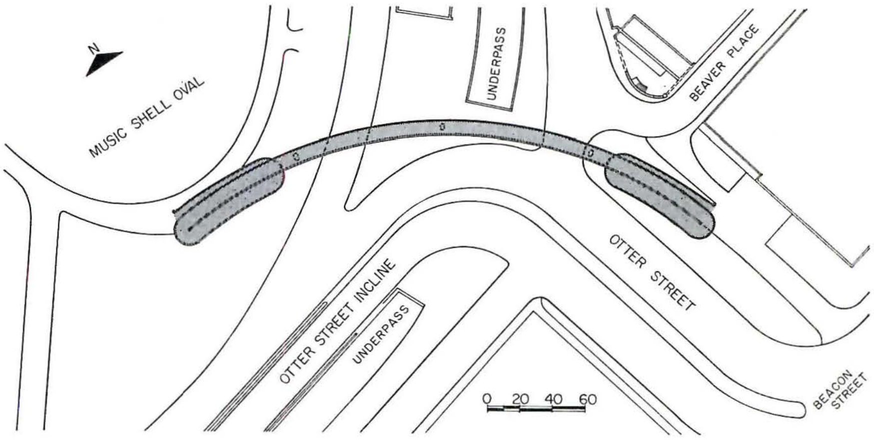
As gay and informal in character as the "Pops" concerts it serves, this graceful bridge both fills a foot-traffic need and sets up an interesting pattern of arching lines as it lightly bends over the multi-curved traffic complex it spans. Recipient of a design award at the 1954 convention of the American Society of Landscape Architects, the structure connects two highway-separated points; a narrow park bordering Boston's Back Bay residential district and the end of the concert oval where the outdoor summer concerts of the Boston Symphony Orchestra are held. Instigated 25 years ago by Arthur Fiedler, these popular concerts now draw from 10 to 20 thousand people.

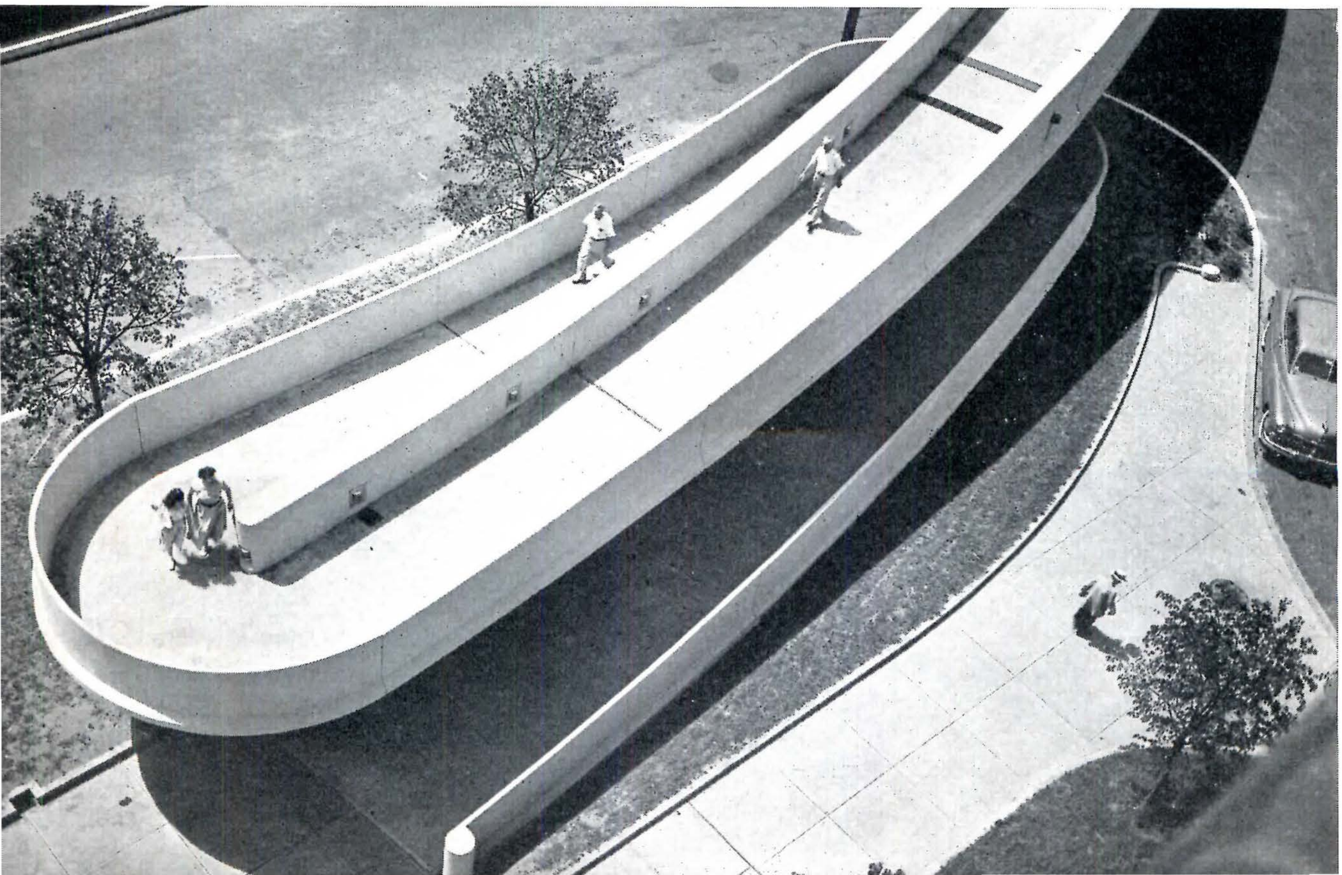
The original design for the bridge — a simple concrete ribbon with open rail — was superseded by the executed scheme when it was found that slinging the 8-ft walkway between 3 ft 6 in girder-

Joseph W. Molitor

ARTHUR FIEDLER FOOTBRIDGE

rails reduced the vertical climb for pedestrians and baby-carriages by 3 ft and the length by 85 ft. The necessary curve (in plan) stiffens the entire structure, while the flowing lines of the design exploit in appealing fashion the peculiar quality of plasticity that structural reinforced concrete possesses.



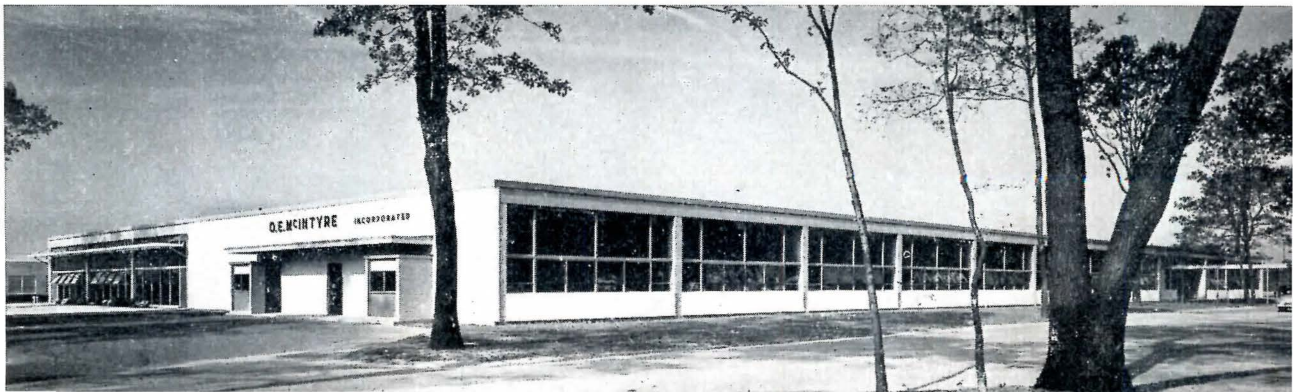


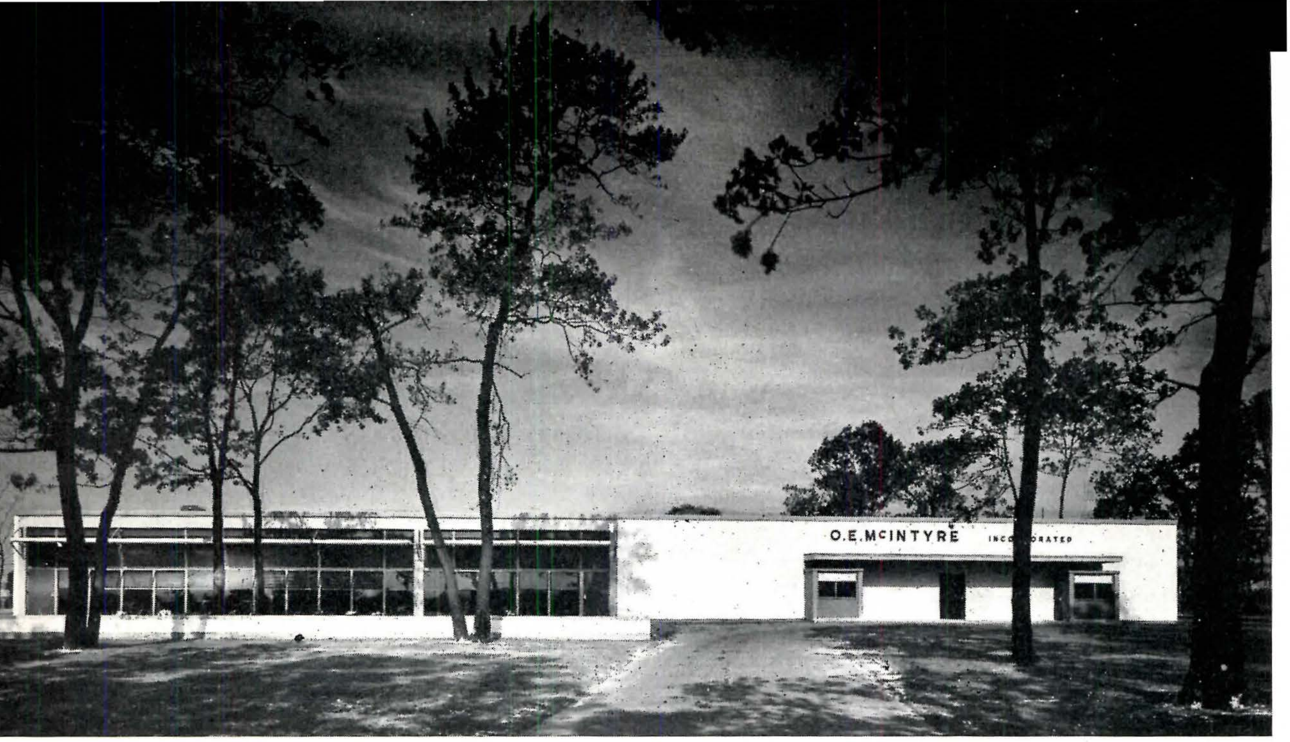
LIGHT, COLOR, OUTLOOK—FOR MORALE

Plant and Offices for O. E. McIntyre, Inc., Westbury, L. I.
Marcel Breuer and William W. Landsberg, Architects
Brown and Matthews, Engineers — Contractors

When a worker's task is repetitive, hence tiring, provision of a bright, cheerful environment can do much to heighten his spirit — thus his productivity. Owner and architects agreed on this idea and endeavored to realize it. Large glass areas yield adequate daylight inside; also look out generously upon a favorable site. The large trees there were preserved at every cost — even at the sacrifice of needed parking space. Primary colors were boldly used in production areas; typically, a 200-ft wall was painted bright red-orange against a surrounding foil of whites, light grays, dark grays. Yellow, red, and electric blue were similarly used. The terrace for luncheon and coffee periods was furnished with gaily colored umbrellas and beach chairs to contribute an almost festive note to the routine work-breaks.

Ben Schnall



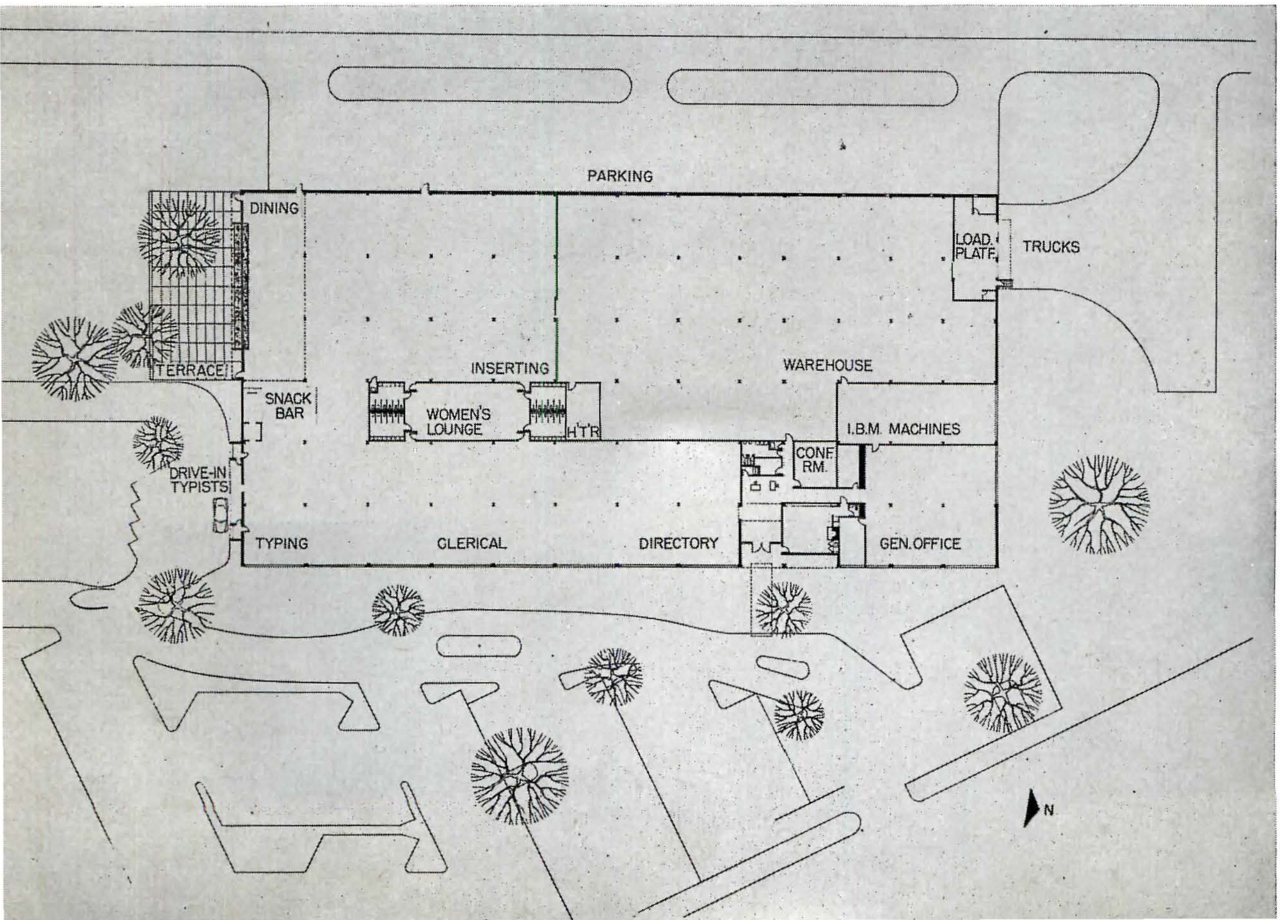


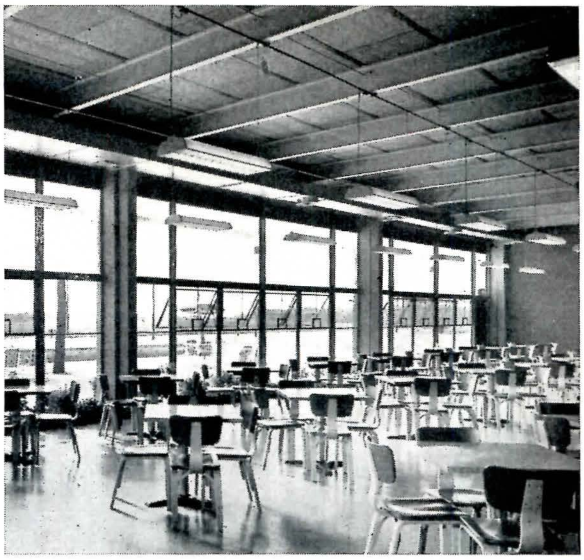
Ben Schnall

The nature of this business — not a common one — led to an interesting set of requirements. Engaged in direct mailing, the company needed areas for receiving and storing material, compiling address lists, inserting, addressing and mailing. A small Post Office occupies part of the area, so material leaving by truck is "in the mail."

Although there are 750 in the plant, additional help is recruited from among housewives in neighboring residential areas. Thus the drive-in section — arranged so part-time workers can pick up or deposit their work weekly in an easy traffic flow that saves time.

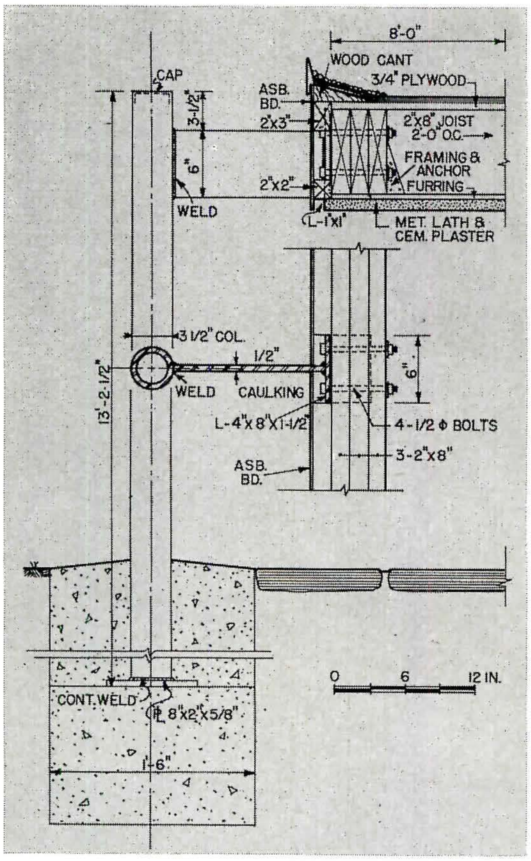
The business is growing so rapidly that a new plant of similar area is now under way. The completed building cost slightly over $7 per sq ft.

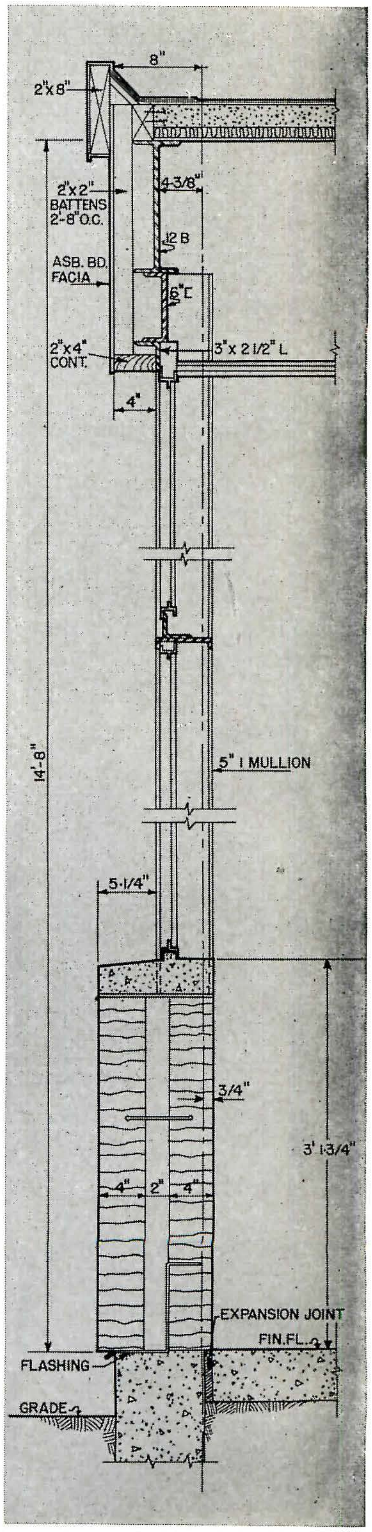




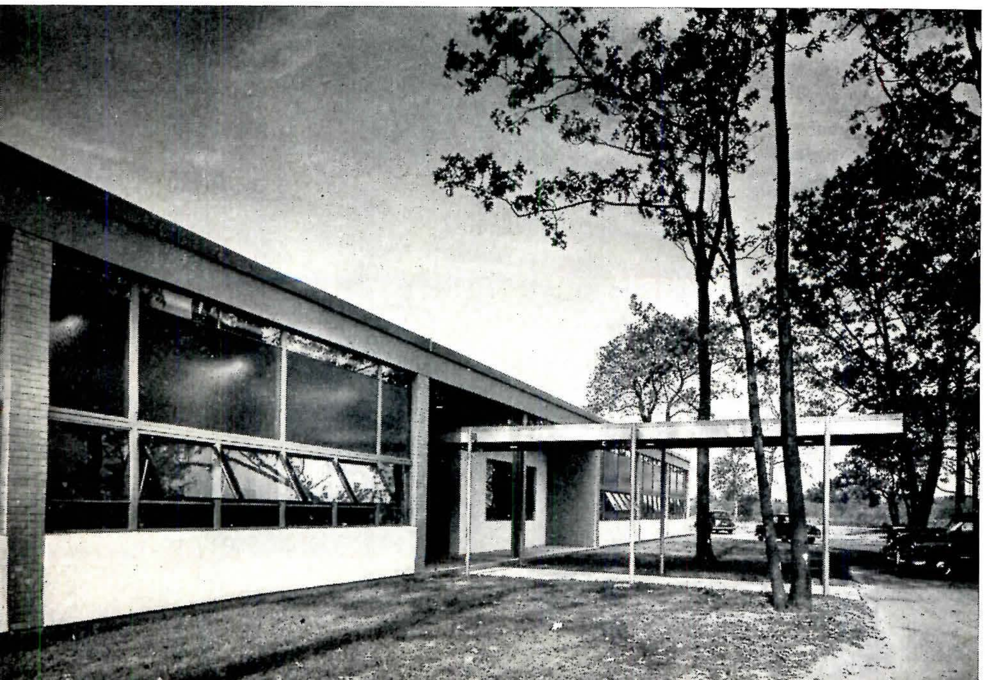
Below — the lobby as one enters: natural clear cypress; black and white confetti-patterned asphalt tile; white and light gray walls; plastic faced desks in blue, white, red, and black

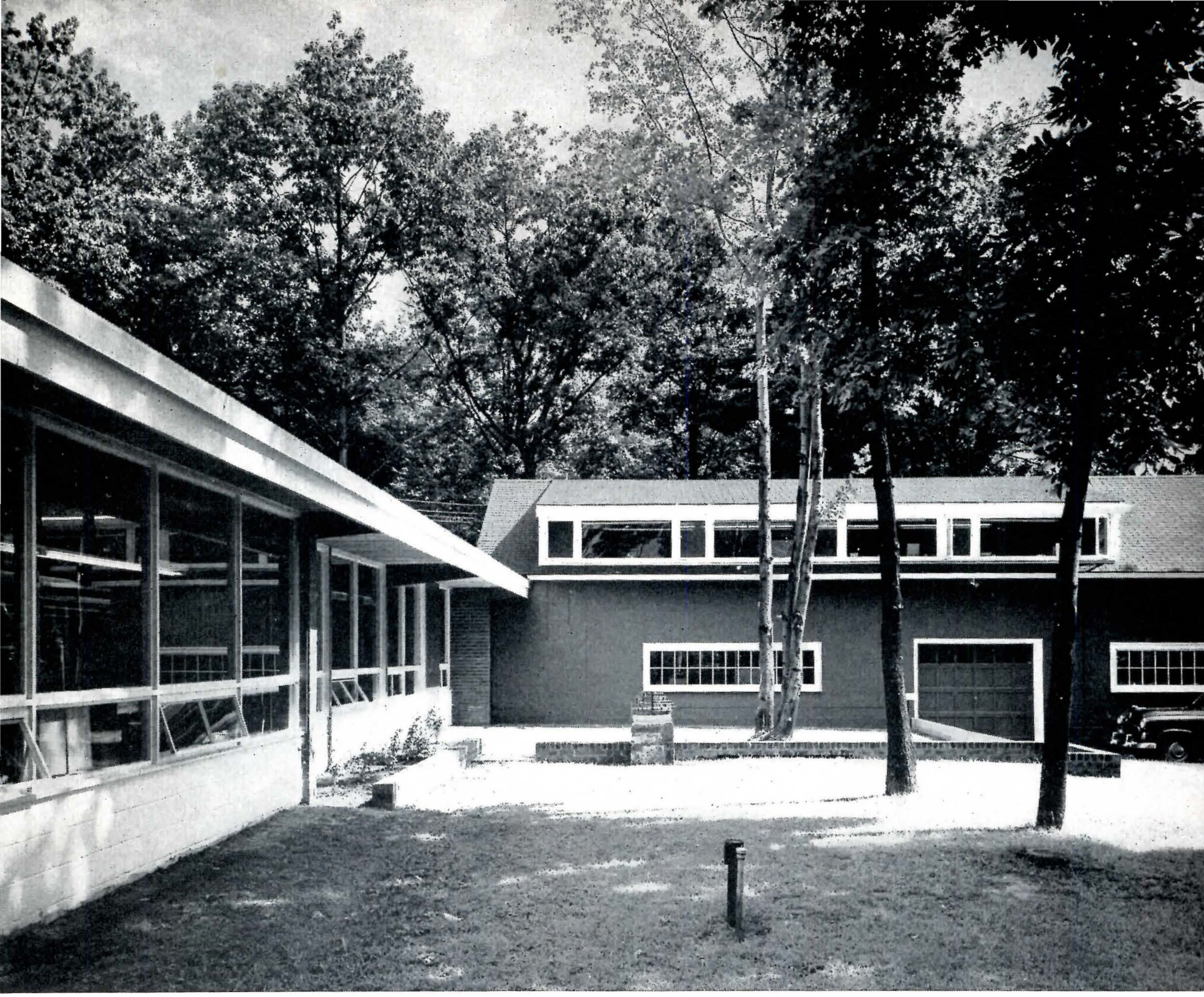
Unpolished plate glass is used in the upper panels to reduce sun glare in the daytime and to conceal after dark the exposed structure, wiring, and fixtures. The exterior is interestingly rendered: light gray column piers, fascia and fixed sash; black opening sash; white projecting block panels below. The marquee, shown in detail below, has a bright red soffit. The typical wall section shows how the usual reveals have been reversed to good effect.





Ben Schnall





Ben Schnall

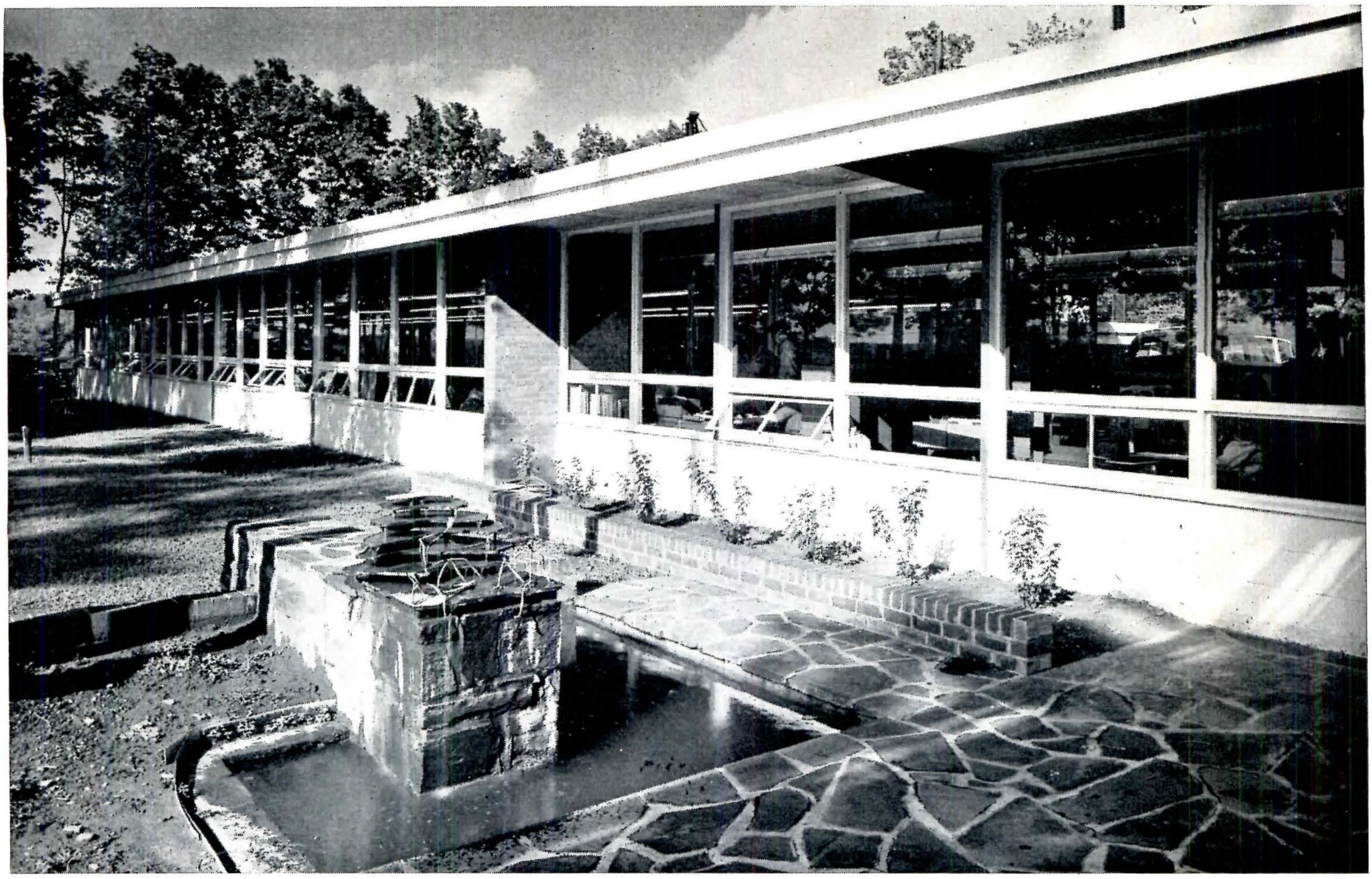
PART ONE OF A FOUR-PART FACTORY EXPANSION

Rotron Manufacturing Co., Woodstock, N. Y. — Slater & Chait, Architects

MIRRORING THE TYPICAL American success story of the small manufacturer starting in a barn and steadily expanding into larger quarters as business grows, this industrial plant is of interest for several other reasons as well.

Devoted to the manufacture of electric and electronic equipment and research, the factory is located on the summit of a mountain with an attractive south view of the surrounding Catskills. Glass areas look out to the view, providing worker amenity that has contributed much to the excellent owner-worker relationship.

The new one-story wing, placed at right angles to the barn, is composed of manufacturing and office space in a ratio of about three to one — this functional division being clearly marked in elevation by the

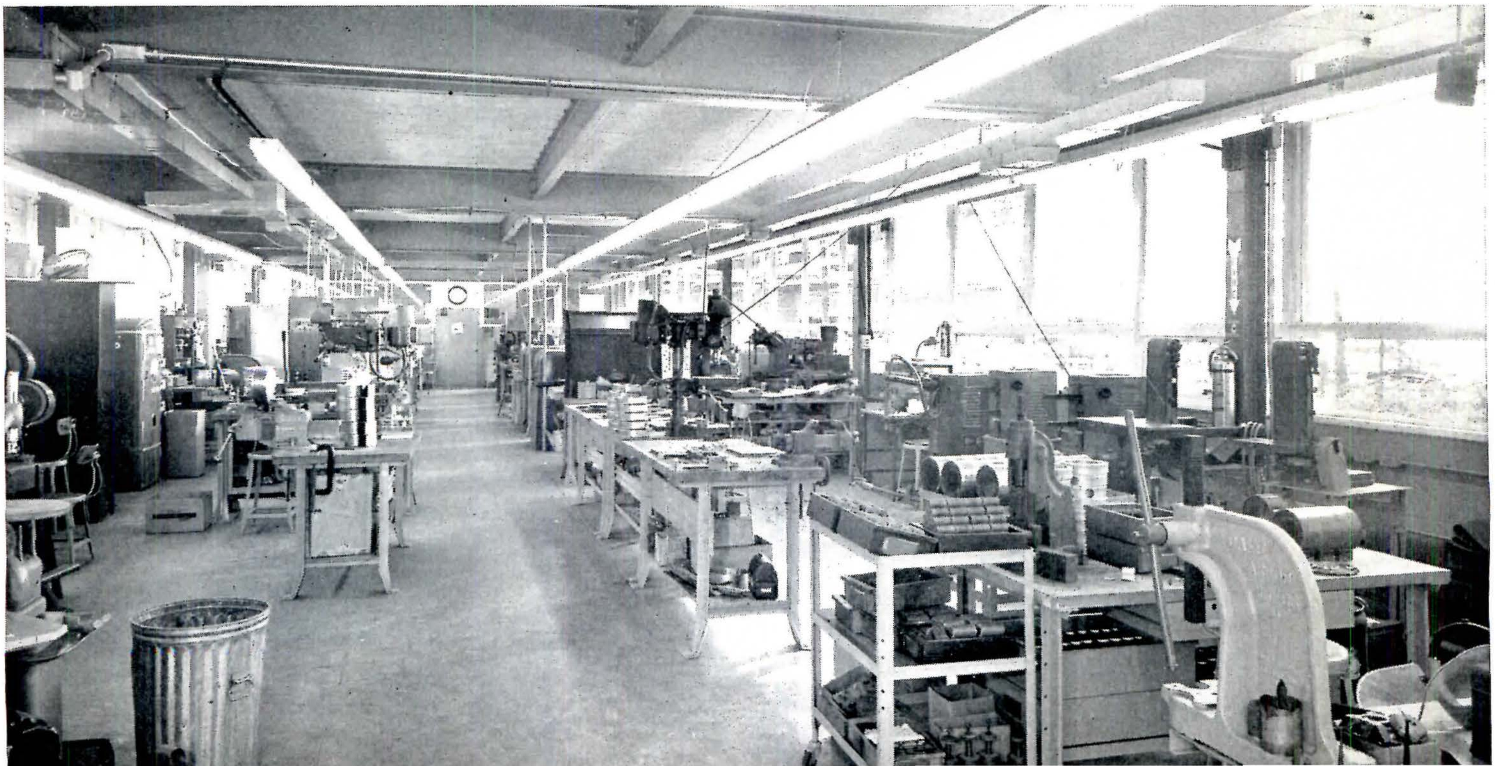


ROTRON MANUFACTURING CO., WOODSTOCK, N. Y.

brick wing-wall. Public and office entrance is located near the juncture of old and new buildings. The new second floor dormer serves the drafting room.

The 4800-sq-ft wing cost $8 per sq ft., not including electrical work. It is steel framed, with steel sash and cinder block wall panels, both painted. The roof is built up over concrete and wood-chip plank, left exposed inside.

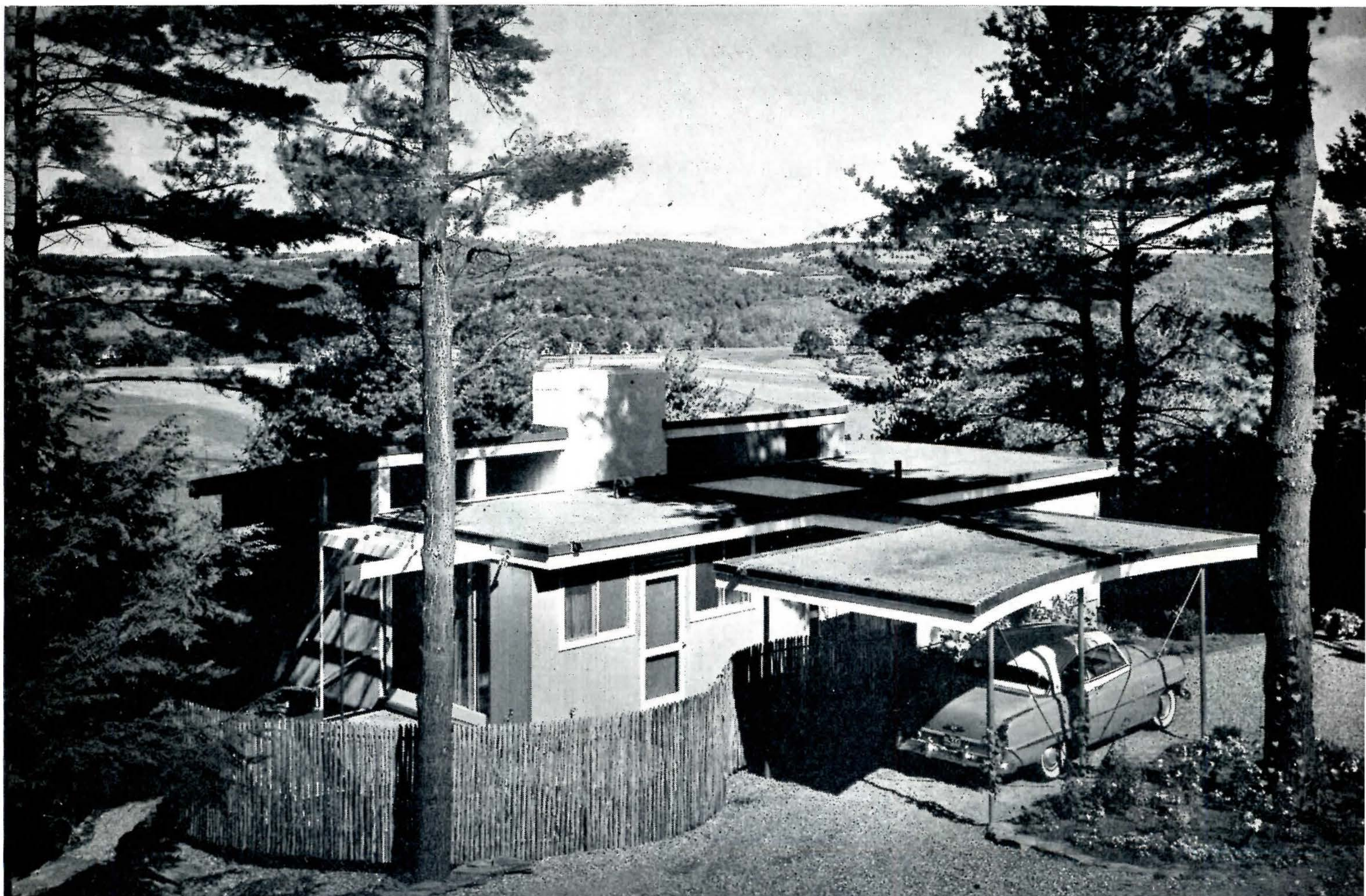
Ben Schnall



FIVE APPROACHES TO THE SLOPING SITE

These five houses — in New Hampshire, Texas, Connecticut, Arkansas and Kansas — were designed and planned with topography a major consideration. All five occupy sloping sites, but there the similarity ends. Just as the slopes varied, so did the owners' requirements — and so did the final plans

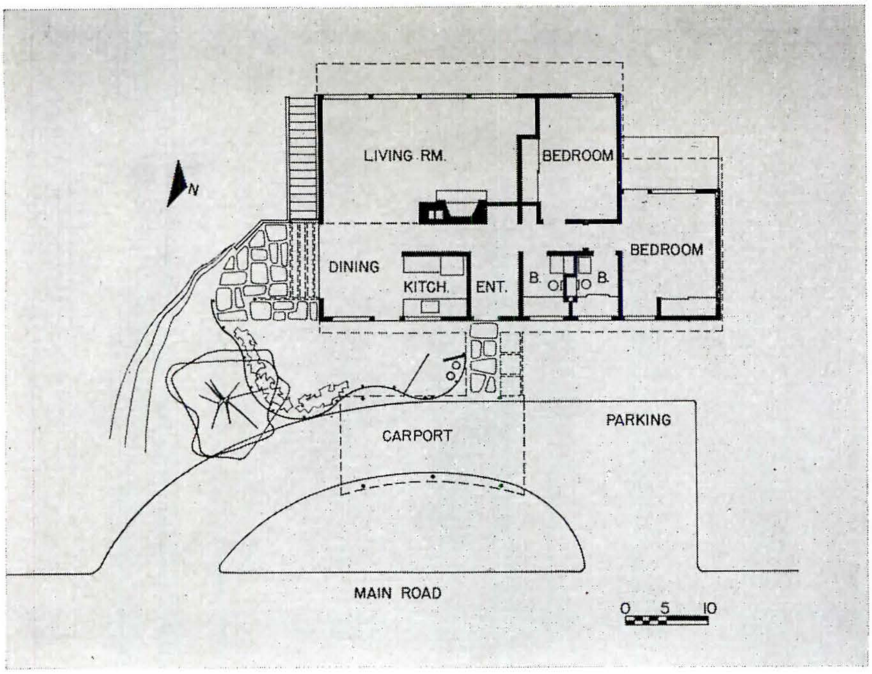
Joseph W. Molitor



1. NEW HAMPSHIRE: LIMITED LEVEL AREA

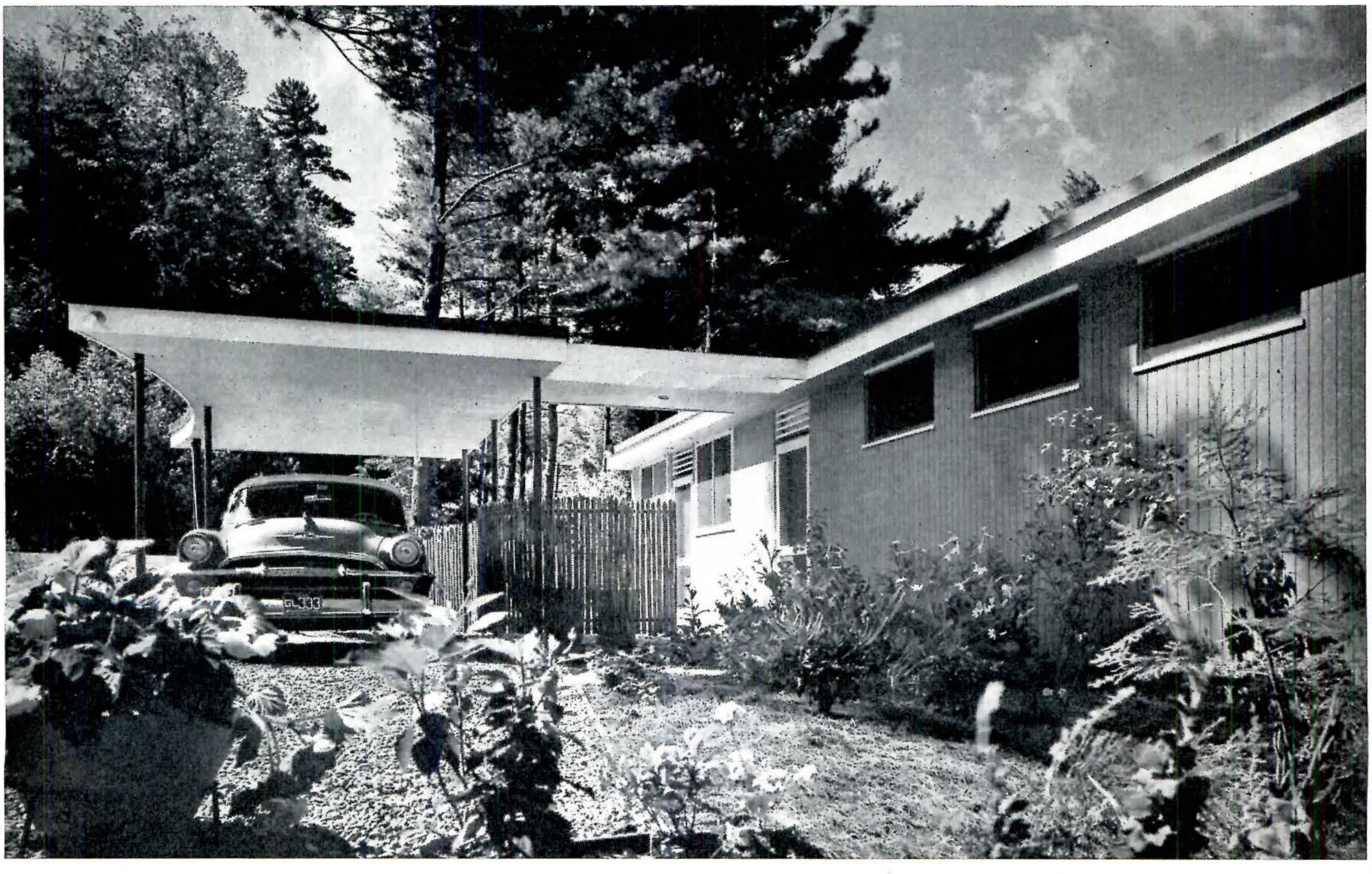
House for Mrs. Bunting Morrell
Hanover, N. H.

E. H. and M. K. Hunter, Architects

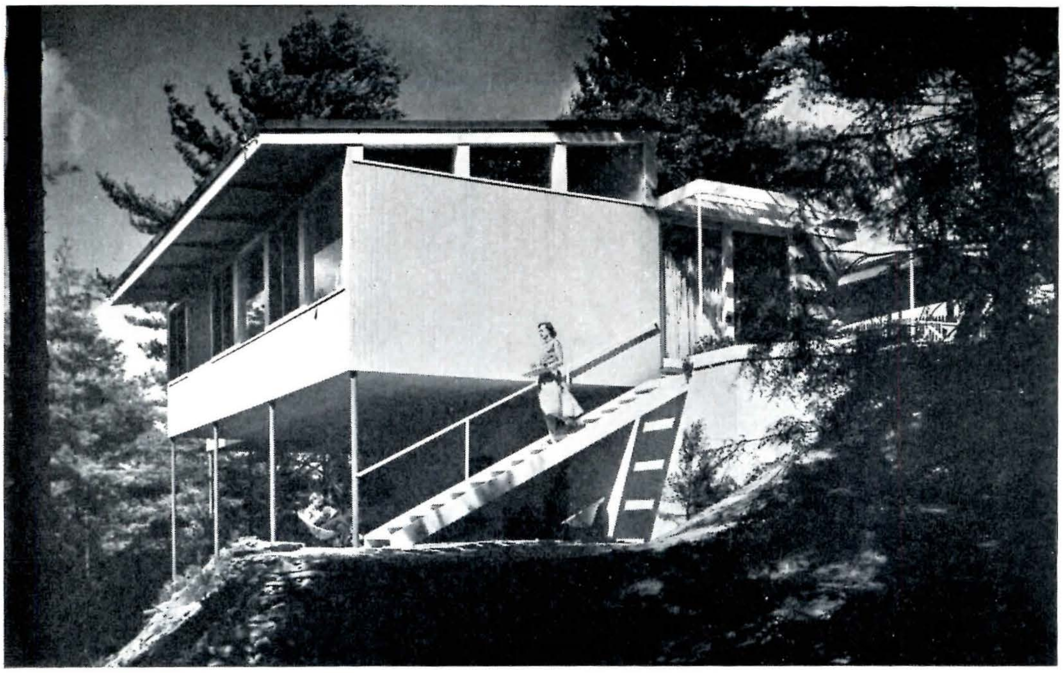


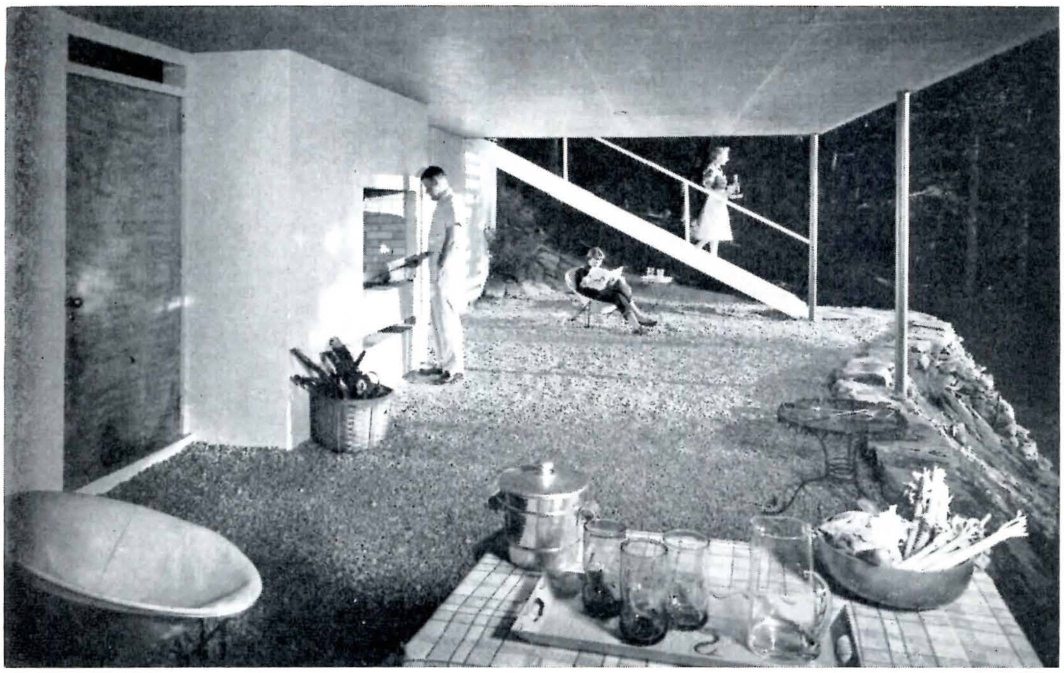
Site slopes steeply to west, with access road running approximately north-south along eastern property line. The only comparatively level area was kept for driveway, carport, parking, front and service entrances, and upper-level terraces

To meet the owner's requirement for a house with no inside stairs and several outdoor living areas on a site such as this, the architects projected the house well out over the slope. Heat loss, which could have been a serious problem in the New Hampshire climate, was prevented by building up the exposed floor as follows: asbestos cement board, rockwool, air space, aluminum accordion, air space, subfloor, building paper, plywood floor, and wall-to-wall carpeting. The cost was less, the architects report, than for a foundation wall.

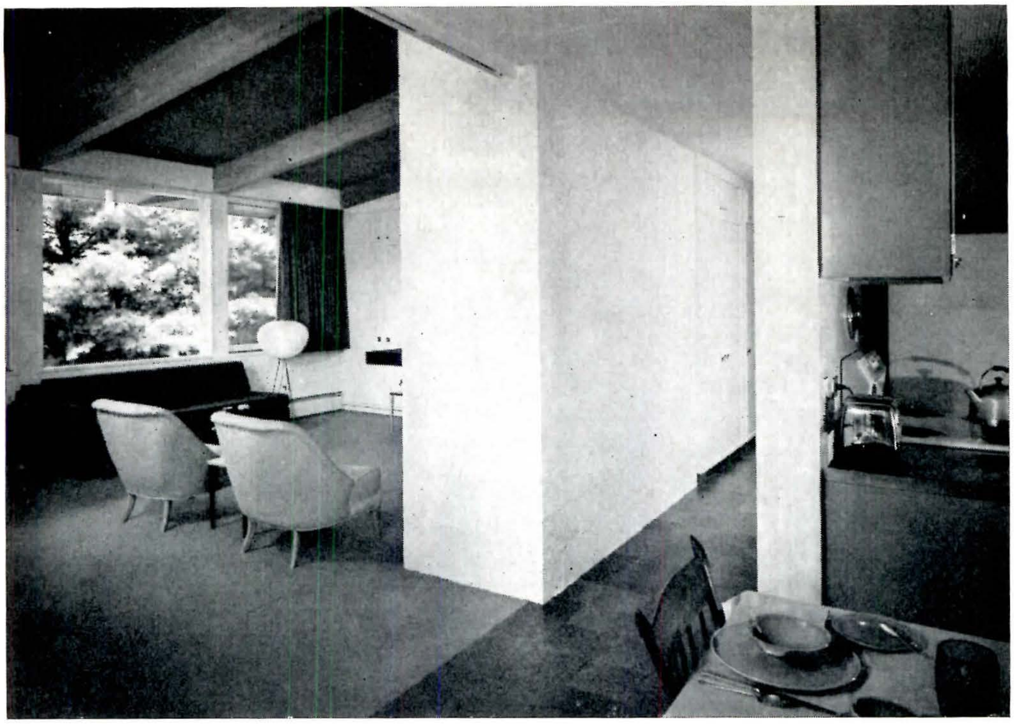


Joseph W. Molitor

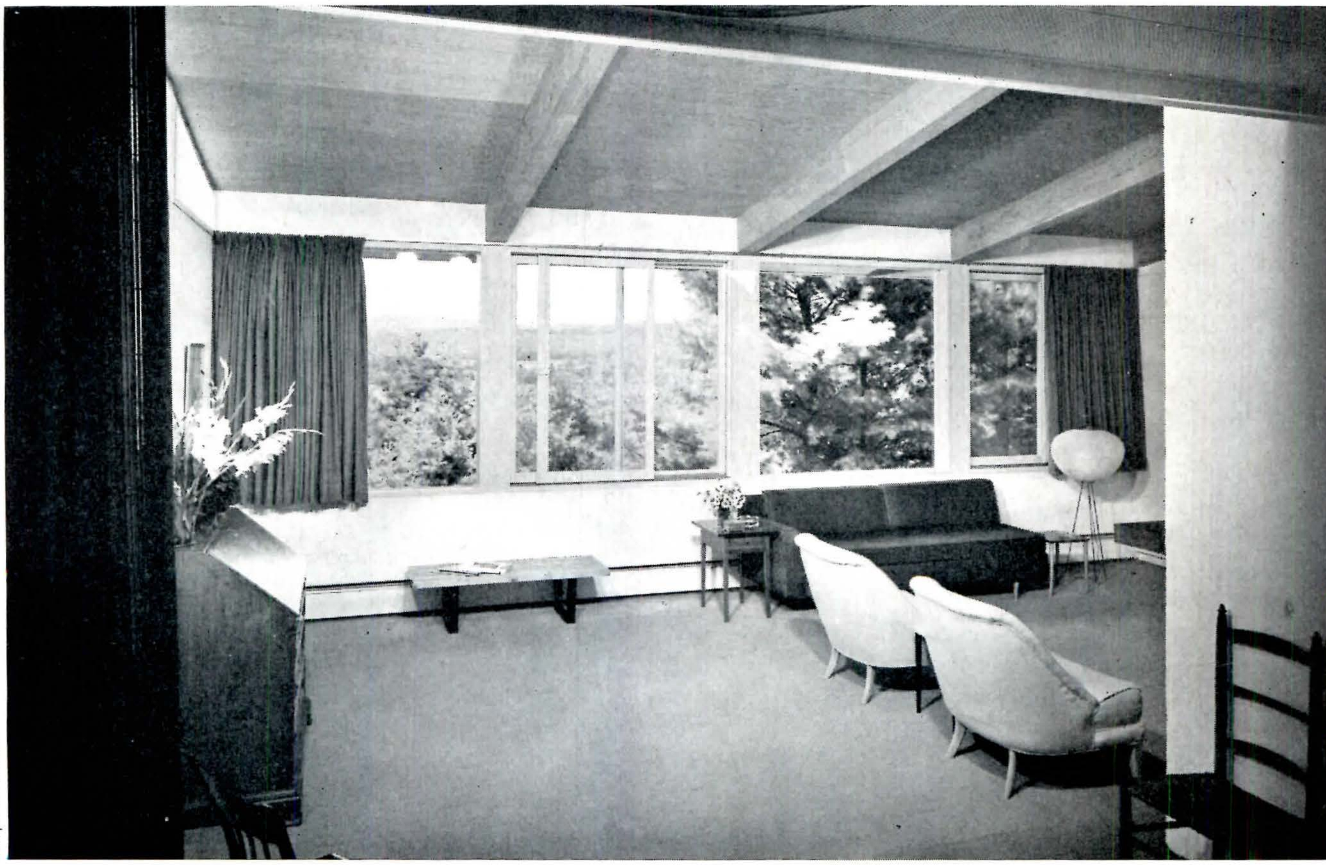




Steepness of site was used to provide sheltered outdoor barbecue terrace connected with upper-level dining terrace by exterior stairs. Heater room and bulk storage area are on lower level, rest of house is on upper. Entry (right) is roofed with yellow corrugated plastic and carpeted wall to wall with thick brush cocoa mat which catches most dirt tracked in from outdoors

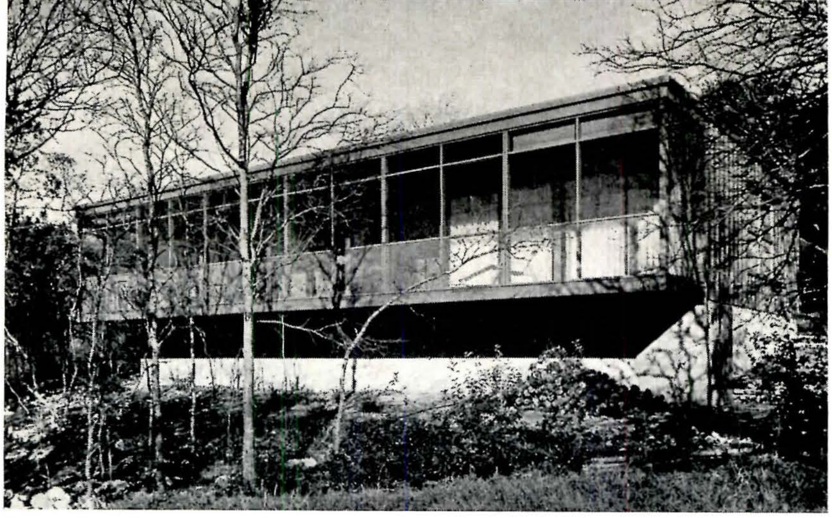


Provision for easy, informal entertaining was an essential requirement in the planning of this house, occupied by a business woman and her mother. Living, dining and kitchen areas are completely open except for a flexible, ceiling-hung screen which can be used as needed to close off any one of the three. Dining room has adjoining terrace, and mother's suite, at end of house for maximum privacy, has own deck

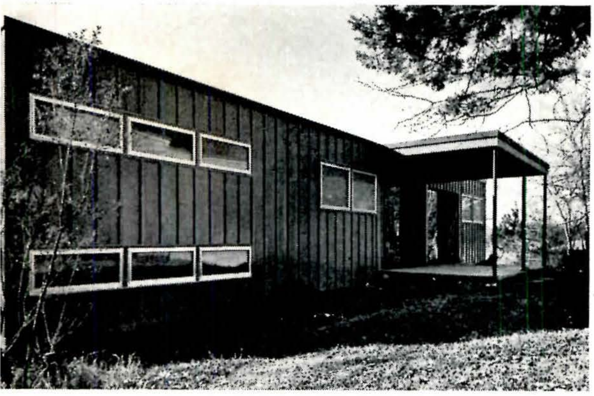


Joseph W. Molitor





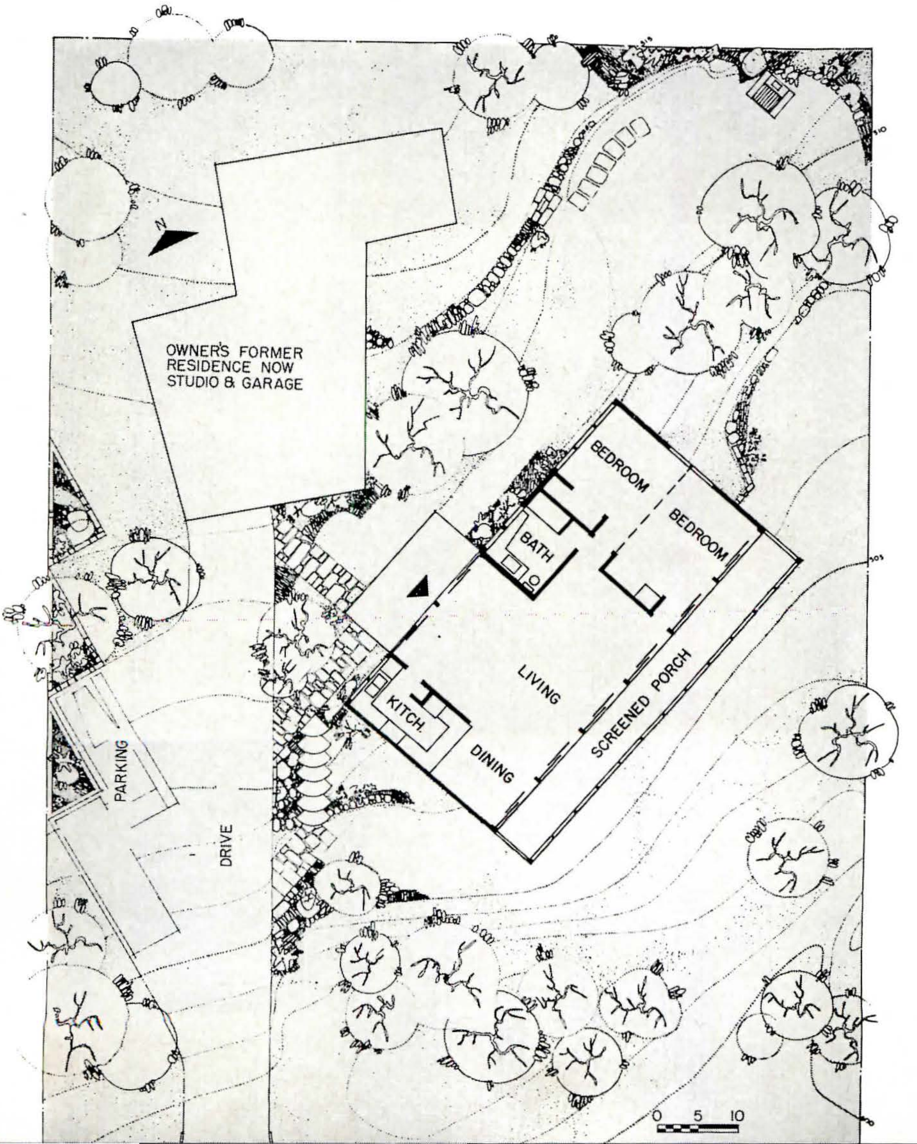
Dewey G. Mears



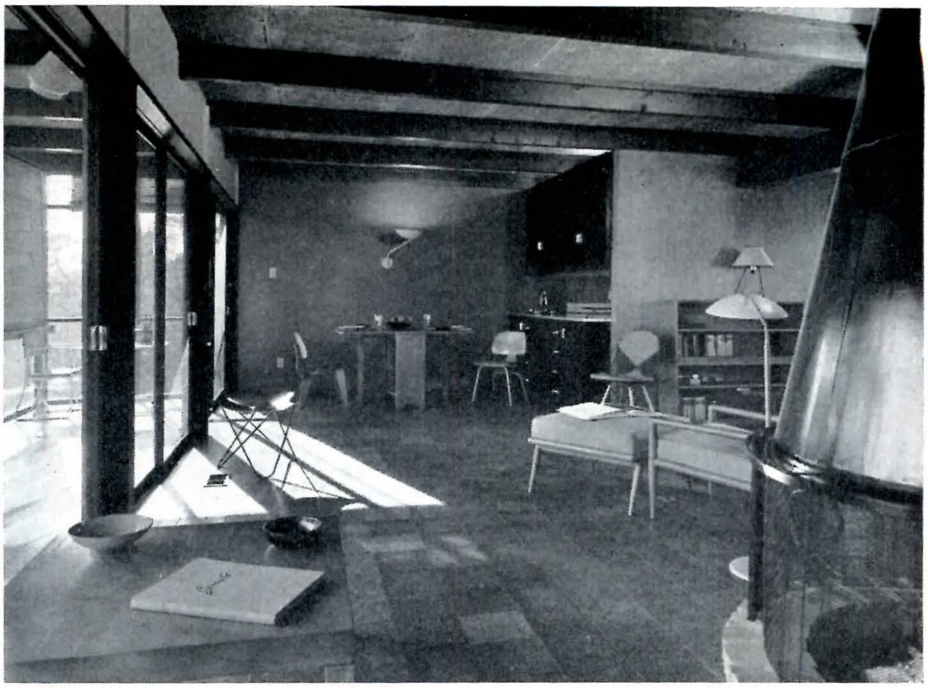
2. TEXAS: WOODED LOT WITH SHARP

House for Mr. and Mrs. Joseph Sneed
Austin, Texas

Fehr and Granger, Architects



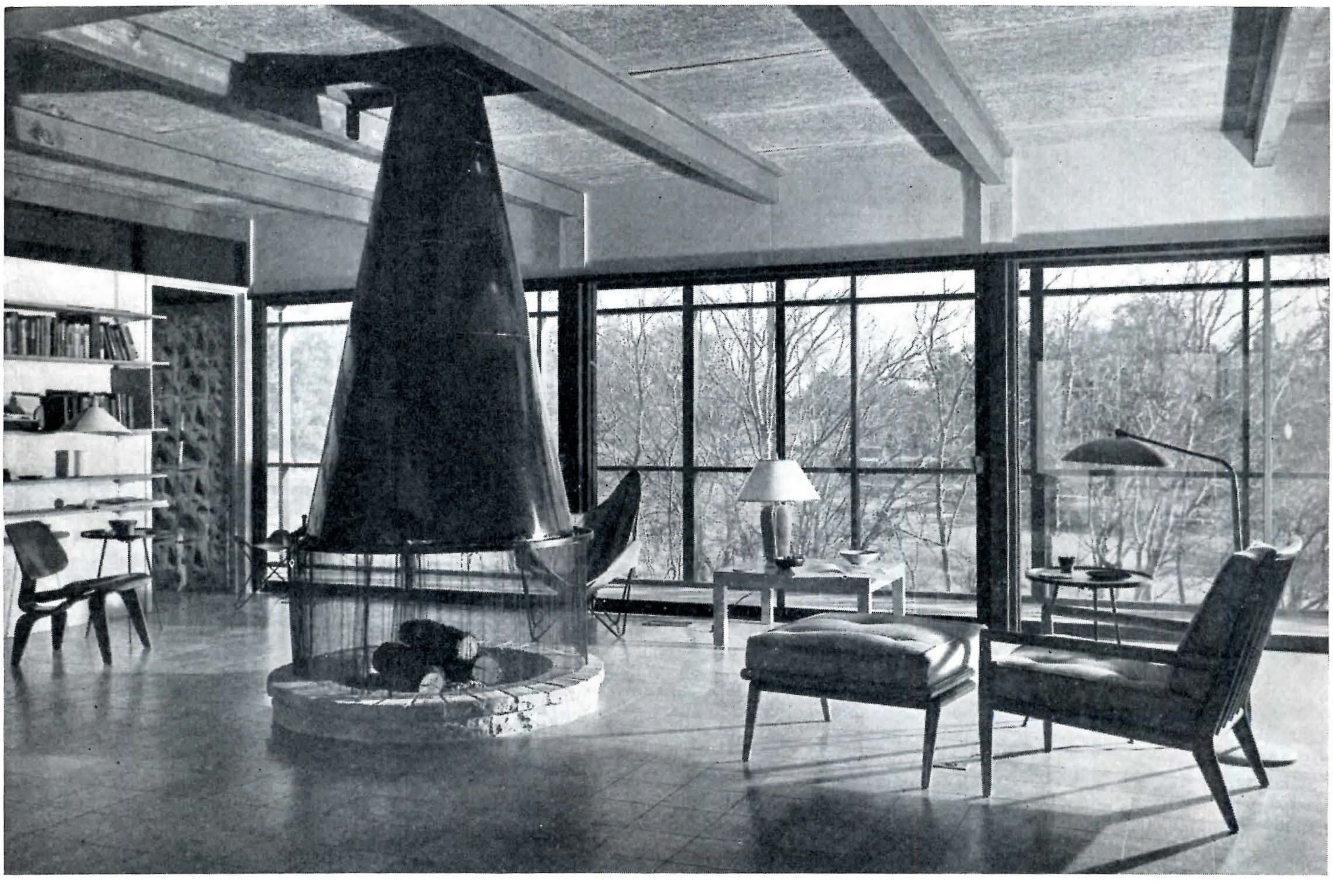
Owners required a small informal house in which they could enjoy the view to the south and which they could open to the prevailing breeze. Central position of free-standing fireplace (which is hung from roof structure) is fine for conversational evenings which Mr. Sneed, a lawyer, particularly likes. Family began to grow while house was under construction, and cabinets to contain baby necessities were built into windows at north end of bedroom. Studio in old building is used by Mrs. Sneed, an amateur painter, and doubles as guest room and overflow entertainment space



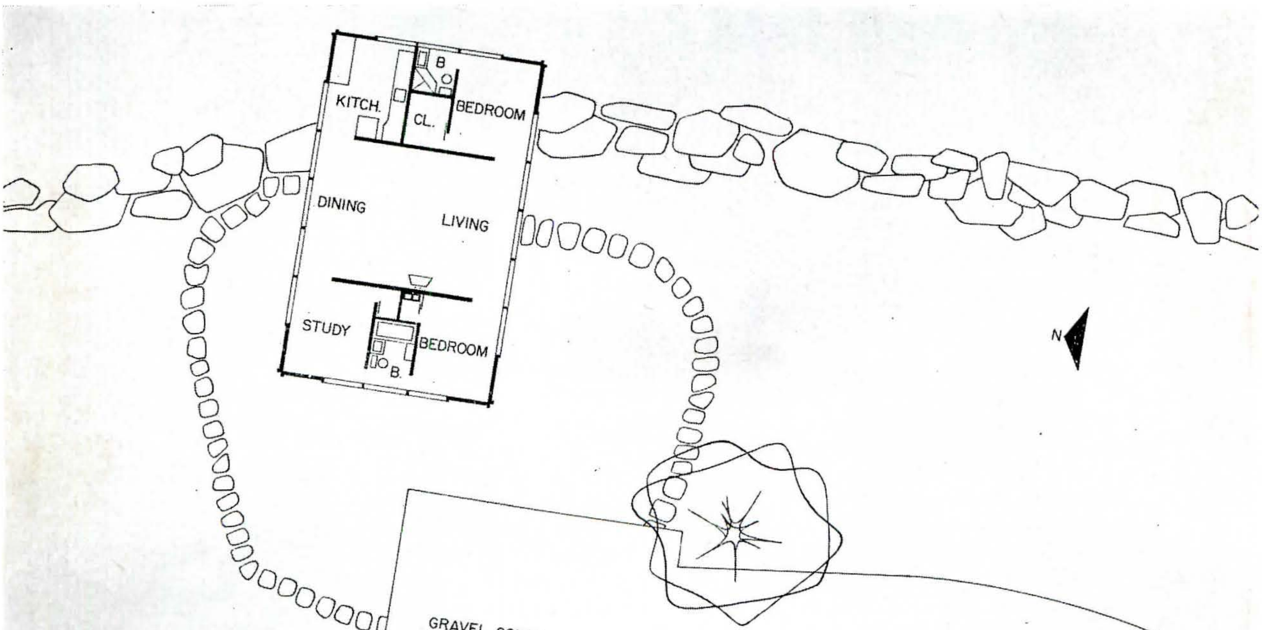
DROP, VIEW TO SOUTH

THE SITE of this house drops an abrupt 6½ ft at the south — and toward the view. The drop was ignored except to provide basement storage and heater-room space, but the view was *not* ignored: the whole south wall is glass, protected from the hot Texas sun by the roof of a full-length screened porch.

Since the budget was limited, construction was kept simple, with standard decking materials, stock lengths and stock doors used throughout. Foundation is spot concrete footings and piers with stucco underpinnings. Requirements included a large living-dining room, a small kitchen (the emphasis was on minimum housekeeping), and one large bedroom planned for future division into two separate rooms.



P. J. Cyr



B.
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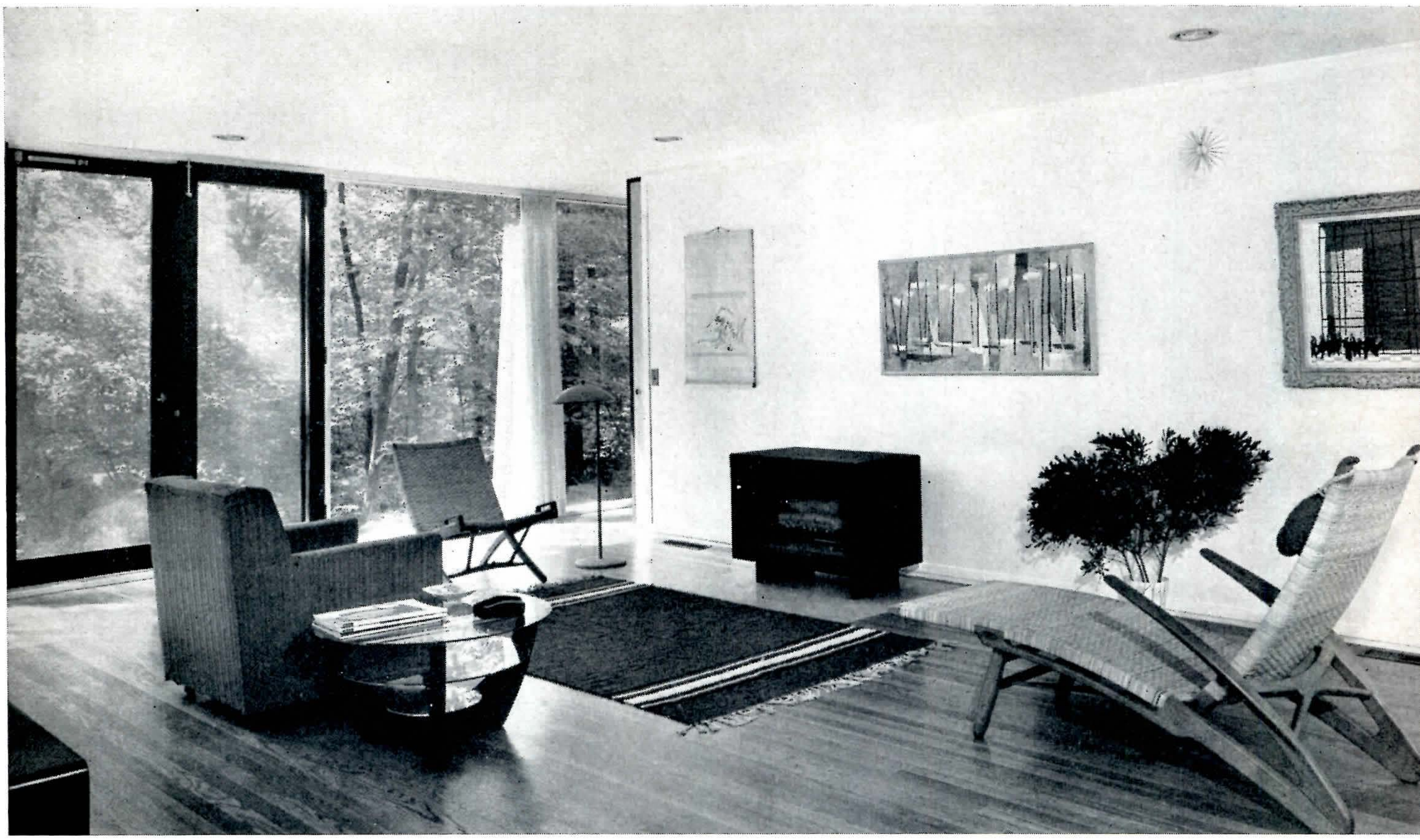
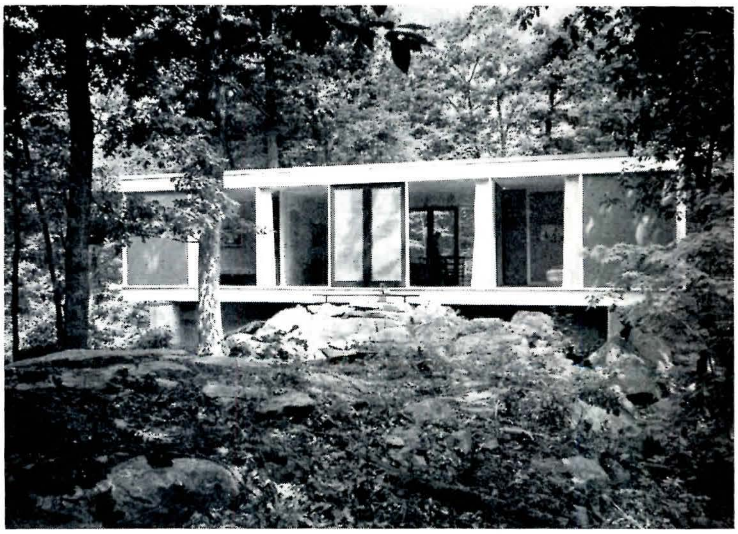


3. CONNECTICUT: A NARROW ROCKY LEDGE

House for Mr. and Mrs. Paul Arlt
New Canaan, Conn.

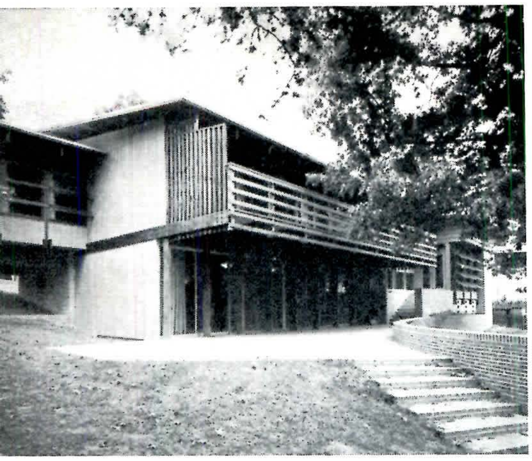
Evans Woollen, III, Architect

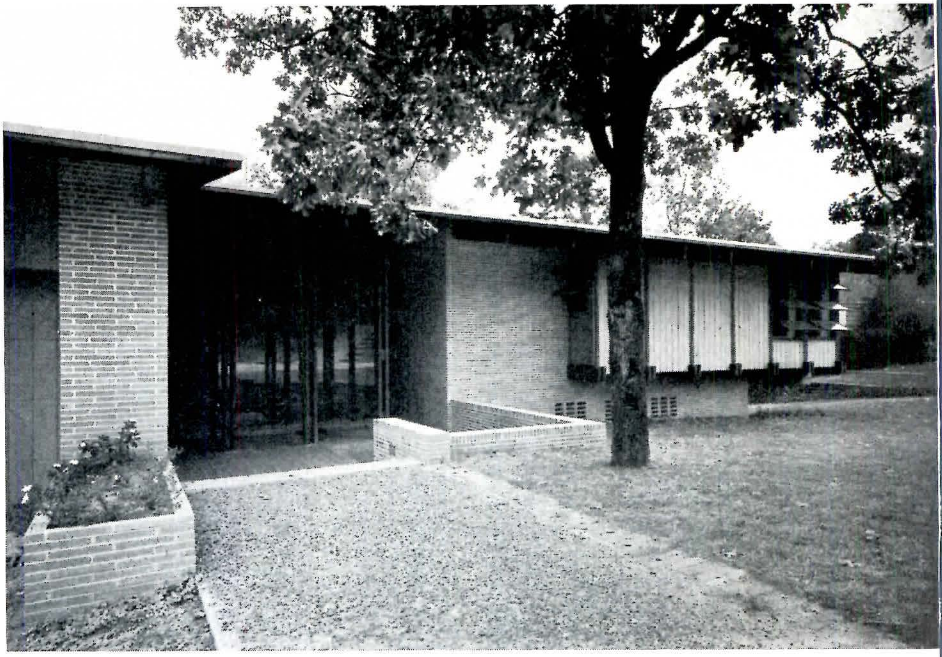
P. E. Guerrero photos



Structure was governed by one typical piece of millwork, milled from a 3- by 6-in. section of select fir, and used for post, beam, frame and trim. Section accommodates doors, screens, fixed glass, solid walls and outswinging ventilators throughout the building

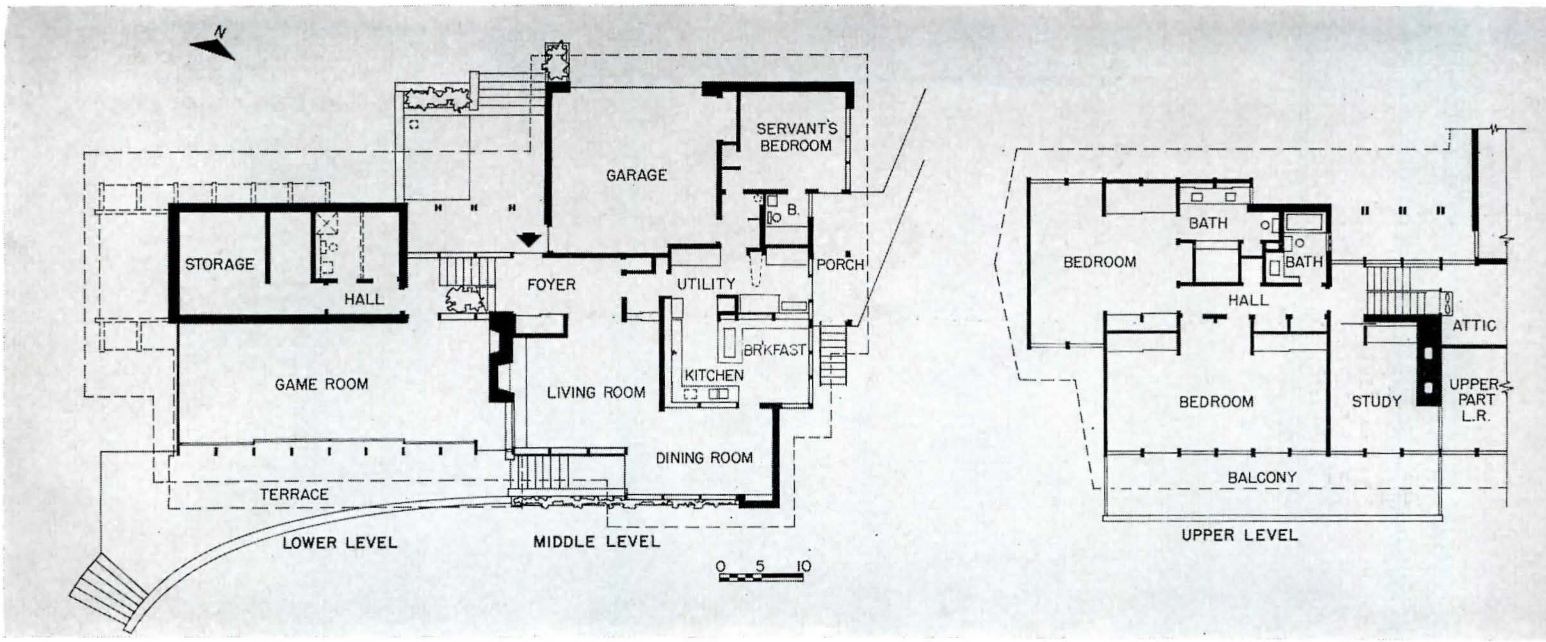
THE BASIC PROBLEM here, the architect says, was the site: "a beautiful, wooded 2 acres with a high, narrow ridge of rock running north and south through the center of the property. The decision was to place the house on top of the ridge with the long side of the rectangle opposing the direction of the ridge; the ridge being the fulcrum with the house overhanging on either side." In plan the house is one large central room facing up and down the ridge, with two smaller rooms on each side, divided by 4-ft-wide sliding doors. The owners are well pleased with this arrangement, commenting that the architect was "particularly successful in providing maximum usable space within a relatively confined floor area." They also praise the "satisfying structural relationships, clean detailing, and the essential compatibility of the house and site."





4. ARKANSAS: THREE LEVELS

Earl Saunders



FOR AIRY SPACIOUSNESS

House was planned to provide third bedroom when needed: child's room at rear is really two rooms, with partition presently omitted. Construction is post and beam, based on 4 ft 6 in. module; paired 3 by 12 floor beams extend out to form balcony deck

House for Mr. and Mrs. Noland Blass, Jr.
Little Rock, Ark.

Noland Blass, Jr., Architect

THE SITE of this house, in a built-up residential neighborhood, slopes down sharply from the street toward a small park with a brook and a fine stand of trees. The house was planned to take advantage of this view to the south and to capture the prevailing southwesterly breeze while shutting out the west sun and north winter wind.

The slope of the site, happily, was down toward the south, allowing a three-level house with all main living and sleeping areas on the favored side. Living room, dining room and kitchen are on the middle level, bedrooms and study are a full story above the gameroom. In the central portion of the house the three levels open to each other, greatly increasing the sense of spaciousness.

The owners report that the house both works and wears well. "What we especially like about it," they say, "are the changing moods from day to night and from winter to summer. The house is open, gay and sunny on a spring morning or with the drapes drawn on a winter night it can be warm, withdrawn, and completely intimate."

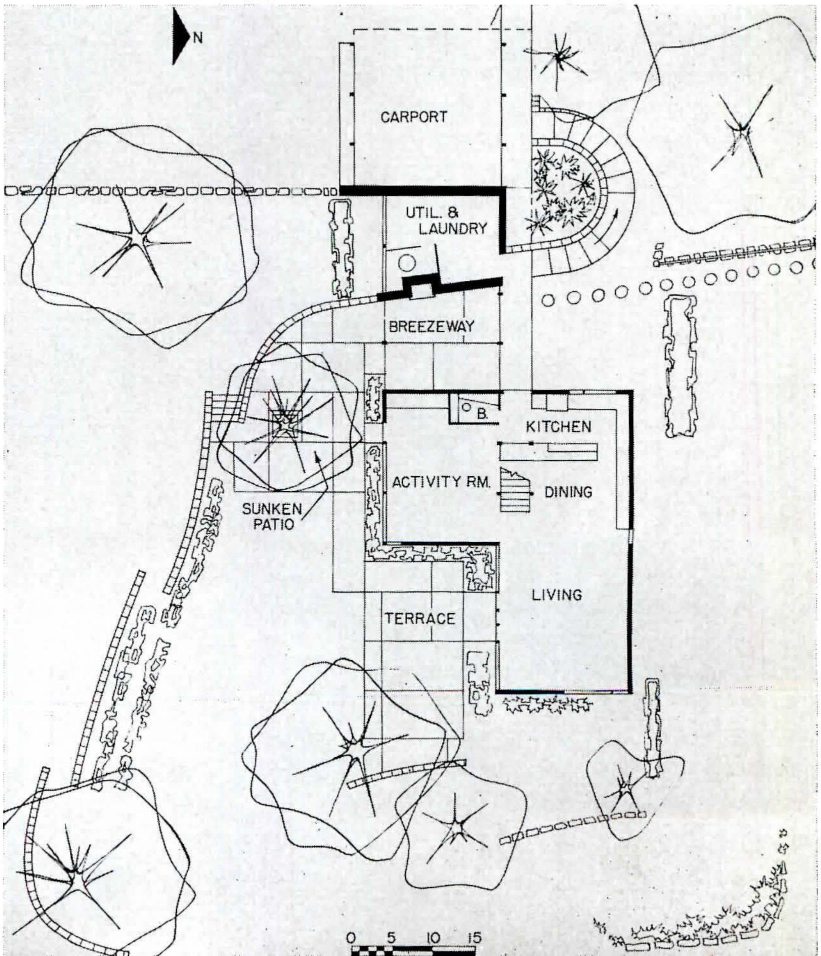
Wayne Wright

5. KANSAS: TWO LEVELS WITH SEASONAL PATIOS

House for Mr. and Mrs. David Benton Runnells
Mission, Kansas

David Benton Runnells
Architect

THIS HOUSE, occupied by the architect and his family, uses the changing levels of its site to provide a separate entrance to the owner's studio-drafting room on the upper level; this entrance also is intended for guests, and connects directly by interior stairs with the living room; an outdoor ramp leads down from the carport to the "family" entrance. Upper level includes three bedrooms and bath in area over laundry, breezeway and activity room. Terrace and patio were planned for use at different times of the year.



Richard Mathers

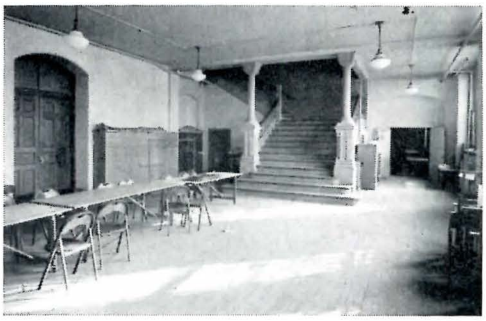
REMODELING REJUVENATES ART MUSEUM

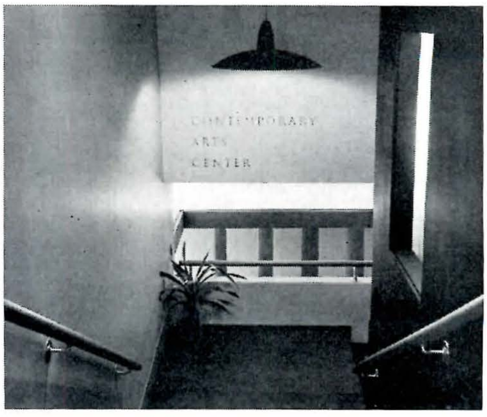
Contemporary Art Center
Cincinnati Art Museum, Cincinnati, Ohio
Carl A. Strauss, Architect

THERE WERE TWO MAIN PROBLEMS in the remodeling of these rooms at the Cincinnati Art Museum. The first, the architect says, was "to 'maskout' the evidences of the 1870 aspects of the building, such as the cast iron columns and stair railings, and particularly the large windows on the south wall, which not only reduced the available hanging space but also admitted too much uncontrolled daylight for exhibition purposes." The second was to create exhibition space which would be both attractive and flexible.

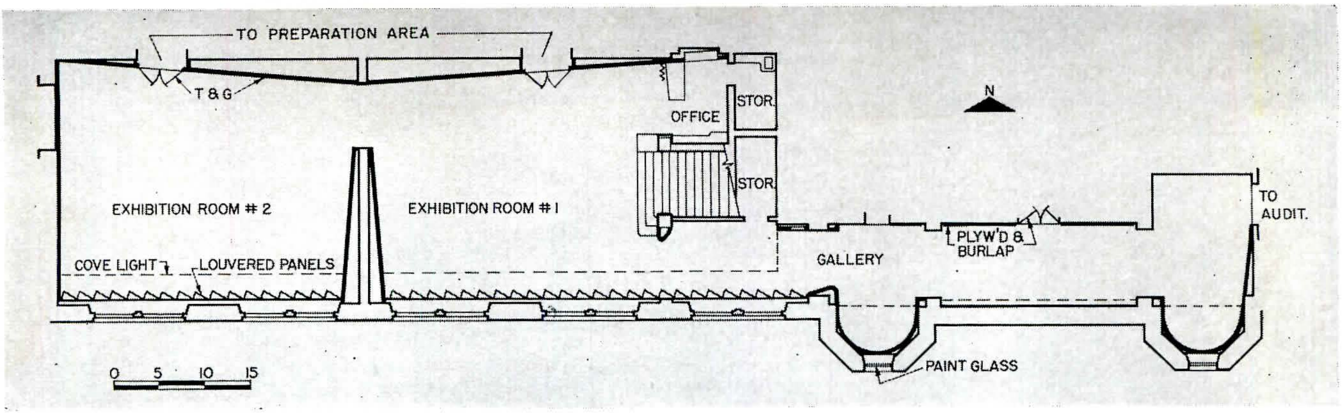
ARCHITECTURAL INTERIORS

Design | *Details* | *Materials* | *Equipment*





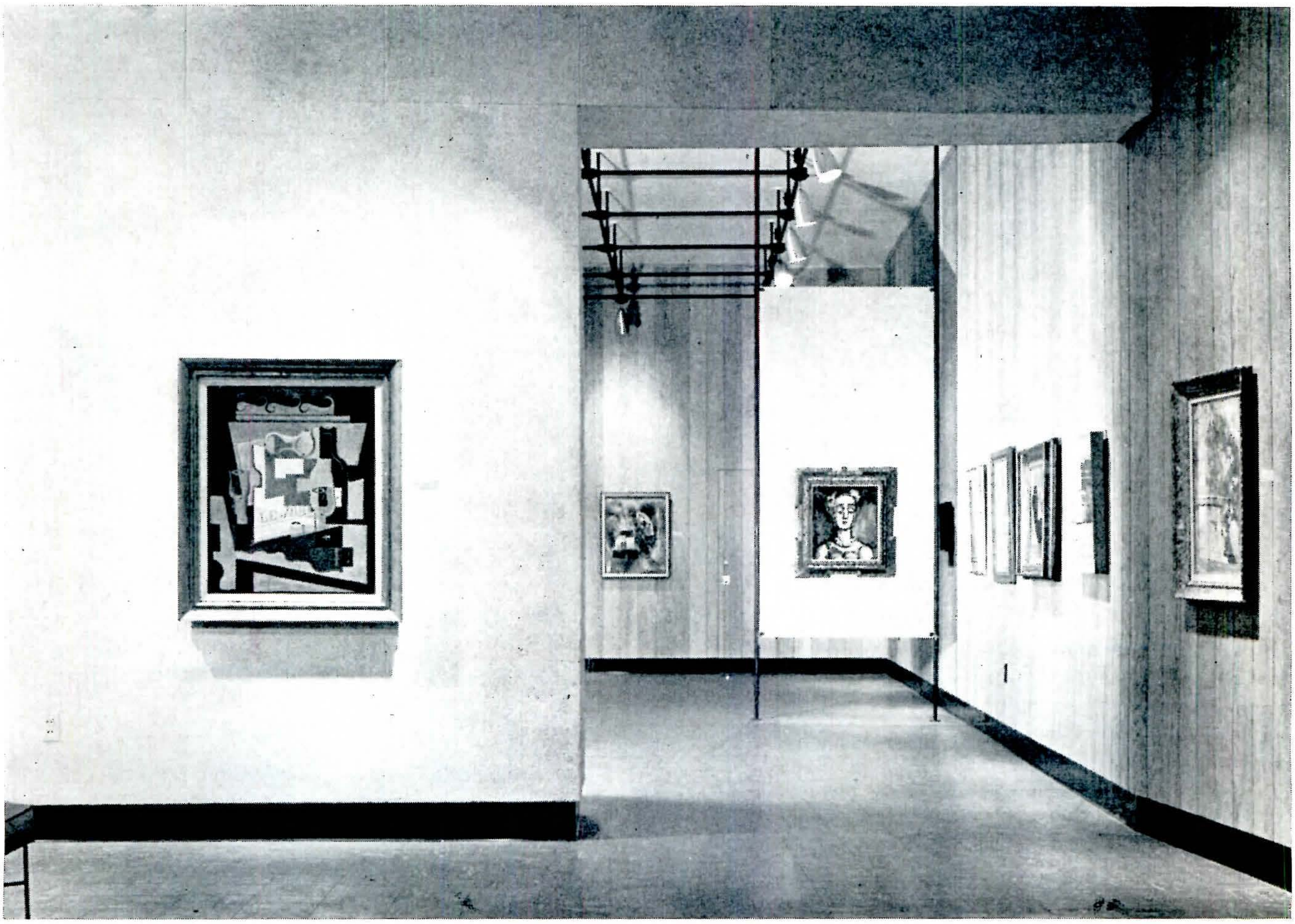
Richard Mathers



ARCHITECTURAL INTERIORS

Design | *Details* | *Materials* | *Equipment*

The entrance to the Center is down a stairway from the first floor. The old cast iron railings and columns were concealed with plaster walls (photos on preceding page), used also to form an office for the curator in the well of the stairs. An existing door between the gallery and the first exhibition room was removed to make the space more continuous, and the whole area was unified by wall and ceiling treatment and lighting (see captions on following pages). Extra display space for temporary exhibits was provided with movable panels, which can be used either vertically or horizontally.



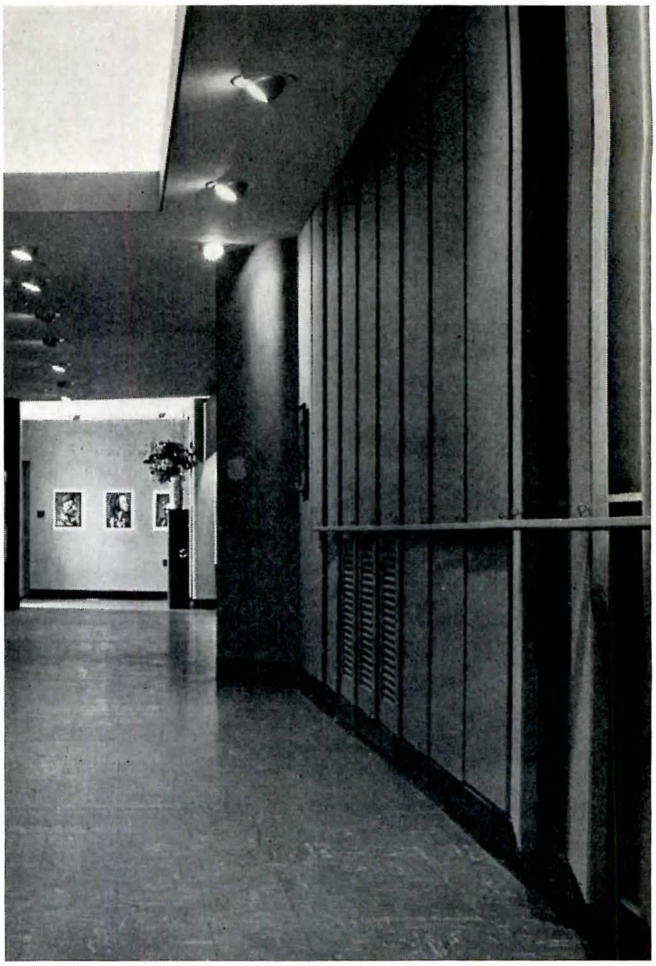
Richard Mathers

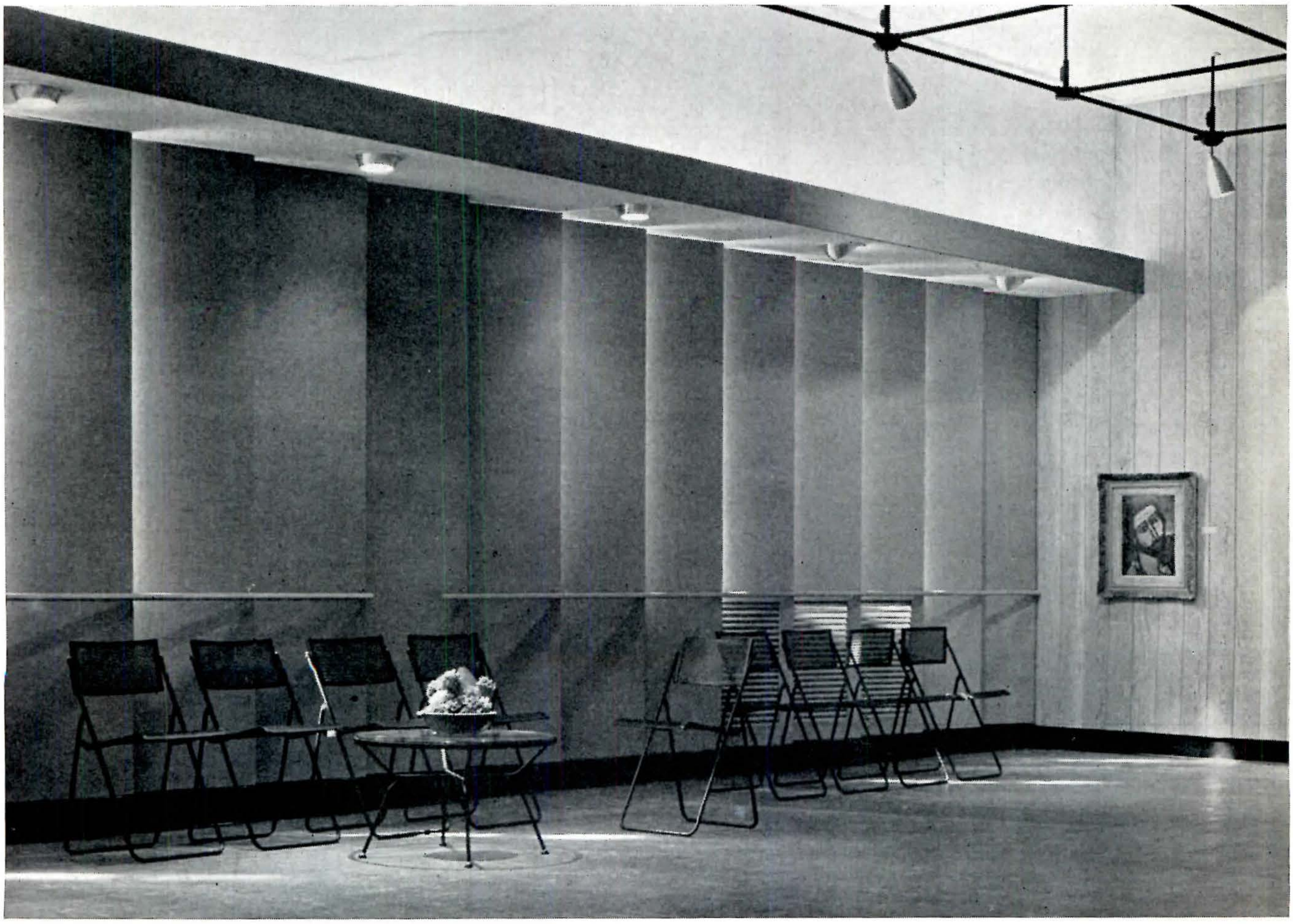
Burlap-covered plywood was used for walls of long gallery leading to auditorium and also for louvered walls in exhibition rooms (see next page). Difference in ceiling height between these areas was minimized by continuing the lower ceiling of gallery into exhibition rooms where lighting was planned to create effect of lower ceiling as well as to be very flexible: a grid of electric conduit was placed 18 in. below existing ceiling, with an outlet box or an adjustable spotlight at each intersection on grid. Cove lighting above dropped ceiling portion of both rooms provides general illumination; recessed lights below cove can be adjusted to focus on objects hung on louvered walls. Wall between exhibition rooms was covered with compressed excelsior board which, architect says, has "an interesting texture" and provides "an excellent, non-marring" hanging surface. Movable panels for temporary display are burlap-covered, attached to iron pipe; they double as room-dividers

ARCHITECTURAL INTERIORS

Design | *Details* | *Materials* | *Equipment*

In both exhibition rooms the windows, radiators and pipes along the south wall were concealed by a series of burlap-covered pivoting plywood louvers which, when closed (right) form a solid exhibition wall and, when open (below) admit a controllable amount of daylight. Other long wall in each room and end wall in one are vertical fir boards in natural finish; doors in these walls are covered in matching board. Floors, which were of both wood and concrete, were covered with asphalt tile, with a black rubber set-on base





Richard Mathers

SCHOLS 219

BUILDING TYPES STUDY NUMBER

THE HISTORIC AMERICAN PATTERN of industrial growth, economic improvement, population increase and cultural advance has been strikingly evident in the South. It becomes tangible in the region's school buildings. Only a few years ago new southern schools were the exception; now they are building at a rate at least comparable to the rest of the country's. The South is no separate entity; rather, since this effect is comparatively recent there its impact is more dramatic than elsewhere.

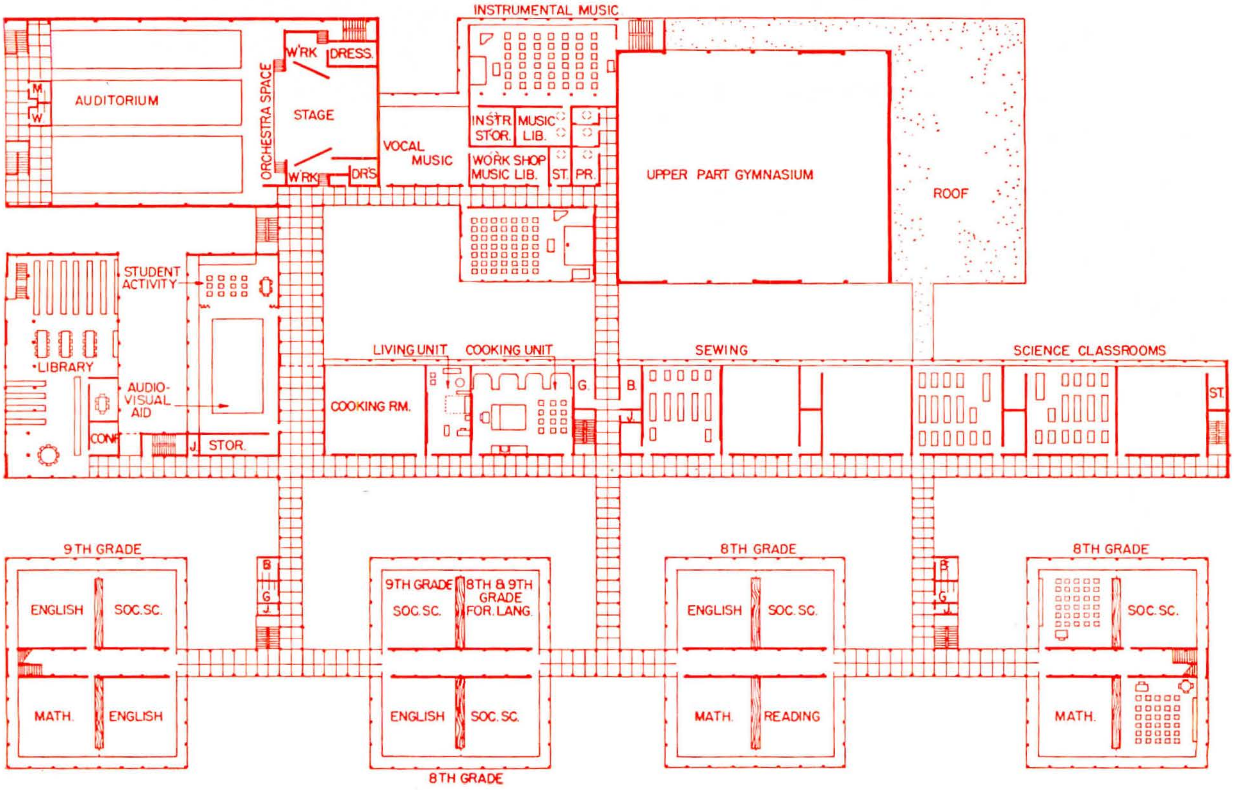
While economic improvement has been phenomenal, the extremely acute construction financing problems have been more than local school authorities could cope with, except for a few which, like Shreveport, have been able to float large, long-term school bond issues. Many an area has suddenly found a factory in its back yard and the employes' children on the threshhold of its dilapidated school. The rural areas, the small towns, or the big city whose problems are so familiar — though brought into peculiar focus — have not often had Shreveport's opportunity. The states individually have aided, and the U. S. Office of Education; as this is written it looks as if Congress will increase the amount of money available. The sources of funds are the same and the locally autonomous control of their expenditure is the same too, in the South as in other states.

The schools in the following pages are evidence of pressures, too strong to be resisted, culminating in multitudes of children whom it is our custom to educate. The schools are evidence, also, of the acceptance of a contemporary educational philosophy to just about the degree one would expect anywhere in the United States, varying widely but in general enthusiastic once the possibilities have been explored. And they are evidence, again, of acceptance of architectural forms and expressions which a few years ago would have been rejected — to continue the parallel, an acceptance not uniform but on the whole encouraging.

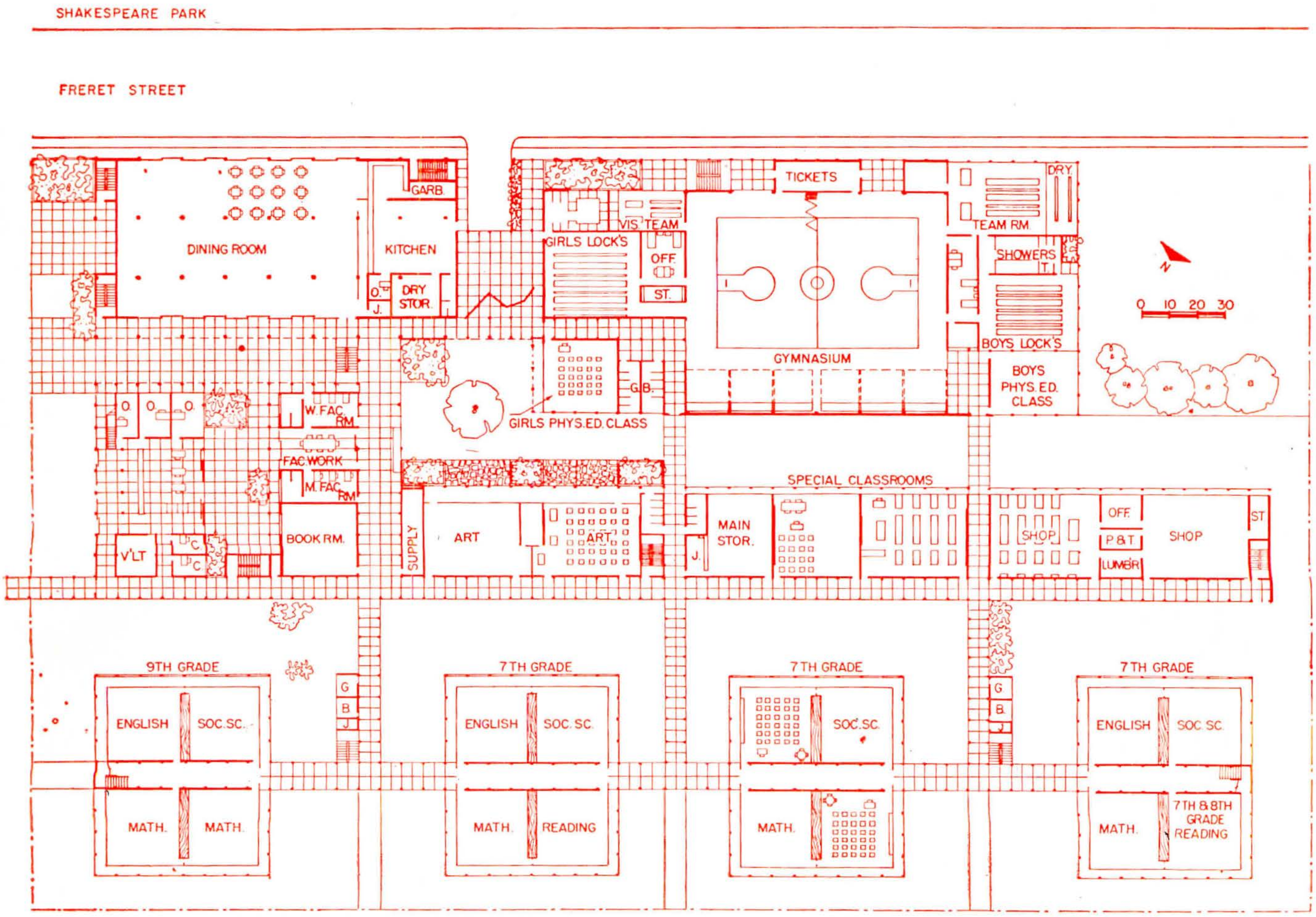
Among these examples are city schools and country schools, big ones and little ones, schools for Negroes and schools for white children, some brand new and some several years old. The recent anti-segregation rulings have not stopped school construction in the South, though they may have slowed it for a while. Mississippi may have voted to turn its public schools into private institutions if the issue is pressed; popular feeling elsewhere may be strong. At some risk we might call attention to the slight difference between Mississippi's proposed course and the situation in existence these many years in — to name a few states — Maine, New Hampshire and Pennsylvania, where the private academy may be the municipal secondary school, the Quaker school the best in town. It is not accidental that a Pennsylvania private school is published here, nor is Eliot Noyes' stimulating balloon-formed project a fortuitous inclusion. Neither private schools nor concrete bubbles will solve all our educational problems, but the stimulus which good design provides is useful in all our regions.

No, school construction is not going to stop anywhere in the country, not while there are more children to educate, and more, and more.

— Frank G. Lopez

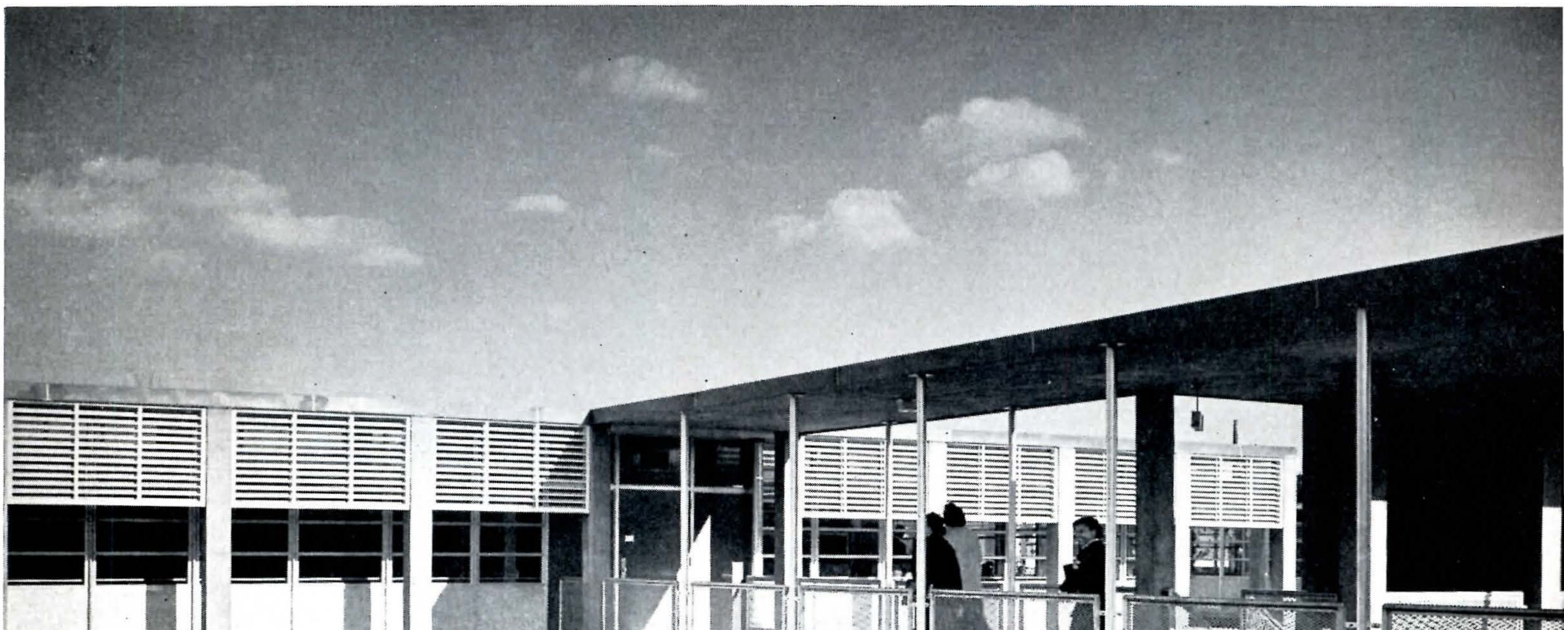


FOR THE CITY: CARTER G. WOODSON JUNIOR HIGH SCHOOL



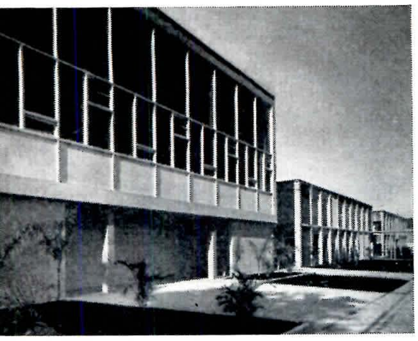
ORDER AND LIFE: DESIGNED FOR A NEW ORLEANS SLUM

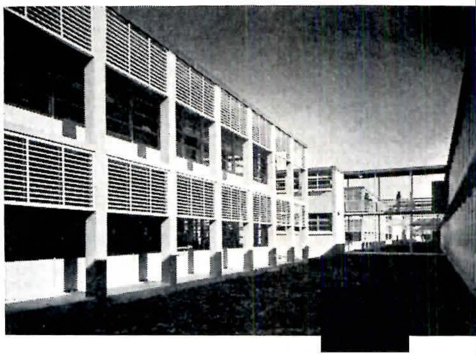
Favrot Reed Mathes & Bergman, Architects; DeLaurel & Moses, Mech. & Elec. Engrs.; R. F. Schneider, Landscape

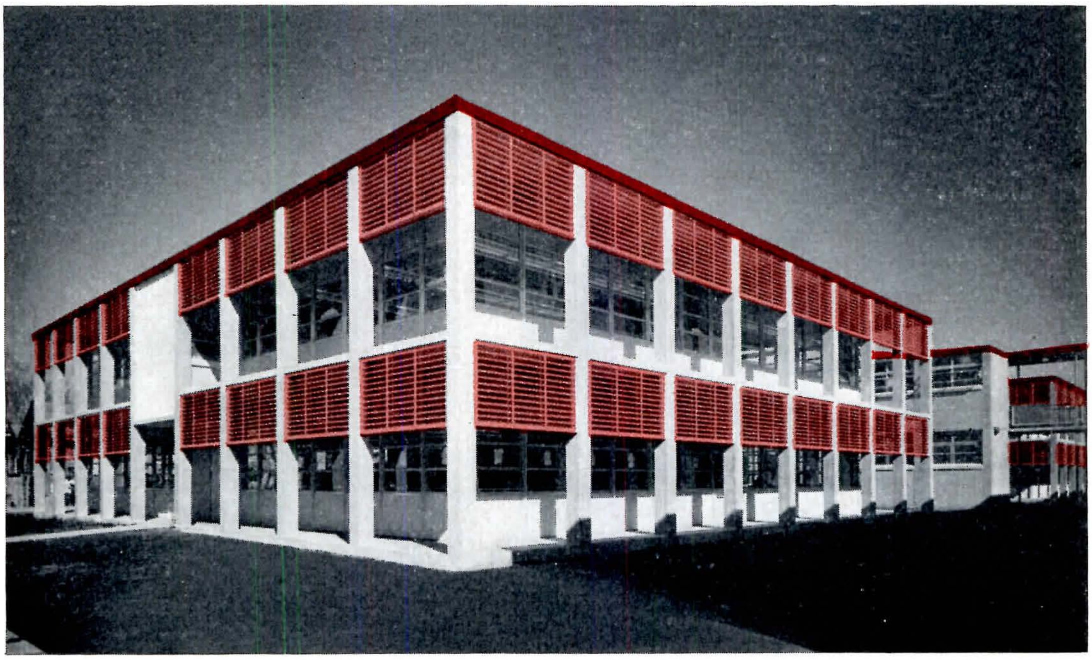


[redacted]
Ulric Meisel

IN PLANNING for this school Orleans Parish School Board "did something" about situations familiar in all our cities yet magnified by such local factors as recent change to a 6–3–3 program; existing schools in ramshackle wooden firetraps; population crowding, disease and delinquency; high land cost; difficult soil conditions. The 90,000 sq ft site was the best obtainable in this back-of-town location. The program required 107,000 sq ft of building area; connecting passages and exterior sunshades (figured at ½) increase this to 121,000. The open, orderly school bright with color, cost less than the budget.



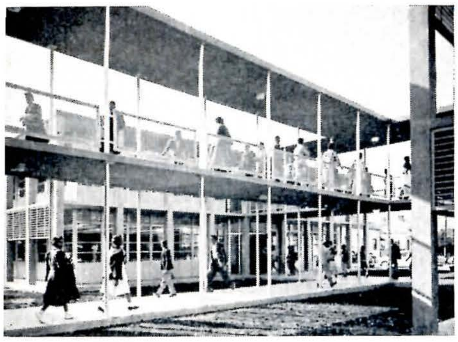


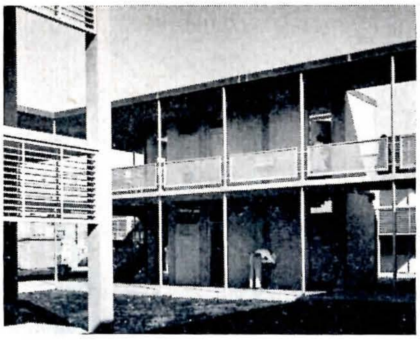


Ulric Meisel

CARTER G. WOODSON

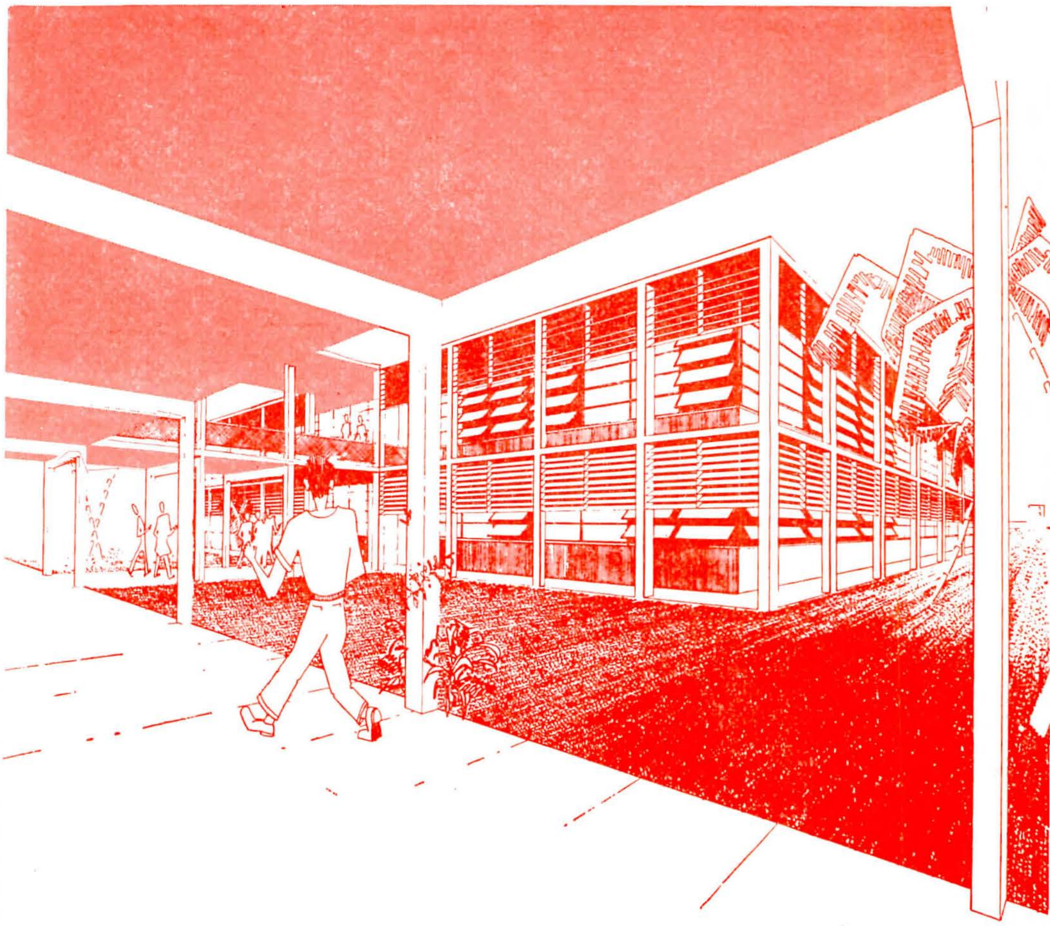
JUNIOR HIGH SCHOOL



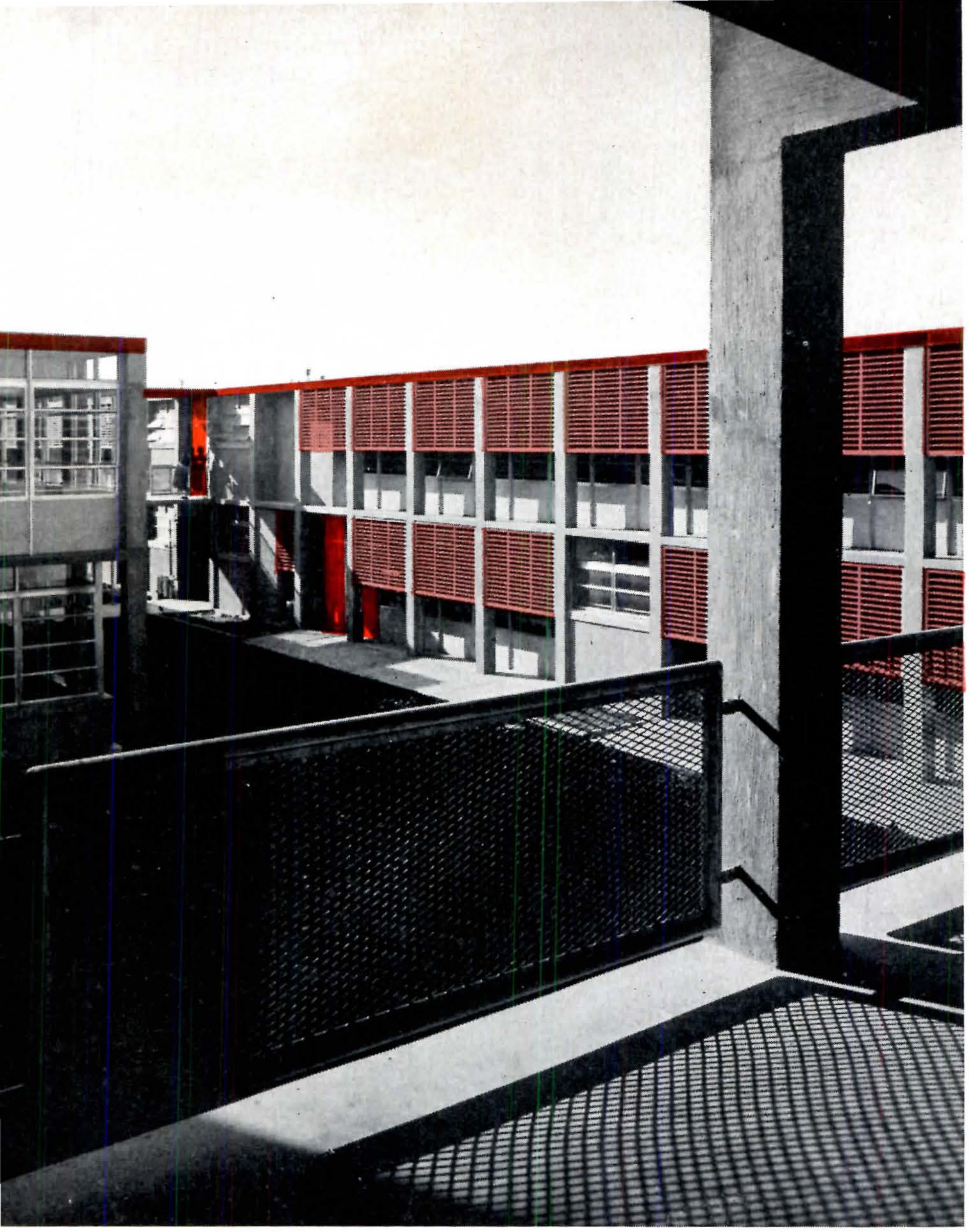


The architects were given a complete program, prepared by the School Board's Office of Planning and Construction, which set forth the educational philosophy, community survey, physical facilities, etc. It was determined that the school should be a means of raising the community's standards. The site, though small, adjoins a two-block city playground available for school use; the street between is to be closed.

The academic classrooms, contained in four buildings of 8 classrooms each, are so arranged that students changing classes do not leave their individual buildings except for elective subjects, which are in the long central building (see next page). While the classroom buildings were first conceived as steel-framed with precast floor slabs, fireproofing requirements proved too costly and a reinforced concrete frame and concrete slabs were selected. Fibrous acoustical and insulating panels were used as slab forms. These remain in place and are the ceiling finish. The exposed concrete beams are bridged with steel channels which also carry the lighting fixtures. The visible framing forms a repeated design module which enhances the sense of order, important in a neighborhood where disorder is characteristic.



The type of structural system used makes the exterior walls mere closures. For these, 2-in.-thick fiber-and-cement panels were employed, stiffened with 5/8 by 4-in. structural steel mullions; awning windows for maximum ventilation (a prime need for the climate) are above the panels. Windows, sills, panel caps and mullion covers are aluminum. Overhangs were designed to cut sky glare from an elevation of 30 degrees above the horizon. On the sides requiring sun control (south and west), metal louvers are set at outer edges of exterior columns to protect the classrooms from direct sunlight. The few solid wall areas are 8-in. concrete blocks covered with a parge coat of portland cement, fine sand and integral waterproofing which completely conceals joints

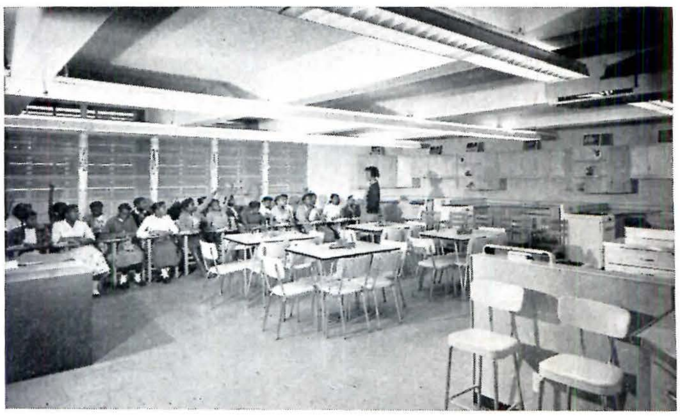


The repeated pattern of visible concrete frame, sunshades and metal louvers is evidence of the logical internal organization

CARTER G. WOODSON JUNIOR HIGH SCHOOL

Ulric Meisel

Rooms for elective subjects: drawing . . . .

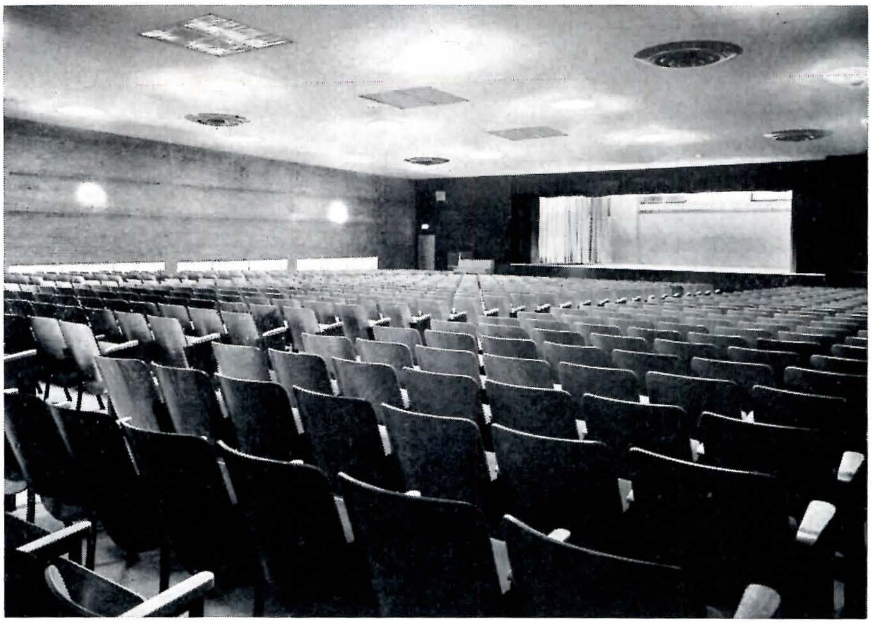


. . . . and home making

Physical Education and Music house the noisiest activities and are closest to the playground; Academic Classroom Buildings are quietest and farthest from the playground; Elective Subjects (shops, drawing, home making, etc.) together with administrative offices, library, student activity and faculty spaces, are contained in a central building which acts as a noise barrier between the other two. The Auditorium-Cafeteria Building, adjoining the gymnasium, occupies street frontage convenient to the playground. Areas used by the public are easily accessible.

Walls of the cafeteria, at ground level, are glass; the auditorium above it has hollow masonry walls which provide fireproofing for the steel framing required by the long span. The windowless auditorium has adjustable louvers at the floor line which, in conjunction with mechanical ventilation, permit air to enter at floor level and exhaust at the ceiling.

Instead of installing central heating; gas fired unit heaters, one for each pair of rooms, are controlled by the program clock system. All structures are supported on 40-ft treated wood piles. Cost of buildings was $1,318,317; of equipment (lockers, auditorium seating, folding gymnasium bleachers, case work in laboratories and home making rooms), $77,683; landscaping, $12,000; architects' fee, $84,480. There are 52 classrooms for a pupil load of 1500; sq footage is 121,000; cu ft, 1,507,000.



Auditorium

Gymnasium

Left, Physical Education and Music . . .

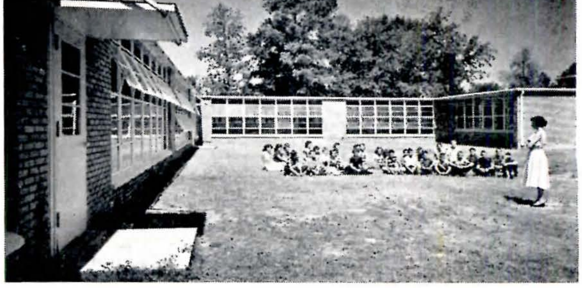
. . . and right, cafeteria; auditorium on second floor

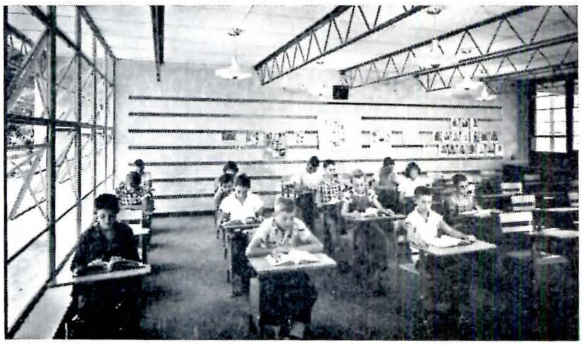
LOCATED in a community where most of the population is employed in textile mills, this junior-senior high school won numerous design awards while it was under construction in 1952: from the *School Executive* magazine; at Boston in the joint AASA-AIA School Building exhibition; and at Atlanta in the South Atlantic AIA Region Honor Awards Program.

It was conceived as, in part, a way of improving mill town living conditions.* It has already had discernible effects: most of the mill-owned houses in town were formerly painted white or nondescript tints; the school is much used by adults and now its bright, strong colors are appearing in the painting and furnishings of many homes. Adults attend both academic and vocational classes. Cloth from the mills is used for dressmaking and home decoration; food habits are improving.

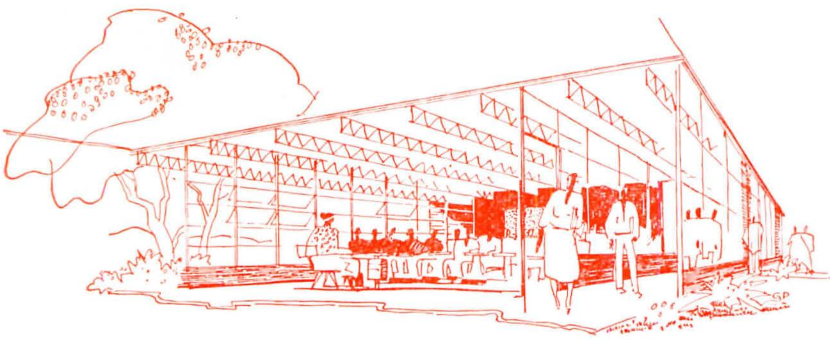
Though the school was designed for 600 students, all white, in grades 7 through 12, the A-E-C H-bomb plant is within the county; this and normal population growth were expected both to increase the pupil load and to cause the nature of the curriculum to develop

* *Paralleling the purpose of the New Orleans school shown on preceding pages!*



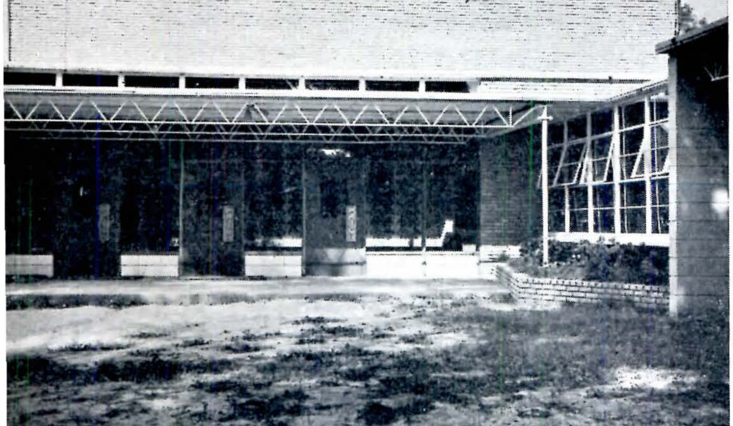


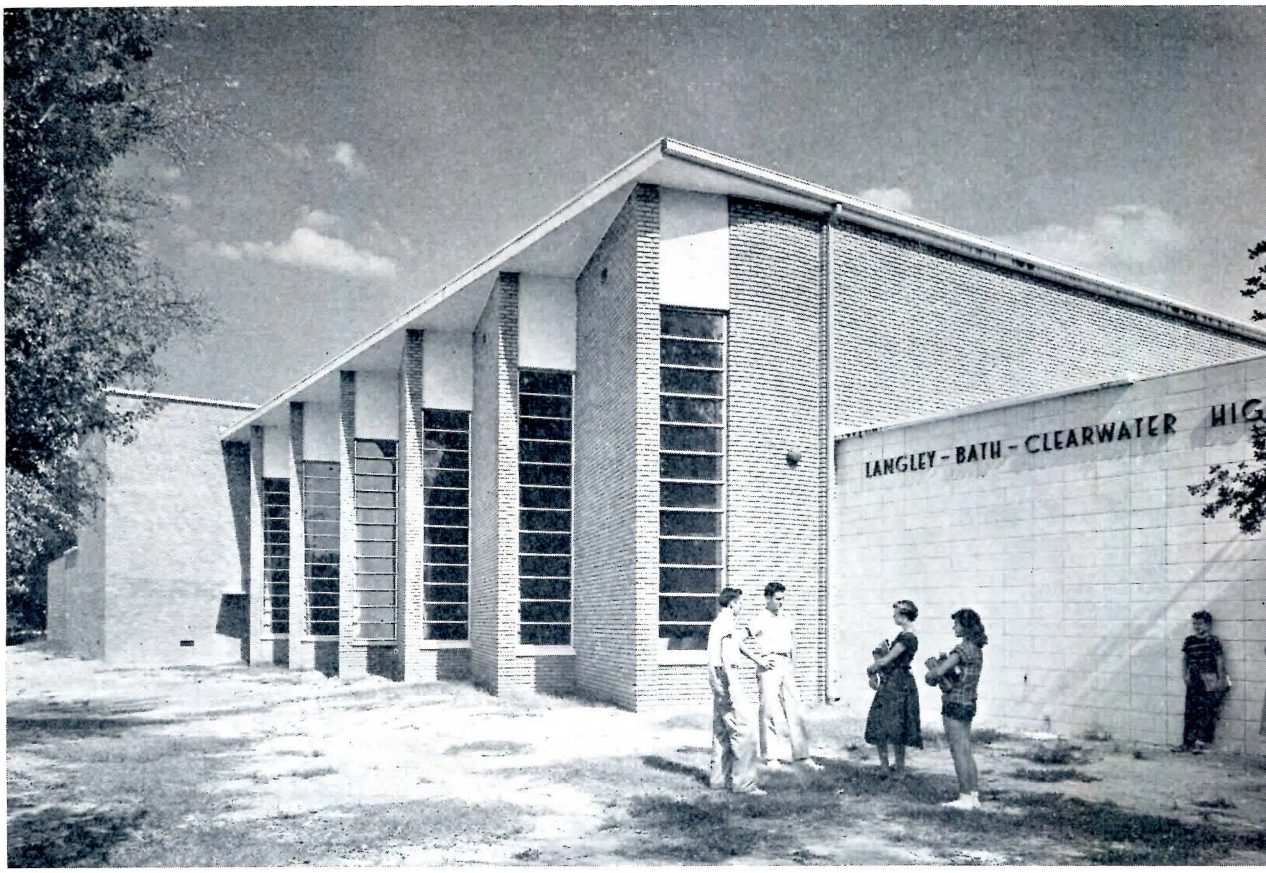
Joseph W. Molitor



SIX-YEAR HIGH SCHOOL

Roof construction determines architectural character: open bar joists 6 ft o.c., standard 30-ft spans; acoustical and insulating board ceilings doubling as forms for gypsum deck; no lintels; window walls of projected steel sash and mullions

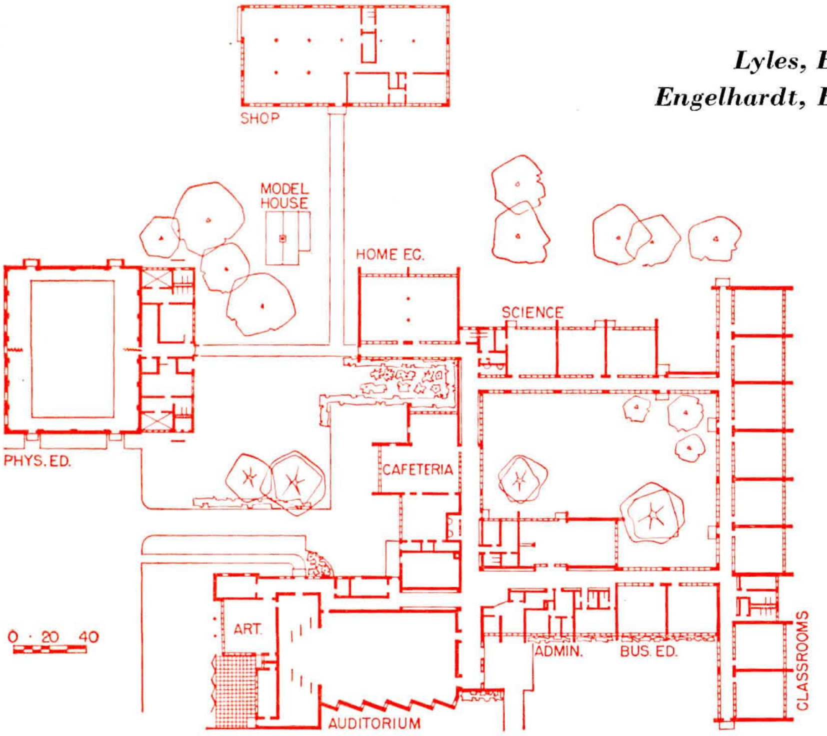




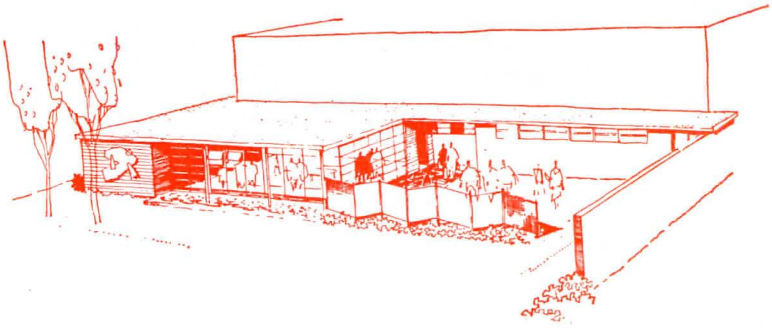
FOR A SOUTHERN MILL TOWN AREA

LANGLEY-BATH-CLEARWATER HIGH SCHOOL
Bath, Aiken County, S. C.

Lyles, Bissett, Carlisle & Wolff, Architects
Engelhardt, Engelhardt & Leggett, Consultants



LANGLEY-BATH-CLEARWATER HIGH SCHOOL

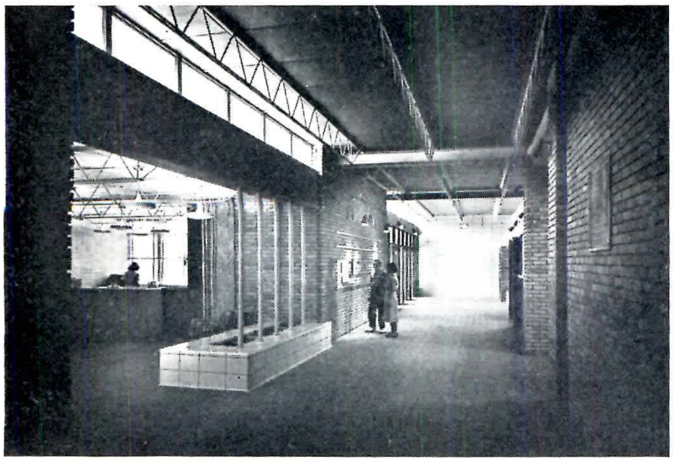


in unforeseen directions. Anticipating the increase, a 50-acre, wooded site was selected and buildings were organized for logical expansion (four more classrooms and enlargement of the cafeteria are already under consideration). To accommodate program changes as well as variations in the ratio of junior to senior high students, separation of the two age groups is virtually nil; and the 900-sq-ft classrooms were made square in plan so they could be used for many different purposes, while the maximum of flexibility consistent with the mandatory economical construction was maintained throughout the plant.

The physical education building and shops are separated from the main building to reduce noise and for access from an existing street. A single paved parking area serves the physical education and main buildings, reducing the extent of road building. Classrooms face outward from a single-loaded, glass-walled corridor which surrounds a quiet court next to the library for outdoor reading. Corridor ceilings on one side, overhangs and trees on the other, protect classrooms from sun and glare.

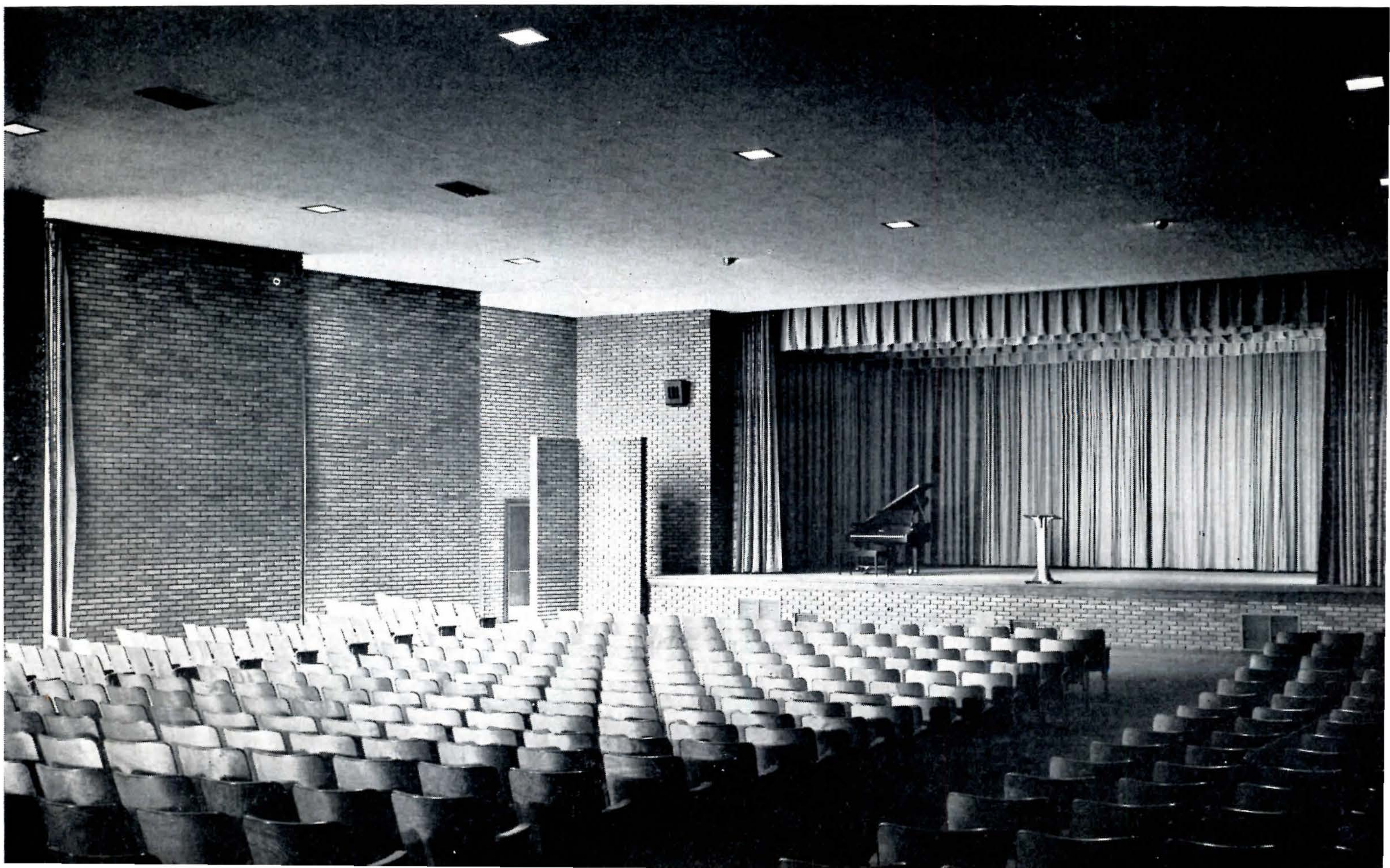
Walls between rooms are load-bearing block; these and exposed joists are brightly painted. Classroom-corridor partitions (photo above) are 3-ft-high special cabinets with double-hung sash above for light and ventilation. Radiant panels in the grade slab are the principal heat source. Art studio (sketch, top of page) has outdoor court. Photos below: entrance to and interior of library

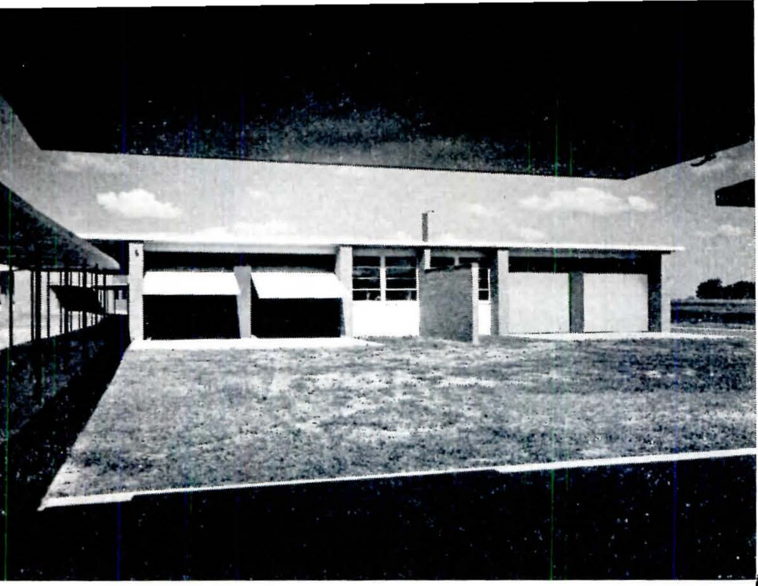
Joseph W. Molitor

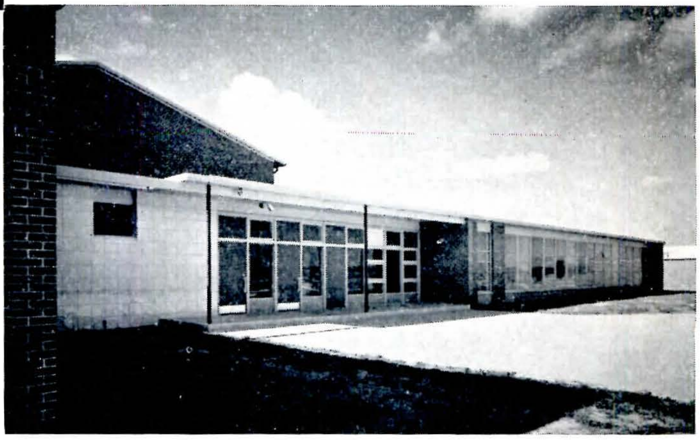




Above: home making, physical education, shop interiors. Below: auditorium. Gymnasium and auditorium trusses were originally wood; the steel actually used cost no more. Construction cost was $541,650, or 63,919 sq ft at $7.96 per sq ft. Plumbing and heating cost $105,137; electrical, $47,159; painting, $13,387. Contract was awarded in January 1952







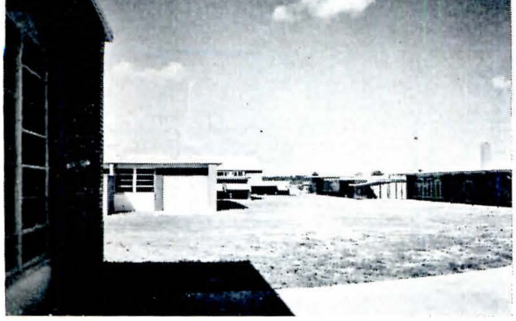
A. L. CORBETT SCHOOL, WAGENER, S. C.
Lyles, Bissett, Carlisle & Wolff
Architects

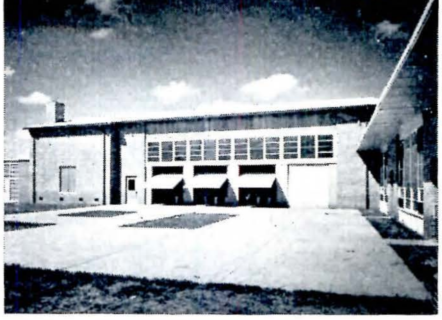
Engelhardt, Engelhardt & Leggett
Educational Consultants

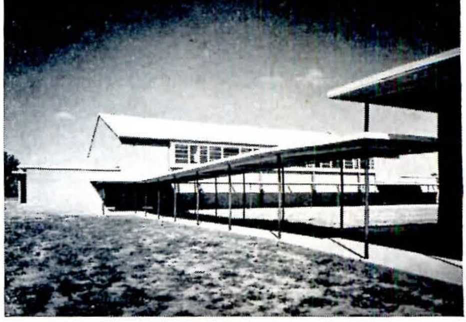
UNLIKE the two preceding southern schools, this one serves a predominantly agricultural population. It accommodates 900 Negro pupils in 12 grades, which necessitated careful planning to separate the age groups. Its small buildings connected by covered walks (which did not increase construction cost) are in child-scale without being coy; it was one of five award-winning schools in the 1953 *School Executive* competition. Its 67-acre site provides room for experimental vocational plots, ample parking facilities for the community-used cafeteria, auditorium and gymnasium, and arrangement of the classroom buildings so outdoor classes can be held without disturbing others. Each classroom has one entire wall that tilts open when a crank is turned; gears and a clutch make operation easy. Materials are durable; there is virtually no plaster. Strong, gay colors are used throughout the school. Unified parking and service ensure economy and safety.

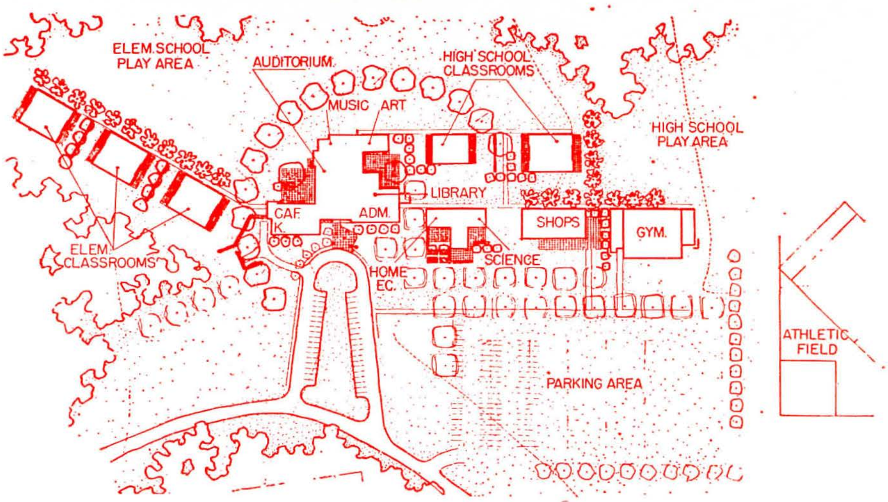
TWELVE-YEAR SCHOOL FOR

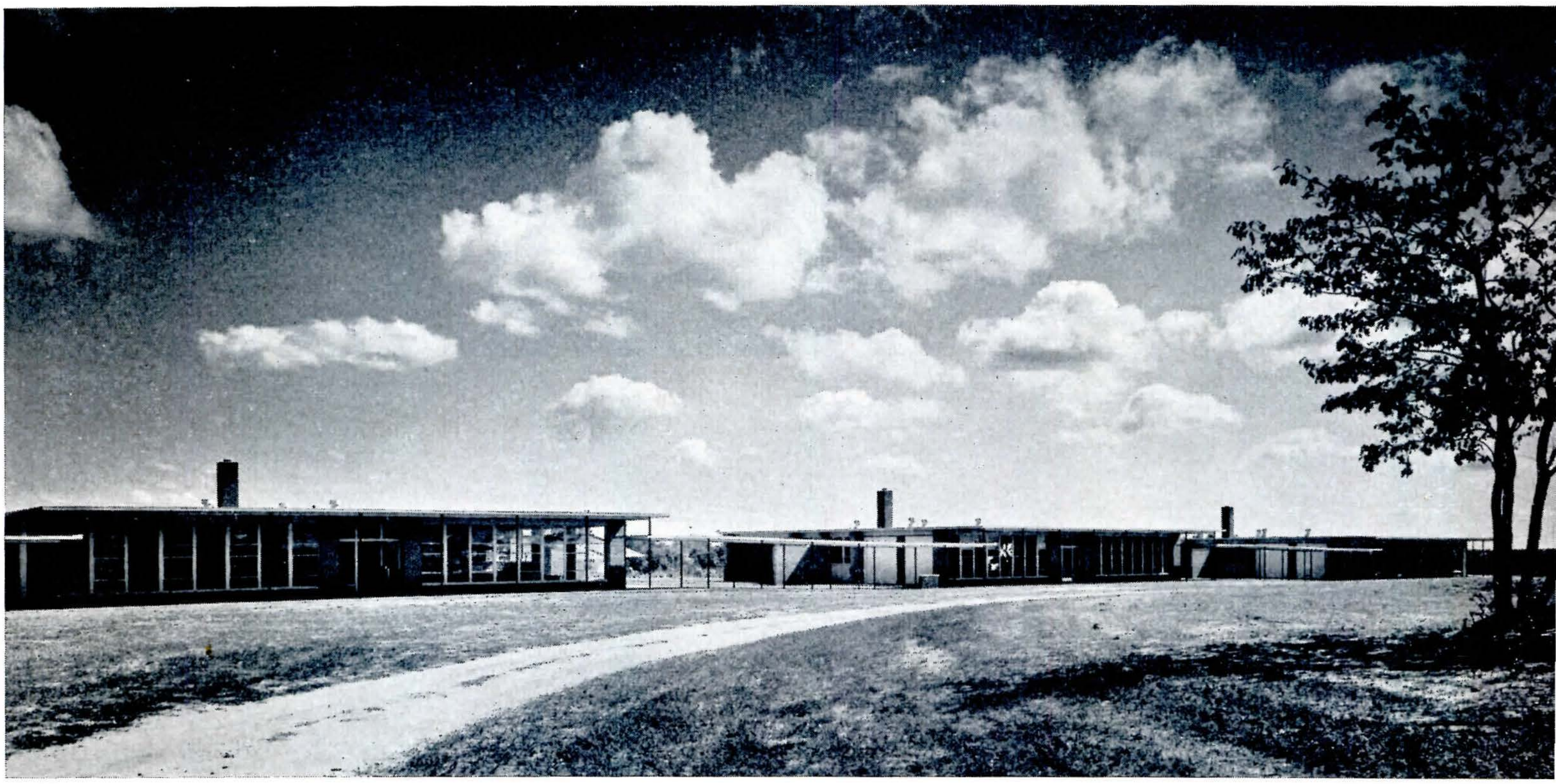
Joseph W. Molitor





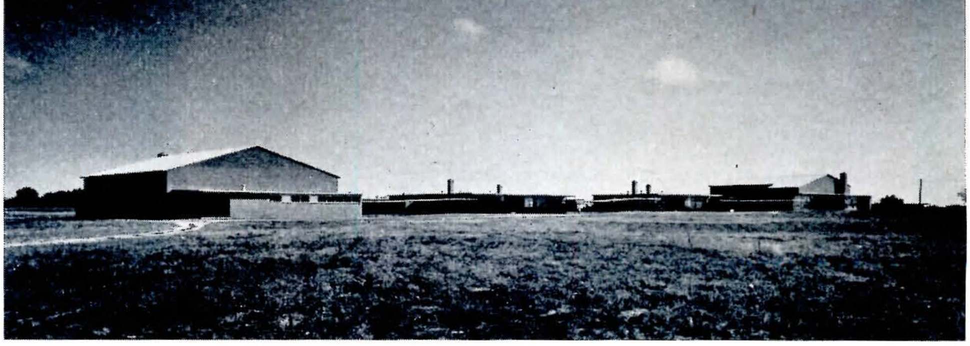


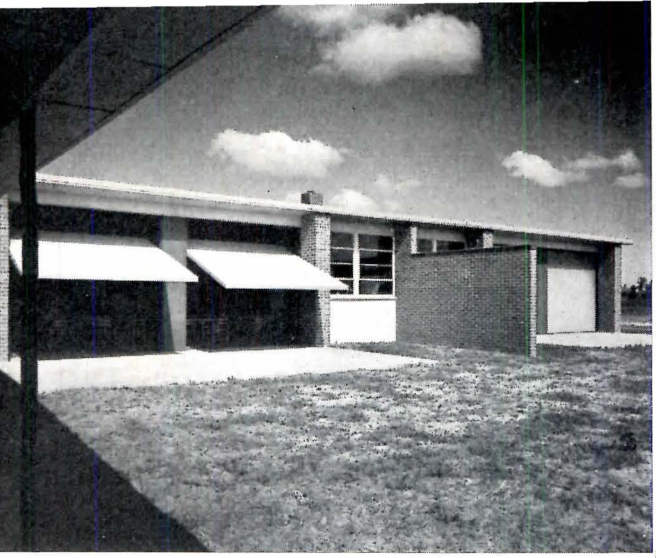


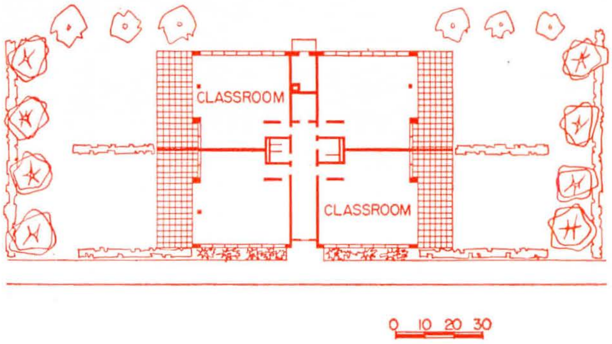


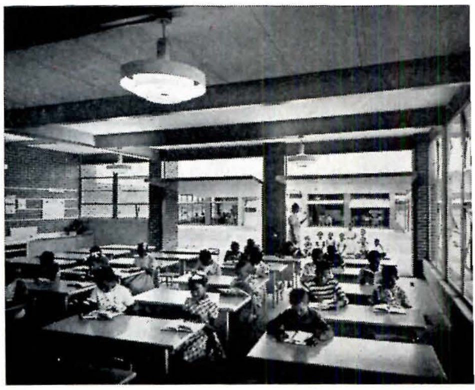
A RURAL AREA IN THE SOUTH

Buildings are carefully oriented; classroom windows are on north sides or shaded by covered walkways, reducing the need for blinds. Artificial light is seldom used. The opening walls provide maximum ventilation, much needed in this climate. Each building unit has its own toilet and perimeter heating facilities; floor slabs are on grade

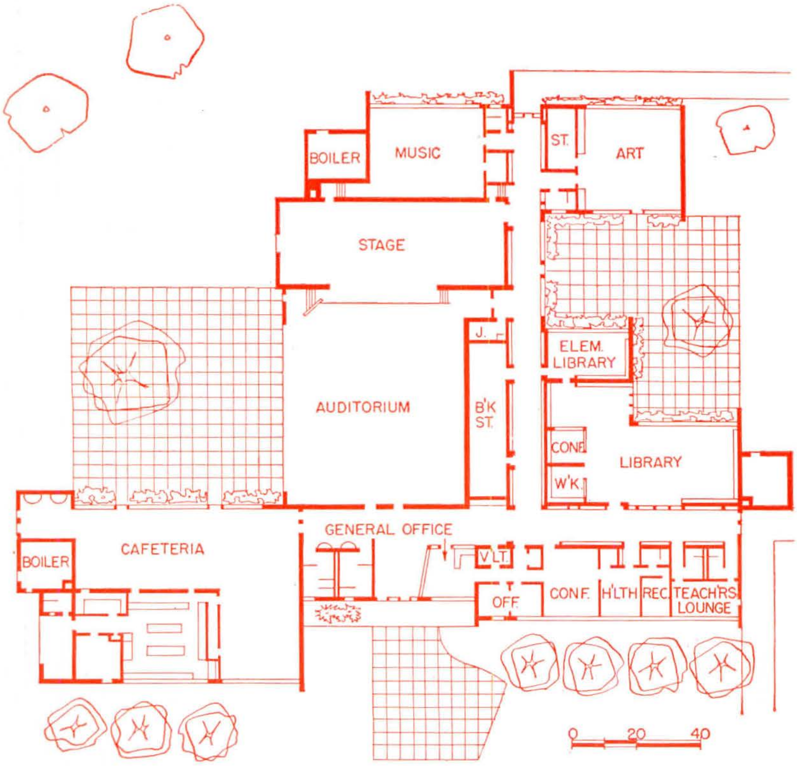






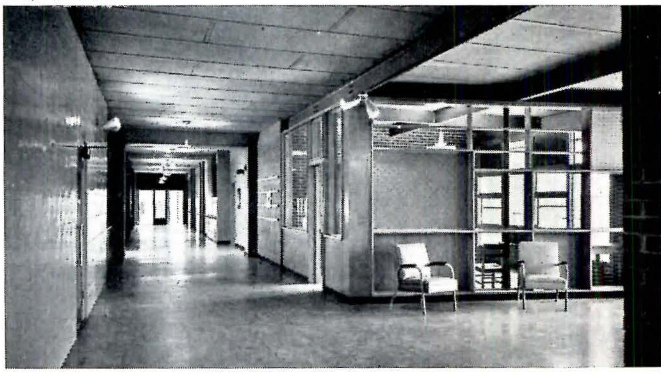


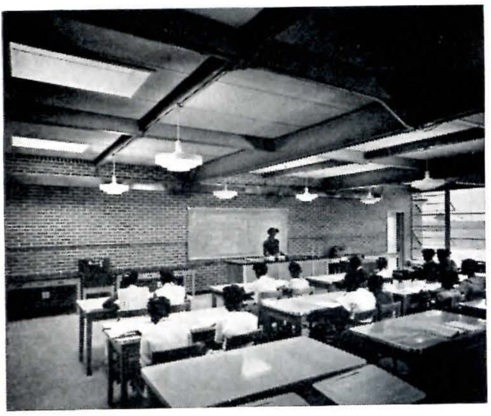
Classroom units (above and right) are all similar. Each contains 4 square classrooms, has masonry interior and exterior walls, concrete floor slab, and roof of light steel members supporting a poured gypsum deck. Program required equal and completely unified indoor and outdoor area; tilting wall is described on preceding pages

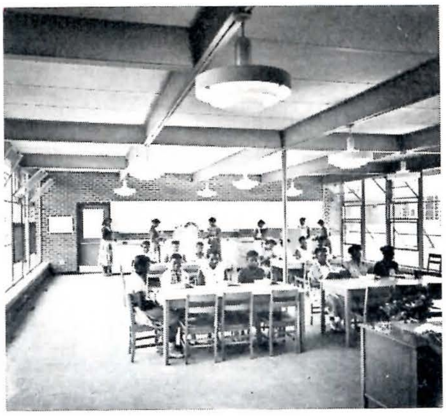


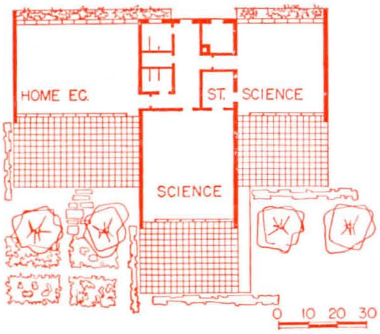
Main building (above, right, and bottom of facing page) separates elementary and high school groups. Entire school contains 72,358 sq ft; construction cost was $601,206 or $7.59 per sq ft. Plumbing and heating cost $74,394; electrical, $31,305; painting, $11,988. Total cost was below national average. Contract was awarded May 1953

Joseph W. Molitor

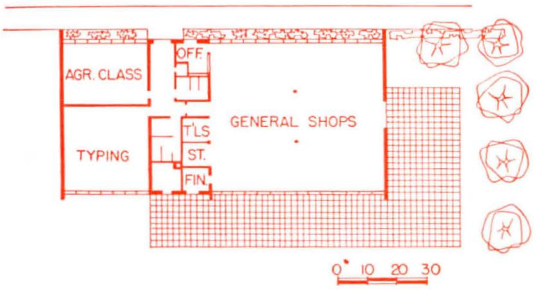




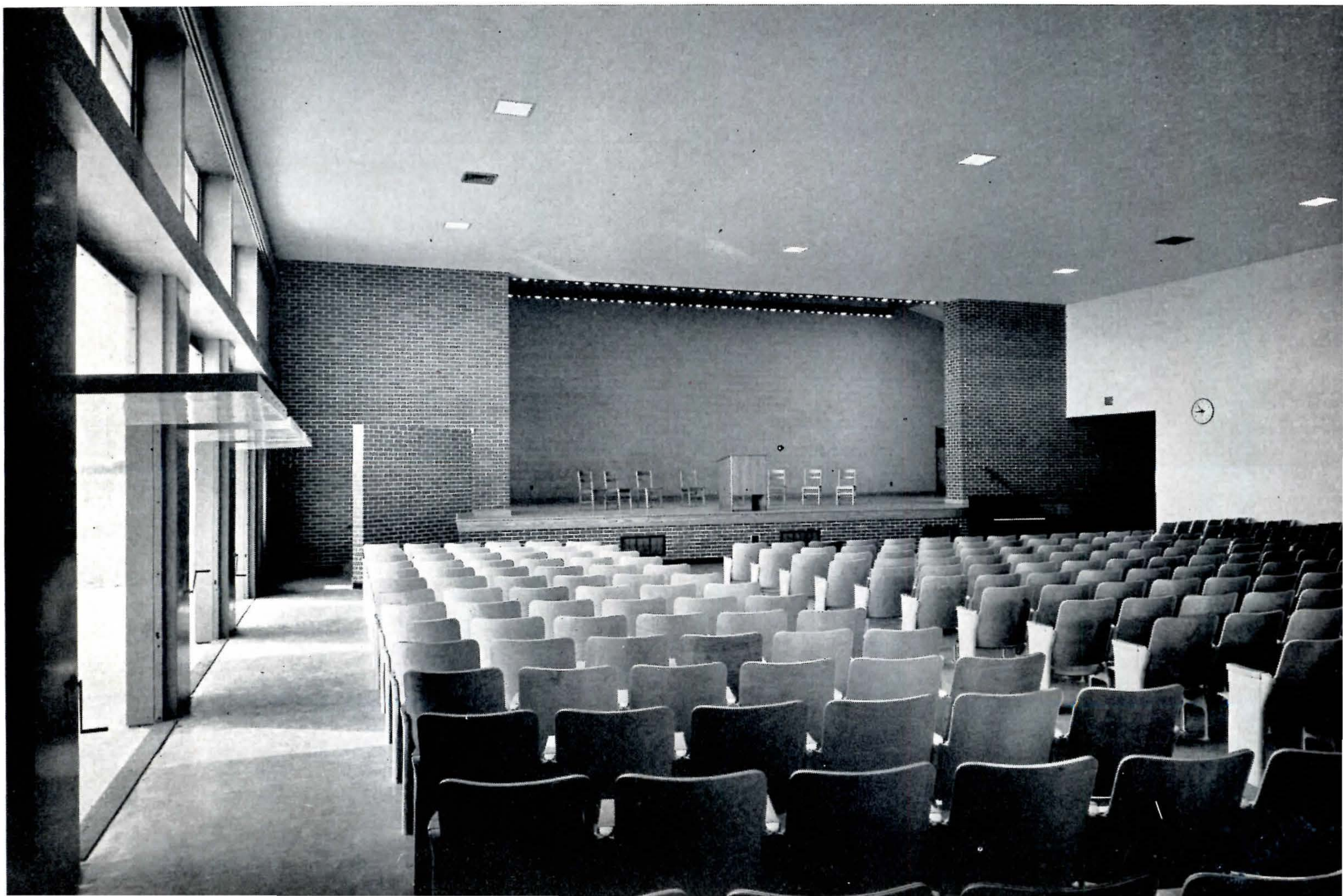


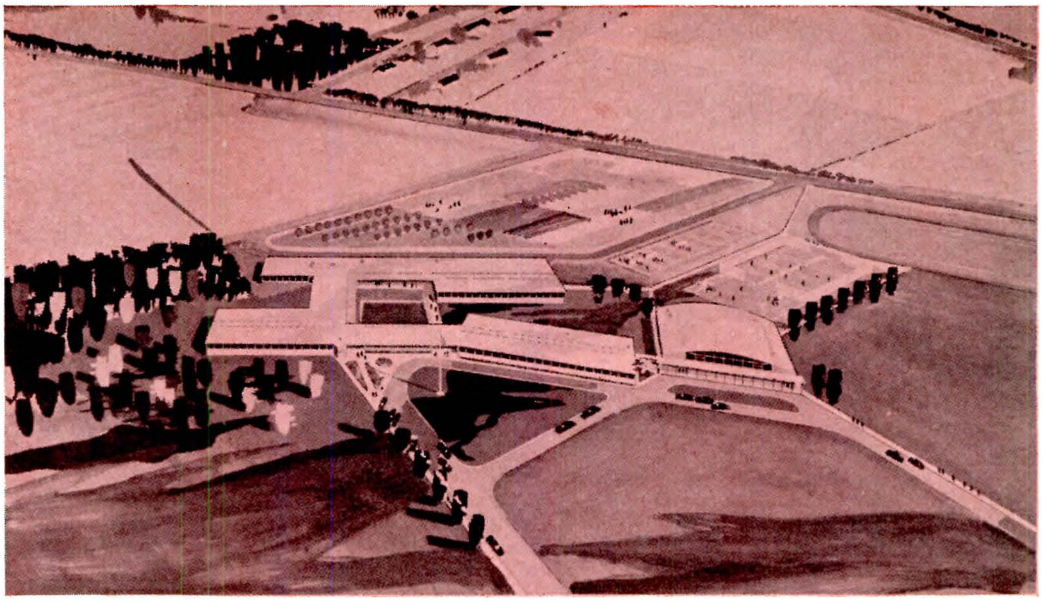


Home making and science unit (plan left, photos above) and shop building (plan right, photo right, above) are located near main entrance drive instead of being hidden; pupil activity can readily be observed by visitors. Auditorium (below) is in main building

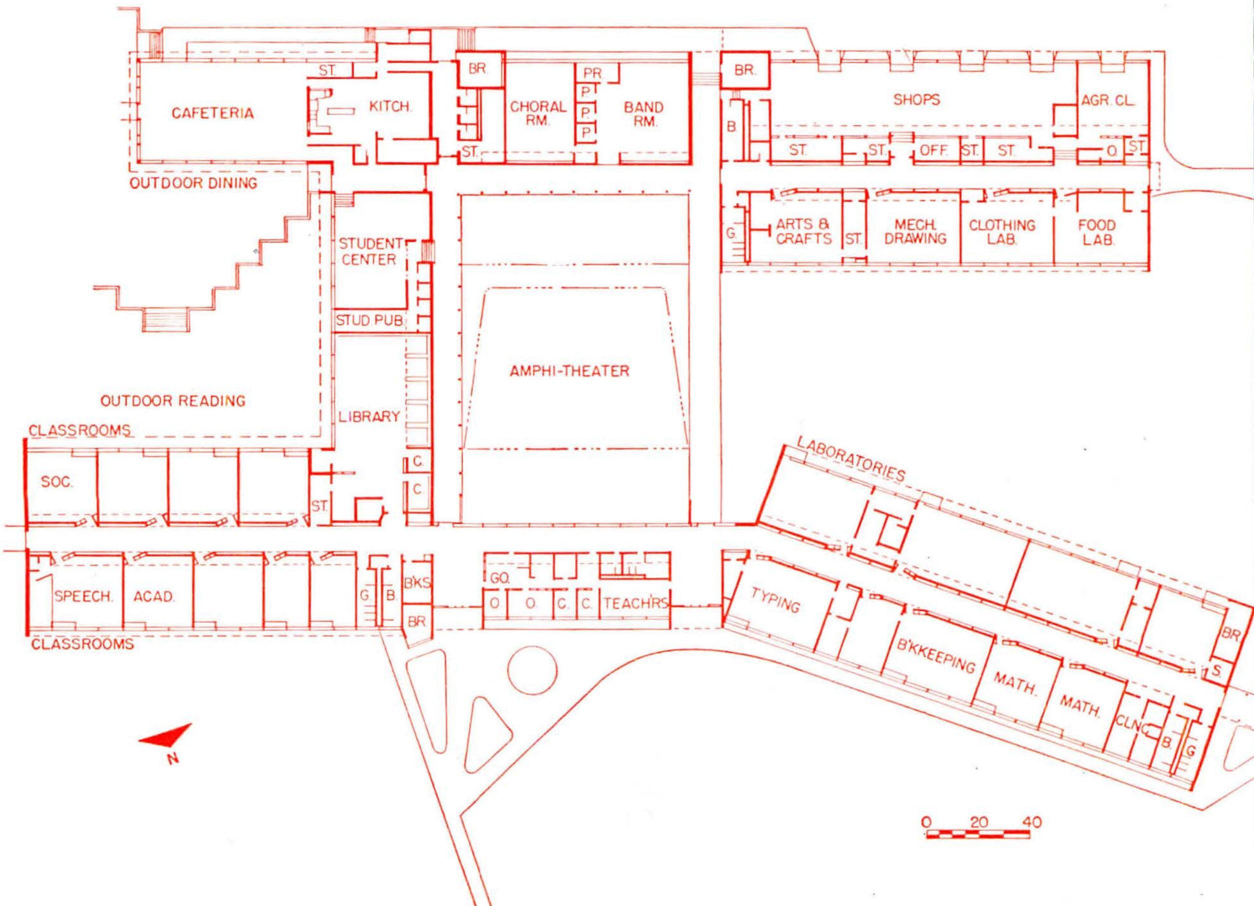


A. L. CORBETT SCHOOL, WAGENER, S. C.





ONE DIRECT RESULT OF THE H-BOMB PLANT:



AIKEN HIGH SCHOOL, AIKEN COUNTY, S. C.

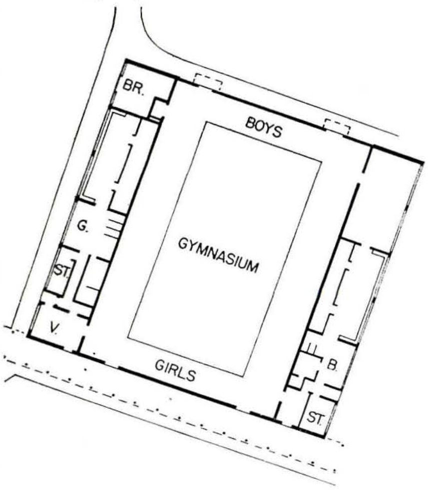
SENIOR HIGH SCHOOL

Hallman, Weems & Dukes, Architects

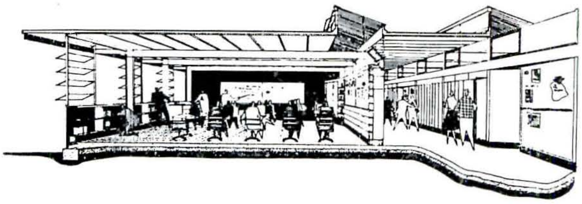
Engelhardt, Engelhardt & Leggett, Educational Consultants

Raymond J. Gauger, Structural Engineer; M. R. Durlach, Jr., Mech. Engr.; G. H. Preacher, Elec. Engr.

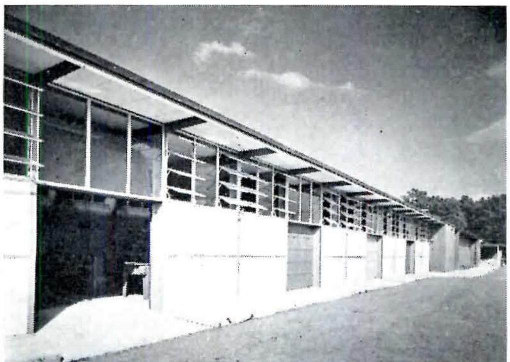
IN NOVEMBER 1950 the Savannah River H-Bomb project was announced; 40,000 construction workers were expected, 8000 permanent employes. Imagine the impact on the region and the small town of Aiken, hitherto occupied with agriculture, winter visitors and some local industry! It had 17 elementary classrooms and a 500-pupil high school; by 1952, 53 temporary classrooms had been added with Federal funds and two permanent elementary schools and the new Aiken High School here presented had been programmed.



Joseph W. Molitor Photos

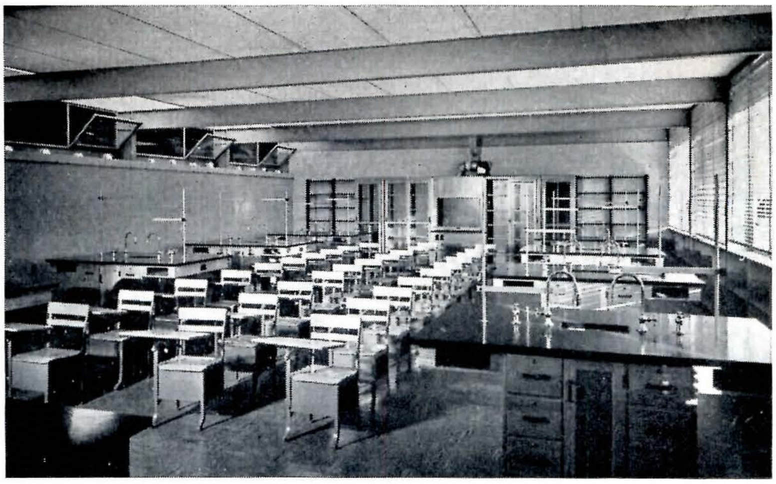


Frame is repetitive steel bents resting mostly on concrete grade beams. Floors are radiant heated concrete slabs; roofs, poured gypsum on acoustical and insulating form boards. Window walls are alternating aluminum awning sash and fixed plate glass above built-in cabinets integrated with the structure. The double-loaded corridors borrow light from actinic-glazed, ventilated skylights which light classroom interiors



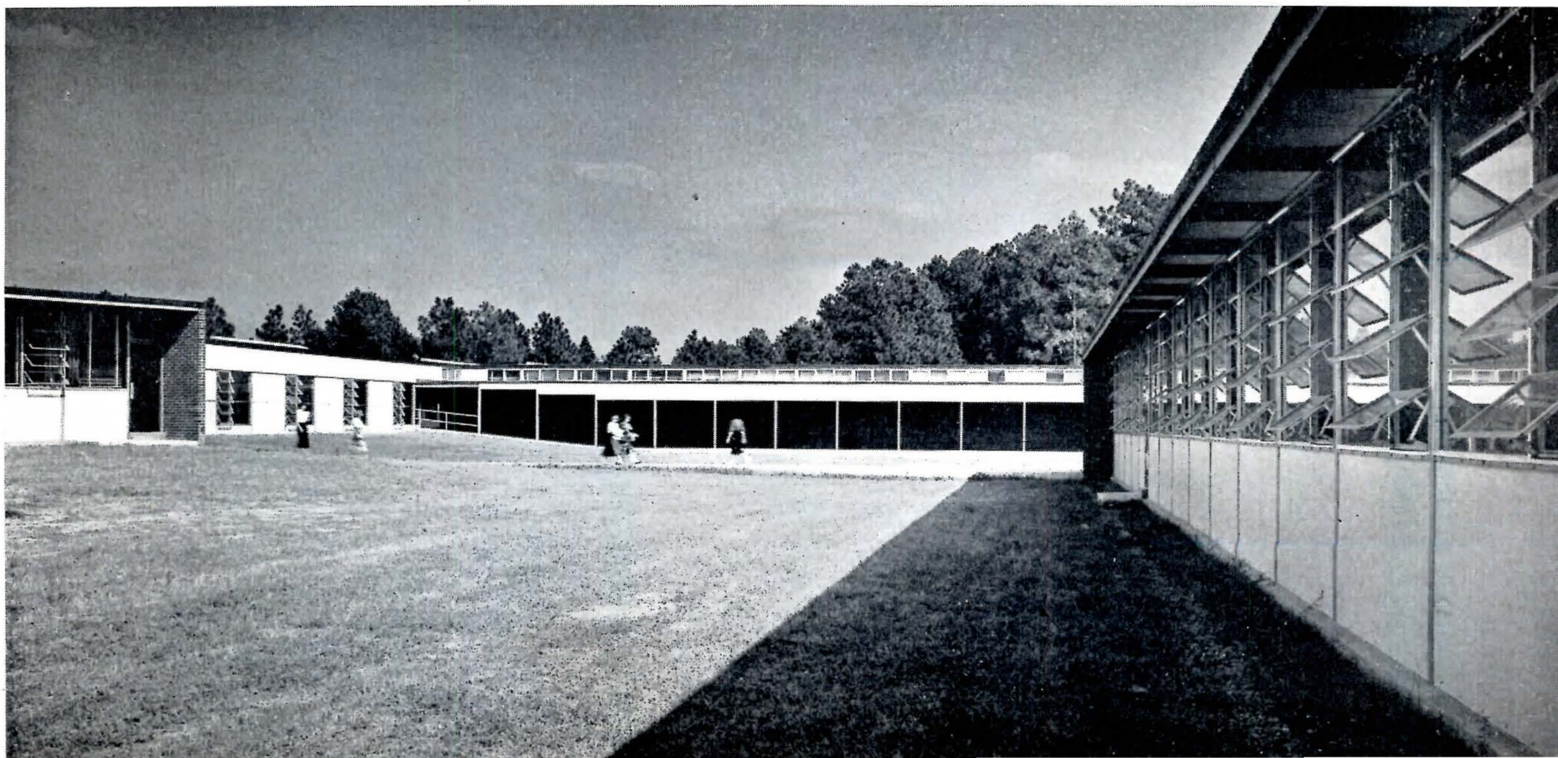
Gymnasium (left above) has main playing floor 50 by 94 ft, folding bleachers for 800, space for seats for 700 more, portable stage so it can be used as auditorium. Shop (center, right above) building contains automotive, wood, metal, electronics and agriculture facilities, can be doubled in size, is adjacent to an 8-acre field for crops and nursery. Bottom of facing page: outdoor amphitheater and stage occupy interior court designated for future auditorium

The high school is designed for an initial 600 pupils, grades 10, 11 and 12; for several years grades below 10 may be accommodated. The site, 48 acres about a mile from downtown Aiken, was selected while time remained to coordinate with school needs new water, sewer, electric and telephone lines for a 600-house development. As an example of the building's careful design, lighting was thoroughly studied; only the library, music, arts and shop areas needed more than occasional artificial light. Classrooms have no visible fixtures; swivel-base lampholders concealed above lockers at interior walls hold flood and spotlights directed at ceilings for indirect lighting. Night lighting for other rooms comes from similar units in plywood troffers suspended from roof framing; some areas have conventional fixtures. Contract, let December 1952, was for $785,175 including built-in equipment; 75,425 sq ft at $10.40 per sq ft, which was later reduced to about $10.00. Including land, equipment, fees, etc., cost was $954,035



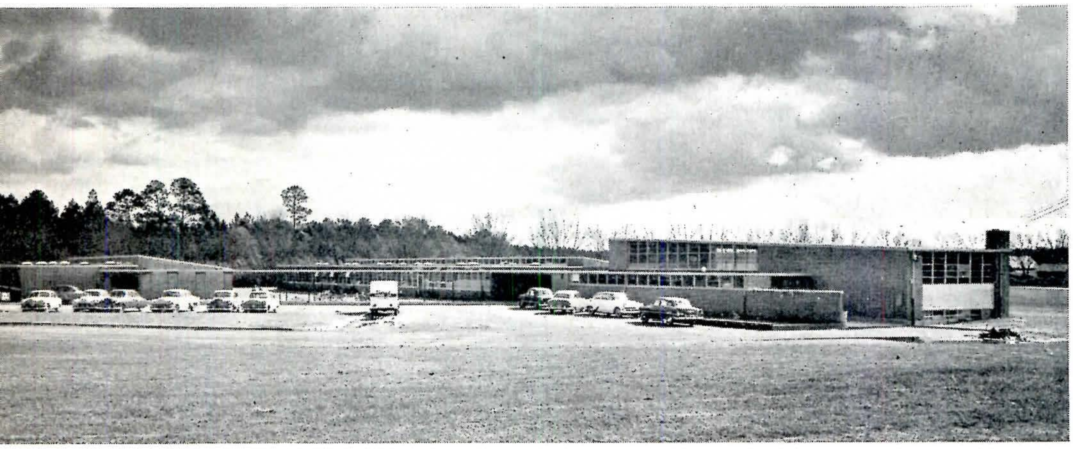
Joseph W. Molitor

AIKEN HIGH SCHOOL

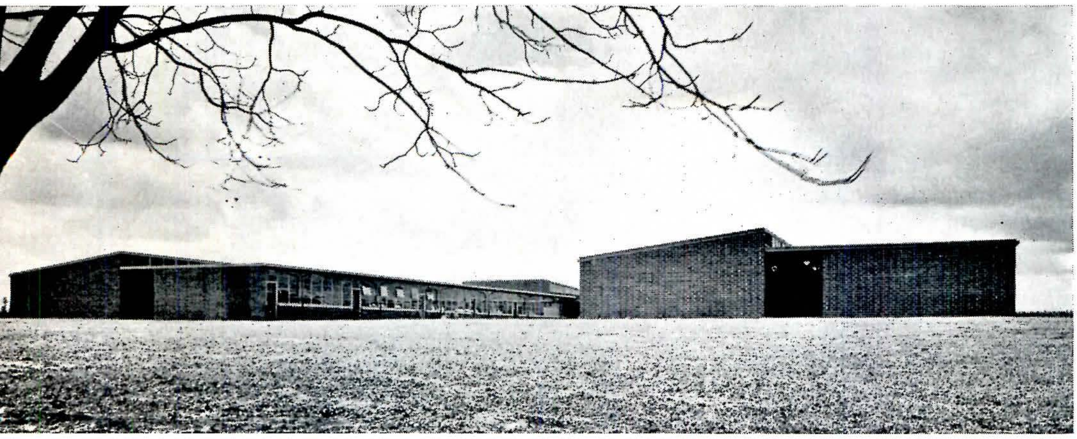


TWO SIMILAR ELEMENTARY SCHOOLS FOR

The two schools are almost identical, have 14 classrooms each, serve the city of Statesboro and surrounding Bulloch County. The Mattie Lively school, above, has an irregular 9-acre plot of wooded, rolling land. To form level areas desirable for economical one-story construction, earth cut up to 5 ft was made on high center of site, used to fill large terrace fringed with pines. Plan at top of facing page was the same for both schools

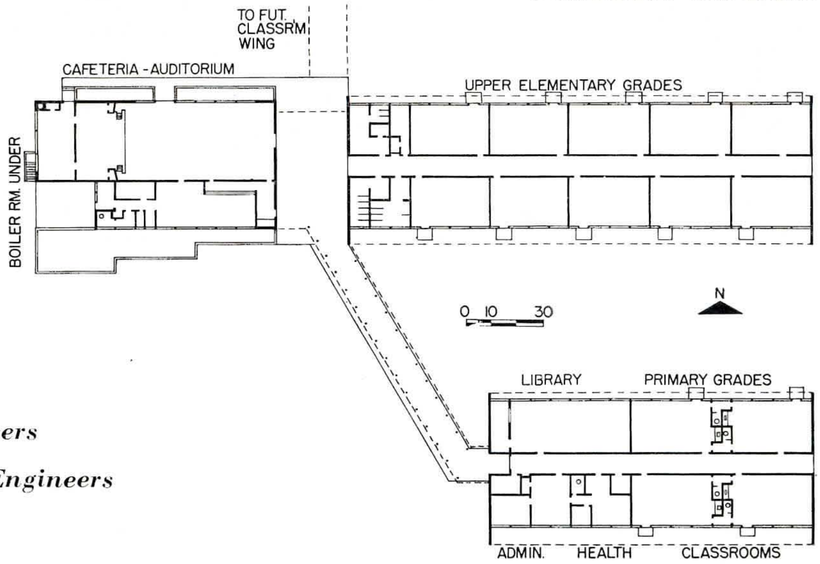


Sally Zetterower school, above and below, uses same materials as other school. Building is in three main units: cafeteria (with stage), kitchen, boiler room; 10-classroom wing with toilets, teachers' lounge; and wing housing library, clinic, administration, 4 self-contained classrooms for lower grades. Covered walk doubles as bus-loading area, connects classroom wings, opens into sheltered area next to cafeteria



Joseph W. Molitor

RURAL GEORGIA



STATESBORO, GA: MATTIE LIVELY and SALLY ZETTEROWER ELEMENTARY SCHOOLS

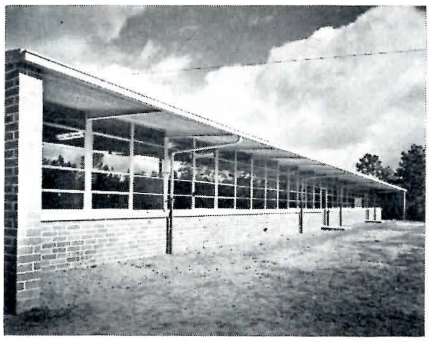
Aeck Associates, Architects

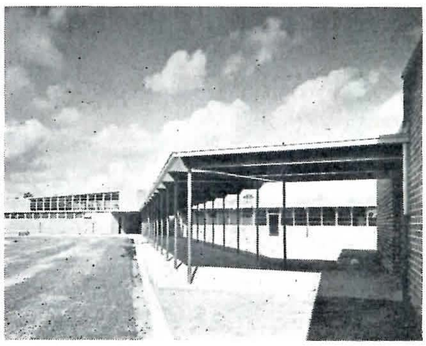
I. E. Morris & Assoc., Structural Engineers

D. R. Lindstrom & Assoc., Mechanical Engineers

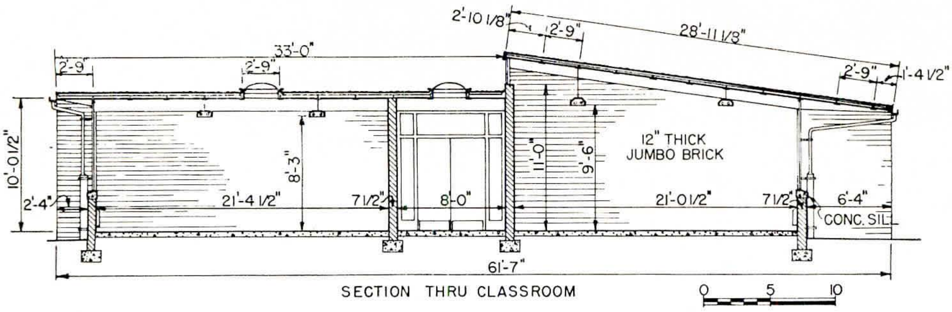
C. F. Howe, Electrical Engineer

Mattie Lively school is shown on this and the next page. Materials were selected for economy and ease of maintenance as well as simplicity of construction. Frame of structural steel, roof deck of wood fiber and Portland cement slabs (possessing thermal and acoustic properties) were quickly erected, afforded weather protection for remainder of work

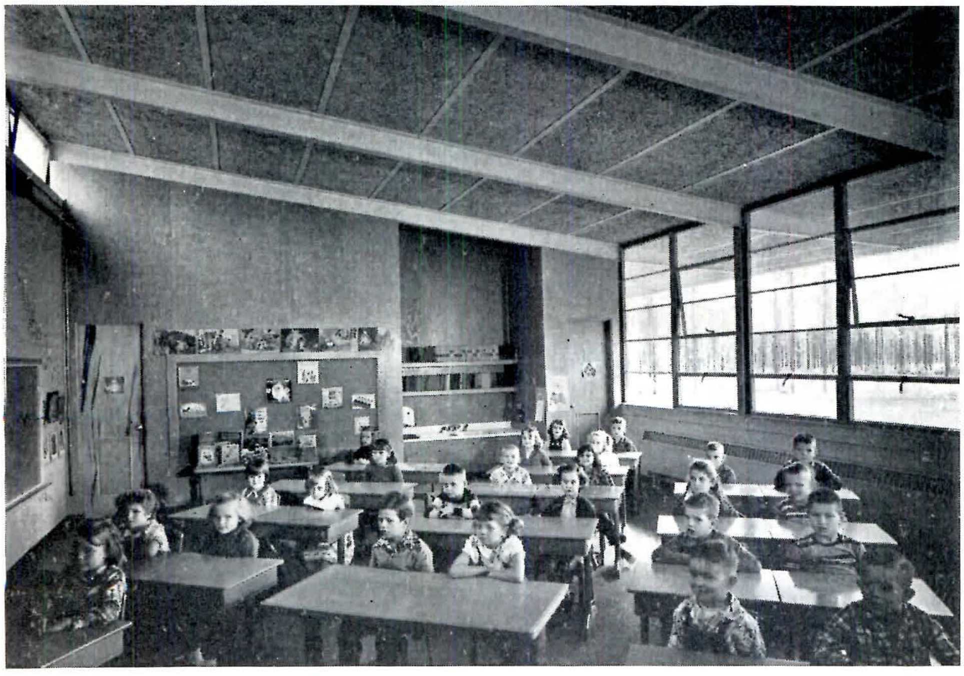




TWO SIMILAR SCHOOLS IN STATESBORO, GA.



In Mattie Lively school jumbo brick, a local product, is used for corridor partitions and exterior walls, unfinished except for paint inside classrooms. Classroom partitions of staggered studs are surfaced with fir plywood rubbed with green paint and varnished. Plastic skylights have a corrugated translucent diffusing panel in classroom ceilings; same skylights without the diffusing panels pour pools of sunlight into corridors and visually shorten them



Joseph W. Molitor

Completed August 1, 1954, the Mattie Lively Elementary School cost $207,823, including kitchen and library equipment. Area is 23,954 sq ft ($8.67 per sq ft); cubage, 263,494 cu ft (.79 per cu ft). Cost per student was $494.76 for 420 students; cost per classroom, $14,844 for 14 rooms. Figures for Sally Zetterower Elementary School are similar; same contractor, Mann-Mobley Construction Co., built both at the same time

Joseph W. Molitor

GRAHAMWOOD SCHOOL, MEMPHIS, TENN.

Estes W. Mann, Architect; William C. Mann, Associate

GRAHAMWOOD SCHOOL in Memphis, Tenn., is a two-story urban elementary school. The building as shown was constructed in 1950–51; consequently its cost bears little relation to today's figures. In a growing suburban area, it had to conform to all the code requirements usual inside city limits; additional classrooms were considered when it was designed. Separation of age groups and arrangement of classrooms is obvious from the photographs. Fluorescent classroom lighting, recessed metal lockers in each room, etc., were local requirements.

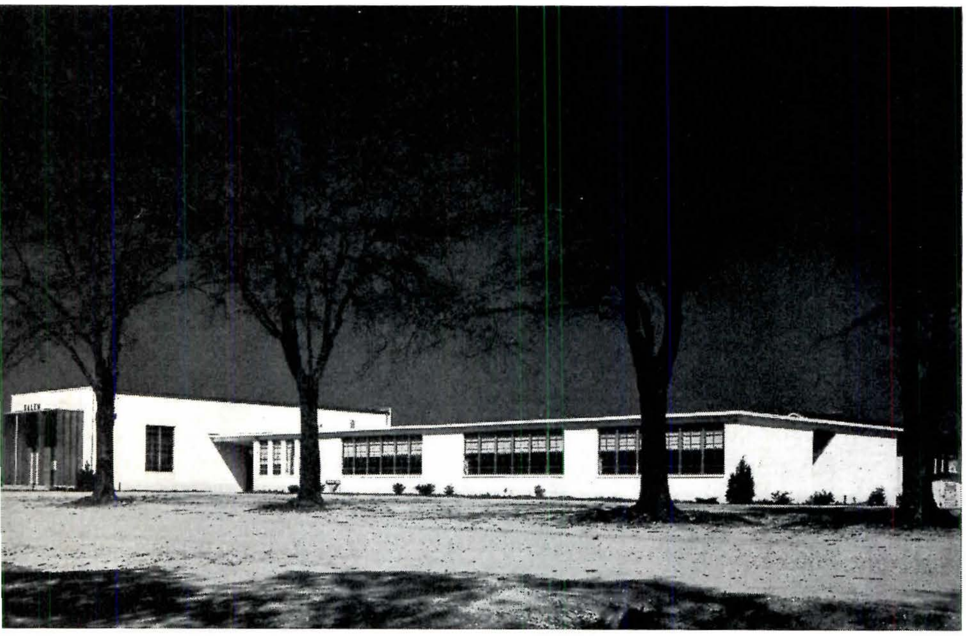
AGGRAVATING its socio-political educational problems, Mississippi has had the familiar school population growth to provide for, and very little money for buildings. This 14-classroom elementary building, with auditorium, offices, gas-fired forced warm air heat, plumbing, sewage disposal and a minimum lighting system, cost only $66,698 in 1952 — or $3.42 per sq ft (19,494 sq ft)! Savings came from realization that soil conditions permitted eliminating gravel fill under grade slabs, using painted concrete block partitions, steel sash, wood roof framing and deck, etc.

CONSOLIDATED SCHOOL

McNair & Archer Architects

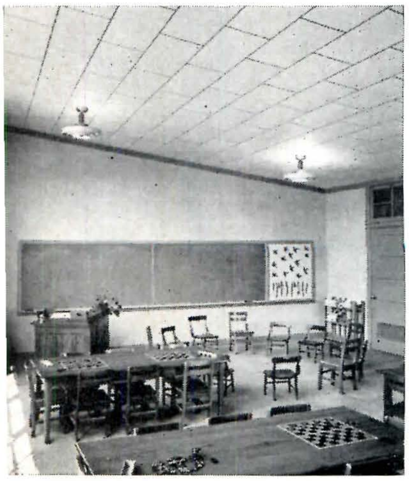
W. M. Hamilton Cons. Engr.

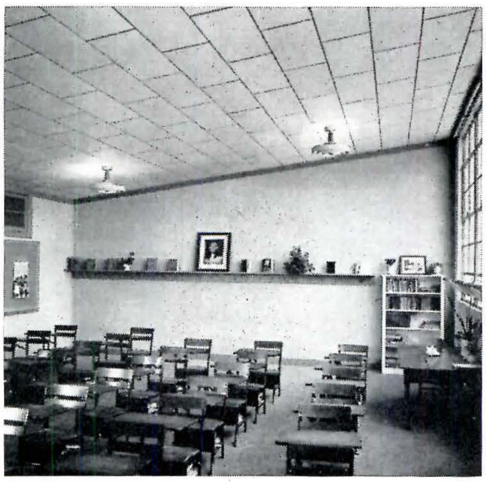
INEXPENSIVE SCHOOL, SALEM, MISS.



Roof is completely flat; gutters are eliminated

Inverted roof trusses provide space for heat ducts



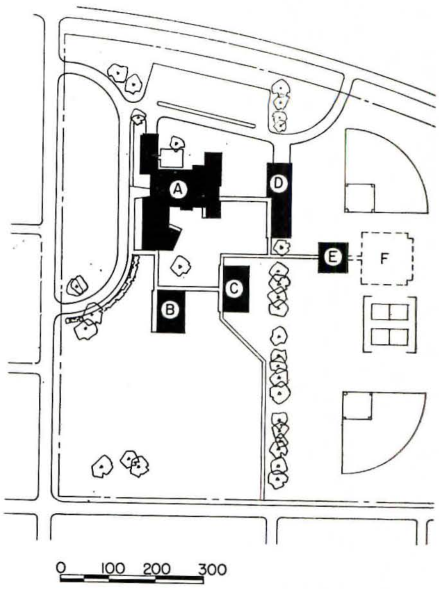


KENNETT HIGH SCHOOL KENNETT, MO.

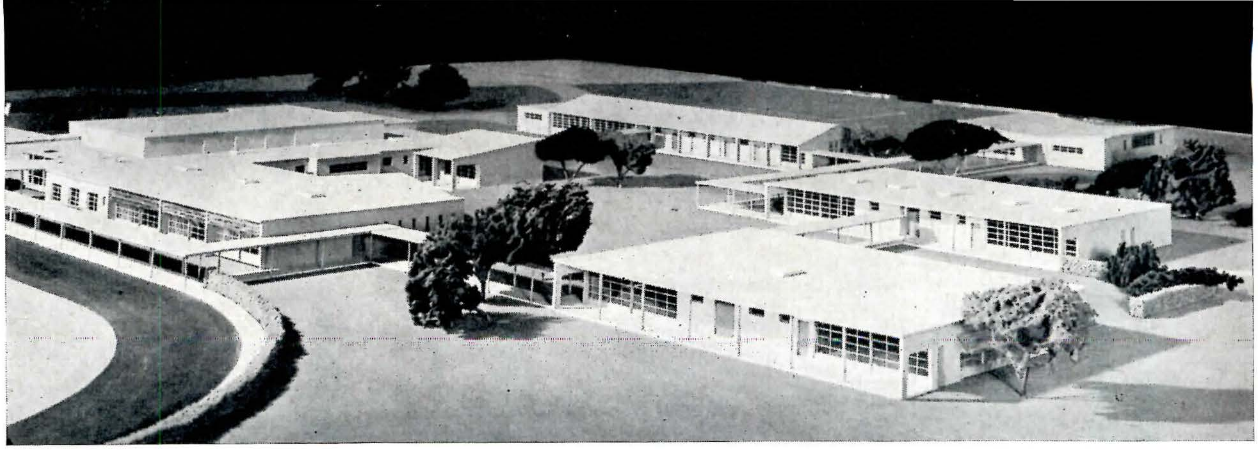
R. Paul Buchmueller Architect

Engelhardt, Engelhardt & Leggett Educational Consultants

MISSOURI GETS

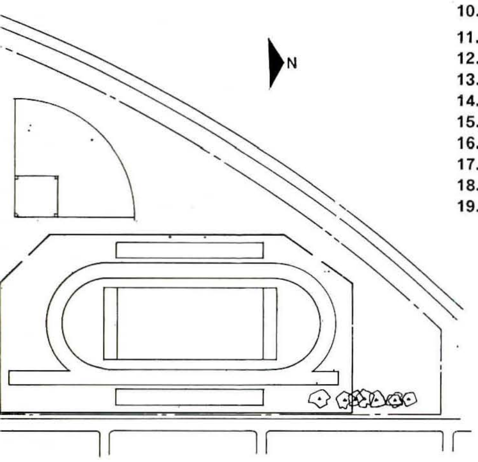


Contracts for this 500-pupil Missouri high school were let and construction started in 1954. Costs per sq ft and per pupil proved to be very low: $9.50 and $946 respectively. The total construction contract figure was $473,000, which does not include fees, etc. The scheme makes the most of a site of moderate size; access from streets to the main building and the shop structure is direct; the health and physical education unit, to be supplemented by a future gymnasium, adjoins athletic fields. Each building has its own heating plant, boys' and girls' toilets, etc.

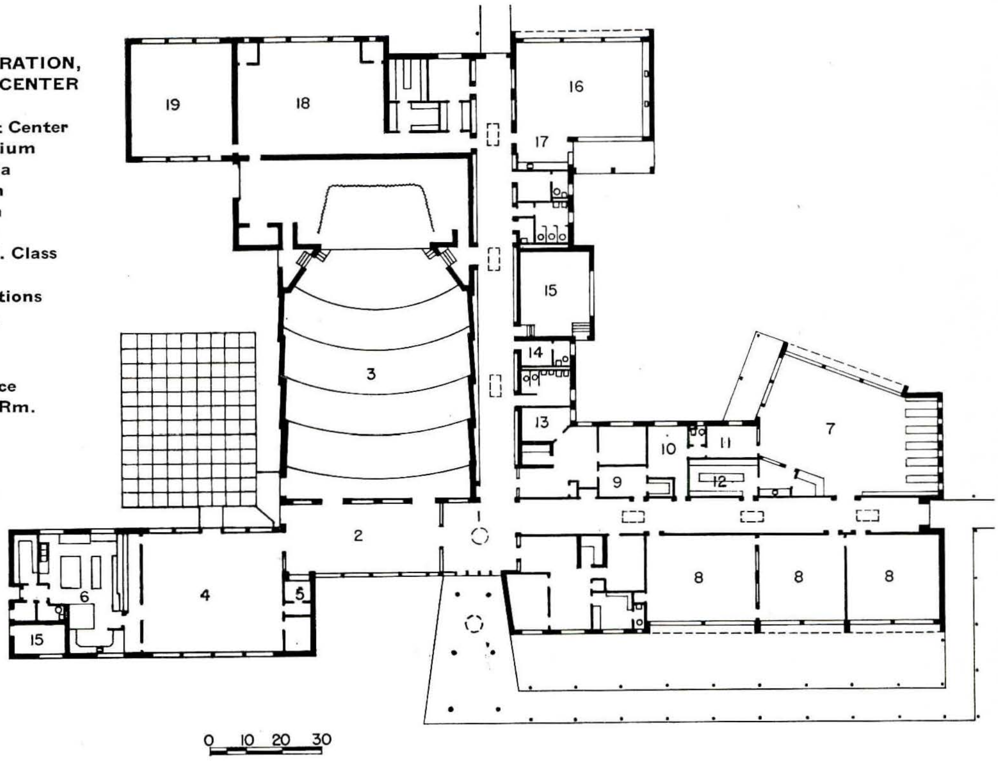


A LOW COST CAMPUS-PLAN HIGH SCHOOL

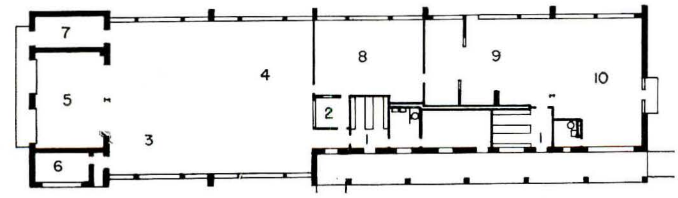
PLOT PLAN
A. Adm., Stud. Center
B. Languages, Soc. Sci.
C. Math., Science
D. Home, Ind. Arts
E. Health, Phys. Ed.
F. Future Gym



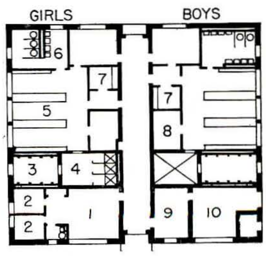
A ADMINISTRATION, STUDENT CENTER
1. Lobby
2. Student Center
3. Auditorium
4. Cafeteria
5. Canteen
6. Kitchen
7. Library
8. Bus. Ed. Class
9. Office
10. Publications
11. Faculty
12. Conf.
13. Books
14. Guidance
15. Heater Rm.
16. Art
17. Crafts
18. Band
19. Chorus

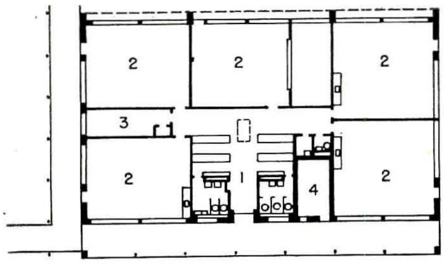


D HOMEMAKING, INDUSTR. ARTS
1. Lockers
2. Office
3. Metal Shop
4. Woodwork'g.
5. Open Area
6. Painting
7. Supplies
8. Drawing
9. Foods
10. Clothing



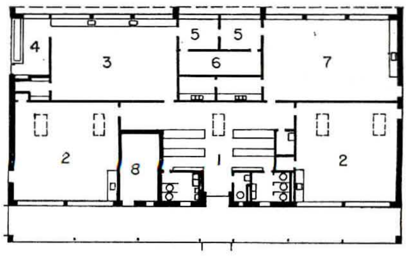
E HEALTH, PHYS. ED.
1. Health
2. Rest Rm.
3. Showers
4. Drying
5. Dressing
6. Toilet
7. Equipm't.
8. Baskets
9. Heating
10. Mainten'ce.





B LANGUAGE, SOC. SCI.
1. Lockers
2. Classr'm.
3. Multipurpose Class
4. Staff
5. Heating

C SCIENCE, MATH
1. Lockers
2. Math
3. Life Sci.
4. Animals, Plants
5. Preparation
6. Supplies
7. Physical Sci.
8. Heating



CAMPUS-PLANNED PRIVATE ELEMENTARY SCHOOL

ELEMENTARY SCHOOL for BRYN ATHYN CHURCH of the NEW JERUSALEM

Vincent G. Kling, Architect

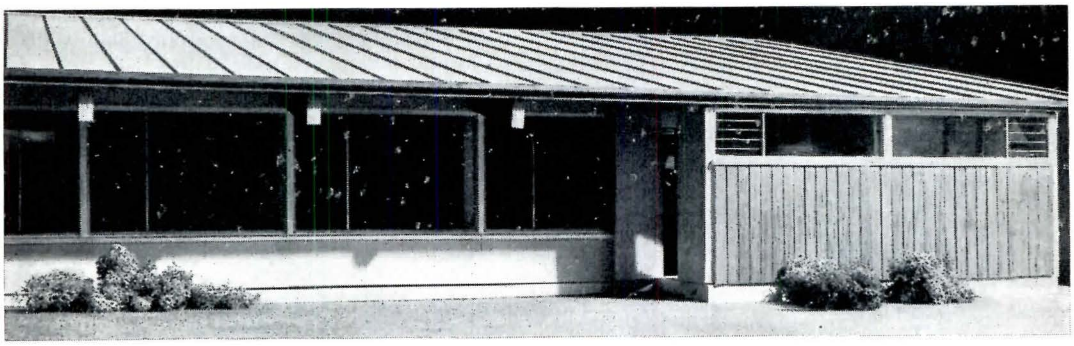
Engelhardt, Engelhardt & Leggett, Educational Consultants

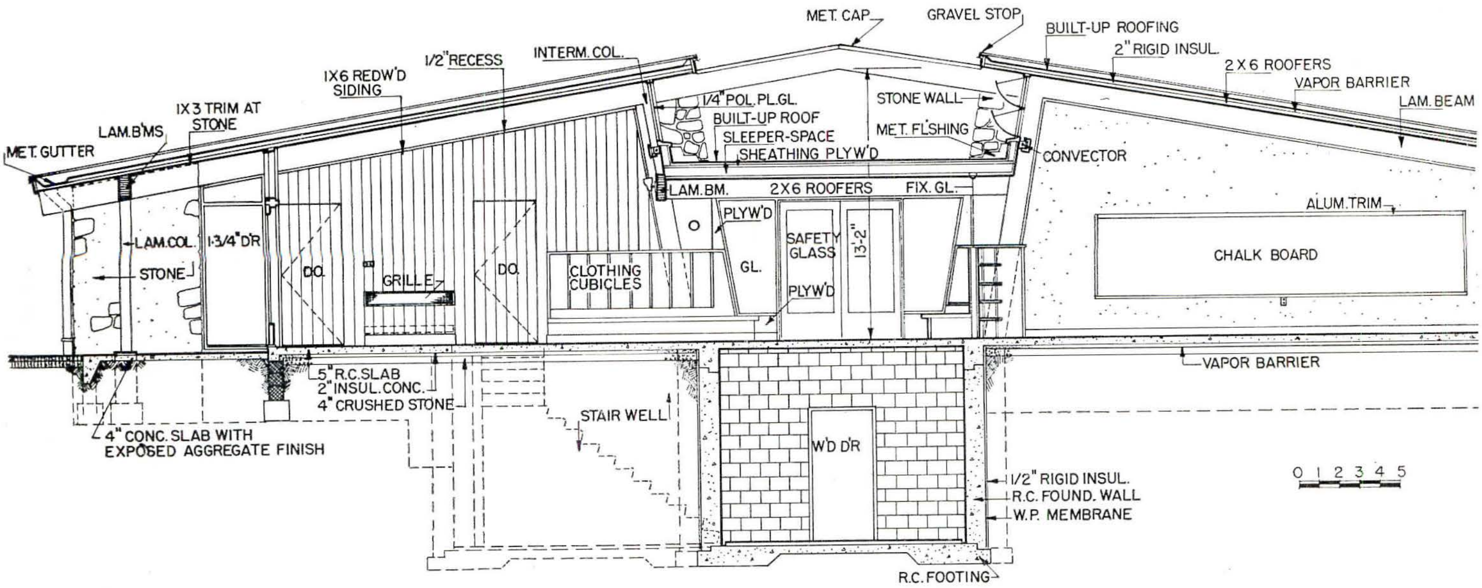
Stevens & Bruder, Structural Engineers

Pennell & Wittberger, Mechanical Engineers

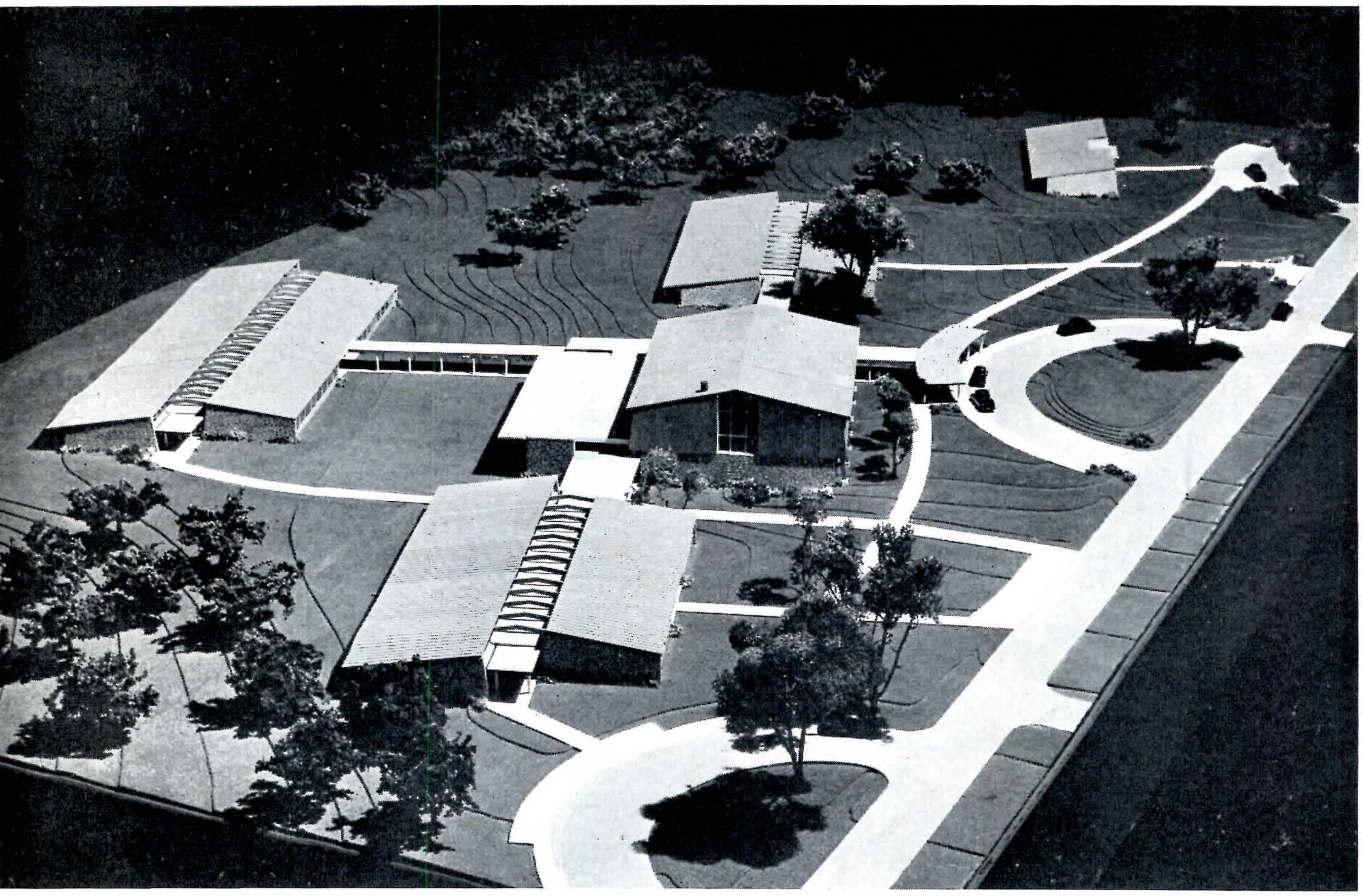
IN PENNSYLVANIA, as in some other parts of the country, certain types of private schools have traditionally served what is commonly regarded as the American public school function. This school in Bryn Athyn, then, has substantial precedent. It is by no means extravagant. Educationally and architecturally it parallels the best now developing among public schools; at the same time its site, its sponsors and its inherent requirements have of course given its design individuality. As a project it received an honorable mention at the February 1954 AASA-AIA School Exhibition at Atlantic City.

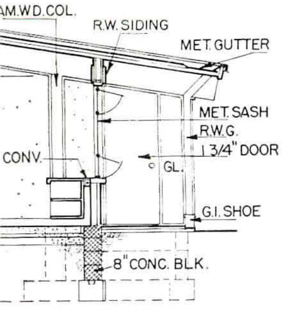
Ultimately to accommodate 500 children, kindergarten through 9th grade, the school is being built in 3 stages. The first (now under construction) provides quarters for kindergarten and primary grades; the second, an all-purpose building, intermediate grades and a separate kindergarten building; the third, separate units for boys and girls in grades 7 through 9. The campus plan was adopted to further this expansion program and to provide an environment both comprehensible to the children and appropriate to the educational philosophy. Construction is evident from the drawings and model photographs. Cost for the first stage, for 150 pupils in 9700 sq ft (108,500 cu ft) is $140,000; for the complete plant (500 pupils, 50,000 sq ft, 741,000 cu ft) is estimated at $721,600.

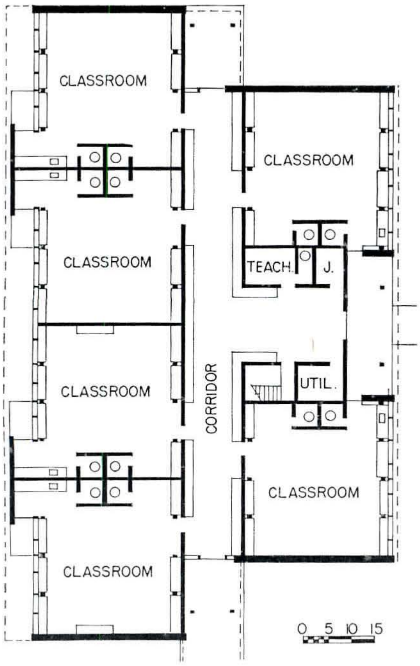




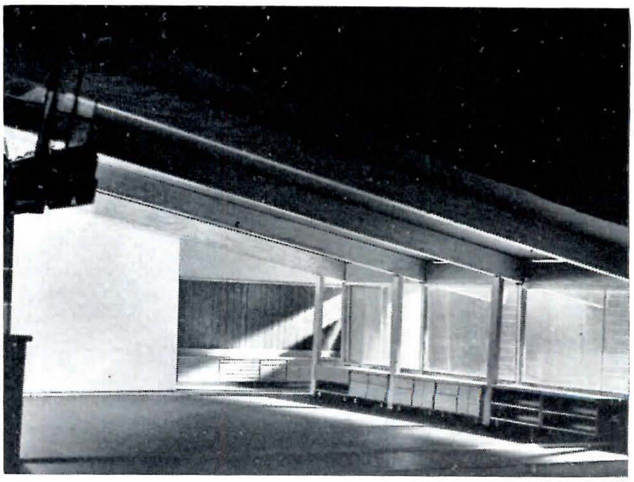
NEAR PHILADELPHIA

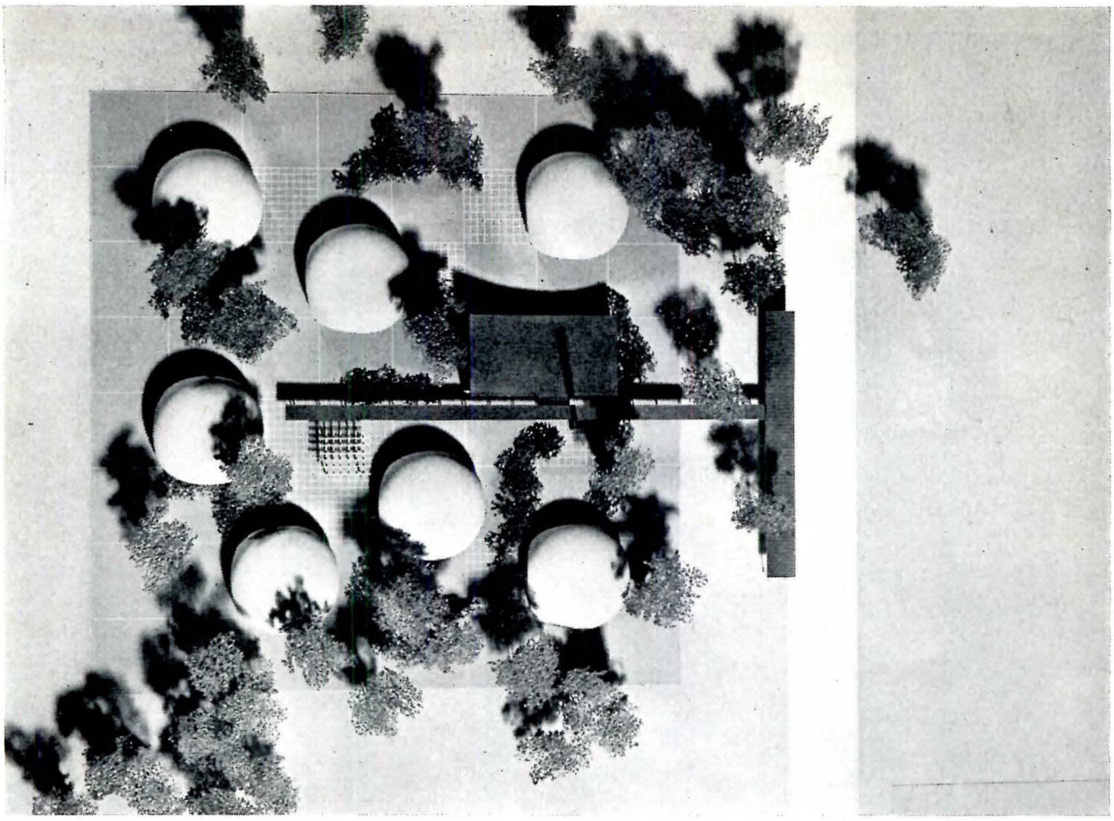






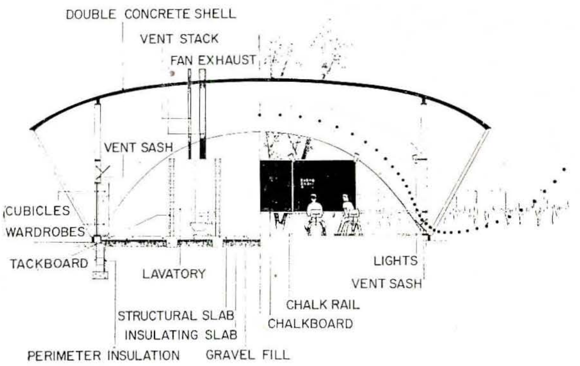
First unit to be constructed is for grades 1, 2 and 3; plan at left. Below, model built and lighted to show sun penetration in midwinter. All buildings are carefully oriented not only for sun but also to fit site contours. Approach is from higher ground, so roof design is important

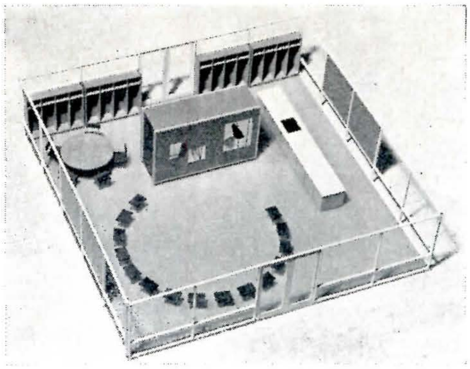


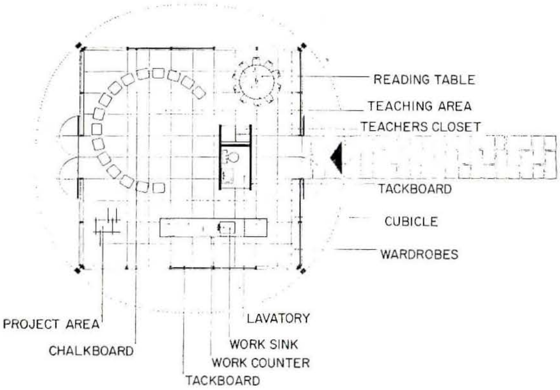


BALLOON-FORMED CONCRETE BUBBLE CLASSROOMS?

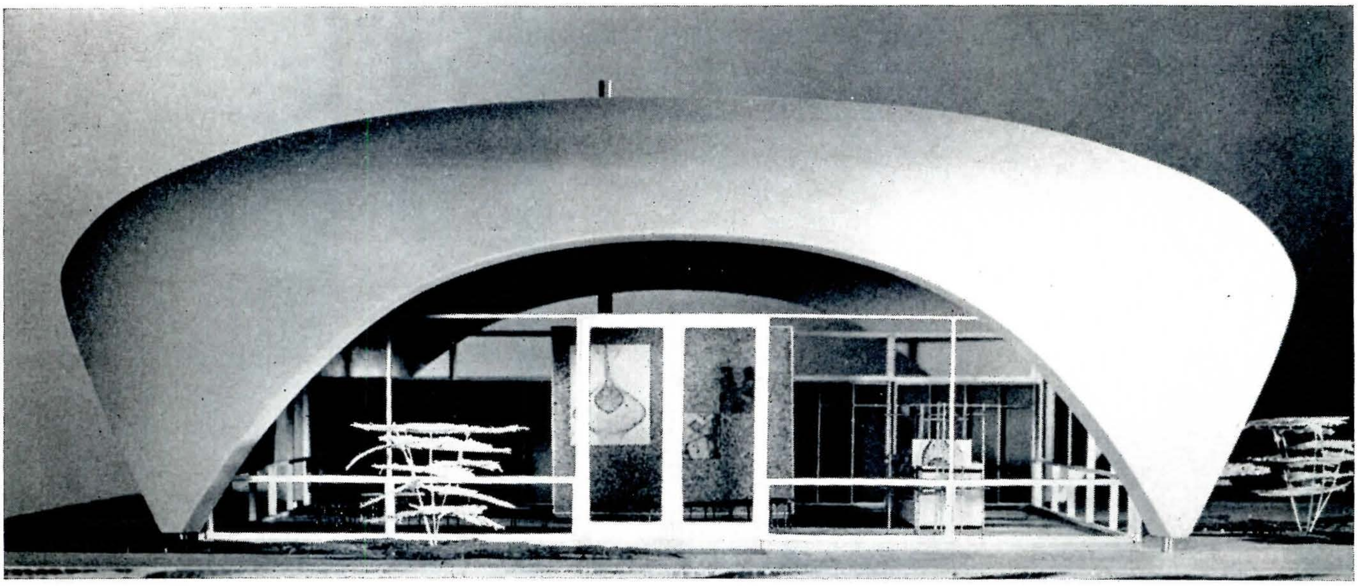
Eliot Noyes & Associates, Architects





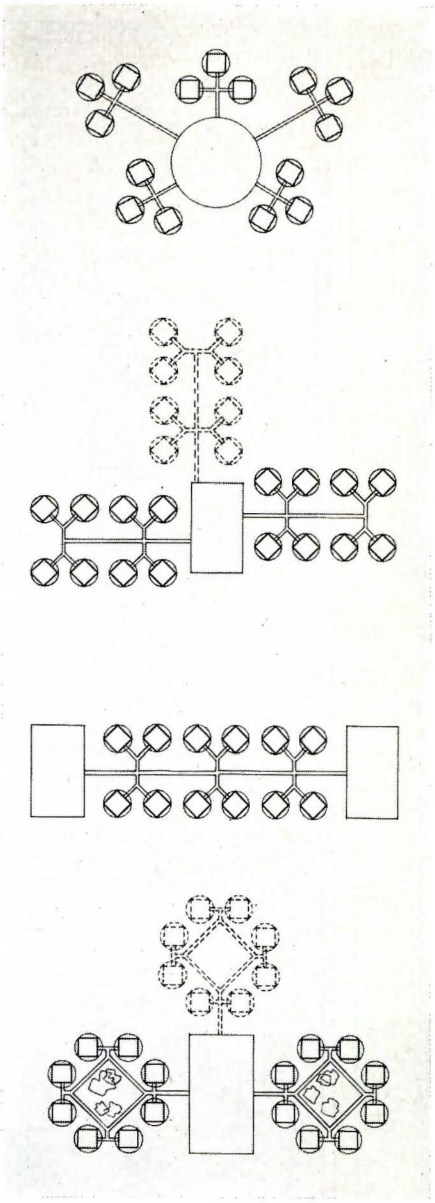


A balloon form 45 ft in diameter yields 1000 sq ft of usable interior space, ample for a large classroom, lavatory, teacher's closet and storage space. A canvas shield much like an awning can be used at each of the four open sides to act as both sunshade and reflector, directing light to the domed ceiling and indirectly illuminating the interior



FORMS FOR THESE unusual experimental structures are balloons inflated with air maintained at constant pressure by automatic controls. Construction is to consist of two sprayed-on concrete shells, each averaging 2 in. thick, with 1½ in. of glass fiber insulation between. After the inner shell is placed the insulating blanket is laid on it, the balloon form removed, and the second shell sprayed on. Two units are to be built (though not as schools) at Cuyahoga Falls, near Cleveland; one will be equipped as a house, the other as a demonstration unit to display building materials. However, to achieve maximum economy by this method it is necessary that several units be built. The balloon form can then be used repeatedly, almost in production-line technique: foundations for successive units started while the bal-

BALLOON-FORMED CONCRETE BUBBLES

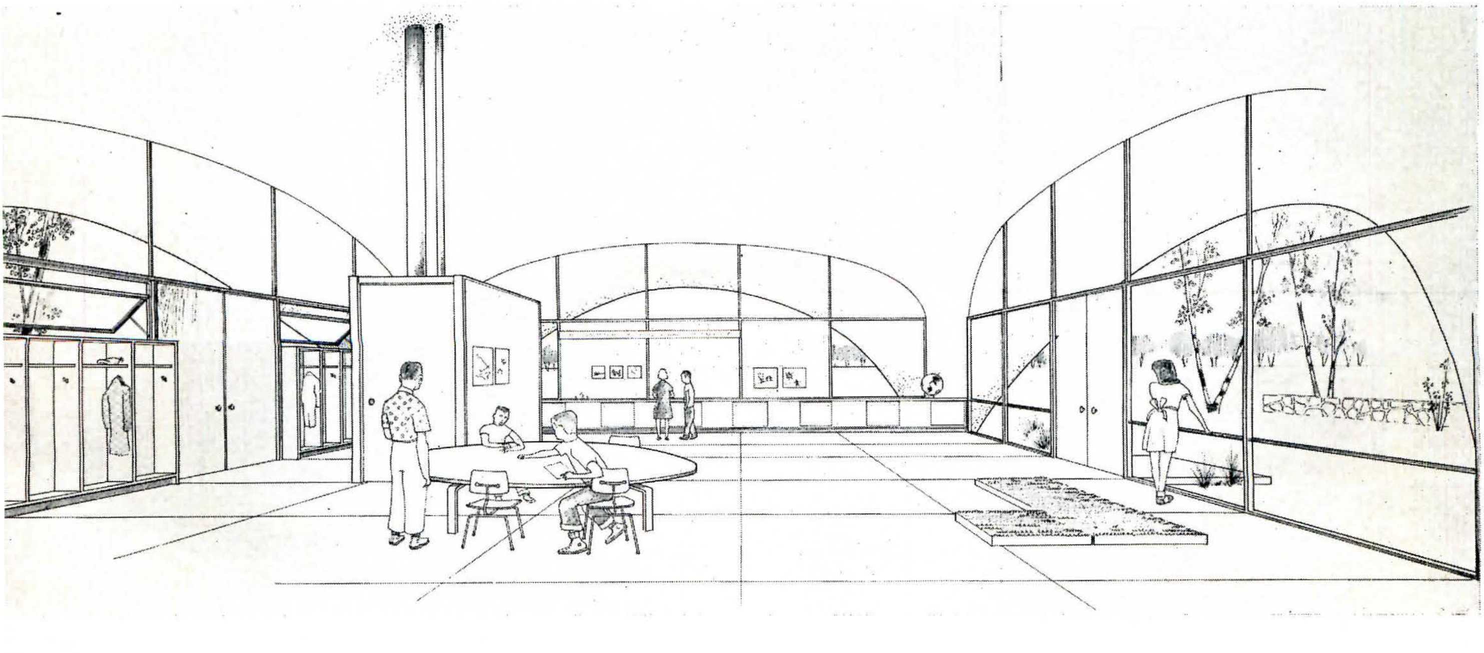


loon is being inflated for the first, etc. It is expected that the interior surface of the shell can be finished with sprayed-on acoustical material.

The tentative arrangements of units shown in photographs and drawings are of course suggestions only. Either enclosed or open corridors might be used to link the units, each of which would become a self-contained classroom. The central structure might be of any form suitable to house the heating plant, administrative and health facilities, and covered play space or assembly area. What is offered by this concept is a potentially economical means of realizing again the values once afforded by the one-room school, plus the advantages of modern mass-production techniques and the stimulating educational environment which contemporary materials and techniques make possible — but which are so often ignored.

The designer can comprehend the pleasant, uncluttered, well lighted space, in good scale for children, opening out on at least three sides, which concrete bubble classrooms might provide. Laymen — and architecturally educators are laymen too — usually find unfamiliar concepts difficult to understand. It is good to hear, then, that school administrators in a midwestern city are considering adding several of these units to an existing school.

Recent use of small buildings (two to four classrooms per building) suggests that other architects have come independently to the conclusion that grouped small structures are economical and philosophically appropriate.



BASIC ELEMENTS IN THE PLANNING OF ELECTRICAL SYSTEMS

By Felix B. Graham
Chief of Electrical Department
Syska & Hennessy, Inc.,
Consulting Engineers

ARTICLE 6: SCHOOLS

This is the last in a series of six articles. Previous articles were: General Principles, February; Office Buildings, March; Stores and Shopping Centers, May; Industrial Buildings, August; Hospitals, October.

WHILE the number of electrical outlets in a school is great, the demand loads are usually moderate. Consequently, the light and power distribution system is relatively simple. Since a school operates as an integrated organization, its time, communications and program systems play an important part and are correspondingly complex. The need for flexibility or uninterrupted power supply for the entire building is not as critical as in other building types. Ease of maintenance and durability are high on the list of importance. Exposed parts should be as tamper-resistant as practicable, and rugged to withstand the abuse of young crowds. With this in mind, the relative order of importance of the system features may be stated as follows: 1. safety; 2. durability and ruggedness; 3. ease of maintenance; 4. reliability; 5. low initial cost; 6. expansibility; 7. appearance; 8. flexibility; 9. small space requirements.

However, there is one other feature typical of school work which may override all others in importance, namely adherence to the established standards of a particular school system. The designer will want to adhere to these standards in most instances.

Lighting

The creation of favorable visual surroundings in the classroom is a joint venture between architect and engineer. It is an important task since education is principally a process of learning by seeing. There are basically three problems involved:

1. Control of daylight
2. Generation and control of electric light
3. Coordination of room finishes.

The principles of lighting design also apply to the control of daylighting. However, a study of daylighting extends far beyond the scope of this article.

When the daylight is not sufficient to provide adequate light in the classroom, electric illumination must be introduced. Thirty foot-candles is considered the acceptable minimum for classrooms, shops and laboratories; 50 foot-candles for drafting, sewing and art rooms.

It is usually considered impractical to produce 50 foot-candles with incandescent lamps because of heat and operating cost. (Brightness of the ceiling need not be excessive if proper stem length is used.) In schoolrooms where 30 foot-candles is adequate, the choice between incandescent and fluorescent can be made on a basis of economics. Since the initial cost of a fluorescent installation is higher, it is its lower operating cost which in the long run may reduce the annual cost. The greater the number of annual lamp operating hours and the higher the electric rates, the more advantageous is a fluorescent installation. The number of lamp operating hours, of course, depends to a large extent on the number of cloudy days and how the building utilizes daylighting. The average number of cloudy days per year varies from a high of 180 in the extreme northwest and northeast corners of the United States to a low of 20 in southwestern Arizona. Most of the Southwest registers between 20 and 80 cloudy days per year. It is in such areas that an economic study may favor incandescent lighting. However, even in an overcast area, with the school designed properly for daylighting, incandescent lighting may be sound on an economic basis. Where incandescent lighting is used, the concentric-ring fixture with a silvered-bowl lamp and proper stem length will produce minimum glare and will be easy to maintain. The enclosing globe of years ago produces too much glare for classroom use.

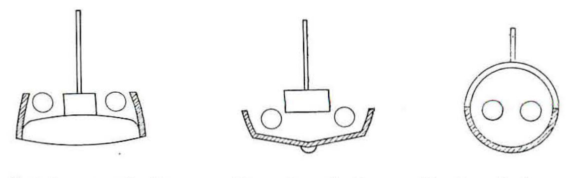
Reflection factors of room and furniture finishes should be within the following range:

Ceiling	80–85%
Walls, upper 12 to 18 in.	80–85
Walls, between windows	75–80
Walls, other	60–70
Tackboard	50–60
Desk tops	35–50
Vertical trim	30–40
Chalkboard, with light chalk	15–20
Chalkboard, with dark chalk	50–70
Floor	25–30

TYPICAL FLUORESCENT LIGHTING FOR CLASSROOMS

Fixture brightness limitations (in ft-lamberts) presently recommended by IES are:
0° to 30° above horizontal 225
30° to 45° above horizontal 450
45° to 90° above horizontal 1000

Suspended type

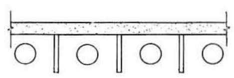


Metal or plastic louvers and sides

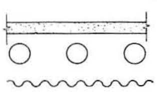
Open-top plastic troughs

Plastic cylinders, translucent bottom

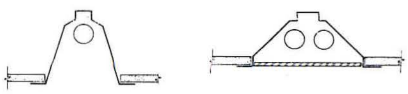
Baffled ceiling



Luminous ceiling



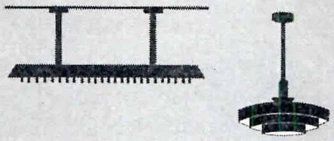
Recessed type (for low ceilings)



Low brightness lamps, open bottom

Prismatic glass bottom

ELECTRICAL REQUIREMENTS



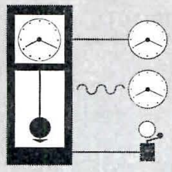
CLASSROOM

Equipment: General convenience outlets • Clock (possibly with built-in buzzer) • Outlet for heating and ventilating unit • Outlets for germicidal lamps

Communications: Loudspeaker (possibly with two-way feature) • Outlets for audio-visual aids • Outlets for TV antenna • Intercom telephones

Lighting: General lighting (good brightness relationships) • Auxiliary chalkboard lighting

Note: these items may apply also to shops and labs

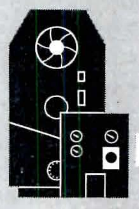


SOUND AND COMMUNICATIONS

Central sound control board—turntable, amplifier, selector board • Loudspeakers • AM/FM antenna and receiver system • TV antenna system • Closed circuit television • Public telephone system and phone booths • Private intercom system

TIME-PROGRAM SYSTEM

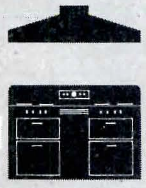
Master clock • Resetting device • Program machine and bells • Transmitter • Room clocks • Bell transfer board • Yard gongs • Time recorders (include card racks) • Fire alarms (bells and horns)



BUILDING UTILITIES

Equipment: Boiler control panel • Electrical switchboard • Oil burner, fuel pumps, oil heaters or stokers and ash hoist • Induced and forced draft fans, ventilation system fans • Vacuum pumps, circulating pumps, ejector pumps, sump pumps • Air compressors • Elevators • Alarm trouble bells • Sprinkler alarm, fire alarm • Outlets for custodian's work bench • Incinerator

Communications: Telephone equipment room



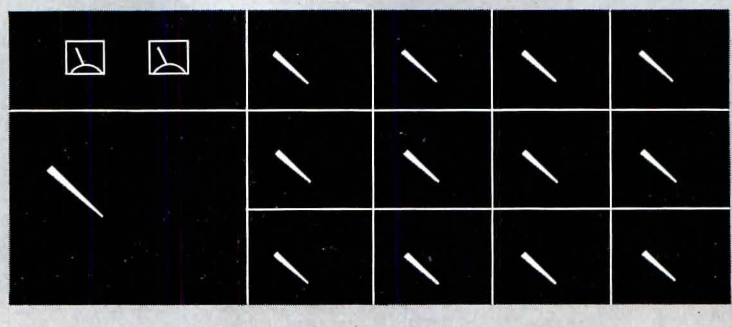
KITCHEN AND CAFETERIA

(See Article 5 on "Hospitals," Architectural Record, October 1954)

MAIN SWITCHBOARD

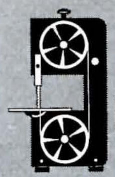
Incoming secondary service

Metering



Outgoing feeder circuits

FOR A SCHOOL



SHOPS AND LABORATORIES

SCIENCE, CHEMISTRY, PHYSICS LABS

Equipment: Outlets at students' and instructor's tables and pedestal units • Variable voltage control board (a-c and d-c) • Demonstration meters • Fume hood exhaust fan and light • d-c motor generator • Batteries and battery charger

METAL SHOP

Equipment: Power hack saw • Grinder • Jig saw • Drill press • Lathe • Milling machine

WOODWORKING SHOP

Equipment: Band saw • Jig saw • Circular saw Jointer • Drill press • Grinder • Lathe • Dust collector

CRAFTS

Equipment: Pottery wheels • Kiln • Furnace Grinder • Polisher

HOME ECONOMICS

Equipment: Kitchen utility outlets • Sewing machine outlets • Washing machine • Dryer • Ironer • Hot plate • Sample apartment outlets

BUSINESS PRACTICE

Equipment: Electric typewriters • Calculating machines • Demonstration telephones • Switchboard and instruments

PHYSICAL EDUCATION

GYMNASIUM

Equipment: Scoreboard • Timing devices • Motor-operated folding doors

Communications: Loudspeakers • Microphone outlets • Turntable

Note: all equipment should be protected against impact

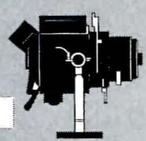
SWIMMING POOL

Equipment: Pumps

Communications: Sound distribution (above and underwater)

Lighting: Underwater lighting

Note: all equipment should be waterproof or vapor-tight



AUDITORIUM

Equipment: General convenience outlets • Curtain motor • Fire alarm gong • Projectors and rewind machines

Communications: Loudspeakers • Microphone outlets • Telephone in projection booth • Signal system between stage, auditorium, projection booth • Program bell

Lighting: House lighting • Aisle lights • Stage lighting—footlights, border lights, floodlights, spotlights, general stage lighting, outlets for portable stage lighting, dimmer control board • Exit signs • Emergency lights

Note: observe code requirements

PLANNING OF ELECTRICAL SYSTEMS: SCHOOLS

In the typical lighting installation producing 30 foot-candles at desk level, the chalkboard receives only 10–15 ft-c on the vertical plane. And yet, with inexpensive chalkboard illuminators the intensity can be increased to the desired 30 ft-c level, thus greatly helping the students at the rear of the room. Sewing rooms may require supplementary portable lighting in addition to 50 ft-c general illumination. This is especially important when students work with dark materials. Working with a black thread on black fabric is one of the most difficult seeing tasks.

Art rooms where good color rendition is required should use cool deluxe fluorescent lamps. Auditorium lighting may consist of four components:

1. General architectural illumination
2. Supplementary overall illumination for study periods
3. Stage lighting
4. Aisle, step and motion picture illumination

Gymnasium lighting should be sufficiently flexible to serve the varying requirements of general exercise, high speed basketball, or social events.

Time-Program System

A school requires a clock system — that is a system in which a central device keeps all clocks synchronized, because its function would be hampered if the clocks did not all show the identical, correct time, and because the clock system serves also the program system. The system components — master clock and the indicating clocks — as well as their connections are available in a number of different types:

Master Clocks
- Synchronous, motor driven
- Electrically wound, spring driven
- Pendulum controlled

Connections
- Wired
- Non-wired

Indicating Clocks
- Minute impulse
- Synchronous
- Dual synchronous

The *synchronous, motor driven master clock* depends on the accuracy of the alternating current frequency. If this should be off or the power fails, it is reset by hand.

The *electrically wound, spring driven master clock* has a motor which keeps the main spring wound with 6 to 12 hour reserve. The power company frequency and main spring control the accuracy.

The *pendulum controlled master clock* is used where extreme accuracy (up to one second per month) is required, or only direct current is available.

The hands of the *minute impulse clock,* which does not have a motor, are advanced once each minute by an impulse transmitted from the master clock. Once each hour the master clock sends out additional rapid impulses to bring any clock which may have fallen behind up to correct time. Clocks which have advanced ahead of the others reject impulses until they too show correct time.

The *synchronous clock* has a motor which runs in exact synchronism with the power company generated frequency. A clock which has fallen behind is brought up to correct time by a clutch arrangement which can be brought into action by the master clock once each hour. The synchronous clock is usually equipped with a sweep second hand.

The *dual synchronous clock* has two motors, one to drive it normally, the other to correct it in unison with the system. It depends on power company accuracy and employs no master clock. Correction of system time is limited to pick-up after power failure and change to and from daylight saving time.

The *wired system* employs wire connections between control unit and indicating clocks.

The *non-wired system* permits connection of the individual clock to any unswitched lighting circuit. Normally, the clock is operated by power company frequency. Each clock also contains a receiver. Every hour the master clock sends high frequencies through a transmitter over the entire light and power wiring system. These frequencies are picked up by each individual receiver to correct a clock, if necessary. This system is usually called *electronic clock system.*

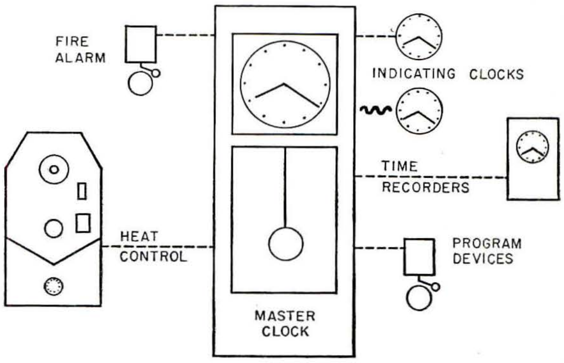
Summarizing the above, we have

1. The wired minute-impulse system
2. The wired synchronous system
3. The wired dual-synchronous system
4. The non-wired synchronous or electronic system.

The first three systems vary only slightly in initial cost, but the electronic system is usually more expensive in small installations, less expensive in extensive ones. The important advantage of the electronic clock system is its flexibility in that clocks can be added or relocated without the need of extending a clock wiring system.

The master clock also serves as the program machine. By punched tapes, disks or similar devices a program is set up and distributed by wires, or in the electronic system by lighting circuits, to bells, buzzers or other signal devices. Multiple program circuits are required where signals in different locations are to be sounded at different times. The electronic and wired systems can also be used to control mechanical systems.

Several possible uses for a time-program system

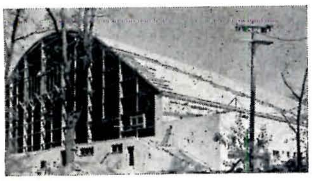


Sound and Communications

The sound distribution system is employed extensively both for instruction and announcements. Large schools often have a separate acoustically treated room used as sound studio. Standard equipment includes a number of microphone pick-ups, an AM-FM radio receiver, a multi-speed record turntable and the necessary amplification and zone control equipment. The auditorium and gymnasium often have their own local sound system. Television is frequently thought of as a medium of instruction in the future. New York City public schools are preparing for this eventuality by leaving in place the conduit system used for temporary light and power during construction for pulling in television cables at some future date.

Union College Field House

WOOD ARCHES ARE HUGE, LIGHT FIXTURES HEAVY



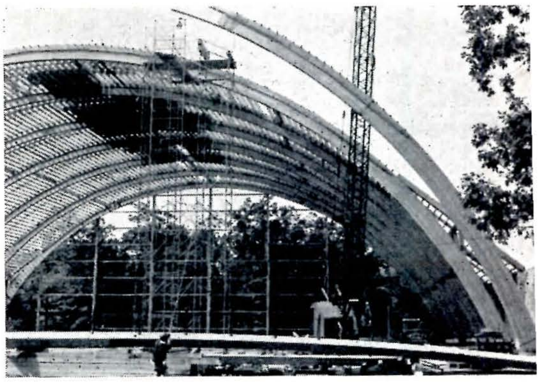
THE BIGGEST laminated wood arches ever to be used clear a 196-ft span in the new Union College Field House in Schenectady, N. Y. Raised in three sections, each of the nine arches in the 210-ft-long building is secured by tie rods at both ends and tied by two 2-in. rods between supports where heavy-gauge steel plates form hinged connections.

The Douglas fir timbers in the arches were laminated with an interior type waterproof casein glue under 100 psi pressure. The stress grading varies from 2600 psi at the outer laminations to substantially less at the center. The roof, which is extended out from the arches to meet the concrete block side walls, is sheathed with 1-in. tongue-and-groove planking nailed diagonally over 3 x 12 joists spaced 20 in. on centers. The sheathing transmits lateral forces to the exterior walls.

A high-frequency fluorescent lighting system was installed in the field house for reasons of long-range economy and ease of maintenance. Conduit for the elements was attached to the arches before installation. The Curtis custom-designed fixtures, each weighing more than 200 lb, are suspended in five rows by hangers from seven arches. Each of the fixtures, about 113 in. long by 96 in. wide, encloses 14 fluorescent lamps. The fixtures are so spaced that there is a fairly even light distribution of 50-ft-c on the field. Two motor generators transform the 60-cycle 208-volt input to 600 volts at 400 cycles to supply the lamps. Harry H. Bond, Consulting Engineer, worked closely with General Electric lighting engineers in designing the unusual system. The units are to be serviced by ladder trucks.

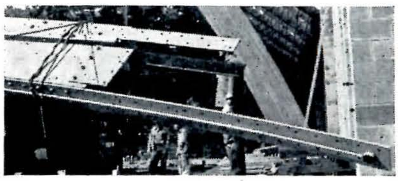
Ten centrifugal-type unit steam heaters are suspended from roof beams at arches to maintain a comfortable temperature in the field house.

The concrete base for the arches was designed for 1350 psi compressive strength. The floor of the field house is of treated earth. A 1/10-mile cinder running track surrounds the infield. The ends of the building contain large windows of glare-reducing glass. Provision was made in construction for expansion by means of additional bays.



Photos by J. P. McNally

Section of arch about to be raised has steel shear plates and wiring ducts already attached (close-up below). Middle arch section is lowered into plates



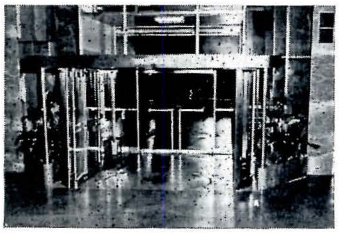
McKim, Mead & White were architects; Severud, Elstad & Krueger, structural engineers; McManus, Longe, Brockwehl, Inc., general contractors.

• **Miniature atomic reactors** for home heating might be available in about three years, opined Frank L. Phillips, with the Boiler Div. of the Cleaver-Brooks Co., to an interviewer from *The Contractor*.

• **"Engineered Timber Construction,"** a color motion picture released by the Timber Engineering Co., was premiered as a special feature of the 1954 annual meeting of the National Lumber Manufacturers Association in Washington. The film, designed specifically for architects, engineers and students, is available for showing to professional, industrial and civic organizations.

• **Bare steel structural members** support part of nine lower floors of the U. S. Rubber Co. Building in New York's Rockefeller Center after razing of the Centre Theater to make way for a 19-story air-conditioned addition, scheduled for completion in December 1955.

REVOLVING DOORS | *15,000th Installed During Diamond Jubilee*



Revolving doors collapsed and pushed back against wall leave wide, unobstructed opening

The revolving door is 75 years old. In celebration of its Diamond Jubilee, the 15,000th revolving door ever to be installed by International Steel Co. or predecessor companies was dedicated at the Hotel McCurdy in Evansville, Ind.

At ceremonies marking the occasion on Dec. 8, 1954, Walter Koch, president of International Steel, announced to a conference of industry representatives a new phase in the entrance field with the introduction of revolving doors to an estimated 10,000 factories whose manufacturing processes require close heat, air and humidity tolerances. Citations for educational work on behalf of this type of entrance were awarded to representatives of four architectural and construction magazines, ARCHITECTURAL RECORD among them.

Guests at the celebration were shown a safety device of the door, which folds it up when pressure is brought to bear on two wings simultaneously.

• **A manual on fire prevention** as it applies to the broad field of plastics will be developed by a Committee on Fire Prevention which has been set up by The Society of the Plastics Industry, Inc., to work closely with the National Board of Fire Underwriters.

• **Reinforced plastics in building** and construction as well as in other fields will be discussed during the 10th Annual Reinforced Plastics Division Conference of The Society of the Plastics Industry in Los Angeles from February 8 to 10.

(*Roundup continued on page 228*)

COST FACTORS IN CONCRETE HANGARS

By Boyd G. Anderson, Ammann & Whitney, Consulting Engineers

Most important economic considerations are weight reduction and reuse of concrete forms

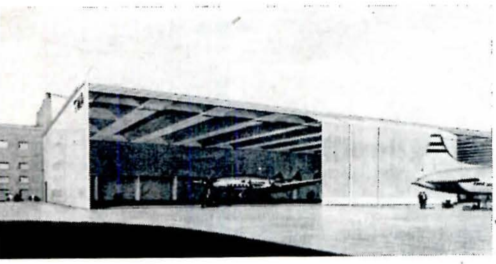
THE IDEAL HANGAR is a building without interior columns and enclosed on all sides by movable and removable exterior walls, permitting rearrangement of service facilities and expansion as needed. At first, hangar buildings were largely oversized sheds, utilizing conventional building methods of their earlier and smaller counterparts. Interior supports were accepted as structural necessities in order to keep costs down. Service areas were virtually inflexible. Recent developments such as arched and cantilevered roofs have reduced such structural restrictions without excessive costs.

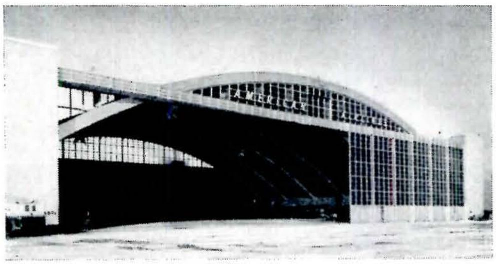
In some types of hangar designs, concrete is at a cost disadvantage for long clear spans compared to lighter steel construction. Strength and, consequently, cost are determined more by the weight of the members than by such external loads as wind and snow.

Recent designs in concrete have overcome this by using a thin skin to keep out the weather which is folded, hipped or curved so that it acts as the main structural member. As in the case of the airplane, hangar construction has developed from a structural system which utilized framing to support a separate and independent cover, to a stressed skin which is structurally capable of carrying loads by itself.

Two types of concrete hangar design promise the most for cost reduction: arch and cantilever systems. The arched roof consists of a thin concrete skin, 3 to 4 in. thick, arched over the floor area and maintained at the desired curvature by light, stiffening ribs. The ribs are usually spaced about 30 ft on center. The profile of the roof is advantageously shaped to more or less tailor fit the outlines of the larger planes.

Hangars with cantilevered roofs are becoming increasingly popular because of the wide unobstructed spaces, some hangars reaching 800 ft in clear span. It has been apparent that the main obstacle to using concrete for cantilever roof construction is the excessive weight, which would be expected to increase rapidly with the span of the cantilever. For conventional spans of 135 to 150 ft, the required average thickness of the concrete in the roof, including subframing and ribs, might exceed 12 to 14 in. This would not only result in high roof costs, but substructure costs as well. Such concrete designs could not compete with light, unfireproofed steel construction, and modifications obviously were necessary in order to make concrete competitive with other materials.





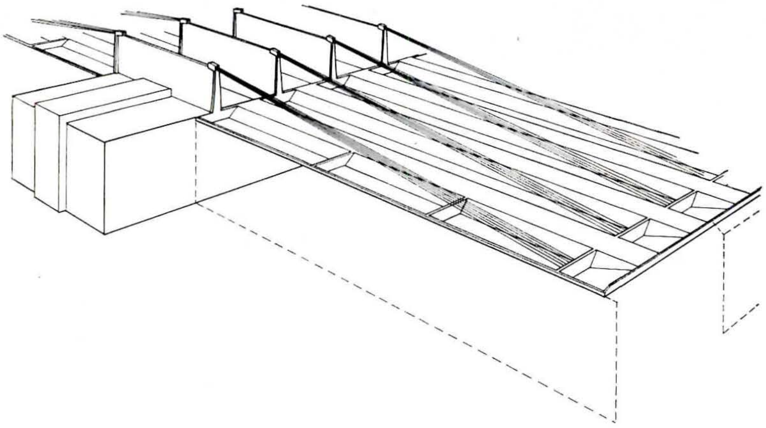
A cantilever hangar built in Rio de Janeiro in 1942 introduced several innovations to reduce the weight of framing (ARCHITECTURAL RECORD, December 1942). An open truss was substituted for the usual solid ribbed cantilever, and the roof deck was lightened by substituting a thin arched shell for the usual flat deck. In more recent attempts to find an economical solution, designs have been made for cantilevers with hollow precast and I-section ribs, combined with ribbed thin skin deck slabs to reduce size and weights of these members. For a study of ways to cut costs through more efficient structural systems see drawings and captions on the opposite page.

The choice of structure and materials will depend to a large extent on how these affect initial cost. In concrete arch type hangars, for example, the division of cost between the roof barrel and supporting abutments and footings is about equal. Any arrangement that simplifies members supporting the roof and lowers height of these members will bring costs down. Variation in size of span, however, has only a slight effect on total cost. With other factors remaining constant, the clear span may be increased from 150 to 300 ft for an added cost of approximately 75 cents per sq ft.

The most important single factor influencing the cost of *arch-shell roof* structures is the depth of the hangar and/or the number of spans. This determines the number of times expensive formwork can be reused. For example, the total cost of the forms for a large hangar may exceed $100,000. If used only one time this item alone would amount to as much as $5 to $7 per sq ft. If used 10 times the cost of formwork might be reduced to less than $1 per sq ft. It is seen that increasing the depth or number of spans affects unit costs more than large increases in clear span. For a barrel hangar 280 to 300 ft in span with formwork used four to six times, the entire cost of the barrel, roofing, insulation, abutments and footings can be expected to be between $5 and $7 per sq ft.

The cost of concrete cantilever hangars will depend primarily on the same factors that influence that of arch-type hangars. The longer the building, the greater the number of reuses that can be obtained from the formwork. The cost of cantilever hangars will increase at a greater rate with cantilever span than do the arched hangars for an increase in clear span. This is usually not too important, however, since the span of a hangar will be limited largely by the maximum length of the plane.

The span-depth ratio of cantilever hangars can be adjusted, within the limits of functional requirements, to produce a service area having minimum unit costs. The unit costs per square foot of hangar floor area will usually be minimum for a depth ranging between 130 and 160 ft. The office-shop width can be approached in the same manner. The most economical width for this area will depend on the span of the cantilever, the weight of cantilever framing and the type of construction used in the main framing. Minimum costs for a double cantilever hangar usually result with office-shop widths between 60 and 80 ft.

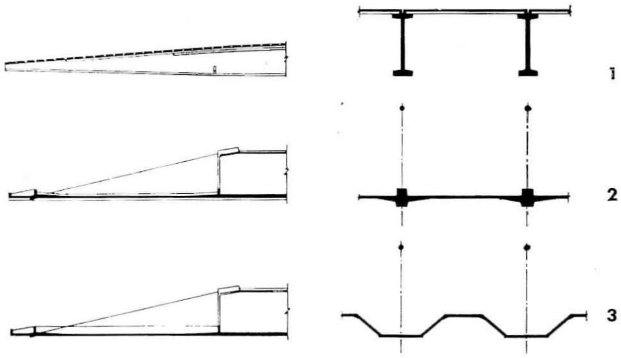


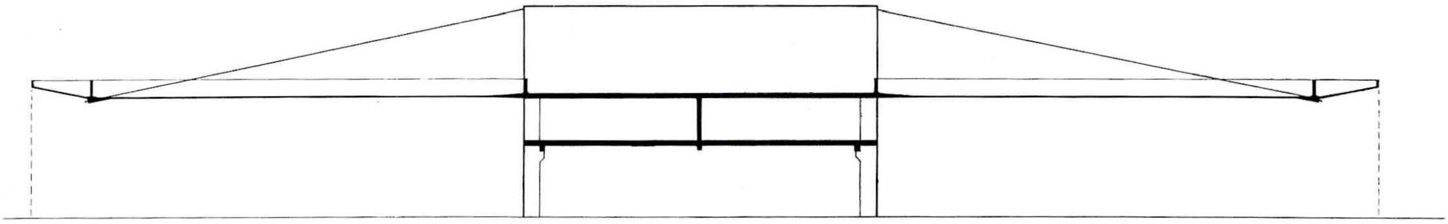
DESIGN FOR A CANTILEVERED HANGAR:

AN EXAMPLE OF STRUCTURAL EFFICIENCY

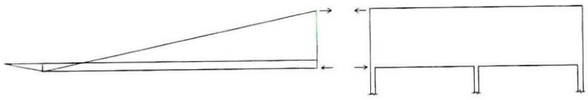
Steps in the development

Keeping cantilever weight to a minimum is practically a necessity in this type of hangar. Consider first a cantilevered roof consisting of I-section ribs combined with ribbed, thin-deck slabs (1). Parts of these ribs are not effective, however, so they could be reduced in size and made integral with the roof slab, the whole structure being suspended by cables (2). Although this system is considerably lighter, the roof slab still weighs quite a bit, and the stiffening ribs require as much concrete and steel as the roof slab. To reduce further the weight of the cantilever slab and at the same time eliminate the stiffening ribs, the roof deck may be hipped as in (3). The slab has such a short span between folds that 3 or 4 in. of thickness gives sufficient strength, while the corrugated section has enough stiffness to replace the stabilizing ribs entirely





Basic structure



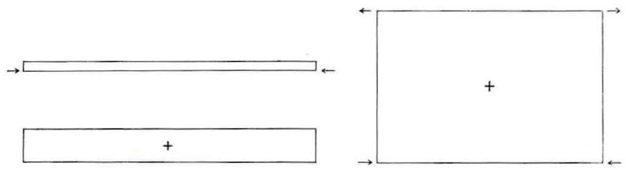
Structural behavior

Structural components of the hangar — cantilevered roof, anchorage wall and suspended floor — act so as to cancel part of the forces due to dead load. It works this way: the horizontal component of the cable tension and the horizontal reaction of the center section roof exert a "squeeze" at or near the lower slab of the corrugated roof; this counteracts the tendency for the roof to bend at the center. Such action plus the fact that the corrugated roof is, in effect, "prestressed" eliminates most of the reinforcing steel that would have been necessary.

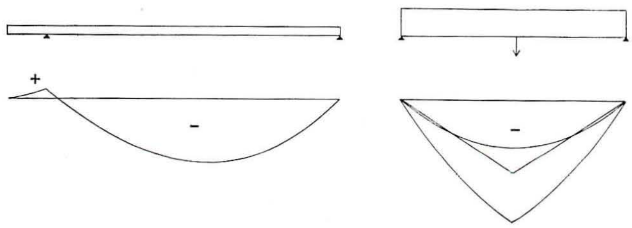
The anchorage wall over the center section is subjected to the cable tension at the top and to the horizontal reaction of the corrugated roof at the bottom. The effects of this are reduced by the weight of the anchorage wall and the center roof slab, and by any lower floors suspended from this wall. Hanging the floors also gets rid of columns.

Construction on a hangar of this type will be started early in 1955 for TWA overhaul facilities at Mid-Continent International Airport, Kansas City, Mo. Burns & McDonnell are Engineers-Architects; Ammann & Whitney, associates for hangar structure

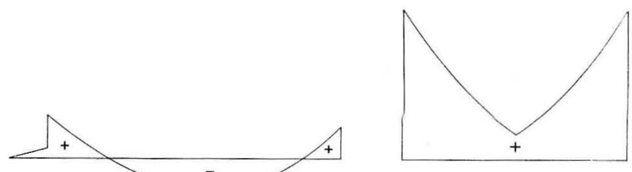
Horizontal loads and moments (simplified)



Vertical loads and moments



Resultant of vertical and horizontal moments



SKYLIGHTS AND VENTILATORS: A SURVEY

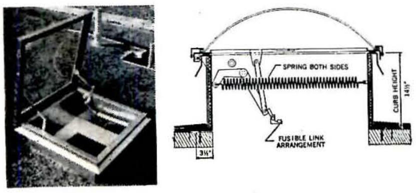
THE FIRST SKYLIGHT may have been the hole that primitive man cut in his roof to let out the smoke from his fire. This hole was primarily a ventilator, secondarily a source of daylight. Shades of these beginnings are apparent in modern skylights, some of which have vents, others powered fans.

Skylights have come into their own just within the last decade, mainly as a result of prefabrication. Packaged skylight units are shipped easily and installed quickly. Since flashing is usually an integral part of the skylight, the old problem of leakage is practically nonexistent. Heat transmission has been controlled in a number of ways, the most common being the use of prisms and air spaces in glass skylights and two sheets separated by an air space for insulation in plastics. Most manufacturers offer both transparent and translucent skylights, and some even provide tints. Plastic domes are usually delivered with a protective covering which is stripped off when the roof is completed.

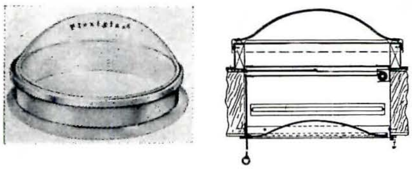
Costs of manufacture and installation have been reduced considerably by prefabrication, thus removing one of the major disadvantages of skylights. In schools, where the trend toward daylighting is most evident, cubage costs have been reduced and construction simplified by lowering ceiling heights. The deep classroom is feasible, with desks next to the interior wall as well lighted as those next to the window. In industrial buildings, where big strides have been made in artificial lighting, we are beginning to see the use of packaged skylights of standard design, particularly those with the venting feature. Skylighting has even extended to the residential field, largely as a result of the indoor-outdoor design influence.

The basic ventilator types are the gravity and fan types. The gravity type is simply a stack over a hole in the roof which has various "extras" to increase the flow of air and protect against weather. The exhaust capacity of a gravity ventilator varies directly as the diameter of the stack, the height of stack above air intake, the temperature difference between inside and outside air and the velocity of passing wind. The fan ventilator is basically a gravity vent with a power-actuated fan added to increase exhaust. The gravity vent is adequate in many installations, but where fumes, dust and corrosive gases accumulate, the power exhaust is the only practical type to expel them quickly and completely. Although ventilators have their widest application in industry, they are being found more and more today in other commercial structures and, in small size, even in homes to combat moisture problems.

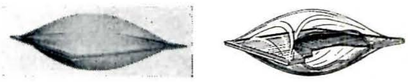
On these pages AR presents some recent developments in skylights and ventilators. *(Continued on page 240)*



Wascolite Pyrodome, *an acrylic resin dome in an aluminum frame, is equipped with a spring-loaded fusible link which opens the plastic skylight under excessive heat.*
Sizes: *36⅞" x 35¾", 36⅞" x 51¾"*
Mfr: *Wasco Flashing Co., 87 Fawcett St., Cambridge 38, Mass.*

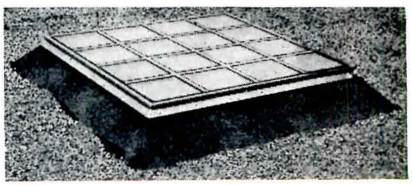


Vanco Domelite, *of acrylic plastic in a 20-gauge steel frame finished in baked white enamel, is available with Vanco Ceilinglite, as in drawing, thus increasing insulation and concealing lighting fixtures which can be installed around well sides.*
Sizes: *20" x 20" to 99" x 119"*
Mfr: *E. Van Noorden Co., 100 Magazin St., Boston 19, Mass.*

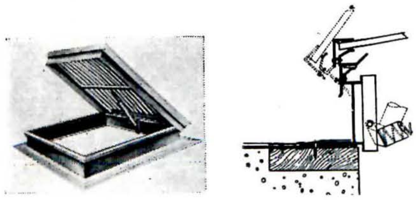


Bettcher Dubl-Dome, *of thermoplastic acrylic resin in a 22-gauge stainless steel frame, is vacuum-insulated to prevent moisture condensation, is available in twin- and triple-dome sizes separated by plastic grids.*
Sizes: *24" x 24" to 48" x 72"*
Mfr: *Bettcher Plastics Co., 1616 N. W. Glisan St., Portland, Ore.*

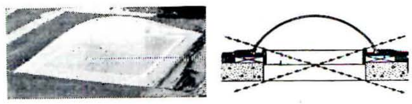
Suter, Hedrich-Blessing



Kimble Toplite Panels *use 3-in.-thick, hollow, evacuated, double-cavity glass blocks in an aluminum structural grid in which are incorporated prisms which transmit a high percentage of light from the winter sun and reject the major portion of light from the hot summer sun.*
Sizes: *3'2" x 3'2" to 5'2" x 4'2"*
Mfr: *Kimble Glass Co., Toledo, Ohio.*

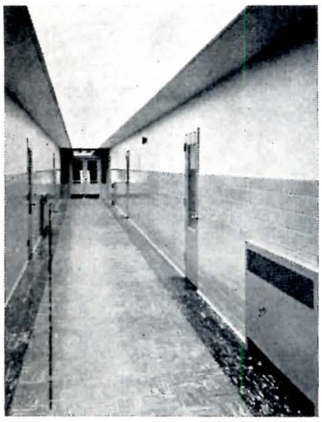


Marcolite Roof Scuttle *combines a fiberglass-reinforced plastic panel with an aluminum roof scuttle so that the hatchway is always well lighted.*
Sizes: *37" x 30½" to 61" x 40½"*
Mfr: *The Marco Co., 45 Greenwood Ave., East Orange, N. J.*



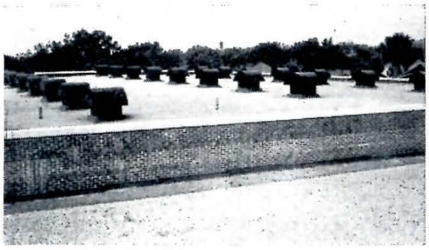
Wide-angle acrylic skylight *is an integral part of the roof, needs no flashing, permits the use of any configuration of the interior facia.*
Sizes: *16" x 16" to 48" x 72"*
Mfr: *Architectural Plastics, Inc., 20 Fitch St., East Norwalk, Conn.*

Skylights in Industry *— Wascolite Skydomes of lightweight acrylic plastic cover the roof of this plant, are self-cleaning and leakproof. Wasco Flashing Co., 87 Fawcett St., Cambridge 38, Mass.*

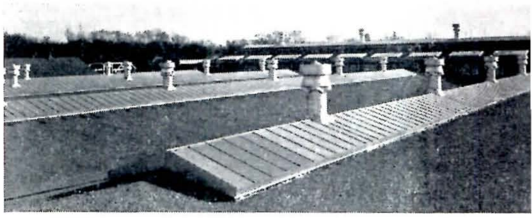


Skylights in Schools *— Corrugated translucent structural panels of fiberglass-reinforced plastic illuminate this corridor so that it can be used for exhibitions or for extra schoolroom space. Resolite Corp., Zelienople, Pa.*

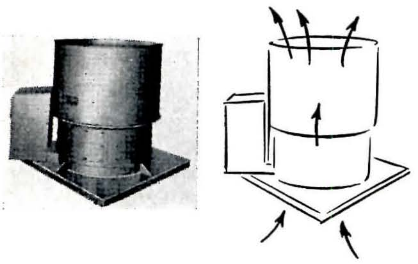
Skylights in Residences *— Corrulux translucent panels in square ceiling pattern bring daylight to all working and eating areas of this kitchen. Corrulux Div., Libbey-Owens-Ford Glass Co., P.O. Box 20026, Houston 25, Tex.*



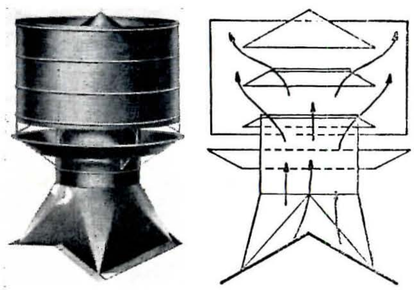
Skylights in Commercial Buildings *— Glass blocks in the roof of this architect's office provide plenty of daylight for drafting. Cast into a steel-reinforced concrete grid, the Skytrol blocks are good insulators. Pittsburgh Corning Corp., 1 Gateway Center, Pittsburgh 22, Pa.*



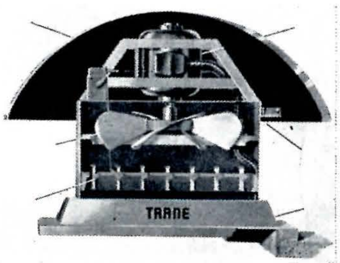
Combination Skylights and Ventilators *— Gravity roof ventilators by the Arex Co., 612 No. Michigan Ave., Chicago 11, Ill., used with continuous reinforced glass panels manufactured by the American 3-Way Luxfer Prism Co., 51-49 35th St., Long Island City, N. Y.*



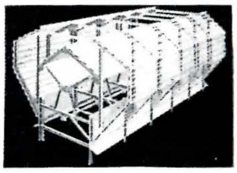
American Blower upblast type exhaust ventilator *exhausts corrosive, oil- or grease-laden fumes at high velocities.*
Housing: *Heavy-gauge welded steel, phosphatized for rust resistance; baked enamel finish*
Stack Cross Section: *32¼" to 56⅜"*
Capacity: *7600 to 34,500 cfm*
Mfr: *American Blower Corp., Detroit 23, Mich.*



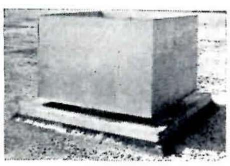
Trane powered roof ventilator *(shown in section below and on a mill roof above) is designed for installations requiring ventilation without supplementary heat.*
Housing: *Heavy-gauge steel cap hood which can be raised for maintenance*
Base Cross Section: *20" to 49"*
Capacity: *355 to 25,000 cfm.*
Mfr: *The Trane Co., La Crosse, Wis.*



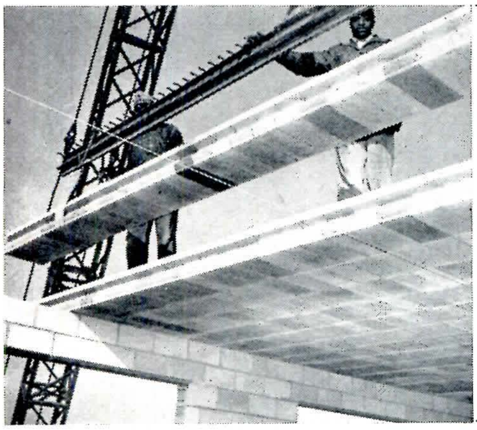
Robertson round gravity ventilator *has a free area outlet almost three and one-quarter times the stack area, permitting unhindered passage of air.*
Housing: *Copper, aluminum, galvanized steel, Robertson Protected Metal or Robertson Galbestos*
Base Cross Section: *15" to 1 5" square*
Mfr: *H. H. Robertson Co., Pittsburgh, Pa.*



Burt Monovent continuous ridge gravity ventilator *is practical for removal of large volumes of air quickly.*
Housing: *Corrugated sheet metal on brace frames spaced along full length of unit on either 4- or 5-ft centers*
Base Cross Section: *10' x 4" to 24"*
Mfr: *The Burt Mfg. Co., Akron, Ohio.*



Hunter industrial power roof ventilator *expels heat, fumes and dust at high velocity.*
Housing: *Heavy-gauge galvanized steel*
Base Cross Section: *39" to 65¼"*
Capacity: *8200 to 36,000 cfm*
Mfr: *Hunter Fan and Ventilating Co., Memphis, Tenn.*



CONCRETE SLAB ROOF

• An 8-page illustrated bulletin offers a general description of *Rapidex* system of Haydite concrete sectional slabs for roofs and floors, including a chart of coefficients of general building materials and a load design table. *Rapidex Co. of Indiana, Div. of Spickelmier Co., 1100 East 52nd St., Indianapolis 5, Ind.*

The underside of a Rapidex roof constitutes an acoustical ceiling. Topside is ready for roofing

BUILDING INTERIORS

• *The Inside Story of Building Economy* describes the use of Hauserman movable steel interiors, including partitions, doors, railings, wall lining units and acoustic steel pan ceilings. 16 pp, illus. A *Decorator's Color Selector* is also available.

Seeing Is Believing illustrates the use of the movable interiors in the Mahony-Troast Construction Co. 12 pp, illus. *The E. F. Hauserman Co., 6803 Grant Ave., Cleveland 5, Ohio.**

FIRE PROTECTION

• *Fireproofing with Perlite* describes the use of lightweight plaster or concrete with perlite aggregate for fire retardant construction. Included are construction details and fire ratings for columns, floors, ceilings and partitions. 8 pp, illus. *Perlite Institute, 10 E. 40 St., New York City.**

• A 12-page brochure gives detail drawings and descriptions of Kidde pressure-operated carbon dioxide fire-extinguishing systems. *Walter Kidde & Co., Inc., Belleville 9, N. J.*

• *Recent Developments in Fire Protection* is a 4-page, illustrated digest of interior fire equipment. *W. D. Allen Mfg. Co., Chicago 6, Ill.**

PLANT LAYOUT

• *The ABC of the Repro-Templet Method of Plant Layout* explains and illustrates this method and includes a price list together with an experimental sheet of repro-templets. *Repro-Templets Inc., Oakmont (Allegheny Co.,) Pa.*

FURNITURE

• A 56-page booklet contains photographs and specifications of household furnishings including chairs, tables, clocks and china. *Raymor, Richard Morgenthau & Co., 225 Fifth Ave., New York 10, N. Y.*

• A 12-page booklet gives examples of the use of *Risom* office furniture in offices, hotels and showrooms. *Jens Risom Design, Inc., 49 E. 53 St., New York 22, N. Y.*

• A 16-page catalog lists and illustrates brass furniture, including tables, chairs and beds, for the home. *Sherrill Furniture Corp., 201 E. 56th St., New York 22, N. Y.*

METAL BUILDING MATERIALS

• *Hand Book of Metal Building Materials* contains 101 pages of illustrations, details and technical data on Baker products such as form clamps, round column forms, highway products, steel door frames and steel joists. *H. J. Baker & Co., P. O. Box 892, Indianapolis, Ind.*

LIGHTING

• *Good Lighting Is Good Business* is a factual treatise covering the economics and mechanics of good office lighting, including layout and planning; quantity of light, fluorescent vs. incandescent and light distribution. 20 pp, illus. *Sylvania Electric Products, Inc., 1740 Broadway, New York 19, N. Y.**

• An 18-page replacement listing gives specifications, detail drawings and installation and servicing instructions of Day-Brite upward lighting industrial fixtures. *Day-Brite Lighting, Inc., 5411 Bulwer Ave., St. Louis 7, Mo.**

• A 4-page illustrated folder gives specifications of *Halo*, *Venus* and *Saturn* lighting fixtures which utilize perforated steel louvers as lamp supports and low brightness baffels. *Carter Lighting Co., Chelsea 50, Mass.*

• *Wiremold Fluorescent Lighting Fixtures and Fittings* illustrates and describes four series of fluorescent and slimline units and presents suggested applications. *The Wiremold Co., Hartford 10, Conn.*

FLOOR TILE

• *Designs for Better Floors* contains a color chart of marbleized colors of *J-M Terraflex Vinyl Floor Tile* and designs possible to achieve in the various color combinations. 12 pp, illus. *Johns-Manville, 22 E. 40th St., New York 16, N. Y.**

• A four-page folder describes glazed ceramic wall and floor tiles with illustrations of their use and available colors. *Royal Tile Mfg. Co., Box 7292, Sylvania Sta., Ft. Worth, Texas.*

TRANSLUCENT PLASTIC BUILDING PANELS

• *What to Look for in a Good Translucent Building Panel* outlines standards for specifying translucent building panels. Recommendations are classified by weight-thickness, glass content, strength, light transmission, uniformity, surface finish, pitch and depth, pits and bubbles and weather resistance. *Corrulux Div., Libby-Owens-Ford Glass Co., P. O. Box 20026, Houston, Tex.**

• A folder describing the use of translucent structural panels for industrial buildings, offices and homes and including a specification chart has been issued by *Ceilite Corp., Allison Park, Pa.*

• *How to Build with Rippolite* is an 8-page booklet containing detail drawings and examples of the application of translucent or opaque plastic structural panels. *Rippolite Plastic Products, Inc., Burbank, Calif.*

(Continued on page 284)

*Other product information in *Sweet's Architectural File, 1954.*

ENGINEERED WOOD DESIGN-7: PLANK AND BEAM CONSTRUCTION

By William J. LeMessurier and Albert G. H. Dietz

Key to tables
Columns A—Maximum economy
Columns B—Minimum depth
Columns C—Built-up beams

BEAM DESIGN TABLES

Roofs, 20 lb/sq ft live load *(Continued from January)*

TABLE 4

Design Conditions:

Live load 20 lb/sq ft
Dead load 15 lb/sq ft
Fiber stress 1200 lb/sq in.
Shear 95 lb/sq in.
Mod. of elasticity 1,200,000

Woods Meeting Design Conditions:

Cypress, 1300f Grade
Redwood, Heart Structural
Spruce, Eastern, 1200f Structural Grade

Spacing ▶ / Span ▼	4′-0″			4′-6″			5′-0″			5′-6″			6′-0″			7′-0″			8′-0″			9′-0″			10′-0″		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8′-0″	3x6	—	2-2x6	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	6x6	2-2x8
9′-0″	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10
10′-0″	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10
11′-0″	3x8	6x6	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x12
12′-0″	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12
14′-0″	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14
16′-0″	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x12	6x12	2-3x12
18′-0″	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	8x10	2-2x12	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x12	—	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14
20′-0″	4x12	8x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-3x12	4x16	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x16	8x14	2-3x16

TABLE 5

Design Conditions:

Live load 20 lb/sq ft
Dead load 15 lb/sq ft
Fiber stress 1450 lb/sq in.
Shear 120 lb/sq in.
Mod. of elasticity 1,600,000

Woods Meeting Design Conditions:

Douglas Fir, Coast Region, No. 1
Pine, Southern, No. 1

8′-0″	3x6	—	2-2x6	3x6	—	2-2x6	3x6	—	2-2x6	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8
9′-0″	3x6	—	2-2x6	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x8
10′-0″	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10
11′-0″	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10
12′-0″	3x8	6x6	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x12
14′-0″	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12
16′-0″	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x12	4x10	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-2x14
18′-0″	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x12	—	2-3x14
20′-0″	4x12	6x10	2-2x10	4x12	6x10	2-2x12	4x12	8x10	2-2x14	4x12	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-3x12	4x14	6x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14

TABLE 6

Design Conditions:

Live load 20 lb/sq ft
Dead load 15 lb/sq ft
Fiber stress 1700 lb/sq in.
Shear 145 lb/sq in.
Mod. of elasticity 1,600,000

Woods Meeting Design Conditions:

Pine, Southern No. 1 Long leaf
Douglas Fir, Coast Region, 1700f No. 1 Dense

8′-0″	3x6	—	2-2x6	3x6	—	2-2x6	3x6	—	2-2x6	3x6	—	2-2x6	3x6	—	2-2x6	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	4x6	—	2-2x8
9′-0″	3x6	—	2-2x6	3x6	—	2-2x6	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8
10′-0″	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10
11′-0″	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10
12′-0″	3x8	6x6	2-2x8	3x8	—	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10
14′-0″	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x10	4x12	8x8	2-2x12	4x12	6x10	2-2x12
16′-0″	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2 2x10	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2 2x12	4x12	6x10	2-2x12	4x12	8x10	2-2x12
18′-0″	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	8x10	2-2x12	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14
20′-0″	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	8x10	2-2x12	4x12	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-2x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14

ENGINEERED WOOD DESIGN-8: PLANK AND BEAM CONSTRUCTION

By William J. LeMessurier and Albert G. H. Dietz

Key to tables

Columns A—Maximum economy
Columns B—Minimum depth
Columns C—Built-up beams

BEAM DESIGN TABLES

Roofs, 40 lb/sq ft live load

TABLE 7

Design Conditions:

Live load 40 lb/sq ft
Dead load 15 lb/sq ft
Fiber stress 1200 lb/sq in.
Shear 95 lb/sq in.
Mod. of elasticity 1,200,000

Woods Meeting Design Conditions:

Cypress, 1300f Grade
Redwood, Heart Structural
Spruce, Eastern, 1200f Structural Grade

Spacing ▶ Span ▼	4'-0"			4'-6"			5'-0"			5'-6"			6'-0"			7'-0"			8'-0"			9'-0"			10'-0"		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8'-0"	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10
9'-0"	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x12	8x8	2-2x12
10'-0"	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12
11'-0"	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x14	4x14	6x10	2-2x14
12'-0"	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x10	8x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x14	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12
14'-0"	4x10	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	6x10	2-2x14	4x14	8x10	2-3x14	4x14	8x10	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14
16'-0"	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x16	8x14	2-3x16
18'-0"	4x14	8x10	2-2x14	4x14	6x12	2-3x12	6x12	6x12	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x16	8x14	2-3x16	6x16	8x14	2-3x16	8x14	—	2-4x16
20'-0"	4x14	6x12	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x16	6x16	8x14	2-3x16	6x16	8x14	2-4x14	8x16	—	2-4x16	8x16	—	2-4x16

TABLE 8

Design Conditions:

Live load 40 lb sq ft
Dead load 15 lb sq ft
Fiber Stress 1450 lb sq in.
Shear 120 lb/sq in.
Mod. of elasticity 1,600,000

Woods Meeting Design Conditions:

Douglas Fir, Coast Region, No. 1
Pine, Southern, No. 1

Spacing ▶ Span ▼	4'-0"			4'-6"			5'-0"			5'-6"			6'-0"			7'-0"			8'-0"			9'-0"			10'-0"		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8'-0"	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10
9'-0"	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10
10'-0"	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x12	4x12	8x8	2-2x12
11'-0"	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12
12'-0"	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x14	4x14	6x10	2-2x14
14'-0"	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x12	8x10	2-3x12
16'-0"	4x12	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2 2x14	4x14	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x12	—	2-2x14	6x14	8x12	2 3x14	6x14	8x12	2-3x14
18'-0"	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x12	—	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x16	6x16	8x14	2-3x16
20'-0"	4x14	8x10	2-2x14	4x14	6x12	2-3x12	6x12	—	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x16	8x14	2-3x16	6x16	8x14	2-3x16	8x14	—	2-4x16

TABLE 9

Design Conditions:

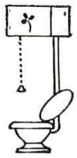
Live load 40 lb/sq ft
Dead load 15 lb/sq ft
Fiber stress 1700 lb/sq in.
Shear 145 lb/sq in.
Mod. of elasticity 1,600,000

Woods Meeting Design Conditions:

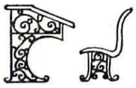
Pine, Southern, No. 1, Longleaf
Douglas Fir, Coast Region, 1700f, No. 1 Dense

Spacing ▶ Span ▼	4'-0"			4'-6"			5'-0"			5'-6"			6'-0"			7'-0"			8'-0"			9'-0"			10'-0"		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8'-0"	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10
9'-0"	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10
10'-0"	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10
11'-0"	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x12	4x12	8x8	2-2x12
12'-0"	3x10	4x8	2-2x8	3x10	6x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x12	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12
14'-0"	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-2x14
16'-0"	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12	6x12	—	2-3x12	6x14	8x12	2-3x14
18'-0"	4x12	6x10	2-2x12	4x12	8x10	2-2x12	4x12	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14
20'-0"	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x14	6x16	8x14	2-3x16	6x16	8x14	2-3x16

You wouldn't specify plumbing like this

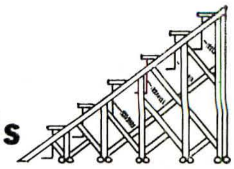


or furniture like this.

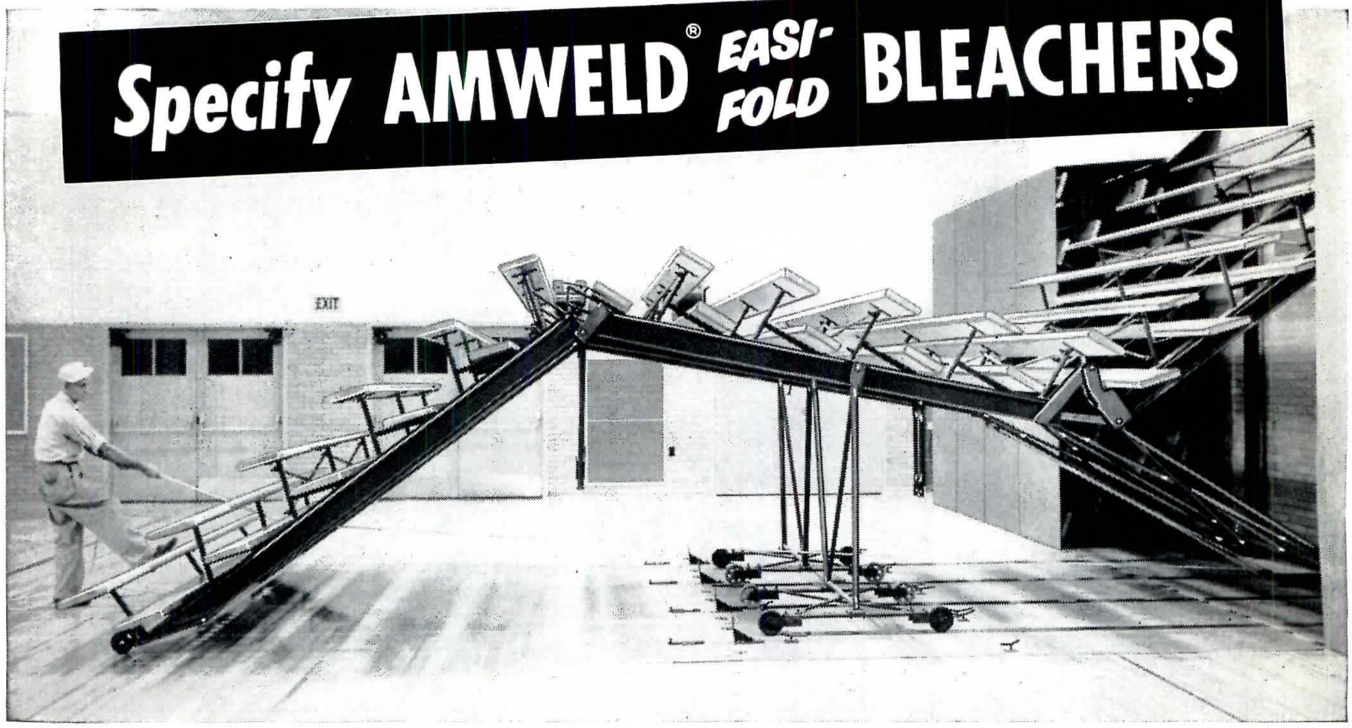


On your next school job...

...instead of old-fashioned bleachers like this



Specify AMWELD® EASI-FOLD BLEACHERS



The modern Space-saving — Work-saving answer to economical spectator seating

- **REQUIRES MINIMUM SPACE**
When not in use, Amweld Easi-Fold Bleachers fold flat against the wall. Occupy less floor space than any other bleacher.

- **SAFE—CANNOT COLLAPSE IN USE**
In use, live load is transferred to floor. Special braces lock supports in place — eliminate any possibility of accidental collapse.

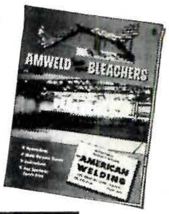
- **ONE MAN CAN OPERATE**
Amweld Easi-Fold Bleachers roll out smoothly — are perfectly balanced for easy opening and closing.

- **EASIER SWEEPING**
No complicated maze of supporting members. Open space underneath seats provides place to hang coats and hats during game and make "after game" cleaning easy.

- **ONLY 25 MOVING PARTS**
With only 25 moving parts, there are fewer things to wear out with Amweld Easi-Fold Bleachers — maintenance and repair costs are greatly reduced.

Send for free Information

Amweld Easi-Fold Bleachers are ideal for all indoor spectator sports seating. Write for complete details today — or look for our catalog in Sweets Architectural File No. 22.



Institutional Products Division
THE
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340 DIETZ ROAD • WARREN, OHIO

ENGINEERED WOOD DESIGN–9: PLANK AND BEAM CONSTRUCTION

By William J. LeMessurier and Albert G. H. Dietz

Key to tables

Columns A—Maximum economy
Columns B—Minimum depth
Columns C—Built-up beams

BEAM DESIGN TABLES

Floors, 40 lb/sq ft live load

TABLE 10

Design Conditions:

Live load 40 lb/sq ft
Dead load 10 lb sq ft
Fiber stress 1200 lb/sq in.
Shear 95 lb/sq in.
Mod. of elasticity 1,200,000

Woods Meeting Design Conditions:

Cypress, 1300f Grade
Redwood, Heart Structural
Spruce, Eastern, 1200f Structural Grade

Spacing ▶	4'-0"			4'-6"			5'-0"			5'-6"			6'-0"			7'-0"			8'-0"			9'-0"			10'-0"		
Span ▼	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8'-0"	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10
9'-0"	3x8	6x6	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12
10'-0"	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12
11'-0"	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14
12'-0"	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	6x10	2-2x14	4x14	8x10	2-2x14
14'-0"	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-2x14	6x12	—	2-3x12	6x14	8x12	2-3x14
16'-0"	4x12	6x10	2-2x12	4x12	8x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14	6x12	—	2-3x14	6x14	8x12	2-3x14	5x14	8x12	2-3x14	6x14	—	2-3x16
18'-0"	4x14	6x12	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x14	6x14	—	2-3x16	6x16	8x14	2-3x16	6x16	8x14	2-4x14
20'-0"	6x14	8x12	2-3x14	4x16	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x14	6x14	—	2-3x16	6x16	8x14	2-3x16	6x16	8x14	2-3x16	8x16	—	2-4x16	8x16	—	2-4x16

TABLE 11

Design Conditions:

Live load 40 lb/sq ft
Dead load 10 lb sq ft
Fiber stress 1450 lb/sq in.
Shear 120 lb/sq in.
Mod. of elasticity 1,600,000

Woods Meeting Design Conditions:

Douglas Fir, Coast Region, No. 1
Pine, Southern, No. 1

Spacing ▶	4'-0"			4'-6"			5'-0"			5'-6"			6'-0"			7'-0"			8'-0"			9'-0"			10'-0"		
Span ▼	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8'-0"	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	6x6	2-2x8	3x10	4x8	2-2x10	3x10	4x8	2-2x10
9'-0"	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10
10'-0"	3x8	6x6	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12
11'-0"	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x12	4x12	8x8	2-2x12	4x12	8x8	2-2x12
12'-0"	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x12	4x12	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x14
14'-0"	4x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x14	6x10	2-2x14	4x14	8x10	2-2x14	4x14	8x10	2-3x12
16'-0"	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	8x10	2-2x14	4x12	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-3x12	6x12	—	2-3x14	6x14	8x12	2-3x14
18'-0"	4x12	8x10	2-2x12	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-3x12	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x16
20'-0"	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x14	6x14	—	2-3x16	6x16	8x14	2-3x16	6x16	8x14	2-3x16

TABLE 12

Design Conditions:

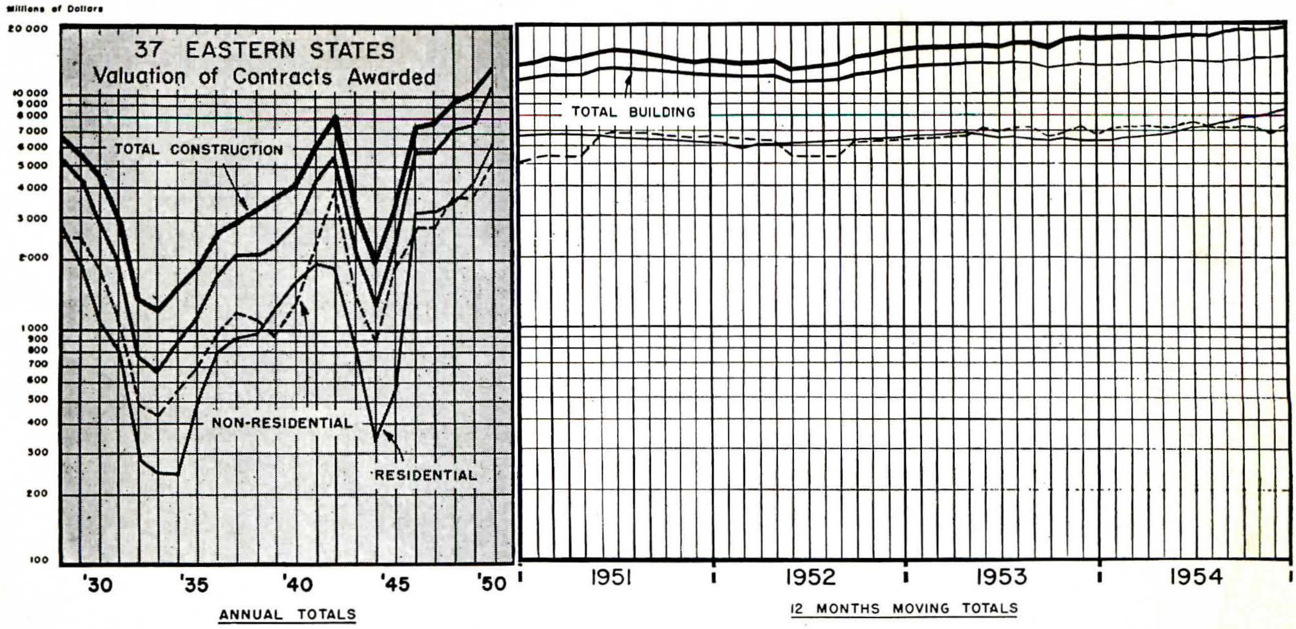
Live load 40 lb/sq ft
Dead load 10 lb/sq ft
Fiber stress 1700 lb/sq in.
Shear 145 lb/sq in.
Mod. of elasticity 1,600,000

Woods Meeting Design Conditions:

Pine, Southern, No. 1 Longleaf
Douglas Fir, Coast Region, 1700f No. 1 Dense

Spacing ▶	4'-0"			4'-6"			5'-0"			5'-6"			6'-0"			7'-0"			8'-0"			9'-0"			10'-0"		
Span ▼	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
8'-0"	3x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x6	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8
9'-0"	4x6	—	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	6x6	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10
10'-0"	3x8	6x6	2-2x8	3x8	—	2-2x8	3x8	—	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	6x8	2-2x10
11'-0"	3x10	4x8	2-2x8	3x10	4x8	2-2x8	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2-2x12
12'-0"	3x10	4x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	3x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12
14'-0"	4x10	6x8	2-2x10	4x10	8x8	2-2x10	4x10	8x8	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	8x10	2-2x14	4x14	8x10	2-2x14
16'-0"	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	6x10	2-2x12	4x12	8x10	2-2x12	4x12	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-3x12	6x14	8x12	2-3x14
18'-0"	4x12	8x10	2-2x12	4x14	8x10	2-2x14	4x14	8x10	2-2x14	4x14	6x12	2-2x14	4x14	6x12	2-2x14	4x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x14
20'-0"	4x14	6x12	2-2x14	4x14	6x12	2-2x14	4x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	8x12	2-3x14	6x14	—	2-3x14	6x14	—	2-3x16	6x16	8x14	2-3x16	6x16	8x14	2-3x16

CURRENT TRENDS IN CONSTRUCTION

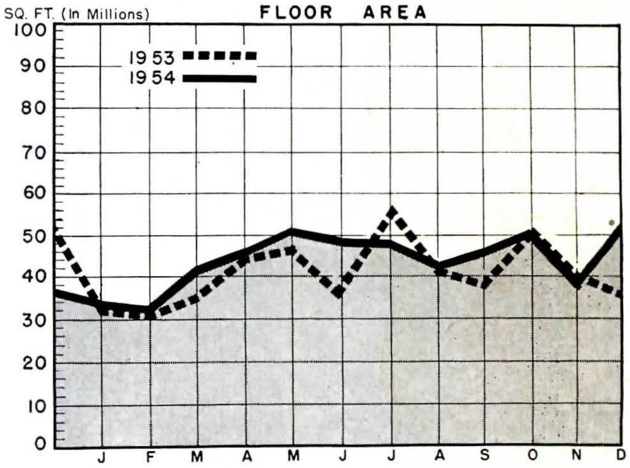


OUTLOOK STRONG AS RECORD GETS BIGGER

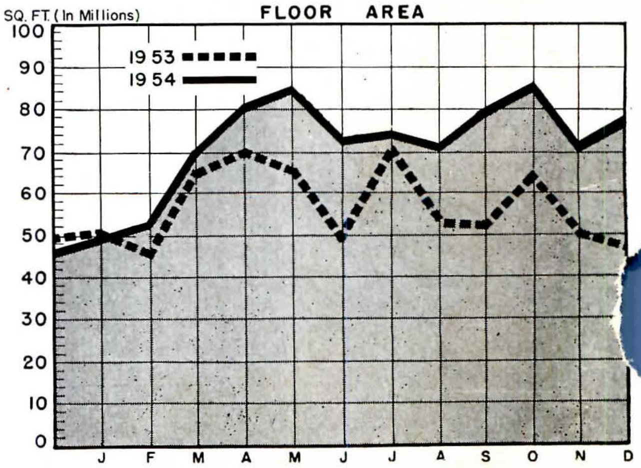
Charts by Dodge Statistical Research Service

EVEN GREATER STRENGTH THAN EXPECTED appeared sure to characterize early 1955 construction on the basis of F. W. Dodge Corporation's latest figures on construction contracts awarded in the 37 states east of the Rockies. A whopping December total of $1,828,837,000, 41 per cent over December 1953, brought the 1954 total — already an all-time high at the end of 11 months — to $19,770,207,000, up 13 per cent from the previous record set in 1953. The year showed gains over 1953 in each of the three basic Dodge categories: nonresidential construction, totaling $7,110,348, was up two per cent; residential, at $8,518,291,000, up 31 per cent; and public works and utilities, at $4,141,568,000, up three per cent.

NONRESIDENTIAL BUILDING (37 EASTERN STATES)



RESIDENTIAL BUILDING (37 EASTERN STATES)



Source: F. W. Dodge Corporation — Contracts Awarded

TOTAL BUILDING—1929 AND 1954 COMPARED

(In Millions of Dollars)

Region	Annual Total 1929	Annual Total 1954	Monthly Average 1929	Monthly Average 1954
37 Eastern States	4291.7	15,628.6	357.6	1302.4
New England	339.9	1,079.0	28.3	89.9
Metropolitan NY	1011.8	1,923.2	84.3	160.3
Upstate NY	147.8	459.0	12.3	38.2
Middle Atlantic	562.6	2,019.3	46.9	168.3
Southeastern	231.3	1,729.0	19.3	144.1
Pittsburgh-Cleveland-Cincinnati	460.2	2,067.2	38.3	172.3
Southern Mich.	265.5	1,010.0	22.1	84.2
Chicago	690.7	1,994.3	57.6	166.2
St. Louis	140.4	638.4	11.7	53.2
New Orleans	64.2	377.6	5.3	31.5
Minneapolis	62.3	450.3	5.2	37.5
Kansas City	167.9	794.6	14.0	66.2
Texas	147.1	1,086.7	12.3	90.6