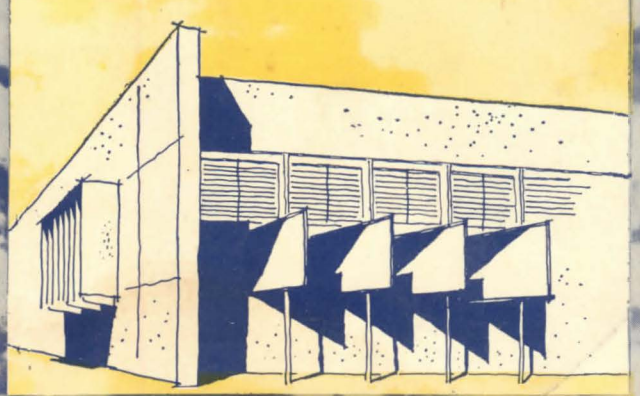
ARCHITECTURAL RECORD

AUGUST 1952



BUILDING IN THE TROPICS

BUILDING TYPES STUDY 18

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Rubbish ... collecting in the basement of a building, is like tinder in the bottom of a stove, waiting only for a spark to kindle it. Once started, flames and searing heat quickly travel upward through vents or hollow walls to break out on upper floors. Too late then to prevent ravage to property — or jeopardy to lives!

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Cover drawing by Tom Ballenger; cloud photograph by Edward Rinker from Black Star

INDEX TO ADVERTISING

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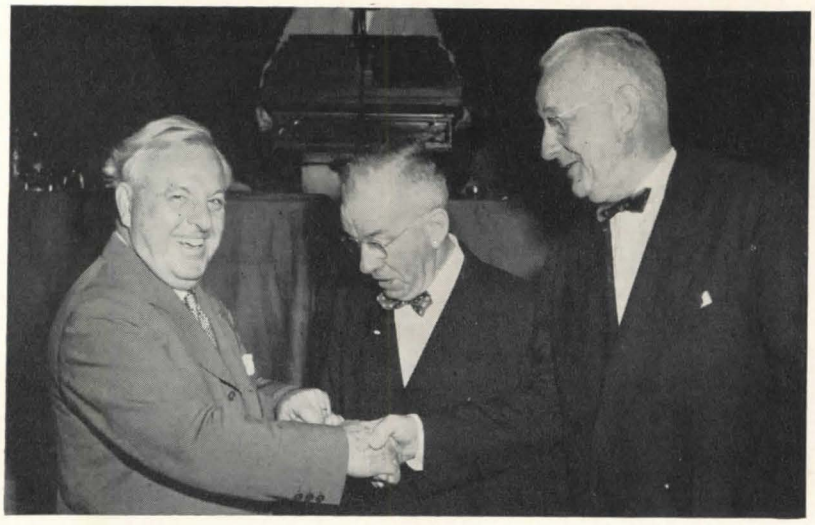
THE RECORD REPORTS

Honor Awards Program: pp. 12-14
More photos: pp. 204, 208, 212



CAREFREE NOW — A.I.A. Past Presidents Ralph Walker, New York; Raymond Ashton, Salt Lake City; and Douglas Orr, New Haven, spoke briefly at the closing session. Right: Hugh Ferriss, president of the New York Chapter, hosts for the convention, made the major convention address, "The Next Step in Design: A Synthesis of Technology and Vision"

All convention photos: Tommy Weber

84TH A.I.A. CONVENTION TAKES IN NEW YORK, BACKS BIG PUBLIC RELATIONS PROGRAM, REELECTS ALL OFFICERS

THE AMERICAN INSTITUTE of Architects' first New York convention in 27 years may go down in history as the hottest — but only because of the weather. Mercury and barometer did their worst June 24-27 and produced a series of sticky, sizzling days that probably make weather everybody's most vivid memory of the convention.

Nearly 2000 persons registered at the Waldorf-Astoria headquarters of the convention. In general they did more looking than listening this year; besides the A.I.A. Honor Awards Exhibit (see pages 12-14), the Building Products Exhibit, the "Reunion of Architecture and Engineering 1852–1952" exhibit at Lever House and countless others arranged throughout New York's five boroughs in cooperation with the A.I.A. convention committee, there were a total of 15 special tours planned to offer an "architect's-eye-view" of New York. All of the tours were swamped with applicants.

The business session of the convention managed to dispose of a large amount of business with a minimum of debate, and without acrimony. President Glenn L. Stanton of Portland, Ore., and the entire slate of officers were reelected, with Clair Ditchy of Detroit winning over Julian Berla of Washington as secretary in the only contest.

The convention voted to support the recommendation of a special committee headed by John Root of Chicago for a three-year comprehensive public relations program to cost $100,000; it also supported a strong resolution of protest at the growing encroachment of government design bureaus and building contracting groups offering architectural services as part of a "package bid."

(*Continued on page 310*)

SALUTE TO THE STAFF: President Glenn L. Stanton (at microphone) called members of the A.I.A. Washington staff to the rostrum to get some well-earned applause from the members they serve. Standing in the back row (left to right) are Executive Director Edmund Purves; Administrative Secretary J. Winfield Rankin; Frederick Gutheim, assistant to the executive director; Louise S. Miller, treasurer's office; Henry H. Saylor, editor of the Journal and Bulletin; Mrs. Florence Gervais, Membership and Records; Walter A. Taylor, director of education and research; Theodore Coe, technical secretary; Frederick A. Pawley, research secretary; George E. Pettengill, librarian. A.I.A. officers and directors at the speakers' table are joining in the applause

HONOR AWARDS AND

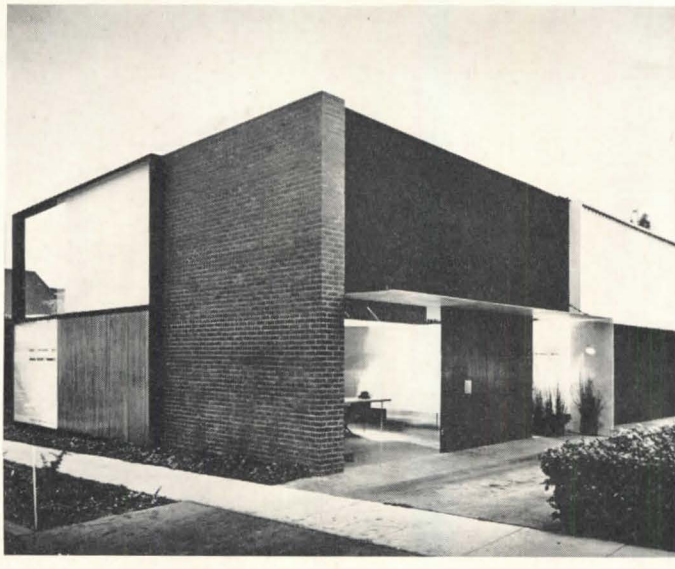
THREE BUILDINGS received Honor Awards and nine received Awards of Merit in the fourth annual Honor Awards Program of the American Institute of Architects, the first of the series to be open to buildings of all classifications.

Winners were selected by a committee headed by Albert F. Heino of Chicago, who announced the awards and presented certificates at the convention's opening session. The premiated exhibits and some others were on display at the Waldorf throughout the convention.

HONOR AWARD

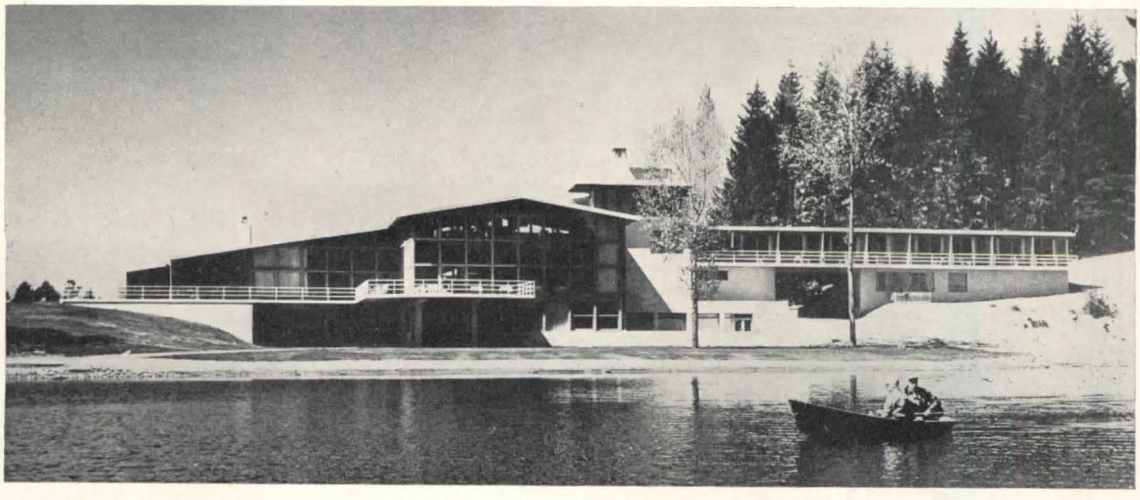
Lever House, New York City; Skidmore, Owings & Merrill, Architects

HONOR AWARD



Office of William Becket, Los Angeles; William Becket, Architect

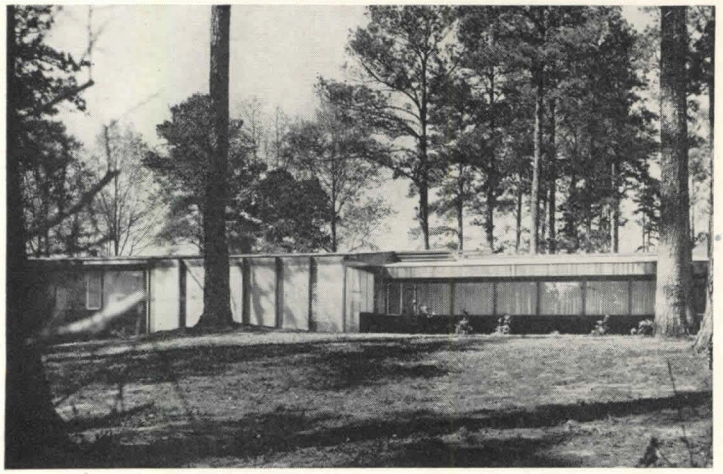
HONOR AWARD



Gaffney's Lake Wilderness, Maple Valley, Wash.; Young & Richardson, Carlston & Detlie, Architects

AWARDS OF MERIT

AWARD OF MERIT



Residence, Shreveport, La.; Richard J. Neutra, Architect

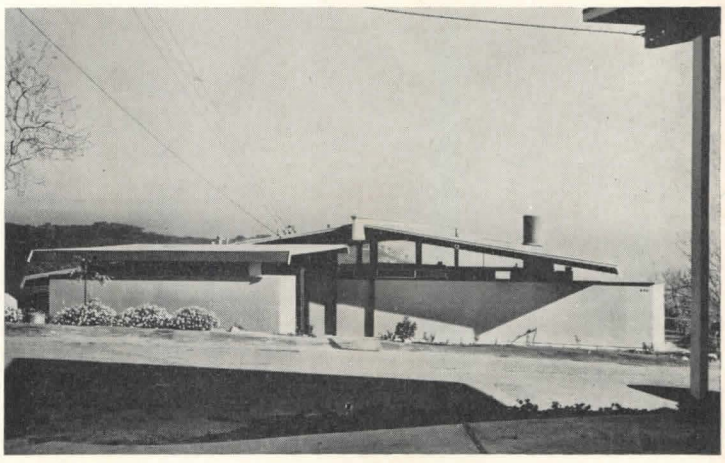
AWARD OF MERIT

Moritz Thomson Residence, Vina, Calif.; Mario Corbett Associates, Architects

AWARD OF MERIT

Residence of Mr. & Mrs. J. D. Hinds, Los Angeles, Calif.; Richard J. Neutra, Architect

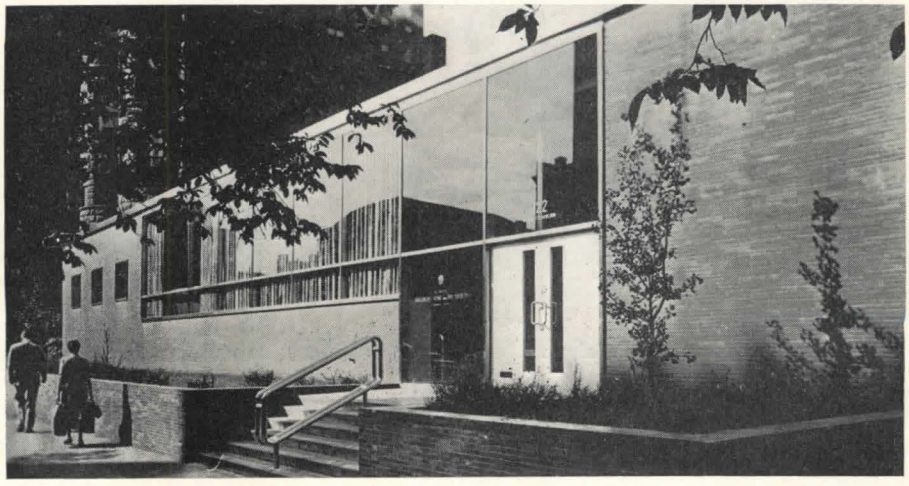
AWARD OF MERIT



500-house community (one unit above), Brentwood, Calif.; Whitney Smith, A. Quincy Jones, Edgardo Contini, Associated Architects, Engineers and Site Planners; Wayne R. Williams and James Charlton, Collaborative Architects

Photos of selected views from winning boards by Tommy Weber

AWARD OF MERIT



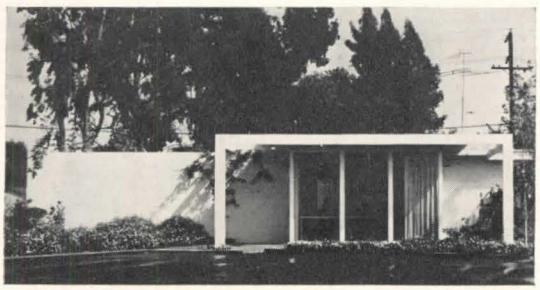
Illinois Children's Home & Aid Society, Chicago; Skidmore, Owings & Merrill, Architects

1952 A.I.A. CONVENTION

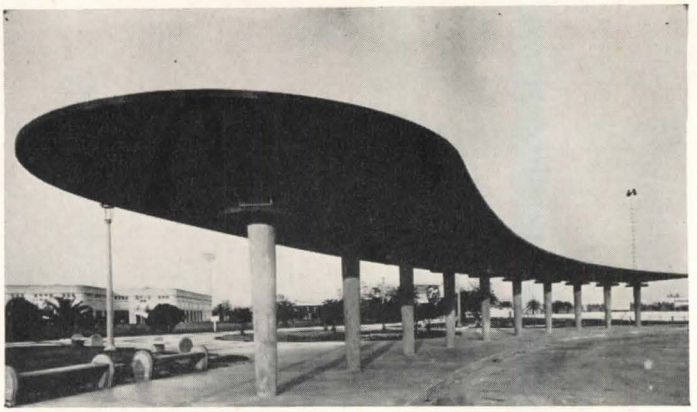
AWARD OF MERIT

Northwestern Insurance Office Building, Los Angeles; Richard J. Neutra, Architect

AWARD OF MERIT



Real Estate Office and Residence for Mr. and Mrs. John Baird, Los Alamitos, Calif.; Edward A. Killingsworth, Architect



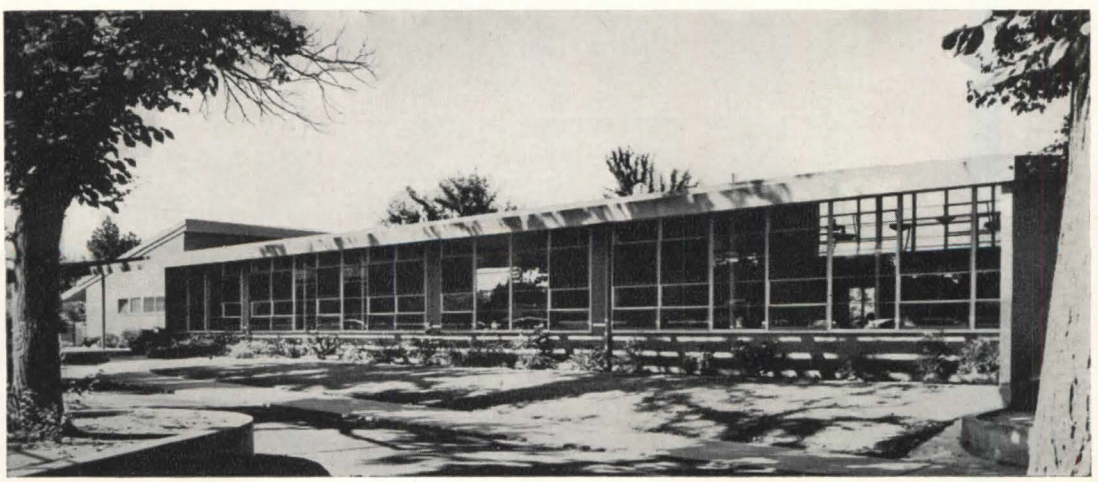
AWARD OF MERIT

Pontchartrain Beach Bus Shelter, New Orleans; Freret & Wolf, Architects

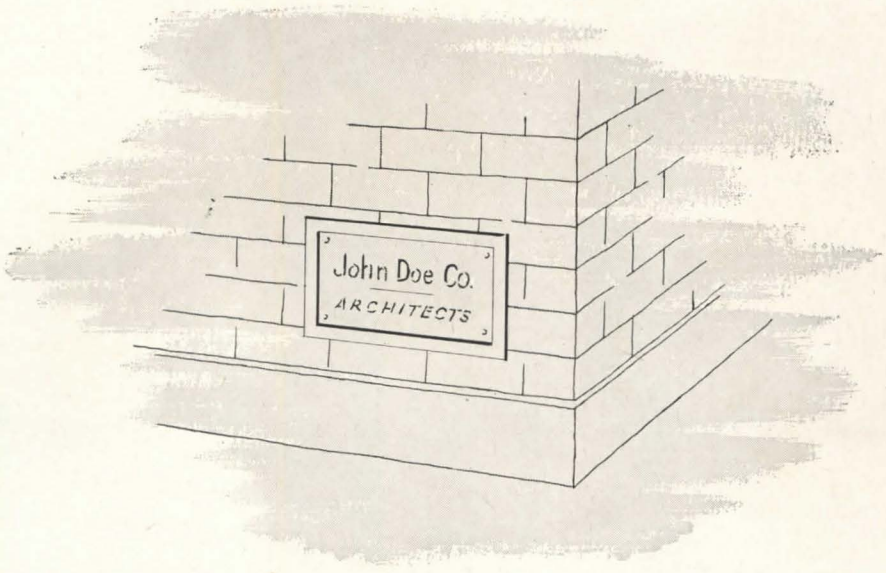
AWARD OF MERIT

Apartment House, 100 Memorial Drive, Cambridge, Mass.; William Hoskins Brown, Vernon DeMars, Robert Woods Kennedy, Carl Koch, Ralph Rapson, Architects

AWARD OF MERIT



Sunshine School (for cerebral palsy children), Fresno, Calif.; David Horn and Marshall Mortland, Architects



Is Destructive Condensation Jeopardizing Your Reputation?

SPECIFYING on a "take-it-for-granted" basis, some architects and builders, with their own hands, sow the seeds of destruction inside the walls of buildings they are so proud of.

A sturdy, frame house in Pennsylvania, for example, had to be moved. But it was found that the sills had rotted away. Ordinary insulation inside the walls, with asphalt rather than metallic vapor barriers, had promoted destructive condensation, causing rot and decay.

A large brick and steel apartment development in the suburbs; a huge housing project in a big city; each caused great expense to its sponsors when ordinary insulation inside walls produced condensation, causing peeling paint and crumbling plaster.

Protection of buildings as well as reputations is ensured by the use of non-condensation-forming, zero permeability, waterproof multiple accordion aluminum sheets, which are an exceptional barrier to heat flow.

Pre-fabricated forms of multiple accordion aluminum sheets are now available which automatically create four or six reflective air spaces.

The air spaces eliminate nearly all heat flow by CONDUCTION. The aluminum surfaces throw back 95% to 97% of heat flow by RADIATION. CONVECTION is blocked.

Further information may be found in standard reference manuals or in "Simplified Physics of Vapor and Thermal Insulation" by Alexander Schwartz. Copies may be obtained *free* by mailing the coupon below.

The commercial form of pre-fabricated multiple accordion aluminum insulation is Infra Type 6, 4, and 4 Jr.

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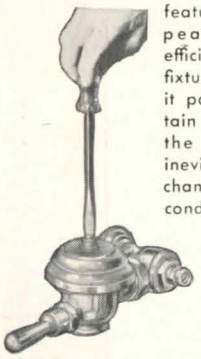

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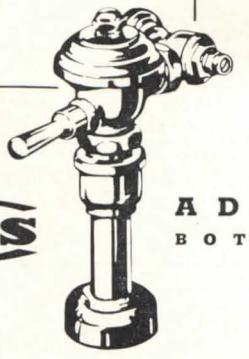

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CONSERVATION IN BUILDING: BRAB STUDY PRODUCES BROAD RECOMMENDATIONS FOR LONG-RANGE APPROACH

Final Report on Year's Research for DPA Provides Charter For Construction Industry Action; BRAB Contract Renewed

THE FINAL REPORT of the year-long Study of Conservation in Building Construction performed by the Building Research Advisory Board for the Defense Production Administration was made public at the end of June, almost simultaneously with publication of the report of the President's Materials Policy Commission (see page 18). It was a happy juxtaposition, because the Materials Commission's analysis of construction prospects for the next quarter-century provides the construction industry with the context it needs for evaluation of the BRAB recommendations.

More than 200 specific proposals aimed at conservation in building are contained in the BRAB report, and some of them will be hotly debated; but more striking and more significant than any of the individual recommendations is the breadth of approach to the subject developed in the preliminary stages of the study and the coordination of effort it produced so that the report has the effect of blazing the trail for the future research so urgently needed. It also gives new authority to the efforts of the many groups and individuals in the building field who have been pushing for enlightened building practices. It further honors one of the major purposes for which BRAB was founded: the correlation and stimulation of research in the building field.

The project started in July 1951 as an offshoot of the defense mobilization program; the idea was that a survey of government construction practices might yield useful information for conservation of then-critical materials. It soon developed into the much broader study of long-term conservation and its implications in terms of costs and manpower as well as materials and methods.

The report is divided into two parts, the first containing BRAB's own report and recommendations (11 of them) and the second containing the reports of eight Advisory Panels comprised of technical experts in each of eight major fields of building technology and practice. The BRAB recommendations are presented as an evaluation of the general principles developed by the whole study, including the panel reports; the panel reports present more specific suggestions and recommendations resulting from the panels' sifting of material developed by the BRAB staff. Names of advisers are listed in one appendix; data on existing Government standards and practices in another.

Two weeks after the report was submitted, DPA renewed its contract with BRAB for another year.

Conservation proposals contained in the report fall into four general categories, as BRAB points out:

1. Revisions of technical standards by technical bodies responsible for various standards.

2. Indications of research needed to produce criteria or technical advancements necessary for conservation.

3. Proposals as guides to the designer to attain conservation through economy and efficiency in practice.

4. Recommendations to the Government for conservation in Federal building construction.

BRAB recommends that conservation practices be based on the concept of lowest annual cost, to be modified only when limited supplies prevent use of materials which will give lowest annual cost.

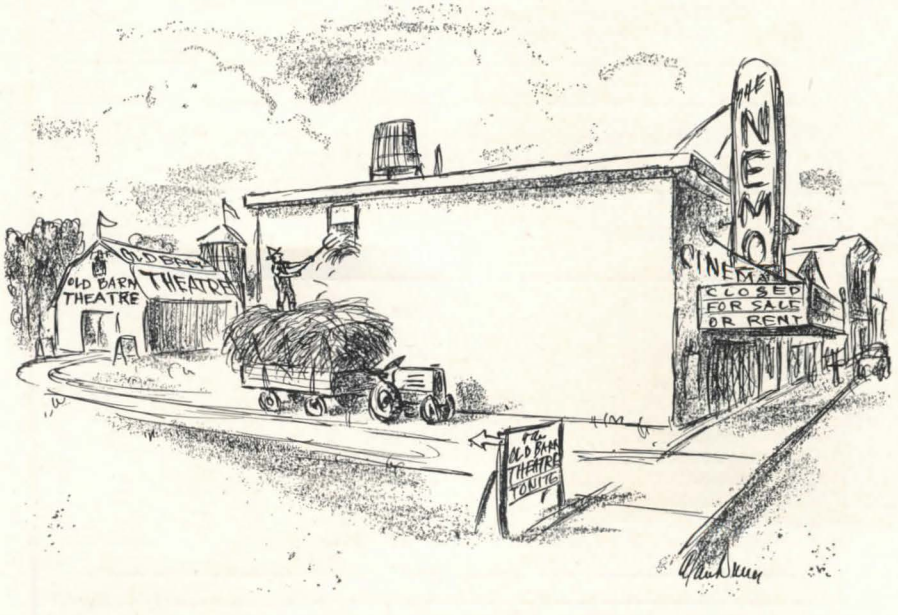
Ingenuity in design is recognized as one of the most important means of achieving conservation in building. The Advisory Panel on Space and Planning advises the government to throw out standard plans and replace them with improved programming of building requirements. The panel suggests that periodic opportunities should be created for "highly competent architects and engineers" to design with "the widest possible latitude for ingenuity, unrestricted by ordinary design standards."

Performance standards that allow and even encourage use of alternates are strongly recommended; BRAB makes a careful distinction between substitute materials and alternates which may be as good as or better than the conventional item.

BRAB also recommends establishment of some mechanism of collaboration among the various Federal construction agencies to encourage conservation of materials and costs; research funds for all agencies concerned with construction; government cooperation with organizations responsible for standards, specifications and codes recommended for uniform adoption in support of collaborative programs to make them more useful tools for conservation.

Modular coordination gets panel endorsement, together with a recommendation that it be required in any contract for federal buildings. BRAB and the panel reports alike emphasize the urgency of the need for cooperation of the design professions and maintenance of a high level of technical proficiency in all segments of the building industry.

Copies of the report are available at $3.50 from the Office of Technical Services, Department of Commerce, Washington, D. C.



—Drawn for the RECORD by Alan Dunn

PALEY REPORT: HOW MUCH WASTE CAN BUILDING AFFORD?

Construction Volume May Increase 35 Per Cent by 1970s if Industry Catches up with Technology, Commission Asserts

By Ernest Mickel

THE REPORT of the President's Materials Policy Commission (made in June) tells the building industry some things it has not wished to hear: that a great deal of waste in its use of materials is avoidable, that many obstacles stand in the way of rapid and widespread adaptation of better building methods, and that it is saddled with a multitude of restrictions, some of them self-imposed, which seriously impede desirable change.

These criticisms reiterate the building industry's own concern over "archaic" practices and frequent reluctance to accept proven superior materials. But the report also points up in bold terms the midcentury position of the industry in relation to rapid technological advances which may be coming far faster than they can be digested.

TABLE I.—*Past volume and estimated future requirements of building construction in the United States*

	Residence (million dwelling units)	Commercial (million square feet of floor space)	Industrial (million square feet of floor space)	Hospital (million beds)	Education (million desks)
1926–50 new construction	13.2	2,290	4,125	0.9	16
1950 new construction	1.4	130	129	[1].05	[1]1.0
1951–75 estimated new construction	35	4,200	7,400	1.4	20
1970's estimated annual new construction	1.6	220	375	.67	.88

[1] Estimated.

TABLE II.—*Past and projected annual construction value.*

[All building construction except engineering structures such as roads, dams and docks.]

	In billions of 1950 dollars
1970's (projected)	34.5
1950	25.5
1940–49 (average)	15.6
1930–39 (average)	11.4
1920–29 (average)	19.1
1915–19 (5-yr. average)	11.6

TABLE III.—*Selected materials consumed in construction, repairs, and maintenance of buildings in 1950*

Material	Unit	Quantity (millions)
Steel	Tons	11
Cast iron	do	3
Copper	do	.5
Lead	do	.2
Zinc	do	.2
Aluminum	do	.2
Asphalt products	do	4
Gypsum products	do	8
Clay products	do	20
Cement	do	20
Glass	do	1
Lumber	Board feet	25,000

All tables from the Report of the President's Materials Policy Commission

Building Made Prime Example

The Commission, headed by William S. Paley, chose construction as the outstanding example of the possibilities offered by study of materials use:

"Nowhere . . . are technological opportunities and barriers to their attainment better illustrated than in the building industry. The possibilities of new methods and new materials or new combinations of familiar materials are great. Many innovations have been thoroughly tested. They work; yet they have been put to relatively little use."

The report projects the materials situation a quarter of a century into the future. It predicts that construction volume (new public and private buildings and repair and maintenance of existing ones) in the 1970s may increase by 35 per cent over the 1950 level, excluding roads, dams and docks. If this proves out, the industry will be consuming some one third more materials in 1975 than it did in 1950.

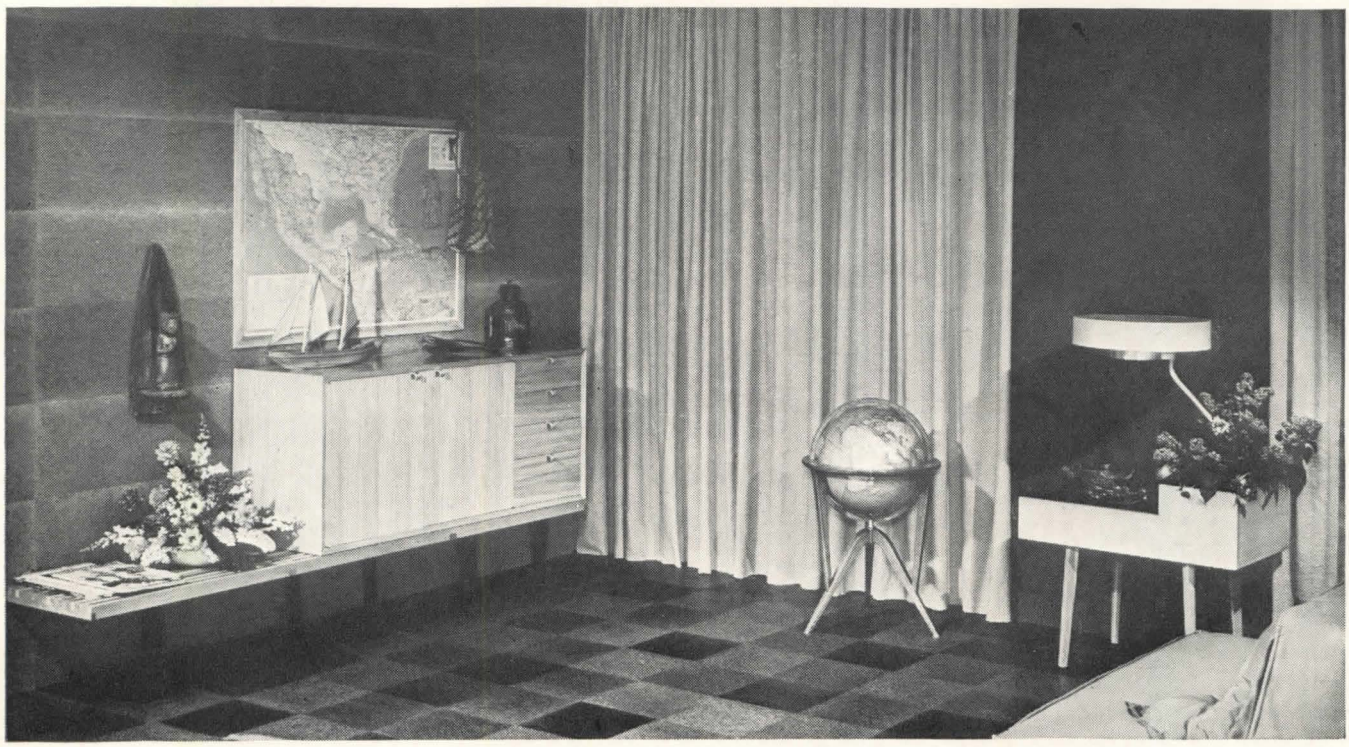
Needed: New "Materials Mix"

If the "materials mix" — the pattern of materials use — is not altered over the next 25 years, builders could find themselves in real trouble on the scarcer items, the Commission reported, warning that failure of the industry to shift away from tight materials to more abundant ones would intensify the materials problem of the entire nation.

The "Way Out": Technology

The Paley group views technology as a "way out" of this potential dilemma. Proven opportunities may reduce construction's demand for copper by over one half before 1975; the demand for

(*Continued on page 332*)



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One of a series of papers prepared by leading authorities on air conditioning. The opinions and methods presented are those of the author and are not necessarily endorsed by the Du Pont Company. Reprints of this, and other articles in the series, may be had free upon request.

AIR CONDITIONING HE MODERN APARTMENT HOUSE

by JAMES MONGITORE

JAMES MONGITORE *is in complete charge of design of the air conditioning, refrigeration, and mechanical systems for the well-known firm of Sullivan A. S. Patorno, Consulting Engineers. Among the more unusual jobs designed under his direction are the air conditioning systems for the International Business Machines Corporation's Electronic Calculator, and the Bahrein Petroleum Co., Ltd., Research and Development Laboratory in Bahrein Island off the coast of Saudi Arabia.*

AIR CONDITIONING in movie theaters and restaurants is now commonplace and taken for granted by the public. It is not surprising to find it in offices, stores, banks and other commercial buildings. But only recently have there been any signs of widespread application of comfort cooling to apartment buildings and modest houses. The tremendous demand for the individual room-type coolers installed in windows proves that the apartment tenant is seeking mechanical air-cooling service.

Modern air conditioning equipment permits the tenant to select his own temperature and air motion. He is no longer dependent on "cross ventilation" and on hopes for cooling breezes. The exclusion of dust and dirt by virtue of filtering equipment and closed windows is a real advantage to both owner and tenant. Redecoration requirements and cleaning chores for the housewife are reduced.

APARTMENT BUILDINGS PLANNED FOR AIR CONDITIONING—SOMETHING NEW

Until recently, apartment houses were seldom planned for air conditioning. Equipment to provide conditioned air had to be specially designed for the range of capacities required. Individual installation cost, therefore, was proportionately greater than it is today, when a variety of equipment types and sizes is available.

Our firm had the problem 15 years ago of air conditioning a 12-story apartment house. It was the first completely air conditioned apartment building in New York. We designed separate systems for each apartment. Each system consisted of a single continuous operating unit with chilled-water cooling coil, separate steam-heating coils, fan and motor, humidifier, filters, tenant-adjusted automatic controls, separate fresh-air inlets, and distribution supply and return ducts to each room, except kitchens and bathrooms. These received air supplies from the unit but were independently exhausted to outdoors. Chilled water or steam from equipment in the basement brought the air temperature to whatever was called for by the thermostat in each apartment. Two equipment rooms per floor were located along the corridor for convenience of servicing without disturbing tenants.

PERFORMANCE REQUIREMENTS OF APARTMENT AIR CONDITIONING

Objectives of air conditioning for apartments are the same as for any other space: the system should control temperature, humidity, cleanliness, odors and air movement, so that no discomfort is experienced. Many different arrangements of equipment could attain the above comfort objectives; but there is considerable variation in initial and operating costs; maintenance required; space occupied by equipment; pipes and ducts; flexibility of temperature control provided; noise level of the apparatus; and the effect on architectural design.

Both the size of the apartment house and the economic level of the tenants will determine to a great extent the type of system to be installed. In a large, multi-story, expensive apartment house designed for high rental, a central refrigeration system would be used, with individual room or apartment fan units. In a low garden-type apartment house, the self-contained (window-type) units could serve adequately.

Comfort air conditioning requirements for apartment houses must meet the varying needs of individual tenants. The tenant expects automatic temperature control geared to his own requirements, rather than standardized temperature conditions which would satisfy a group as a whole.

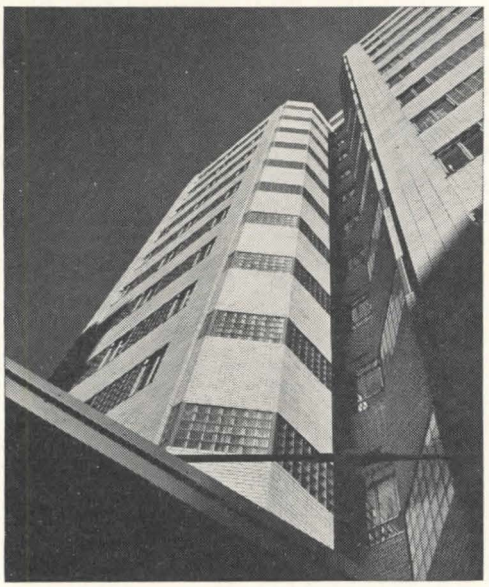
TYPES OF SYSTEMS AND RELATIVE MERITS

There are five major types of systems applicable to apartment buildings, each with its particular advantages.

1. Central refrigeration and heating with single unit for each apartment. Chilled water in summer, and hot water or steam in winter is delivered to the apartment conditioning units from a central plant. The outside air and return air are first filtered, then brought to desired temperature and finally distributed to each room through a duct system and registers. Return air is brought back to the central unit through a separate duct system and grilles from each room, except kitchens and bathrooms, which are mechanically exhausted to outdoors.

This system provides automatic temperature control in each apartment. Equipment is located in spaces accessible only to maintenance crews, and maintenance costs are lowest.

2. Central refrigeration with high-velocity induction units for each principal room. Fresh primary air is conditioned at a central point and is delivered at a high velocity through small ducts running up throughout the building to the individual room conditioners located along outside walls and under windows. The fast-moving primary air induces a flow of room air through the room conditioners. The air is drawn over coils, which are supplied with cooled water in summer and heated water in winter from a central plant. Unit includes filters.



New York City's first apartment house completely planned and engineered for air conditioning by the firm of which Mr. James Mongitore is a member.

In this system, each room can be separately controlled by a room thermostat. The high-velocity units require the installation of ducts and of water piping and drain connections. Maintenance costs may be higher than with the single-apartment-unit system.

3. Central refrigeration with a fan unit in each principal room. Fresh air may be supplied by a central plant or taken directly from outdoors through wall openings. Unit includes filters. The required temperature conditions are provided by chilled water in summer and hot water in winter, supplied from a central plant and passing through the unit coils. Space must be provided for the risers and for the individual units in each room, as well as power for the units.

4. Multiple or "Package Unit" refrigeration for each apartment (complete warm weather service, and winter ventilation only). One complete refrigeration and air handling unit for each apartment, with a duct system for the various rooms. This type unit filters and heats outside fresh air for winter ventilation.

Heavier power distribution system, and condenser water service and steam for winter ventilation is required. Apartment heating is by conventional system. Maintenance cost would be higher than previous schemes outlined. This scheme permits connection of refrigeration service on tenants' meters, and also completely shutting down unit if apartment is unoccupied.

5. Self-contained window units (warm-weather service only). Each conditioner is complete with compressor, cooling coil, fan, motor and filter. These units require power connections only; they may be located at exterior walls, so that the unit is cooled with outside air.

Maintenance may be more of a problem, but initial cost to the owners is reduced, since only power connections are needed, which can be provided during construction . . . with actual units installed at a later date, at the option of the tenant. This type of unit is popular for adding systems to existing buildings. However, appearance of outside air connections may be a consideration and installation in casement-type windows may require special handling.

The important points to remember in apartment air conditioning are:

1. Top-quality performance is expected of the equipment.
2. Individual controls should be provided to meet varying tenant requirements.
3. Maintenance costs should be given as much serious consideration as initial costs. Generally, the more decentralized the system, the more complicated the repair and servicing.
4. Bathroom and kitchen air should be exhausted to outdoors.
5. Air from one apartment should not be returned or recirculated to another apartment.

• • •

Today, air conditioning for apartment houses is increasingly recognized as a vital feature of apartment-house service. To meet the demands of tenants, architects and engineers are giving careful consideration to planning installations for air conditioning.

Whatever the type of air conditioning desired for an apartment house, the equipment used must meet the requirements of compactness, safety and economy. Prominent consulting engineers and architects agree that equipment operated with "Freon" refrigerants meets these requirements better than any other.

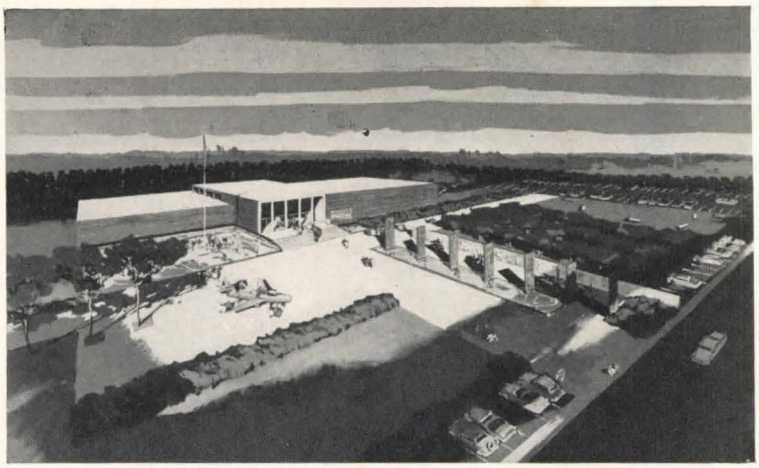
They know that "Freon" refrigerants are safe . . . nonflammable, nonexplosive, of low-order toxicity. They meet all building and safety-code requirements, such as B9.1 (ASA Standard). Manufactured under exacting standards of purity and uniformity, "Freon" Safe Refrigerants assure trouble-free operation of equipment over long periods of time. You can recommend "Freon"-charged equipment with full confidence for air conditioning systems of any type. E. I. du Pont de Nemours & Co. (Inc.), "Kinetic" Chemicals Div., Wilmington 98, Delaware.

EISENHOWER MUSEUM PLANNED FOR FOUR-ACRE SITE IN ABILENE

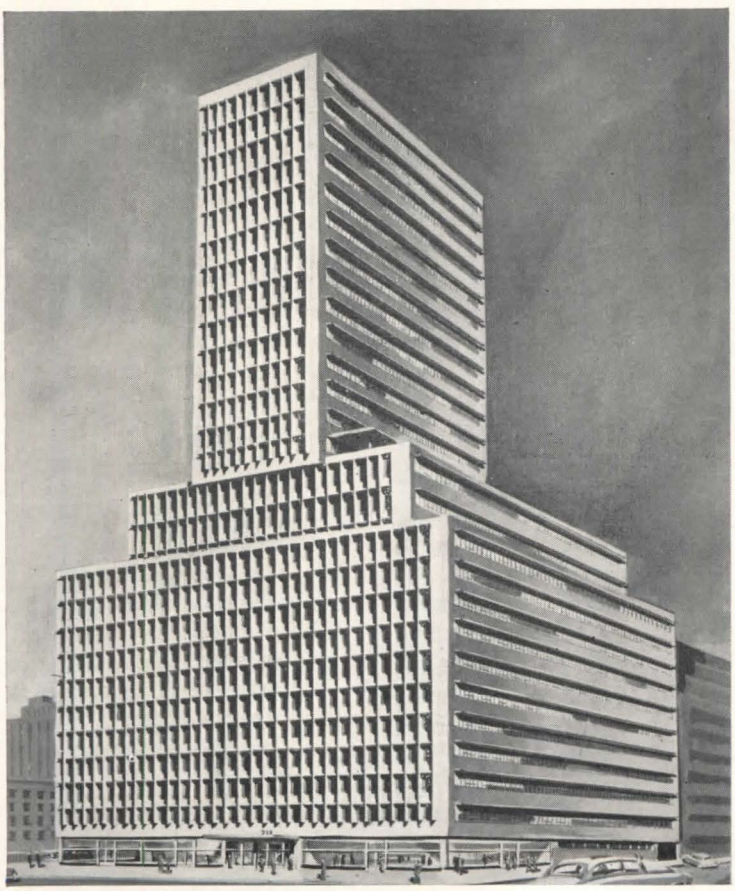
WIN OR LOSE in November, Dwight David Eisenhower is the inspiration of an architectural enterprise that is probably unique — the building of a museum intended to house the memorabilia of a living person and in effect dedicated to him.

The Eisenhower Memorial in Abilene, Kan., where the General spent his youth, has been officially — at Eisenhower's insistence — dedicated by the Foundation formed to sponsor it to the men and women of the armed forces; but the first unit, now under way, will be devoted solely to exhibit space for Eisenhower souvenirs. The second unit will add an auditorium and other facilities for civic and community events.

Murray and Clayton of Abilene are architects; Welton Becket of Los Angeles, supervisory architect.



The one-story building of native stone will stand on a four-acre site which includes the former Eisenhower home. Approaches will be elaborate



LESCAZE DESIGNS MANHATTAN SKYSCRAPER

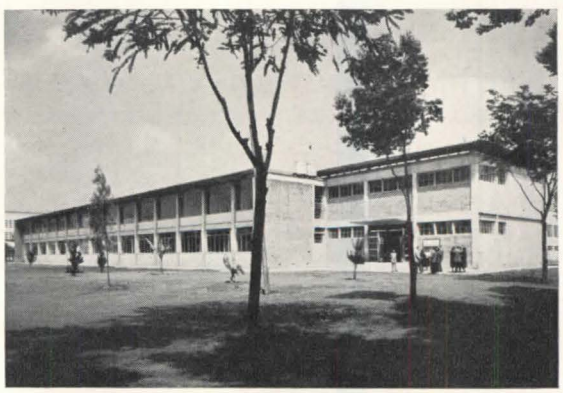
William Lescaze is architect for the 28-story office building to be built on the east side of Third Avenue between 44th and 45th streets for William Kaufman, builder, who has an 89-year lease from the William Astor estate trustees. "Built-in" shade will be provided by 3 ft 9 in.-wide vertical sunshades set at a 65-deg angle at each window on the west side and two-ft-wide horizontal hoods over windows on the south façade. Shades and hoods will be porcelain enamel. Exteriors may use color

OWN BUILDING PLANNED FOR HOUSING CENTER

THE INTER-AMERICAN housing research and Training Center, inaugurated this spring in Bogotá, Colombia, under the program of technical cooperation of the Organization of American States, will soon have its own new building.

The Center has been established for the present in one of the new Engineering School buildings of the National University of Colombia, but plans are under way to provide it with a large research laboratory equipped with every facility for testing building materials and construction methods.

Leonard J. Currie of The Architects Collaborative, Cambridge, Mass., heads the staff of the Center.



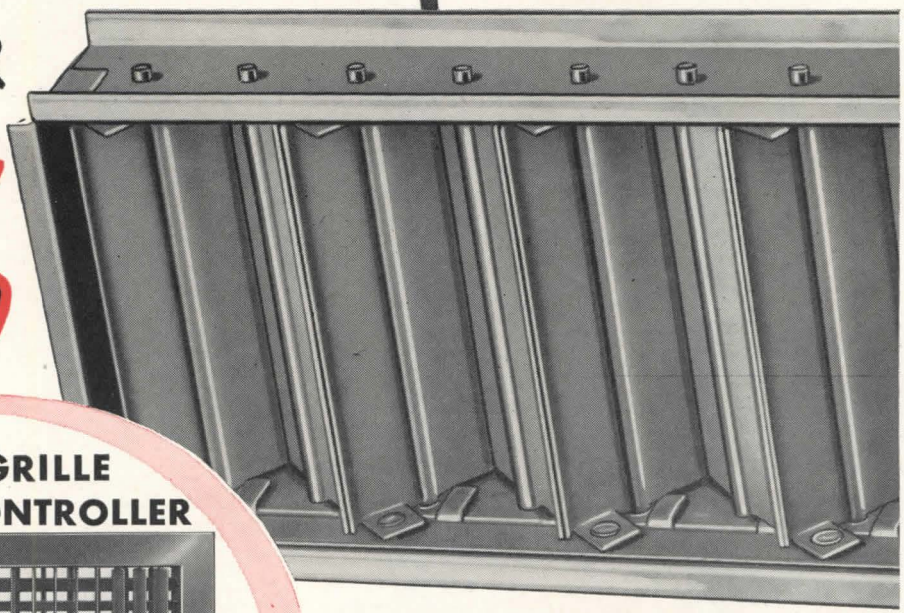
The Housing Center is temporarily occupying space in Colombia National University's new Engineering School building

AirFoil AG-35 VOLUME CONTROLLER

NEW... REDUCES ADJUSTMENT TIME and LABOR 90%

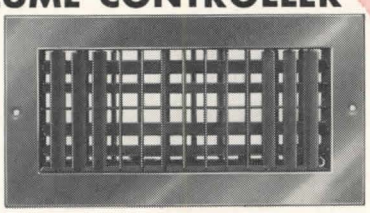
BALANCE SYSTEM WITHOUT REMOVING GRILLE

This means that plaster or paint is never damaged or smudged during balancing. Key-operator regulates air volume to hairline adjustment.

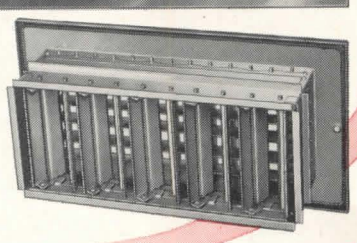


ONE-UNIT GRILLE and VOLUME CONTROLLER

COMBINE AG-35 with any AIRFOIL grille for complete one-unit handling.



PERFECT 4-WAY AIR CONTROL
Light weight—easy to handle—easy to install.



VOLUME CONTROL LOUVERS MOVE SIMULTANEOUSLY IN OPPOSITE DIRECTIONS—CLOSE TO ANY DEGREE DESIRED FROM FULL OPEN TO FULL CLOSED

Installers balance an air-conditioning system in *one-tenth the ordinary time* with amazing, new AIRFOIL AG-35.

There are no grilles to remove. *Workman's hands never touch grille or wall to leave dirty, expensive smudges.* Blades adjust faster—easier. Close more tightly.

Louvers do not close flat as in common styles using damper but *close at 45°*. This maintains a metering control down to the final moment of closure with a minimum disturbance of the air pattern.

Remember—there is *one unit to install—one unit to handle—one unit to purchase* when the air guide volume adjuster is combined with an AIRFOIL grille.

AIRFOIL Grilles are the most efficient ever designed. They are priced to enable you to use a superior product at lower cost. Get complete information at once.

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- ☐ Return air grilles and registers
- ☐ Volume controllers
- ☐ Perforated metal and ornamental grilles
- ☐ Door ventilators
- ☐ Special made-to-order grilles

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- ☐ RUSH information on AG-35
- ☐ Send complete catalog.
- ☐ Send literature on above checked items.

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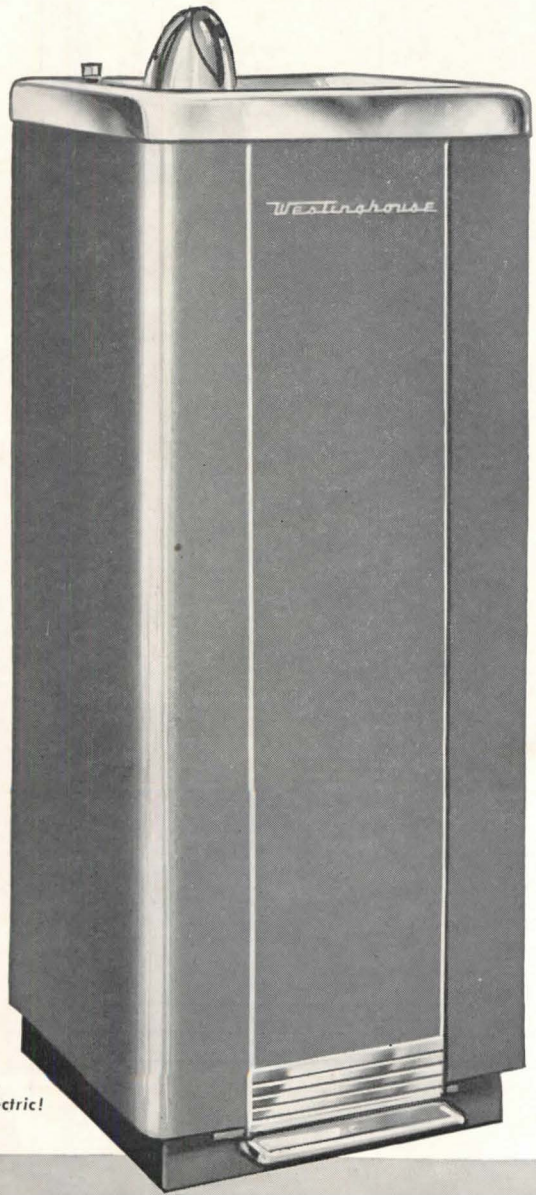
of Philadelphia, Pennsylvania
Moody & Hutchison, Mechanical Engineers

Neurological Building
Philadelphia General Hospital



course,
it's electric!

Our national need for greatly expanded medical facilities is being met by such new construction as The Department of Public Health Neurological Building of the Philadelphia General Hospital. Here, as in many other large hospitals, you'll find Westinghouse administering to the pure, cool drinking water needs of the patients, visitors and staff.

These Westinghouse Water Coolers (Model WW14A) meet all local and state building requirements as well as the architect's engineering specifications. They're easy to service and economical to operate. Like all models, they occupy only 14″ by 14″ of floor space. The blue-grey, baked-on enamel finish with stainless steel trim complements the modern interior design.

WW14A . . . 14-gallon capacity. Stainless steel top. Foot-pedal control. Automatic stream-height regulator. Anti-squirt bubbler. 11 other models are available with capacities from 1 gallon to 22½ gallons.

WB3
3-Gallon,
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WA4A
4-Gallon,
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7-Gallon,
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13-Gallon,
Water Cooled

Westinghouse Water Coolers are first choice in hospital installations throughout the country. They're known as the *Blue Chip Line of the Industry* . . . an endorsement established because of trouble-free service and their outstanding percentage of industry sales obtained in 1951 and continuing, this year, at an accelerated pace.

answers to your immediate water cooler needs are included in an Architect's Kit assembled by Westinghouse. It contains all needed specification material plus large-sized, readable and accurate engineer's drawings. It's yours for the asking. Just drop a card to the Advertising Department, Westinghouse Electric Corporation, 653 Page Boulevard, Springfield 2, Mass.

every engineering and construction precaution has been taken to make sure that Westinghouse Water Coolers live up to their reputation for long and economical performance. Every model includes the 5-Year Guarantee Plan on the *entire* Hermetically-Sealed Refrigeration System.

water cooler models by Westinghouse cover a full line in every capacity for every need . . . Bottle, Pressure, Compartment and Remote types for industrial plants, military installations, institutions, stores or buildings, large or small.

need assistance in determining your water cooler requirements? Westinghouse assures you of every possible assistance in the selection of water coolers that will meet the most exacting details of local codes or construction demand. For any construction now on your drawing board or contemplated for the future, you'll find it profitable to specify Westinghouse because . . .

YOU CAN BE SURE... IF IT'S Westinghouse

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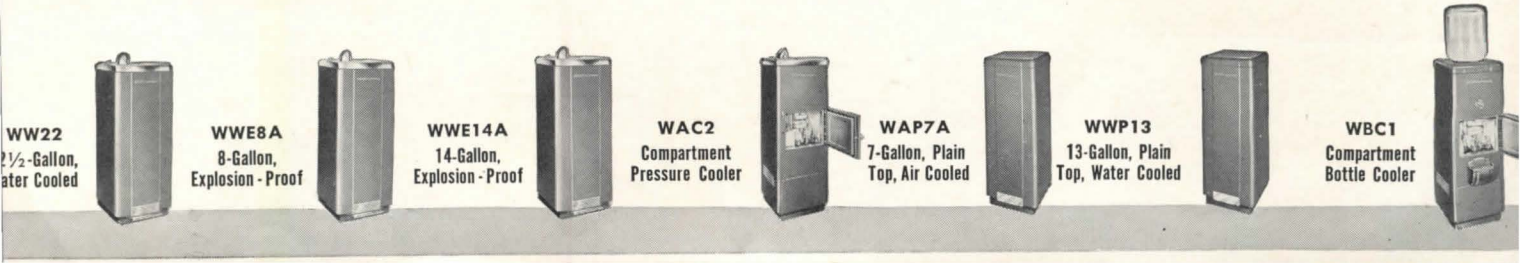
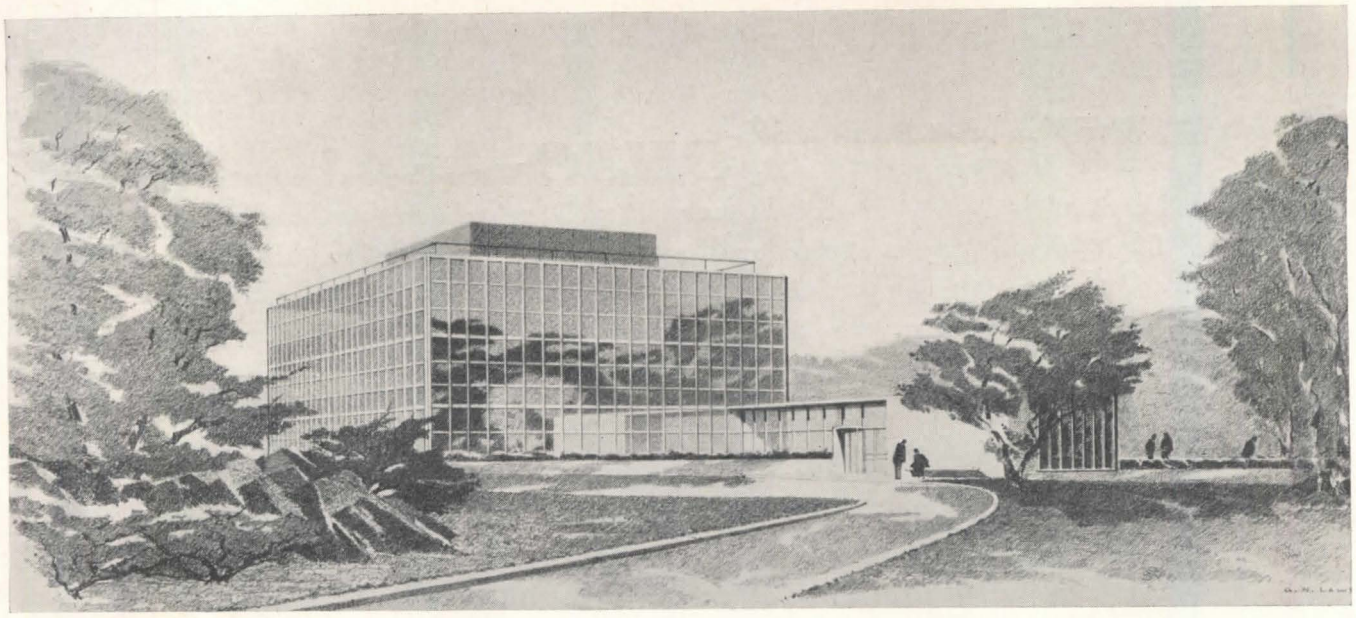




Architect's rendering of the new building which will replace present basement research facilities

NEW RESEARCH LABORATORY PLANNED FOR NEW YORK BOTANICAL GARDEN

A MILLION-DOLLAR RESEARCH laboratory of concrete, aluminum and glass, to be built on the city-owned site of the New York Botanical Garden in Bronx Park, New York City, has been planned for the Garden by Brown, Lawford and Forbes, New York architects.

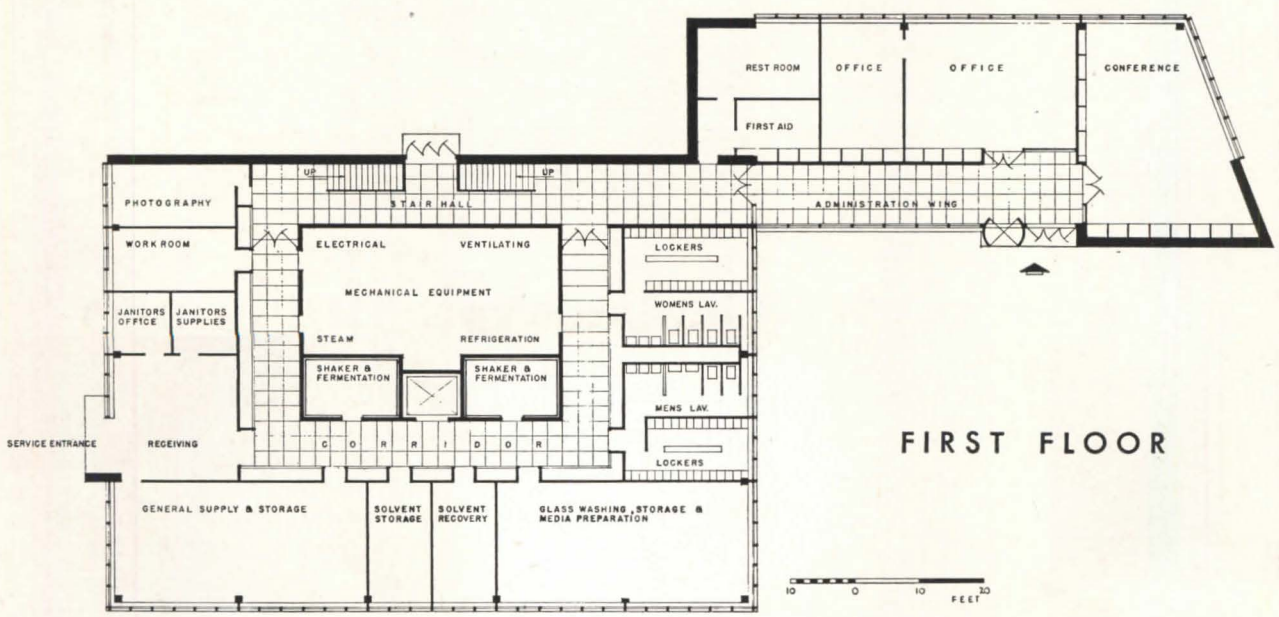
The new laboratory, which will replace the research facilities in the basement of the Garden's main building, has been for several years a project of Garden members, in large part in response to the widespread recognition of the need for basic scientific research in this country, which before World War II had looked to Europe in the botanical field as in other branches of science.

Announcement of definite plans was made after private contributions totaling $350,000 and a $150,000 allowance in the 1952 budget of the City of New York had put half the needed funds in sight. A campaign to raise the other $500,000 is now in progress.

The main part of the building is designed with a service core surrounded by laboratories, with the exterior on three sides consisting of a glass skin; the fourth side will be brick. Construction will be reinforced concrete.

The "core" will contain rooms for special instruments, rooms with controlled temperature, humidity and light and other rooms with special facilities.

All laboratory rooms will be provided with electricity, water, gas, high pressure steam, suction and compressed air; movable partitions of lightweight incombustible material faced with plywood will subdivide all laboratory space. Fixed interior partitions will be plastic-finished plastered terra cotta blocks.



FIRST FLOOR

"John, this building of mine holds a cost-cutting *Tip-Off* from ONE BUSINESSMAN TO ANOTHER"

"What is it?" asked John, a prominent appliance manufacturer.

The contractor answered, *"Simply this: don't take your fasteners for granted!*

"An RB&W man showed me how a switch in fasteners could help me make field connections much more economically.

"He suggested switching from rivets to high strength bolts. They cost more than rivets initially, but the assembled cost is much lower. My men work faster than with rivets. The building goes up faster."

You, too, can find a cost-cutting lesson from this story, whether you're in construction* or any other industry.

MORAL: Look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New inventions, like RB&W's SPIN-LOCK Screw, may prove more efficient than the fasteners you're now using. Or you may save by the stepped-up production you get from using the finest fasteners . . . RB&W bolts, screws, nuts and rivets of uniform accuracy, dependability and physical properties.

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*If you're interested in construction, write RB&W at Port Chester for a free reprint of the recent article, "No More Riveting."

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NEWS FROM CANADA *by John Caulfield Smith*

ARCHITECTURE IN PERSPECTIVE FOR TOMORROW: "UNASHAMED MODERNISTS" EXHIBIT IN TORONTO

MODELS OF 31 PROJECTS ranging from low-rent housing projects to golf clubs were presented as typical work of the students of the University of Toronto School of Architecture in an exhibit at the Robert Simpson Department Store in Toronto early this summer.

"Architecture in Perspective for Tomorrow" was the title of the exhibit, which provided an opportunity rare in Canada to assess the approach to building design of its future architects.

According to one of their professors of architectural design, Eric R. Arthur, the students are "unashamed modernists" who reflect "a growing humanity in architectural feeling" during the last two decades. Professor Arthur pointed for evidence of the humanistic approach to the projects chosen independently by advanced students — a convalescent hospital, a summer camp, a cultural center, a social center for a church, a war memorial social and recreational center, a low rental housing project and a Y.W.C.A. residence.

No "Reservoir for Cribbing"

As for their attitude toward history, "they don't use history as a reservoir for cribbing," said Professor Arthur, who insisted students today are no less interested in the history of architecture than their fathers but look on all periods of architecture as a reflection of the society that produced them.

Toronto makes no conscious effort to guide the students' thinking, according to Professor Arthur, but he pointed out that the very curriculum of the School of Architecture reveals the new philosophy, with courses in English, economics, modern history, public speaking and other subjects in the humanities placed prominently in the work of all classes.

Real Problems Chosen

Projects on view in the exhibit represented student solutions to actual problems, either existing or recently existing. In working on the problem, students consult with the "client" whose "approval" for their final solution they seek.

The complete list of the exhibits which follows testifies to the variety of problems included:

1. Student project, Elementary School, North York Township — Peter A. Allward, 4th year; 2. Design thesis, Canadian embassy for Norway — D. Geoffrey Armstrong, 5th year; 3. Design thesis,

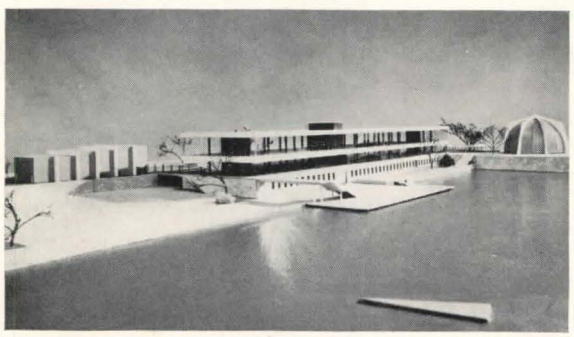
(*Continued on page 32*)

UNESCO Commission to Breuer

Marcel Breuer of New York has been selected as the architect to design the permanent headquarters of UNESCO in Paris, his office announces as this issue goes to press.

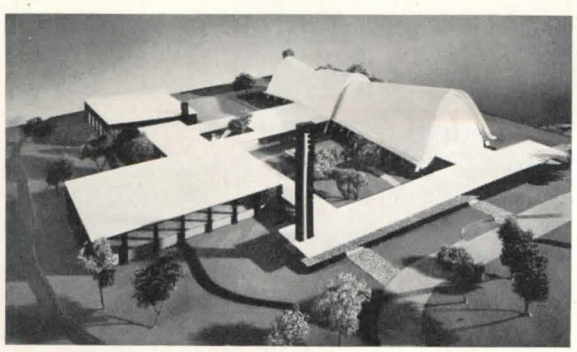
SOME OF THE STUDENT DESIGNS IN EXHIBIT

Panda



Model by Spencer M. Johnson for Boston Museum of Science, Charles River Basin site; dome is planetarium

Design by Norman W. Critchley for United Church, Noranda, Que.; gymnasium auditorium at right



Model by Kenneth Foster for Baptist Church, Bayview, Ont.

Model for Toronto bus terminal by John L. Blatherwick

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Memorial School, Hull, Mass.

Architects:
Edmund I. Leeds & Associates, Inc.

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HERE are three big reasons America's leading architects specify Samson Folding Chairs. They're low in cost, low in upkeep, long lasting!

Samson chairs are made of tubular steel of even heavier gauge than required by U. S. Bureau of Federal Supply specifications. They are electrically welded and cross-braced for extra strength. All metal is Bonderized, and the baked enamel finish resists chipping. Pittsburgh Testing Laboratory found that these chairs withstand metal finish tests actually in excess of Federal specifications!

Leading Users Of Samson Folding Chairs

Denver University, *Denver, Colorado;* Corning Glass Works, *Troy, New York;* Woodward & Lothrop, *Washington, D. C.;* Hotel San Carlos, *Pensacola, Florida;* Columbia Broadcasting System, Studio 21, *New York, New York;* St. Gregory's Church, *St. Louis, Missouri;* E. I. DuPont DeNemours & Co., *Wilmington, Delaware;* Matson Steamship Company, *San Francisco, California;* Kalamazoo State Hospital, *Kalamazoo, Michigan.*

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ARCHITECTS EVERYWHERE CHOOSE

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This is MOBILEX with Moulded Plastic Panels, one of three shielding elements available to provide a variety of pleasing patterns. Glass, Plastic and Louvered frames are interchangeable and hinge from either side to allow the most convenient arrangement for easy servicing.

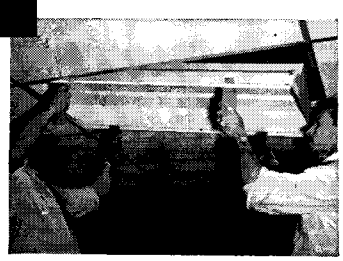
MOBILEX

BY DAY-BRITE

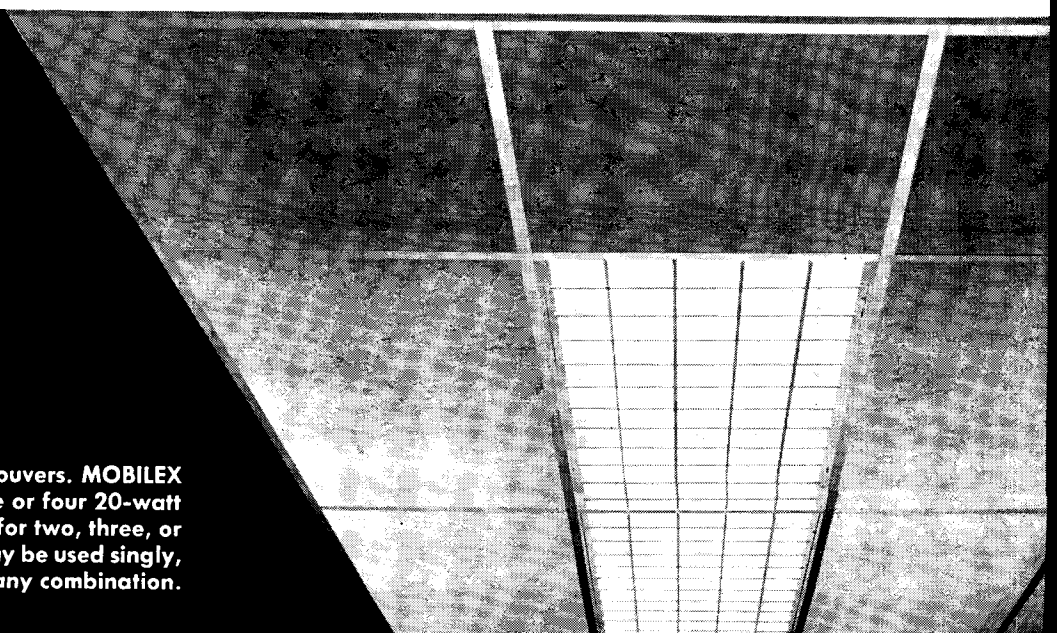
A NEW IDEA IN LIGHTING

MOBILEX introduces a new lighting tool to help you plan attractive, well-lighted, low-cost ceilings with a custom-designed look. This recessed lighting system is designed for use as an integral part of the newly developed grid-type suspended ceiling which consists of interlocking "tees" supporting Fiberglas* Ceiling Board. MOBILEX, in 2′ square and 2′x4′ modular units, gives you complete flexibility, high efficiency, is extremely easy to install and service.

**Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens-Corning Fiberglas Corp., Toledo, Ohio.*



Easy to install. Simply compress the sides of the fixture and insert into grid opening.



This is MOBILEX with Boxco® Louvers. MOBILEX is available in 2′ x 2′ units for two, three or four 20-watt fluorescent lamps and in 2′ x 4′ units for two, three, or four 40-watt fluorescent lamps. Units may be used singly, end to end, or side by side . . . and in any combination.

MOBILEX

GIVES YOU NEW LIGHTING FLEXIBILITY AND NEW OPPORTUNITY TO KEEP COSTS DOWN

Now you can dig into those tough remodeling jobs and new projects with low budgets and really come up with a client-pleasing answer!

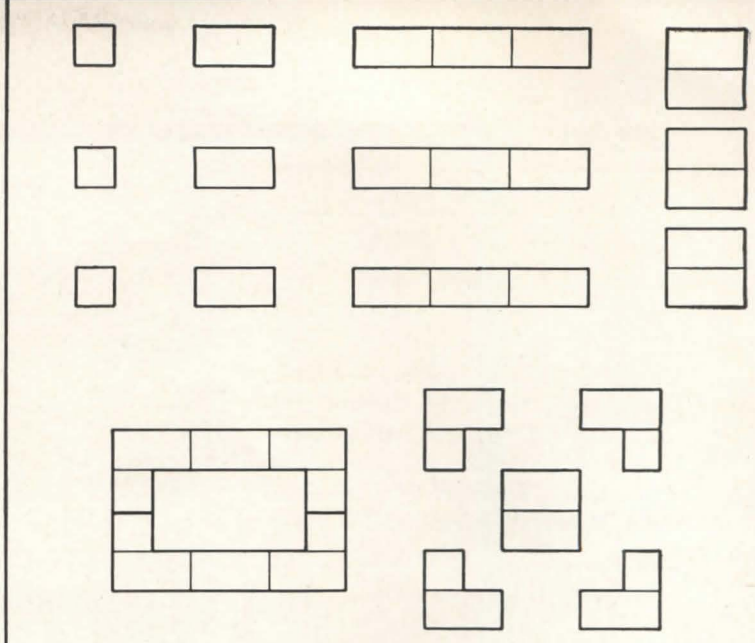
By combining MOBILEX and a grid-type suspended ceiling, you can plan beautifully lighted interiors that not only keep costs down and keep your clients happy, but satisfy your own sense of good design as well.

You can go to patterns of light, if you like . . . or continuous runs . . . or unit applications. MOBILEX flexibility gives your imagination room to roam! You can choose the intensity of light you need. You have a choice of plastic, glass or louvered shielding.

There's something else you can count on MOBILEX to do for you, too. Structurally, MOBILEX is built to *last* for a long, long time and to *perform* efficiently every day it's on the job.

Features like die-formed and welded steel construction . . . HOT-BONDED SUPER-WHITE enamel finish . . . RAPID-SMOOTH START ballasts on all 40-watt units . . . are just a few of the reasons you can recommend MOBILEX, *knowing that your client is getting the most for every lighting dollar he spends.*

Why not write for the complete MOBILEX story today?



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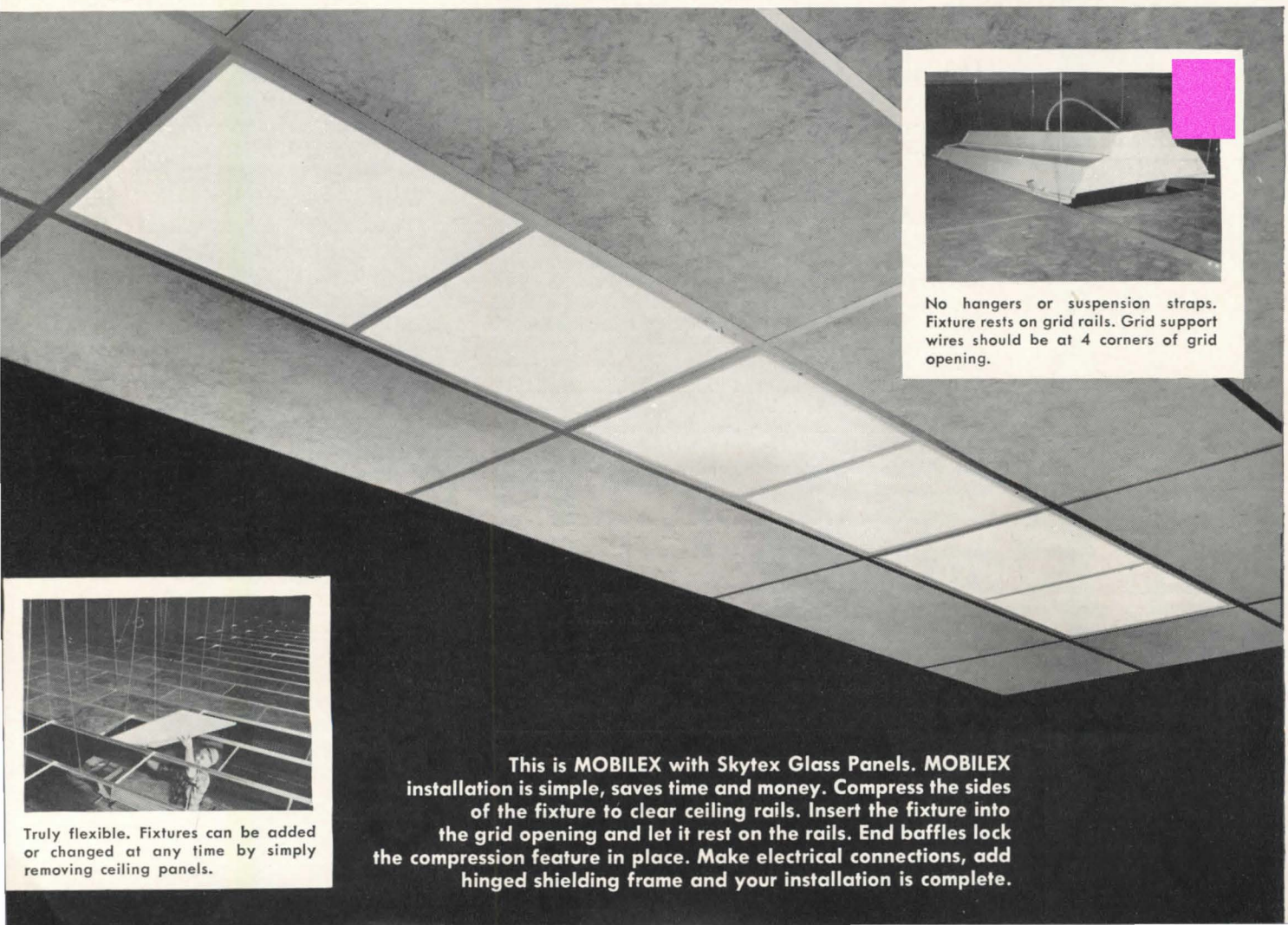


No hangers or suspension straps. Fixture rests on grid rails. Grid support wires should be at 4 corners of grid opening.

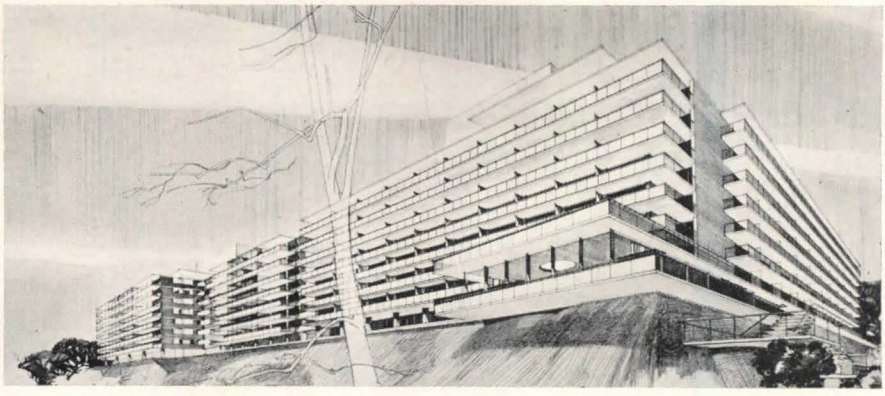
Truly flexible. Fixtures can be added or changed at any time by simply removing ceiling panels.

This is MOBILEX with Skytex Glass Panels. MOBILEX installation is simple, saves time and money. Compress the sides of the fixture to clear ceiling rails. Insert the fixture into the grid opening and let it rest on the rails. End baffles lock the compression feature in place. Make electrical connections, add hinged shielding frame and your installation is complete.

CANADA

(*Continued from page 28*)

Dundas Street Bus Terminal — John L. Blatherwick, 5th year; 4. Student project, a United Church, Noranda, Que. — Norman W. Critchley, 4th year; 5. Design thesis, Headquarters, National Color Photography Society, Toronto —



Benvenuto Apartments, six-story luxury-type apartments, will be built on a hill-top site commanding a view of the city of Toronto and the lake beyond. The building will provide 350 suites, a large restaurant, a coffee shop and a drug-store. Construction is reinforced concrete, exteriors yellow brick. Architects: Page and Steele, Toronto

D. Bruce Douglas, 5th year.

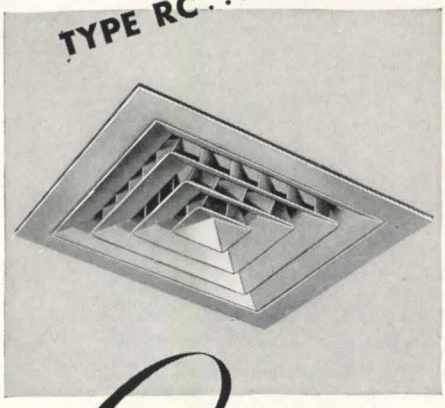
6. Design thesis, Baptist Church, Post Road, east of Bayview — Kenneth H. Foster, 5th year; 7. Design thesis, Golf Club, north of Toronto — Max Goldman, 5th year; 8. Student project, Resort Hotel, Muskoka District — Stanley F. Heinonen, 3rd year; 9. Design thesis, Canadian International Trade Fair Building — Darcy G. Helmer, 5th year; 10. Student project, Resort Hotel, Muskoka District — John W. Hoag, 3rd year.

11. Student project, the American Consulate, Toronto — Richard A. Holt, 4th year; 12. Design thesis, Boston Museum of Science — Spencer M. Johnson, 5th year; 13. Student project, Suburban House — Yusing Y. Jung, 2nd year; 14. Design thesis, the Royal Conservatory of Music — William C. Karleff, 5th year; 15. Student project, Convalescent Hospital, Toronto — Jack Klein, 4th year.

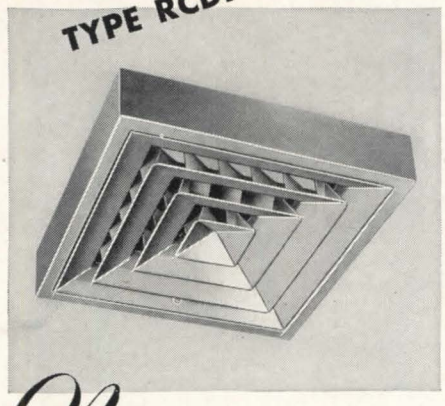
16. Student project, Presbyterian Church, Islington — J. B. Love, 4th year; 17. Design thesis, Summer Camp, Gull Lake, near Gravenhurst, Ont. — John Ma, 5th year; 18. Design thesis, Ontario College of Art — Norman D. Macdonald, 5th year; 19. Design thesis, Airport Administration Building, Toronto Island — I. Roy Matsui, 5th year; 20. Design thesis, Appleby College, Oakville — David M. G. Molesworth, 5th year.

(*Continued on page 34*)

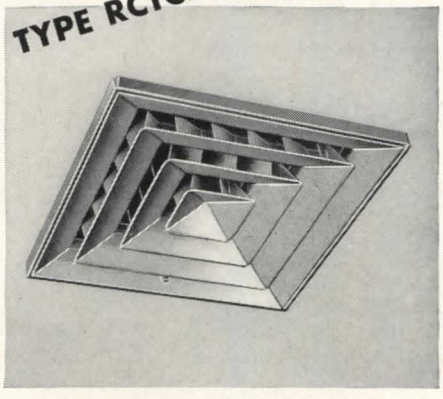
TYPE RC . . . For Standard Installations



TYPE RCDF . . . For Drop Frame Installations



TYPE RCTC. . .For Tile Ceilings



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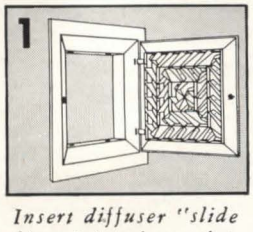
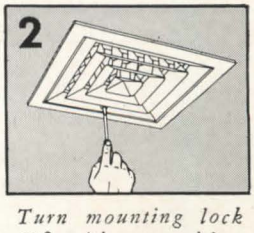
AGITAIR "RC" diffusers are available in a wide variety of sizes and patterns . . . easy and economical to install. For complete engineering and application data contact your nearest AGITAIR representative or write direct to Air Devices Inc.

1-2 YOU'RE THRU...



Insert diffuser "slide hinges" into frame slots



Turn mounting lock 90° with screw driver

WRITE FOR COMPLETE INFORMATION

AIR DEVICES INC.

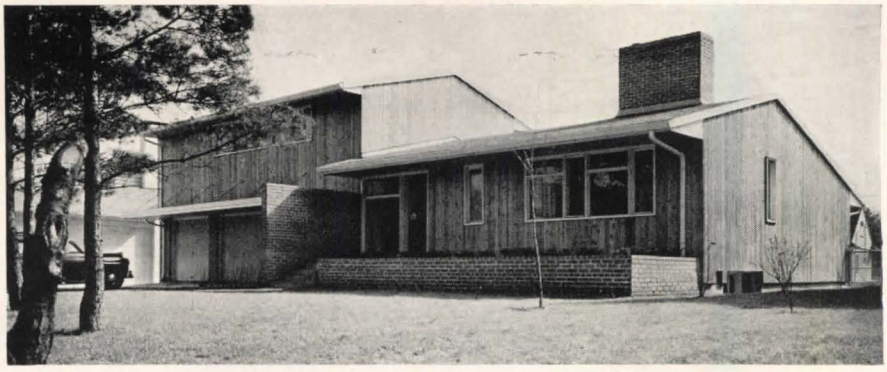
17 EAST 42nd STREET • NEW YORK 17, N. Y.

AIR DIFFUSERS • AIR AND GREASE FILTERS • EXHAUSTERS

CANADA

(*Continued from page 32*)

21. Design thesis, Finnish Cultural Center, Sudbury — Jules P. Paivio, 5th year; 22. Student project, Social Center for Existing Church, Toronto — David G. Powrie, 4th year; 23. Student project — Suburban House, Toronto — Uno Prii, 2nd year; 24. Design thesis, Thames Valley Golf Club, London, Ont. — William W. Rankin, 5th year; 25. Student project, Joint Services Officers' Mess, Vancouver, B. C. — Julian A. Rutherford, 4th year.



E. C. S. Cox, Toronto, Ont., was architect for the Bronskill house at Toronto

26. Student project, St. Casimer's Polish Roman Catholic Church, Toronto — William Saccoccio, 4th year; 27. Design thesis, Suburban House — John N. Shaw, 2nd year; 28. Design thesis, Jewish War Memorial Center, Toronto — Norman R. Stone, 5th year; 29. Student project, Y.W.C.A. Residence, Toronto — Elmar Tampold, 4th year; 30. Design thesis, Regent Park Low Rental Housing Project — Albert P. Tilbe, 5th year; 31. Student project, Motor Hotel, Toronto — Frederick A. Wallis, 4th year.

Construction Awards Dip; 5 Months Off $95.1 Million

The latest figures from MacLean Building Reports Ltd., through May 1952, show a total of $700.8 million in construction contract awards for the first five months of 1952, $95.1 million below the figure for the first five months of 1951.

Only industrial and engineering projects showed gains over last year during this period; these two categories were up $5.6 million and $8.8 million respectively.

Residential construction was off $9.4 million in May compared with May 1951; commercial, $21.3 million.

New Nickel Town Planned

International Nickel Company of Canada Ltd. has announced plans to build a new $1.2 million housing project at Levack, Ont., 30 miles west of Sudbury.

The project will consist of 85 houses, a school, streets, water and sewerage systems and a three-sheet curling rink.

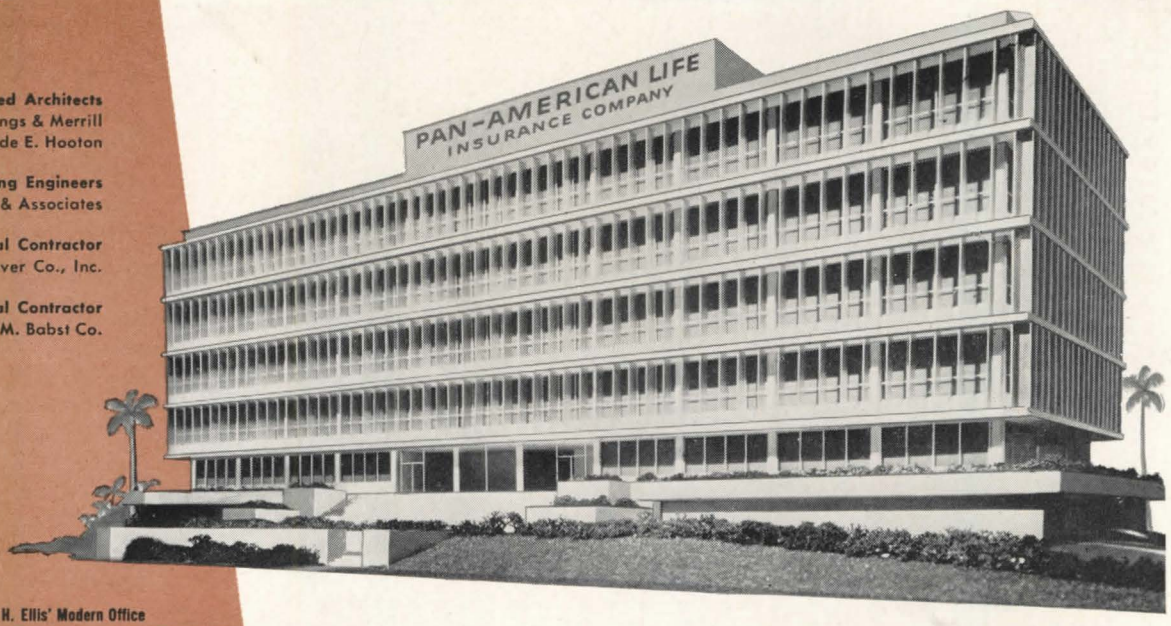
(*Continued on page 36*)

Associated Architects
Skidmore, Owings & Merrill
Claude E. Hooton

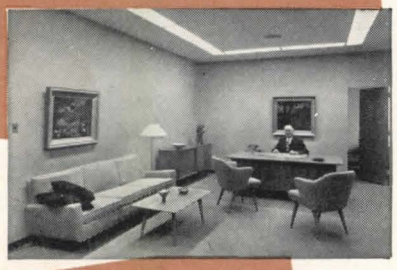
Consulting Engineers
Cary B. Gamble & Associates

General Contractor
George J. Glover Co., Inc.

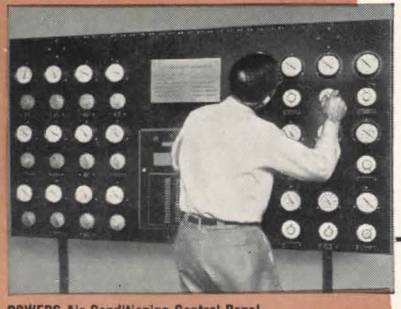
Mechanical Contractor
Emile M. Babst Co.



President Crawford H. Ellis' Modern Office



Typical Clerical Space



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(a82)

POWERS CONTROL

THE RECORD REPORTS

CANADA

(*Continued from page 34*)

Ontario Architects Stress Need for School Playgrounds

Ontario architects have called for school sites spacious enough to provide proper play facilities for children for the 300-odd new schools or additions which will be built in Ontario during the next four years.

President Earle L. Sheppard of the Ontario Association of Architects has pointed out that not one of the 87 public schools or the 16 secondary and technical schools in Toronto has a play area large enough to meet provincial recommendations. Niagara Street Public School, at the bottom of the list, provides only 26 sq ft of yard per pupil, whereas provincial authorities suggest a minimum of 342 sq ft. (The Niagara Street school is in a highly congested area.)

Not only Toronto but all Ontario cities and towns must realize that accidents are likely to multiply with increases in child population and motor vehicle registration, Mr. Sheppard warned, asserting that the solution lies in supervised play areas in existing and new school grounds.

Two Construction Shows Score Success in Toronto

About 40,000 people attended the third National Home Show held this Spring in the Horticultural Building at Exhibition Park in Toronto.

A combined trade-consumer exhibition, the show was sponsored by the Toronto Metropolitan Home Builders' Association under the managership of Grant Smedor. Plans have already been made to secure larger quarters, possibly the Automotive Building, next year.

Closely following the Home Show came the first construction show held in conjunction with the Canadian International Trade Fair in Exhibition Park. Over-all area occupied was about 50,000 sq ft, of which 30,000 was outside.

A giant 112-ton excavator — largest item of equipment ever displayed at the Fair — and other big machines chewed the earth and went through their paces in a reserved space near the Coliseum.

Canada led off the list of exhibitors, with the United States next, followed by Britain, Sweden, Italy and Germany.

By Ernest Mickel

MILITARY CONSTRUCTION FUNDS FOR FISCAL 1953

	Appropriation	Authorization	Carryover from 1952
Total	$2,286,764,840	$2,398,282,800	$2,716,000,000
Army	585,510,000	320,492,800	898,000,000
Navy	361,254,840	255,735,000	318,000,000
Air Force	1,200,000,000	1,813,360,000	1,500,000,000

CIVILIAN HEAD PROVIDED FOR MILITARY BUILDING

PLANNING AND CONSTRUCTION by all military services will be supervised by a civilian Director of Installations when a Senate amendment attached to the year's final authorization bill is put into effect.

The new post will be in the office of the Secretary of Defense. The intention of the Senate was not to create another large agency, but to provide a civilian group consisting of a very small number of persons having construction know-how to keep the Department of Defense better advised on military construction matters.

The Department of Defense showed no inclination to move with undue haste in making the appointment.

MILITARY CONSTRUCTION IS GIVEN $2.3 BILLION

IN THE LAST BILL passed by the second session of the Eighty-Second Congress, $2,286,764,840 was appropriated for military public works construction around the world.

The appropriation, which provided additional funds of $585,510,000 for the Army, $361,254,840 for the Navy, and $1.2 billion for the Air Force, told less than half the story for the current fiscal year, however: the three services have unobligated carry-over funds in their construction treasuries amounting in the aggregate to more than the total new appropriation (see table).

Barracks Program Cut

The major portion of the barracks construction plan was deleted by Congress in the authorization bill. All reference to "troop housing" was removed except in a few cases of proven need.

Applying a "new formula" (new series of cost ceilings) to the housing portion of the measure, Congress reduced the unit cost of troop housing from $2000 per man for permanent-type barracks to $1700, and from $1900 per man for temporary types, to $1400. The original unit price of bachelor quarters for officers was dropped from $6000 per man to $5000.

Still another cut was made in the cost of warehousing. The original bill allowed a budget of $7.50 per sq ft for permanent-type warehousing. This was reduced to $6.

(*Continued on page 284*)

OFFICE, PLANT AND LABORATORIES
WHITE LABORATORIES, INC.
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Consulting Engineer:
A. M. Kinney, Inc., Cincinnati, Ohio
Contractor:
Frank A. McBride Co., Paterson, N. J. and
New York, N. Y.

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- No. 494—Cooling Towers
- No. KT-1—Cooling Towers
- No. 491—Evaporative Condensers
- No. 47A—Finned Coils
- No. HV-1—Heating and Ventilating Units
- No. MZ-1—Multi-Zone Air Conditioning Blower Units
- No. SC-1—Sprayed Coil Dehumidifiers

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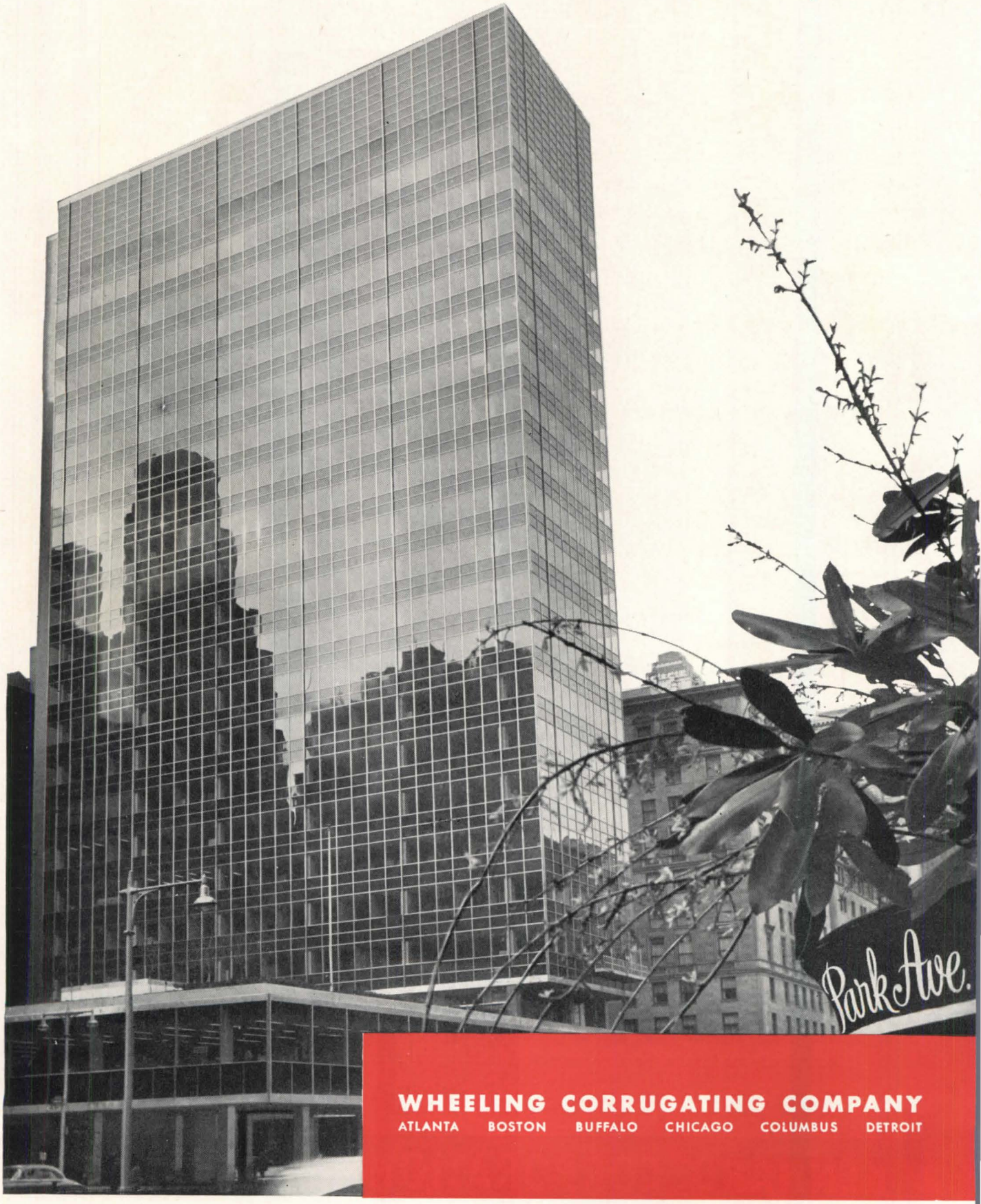

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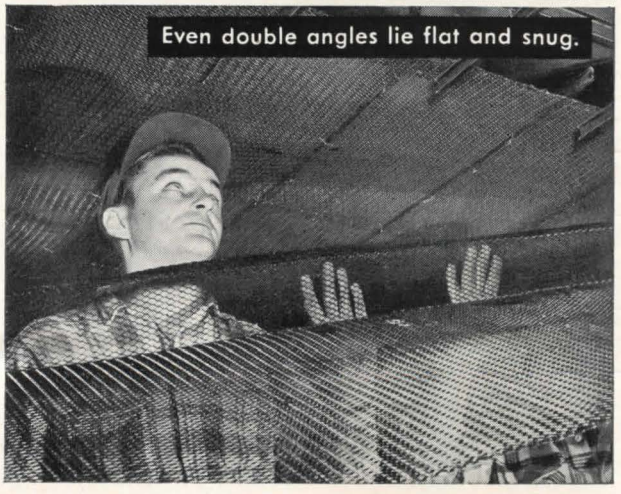
On all plastered surfaces, Wheeling Metal Lath and Lath Accessories assure a lasting base. Wherever lathers use Wheeling Metal Lath, they find it always a *better* start for the *best* finish!

The Wheeling line of building materials includes: Steelcrete Reinforcing Mesh, Expanded Metal, Metal Lath and Metal Lath Accessories, Tri-Rib Steel Roof Deck, ExM Angle Frame Partitions, and Steelcrete Vault Reinforcing.

Metal Lathing Contractor, Jeremiah Burns, Inc. Metal Lath furnished by Universal Builders Supply Co., Inc. General Contractors, George A. Fuller Co.



Wheeling
CORRUGATING COMPANY

BUILDING MATERIAL DIVISION • WHEELING, WEST VIRGINIA

KANSAS CITY LOUISVILLE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA RICHMOND ST. LOUIS

CONSTRUCTION COST INDEXES

Labor and Materials

United States average 1926–1929 = 100

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

NEW YORK

Period	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel
1925	121.5	122.8	111.4	113.3	110.3
1930	127.0	126.7	124.1	128.0	123.6
1935	93.8	91.3	104.7	108.5	105.5
1939	123.5	122.4	130.7	133.4	130.1
1940	126.3	125.1	132.2	135.1	131.4
1946	181.8	182.4	177.2	179.0	174.8
1947	219.3	222.0	207.6	207.5	203.8
1948	250.1	251.6	239.4	242.2	235.6
1949	243.7	240.8	242.8	246.4	240.0
1950	256.2	254.5	249.5	251.5	248.0
1951	273.2	271.3	263.7	265.2	262.2
Mar. 1952	277.2	273.7	269.9	274.0	270.1
Apr. 1952	277.2	273.7	269.9	274.0	270.1
May 1952	277.5	274.0	270.1	273.5	270.0
	% increase over 1939				
May 1952	**124.7**	**123.9**	**106.7**	**105.0**	**107.5**

ATLANTA

Period	Residential Brick	Residential Frame	Apts., Hotels Office Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Concr.	Commercial and Factory Bldgs. Brick and Steel
1925	86.4	85.0	88.6	92.5	83.4
1930	82.1	80.9	84.5	86.1	83.6
1935	72.3	67.9	84.0	87.1	85.1
1939	86.3	83.1	95.1	97.4	94.7
1940	91.0	89.0	96.9	98.5	97.5
1946	148.1	149.2	136.8	136.4	135.1
1947	180.4	184.0	158.1	157.1	158.0
1948	199.2	202.5	178.8	178.8	178.8
1949	189.3	189.9	180.6	180.8	177.5
1950	194.3	196.2	185.4	183.7	185.0
1951	212.8	214.6	204.2	202.8	205.0
Mar. 1952	217.8	220.1	210.5	207.7	211.1
Apr. 1952	217.8	220.1	210.5	207.7	211.1
May 1952	218.1	220.3	211.3	208.6	212.5
	% increase over 1939				
May 1952	**152.7**	**165.1**	**122.2**	**114.2**	**124.4**

ST. LOUIS

1925	118.6	118.4	116.3	118.1	114.4
1930	108.9	108.3	112.4	115.3	111.3
1935	95.1	90.1	104.1	108.3	105.4
1939	110.2	107.0	118.7	119.8	119.0
1940	112.6	110.1	119.3	120.3	119.4
1946	167.1	167.4	159.1	161.1	158.1
1947	202.4	203.8	183.9	184.2	184.0
1948	227.9	231.2	207.7	210.0	208.1
1949	221.4	220.7	212.8	215.7	213.6
1950	232.8	230.7	221.9	225.3	222.8
1951	252.0	248.3	238.5	240.9	239.0
Mar. 1952	254.8	251.3	241.8	244.2	241.9
Apr. 1952	258.9	253.2	247.5	253.5	246.2
May 1952	260.7	254.0	251.6	258.1	250.2
	% increase over 1939				
May 1952	**136.6**	**137.4**	**113.2**	**115.4**	**110.3**

SAN FRANCISCO

1925	91.0	86.5	99.5	102.1	98.0
1930	90.8	86.8	100.4	104.9	100.4
1935	89.5	84.5	96.4	103.7	99.7
1939	105.6	99.3	117.4	121.9	116.5
1940	106.4	101.2	116.3	120.1	115.5
1946	159.7	157.5	157.9	159.3	160.0
1947	193.1	191.6	183.7	186.8	186.9
1948	218.9	216.6	208.3	214.7	211.1
1949	213.0	207.1	214.0	219.8	216.1
1950	227.0	223.1	222.4	224.5	222.6
1951	245.2	240.4	239.6	243.1	243.1
Mar. 1952	248.0	242.8	242.2	245.0	245.5
Apr. 1952	248.0	242.8	242.2	245.0	245.5
May 1952	247.6	242.4	241.7	244.6	245.1
	% increase over 1939				
May 1952	**134.5**	**144.1**	**105.9**	**100.7**	**110.4**

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

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

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

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

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

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

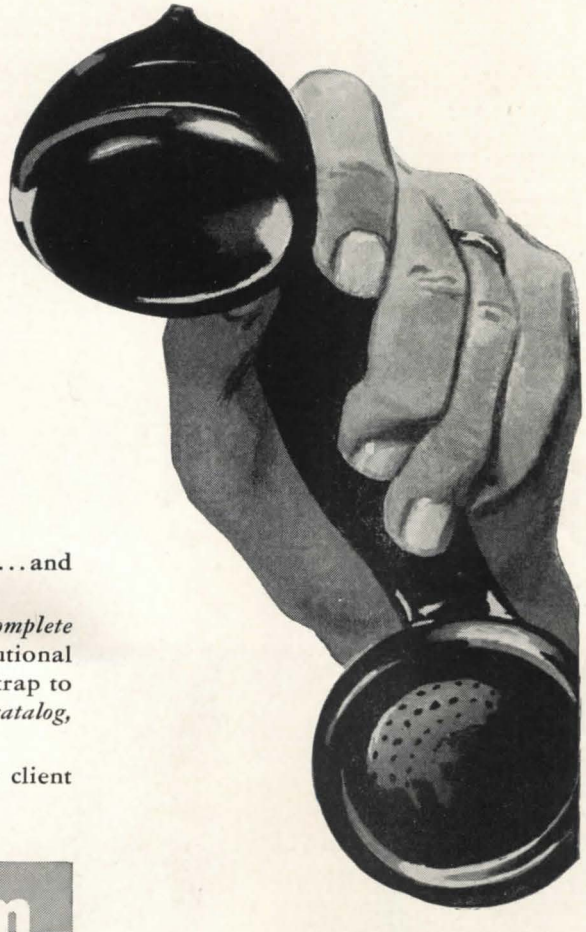
Conversely: costs in B are approximately 14 per cent lower than in A.

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

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

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

These index numbers will appear regularly on this page.



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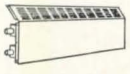
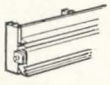
Temperature Control Systems


Fin-Vector Radiation

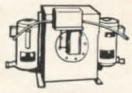

Baseboard Radiation

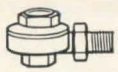

Convector Radiation


Horizontal Heaters

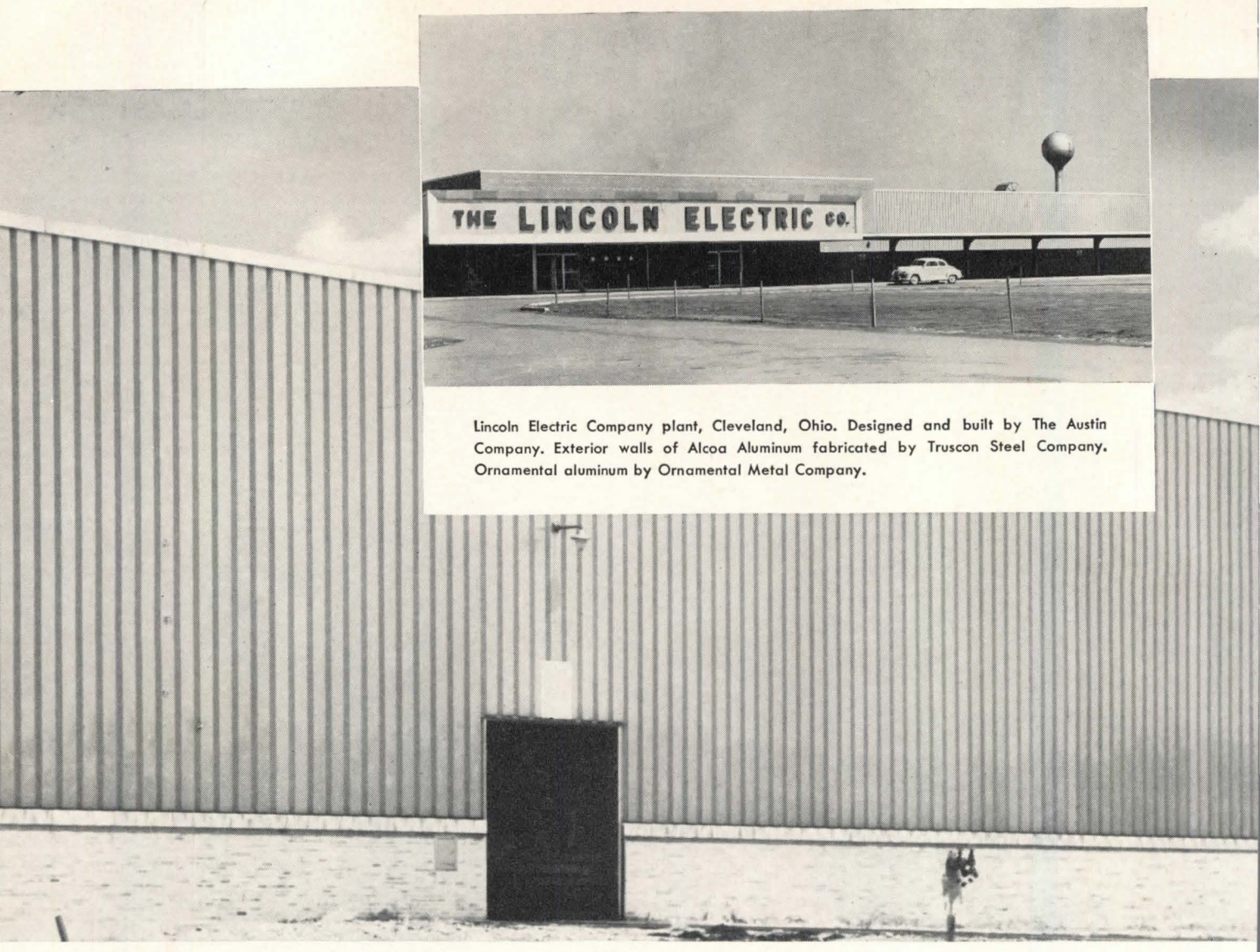

Vertical Heaters


Vacuum Pumps


Condensate Pumps

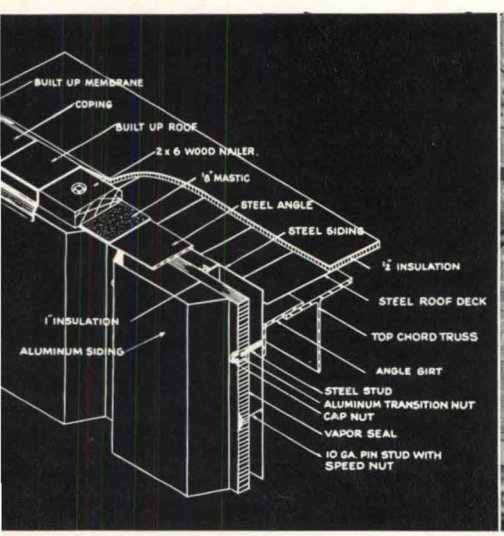

Traps


Valves

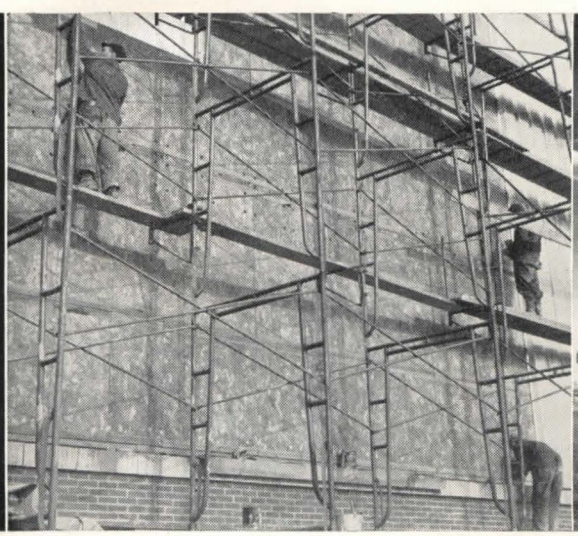


Lincoln Electric Company plant, Cleveland, Ohio. Designed and built by The Austin Company. Exterior walls of Alcoa Aluminum fabricated by Truscon Steel Company. Ornamental aluminum by Ornamental Metal Company.

BUILT TO SAVE MONEY

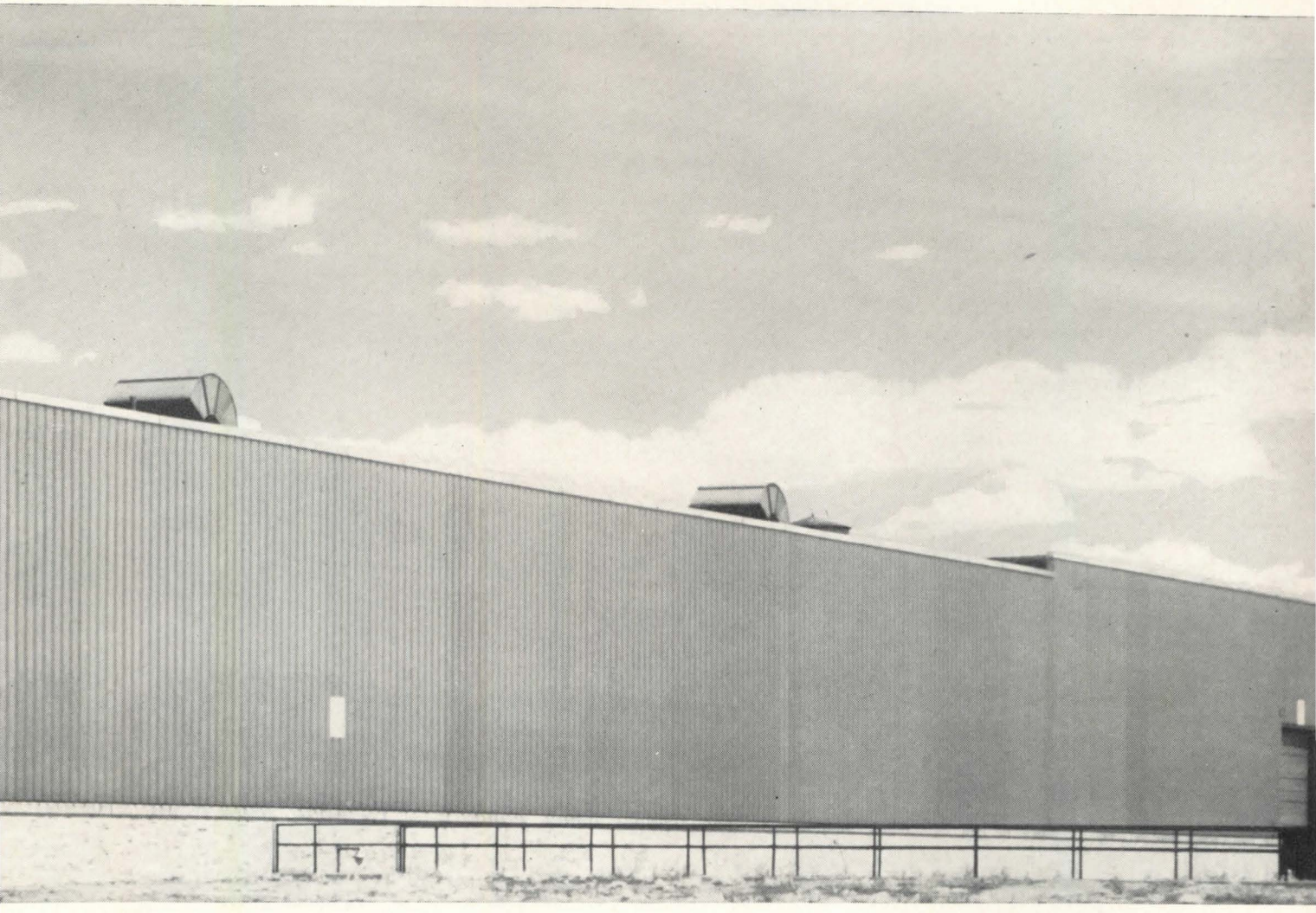


Detail of *wall panel. Completed wall* has heat-transfer coefficient of .25 BTU per sq ft, is 6¼ inches thick, weighs 3¾ lbs per sq ft. Compare with .50 BTU for 8 inch brick wall weighing 50 lbs per sq ft.



Speed clips over ten gauge, headless pins welded to inner wall hold Fiberglas insulation in place. Aluminum exterior panel then is fastened to studs with aluminum transition and cap nuts.

Twenty-five foot, inner (Ferroboard) panels studs fastened to girts at sill line and parall and bottom chord of trusses. Fourth girt, additional row of studs is arc welded to inn



. Inside and Out

Dedicated to a policy of constant cost reduction, Lincoln Electric Company built a complete new plant designed to slash or eliminate materials handling, storage, maintenance and other indirect production costs of manufacturing welding equipment.

Insulated, aluminum-faced panels were used for exterior walls because they were, "faster to put up, lower in cost for equal insulating value, require less maintenance."

Alcoa engineers worked with the builders of this plant as they have with the designers of nearly every pioneering use of aluminum in the building field. They will be glad to work with you. Nowhere else will you find so many men who know so much about aluminum. For information on any application of aluminum call your local Alcoa sales office or write:

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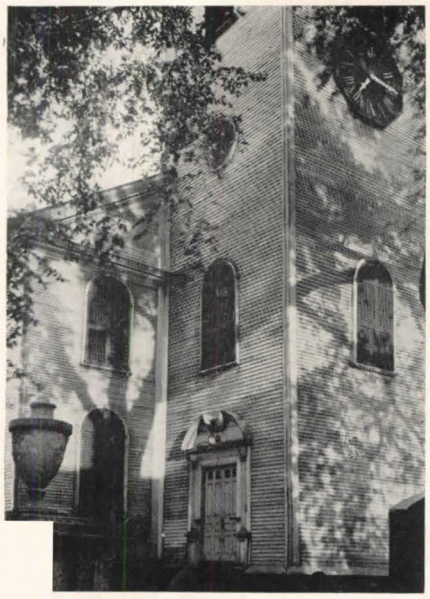

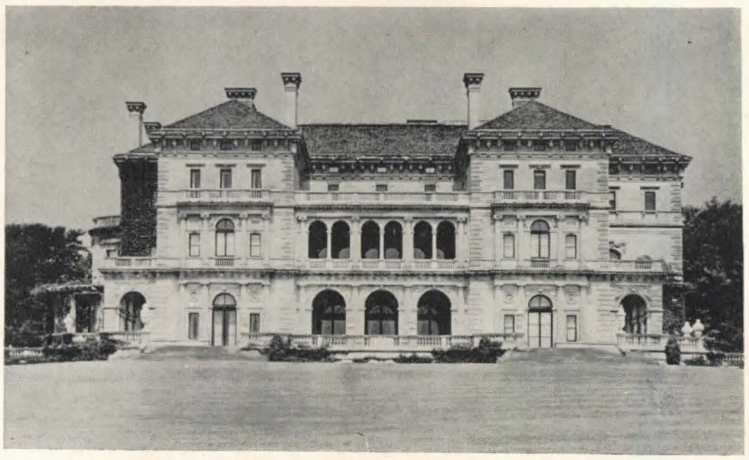

Richard Munday's Trinity Church, 1725 (left). The Breakers, Richard Morris Hunt, 1892–1895, Cornelius Vanderbilt House (above). Below: restoration of the east side of Clarke Street. From "The Architectural Heritage of Newport, Rhode Island"

Photographs by Meservey

NEWPORT'S BUILDINGS

The Architectural Heritage of Newport, Rhode Island: 1640–1915. By Antoinette F. Downing and Vincent J. Scully, Jr. Harvard University Press (Cambridge, Mass.) 1952. 9 by 12 in. 14+242 pp., 230 plates. $18.50.

This massive volume has much to offer to students of both architecture and Americana. It is a handsome book, well printed and amply illustrated. Narrow though its scope seems to be, it fills its half-thousand pages with no particular trouble. Newport is, after all, one of the oldest communities in the United States, and is full of well-preserved examples of early American architecture.

The authors have chosen to present Newport to the general public in a brief introduction, followed by four sections of text devoted to 17th and 18th century and Early Republican Architecture and 19th Century Resort Architecture. Appendices add detailed notes about the various buildings. Then follow the 230 photographic plates, grouped in the same order. The arrangement is logical and economical, but it forces the reader to flip pages incessantly, or take text and illustrations as separate entities.

Despite the annoyance of constant page-flipping, however, the book is well worth reading. A new understanding of United States history can be drawn from its many text pages: for here is the story of one small New England town from 1639 to the present. The story — in a way familiar — makes good reading, starting with young Peter Easton's diary comment in 1639 that "In the beginning of May of this year The Eastons came to [Newport] Road Island and builded the first English building. . . ." Who followed the Eastons, what they did, how they built, how they lived, and how the town of Newport grew to its present resort status, is the concern of succeeding chapters.

The text is somewhat over-factual and over-annotated for the general public, but it is nonetheless interesting. More quotations from old diaries and documents could have added to the interest and fewer references to the appendices would have minimized the textbook approach. The photographs, furthermore, are largely below the architectural par, and the plans are not uniform in scale. A little more attention to such matters would have lifted the book out of the reference category.

(Reviews continued on page 48)

Rendering by Edward Doyle

INSULATED METAL WALLS

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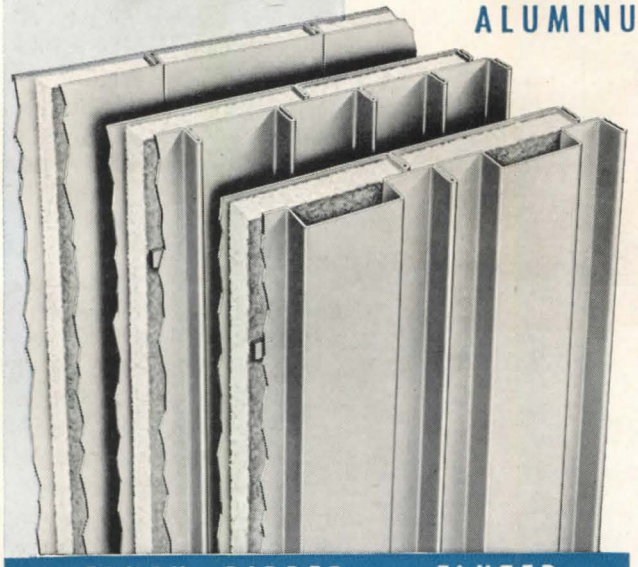

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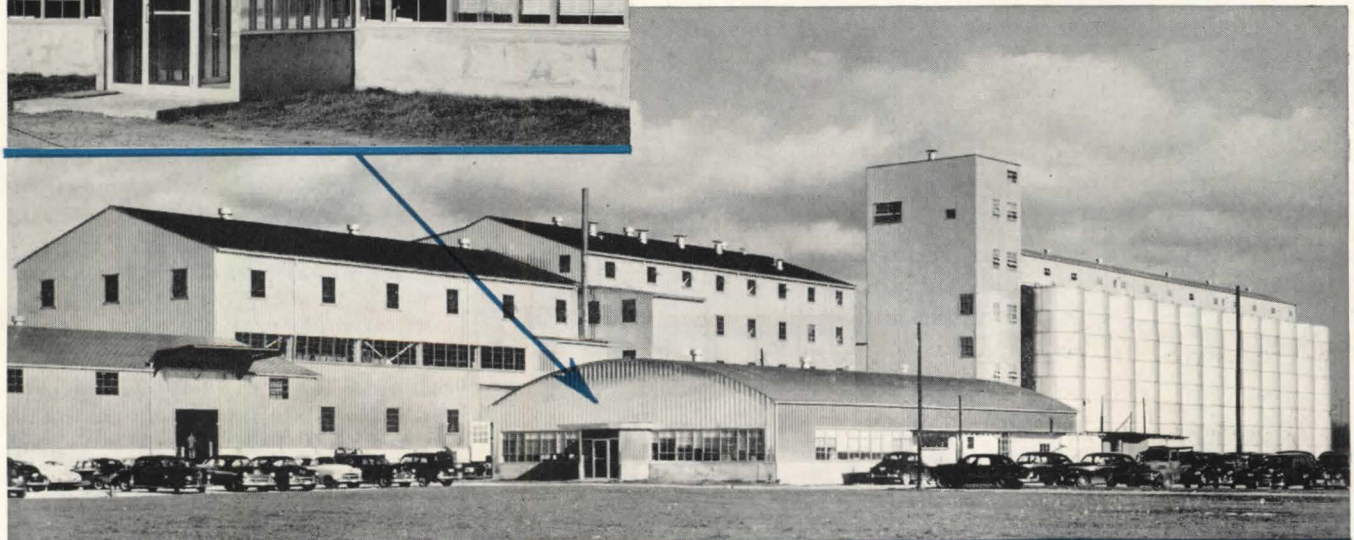

Mahon Insulated Metal Walls and Mahon Steel Deck Roofs employed in the Construction of a complete new plant for Quaker Oats Company, Chattanooga, Tenn. Johnson & Johnson, Chicago, Ill. Architects & Engineers; John Martin Company, Chattanooga, Tenn., General Contractors.

MAHON

REQUIRED READING

(*Reviews continued from page 46*)

AN ARCHITECTURAL JOURNEY THROUGH SCANDINAVIA

Scandinavia: Sweden, Denmark and Norway. By Eric de Maré. B. T. Batsford, Ltd. (15 North Audley St., W.I., London, England), 1952. 6 by 9 in. 262 pp., illus.

While it may seem impossible to present a clear and detailed picture of Sweden, Denmark and Norway within the confines of a single volume, Mr. de Maré is consciously selective in his choice of material and has succeeded in doing so. He is well prepared to take us on this Scandinavian journey, which is directed to those who may wish guidance "on what to seek there of beauty and interest in landscape, architecture, general culture and national character." Architecture is stressed because the author believes that this art, above all others, enables us to see a nation clearly.

The three countries are treated separately, and in addition to presenting the high points of each's land and livelihood and history and heritage, chapters on the various topographical divisions are included. The concluding chapter is devoted to an analysis of the national character of Sweden, Denmark and Norway.

Fortunately, Mr. de Maré has photographed many of the over 100 illustrations, thereby affording an excellent integration of text and pictures.

BOOKS RECEIVED

Creating an Industrial Civilization. A Report on the Corning Conference. Edited by Eugene Staley. Harper & Brothers Publishers (New York, N. Y.) 1952. 5½ by 8½. 368 pp. In May 1951 nearly 100 industrial and academic leaders — from management and labor, government, arts and professions, science and humanities — met to discuss the human values in an industrial civilization. Through the joint sponsorship of the American Council of Learned Societies Devoted to Humanistic Studies and the Corning Glass Works, these men and women were brought together to consider the "place of human values in a world increasingly dominated by the products of mechanical technology." "Creating an Industrial Civilization" records the proceedings of the conference. Summaries of both the general and round-table discussions, with a bibliography included at the end of

(*Continued on page 340*)

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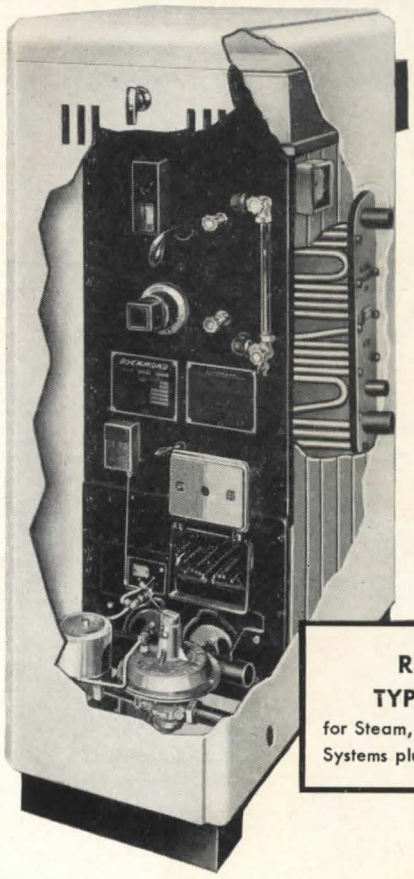

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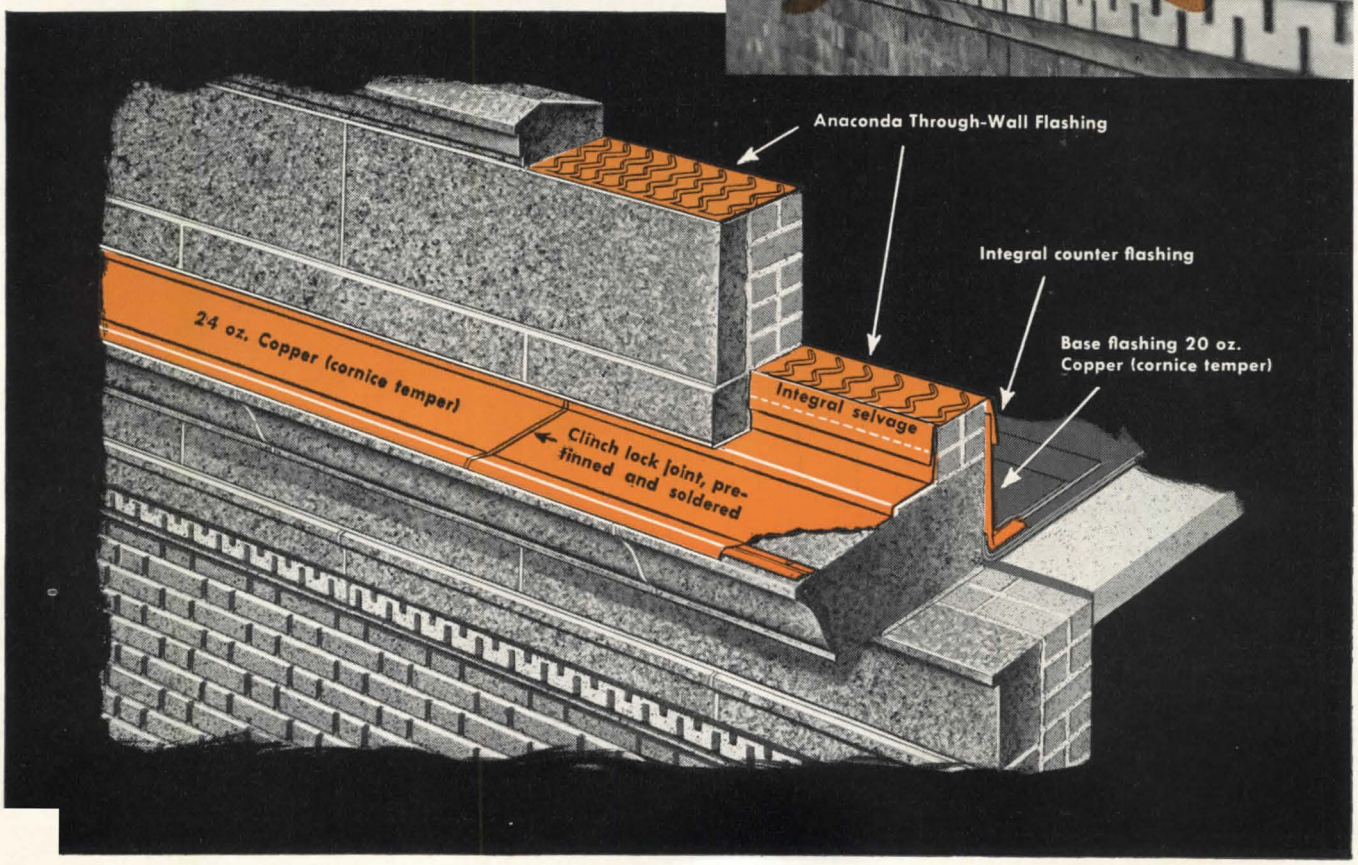

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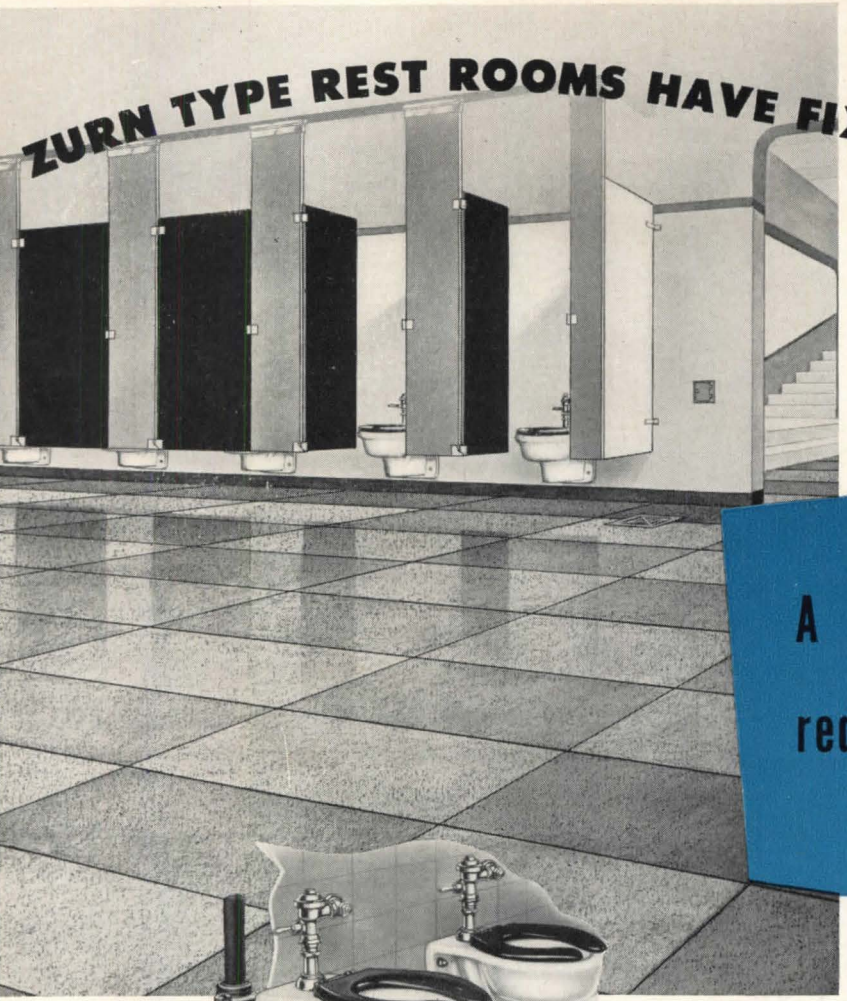

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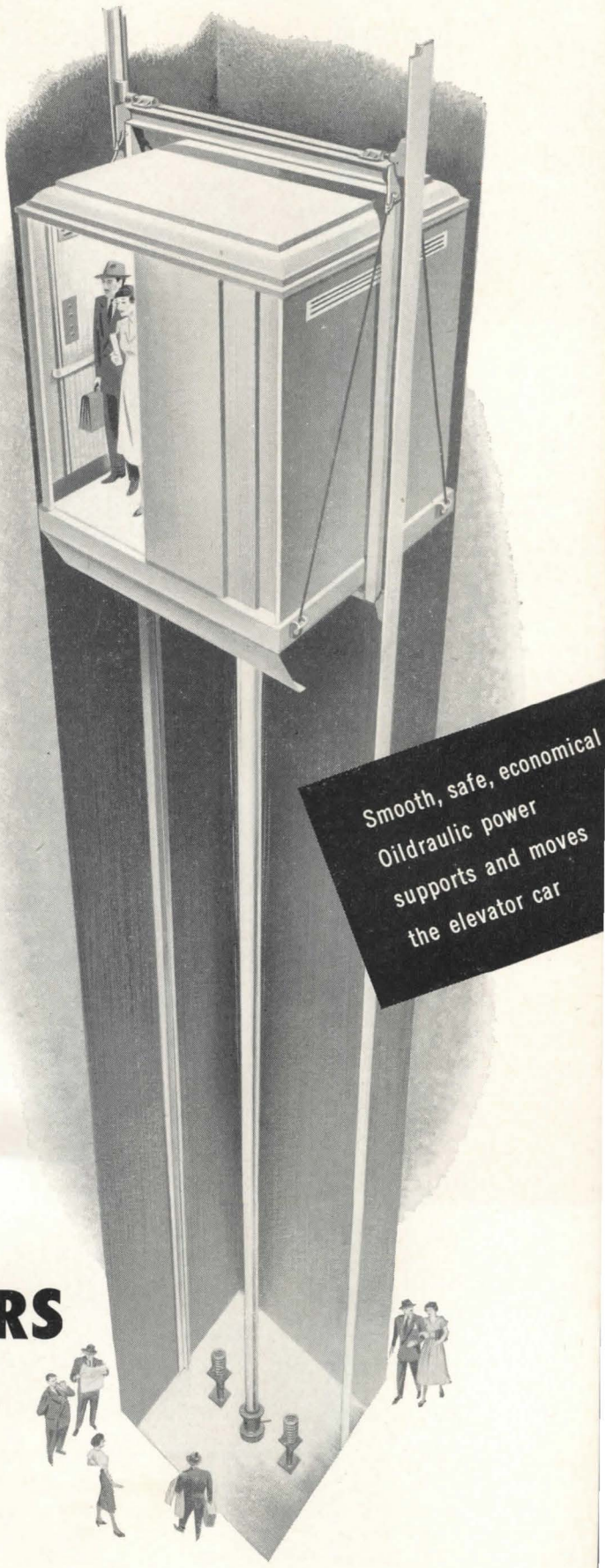

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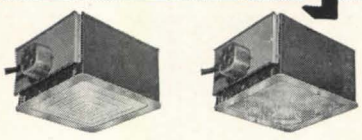

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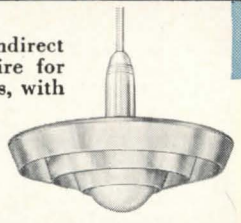

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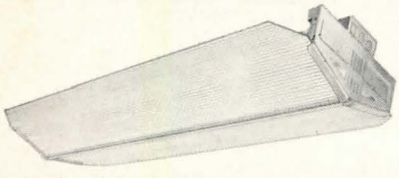

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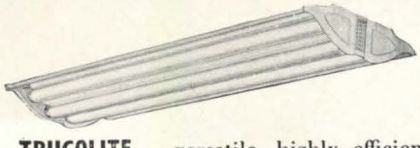
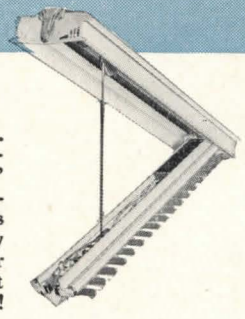
▲ NEW FUTURLITER®



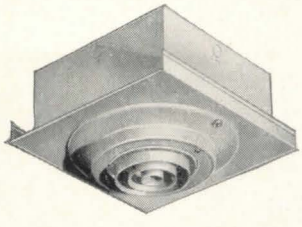
TRUCOLITE ...versatile, highly efficient, semi-direct type; can be used open, with Eggcrate louvres or diffusing glass bottom. For 2, 3 and 4 40-watt lamps...also 2 and 4 4-ft. or 8-ft. SLIMLINE lamps. Ceiling or suspension, unit or continuous mounting. Bulletins 814 and 852.

▲ TRUCOLITE®



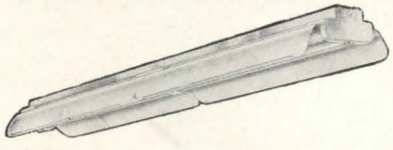
GUTHLITE ... the revolutionary "Jacknife" Hinge Luminaire that swings down for easy relamping or cleaning right from the floor! For 2 40- or 2 85-watt or 2 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Simplest fixture to install. Bulletin 845.

▲ GUTHLITE®



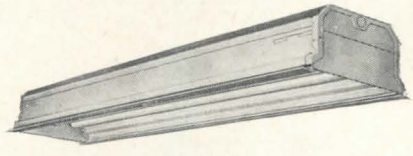
HY-LITERS ...recessed and surface types for PAR 38. Adjustable 45° from vertical in all directions. Can be used as individual units, or in conjunction with our fluorescent types. Bulletin 834.

▲ HY-LITERS



WYTE-LINER ...white inside and outside (takes gloom off ceiling). AIRFLOW channel for longer ballast life. Reflectors 300° Permalux or Porcelain Enamel. Made in 2 and 3 40-watt, 2 85-watt, and 4- and 8-ft. SLIMLINE lamps. Easy to install and clean. Catalog 48.

▲ WYTE-LINER



"LITE-BLOX" RECESSED TROFFERS... for 1, 2, 3 or 4 lamps: 20-, 40-, 85-watt, or 4-ft., 6-ft., or 8-ft. SLIMLINE. Exclusive end KO's provide exact 48.0"; modular design for unlimited patterns. Wide variety of shielding and diffusing glass panels available; also ALZAK reflectors if desired. Bulletin 869.

▲ "LITE-BLOX" RECESSED TROFFERS

GUTH 4-FT. SLIMLINE available in every GUTH fluorescent fixture

- no starters or starter troubles!
- easy to handle Single-Pin lamps!
- light in two steps almost instantly!

GUTH'S GOLDEN YEAR 19 Guth 52 ...leaders in lighting since 1902

THE EDWIN F. GUTH CO. / ST. LOUIS 3, MO.

Valley Village

GOES MODERN

Living rooms, bedrooms, dinettes and kitchens in these new, ultra-modern Valley Village Apartments in Minneapolis are enjoying June in January thanks to Fedders Baseboard Radiation. This is another typical example of why architects, general and heating contractors demanding the finest, specify and install Fedders Baseboard Radiation.

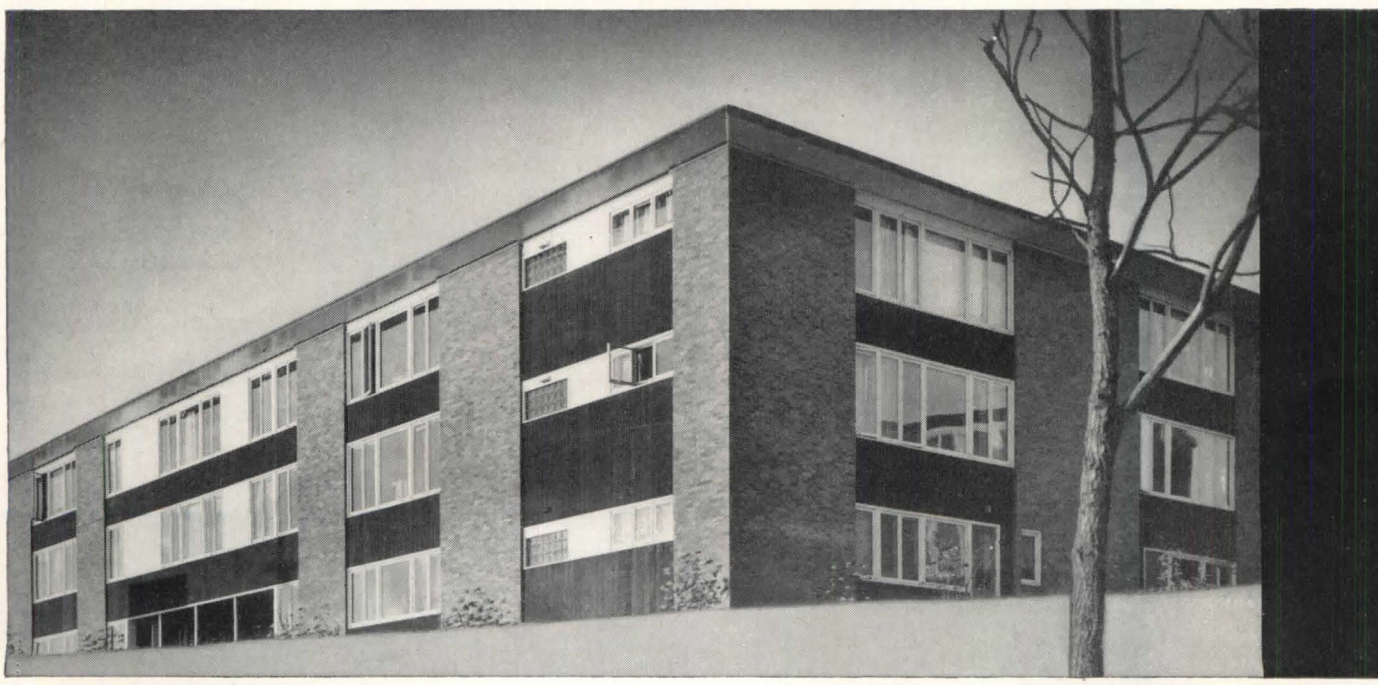
VALLEY VILLAGE APARTMENTS,
Minneapolis, Minn.

Owner: Valley Village, Inc.

Architect: Gerhard W. Brandhorst, Minneapolis, Minn.

General Contractor: Sebco, Inc., Minneapolis, Minn.
Enaco, Inc., Minneapolis, Minn.

Plumbing & Heating Contractor:
H. R. Nichols Co., St. Paul, Minn.



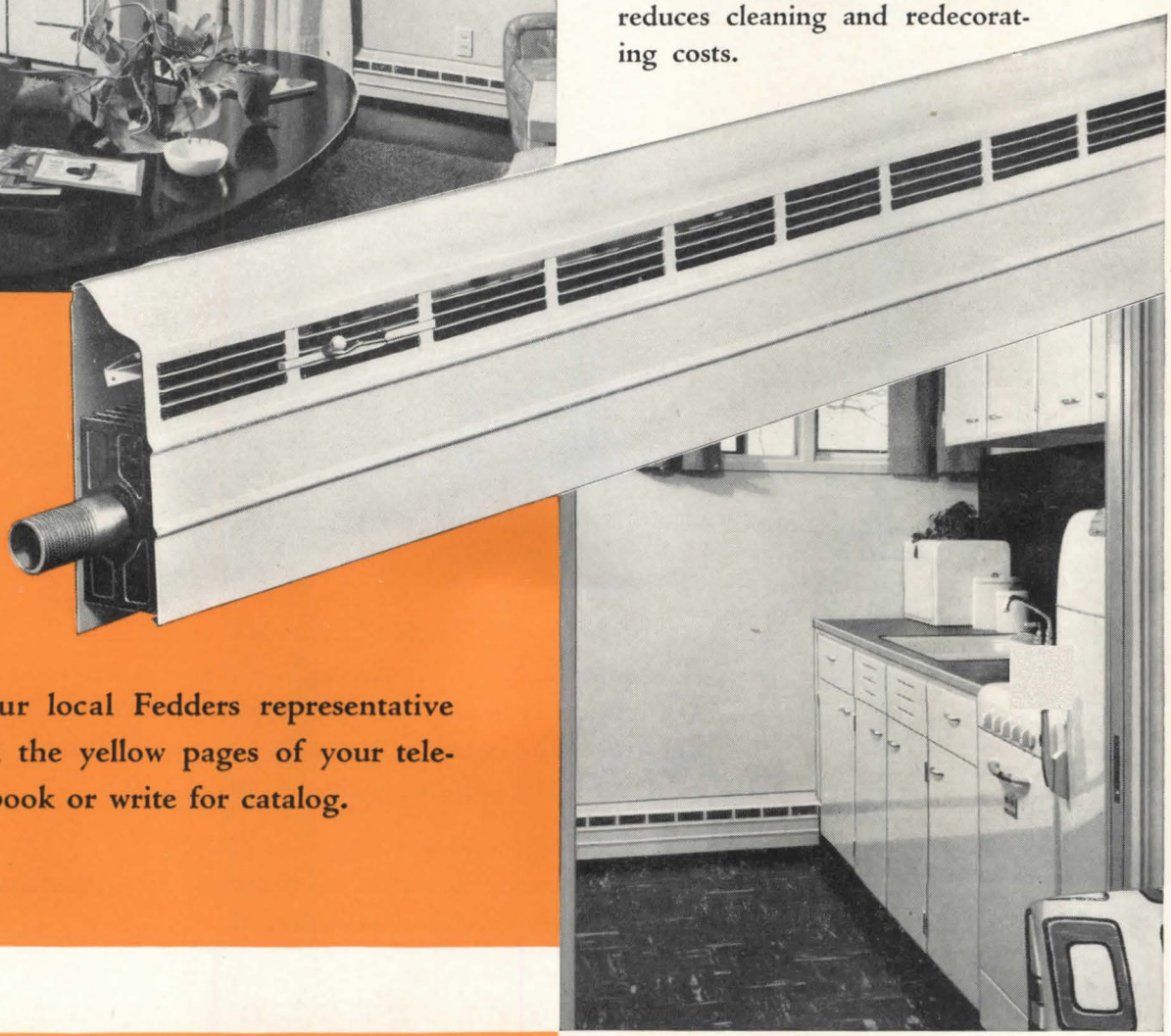
FEDDERS-QUIGAN CORPORATION

with **fedders**

A GREAT NAME IN COMFORT

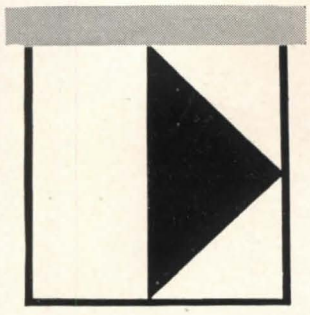
Baseboard Radiation

This new idea in heating is making warm friends everywhere! Compact . . . inconspicuous . . . space-saving . . . Fedders Baseboard Radiation is in perfect harmony with every color scheme and provides uniform comfort wall-to-wall. Covers have Fedders exclusive anti-streak design which reduces cleaning and redecorating costs.

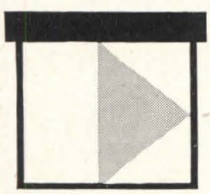


Call your local Fedders representative listed in the yellow pages of your telephone book or write for catalog.

57 TONAWANDA ST., BUFFALO 7, N. Y.



as fundamental as counter tops...



A good plan is always better when it includes symbols for telephone outlets.

Without working surfaces, a kitchen fails in one of its chief functions. And without telephone raceways, walls, too, are functionally incomplete. Raceways keep telephone wires out of sight and so protect the beauty of carefully planned interiors. The cost is low. Client acceptance is high.

Your Bell Telephone Company will be glad to help you work out economical telephone conduit installations. Just call your nearest Business Office.

BELL TELEPHONE SYSTEM

Architects: THE BALLINGER COMPANY. *Contractors:* TURNER CONSTRUCTION CO.

YALE & TOWNE selects JENKINS VALVES

What Yale preaches, it practices. The Yale & Towne Philadelphia plant, newest and largest materials handling plant in the world, is engineered for top production speed, economy and efficiency.

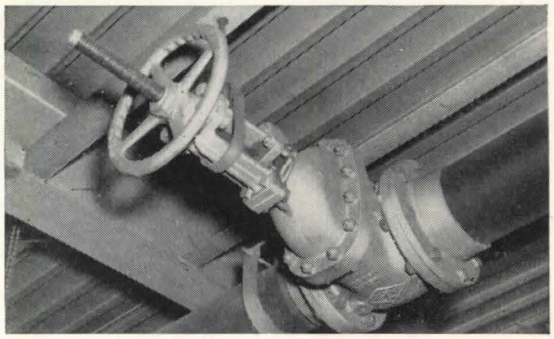
Departments were planned and located to permit a constant flow of material through each operation. All operating equipment was selected on the basis of low maintenance, and efficient, long-life performance. Jenkins Valves, for example, are installed in all unit heaters at Yale, and at control points on the complex network of water and air lines.

With the nation's top-flight building specialists, the only true economy is to install the best valves money can buy. This confidence in the *extra measure* of efficiency and endurance built into Jenkins Valves is shared by plant operating staffs in every type of industry.

Yet despite this extra value, *you pay no more* for Jenkins Valves. For new installations, for all replacements, let the Jenkins Diamond be your guide to lasting valve economy.

Jenkins Bros., 100 Park Ave., New York 17; Jenkins Bros., Ltd., Montreal.

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE



Numbering more than 3000, and ranging in size from ½ in. to 8 in. Jenkins Valves assure trouble-free fluid control at Yale & Towne's new plant. One of the large gate valves, on a water main, is shown at right.

JENKINS VALVES

LOOK FOR THE DIAMOND MARK

SINCE 1864 TRADE JENKINS MARK

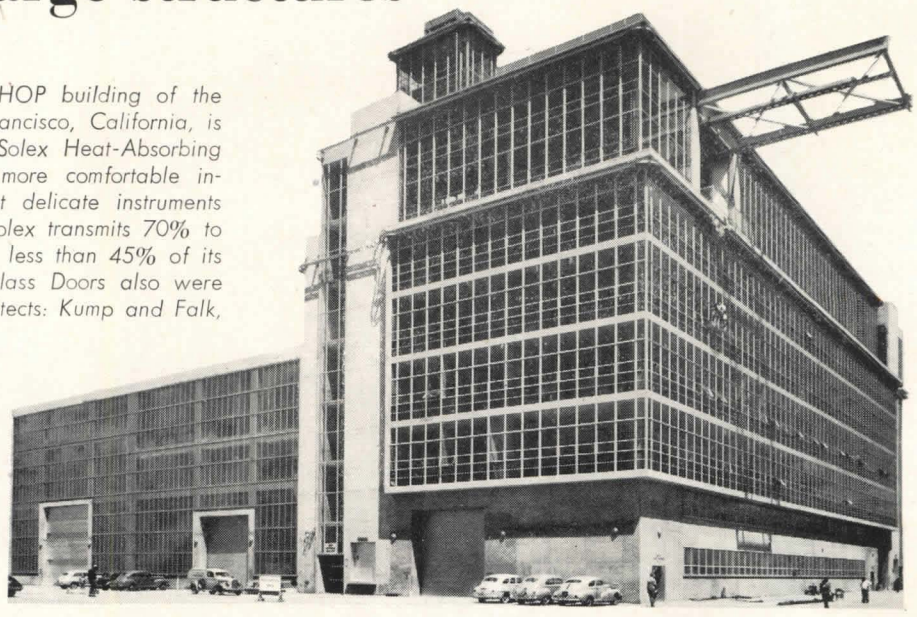
Jenkins Bros

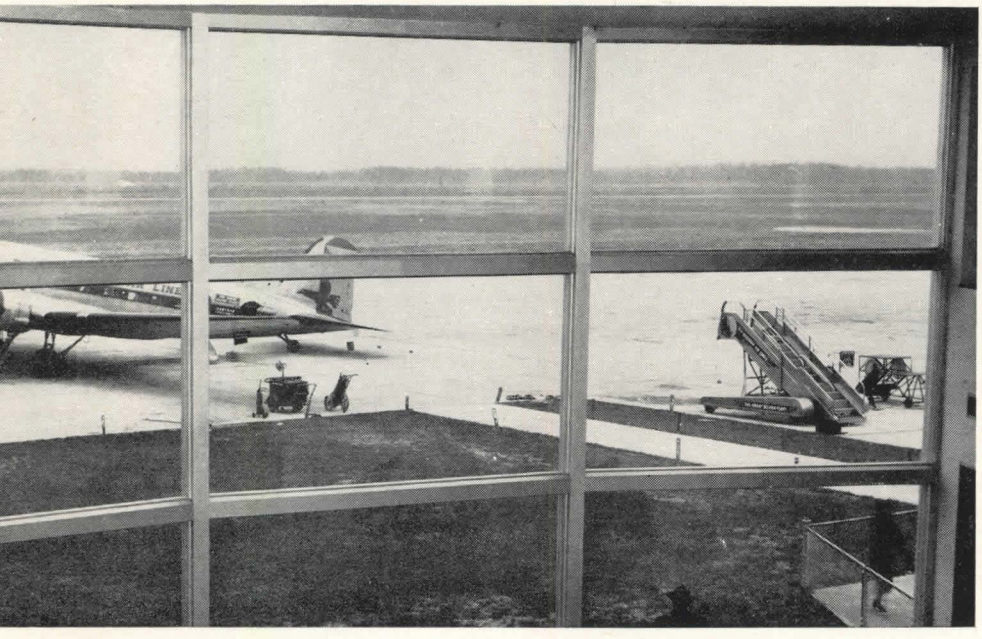
Examples of the architectural vitality

THIS TOWERING ALUMINUM-FACED office building of the Aluminum Company of America at Pittsburgh, Pennsylvania, was glazed with Solex-Twindow. Among the other glass products utilized in this new skyscraper were Pittsburgh Polished Plate Glass, Mirrors, Heavy Plate Glass, Carrara Structural Glass in men's and women's washrooms. Architects: Harrison and Abramovitz, New York City; Associate Architects: Altenhof and Brown; Mitchell and Ritchey.

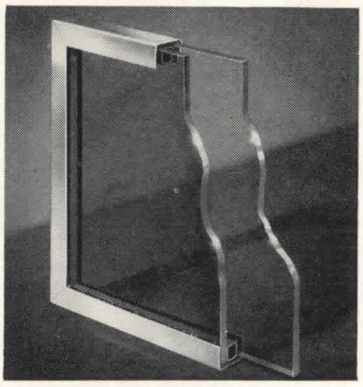
# of Glass in large structures

THE ORDNANCE AND OPTICAL SHOP building of the San Francisco Naval Shipyard, San Francisco, California, is another example of the trend toward Solex Heat-Absorbing Glass in modern buildings to achieve more comfortable interiors for workers and to help protect delicate instruments from too-great temperature variations. Solex transmits 70% to 75% of the sun's total light, but admits less than 45% of its total heat. Herculite Tempered Plate Glass Doors also were chosen for this impressive building. Architects: Kump and Falk, San Francisco, Calif.





AT THE ADMINISTRATION BUILDING of the Richard E. Byrd Flying Field, Richmond, Virginia, extensive use was made of Pittsburgh Glass. Solex was a logical selection for the waiting room observation windows, as were the Solex-Twindow units for the control tower. Polished Plate Glass and Pennvernon Window Glass were used in the other fixed sash, and twenty-eight Herculite Tempered Plate Glass Doors serve the heavy traffic at this busy air field. Architects: Marcellus Wright and Son, Richmond, Virginia.



SOLEX-TWINDOW offers all the advantages of Pittsburgh's Twindow —"the window with built-in insulation" — plus the heat-absorbing, glare-reducing properties of Solex —"the best glass under the sun!" The construction of this unit is shown in the sectional view here. The outer pane is Solex Plate Glass; the inner light is clear Plate Glass. Between them is a sealed-in air space. A stainless steel frame protects the seal and glass edges; makes handling safe and easy.

***Design it better with* Pittsburgh Glass**

Your Sweet's Catalog File contains detailed information on all Pittsburgh Plate Glass Company products . . . Sections 7a, 13e, 16b, 15, 21.

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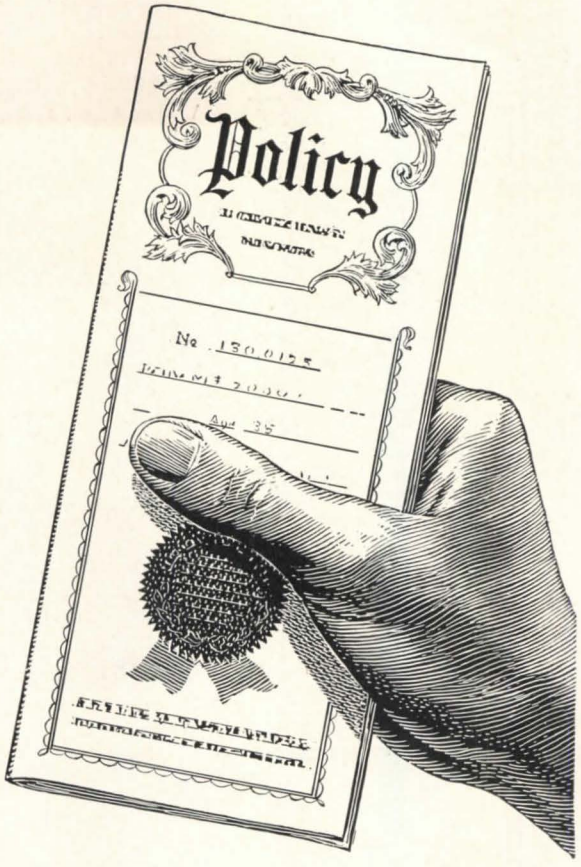
PITTSBURGH PLATE GLASS COMPANY

Your Best Over-all Policy:



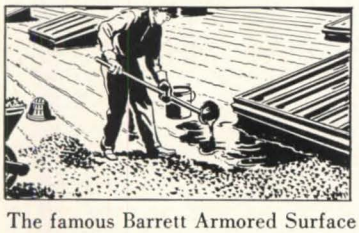
A Barrett SPECIFICATION* Roof

No premiums to pay! Dividends in protection! Benefits of security!

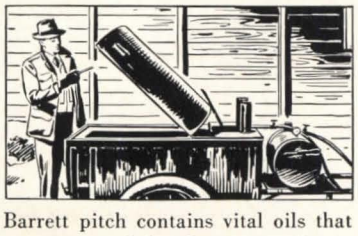
When you specify a Barrett* Bonded Roof you have the assurance of the best built-up roof that money can buy. The superiority of a Barrett "SPECIFICATION" Roof is due to the combination of highest-quality roofing materials and scientifically-standardized application techniques based on almost a century of roofing experience.

Barrett* pitch and felt meet the exacting requirements of Federal, A.S.T.M., and A.R.E.A. specifications—and when applied according to Barrett application methods are given a Class A rating by the National Board of Fire Underwriters.

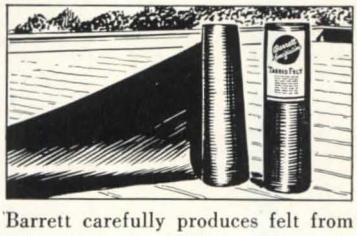
A Barrett "SPECIFICATION" Roof is bonded against repair for periods up to 20 years—a roof *so good* that it regularly outlasts the bonded period by many years.



The famous Barrett Armored Surface of a triple-thick coating of pitch plus a top layer of gravel or slag assures extra protection against mechanical damage and fire.



Barrett pitch contains vital oils that are preserved by the very moisture to which it is constantly exposed. For nearly a century it has been recognized as an unexcelled waterproofing agent.



Barrett carefully produces felt from selected stock and then saturates it with a coal-tar saturant to provide a uniform, tough base for the intervening layers of pitch.

Barrett Specification Roofs *

*Reg. U. S. Pat. Off.

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ALLIED CHEMICAL & DYE CORPORATION
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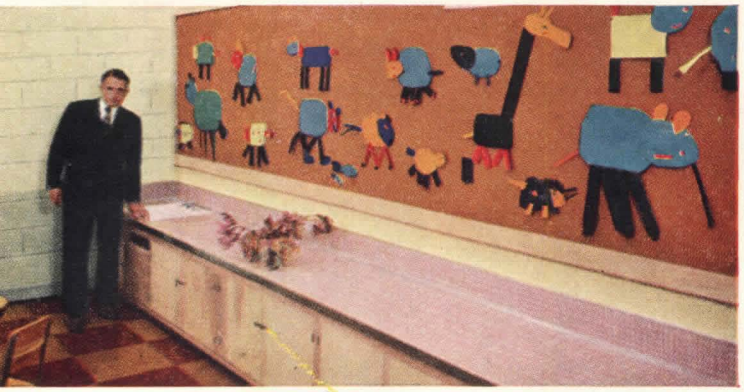
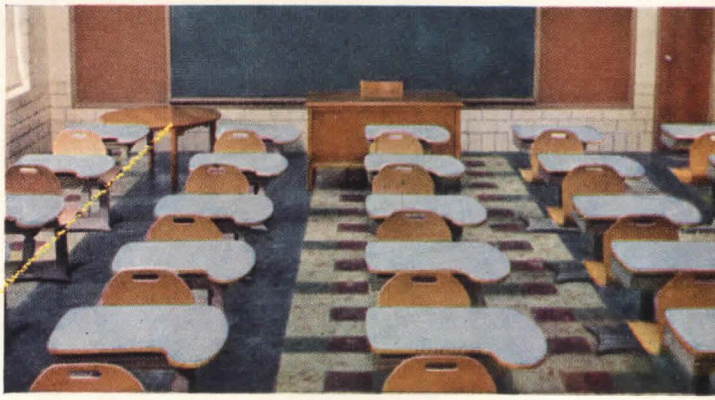
In Canada: The Barrett Company, Ltd., 5551 St. Hubert St., Montreal

UNTER TOPS covered with beautiful G-E Textolite plastics surfacing are easily aned with just a damp cloth. This tough, wear-resistant plastics topping is also al for sink and counter tops in school kitchens.



orkroom, Midvale School, Madison, Wis. Contractor: J. P. Cullen & Son, Janesville, Wis.

DESK TOPS covered with G-E Textolite plastics surfacing are extremely durabl —keep replacement costs *down*. Special patterns for desk-top use have bee designed to minimize eyestrain and improve illumination in classrooms.



Classroom, South Lawn School, Coshocton, Ohio

To put "class" in classrooms...

specify G-E TEXTOLITE* SURFACING

E TOPS in playrooms and workshops, covered with colorful G-E Textolite plastics ing, remain unharmed by ink, clay, paints and other hazards . . . make school- brighter, pleasanter places for both teachers and pupils.

m, Martin Avenue School, Bellmore, N. Y.

ELEVATOR INTERIORS represent an interesting use of G-E Textolite plastics surfacing for *vertical* applications. It gives a modern "new look" to old installations . . . can be used as decorative wainscoting or wall paneling.

Elevator, Pratt Institute, Brooklyn, N. Y.

Schools are only one type of construction for which you can specify General Electric Textolite plastics surfacing. This beautiful, durable plastics material is ideal for table tops, counter tops and wainscoting in restaurants, hospitals, housing developments—anyplace where good looks and hard wear must go together. G-E Textolite surfacing wears like iron, cleans like glass . . . and the beauty lasts.

* Reg. U. S. Pat. Off.

You can put your confidence in—

GENERAL ELECTRIC

FREE!

General Electric Company, Section 141-2A
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Please send me free pattern sheet showing the latest G-E Textolite designs in full color.

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BRIGGS

refuses to compromise with

Quality!

IT'S A TIME of keen competition in the plumbing ware industry—with every manufacturer on the alert for ways and means to increase his sales. Naturally there is a temptation to accomplish this by cutting prices. But with costs on the rise, as they are today, this usually means reducing quality.

THIS THE MAKERS OF BRIGGS BEAUTYWARE REFUSE TO DO!

Briggs will *not* lower the traditional high quality of these fine plumbing fixtures to meet the current competitive trend. Briggs will *not* make an undersize bathtub or one without a rim seat. Briggs will *not* manufacture a second, cheaper grade of fixtures—*all* Briggs fixtures are acid-resistant; *all* Briggs colors are non-fading.

The modern porcelain enameled formed steel bathtubs and lavatories developed and perfected by Briggs are the finest obtainable. Briggs high-density vitreous china lavatories and closets are the very best we know how to produce. Briggs brass fittings are of excellent design engineered for long, dependable service.

Briggs is proud that over the years every modification in its plumbing ware design—every change in materials and manufacturing techniques—has been made to *improve* the product. This is the way Briggs will always do business.

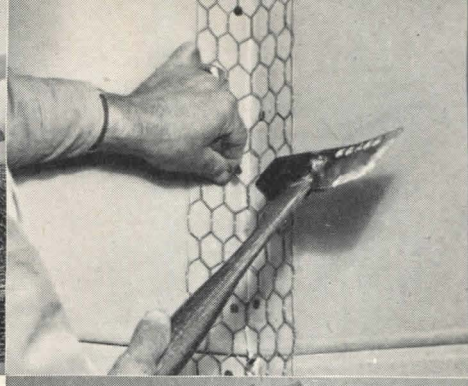
WHEN YOU ORDER BRIGGS BEAUTYWARE YOU BUY THE FINEST!

BRIGGS BEAUTYWARE

PLUMBING FIXTURES

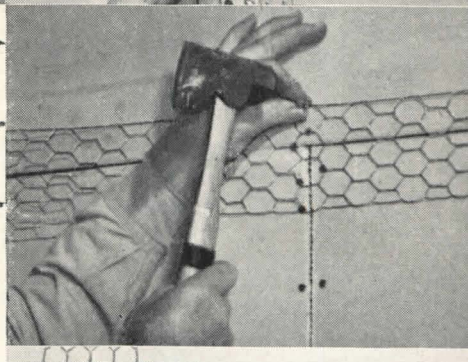
Briggs Manufacturing Company • 3001 Miller Avenue • Detroit 11, Michigan

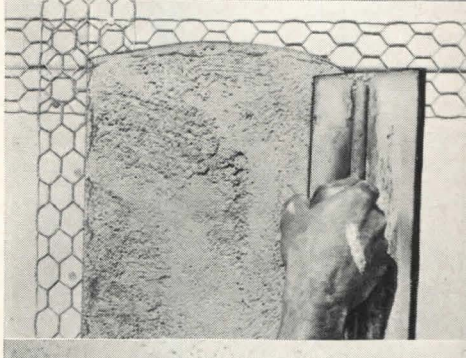
▶ **FOR WALL AND CEILING CORNERS AND JOINTS WHEREVER PLASTER IS APPLIED...**

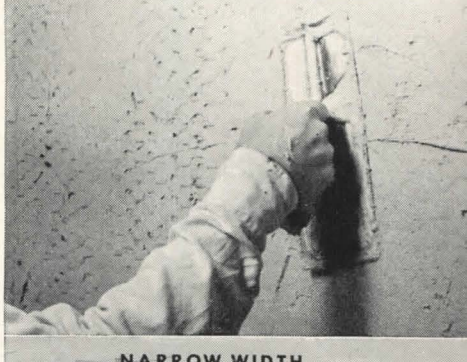


Keymesh-NARROW

NEW...ECONOMICAL SOLUTION TO AN OLD PROBLEM!







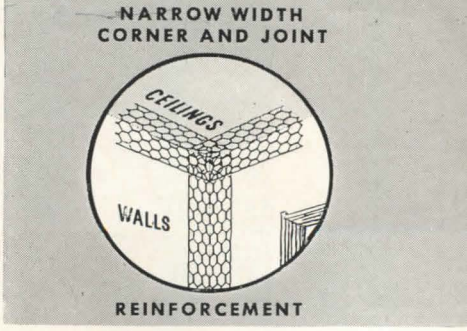
Pre-formed for Corners...lies flat, too... while Keymesh-NARROW is purposely supplied pre-formed for corners, it still lies flat in the roll and when applied on flat surfaces. It forms easily for corners by merely flexing the cut piece . . . holds its shape or can be re-shaped if desired. Its narrow width and low cost permit a fast, economical reinforcing job on any location where interior plaster is used . . . and helps prevent future crack troubles!

SAFE HANDLING . . . IMPROVES BOND AND REINFORCEMENT

Keymesh-NARROW will not injure the hands, because the smooth selvage edges eliminate this hazard. It's galvanized against rust, too. And, the open mesh permits the brown coat to flow through and around the mesh giving a generous bond of plaster to rock lath, insulation lath, etc., imbedding the steel wires . . . thus making a strong, reinforced section where needed . . . with an even base for the second coat . . . and a firm, smooth finish!

SIZED RIGHT . . . FOR EVERY PLASTER REINFORCING JOB

Keymesh-NARROW is manufactured in 150 foot rolls in several widths. For corners and joints it is made in 4″, 5″ and 6″ widths, 1″ mesh, 18 gauge . . . 4½″ and 6″ widths, 17 gauge. For joints, also in 6″ by 1″ mesh, 20 gauge. For reinforcing above large windows and openings, 12″ with 1″ mesh, 20 gauge is recommended. Keymesh is also available in 3 and 4 foot widths for easy overall lathing reinforcement practice.



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KEYSTONE STEEL AND WIRE COMPANY

Building Materials Division *Peoria 7, Illinois*

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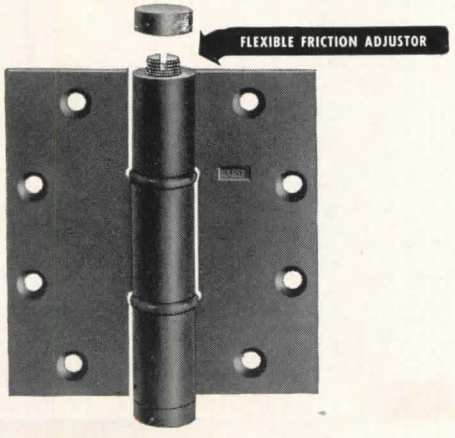
KEYSTONE NON-CLIMBABLE FENCE • KEYSTONE ORNAMENTAL FENCE

WRITE FOR PRICES AND OTHER INFORMATION ON Keymesh PRODUCTS

"EVERYTHING HINGES ON HAGER!"*



HAGER No. 1147
EXTRA HEAVY FRICTION-TYPE BUTT HINGE
Available also with "Hospital-Type" rounded top ends to prevent attaching ropes, wires, etc.

ELIMINATE NOISY, SLAMMING DOORS!

Exclusive flexible friction adjustor in the barrel of Hager Friction-Type Butts controls the friction exerted to just the desired degree. Proper adjustment of friction pressure prevents doors from slamming shut . . . holds them open to any desired ventilating position.

Removal of screw-type-plug at top end of butt provides quick access to the slotted pin. A few screw driver turns in one direction exert additional friction that retards the ease of door movement; several screw driver turns in the other direction eliminate friction . . . allow door to silently float back and forth.

Specify Hager Friction-Type Butts in hospitals or other buildings where *quietness* is either desirable or a necessity.

C. Hager & Sons Hinge Mfg. Co. • St. Louis, Mo.
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HAGER HINGES *®

STOP RUST! with RUST-OLEUM

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BEAUTIFY AS YOU PROTECT—ALL COLORS, ALUMINUM AND WHITE!

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FREE SURVEY: A **RUST-OLEUM** specialist will gladly survey your rust problems. He'll make specific tests and recommendations. No cost or obligation. See Sweets for complete catalog and nearest **RUST-OLEUM** distributor, or write for literature on your company letterhead.

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CHASE® COPPER WATER TUBE

For hot and cold water lines

Why risk a substitute when you know you just can't beat Chase Copper Water Tube for domestic hot and cold water lines! Chase Copper Water Tube will not clog with rust. For new construction use Chase Type L, hard temper, and Chase solder-joint fittings. Available in 20 foot straight lengths hard or soft temper. Type L, soft temper, also comes in 40 foot, 60 foot and 100 foot coils that can be snaked behind walls and under flooring.

For underground piping

Look at all the advantages in using Chase Type K Copper Water Tube soft temper, for underground piping! It is so ductile it can be bent around rocks and obstructions. Settling won't harm it as it moves with the earth. Chase Copper Water Tube comes in coils in lengths up to 100 feet. This means fewer fitting connections. All Chase Copper Water Tube is readily bent and cut.

Chase® BRASS & COPPER

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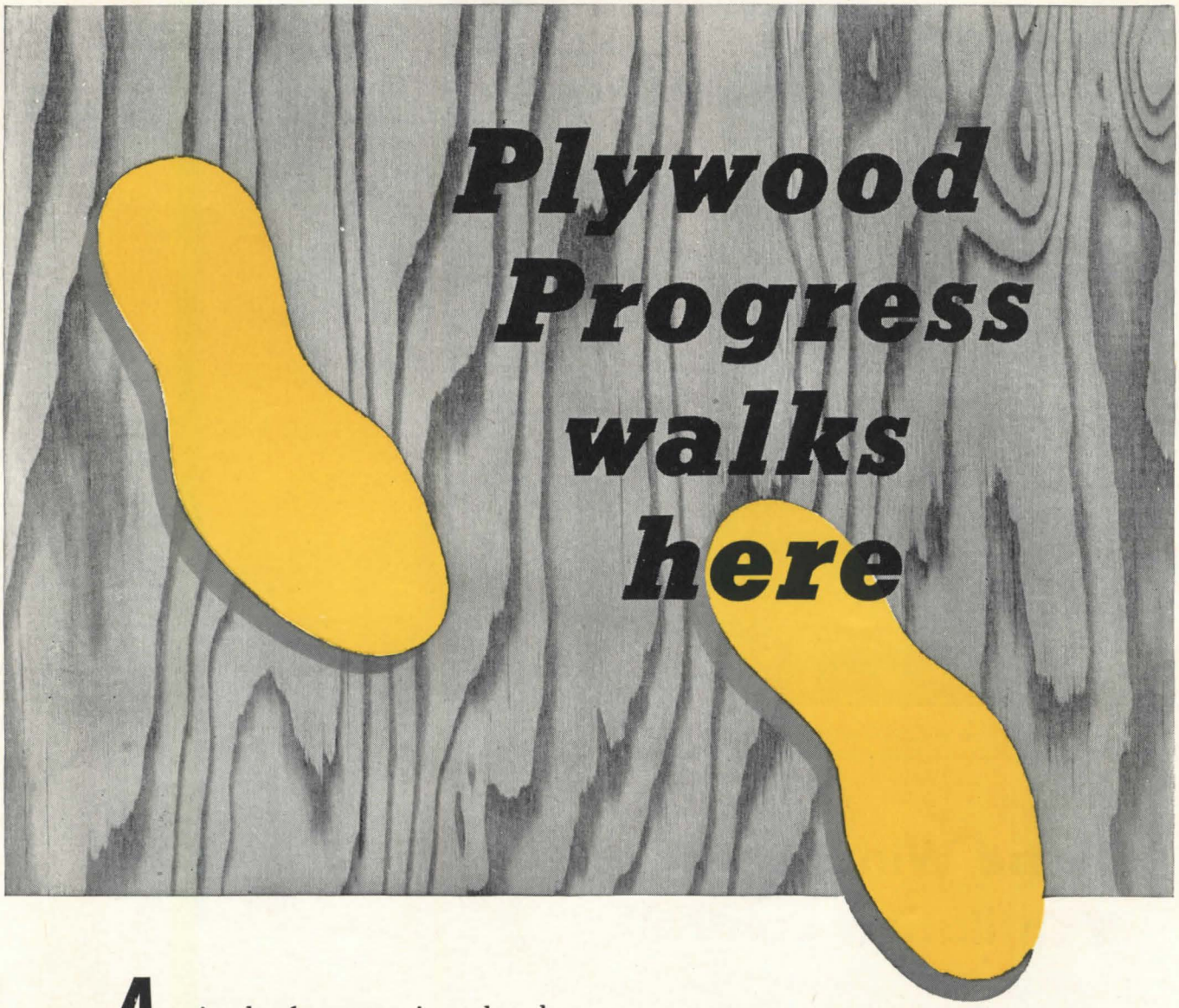

Associated makes a type, size and grade of Douglas fir plywood for every building need:

Interior-type: For walls, ceilings, cabinets, built-ins; for sheathing and subflooring.

Exterior-type: For siding, outdoor signs, farm structures, boats of all sizes and shapes.

Sea Swirl (interior and exterior). A beautiful decorative plywood for remodeling and new construction.

Vertical Grain (interior and exterior).

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All APMI plywood is manufactured in the heart of the Douglas fir region of Oregon; is grademarked and trademarked; is available through branch sales warehouses in major building cities, sold by experienced plywood men. Your inquiries are invited.

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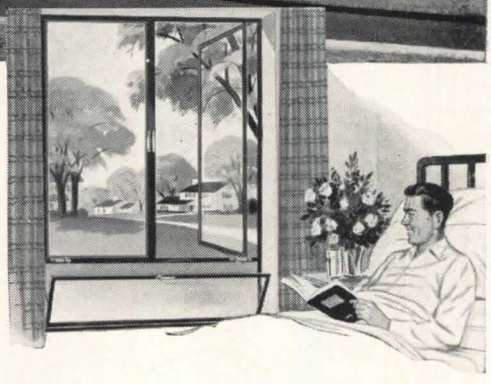
APMI

Don't miss our exhibit in Booth 150 at the American Hospital Association Convention . . . Convention Hall, Philadelphia, Sept. 15-18.

Fenestra Intermediate Steel Windows in Veterans' Hospital, Altoona, Pa. *Architects:* Marlier, Wolfe, Johnstone & Associates, Pittsburgh. *Contractors:* Mellon-Stuart Company, Pittsburgh.



These Windows Give You Ventilation Control!

Fresh air to sweep the staleness out—even when it's raining. Fresh air in the amount you want—where you want it—without drafts. That's what your windows ought to give you.

The swing-out vents of a Fenestra* Intermediate Steel Window catch passing air and guide it in. The tilt-in sill vent keeps out the rain and tames the breeze. Always easy to operate—with one hand—Fenestra Windows never stick.

You get more glass area, light, and more view, too, with Fenestra Steel Windows, because their frames are designed to be strong and rigid without being *bulky*. And those graceful lines add immeasurably to the trim, clean beauty of your building.

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No maintenance-painting is necessary with Fenestra Super Hot-Dip Galvanized Steel Windows. The combination of the strength of steel and the protection of Fenestra's special galvanizing makes Fenestra Windows the most *permanent* windows made.

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Send for your free book on how Fenestra Super Hot-Dip Galvanizing makes Fenestra Steel Windows stay new.

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Plywood Built-Ins Often Mean The Difference Between FOR SALE and SOLD

No DOUBT about it, plywood built-ins have buy-appeal. Space-thrifty plywood storage wall, built-in dining bar or crisp kitchen cabinets can often mean the difference between a house that's snapped up the minute it's offered and one that's a drug on the market—an important fact to consider as selling becomes more and more competitive.

And it's so easy to add client and customer-winning distinction to your homes with plywood built-ins. For no other material is so adaptable to specific design and space requirements. With plywood, you can make the built-in fit the house—*exactly*. No bothersome juggling of "stock size" units. No limit to size, design, finish or color. Plywood works quickly, easily with ordinary tools. It is equally adaptable for construction of shop-fabricated units. Plywood won't split, chip or puncture. *It's the logical material for every built-in.*

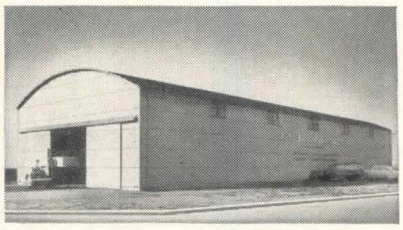
Douglas Fir Plywood

AMERICA'S BUSIEST BUILDING MATERIAL

Portfolio of Prize-Winning Built-Ins. Valuable collection of designs that will serve as a springboard for your own imagination. Contains over 50 designs judged best in the national "Better Living Home" architectural contest. For your free copy write Douglas Fir Plywood Association, Tacoma 2, Washington.

PANEL DISCUSSION

Builder Saves $10 Per Square With Douglas Fir Plywood

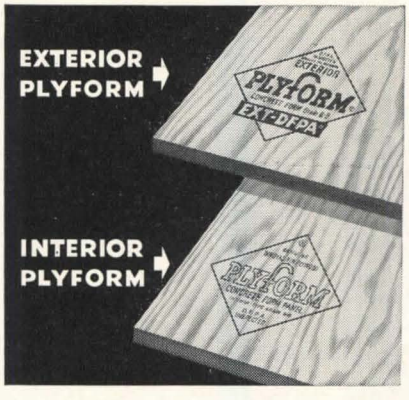


With unlimited choice of building materials, Rusdick Lumber Sales chose plywood siding for its new Tacoma, Wash. warehouse and the builder reports the panels cut construction costs by $10 per square. "We chose plywood because we like a smooth, flush exterior surface but cost was an important factor and plywood was cheaper," says part-owner Russell Ross.

MacDonald Building Co. designed and built the new structure. According to L. B. MacDonald, plywood afforded the least expensive satisfactory construction. He estimates the in-place cost of plywood, unpainted, with studs 16″, o.c., and metal flashing, at $68 a square—some $10 less than the in-place cost of other siding combined with the necessary sheathing.

The building is 50′ by 150′, 20′ high to the roof trusses. PlyShield grade plywood, ⅝″-thick, was used as a combined siding-sheathing. Panels were applied horizontally with metal flashing.

PlyForm Grade Plywood Now Made In Two Types



The familiar PlyForm grade-name now identifies special concrete form grades within both Interior and Exterior-type fir plywood. Exterior PlyForm replaces the old Exterior Concrete Form grade-name. Identified by the new diamond-bar symbol shown above, Exterior PlyForm with 100% waterproof bond is intended for use where forms will be used until the wood itself is worn away. Simultaneously, the highly moisture-resistant glueline of Interior PlyForm has been fortified for better service, and up to 10 or 15 re-uses may be expected even though glueline is not permanently waterproof.

(*Advertisement*)

Tests Prove Plywood's Great Resistance To Lateral Loads

New design data proving the extra strength and rigidity imparted by plywood subfloors and roof sheathing have been developed by plywood research engineers, culminating 14 months of tests. The new design data permits architects and builders to specify plywood floor and roof construction in schools, commercial and industrial buildings with full confidence that the structure will withstand the great lateral stresses caused by windstorms or earthquakes.

Plywood Thickness	Nail Size	Shear (lb-per-ft.-width) 2⅝" framing Nail Spacing on all panel edges		
		6"	4"	3"
5/16", ⅜"	6d com.	185	280	315
⅜", ½", ⅝"	8d com.	265	400	450
½", ⅝"	10d com.	320	480	545

Tabulated shears should be reduced one-fourth for other than wind or seismic loads. Diaphragm width measured parallel with load.

As one result of the tests, Uniform Building Code has been amended to permit greater allowable lateral loading for plywood diaphragms as shown above in condensed form. Complete data is available from Douglas Fir Plywood Association, Tacoma, Washington.

Plywood Helps Complete Rush Job On Schedule

A crew of 25 men completed construction of the new Lakewood (Wash.) Branch of the Puget Sound National Bank in 10 working days to hang up what might well be a record for buildings of its kind.

The final decision to rush construction of the 2,600 sq. ft. building was made by bank officials only 18 days before job completion. Architects Lea, Pearson and Richards went to work to meet the "impossible" schedule. To give the builder every opportunity to save time, they turned to virtually all-plywood construction. Drawings and specifications were completed within a week and work was begun under the direction of O. D. Parker, building superintendent for Ketner Bros., Inc., contractors.

According to both builder and architect, plywood made possible the speed of building. The big panels were used for combined siding-sheathing, gable ends, interior paneling, roof decking and underlay floors. The plywood board and batten siding is painted barn red to contrast with white flush-surfaced gabled ends. Interior paneling is painted light green.

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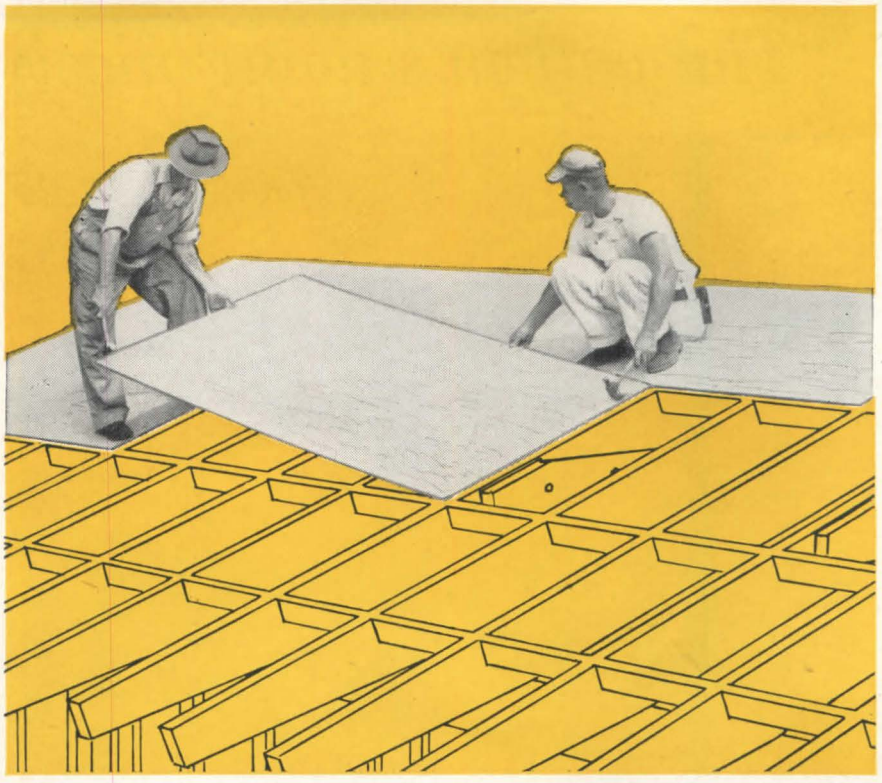

Prove It Yourself-PlyScord® Roof Decks Actually Cost Less

HERE'S paper and pencil proof that you *can* cut costs with PlyScord grade plywood. Figure it *both* ways on the chart below. Then make a special note to put PlyScord on your next bill of materials—for better construction . . . for lower in-place costs.

Estimating Chart to Cover 1,000 Square Feet of Roof Area*

PLYSCORD	RATE	TOTAL	LUMBER	RATE	TOTAL
1,056 sq. ft. ⅜" or 5/16"			1,200 ft. b.m. 1x8 shiplap		
Nails 6d-12 lbs.			Nails 8d-20 lbs.		
Carpenter 6 Hours			Carpenter 11 Hours		
Helper 3 Hours			Helper 5 Hours		
TOTAL COST IN PLACE.....			TOTAL COST IN PLACE.....		

*Data developed from Walker's "The Building Estimators' Reference Book"

Douglas Fir Plywood

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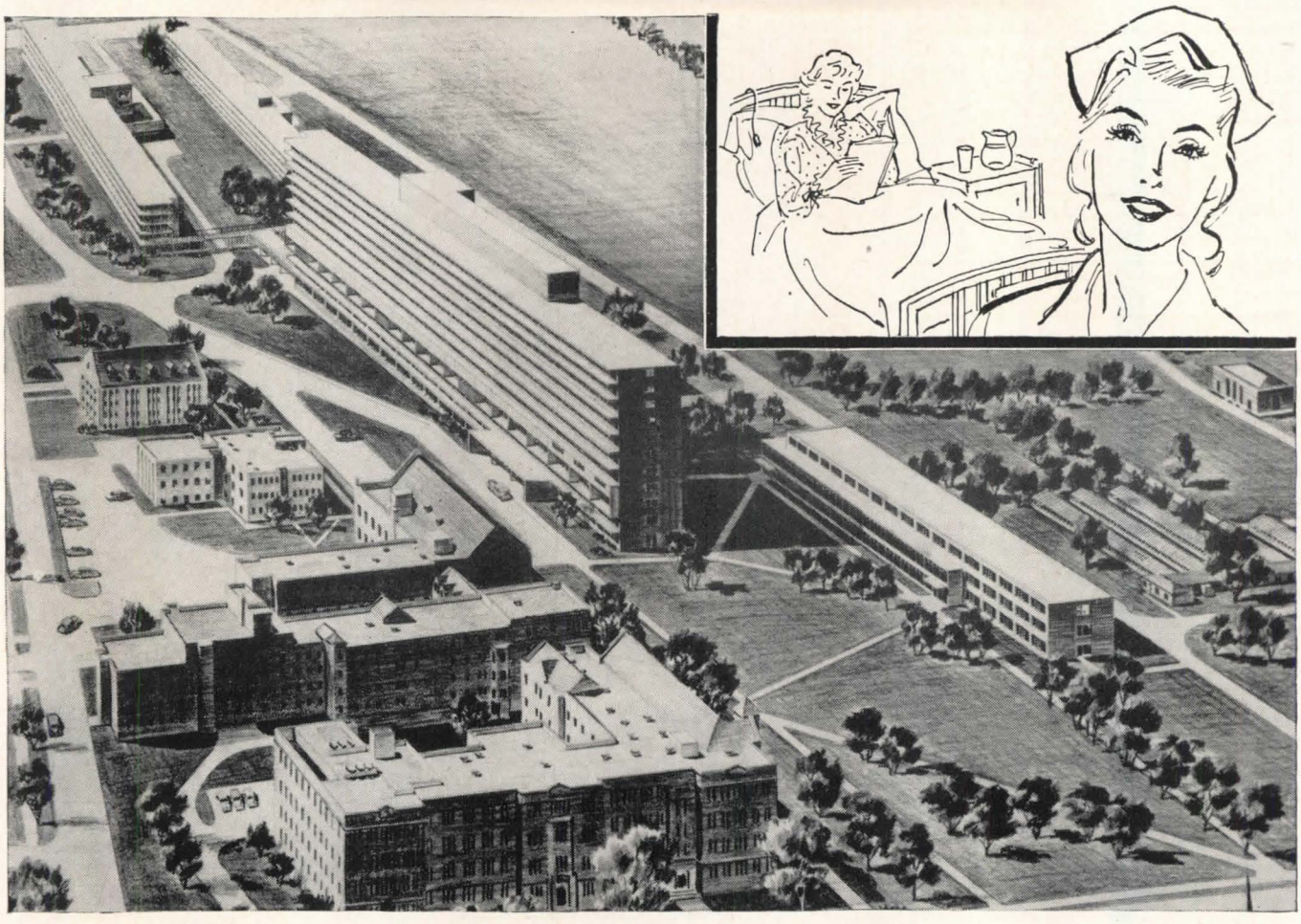
® PlyScord is the unsanded construction grade of Interior-type plywood bonded with highly water resistant glues. For subflooring, sheathing, backing, one-use forms. PlyScord is a registered grade-trademark identifying quality plywood manufactured in accord with U. S. Commercial Standards and inspected by Douglas Fir Plywood Association (DFPA).

"The patient's doing nicely, thank you"



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Steel pipe, more than any other, has made the large-scale application of radiant heating economically practical in any type of building; while the demonstrated performance capacity of steel pipe in hot water and steam heating systems, for more than 60 years, attests its complete reliability and durability in service. That's why steel pipe is first choice—the most widely used pipe in the world—for radiant panel heating!

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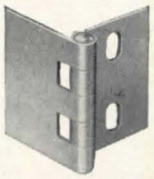
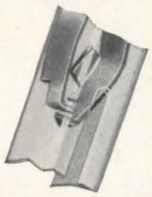


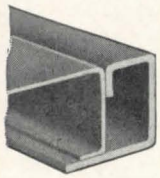
Rugged 5-knuckle hinges, with 3/16" semi-recessed pins, are made of 14-gauge steel, both welded and bolted into place.

GREATER SECURITY

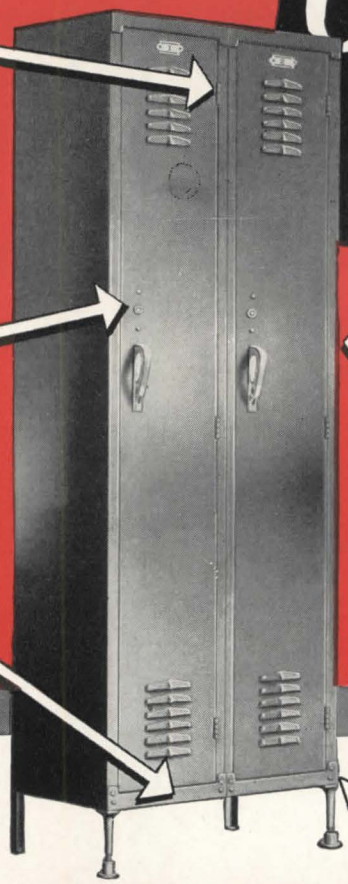


Only Medart Lockers have this patented pick-proof "dual latch" mechanism concealed in the lock rod channel. It's pre-locking, positive in action whether door is slammed or gently closed.

STURDY BOTTOMS

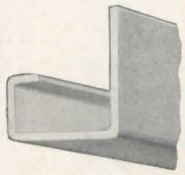


Built to take brutal punishment — won't break or sag. Full ¼" flange of bottom is tied solidly to steel frame. Compare this feature with ordinary lockers!



STRONGER

Entire frame — top, bottom and sides — is channel-shaped steel electrically welded into a single solid, rigid unit that stays square and true.



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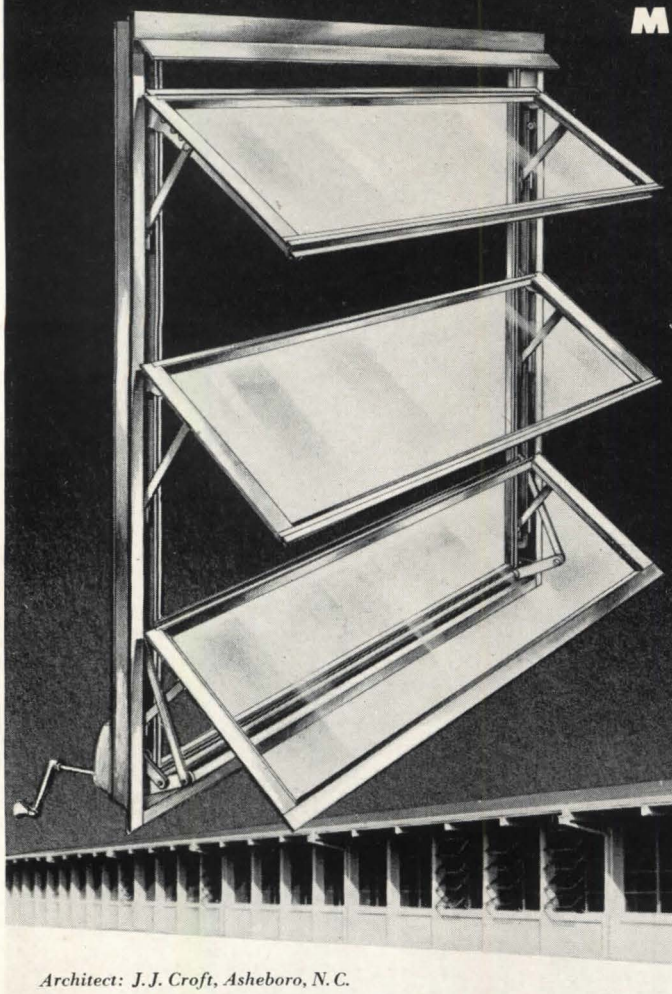

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BETHLEHEM LONGSPAN JOISTS

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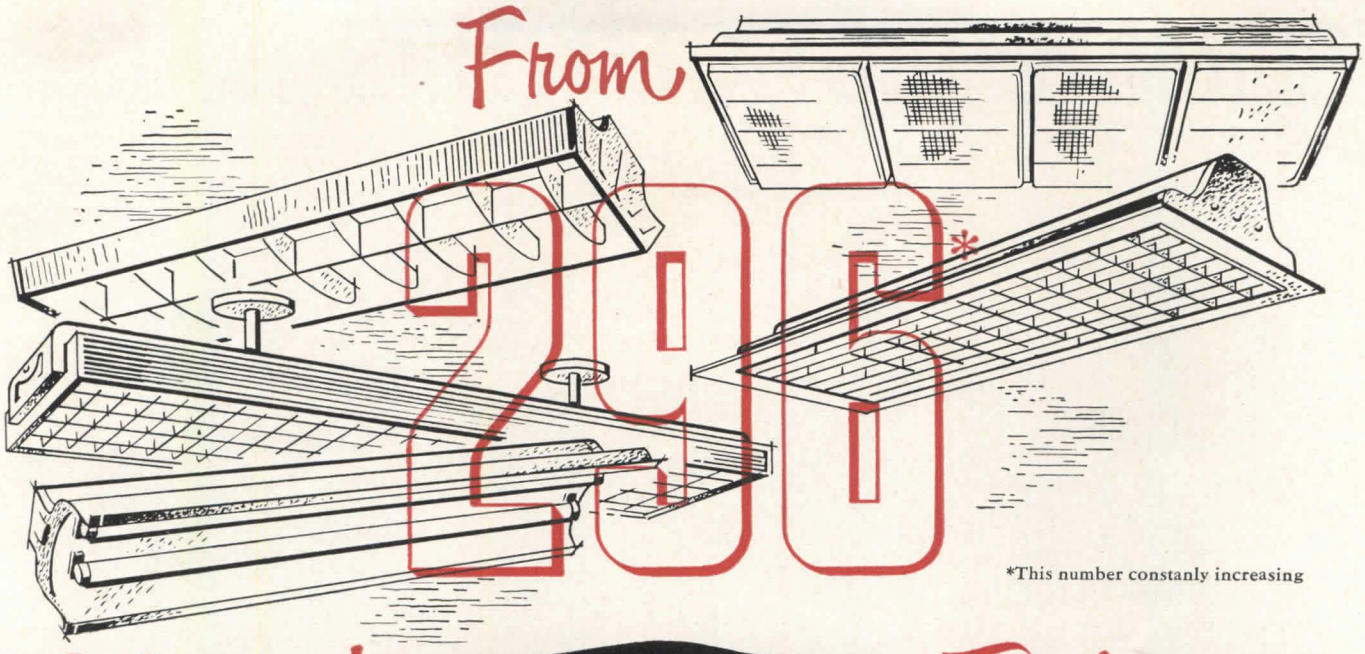

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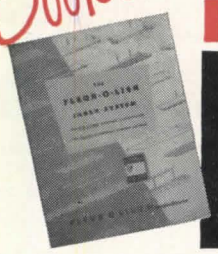

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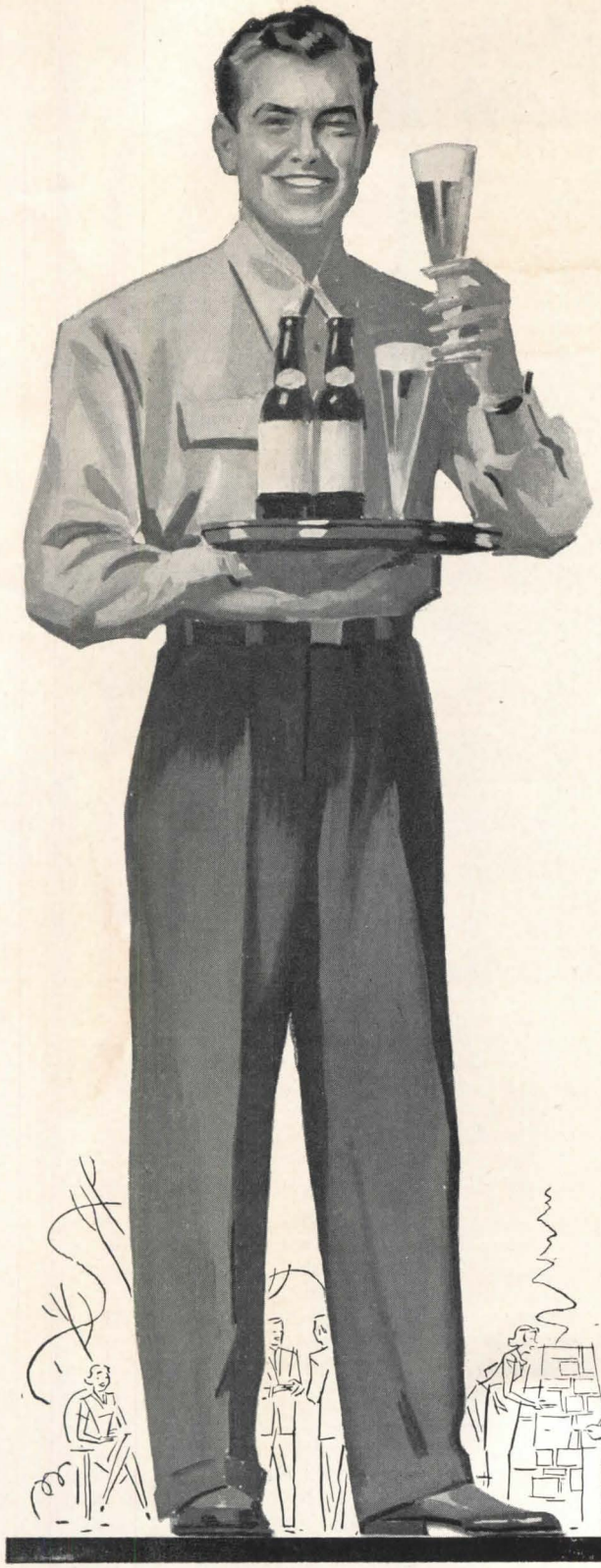

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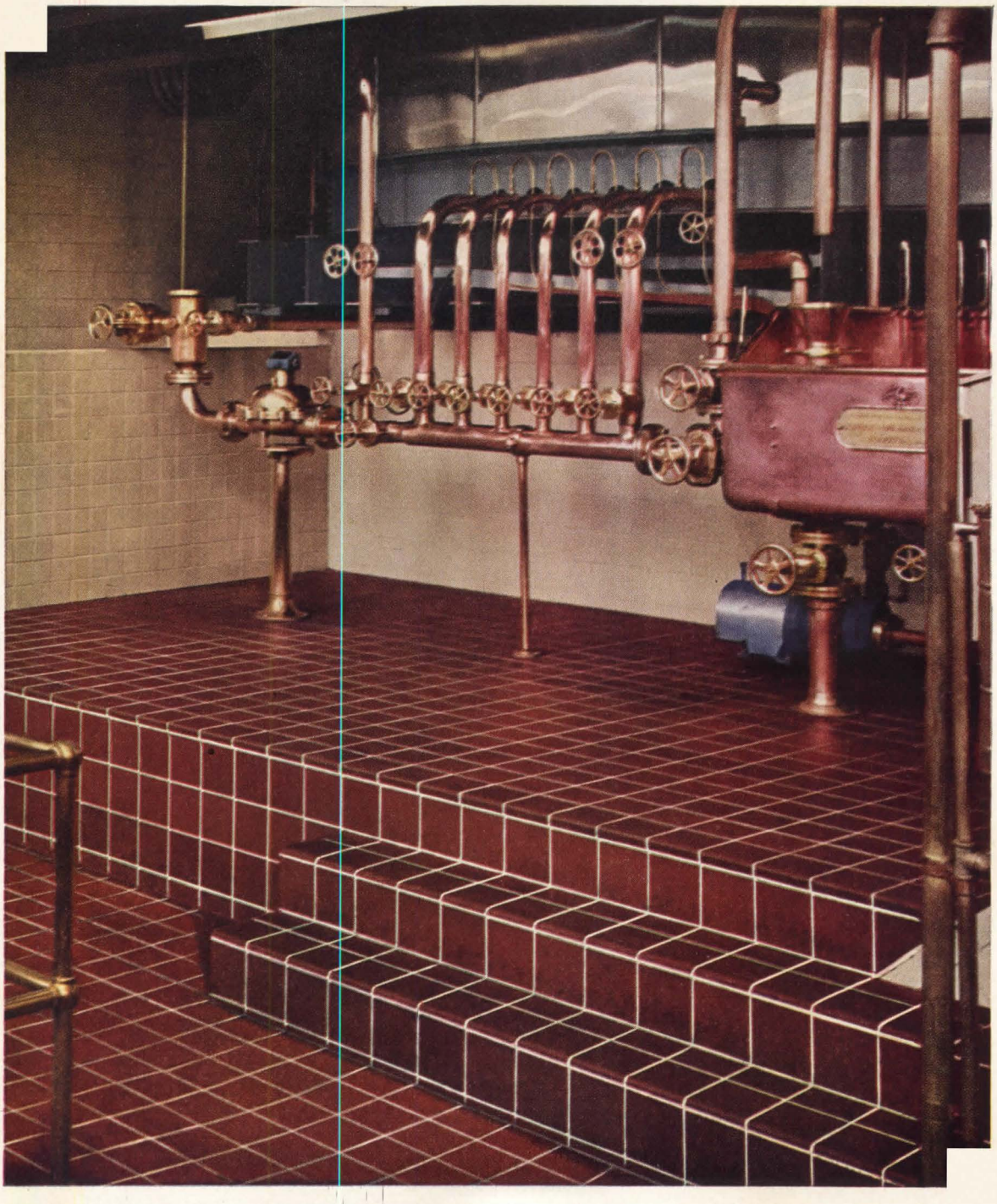

Fehr's new Brewhouse, Louisville, Kentucky. 4¼" x 4¼" Wall Tile, Color No. L-216. Floor—6" x 6" Carlyle Quarry Tile in Navajo Red.

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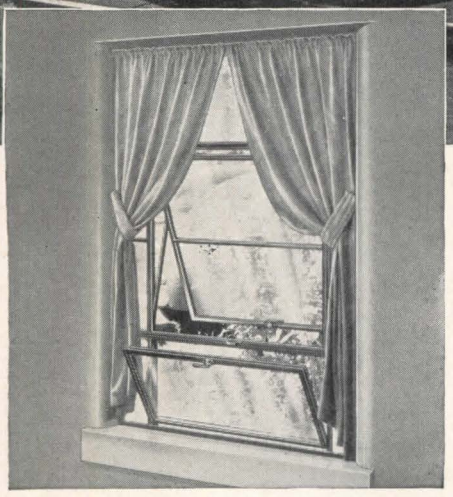
Where the *other* services also count – it's always BAYLEY WINDOWS

Shriners Hospital, Salt Lake City, Utah
Scott & Beecher, Archt., Salt Lake City
Olson Construction Co., Contr.,
Salt Lake City — Lincoln, Nebraska



Highlights of this New Popular BAYLEY Product

- Carries Quality Approved Seal of the Aluminum Window Mfgrs. Ass'n. for materials, construction, strength of sections and air infiltration.
- Modern Appearance.
- Economical — Painting unnecessary.
- Permanent — Long carefree life.
- Simplicity — No complicated mechanism.
- Adaptable to all types of construction.
- Glazing outside — flat surface inside.
- Extra deep sections — Accommodate "Thermopane" or "Twindow" glazing.
- Easily washed from inside.
- Prepared for screens.
- Permits use of accessories, such as draperies, shades, curtains, venetian blinds or awnings.
- Positive acting hardware of white bronze.

73 Years of RELIABILITY

Bayley Aluminum Projected Window

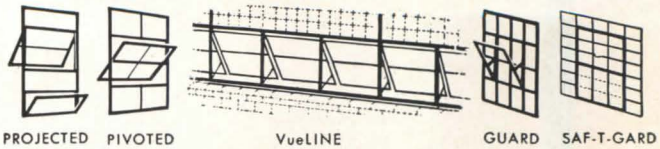
Offers New Features for Modern Hospitals of All Types

The *first* essential to a truly satisfactory relationship is a fine quality product. But much more is also required. Full appreciation of this fact is the bedrock of Bayley's policy — and is the reason descriminating designers from coast to coast have so highly favored Bayley for so many years.

Bayley's determination to better serve through all the building stages — from the building's inception to its occupancy — is again exemplified in the Bayley Aluminum Projected Window It represents the culmination of years of conscientious endeavor. First to fully recognize the universal advantages of the projected window, Bayley refined its desirable features in the most enduring construction material developed through long research by the Aluminum Industry. The result is an ideal window for schools, hospitals, institutional and commercial buildings — but equally suited for private living units — that reflects Bayley's years of specialized window experience.

Regardless of window requirements, you too will find *extra values* in discussing your needs with Bayley. Write or phone.

See Bayley in Sweet's Complete catalogs on aluminum windows, 17a/BA; steel windows, 17b/BAL; Saf-T-Gard Hospital Detention Window, 17b/BAY.



PROJECTED PIVOTED VueLINE GUARD SAF-T-GARD

THE WILLIAM BAYLEY COMPANY

Springfield, Ohio

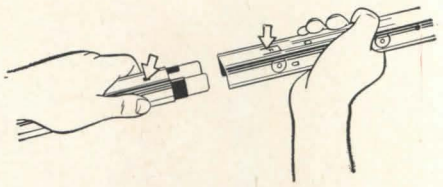
District Sales Offices:

Springfield Chicago 2 New York 17 Washington 16

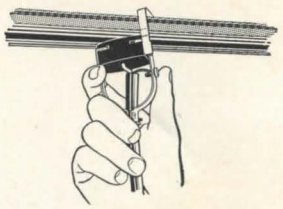
Lighting where and when you need i

. . . without rewiring!

Safe. Sturdy. Current-carrying Trol-E-Duct bus bars are totally enclosed. Duct itself (arrow) supports fixtures. Continuous slot in bottom of duct means you can move lights (or small portable tools on trolleys) anywhere, any time without rewiring. *It's every inch an outlet!*



Quickly installed. Sections go up in a hurry, join without bolting. Sections are prefabricated, standardized in lengths of from 1 to 10 feet. Entire duct can be dismantled and reinstalled easily without a scrapped part.



Convenient. Lighting twist-out plugs slip into duct without cutting off power or upsetting production schedules. Plugs ground on steel casing before contacts touch bus bars, slide in with simple twist anywhere along duct.

Mobile Trolleys. Smooth-rolling trolleys are available to carry small, portable power tools, speed up production. Trolleys ride inside duct on metal wheels. Constant spring pressure against bus bars assures perfect contact.

BullDog Universal Trol-E-Duct lets you add, remove or rearrange lights quickly. No loss of man-hours, money, material.

When it comes to moving lighting fixtures, costs usually skyrocket. Not so with BullDog Universal Trol-E-Duct.

For here is a *truly mobile, fully flexible* lighting system at its money-saving best.

Every inch of Trol-E-Duct is a potential tap-off for lights or small power tools. To move lights or add new ones when you change machine layout, just slip twist-out plugs or trolleys in or out of continuous slot in bottom of duct. Duct itself supports lighting fixtures.

That's all. No rewiring needed. No production lost through shutdowns. No wasted man-hours or scrapped material, either, as with fixed outlet systems.

Trol-E-Duct is prefabricated, standardized and salvable. Installs in a hurry. Can be dismantled and reinstalled without loss.

Get all the facts on this modern, low-cost lighting system that fits present needs . , . provides for future needs, as well. Contact a nearby BullDog Field Engineer. He'll show you an installation in your area that will speak for itself. Or, for descriptive bulletin, write BullDog direct, won't you?

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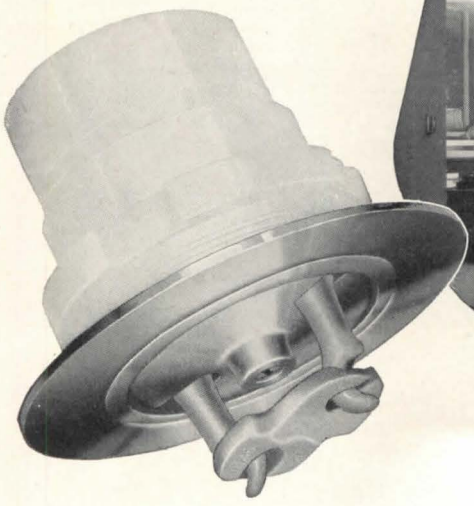
MODERN DOOR CONTROL BY *LCN* · CLOSERS CONCEALED IN DOOR

NEW PLANT OF POWERS REGULATOR COMPANY, SKOKIE, ILLINOIS

LCN CATALOG 11-E ON REQUEST OR SEE SWEET'S • LCN CLOSERS, INC., PRINCETON, ILLINOIS

the only difference...

added *Beauty*



It's the same room in both cases protected by a Viking Sprinkler system . . . the general offices of the Chicago Merchandise Mart . . . Nothing is changed . . . except the sprinkler heads. Note the added attractiveness and unmarred symmetry of this room after the change to *Viking Flush Type Sprinklers.* Viking Flush Type Sprinklers blend quietly with any room design or motif. They are unexcelled from the standpoint of design . . . unexcelled from the standpoint of water distribution.

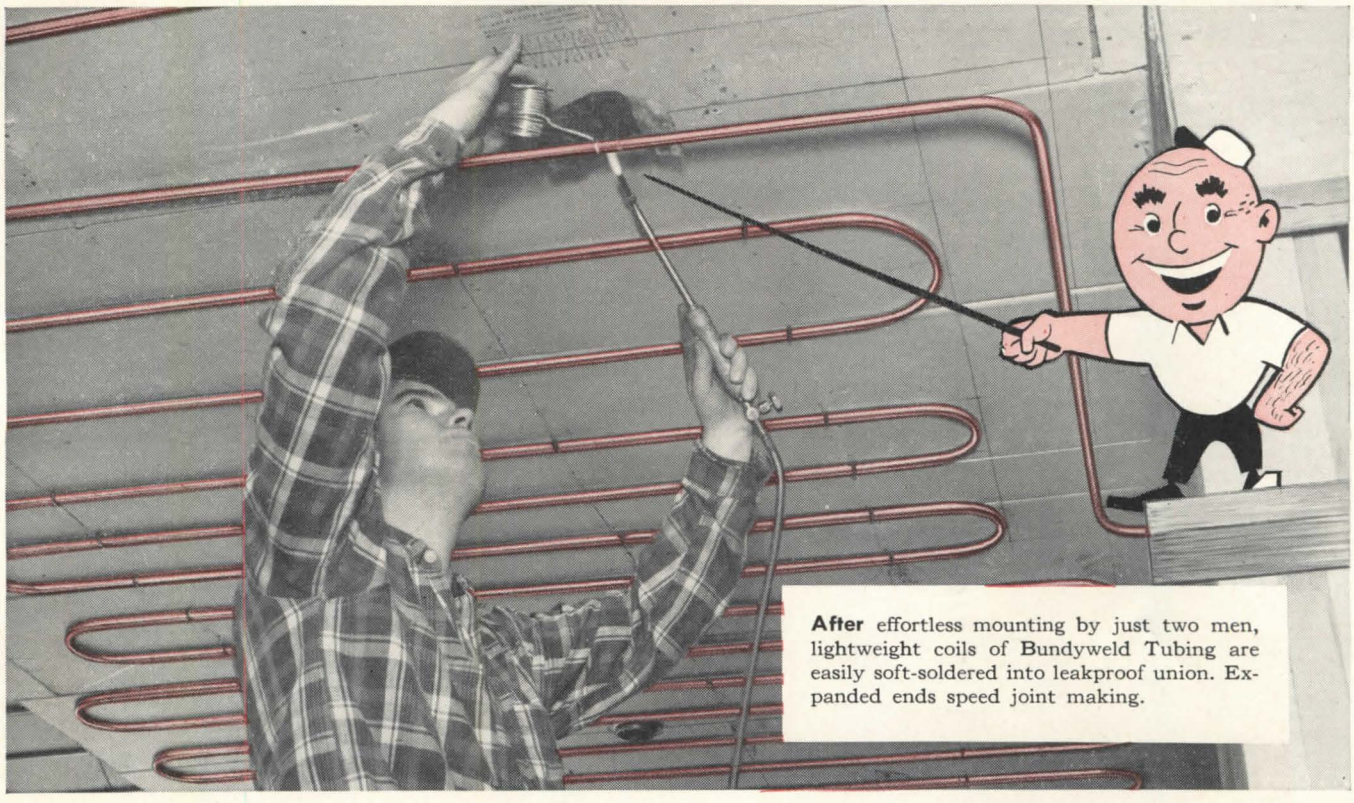
The Viking Flush Type Head exemplifies the entire Viking Sprinkler line . . . is visual evidence of the farsighted engineering, the up-to-date practical engineering that goes into every piece of equipment in the Viking Automatic Sprinkler line . . . the most complete line in the industry.

There is a Viking representative near you . . . ready to help you with the design and installation of a modern Viking fire protection system for your next building. You'll find that his staff of engineers, his experienced, full-time installation crews and his completely stocked warehouse, *located in your area,* will make the design and installation of a sprinkler system quick and easy for you. Contact him, today.

Write for your copy of "Fire and Your Business" . . . facts on how a Viking Sprinkler System can protect your buildings from fire; forever.

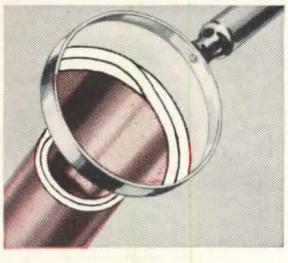
the VIKING corporation

HASTINGS, MICHIGAN



After effortless mounting by just two men, lightweight coils of Bundyweld Tubing are easily soft-soldered into leakproof union. Expanded ends speed joint making.

A new competitive edge, a new sales feature in Bundyweld Ceiling Radiant Heating



Key to Low Cost

Bundyweld is the only tubing double-walled from a single strip. It's steel, copper-coated inside and out. It gives finest radiant heating performance, with savings up to 50% on material costs and installation time.

Standard 20′ or 24′ lengths of Bundyweld are easily formed into coils in shop or on job site. Expanded ends (furnished when specified) are quickly soldered into leakproof union. Joined, lightweight coils are easily mounted onto ceiling, quickly plastered over.

Put your houses years ahead of competitive houses.

Give them the extra sales appeal of Bundyweld Ceiling Radiant Heating—today's fastest-growing, most practical heating method.

More and more prospective home buyers and home builders are inquiring about its lower operating costs, healthfully moderate air temperatures, absence of dirt-catching radiators and registers, streak-free walls and ceilings, unlimited choice of flooring materials.

Proof? Bundy ads in *Better Homes & Gardens* and *American Home* bring coupons from thousands of people wanting the full story on Bundyweld Ceiling Radiant Heating *plus* names of architects and builders installing it.

Why not turn this growing demand to advantage in your own houses? Send the coupon today for more details on Bundyweld Ceiling Radiant Heating and Bundyweld Tubing.

Radiant Heating Division

BUNDY TUBING COMPANY

Detroit 14, Michigan

SEND TODAY! FREE!

LIKE HAVING THE SUN IN YOUR CEILING

Bundyweld
Ceiling Radiant Heating

Radiant Heating Division, Dept. AR-852
Bundy Tubing Company, Detroit 14, Michigan

☐ Send free 20-page nontechnical brochure explaining Bundyweld Ceiling Radiant Heating.

☐ Send Bundy technical radiant heating pamphlet.

Name_____ Title_____

Company_____

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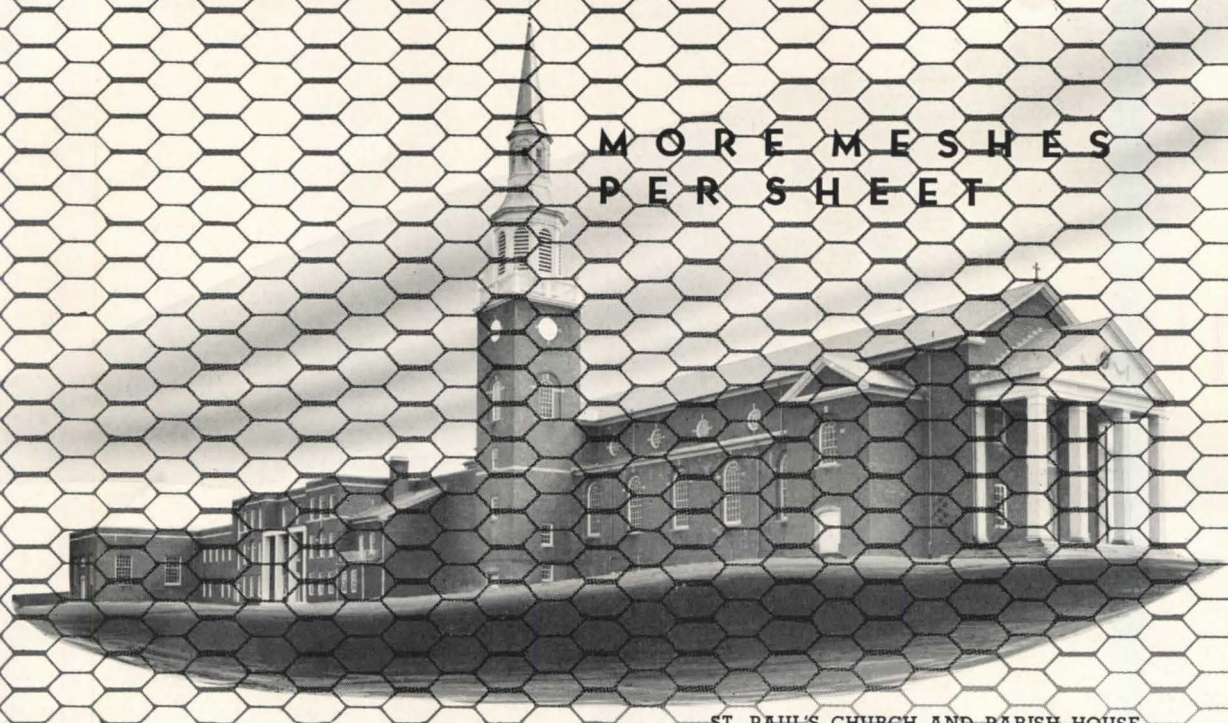
City_____ Zone____ State_____

BOSTWICK DIAMOND MESH METAL LATH

MORE MESHES PER SHEET



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Cram & Ferguson . . . . . Architects-Engineers
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For the ingenious architect

● As an architect, you look at yourself not as an interior decorator, but as an interior designer. And, here is the place where the functional and decorative advantages of Bostwick metal lath and cold-rolled channel enter your plans.

The thinnest and lightest non-bearing walls, having a 2-hour Underwriters' Laboratories fire endurance rating, are made of metal lath. For color and lighting schemes, for hidden heating and air conditioning installations, to get strength and low maintenance, Bostwick metal lath can fit into many of your wall and ceiling plans.

Bostwick, having for over 50 years furnished lath to architects' most exacting specifications, asks you to consult with them on your next job that is "different." We will use our ingenuity, too. Start by writing for Bostwick's full-line catalog today.

the Bostwick steel lath company

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The
INVISIBLE SUPERINTENDENT
at the
MORTAR BOX

ASSURES THE MIX YOU SPECIFY

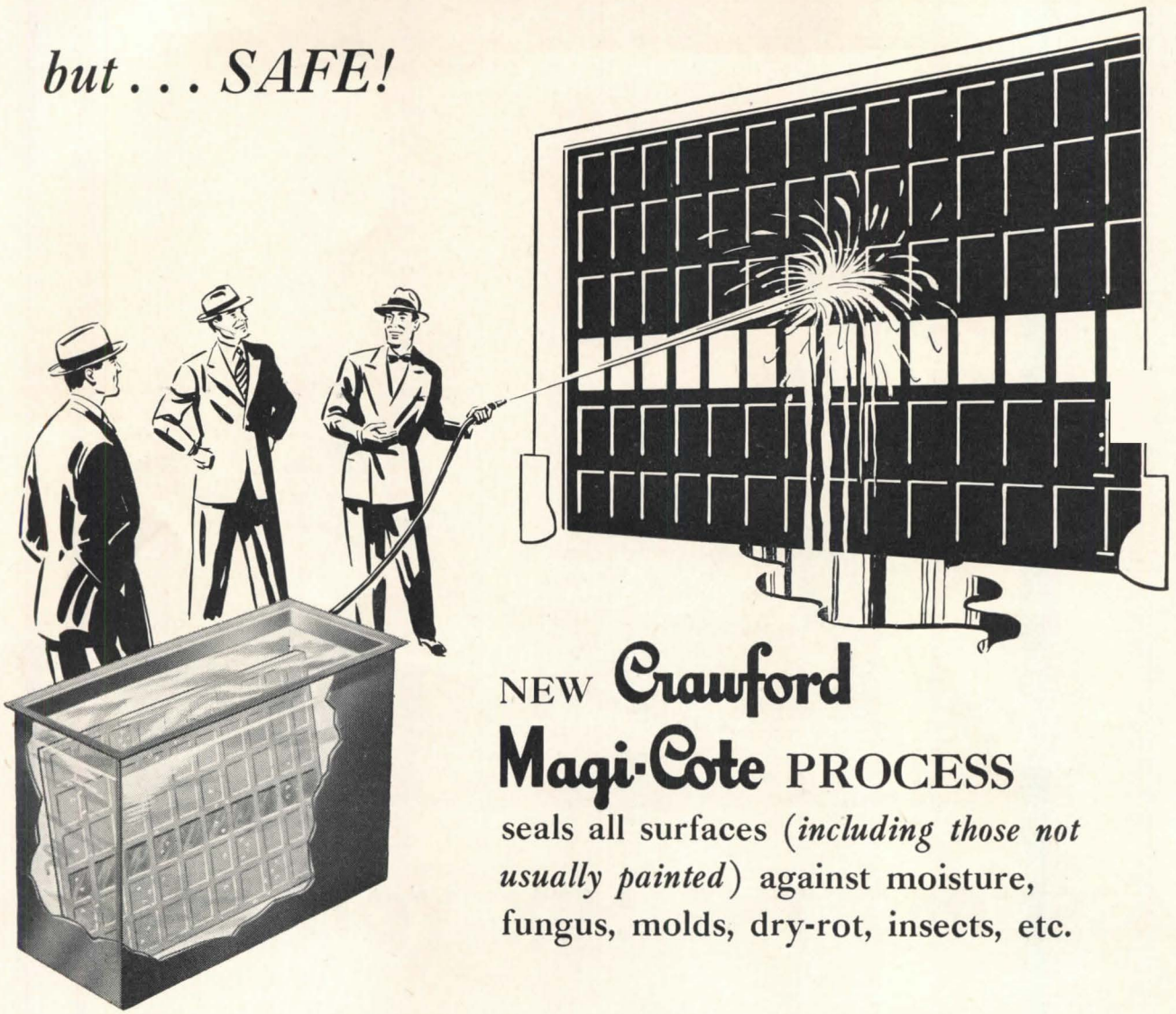
When the architect specifies definite proportions of portland cement and lime for mortar, he has no assurance that his specifications will be accurately followed unless his superintendent is constantly at the mortar box. . . The proportion of lime may be increased for the sake of plasticity, or the mix may be over-sanded. In either case, the strength of the mortar is impaired. . . The use of Brixment, however, is your assurance that all mortar will be uniform in strength and color and that your specifications will be accurately followed. If over-sanded, Brixment mortar works short, and with no lime in the mix, the necessary plasticity can be secured only by using the proper amount of Brixment.

BRIXMENT

LOUISVILLE CEMENT COMPANY, Incorporated, LOUISVILLE, KENTUCKY

NOT YET PAINTED

but . . . SAFE!



NEW Crawford Magi-Cote PROCESS

seals all surfaces (*including those not usually painted*) against moisture, fungus, molds, dry-rot, insects, etc.

EACH section of each Crawford-built door (east of the Rockies) now undergoes a 3-minute Magi-Cote Process immersion in colorless liquid chemical seal which closes wood pores to all destructive elements.

Magi-Cote penetration is such that a 10′ x 10′ door drinks up five quarts of liquid. Sections are then air dried. Magi-Cote effectively seals all surfaces (including those usually left unpainted) against moisture, fungus, molds, dry-rot, insects, etc. It protects the door against soiling during erection and against moisture while it is waiting for whatever finish is to be applied. Because it controls the porosity of the wood, it is an excellent base for varnish or paint, and gives these finishes superior stand-out and durability because their binders are not absorbed but stay where they belong, in the material, on the surface.

When you specify Crawford-built doors (Marvel-Lift, Fleetwood, Stylist or Doormaster, all sizes, all models, east of the Rockies) your client gets Magi-Cote Process protection as standard.

A sample of Magi-Cote treated wood is yours for the asking.

"Standard of the Industry"

CRAWFORD DOOR COMPANY

Main Plant: 83-401 St. Jean Ave., Detroit 14, Michigan

FABRICATING PLANTS in Portland • Tacoma • Los Angeles
San Francisco • Dallas • Kansas City • Chattanooga • Milwaukee
Hudson • Cadillac • Williamsport • Ottawa, Canada.

DISTRIBUTING WAREHOUSES in 79 major cities.

SALES AND SERVICE companies everywhere.

BOY • IT'S A GIRL • IT'S A BOY • IT'S A GIRL • IT'S A BOY • IT'S A GIRL • IT'S A

we'll even signal the expectant father

B-L-U-E

P-I-N-K

ARCHITECTS KNOW
NO ANXIOUS MOMENTS
WHEN THEY SPECIFY STANDARD
HOSPITAL SIGNAL AND CLOCK SYSTEMS

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STANDARD *Since 1884*

THE STANDARD ELECTRIC TIME COMPANY
81 LOGAN STREET • SPRINGFIELD 2, MASSACHUSETTS

Carnegie Endowment's 12-Story "INTERNATIONAL CENTER"

Opposite the United Nations Plaza

SAVES STEEL WITH REINFORCED CONCRETE

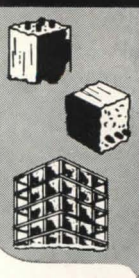
OWNER: Carnegie Endowment for International Peace. ARCHITECTS: Harrison & Abramovitz. GENERAL CONTRACTOR: Cauldwell-Wingate Co.

In this impressive Manhattan structure, planned for the use of nonprofit organizations active in promoting international understanding, reinforced concrete was chosen for framing and floors . . . in order to *save steel* for national defense.

By designing their structures for reinforced concrete, builders all over the country are conserving the nation's vital steel supply and stretching their own steel allotments. Furthermore, they are *reducing the cost* of the buildings they erect.

Because reinforced concrete framing is faster to erect, it also provides extra months of rental income. In addition, it is inherently firesafe and durable—highly resistant to wind, shock, and quakes. On your next structure, *design for reinforced concrete!*

HOW REINFORCED CONCRETE SAVES STEEL



COLUMNS Use Less Steel

BEAMS Use Less Steel

Complete **BUILDINGS** Use Less Steel

CONCRETE REINFORCING STEEL INSTITUTE • **38 South Dearborn Street, Chicago 3, Illinois**

The RLM Standards Institute Announces its

1952 ENLARGED EDITION

of the RLM Specifications Book

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Latest RLM Lighting Data:
Coefficient of Utilization Tables
Light Distribution Curves
Typical Reflector Shapes

UP-TO-DATE

Two New RLM Specifications:
No. 4 RLM 300-1500-w Porcelain Enameled Reflectors for High Mounting
No. 40 RLM 300-1500-w Aluminum Reflectors for High Mounting

HELPFUL

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Nos. 5, 6 RLM 48" CLOSED END UNITS two and three-lamp
Nos. 9, 10 RLM 48" OPEN END UNITS two and three-lamp
Nos. 22, 23 RLM 48" TWO-LAMP UNITS with LONGITUDINAL SHIELD open and closed end
Nos. 7, 11 RLM 60" TWO-LAMP UNITS open and closed end
Nos. 28, 29 RLM 72" OPEN END UNITS two and three-lamp
Nos. 30, 31 RLM 96" OPEN END UNITS two and three-lamp

AUTHORITATIVE

Revisions of and Additions to RLM Incandescent Specifications:
No. 1 RLM DOME REFLECTOR
No. 2 RLM DEEP BOWL REFLECTOR
No. 3 RLM SYMMETRICAL ANGLE REFLECTOR
No. 18 RLM GLASSTEEL DIFFUSER

INFORMATIVE

Easy-to-Read, Illustrated "Story of the RLM Label": The need for standards in Industrial Lighting . . . History of the RLM Institute . . . How the RLM Inspection and Certification Program works . . . The Importance of Porcelain Enamel . . . etc.

Published as a contribution to the advancement of the Science of Industrial Lighting, and as an aid to everyone who buys, sells, recommends or specifies Industrial Lighting Equipment.

You are invited to obtain your complimentary copy of this latest reference work on industrial lighting equipment. Architects, lighting engineers, electrical contractors, etc. recognize the RLM STANDARD SPECIFICATIONS BOOK as an authoritative aid in the specification, recommendation and purchase of industrial lighting units. It is the only industrial lighting book which helps evaluate lighting units in terms of illumination, construction and performance standards. Further, the RLM Specifications Book provides ready-made specifications which assure industrial lighting units that meet approved minimum standards of quality.

The 1952 Edition is designed to be even more helpful. It contains newly-approved specifications and latest revisions, and for the first time, valuable coefficient of utilization and light distribution data. Thus the user has at his fingertips the *complete picture* on each RLM unit. If your work is concerned with industrial lighting equipment, a copy of the 1952 Edition RLM SPECIFICATIONS BOOK is available to you without cost or obligation. Write RLM Standards Institute, Suite 827, 326 West Madison Street, Chicago 6, Illinois, for your free copy.

RLM STANDARDS INSTITUTE
INCORPORATED

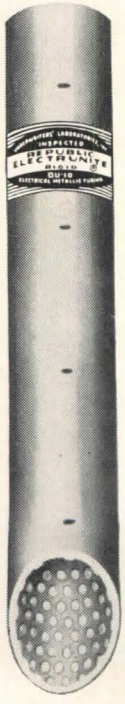
The letters RLM stand for Reflector and Lighting Equipment Manufacturers

R-5798

"Shaker Towers", Cleveland, Ohio.
Shaker Coventry Corp., Owners; Joseph Ceruti, Architect; Roediger Construction, Inc., General Contractors; Superior Light Co., Electrical Contractors.

"SHAKER TOWERS" where ELECTRUNITE E.M.T. helps keep electrical servants on the job

Electricians like the ease of installing ELECTRUNITE E.M.T. *in bar-joist construction. Accurate bends and stubs are easy to make with the exclusive inch-markings and the handy lightweight* ELECTRUNITE *Bender.*



SEE SWEET'S FILE

or write us for detailed information on these Republic Steel Building Products:

Pipe—Sheets—Roofing
Enduro Stainless Steel
Toncan Enameling Iron
Electrunite E.M.T.
Fretz-Moon Rigid Steel Conduit
Taylor Roofing Ternes
Berger Lockers, Bins, Shelving
Berger Cabinets for Kitchens
Truscon Steel Windows, Doors, Joists and other Building Products

The circuits serving the tenants in this new 92-unit apartment are protected by the steel walls of ELECTRUNITE E.M.T. against fire, moisture, and mechanical damage. Tenants are protected from stray currents and shock by the built-in grounding system which only metal raceways assure.

ELECTRUNITE E.M.T. adds years to the life of any electrical installation... the galvanized end-to-end surface of ELECTRUNITE E.M.T., unbroken by thread-cutting, gives this raceway the unbroken protection of zinc in concealed, exposed, or concrete-slab installations, for which it is approved by the National Electric Code.

If you have extra-corrosive locations when even the best raceway material goes to pieces too soon, install ELECTRUNITE "Dekoron-Coated" E.M.T. It's steel armored with plastic that is impervious to a long list of corrosive chemicals. Its cost is quickly offset by its much longer life in tough atmospheres. Write for literature.

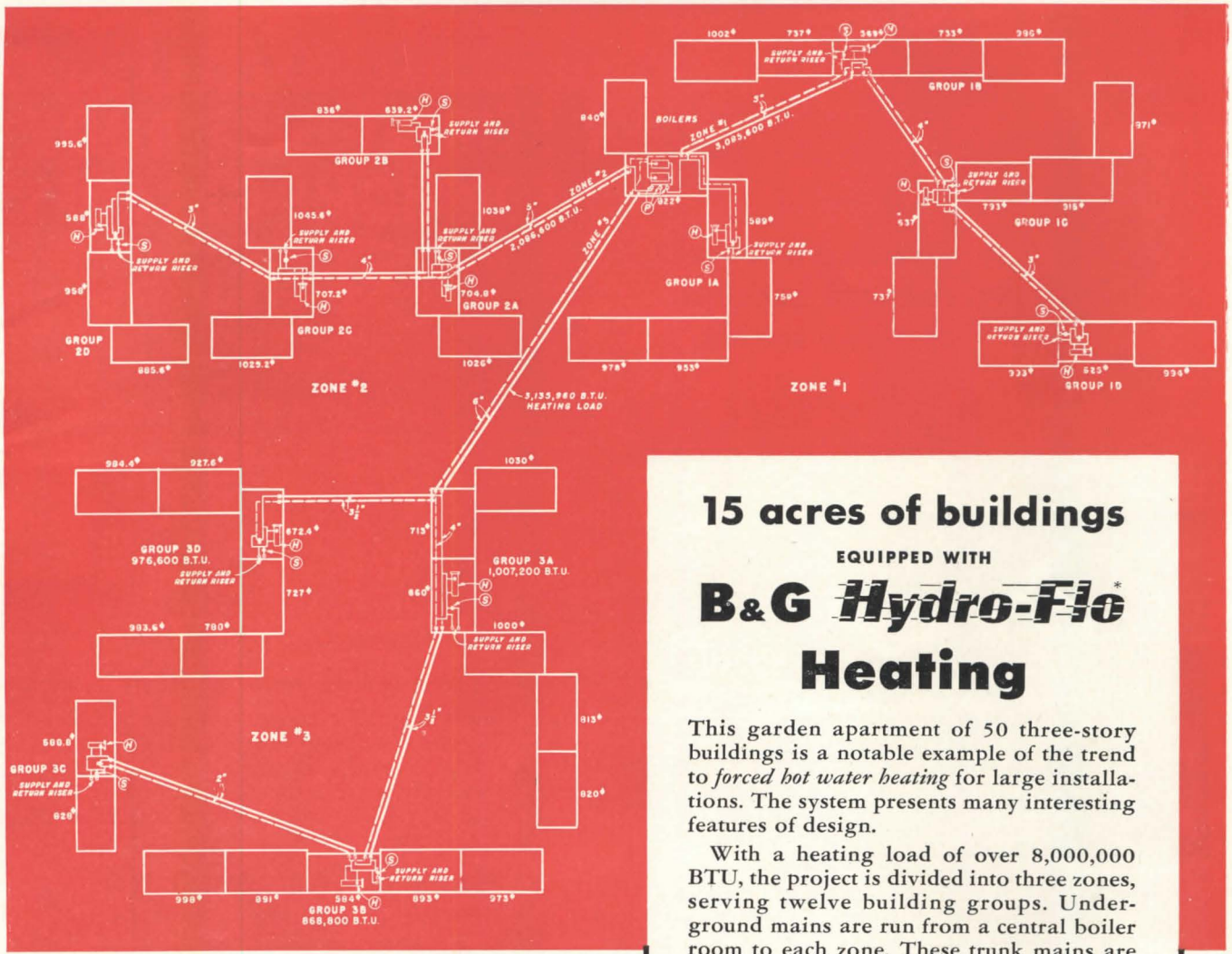
REPUBLIC STEEL CORPORATION
STEEL AND TUBES DIVISION
224 EAST 131st STREET • CLEVELAND 8, OHIO

50th ANNIVERSARY 1902 1952 STEEL and TUBES DIVISION

REPUBLIC STEEL

Republic
ELECTRUNITE E.M.T.

ELECTRUNITE...THE ORIGINAL ELECTRICAL METALLIC TUBING



15 acres of buildings

EQUIPPED WITH

B&G *Hydro-Flo** Heating

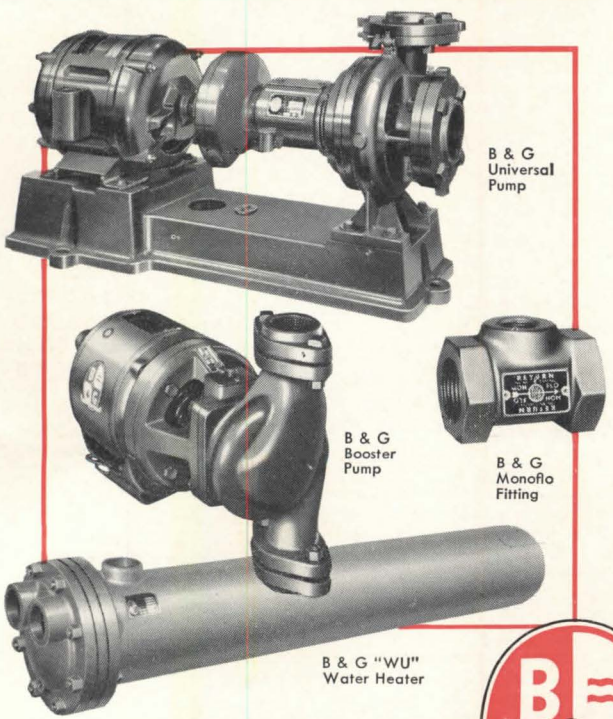
This garden apartment of 50 three-story buildings is a notable example of the trend to *forced hot water heating* for large installations. The system presents many interesting features of design.

With a heating load of over 8,000,000 BTU, the project is divided into three zones, serving twelve building groups. Underground mains are run from a central boiler room to each zone. These trunk mains are of two-pipe design while the branches to the various building groups are single main circuits equipped with B & G Monoflo Fittings. The Monoflo mains are carried in the roof space and feed down to the radiation.

A novel piping arrangement permits the heating of each building group to be individually controlled. B & G Universal Pumps in the boiler room are used as primary pumps, for circulating the trunk mains. The Monoflo mains are independently circulated by secondary B & G Boosters. This method of pumping isolates the branch circuits so that they are not affected by the pressure head developed by the primary pump.

Domestic hot water is provided by a B & G Tankless Heater located in each building group. Water from the heating trunk main is pumped through the Heater by a B & G Booster.

Send for Catalog of B & G Hydro-Flo Heating Products.



The B & G Hydro-Flo equipment illustrated above is used in the installation described here.

*Reg. U. S. Pat. Off.

BELL & GOSSETT COMPANY

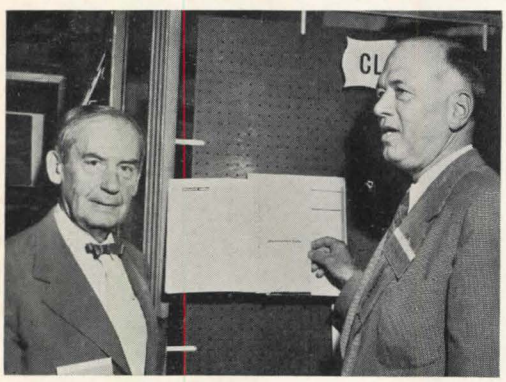
Dept. CP-32, Morton Grove, Illinois

Canadian Licensee: S. A. Armstrong Ltd., 1400 O'Connor Drive, Toronto

1952 A.I.A. CONVENTION

(*Continued from page 204*)

W. H. Tusler, Minneapolis; Harold Willis, Boston; Kenneth Reid, Vermont



Two deans: Walter Gropius of Harvard; William Wurster, University of California

William Wiener, Shreveport; Herbert Smith and Frank Lopez, ARCHITECTURAL RECORD; *Moise Goldstein, New Orleans*

Tommy Weber Photos

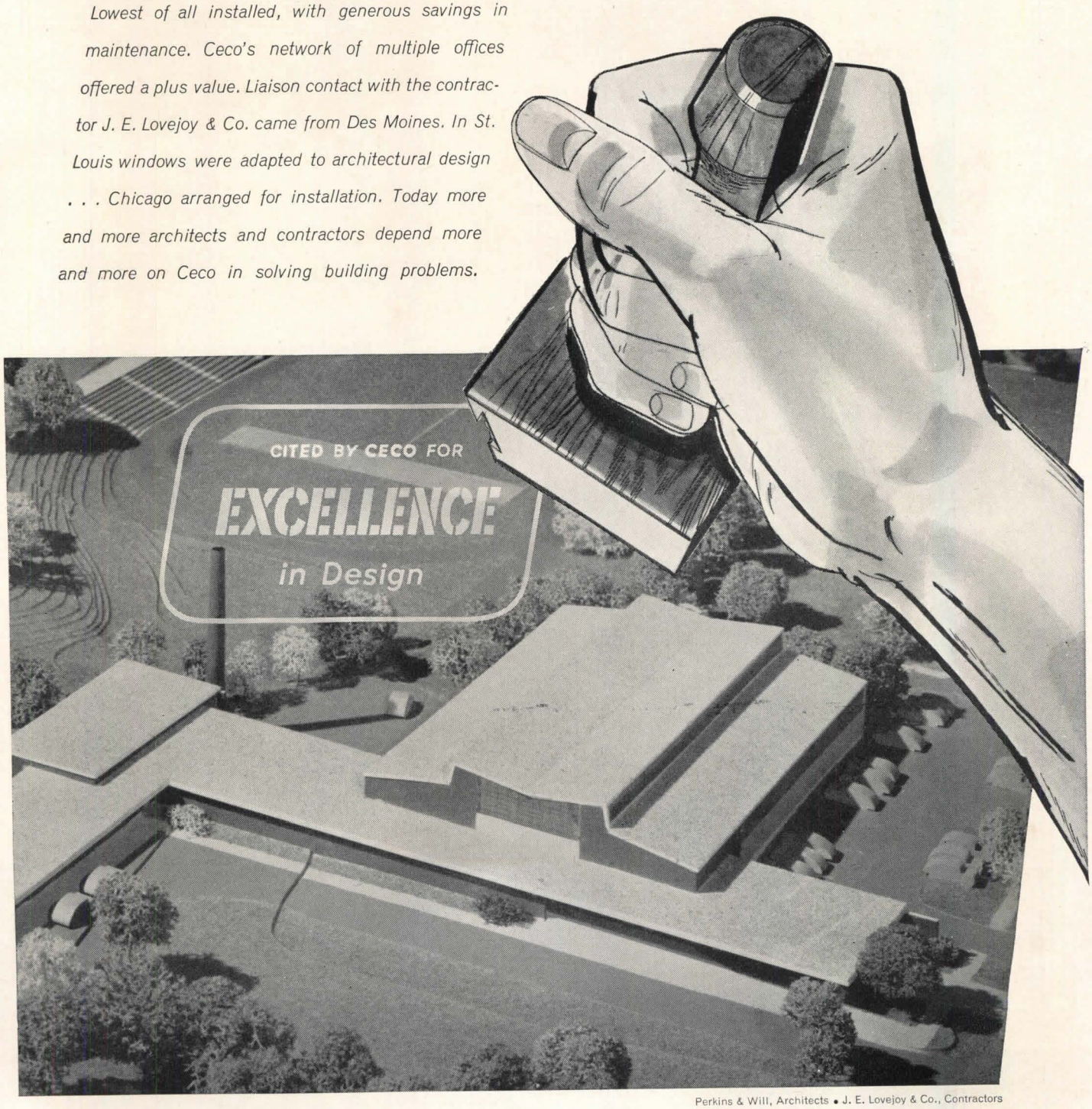
Top left: Gordon Ferguson, Albuquerque, and Truman Mathews, Santa Fe, at one of the 60 building products exhibits with Alonzo Clark. Above: Henry Kamphoefner, N. C. State College School of Design dean, with Olindo Grossi, chairman of Pratt Institute's Department of Architecture, and Mrs. Grossi

Energetic Marshall Shaffer, U. S. Public Health Service architect, and B. Sumner Gruzen of New York

Edward L. Varney, Jr., Phoenix; William D. Merrill, Honolulu; Mrs. Varney; Mrs. Frederick Weaver, Phoenix

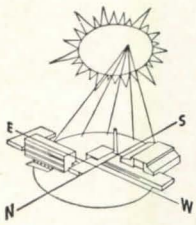
...to better daylight schools

light gets in, more view, too. They won't rot, warp, stick or swell . . . provide controlled ventilation. Cost? Lowest of all installed, with generous savings in maintenance. Ceco's network of multiple offices offered a plus value. Liaison contact with the contractor J. E. Lovejoy & Co. came from Des Moines. In St. Louis windows were adapted to architectural design . . . Chicago arranged for installation. Today more and more architects and contractors depend more and more on Ceco in solving building problems.



Perkins & Will, Architects • J. E. Lovejoy & Co., Contractors

In construction products* CECO ENGINEERING *makes the big difference



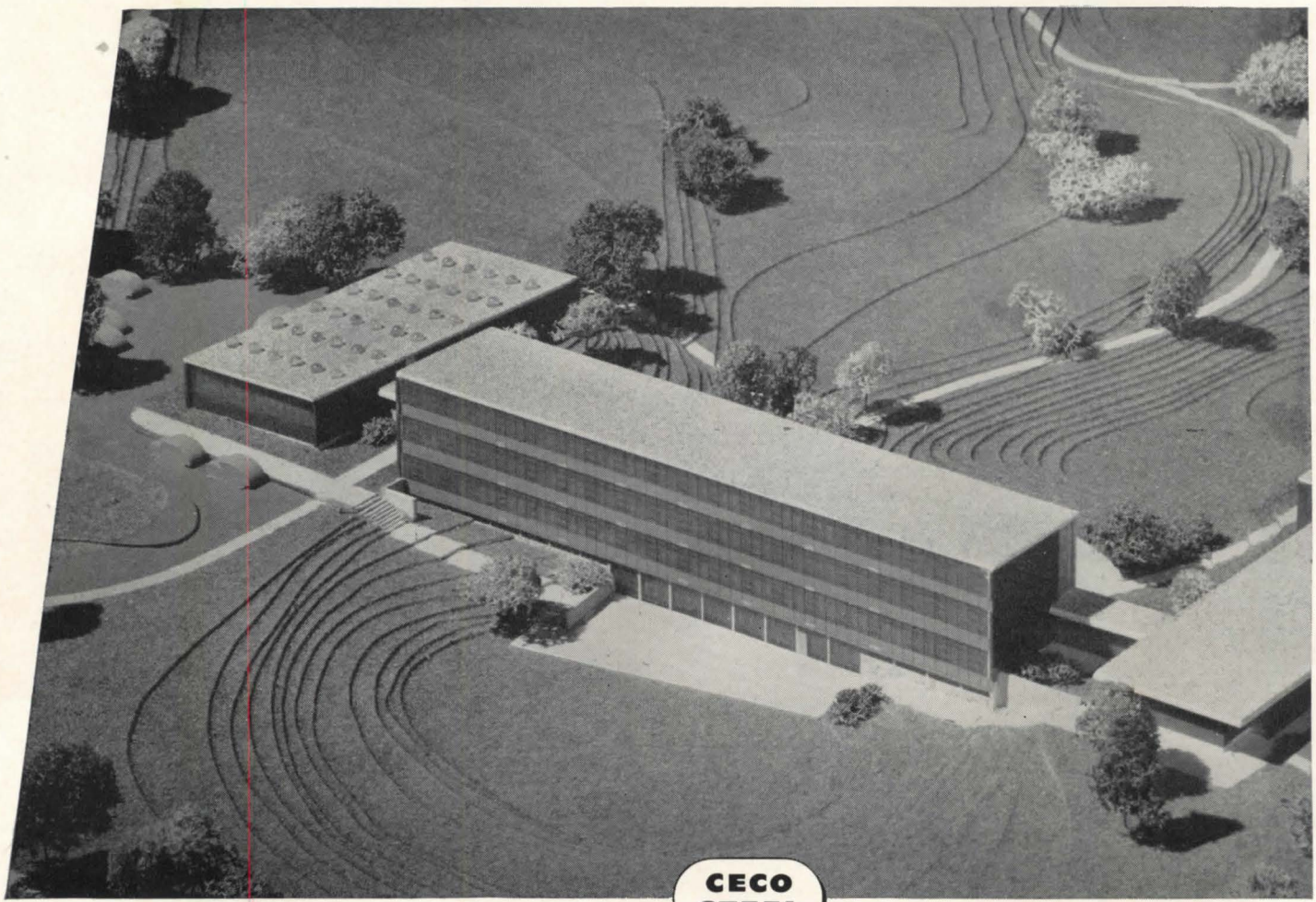
How to borrow a sunbeam

Borrowing a sunbeam to daylight a school is a very neat trick if you can do it.

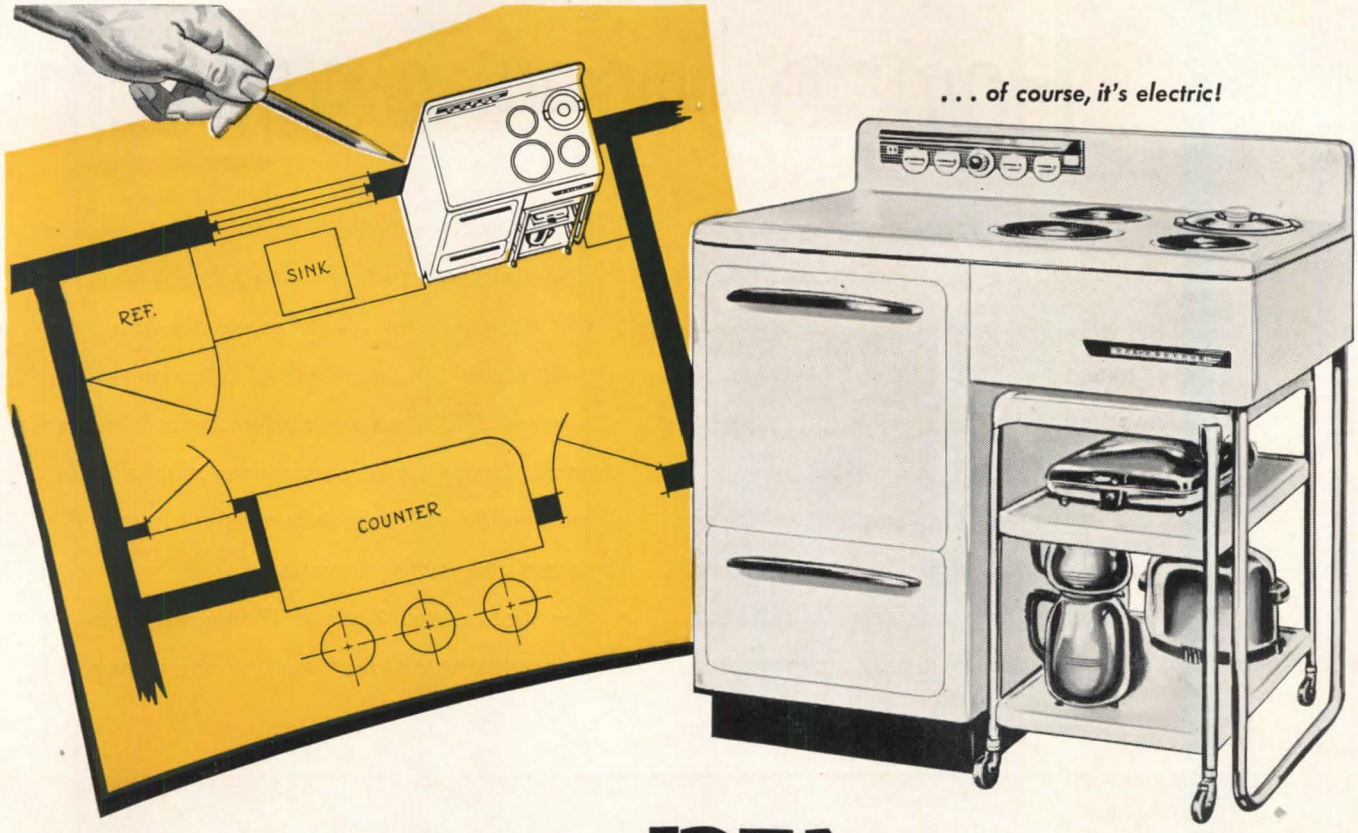
And that's just what Perkins & Will, architects did in designing the Keokuk, Iowa High School. Ceco steel windows played a big part in this unique method of daylighting for better vision.

Functional use of daylight was achieved through window arrangement and purposeful positioning of the building. Built side by side, corridors and classrooms all have outside exposures. Classrooms face north, utilizing diffused indirect north light. Corridors take the shape of window walls from floor to ceiling with a southern view . . . and on one side open strips at the top of the inner walls of classrooms admit "borrowed light" from the corridor areas. Corridors become pleasing sun-lit passageways strikingly different from the dark tunnels so prevalent in central corridored schools of earlier days.

Ceco Architectural Projected Windows were selected because their slender muntins mean more



CECO STEEL PRODUCTS CORPORATION General Offices: 5601 W. 26th St., Chicago 50, Illinois
Offices, warehouses and fabricating plants in principal cities



. . . of course, it's electric!

You're looking at an IDEA that Makes Space Work Overtime

Kitchen storage is at a premium in most small houses and apartments.

One way to help beat this problem is with the Westinghouse Rancho Range. The tuckaway space will accommodate a roll-out table. In effect, you are adding 7⅓ square feet of table top and shelf area storage in addition to big range cooking capacity . . . without construction cost.

This combination offers the residents flexibility of use. The table can be moved anywhere, can be used as a teacart. Or, the tuckaway space can be used to house a kitchen stool, wastebasket or to straddle a radiator or register.

Here, again, is another example of the originality and adaptability of Westinghouse-designed Appliances. Look through our new 1952 catalog, you'll find that Westinghouse Appliances offer many opportunities for flexibility in planning homes for electrical living. Send for your free copy, today.

Westinghouse Electric Corporation
Electric Appliance Division
Mansfield, Ohio

Gentlemen:

Please send me a copy of your new 1952 Appliance Catalog.

Name_____

Firm Name_____

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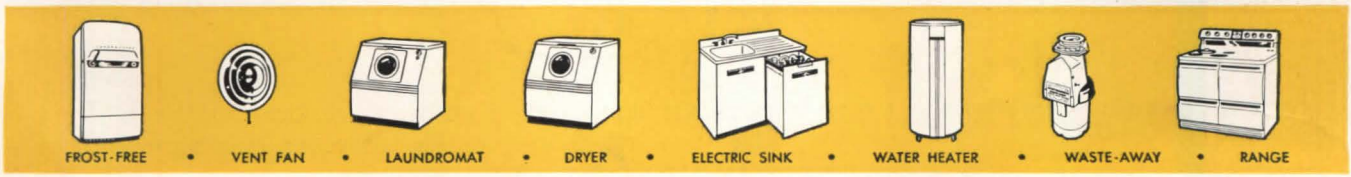
AR-8

YOU CAN BE SURE..IF IT'S Westinghouse

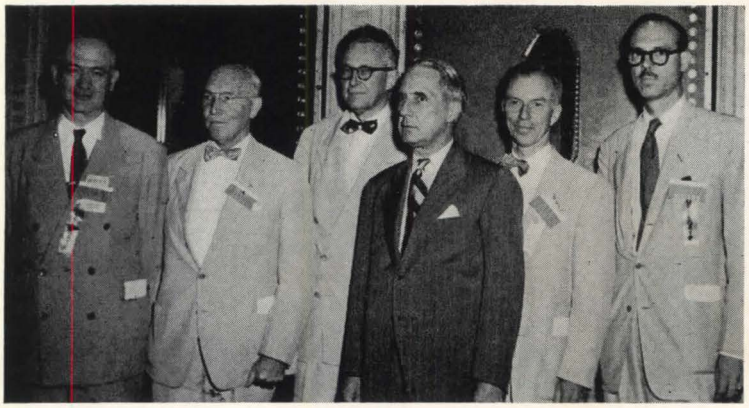


FROST-FREE • VENT FAN • LAUNDROMAT • DRYER • ELECTRIC SINK • WATER HEATER • WASTE-AWAY • RANGE

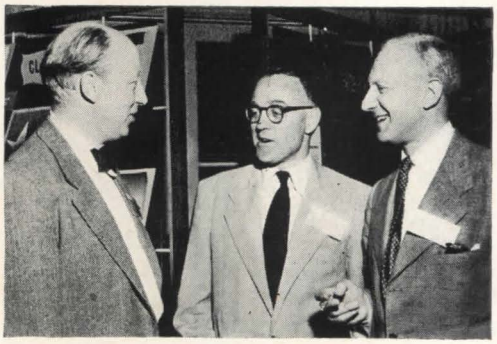
1952 A.I.A. CONVENTION

(*Continued from page 11*)

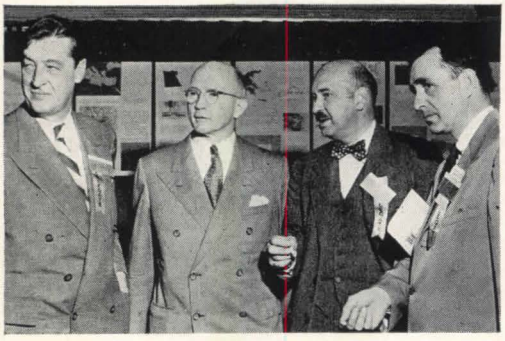
Tommy Weber Photos



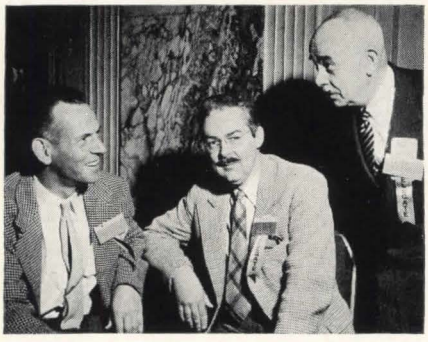
After the convention was over: Convention Co-Chairman Matthew Del Gaudio, N. Y.; C. Storrs Barrows, Rochester; President Stanton; James Kideney, Buffalo; Convention Chairman Arthur Holden, N. Y.; Alonzo Clark, convention committee secretary



Danish visitor Preben Hansen of Copenhagen chats with Joseph B. Mason of ARCHITECTURAL RECORD *and Julian Berla, Washington, D. C.*



East meets West: Francis Joseph McCarthy of San Francisco; John Root, Chicago; Walter Bogner, Cambridge, Mass.; Robert S. Hutchins of N. Y. C.



Philip Will and Morgan Yost of Chicago and Kenneth K. Stowell of New York. Mr. Stowell headed the student program

Edwin Lundie of St. Paul, Paul Thiry of Seattle and Emerson Goble of ARCHITECTURAL RECORD

Ralph Walker and Frank Lloyd Wright. Mr. Wright made two appearances at the convention—as a visitor the opening day and later to address students: "my heirs"

Sober talk: Walter Gropius of Harvard; Louis I. Kahn of Philadelphia; Serge Chermayeff, former head of the Institute of Design, Chicago; and Eero Saarinen of Bloomfield Hills, Mich.

Roy Larson of Philadelphia and Francis Keally of New York shake hands; Alfred Bendiner of Philadelphia and A.I.A. Executive Director Purves look unconvinced

Washington threesome: BRAB Executive Director William Scheick; Managing Director Harry Plummer of S.C.P.I.; Walter Taylor, A.I.A. research and education head

The president at a party—Glenn Stanton takes time out of a busy week for some fun. Walter H. Kilham, New York City, is sharing the joke

PORCELAIN ENAMEL—9: Sign Letters

Prepared by Harold Edelman, A.I.A.
Instructor at Pratt Institute

Sign Letters

1. Design — Any shape or size can be constructed with almost any cross section. The architect should check the stock shapes of manufacturers to see if these may be used instead of special designs that may vary only in unimportant respects.

2. Standard Types of Letters — Non-Illuminated:

a. Brushed Letters — stencilled on flat panel.

b. Flat Letters — cut from heavy gauge sheets.

c. Beveled Letters — made from heavy gauge sheets.

d. Raised Letters — usually a channel shape built up of sheet metal with the legs set to the rear. This is the most widely used type.

3. Standard Types of Neon-Illuminated Letters:

a. Channel Letters — legs are set to front with neon tubes between.

b. Insert Letters — the legs are set to the front with a metal insert between and the neon tubes wired to the insert.

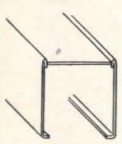
c. Neon Letters — the letter is formed from the neon tube itself and wired directly through ¾ in. diameter holes to the surface of the porcelain enamel panel or any of the letter types listed above under "*non*-illuminated".

4. Cross Section of Letters — *see Diagram A.*

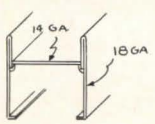
5. Cross Sections of Curb Boxes or Raceways — usually a channel with legs to the rear, used horizontally to support rows of letters. A simple channel is not good design as the face will usually buckle during firing. Curb boxes are usually designed as a heavy flat or ribbed face welded or fastened to a lighter top and bottom.

Diagram A.

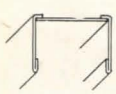
CONSTRUCTION OF LETTER CROSS SECTIONS



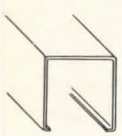
RECOMMENDED — arc welds do not show, economical



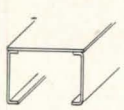
RECOMMENDED — arc welds do not show, economical



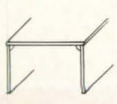
GOOD — for large letters, spot welded, economical



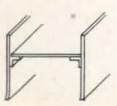
POOR — gas welded, heat may buckle face



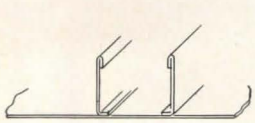
NOT RECOMMENDED — arc welded, does not finish well



NOT RECOMMENDED — arc welded, does not finish well

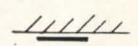


POOR—spot welded with angles, buckles excessively, too expensive

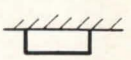


IMPOSSIBLE — flanges welded to sign background

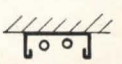
DIAGRAMMATIC SECTIONS OF LETTER TYPES



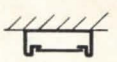
Flat letter



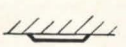
Raised letter



Neonized channel letter



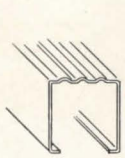
Neonized insert letter
neon tubes are placed in front



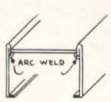
Beveled letter

Diagram B.

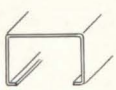
DIAGRAMMATIC CROSS SECTIONS OF CURB BOXES



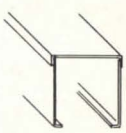
RECOMMENDED — face reinforced with ribs



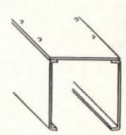
RECOMMENDED — arc welded



POOR — buckles under firing except on small sections 3 by 3 in. by 18 ga and 4 by 4 in. by 16 ga are O.K.



Fastenings show top and bottom



Fastenings show on face

MILCOR* Casing Bead

for windows and doors

. . . creates smart interior beauty and satisfies everyone all down the line

At the drafting board — Milcor Casing Bead gives you freedom to design door and window openings flush with surrounding walls.

On the job site — Milcor Casing Bead is easy to install and finish; gives a secure bond and key for the plaster. And because Milcor Casing Bead is made of steel, it assures a lifetime of interior beauty.

That's why you please craftsmen and clients alike, when you specify Milcor Casing Bead. A variety of styles is available — solid- and expansion-wing types. Refer to the Milcor Manual in Sweet's.

*Reg. U. S. Pat. Off.

M-104

INLAND STEEL PRODUCTS COMPANY

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New OPERATIONAL EASE!

Now, windows so simple and easy to close, the youngest child can manage them. Just push-out or pull in. Opened fully or only a fraction vents stay put in any position.

New INSTANTANEOUS WEATHER CONTROL!

All vents can be opened fully or closed as tight as a refrigerator door, *in less than one second.* Nothing to crank...the Control Bar opens and closes all vents.

Absolutely INJURY-PROOF!

Completely concealed and enclosed Ludman Auto-Lok operating mechanism provides "weightless balance" for every vent. Nothing to jam fingers or catch clothing. No straining.

New VANDAL PROTECTION!

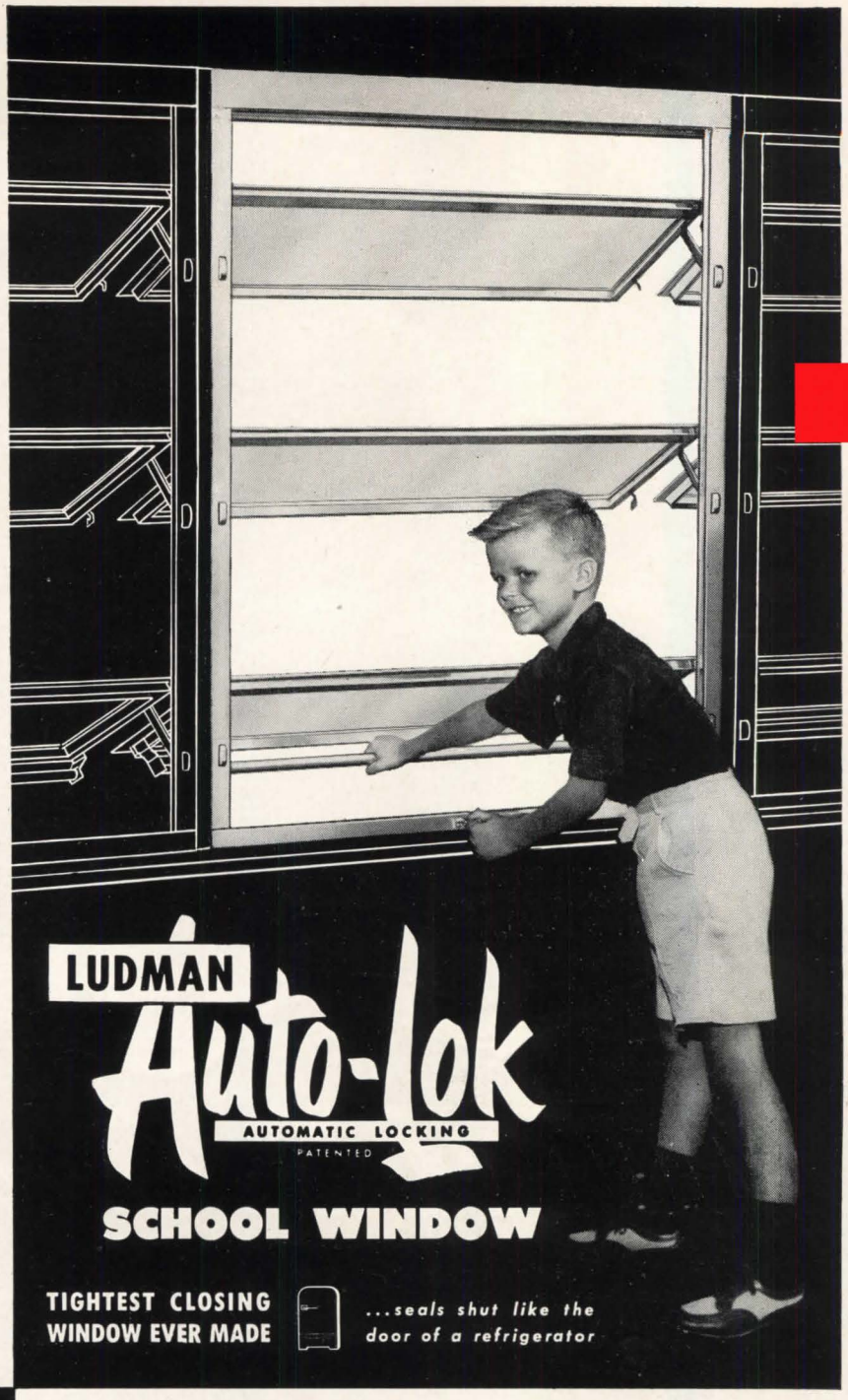
Patented, automatic-locking Ludman Auto-Lok hardware locks each vent separately and independently. New Center Latch locks bottom vent after all other vents lock automatically. *Auto-Lok Windows cannot be forced open from the outside!*

New MAINTENANCE ECONOMY!

Now, windows that are positively "student-proof!" No parts to work loose...no operator handles to become bent or broken...no gears to become stripped. No adjustments or replacement of any part of the Ludman Auto-Lok operating mechanism necessary *ever!*

Lifetime TROUBLE-FREE OPERATION!

Auto-Lok Windows are the finest windows ever made for schools. They are the result of years of special research and study of school window problems, and are guaranteed to last a lifetime under the most severe school usage.



MAIL THIS COUPON *today*

ARCHITECTS: Write for complete information and specification before you plan another school!

CONTRACTORS & ENGINEERS: Find out why Ludman Auto-Lok Windows for Schools are easier, quicker to install!

SCHOOL BOARD MEMBERS: You can't afford not to get all the facts about this new Ludman Auto-Lok Window, designed exclusively for schools!

LUDMAN CORPORATION
P. O. Box 4541, Dept. AR-8 Miami, Florida

Gentlemen:
Please send me, at once, complete information regarding the new, revolutionary Ludman Auto-Lok Window for Schools.

And, where can I see this new window?

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- ☐ a Contractor
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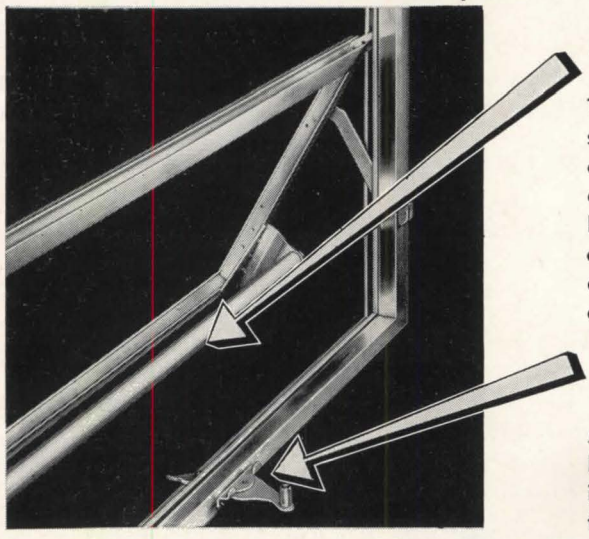
ANOTHER LUDMAN FIRST!

THE NEW LUDMAN Auto-Lok AUTOMATIC LOCKING PATENTED

SCHOOL WINDOW

Designed to meet all school window requirements

Here is a window designed and engineered exclusively to meet all the problems of windows that are operated, regulated and must withstand the abuse in use by school children. Primarily, the advantages of Auto-Lok Windows for schools are better, and more easily controlled ventilation...fresh air *all* the time...even when it's raining...and, positive tight closure to eliminate the "cold zone" around windows. Now, to these outstanding advantages, Ludman Engineering has added a new sturdy control bar for the simplest push-out operation.



New LUDMAN Auto-Lok Control Bar

The simplest operating device ever designed! Quick, safe, effortless opening and closing can be accomplished by the youngest child. Handsome, smooth aluminum alloy bar takes the place of slower turning operator... reduces window operation to absolute minimum. No maintenance, no adjustments ever!

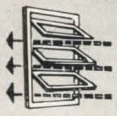
New LUDMAN Auto-Lok Safety-Lock

An improved locking feature that securely locks the bottom vent. Center position makes it handier, more accessible. Extra protection against intruders.

PLUS *these famous regular* LUDMAN Auto-Lok *features...*

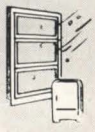
1. FRESH AIR WHILE IT'S RAINING...

No more running to close windows ...rain can't enter through Auto-Lok's scientifically designed slanting vents.



2. WARMER IN WINTER...

Auto-Lok Windows are the tightest closing windows ever made by actual laboratory tests. Heat stays in...cold stays out...cutting fuel costs!



3. COOLER IN SUMMER...

Auto-Lok Windows open widest... almost 90°. The slanting vents help to scoop in even the slightest breeze...always inward and upward thus eliminating drafts.

4. HANDSOME INTERIORS & EXTERIORS

Narrow horizontal lines and graceful tilt of vents in every open position add distinction to any school building.

5. EASIEST, QUICKEST WINDOW TO CLEAN

Nothing to lift out...no sash to remove...no gadgets to disengage. Simply open wide and clean all glass from the inside...top vents, too!

6. COMPLETELY CONCEALED HARDWARE

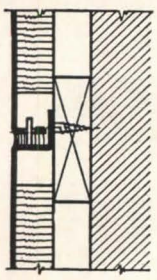
No unsafe, unsightly mechanism exposed to collect dust. Compact roto-type operator handle does not interfere with blinds or other window furnishings.

LUDMAN LEADS THE WORLD

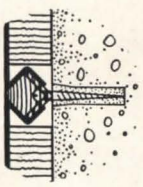
PORCELAIN ENAMEL—8: Attachment Methods

Prepared by Harold Edelman, A.I.A.
Instructor at Pratt Institute

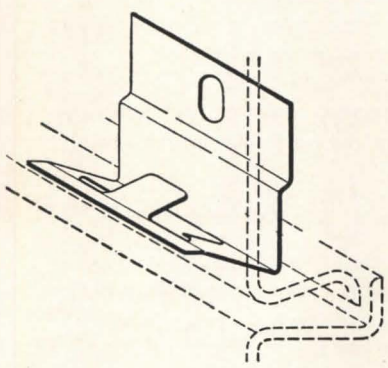
ATTACHMENT OF SHEETS WITH FORMED EDGES *(Continued)*



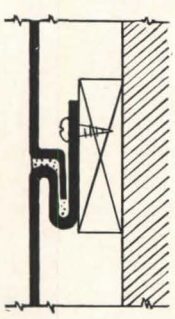
PINS AND HOLES — pins are welded to the top flange of the lower panel and fit through holes in the bottom flange of the upper panel. Top of panel acts as flashing, but an additional strip of metal is required for flashing behind vertical joints. Sides have straight flanges



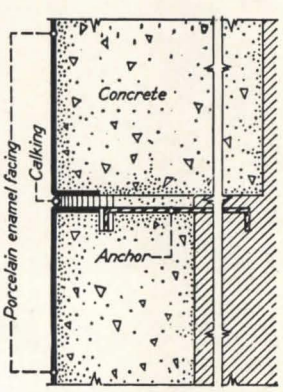
ANGLE CLAMP — a continuous steel angle is set horizontally in the top joint of the lower panel and the bottom of the upper panel fitted over it



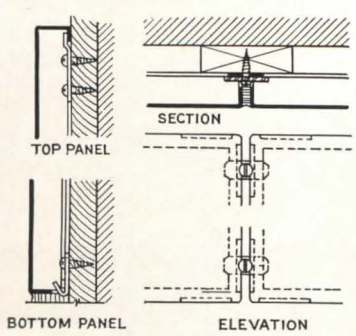
SPRING CLIP — bottom clips are applied first, the panel is placed and top clips are applied



INTERLOCKING EDGE — must be assembled from bottom up. Two adjacent edges are male, two female



MASONRY BACKED PANELS (see "Fabrication Methods," paragraph on "Back-up Materials")



SLOT AND CLIP — bottom row of panels is attached with simple hook that fits through slots in the flanges. Clip is fastened after one panel is in place, and the adjoining panel is slipped into place

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Alsynite

TRANSLUCENT GLASS FIBER PANELS

miracle material for

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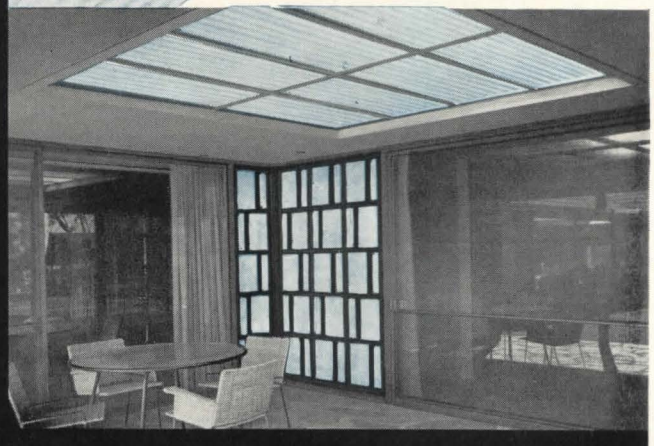
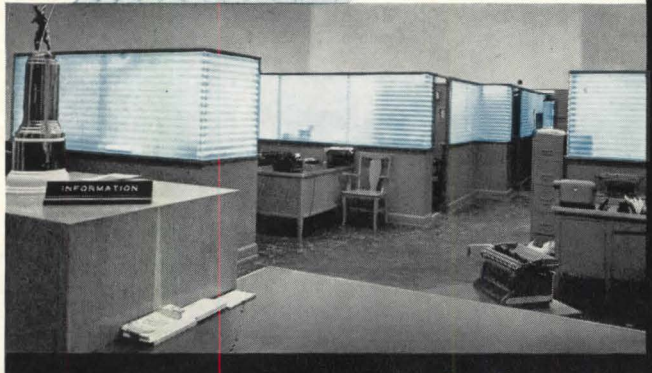
residential

Alsynite for skylights, patio roofs window walls, partitions, sun and wind shelters, awnings, shower stalls, cupboard doors, movable screens . . .



commercial

Alsynite for store fronts, office partitions, luminous ceilings decorative effects, general daylighting, screens, displays . . .



industrial

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data: Alsynite is a new kind of structural glass made by combining glass fiber with resin. It is shatterproof, permanent, feather-light (8 oz. sq. ft.) Can be sawed, nailed, drilled. High light diffusion factor. Available in corrugated or flat panels. Seven colors. Proven in use since 1947. Plants in California and Ohio.

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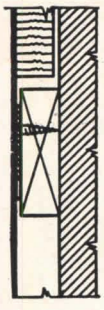
DISTRIBUTORS IN PRINCIPAL CITIES

PORCELAIN ENAMEL—7: Attachment Methods

Prepared by Harold Edelman, A.I.A.
Instructor at Pratt Institute

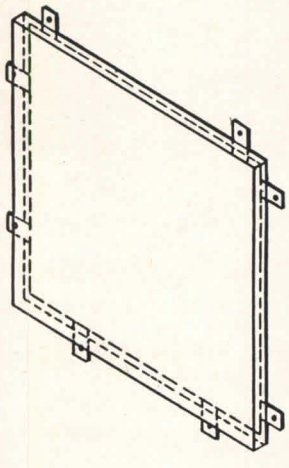
ATTACHMENT OF FLAT SHEETS *(Continued)*



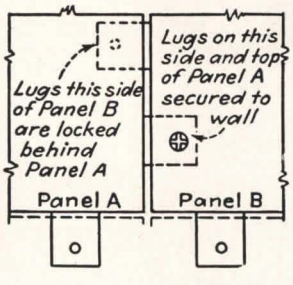
WELDED LUG — an interlocking system which is the same as lug and pan system used for flanged panels. Joints may be made very fine

VEE CLAMP — a rigid installation with grooved edges is cemented to the panel. A continuous square strip at the top of the lower panel is nailed to the studding or blocking, and the next panel dropped in place

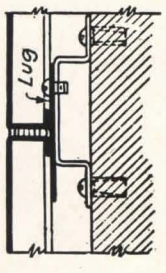
ATTACHMENT OF SHEETS WITH FORMED EDGES



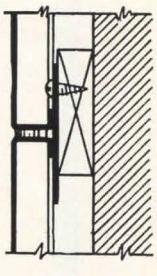
LUG AND PAN — an interlocking system of panels is also used for flat sheets. There are many variations of this basic system

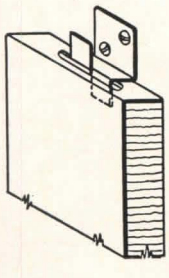


METAL FURRING

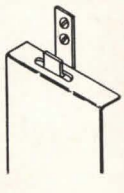


WOOD FURRING



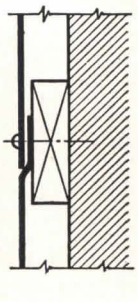


LOCK CLIP — the clips hold the top of one panel and the bottom of the panel above by passing through a slot in the flange. The clips are secured after the lower panel is set

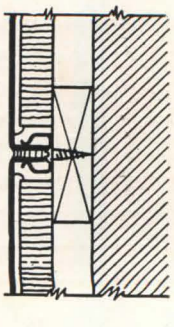


HANGING HOOK — the hook holds the top of one panel and the bottom of the panel above, by passing through a slot in the flange

LAP JOINT — for interior work with exposed fastenings. Two adjacent edges are formed, two are flat



SPRING STEEL CLAMP — may be used for exterior work with caulking or interior work with dry, tight joints



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PORCELAIN ENAMEL—6: Attachment Methods

Prepared by Harold Edelman, A.I.A.
Instructor at Pratt Institute

Methods of Attaching Panels

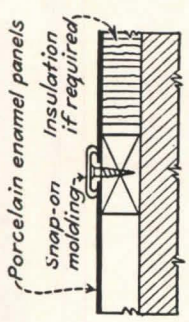
A great number of attachment and connection methods are in use, each requiring special edge conditions. In general the attachment device is screwed or bolted to the furring, which may be painted or galvanized metal or waterproofed wood placed behind vertical and/or horizontal joints. Extra attachments are used for support 12 in. in any direction where joints are widely spaced. Some devices may be screwed or anchored directly to the wall without furring but these may be difficult to align. Exterior joints are made by formed edges and may be designed to act as flashing between panels. These edges are usually held $\frac{1}{8}$ or $\frac{3}{16}$ in. apart to allow for $\frac{1}{2}$ in. deep (minimum) mastic caulking and to permit expansion and contraction of the panels. Some use has been made of extruded rubber or plastic strips to weatherproof these joints. Interior sheets used under dry conditions may be flat sheets with butt joints or formed edges placed so close together that no caulking is needed. Both interior and exterior joints may be covered with battens and/or moldings which may screw on or snap on and be made of various metals. These may be used on all four sides or on two sides only with the other two sides using a different system.

Clips are sometimes bent enough during erection to cause damage to the enamel surface and start rusting of the clip metal. Many manufacturers now use stainless steel clips to prevent this.

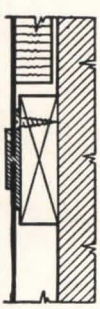
Screw and bolt holes must be designed with proper clearances. (See "Shapes and Forms".) Cover coats of enamel under the head are usually brushed away to prevent chipping, or non-rusting metal eyelets, grommets or washers are used to take up the stress.

Correcting errors in finished porcelain enamel by sawing, shearing, drilling, etc. is sometimes necessary but not desirable. When the metal is distorted the enamel coating is damaged but with proper bucking corrections can be made satisfactorily. Cutting oils must be carefully removed and the raw edges protected with paint and/or caulking to prevent rusting. Lacquer of matching color can be provided by the porcelain enamel companies for touching up minor damages. In case of severe errors or damage the panel should be returned to the company for repair or replacement.

ATTACHMENT OF FLAT SHEETS — Usually used on interiors under dry conditions

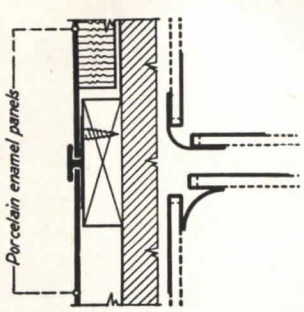


SNAP ON MOLDING — made in many types and metals — may be caulked underneath, and used on all four sides or on two sides with a different edge condition on the other two sides

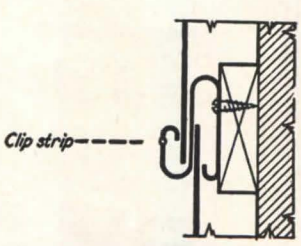


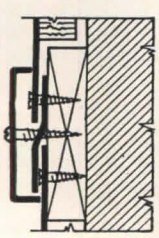
EXTRUDED MOLDING — many varieties — panels are assembled progressively

ROLLED MOLDINGS — may be stainless steel or stainless steel clad — allow proper expansion and contraction of the panels



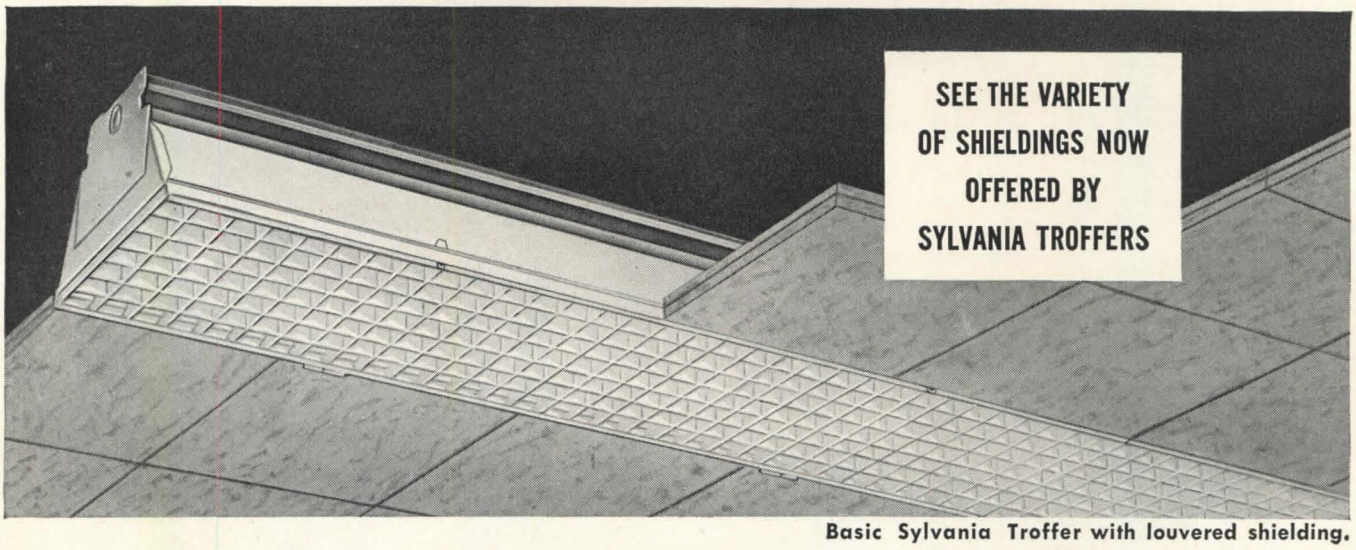
CLIP STRIP — made of stainless steel — ends of panels are overlapped — holes in middle leg of strip allow introduction of a screwdriver





BATTEN — can be used on exterior work with flashing along the horizontal joints. Batten may be porcelain enamel

EXTRUDED MOLDING — the inside or "gripping member" is applied to the wall first, and the sheets attached with the "holding member." Moldings are aluminum



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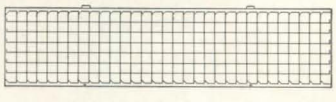
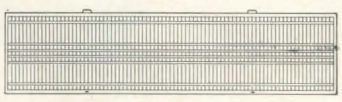
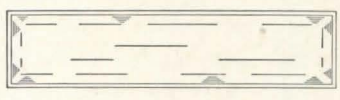
45° x 45° Louvers . . . for classrooms, offices, and many types of stores. This shielding available with open or closed ends.



Albalite . . . provides attractive diffused lighting for scores of applications. Comes in both open- and closed-end frames.

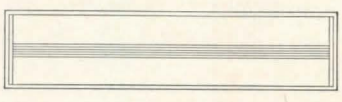
Twinlite . . . another interesting diffused lighting shielding, available with open or closed ends. Ideal for reception rooms, hotel lobbies, and display areas.





Curved Lens . . . available with closed frames only. Provides an extremely attractive light source where less contrast is desired.

Plastic . . . comes with closed frames only. Sturdy, extra lightweight shielding for soft, diffused recessed troffer lighting.



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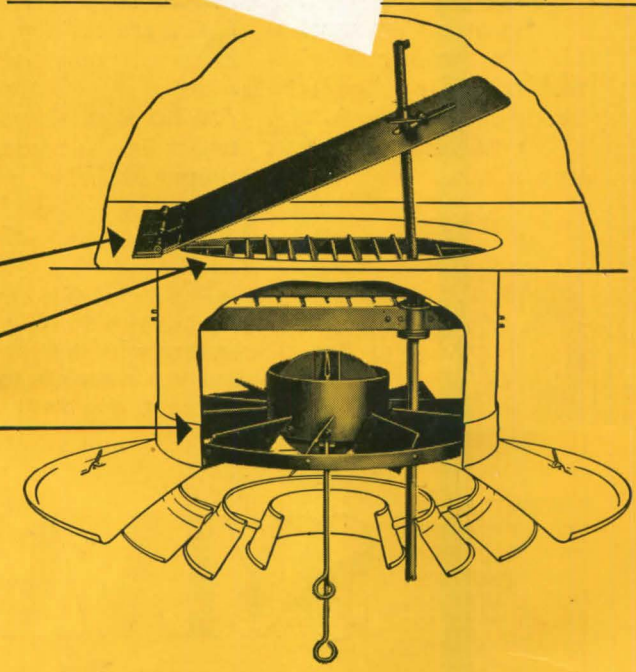

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LITERATURE FOR THE OFFICE

Revised Furniture Catalog

The Herman Miller Collection. New catalog is attractively illustrated and gives the complete line of Herman Miller furniture designed by George Nelson and Charles Eames and also several designs by Isamu Noguchi and the Danish firm of Hvidt-Neilsen. Containing a foreword by Mr. Nelson, the book is divided into five sections; storage, sleeping, dining, leisure and work. Each section includes photographs, dimensioned diagrams and specifications of the pieces shown, and a detailed description of each item is given. An added feature of the catalog is the section on the Eames Storage Units — shown in color and illustrating available combinations. 116 pp., illus. $5.00. Herman Miller Co., Zeeland, Mich.

Revised Edition of Contemporary Furniture Catalog is sectioned according to category and attractively illustrated

Industrial Control Devices

Honeywell Composite Catalog 5000. Catalog gives description of principal types of industrial instruments, including thermal sensing elements, resistance thermometer bulbs, thermocouples and various types of thermometers. Information is given on panelboards, including indicators, recorders, etc. Photographs illustrate each type of control listed. 25 pp., illus. Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne and Windrim Aves., Philadelphia 44, Pa.*

Aerial Photogrammetry

Aerial Surveys and Maps from Photographs. Booklet gives a brief non-technical explanation of aerial photogrammetry. Steps taken in the process are shown, descriptions of cameras used are given and laboratory processing is described in detail. Various types of available photography are explained, giving uses for which each type of photography is selected. Booklet is completely illustrated, and enlarged details of planimetric, topographic and plan and profile maps are given. 18 pp., illus. Abrams Aerial Survey Corp., Lansing 1, Mich.

Laminated Panels

News and Views in This Formica World. Issued quarterly, booklet presents the many uses to which Formica may be put, such as in the home, hospital, store, industrial plant, etc. Full color illustrations showing interior applications are given along with descriptive text. Stressing the point that the kitchen is gradually merging with the rest of the house, several illustrations show how various finishes of Formica may be applied to the kitchen which will blend with the living quarters. 16 pp., illus. Formica, 4657 Spring Grove Ave., Cincinnati 32, Ohio.*

Building Paper and Reflective Insulation Specification

Richkraft Building Papers and Reflective Insulation. Folder contains data sheets designed to help architects and builders in proper specification of the manufacturer's various building papers and reflective insulation products. Photographs and descriptions of the procedures for using the materials help in determining which type is most suited to a particular construction problem. 7 pp., illus. Richkraft Co., 228 N. La Salle St., Chicago 1, Ill.

New Ideas for Kitchens

The World's Newest Kitchen Ideas. Kitchen photographs in color and illustrations of various sinks and cabinets are presented in this new consumer catalog. *Youngstown Kitchens* automatic dishwasher and food waste disposer are described, and space is devoted to kitchen planning and basic kitchen arrangements. 24 pp., illus. Mullins Manufacturing Corporation, Warren, Ohio.*

Plastics and Resins

Condensed Reference File of Bakelite and Vinylite Plastics and Resins. Catalog describes the manufacturer's various products including phenolics, resins, laminating plastics, styrene, elastomeric and polyethylene plastics and others. The various products are classified under the headings of Moulding and Extrusion Materials; Flexible Film and Sheeting; Protective Coating Resins; Rigid Sheets; Calendering Resins; and Laminating, Bonding and Adhesive Resins. Photographs show typical articles manufactured from the materials. 8 pp., illus. Bakelite Co., Div. Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

(*Continued on page 276*)

** Other product information in Sweet's File, 1952.*

PRODUCTS for Better Building

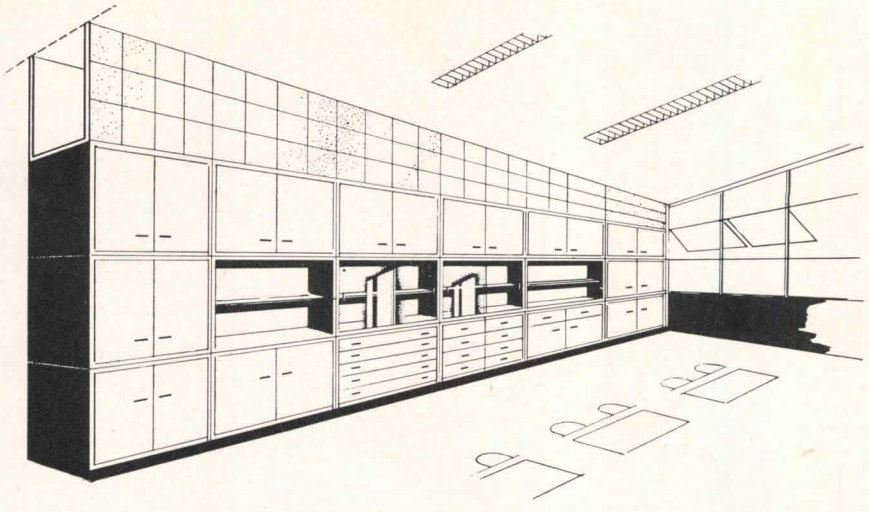
Laboratory Furniture For Secondary Schools

A new approach to the problem of outfitting secondary school laboratories at a minimum of expense has been brought about by the use of *Sjöström's Unaflex Furniture*. The furniture, consisting of a series of units which may be combined in numerous ways, meets all school requirements and is particularly good in school conversion or expansion programs. Outstanding features of the units include: exterior and interior surfaces resistant to chemicals; doors and drawers designed and built for continued free opening and closing; accidental removal of drawers eliminated by check stops; recessed toe space area moldings reported to be wear-proof and impervious to water and chemicals; service areas easily accessible from the inside of base units; and all parts are designed for ease of cleaning and resistance to wear. Various dimensions in height and width are available, and tops of surfaces may be obtained in several materials, which include Labwood tops, built of carefully selected hardwood tops; Monolab tops, made of a special impregnated asbestos compound; and Alberene tops, a quarried stone which is especially suited for laboratory use. Tops may also be obtained in stainless steel when specified. John E. Sjöström Co., 1717 N. Tenth Street, Philadelphia 22, Pa.

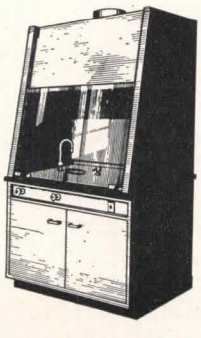
Recessed Lighting Unit

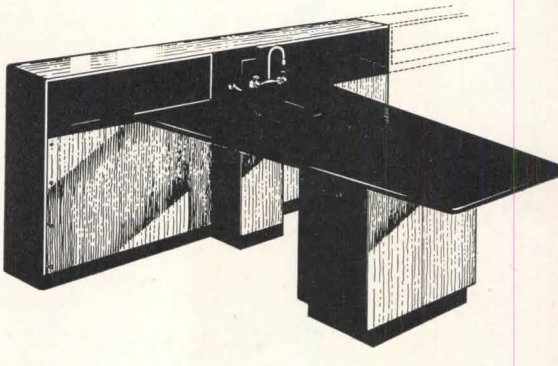
Blending harmoniously with modern architectural lines, the *Starlight* incandescent recessed lighting fixture has a beamspread which may be adjusted to "pin-point" any desired area in a room. The fixture was given its name because of the sparkle it adds to table settings, planting areas, etc., creating accent points of interest. An external control switch directs the beam to whatever position is desired, enabling the operator to shift positions of various objects to be highlighted at will. The beamspread is adjustable from 10 to 36 deg from vertical. Trim finishes are available in chrome, brass, copper or prime coat. Marvin Mfg. Co., 3071 E. 12th St., Los Angeles 23, Calif.

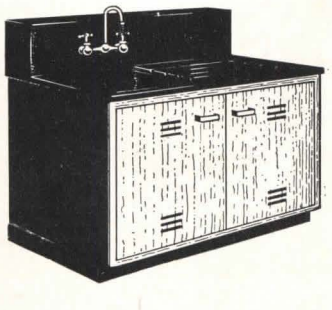
(*Continued on page 236*)

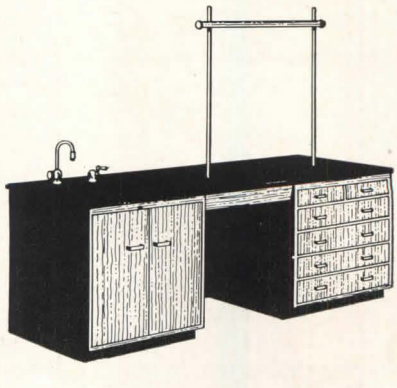


Storage wall (above) is formed from several units. Desks, sinks and other individual units can be arranged freely as desired. These include a fume hood and a multi-purpose unit (center left and right), and a sink unit and instructors' desk (bottom left and right)









excellent in rooms in which conferences or lectures are to be held and is much superior to the overall "acoustic" ceiling so often provided in these rooms.

A hard sound reflecting central portion of the ceiling is very useful in reinforcing sounds from various parts of the room and in making it easier to hear throughout the room. The situation may be compared to the lighting situation where fixtures are hung from the ceiling. One gets light directly from the source and by reflection from the ceiling and wall surfaces, and for maximum efficiency one paints these surfaces light colors.

To use an overall sound absorbing ceiling in a space in which it is important to have good hearing conditions is analogous to using flat black paint on the ceiling of a room containing indirect lighting fixtures. In the former case, the sound — in place of light — is absorbed by the ceiling rather than being reflected usefully to the listeners.

As we noted above, it is desirable where noise control is important to cover about 50 per cent of the ceiling with sound absorbing material. In Figs. 3, 4 and 5 we have shown various arrangements of special treatment alternating with luminous panels. The greater the scattering of the sound absorbing panels in the ceiling the greater will be their effectiveness. That is, if a checkerboard pattern such as that shown in Fig. 4 is used, it will be found to be slightly more effective than a strip pattern such as is shown in Figs. 3 and 6. The treatment of Fig. 5 is shown as slightly heavier than that in Fig. 3 since the noise problem is more acute in the general office space than in the large banking room.

In Fig. 4 the sound absorbing material in the "dropped" ceiling area is confined to a narrow strip above the display cases. Here, the display material is men's suits which, of themselves, will provide a large measure of reverberation control. However, each room must be considered separately and the necessity for sound absorbing material be determined on the basis of different finishes and furnishings.

In Fig. 7 we have shown a situation in which no sound absorbing material is used on the ceiling — all of the necessary material is placed on the upper wall spaces. This type of treatment can, of course, also be used in the conference room-classroom type of space instead of the peripheral ceiling treatment shown in Fig. 1. In the entire luminous ceiling situation shown in Fig. 7 the room acoustics can be improved by the addition of rugs and draperies.

Another solution for the room with a complete luminous ceiling is to use small sound absorbing baffles attached to the supporting T's. In many cases where noise control is important it will be found necessary to supplement the absorption provided by such baffles with additional treatment on walls and other surfaces in the room.

In extremely noisy office situations such as rooms housing business and accounting machines, it will nearly always be necessary to provide considerably more sound absorbing treatment than is provided by the 50-50 treatment suggested in the preceding paragraphs. In order to have the benefits of luminous ceiling lighting in such a space, with efficient noise control, it may be desirable to use sound absorbing screens placed close to the noisy machines. This type of treatment close to the noise source can prove quite effective. Here again, however, the particular circumstances in question must be investigated — it is difficult to generalize.

The general statement can be made, however, that good acoustics may readily be obtained in conjunction with translucent plastic luminous ceilings by the proper incorporation of sound absorbing materials and furnishings.

It should be noted also that in a room designed especially for conferences or lectures, a hard central ceiling is mandatory and the use of a material such as a plastic is much superior to the usual overall acoustic treatment.

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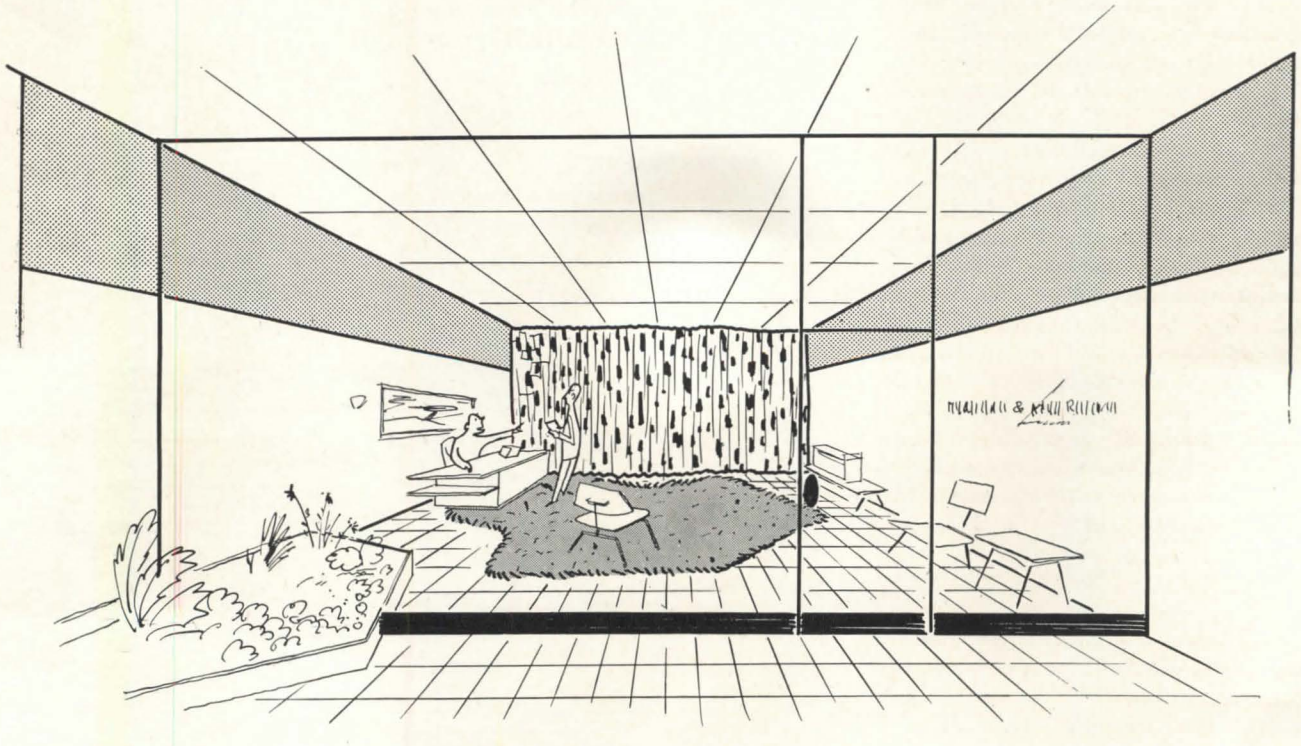
7. *Where only a small amount of sound absorbing material is needed for reverberation control, the entire ceiling can be utilized for lighting, and the acoustical material placed at the tops of the walls, where it works just as well. Room acoustics can be improved by the addition of rugs and draperies*

All sketches by Sol Ehrlich



To isolate noises from outside a room one must introduce some type of separating barrier. To be effective this barrier must be heavy and impervious to air flow. The amount of reduction which a barrier affords is directly related to its weight and complexity of structure.

The amount of sound absorbing material in a space determines the reverberation characteristics of the space and to some extent is related to acoustic comfort. In addition to contributing to comfort, the presence of sound absorbing material can, to a limited extent, affect the noise reduction between rooms and to a greater extent the noise reduction between parts of a given room.

The noise reduction between two rooms may be raised 4 or 5 decibels by adding considerable amounts of sound absorbing materials in the spaces. Sound absorbing materials do a great deal towards reducing the multiple reflection of sound from the enclosing surfaces of the room and make the sound seem to come directly from its actual source rather than from everywhere in the room.

This means that the noise from the typewriter across the room seems to stay over there at the typewriter and not completely to surround the listener across the room. There is a certain psychological advantage in being able to control a noise at one's own discretion. The typist does not mind the noise from her own machine but she may be considerably annoyed by the noise of other machines. In the highly reverberant space, these noise intrusions become more noticeable and the noise seems (by multiple reflection from the room surfaces) to be everywhere, rather than localized at its source.

One often sees references to "breaking up the sound" by surface irregularities. The implication is that this "breaking up" will reduce the noise level in the room. This is not the case. Actually, if surface irregularities are 2 or 3 ft across and 1 or 2 ft deep, they can provide some diffusion of sound in the room but there will be no loss of sound energy. Small corrugations of 2 or 3 in. spacing and amplitude are of insufficient size to have any effect on ordinary sounds — the surface appears perfectly smooth to the sound waves.

Effectiveness of Partitions as Sound Barriers

As we have noted earlier, the transmission loss of a partition is determined by its weight, imperviousness and complexity. The materials which are effective as sound absorbers are necessarily porous and therefore do not provide appreciable transmission loss when used alone. They are effective in reducing the noise level within a space but the location of the sound absorbing material in the room is unimportant — it can be just as effective on the walls as on the ceiling. *The noise reduction between two spaces is not appreciably influenced by placing the sound absorbing material on the dividing partition.* There is much misunderstanding of this point.

A partition is effective in providing the transmission loss characteristic of its construction only if it closes off the entire opening between two spaces. In other words, a partition must extend from the floor to the structural ceiling above. The partial height partition or screen, while providing a visual barrier, is relatively ineffective in providing acoustic separation since the sound readily finds its way around the edges or over the top.

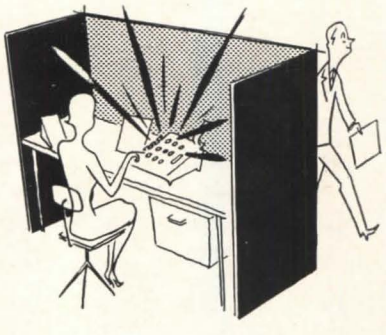
There has been increasing use in recent times of so-called "flexible planning" in which movable partitions are used. Often these partitions are carried from the floor up to some type of hung ceiling. This ceiling is usually made of a sound absorbing material (which is transparent to sound) or of a material serving as a luminous ceiling.

In order to stop effectively the transmission of sound between rooms using this type of construction, it is necessary to block the space between the top of the partition and the structural ceiling above. This sound barrier above the hung ceiling must be as good as the partition itself if satisfactory results are to be obtained. (See Fig. 2.)

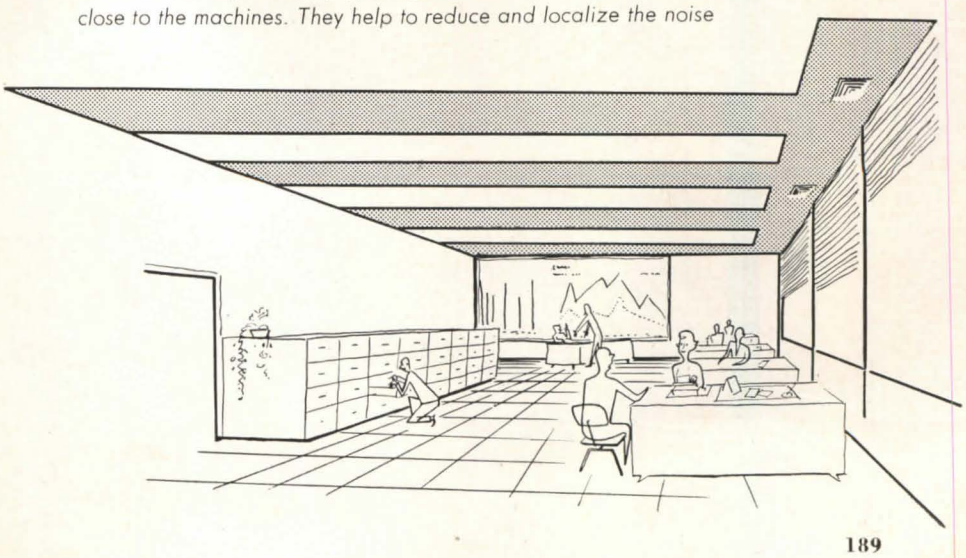
Specific Examples of Rooms with Luminous Ceilings

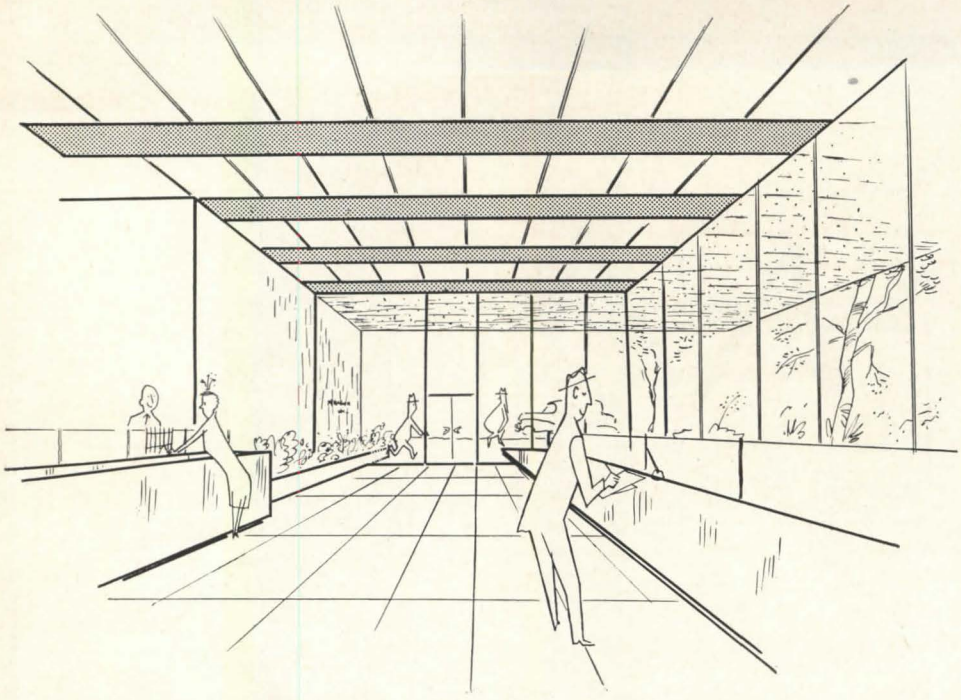
For significant control of noise in a room in which there are no large areas of sound absorbing furnishings, about 50 per cent of the ceiling should be treated with sound absorbing material. In all references to sound absorbing material we imply the use of a perforated metal or hard board facing covering a mineral or glass wool absorbing pad or any of the standard acoustic tiles with perforated or fissured surfaces.

If the space in question is a rather large conference room, executive office, or a classroom, the central portion of the ceiling should be sound reflecting and the necessary material for reverberation control should be confined to peripheral areas. (See Fig. 1.) The central luminous ceiling forms an excellent sound reflector, and we have indicated in Fig. 1 that sound absorbing material can be placed in a 3 or 4 ft strip around the sides of the ceiling. This type of treatment is



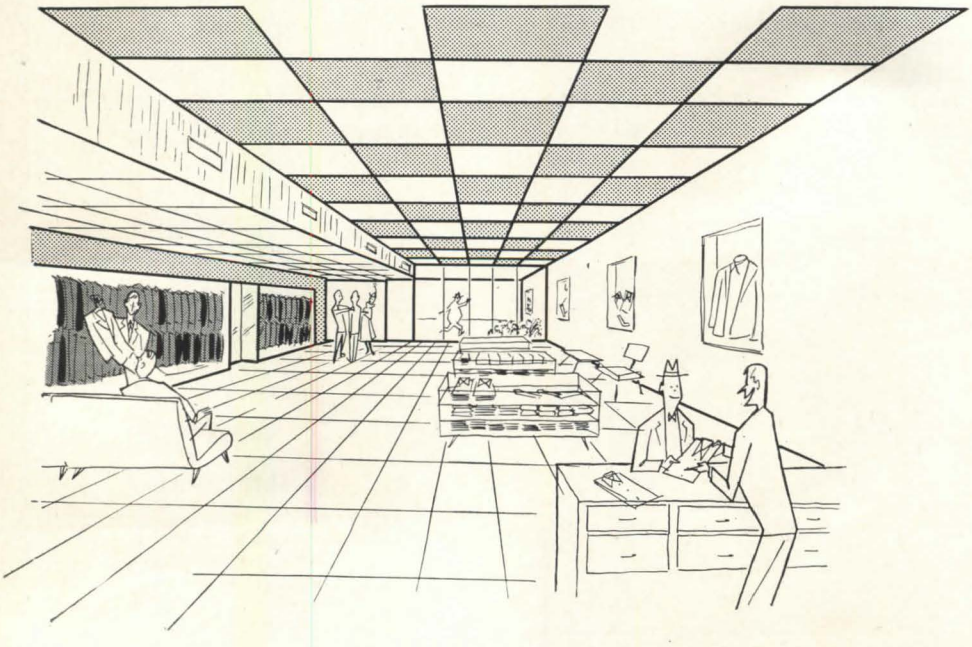
The noise problem is more acute in a general office **5** *(below) than the bank in Fig. 3; thus more acoustical material is used. Where offices are extremely noisy due to business and accounting machines, and luminous ceilings are desired, the noise problem can be improved by placing sound absorbing screens* **6** *close to the machines. They help to reduce and localize the noise*





3. *For a luminous ceiling in a bank, the sound absorbing material might be placed in strips, alternating with the lighted portion of the ceiling. The greater the scattering of acoustical material, the greater its efficiency; hence, the checkerboard pattern in Fig. 4 is slightly better*

4. *Luminous ceiling panels and acoustical panels form a checkerboard pattern in the main portion of the store. Sound absorbing material in the "dropped" ceiling area is placed in a narrow vertical strip above the display cases. The mens' suits also provide some reverberation control*



Acoustic Environment

A satisfactory acoustic environment is one in which the character and magnitude of all noises are compatible with the satisfactory use of the space for its intended purpose. A library reading room can be a difficult place for study in the presence of distracting noises. These same noises might be quite acceptable in a large business office; but here again there are limits of noise intrusion beyond which the workers would find it difficult to maintain efficiency and composure.

There is a wide range of acceptable background noise levels in rooms. In offices and other commercial spaces these acceptable background noise levels are in the range of 40 to 55 decibels.

The noise level is only one of the factors which is important in determining the "satisfactory" acoustic environment.

The intelligence conveyed by background noise is just as important as its loudness. High pitched whines, intermittent noises, etc., can be annoying even when they are considerably below the general background noise level. On the other hand, it is undesirable to have too low a background noise — silence can be quite oppressive.

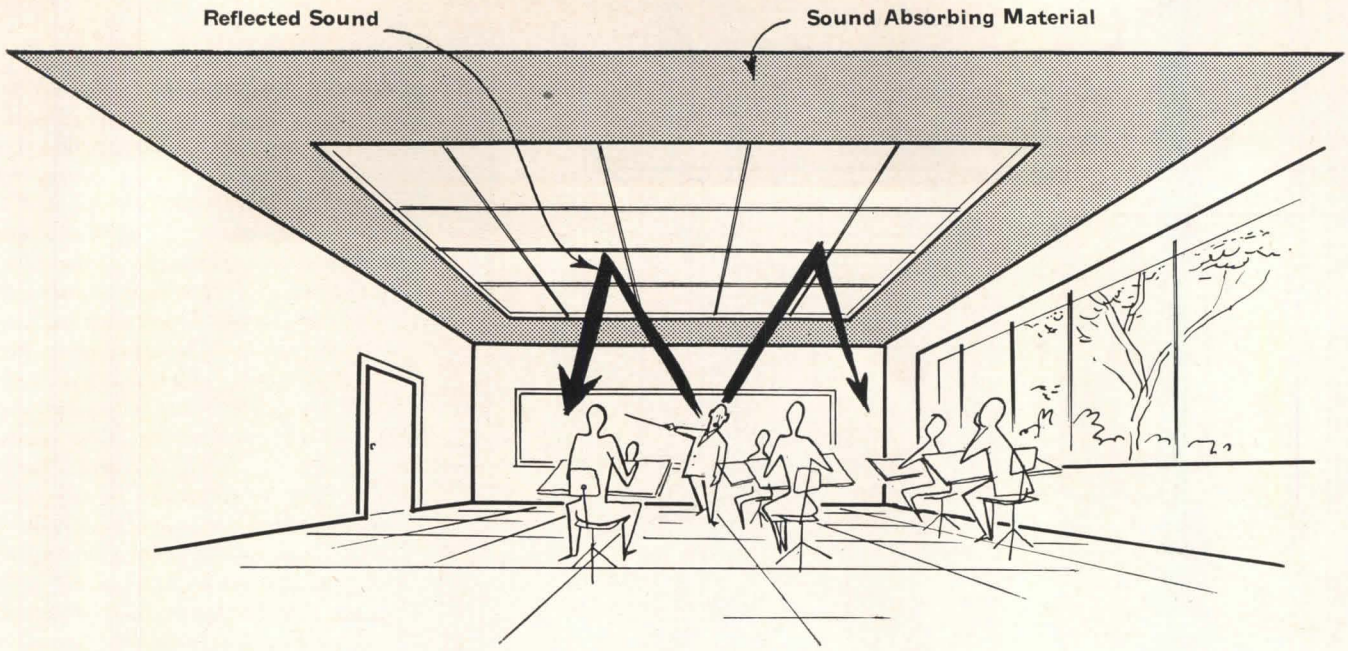
A moderate continuum of background noise tends to make a space seem quieter because it masks or hides many sounds from other activities. A quiet fan, for example, may make an office seem quieter because it masks the noise from typewriters down the hall which would be heard if there were no fan noise.

It is also necessary to consider the sound reflecting properties of the room because an extremely reverberant space or one which is too "dead" can be annoying for some purposes even with relatively low noise levels. The amount of sound absorbing material in a room can affect the overall level of background noise, but one can see that it is not only this factor which concerns us in determining the acoustic "comfort."

Good Hearing Conditions

Once the acoustic environment has been made satisfactory, we concern ourselves with providing good hearing conditions.

The ideal situation is one in which the background noise is not distracting or uncomfortable and in which one can converse with other people at required distances and use the telephone without interference. If these conditions are achieved the space is usually called satisfactory.



1. To provide good hearing conditions in classrooms, the center portion of the ceiling should be a hard, sound reflecting surface (in this case it is a luminous ceiling). Sound absorbing material can be placed around the periphery

SOUND CONTROL FOR ROOMS LIGHTED BY LUMINOUS CEILINGS

By Robert B. Newman of Bolt, Beranek and Newman, Consultants in Acoustics*

DURING THE PAST FEW YEARS there has been an increasing awareness of the importance of noise control in commercial spaces. It has become almost standard practice to install special sound absorbing materials in offices, banks, etc., to make these spaces more "comfortable." Also, increasing attention has been paid to the problem of noise transmission from one space to another to insure acoustic privacy where it is needed.

Along with this increased interest in noise control, tremendous improvements in lighting have been developed. In particular, the use of acrylic plastic diffusing panels for overall luminous ceilings has become widespread. With such luminous ceilings there is a problem of introducing into some types of rooms adequate sound absorbing materials which might cover the entire ceiling when used with other types of lighting.

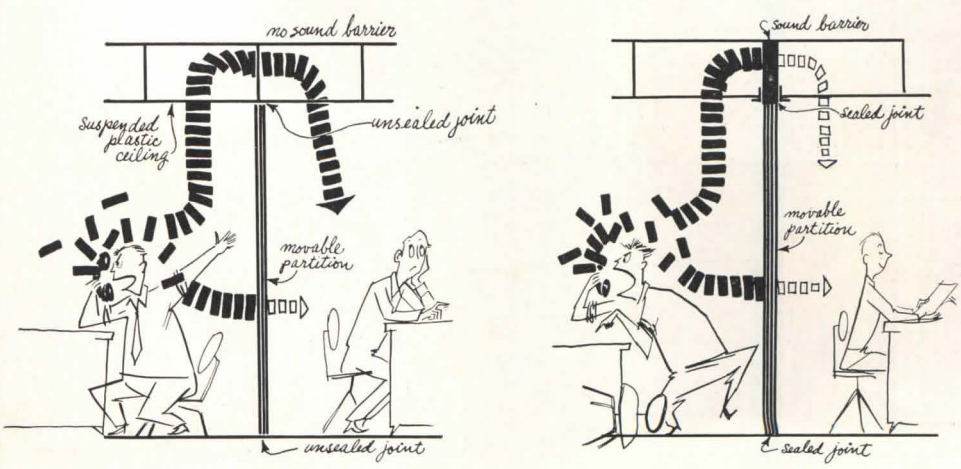
This article deals with the problem of acoustics in commercial spaces and schools, in which acrylic plastic is used for light diffusion. Before specific problems are discussed in detail, some basic principles of acoustical design will be reviewed, pertinent to these problems, which have appeared before in ARCHITECTURAL RECORD (*Architectural Acoustics* by Richard H. Bolt and Robert B. Newman, April, June, September and November, 1950).

In architectural acoustics we are concerned with two basic problems: 1) The provision of a comfortable acoustic environment and, 2) The provision of satisfactory hearing conditions. In nearly all cases, both of these factors are important to some degree.

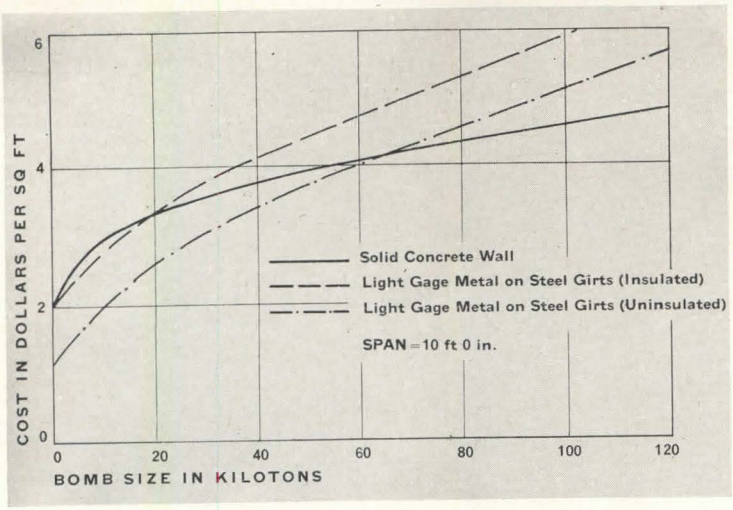
For example, in a large clerical office the worker should not only be free from excessively high levels of extraneous noise, but he should be able to do his job without distraction, to discuss matters with other people when necessary, and to use the telephone comfortably. In the private office these problems are even more critical.

In large public lobbies, on the other hand, hearing conditions are unimportant but noise should be somewhat suppressed and the space should not sound "empty".

2. A sound barrier is needed to prevent the suspended ceiling from short-circuiting the movable partition. In addition, all joints must be sealed to prevent leakage



* *Based on a report prepared for Rohm & Haas, Co., Philadelphia, Pa.*



5. *Relative cost of typical blast-resistant wall panels at 3000-ft range for different sized bombs*

distances from ground-zero. (A 20 KT bomb releases an amount of energy equivalent to that of 20,000 tons of TNT.) This type of bomb resistant construction is probably more economical than any other where it can be satisfactorily used. It will be noted that the cost of resistant construction does not increase in proportion to the weight of the bomb, indicating that there must be an economic limit to the size of bomb.

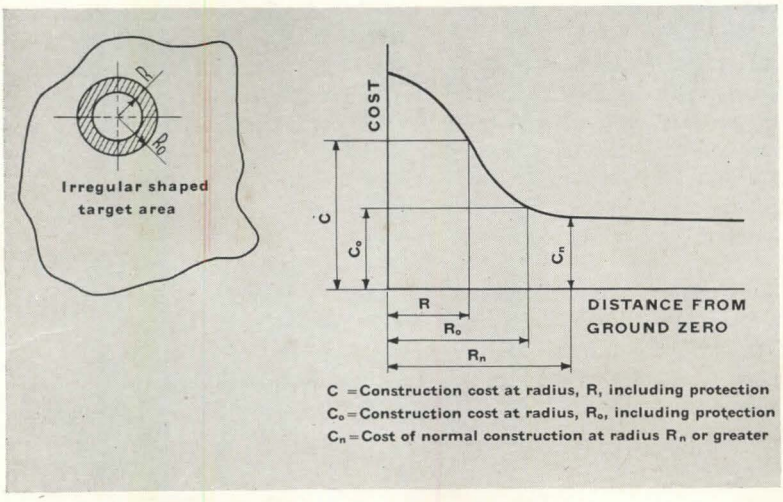
Fig. 2 indicates the relative cost of some types of steel and concrete construction to resist a 20 KT bomb at varying ranges. In the case of the 50 ft spans, concrete construction is more economical than a steel frame with concrete enclosure at the closer distance because of its greater mass. Similarly, at a short range, concrete construction is more economical than light gauge steel siding and roofing on the steel spans.

Fig. 3 shows how the cost of a wall or roof slab is reduced by permitting a plastic deflection. The energy of the blast is absorbed by plastic strain in the reinforcing steel. There is little reduction in cost through increase in deflection above one ninetieth of the span.

Fig. 4 indicates the effect of span length on the cost of a non-blast resistant concrete slab and one designed to resist a 150 KT bomb at a 1¼ mile range. The costs converge at long spans because the non-resistant slab is designed for dead plus live load with a safety factor, while the resistant slab is designed for dead plus blast load at yield stresses. It follows that the effective blast load is reduced as the mass increases with increase in span until it has less influence than the 150 lb live load.

Fig. 5 gives the relative cost of typical blast-resistant wall panels at a 3000 ft range for different sized bombs. It is again seen that the cost does not increase in proportion to bomb size. The concrete wall is more effective with the smaller bombs which create peak blast pressures of shorter duration, making the heavier mass more important.

6. *At a small additional cost, normal construction can be improved enough to greatly reduce the safe radius from the bomb blast. To still further reduce the radius costs exceedingly more*



General Conclusions

The foregoing data lead to conclusions which should help establish a policy regarding bomb resistant construction. This will be developed with the use of Fig. 6 which indicates diagrammatically on the right the variation in the cost of bomb-resistant construction with distance from ground-zero. The shape of this curve is generally correct, but it is not intended to apply to any specific case because its proportions will vary with the type of construction and size of bombs.

By careful design and selection of materials, the resistance of normal construction can be materially improved without great increase in cost. These are the improvements which are usually incorporated in structures to increase their resistance to earthquakes and wind pressures such as the use of rigid frames instead of bearing walls, and careful tying together of all the parts.

The following discussion involves considerable simplification of the problem, but it is believed that the validity of the conclusion is not affected.

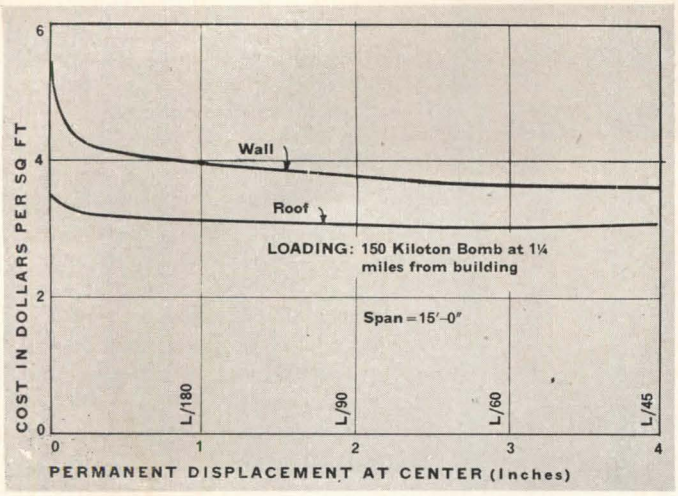
A bomb dropped in the target area would destroy all the buildings in the circle whose radius is R. With no special protective construction other than recommended above, the radius of destruction would be R_o. Therefore the only buildings saved by special protective construction would be those in the small ring between circles R and R_o. The value saved would be the number of buildings in that ring multiplied by the cost of *unprotected* construction.

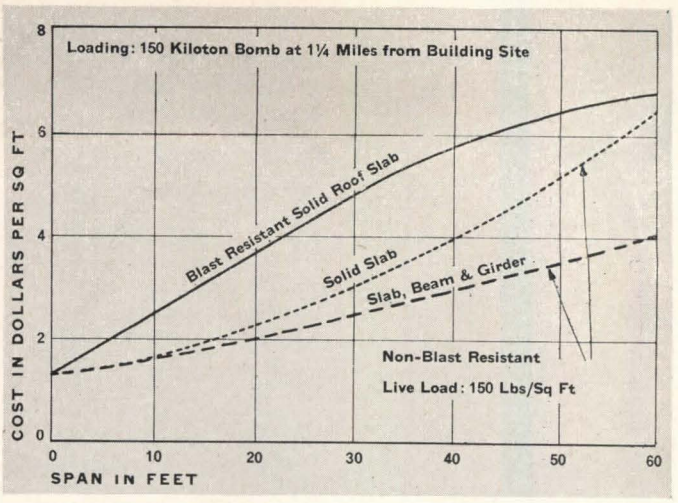
It is obvious that even if it were certain that a bomb would be dropped in the target area, the added cost of special protective construction applied to all buildings would be much greater than the saving which it could effect.

Recognizing the uncertainty of a drop in any particular area and the greater improbability of drops in all target areas, it is obvious that a general program of protective construction would result in a waste of national resources more surely and just as effectively as destruction by enemy bombs.

It is therefore suggested that special protective construction should not be attempted except in particular cases.

Note: All blast loadings in the text and figures are based on data from "The Effects of Atomic Weapons (Sept. 1950)" Superintendent of Documents, U. S. Gov't Printing Office, Washington 25, D. C.





3. *Reduction in cost by plastic action of solid concrete construction.* **4.** *Effect of span length on the cost of a non-blast-resistant concrete slab and one to resist a 150 KT bomb at 1¼ miles*

range of damage to conventional construction, an estimate may be made as to the probable distance from ground-zero. Also the estimated direction of the blast may influence the orientation and design, permitting a lesser degree of protection than would be necessary in the target area. A fair amount of assurance on the orientation may greatly effect the design strength required and the cost.

Related to the distance factor is the possible influence of topography and shielding, but they probably should not be overestimated because the burst may be at high altitude.

3. Importance of Survival. Because of the high cost of protective construction, consideration must be given to the importance of survival in each particular case. It is not economically practical to make most structures bomb-resistant to any great degree.

Only those structures of great strategic or economic importance such as communication centers, essential plants and utilities, and record vaults in target areas should be protected fully. Wherever possible, these buildings should be remote from the target area because a burst at or near the ground will demolish practically any structure within a very short radius.

Rather than attempt to give a high degree of protection to essential plants, it may be more economical to disperse them. The economical distance between buildings can be calculated by balancing the cost of protection against the cost of dispersion at different distances.

4. Degree of Protection. Before a structure can be properly designed it is necessary to determine the degree to which protection is needed. Criteria must be established as to how much damage, if any, can be permitted without seriously injuring its usefulness.

If it is not necessary to protect contents and occupants, and some permanent deformation can be tolerated, considerable economy can be effected.

If sensitive equipment must be protected or if more than nominal protection is desired for any reason, it will be necessary to use windowless construction designed to resist large permanent distortion.

Except where personnel must be constantly on duty, they can be protected more economically in special shelter areas instead of designing the entire structure for that purpose. It is usually possible to substitute economical but highly resistant reinforced concrete walls for fire walls, stair and elevator enclosures, corridor partitions, and walls around fixed utilities, without affecting the usefulness of the building.

5. Loss in Efficiency Due to Protective Construction. The planning of a building always involves consideration of the cost of the structure as affected by the spacing of supports and arrangement of other structural members. In a conventional building, the structure is designed to carry ordinary loads and considerable freedom is permitted in the planning of large unobstructed areas to permit economical operation.

The addition of blast loading increases the cost of long spans so greatly as to make large unobstructed floor areas impractical for ordinary use. The areas needed for economical operation may therefore not be obtainable in a bomb resistant building and a compromise must be made.

The use of shear walls (transverse walls designed to resist lateral forces in their own plane through strength in shear) may be more economical than open frames to resist horizontal pressure. They also provide fire stops and should ordinarily be used where such a subdivision of space does not interfere too seriously with its usefulness.

Windowless construction is indicated where a high degree of protection is required. With modern lighting and air conditioning, there appears to be no real reason why windowless factories should not be entirely satisfactory to the occupants.

For hospitals or residential buildings, it is probably best to provide windowless cores in the interior for protection and to retain the windows in the living quarters.

6. Cost of Protective Construction. Basically, structural design to resist dynamic blast loading involves many more factors than the case of static loading, and no general static equivalent loading will give economical and safe designs.

The value of a rigid mathematical analysis is, of course, limited by the uncertainty of the expected blast pressures, but the accuracy of the design should not be reduced by an inaccurate method of analysis.

After the first five criteria have been evaluated, it is possible to design and make an estimate of the cost of the indicated construction. Inasmuch as some of the criteria themselves will be affected by the cost, a well balanced design can only be arrived at by successive trial estimates. In the final analysis, the decision still depends on estimates of probabilities.

Fig. 1 indicates the structural cost of short span reinforced concrete shear-wall construction (three stories and basement) designed to resist 20 KT (kiloton) and 20,000 KT bombs at varying

approaches for determining the vulnerability of steel structures to atom bomb blast. A major part of the paper was devoted to showing that simple methods exist, or can be derived, with which practicing engineers can evaluate such vulnerability.

Newmark discussed methods of analysis for the dynamic behaviour of structures. It was his feeling that the methods he described could be applied by anyone familiar with the usual techniques of structural analysis.

Johnston evaluated the blast resistance of continuous welded frame and truss frame structures with both fixed and pinned bases, and with and without cables for bracing.

Shelters

The provision of atomic blast shelters will always remain a debatable question, said Arsham Amirikian, Head Designing Engineer, Bureau of Yards and Docks, Department of Navy, in his talk on "Precast Concrete Structures." He believes that procurement of shelters will be essentially an individual responsibility — the immensity of the task being such that the Government could not provide the needed structures for the civilian population.

If the concept of protection by individual personnel shelters is not compatible with the thinking of many people, Mr. Amirikian suggested that a change in the functional designation of a shelter may render it less objectionable — such as a garage, tool shed, etc.

Thin-shell precast concrete could utilize a relatively few standardized components for a variety of shelters.

COST OF BLAST PROOF CONSTRUCTION

From a paper by Charles S. Whitney, Ammann & Whitney, Consulting Engineers

There can be no simple general criteria for the design of structures to give protection from atomic bombs. Optimum design depends on a number of factors, all difficult to appraise, and each must be given special consideration.

There are, however, basic principles indicating what the national policy should be. It is the purpose here to discuss these basic principles to help management in establishing its policy for arriving at design criteria. Data on the cost of protective construction are still limited, but some examples will be presented which should be helpful in developing a sense of proportion.

Controlling Design Factors

The factors controlling optimum design criteria are listed as follows in approximate order of indeterminacy:

1. Intensity of attack; that is, size and number of bombs.
2. Distance of the structure from ground-zero or the point of burst, and its relation to the target area. The term "target area," is intended here to mean an area within which an atomic bomb might do sufficient damage to warrant its use.
3. The importance of survival of the particular structure under consideration.
4. The degree of resistance needed for satisfactory survival.
5. The loss in efficiency of the structure due to the type of construction needed for protection.
6. The cost of construction.

1. Intensity of Attack. The size and number of bombs used against a target cannot be anticipated accurately, and any estimate may be subject to wide error. The intensity of attack, if any, will probably depend on the importance of the target, the dispersal of buildings and the power of the enemy.

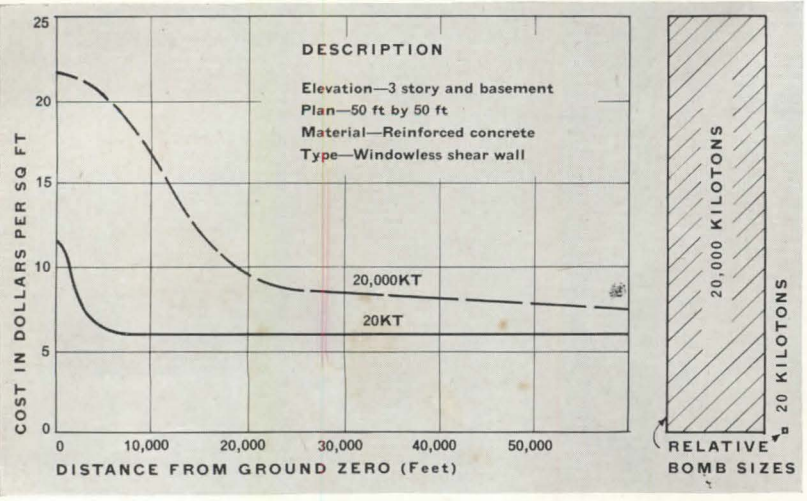
This intensity factor is highly indeterminate, but obviously some assumptions must be made before design criteria can be established.

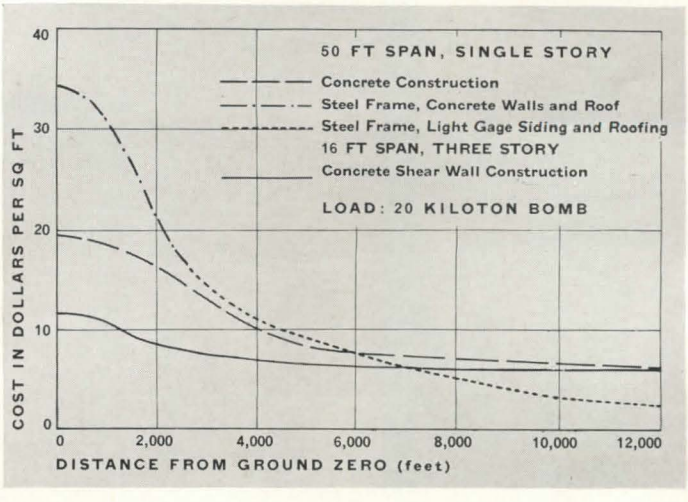
2. Distance from Ground-Zero. The distance from ground-zero is also subject to speculation.

The theory that size of bomb and distance from burst are related by the rule that corresponding effective distances (same degree of damage) vary about as the cube roots of the amount of charge is not entirely true; the duration of peak pressure varies with the bomb size, and the effect of the blast on structures will vary accordingly.

The estimate of distance of the building from ground-zero will vary with the importance of the structure and its relation to the target area. If the building is outside of the target area, but within

1. Cost of multi-story shear wall construction designed to resist 20 KT and 20,000 KT bombs at varying distances from the point of burst. 2. Relative cost of steel and concrete construction to resist a 20 KT bomb at varying range





difference between darkness and daylight. The difference between some protection and more protection is only a matter of degree.

7. It is desirable to use accurate methods of analysis, but it is better to use methods that frankly are approximate than not to design for blast resistance at all.

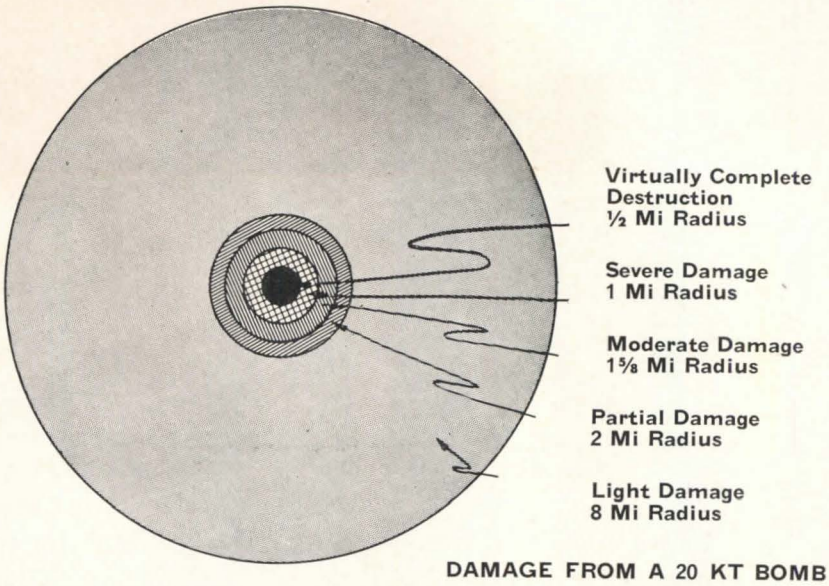
Reaction of Buildings to Atomic Blast

While it is true that nearly everything within close range of an atomic attack will be destroyed, the area of virtually complete destruction is small in comparison with the very large areas in which varying degrees of damage result. It is in these fringe areas, according to Sherwood B. Smith, Technical Adviser, Armed Forces Special Weapons Project, Department of Defense, that the greatest improvement in resistance to blast and fire can be accomplished.

In many cases avoidance of dangerous features of construction that might prove missiles such as false ceilings and heavy fixtures might make a great difference in the number of casualties. Possibly minor changes in construction details or choice of construction materials would measurably decrease the effects of blast.

Smith outlined the reaction of a building to atomic blast as follows: When the blast wave strikes, the building starts to move. The foundation resists this motion immediately, producing a shearing force in the first story. As the resistance in the first story develops with displacement, shear is produced in the next story above and so on to the top of the building. The high lateral force causes shear and bending stresses in columns and may cause failure in either columns or in the connecting beams, and may result in collapse of the building.

In large buildings without cross walls the columns may carry the primary burden of resisting lateral forces. If there are cross walls or shear walls, these will have a large effect on resistance.



DAMAGE FROM A 20 KT BOMB

In the case of industrial buildings, the siding and roofing may be corrugated iron or asbestos cement which are rather easily stripped from the frame. However, they can transmit a considerable amount of load before failure, and as the building generally has little lateral strength, the frame may be distorted.

Boyd G. Anderson of Ammann and Whitney, Consulting Engineers, discussed the design of reinforced concrete structures and gave further insight into the effect of bomb blast.

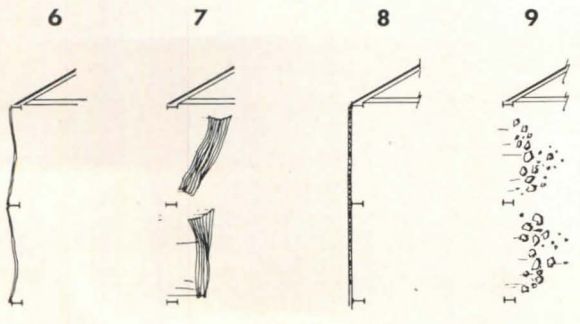
The degree of protection provided by any particular framing system, said Mr. Anderson, depends a great deal on whether the curtain walls are made blast resistant to protect personnel and contents. Blast-resistant walls deliver the full blast load to the supporting frames, while weak or fragile walls will fail relatively quickly with a minimum amount of damage to the frames. The relief offered by fragile walls is limited, however, as each fragile wall area will contribute an impulse to the frame in proportion to its strength.

Mr. Anderson pointed out that concrete offers many advantages in resisting bomb blast because of the relative ease in providing strength against lateral loads, and the high mass and sluggish action of the relatively heavy members. Concrete is advantageous in that it may be readily substituted for curtain and fire walls, providing high strength shear members. The main disadvantages of concrete are the structural cracking that occurs when the members are subjected to large plastic strains and the bulkiness of concrete.

Analysis and Design of Structures

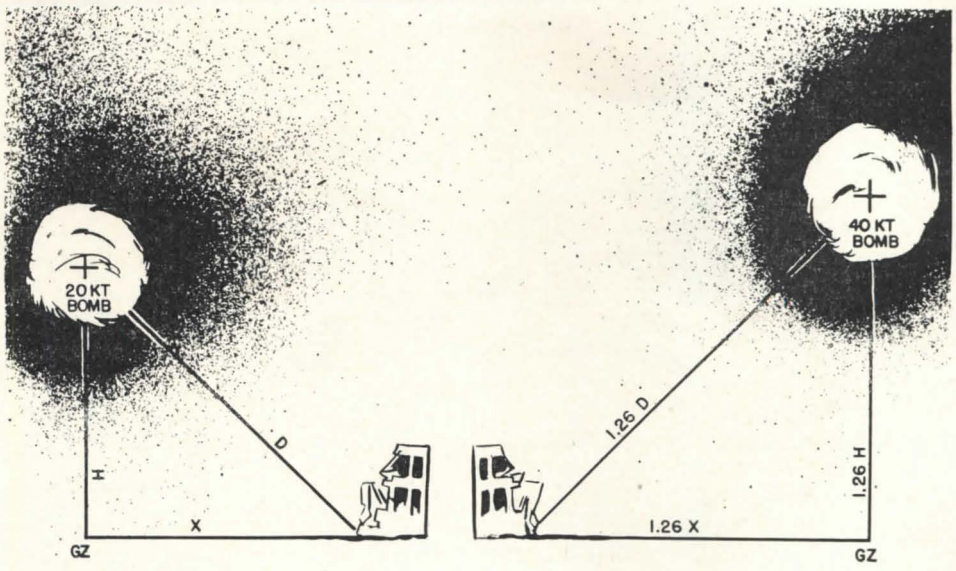
Included in the discussion on analysis and design of structures were papers on "Steel Structures," by Stephen J. Fraenkel, Asst. Chairman, Dept. of Structural Research, Armour Research Foundation; "Analysis and Design of Structures Subjected to Dynamic Loads," by Nathan M. Newmark, Research Professor of Structural Engineering, University of Illinois; and "Steel Frames for Industrial Building," by Bruce G. Johnston, Professor of Structural Engineering, University of Michigan.

Fraenkel's paper was designed to acquaint the non-specialist in the dynamic behavior of structures with engineering



Personnel shelter designed by Navy of precast concrete

Those who attended the recent M.I.T. conference on "Building in the Atomic Age" or the University of California symposium on "Earthquake and Blast Effects on Structures" heard experts say that conventional construction can be strengthened sufficiently to resist the blast of atomic bombs at a moderate increase in cost. These experts also indicated that special protective construction would be warranted only for structures of great strategic or economic importance



Relative distances at which 20 KT and 40 KT bombs cause comparable damage

BUILDINGS CAN BE DESIGNED TO RESIST A-BOMBS

POPULAR conceptions of the atomic bomb have led many people to think that the effects of its blast on buildings within short range are nearly irresistible. This is far from being true. Even conventional construction can be strengthened so as to have some blast resistance.

To make known the most recent available knowledge on the design of structures for resistance to large blasts, two conferences were held this June.

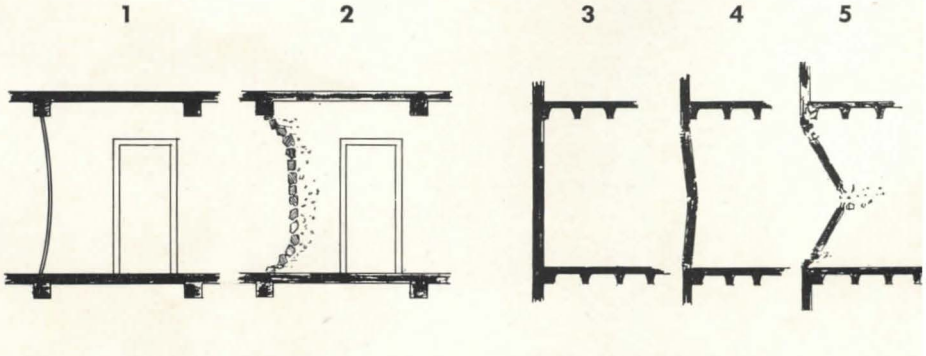
The first conference, "Building for the Atomic Age," was held at M.I.T. Nine days after the M.I.T. conference a "Symposium on Earthquake and Blast Effects on Structures" was held at the University of California at Los Angeles. Some of the same speakers appeared at both conferences, and the talks covering resistance to A-bombs were very similar.

Highlights of the M.I.T. conference, which dealt solely with the problems of protection against possible atomic attack, are presented here. And starting on page 184 is an abstract of the talk "Cost of Blast Proof Structures" by Charles S. Whitney given at the M.I.T. conference.

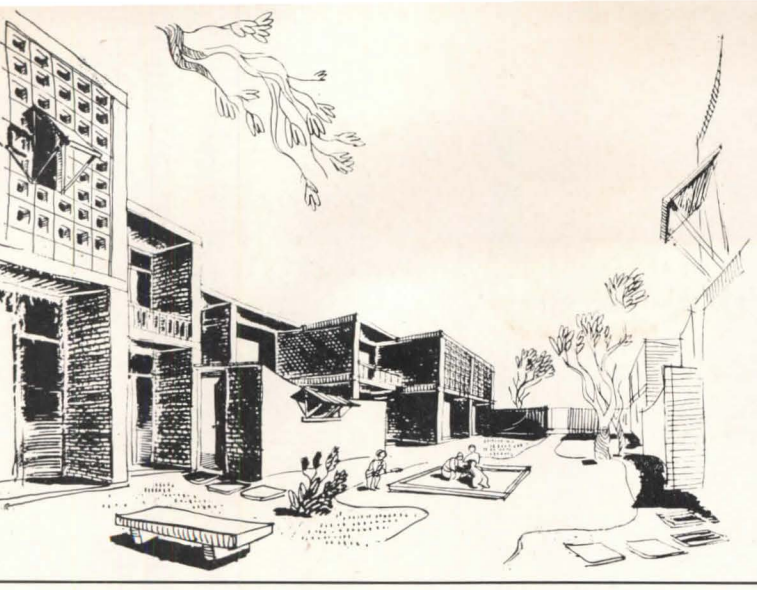
Emphasis on "Improved Construction"

Here are the salient points of the M.I.T. conference as summarized by John B. Wilbur, Head, Dept. of Civil and Sanitary Engineering, M.I.T.

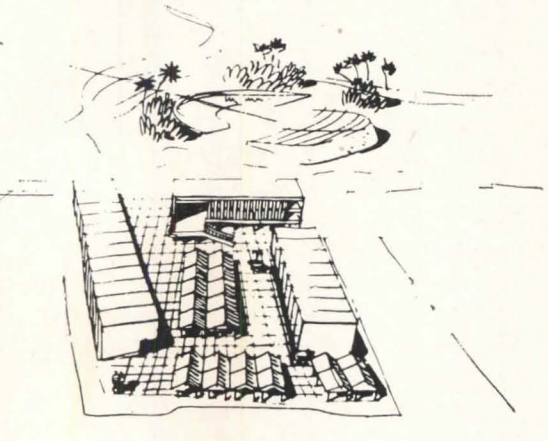
1. Building for the atomic age involves not only technical complications, but social and economic aspects of gravest importance.
2. If an atomic war comes, it may be delayed long enough for architects, engineers and planners to significantly minimize loss of life, property and industrial output.
3. Such steps are technically possible, and it appears that over a period of years they can be made economically and socially feasible.
4. It may be difficult to devise protection, but it will be more difficult to arouse public support.
5. The problem is one of economics, so extreme measures must be set aside. We must think in terms of partial measures: dispersal that will discourage attractive targets; shelters that will offer a reasonable degree of protection; methods of construction that have definite resistance to shock and blast load — even though few structures will be built that are actually bomb-proof.
6. The difference between no protection at all and some protection is the

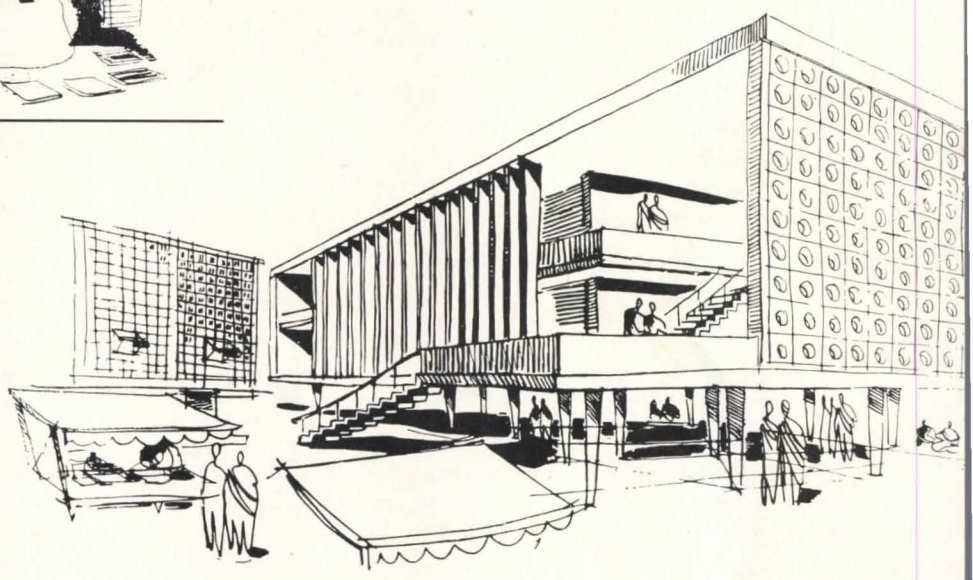


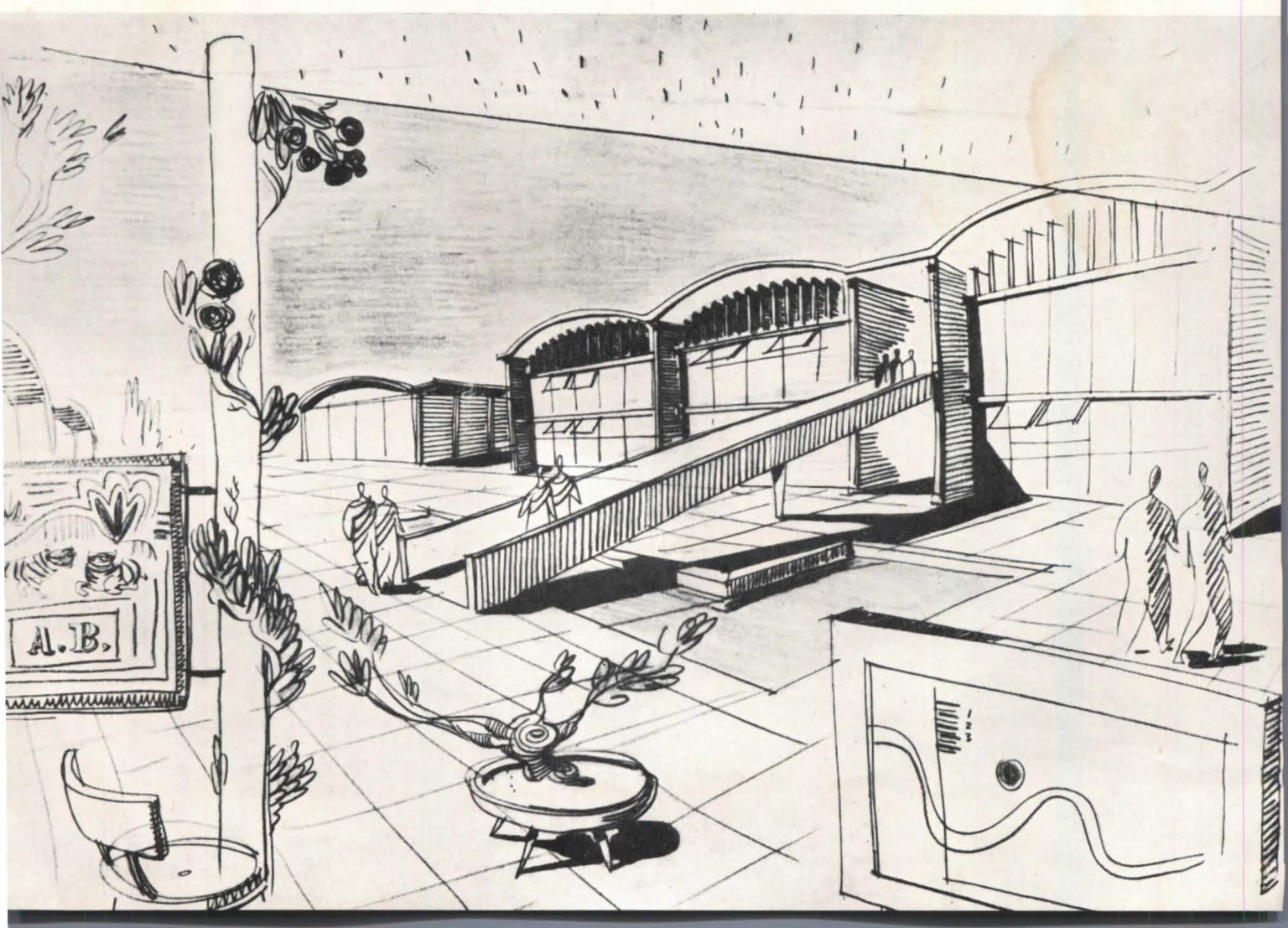
Effect of blast on various constructions. **1, 2.** *Well attached partition having tensile strength will deflect; brittle partition will break up.* **3, 4, 5.** *Comparative behavior of one-way reinforced concrete wall with blast loads of different intensities: (3) panel vibrates, (4) panel deforms plastically, (5) panel fails.* **6, 7.** *Effect of blast on sheet metal.* **8, 9.** *Effect of blast on asbestos cement*



As much as anyone in our time, Matthew Nowicki realized in his work both the heritage and aspirations of people—was able to build traditional richness into fresh new forms—to apply modern technical knowledge to age-old problems of climate and culture. These sketches are a few visualizations of the "hard line" plans he developed for buildings in a low-to-middle-income superblock in the new capital city for the Punjab—Mayer & Whittlesey, architects for the master plan







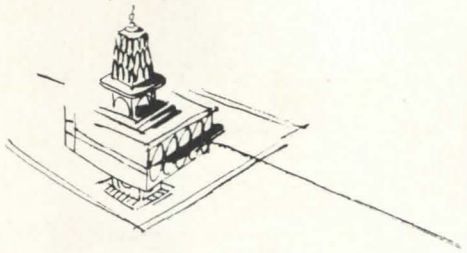
hot, dry climates, although it endures indefinitely under the same conditions when it is protected.

It is much like piloting in strange waters — "local knowledge" must be sought in each unfamiliar situation to avoid wasteful design or outright mistakes.

SUMMARY

The panorama of the tropics is vast, even when approached along the comparatively narrow pathway of building design. Even this limited approach soon takes us into actively contradictory situations, such as the existence side by side of twentieth-century technological standards in commercial or industrial work and standards of community development or housing which are a century or more behind. More different sets of conditions are met than we are accustomed to in work at home. Materials or details, for instance, not only must fulfill requirements of durability and comfort as determined by the climate but they may pose such questions as these: Are the local types of construction adequate for our new buildings or have better types been developed elsewhere? Are local building materials adequate or must materials be shipped in? Should shipped-in materials be prefabricated, for assembly by local labor, or must a complete construction operation be set up on the site, with imported mechanics?

The continued usefulness of new buildings for a specific location may depend on a general knowledge of economic or political developments in the area, so that even a strictly "building" approach needs to be illuminated by other points of view. The literature on the tropics, from newspapers and accounts of travel to serious works of research, give any number of viewpoints covering climate, health, foreign trade, industry and agriculture, politics, cultural development, history — any or all of which may interest us. Most of these and several more are explored in the book by Marston Bates which was



quoted above. Bates appears to cover everything *except* building construction, although his study, by concentrating on "man and nature in the tropics" gives a very rich understanding of the full background — physical, historic, cultural, economic, etc. — without which buildings themselves cannot be fully understood.

Building design for tropical areas requires careful and continual re-examination of standardized methods and perhaps a keener realization of changes taking place in building technology than is necessary in practice closer to home. Changes in people's attitudes are equally important, creating demands for symbolic expression, of *prestige* especially, which may override functional considerations. Imported wood-and-corrugated-iron shacks, termite-ridden and rusty, are frequently preferred as "modern" in areas where native construction is quite superior. And sunshades, like grille-work on autos, must *look* like what people want, whether they are functionally effective or not. The facts of building technology can be turned into symbolic fancies almost as readily as styles of ornament were adapted in an earlier day. It is up to us to keep on questioning our building types — never to assume that the answers are final.

UNITED NATIONS STUDIES OF TROPICAL HOUSING

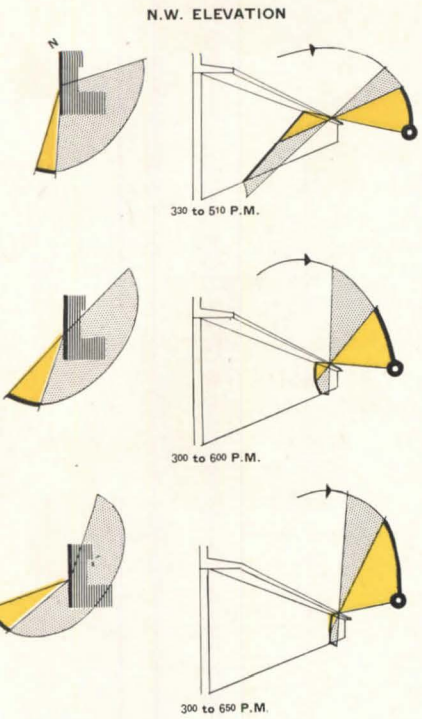
The Department of Social Affairs of the United Nations has issued a number of mimeographed reports on social and economic conditions in the tropics with special reference to housing. Some of these have been cited above. The latest issue of their publication *Housing and Town and Country Planning, Bulletin No. 6* "Housing in the Tropics" brings together much of this and much new material in a single document which will be of great value for anyone concerned with the tropics. This bulletin was issued just before this number of the RECORD went to press, too late to be incorporated into the body of the present article. It seems worth while to add a few comments on it:

A major concern of the Department of Social Affairs has naturally been the improvement of housing conditions — the most obvious and pressing need in all the underdeveloped but over-crowded areas which are so typical of the tropics. The main emphasis of this bulletin is on the improvement of housing in such areas by "aided self-help" programs which can be carried through without financial burdens beyond their present economic abilities.

A particular value of this bulletin, for our purposes, lies in its description of conditions in various localities and of building types which have proved most suitable for the various climates and levels of development. There is an authoritative article "*Design and Construction in the Tropics*" by G. Anthony Atkinson of the Great Britain's Building Research Station. Weather records of representative tropical cities are given in another article; standards for comfort and health are discussed, and so on.

The exchange of technical information is a leading objective of the Department of Social Affairs in all of its publications and is well realized in this one . . . "*intended for the use of government services, architects, town planners, building practitioners and householders. It states the problem of tropical housing in less developed areas and indicates the main lines along which a solution may be found. It will be followed by the publication of a* Handbook on Tropical Housing *which will contain a comprehensive international survey of available documented information.*"

An extremely thorough bibliography of about 40 pages is included, cross-referenced so that information on any technical subject can be brought to bear in areas with similar types of problems. The material covered is broad in scope, by no means limited strictly to housing.



which will have similar or superior qualities. Considerable applied research along these lines has been done by British and French governments in connection with planning and housing, especially in their African colonies.

In hot, humid climates there is little change in temperature from day to night and no advantage in using heavy construction. The chief comfort factor is air movement, aided by scanty clothing and frequent bathing. Buildings are one room deep wherever possible and arranged to encourage movement of air, or at least not to impede it. Openings are wide and full height of the wall or entire walls are made of porous materials such as matting, and "dead" areas or pockets are avoided. Buildings are turned to face breezes wherever possible but east and west walls are blank or heavily shaded as protection against sun. Sky brightness is much higher than in dry climates, twice as great in extreme cases, and there is no glare from the ground, which is generally covered with foliage.

Where masonry construction is available (and it is sometimes the most effective device for countering termites) it is best used between rows of rooms, leaving the exterior walls open or mere screens. The chief structural problem in the humid tropics is set by the combination of torrential rains with the necessity for free ventilation. High ceilings are the rule. (Barracks for mine labor in Malaya, for example, are required to have ten-ft high walls at inner sides of verandahs.)

Both tropical upland and ***tropical marine climates*** are variations or combinations of the dry and the humid, as far as building construction is concerned, plus a few special problems of their own. Comfort factors, however, may vary considerably.

Upland climates have colder nights than at lower elevations and it is often desirable to have enough heat capacity in house construction to keep the interiors from getting too cool at night. In their wet seasons verandahs and cross ventilation are desirable although not so essential as in the humid lowland climates.

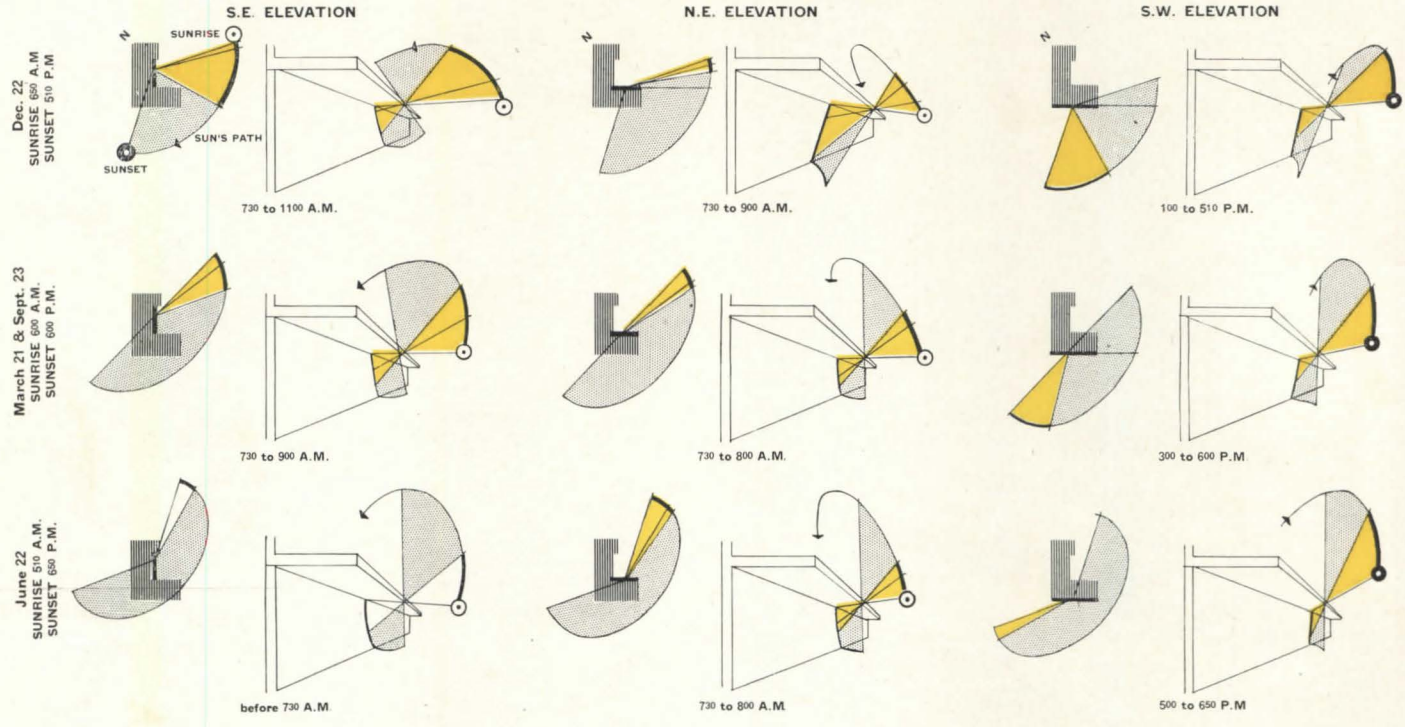
Marine climates may be either dry or humid, or even both in turn in "wet" and "dry" seasons. They may be located in the sweltering monotony of the equatorial belt or in the freshness of the trade winds: Rains fall straight down in the former; may be driven horizontally by high winds in the latter. In the former every stray draft of air is encouraged and interiors are kept "aired out" to prevent mould and rot, while in the latter case ventilation is often more a problem of controlling a strong flow of air.

All tropical climates are free of the alternate freezing-and-thawing that is so rough on materials in the temperate zones. Each tropical type, however, imposes its own strictures. Timber is especially susceptible to attack by termites or fungus in the humid tropics, although some varieties of bamboo and a number of hardwoods, notably teak, are immune. Ferrous metals go to pieces very rapidly under extreme humid conditions. Timber also deteriorates quickly when exposed to sun in

OFFICE BUILDING FOR THE BAHREIN PETROLEUM CO., LTD.

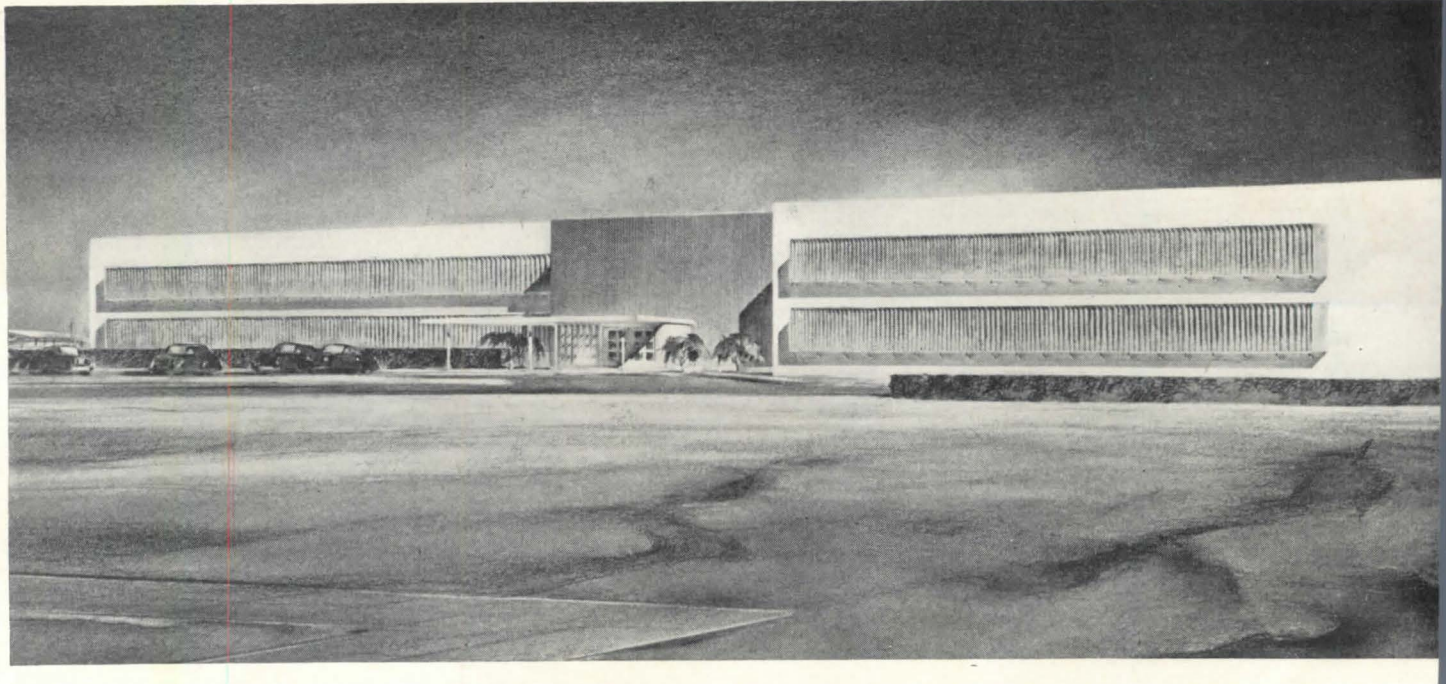
Bahrein Island, Persian Gulf

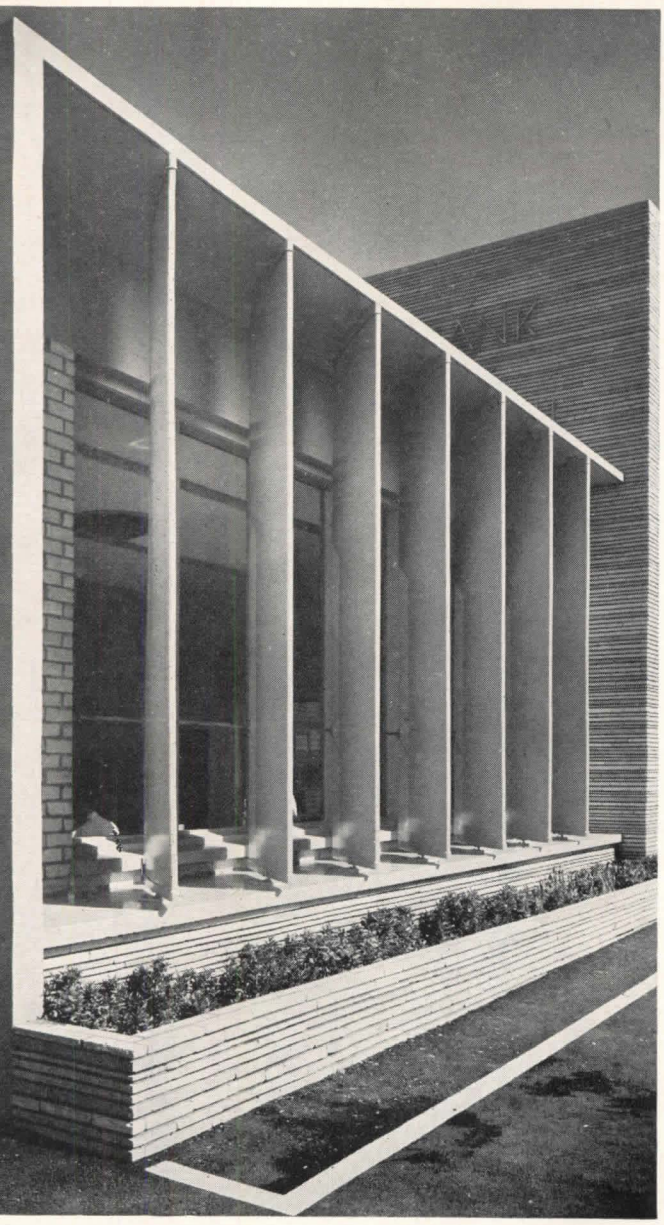
Chauncey W. Riley, Architect



Drawing by Tom Ballenger

Seasonal sun orientation for determining sunshade designs. Sunshades are of simple construction, designed to relieve the air conditioning load by screening both windows and walls from direct sun during period of greatest build-up of heat in the structure





otherwise be very simple. Fortunately, the problems involved are well understood by American engineers.

Types of construction for different tropical climates will have to take into account not only the physical conditions but also the cultural and economic levels of development, such as were discussed above. The following résumé is concerned only with the physical conditions. Suitability of different construction methods will of course be judged in terms of the levels attained in the area under consideration as well as the universal factors of comfort — temperature, humidity and movement of air and radiation.

In hot, dry climates there is usually a considerable range of temperature from day to night and the traditional solution is thick walls with small openings and a flat roof — all of earth construction. The thermal capacity of the heavy structure keeps the interior surfaces comparatively cool during the day and the heated day-time air is largely excluded. The buildings thus serve as protection against heat by keeping the air cooler than out-of-doors and by providing cooler surfaces to which body-heat can radiate.

Sky-brightness is low in the clear atmosphere of the dry climates and where there is little vegetation the strongest light comes from the ground. Windows are therefore kept high in the wall and even shuttered entirely during daylight hours. Openings on east and west walls are avoided. Exterior surfaces are kept light in color to resist solar radiation.

By nightfall the interiors have heated up and the flat roofs are used for sleeping or else a light-weight structure such as a tent is used.

These age-old means of utilizing environmental factors for comfort can be tested and verified in the laboratory and by full-scale experiments. Information on heat-lag in our own "heating and ventilating" literature can be utilized for choosing modern materials

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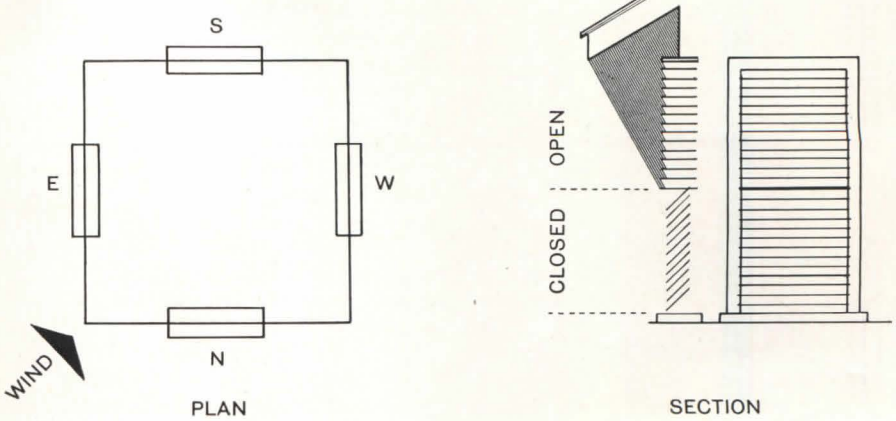
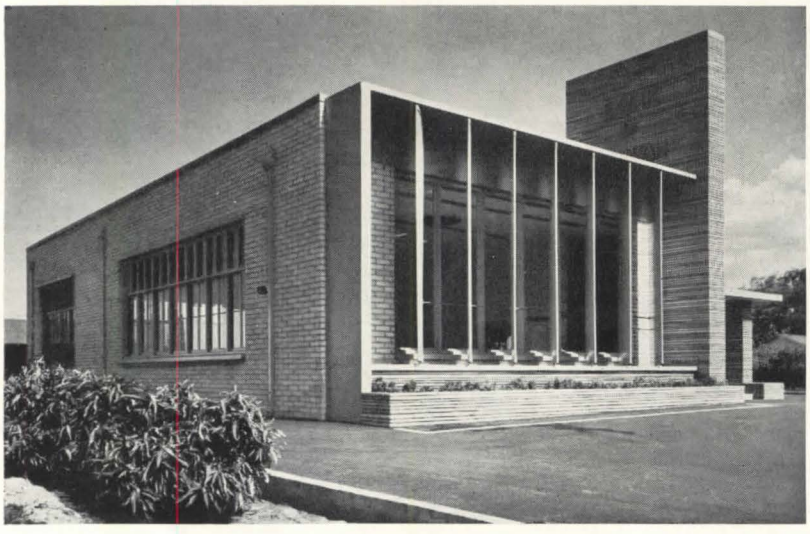
of typhoons or hurricanes, frequency and amount of rainfall, exposure to salt water corrosion, types of destructive insect infestation prevalent, soil and drainage conditions, etc., all directly affect techniques of design and necessitate specific solutions for individual areas and site conditions."

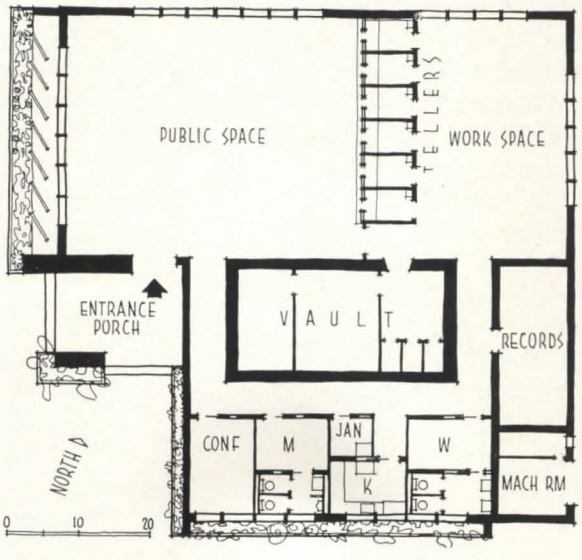
And from ***Thomas F. Litaker, A.I.A.,*** Honolulu: "Fortunately our trade winds keep us refreshed so that controlled cross ventilation is the real answer to comfort. When that is not possible, all the other problems present themselves (thermal).

"Our trade winds blow from northeast and since the long afternoon sun shines from just the opposite direction — I have found that the best solution of the problem is the use of jalousies (glass and wood)."





R. Wenkam



Kahului Branch, Bank of Hawaii, Rothwell & Lester, architects. The pivoted vertical louvers can be adjusted to shade the west exposure—still provide openness and light

that anyone tried to consider comfortable climatic evironment in these latitudes.

"We in Honolulu do not have extreme heat nor do we have extreme humidity, and except for particular locations and sites the problem is not as aggravated as it is southwest of here, though the problem posed by our northeasterly trades, which are more insistent here than in other, more tropical locations, cannot be disposed of lightly."

And from ***Cyril W. Lemmon, F.R.I.B.A., A.I.A.,*** of Lemmon and Freeth, Honolulu: "We try to evolve as open a plan as possible with emphasis on through ventilation. We try to keep the sun off exterior walls by means of broad eaves in the case of residential work and projecting canopys on other types of structures. We use vertical wood louvers a good deal for sun control and, also, horizontal glass and wood jalousies. High ceilings are used in buildings which are not air conditioned. A feature which perhaps is novel to this part of the world and is due to the climate, is the use of exterior balconies and stairs instead of interior corridors for access to offices and apartments."

R. E. Windisch, A.I.A., Honolulu: "Subjects to be very concerned about, when designing for the tropics, are, for instance:

"Climate, humidity, dampness, rains, driving rains, winds (good ones and bad ones). Exposure to sun, sun-glare and sky-glare. Earthquakes, rot, fungus, rust, salty air, termites, rats.

"Labor cost and productivity, remoteness from the supply centers, lack of service facilities, limitation in choice of material, use of material: concrete, steel, wood, masonry, types of windows, doors, etc.

"You see that there is much to it and no set experience."

William D. Merrill, A.I.A., Partner, Merrill, Simms & Roehrig, Honolulu, after mentioning the generally equable climate, notes the great local variation in rainfall: "Rainfall varies radically. For 1949, downtown Honolulu had 23.96 in. while five miles up Nuuanu Valley 81.76 in. was recorded. Hilo showed 132.14 in. This sort of a climate doesn't necessitate planning for extremes but is a challenge to the designer."

John H. McAuliffe, Jr., A.I.A., Oahu, reminds us of the adverse conditions: "Such considerations as incidence

necessary to health in the tropics — and particularly that it enables the body to adjust to suddenly lowered temperatures, which are much more noticeable after becoming accustomed to steady warmth.

OTHER FACTORS which apply generally to all types of climate are found to vary all over the map and with differences in elevation on the map and with any number of local conditions. Each different location or even each site will have different combinations of these.

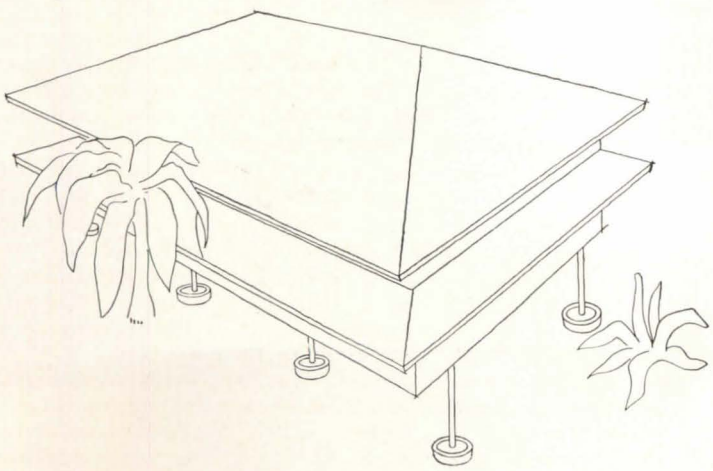
Take rainfall in the Trade Wind Belt, the Hawaiian Islands for example, where great differences occur within small distances. The lowlands are quite dry (20 in. of rainfall or less per year) and almost always sunny, while the mountains are usually hidden in clouds and have almost daily rainfall aggregating 200 in. and more per year. The highest mountain tops are again arid, for the moisture-laden trades have spilled most of their rain below 6000 ft.

Almost as striking are the temperature differences that go with differences of elevation. The *minimum* temperature near sea level is around 50 deg but on the higher mountains, over 6000 ft, winter snow is usual and frost is common at 4000 ft and upward. Maximum temperatures are in the 90's and with the almost constant breeze this is most pleasant. The Islands' only oppressive weather comes briefly in the fall, with lower temperature but high humidity, and without the usual relief from breezes, when the regularity of the trade winds gives way to light variables.

Placing of buildings will generally be governed by direction of prevailing breezes where these are dependable, rather than with relation to sun. Very frequently this direction is locally affected by the slope of the ground and location of vegetation, especially large trees. When a pleasant outlook is not inconsistent with these primary requirements those who use the building are indeed fortunate. And fortunate are the dwellers in tropical lowland countries where mountains are within reach — for variety and for relief during the less comfortable parts of the year.

Earthquakes are not peculiar to the tropics, although more regions within are subject to them than are the regions beyond. *Hurricanes* (and typhoons — same thing), although they do not occur along the equator, *are* tropical phenomena, usually expending themselves without going very far beyond, but occasionally spreading destruction as far north as our New England coast. In areas where they may be expected, both earthquakes and hurricanes impose severe additional structural requirements on buildings whose construction might

Rainfall Map of Oahu Island, Territory of Hawaii

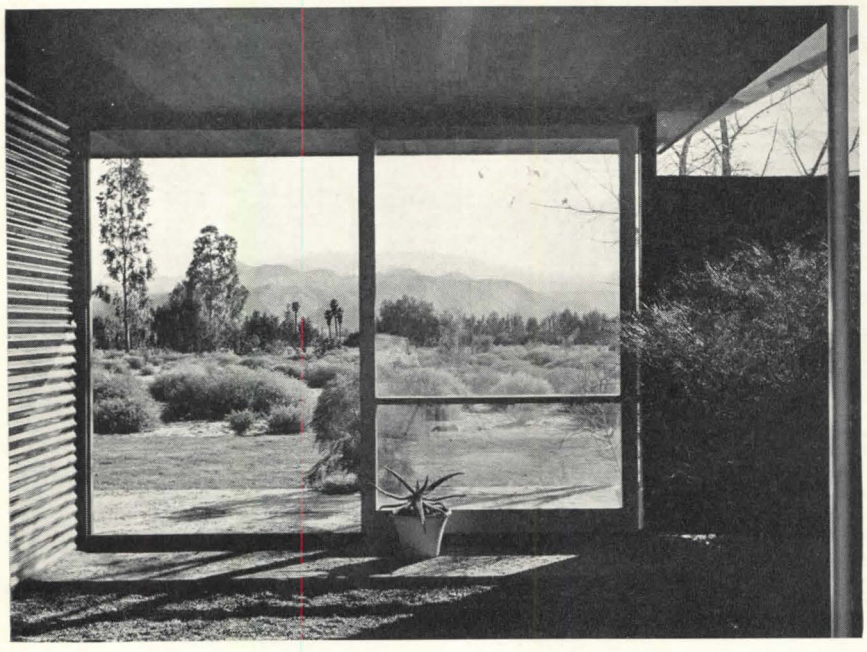


Wide overhangs for protection against wind-driven rains

HAWAIIAN ISLANDS

All of the territory of Hawaii is within the tropics — although a number of the architects here speak of experience in "more tropical" locations, meaning hotter or more humid or less pleasant than the trade-wind-dominated climate of these islands.

Vladimir Ossipoff, A.I.A., of Honolulu, whose work has frequently appeared in these pages, puts it thus: "The design problem here boils down to one major criterion: ample ventilation without being blown out of the house and without admitting horizontally-driven rain. Thus the problem is bipolar, and were the questions raised by each pole to be answered individually, the answers to each would be found to be opposing each other. Attempts to satisfactorily resolve this opposition within the single framework of one answer have been going on ever since the first time



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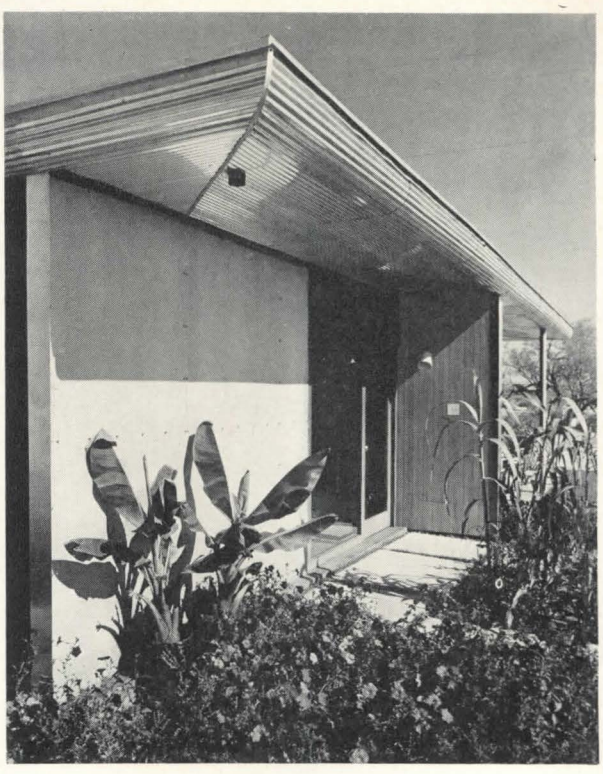

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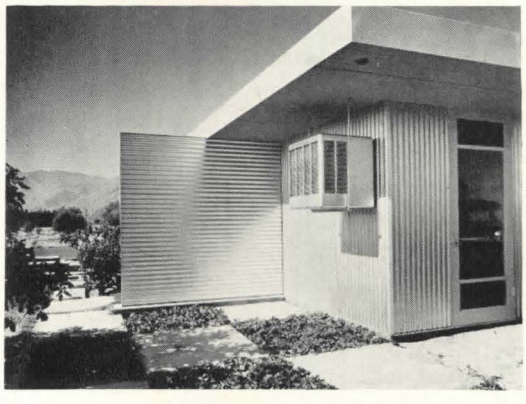


3

Julius Shulman

1 *J. P. Clark house*
2 *Robson Chambers house*
3 *Albert Frey house*
These three houses by Clarke & Frey, architects, feature lightweight reflective materials, wide overhangs for sun protection, evaporative coolers

the summer we have exceedingly heavy rains of short duration preceded and followed by intense sunshine which creates several problems in building construction. This peculiar whim of nature is not too severe for the people because we are fortunate in having pleasant southerly breezes from the Gulf during the hottest season of the year. This area also has hurricane winds in season but not with the regularity of the Florida area. Except for beach front property, this is not usually a major consideration in construction.

"Important Considerations:

"1. Orientation for sun and wind.

"2. Window size for maximum ventilation.

"3. Wide over-hangs and awning windows.

"4. Louvered interior partitions for cross ventilation.

"5. Waterproofing under slabs and exterior walls.

"6. Treatment of lumber for termites.

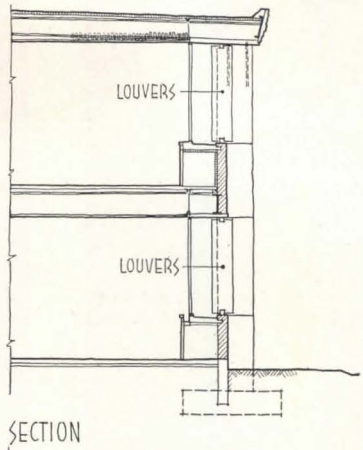
"7. Treatment of paints against mildew.

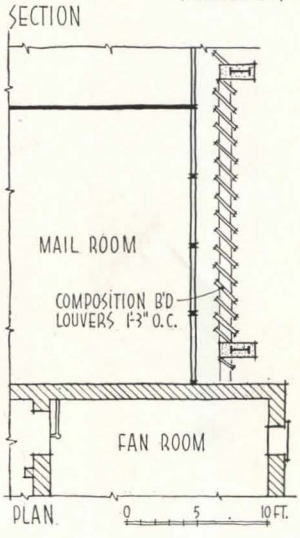
"8. Insulation against heat."

And from ***Francis R. Walton, A.I.A.,*** Daytona Beach, whose description of the effects of wind can be taken as typical for a great many "tropic marine" localities: "First of all, the word tropical is a romantic term which conjures up pictures of swaying palms, surfboard riders, outdoor eating, etc. The word is never used in a vocabulary of natives of my town. Designing homes for this area and for the clients we find here involves considerable concern for heavy rains, objectionable insects, termites, 30 degree winter days and nights, 90 degree summer days and nights with severe humidity conditions, and hurricane strength winds. Our terrain is almost table-top flat at sea level with only occasional sand dunes and shore lines at river and ocean to break the monotony. Our vegetation varies from scrubby, stunted growth near ocean and in dry sandy inland areas, to towering occasional trees and dense jungle away from ocean and in areas having clay undersoil or moist conditions.

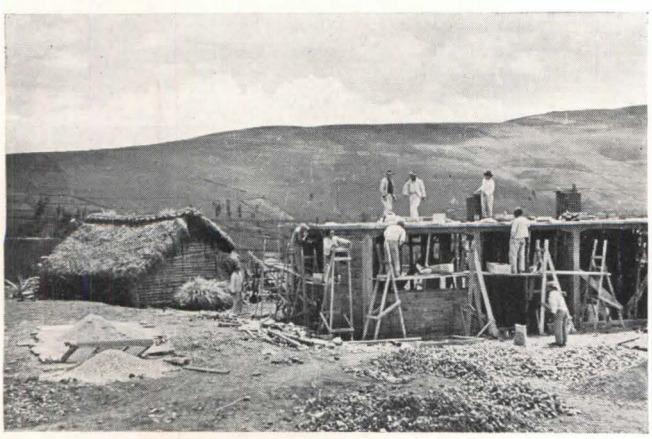
"Our summer heat is tempered by strong to stiff breezes. One set of breezes is caused by the alternating effect of warm land areas and cooler water areas during the day and warm water areas and cooler land areas during the night. This produces the standard rocker effect which occurs at all sea coast or shore line areas. The other set of breezes is produced by larger wind movements and follows a seasonal pattern. During each summer there are a few days when the sky has been overcast sufficiently to prevent the water or the land from heating up enough to bring about a

(*Continued on page 224*)

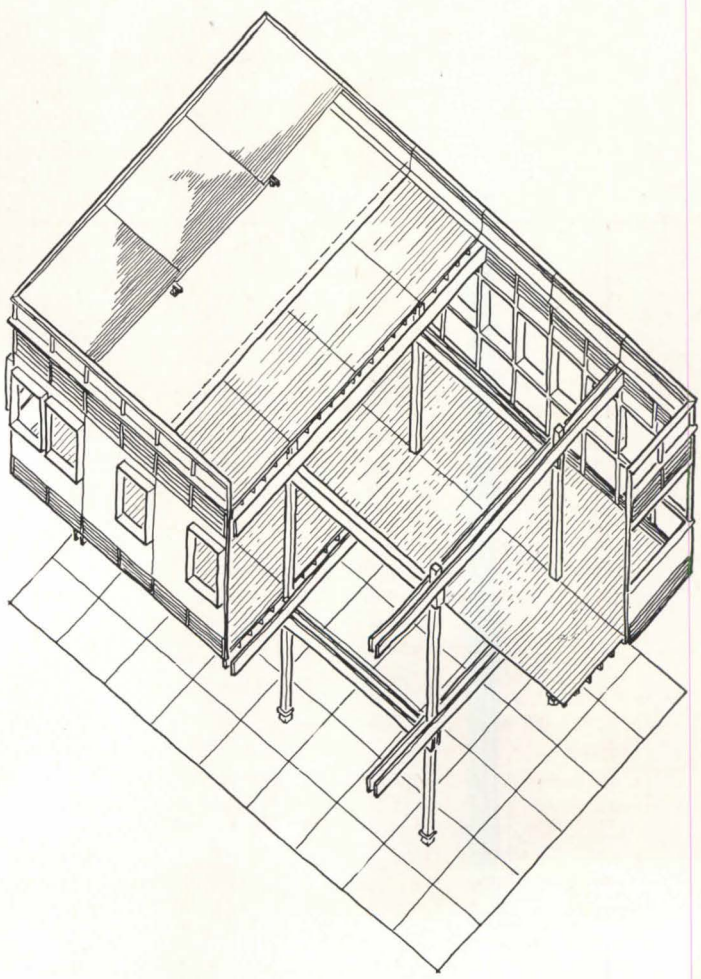




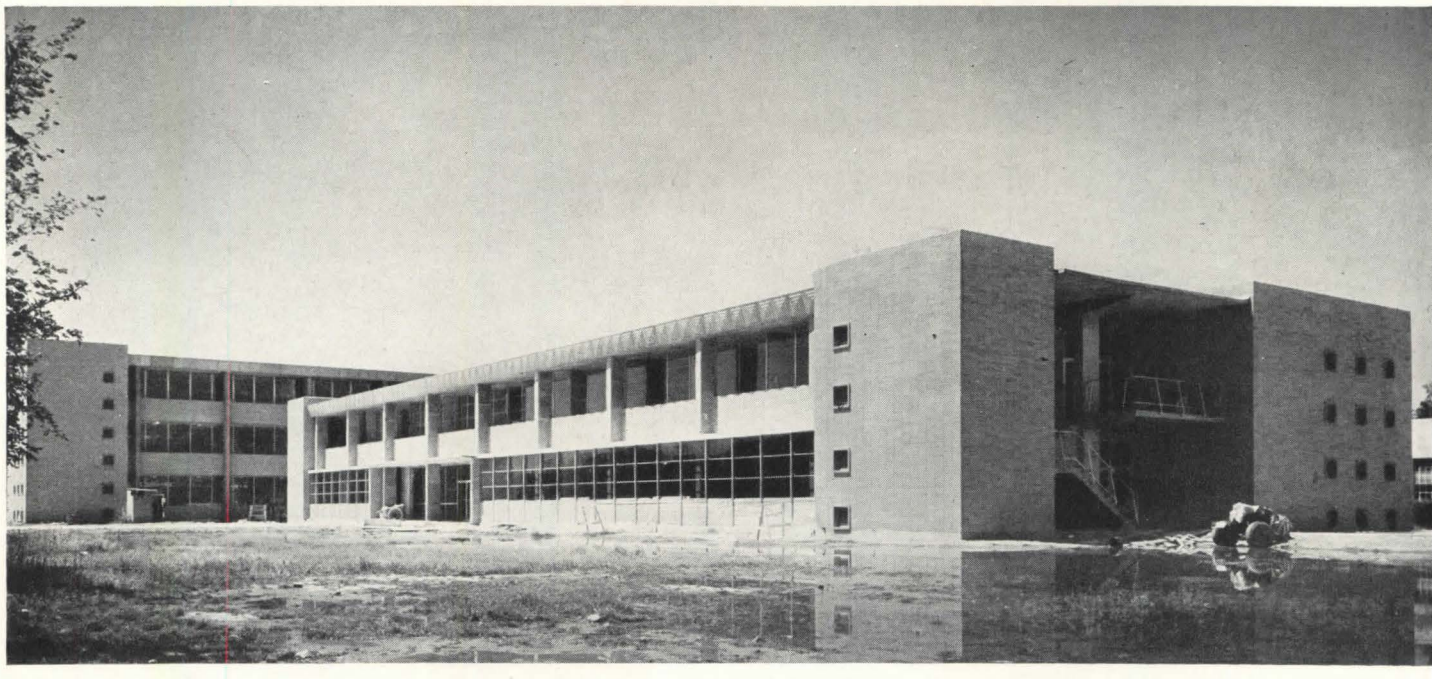
Left and above: Administration Building, Arizona State College—Edward L. Varney, architect. Refer to Varney's letter, page 167. The plan and section at right show deep reveals for protection from glare, vertical louver sunshades, duct space for conditioned air. Below: rehousing in Ecuador, under the guidance of the Pan American Union Technical Assistance Mission. Note contrast between the old standard type house and the new construction in progress. Concrete hand mixed. Below, right: sectional house developed in British Guiana for factory prefabrication and common labor assemblage by bolting. Designed by M. Costello, government architect and planning officer. Features: rain water storage tank on roof for insulation and water supply; house raised above ground for ventilation—utility room at ground level; walls and partitions louvered at top and bottom for air circulation



R. C. Pollock



Stuart A. Weiner



of heat or radiation or air movement, it is not possible to define these physiological comfort factors precisely. They are very real, however, and must be taken into account under all sorts of different combinations of climatic conditions.

Many aspects of physical comfort can be studied by laboratory research methods. The "comfort chart" of the American Society of Heating and Ventilating Engineers, for example, is universally used as a basis for comparing people's reactions to different combinations of temperature and humidity. This and much other material in the A.S.H.V.E. "Guide" applies to reactions which may be expected in any climate. Advanced studies of the various physiological effects of heat transfer have been carried on by the John B. Pierce Laboratory of Hygiene * and by many researches sponsored by the government in order to guide the design of military clothing for the tropics.** Such studies give us data which can be applied universally to aid in understanding physical reactions but it makes a difference whether the conditions are native to us or foreign. Comfort in the midst of unfamiliar conditions involves *adaptation* and that is as likely to be cultural as physical. In either case it may take time.

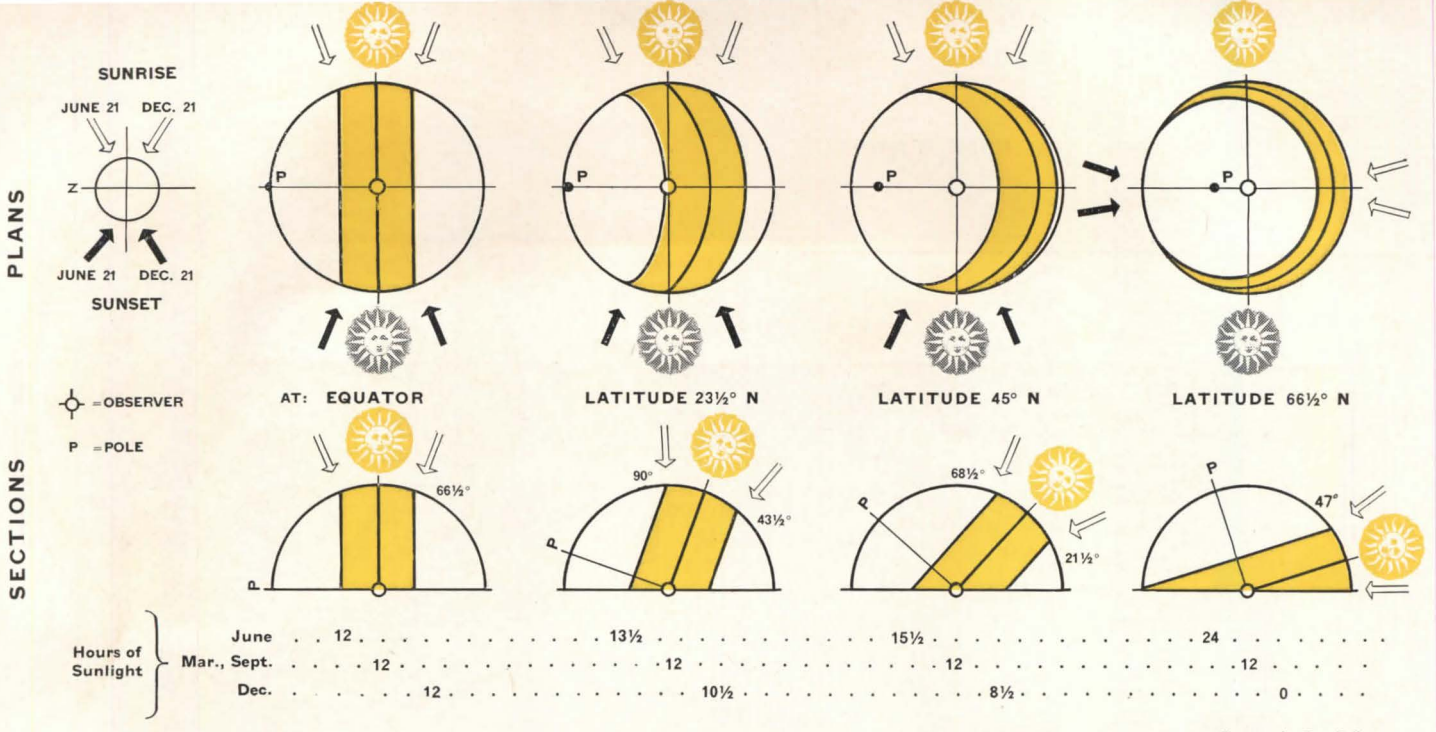
Heat is not only experienced through contact with the surrounding air, in terms of its temperature, humidity and movement (the terms of the "comfort chart") but also through radiation, either solar or from surrounding surfaces. Radiation is also a very important factor in sensations of cold, as we have learned again in the past few years with the revival of "panel warming" as a heat source and from the "cold wall effect" of the very large glass areas which are now in fashion.

The importance of radiation from (and to) building materials in the tropics will be seen when considering different combinations of temperature range and heat capacity of structure in connection with different types of climate. This will be as true of *air conditioned* situations as it is of the *natural*.

The human body has several mechanisms for adjusting to unusual heat conditions which can be greatly aided by suitable choice of clothing, by easing the pace of our activities, by more careful attention to diet and health generally. Perhaps the greatest cause of discomfort in the tropics is unsuitable clothing. Yet the very unsuitable European dress is often a "must," both for the outsider as a mark of prestige and among dwellers in the tropics who are in the process of improving their status. Avoidance of physical work is another "prestige" factor. It has been found, however, that active physical work or its equivalent in exercise is

* *Reported in* Temperature and Human Life *by C. E. A. Winslow and L. P. Herrington, Princeton University Press, 1949.*

** *Summarized in* Physiology of Heat Regulation and the Science of Clothing *by L. H. Newburgh (Editor), W. B. Saunders Co., Philadelphia, 1949.*



Drawing by Tom Ballenger

much anywhere within the tropics. The full range is contained within the first two diagrams in Figure 3. "Sun control" methods are therefore less important here for screening midday sun from the interior of a building than in "temperate zone" latitudes where the sun shines *in* rather than *down*. Protection against the rays of early morning and (especially) late afternoon sun is most important, however, also roof insulation (or ventilation or both) for protection against midday radiation.

Variation in direction of sunlight at various latitudes *is* a factor, however, to be taken into account when applying methods worked out for our arid Southwest (lat 33 deg, say) to otherwise similar conditions (at, say, lat 15 deg); or when comparing Singapore (at the equator) with Hong Kong (at the Tropic of Cancer).

FACTORS OF PHYSICAL COMFORT are also "universals." But unlike the position of the sun or physical measures

At the equator, the sun rises and sets no more than 23½ deg north or south of due east or west; there are always 12 hours of sunlight; and the midday sun is not far from straight up the year 'round, for the poles are on the horizon, north and south.

At the tropics, the directions of sunrise and sunset are not much farther from the east-west line in June and December; the duration of sunlight differs by about three hours at these times of year; and the path of the sun takes a definite swing away from the pole of the heavens, now 23½ deg above the horizon.

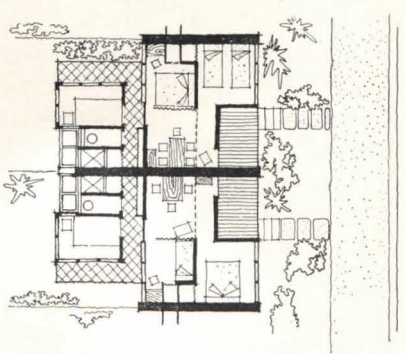
Halfway to the pole, at 45 deg N (latitude of Minneapolis-St. Paul) the differences become more pronounced, while *at the Arctic Circle* the midsummer sun sweeps day and night around the entire compass and the December sun is only glimpsed briefly at the southern horizon.

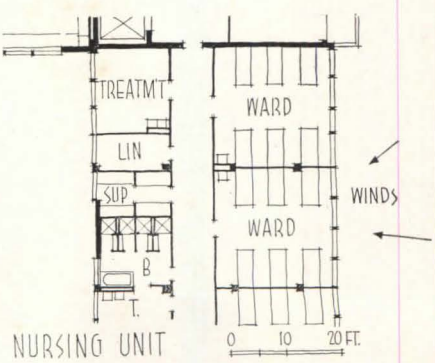
BUILDINGS ORIENTED TO PREVAILING WINDS

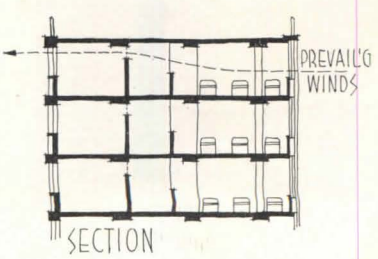
Left—School in French West Africa—Techniques & Architecture, 11th Série, No. 5–6.

Right—Typical design for low-cost housing in hot humid climate (British West Indies). Large openings, thin partitions, shaded verandah. Development and Welfare Bulletin 18, Department of Scientific & Industrial Research, British Government.

Far Right—Industrial Hospital of the State Insurance Fund, Rio Piedras, Puerto Rico, Isadore Rosenfield, architect, New York. Note ventilation through all corridor partitions







ber and mechanics are available. In British Guiana, for example, a very promising demountable house is being developed for the double purpose of utilizing some of the rich timber resources locally and for relieving the acute housing shortage in the British West Indies. Of simple, panel construction and bolted connections, it can be erected by common labor.*

Without a historic sense (projected, hopefully, into the future) it is almost certain that present designs for a "developing" area will either become obsolete shortly or that they will prove wasteful in the long run. Making effective use of available resources is as important a function of a construction program as is the designing of buildings well suited for their intended uses. For areas which have caught up with the twentieth century this is no more of a problem than in architectural work anywhere, but in far-away places which are in the process of catching up, the techniques may need to be continually adjusted to a changing technological level. Better a planned sequence of temporary-into-permanent structures, some of them to be scrapped, than a too-heavy burden imposed on the population by insistence on 100 per cent "sound" construction.

THE PATH OF THE SUN ACROSS THE SKY throughout the year is the one climatic "absolute" which applies to all locations on the earth.

THE SUN CHARTS of Figure 3 are the "down-to-earth" counterparts of the situation diagramed in Figure 1 (perennial puzzler of the school geographies, repeated above). That is, if we conceive of the heavens as a hemisphere centering at the observer and extending, apparently, somewhat beyond the visible horizon, the sun will trace a spiral path in the course of a year within a band 47 deg wide on this "*celestial sphere.*" Each latitude has its own chart, on which the apparent position of the sun may be plotted for any hour or date, and related to any site at the same latitude by simply placing the chart, properly oriented, alongside the plot plan or location map.

Direction and duration of sunlight do not differ very

The Bettmann Archive

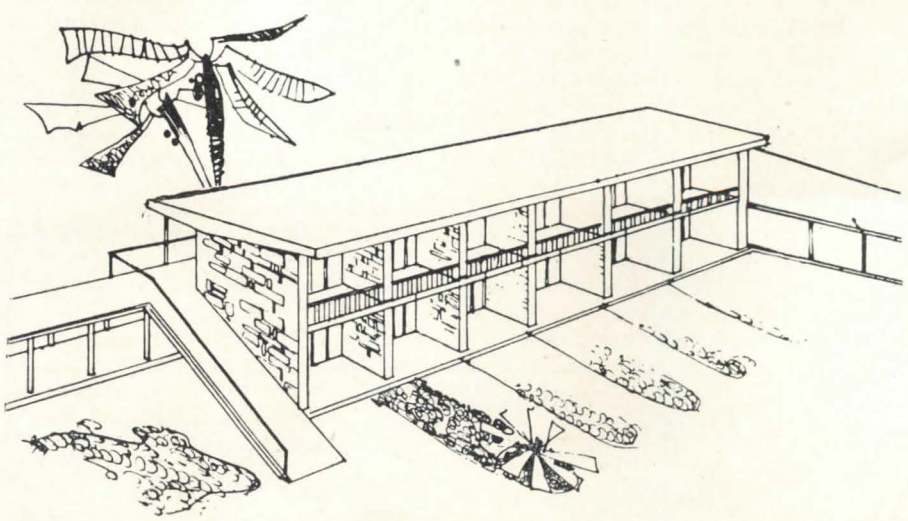
Figure 3 (Right) Effect of Latitude on Sun's Altitude, also Direction and Duration of Sunlight

* *See pictorial sketch, page 173.*

your windows open during rainstorms.

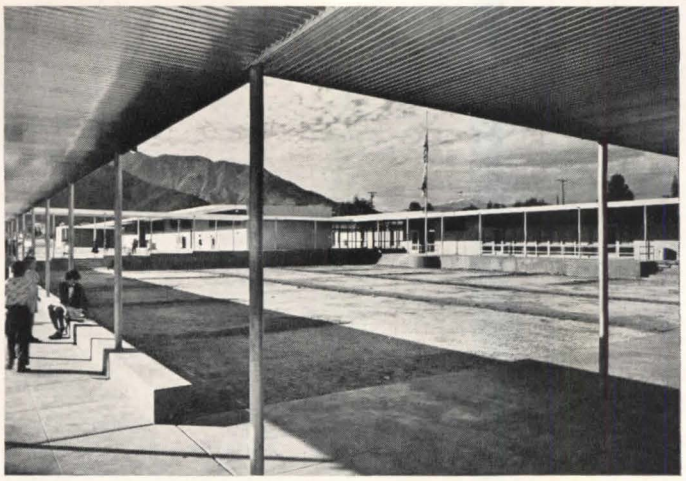
"3. We recommend the use of attic ventilating fans to clear the hot air out of the attic spaces and to draw in the cool air, particularly in the evenings when the temperature out of doors may be from five to ten degrees lower than the temperature in the house.

"4. We also find that sliding glass doors and sliding screens can be used here very successfully. With them you can open up the entire side of a room or porch when the weather permits, and still have an enclosed and heated room in the cold weather."

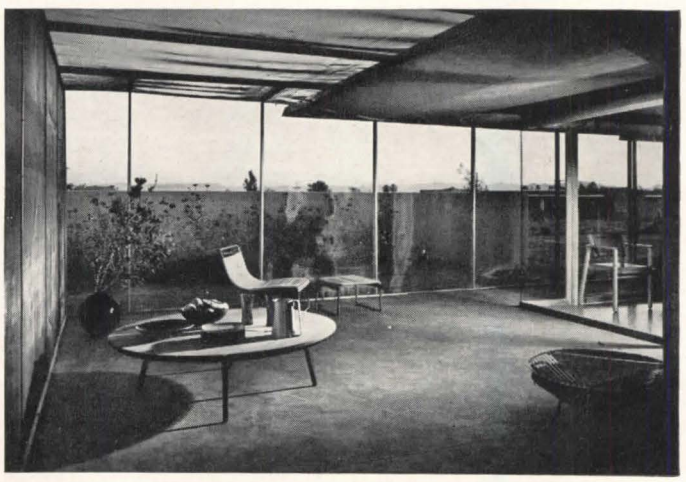


Milton B. E. Hill, A.I.A., describes conditions at Gulfport, Mississippi, with its heavy summer rains as more typical of the humid tropics: "Year round the climate is mild but during

(*Continued on page 174*)



Above, left—Palm Springs, Calif. Health Center, Clark & Frey, architects—evaporative coolers on roof. Above, right—Elementary School, Palm Springs, Calif., Clark & Frey, architects—shaded outdoor passages



Julius Shulman

Above, left and right—Owen House, Phoenix, Ariz., Blaine Drake, architect Shelter at pool for sun protection—screening over terrace allows cool night air to descend to floor for after-dark comfort

spring, too, when the sun is not wanted in a building. Where much glass is used the roof projections must be adequate to shade the glass at this time.

"Cooling And Heating. Heating is necessary from November through March. The change from heating to cooling, and from cooling to heating, is often necessary in the same week. It must be stressed that the desert climate is one of extreme changes, both daily and seasonal, in temperature, wetness and dryness, and mood. Heating can be simple, as by electric wall units or space heaters, but it is still necessary for comfort if the early morning temperature is near freezing. The sun will make the building comfortable by noon if there is adequate glass on the southern exposure.

"For comfortable day and night living in the summer months, and this can

(*Continued on page 224*)

Albert Frey, A.I.A., of Clark and Frey, Palm Springs, California, has this to say of the conditions which resulted in their highly specialized desert houses:

"Our experience has been in hot and low humidity areas. Cooling in daytime in summer is generally adequate with evaporative type equipment. Since nights are often comfortable out of doors, ample cross-ventilation of buildings is desirable. Construction materials which do not retain heat after sunset are essential for night comfort, skin type finishes, reflective insulation, etc. Protection of openings, windows and walks from intense summer sun has brought about new design features, and glare reduction calls for louvers or tinted glass and plastics in windows."

FLORIDA AND THE GULF COAST

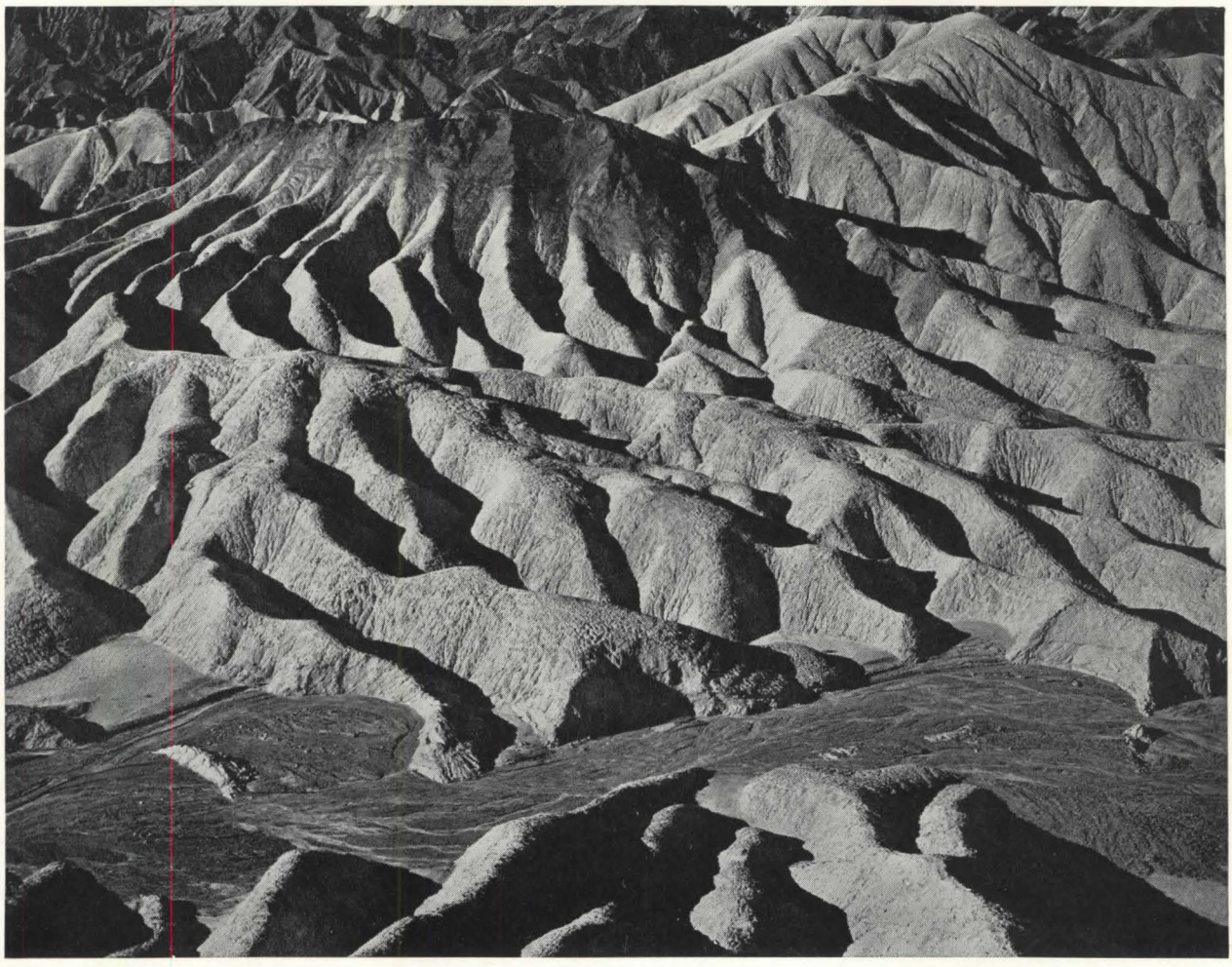
This is the area most readily associated in peoples' minds with "subtropical." Perhaps it's the palm trees, whose presence might be as good a definition as any for "drawing the line" around the tropics, although this line at best is a purely arbitrary one.

M. S. Wyeth, A.I.A., of Wyeth, King and Johnson, Palm Beach, gives a picture of design-for-comfort that is fortunately becoming typical:

"We find more and more that people are building smaller houses and confining them to one story and we have developed a type of architecture which incorporates the following features:

"1. A hipped roof covered with a clay or cement tile, amply ventilated with bat insulation over all ceiling areas and an overhang of from 2½ to 3 ft to protect the windows from driving rains.

"2. We have found that the awning type of window is the most practical in this climate as it enables you to leave



Death Valley, Zabriskie Point, by Edward Weston, 1938

eight towers housing the heating and cooling units.

[*This very interesting building will be published in full in an early issue of the* RECORD.]

"I would suggest that a study of desert design should include research on the typical adobe dwelling of northern Mexico. This house has provided comfortable environment for centuries, and, of course, has its counterpart in desert areas in all parts of the world. Much can be said for its interior court yard, small window openings and heavy adobe walls."

Blaine Drake, of Phoenix, sent us a full description of desert conditions: "THE ARIZONA DESERT. As in most arid regions, the controlling influence is the sun. The sun shines brightly in this area for fully 75 per cent of the possible time.

"Little rainfall . . . average of seven inches a year, mostly in short intervals of winter and midsummer. Long periods of no rain so only well adapted plants can survive these dry intervals.

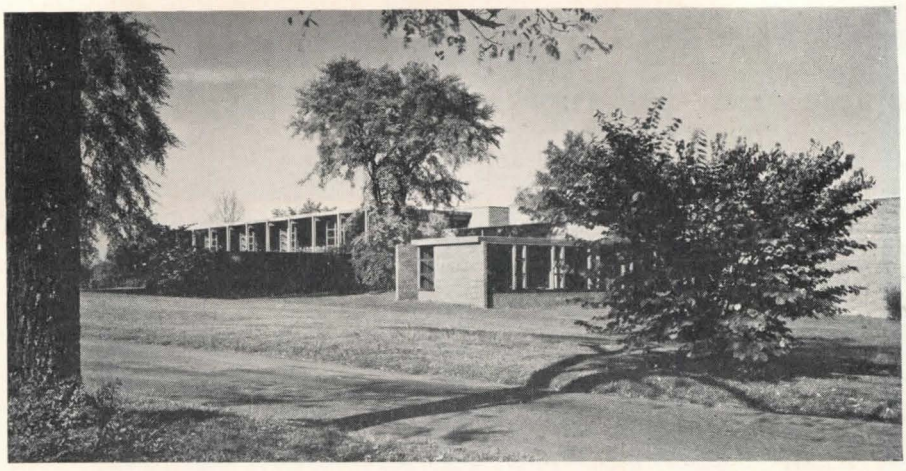
"High temperatures from May through October. High may reach 118 degrees. Low for July and August can be as high as 80 degrees. Clear atmosphere responsible for temperature changes up to 50 degrees in twelve hours. Materials in sun liable to change 80 degrees in the same length of time.

"Low humidity most of the year . . . sometimes high in mid-summer during rainy periods.

"DESIGN. Based on the above general conditions the main problem in design is avoiding the sun from April through October and taking advantage of the low sun in the winter months. The winter sun is a great source and an important source of both heat and the feeling of well being. Of course, the sun's heat must be supplemental to a good heating system, such as hot air or radiant.

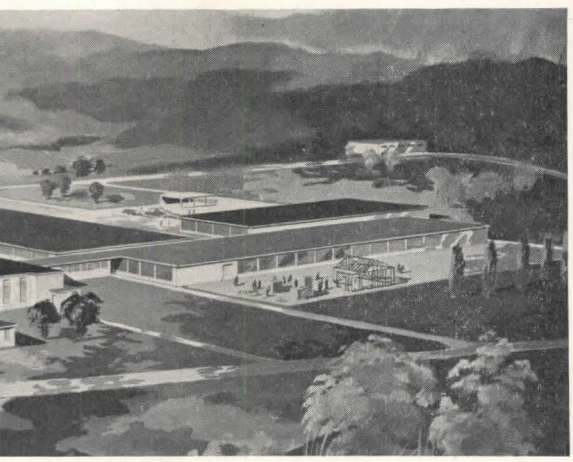
"The position of the building in relation to the sun, especially the elevations having glass, is of the greatest importance. The western exposure to glass should be entirely avoided. The northeast is not good for summer morning sun. When there are desired views on these sides deep overhangs and projections seem to do better than elaborate screens or shutters, both mechanically and from the interior feeling. The great temptation is to use glass freely as is done in the moderate coastal climate, but this is a source of expense and unpleasantness during both the hot and cold seasons. California architects have been embarrassed with unhappy situations building here as they do on the Pacific Coast.

"Another problem with sun and glass is the time early in fall, and in late



1

1 Joseph Molitor, 2 Rendering by Petroff, 3 Ernest Graham



3

interrupted halls developed from the 'dog run,' screened or latticed porches, blinds, louvered partitions, covered sidewalks on business buildings. Unfortunately most of the recent work in this area has held less regard for the logic of these ideas than for the luxury of air conditioning."

Ralph Haver, A.I.A., Phoenix, Arizona, has this to say about materials: "1. Use little exposed wood or other materials subject to deterioration from heat and low humidity. Masonry walls and metal sash do the job in this area. Frame-stucco walls, wood walls and wood sash are not good. Cement asbestos wall facings and roof surfaces are O.K.

"2. Paint on exterior surfaces should be kept to a minimum.

"3. Because of 30 to 40 degrees differences in temperature from night to day are not unusual, heavy wall and ceiling construction tend to even out variation in temperature. A wall with 12 hour heat lag works well.

"4. Evaporative coolers have been the biggest influence on building design ever experienced in this area. These 'swamp boxes' have made it possible to live quite comfortably in a corrugated iron shed with no natural ventilation. An air change every two minutes or so makes it possible.

"5. Sun orientation is important. Low east and west sun are murder (overlags don't go far enough); south sun takes considerable protection because even winter sun is intense. Because sun in this latitude rises and sets quite a distance (about 35 degrees) north of east and west, north windows shouldn't be without protection. Limited and protected glass are the deal in a case of this kind."

Also from Phoenix, with special reference to year-round use of buildings where summer conditions are extreme, ***Edward L. Varney, A.I.A.,*** writes: "More and more, our buildings in this area are being integrated about the air conditioning system. At present we are calling for bids on a new 20-classroom elementary school with refrigerated cooling throughout. While this has been common in college buildings here for some time, I do not believe it has been used in secondary schools before. We are pushing the idea because we believe it will make possible twelve-months use of the school facilities.

"Our recently completed Administration Building at Tempe College, I think, represents complete integration of design, structure and air conditioning. The deep spandrels provide protection from glare and at the same time channel the conditioned air from the

tion is changing rapidly now, however, under the stimulus of the cement mill built by the Puerto Rican government about ten years ago. Reasonably inexpensive masonry construction is now increasingly used for low-rent or owner-built houses. Of course housing is only one aspect of Puerto Rico's "boom". It is singled out here as an example having close parallels in more remote places, at lower levels of economic development, where presence or absence of such things as a cement plant or brick yard or lumber mill or groups of able mechanics makes a world of difference.

THE PRESENT LEVEL OF DEVELOPMENT in a locality will be a determining factor in the design of new buildings, with *rate* and *direction* of development nearly as important. In a long-range construction program the probable future levels at successive periods will certainly be more important than the present situation. This is, of course, no more true of the tropics than of our own country but here we are accustomed to change by repeated experience, while in the unfamiliar situation it is about all we can do, at first, to get a full picture as of now. It is hard for us to realize that a place which has been much the same for centuries can change mighty fast under new economic or social pressures. *Any* change is extreme when it starts from scratch.

On the other hand, any "improvement" which is much above the present levels must have outside backing until the place can support the new outlays. This is especially true in the vexed field of tropical housing where it has been found repeatedly that construction of "model" dwellings can be burdensome. For example, the preliminary report *Survey of Problems of Low Cost Rural Housing in Tropical Areas* * (with special reference to the Caribbean) states in the chapter on Materials and Buildings: "Thus, the repair and improvement of existing dwellings and the construction of new dwellings on an aided self-help basis for as many people as possible are very often considered preferable to the building of a limited number of modern, very well-equipped housing units."

A more hopeful view can be taken where local tim-

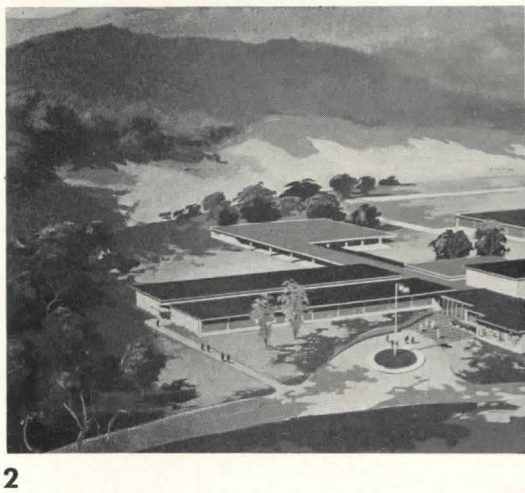
(*Continued on page 170*)

* *Issued 17 November 1950 by the United Nations Secretariat, Department of Social Affairs, United Nations, New York.*

1 Maryville College Fine Arts Center, Maryville, Tenn., Schweiker & Elting, architects

2 Vocational School, El Salvador, Wm. G. Lyles, Bissett, Carlisle & Wolff, architects

3 Prentice House, Del Ray, Fla. Wyeth, King & Johnson, architects



2

Photo by Richard Koch, F.A.I.A.

White Pillars, published in 1941 by William Helburn, Inc.

"In our office, we have been unable to claim any really new ideas in architectural forms. Every time I think we have made a discovery, I find we are 100 years too late. New materials, new techniques and new methods, yes. With wise application to old fundamental design principles, we are able to find satisfaction in the freshness and honesty of our solution."

Richard Koch, F.A.I.A., writes from New Orleans: "Buildings in this climate, due to the humidity, must have cross ventilation, and open screened porches with fans are most necessary. However, the use of air-conditioning and ventilating fans has diminished the use of porches, though in the open country they are still ideal. Of course, the rooms should be protected from the direct rays of the sun."

THE SOUTHWEST — HOT AND DRY

Although the traditional construction in the Southwest is older than the South's, there has been no such continuity in the practice of architecture across the emptier stretches of West Texas and the "Indian Country" of our two youngest states. But recent architectural design in the Southwest has been more closely meshed with the requirements of the natural environment than in most places. Of course it is the *summer* conditions in these localities which give us the "lead" in coping with the *tropical* conditions at lower latitudes.

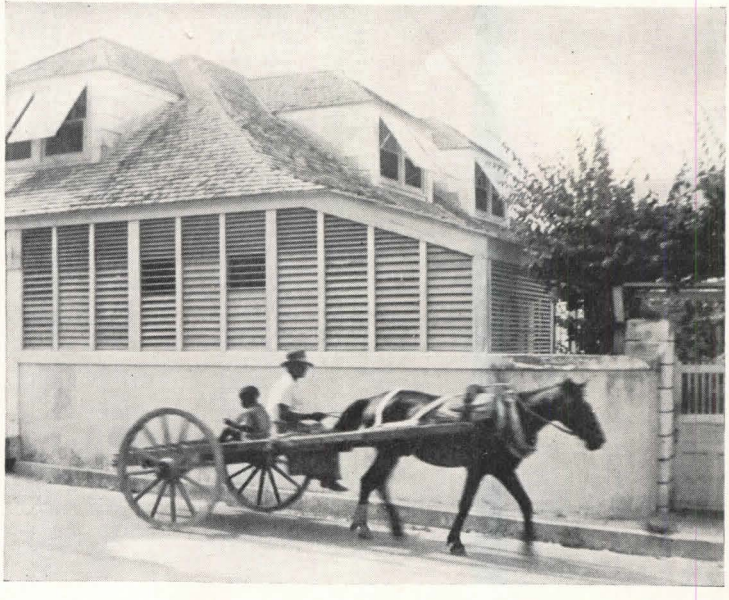
H. E. Jessen, A.I.A., of Austin, Texas, comes directly to the main point: "In this climate, any device that will block the sun and lead interference for our breeze makes for a more comfortable place to work or live. As you well know, many such devices were employed in some of our early structures — wide un-

which the designer is accustomed to work. On this basis Appalachia's hand-split shingles on open-spaced nailers are the functional equivalents of the South Seas' Nipa Palm thatch tied to bamboo poles. In both cases the natives all know the technique and the materials are at hand. Both are lightweight, low in heat capacity and allow passage of air. Poured concrete and mud-wall construction constitute another sort of parallel. They have much the same thermal properties but here the resemblance ends. They are at opposite poles in the *heavy labor* vs *heavy plant* situations and they are at the extremes of the *capital investment* scale.

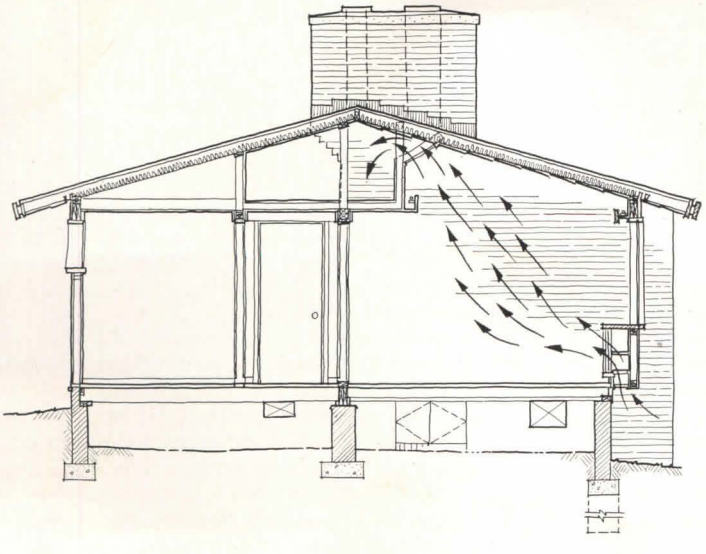
Availability of materials is a continually changing situation. In a "developing" country there will be a rapidly changing sequence of materials available at different stages as mechanics are brought in and local resources exploited. In Kenya Colony for instance, the completion of the railway to Nairobi in 1900 found this active new center for a large territory without masonry construction. The majority of government and railway buildings were therefore made of wooden framing set up on posts and covered with galvanized corrugated iron. Such wood and iron structures are to be found everywhere in the tropics, for the key material is easy to transport, flexible in application and the frame can be of local timber, easily erected by local workmen. But they are very unsatisfactory for dwellings. When finished inside they are subject to vermin infestation; in an upland climate like Nairobi's they are much too hot in the daytime and much too cold at night. The typical house construction there now is similar to southern Europe and dwellings of sheet iron are no longer permitted, since an adequate building industry has developed and a full range of locally manufactured masonry materials is at the architect's disposal.

Another typical *developing* situation is to be seen in Puerto Rico where a new surge of construction is taking place in an already urbanized country. There was a long tradition of earth-walled house construction in Puerto Rico, dating from Ponce de Leon, whose governor's mansion is still in use after nearly four and a half centuries. (It had been in use a full century when our Pilgrim Fathers built the first dugouts into their Cape Cod hillside.) Twentieth-century construction in Puerto Rico has been, until very recently, of imported materials and largely limited to "heavy-money" buildings or to light wooden prefabs for workers' housing. This situa-

Jalousied House, Nassau, Bahamas,
Photo courtesy of Tom Litaker, A.I.A., Honolulu



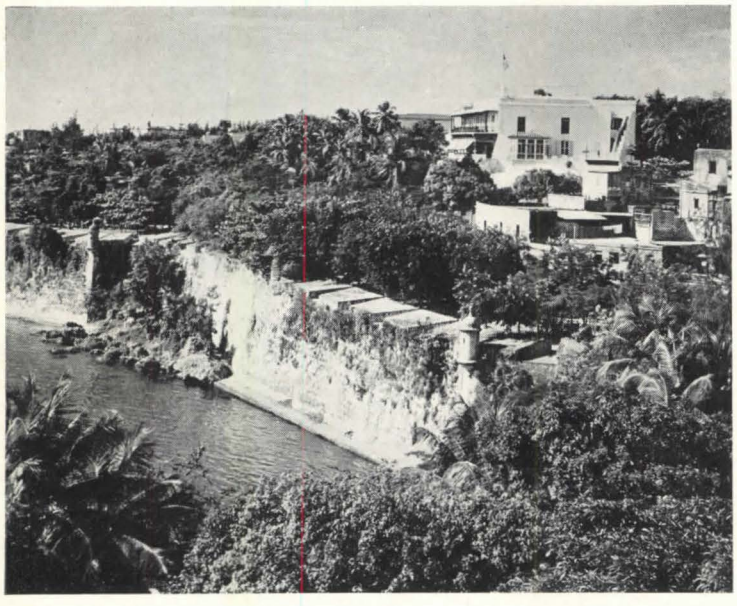
Section—Ramsey house



ground. Through normal circulation the bedrooms of our residence are kept cool during the major portion of the summer months without any artificial assistance. For extremely warm weather, this natural circulation is assisted by the much used attic fan."

And ***J. Frazer Smith, F.A.I.A.,*** Memphis: "From 1931 to 1941 with plenty of spare time and energy, our office completed a thorough study of the architecture of the Deep South, which fully convinced me that this section of the country had developed an indigenous type of architecture which solved completely the contemporary living requirements of the ante-bellum period, and that these solutions had been discarded in the period following. This study was summed up in the book,

Casa Blanca, the old governor's palace, and ancient fortifications, San Juan, Puerto Rico. Photo courtesy of Government of Puerto Rico, Department of Labor



tradition, we wind up now with Cape Cod derivatives and more recently picture window Ranchos trying, unsuccessfully, to ape California regionalism.

"I expect to see a considerable revival of the old southern forms. They may not be recognizable, clothed in modern technology, but they are philosophically the same.

"The widespread use of water as an architectural plane of reference is long overdue. Coupling water planes and water movement with sun and breeze action produces rich effects, and affords the most satisfactory cooling medium, both by actual temperature drop and by suggestion of water falling on water, that I know of, short of mechanical summer air conditioning. I don't expect that the regional approach we develop here will utilize full mechanical air conditioning except for commercial work and the most urban building types."

Also from Jackson, Mississippi, ***James T. Canizaro, A.I.A.,*** Architect-Engineer, writes: "There are several details we consider in connection with commercial and residential work that are ideal for this humid and very hot climate in this part of the country:

"1. Concrete slab on fill or earth: on a Sisalkraft paper under which is 6 in. minimum of wash gravel, on a grade sloped and drained to take off any water conditions. This prevents condensation coming from the earth, and with the insulation of the outside wall below ground, keeps floors cool in summer.

"2. Omission, as much as possible, of windows in west wall: and if frame walls, to be insulated with 4 in. rock or glass wool. The heat in the west in this area in the summertime is the worst condition that we have to combat.

"3. Ventilation in attic spaces: having cross ventilation by the use of grilles, louvers or open areas underneath the overhang.

"4. In residential work we have tried to make rooms one thickness so as to create a direct cross ventilation, having low windows on one side and high windows on the opposite side."

John Erwin Ramsay, A.I.A., of Salisbury, North Carolina, submits a detail suitable for warm-weather ventilation anywhere:

"This solution is based on the ancient knowledge that warm air rises and that cool air, if it exists at all, hugs the

theirs if we let appearance interfere with usefulness.

We are near enough to the great expansion of the century before ours to have a wholeness of understanding of the development of this country and its buildings. This history has been just about long enough and varied enough to provide the perfect background for our so recently developed *comprehensive* approach, through which architects the country over are now designing for whole sets of requirements, meeting whole ranges of conditions. Our understanding is on the increase but we cannot allow ourselves to become complacent with our solutions. For we are developing a flexible architecture, geared to a world that is changing rapidly, in the demands it makes upon us.

DESIGN CONDITIONS

THE SPECIFIC SETS of climatic conditions which obtain at different times of year at any particular site will be one of the first concerns of the architect who has work to design for unfamiliar places. These conditions will have to be in more detail than the general types of climate which have already been indicated in a broad way, but information is generally to be had in sufficient detail from government or commercial reports or directly from the client. This fraction of the conditions may contain a lot of inherent puzzles and contradictions but fairly sure knowledge is at least available as the basis for design.

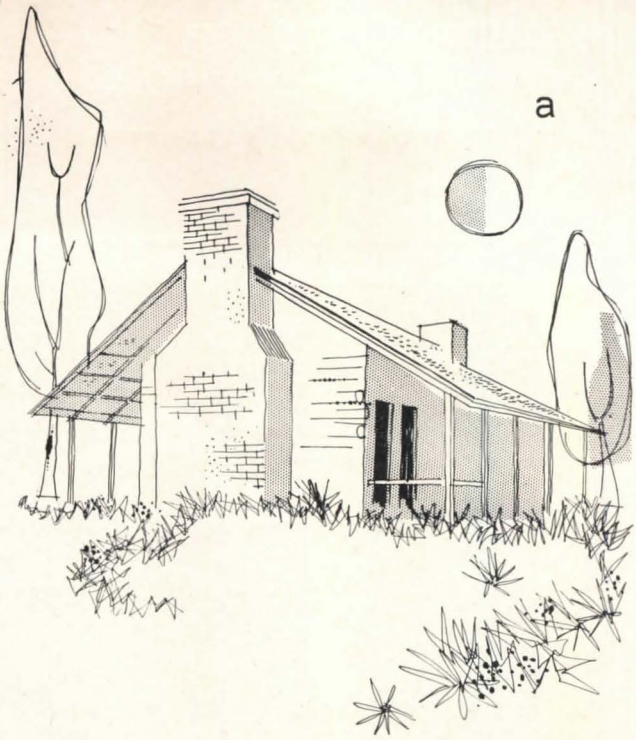
GIVEN THE CLIMATIC CONDITIONS, then, for a building at a given location, the well-informed modern designer can arrive at a preliminary solution based on the results of experience and building science. *Then* comes the big puzzle: economic translation of the preliminary scheme in terms of suitable materials and skills available at the site.

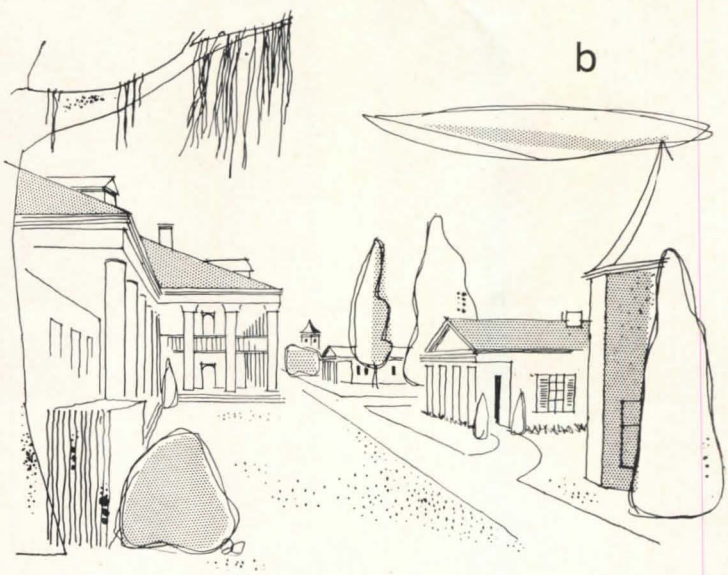
Suitable materials are those meeting the requirements *in principle*, not necessarily the same materials with

very long ago. We have confirmed or rediscovered basic principles which apply to our current problems — which give form to our contemporary structures. It is no accident that the bulk of this re-study has been focused on individually designed houses. The luxury house field serves as a sort of experimental testing ground where problems of comfort get worked out before they come up elsewhere. The results, however, feed back into general practice and are applied to all sorts of buildings.

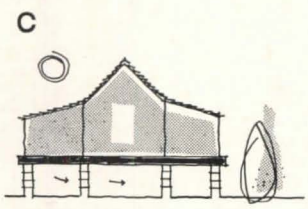
The experiences of architects who have followed this line in meeting some of the extreme conditions in this country set us on the path toward solution of similar problems in less familiar places. They give us a basis for asking the right questions which will lead to fruitful results. Most important, according to old campaigners, is flexibility of approach — "There are no pat solutions."

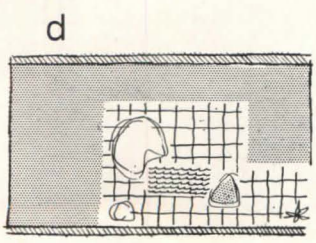
LEST WE GET SMUG about our new-found independence, we must keep reminding ourselves that its history has been short — that the opposite doctrine from which ours took off is still near enough to haunt. Echoes of the "Battle of the Styles" that was at its peak 50 years ago are still ringing in our ears; the sight of all the mixed offspring of our "Great Architect" period is everywhere before our eyes. Much of the planning of that day was sound and many of the buildings are still doing yeoman service, however antique the façades. Our own façades can become meaningless clichés as readily as





Sketches by Tom Ballenger





"In current buildings, there is some recognition (but not much) of warm climatic conditions. Present buildings do not solve, for our time, this condition nearly as well as pre-1860 buildings did. For instance:

"a. The 'dog-trot' frontier dwelling (early bi-nuclear?) generally of log wall, pole joists and rafters, wood shingle construction. Note that the north-south 'dog-trot' or 'saddle bag' or breezeway produced, with its orientation and the prevailing breezes, a draft which, in the shade of the roof umbrella, produced satisfactory cooling. On the porch, the occupants simply followed a course around opposite to the direction of the sun.

"b. The Southern Mansion still the same general precepts, but expanded as permitted by wealth and servants, and in keeping with the culture and social customs of the times.

"c. Cross sections through many of the buildings, particularly Deep South and Gulf Coast. Both levels, during warm weather, were comfortable; the upper level, being elevated was in good position to capture breezes; the lower level, in deep shade and insulation from the upper level and because of ground contact and masonry materials. This cross section is closely akin to the New Orleans and vicinity type and to:

"d. The New Orleans Town House, with protection by insulation of masonry walls, inward looking and revolving about a court, lushly planted and nearly invariably with water, balconies, etc.

"Yet, in spite of this well-founded

Courtyard of house in New Orleans, ca. 1795. From New Orleans by Stewart M. Lynn, courtesy of Hastings House

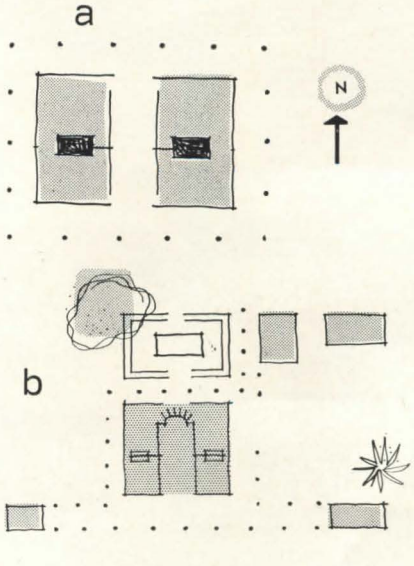
REGIONAL PROBLEMS AND SOLUTIONS

MUCH of the text for this study was written by our architect-correspondents in the South and Southwest, in response to the RECORD'S inquiries. These letters were so full of down-to-earth detail, both conditions and solutions, and so rich in understanding of the sort of problems with which a designer in the tropics is confronted, that it seemed best to print large chunks of several rather than attempt a systematic abstract.

The types covered by the letters fall into slightly different groupings than the definitely *tropical* climates. The *tropic upland* characteristics do not show up separately but may be discerned in both the *warm, humid* South and in the *hot, dry* Southwest. Conditions in Florida and the Gulf Coast and in the Hawaiian Islands typify the *tropic marine* climates although they do not by any means describe them completely. The following material taken directly from some of our correspondents' letters shows how well-oriented the American architect is to this kind of problem.

THE SOUTH — WARM AND HUMID

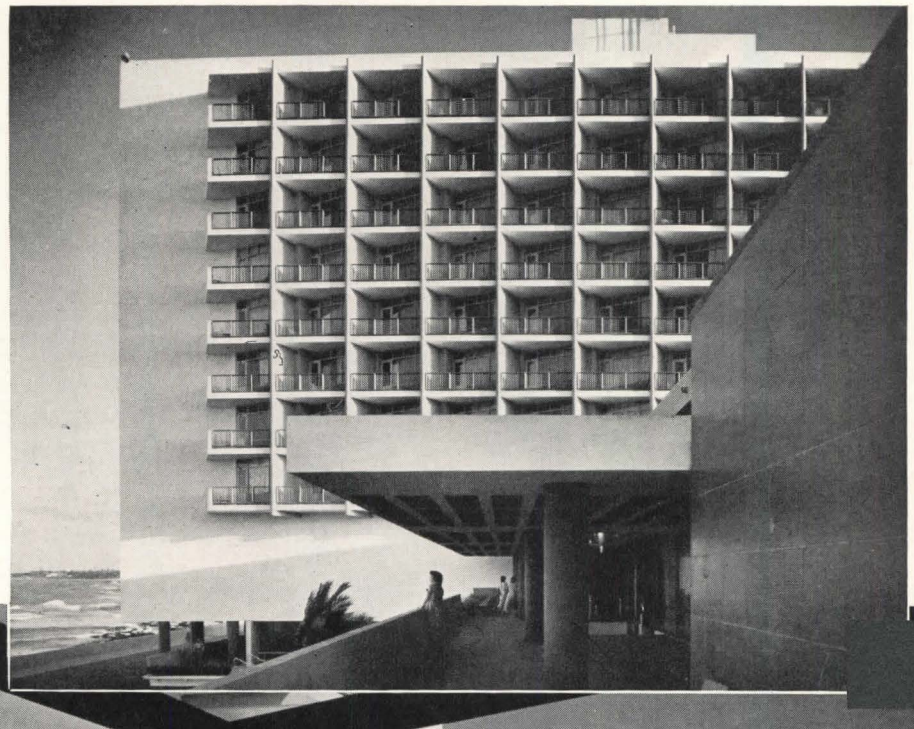
First, from ***Thomas J. Biggs, A.I.A.,*** of Biggs, Weir and Chandler, Jackson, Mississippi: "I am glad to offer my two-bits worth, down to and including the Mississippi Gulf Coast:



full advantage of modern technology, concentrating chiefly on design of buildings for use and finding forms which express that concentration.

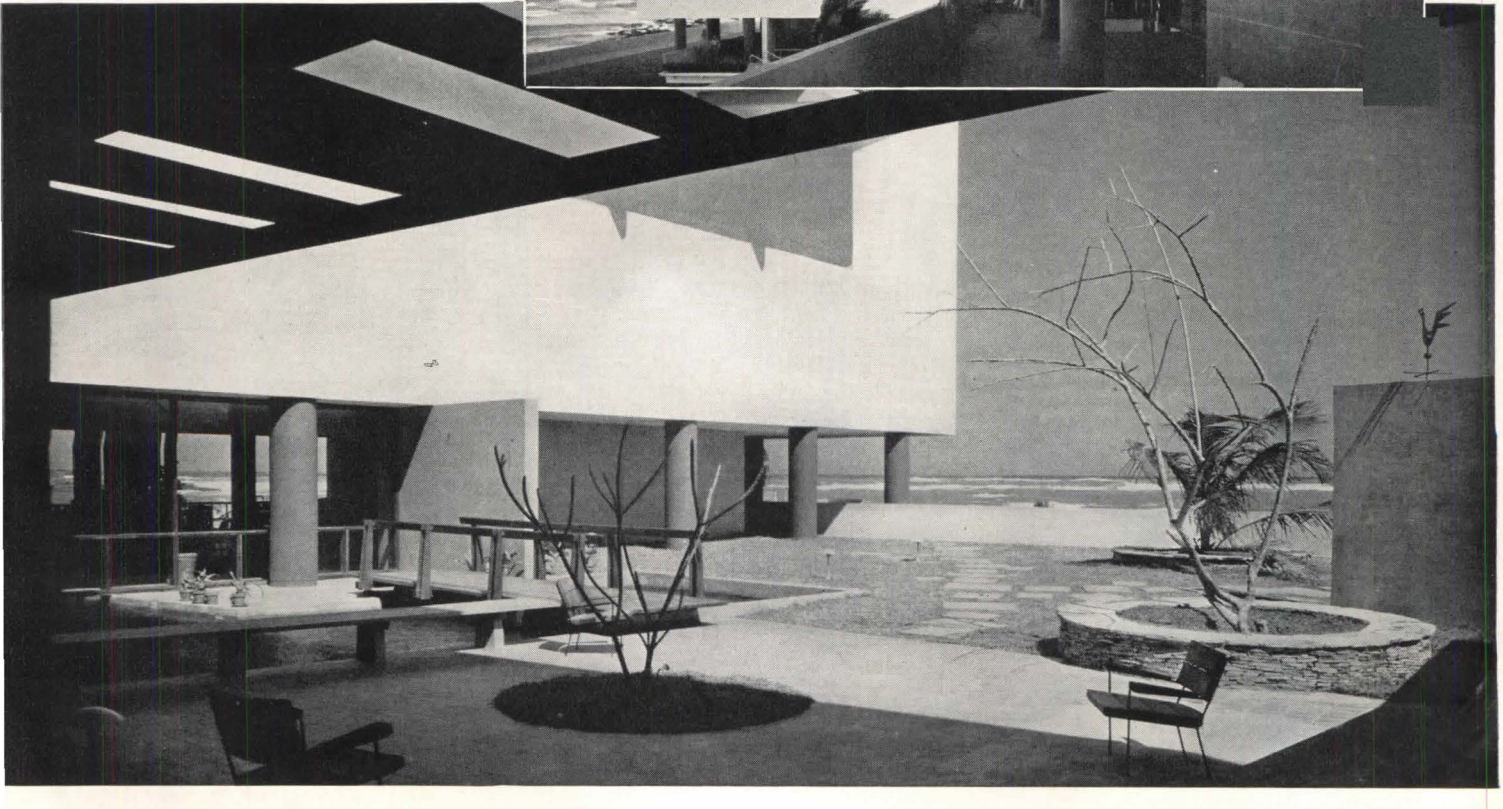
MAKING THE MOST OF NATURAL ENVIRONMENTAL CONDITIONS for man's comfort and enjoyment and working efficiency is an ancient art practiced the world over — a chief component of good architecture everywhere. Its expression is to be seen in agreeable houses, pleasant and efficient work places — in short, the physical accommodations for good living. This art has lately experienced a revival in this country, after a period of neglect. It was never a lost art, for comfort was never deliberately excluded from architectural design. Comfort and "high style" can go together — witness the "*cupola*" on many a Greek Revival mansion, which designedly ventilates the central stairhall and all the rooms, or the cool shaded porticos and verandahs of the Old South. Now we design houses primarily for family living, and we are paying more attention to convenience and comfort in our schools and workshops and public buildings.

We are paying more attention now to site and climate and how to take advantage of the variations in the "microclimate" — the immediate environment of each single structure. (The French have a better word for it — *micromilieu.*) We are beginning to look around, in each different region, to see what our less sophisticated but perhaps more realistic predecessors did to make the most of each local environment with the materials and skills at their command. We have learned much from the study of these "native" buildings, themselves adaptations of types transported from Europe not so



Caribe Hilton Hotel, San Juan, Puerto Rico (right & below); Toro, Ferrer & Torregrosa, architects; Warner-Leeds, architectural collaboration. Sunshaded terraces produce an impressive facade pattern

Ezra Stoller photos



ago, general education has been introduced, commerce greatly expanded and industries developed. The *public school*, often prominently located near the plaza with its own open space for playgrounds and recreation, has become the new focus of the community, used for civic meetings and social activities as well as its direct "teaching" purposes.

There are no indigenous prototypes for the modern school; modern "official" structures, whether "municipio" or oil company headquarters, are open to all and can no longer appear comfortable when clothed in the aloof grandeur of the past; modern commercial and industrial structures must often fulfill requirements whose historic background is not local but imported.

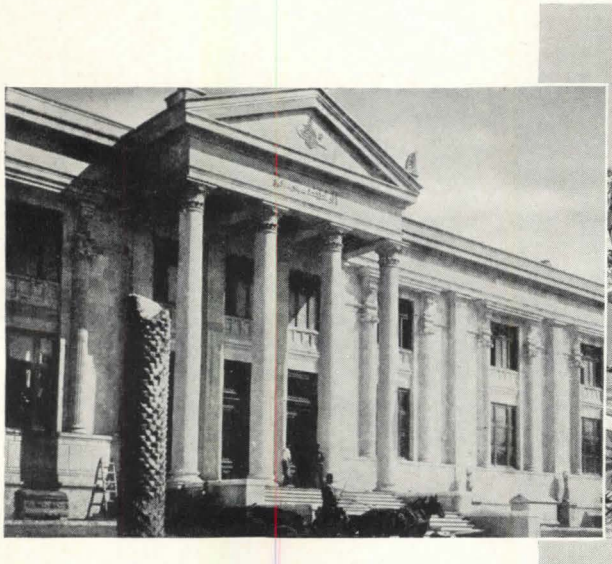
This is not to say that local experience is not valuable. It is. *Always.* And "regional" types are always worth study. Very often they can be copied "cold". The big point is that since any considerable building inevitably plays out a historic role in helping to reshape the small world around it, each new building should be given the full benefit of whatever will make it most useful — taken either from local precedent or from specialized experience that is pertinent, no matter where it originates.

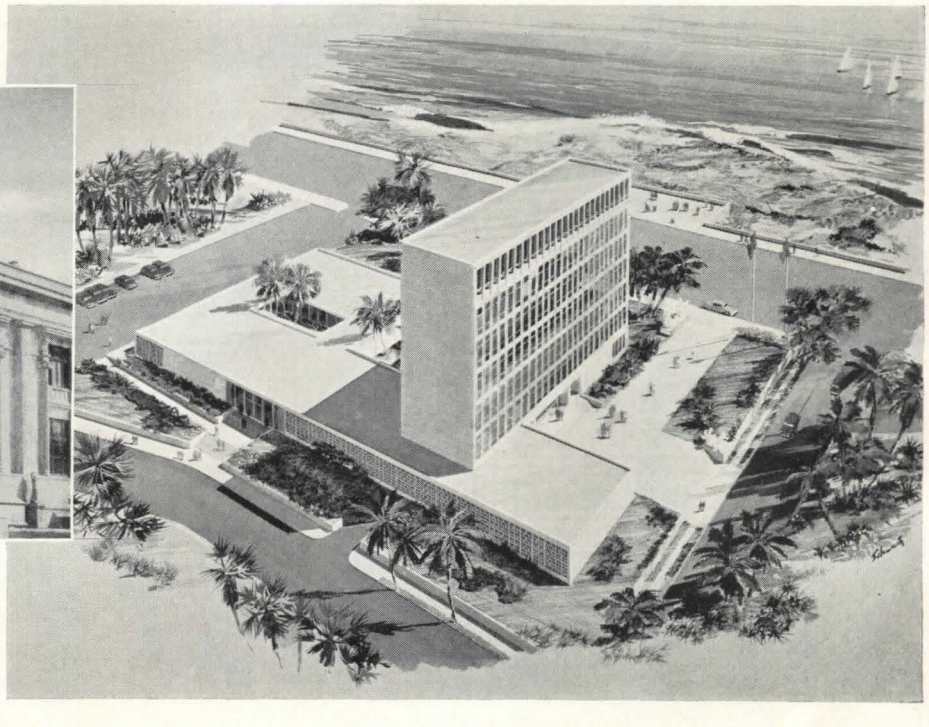
CHIEF REASON, perhaps, for relying on the experiences of U. S. architects is the fact that our current approach to design has come of age only during the past couple of decades. We have only recently "come out of the woods" ourselves and we have not lost the keenness so recently developed by pioneering a new frontier, nor the independence to question any traditional form which we have not ourselves tested, nor the awareness that a struggle is still going on.

The architect's double concern has always been the solving of his clients' problems as they relate to space while at the same time expressing the solution in suitable form, making full use of current technology. The key word here is "suitable". In our own recent past we so strained after forms which would be symbolically expressive of the purposes served by our buildings that we failed to make full use of new and more suitable forms which were growing before our eyes in our expanding building industry. We need not go back to our "historic styles" period for examples. As recently as four years ago Bill Levitt was very sure that "Cape Cod Style" was the only right thing for his customers although he preferred "modern" himself.* Architects as well as builders still labor under such mass illusions as this, especially around the large urban centers. But in the country at large, the public is happily unimpressed by such "proper" forms. Under the influence of mass-produced automobiles and household equipment, people now want the comforts that modern industry can give them and they are finding contemporary architecture eminently suitable. Architecture has been getting back in step with the times lately, taking

** Expressed in a "Planning Round Table" meeting at Columbia University in the spring of '48. Levitt's houses are now quite "modern" in appearance. Their construction has always been a model of efficiency.*

Rendering by Schwartz





U. S. Embassy in Havana (right), Harrison & Abramovitz, architects: an example of the new approach to official buildings

Office Building for Standard-Vacuum Oil Co. in Manila; Gonzalo Balatagas, architect. The sun control system prevents direct sunlight from entering the interior of the building at any time

these buildings in fact suited to the needs of the place itself? Shouldn't we look for prototype solutions to current problems in the pre-European *poor* structure?"

For the "regional" styles which have developed in different parts of the world are direct descendants, most of them, of replicas of buildings "back home," brought in by the early European colonists. And, like those colonists and their descendants, the buildings may have become acclimated or they may still exist largely as symbols of outworn social orders. To our eyes, coming on the scene but a couple of centuries later, all buildings in a locality appear to belong, but this needs looking into. The European influence is *at most* four centuries old. The truly indigenous ways of life in the tropics stretch back endlessly through time.

The U.N.'s report on *Low-Cost Housing in South and South-East Asia** describes three successive stages by which the different major buildings and parts of towns in the Philippines have changed in relative importance. This description may be taken as typical for the history of any such local area undergoing development: A — The pre-Spanish village or *barangay* was far from planless. It was arranged around an open space for meetings and tribal ceremonial. Adjoining this open space was the "palace" of the Rajah and the houses of his nobles; farther away were the lesser houses, arranged at random, without "streets" but with well defined common paths used by men and animals alike. B — During the Spanish regime the towns were typically laid out on a gridiron street pattern like the pueblos of medieval Spain, with a main street (*Calle Real*, of course, equivalent to *King Street* in British colonies) leading to a large public square, the *Plaza*, which was dominated by the church. Again the open space served for public ceremonial, especially the frequent religious processions. Homes of the rich and influential were located on the few paved streets along which the processions passed. The administrative functions of the state were housed in a municipal building, the *municipio*, which came to be a ponderous structure in the grand manner, rivaling the church itself in importance. C — Since the coming of the Americans about 50 years

* *Issued 16 July 1951, by United Nations Secretariat, Dept. of Social Affairs, United Nations, New York.*

View of Tumaco, Colombia

Iris photo courtesy of Weiner and Sert

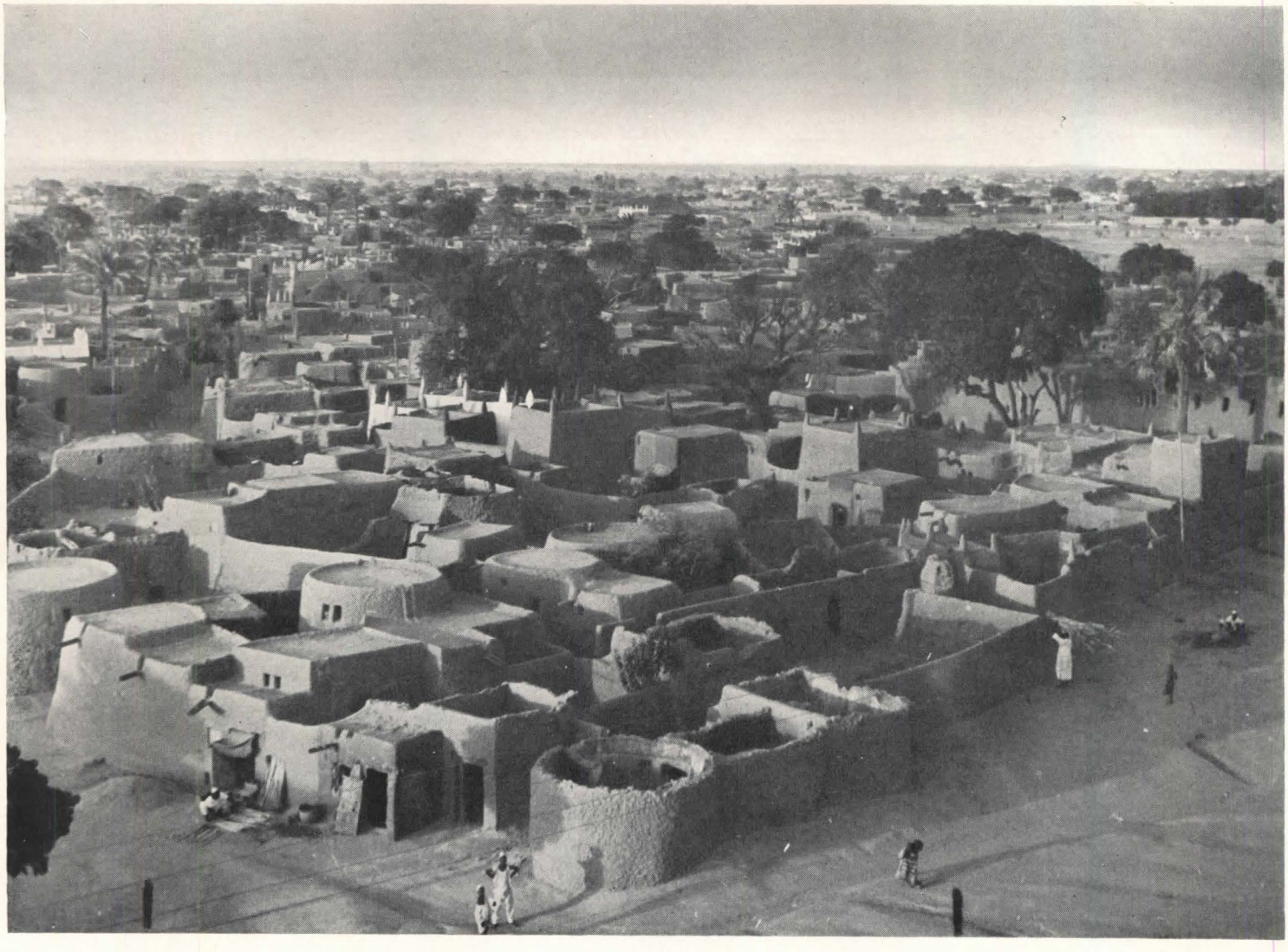
in the tropics would be irksome to most of our own population.

APPROACH TO DESIGN

PROBLEMS OF DESIGN for the tropics, as they may be encountered by U. S. architects, can be approached with some assurance on the basis of contemporary solutions of somewhat similar problems. This study will explore a number of such solutions by members of our profession in the course of their practice in our South and Southwest as well as actual "tropical" jobs. There are several good reasons for taking this approach rather than starting with a more comprehensive and "scientific" survey of all the conditions and solutions which are to be found within the tropics.

FIRST OF ALL, buildings are for the use of people, and those which American architects are asked to design will be intended for present-day use by our contemporaries — even in the extreme case where the sole purpose of a building is the storage of goods (a storage shed at a railroad siding, for instance), its conception is based as much on the work of handling those goods in and out and keeping tally on them as it is on the economics of protection. The requirements of our "tropical" clients are largely framed in the context of modern materials and methods. Their operations are largely in charge of Americans or local people of like status and similar background. The firms (or government agencies, etc.) which bestow the commissions are accustomed to modern ways of building and are already doing business with construction contractors and with architects. They speak our language insofar as buildings are concerned.

THEN THERE IS THE QUESTION — "How far should we follow *indigenous* buildings as prototypes for our own designs in tropic countries?" A whole family of questions come tumbling after: "Do the *good* buildings represent satisfactory solutions for our own problems? — in terms of the requirements of the people who will use them? — in terms of present-day availability of the methods and materials of an industry capable of producing them? Were they, our *good* buildings, conceived with so much concern for formal criteria of appearance that their useful functioning is crippled in the high cause of a dominant symbol? Are



Building Research Station, United Kingdom

Kano, Northern Nigeria. An African city in a hot, dry climate. Note the thick walls, flat roofs, small openings, shaded courtyards. Courtesy U.N. Housing and Town and Country Planning Section

days and cool nights, very little rainfall and considerable seasonal variation. *The hot, humid* climates are found mostly near the equator. Seasonal variations here are generally slight unless the prevailing winds are subject to seasonal change. Temperatures do not vary much — perhaps no more than 10 deg from day to night and extremely high temperatures are almost unknown; but with the high humidity and lack of change a temperature in the 90's is likely to be at least as uncomfortable as the much higher temperatures experienced in a dry climate. The hot, humid climates are characterized by overcast skies, especially after midday, hot days with only slightly cooler nights, high relative humidity and heavy rainfall — in some places tremendous rainfalls aggregating well over 200 in. per year. The *tropic upland* climates are characterized by strong sunlight, "dry" and "wet" seasons and a large temperature range, especially in the clear weather of the dry season when night frosts may be experienced.

Another general type may be added to these three — *tropical marine*. This is not a distinct type as regards buildings but it probably accords most nearly with the popular notion of what is "tropical" and it does have distinct characteristics due to nearness to the sea. To the typical "hot humid" and "hot dry" conditions is added the relief of air movement. But rains are wind-driven, enforcing additional requirements of shelter. Hurricanes are also a possibility, except very near to the equator, introducing criteria of structural strength quite out of line with the light-weight construction which is otherwise suitable.

Tropical conditions, then, are not so extreme that they cannot be matched, at least for short periods, by climatic conditions to be found in our own country. Heat in our great plains during wheat harvest or the combined heat and humidity during a hot spell in the Mississippi valley would be considered extreme by many dwellers in the "hot" countries of the world, although the continuing monotony of lesser extremes

Native houses of the great inland plateau of Nigeria. Grouped in compounds, these mud and thatched houses are largely sleeping places, entered by small holes. Cooking is done in the compound

British Official Photograph

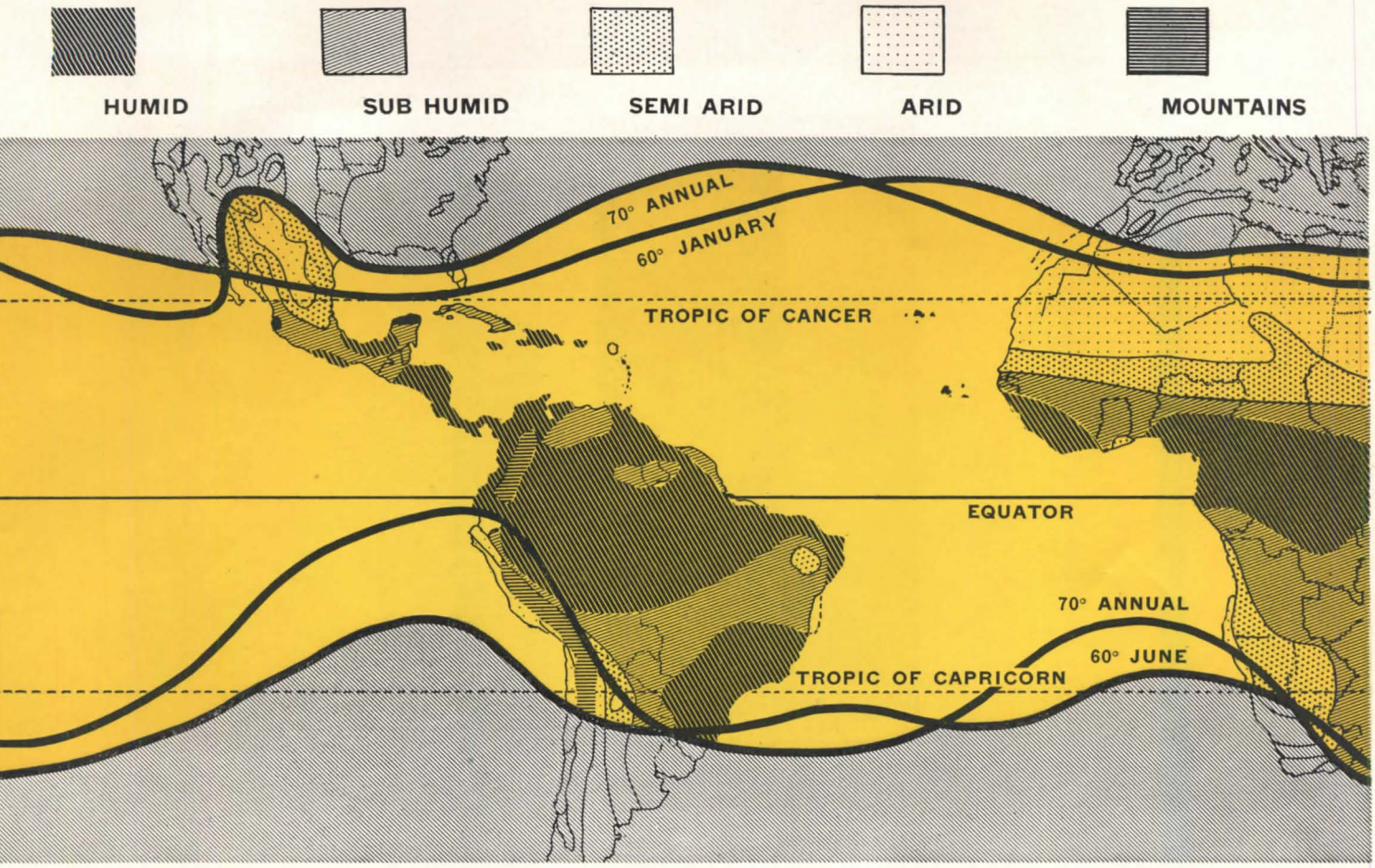
kinds of variations, and especially affects the amount of moisture in the air — chief factor in climatic differences. A small mountainous island in the trade wind belt, for instance, may have a humid climate on one side and arid on the other; in many places the chief seasonal variation is a change in wind direction.

THE LINES OF CAPRICORN AND CANCER seem to have nothing to do with the principal climates of the world, as may be seen on the map at the head of this article. Especially in North and South America, the climate boundaries tend to run north and south under the influence of the Rockies and the Andes. But lines of equal average temperature or *isotherms* do correspond in a general way with the geometrically determined zonal boundaries. The successive bands on our climate map are bordered by isotherms of 60 F for the coolest month and 70 F for the entire year. The differences between these lines at oceans and at continents gives some inkling of the extent to which tropical *conditions* stray across the lines of the tropical latitudes. Within rather loose limits, anyone is free to draw the line where he chooses, to accord with his own definition of "the tropics." These particular isotherms represent such choices by geographers, but since they also vary from year to year they indicate a vague intermediate zone of "subtropical" or "semitropical" conditions rather than definite boundaries. Thus unpleasant conditions can always be blamed on the unseasonable weather, while predominantly fine conditions can be accredited to the climate. As Marston Bates puts it, in his wonderful study of Man and Nature in the Tropics,* "Weather in the Tropics, as in California and Florida, is always exceptional, a transient embarrassment that most frequently coincides with visitors."

TROPICAL CLIMATES are of all sorts *except* that they have no winter as we know it and weather conditions are typically stable over long periods. Seasons tend to be simply "wet" or "dry" rather than the four distinct seasons of our temperate zone. Tropical climates are as subject as any to local variations, depending on such things as position with regard to sea or mountains, soil and vegetation, seasonal or daily shifts in wind direction, etc. As far as building construction is concerned they can be grouped into three general types: hot and dry, hot and humid, and the cooler climate of tropical uplands. The latter, in the minds of many people is "not tropical at all."

The hot, dry climates are typically in the trade-wind zones and even extend above the tropics, as in our Arizona-California desert. The highest temperatures (90 deg and more) are experienced in these climates, which are characterized by very strong sunlight, hot

* **Where Winter Never Comes, *by Marston Bates, Charles Scribner's Sons, New York, 1952.***



Drawings by Tom Ballenger

THE WORLD-WIDE SYSTEMS OF CLIMATE AND WEATHER all have their origin in the heating effect of the sun on the earth as it swings around the sun during the course of a year, while turning once daily on its axis and always maintaining the same 23½ deg "tilt" to the plane of its orbit. This situation is charted in Figure 1, where the directions of sunlight in relation to the globe are shown for the four critical points in the cycle.

At each peak of the yearly cycle, one "end" of the world is warming while the other is cooling. Thus the heating effect of the sun at the equator is steady while in the high latitudes it varies hugely from winter to summer. The daily and seasonal cycles of exposure to the sun make a gigantic heat machine of the earth, causing convection currents in the atmosphere above its surface. The earth's spinning motion shapes these currents into the system of air movements and pressures which are shown diagrammatically in Figure 2. This is an idealized pattern, more nearly true for the open ocean than for the land masses of the earth, but it does form the groundwork on which are built the different kinds of climate and the changes in weather. The major variations in this underlying system come from cold air masses which periodically break through the *polar fronts*.

THE DISTRIBUTION OF CONTINENTS AND ISLANDS, oceans and seas over the face of the earth makes for all

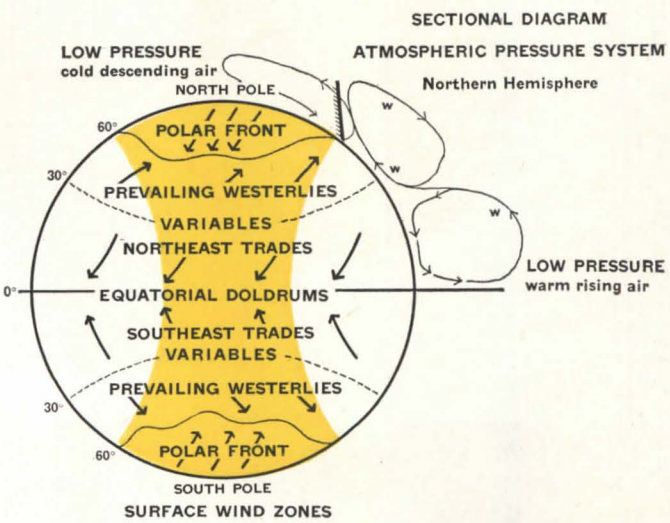
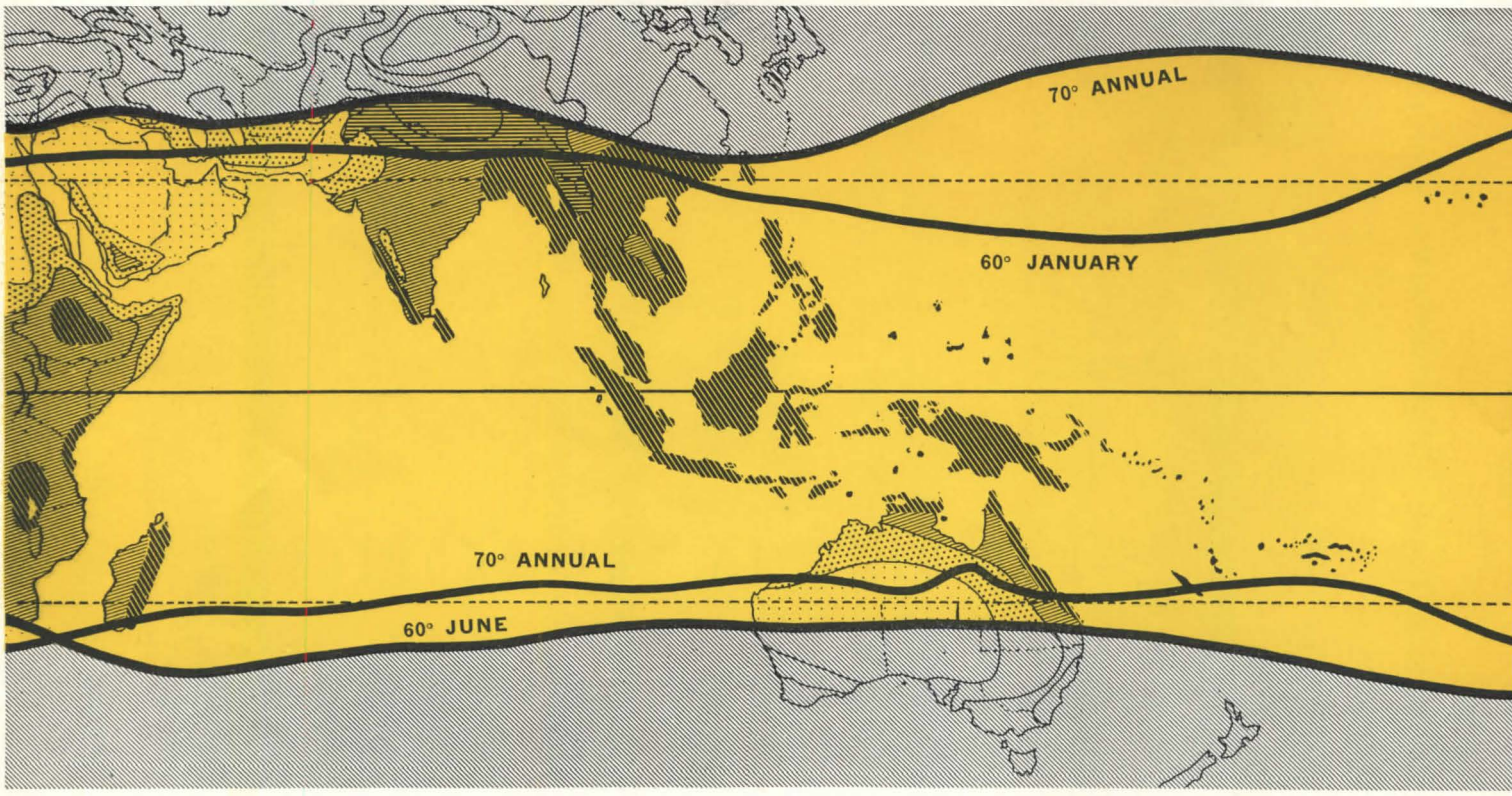


Figure 2:

World wind and pressure systems

TROPICAL CLIMATES OF THE WORLD



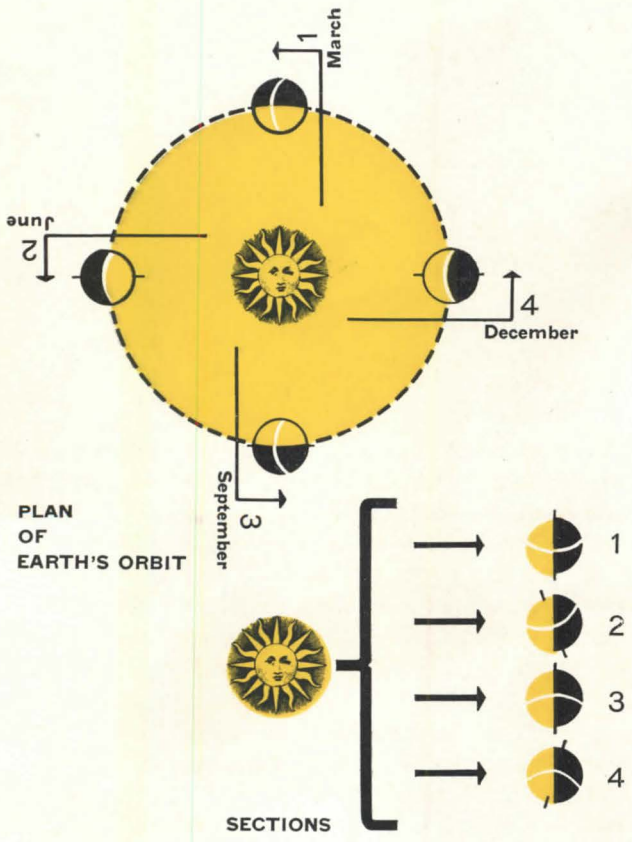


Figure 1:
Key Positions of Sun in Relation to Earth

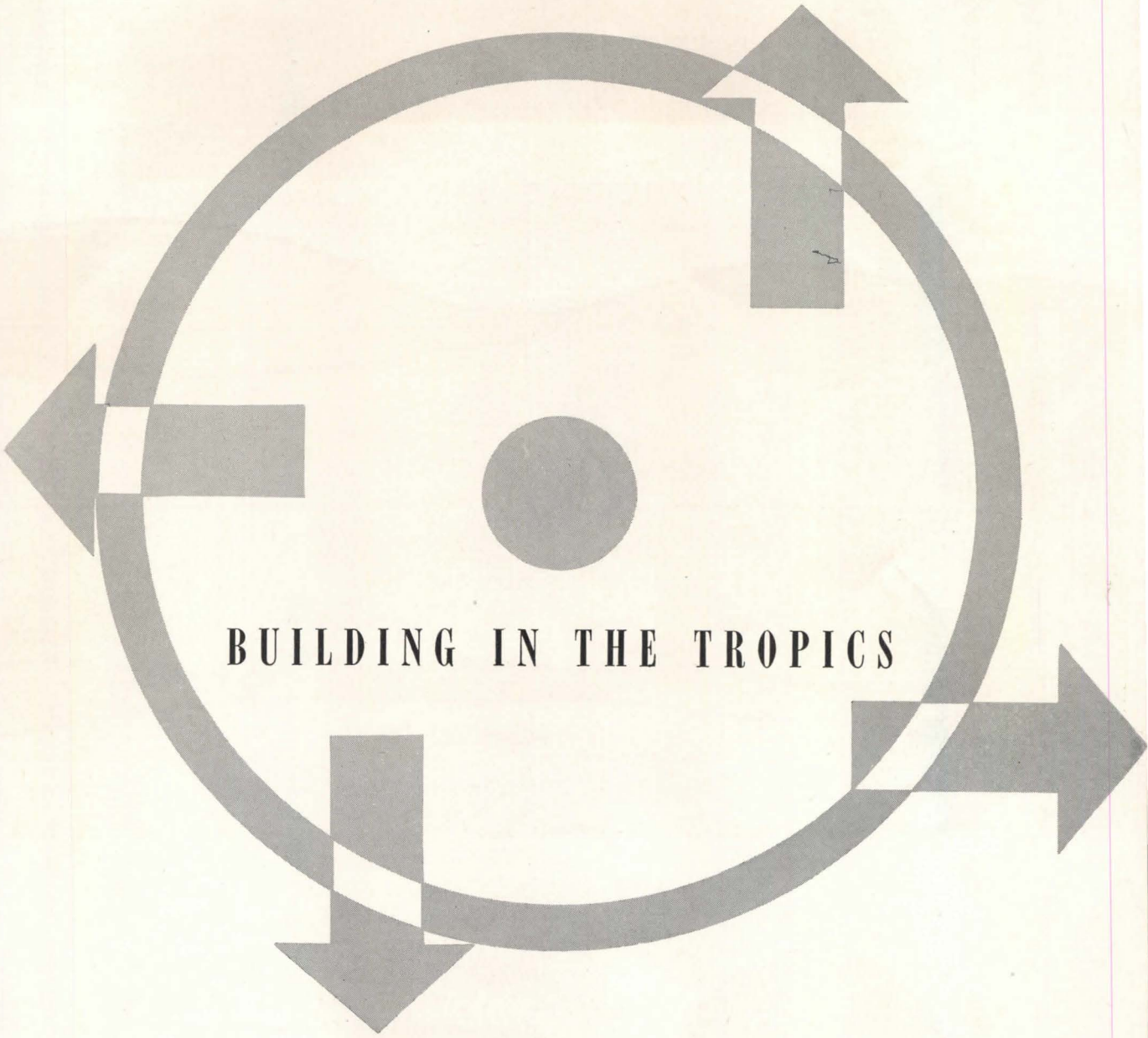
1, 3 *At the Equinoxes — March and September*
2 *At the Summer Solstice — "farthest north"*
4 *At the Winter Solstice — "farthest south"*

mind, it will be limited to a fairly definite set of conditions in a given locality.

"THE TROPICS" is an enormously comprehensive term, no matter how you look at it. In the geometric framework of astronomy it means the entire band around the middle of the earth, extending 23½ deg, very nearly, toward the poles from the equator — a band containing some 40 per cent of the surface of the globe. Strictly speaking, it means the *lines* bounding this middle or "tropical" zone of the "low" latitudes — lines along which the sun stands directly overhead at noon on mid-summer day — the Tropic of Cancer at 23½ deg N and the Tropic of Capricorn at 23½ deg S.

Weather conditions are inclined to be steady and warm in the tropics, where the sun shines *most directly* downward all the year round and the days are always about equal to the nights — exactly equal on "the line" as sailors call the equator.

It is the *arctic* zones around the poles that are the weather breeders, with their sunless winters and their 24-hour-long days of sunshine in mid-summer. However, both winters and summers in the high arctic are fairly steady; the greatest variations occur in the so-called *temperate* zones between latitudes 23½ deg and 66½ deg — zones containing over half of the surface of the globe.



BUILDING IN THE TROPICS

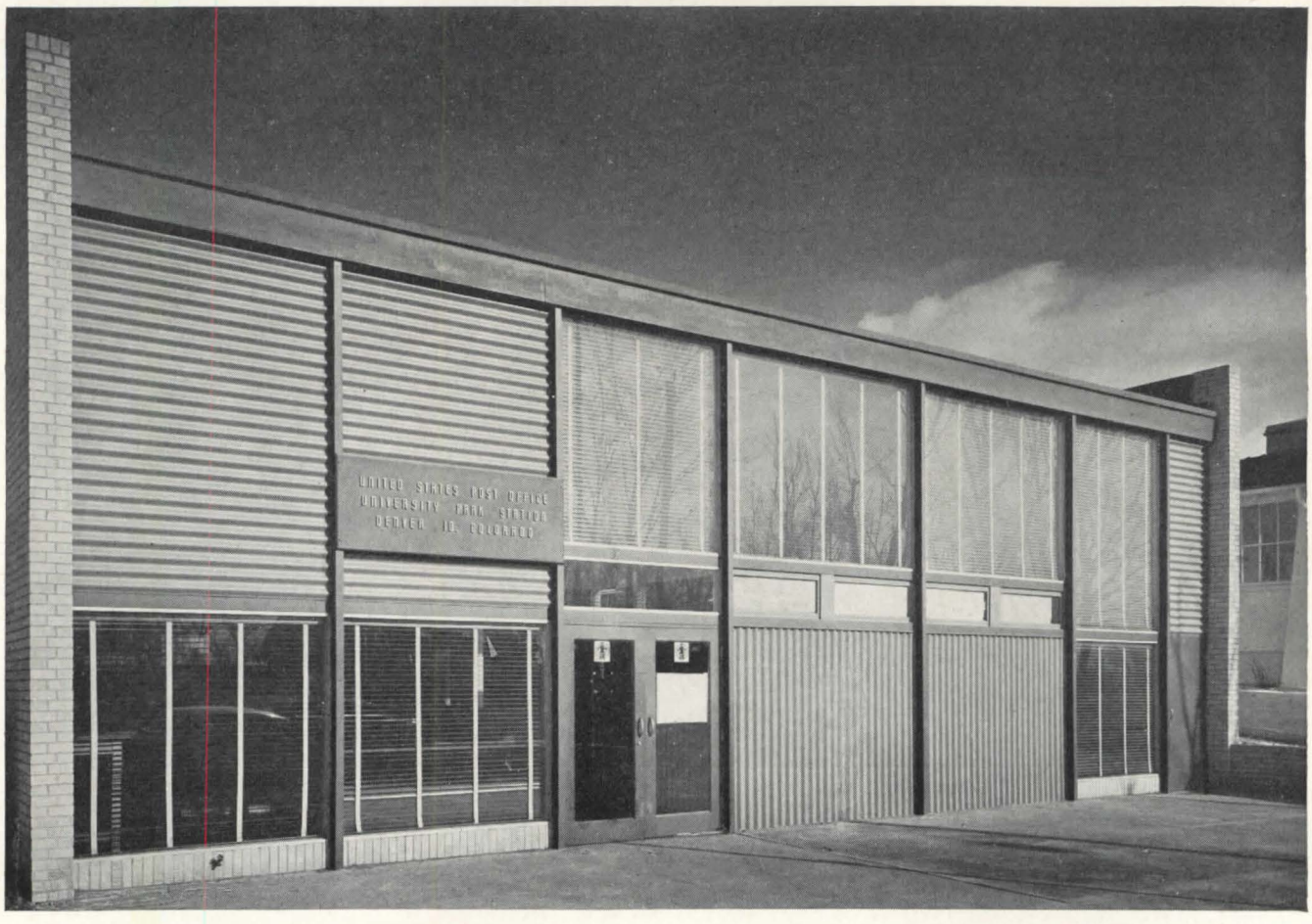
An Approach to the Study of Building Types Suitable for Tropical Conditions

by John Rannells

BUILDINGS FOR THE TROPICS must meet the same kind of problems as clothing for the tropics. We don't entirely "go native" in either instance — to some degree we drag our own native environment along with us when we go to work in far places. It may prove to be a heavy burden if we aren't sensible about it — if we *don't* adapt our ways to the governing conditions as we find them. Since the opening up of the world to the expanding commerce of Europe four and a half centuries ago, the history of building in all "new" lands and colonies has been full of adaptations — both successes and failures. We can learn from both.

This is a study not so much of Tropical Building Types as it is an approach to design in the tropics. There are altogether too many different conditions and requirements in this vast area to be included under one heading. Types have been evolved to meet any number of different conditions but new work coming up is quite likely to confront sets of conditions which do not fit any presently existing type. It seems best, therefore, to approach the problem on the basis of knowledge of materials and techniques which have been worked out by our own architects to meet requirements of tropical *conditions*.

But first, what is meant by "the tropics"? Is it waving palms on a coral atoll, or steaming jungle, or open grass lands where the big cats prey on cattle or parched deserts? It may include all these and more, in terms of a world airline, but, in the sort of work for which a typical architect has a typical client with a program in



Hedrich-Blessing

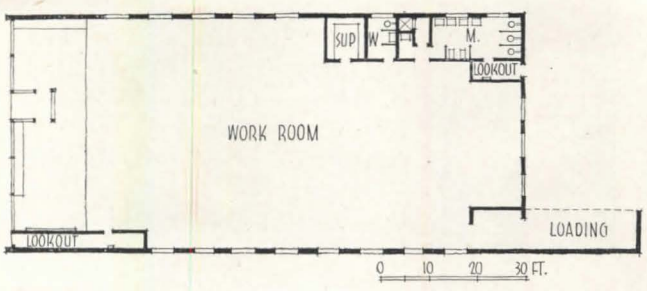
BRANCH POST OFFICE, DENVER, COLORADO

University Park Station

Henry Replin, Owner

W. C. Muchow, Architect

A CHANGE in official policy which now makes it possible for private architects to design some post offices is responsible for this simple sub-station. A speculative investment for a private owner, its flexibility makes it easily adaptable to other occupancy should the government ever decide to vacate. The interior is a bare box which can be subdivided and arranged as desired. The floor was freed from structural supports by trusses tied to steel columns which are buried in the masonry walls. The attractive front façade employs panels of glass and green corrugated asbestos cement. The steel frame is green, brick sides buff.



Marshall Brooks

IWILEI FIRE STATION, HONOLULU, HAWAII

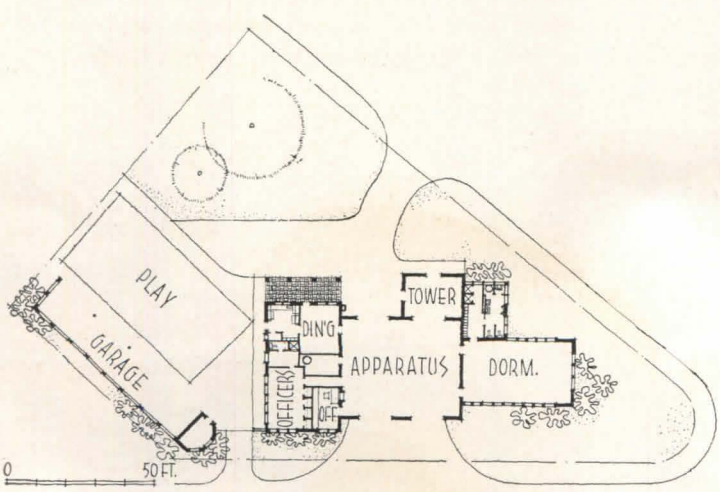
Law & Wilson, Architects

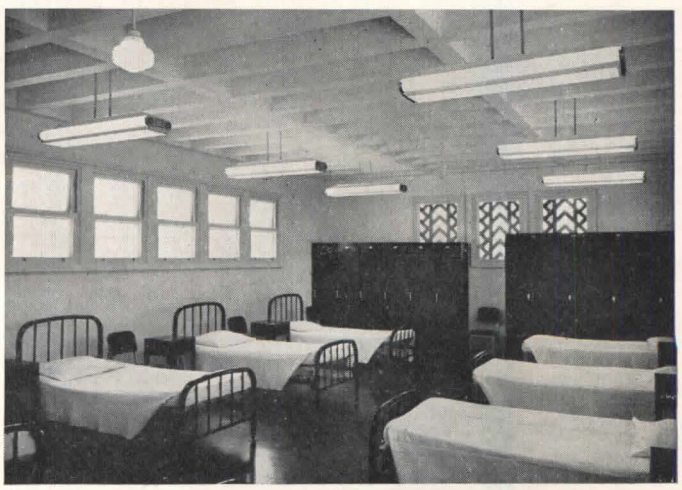
William J. Geilfuss, Associate Architect

Engineers: Structural, Lo and Katavolos;

Mechanical, Henry L. Conger; Electrical, Martin & Curley

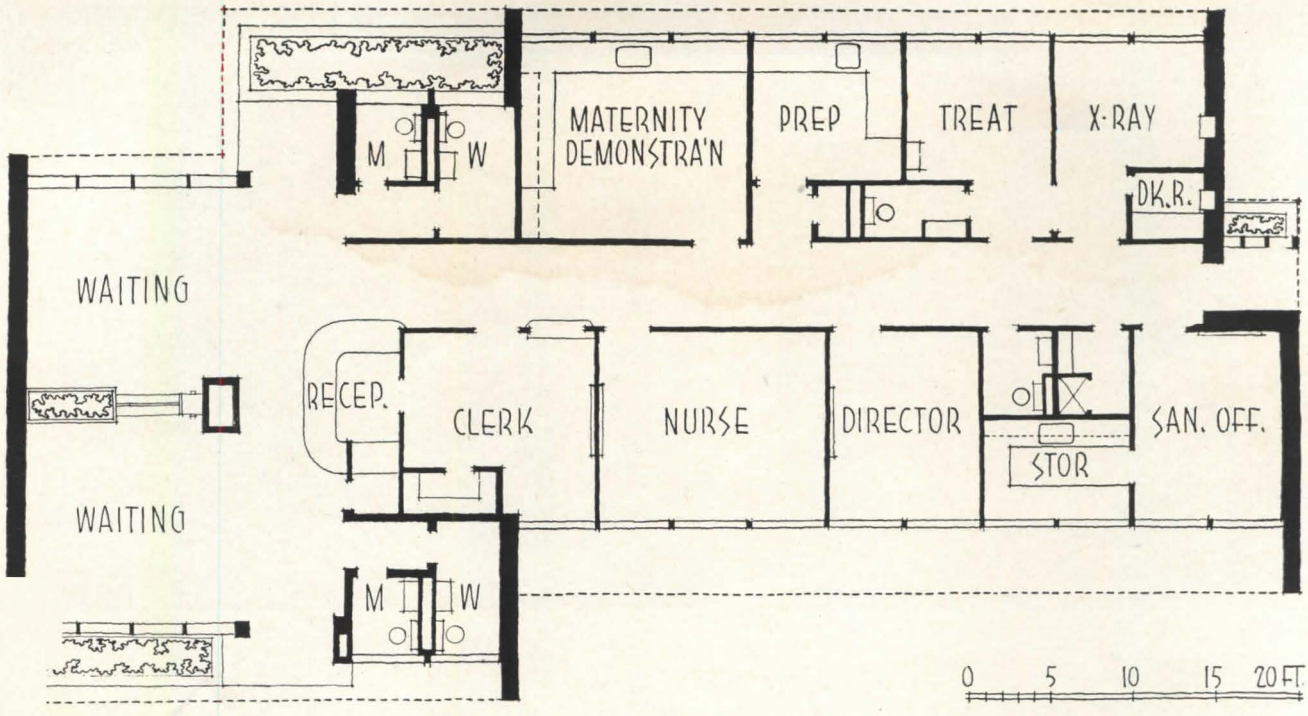
LOCATED at an oblique intersection in an industrialized area, this one-story fire station makes use of its roughly triangular site to provide unusual ease of circulation for fire-fighting equipment. Doors at either end of the apparatus room permit trucks to enter or leave by both of the bordering streets. The plan was also affected by location of the hose tower. With the exception of some minor plaster partitions, construction is of reinforced concrete throughout. Doors were specially designed by the architects.





R. Wenkham

Firemen's dormitory, above right, accommodates three shifts of 12 men each. Concrete roof was built with metal pan forms. Pre-cast grilles were used in end wall, top of hose tower

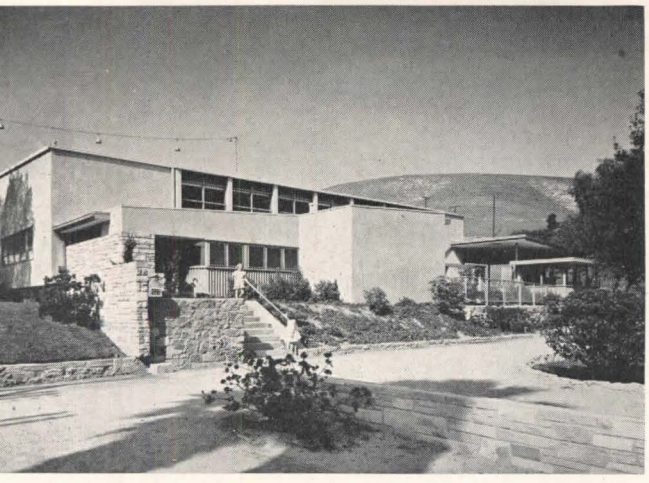


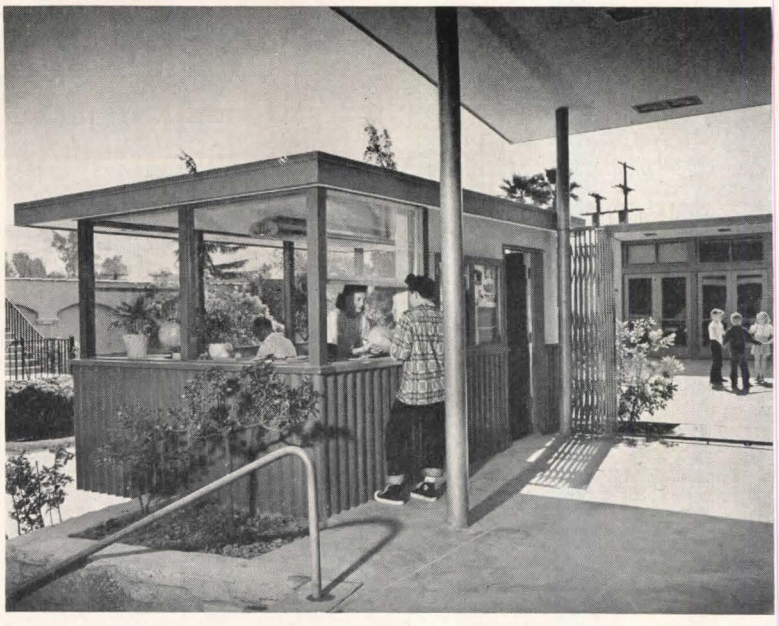
EVANGELINE PARISH HEALTH CENTER

Ville Platte, La.

Ricciuti, Stoffle & Associates, Architects

THE ARCHITECTS of this small southern health center had to provide a complete community clinic within a rigidly limited budget. They did this at a cost of about $16 per sq ft, equipped. While medical facilities are shared by all patients, separate accommodations had to be provided for white and colored patients in the waiting room and toilets, as well as entrances. However, since the waiting room doubles as a small auditorium for movies, lectures and the like, it is divided only by a low plant box on casters.





Julius Shulman

THIS PLAYGROUND ACTIVITIES CENTER was designed for a narrow, shelflike site. Above and below it to either side were existing playground facilities, including a bathhouse and tennis courts. The area also included other facilities, with still others proposed. Good visual control, avoidance of maintenance problems and a cheerful, colorful atmosphere were prime requirements.

To afford visual control on all four sides and into the building, the office was isolated and glazed all around. Entrance to it is off a large open game porch which also leads into the combined auditorium and gym. The stage, deliberately small, is opened at the rear to permit access to kitchen and craft room, which are used as dressing rooms for theatricals.

Construction is frame and stucco, with pipe columns for the game porch. The auditorium roof is exposed T. & G. planking laid on exposed, open-webbed steel beams. The auditorium floor is of maple blocks laid over the slab. Asphalt tile and ceramic flooring are used elsewhere. Windows are of safety glass.

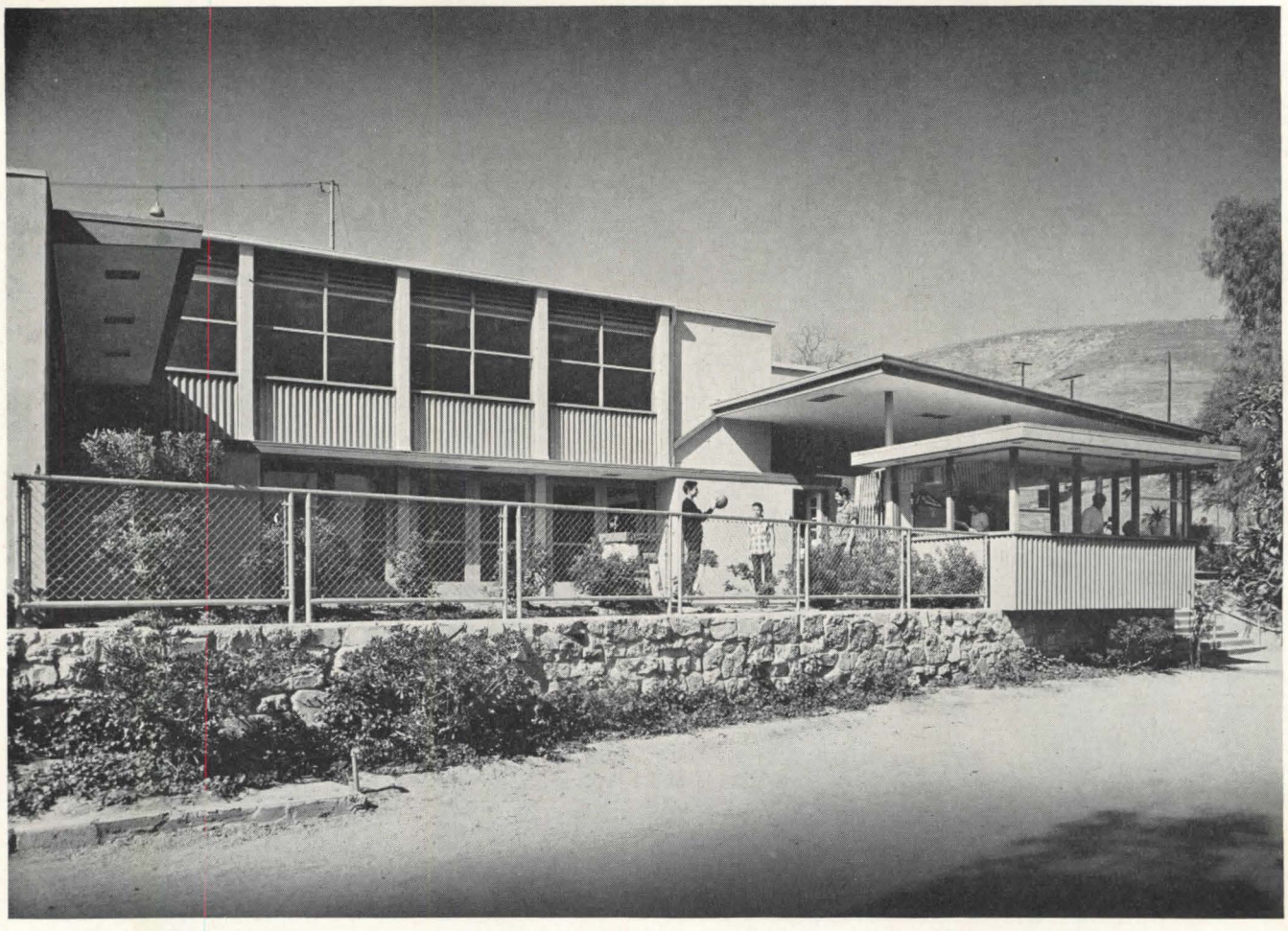
BUILDING, LOS ANGELES, CALIFORNIA

Milton H. Caughey, Architect

Kurt Bardizbanian, Structural Engineer

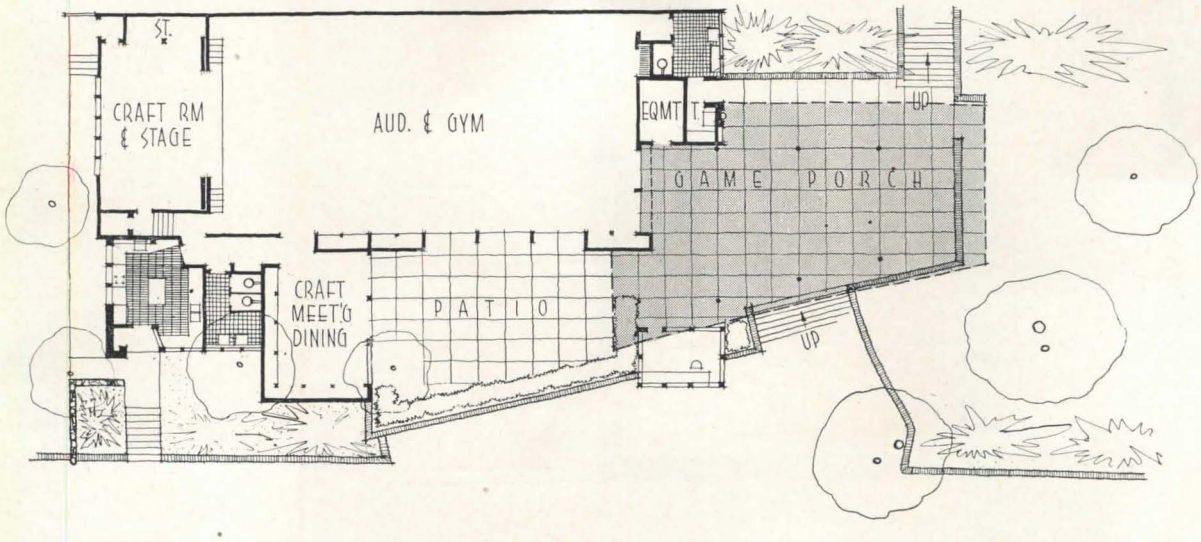
Deconly & Randall, Mechanical and Electrical Engineers

Character of site can be seen in view top left. Office, top right, is a large isolated booth, cantilevered out from game porch. Large room at right doubles as auditorium and gym. Wainscoting is of vertical Douglas Fir flooring



EL SERENO PLAYGROUN

PUBLIC BUILDINGS



As indicated in plan, opposite page, building incorporates two separate areas connected by central service core and kitchen. Jail construction is heavier throughout. Comparison: jail has walls of brick and structural tile, concrete slab roof; residence has wood framing with brick veneer and shingles, built-up tar and gravel roof. Jail, plan below, can be expanded by addition of another cell block at left. Guards' corridor at left will then become center corridor. Note showers in each cell

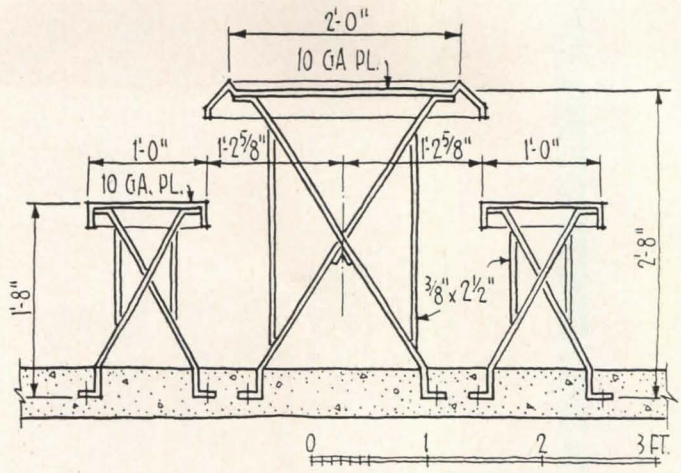
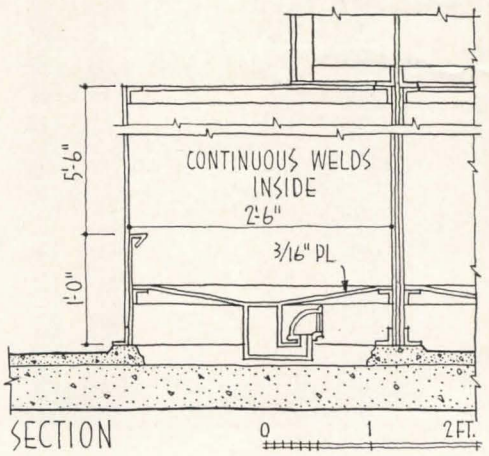
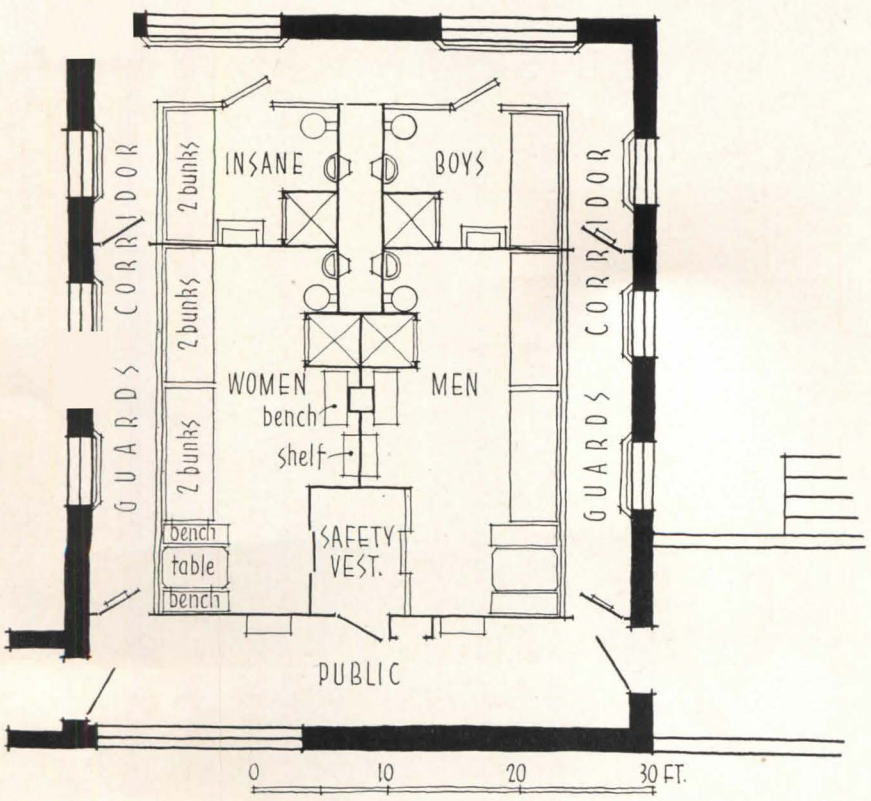


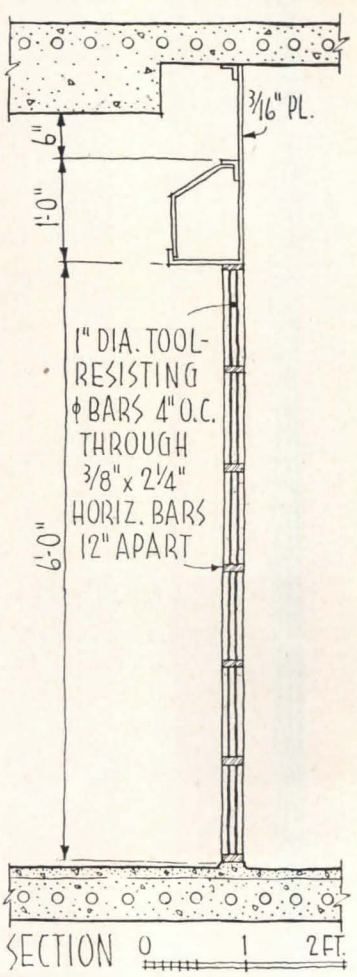
TABLE AND BENCHES

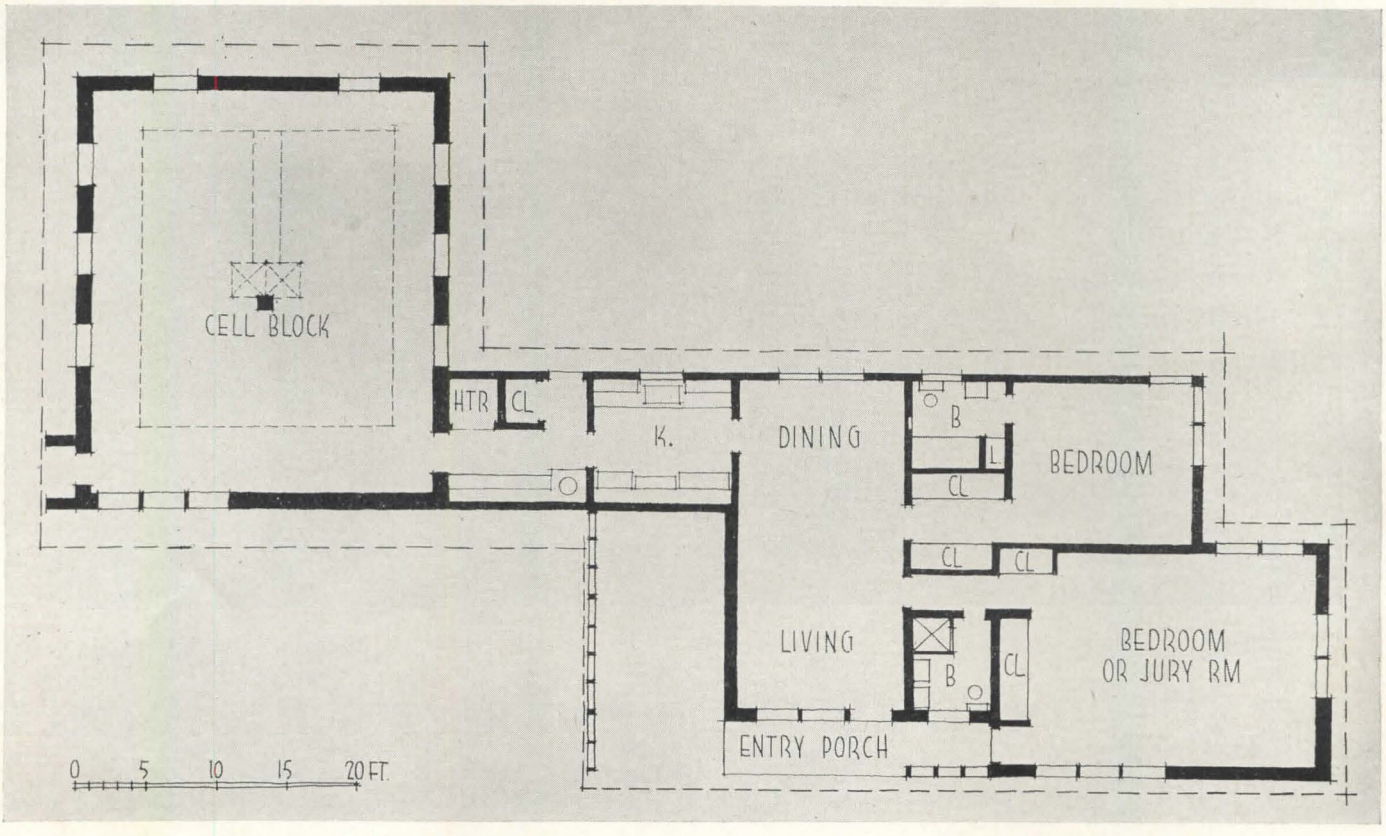


WELDED STEEL SHOWER

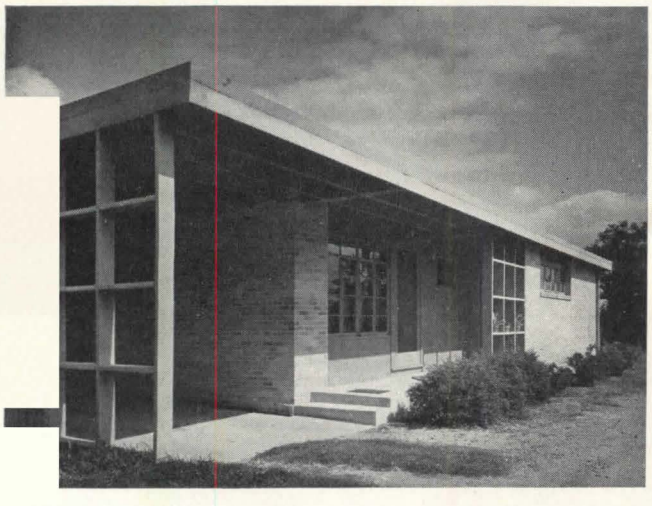
VESTIBULE WALL GRATING

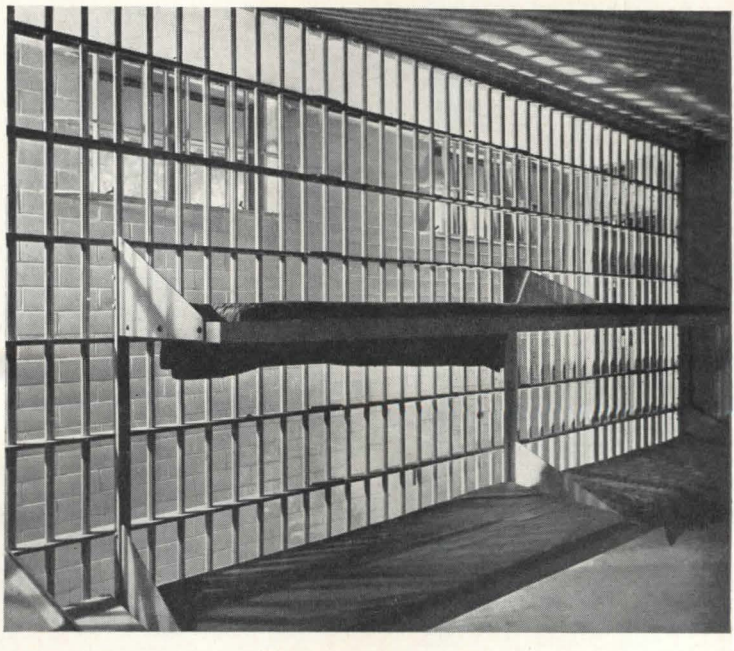


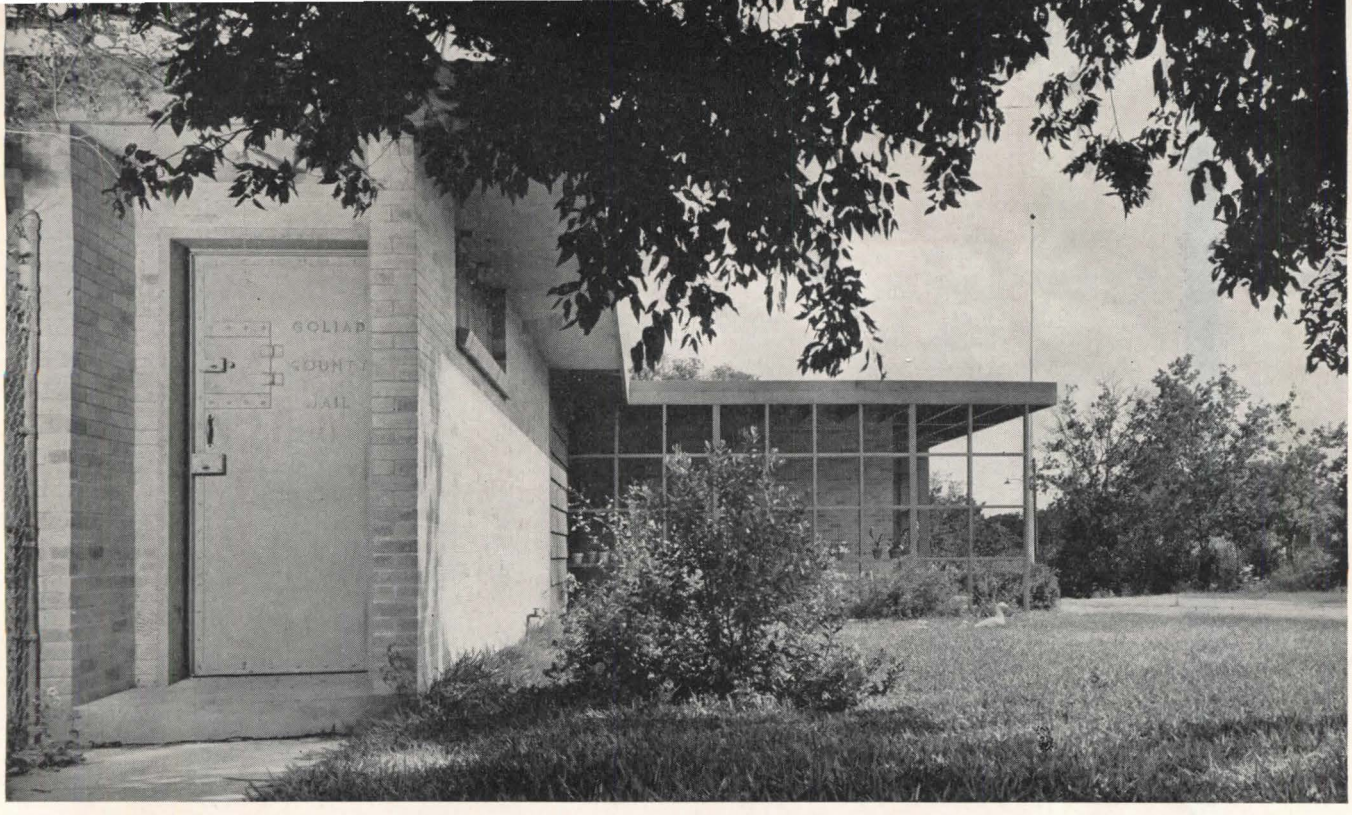




Mears Studio







Mears Studio

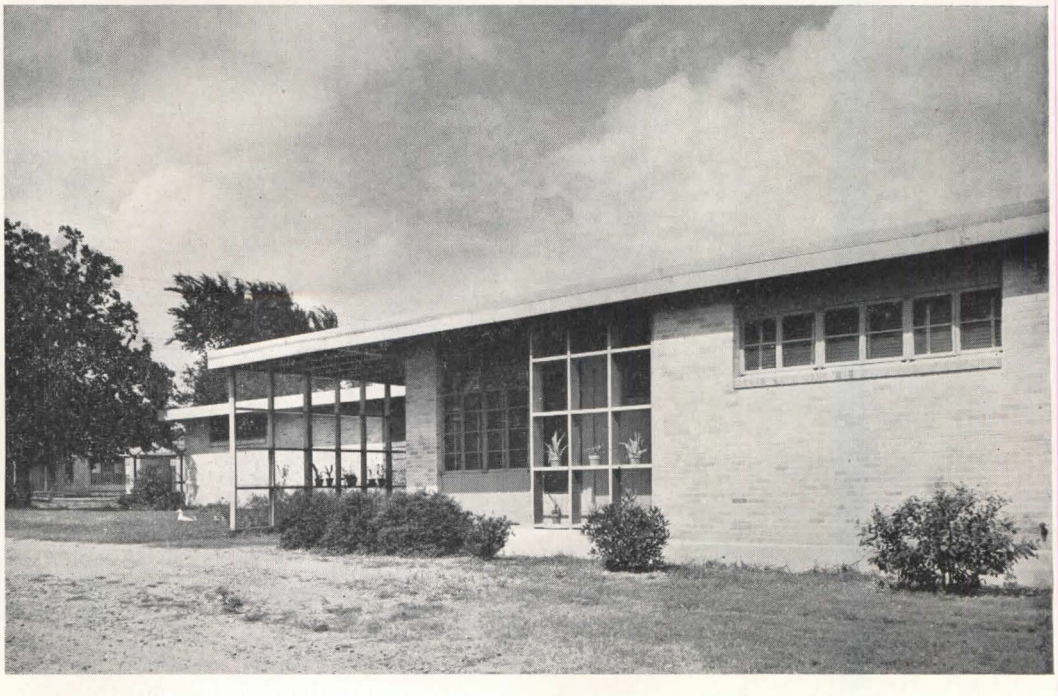
JAIL COMBINED WITH SHERIFF'S RESIDENCE

Goliad County Jail, Goliad, Tex.

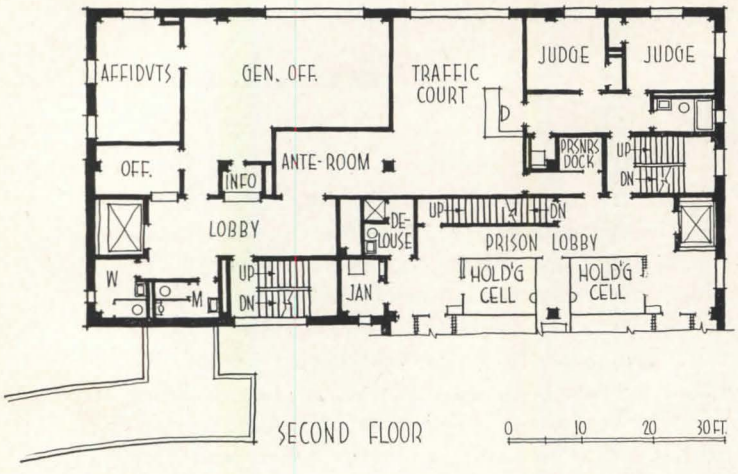
Page, Southerland and Page, Architects-Engineers

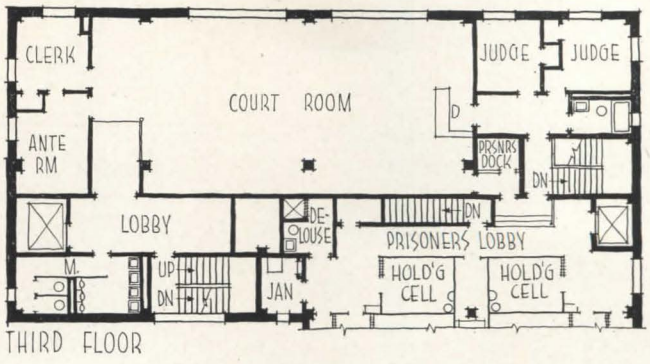
THIS building looks more like a residence than a jail. Actually it combines a fully-protected cell block together with separate living quarters for the county sheriff and his family. This arrangement permits the sheriff to supervise the jail constantly without having to sacrifice his normal family life, and it avoids the duplication of facilities which a separate residence would have necessitated. Wherever possible, provision has been made for combined use of equipment and space. Since the sheriff's wife cooks for both her family and prisoners, a single centrally-located kitchen serves both areas. The second bedroom also can do double duty as a jury room. With a separate outside entrance and its own adjoining bathroom, it can be completely isolated whenever necessary, with a minimum amount of inconvenience to the sheriff's family.

Photo top of page shows jail entrance at left, porch of residential area in background. View at right is of residential portion. Although jail and residence were treated structurally as two separate units, they combine visually into a single mass. Some visual separation is made, however, in shingled exterior of connecting passage between two areas

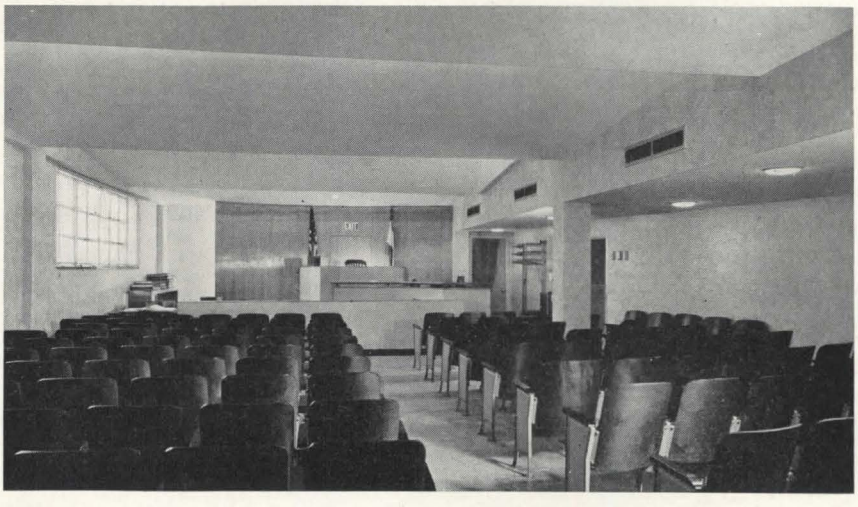


MUNICIPAL COURTS BUILDING, NEW ORLEANS

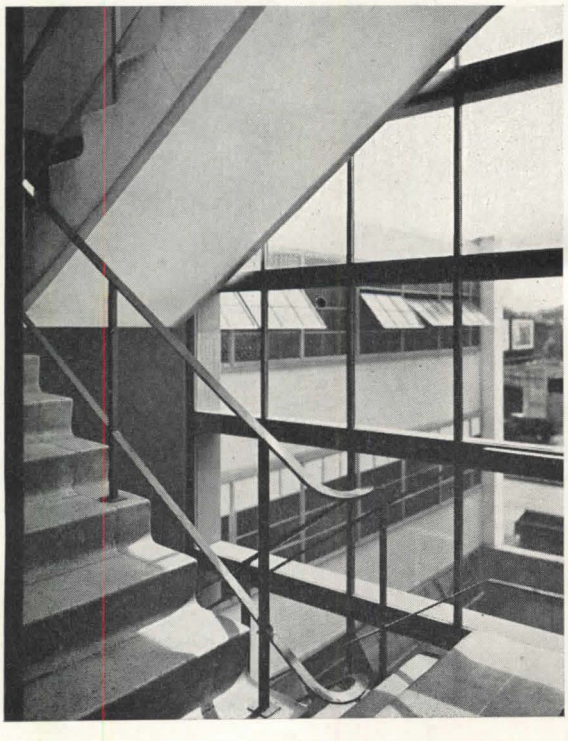


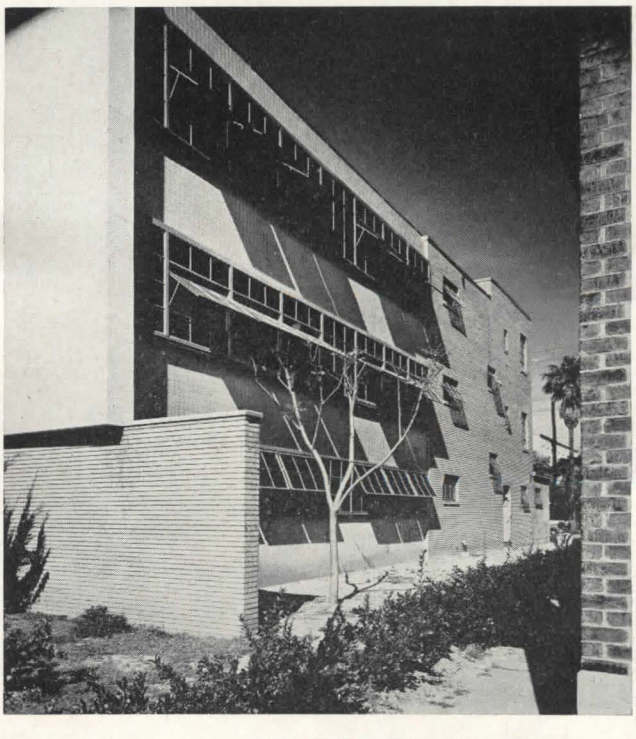


Public areas and courtrooms, like one at right, are air-conditioned. Jail has forced draft system. Stairwell, below left, is glazed for entire height with safety glass. Rear of building, with cell block in foreground, is shown below right. Door near right of photo is separate entrance for police and other officials



Joseph Molitor





PUBLIC BUILDINGS

MUNICIPAL COURTS BUILDING, NEW ORLEANS, LA.

Curtis & Davis, Architects

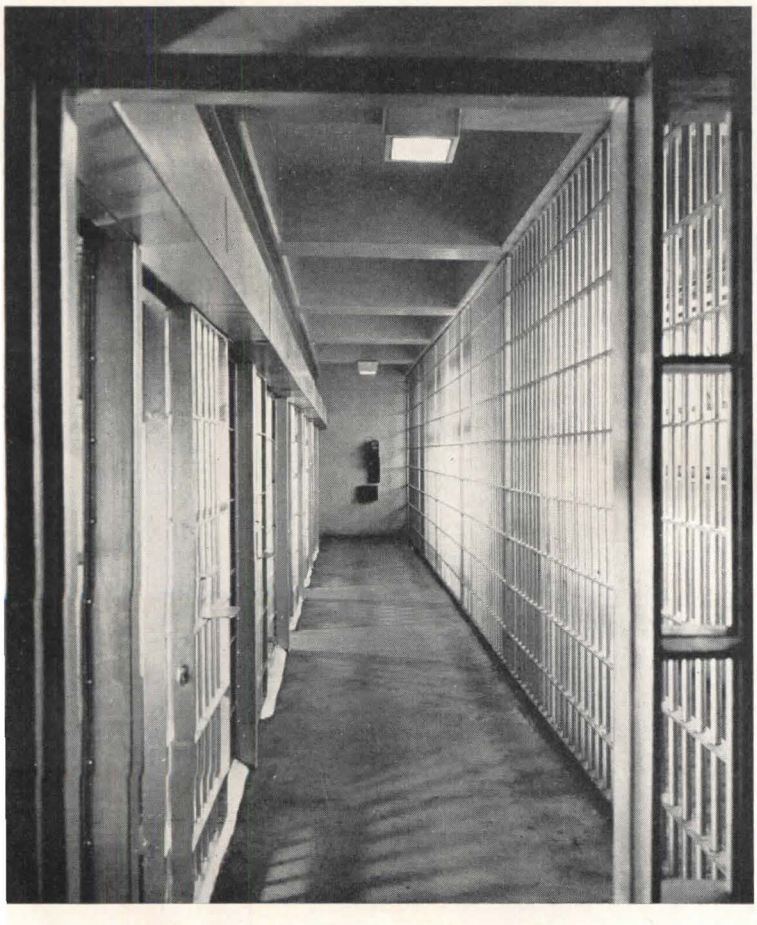
Blank end wall of cell block, right above, was designed for sculpture of family group. Opposition to figures' nudity forced replacement with sculpture shown here

Joseph Molitor

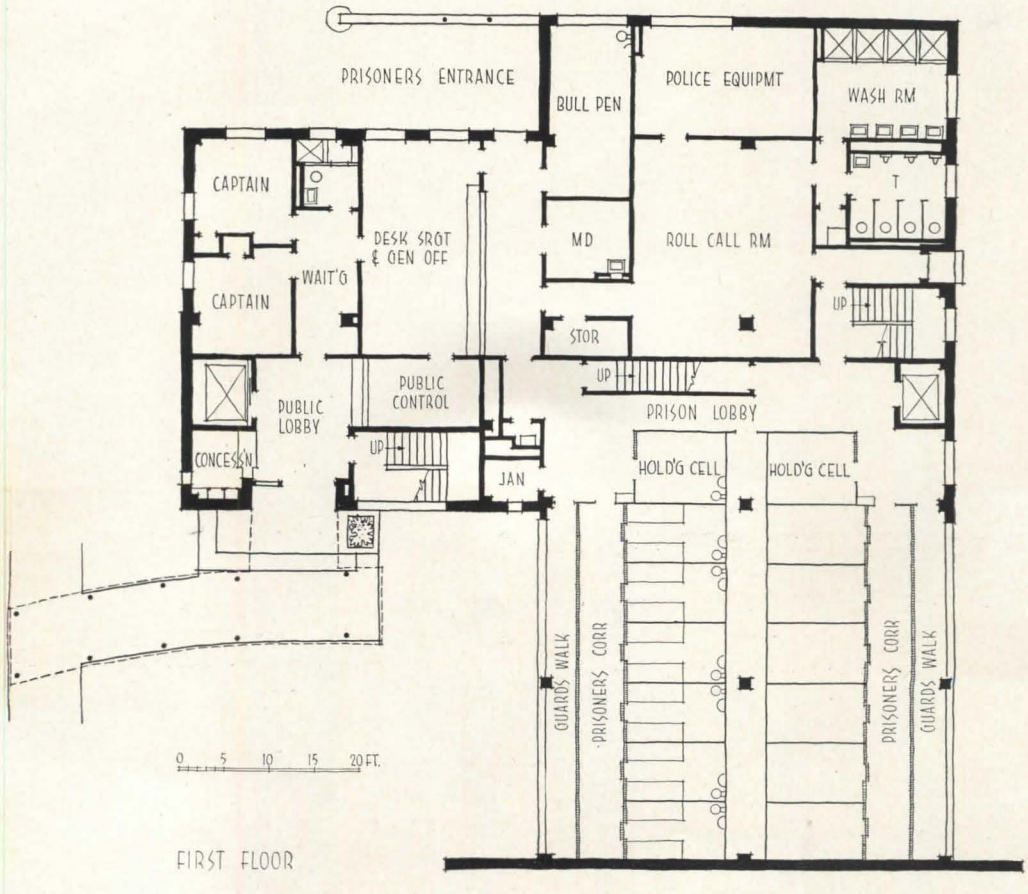
OCCUPYING a relatively limited lot, and at the same time providing space for several separate functions, this building had to be designed as compactly as possible and with a minimum of waste space. It houses New Orleans' Traffic Court, Municipal Court and District Headquarters for the downtown section of the Police Department. In addition, it also includes 36 prison cells, plus a bull pen and holding and visiting cells, all of which will accommodate a peak load of about 160 prisoners. Design of the cell block (see plan) made it unnecessary to have bars on the outside windows.

Public and official circulation is separated throughout. Prisoners and patrol wagons have a separate entrance, and police, judges and other officials have another at the rear. There is also a second stairwell at the rear for direct access to judges' chambers. The cell block has its own elevator.

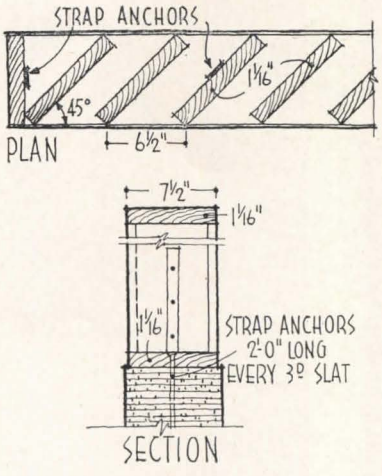
Almost all interior wall surfaces are of tile for maximum indestructibility. A variety of facings was employed on the interior to provide a visual expression of the functions of the separate areas.



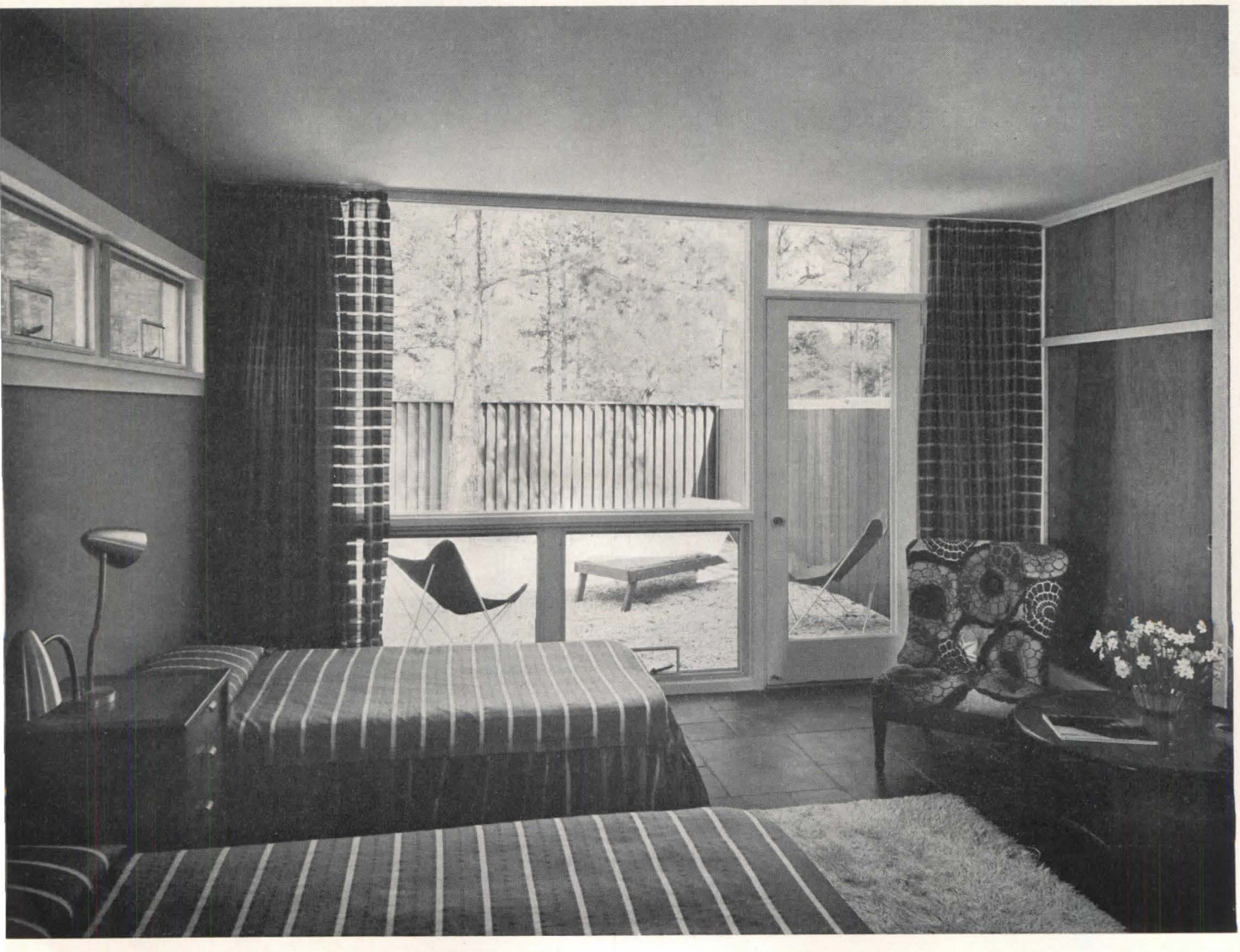
Joseph Molitor



FIRST FLOOR

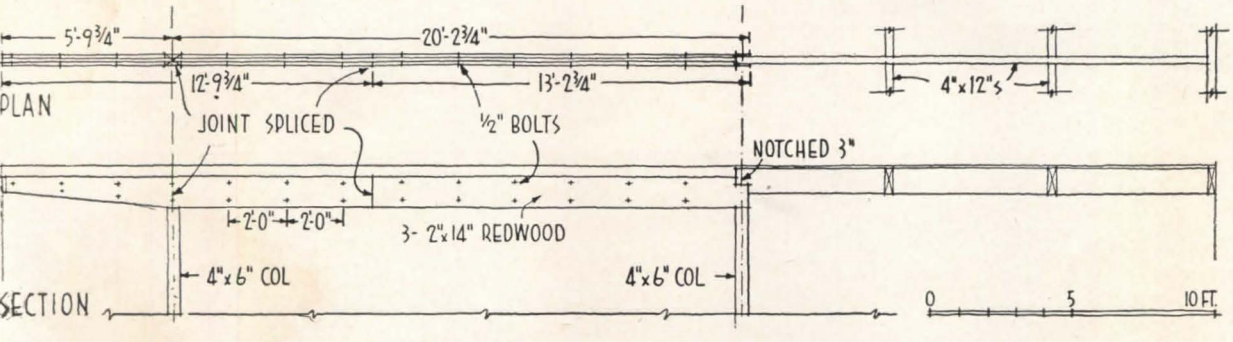


DETAIL OF LOUVERED FENCE

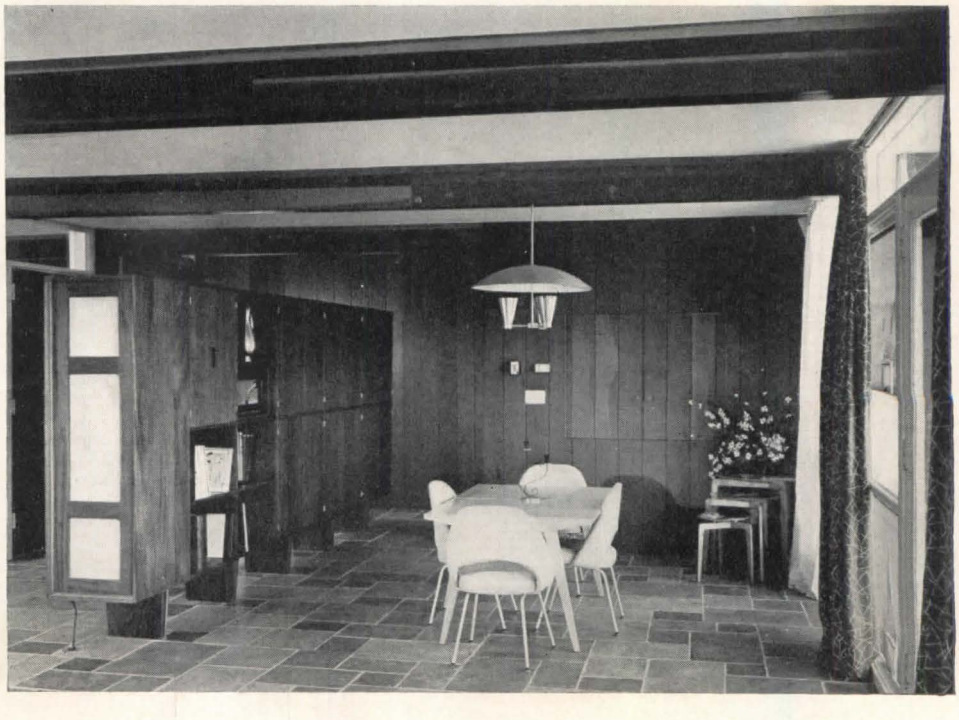


Storage space is exceptionally good throughout the house, but especially in kitchen (left) and master bedroom suite (right and below). Storage unit separating bedroom and dressing room reaches neither floor nor ceiling, permits ventilation straight through house. Both master bedroom and guest room (bottom, opposite) have direct access to outdoors, and guest room has its own patio

Joseph W. Molitor



Joseph W. Molitor



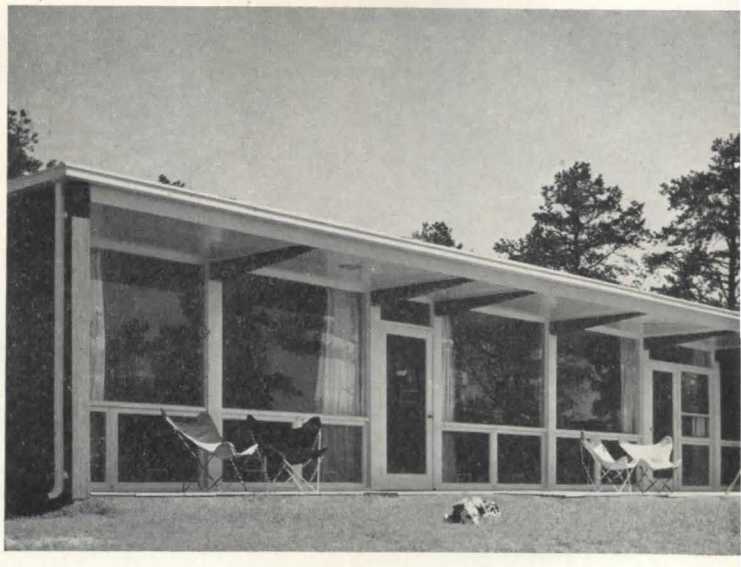
Living room (opposite) has north and south walls largely of glass to take advantage of contrasting views; wide overhang protects south side (detail above). Top right: library-den. Right: dining room is separated from entrance vestibule by free-standing cabinet providing miscellaneous storage and housing a three-speaker record player and radio

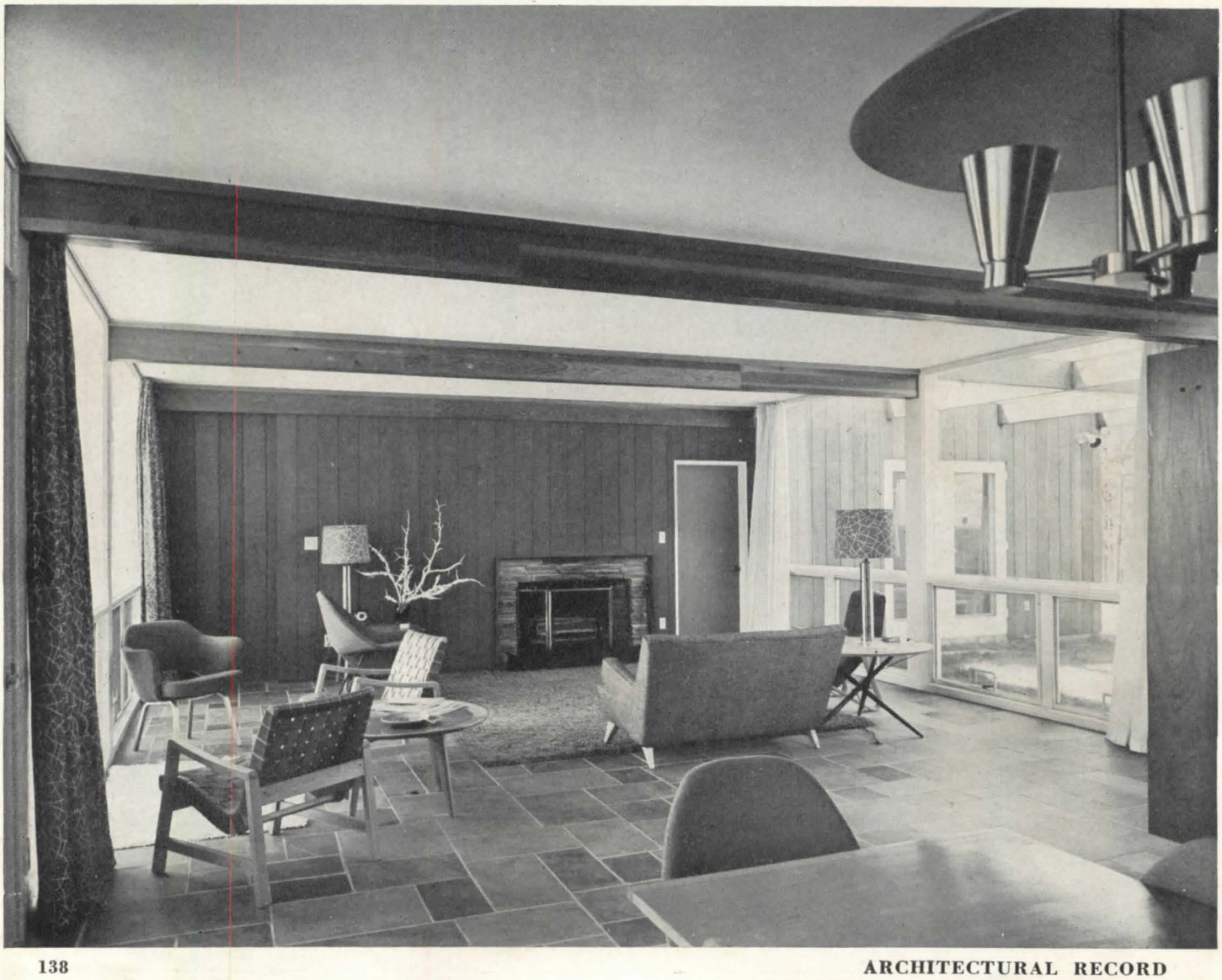
RESIDENCE OF MR. AND MRS. J. SPENCER BELL

A HILLSIDE SITE with contrasting views in opposite directions was a chief problem in the planning of this house. Both views — a densely wooded ravine to the north and a sloping meadow to the south — merited living room outlook; the solution was a central living room wing running east-west, flanked by bedroom and service wings.

The owners, a couple whose only child is grown, wanted a house easy to care for and enjoy without servants. Out of this requirement came such features as a kitchen unusually large for a house of this size, with a fireplace and grill; a library-den quickly closed off from the living room by a ceiling-high sliding door; and a two-way cabinet between kitchen and dining room which can double as a bar.

Construction is wood frame on concrete foundation. Exterior walls are redwood, interior walls are plywood and plaster. Floors are sawed random rectangular slate, sand rubbed.



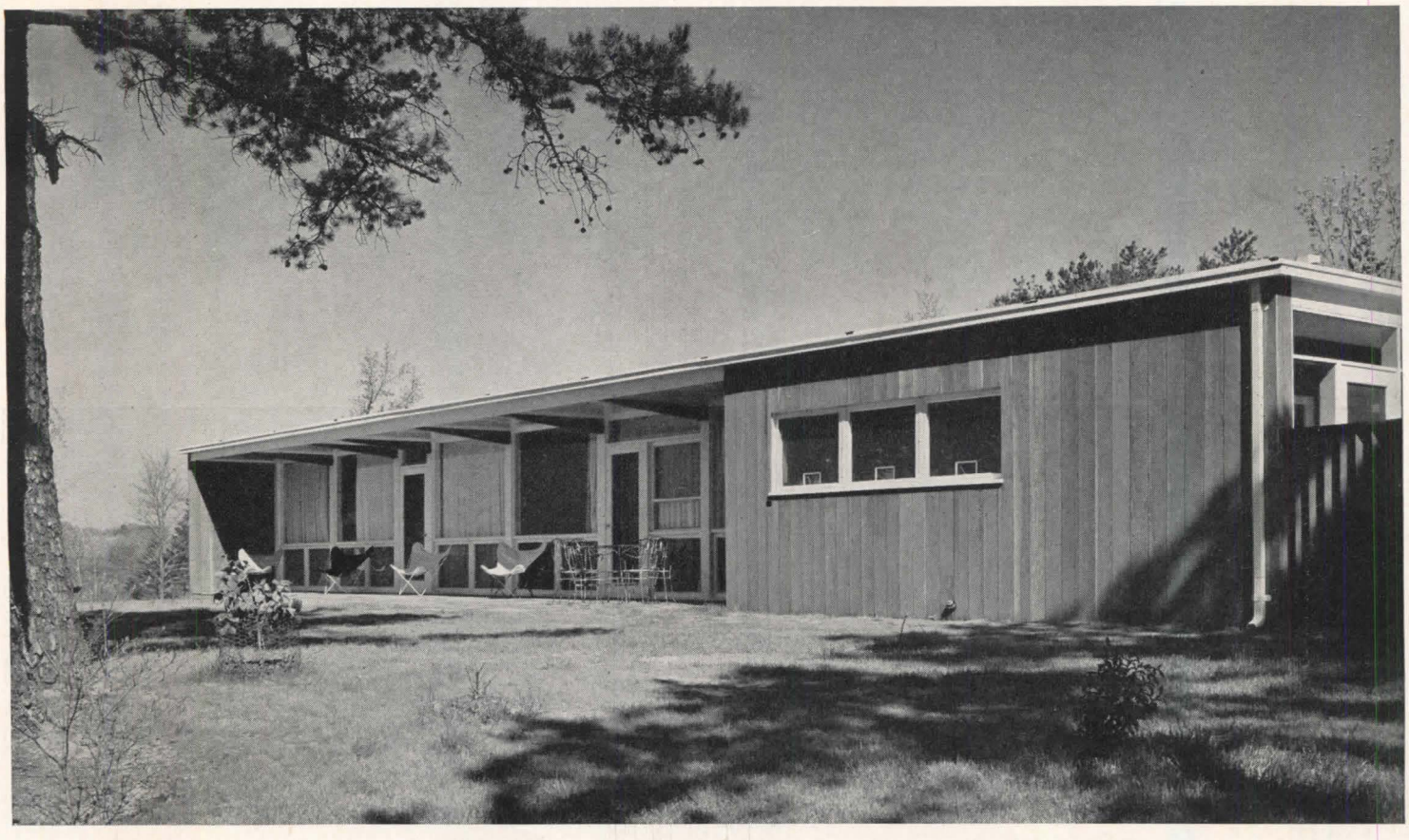


GOOD LIVING FOR SMALL SERVANTLESS FAMILY

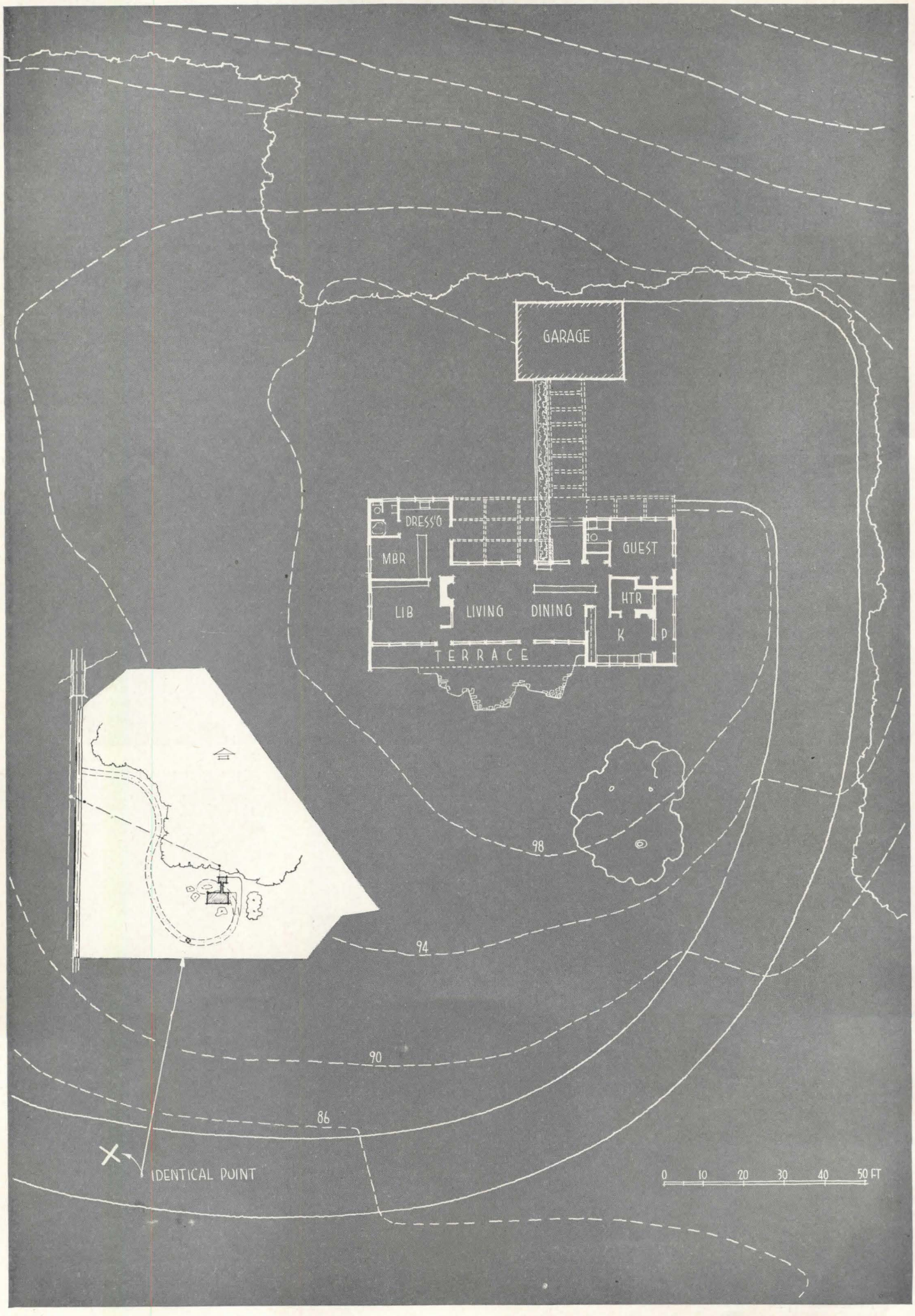
Residence of J. Spencer Bell

Charlotte, North Carolina

A. G. Odell, Jr. and Associates, Architects



Joseph W. Molitor


GARAGE
DRESS'G
MBR
GUEST
LIB
LIVING
DINING
HTR
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TERRACE
98
94
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IDENTICAL POINT
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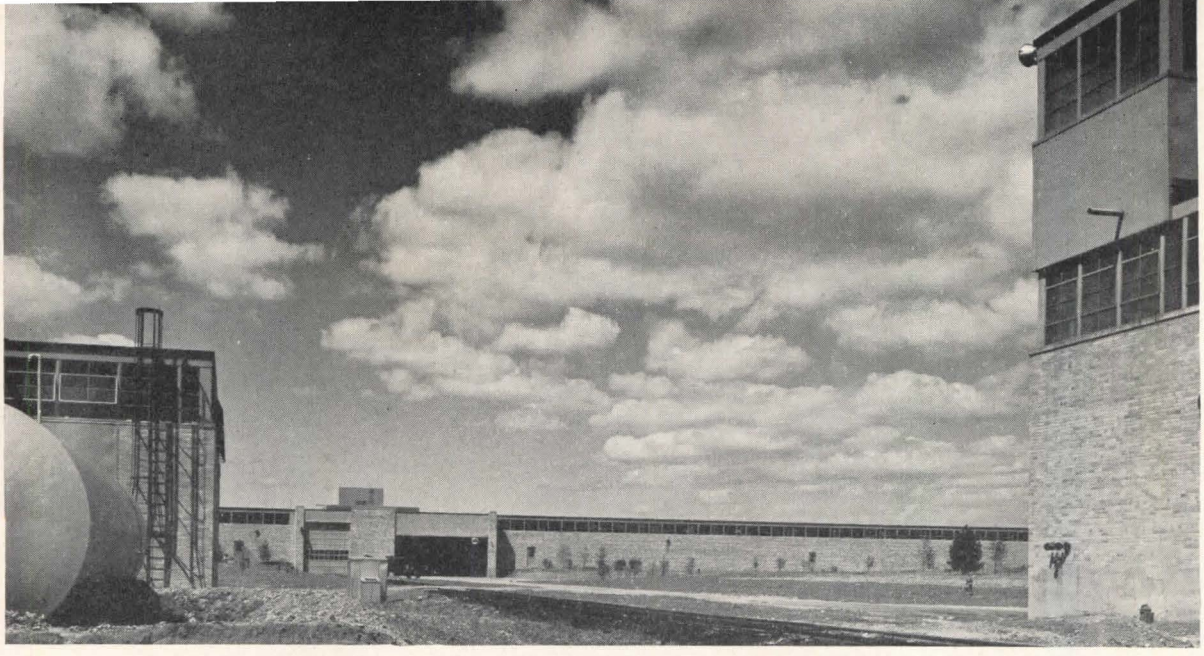
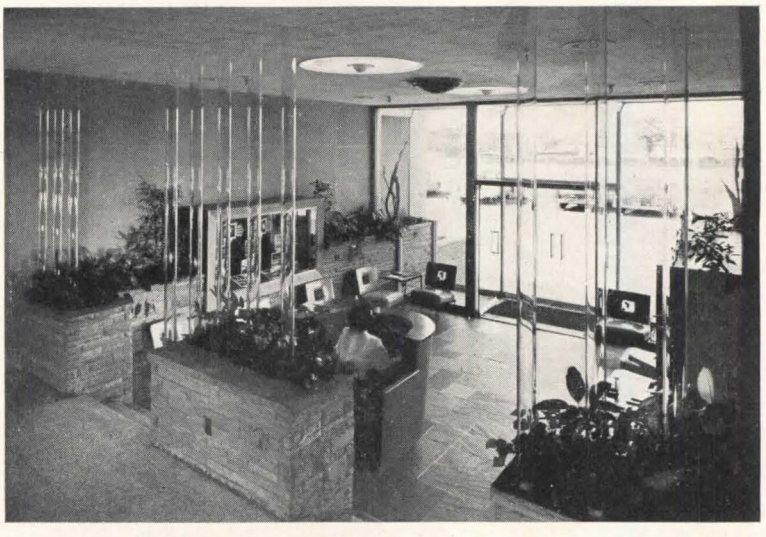
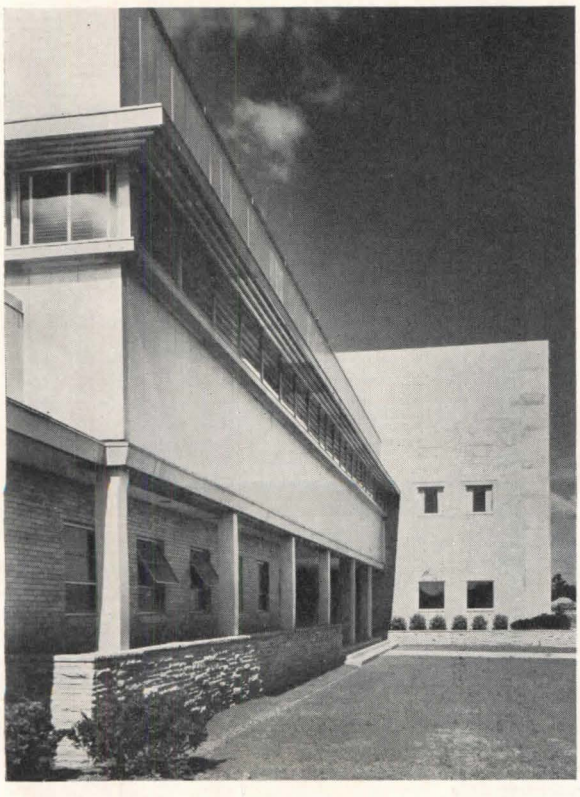
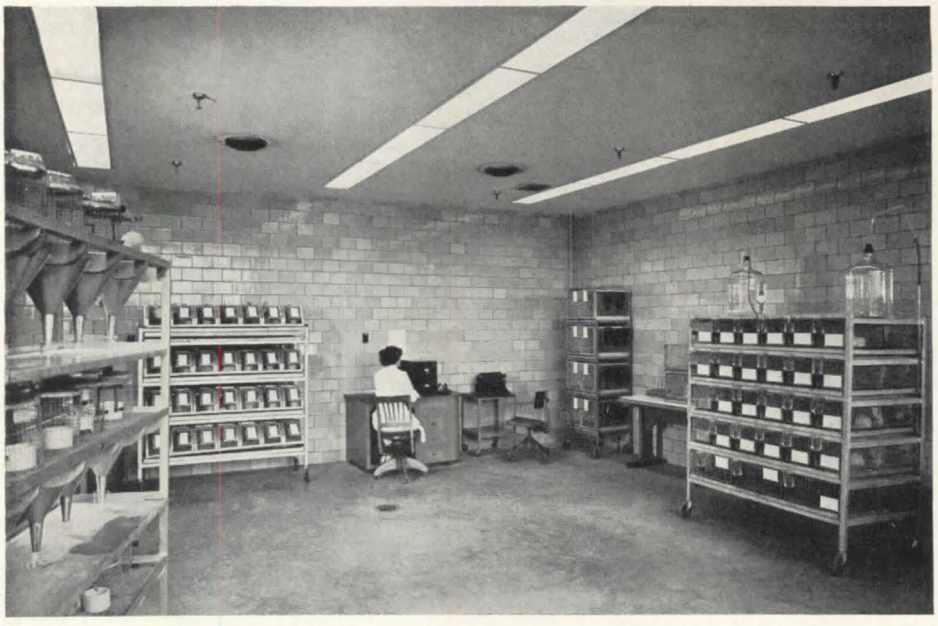




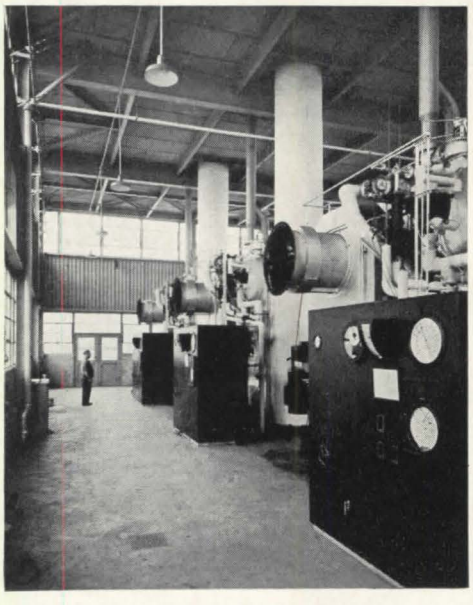
Above, boiler house at left has 3132 sq ft area; chemical processing plant at right, 7892 sq ft of space used for manufacturing medicinal ingredients of the company's products; main plant in background. Right, entrance lobby, administration building. Below, left, wing of administration building showing metal siding panels, masonry surfaces, metal sash. Below, right, central unit, administration building; third floor is an executives' conference room

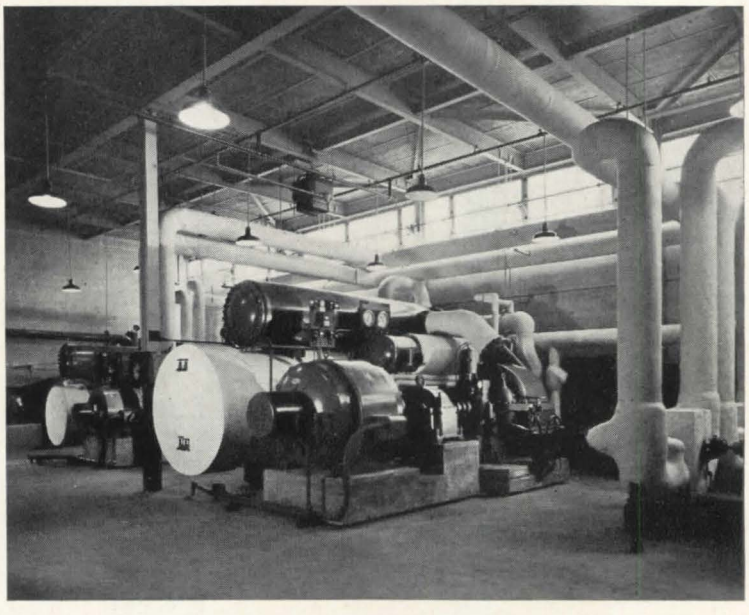


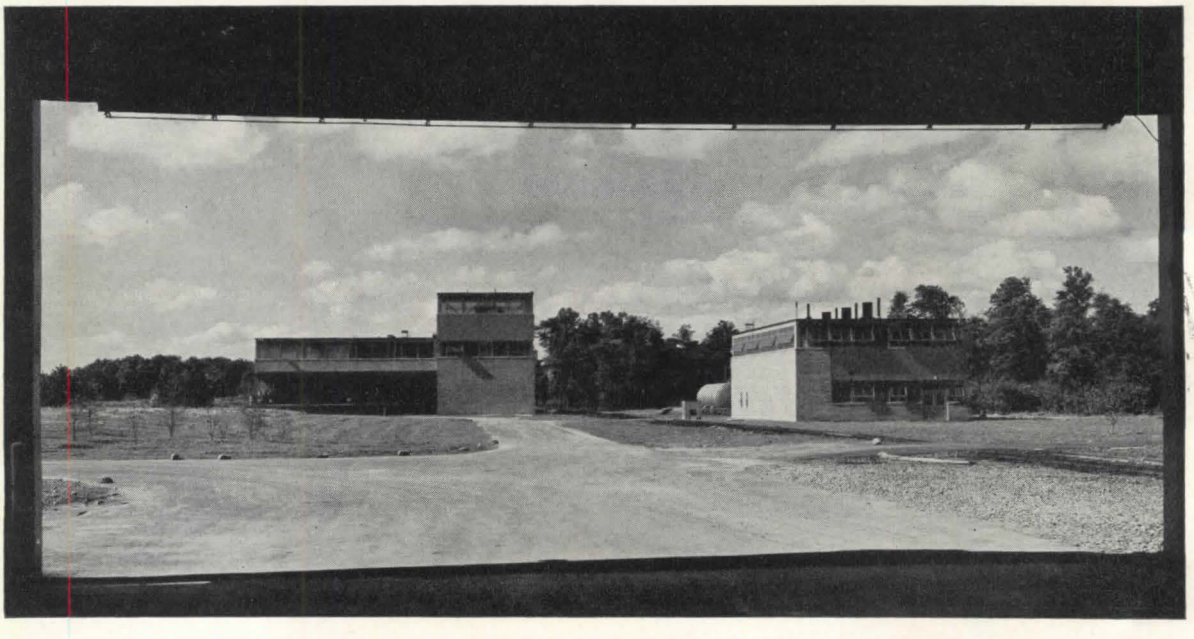


Left, animal room in laboratory wing. Below, center left, steam is supplied by three oil-fired, high-pressure boilers of a new design, each with a capacity of 24,000 lb of steam per hour at 300 lb pressure. Fuel burning efficiency exceeds 80 per cent under full automatic control. Center, right, 200-ton and 450-ton refrigeration machines; well water which has passed through air conditioner coils is reused here in condensers before being discharged. Bottom of page, chemical processing building and boiler house, seen from main plant

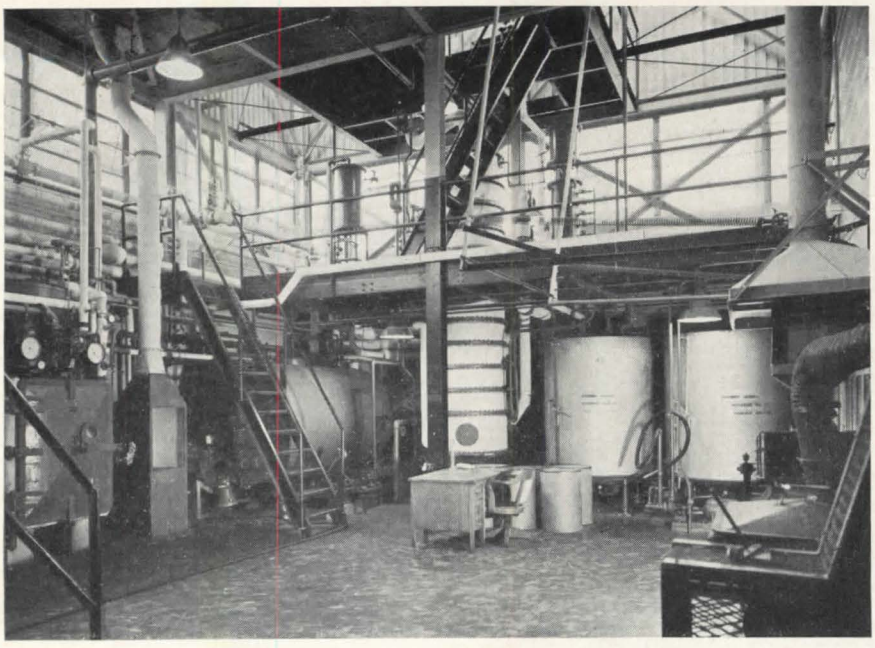
Joseph W. Molitor







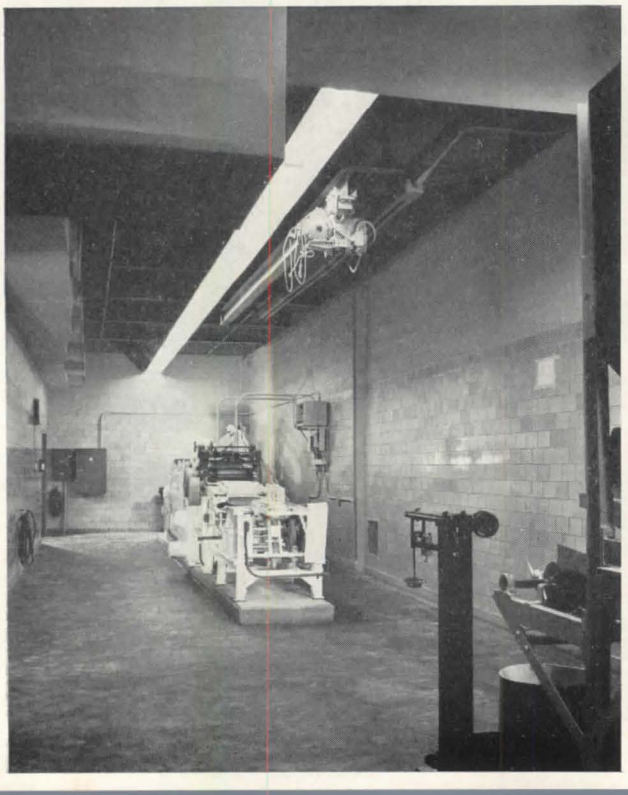
Above, packaging room; here tablets are automatically wrapped, packed in cartons and transferred to large finished products warehouse (photo below), where they are stored temporarily pending shipment

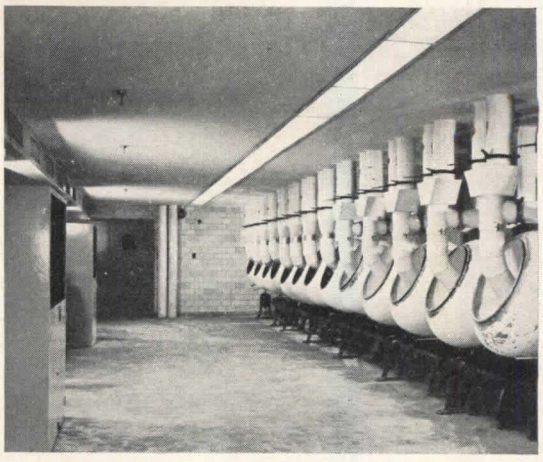


PHARMACEUTICAL PLANT

Process also involves manufacture of medicinal ingredients, laboratory procedures for testing and maintaining quality, final finishing of products, packaging and ample warehousing facilities. Left, chemical processing room showing process kettles for liquid manufacturing (see also photo far right, top of facing page). Left and right, center, two views of the air conditioned, fluorescent lighted control laboratories. Bottom left, room where gum tablets are cut and broken. Bottom right, tablet polishing and sorting room

Joseph W. Molitor

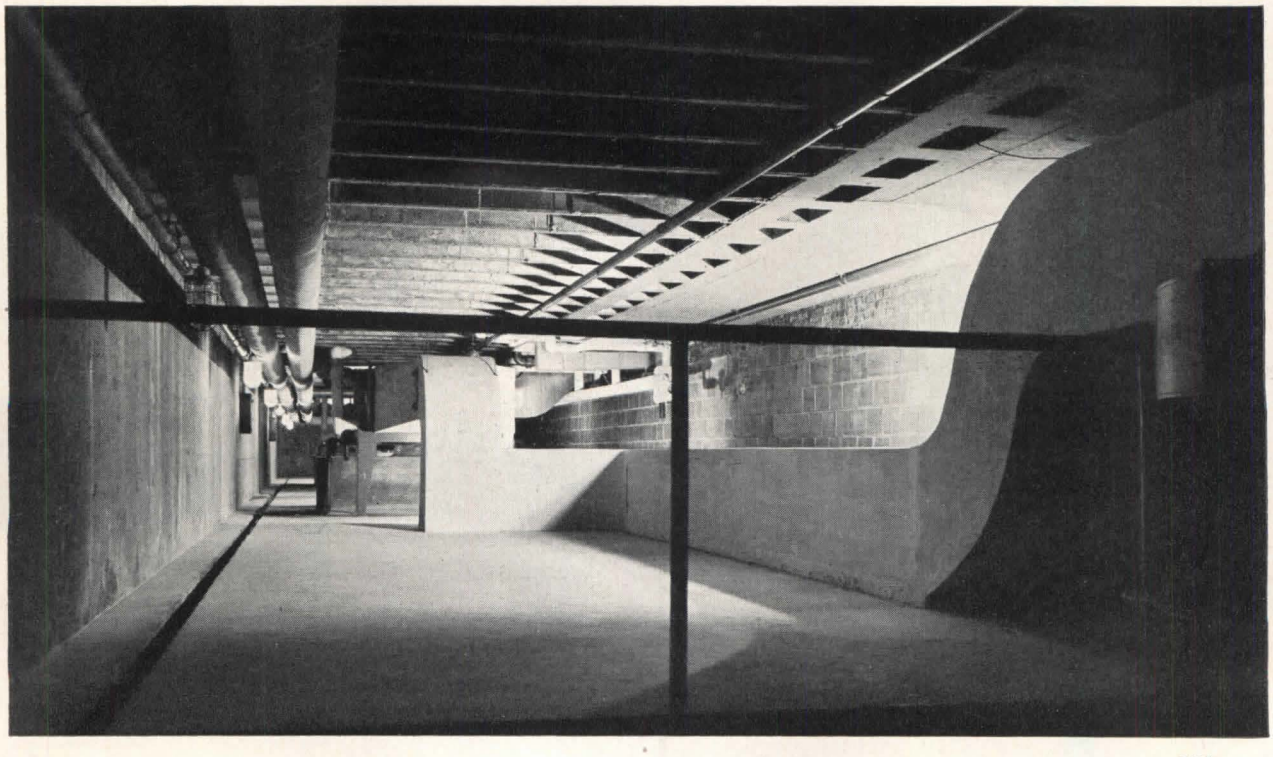




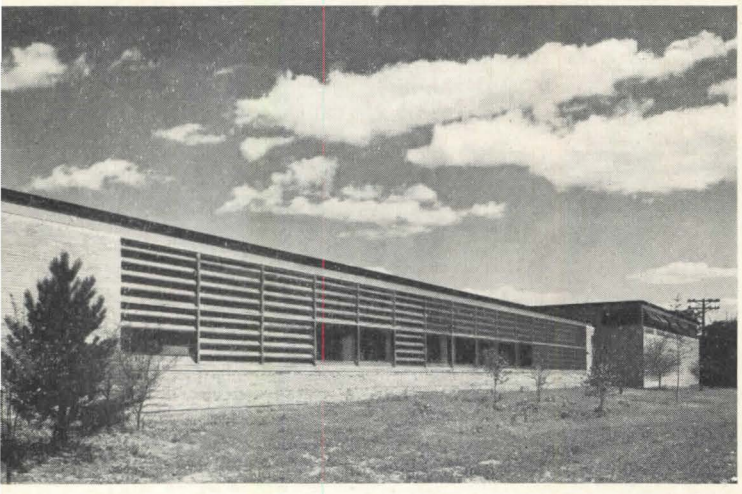
Above, left, pair of coating pan rooms. High-velocity air stream enters each pan or drum. Right, another coating pan room

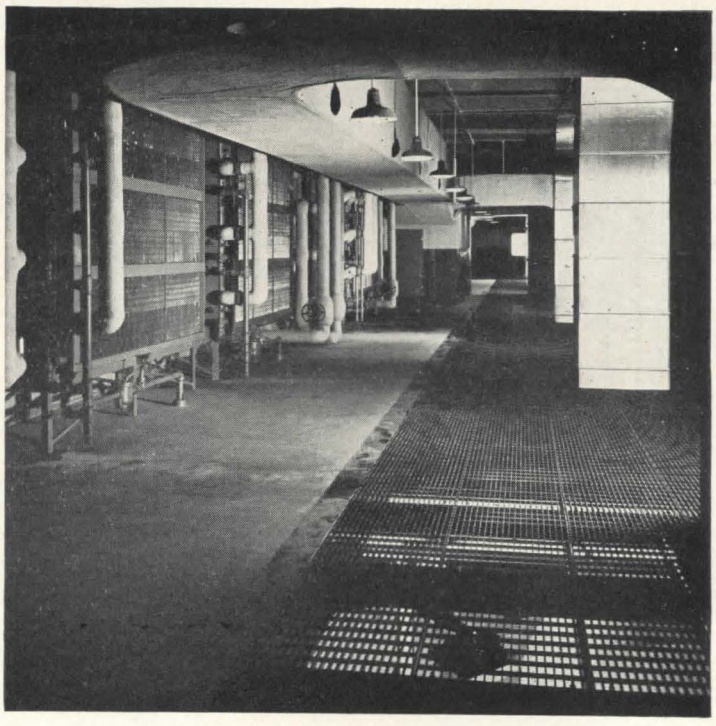
White Laboratories had previously spent much time and money in nine attempts to solve problems of tablet coating. The process takes place in rotating pans into which air is blown at 50F and 65 per cent relative humidity. As the material dries, part of it is carried out of the pans as very fine dust and, in the usual case, coating room air becomes heavily loaded with the particles. This causes four problems. One concerns the possible irritant effect of dust from some coating materials on mucous membranes. Second, concentration of dust could cause dust explosions. Third, another discomfort may result from the low-temperature air blasts directed into the pans. Fourth, it is necessary, of course, in pharmaceutical manufacturing to prevent positively the contamination of one medicinal ingredient by another. Study by the architects and engineers led to development of the control technique explained in the illustrations, which was pre-tested by an experimental installation at the company's former plant. Since the volume of air circulated through the air walls is large in proportion to cooling load, there is little rise in temperature and chilling drafts are eliminated.

Below, supply air tunnels which alternate with exhaust tunnels under entire coating pan area. Air enters from lower plenum, feeds up to hollow perforated metal "air walls" through ceiling slots shown at right. Duct feeds air directly to pans at 500 cfm



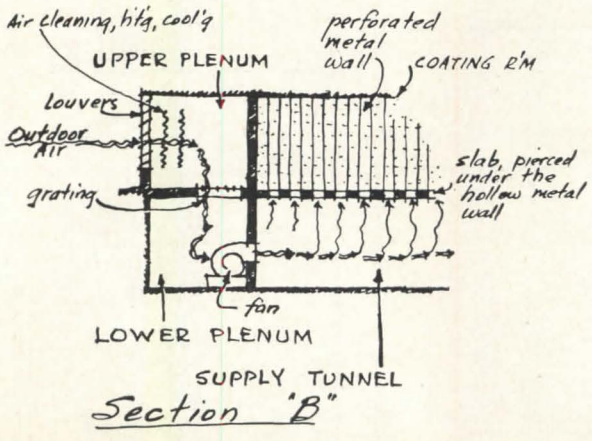
PHARMACEUTICAL PLANT

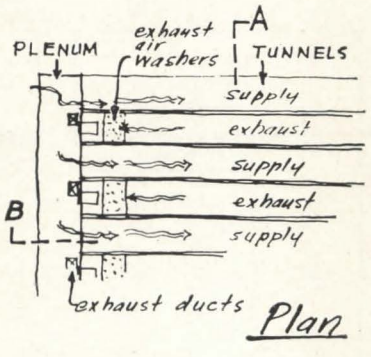


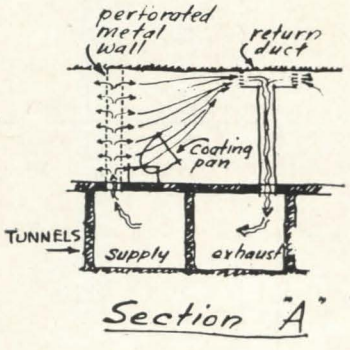


Joseph W. Molitor

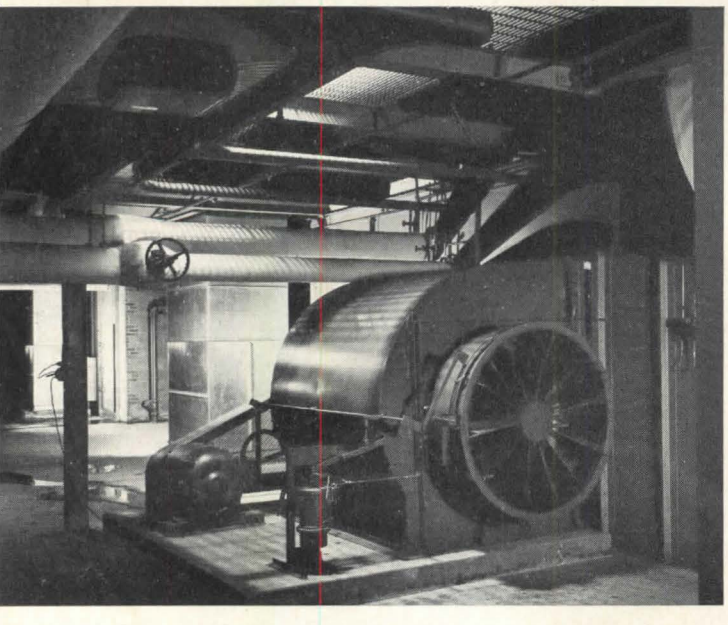
For the tablet coating process a unique air conditioning installation was devised. Above, left, louvered wall admits outside air to a 2-level plenum. Right, upper plenum chamber; air is cleaned, brought to temperature and humidity at left, passes down through grille to lower plenum. Vertical ducts carry exhaust air to roof

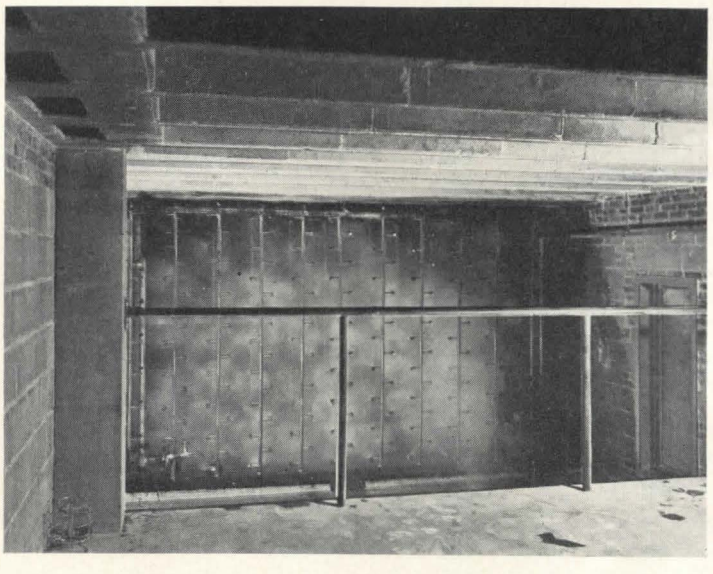


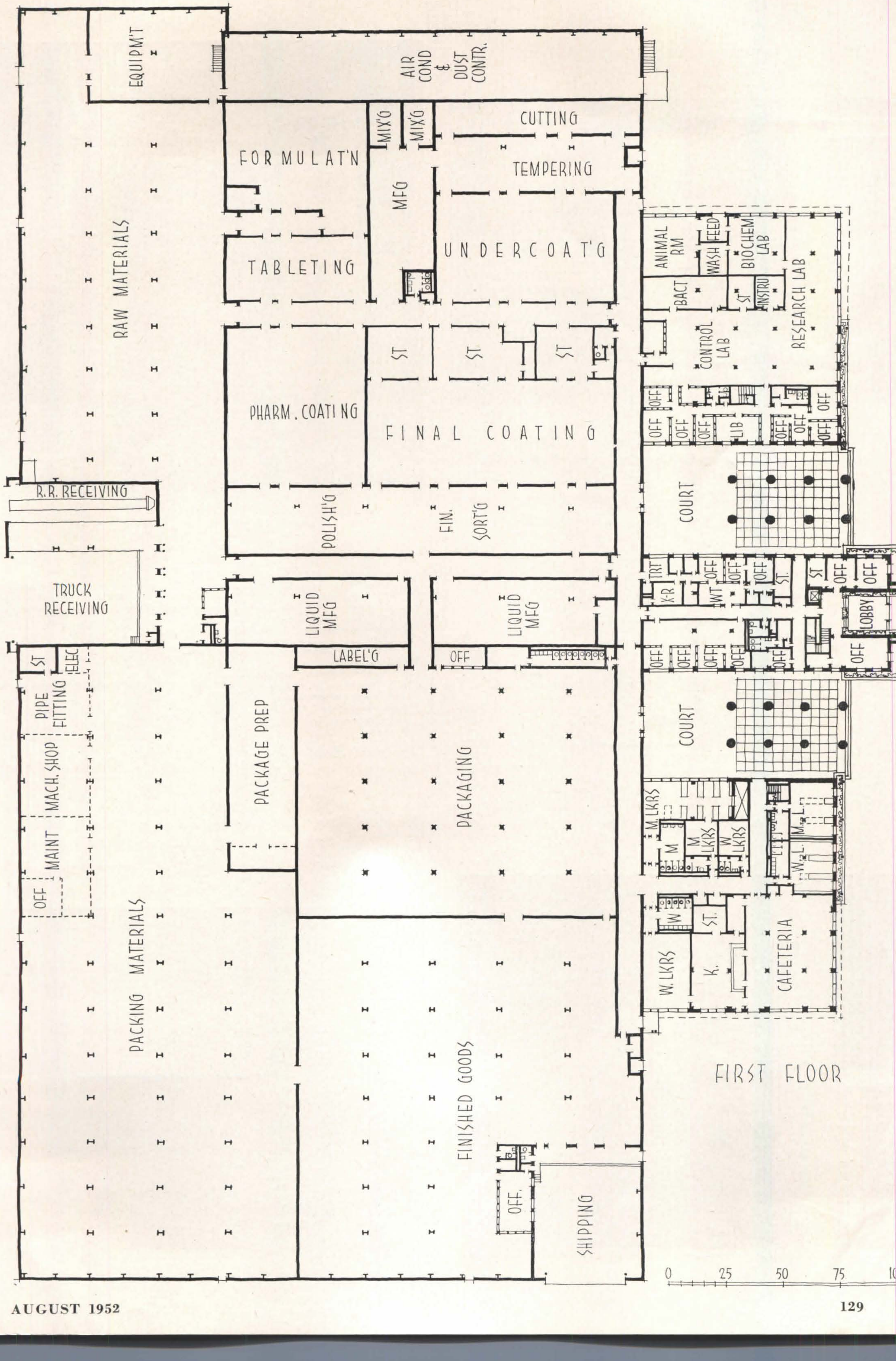




Below, left, lower plenum chamber, showing one of the exhaust fans which pulls used air through tunnels under floor. Right, end of exhaust tunnel showing air washer for removing dust before air is discharged






EQUIPM'T
AIR COND & DUST CONTR.
MIX'G
MIX'G
CUTTING
FOR MULAT'N
MFG
TEMPERING
UNDERCOAT'G
TABLETING
RAW MATERIALS
ST
ST
ST
PHARM. COATING
FINAL COATING
R.R. RECEIVING
POLISH'G
FIN. SORT'G
TRUCK RECEIVING
LIQUID MFG
LIQUID MFG
LABEL'G
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ELEC
PIPE FITTING
MACH. SHOP
MAINT
OFF
PACKAGE PREP
PACKAGING
PACKING MATERIALS
FINISHED GOODS
OFF.
SHIPPING
ANIMAL RM
WASH
FEED
BIOCHEM LAB
BACT
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INSTRU
RESEARCH LAB
CONTROL LAB
LIB
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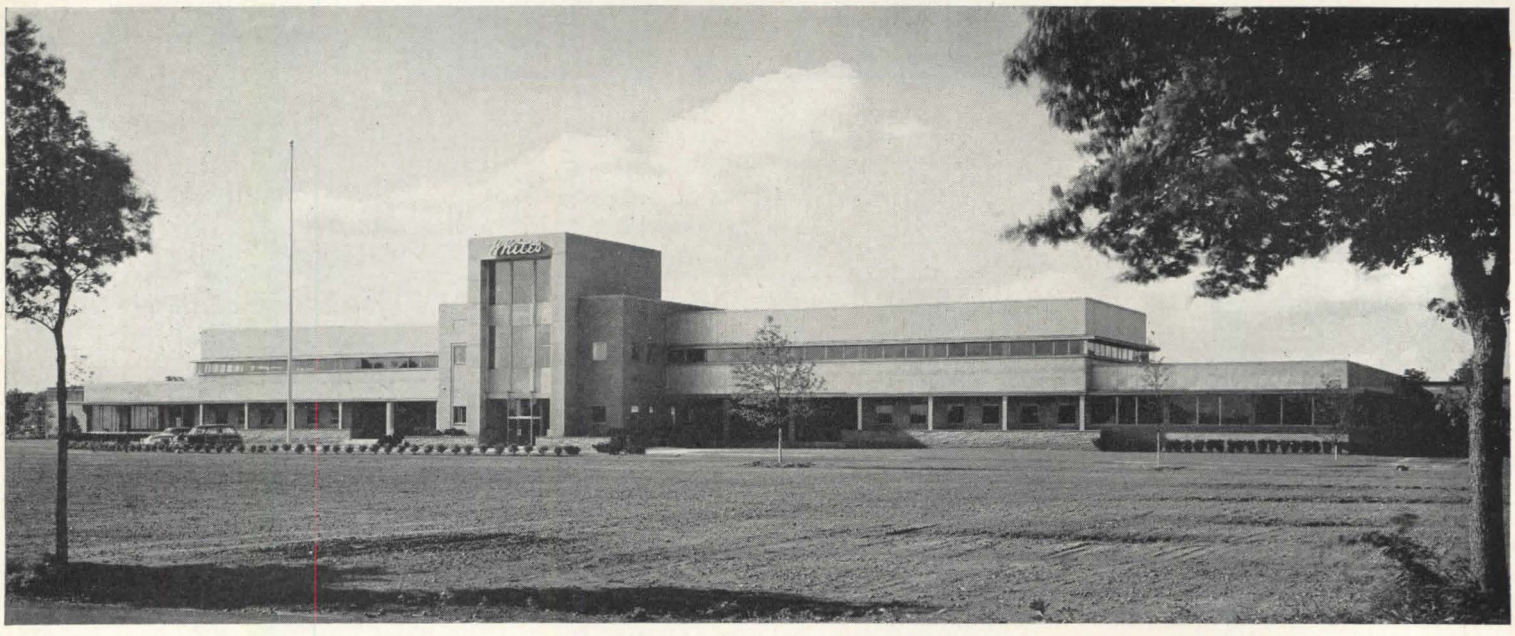
CAFETERIA
FIRST FLOOR
0 25 50 75 100 FT.



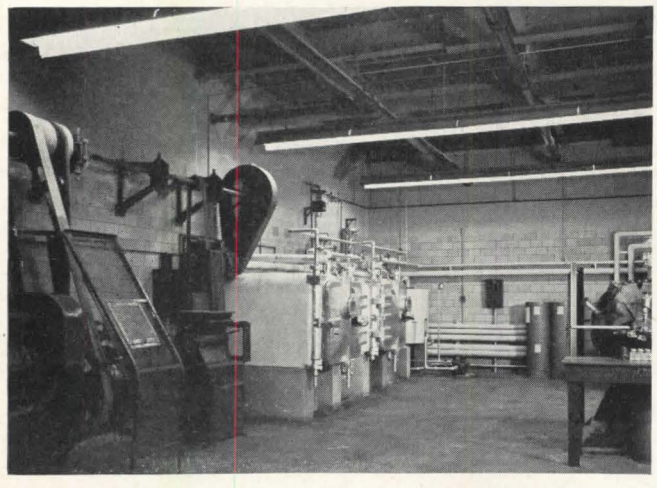
COMPLEX DRUG MANUFACTURING PROBLEMS SOLVED

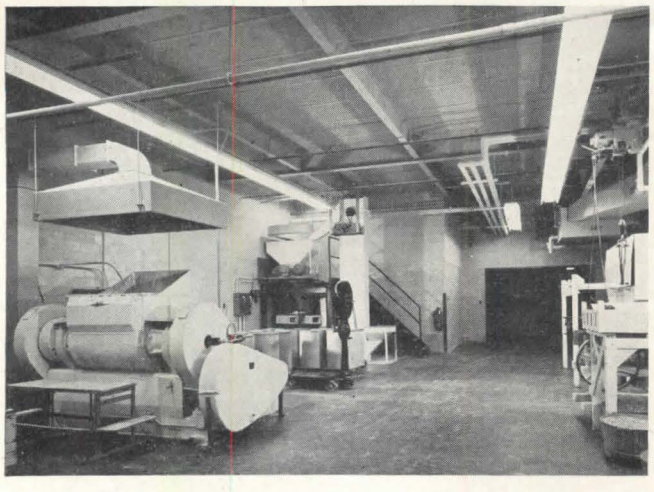
WHITE LABORATORIES, INC.,
KENILWORTH, N. J.

A. M. Kinney, Inc., Architects and Engineers

M. M. Schmidt, Landscape Consultant

Much of the production of White Laboratories, Inc. and its subsidiary, Pharmaco, Inc., consists of small medicinal tablets, including medicated chewing gum coated with flavoring and other materials. Below, tablet formulation and manufacturing areas

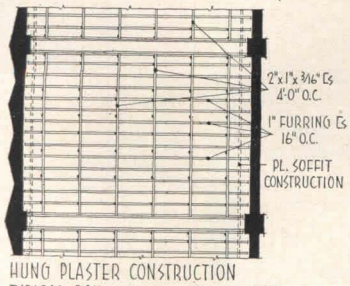




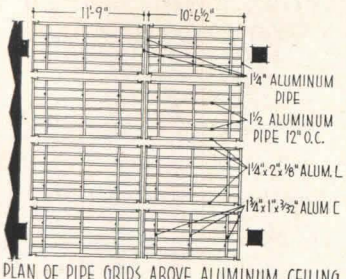
SINCE its founding 28 years ago the growth of White Laboratories has necessitated four major expansion programs. In the latest, the company moved from the city of Newark to a 125-acre rural site, where it has built a plant costing approximately $3,000,000, including site development, utilities, process piping and wiring, engineering expenses and moving costs. Land costs and expenditures for manufacturing and processing equipment, and laboratory and office fixtures brought the total well over $4,000,000.

The new plant can be expanded easily; it occupies only a small portion of the site. It consists of a two-story administrative building, 352 ft long and 90 ft deep; a one-story manufacturing building 560 ft wide and 272 ft deep; a chemical processing building 92 by 94 ft; and a 74 by 42 ft boiler house (last two not shown in plans). Construction is steel frame on concrete foundations, with walls of buff face brick, Indiana limestone and metal panels. Roofs are built-up, over either lightweight precast concrete slabs or reinforced gypsum poured over glass fiber insulating board. More interesting, however, than the large size and excellent construction of the plant is the method of solving the problems posed by the manufacturing process; this is explained on the following pages.

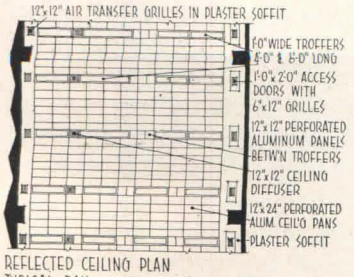
ALCOA
BUILDING



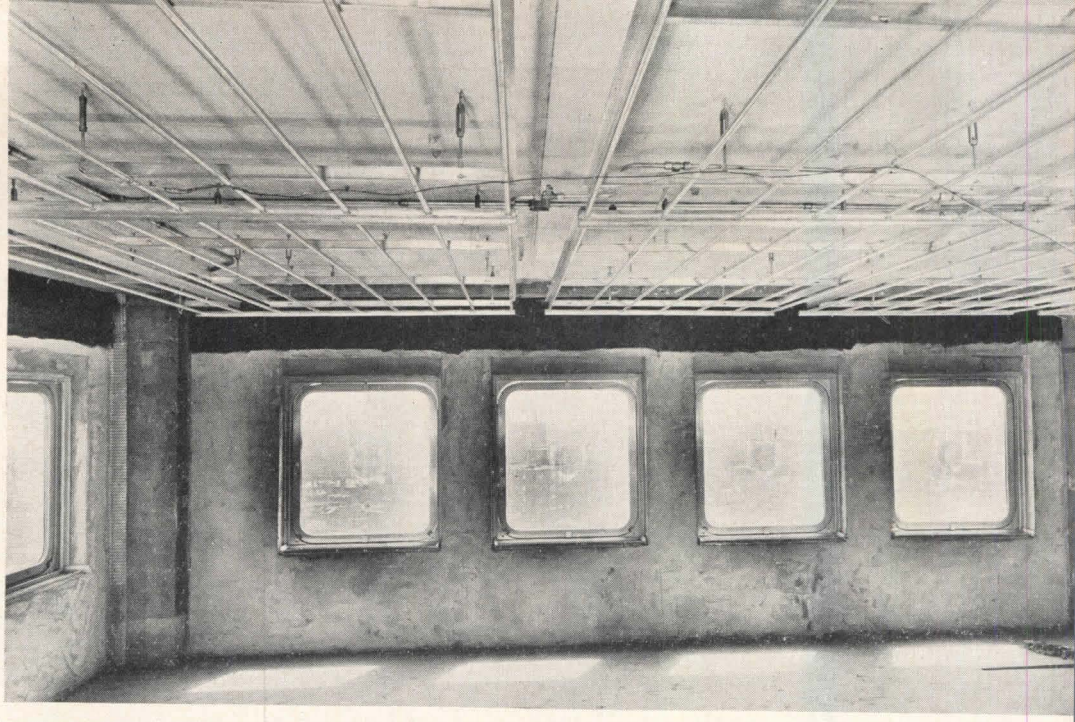
HUNG PLASTER CONSTRUCTION
TYPICAL BAY 0 5 10 FT.

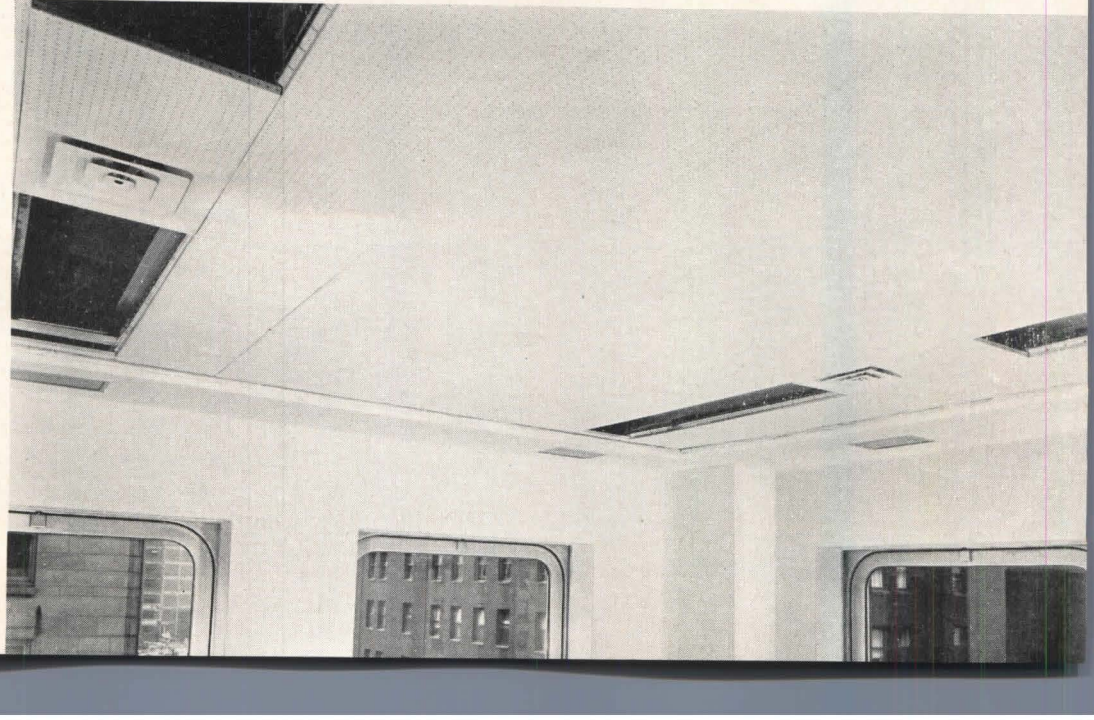


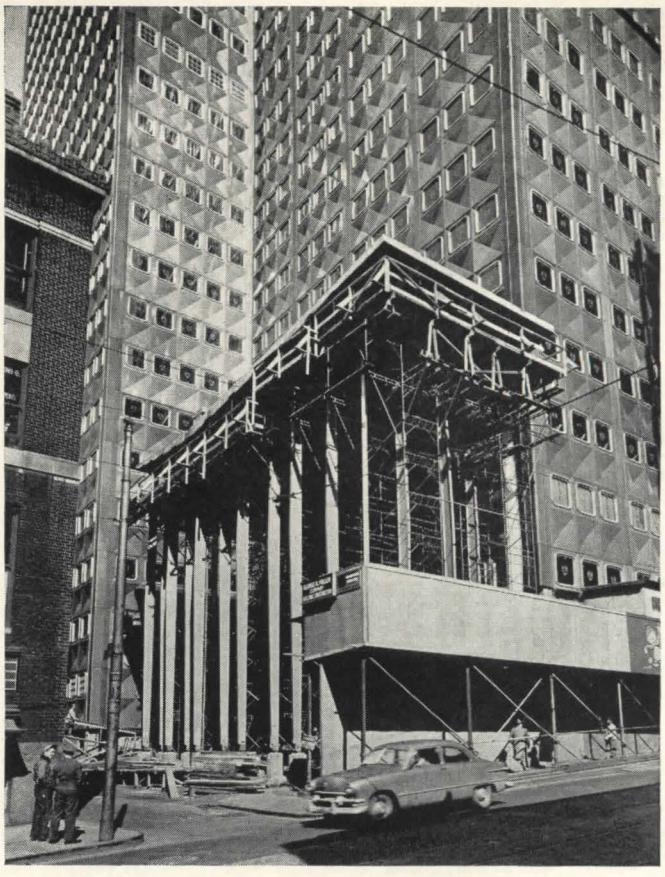
PLAN OF PIPE GRIDS ABOVE ALUMINUM CEILING
TYPICAL BAY 0 5 10 FT

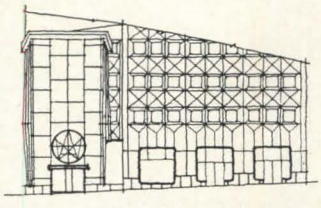


REFLECTED CEILING PLAN
TYPICAL BAY 0 5 10 FT.





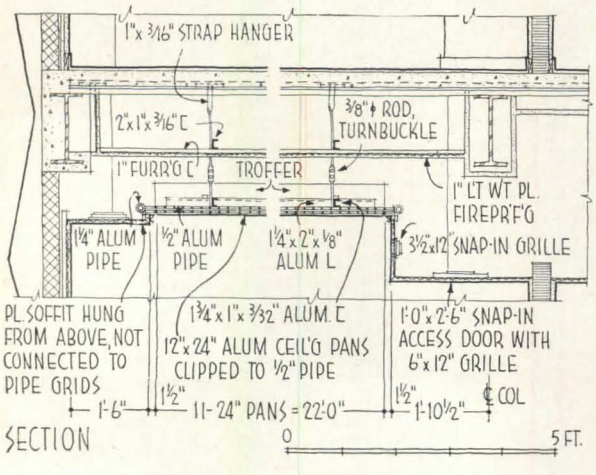


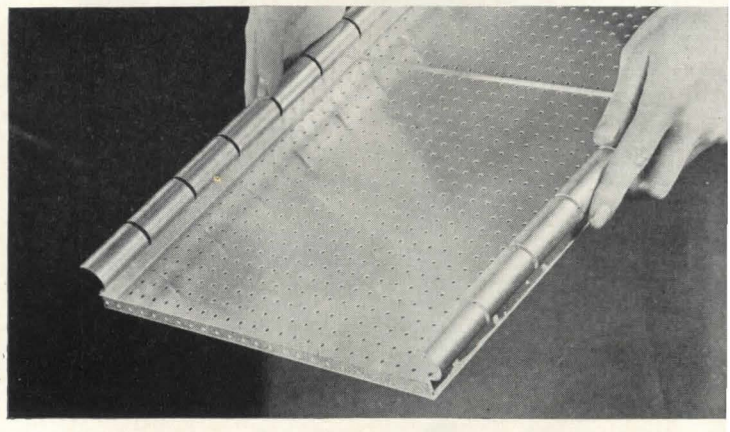


Four and one-half story entrance lobby is suspended from two huge cantilever beams at fifth floor level (above left). The tall aluminum glazed framing members (above) will hold lights of double-glazed plate glass similar to sketch, left

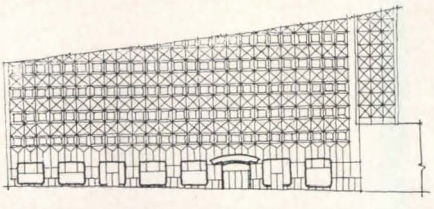
---

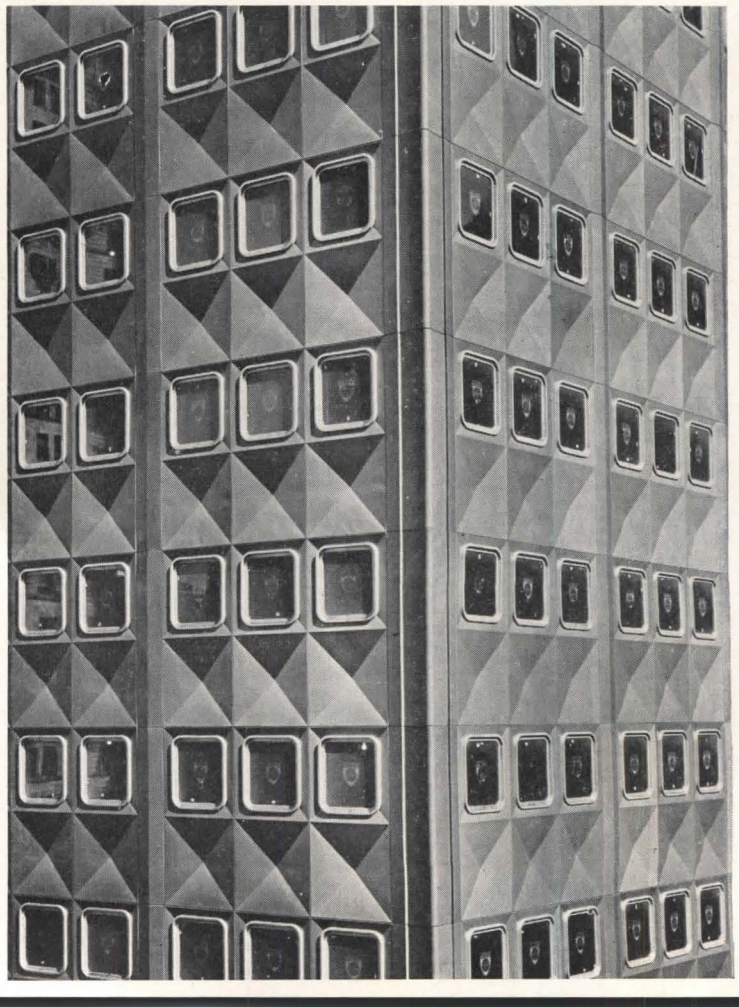
Labor-saving devices were developed and used throughout the project. Typical is tool (right) for fastening special aluminum ceiling panels directly to heating and cooling coils. A glass fiber blanket is placed above coils for acoustical insulation. Photos and sketches, far right, show details of ceiling panels. Windows have pockets for aluminum blinds

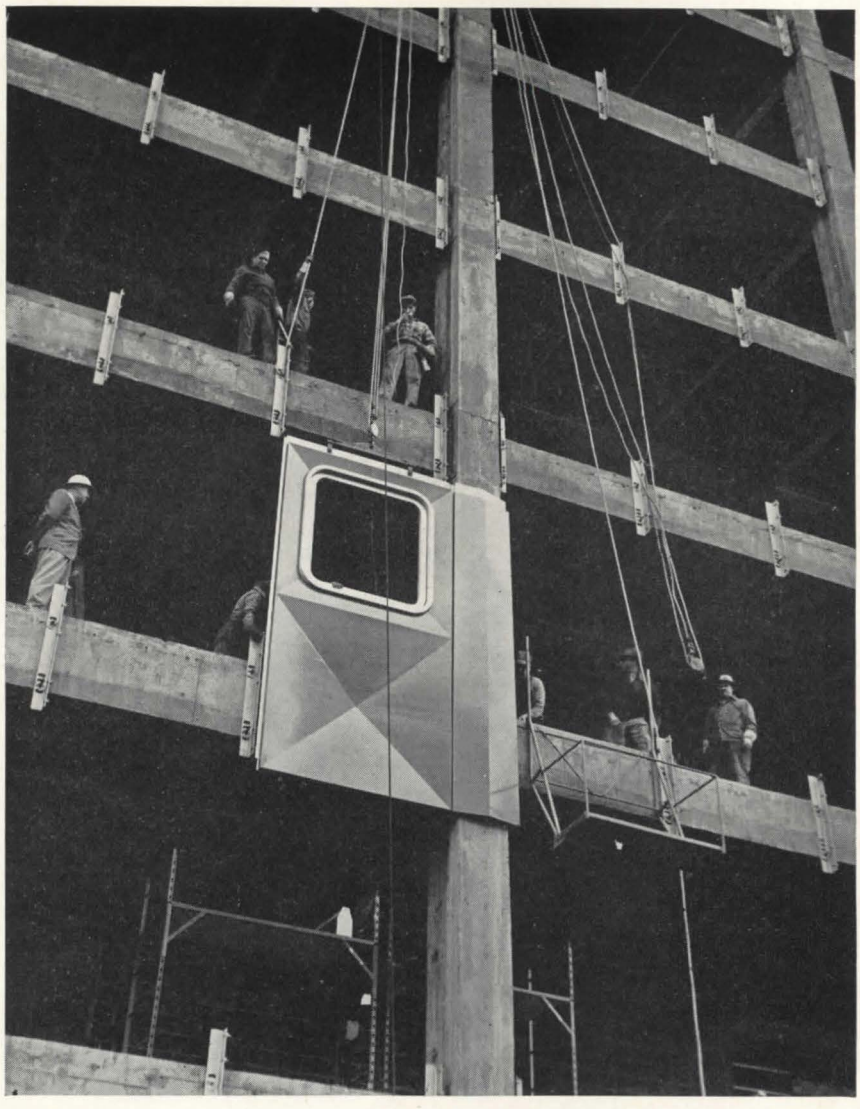


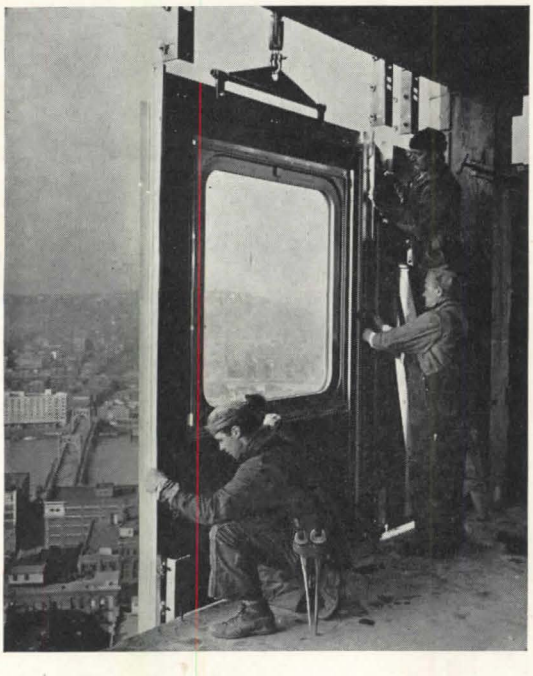


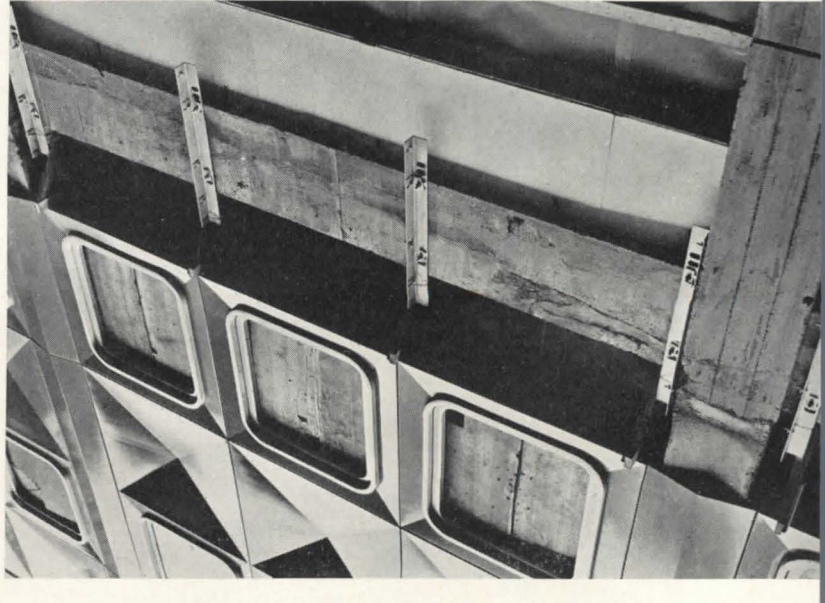
Opposite page: erection of stamped aluminum exterior panels. These are backed by aluminum lath (above) and lightweight concrete. Special windows are double glazed, with heat resisting exterior panes, are reversible for cleaning, and are sealed with pneumatic synthetic-rubber tubes around edges. Sketch shows lower floor fenestration

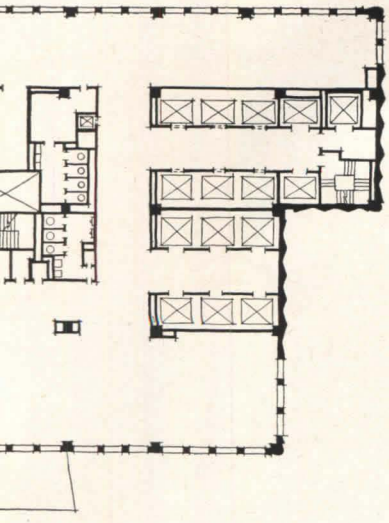


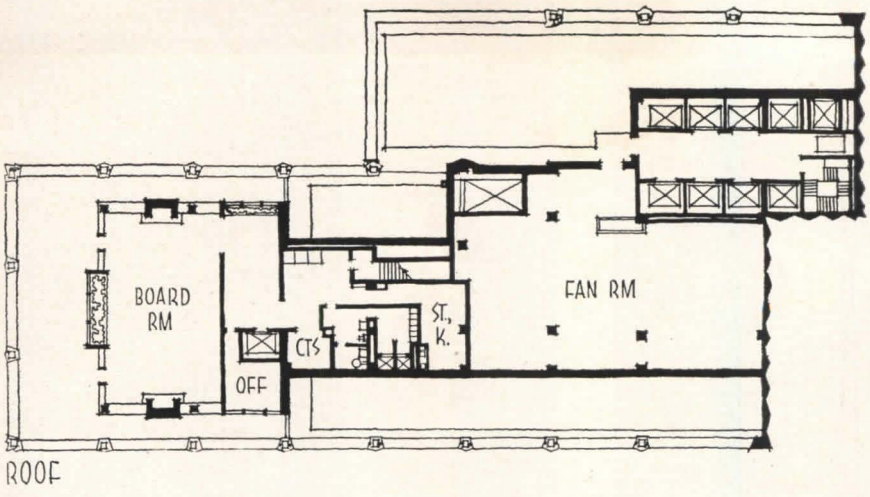






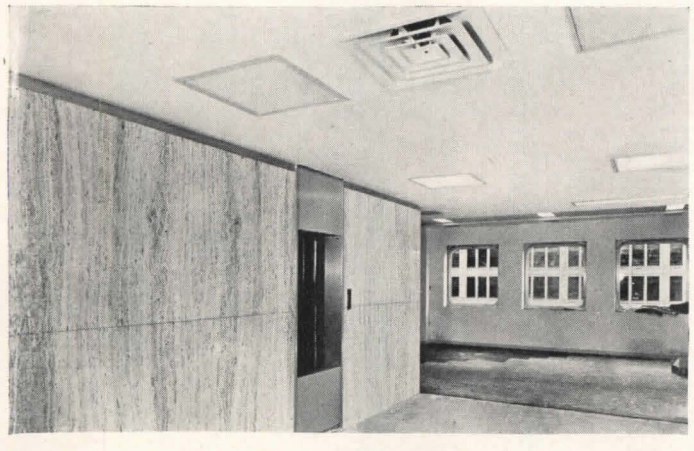


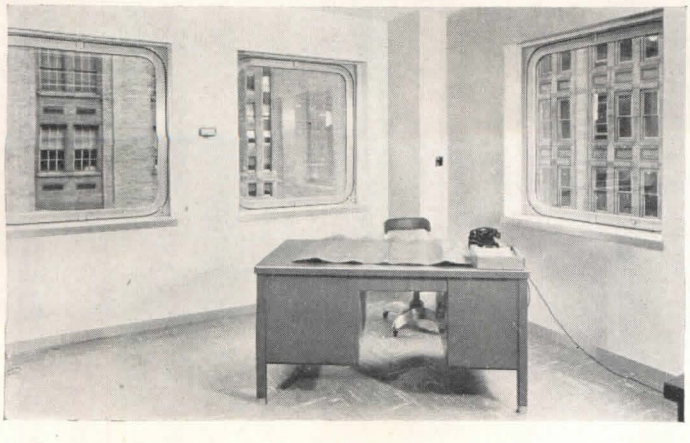


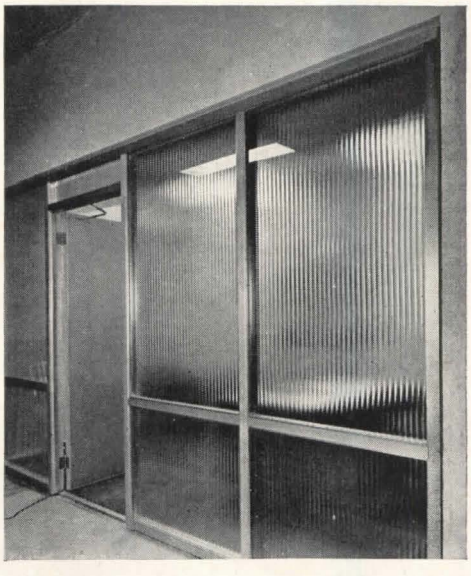


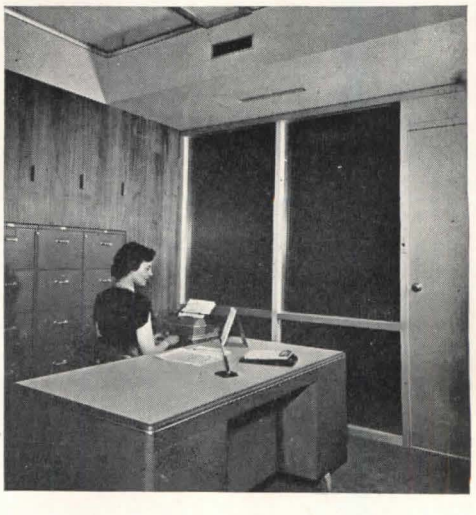
ROOF

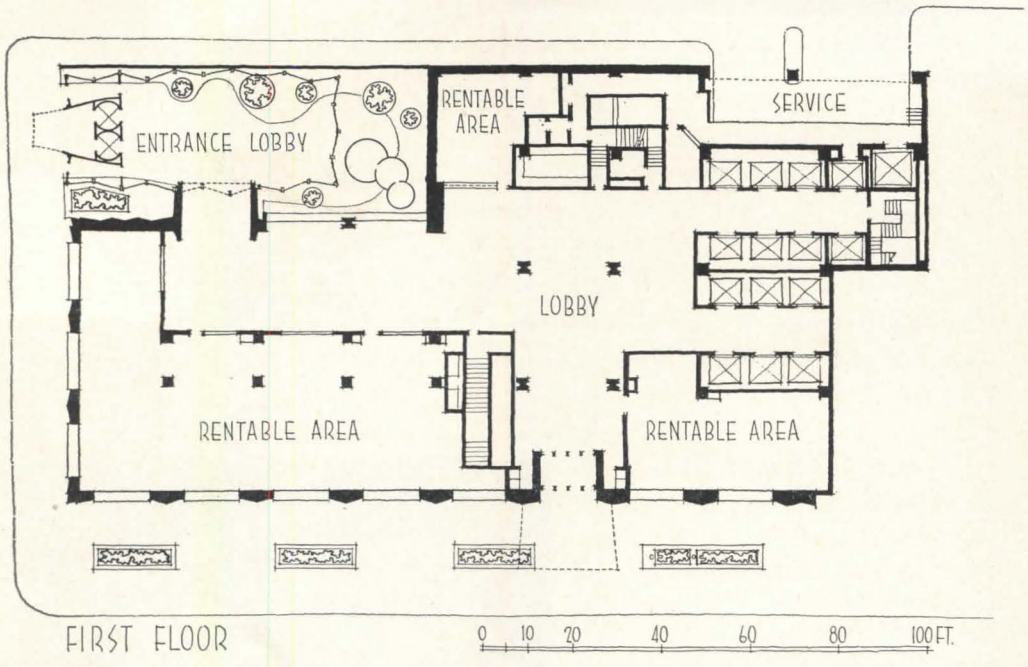
Building plan shape was calculated to give maximum number of outside offices (see fifth floor plan above center). Photos at right show mock-ups of typical offices; below, present stage of interiors



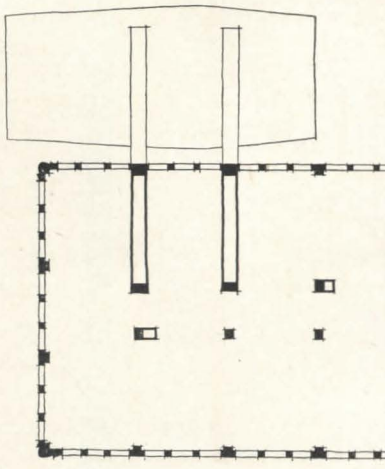




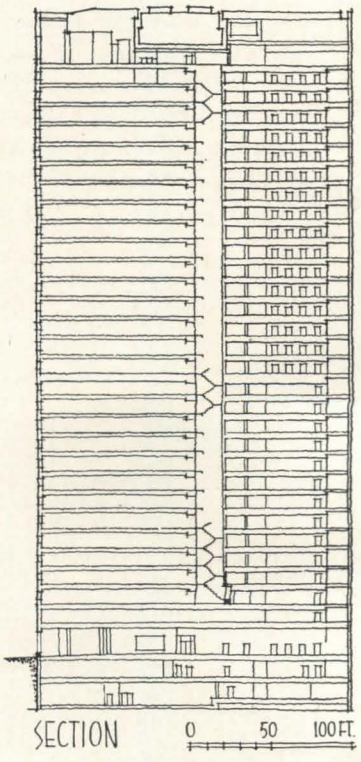




FIRST FLOOR 0 10 20 40 60 80 100 FT.



The building is 30 stories high, plus a penthouse and two basements. The lower five floors are for rental; Alcoa will occupy the rest. Mechanical equipment is located in sub-basement, 14th floor and penthouse; each floor has small utility core containing fan room, electrical equipment, fire stairs, wash rooms, dumbwaiters for mail distribution



SECTION 0 50 100 FT.

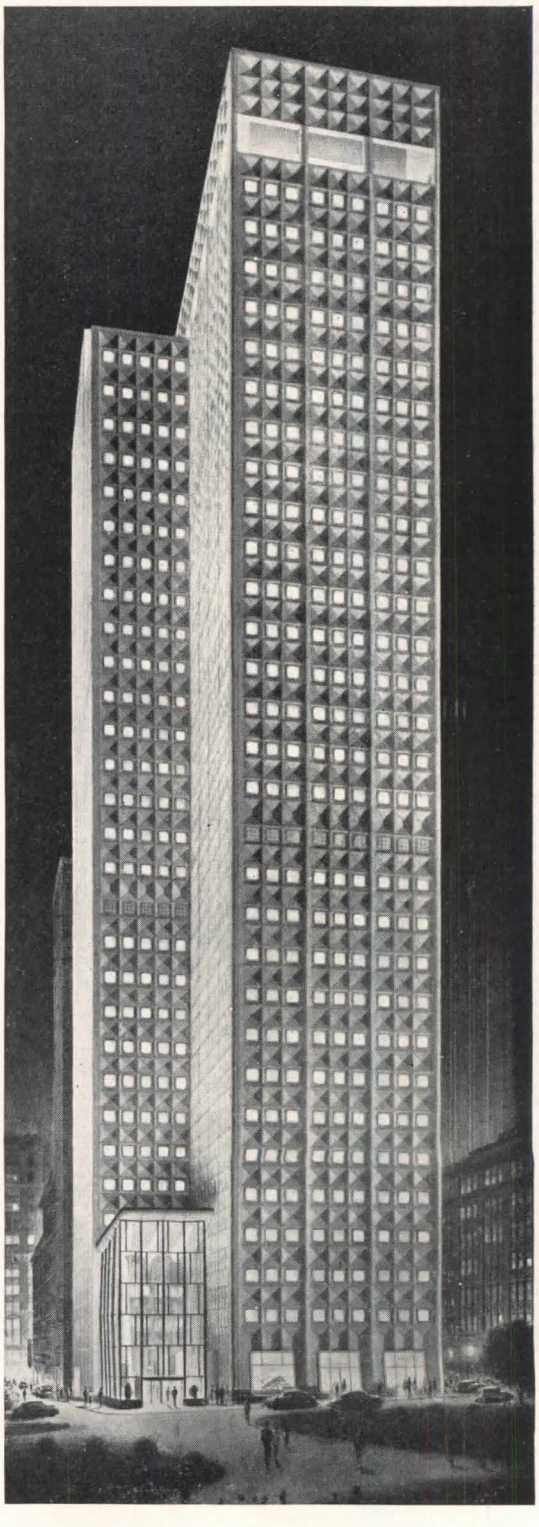
ALCOA BUILDING: INNOVATIONS IN ALUMINUM

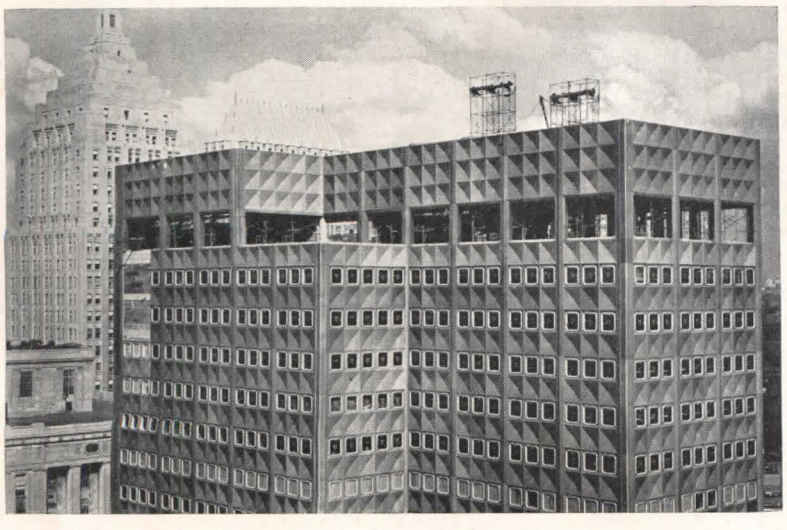
Harrison & Abramovitz, Architects
Mitchell & Ritchey and Altenhof & Bown, Associate Architects
Edwards & Hjorth, Consulting Structural Engineers
Jaros, Baum & Bolles, Consulting Mechanical Engineers
Edward E. Ashley, Consulting Electrical Engineer
Moran, Proctor, Mueser & Rutledge, Consultants on Foundations
George A. Fuller Co., General Contractor

THIS ALUMINUM TOWER, now nearing completion in Pittsburgh's famed Golden Triangle, has proved an unusual opportunity for its team of architects, engineers, builders and owners to experiment with new ideas, materials and methods in such a large project.

In addition to housing its now-scattered Pittsburgh offices, the Aluminum Company of America expressly wished the building to serve as a demonstration of both standard and new uses of aluminum in construction. The result, after several years of study and revision, is the lightest-weight building of its size to date and incorporates a great number of new developments. The structural steel frame is fireproofed with foam concrete, which was also used for floor slabs in the mechanical core areas. The remainder of the flooring is of cellular steel panels surfaced with concrete fill and plastic tile or carpet, and fireproofed beneath with perlite-plaster.

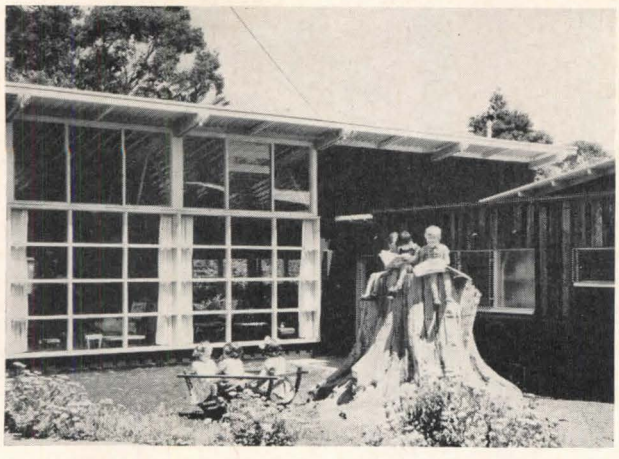
Exterior walls are thin, stamped aluminum panels bolted to angles on the spandrel beams, and backed up with 4 in. of perlite-concrete sprayed on slotted aluminum lath and reinforcing bars. Ceilings are aluminum radiant heating and cooling panels designed to provide all the winter heating and half of the summertime sensible cooling. Air for ventilation and the rest of the cooling is distributed through aluminum ducts to ceiling diffusers. All electrical wiring, conduit and sector busses, and most piping are also of aluminum.

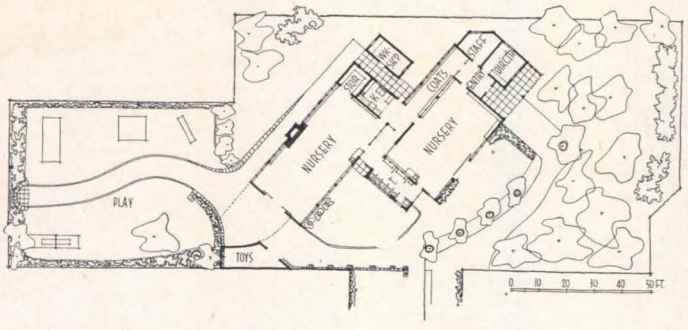


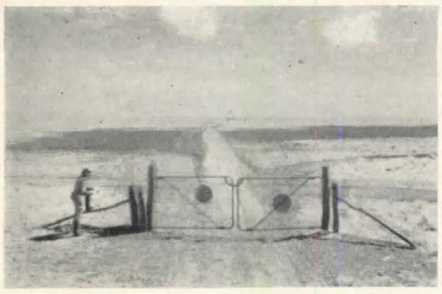


Robert Cochran Free Kindergarten, Auburn, Victoria

H. J. Tribe, Architect







AUSTRALIAN ARCHITECTURE

by John Ely Burchard

ing houses were evolving out of the Colonial tradition appropriately modified for the climate. In wet and chilly Tasmania, houses still without central heating were built without verandahs for there is little need for sun shade there. Farther north in Sydney verandahs were added to the traditional Georgian on the sunny side. Some shaded area with a breeze was needed for the summer. The verandah soon passed into tradition and then was widely used without regard to its function and simply as the proper façade of a respectable house regardless of its orientation.

Still farther north, in Queensland, where it was really hot, the verandah was carried around three and sometimes all four sides and the houses were raised on stilts. These verandahs were not for sitting out but to shade the walls. The stilts provided good air circulation underneath, kept the house from being flooded in the spring, brought the termite tunnels out in the open where they could be destroyed, and in a blizzard-free country offered inexpensive storage space.

All this was a good and indigenous architecture but Australia has always looked too much outside her borders for inspiration.[9] In a tragic moment in the thirties subdividers discovered the Central European curved corner, the corner window and the cantilevered sun shade. The standard contemporary house has forgotten its tradition although its plan is unchanged. For this still sensible tradition the builders have substituted an outmoded European fad designed for a different climate. This fad makes no sense at all. Save for a few examples like those in the portfolio the various movements of modern architecture, much diluted by English restraint, have washed aimlessly over Australia with no advantage to anybody.

Only two other milestones need to be mentioned. At the turn of the century the several states of Australia became a nation with a new national capital at Canberra, in the highlands of New South Wales. In 1911 a great international competition was held for the planning of the new city. This competition was boycotted by the official British architectural organizations and was won by the American Walter Burley Griffin in a close race with Eliel Saarinen.

Griffin is little remembered in America but has a firm hold on the architectural memory of Australia. A disciple of Frank Lloyd Wright, he produced a city plan which would need an article to describe. The plan still controls the development of Canberra. But he also built houses and Newman College at the University of Melbourne and a magnificent plaster extravaganza of a theatre, the Capitol, in Melbourne. In Sydney his houses of Castlecrag might have influenced Australian architecture enormously but in fact did not. Like those of many another pioneer, his roofs were said to leak. That the roofs of unimaginative architects also leak never seems to be remembered.

Finally, what did the Australians do with their brave new capital? They immediately set about building Houses of Parliament, Patent Offices, a hotel or two, some shops and a good deal of housing. But the official buildings were not to be the fine ones which would appear some day "when the crisis was over." Australian budget makers do not like to call their buildings temporary. This sounds too cheap. So they call them "provisional." This is really worse since a provisional building need be no better than a temporary one but will last longer. Only an inadequate and trivial library building and a large National War Memorial are permanent buildings in Canberra — those and the United States Embassy. And here hangs the final tale.

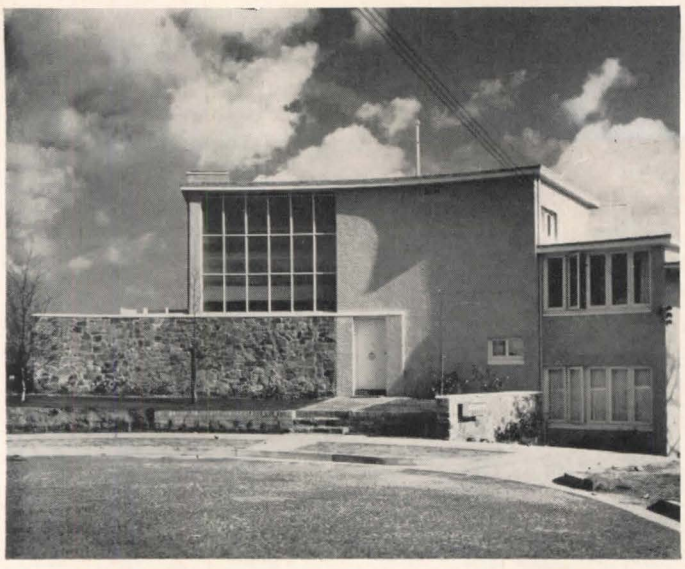
The United States has an eminent site for its Australian embassy. There we have built an expensive house. It sits in the middle of the beautiful and special Australian climate and landscape, up on a hill for all to see. Here we had a chance to show Australians what building for their climate could be like today. Any one of a dozen Pacific Coast architects could have made this demonstration. Instead of that, ten thousand miles west, five thousand miles south and two thousand feet higher above sea level, not on the misty James but on the dry Australian veldt, we presented to Australia a modest imitation of Williamsburg. The worst of it is that lots of them like it.

What of the present? After a fast start in the thirties there has been very little modern architecture in Australia. The portfolio shows what it is like. Every Australian city of any size has one or more hospitals of the first class measured by any architectural standard, buildings which dominate the towns just as cathedrals did in the days of yore. In an interesting way they seem to be reflections of the great proposals made many years ago by Paul Nelson in his Cité Hôpitalière de Lille.

The other distinguished architecture is to be found in institutions as small as the hospitals are large.

(*Continued on page 216*)

[9] *This was not, of course, limited to architecture but turns up in all the arts. Australian painters painted the Australian landscape for many years with great skill but as though it were in Kent or on the banks of the Seine without any eucalyptus trees at all. Only in the late 19th century did Australian painters like Roberts, Streeton and Heyson notice the gum-tree. Since then the best painting has still been related to the landscape, representational not abstract. The best current painters are clearly Drysdale, Dobell and Nolan. Each works with the landscape and the people in a documentary way. But to many Australians who are persistently romantic (like cowboys in Wyoming) these painters are in some strange way "betraying" Australia. Neither these old paintings, nor the new school of aboriginal painters nor the tepid Australian abstractions have had any consequential influence on Australian architecture.*

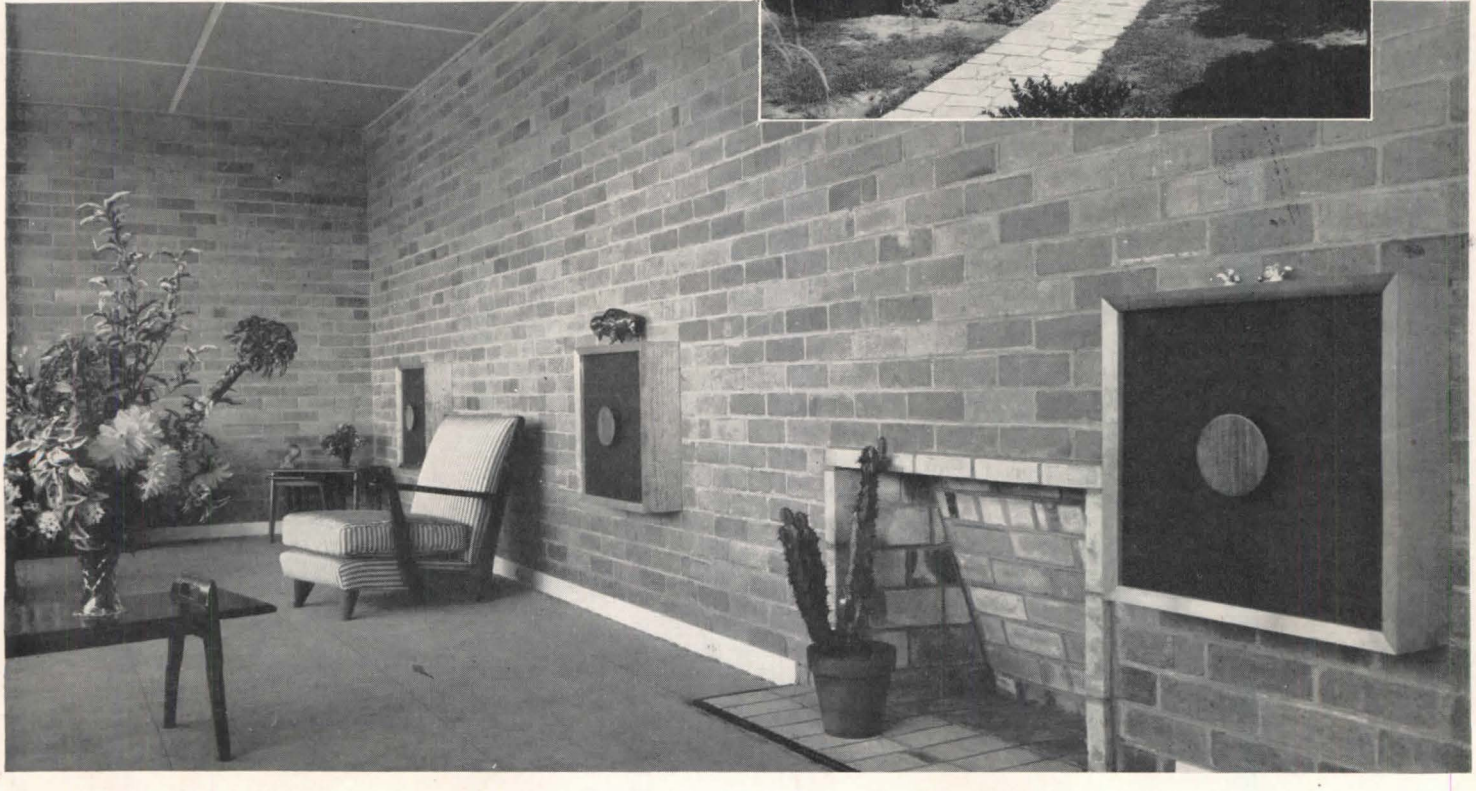


Flats at Glover Court, Melbourne

Roy Grounds, Architect

House at Kew near Melbourne

F. R. Bell, K. H. Petheridge, Robin Boyd, Architects

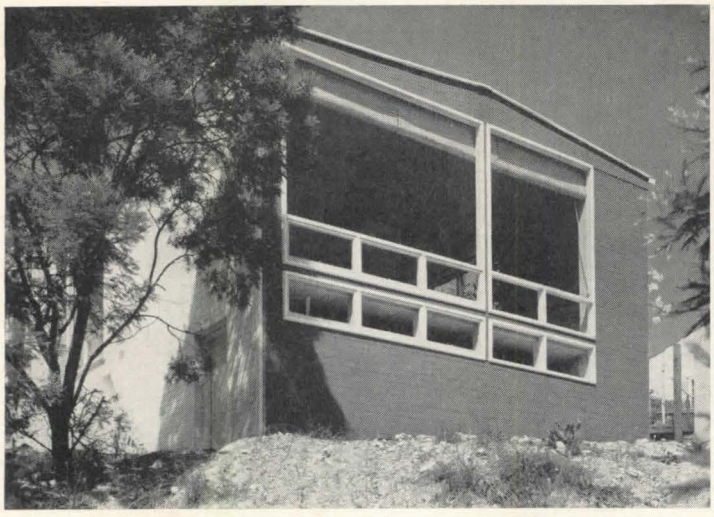


AUSTRALIAN ARCHITECTURE

by John Ely Burchard

House at Studley Park, Melbourne

John and Phyllis Murphy, Architects

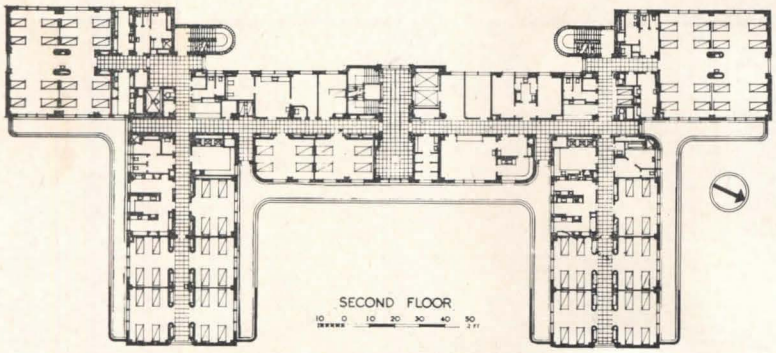


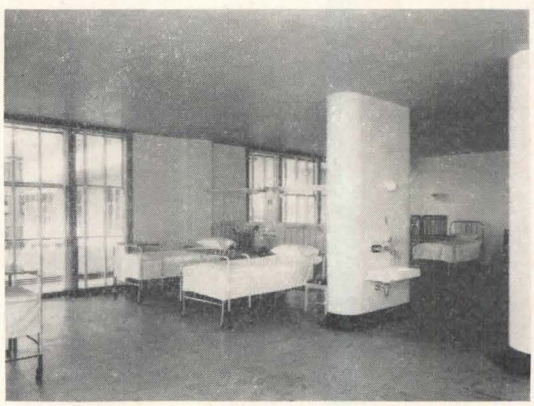
Suburban House at Sydney

Harry Seidler, Architect

King George V Memorial Hospital for Mothers and Babies, Royal Prince Alfred Hospital, Sydney

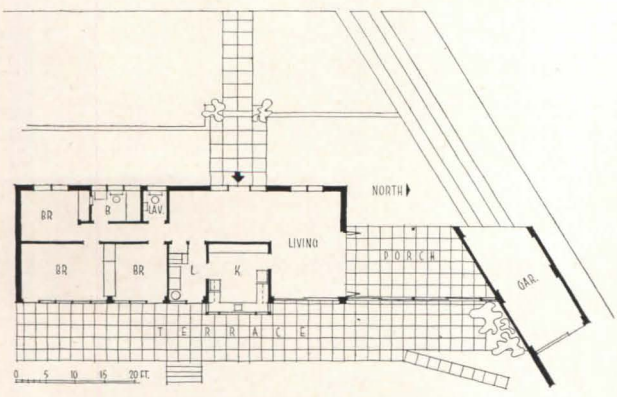
Stephenson & Turner, Architects

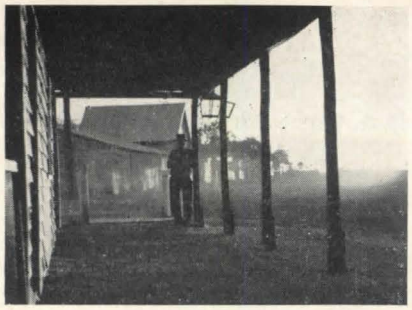




House at Killara, near Sydney

Sydney Ancher, Architect





AUSTRALIAN ARCHITECTURE

by John Ely Burchard

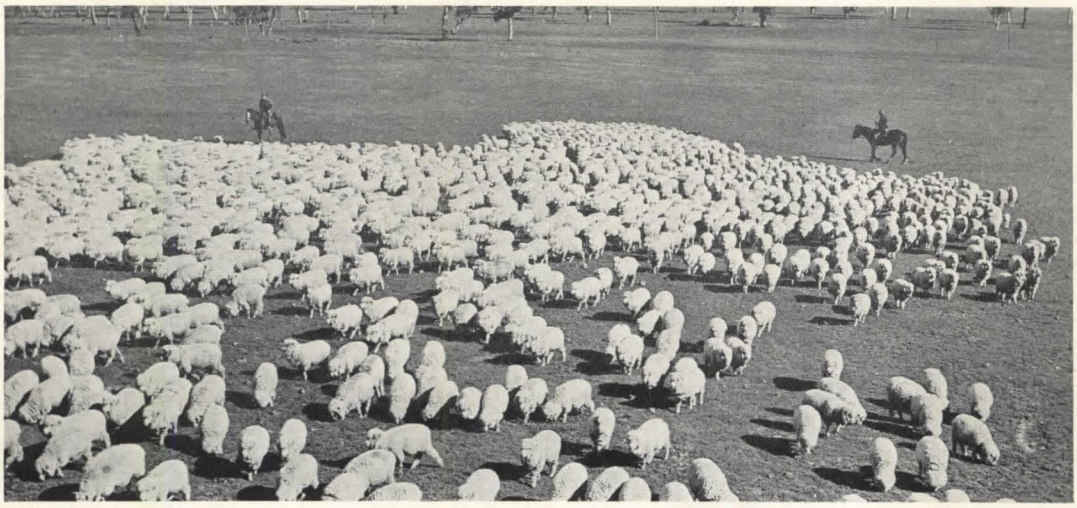
him Government Architect at a salary of three shillings a day. He was emancipated in 1817. The hand of Greenway was everywhere. He worked on proposals for squares, houses, parks, churches, law courts. Of these he realized but few, yet the Hyde Park Barracks, the Macquarie Tower and Lighthouse, St. James's Church in Sydney and St. Matthew's in Windsor offer the finest architecture in Australia. They are reasonably compared with Bulfinch's work in America.

"Everything he touches is simple, stately and good. His architecture, now called 'Colonial,' is a transition from the Georgian architecture developed in England with modifications to suit the Australian climate. Verandahs supported on light wooden posts are added to provide an outdoor escape from stuffy interiors, to shade the walls from the hot sun in the summer months and as protection against sudden rains. The economy of materials, caused by circumstances, enforces a simplicity and a dependence on good proportion and design which becomes a characteristic of the style. It is an architecture of fine craftsmanship; the beauty of brick and stone in shade and shadow, of spacious open settings amid trees and sunlight." [7]

This could not last for long. A commissioner was sent out from England to find out why such fine buildings should be created in an "insecure" colony. The commissioner, like many public servants since, stopped work on the town hall, rejected most of the architect's proposals, said that "common sheds on pillars of wood are quite good enough for a Colony like this." This was the beginning of the end. Macquarie was recalled for his extravagance; Greenway had no more commissions and died in oblivion. Several of his buildings remain to be admired in old Sydney.

This Greenway experience too may be symbolic. It is a long time since Australia has built an extravagant or distinguished building. "Common sheds on pillars of wood," if now of brick, seem to too many legislators quite good enough for a nation in so precarious a position.[8]

The other high points can be dismissed more summarily. A little later Colonel Light, first Surveyor-General of South Australia, made the notable plan of Adelaide which though long since outgrown has no doubt preserved for this city some of its distinguished character. In 1850–60 the gold rush brought new prosperity to Australia. But her gold-rush towns had elegance and have since not sunk back into ghosts. Little cities like Castelmaine or larger ones like Ballarat or Bendigo, all in Victoria, achieved a remarkable urbanity. So it was on Collins Street in Melbourne, along the North Terrace of Adelaide, on George Street in Brisbane. Railroad stations, town halls, post-offices, libraries and galleries together with inevitable statues of Queen Victoria all testified to the richness of this new land and to the confidence Australians had in their future. The buildings of this time are of almost uniform elegance. They are to be sure in the idiom of mid-nineteenth-century London but the important thing is that they were courageous, that Australians were building more extravagantly than common sense said they ought. This probably was the high tide of Australian architectural daring. It would be good to see more of it now.



At the same time anonymous and indigenous dwell-

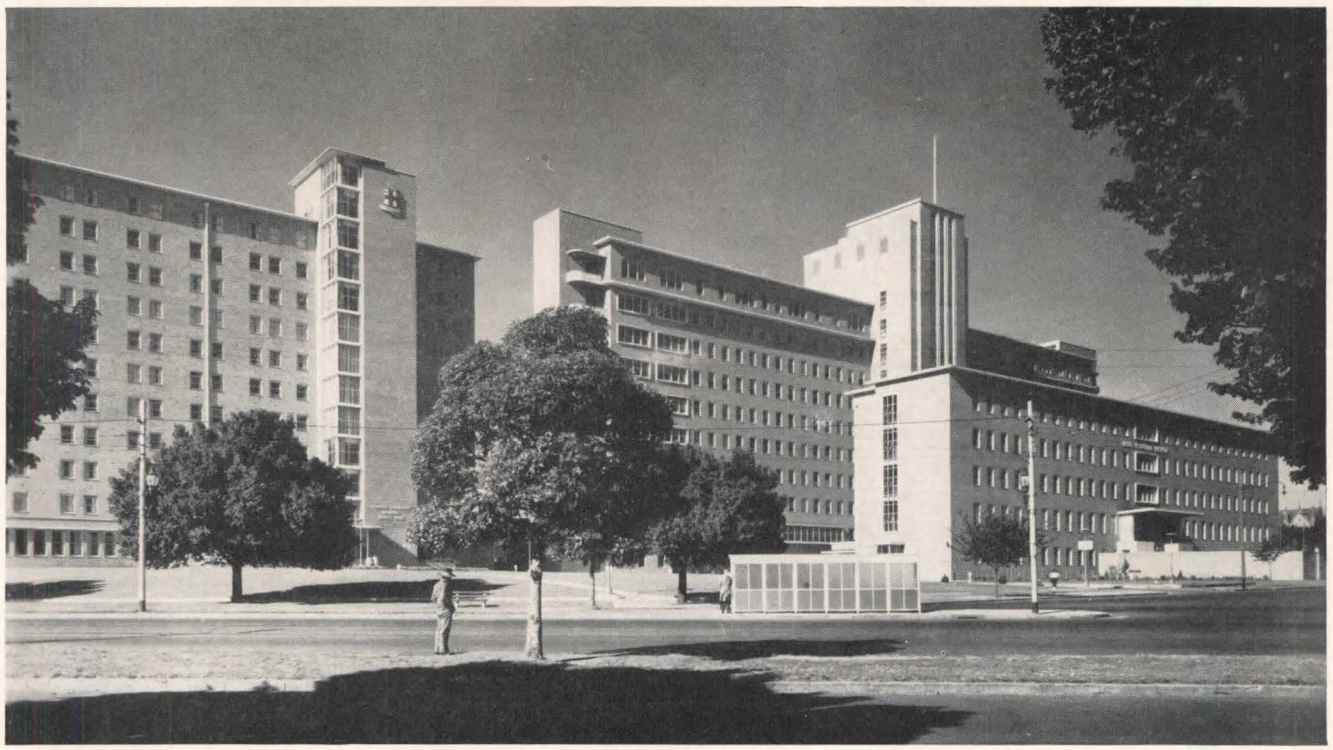
(*Continued on page 118*)

[7] *Op.cit., p. 17.*

[8] *Probably the only recent exception is the Library of New South Wales which though cast in an antique mold has several elements of distinction.*

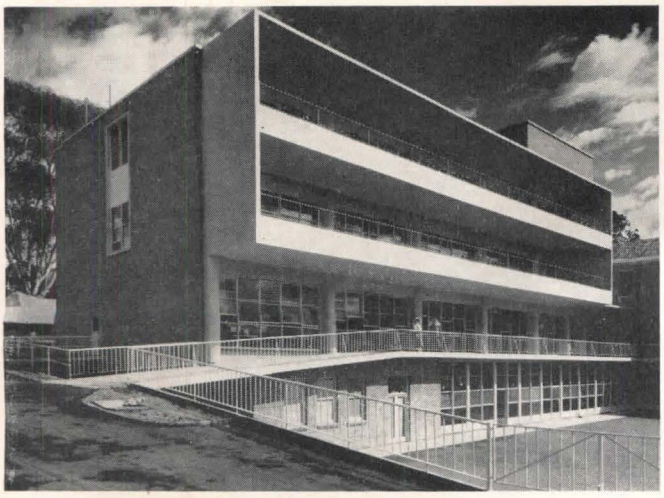
Royal Melbourne Hospital, Melbourne, Victoria

Stephenson & Turner, Architects



New Children's Block, Austin Hospital, Heidelberg, Melbourne

Yuncken, Freeman Brothers, Griffiths and Simpson, Architects



Parklands Maisonettes, Melbourne

Office of Frederick Romberg, Architects

AUSTRALIAN ARCHITECTURE

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squalid. And hardly anyone worries at all about the ugliness.

Mediterranean people, building a Lisbon or a hill town of Italy, on an equally disorganized principle, never affront the landscape with their individualism. English-speaking peoples usually fail the same test. The back-sides of San Francisco or Chicago are no more elegant, probably worse than the back-sides of Sydney or Melbourne, but the big moments of the American cities are finer; the range from marvelous to awful is longer at both ends. This is probably because we have simmered in the melting pot about which Australians are still dubious.

And when Australians set out deliberately to make beauty they sometimes come out very badly. Countryside they understand. Every city has a large botanical garden of magnificent scale and effect. They are conscientious and intelligent gardeners and, abetted by a benign climate, grow magnificent flowers. But when they arrange them the results are likely to be stiff and banal, like those of a late nineteenth-century British still-life painting. Their recent buildings have come off rather better when they have not sought too hard to be fine.

Finally, the Australians for whatever reason are committed to a philosophy of egalitarianism which is quite different from equality of opportunity and which can have disastrous results for aesthetics. Australians, like the rest of us, but in an aggravated form, have always been suspicious of "great" men or "great" things and consistently try to bring them down to size.

Now we may talk all we want to about the dignity of the universal standard and in theory something might be accomplished if the standard is pushed high enough — but there is nothing yet written in the history of art or architecture which says the average standard can ever be high enough. Aspirations require something to look up to and to aspire for. When these things are the result of human creation, it means that some individuals with more courage and imagination than the rest of us have planted too high up on peaks extravagant banners for us to try to grasp. But *Excelsior* would not be a popular poem in present-day Australia.

The result of this is as follows. There is no city in Australia which would permit its streets to be so desecrated by hustings and neon as Piccadilly Circus or that greatest honky-tonk in the world, mid-town Broadway. There is no city in Australia whose in-town beaches will not be free of commercial concessions, neat and clean and fundamentally attractive, in contrast to their opposite numbers here. But by the same token the outlying beaches are no more distinguished than the in-town ones. The continuously stretching suburbs become more and more alike, whether they run over the plains of Colonel Light's Adelaide or up and down the hills of Sydney and Hobart. Both of these magnificent natural surroundings are rapidly being run over by the plasmodium of indifferent architecture.

There are not many landmarks in Australian architectural tradition but the few are significant. The first was set at the beginning of the colony. It is almost allegorical.

Nine hundred people landed in Sydney Cove a year before Washington was elected President of the United States. Seven hundred of these were transported convicts, two hundred guardian marines under Captain Phillip. The convicts were an ill-assorted lot. Many were aged or infirm; there were six men to every woman; there were no agriculturists, no teachers, few carpenters; some were idiots.[6]

On unpromising land and with these unpromising workers progress was at first very slow. Lime could be had only by burning sea shells. Other building materials were as hard to get. At the end of a year four wooden huts had been put together for the officers and a wooden house for the Governor "in the Italian style with a colonnade." Yet Captain Phillip was already making a town plan, visualizing a near day when streets would be two hundred feet wide, lots would be amply zoned, there would be no mean and airless alleys, the structures would be of stone.

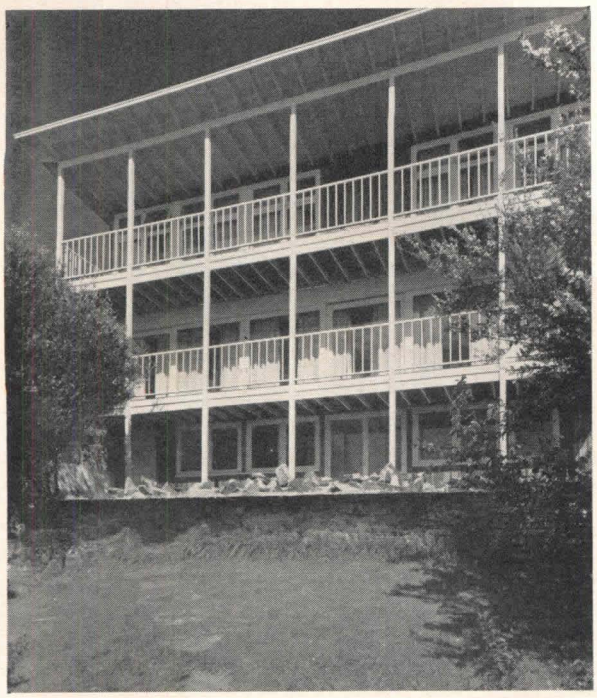
The allegory is that the plan was never realized. Food supplies and other imports from Britain ran short. Faced with starvation and drought, the settlers found the grand plan nothing but academic. Existing huts could not be torn down to make room for the new boulevards since there were not enough roofs as it was. So the street layout grew irregularly, and Sydney never again found order for its growth.

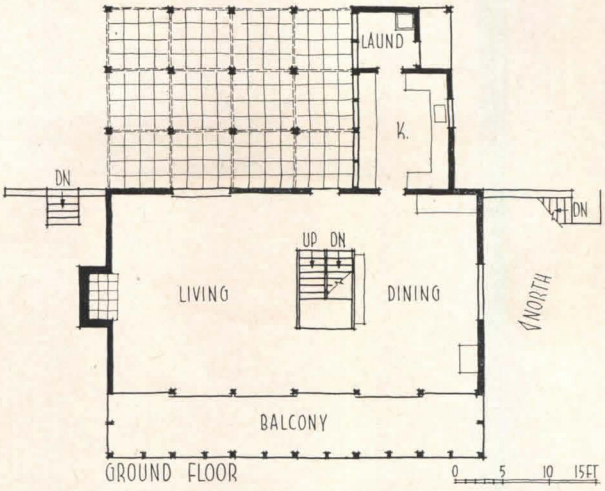
Australia's first plan was not executed because of a crisis in housing. Nearly two centuries later, a crisis in housing is still preventing any nobility of architectural development. Crisis may be chronic in Australia.

Then, beginning in 1814, there was a brief moment of architectural grandeur, created by the genius of Francis Greenway under the sponsorship of Governor Lachlan Macquarie.

Greenway was characteristic of his age. He was an architect of moderate fame in an England which had a noble Georgian tradition. Engaged in litigation over a fee, he presented a letter purporting to bear his client's signature. The court found it a forgery. Some say that this was at the behest of the Governor, some say by accident. Anyway, the Governor appointed

[6] *An excellent brief account of these matters may be found in "Homes in the Sun" by Walter Bunning, W. J. Nesbit, Sydney, 1945, to which I owe much of my history.*





"Iluka" Residence at Beleura Hill

Roy Grounds, Architect, in association with Mussen, MacKay, Mirams & Potter

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House at Palm Beach, Sydney

Bunning and Madden, Architects

through their grandchildren. So though they have developed one of the highest physical standards of living in the world,[5] they will pay only so much for it. Then they go and play on the beach. We call this lazy. It may be sensible. But their conflict of desires is real and unresolved. They are neither Fijians nor Babbitts.

It is entirely possible that, for a people like this, architecture is not the most important thing in the world. Buildings may take on less importance from their point of view.

The general architectural taste of Australia is best described by saying it is lower-middle-class British suburban. Up and down the city hills they march, the little semi-detached villas of Mr. Pooter, each with a hedge clipped assiduously into an extraordinary shape. En masse they are plainly ugly but they are never

[5] *Third largest number of automobiles per capita; second best health record; highest percentage of population receiving higher education; probably greatest number of air miles per capita, etc., etc. Transportation is efficient, food plentiful, clothing good, hospitals extraordinary.*

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some stone. There is plaster. There is steel. There are brick and tile (and paint to cover them with). It is not material resources which hold Australian architecture back. There are more materials now in Australia than Australia's best architect, Francis Greenway, had to use in 1810.

This brings us to the *mores*. What kind of people are the Australians, anyway? How does what they are affect their architecture?

Essentially all are white; more limiting, almost all are English, Scotch, Irish or Welsh. There has been very little nonsense in Australia about mixing in Mediterranean or other bloods. To be sure, there are a few Germans in South Australia and they have turned out all right. Even now under the new immigration scheme British people are preferred, then Americans and people from the other Commonwealth nations (we seem in a strange way still to be a Crown Colony), and so it goes down the list. There is no objection to French or Italian people but perhaps there had better not be too many of them. And certainly there must be no Asiatics at all.[4]

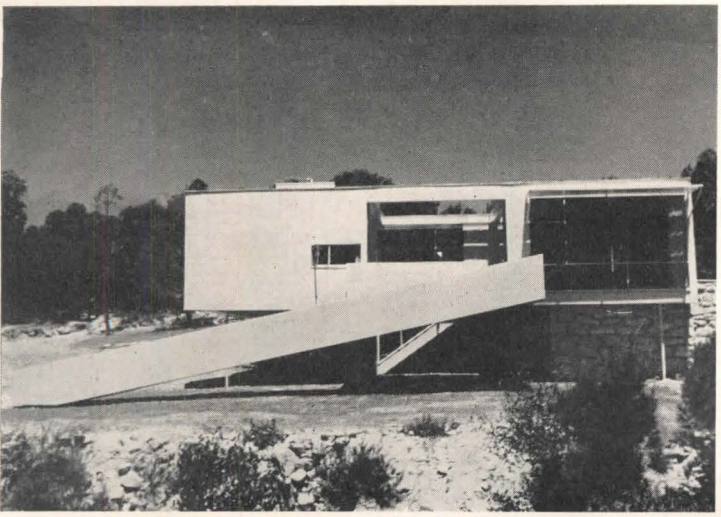
Since the 50,000 indigenous aboriginals and the handful of Asiatic immigrants have had a negligible influence, the European whites and really the English colonials have had the freest of free hands in this land. What manner of men were they? The colonization of Australia began in 1788. It began with convicts but these convicts of 1788 were by no means all or even largely criminals in the contemporary sense. They were not unlike the few hundreds King James sent to Virginia soon after the founding of that colony, or the thousands who came to Georgia until the American Revolution begat Australia by closing the penal colonies of America. Transportation stopped a hundred years ago. The small population of Australia was at that time not more than half convict. The dilution of the original convict settlers is by now extreme. Today it would be hard to ferret out this ancestry among one's Australian friends and not significant to try.

It is significant that few people sought Australia for any freedom save economic. It is still more significant that Australians rather like being Colonials. Fourth and fifth generation Australians who have never left their country still talk of England as "home." English ways of preparing food, English tea habits, English traditions of building and of taste, or lack of it, are clearly dominant. Australian aesthetic, developed on an entirely different terrain, in an entirely different climate from that of the homeland, remains a diluted version of what is acceptable at home.

This is almost but not literally true. Australians *are* different from Englishmen who stayed at home. They are more reckless, they are freer in speech and dress and in a few ideas, but intellectually are more conservative and far less imaginative. They like to think of themselves as being more like Americans and in a few respects they are. American culture has left some impress, too. But not enough — and not the right impress. It is our get-up-and-go they should emulate and not what we have done by getting up and going.

There is an important way in which Australians are different from the other English-speaking peoples. More than any of the rest of us they like their outdoors and their surf-drowned beaches and their glowing sun. They want the physical goods of modern technology but they are not prepared to live in a grubby desperation, in a rat race of effort, to achieve these physical goods. Free time has a value for them. They want to live now and not hundreds of years hence; themselves, not vicariously

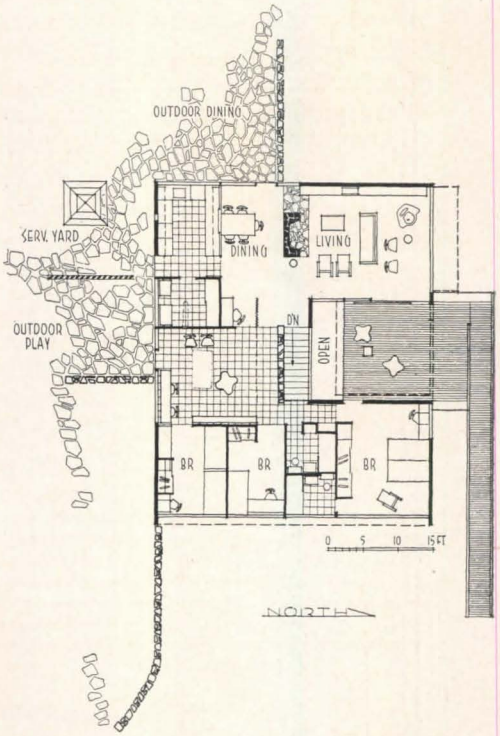
[4] *White supremacy dies hard in a pukka dominion. The Australians fear that Asiatics would breed faster and soon dominate the population. Perhaps unconsciously they also fear, like the Californians, the greater enterprise of the Japanese on the land. The policy has its ironies since the policy surely rouses resentment among the Asiatics; and since there is nothing that would do Australian architecture more good than a stout infusion of topflight Japanese taste.*

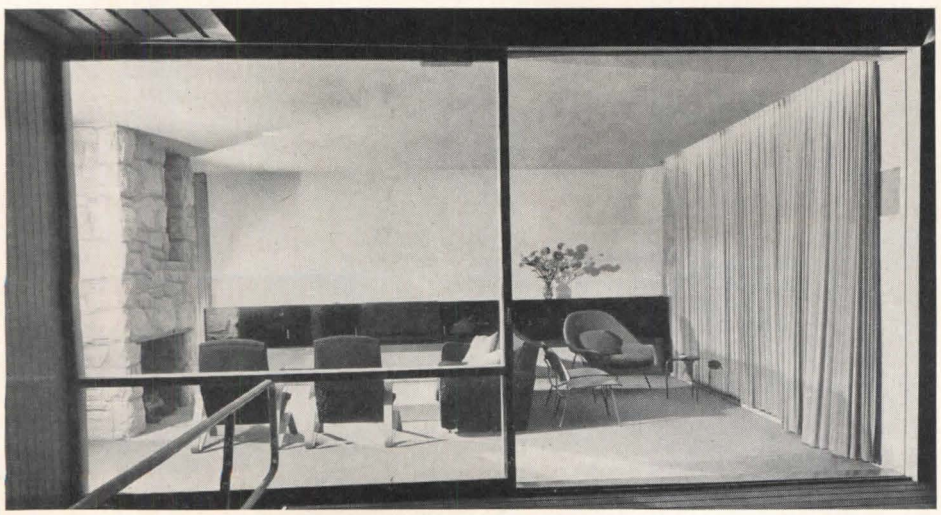


Suburban House in Sydney

Harry Seidler, Architect

Marcell Seidler photos





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borrow from, no Big Thompson to divert through the mountains to the irrigable lands. The population here is sparse. There are some good station properties but this section also has not affected the course of Australian architecture.

Thus our architectural map like all the others will have its green areas on the east, south and west peripheries. Architecture naturally enough follows people.

There are eight million of these people now and almost all of them live on or near the seaboard. More than half of them are in six cities — bustling Brisbane (400,000) in the antipodal latitude of Tampa; smoky Newcastle (140,000) in the latitude of Charleston; ambitious Sydney (1,500,000) in the latitude of Los Angeles; amiable Perth (270,000) on the west coast, also in the latitude of Charleston but more Californian in its climate; civilized Adelaide (395,000) in the latitude of San Luis Obispo, and with much the same climate; sophisticated Melbourne (1,200,000) in the latitude of Norfolk. Across the Bass Strait there is little Tasmania with an English climate and a small population. At the bottom of Tasmania, in the latitude of Boston, is somnolent Hobart (80,000).[3]

Hobart and Sydney have two of the most spectacular harbors in the world. Brisbane, Melbourne, Adelaide and Perth are on handsome rivers each with its own character, the Brisbane, the Yarra, the Torrens and the Swan.

Thus it is the urban coast of Australia which has conditioned its architecture.

This coastal landscape, sometimes wrongly called monotonous, is in fact one of the most beautiful in the world. There is a great roll and swell to the land. There are dry seasons almost everywhere so that the ground will be California-brown part of the year. The blue but cloud-filled sky casts an ever-changing dust-free light, an amazing light, on the variform contours which because of their color are readily modeled. The trees, sometimes in clumps but often freestanding, have enormous structure easily revealed through diaphanous leafage. This is true whether they are the ubiquitous gums or the brilliant but less prevalent figs. The colored trunks, a muscular, sensuous gray for the fig, a gleaming white for the gum, white to the very finger tips of the tree, these trunks are things to look at. Even burned-over areas recover rapidly and have their own eerie power. All is at once soft and powerful, entrancing and frightening.

The palette is subtle and superficially serene. Most of the leaves are blue-gray, green-gray or dusty olive. Thus the prevailing tone of the landscape is brown, gold and gray. Stronger yellow notes are struck by clumps of blooming gorse, by graceful wattles, by delicate silky oaks. Sometimes there are accents of scarlet or vermilion furnished by spectacular coral or flame trees. There are purples of jacaranda, lilac, wisteria; or pinks of fruit trees. But these merely emphasize the prevailing palette. The water-colorist might leave his viridian at home, but he will need more ochre than he expects.

You would think that Australians who love this beautiful landscape would try to bring it into their houses through proper windows. But this has not seemed important to most of them.

You would think too that they would not like to affront this landscape with ugly red bricks, red or blue corrugated iron, mottled roof tiles or a stone with too busy veins. But they do not seem to mind.

It was not always thus. There are some fine colonial homesteads in quieter chroma. Australians had beautiful brick when they built the town hall of little Castlemaine, a gold-rush town of the seventies. They cut handsome timbers which could serve for something besides rafters, and have on occasion (but not often of late). Anyone acquainted with the white wood tradition of the Pacific Coast wonders why there is not more fine wooden architecture in Australia. When he asks, he gets the wrong answer. He may be told that there is not enough timber and that it is too hard to work or that it is too vulnerable to termites. Neither rationalization will hold water. The plain fact is that for Australians, wood as a material has less prestige than brick. The wood may be beautiful, the brick ugly, but the brick has the prestige anyway. This is partly because of cost, partly because of habit and British tradition, partly because a set of restrictive fire laws stretch into the suburbs. Anyway, what contemporary Californian architects might have been able to make with Australian woods on Australian hills can be seen only in the mind's eye.

If you show Australian architects the General Motors Laboratories by Saarinen, they will admire the building and then say, "But where could we get bricks like that?" At first you think this shows lack of imagination and energy and think that you, an American, would not long put up with such nonsense. Then you begin to come across the skeletons of people who have tried to be expediters in Australia. There is no doubt that a heavy hand is laid by what is acceptable, by what can be permitted in the "crisis," by legislation, and by custom. Then Australian brickmakers and bricklayers are simply unwilling to make something different. All this limits the materials which an Australian architect can use.

But the basic ones are still there. There is hand-

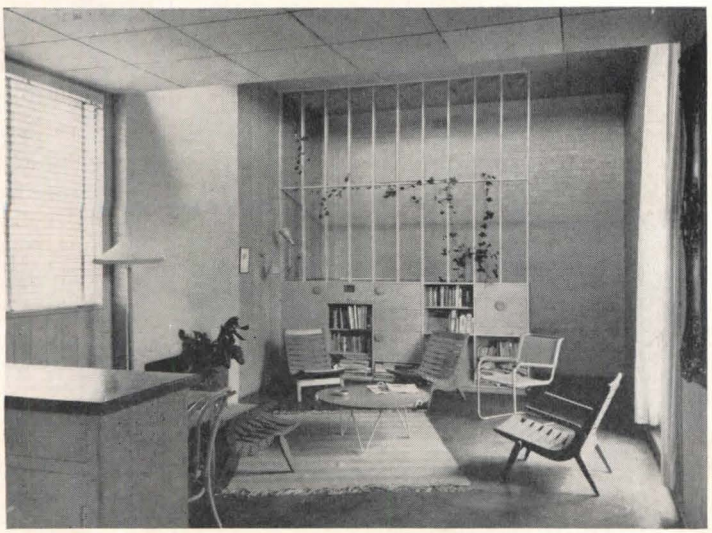
[3] *The density is 10/sq mi. New Zealand has 15, the U.S.A. 21, Europe (including U.S.S.R.) 120, U.K. 500. But there are a hundred million sheep, ten million beef cattle, and five million dairy cattle in Australia.*

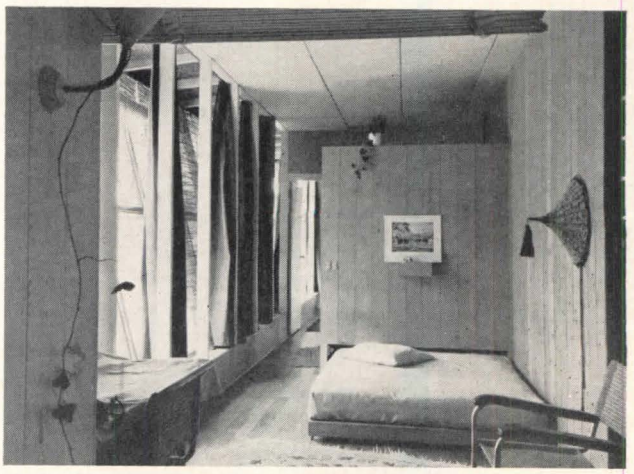
The Royal Hayman Hotel, Hayman Island, Great Barrier Reef

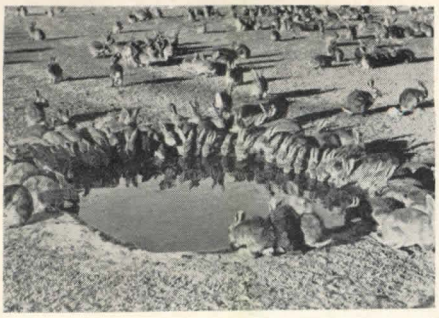
Guilford Bell, Architect

House at Camberwell, Melbourne

Robin Boyd, Architect







AUSTRALIAN ARCHITECTURE

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the South Pole and to the highest mountains but only in winter.

Endow this land with a liberal and beautiful cover of clouds but do not let them drop much rain. Let forty inches a year be a lot; let ten inches serve more than a third of the land.

You will have no permanent snow and your glaciers will have gone away long ago. The rain which falls on the eastern slopes of the mountains will run quick to the sea so there will be no important rivers there. Towards the west they will start powerfully enough. Let them waste themselves worrying through the desert limestones. Most of them will then go underground. One, the Murray, will survive and be the only important river on your continent. Even it will look like a tired Missouri before it deltas out into Encounter Bay on the south. Smooth the edges of this continent so that it has few inlets. Let the cliffs sometimes run down to the shore. Between these "heads" let the ocean carve long curving lunettes to hold fine sandy beaches. Provide a dozen majestic inlets to offer great natural harbors, harbors equal to any in the world. You have made Australia.

Imagine some maps of this land, each emphasizing one feature, the distribution for example of rainfall; or iron and coal; or wheat; or sheep or cattle or humans. Show the intensity of each of these things in a different color. Let green indicate maximum intensity. All the maps will look alike. The green will always paint a wide band down the east coast. It will turn narrowly around the south. As it straggles west it will thin out. Finally, about half way west and in the vicinity of the Great Australian Bight, in the concave part of the kidney, it will peter out altogether for a while. There the desert will come down to the sea. In the southwest corner it will become a fair-sized green circle. That will be all. The rain and the beef-cattle charts will also show a band across the north. The center will everywhere be pale.

One third of this land will be that center. Most of it will be some kind of desert. It will have its beauty. People who know it can find differences in it. There are hundreds of square miles of gibber plains blanketed with millions of stones. There are dry, eroded watercourses around Lake Eyre, forty feet below sea level. There are fields of spinifex, and handsome ghost gums with gleaming white trunks. There are acacias. There are sand dunes fully equipped with camels. There are enormous natural monuments, some like the enormous monolith called Ayers rock, a brilliant terra cotta color. There are regions then of scenic beauty here but no people except a few desert aborigines. Not even very many people have seen this third in paintings or in movies.[2] Its effect upon Australian architecture has been negligible.

The second third of the land will not support an opulent agriculture but will graze a few sheep to the acre. These sheep, foraging widely in the "salt bush," do not suffer because of the hard pasturage. Indeed, in many respects their wool is the best. So their owners do not suffer either. But they live pretty far apart, say fifty miles. They are the people of the outback.

The trouble with the outback is that it has no water. The Great Australian Plain has a geological history like that of the Nile Valley but the Nilelike floods have unfortunately disappeared long ago. Today this land is much like that of California's interior valleys or the eastern slopes of the Colorado Rockies before irrigation. Unfortunately, though, there is no Colorado River to

[2] *Including the splendid documentaries* Walkabout *and* Tjurunga *taken by Charles P. Mountford.*

THE STATE OF ARCHITECTURE IN AUSTRALIA

by John Ely Burchard

Australian Reporter: ***"Is Australian architecture in your opinion up to 'world standard'?"*** [1]

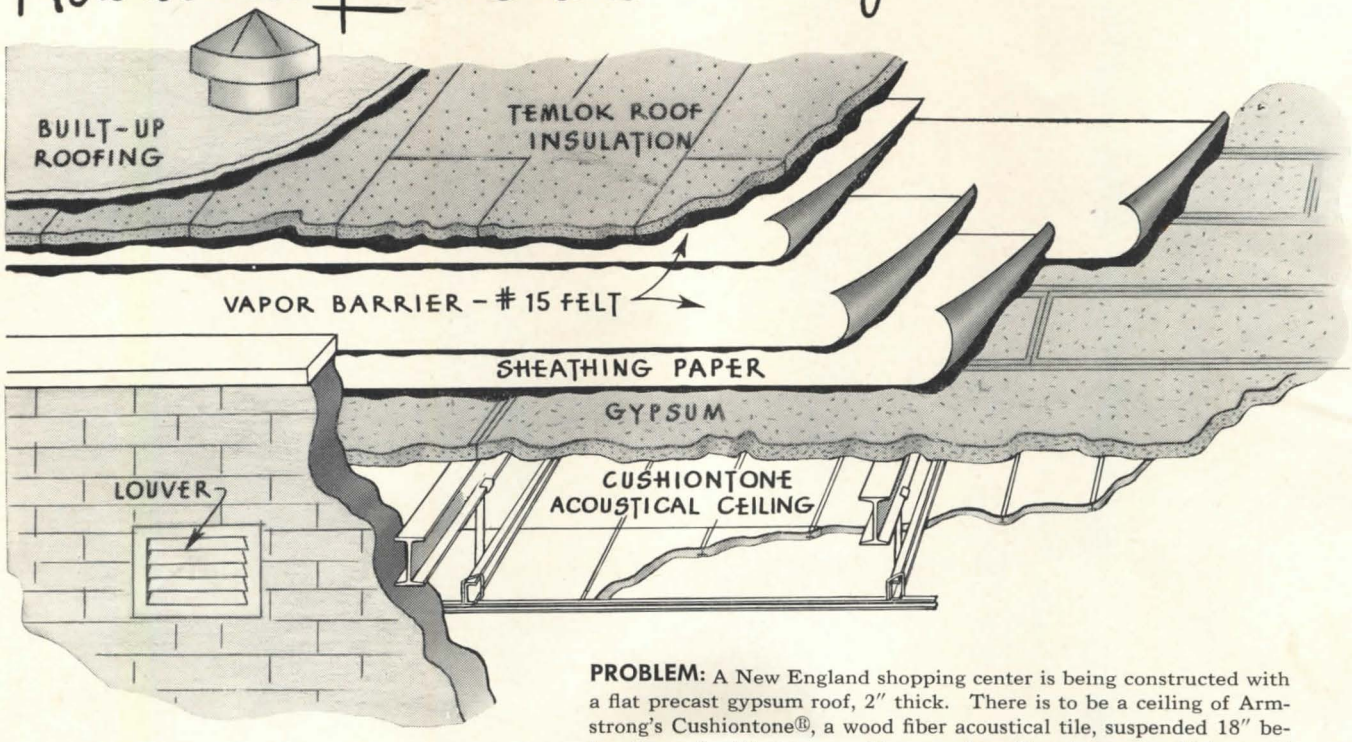
American Professor: ***"Sir, in all candour, it is not; nor does it properly represent that of which you are capable."***

[1] *"World standard" in Australia means the best in the world; i.e., Claridge's or the George V for hotels, Everest for a mountain, the City of San Francisco or The Chief for a railroad train, etc., etc. Are we up to "world standard" is the most common question in Australia. This is healthy. What is unhealthy is the concomitant expectation that the answer will be, "Frankly, no."*

SHAPE THE ISLAND like a giant kidney, 2400 miles longitudinally, 2000 miles on the meridian. Flatten the eastern and southern edges. Forty miles in from the eastern edge let some 4000-foot mountains vault steeply from the plain. Make them into tablelands rather than into Alps. Depress the middle of the kidney. You have now got a small continent.

Put this continent south of the equator but fairly near to it so that the northernmost tip is in the antipodal latitude of Costa Rica and the southernmost promontory in that of Boston. Temper the expected climate with ocean currents so that almost the whole land is sub-tropical. Let a little snow come to the part nearest

How would you insulate this roof?



PROBLEM: A New England shopping center is being constructed with a flat precast gypsum roof, 2″ thick. There is to be a ceiling of Armstrong's Cushiontone®, a wood fiber acoustical tile, suspended 18″ below the roof. What type and how much roof insulation should be used?

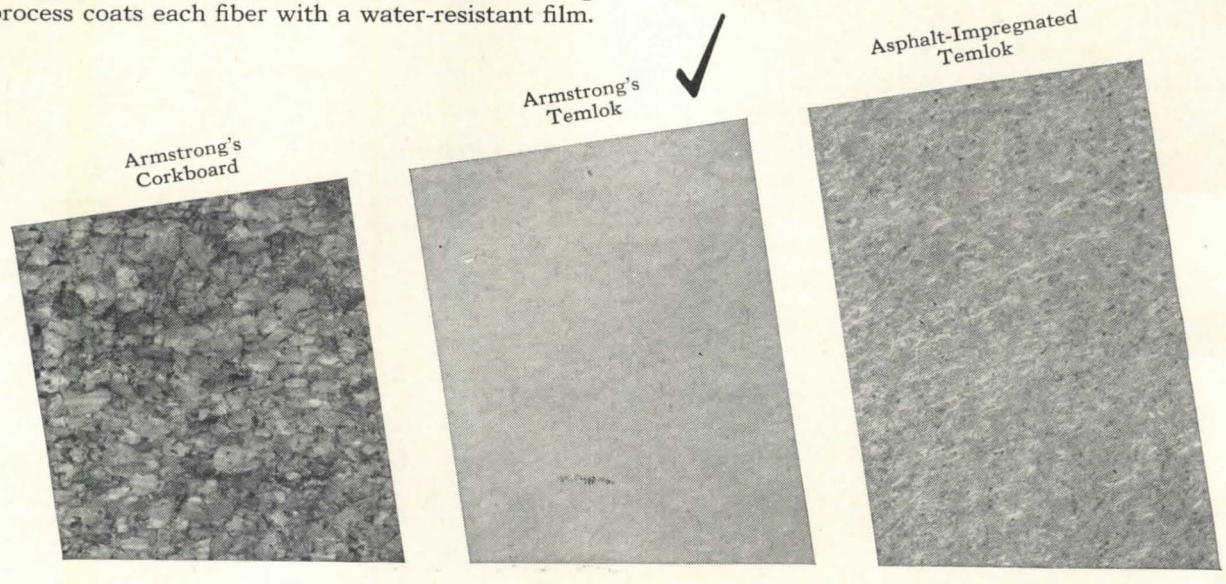
SOLUTION:

In calculating insulation requirements, it should be remembered that the acoustical ceiling contributes some insulating effect. This permits use of thinner roof insulation than might otherwise be required. With this construction, a one-inch thickness of Armstrong's Temlok® Roof Insulation is entirely adequate for year-round protection. This combination produces a U-factor of .14.

Armstrong's Temlok, applied over a vapor seal in accordance with Armstrong's specifications, is the choice of many architects for this type of job. Made from pine fibers, Temlok is a strong, lightweight board that makes a firm and rigid base for built-up roofing. Tiny enclosed air spaces trapped between the fibers give Temlok its high insulating efficiency. A sizing solution introduced in the manufacturing process coats each fiber with a water-resistant film. Where service conditions are normal, Armstrong's Temlok is the ideal, low-cost roof insulation.

Every job has its own cost and service requirements. Where extra moisture resistance is important, Armstrong's Asphalt-Impregnated Temlok may best serve your needs or, to meet especially severe conditions, you may select Corkboard. For full details, write Armstrong Cork Company, 2408 Concord Street, Lancaster, Pa.

ARMSTRONG'S ROOF INSULATIONS



Here it is!

the new kno·draft square diffuser

Even before we could get this announcement into print, word of this new Kno-Draft *Square* Diffuser got around. We've been filling orders from all over. The air conditioning folks who have seen it and installed it are plenty enthusiastic. And no wonder —

Here in this smart, efficient *square* unit are the advanced engineering characteristics that have made the standard round Kno-Draft Air Diffuser famous — built-in volume control, precision *circular* air patterns, sturdy construction, and others.

You can get the new *square* Kno-Draft in two brilliantly conceived modern designs — both for quick, easy installation. *Type KP* features overlap style construction. *Type KPT* is designed for T-bar installations, snapping snugly into perforated acoustical-type ceilings.

You can get complete engineering data on the new, already popular, Kno-Draft *Square* Diffusers quickly. Just mail the coupon today.

TRADE MARK "KNO-DRAFT" REG. U.S. PAT. OFF.

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Danbury, Connecticut
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Dept. E-82, Danbury, Connecticut

Please RUSH full information on the new Kno-Draft *Square* Diffusers.

Name.....

Position.....

Company.....

Street.....

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