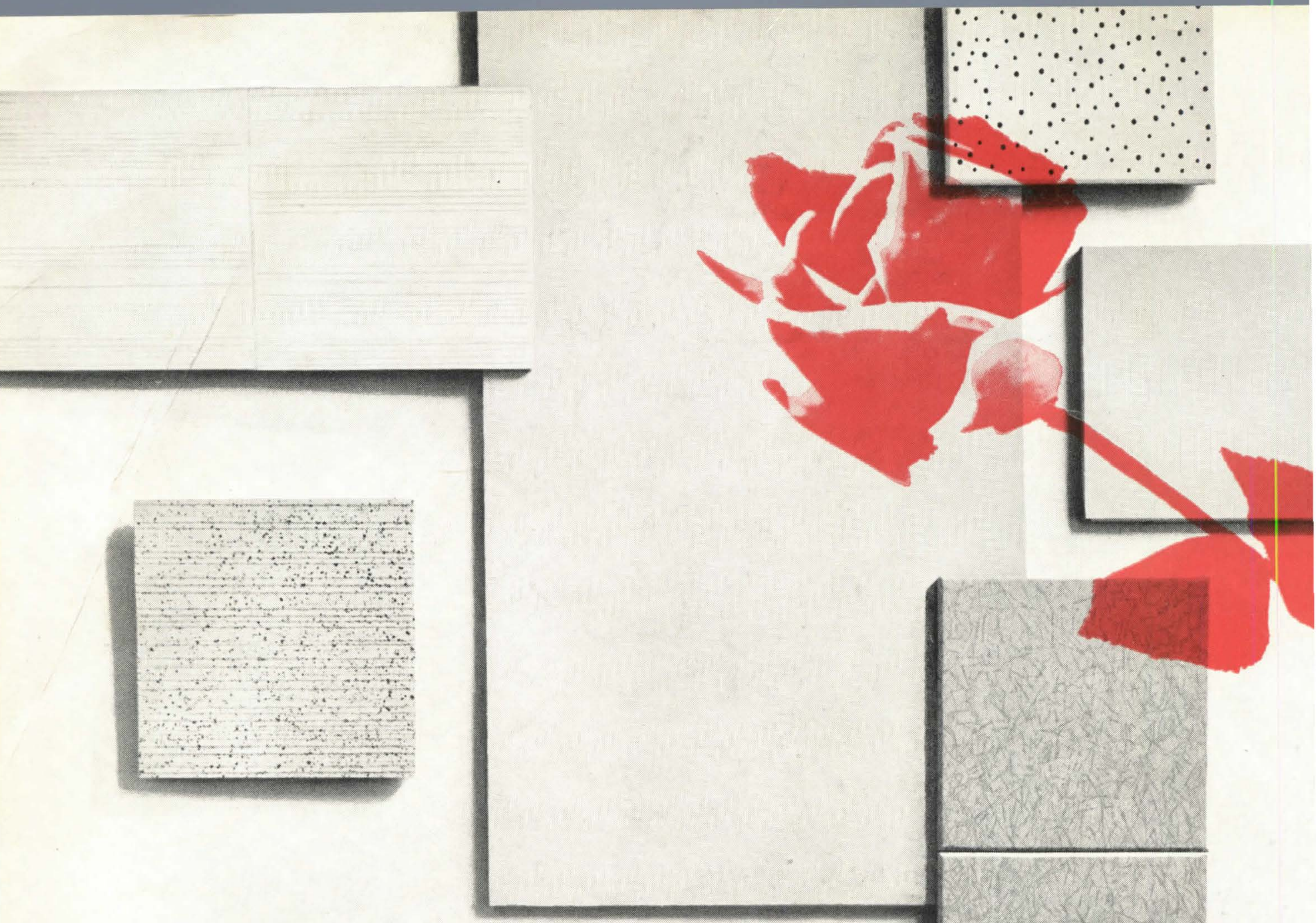
PROGRESSIVE ARCHITECTURE

7

july 1956

world's largest architectural circulation

p/a commercia bui dings



beautiful overhead...

with the fire department built in!

Not only do Fiberglas* Acoustical Tiles soak up sound, they reflect beauty and brightness too. Naturally inorganic, they're certified fire-safe, they won't shrink or swell, they keep their good looks through long, carefree years of service.

But here's the clincher . . . Fiberglas Ceilings are the lowest cost fire-safe acoustical ceilings you can specify. What more could you ask for? If it's more information, just write: Owens-Corning Fiberglas Corporation, Dept. 68-D, Toledo 1, Ohio.

*T.M. Reg. O-CF Corp.

OWENS-CORNING
FIBERGLAS

SOUND CONTROL PRODUCTS

- Textured, Perforated, Sonofaced*, Stria* Acoustical Tile
- Textured, Sonofaced Ceiling Board • Noise-Stop* Baffles

PROGRESSIVE ARCHITECTURE

Published monthly by REINHOLD PUBLISHING CORPORATION, 430 Park Avenue, New York 22, N. Y. Second-class mail privilege authorized at New York, N. Y. Additional entry at Brooklyn, New York. Professional subscription — $5. (For full data, see page 13.)
Volume XXXVII, No. 7

GUTH GRATELITE CEILING, WINTERS NATIONAL BANK, DAYTON, OHIO. MANUFACTURED BY EDWIN F. GUTH CO., ST. LOUIS, MISSOURI.

ADVANCE Fluorescent Lamp Ballasts are "Silent Partners" to America's leading lighting equipment manufacturers. These fine ADVANCE Certified CBM Ballasts are designed by ADVANCE engineers to provide exacting amounts of electrical energy necessary to operate fluorescent lamps efficiently, economically and for long life. In providing this peak performance, ADVANCE becomes a real partner in bringing greater quality and value to users of fluorescent lighting.

ADVANCE ballasts are produced by skilled craftsmen using modern techniques in America's largest exclusive ballast manufacturing plant. Whether you use fluorescent lamp ballasts in products of your own manufacture, specify ballasts, or use ballasts in the maintenance of fluorescent lighting, a trial will prove that ADVANCE Certified CBM Ballasts give you more efficiency, longer life and greater value.

Let the ADVANCE service-stocking distributors be your partner in your ballast needs. Write for complete details and name of distributor nearest you.

The Heart of the Lighting Industry

ADVANCE

CBM CERTIFIED by ETL

World's Largest Exclusive Manufacturer of Fluorescent Lamp Ballasts

TRANSFORMER CO.

2950 NO. WESTERN AVE. CHICAGO 18, ILL. U.S.A.

It's the Law *by Bernard Tomson*

P/A Office Practice ***article on the Right of a Municipality to Violate its own Zoning Ordinance.***

Can a municipality, in effect, violate its own zoning ordinance? After zoning an area for residential use, may a municipality then, in disregard of its own ordinance, use a part of such area for nonresidential purposes? These are the questions presented in a recent case decided by the Supreme Court of the State of New York.

In 1950, the Incorporated Village of Lloyd Harbor adopted a zoning ordinance restricting the entire Village to private residential use on minimum plots of two acres. This 1950 ordinance changed the previous zoning by completely eliminating business use in the Village. In 1953 the plaintiff, Nehrbas, purchased eight acres of property within the Village and erected a home, which cost, together with improvements to the land, in excess of $80,000. The following year the Village acquired a two-acre parcel diagonally opposite to the property of Nehrbas. It was the intention of the Village to alter a barn located on the parcel and to use the building for various municipal purposes. Nehrbas instituted a legal action to restrain the Village from such action.

The Court held that it was unlawful for the Village to use the building for the storage and maintenance of garbage and highway repair trucks and other vehicles, but ruled that the Village had the legal right to use the premises as offices for the Village, as a meeting place for the Village Trustees, and as a courtroom for the use of the Village Police Justice.

In permitting the limited violation by the Village of its own zoning ordinance, the Court distinguished between municipal functions which it termed private or proprietary and municipal functions which it classified as public or governmental. The Court stated that the collection and disposal of garbage and the maintenance and repair of highways were private or proprietary functions on the part of the municipality and that, therefore, such uses fell within the restriction of the Village's zoning ordinance. On the other hand, it was the opinion of the Court that the use of the premises as offices of the Village and as a courtroom were public or governmental functions to which the zoning ordinance did not apply.

There would seem to be no clear-cut distinction between those municipal functions classified as governmental and those classified as private. The Village, in its argument before the Court, relied on a previous decision of another New York Court (*Stiger* v. *Village of Hewlett Bay Park*, 129 N.Y.S. 238) in which a municipality was permitted to lease land in a residentially zoned area for the purpose of erecting a garage for the storage of village trucks and equipment which were used in connection with the care of the streets. In this case, the Court ruled that the use of the garage was an exercise of a governmental or public function and that, consequently, the Village would be unrestricted by its own zoning ordinance.

The inconsistency in these two decisions is difficult of explanation, unless consideration is given to the differing practical factors raised in each of the cases. In the Nehrbas case, there was evidence that the proposed use of the premises would result in a substantial diminution in the value of surrounding homes. Further, in that case, the Court emphasized that the Village was motivated by the fact that the premises sought to be used could be purchased for an advantageous price and that the Village had other available sites on which to construct premises for the proposed uses. In the Stiger case, however, the Court found that the neighboring residences would sustain no damages as a consequence of the proposed use by the Village, and that the Village had no other area available for the intended use. Differing pragmatic considerations, therefore, led to different conclusions in the two decisions.

Due to shifting and rapid increases in population, many communities throughout our country have been faced with additional and unexpected responsibilities. Under these circumstances, the apparent tendency of the Courts to give great weight to practical considerations when determining the right of a municipality to violate its own zoning is understandable. In still another New York case (*Hewlett* v. *Town of Hempstead*, 133 N.Y.S. 2d 690), the Court frankly stated the necessity of giving weight to practical factors in determining the legitimacy of the use of property by the municipality.

In that case, the Town had amended its zoning ordinances in order to authorize the erection of an incinerator in an area zoned as a residential district. The Court was faced with the fact that the weight of precedent, through application of the "governmental-proprietary" test, held the collection and disposal of garbage to be a private or proprietary function. If the Court had strictly applied this test, it would have been compelled to hold that it was unlawful for the Village to put the property to the use sought. The Court, however, took into account the pressing need of the community and ruled that under existing circumstances the operation of an incinerator was a governmental, rather than a private, function of the town.

> ". . . . . yet the conditions which exist in a closely-knit, fast-growing township such as the Town of Hempstead, have made it imperative that the Town provide for the disposal of refuse and garbage. It is a matter of public health that offal and garbage be disposed of scientifically and efficiently. Burial of refuse and open dump disposal is no longer permissible and the capital to be supplied for the erection of a large incinerator has become a public responsibility. It it perhaps true that in some places the public disposal of waste is optional, but in the Town of Hempstead with its present population and closely developed territory, it is no longer an optional matter. In such a circumstance, the incineration of garbage is not a proprietary but rather a governmental function. Without it, the community in its present form cannot continue to exist without risk to the general health of its inhabitants."

The concept underlying zoning is the promotion and protection of public welfare and safety by the limitation of property use. The violation or disregard by a municipality of zoning laws previously adopted may be necessary, but is, at the same time, self-defeating. In the wake of rapid municipal expansion and its accompanying pressures for the furnishing of vital services, it will be of interest to see how far the courts will go in departing from established precedent in permitting municipalities to disregard their own zoning.

Since the responsibility for designing a building in accordance with existing ordinances rests on the architect, this again emphasizes the importance of placing the burden on the owner's attorney in doubtful cases when any question arises as to the propriety of the program contemplated for a particular site.

ASK THE AEROFIN MAN

About Practical Heat Exchange

There is a competent Aerofin heat-transfer engineer near you—qualified by intensive training and long experience to find the *right* answer to your own particular heat-exchange problem—and backed by the research and production facilities of the pioneers in light-weight extended surface.

Ask the Aerofin Man.

Aerofin is sold only by manufacturers of nationally advertised fan system apparatus. List on request.

AEROFIN CORPORATION

101 Greenway Ave., Syracuse 1, N. Y.

Mechanical Engineering Critique *by William J. McGuinness*

P/A Office Practice *article devoted this month to Multipurpose Ceilings.*

In office and merchandising areas flexibility is very important, yet it must not interfere with the orderly distribution of mechanical services. For instance, in office spaces with continuous, exterior glass walls from floor to ceiling and few permanent interior partitions, the distribution of mechanical facilities must be made through ceilings, floors, and columns. Pipes for localized washing and drinking water can be furred into "wet" columns; floor conduits may be used for telephone and electric service; the ceiling inherits the balance of the required mechanical functions, together with facilities for their maintenance. These include:

1. Uniform lighting to effect high intensity at work level, minimum glare, and maximum eye comfort.
2. Access for relamping and cleaning of translucent diffusing surfaces.
3. Provisions for sound absorption, using surfaces that can be cleaned easily.
4. Provision for diffused delivery of conditioned air for heating, cooling, and humidity control.
5. Modular, linear divisions for the top-bracing of thin, ceiling-high partitions or to receive the tops of partition mullions that will brace dwarf or intermediate-height divisions.
6. Easy adaptation to a uniform and inconspicuous sprinkler pattern, when the occupancy dictates this kind of fire protection.
7. The combining of these elements into a visually attractive, esthetically pleasing, and flexible composition.

It is only recently that all of these design requirements have been jointly considered and the effort invested to produce usable results. One of the assemblies that solves all these problems is the Sigma ceiling of The Wakefield Company, manufacturers of lighting equipment.

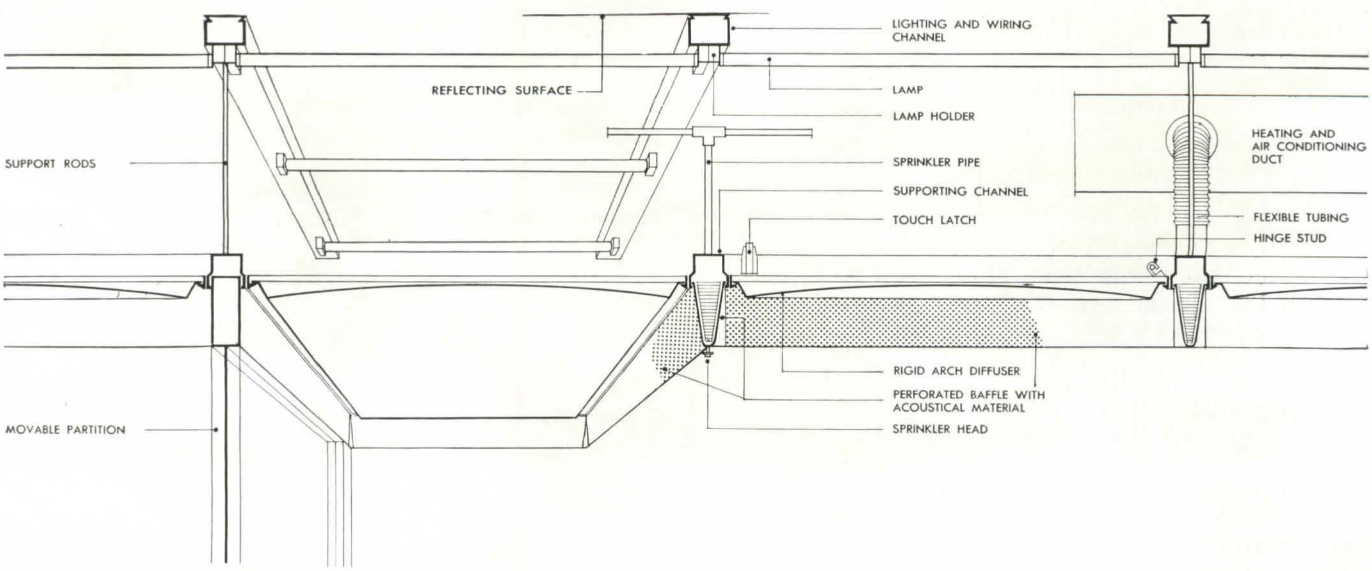
Installed and tested in Wakefield's new office building at Vermilion, Ohio, this new ceiling will soon be on the market. Lighting intensity of 100 ft-C is produced by continuous, slim-line fluorescent lamps on two-ft spacing. An 88 percent reflective surface above and cambered, square, plastic light diffusers below combine to achieve this with a comfortably low contrast-ratio of ceiling to work-level intensity. Actuated by a touch-latch, the aluminum-framed acrylic-plastic light diffusers swing down to permit cleaning, relamping, and service. Using the world's first complete installation of high-frequency, high-voltage lighting (400 volts, 840 cycles), the system shows many advantages. They include simpler wiring, fewer circuits, 15 percent greater efficiency, no flicker, and prospect of longer lamp-life. The wattage reduction lowered the air-conditioning load by 15 percent. The cost of the lighting installation is the same as that of conventional installations. Lamps start instantly and are controlled by switches on the mullions of movable partitions.

The acoustical baffles are of perforated steel with 25 percent open area and a glass-fiber core held ¼ in. away from the metal. This space makes the baffle more effective acoustically and creates an air passage which permits the perforations to double as air-conditioning supply registers. The coefficient of acoustical absorption is .90 for the material of the baffles and .50 for the composite ceiling.

Air-conditioning ducts above the plane of the lights serve the baffles by flexible conduits painted white and placed to avoid shadow. Tests at Case Institute of Technology have established reasonable static resistances for usable rates of air flow. The supply locations may be changed to accommodate office divisions or concentrations of heating or cooling demand.

The tapered baffles may be removed when ceiling-high office partitions are desired. Four- and five-ft module grid systems are available. Mullions fasten at the intersections of the module lines. At other intersections over occupied areas, very unobtrusive sprinkler heads may be installed.

Architects for the Wakefield Building were Outcalt, Guenther & Associates of Cleveland; Consulting Engineer was Paul C. Mehnert, also of Cleveland; and Illuminating Engineer was Robert D. Burnham of The Wakefield Company.



Ernest W. Fair

Precautions in Dissolving a Partnership

P/A Office Practice ***article on the legal pitfalls of concluding a partnership, without incurring heavy penalties or responsibilities.***

The reasons for dissolving partnerships are multitudinous. Whenever a particular one of these may arise for the individual architect he can well proceed with caution. Partnerships are like marriages: mighty easy to get into—not so easy to dissolve.

The architect can of course pick up his belongings and just walk out the front door, but in so doing he opens himself wide to a long string of future difficulties, whether there are or are not assets to divide.

Here are important factors of agreement for the partners, as well as safeguards for each individual in any such action. They are compiled from advice of lawyers, bankers, and experts as well as from the practical experience of several architects of the writer's acquaintance.

First, there is the matter of liability. The law, in many court decisions, has set forth that in situations where one partner has broken his contract by withdrawal his copartners may recover damage from him for the breach, if the breach is unjustified. One cannot, ordinarily, just walk out of a partnership.

The partnership contract should be examined closely before any notice to step out of the arrangement is given or any action of this nature taken. It is always safest to have it checked by one's lawyer to make sure that one may withdraw from the partnership without penalties and to analyze in advance what those penalties will be, should the step be taken. Even where the partnership contract does not provide for such penalties, one partner who does breach the contract can possibly be liable for damages to the other partners.

It is far better to make certain of the existence of any such penalties or possibilities for a damage suit before the initial step has been taken. In every instance it is far better to come to a mutual agreement to dissolve such a partnership before doing so, and to have a contract drawn under guidance of one's lawyer, agreeing to such dissolution in order to preclude any possible change of mind at a later date by the remaining partner or partners.

Of course, a partnership may come to an end by operation of law as well as by the act of a partner. The death of a partner automatically works a dissolution. Although the surviving partners may continue the same business, at the same place, in the same manner, it is a new partnership relation. The sale of a partner's interest, whether forced or voluntary, has the same effect.

Another very important step is for the architect to issue a notice of dissolution of the partnership. Legally, when two or more architects enter into a partnership they give evidence to one and all that within the scope of the relationship each partner is an agent. Notice of dissolution is a necessary procedure not only to give the retiring partner protection against future liability as a member of the firm but also as protection for the remaining partners.

It is not required that any such notice be given to persons never made aware of the existence of the partnership. To protect themselves, the partners should give notice of such dissolution to persons who have been accustomed to deal with the partnership. Some courts have ruled that actual notice is necessary only to persons who have at some time during the continuance of the relation extended credit to it. Publication of a general notice of the dissolution will usually protect the partners.

•

The next step is one of accounting. Where the partnership contract has specified exactly what steps are to be taken in determining division of assets or liabilities, then these must be followed. It is legally safer to follow them to the letter than to take any steps by oral agreement.

When no such provisions have been set forth and where partners cannot amicably agree upon a settlement of the affairs of the partnership or distribution of assets, any partner may call upon a court of equity for its assistance. The court, after bringing all partnership assets under its control, will decree a sale of them and a division of the proceeds among those entitled to share in them.

The court also determines the order of distribution of assets once they have been determined. Claims of creditors, other than claims owing to members of the partnership, are to be paid first. (Even where the matter has not been placed in a court of equity this is the

Looking for Architectural Consultant Service on Floor Treatments?

HILLYARD CHEMICAL CO.
Architectural Dept.
St. Joseph, Mo.

see our catalog in ARCHITECTURAL FILE

Please have the Hillyard "Maintaineer*" give me a complete set of A.I.A. numbered files on the proper Hillyard treatments recommended for every type floor.

Name...Title.................................

Firm Name...

Address...

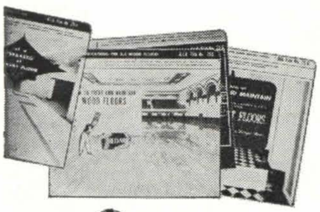
City...State.................................

* A trained floor treatment Architectural consultant

SEND FOR FREE HELPS TODAY!

A Specialized Hillyard SERVICE FOR ARCHITECTS

includes assistance in three important phases of your total responsibility. Careful consideration of these three steps in Hillyard service can assure floor beauty and utility that will commend complete client satisfaction.



1

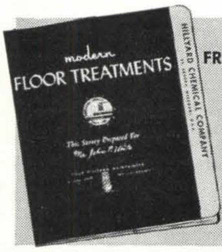
RECOMMENDATION OF SPECIALIZED PRODUCTS. Every Hillyard product is made because of a particular need. Whether it's treating a new concrete floor to permit proper curing or sealing asphalt tile to develop a more beautiful slip-resistant finish, the Hillyard "Maintaineer" has the answer to any floor problem.

2

PROPER APPLICATION METHODS are thoroughly explained and illustrated in material that is made available to your contractors.

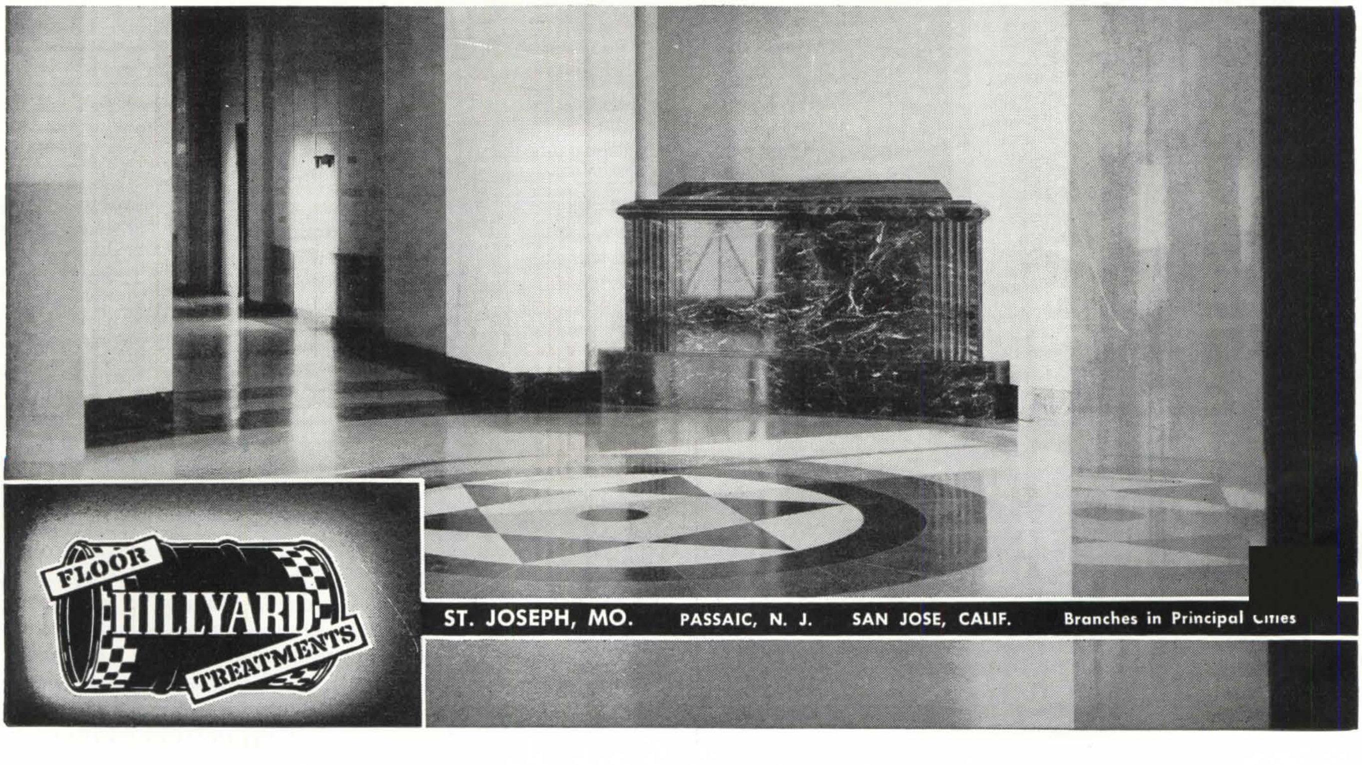
3

"JOB CAPTAIN" SUPERVISION is provided FREE on any job you specify. To be sure these application methods are fully understood and used according to specifications, a staff of trained experts located throughout all 48 states is available to you at all times.



FREE RECOMMENDATION SURVEY of any job on your boards now. There's a Hillyard floor treatment expert near you. Just send the coupon above or write to Hillyard, St. Joseph, Mo.

AL JOLSON MEMORIAL Architect: Paul R. Williams, Los Angeles



FLOOR HILLYARD TREATMENTS

ST. JOSEPH, MO. PASSAIC, N. J. SAN JOSE, CALIF. Branches in Principal Cities

Precautions in Dissolving a Partnership

best procedure to follow, rather than division of liabilities together with assets.) Until such claims have been paid, partners are not entitled to take anything from remaining assets.

When the matter is in equity, if the assets are insufficient to meet claims, the court will order the members of the partnership, in the ratio to which they are to bear the losses, to pay into court an amount sufficient to meet the debts owed by the partnership to other parties.

Under equity procedure, after such claims have been paid, the court will, if the balance is sufficient, return to each partner any advance which he has made to the partnership over and above the amount he agreed to contribute as capital. If the balance is insufficient to meet such advances the partners will be charged with this as a loss in the ratio in which they are to bear losses.

Determining what we plan to do after partnership dissolution should also receive consideration before the actual steps are taken. If the partnership agreement has specified restrictions on our actions as to where we may set up practice on our own, or within what specified period of time, these will ordinarily have to be followed. In almost every instance, courts have upheld such clauses of partnership contracts and awarded damages; exceptions were usually those involving individual and unusual circumstances. It's safest to take the point to one's lawyer and have him prepare advice on what steps are to be taken.

Where there have been no provisions of this sort in a partnership contract we can, of course, do anything we please so long as our actions are not of such a nature as to expose us to possible damage suits.

•

Tax matters should be given the very closest attention in any partnership dissolution. Safest rule, by far, is to place tax liability accounting of the individual partners in the hands of a lawyer or of a qualified tax expert. In most cases, the matter may be taken directly to the various tax bodies and liability determined. Where agreement can be obtained as to liability and the matter settled then and there, it is, of course, the best step to follow. Another method is to secure such agreement between the partners and place such funds as are determined upon in trust for payment at the proper time. This should be accompanied by specific agreement as to liability for taxes in the remaining period of the year by the remaining partners. Such an agreement will protect one only in providing a basis for a damage suit should that be needed; usually tax bodies hold the retiring partner liable regardless of what steps have been taken for mutual dissolution of the partnership.

The 1954 tax law provides special rules for the treatment of payments made to a retiring partner or to his estate or other successor in the partnership. It specifies that capital-gain treatment will be available only to the extent that the payments are for an interest in the partnership or property.

The treatment of payments which are not made for an interest in the partnership depends upon whether these are determined by reference to the income of the partnership. If they are so determined, they are treated as a distributive share to the recipient; if not, they are treated as "guaranteed payments."

If the payments consist of a percentage of partnership income, they are excludable from the gross income of the remaining partners. If they are not so determined, the effect is the same, because they are deductible as business expenses in determining partnership taxable income. In either case, the payments will be treated as ordinary income, and not as capital gain, in the hands of the recipient partner.

The manner of partnership dissolution and the "air" under which it is conducted can often determine whether the action will be successful. No matter how belligerent we may feel, we stand to gain the most by holding back our emotions while such matters are being decided. Where belligerency exists on the part of both sides in such matters, a great many difficulties can arise and make the dissolution a painful procedure.

Best program for a partnership dissolution under such circumstances is to reach agreement that all details will be handled by a third party, preferably a lawyer whose decisions will be accepted by both sides. In this way, both partners will be assured of an impartial view on all matters concerned with the dissolution, and there will be less opportunity for additional disagreement.

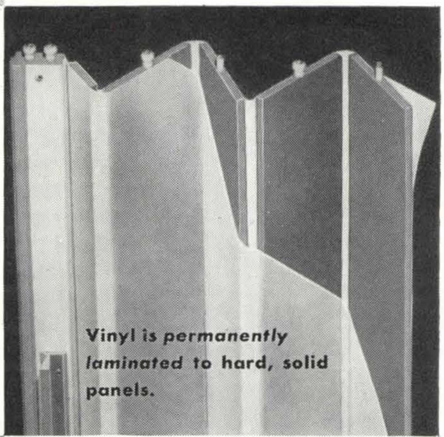
the newest outstanding Grant product development

Textured, scuff-proof, tough, vinyl fabric surface

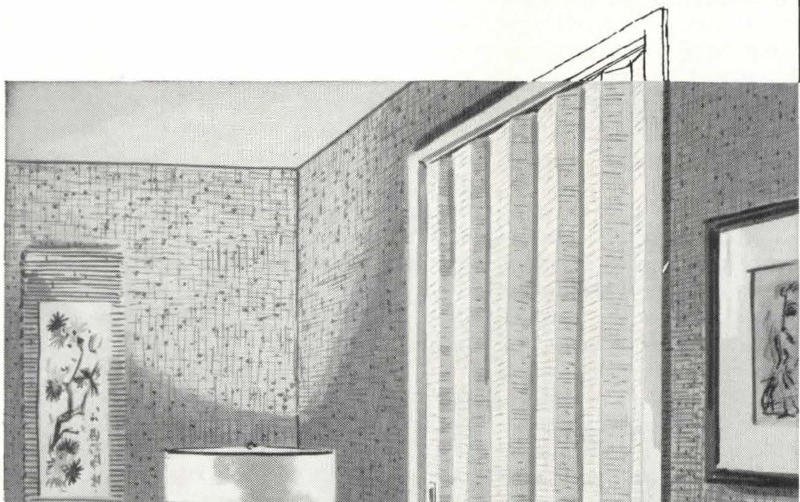
the Grant folding door

A REAL DOOR THAT FOLDS!

styled by Paul McCobb



Vinyl is *permanently laminated* to hard, solid panels.



features

Solid Panels: The solid panel construction of this Grant door is a revolutionary development in a folding door at moderate price. The *Grant Folding Door* has crisp, clean lines, blocks sound, hangs rigid without billows or rustle. Knock on it. It sounds and feels like a door.

Space Saving: Frees an average of 14 square feet of floor space (19 square feet of wall space) for living space, better arrangement of furnishings.

Durable — Easy to Maintain: Vinyl surface can be wiped with a damp cloth—scrubbed if necessary. Tough and long-wearing, resists scuffing, color is permanent.

Easy Installation: Only a screwdriver is needed to install the *Grant Folding Door* in standard door openings in minutes. Readily adaptable to non-standard openings.

Decorative Flexibility: Color styled to harmonize with modern or traditional furnishings. Attractive design of handles, track and other details, also specially styled by famous Paul McCobb.

▶ **Ask for your copy of fully descriptive specifications booklet, the swatch book showing the attractive colors available and texture of the non-scuffing vinyl finish.**

the Grant folding door

"A REAL DOOR THAT FOLDS"

Grant Pulley and Hardware Corporation
31-91 Whitestone Pkwy., Flushing 54, N.Y.
944 Long Beach Avenue, Los Angeles 31, Calif.

Other Grant Products:
Sliding Door Hardware • Drawer Slides
Drapery Hardware • Sliding Door Pocket Frames
Sheaves and Tracks • Pulls • Industrial Slides

"Structures in Membrane on Co-Acting Ribs"

Dear Editor: Paul Chelazzi's article on membrane-rib structures (page 91) is a contribution to progressive architecture. A primary reason is the correctness of his approach. Architecture deals in mass, form, and color with these properly expressed in a plan and design which is useful and economical, with the further necessity that the whole is "mechanically efficient" and "constructionally healthy." Chelazzi presents thinking along these lines and I find his article to be:

Stimulating and practical. It provides for flights of the imagination, yet in greater degree it sets forth a basis for practical application of some hitherto less understood adaptations of natural forces. This stimulating approach, and more study of it, should arouse the progressive architect toward gaining fuller freedom of expression through legitimate structural media.

In step with the technics of our present time. Architecture records the history of previous great civilizations and tells us much about man and his living during those times. Good architecture must always keep step with contemporary civilization and express itself in the best possible form permitted by its technics. The Renaissance architects had difficulty in fully expressing their capabilities of design because of a lack in certain cases of suitable materials which would allow this expression. The technics produced by advancing civilization since the Renaissance have given us steel and lighter materials of greater strength and architecture in varying degree has reflected these. Lately has come further developments in material such as glass, with its larger expanse, its greater structural strength, and its characteristics for better living. Another material, reinforced concrete, has developed in recent times, but to my mind it still lacks a development that reaches its greater capabilities. A still further development in another form is that of steel cables or "steel-wire purlins" which while used successfully on bridges, have had less application to architectural building structures. In this article we are presented a refreshing thesis on the greater possibilities of both materials. Chelazzi has courageously pursued his goals in this respect and he is to be urged to continue and further his studies. My discussions with the author and this article lead me to the hope that other members of my profession will join in such studies.

Suggestive of ingenious architectural solutions. While fanciful at times, the article provokes sound thinking and goes further than "philosophy" by providing solid engineering data as to how results can be obtained from an engineering standpoint. For instance, the treatment of a cloister walk with the haunched-curved ribbed structure, shown in Figure 17, may seem an over-extension of customary methods of providing pedestrian shelter. Yet it highlights a pattern and stimulates thought as to how with less structural extravagances it might solve problems for more useful structures under certain circumstances. This and other examples by Chelazzi of either an asymmetrical plan or an equilateral as shown in Figures 15 and 16 give further ideas toward logical and interesting solutions of problems, even applied to such down-to-earth projects as modern parking garages. Other solutions are possible by employing a continuously curved polygonal rib for a long-span arch or a cantilever span. His groin-ribbed membrane-roof structure shown as a cover for market place is certainly provocative of thinking that may reach, with further study, a fulfillment meeting the challenge

(Continued on page 14)

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

REINHOLD

(Continued from page 13)

which forward-looking architects feel exists.

A practical exposition in its overall aspects. In addition to setting forth engineering data, and forms which they may take for practical construction, it weds within a design, the use of different materials into a practical union. An example is the use of reinforced-concrete struts and purlins of steel wire for supporting load along the span "regardless of the difference in the moduli of elasticity of these materials." Yet more than this, he has been practical by not forgetting that greatest of all factors in modern architecture, economy. I quote, "hence a structure designed with concrete struts and steel cable wire purlins may prove cheaper than an all steel job."

PROGRESSIVE ARCHITECTURE is to be commended for the publication of this article, and naturally, Paul Chelazzi, for writing it. It certainly, in my opinion, is worthwhile to encourage Chelazzi's efforts, both for their relevancy and also their usefulness toward what could prove better and more economical buildings.

CHESTER L. CHURCHILL
Boston, Mass.

•

Dear Editor: Paul Chelazzi's article is a splendid contribution to the Architectural and Engineering professions. He focuses our attention on the advantages and efficiency of axially stressed members and gives us some examples of arrangements of structural members which can make the best use of this principle.

He is to be congratulated for his success in accomplishing his stated objective of analyzing the problem so that it will be clear even to the layman. Furthermore, his analysis of the various structures seems to the writer to be complete and adequate with respect to the unchanging dead load of the structure. In most of the cases involving building structures such as he is discussing, it is quite likely that live loads, and perhaps even wind loads, will be small with respect to dead load and thus require no special treatment. However, in some cases there will be unsymmetrical live loads and wind loads of relatively large proportions. In such cases the ideal structures

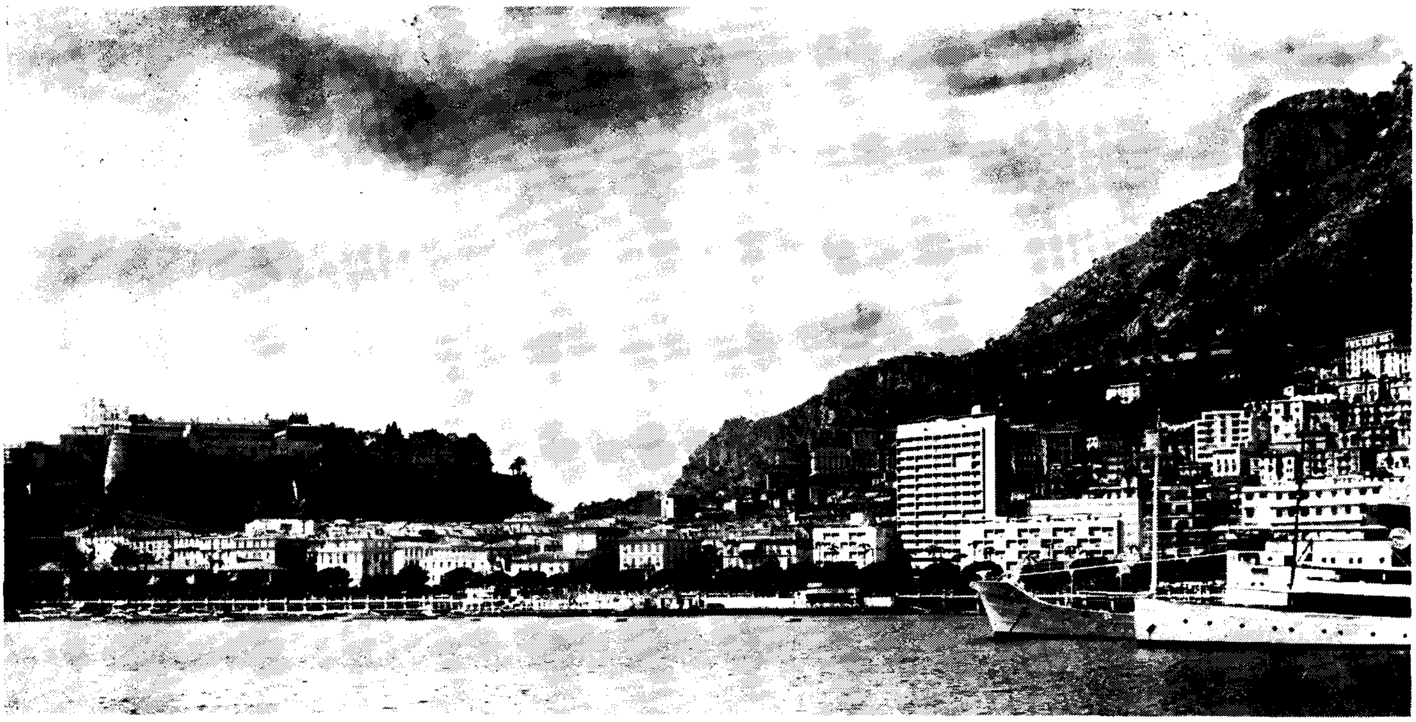
(Continued on page 16)

WHEN YOU CHANGE YOUR ADDRESS

Please report both new and old addresses directly to P/A five weeks before you move. The Post Office will not forward your magazine to the new address unless you pay extra postage. Avoid this needless expense by notifying us five weeks in advance.

PROGRESSIVE ARCHITECTURE
Circulation Department
430 Park Ave., New York 22, N. Y.

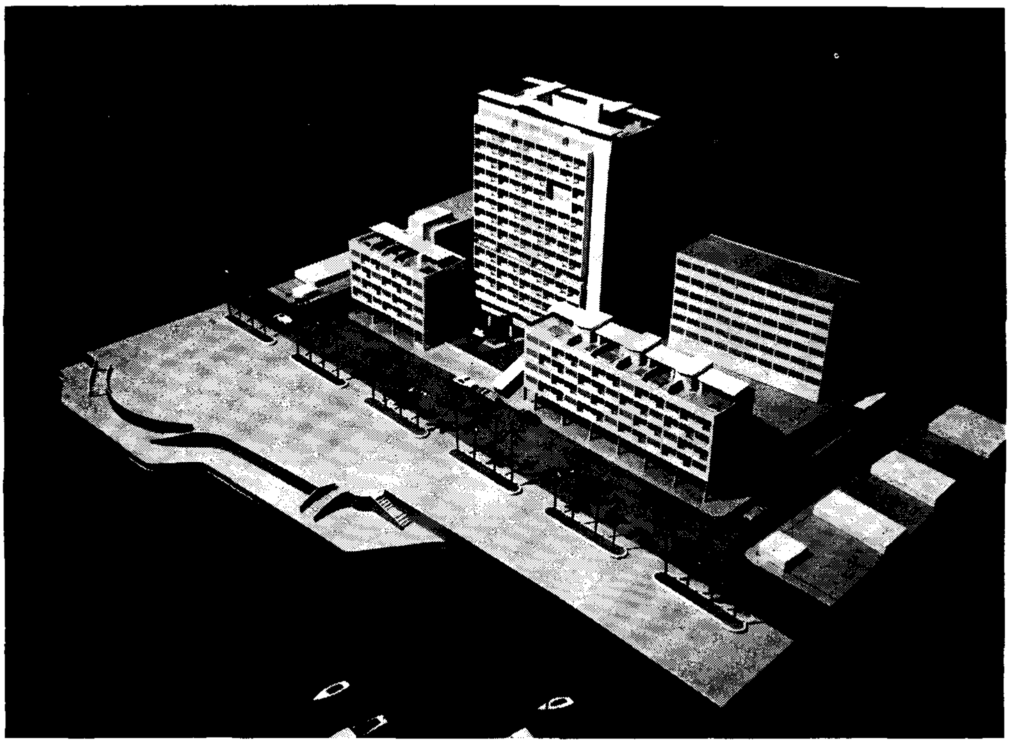
p/a news survey



NEW CLUSTER CHANGES MONACO SKYLINE

Monaco has been much in the news in recent months. And now, in addition to having acquired a new Princess from Philadelphia and the rumor of a forthcoming heir to the Principality, the picturesque community also boasts an impressive new residential and civic center that dominates the Mediterranean shoreline along Boulevard *Albert Primier*. French Architects for the project were J. Ginsberg and G. Massé, with Ilinski collaborating.

On the model below (*left to right*) are living quarters for police, with police officers and jail block behind; a 14-story luxury apartment house; a 4-story unit consisting of studio apartments (*foreground*) and a 6-story administrative building for the Principality. Joining the (latter) two is a parking garage. All buildings except the jail are completed. Covered galleries adjoin retail shops at street level, and landscaped walks and gardens penetrate the heart of the site.



Photos: Duprat

News Bulletins

• XXIII International Congress for Housing and Town Planning—on "The City and Its Surroundings"—is scheduled in Vienna, Austria, July 22-28, 1956. International town planning exhibition and awarding of prizes for best films on housing or town planning will also be featured in conjunction with Congress. Address applications to Hauptschriftleitung Der Aufbau, Wien I., Neues Rathaus, Stadtbauamsdirektion. . . . Walter F. Bogner, of Cambridge, Mass., will attend Congress as official AIA representative.

• Charles W. Attwood Research Fellowships in Architecture—two $3500 awards for research projects at University of Michigan—are available for 1956-57. For information, contact: Dean, College of Architecture and Design, University of Michigan, Ann Arbor, Mich., before Aug. 15, 1956.

• Buford L. Pickens has resigned from post of Dean at Washington University's School of Architecture, to accept new position as architectural planner and adviser for university's Second Century Development Program. Joseph R. Passonneau, Design Critic in Architecture and former Chief of Design for TVA, has been appointed Acting Dean, effective July 1. . . . Joseph F. Morbito has been named Professor of Architecture and Head of new Department of Architecture at Kent State University, Kent, Ohio. . . . Paul M. Heffernan has been selected to succeed retiring Director Harold Bush-Brown at School of Architecture, Georgia Institute of Technology.

• Seminar on Parish Planning—for Architects and Priests—will be held at University of Notre Dame, July 13-15. Speakers—including Rev. Ernst Grieshaber of Karlsruhe-Knielingen, Germany, and Thomas H. Locraft, of Catholic University of America—will discuss building facilities for spiritual activities as well as integration of the arts in church buildings.

• Several U. S. Government awards for visiting lecturers or research scholars in architecture and planning are available for Denmark, Finland, Germany, and Greece. Applications for academic year 1957-58 are due Oct. 1, 1956. For applications and information write: Conference Board of Associated Research Councils, Committee on International Exchange of Persons, 2101 Constitution Ave., Washington 25, D. C.

• Honors in architecture and the arts were recently announced by The American Academy of Arts and Letters and The National Institute of Arts and Letters. John Yeon, Architect, Portland, Ore., received $1000 Arnold W. Brunner Memorial Prize in Architecture; Gold Medal of the Institute was awarded to Sculptor Ivan Mestrovic; $1000 grant in literature went to Henry-Russell Hitchcock. Lewis Mumford was named to membership in the Academy—which limits its number to 50.

• American Institute of Planners has presented its Annual Distinguished Service Award to Charles B. Bennett, Director of Planning for Pereira & Luckman. . . . James H. Grady, Professor of Architecture at Georgia Tech., has been elected to membership in Royal Society of Arts, Great Britain. . . . Richard M. Bennett, Chicago, has been named to succeed Ralph Walker on State Department's advisory committee on foreign buildings.

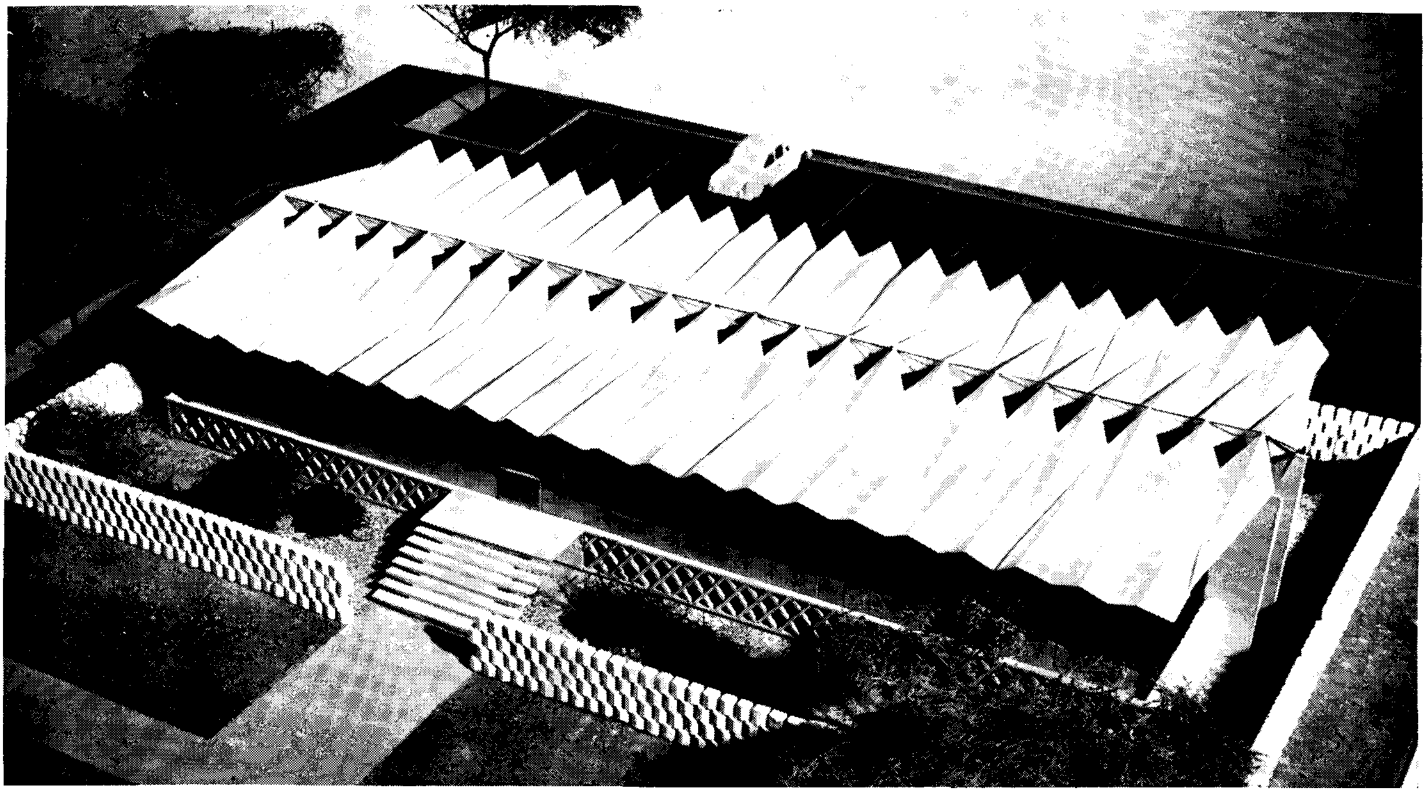
• South Carolina Chapter, AIA, has established Clemson Architectural Foundation, to assist Department of Architecture at Clemson College. Foundation will seek to improve basic architectural training and develop research into construction materials and methods particularly suited to that region.

• The Japanese House (below)—which attracted more than 223,000 visitors during its two-year stay at New York's Museum of Moden Art—will soon be dismantled for removal to a permanent site in Philadelphia's Fairmount Park. The house, presented to the Museum by America-Japan Society of Tokyo and private citizens of Japan and the U. S., was built to illustrate the relevance of classic Japanese architecture to problems of contemporary Western architecture.

Ezra Stoller

New Japanese gardens will be designed especially for Lansdown Road site in Philadelphia by Junzo Yoshimura, Architect of the house; Japanese gardens and pools at the Museum will be retained as setting for outdoor sculpture.

• Professional photographers are invited to enter Second Exhibition of Architectural Photography, sponsored by AIA to give recognition for outstanding work in architectural photography and to demonstrate its value to the architectural profession. Entries for exhibition—to be held in Gallery of the AIA in early 1957—must be received by Oct. 16. For exhibition regulations and applications, write Mrs. Alice G. Korff, Curator of Gallery, AIA, 1735 New York Ave., N.W., Washington 6, D.C.

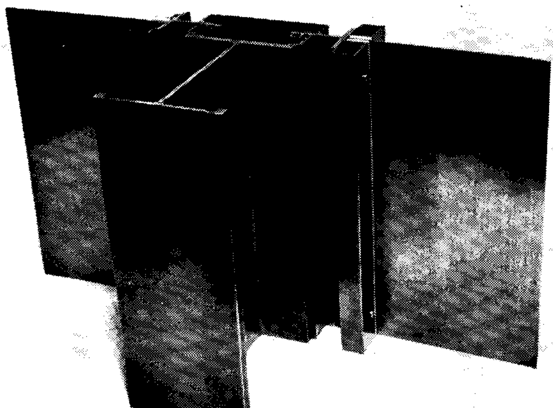


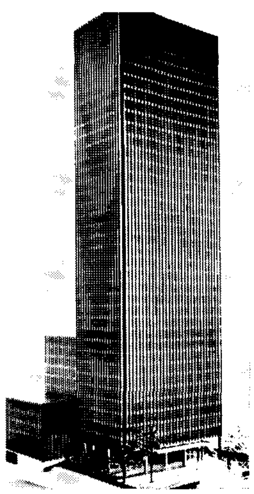
• New headquarters for American Concrete Institute (above)—designed by Minoru Yamasaki—will be a showcase for products and technological accomplishments of the concrete industry. Folded-plate, reinforced-concrete roof system is cantilevered at front and rear from concrete interior-corridor walls to project over façade of precast-concrete panels, glass, and colored-concrete pipe sections; triangular skylights will provide natural lighting for central corridor. Construction on $275,000 structure in Detroit's northwest residential area will begin in early 1957.

• Winning designs in Third New England Architectural Competition— for buildings erected in New England during past five years—were exhibited at recent Boston Arts Festival. Grand Architectural Award was presented to Eero Saarinen & Associates and Anderson, Beckwith & Haible, Associated Architects, for new MIT Chapel. Special Commendation was given to Coletti Brothers, Boston, as Architects for Beach Pavilion, Salisbury, Mass.; Commendation went to The Architects Collaborative, for Northeast Elementary School, Waltham, Mass.

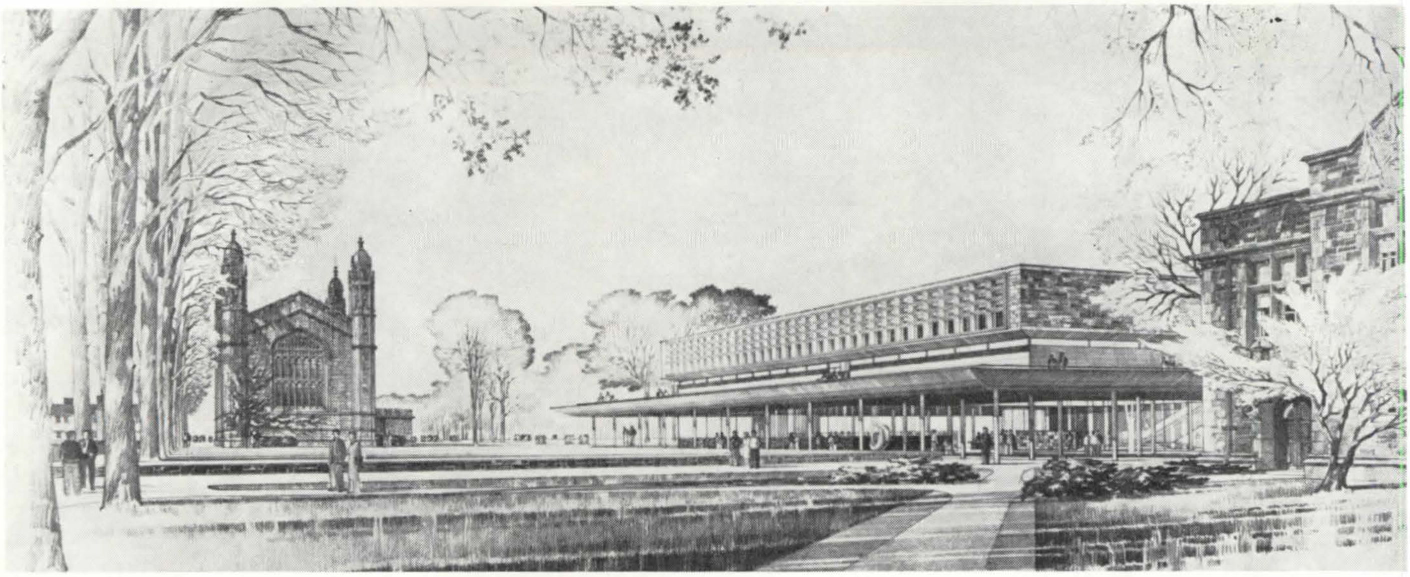
• Several U. S. Architects have been awarded recognition from outside the architectural profession at recent commencement exercises. William Caudill received Honorary L.I.D. Degree from Michigan State Normal College. . . . Marvin Pierce Halverson and Harold T. Spitznagel were awarded Honorary L.I.D. Degrees at Augustana College, Sioux Falls, S. Dak. . . . Honorary L.I.D. Degree was conferred on Mies van der Rohe by North Carolina State College. . . . L. Morgan Yost was named a "Distinguished Alumnus" by College of Engineering of The Ohio State University.

• Design of Seagram House (below), first skyscraper in New York City to use plate glass from floor to ceiling and first to have an architectural-bronze curtain wall, has necessitated new standards of color matching, dimensional tolerances, and extrusion sizes in the bronze industry. Specially designed mullion system (left), to be fabricated by General Bronze Corporation, has I-shaped extruded-bronze mullions projecting from façade to support windows and spandrels and to guide mobile window-cleaning equipment; attachment of windows and plate-bronze spandrels allows ample expansion or contraction within each 4'-7" bay. Architects for 38-story office tower are: Mies van der Rohe and Philip Johnson; Kahn & Jacobs, Associated.



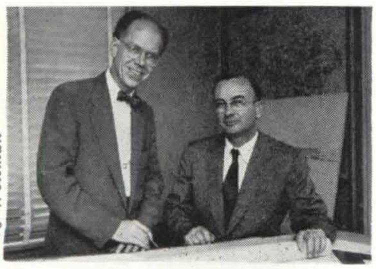


ST. LOUIS ARCHITECTS WIN



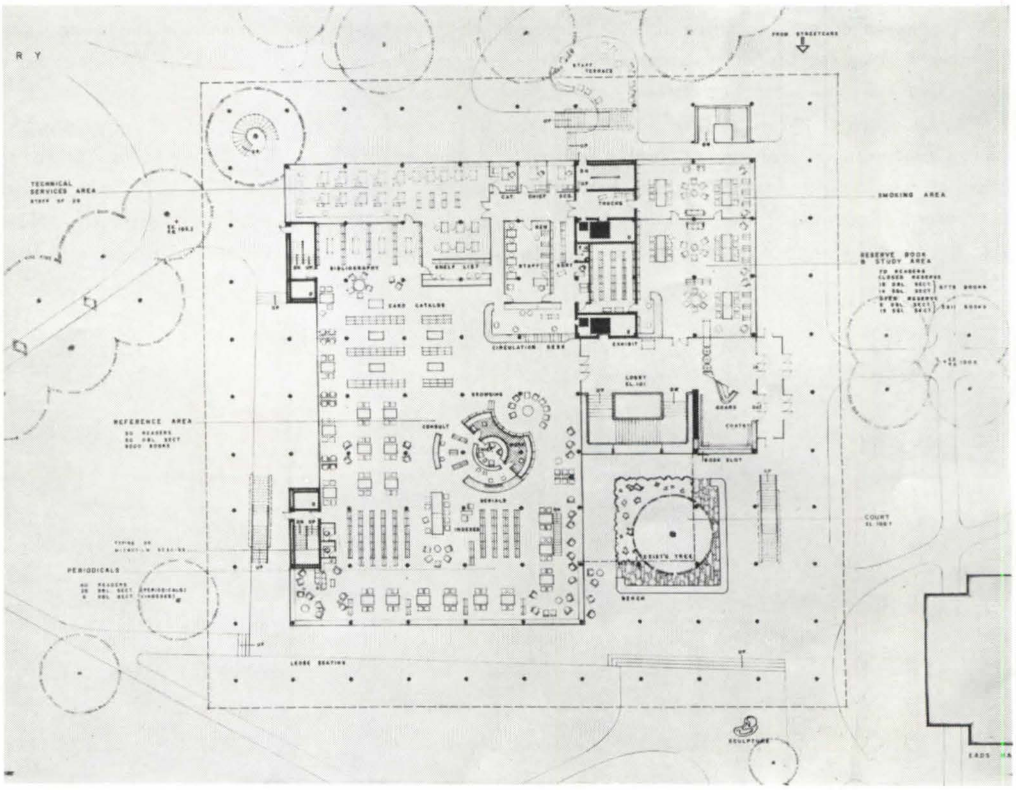
St. Louis Architects Murphy & Mackey, one of six distinguished architectural firms invited to participate in this recent design competition, were chosen as Architects for Washington University's new John M. Olin library. The Jury was composed of Dean William W. Wurster of University of California School of Architecture; Charles David, former director of libraries at University of Pennsylvania; Henry R. Shepley, member of the Boston firm of Shepley, Bulfinch, Richardson & Abbott. Buford Pickens, Dean of Washington University's School of Architecture was Professional Advisor. Library requirements were determined by a special faculty committee in consultation with Andrew Eaton, Director of the Washington libraries, and Keyes Metcalf, former director of the Harvard libraries. The winning design (*above*) is a five-story building of rectangular plan, in which reading rooms will be distributed on all floors. For convenience of access to library facilities and for reduction of building height, two stack levels are below ground, two above the central ground floor. In keeping with surrounding campus buildings, the floors above the ground level will be of pink Missouri granite. Glass and masonry are horizontally separated by a 22-ft-wide continuous gallery, which will serve as promenade deck on the upper floor and provide cover for an arcade at the ground level (*below*). A landscaped court within the building will be the focal point seen from the main stair hall. Deliveries to the library will be made through a tun-

Eugene J. Mackey

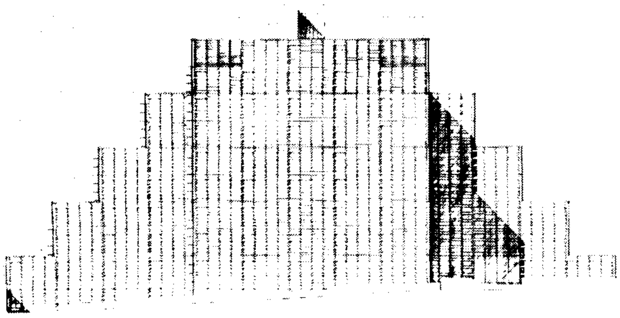


Herb Weitman

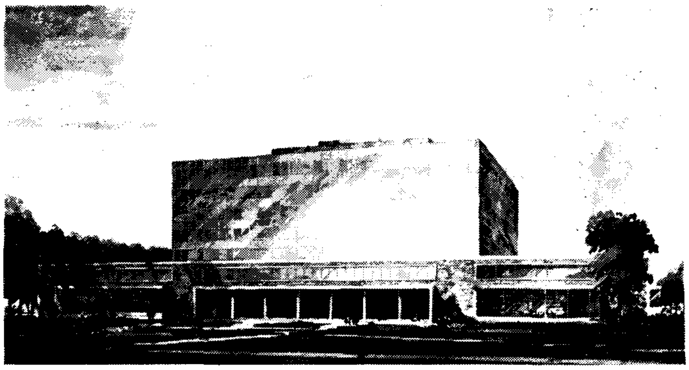
Joseph D. Murphy



WASHINGTON UNIVERSITY COMPETITION



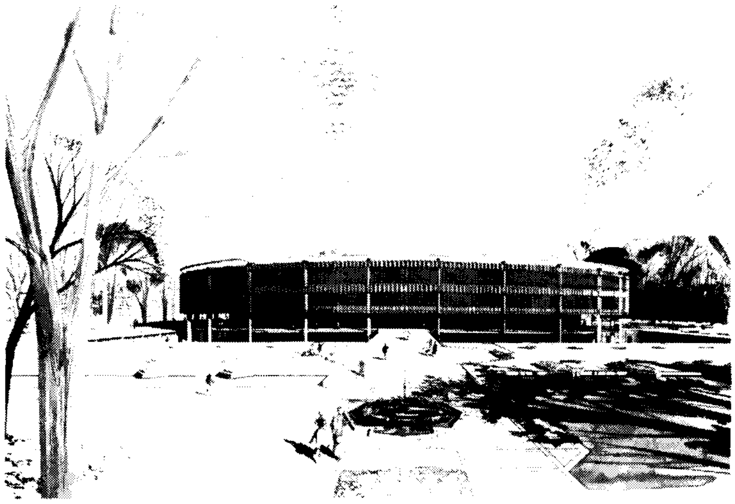
Design by Kahn (left) *is a concrete structure. "Future expansion" is accomplished "by adding vertically to stepped wings any required number of one-story units with 17'-4" bays."*



Five-story glass building (right) *was entry of Jamieson, Spearl, Hammond & Grolock.*

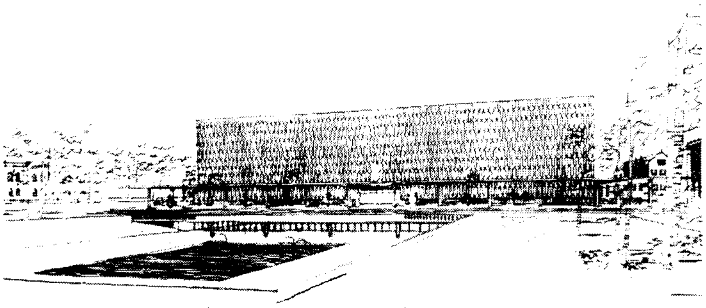
Circular library (below), *by Caudill, Rowlett, Scott & Associates, uses copper and glass on exterior.*

nel from the service road on the north side of the campus. The building will contain approximately two million cubic feet, affording space for 900,000 books, and providing reading facilities for 1200 students and 75 faculty members. Other design contestants were: Caudill, Rowlett, Scott & Associates, Bryan, Tex.; Louis I. Kahn, Philadelphia, Pa.; Edward D. Stone, New York, N. Y.; Hellmuth, Obata & Kassabaum, Inc., St. Louis Mo.; and Jamieson, Spearl, Hammond & Grolock, St. Louis, Mo.



Design by Hellmuth, Obata & Kassabaum, Inc. (above) *was to harmonize with existing buildings through use of pink granite for exterior walls and conformity in building height.*

Stone's entry (left) *was a rectangular building with a central, multistoried hall and a sunken garden.*



Washington Report

by Frederick Gutheim

Opposition to Federal dispersal policies in the national capital area has been inevitable from downtown interests, if slow in materializing. Last month, two powerful groups—the Washington Board of Trade and the District Bankers Association — announced they would formally oppose the policy of the National Security Council to reduce the vulnerability of the capital by dispersing many Federal agencies to a zone 20 to 30 miles from the center of Washington. Most recent is a proposal to build a $31-millions project near Washington for Weather Bureau/Coast and Geodetic Survey. Moreover, every month has brought news of massive suburban developments here, as in all major large cities. Measured in houses, stores, industries, utilities, or any other type of building, it is clear that the area outside the Federal city is growing ten times as rapidly as the central district. This development is taking place without regard to dispersal—and is unlikely to be affected by it. Steps toward regional government might usefully be taken, if dispersal is to have a better-planned context. Anyone trying to stop the spreading-out movements, whether spontaneous or in response to security concepts, is a bit like King Canute. The belated appearance of these representative central-city forces, however, will be a healthy move in forcing the Federal Government once again to define the Federal interest in its capital—a job that has to be done at least once every decade. In addition to the usual questions of the franchise and the Federal share of the cost of local government, we are due to consider dispersal, a metropolitan regional housing and redevelopment agency or one with extra-territorial powers, and some other segregation-liked isssues. If the National Security Council thinks it is going to limit the dispersal question to matters related to the hydrogen bomb, it is due for a rude awakening.

• In addition to the proposed National Auditorium (about which I wrote at length in March 1956 P/A) local interest in a stadium has been kindled by the endorsement President Eisenhower has given this proposal at a recent news conference. A stadium commission was authorized by Congress a dozen or so years ago. While it is still in being—on paper, at least—the Federally established body never produced a concrete proposal. It is redevelopment powers, of course, that are now looked to as the means of realizing such a project. Those powers, too, are the best hope for putting together the powerful interests in the existing commercial stadium (strangled by a lack of adequate parking) and what is desired in the way of a new facility.

• The best bet now is that the strong public-housing sentiment expressed in the Senate can be made to prevail in the House. Not that 135,000 units a year (the Senate figure) or anything like it can or should prevail, but something substantially in excess of the 35,000 annual figure the Administration has asked will emerge from the ultimate conference.

• Less than a year ago, Wallace Harrison, on behalf of the Commission of Fine Arts, appealed to Congress not to allow the destruction of Robert Mills' Old Patent Office building, in recent years the home of the Civil Service Commission. Situated in the commercial district, the use of the site for a parking structure had been agitated. The General Services Administration had concluded it was unsuited for continued use as an office building. An unbelievably constructive solution assuring the preservation of this important Greek Revival monument has been reached by the decision to turn it into a National Portrait Gallery. This fine conception is the work of David Finley, Chairman of the Commission of Fine Arts, and Leonard Carmichael, Secretary of the Smithsonian Institution, with the co-operation of the General Services Administration. It is to be hoped that the House Public Works Committee will speedily endorse this recommendation. The proposed Gallery will involve some conversion of the present building, and will become effective at some time in the indefinite future when the reshuffling of Federal agencies now occupying temporary structures is farther advanced. The Gallery will become a repository for paintings now in the possession of the National Museum, the National Gallery of Fine Arts, and other government agencies, including, I should hope, at least some really fine ones now hanging forgotten in departmental corridors. (While peparing this note I consulted H. M. Pierce Gallagher's biography of Mills and was surprised to learn that because of its irregular site, jutting into F Street, the Patent Office has been menaced from early days by those who wanted to "plant it out"; and that since 1925, at least, it has had to be defended against those who would demolish it.)

While his public service in his capacity of Chairman of the Fine Arts Commission continues, David Finley's retirement as director of the National Gallery of Art ought to be noted. The soft-spoken South Carolinian who guided the destinies of this institution from the time it was a gleam in Andrew W. Mellon's eye, is succeeded by John Walker, who has been on the Gallery staff since 1939.

• On Capitol Hill, the list of building projects grows and grows. The extension of the historic East Front of the Capitol, already authorized by Congress and endowed with a sufficient appropriation to get the work started, will be held up until after the January inauguration ceremonies. In that time a panel of consultants will report. But, meanwhile, plans for a parking structure under the East grounds, a complete landscaping re-do, and new buildings for both houses of Congress (including the provision of a mammoth restaurant in the court of the House Office Building) have been announced. Land is being acquired for additional expansion beyond the new Senate Office Building now under construction. So far, however, there is little to show that this list is more than piecemeal projects being rammed through by J. George Stewart, the politically astute Architect of the Capitol. On the whole, not a promising situation.

F-nancial News

by William Hurd Hillyer

No longer do we hear the word "booming" applied to current conditions. New York's topsize trust company concedes that business confidence seems to have weakened during the past month; the city's biggest national bank puts optimism on the defensive by admitting that certain adjustments have "cut deep." The trust company reveals that a new cyclical downturn is being discussed as a possibility; the bank sees an over-all pattern of stability, yet finds it necessary to explain that today's soft spots in business are caused by the current shift from an automobile and homebuilding demand to a demand for industrial equipment. These are not the best of tidings for architects, but pessimism wanes as our page progresses.

Both observers agree that the '56 midyear picture differs radically from the analogous scene in '55. Gross national product has assumed a "sideward drift" in contrast with the "pronounced upward tilt" of last year, having risen less than 1/2 of 1 percent since December. Money was easy last year; today it is tight and may get tighter. Residential nonfarm construction is down a billion dollars from the annual rate at the close of '55, and dwelling starts are 80,000 less for the six months ending March of this year than for last year's like period. On the other hand, capital outlays by business and various public entities continue to expand. Such outlays tend to augment tangible production and thus provide material for renewed prosperity.

• The most acute strain on the construction sector of the nation's economy, as seen by the Federal Reserve Board, is in the costs area. Steel has risen 60 index points since mid-'54; lumber and plumbing equipment, 10 and 15 points respectively; building materials as a whole are up some 16 index points or around 7% since the beginning of 1955; complete building costs, over 10 points. Arresting as these transitory figures are, the problem they pose will soon be dwarfed by the irreversible scarcity of suitable land—a fundamental depletion which carries with it a steady cost-increase for prepared residential sites.

• More heartening is our next array of figures, dealing with the cost factor pertaining to such expansion as covers the type of construction which serves residential areas and makes them livable. According to a current Federal Reserve study, total cost of these auxiliaries is rivaling that of the residences themselves. Deduction of local streets, roads, and utilities from a nationwide $10.6 billions leaves $6.1 billions as a sum pertinent to architecture. This amount consists of $2.7 billions for school and managerial edifices, $1.5 billion for stores, $1.1 billion for hospitals and recreation centers, $700 millions for churches. Architecture's nonresidential domain has been bettered, dollarwise, by over 300% since 1946.

• Bankers are beginning to realize that the nexus between various types of construction is much closer than a few years back. Today's dwelling, whether single or multiple, is surrounded by what might be called a magnetic field of complex community interest. Mortgage lenders, as well as builders, are intrigued by these new population patterns. Though steps are officially contemplated to make homebuilding financially easier, moneyed men feel that this does not go far enough. They favor conventional mortgage funds without Federal guarantee, plus state and municipal long-term credits, as more practicable dollar sources for both the dwelling units and their supporting adjuncts. Happily enough, the volume of "conventionals" is rising and the municipal bond market has regained its appetite. In addition, corporate shares are being used to develop shopping centers: a stock issue for that purpose is announced by a major food chain subsidiary.

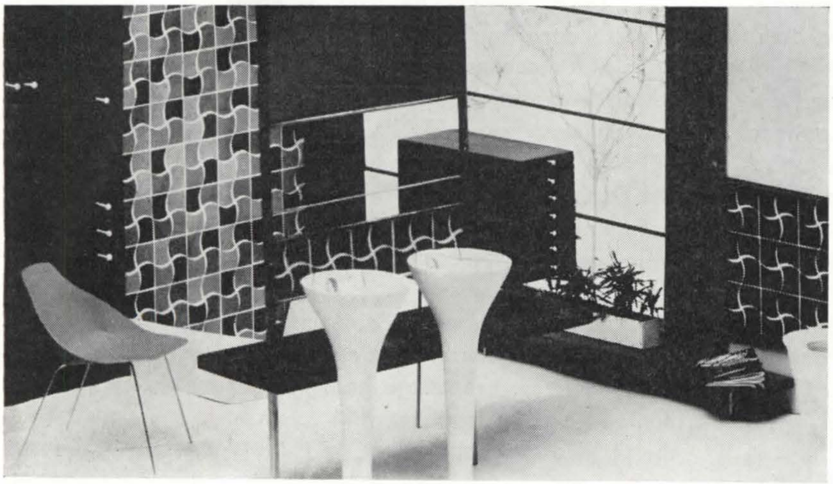
• Buyers are preferring larger homes in face of rising costs. A recent survey inspired by Wall Street reveals that postwar family expansion has provoked a demand for more bedrooms, baths, and (history repeats itself) full-sized separate dining rooms. The two-bedroom G.I. house, builders report, is no longer a quick-sale commodity. Representative builders are quoted as discontinuing them entirely in some areas and going in for more spacious and individualized models. Here, again, the preference is for conventional mortgages, devoid of FHA or VA underwriting. This turn of events further enlarges the architect's opportunities.

• The pressure for new homes having eased, attention is turning to the vast reservoir of public architectural construction, particularly institutions and schools, accumulated while residential activities was at its highest. Bond issues, earmarked for such purposes, may be floated in fair volume during the July re-investment period, now that Federal Reserve has eased its credit policy. Public nonresidential building will touch an estimated $4 billions in 1956 and total new construction of some $27 billions is expected for the year, exclusive of nonarchitectural items.

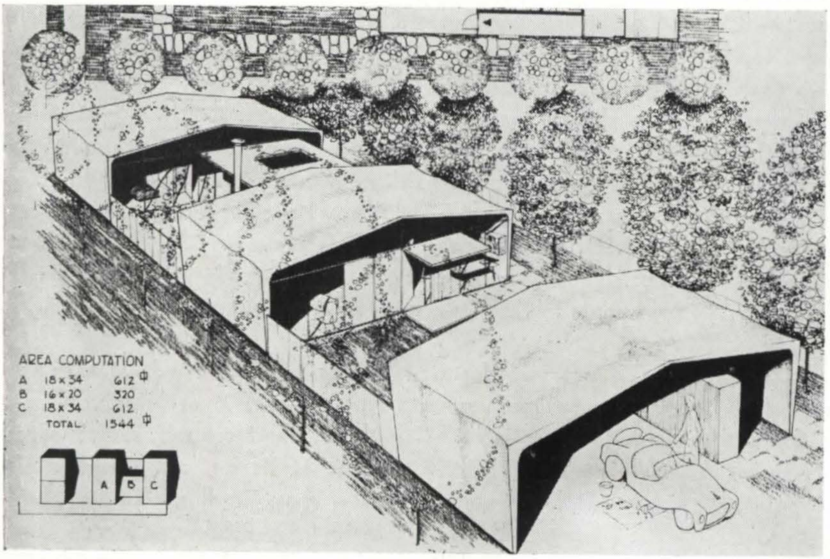
• As 1956 swings into its second half, it is preceded by one large question mark: Where's the money coming from? The Securities & Exchange Commission reports that individual savings (the ultimate source) were $3.3 billions less in 1955 than during the previous year, while net private debt shot up $18 billions. A Chicago trust company's prepared graph, however, shows a steep decline in personal spending since Christmas. Savings institutions, according to Federal Reserve figures, report a healthy upturn in deposits of over $1 billion for banks alone. Business, meanwhile, is "moving" along at a quickened pace," to quote the Federal Reserve Bank of Chicago.

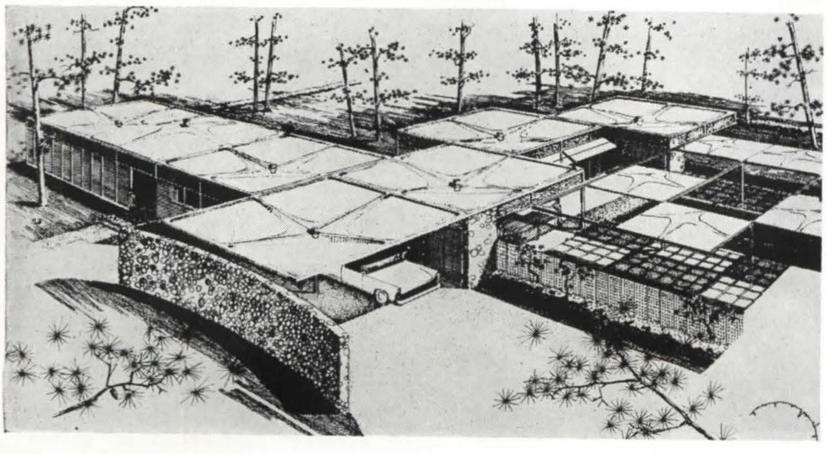
• A concluding note (not in a minor key) is supplied by the Department of Commerce, which estimates that $850 millions will be spent on church buildings in 1956—eight times the amount so employed 10 years ago. Some $219 millions went into religious edifices during January-March.

PLASTICS TEST DESIGNERS' TALENTS



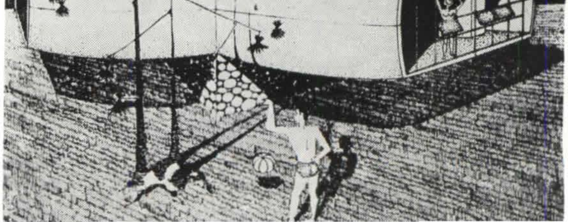
Although a 50-percent increase (over 1954) in plastic wall-tile sales is anticipated by 1960, the prediction is considered valid only if improved design and workmanship are coupled with more effective marketing. Two new examples of improved tile design, making maximum use of plastic's inherent formability and color, were created at the Pratt Institute Industrial Design Laboratory for Monsanto Chemical Company's Plastic Division. Bathroom (*above left*) was designed by Alexander Cranstoun; living room (*above*) is the work of Donald Tripp—both June graduates.





Thirteen prizewinners in the Plastic House Competition, Sponsored by the Society of the Plastics Industry, Inc., were announced in conjunction with the 7th National Plastics Exposition staged in New York last month. Winners were named in categories ranging from overall design for small homes not more than 1600 sq ft in area, to designs for special living spaces, such as bathrooms, playrooms, outdoor living or porch areas.

Grand Prize in "Best Houses" category was won by entry of William Goodwin, Marblehead, Mass. (*center left*); second and third prize entries (*bottom left* and *below, respectively*) were submitted by Hermes & Colucci, Cincinnati, Ohio, and John Dyal, Boston, Mass.



structures in membrane on co-acting ribs

by Paul Chelazzi*

After 22 years of practice in China and Southeast Asia, this author recently resumed contacts with the Western professional world. Although greatly impressed by many of the developments that he saw upon his return, he felt at the same time that some of the structures in the contemporary scene conveyed the impression of seeking stability in a vacuum—as if these structures could be sustained in their mechanical labor by some uncanny means.

He must concur that imagination is still, and unquestionably always will be, an impelling force in structural studies leading toward progressive architecture. At the same time, however, he firmly believes that imaginative thinking can only create geometrical, decorative figments unless the structures imagined are primarily conceived as physical means for supporting loads that are governed in their behavior by the laws of statics and elasticity which cannot be fancifully reinterpreted—even though they are susceptible of being applied in novel but equally valid approaches other than the conventional. The approach which he subscribes to is based on the philosophy that architectural expression can only be found in mechanically efficient, constructionally healthy structures.

In exploring structural studies, mathematics is a precious tool. This author believes, however, that any architect could grasp the essentials in mechanics for preliminary structural design, if he would study the three equations of statics not as formulas, but rather as they express the real phenomena of the physical world surrounding us. After observing the ingenious structures fabricated by Chinese and Japanese farmers, he also believes that a sense of statics may be developed intuitively—even by our own sidewalk superintendents, if a keen interest in construction is guided by but a secondary-school education.

With this brief background, let us consider imaginative structural thinking for the analysis of structures in membrane on co-acting ribs.

*Engineer-Architect, Member of American Society of Civil Engineers, New York, N. Y.

background analysis

A roughly cut stone lintel supported as shown (*Figure 1a*) develops the same resistance whether in compression or in tension. Eight equally spaced loads **P** carried by the lintel obviously produce reactions **R** at supports which are equal to **4P**.

Let us observe the effect of these loads and reactions with respect to the mid-span section **A-A**, on both sides of which the effect is similar (but reversed). Reactions **R** develop moments M_r tending to bend the beam upward while gravity loads **P** cause moments M_p in the opposite direction. The difference between these two moments, M_r—M_p, is moment **M** stressing the material fibers crossing section **A-A** (*Figure 1b*). Intuitively we can visualize that in responding to moment **M** (*Figure 1a*) an upper zone of the lintel develops resisting forces to compression which may be represented by their resultant **C**, while a lower zone of the lintel produces an equal amount of tension represented by its resultant **T**. In developing these resistances, **C** and **T**, the top fibers will naturally be the most compressed and maximum tension will occur in the bottom fibers (*Figure 1b*). In such a reversal of stressing, there should be a layer (neutral surface) between the top and bottom where fibers are not stressed at all. All fibers in the section, however, could contribute full resistance up to their maximum allowable stress. Actually, only the top and bottom fibers do so while the remaining fibers have to work less and less as the layer of fibers is located closer to the neutral surface. Evidently, the result is that only one half of the potential resistance in the material of the lintel section can be utilized.

On the other hand, the resisting capacity of the lintel is not produced by the internal forces **C** and **T** alone, but rather by a moment of which they are only one component factor—the other being the distance separating them, namely the arm of resistance (*Figure 1c*).

In a rectangular section, which has been the traditional shape of beams up until the last century (*Figure 2*), the

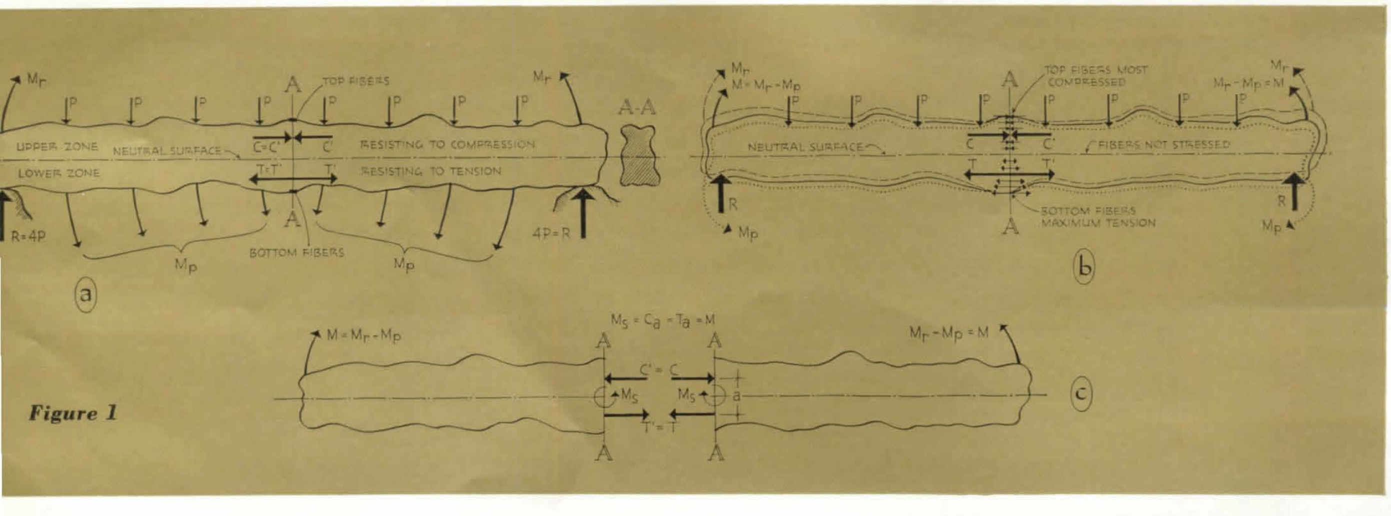


Figure 1

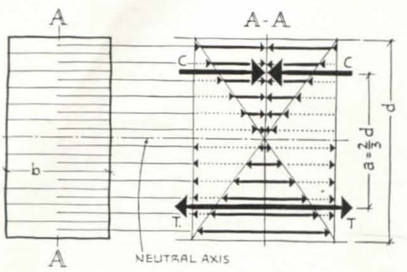


Figure 2—homogeneous-material section

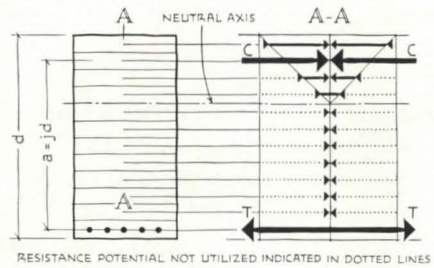


Figure 3—reinforced-concrete section

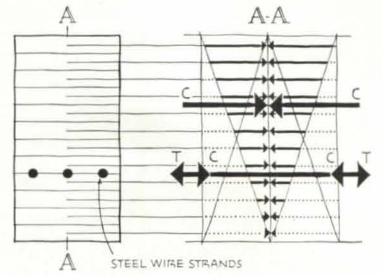


Figure 4—prestressed-concrete section

arm of resistance cannot extend beyond two-thirds of the beam depth **d**.

The preceding limitations of the resistance of internally co-active homogeneous-material beams was intuitively understood by Galileo, but apparently no further advance was made until reinforced concrete was discovered. Possibly because of its competitive price in most building markets, the efficiency of reinforced-concrete sections was not questioned until recently—following developments in prestressed concrete.

As used in beams, reinforced concrete is fundamentally not a homogenous material. This is because concrete has practically no resistance to tension. Thus, in such a beam, only the upper portion of the concrete is used for stress-carrying purposes. The lower part of the beam simply encases the reinforcing steel.

In a typical reinforced-concrete rectangular section (*Figure 3*), utilization of potential resistance to compression in the concrete may be as low as 11½ percent, but not over 27½ percent of the total in the section—depending on the combination of maximum working stresses assumed for concrete and steel. The use of prestressing techniques brings concrete for beams back into the class of the homogenous material mentioned above. Thus, in a prestressed beam, one half of the potential resistance of the concrete is utilized (*Figure 4*). Full or 100-percent utilization of resistance potential is possible only when the section is axially stressed (*Figure 5*). This simple but basically important mechanical fact was first and intuitively realized by Palladio over four centuries ago. He is generally credited with the invention of the truss or rather with the "scientific use of the truss element, the rigid triangle."[1] But rather than thinking only of triangles, his keen sense of mechanics led him to the concept of separating the compressed zone of a rectangular timber beam from the one in tension and connecting them again by means of an open-web system, thereby restoring the co-action between the separated sections (*Figure 6*). Thus he provided far larger arms than the ones limited by a rectangular-shaped beam while utilizing the full resistance potential of the two half sections which he rendered axially stressed. Regarding the extra material and labor required for the web work, he undoubtedly considered that the additional loading capacity provided by extending the arm would amply compensate for it.

Concerning this rather personal and free interpretation of Palladio's possible concepts of design, the author feels justified in thinking that it is not the more or less elaborate geometrical pattern of web work which provides for the truss-loading capacity, but rather its capacity is essentially due to the resisting forces in the sections of the axially stressed chords and equally on the truss panel depth. The web system does not directly contribute any work in resisting the effect of the loading, but becomes indirectly stressed while performing its basic function of connecting the chords.

It has been stated that web members "take up" shear. This they do, by transfering axial load back and forth to the chords, as they logically should do as they are only connecting members. Later versions of the linear truss have been produced by "stretching" these noted concepts of Palladio.

As timber was replaced by steel and fabricating techniques were perfected, larger and larger panel depths could be attempted, thereby rendering more and more questionable the web system's capacity to connect and adequately maintain the truss in the vertical plane of the external loads. To that end, heavier and heavier web work has to be provided together with rigid cross-bracing methods in order to resist the ever larger secondary stresses which develop due to buckling and lateral bending (*Figure 7*). All this causes one to wonder if span and panel depth of framed linear trusses have not far exceeded the limit of mechanical fitness for this type of structure.

Among the comparatively recent re-elaborations of Palladio's linear truss is the Howe-type truss (*Figure 8*).

In its conventional design an open-web truss system connects chords of the same material. Usually, timber or steel has to be used for all members since, under loading, the lower chord in tension should elongate by just as much as the compressed upper chord is shortened—otherwise stability is impaired.

[1] Johnson, Bryan & Turneaure. *Modern Framed Structures.*

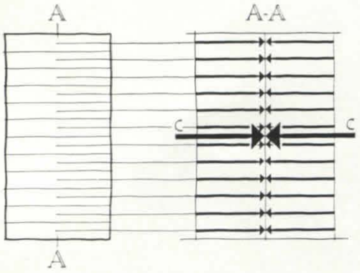


Figure 5—axially stressed section

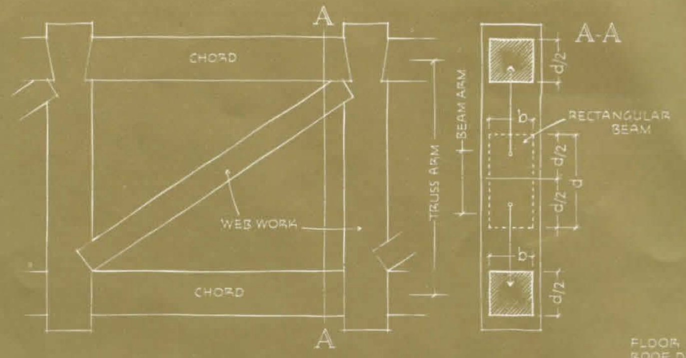


Figure 6—Palladio's linear truss (circa 1550 A.D.)

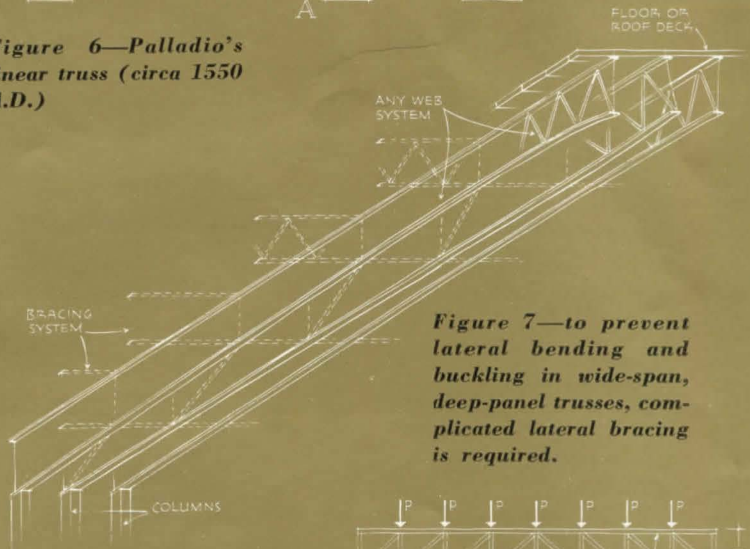


Figure 7—to prevent lateral bending and buckling in wide-span, deep-panel trusses, complicated lateral bracing is required.

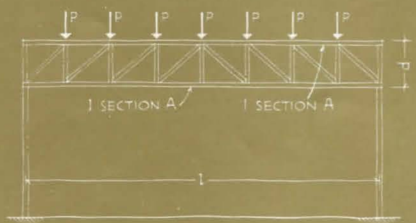


Figure 8—Howe-type truss

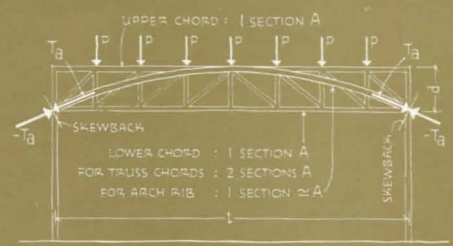


Figure 9—comparison of Howe truss and arch system

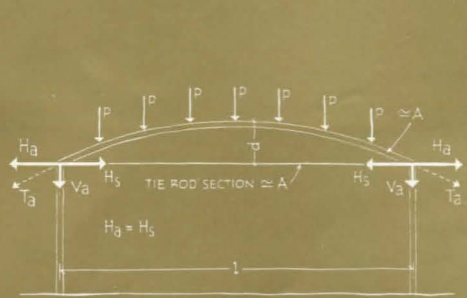


Figure 10—tied arch

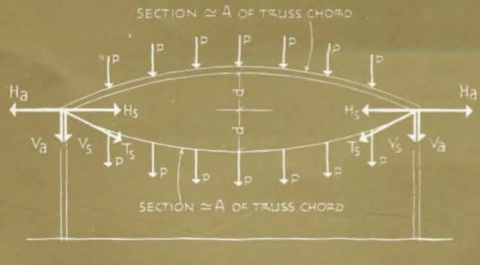
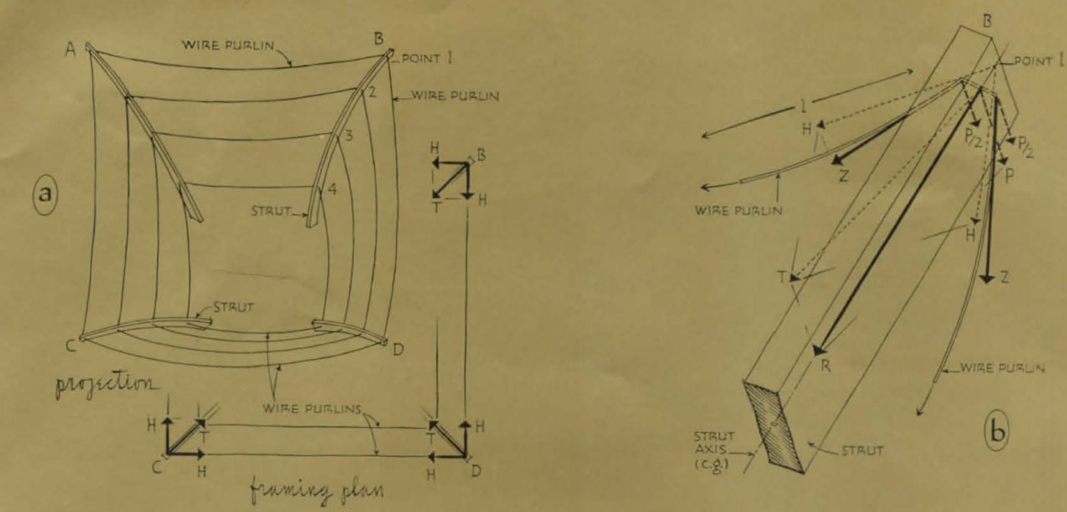


Figure 11—hypothetical "Suspenarch" supporting unit

Should an arch with a rise equal to the above truss' depth support the same loading (*Figure 9*), it would require a sectional area of the same material practically equal to that of *one* of the truss' chords. Furthermore the arch could be shaped so that its axis follows the pressure line of loads and as a result be axially stressed to allow full utilization of the resistance potential in the section. This would be possible, provided that the supports can adequately react to the inclined thrust of the arch $\mathbf{T_a}$ at its skewbacks. However, if the arch has to be supported on slender columns (*Figure 10*), a tie rod would be needed to balance horizontal components $\mathbf{H_a}$ of arch thrust $\mathbf{T_a}$. For this tie rod, a load capacity equal to that of one truss chord would be required, thus offsetting the advantage offered by the arch within the span—namely, about 50 percent of the sectional area of main structural members and elimination of web work. On the other hand, should the tie-rod (*Figure 11*) hang on a symmetrical funicular like that of the arch while supporting a similar load, it would require practically the same section as that needed to resist passively $\mathbf{H_a}$ without carrying any load (*Figure 10*). At the same time the curved tie-rod would provide at the supports an equal horizontal inward component $\mathbf{H_s}$ to balance the opposed corresponding $\mathbf{H_a}$ of arch thrust $\mathbf{T_a}$. As a result, an hypothetical structure is developed combining an arch and a suspension system which may support twice as much load as that of the tied arch, although requiring practically an equal amount of the same material.



These concepts of design[2] which the author has called "suspenarch" may also be termed principles of mechanical economy, which may be summarized as:

A. From a mechanical point of view, structures carrying gravity load along the span are more economical when less exposed to the combined action of bending moments, shear, buckling, lateral bending and, in some cases, torsion, which causes an accumulation of stressing. Most economical are those structures in which loading results in axial stressing only.

B. Within certain limits of span, the arch and suspension systems produce maximum mechanical economy insofar as their axes geometrically follow the loads' pressure line which may be a funicular, parabolic, catenary, or other curve corresponding to particular load distribution.

C. In structures of combined arch and suspension systems, conditions set by the first two equations of statics, namely $\Sigma H' = O$ and ΣV O, may be produced through external mechanical "co-reaction" of component systems on their common hinge at support or joint. Since the main carrying members of said structures are not in themselves subjected to bending moments, the third equation of statics, namely $\Sigma M = O$ obviously does not apply within the individual carrying member itself. The component systems of these structures are not connected within the span by web members which would generate an internal co-action between them. They are designed for free, independent deformation of component systems according to the natural elastic law of the respective material of which they are built.

Preliminary designs based upon the above concepts have been prepared for hangar structures and have proved highly competitive with comparable types of conventional design. They have also been used in studies of the supporting units for reinforced-concrete buildings up to 30 stories high while similar ones have been considered in exploratory studies for a 120-story and a 300-story building.

application

Structures in membrane on co-acting groin ribs express three-dimensionally other aspects of mechanical economy. A clearer understanding of these principles may be had through observing their application in a hypothetical wire-strut structure designed for a roof covering a square plan (*Figure 12a*).

Four struts in diagonal locations support four continuous steel-wire purlins which, under the loading of the roof deck, obviously hang parabolically.

Let us examine the outer wire purlin intersecting and discharging load at point **1** on strut **B** (*Figure 12b*). Due to symmetry, the wire purlin exerts the same pull **Z** on both sides of the strut—**H** being the horizontal components and **P/2** (each being equal to one half of the load **P = wl/2** on the purlin's span) the vertical ones. The resultant of the two horizontal components **H**, is **T**, acting in the same plane in a diagonal direction (*Figures 12a and 12b*) while the two vertical components **P/2** combine at point **1**. This is indicated as a plane for a clearer understanding of the mechanics.

As **T** combines with **P**, a final resultant **R**, which also acts diagonally but downwardly inclined, is produced. Should the strut be similarly inclined as resultant **R**, it would become axially stressed in compression for a distance up to intersection **2**. Thus its resistance potential could be fully utilized as could that of the purlin —which, obviously, is also axially stressed in tension.

The value of tension **Z** in the outer wire purlin, which determines those of all of the other forces in the system, is analyti-

[2] Chelazzi has embodied these principles on several structures, three of which were granted a U. S. Patent in 1941.

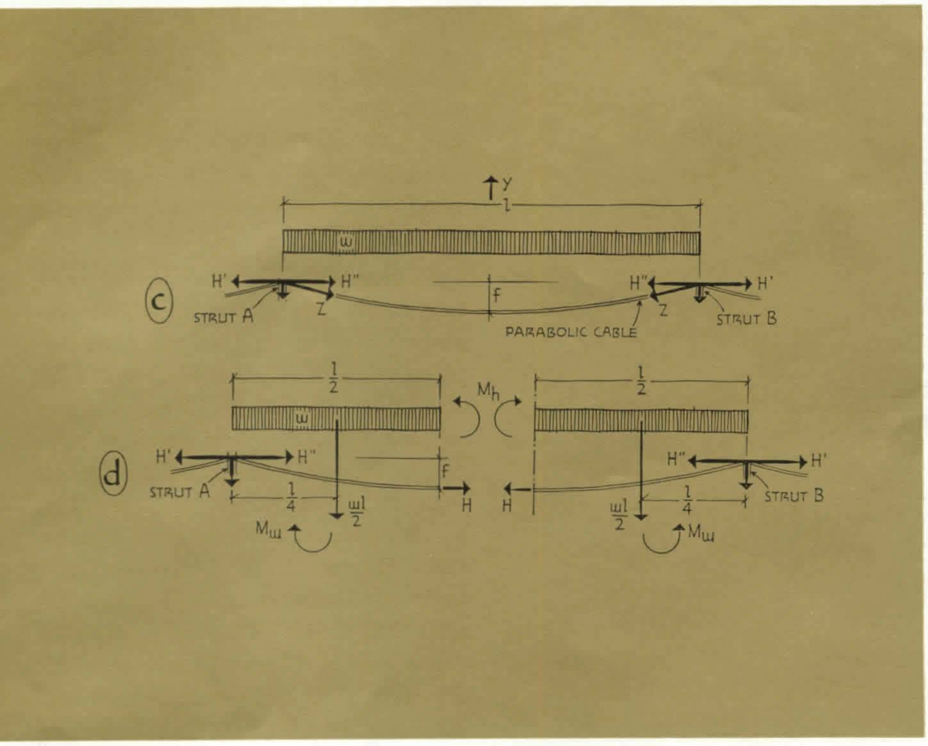


Figure 12—roof framing and wire purlins on struts

cally derived from that of **H**, which is in turn obtained through integrating twice the differential equation of the parabolic cable: $\frac{d^2y}{dx^2} = \frac{w}{H}$, in which **w** = unit linear load of the span.

As architects and engineers in general—including the author and the sidewalk superintendents—do not frequently use that sort of mathematics, let us consider what may possibly be a more realistic evaluation of **H**, in simpler terms of statics, which also gives a clearer picture of mechanical facts involved in the uniform loading of a cable.

If the cable (*Figure 12c*) is cut at midspan (*Figure 12d*), it can be visualized that in order to hold up the load, two equal and opposed pulls **H** have to be applied to both faces of the cut cable. At supports **A** and **B** the inward pulls **H** at midspan produce equal outwardly directed reactions **H'**, which are in turn balanced by the corresponding ones **H''** of the adjoining spans. It follows that the cable is in equilibrium at supports **A** and **B** where, consequently, the sum of moments due to forces acting on the respective half span should equate to zero.

The total load on each half span is **wl/2**, which applied to the load diagram's center of gravity produces the same moment as the distributed uniform loading itself. It will be seen that **wl/2** acting downwardly causes a moment M_w with reference to **A**, which operates in the opposite direction to that of M_h due to the **H** applied on the left face of the cut cable. Thus (*see Figure 12d*):

$M_w = M_h$; namely, $\frac{wl}{2} \times \frac{l}{4} = H \times f$; hence, $\frac{wl^2}{8} = Hf$; and $H = \frac{wl^2}{8f}$.

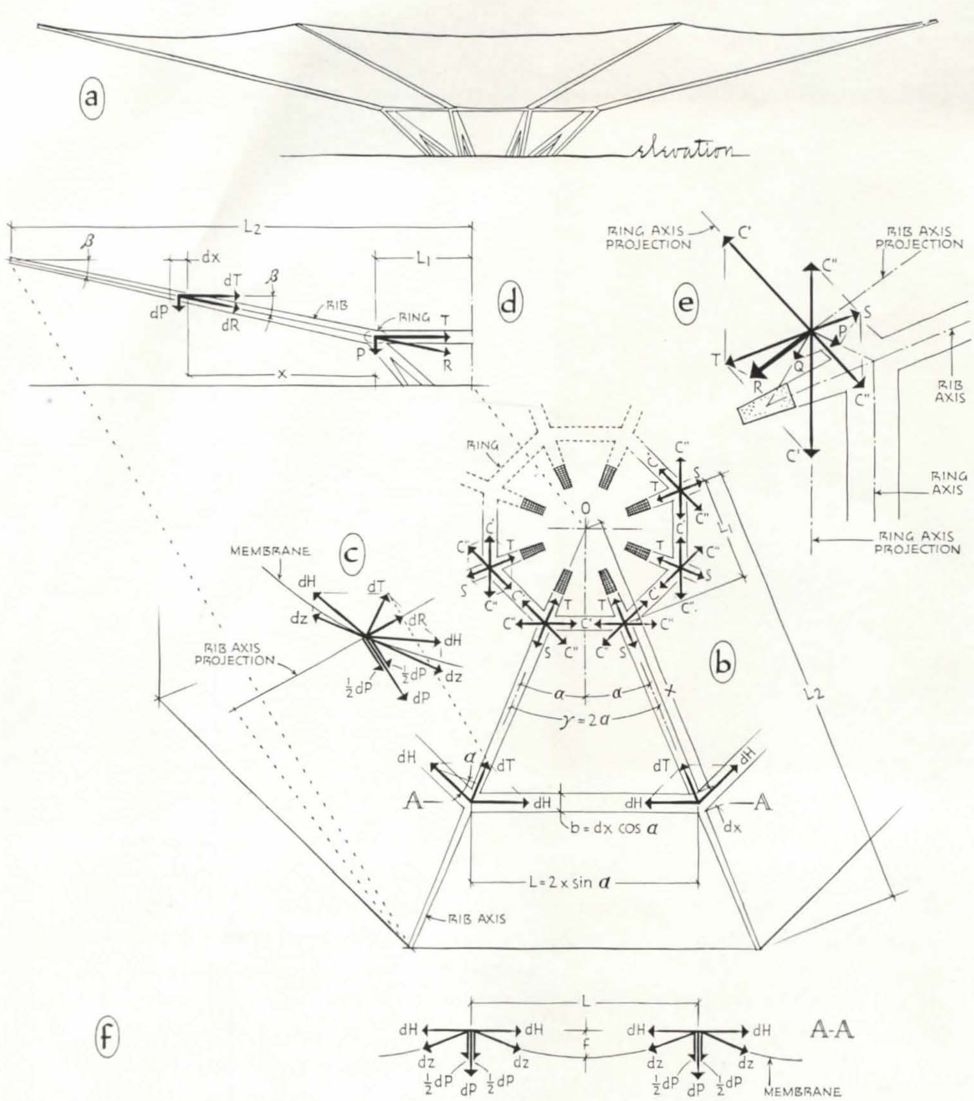
For small sag/span ratios, usually assumed in the design of this kind of structure, **H** is practically equal to **Z**. Though they have to work together under loading, compression simultaneously causes an amount of shortening in struts which is independent from elongation in wire purlins due to tension.

In other words, behavior of struts and wire purlins is not conditioned by elastic "co-action" as is required in members of conventional trusses in which the elongation of the lower chord is equal to the shortening of the upper chord and, for that reason, have to be built of the same material.

What actually occurs in these structures is an external, balanced mechanical "co-reaction" between the wire purlins and struts at points on the struts where the two systems are connected. This external co-reaction is governed only by the relative geometrical location of members of component supporting systems, which for all practical purposes may be assumed unaffected by the deformation of the individual members—usually small compared with their size.

This advantage is significant in practical design. For example, it permits the use of concrete struts in conjunction with purlins of steel wire or Manila rope or any other suitable material for supporting load along the span, regardless of the differences in the moduli of elasticity of these materials.

From a mechanical point of view this advantage is also economically significant—particularly in countries where, for example, the unit cost of compression resistance in concrete is considerably lower than that of steel. Hence, a structure designed with concrete struts and steel-cable wire purlins may prove cheaper than an all-steel job. This condition, of course, is dependent upon span limitations. For large spans where the difference between the shortening of arched members and the elongation of cables considerably alters the geometrical shape of the component systems, their balanced co-reaction at the supports may be assured through the provision of prefabrication and erection methods.



f

$$(1)\ b = dx \cos\alpha$$

$$(2)\ l = 2\,x \sin\alpha$$

$$(3)\ dH = \frac{w'l^2}{8f}$$

$$(4)\ \frac{l}{f} = c = \text{constant}$$

$$(5)\ w' = wb = wdx \cos\alpha$$

$$(6)\ dH = \frac{w'l}{8}\,\frac{l}{f}$$

$$(7)\ dH = \frac{wdx\ \cos\alpha}{8}\,2\,x \sin\alpha\, c = \frac{w}{4} \sin\alpha \cos\alpha\ c\ xdx$$

$$(8)\ dT = 2\ dH \sin\alpha$$

$$(9)\ dT = 2\,\frac{w}{4} \sin\alpha \cos\alpha\ c\ xdx \sin\alpha = \tfrac{1}{2}\,wc \sin^2\alpha \cos\alpha\ xdx \quad (9a)\ dP = 2(\tfrac{1}{2}\,w'l) = w'l$$

$$(10)\ dP = wdx \cos\alpha\ 2\,x \sin\alpha = 2\,w \sin\alpha \cos\alpha\ xdx$$

$$(11)\ \tan\beta = \frac{dP}{dT} = \frac{2\,w \sin\alpha \cos\alpha\ xdx}{\tfrac{1}{2}\,w\,c \sin^2\alpha \cos\alpha\ xdx} = \frac{4}{c \sin\alpha}$$

$$(12)\ dR = dP\,/\,\sin\beta$$

$$(13)\ dR = \frac{2\,w \sin\alpha \cos\alpha}{\sin\beta}\,xdx$$

$$(14)\ \sin\beta = \frac{\tan\beta}{(1 + \tan^2\beta)^{\frac{1}{2}}}$$

$$(15)\ \sin\beta = \frac{4/c \sin\alpha}{(1 + 16/c^2 \sin^2\alpha)^{\frac{1}{2}}} = \frac{4}{c \sin\alpha\,(1 + 16/c^2 \sin^2\alpha)^{\frac{1}{2}}}$$

$$(16)\ dR = \tfrac{1}{2}\,w\,c \sin^2\alpha \cos\alpha\,(1 + 16/c^2 \sin^2\alpha)^{\frac{1}{2}}\ xdx$$

$$(17)\ \frac{dR}{dx} = \tfrac{1}{2}\,w\,c \sin^2\alpha \cos\alpha\,(1 + 16/c^2 \sin^2\alpha)^{\frac{1}{2}}\ x$$

$$(18)\ Ro = \int_{0}^{L_2} \tfrac{1}{2}\,w\,c \sin^2\alpha \cos\alpha\,(1 + 16/c^2 \sin^2\alpha)^{\frac{1}{2}}\ xdx$$

Figure 13—structure in continuous membrane on linear ribs

Similar concepts have been applied to the design of a structure (*Figure 13a*) in which purlins have been replaced by a roofing membrane and struts replaced by linear groin-ribs continuously *co-reacting* with the membrane along their contiguous surfaces. Though notations appear on an octagonal plan (*Figure 13b*), the following analysis refers to a generic equilateral-polygon plan.

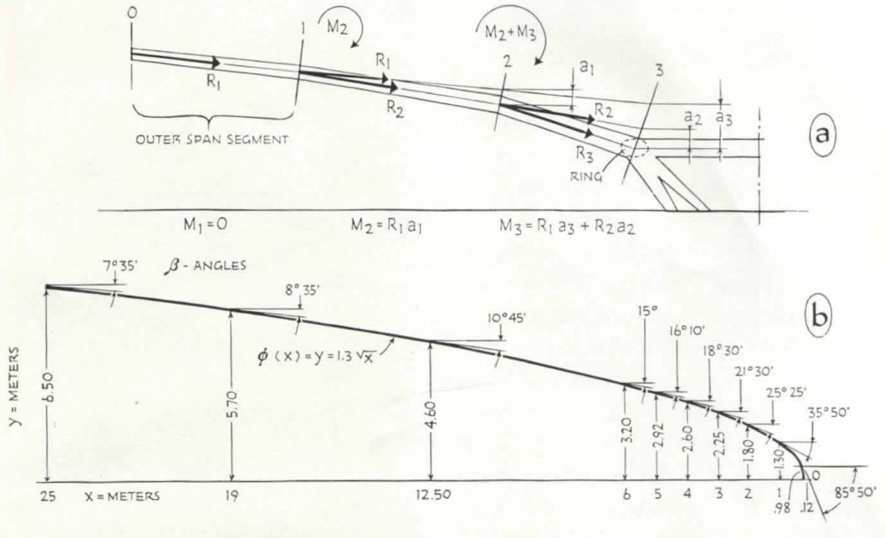
The mechanical behavior of this structure is basically the same as that explained in presenting the preceding hypothetical one (*Figure 12*), as can be noted in the projection of forces diagram (*Figure 13c*). An equilateral polygon may be defined by the angle its diagonals form at the center **0** (*Figure 13b*), $\gamma = 2\alpha$. Reference is now made to equations (*Figure 13f*). It will be seen that a uniformly loaded parabolic mebrane element with a width (**1**) and a span (**2**) exerts thrusts **dZ** on the rib, of which **dH** are the horizontal components. Should **w'** be the linear unit load along the membrane span, the magnitude of horizontal components **dH** is (**3**). If the same sag/span ratio (**4**) is assumed for all membrane elements, and **w** is the load intensity, we find (**5**). We can write (**3**) as in (**6**). Substituting in the latter (**2**), (**4**), and (**5**), we find (**7**). The resultant **dT** of horizontal components **dH** stressing the rib symmetrically is (**8**). Substituting the value of (**7**) in (**8**), we find (**9**).

As the load reaction **dP** is (**9a**), if the value of (**2**) and (**5**) are substituted, we would obtain (**10**). The resultant of **dT** and **dP** is **dR** (*Figures 13c and 13d*). In order that all **dR**s due to membrane elements stress the linear rib axially, it should be positioned with an inclination β, the tangent of which is (**11**). The value of **dR** is given by (**12**) and substituting in it the values of (**10**), we find (**13**). Since (**14**), (**11**) may be written (**15**). By substitution of (**15**) in (**13**), we develop (**16**). Hence (**17**). Therefore integral (**18**) gives the value of resultant R_o at center (**0**). The value of **R** at the intersection with the ring axis is readily obtained by subtracting the value of the same integral between limits **0** and L_1 from the one given by (**18**). **P** and **T** are the components of resultant **R** which stress the ring and strut as indicated in the diagram projection (*Figure 13e*). Due to the inclination of the strut, the gravity load **P** produces a force **S**, the components of which **C″** reduce axial stressing in the ring **C′** *caused by rib thrust* **R.**

Responding to an architectural impulse, the writer investigated possibilities in curved ribs, and a polygonal one (*Figure 14a*) was first considered. However, it was soon realized that stressing in the rib could only be rendered axial within the outer segment of the span, as bending would occur in adjacent segments.

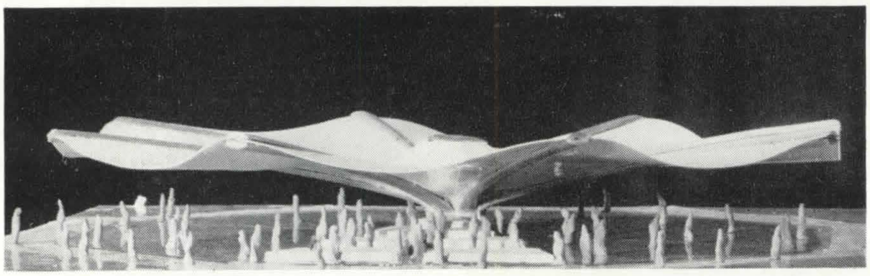
Intuitively, however, it was felt that through gradual adjustment in the membrane sag/span ratio element, resultants **dR** would be more and more inclined and could possibly form a polygonal line of action suitable for shaping the rib to render it axially stressed in all its sections. At this stage mathematics confirmed that a curved-rib shaped on a continuous function would result in being axially stressed at any point where membrane elements intersect, provided their sag/span ratio is equal to the **x**-derivative of the rib-curve function at that point multiplied by **¼sin** α (*Figure 13b*).

But further analysis led to an elliptic integral requiring considerable elaboration on binomial series which would render the approach rather impractical for actual designing purposes.[3] However, the finite differences method (*Figure 14b*) proved much speedier and sufficiently accurate in the preliminary investigations of the first two structures. One of these structures (*Figure 14c*) was designed with a membrane of cement-grouted steel mesh (of the type developed by the Italian Engineer Pier Luigi



Rib span L = 25 meters = 82′; max height = 6.50 meters = 21′3″; w = unit uniform load; $\phi(x) = y = 1.3\,x^{\frac{1}{2}}$; membrane sag/span ratio $c = f(x) = \dfrac{1}{\psi(x)}$;

$\psi(x) = \dfrac{\sin\alpha}{4}\dfrac{\partial\phi(x)}{\partial x}$ whence $c = 16\,x^{\frac{1}{2}}$. Membrane elements' dRs have been obtained through substituting said value of c in equation $\dfrac{dR}{dx} = \frac{1}{2}\,wc\sin^2\alpha\cos\alpha\left(1+\dfrac{16}{c^2\sin^2\alpha}\right)^{\frac{1}{2}}x$. The membrane area between outer end of rib and central ring was then subdivided into 25 elements one meter wide (dx = 1) and their respective dR computed. Summation of all dRs produced value of R acting on the central ring.



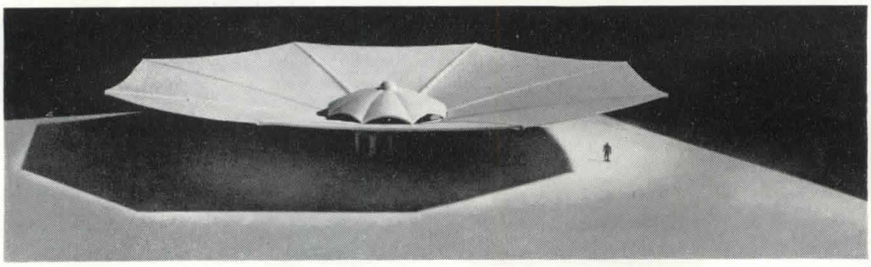


Figure 14—analysis of membrane with curved ribs:* (a, top) *polygonal rib;* (b, above) *continuously-curved rib with outline of analysis by finite-differences method;* (c, left) *groin-ribbed membrane-roof structure designed as a cover for a market place. Membrane material would be concrete-grouted steel-mesh layers;* (d, left below) *all stainless-steel structure.

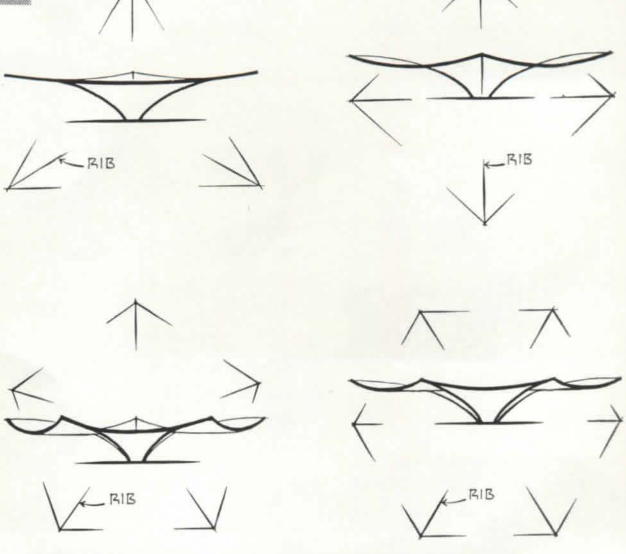


***Figure 15—membrane and rib structures on equilateral plans* (right).**

[3] "Engineers' Notebook," May 1956 *Civil Engineering.*

Nervi), while the other structure (*Figure 14d*) was planned for an all-stainless-steel construction. Possible adjustment of these structures to the requirements of equilateral plan, other than octagonal polygon, are shown (*Figure 15*). The structure (*Figure 16*) features a continuous membrane covering an outer floor area while steel wires support a roofing membrane of acrylic-plastic or resin-glass-fiber material over a centrally skylighted zone. Ribs would be of concrete.

For a structure to shelter a cloister walk (*Figure 17*), the irregularly shaped plan calls for a membrane with variable sag/span ratio and haunched curved ribs to render them axially stressed.

Queries may be anticipated regarding the behavior of these structures under unsymmetrical conditions of loading and upward wind pressure. Replies would depend mostly on specific design load and span assumed. But generally, under upward-wind-pressure conditions, the membrane, acting as continuous thin vaults, may contribute considerable resistance and stiffness. In designs for wide-span ribs, where larger sections are not advisable, tie-down cables may be provided at their outer ends to stabilize the structure. However, no particular difficulties are expected in tackling these and other structural problems, should support be secured for advancing the present phase of exploratory investigation and preliminary design to that of experimental work and final planning.

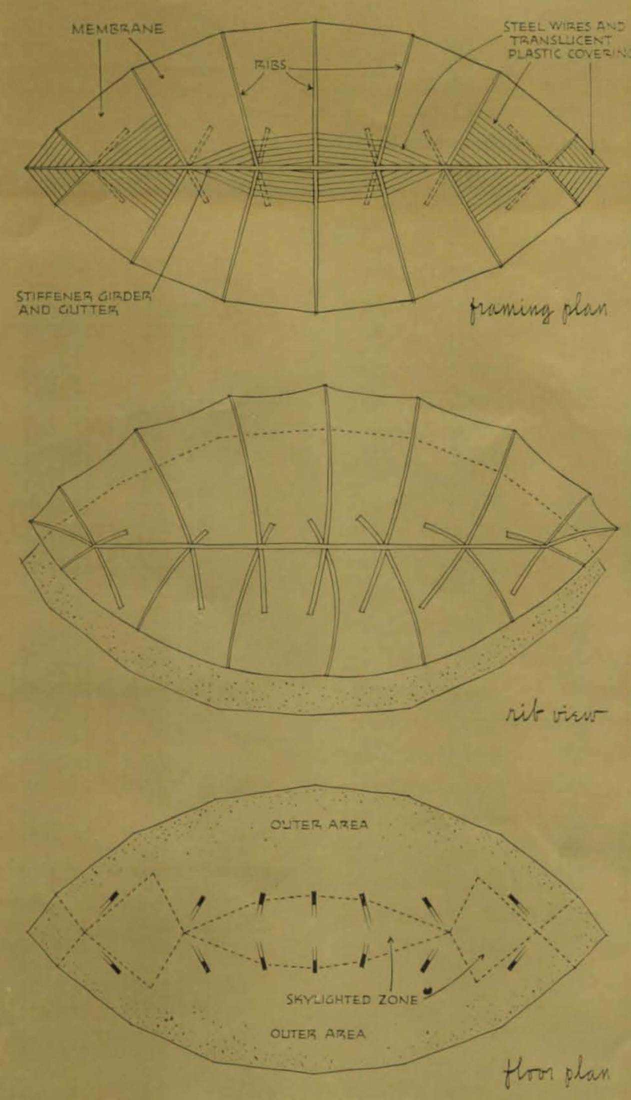
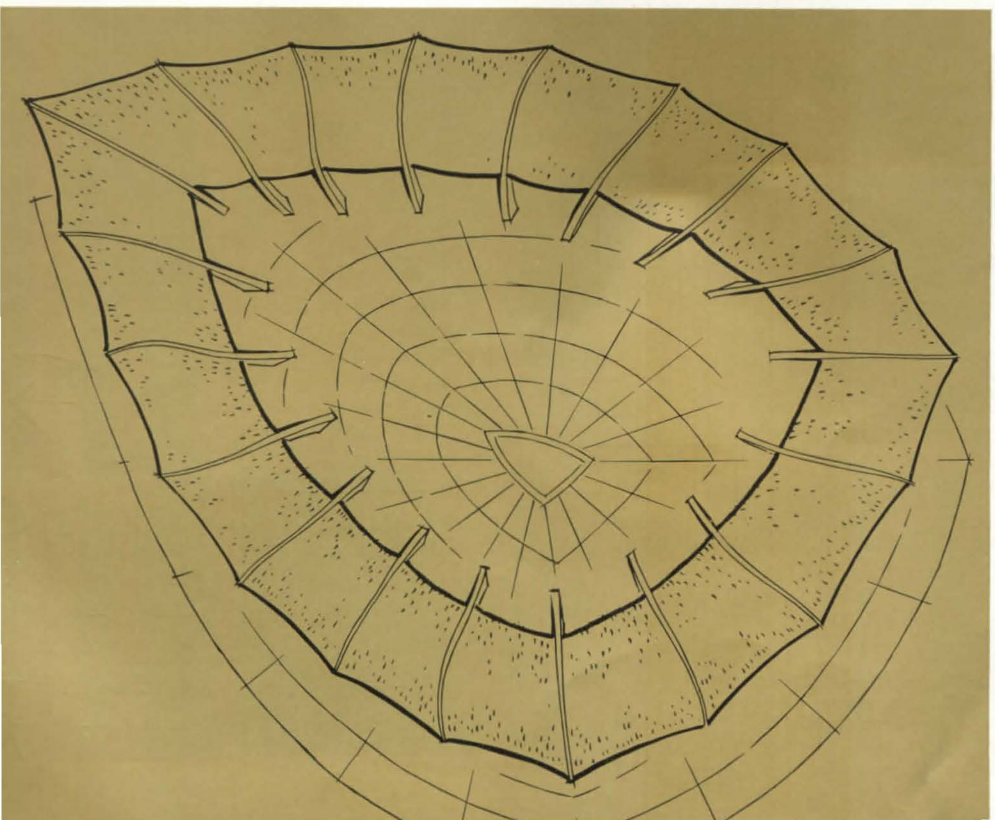


Figure 16—structure in membrane and ribs on asymmetrical plan

***Figure 17—visualization of a structure with variable sag-span ratio and haunched-curved ribs designed to shelter a cloister walk* (below).**

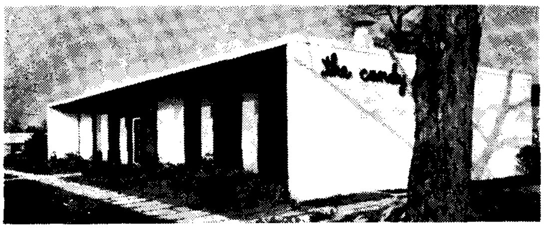


Early this year Chelazzi had the opportunity to present his views on membrane and cable-arch structures in architecture in a series of lectures before the Faculty of Architecture at the University of Florence, and at the seminar organized for American Architects Fulbright Grantees in Rome. He feels that the keen interest shown in academic and in some professional circles reveals a clear indication of a trend which may eventually lead to a widening utilization of steel-wire cable as an advantageous and mechanically efficient building material.

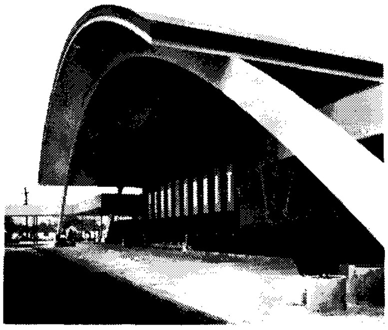
For professional comment on this article, see VIEWS (page 13). B.H.H.

department store

"candy garden"



prototype supermarket



commercial buildings

The business community has long been one of the profession's richest clients—in every sense of the word. Not only has it accounted for a great *many* commissions, but also it has had the wherewithal to offer some of the most succulent "plums" in the orchard. Furthermore, it has been and continues to be one client group that, in the main, has been willing (even anxious) to go along with progress. This is for at least two reasons:

1. In the competitive world of business, no little has been gained by those firms that manage to identify themselves as leaders, as being as up-to-date as tomorrow; and
2. The man who commissions a factory or other place of business seldom does so sentimentally. He wishes to obtain the most efficient "machine for working" that modern technology and the architect's resourcefulness can provide. If, in addition, he obtains a thing of beauty, noticed and talked about, he earns a sizable increment that may cost few, if any, additional dollars.

When Lever Brothers built its New York headquarters, the firm commissioned a sparkling structure that in a few short years has become a Manhattan landmark. Hudson's of Detroit has surely gained prestige—and, one may safely assume, increased business—through being the sponsor of the Northland Shopping Center. Also, Prudential Life has not suffered from having underwritten one of the best office buildings in Los Angeles.

One instinctively looks for progressive architecture in buildings for business. And, while the score is far from perfect, the incidence of excellence is impressive. In this issue, P/A cuts a wide cross-section through the many types of buildings designed to serve commercial interests. Universally evident is the constant search for design refinement that results increasingly in a more mature commercial architecture.

silver shop

factory complex

branch offices

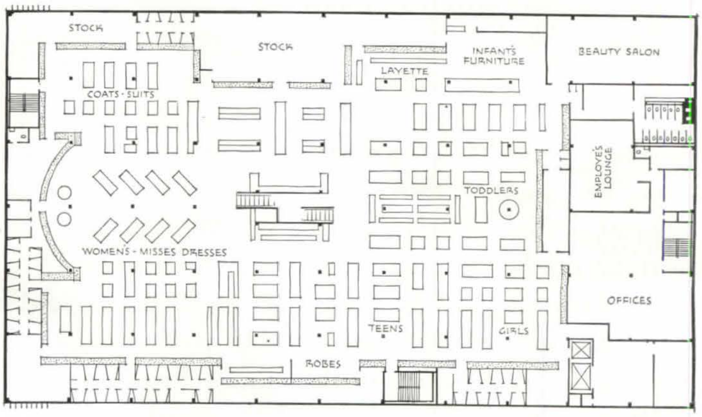
home offices

commercial buildings: department store

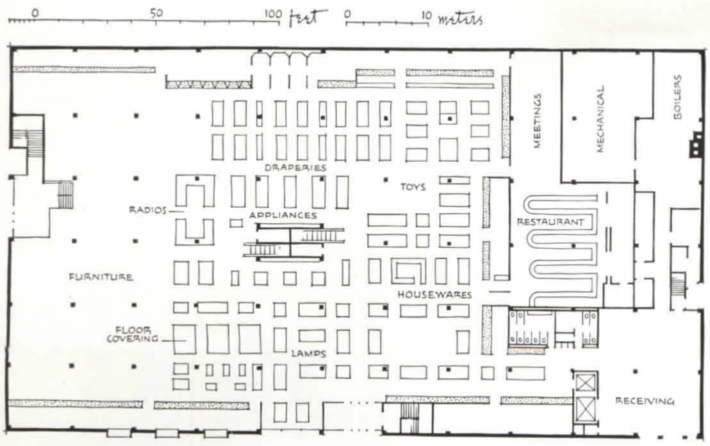
location | Langley Park, Maryland
interior architect | Meyer Katzman
associate-in-charge | Richard Katzman

Focus in this presentation is on the interior design of three floor levels in a suburban department store. The structural shell, a new building of simple rectangular shape, was designed by Abbott Merkt & Co., Engineers, New York. Column spacing in both directions was set at 25 ft on centers, dividing the floor area into six bays in width, and eleven bays in length. Aside from one set of escalators, more or less centered, no structural or immovable elements stood in the way of the interior designer. His chief objective thus became the creation of sales departments of individual character, while maintaining uniformity and spaciousness. This design objective has been successfully met by a series of perimeter wall fixtures reaching from floor to within 1′-6″ of the ceiling, each adapted to its special display requirements on the customer side, each backed with standard metal shelving toward stock rooms. Continuity between one department and the next has been achieved by means of a 5-ft module—a measure directly related to the 25-ft structural module and a dimension suitable for the display and storage of most sales articles. Since these fixtures are also provided with wall standards, necessary changes —from shelving to hangrods for example —may be easily made. The 5-ft module is particularly apparent in the spacing of the vertical steel members which tie perimeter fixtures to the ceiling. To maintain openness in the center of the floors, fixtures in those locations are low, only occasionally topped with super-structures serving as lighting fixtures. Here, as well as in the ceiling pattern, the basic module has been maintained, in order to quiet and unite the many elements required. Ceiling surfacing, supported on a suspended frame, consists of glass-fiber boards. General illumination is provided by recessed spot lights and eggcrate fixtures fitted into the suspended frame. Ceiling panels are removable and may be interchanged as needed. The floor surface at the ground level is asphalt tile; terrazzo on the first floor; and carpeting on the second floor. The color scheme employs white or neutral colors in back of all sales articles; red birch and oil-finished teak for sales fixtures; and strong colors for vertical supporting members and display panels of perimeter wall fixtures.

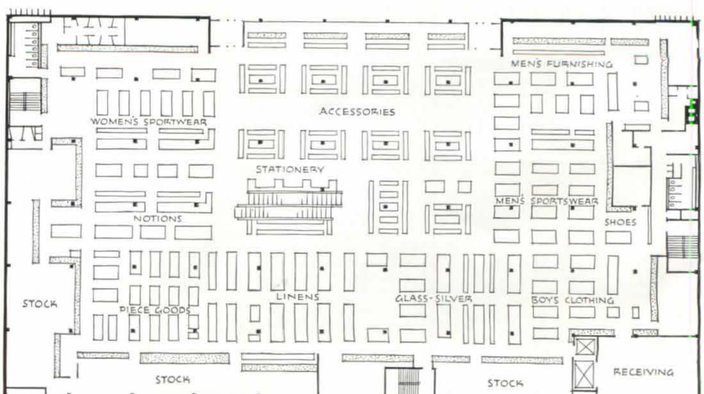
Photos: Alexandre Georges



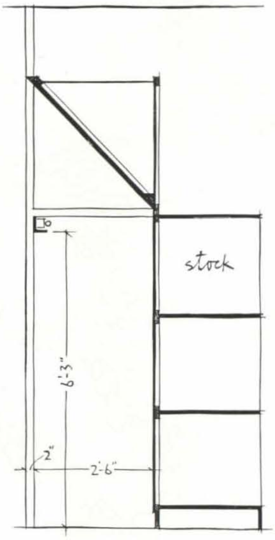
second floor

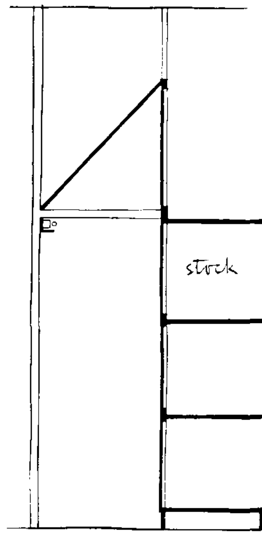


ground floor



department store

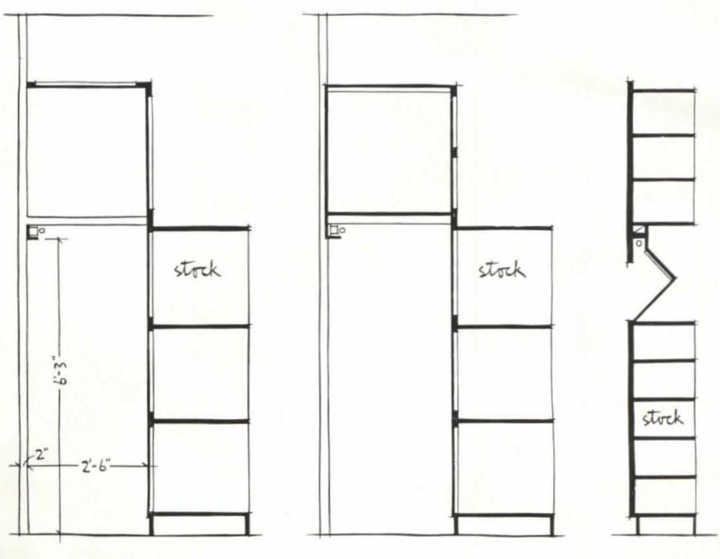




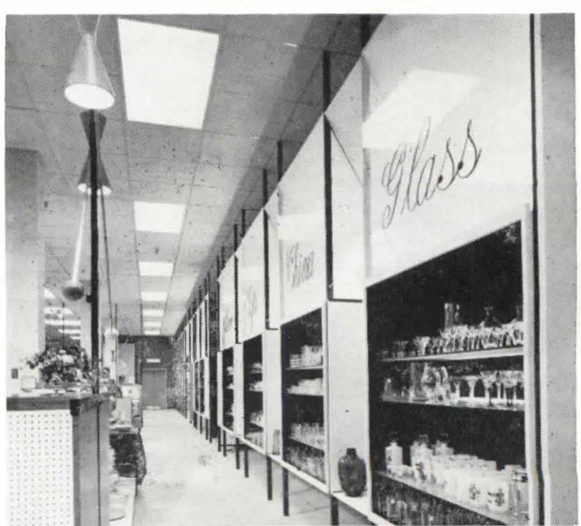
Perimeter wall fixture (above) *employs 6½"-wide boards, spaced 1" apart, to emphasize the individuality of this department. Mirrors are directly mounted on metal uprights.*

Perimeter wall fixtures (acrosspage, below *and* right) *with forward-sloping plywood panels form backdrops for a wide variety of signs and displays. Uprights are coated with a plastic finish, plywood baffles are lacquered with white or gay colors.*

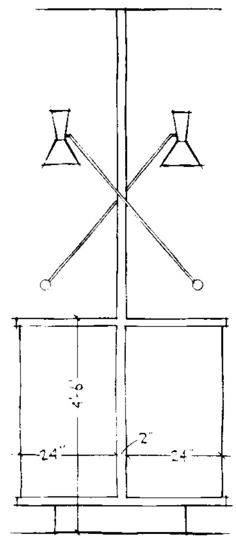
department store



Other variations in the design of the perimeter wall fixture are noted in the shoe department (top) *with recessed display shelf at eye level; in the drapery department* (above) *which employs vertically placed plywood panels; the glassware department* (right) *with vertical glass panel in front of a light-reflecting baffle; and men's wear department* (acrosspage bottom) *using vertical teak panels.*



Island sales fixtures (right *and* below, also SELECTED DETAIL) *can be adjusted to the display of such merchandise as glass, silverware, men's furnishings, hats, lingerie, yard goods, etc. Display cases are spotlighted from super-structure above. Rods and light cones are of brass or lacquer-finished metal.*



commercial buildings: candy garden

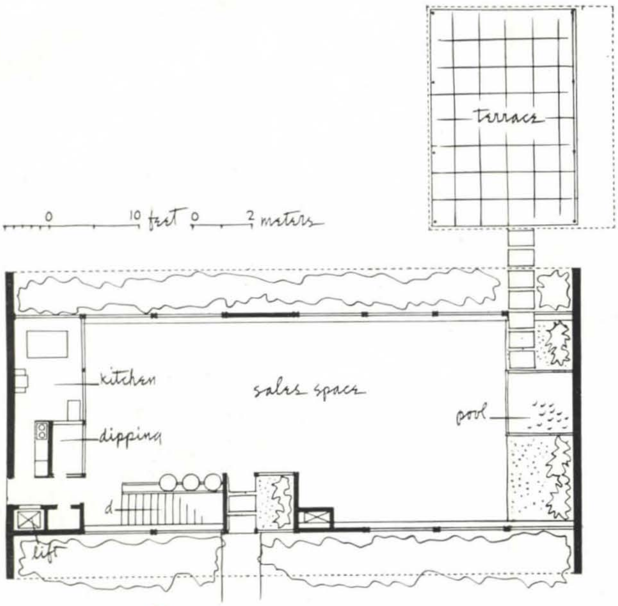
location	Union, New Jersey
architect	Meyer Katzman
associate-in-charge	Robert Alpern

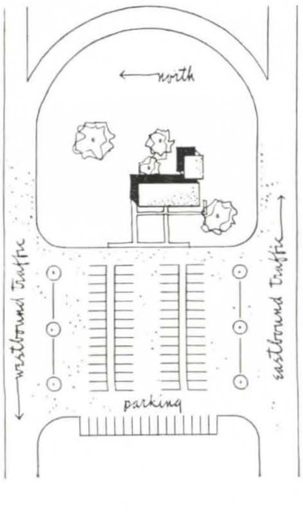
This colorful commercial unit is a most exceptional type of facility and it occupies a customer-luring site that many a retail enterprise would envy. Basically it is simply a retail candy store—one of the chain of Lofts Candy Shops in the New York area. But unlike most of the shops that are at busy in-town locations, this one, a "candy garden," is located out in the country, on a broad grass strip between the east- and west-bound lanes of U. S. Highway 22. Hence, the unusual provision for parking, and turn-around lane.

Here motorists may drive in simply to buy confections; or they may stop and lounge on the outdoor terrace; or use the washrooms (in the basement) for freshening up. A diversion is the candy kitchen, where some of the candy is made, which can be viewed through room-height plate-glass panels. Air conditioning makes the place inviting on the hottest summer day.

This building was created as a prototype for repetition at various locations. A come-on, a conversation piece, it is an effective promotional unit for the owner. The steel frame consists of columns and tie channels; end walls are brick cavity, and curtain panels are stuccoed wood stud.

Photos: *Alexandre Georges*


terrace
0 10 feet 0 2 meters
kitchen
sales space
dipping
pool
d
lift


north
westbound traffic
eastbound traffic
parking

candy garden

The bright, bouquet-like color of the sales room occurs on vinyl-asbestos-tile flooring; walls of painted stucco, brick, or vertical wood siding; and wood beams and planking of the ceiling—in addition to the various display elements and the merchandise itself. B. F. Green was Mechanical Engineer for the "Candy Garden"; F. H. Mulcahy, General Contractor.

commercial buildings: prototype supermarket

location | Audubon, New Jersey
architects | Victor Gruen & Associates
project design | Ben Southland

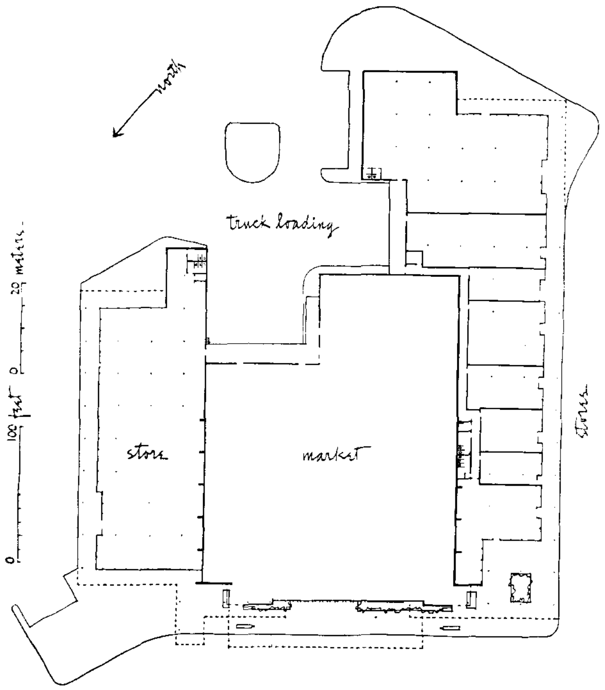
A very special problem that may be involved in designing a building for a chain-store organization is the requirement to develop a prototype which may be repeated (possibly modified) wherever a new "link" in the chain is to be established. To answer the problem, the building so designed must not only serve its specific merchandising purpose but also be sufficiently distinctive in form and appearance that it becomes an immediately identifiable trademark. Such was the case with this supermarket, worked out for a rapidly expanding major food chain. The great arched form, spanned by uninterrupted, soaring, 114-ft laminated wood arches, seems to solve both basic conditions.

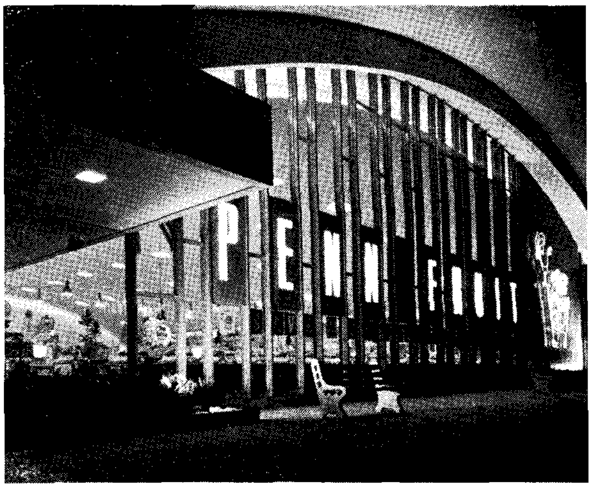
Surely it is a readily comprehended architectural form and, if repeated at various locations, would identify itself—without, as the architects comment, "the need for extraneous and arbitrary sign structures." As for its efficiency, it obtains as large an area as possible unobstructed by columns; it is an economical solution; and it answers the basic space requirement for the market portion—"an impressive ceilinged sales area surrounded on three sides by relatively low-ceilinged service areas."

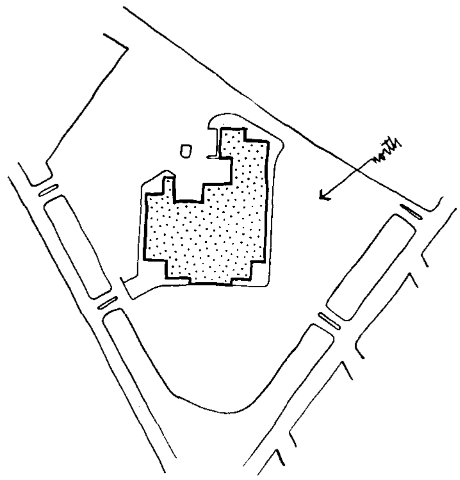
The laminated arches in the main body of the building are supported by small, exposed, steel pipes to minimize the visual obstruction between the lower side areas and the central, vaulted sales space. To avoid unsightly ties or lower bow-truss chords, horizontal forces are carried below grade and transferred to reinforced-concrete arch ties. The wood arches at the front of the market continue to the ground, resting on reinforced-concrete buttresses just above grade.

Wood construction consists of heavy timber framing; between the timber purlins are sheets of cement-bonded, wood fiber that provide both roof surface and insulation. A by-no-means unimportant element of the over-all design was the establishment of co-ordinated and characteristic architectural expressions of symbols and lettering which, like the building, would be readily indentifiable as a trademark and repeated in future units.

Photos (except as noted): Lawrence S. Williams

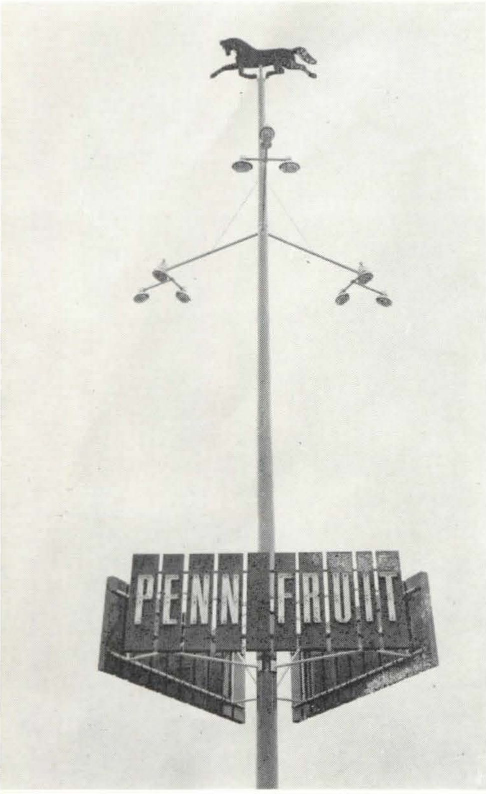

north
truck loading
store
market
stores
0
100 feet
0
20 meters

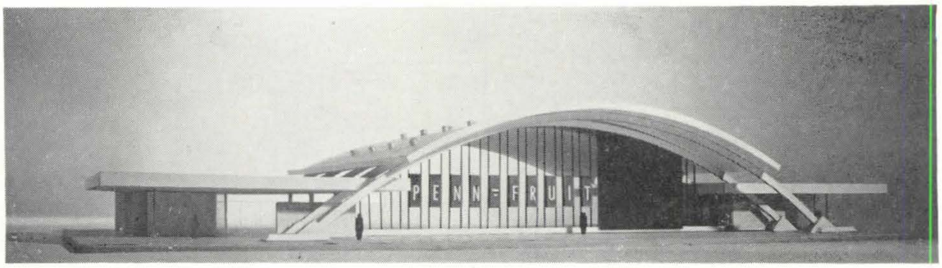



north

prototype supermarket

Gordon R. Sommers





The prototype design was most carefully developed in model form (above) *before the first unit was built.*

Photos here and on page 105 reveal the fortunate result of studying co-ordinated lettering and sign patterns.

The battery of check-out counters, with suspended overhead-light fixtures, forms a bold and sparkling unit at the front of the main market.


PENN FRUIT
PENN FRUIT
3-49

prototype supermarket

In one of the lower bays at one side of the main market floor is the flower mart, handsomely set off against a vari-hued wall of brick.

Materials & Methods

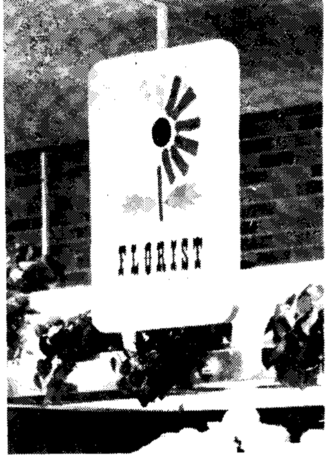
construction

Foundation: reinforced concrete: cement—Camden Lime Company; reinforcing steel—Bethlehem Steel Company. **Structure:** frame: laminated-wood arches—Timber Structures, Inc.; walls: concrete block—Stonecrete Corporation, reinforced concrete; floors: reinforced concrete; roof: cement-bonded wood-fiber panels—Insulrock Corporation. **Wall surfacing:** exterior: brick—Diener Brick Company, concrete block—Stonecrete Corporation; interior: brick, plaster — National Gypsum Company; rest rooms, toilets: tile—United States Ceramic Tile Company. **Floor surfacing:** terrazzo—Angelo E. Dinon & Son, Inc.; asphalt tile—Floor Tile Division of Hachmeister, Inc. **Ceiling surfacing:** acoustical plaster—National Gypsum Company. **Roof surfacing:** white mineral surface—The Flintkote Company. **Partitions:** metal toilet partitions—Sanymetal Products Company, Inc. **Windows:** plate glass—Pittsburgh Plate Glass Company: custom-design store front and entrance—The Erie Enameling Company and John G. Leise Metal Works, Inc.; custom-designed skylights — Aluminex Incorporated: sign—Philadelphia Sign Company. **Hardware:** lock sets—Sargent & Company: carpet-actuated door controls—The Stanley Works. **Paint & stain:** M. A. Bruder & Sons.

equipment

Special equipment: refrigerated display cases —C. V. Hill & Company, Inc. **Lighting fixtures:** Skyline Lighting Company: Crouse-Hinds Company: Holophane Company, Inc.; Keystone Electric Manufacturing Company; Litecraft Manufacturing Corporation; General Electric Company. **Plumbing & sanitary:** water closets and lavatories—Kohler Company; water heater —A. O. Smith Corporation; sprinklers—Adelphia Sprinkler Company. **Heating:** type: forced hot water; sectional boiler—H. B. Smith Company, Inc.; fuel: oil; finned-tube convectors—Vulcan Radiator Company; unit heaters—Modine Manufacturing Company and The Trane Company. **Air conditioning:** horizontal units—The Trane Company; cooling tower—The Marley Company.

Flooring throughout is terrazzo; ceilings are surfaced with acoustical plaster. General Contractor was McLain Construction Company.


FLORIST


6
item limit
EXPRESS LANE

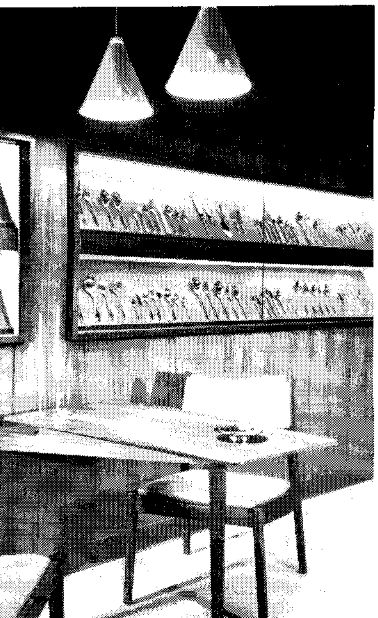

carriages
thank you

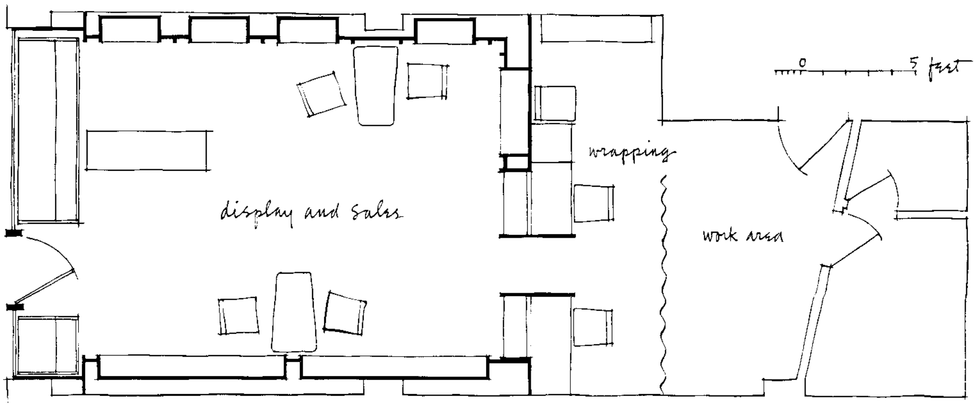
commercial buildings: silver shop

location | New York, New York
designers | Hansen & Thuesen, Inc.

One of the basic requirements for this small retail shop was that it be so planned that one sales person could at all times oversee the store, even when sitting at one of the sales tables or when wrapping merchandise. Display needs were for prominent showing of complete sets of 12 different flatware patterns—to be clearly seen but not handled by customers. Supplementing these, loose trays were to be provided in a cabinet located elsewhere, which could be brought to the tables for viewing. Additional display cases were needed for larger silver pieces.

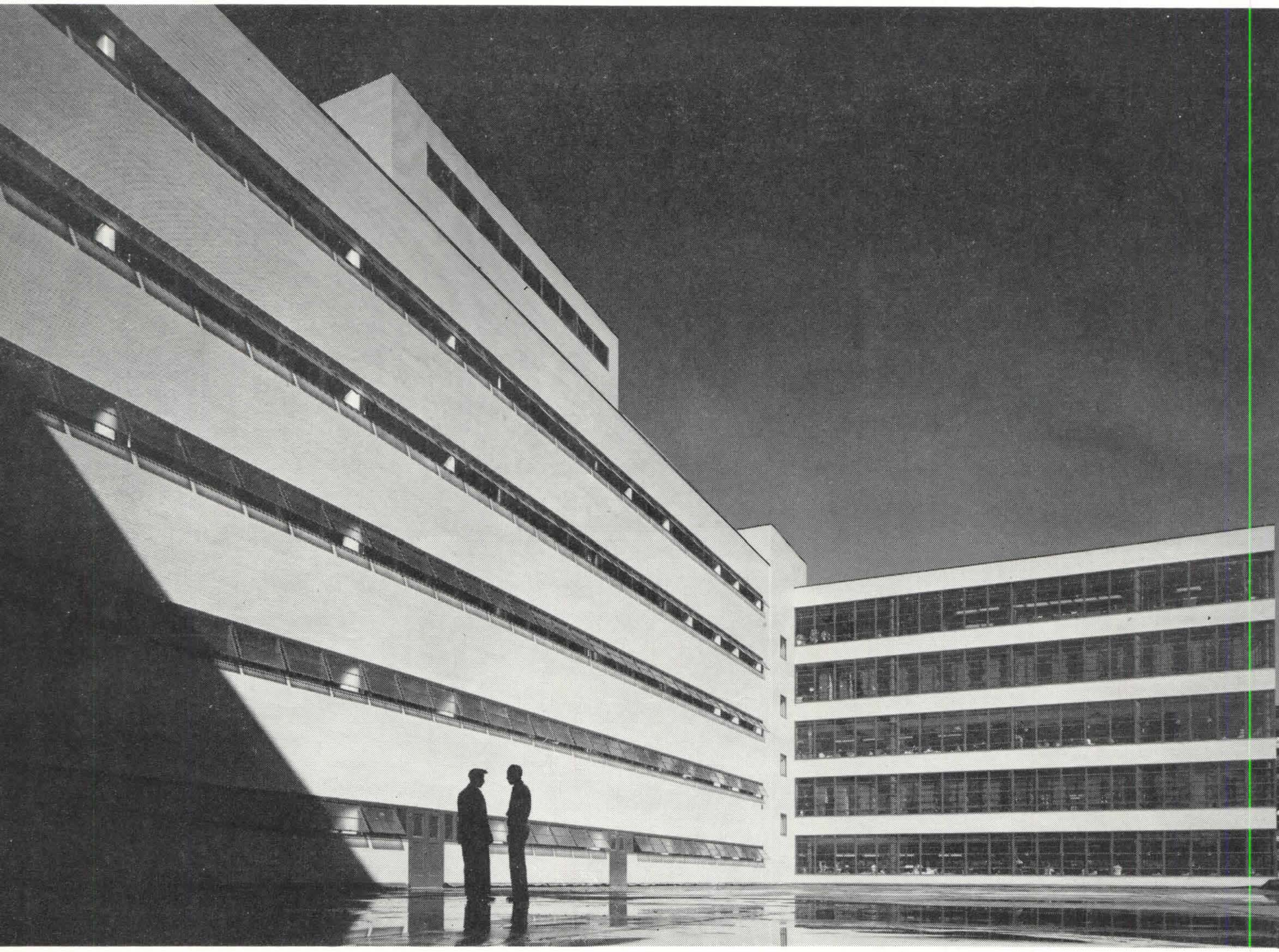
The solution treats the entire store as a showcase. Not even draperies intervene between show window and sales area. Along the walnut-surfaced, right-hand wall are long, recessed display cases for flatware. In the wallpapered rear and left-hand walls are cases, equipped with sliding glass doors, for the larger pieces. Frames around display cases, vertical wall fins, and all other exposed wood is oil-finished walnut. Felt lining for the flatware and jewelry cases is bright tangerine, as is the fabric used on chairs at the sales tables. These tables, incidentally, are of dining-table height to simulate the conditions under which the consumer would ordinarily use flatware. The inside of the showcases for the larger pieces is a light gray-green satin-finished lacquer, a color repeated in the background tone of the white-patterned wallpaper. Vinyl-asbestos floor tile is cork color; hanging ceiling lights are white enamel, satin finish. For ease in arranging the front window displays, as well as to facilitate window cleaning, the cases here have casters on three of their legs, the fourth serving as a pivot.




0
5 feet
wrapping
display and sales
work area

commercial buildings: factory complex

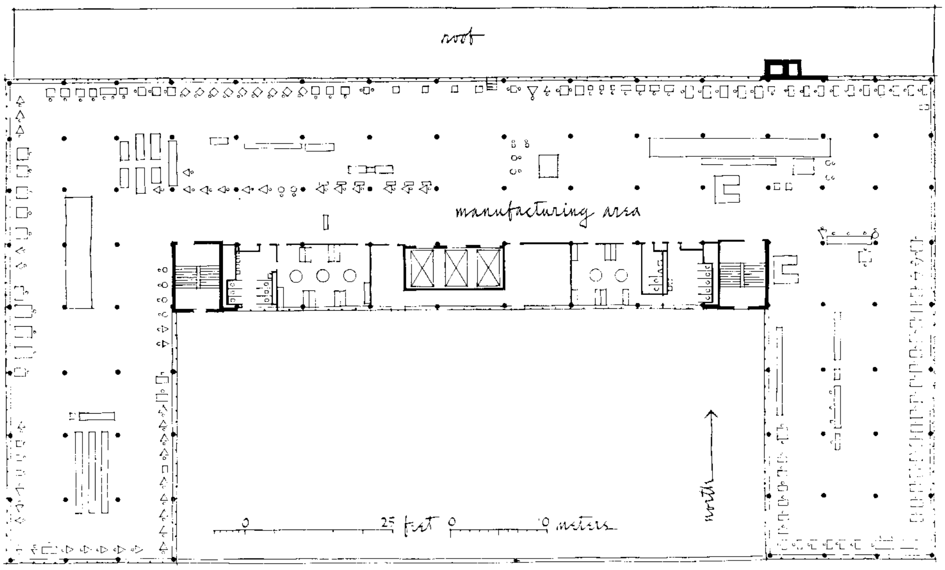
location | Chicago, Illinois
architects-engineers | Shaw, Metz & Dolio



Reversing the current trend of most light industries to build new plants in a decentralized location on the outskirts of the city, or in the country, the Florsheim Shoe Company decided to place its new factory and headquarters offices in downtown Chicago, just across the street from Union Station. Chief deciding factors were proximity to an ample and flexible labor supply and a location central to all forms of transportation. An advantage of the full-block site — rare in Chicago — was a 12-foot difference in grade from the Canal Street front down to Clinton Street, at the rear. Thus, all shipping and receiving is handled at the lower level, without conflict with public and sales floors. Two main functions are housed in the building—executive offices, design, advertising, accounting, and sales departments (located on the main floor) and the factory—actually two complete factories each occupying two of the upper floors. The remaining (top) floor is for leather cutting and other basic operations that serve both factories.

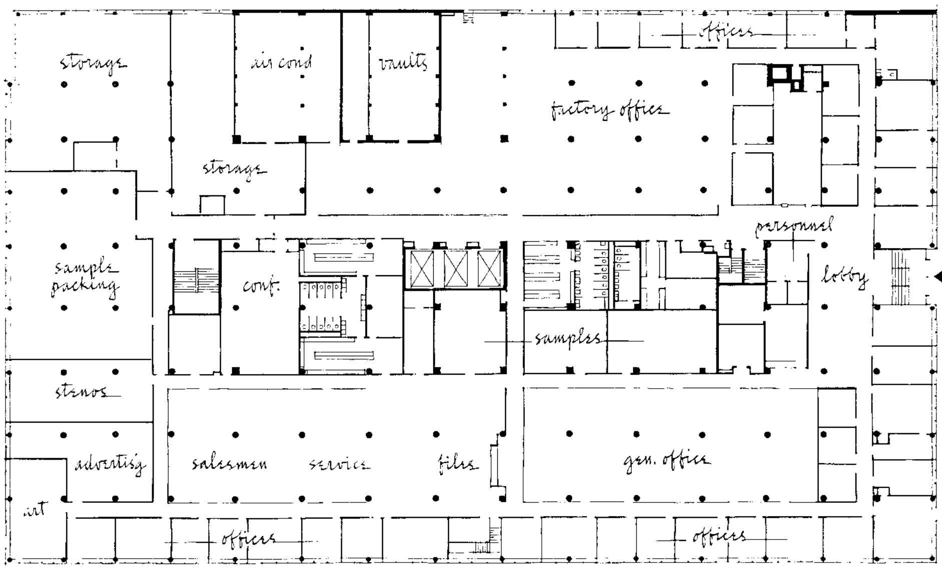
The nature of shoe manufacture requires as much daylighted, perimeter bench space as possible, which accounts for the U-shaped plan of upper floors—a condition protected for all time by setting the building back 23 feet from the north property line. Continuous window bands, with glass on the plane of the brick walls, provide maximum daylight, and the worker's comfort is assured by strip-type radiation installed just below window sills.

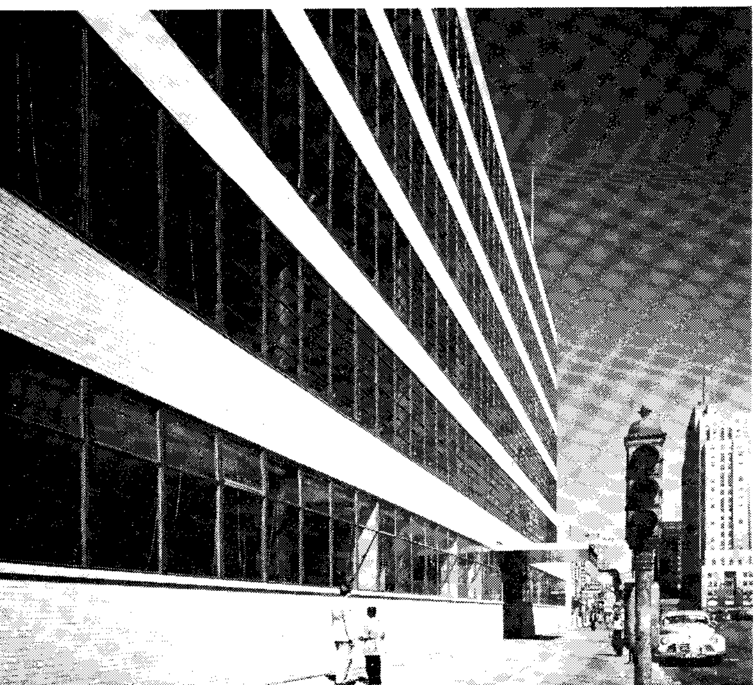
The building is a reinforced-concrete structure, with varying floor loads, up to 250 pounds for press-work. Spandrel areas are surfaced with vitreous gray brick. The whole first floor is air conditioned, with zone thermostatic controls. General Contractor for this factory complex was Campbell, Lowrie, Lautermilch.



SECOND FLOOR

MAIN FLOOR



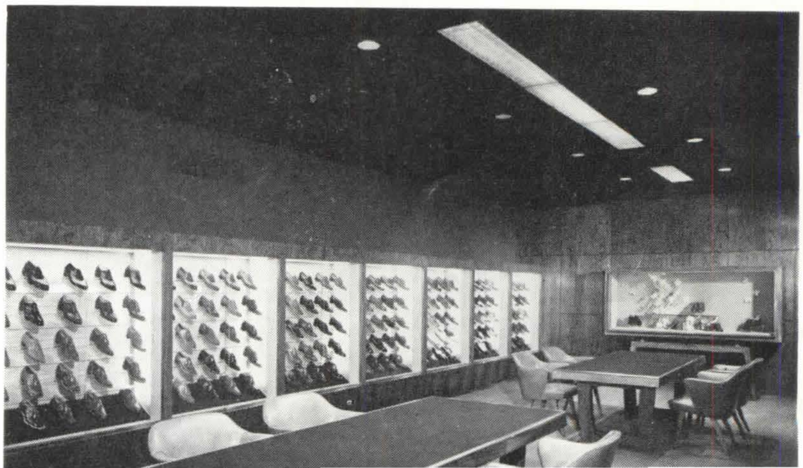


The U-shaped upper floors form a dramatic, southern, rooftop court at the second-floor level (acrosspage) ; *factory wings at either end; service rooms in the central portion. The uninterrupted bands of windows are projected steel sash.* Photos: Hedrich-Blessing

factory complex

The penthouse that houses equipment for handling contaminated air, leather dust, etc., also serves as a sky sign heralding the company name (top).

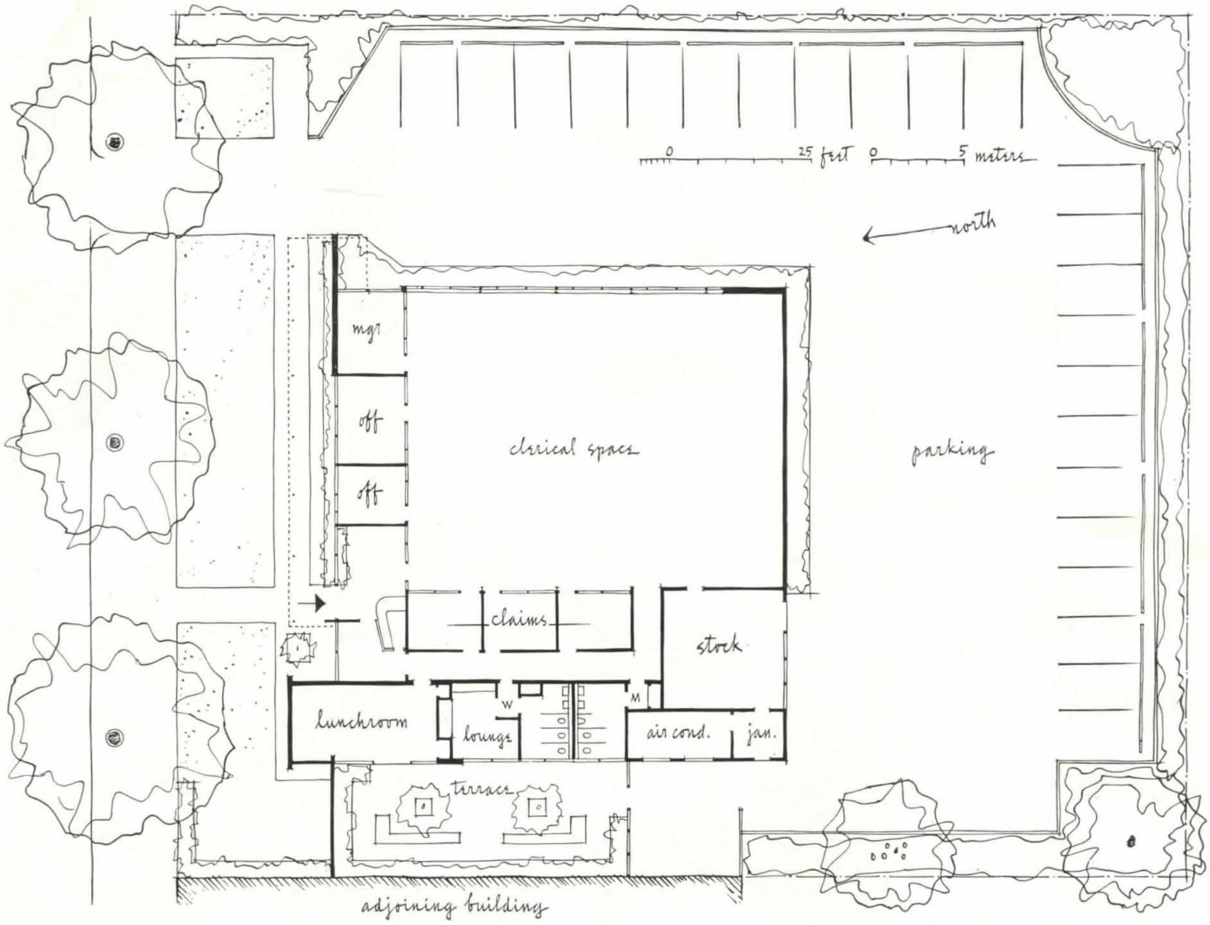
General office space (above) *occurs between perimeter private offices and various display, sample, and sales rooms, such as the one shown here* (right).



commercial buildings: branch offices

location	Sacramento, California
architects	Bolton White & Jack Hermann
consulting architect	Gardner A. Dailey
structural-design consultant	Walter T. Steilberg, Architect
landscape architect	Thomas D. Church

branch offices



Photos: *Rondal Partridge*

The first of several projected division offices for the Industrial Indemnity Company of San Francisco, this building serves two categories of the public—insurance brokers and claimants. Hence, the placement of the reception room in such a way that it feeds two separate traffic channels—brokers having immediate access to the clerical space and top division offices; the claimants moving directly to the claims adjustor's offices. A single large room without *physical* departmentalization handles all clerical work—underwriting, claims, payroll, collections, engineering, service, and filing.

The 154-ft frontage of the flat, rectangular site faces north; to the west is a two-story business building; to the east, a driveway; and across the street, a city park. Location of the building 20 feet east of the site's western boundary allowed introduction of a sheltered, landscaped terrace opening off the office lunchroom. Because of summer sun heat in the Sacramento area, the south wall of the building is both windowless and mineral-wool insulated.

Structure, in the main, is wood frame, though certain areas have brick bearing walls, and the large clerical space is framed with steel columns (exposed on the interior and painted coral) and light trusses. The floor is a concrete slab. Exterior walls, other than brick areas, are covered with ¼-in. asbestos cement board applied over wood sheathing and felt paper. The sheets, laid with mastic-lined butt joints, are surface nailed with cadmium-plated drive-screws.

The interior climate is governed by a forced-air system, with air blown over heating or cooling coils as required and distributed through ceiling ducts and diffusers. Return air travels underfloor back to the mechanical room. Keller & Gannon, Mechanical Engineers; Chas. A. Von Bergen, Electrical Engineer; H. W. Robertson, Inc., General Contractor.

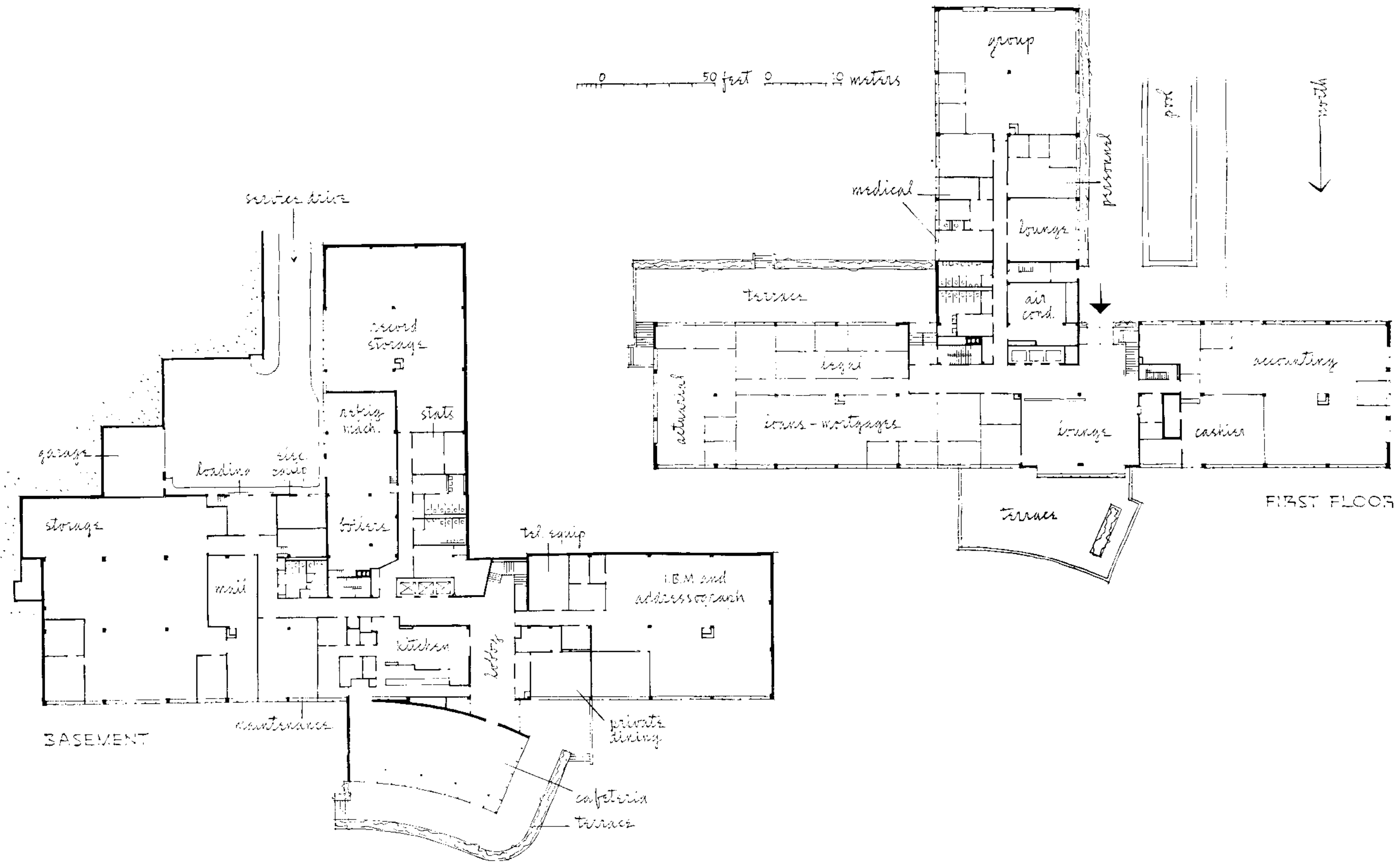
commercial buildings: home offices

location	Greenville, South Carolina
architects	Carson & Lundin
engineers	Lockwood Greene Engineers, Inc.
landscape architect	William Pitkin

Because of rapid growth, the Liberty Life Insurance Company found itself inefficiently housed in a series of makeshift offices scattered throughout the downtown area. To correct this situation and to provide for any anticipated future growth, a handsome, 12-acre site at the City limits was acquired, and the new home office building shown here was built. Should the need arise, a fourth wing, forming a cross-shape plan, will be added on the north side of the present, T-shape structure. The site slopes away to the north, allowing on this side a full, above-grade floor at the basement level. Thus, the curved-walled cafeteria wing (*across-page*), adjoins a paved terrace that overlooks the wooded acres beyond. Longer wing of the building is 64′x324′ in area, while the stem of the T is 64′x135′. The third floor is a typical office floor, and the fourth, housing executive offices, board room, etc., is set back from the building line, providing penthouse terraces to which all adjacent offices open.

The steel-framed building has filler walls of block back-up with gray glazed-brick exterior finish. Metal column fascias are painted white, and the entrance is executed in white marble and stainless steel. Because of a hot summer sun, window areas were kept relatively small, and those on critical exposures are protected by louvered aluminum sunshades. A zoned hot-air system heats the building, and a year-round, dual-duct air-conditioning system maintains a temperature differential of 10 degrees between interior and exterior of the building. On the entrance side of the building are separate parking spaces for office personnel and visitors. A service drive leads down to a basement-level loading dock. The Daniel Construction Company was General Contractor.

Photos: Ezra Stoller



BASEMENT

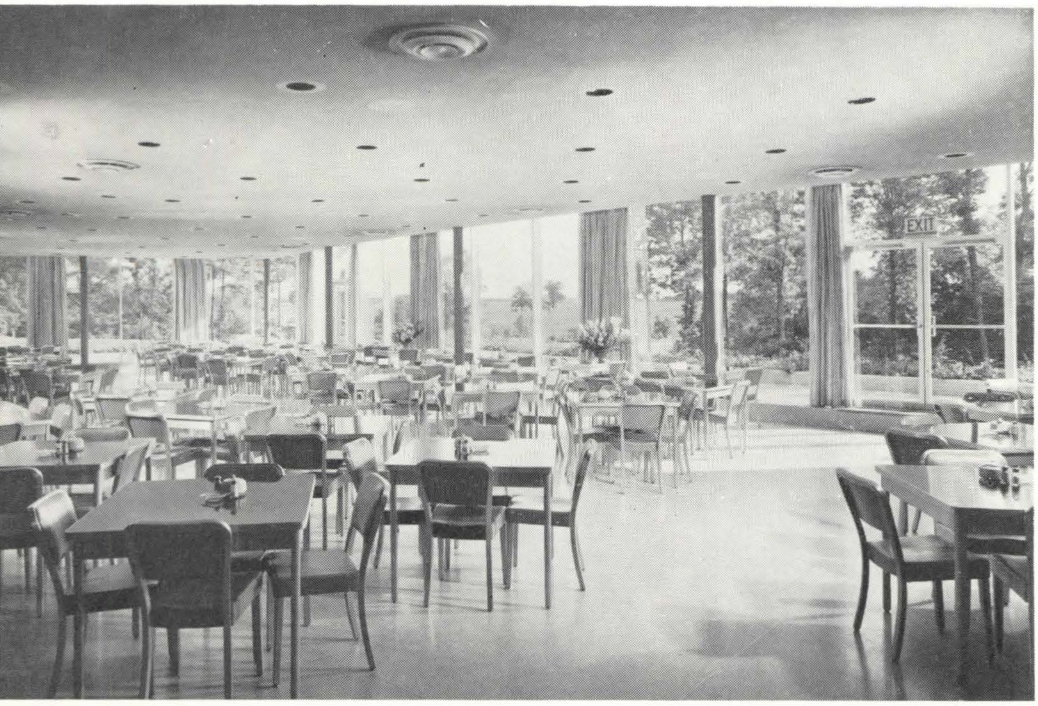
FIRST FLOOR

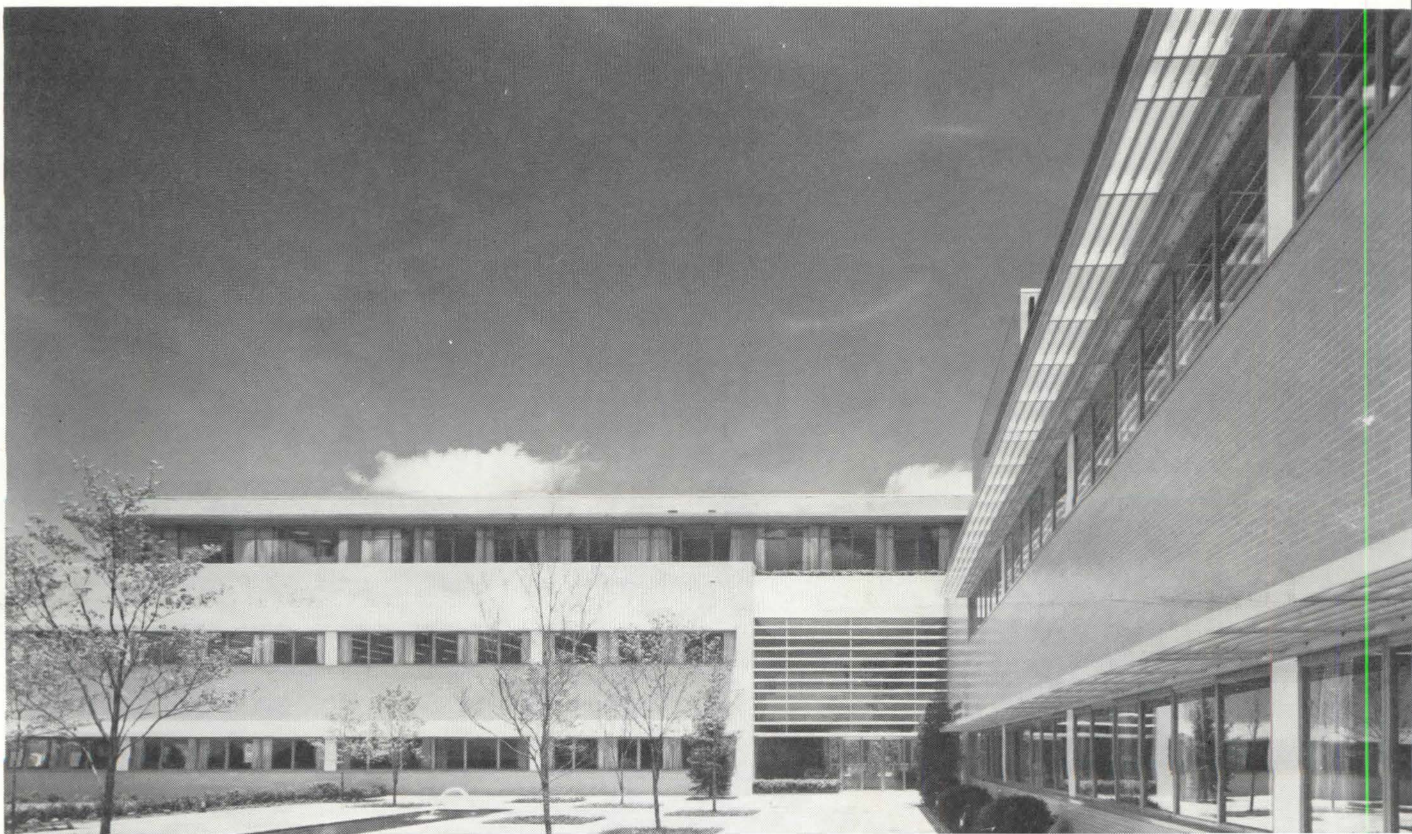
home offices

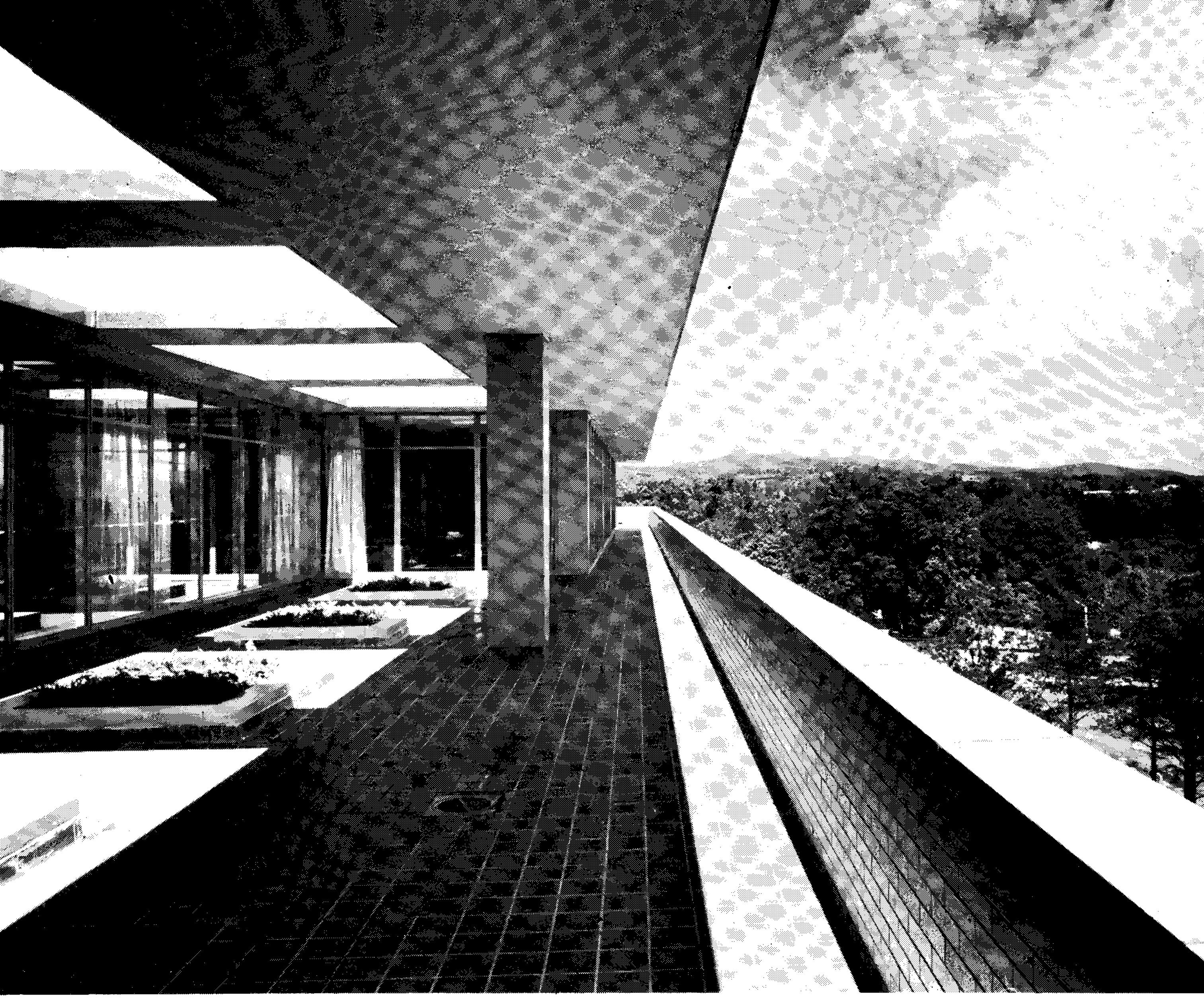
The reception lobby (right) *has a wall of glass, with doors opening to a paved terrace above the cafeteria wing. Floor is travertine.*

The spacious cafeteria (below) *is more like an open pavilion than a room. The floor is surfaced with terrazzo.*

At the entrance (bottom), *dogwood trees border a black-painted reflecting pool in the paved terrace. Above the entrance doors is a fixed, louvered sunshade* (see SELECTED DETAIL).

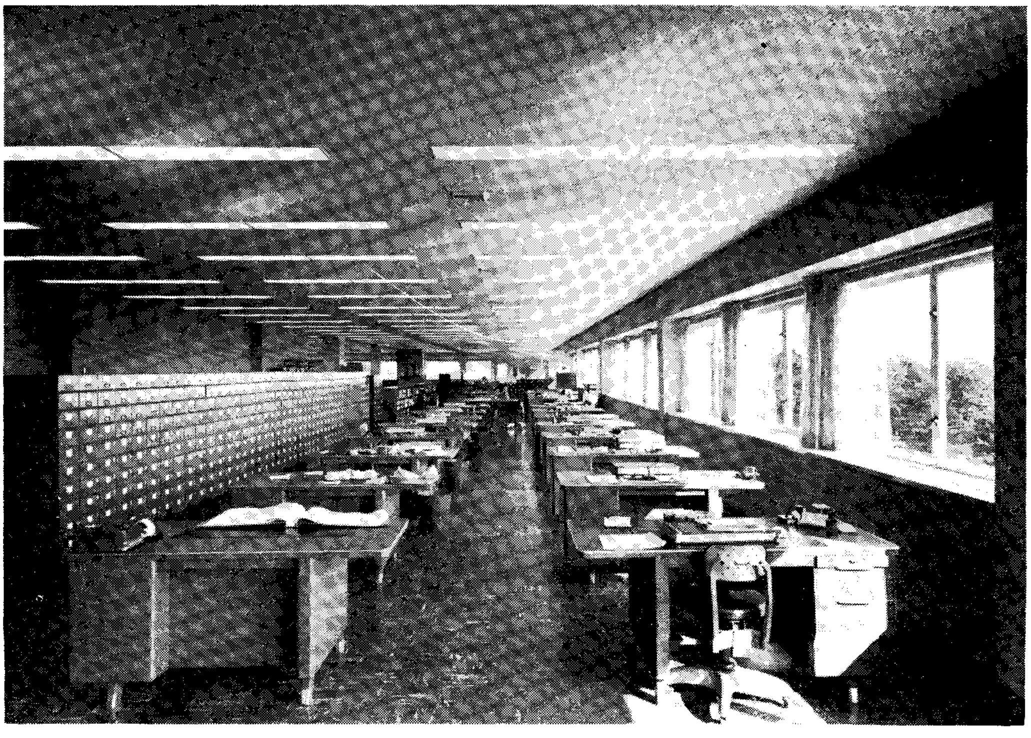






The quarry-tiled, landscaped penthouse terrace (above) *adds eye-filling dimensions to the executive-office suites.*

General work spaces (right) *are bright and cheerful; flooring is asphalt tile, and the ceilings, as throughout the building, are acoustical tile. Recessed, fluorescent troffers are mounted flush with the ceiling plane.*

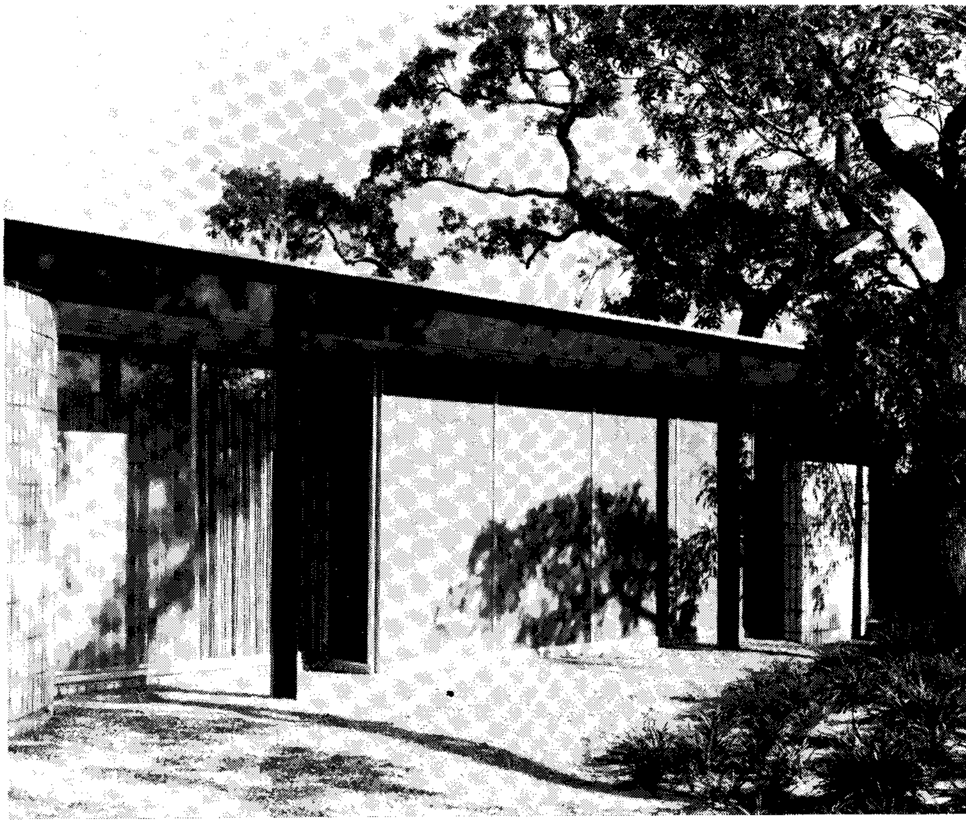


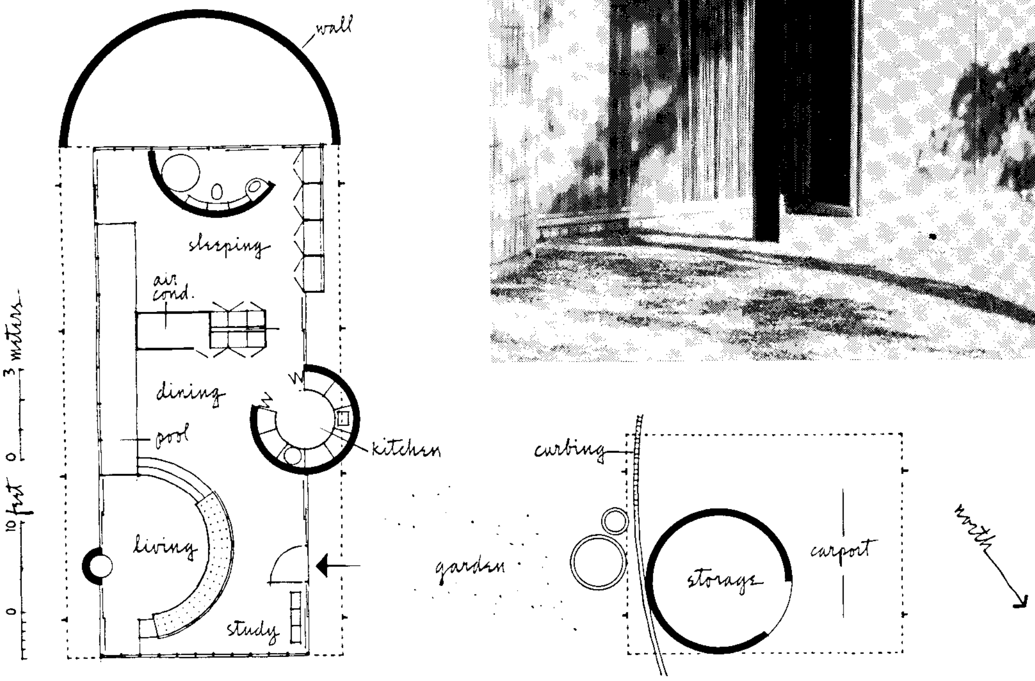
HOUSE

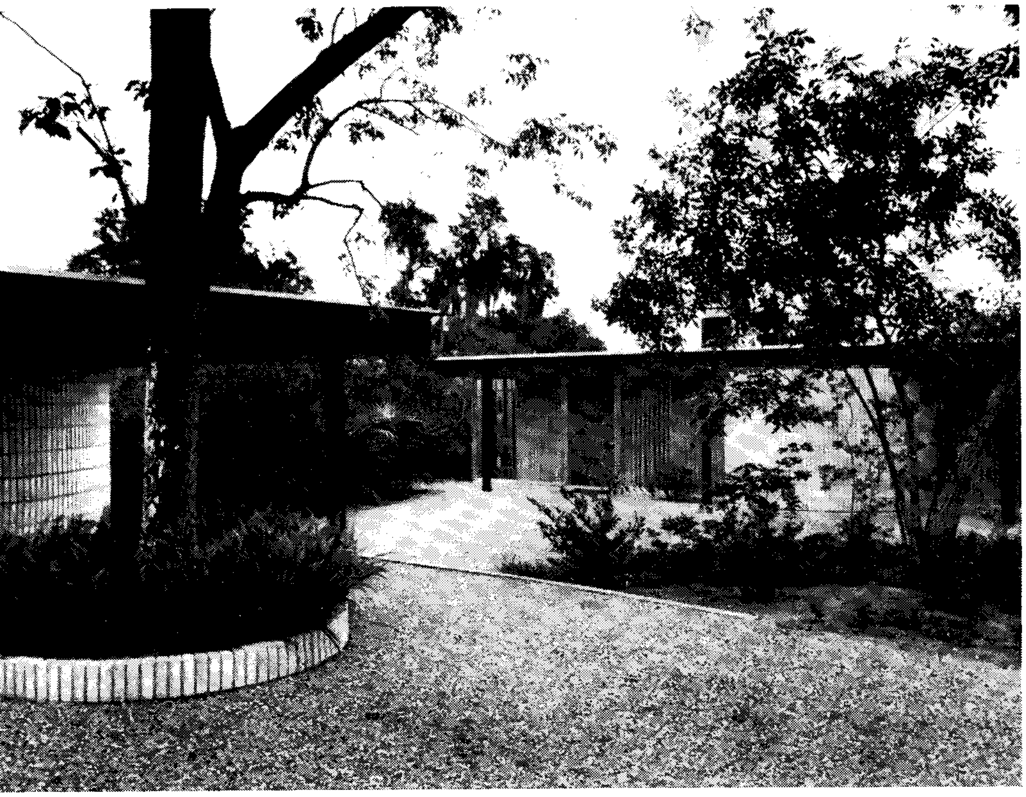
location	Lake Wales, Florida
architect	Mark Hampton
interiors-landscaping	Mark Hampton

While all houses have individual qualities that grow out of personal tastes of the occupants, this pavilionlike structure, disposed to make the most of a view of a bordering lake to the southeast, is more highly individual than most. For it is the home of one person, a bachelor with a liking for frequent, informal entertaining of small groups and an "uncluttered" approach to living. In siting, plan, and disciplined over-all design, it is a clear statement of what this owner wished for living.

Basically, the house is a single rectangular space (solid partitioning to avoid noise or gain privacy not required) subdivided into functional areas by partial screening, storage units, reflecting pools, and curved semienclosures—and by changes in level. The black-painted steel frame of the air-conditioned house stands boldly exposed outside the envelope walls of glass panels or vertically coursed, white concrete brick—as a foil to the natural luxuriance of the surrounding oak and hickory trees. Short end walls are of blue, translucent glass, framed in walnut stiffeners. This device not only introduces a note of color in the house, but also constitutes a constantly changing daytime effect, as the shadows of tracery of surrounding foliage develop their own fluid patterns with the movement of the sun. It further eliminates the need for many draperies.

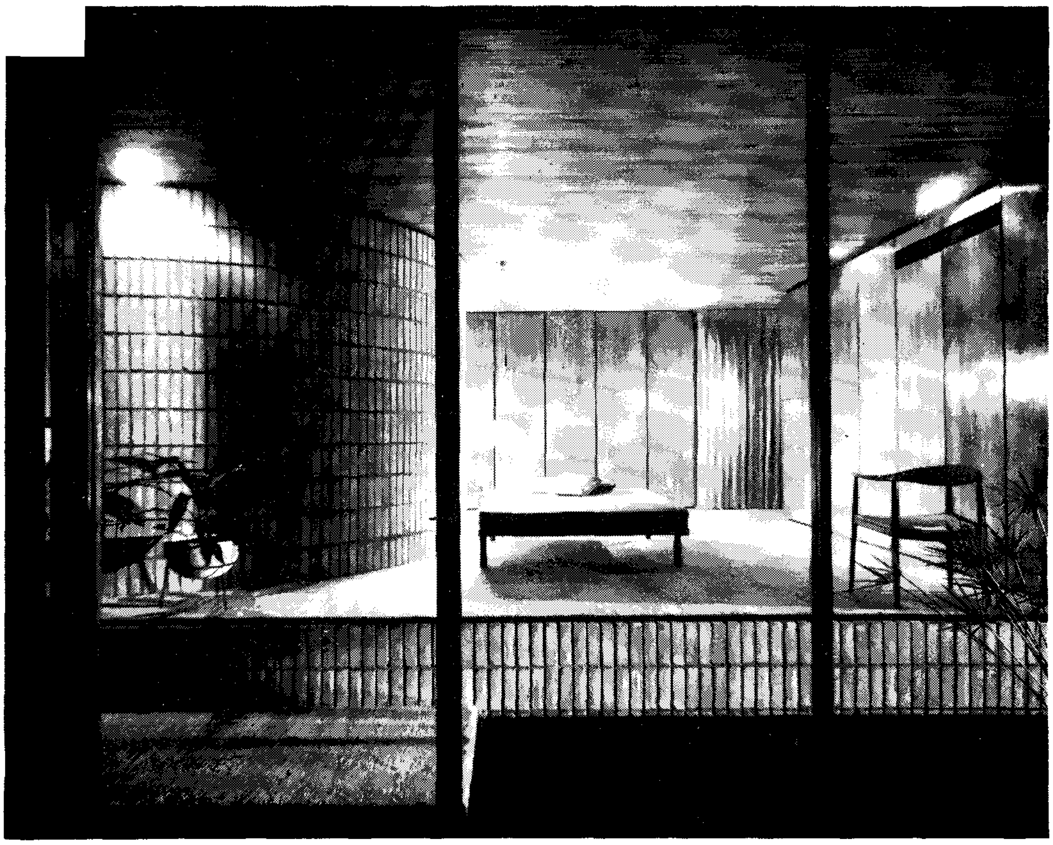






The structural system is composed of steel T columns, 16 ft o.c., supporting 30-ft steel WF beams. Wood joists (2"x12"), 16 in. o.c., frame between beams; with 2"x2" furring strips on top for through ventilation. L. F. Martin-Builder, Inc., was General Contractor. Photos: Alexandre Georges house

In the living/dining area, organized on two levels, Spartan restraint was exercised in selection of furnishings—the curved couch focusing on the fireplace niche and view of the lake beyond; one or two occasional chairs; the dining table and its chairs; and a metal-based, marble-topped coffee table. Color is chiefly gray (carpet), blue (sofa-pillow upholstery and the translucent glass end walls), and warm wood tones (walnut casework), ceiling of random-length strips of pecan flooring.



In the sleeping bay of the house (above) *one whole side wall (background) is of walnut-doored closets. The curved masonry wall at left encloses the bath.*

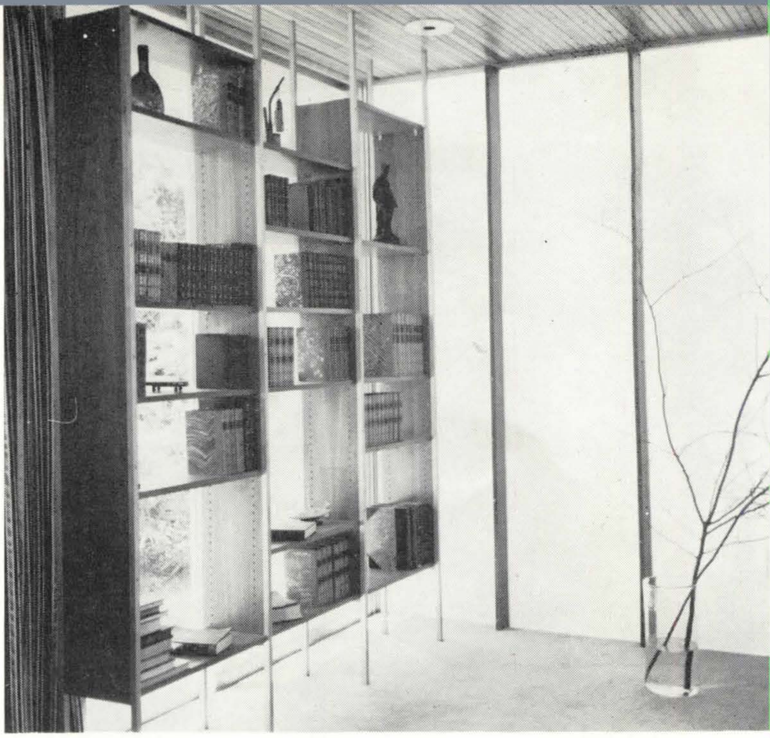
The round kitchen (right) *left of photo opens by folding doors to the dining platform; kitchen flooring is oiled slate, and the room is daylighted by a blue-glass skylight.*

The pecan ceiling is of 1½-in. wide strips, with a ⅛ in. revealed joint, which "has proved to be satisfactory acoustically."

At left of the entrance door is a freestanding book-storage unit (right) *with metal standards, and adjustable walnut shelving; translucent blue-glass wall beyond.*

Only division between sleeping bay (foreground, below), *and living/dining space (background) is a blue-painted reflecting pool, one end of which occurs in each area, and the partial storage wall, including housing of the air-conditioning blower (left of photo).*

Heating and air conditioning of the house is by a water-to-air heat pump, with a remote unit located in the round storage room in the carport.



total air conditioning for hotels

by F. G. Honerkamp*

A major trend toward total air conditioning is developing in the hotel industry as a result of recent technical advances made in the design of air-conditioning equipment for hotels. High-velocity air distribution is attracting growing attention as a potential solution for many of the problems in total air conditioning.

As air conditioning has become increasingly accepted as a requirement in many types of buildings, hotels have lagged behind in providing guests with comfort cooling. Although most hotels have installed some type of air conditioning—usually in lobbies, restaurants, cocktail lounges, and other public rooms—a recent survey shows that only 20 percent of hotels with 100 or more guest rooms are totally air conditioned.

Hotel managements have long been concerned with this situation and have attempted to meet the problem. Until the advent of high-velocity systems, a major obstacle to installation of central systems was the lack of space to install the bulky ductwork required for conventional air conditioning. Almost all new hotels are air conditioned, but—aside from resorts—only eight major hotels have been built in the United States since 1933. Most of the nation's hotels were constructed more than 20 years ago, with no provision for installation of air-conditioning equipment. In New York City, for example, 84 of the city's largest hotels were built in the period 1927-1933, and almost none have been built since.

air conditioning in hotels

The problem of air conditioning hotels, therefore, boils down to (1) finding space in older structures for the equipment required to serve a large number of small rooms, (2) providing each room with individual control, and (3) accomplishing these ends while utilizing each cubic foot of space fully during installation, since metropolitan hotels are generally centrally located, and built on extremely valuable land. High velocity is now considered capable of effecting substantial savings of space in the guest-room areas, due to use of smaller ductwork.

After World War II the hotel industry embarked on a series of large-scale improvement and modernization programs that so far have amounted to over $3 billions. Many managements wanted to include air conditioning in these projects, but found their buildings were poorly suited to installation of conventional systems in the guest rooms. The majority of hotels have, therefore, confined central systems to public rooms. The familiar "window-box" units have been tried for guest rooms and generally found unsuitable for hotel application because of their appearance from the inside as well as outside. In addition, the necessity for frequent maintenance is troublesome to management and inconvenient to guests. The air-conditioning systems that have been installed in hotels, whether in public spaces or throughout the building, have proved their value both in terms of comfort for the guests and profit for the management. The trend of the day is to extend air conditioning throughout the building wherever possible, with special emphasis on sleeping rooms, since these are, of course, the areas where the guests spend the greater part of their time in the building.

all-air high-velocity system

Savings of space and economy are important features in an air-conditioning system, but the most obvious advantage of the all-air high-velocity system is that it makes it possible to add air conditioning in buildings where previously this could not be done under any circumstances. In addition, cutting large openings to accommodate the ductwork of low-velocity systems can seriously weaken the building structure.

The advantages of installing high-velocity systems in old buildings also apply to new buildings, with some savings applicable only to new construction. Advantage can be taken of the space-saving features of high velocity in reducing floor-to-floor heights. This allows the architect to get more floors into a building of given height than would be possible with low velocity. In many cases this is especially valuable when zoning laws or earthquake hazards restrict the height of a building or the building is constructed on land so valuable that all available space must be utilized to the fullest.

design features of high velocity

The high-velocity system consists essentially of a conventional refrigeration system including refrigerating compressors, condensers, chillers, heat exchangers and heating coils, cooling tower, conditioning water and condenser water pumps, and a central-plant air-conditioning unit or units of the designer's choice. The air is filtered, cooled, and dehumidified — or heated and humidified — in the central air-conditioning unit. The system draws in outside air, mixes it with return air from the building, passes the mixture through the air-conditioning unit, and distributes it through a high-velocity system to the conditioned spaces. Since the velocities at which air is sent through the ducts are much higher than in conventional systems, the size of the ducts may be reduced proportionally. For example, if the velocity of air in the ducts is 6000

* *Chief Engineer, Anemostat Corporation of America, New York, N. Y.*

fpm, the ducts need be only one-fourth as large as those for air moving at 1500 fpm, with the same amount of air being delivered in both cases.

In addition, the high temperature differentials which are possible in a high-velocity system reduce the amount of air required in a room, since the amount of cooling is a function not only of the amount of air supplied, but also of its temperature.

In the all-air system, all refrigeration is accomplished in the central plant, and the only elements of the system present in the rooms are the attenuator-diffuser units. The attenuator-diffuser unit consists of a sound-attenuating chamber, tapped onto the supply ducts, which feeds directly into the diffuser. The attenuator chamber reduces the velocity of air fed from the ducts and, in addition, reduces the noise generated by air moving at high speeds. The diffuser takes in room air, mixes it with air from the supply ducts and discharges it draftlessly into the room.

Since there is no established requirement as to the location of the sound-attenuator units and diffusers, any suitable location in a room can be used and the availability of a variety of units adds considerable flexibility to the system. Some rooms can be equipped with under-window units, others with ceiling units, and still others with sidewall units, depending on the cooling requirements of the room or the structural features in the area. The location of the attenuator-diffuser combination in a corridor, with the outlets protruding into the room, is one of the possible systems that renders high velocity particularly adaptable to the hotels.

The system may be controlled as any conventional central-plant air-distribution system except that special consideration must be given to balancing and/or modulating the flow of air due to the noise potentialities of high-velocity air. The success of this system depends on securing an air outlet that can control the air flow with a minimum of noise while aspirating a sufficient quantity of room air to be mixed with the air from the system. This will allow conditioned air to be introduced into the occupied space at a reasonable temperature.

high velocity in hotels

It will be seen that this system is adaptable to hotel use and meets the special requirements of hotel air conditioning, which follow:

Economy of installation. Small ducts in high-velocity system require less sheet metal and less insulation and, therefore, require less installation time and lower cost for the basic materials.

Minimum building alterations. Obviously, the use of smaller ductwork cuts down the amount of alteration in the building. Some cutting through walls is necessary during installation but this is reduced considerably. Following installation, the holes must be patched and the ductwork furred in.

Minimum revenue loss during installation. Since in most cases round ductwork is used, a core-boring machine can be applied to cut down working time during installation. In a high-velocity system the only element of the system present in the room is the diffuser, and this can be installed in a short time. With careful planning, not a day's room rent need be lost during installation.

Individual-room control. In a hotel room, control is essential for two reasons: (1) the comfort of guests whose tastes are likely to vary considerably, and (2) economical operation of the system, since rooms can be closed off from the supply when not occupied. High velocity can be controlled in various ways: Manual control, directly at the diffuser, regulated by the occupant himself when he feels the room is too hot or too cold. Remote manual control can be used where the diffuser is installed above the door or in the ceiling, in which case a flexible cable connects to the diffuser inlet. Thermostatic control can also be used where the strategically located thermostat changes the temperature of air supplied to the room according to the initial setting and the change in room temperature.

Draftless air diffusion. This is important in hotel rooms because the system must

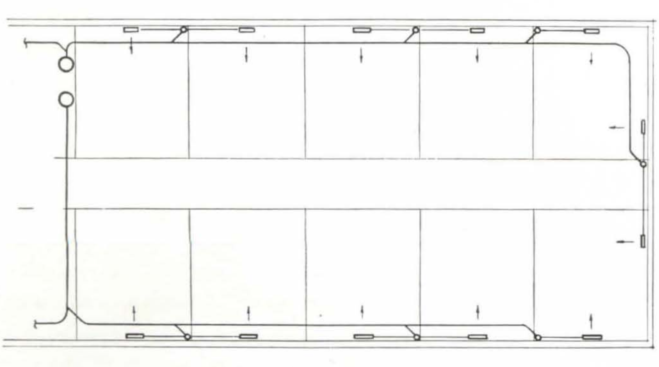


Figure 1—single-duct under-window installation: two zones fed from two risers distribute high-velocity air in perimeter areas through horizontal ducts beneath floor. Take-offs may feed one or two under-window units.

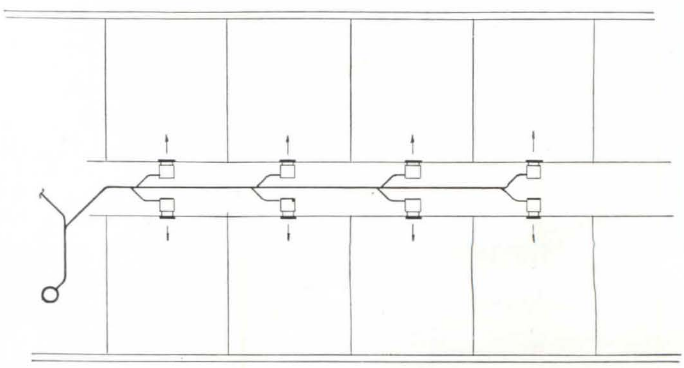


Figure 2 — single-duct corridor distribution. Duct furred-in under corridor ceiling feeds high-velocity air to attenuator boxes with outlets projecting into rooms. This installation reduces work done in rooms.

be capable of operating 24 hours a day. The occupant of the room is likely to spend more time in a hotel room than in, say, a theater, and thus is more apt to feel any draft that develops as a result of poor diffusion. The high-velocity system makes use of a sound-attenuation and pressure-reducing chamber, which reduces the velocity of supply air and consequently reduces the drafts in the room. In addition, the cones or vanes on a properly designed diffuser direct the air in such a way as to create an air flow in the room imperceptible to the occupants.

Quiet operation. In a hotel room, due to the 24-hour occupancy, it is one of the most important factors to be considered. The all-air high-velocity system makes it possible to eliminate outside or street noises, and careful selection of equipment and equipment location should minimize the creation of additional noise sources. The high-velocity sound attenuator terminal chambers, constructed with sound baffles and glass-fiber insulation, absorb a great deal of noise which might be air-borne, generated by the fan, or in the ductwork. A wide variety of available sizes of attenuators makes it possible to design a system for any desired sound level.

One source of noise that is definitely eliminated in high-velocity systems is cross-talk between rooms through the duct system. Whether the system is in operation or not, there is no possibility that the duct could act as a transmitter of any sound from room to room, as there are always two sound-attenuator terminals between each room.

Ease of maintenance. The high-velocity system eliminates all fans, filters, coils, and motors in the room. Therefore, there is no need for any servicing of the room unit beyond an occasional dusting. This, of course, is important for hotels, since the cost of conducting regular maintenance on several-hundred individual units could be quite considerable, and troublesome to the guests of the hotel. An incidental advantage is the elimination of redecorating following visits by the maintenance man, due to chipped paint or finger marks in the vicinity of the unit. All equipment requiring maintenance is in the main equipment room and can be serviced without causing any inconvenience to the guests of the hotel.

The all-air high-velocity distribution system meets these requirements to a greater extent than any other system in use. An additional advantage is the inherent economy of operating the system. Since it is possible to operate on a 100 percent fresh-air supply, a large part of the cooling can be done without running the refrigeration equipment. During the spring and fall and even in early and late summer, the outside air might be cool enough to be introduced into the space and provide the required cooling without the aid of the refrigeration plant.

high-velocity distribution systems

Each hotel application, of course, requires a study of what is needed to integrate the system into the building for which it is designed. The general characteristics of the two principal types of systems can be only a guide to further variation, and no formula can be given that will apply in individual cases. The following, however, are the main types of air-distribution designs:

Single duct. In this system, the air from the main unit is distributed throughout the building through a single riser or duct per zone, with one outlet for each individual room (*Figures 1, 2, and 3*). Temperature control in this type of system consists of varying the amount of air supplied to the area, by regulating a damper at the attenuator-diffuser unit. As air supplied to the attenuator is decreased, the temperature in the room is reduced.

Dual duct. This type of system, which was rarely used before the development of high velocity, has steadily increased in popularity with the growing use of high velocity. Instead of one duct, air from the main unit is feed into a hot duct and a cold duct (*Figures 4* and *5*). The two ducts run parallel to each other throughout the building. At each outlet, both ducts tap onto the attenuator unit.

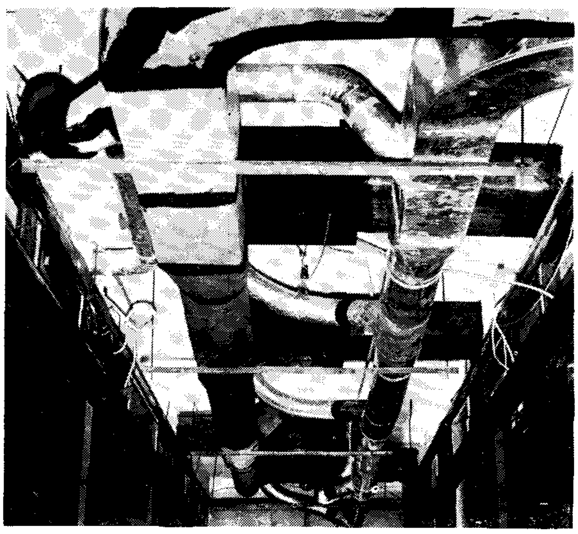


Figure 3 — small size of high-velocity ducts permits installation of ductwork above hung corridor ceiling. Attenuator boxes of single-duct system in corridor are tapped onto duct; sidewall diffusers inside rooms are attached directly to attenuators.

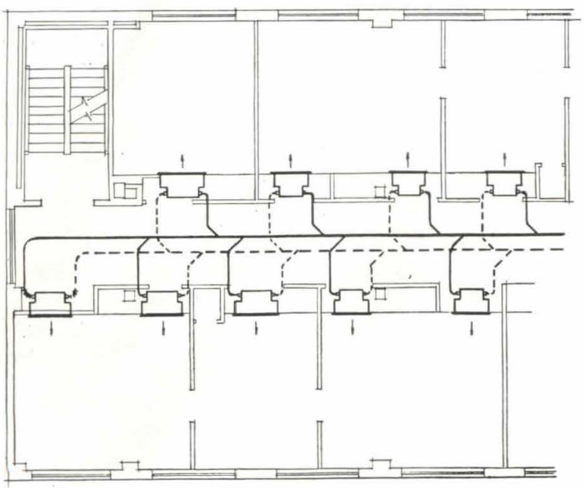
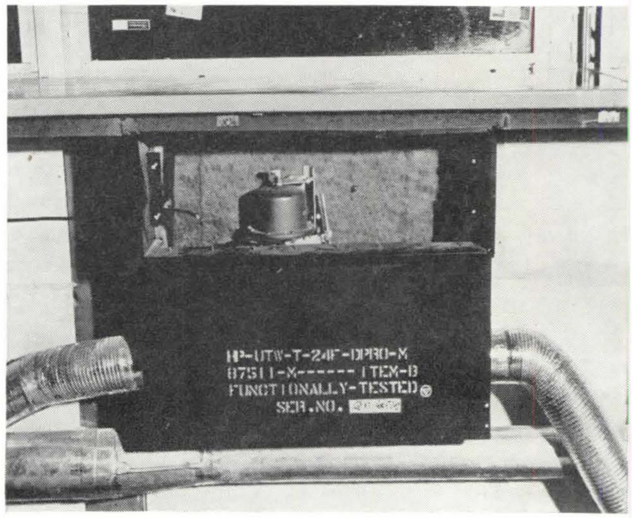


Figure 4—dual-duct corridor distribution. Both hot and cold ducts, furred-in under corridor ceiling, feed attenuator-diffuser units projecting into rooms. Each room is equipped with automatic control for temperature regulation.

Figure 5—under-window unit is fed from a hot and a cold duct. Dual-duct systems permit high degree of individual room control. Proportions of hot and cold air are established in attenuator section of unit by automatic or manual control.



The hot and cold air are mixed in the attenuator, and the resulting mixture is discharged into the occupied area. Temperature is varied, not by regulating air quantities, as in the single-duct system, but by changing the proportions of hot and cold air supplied to the attenuator. It is important to note that the total quantity of air supply remains constant.

This system is, of course, much more flexible than the single duct and, as noted above, can be used for heating as well as cooling.

diffusion

The diffuser selected for any particular installation should discharge the air into the occupied area so that it is delivered in a multiplicity of turbulent moving air currents. While the air is being diffused, an amount of room air equal to as much as 100 percent of air supply is mixed with the supply *in the diffuser itself* before the mixture is discharged into the room. This effect, known as aspiration, creates uniform air motion in the room, thereby eliminating the sensation of drafts, and at the same time eliminates sharp variations in temperature throughout the area. The aspiration effect cuts down temperature differential in the zone of occupancy.

The combined attenuator-diffuser units for all-air high-velocity application contain all volume controls for adjustment after installation without disturbing the wall or ceiling surfaces. The attenuator chamber insures quiet operation of the system and reduces the velocity of air supplied from the ducts.

The diffuser is one of the most important elements in an air-conditioning system: the finest air-conditioning system will be a failure if the diffusion is poor and if the occupants of conditioned areas are subjected to drafts or poor temperature regulation.

As in the case of system design, no precise and universally applicable guide can be given to selection of the proper unit for all jobs. The unit to be used will depend on outside temperature, amount of control desired, sound level, and many other factors. The most widely used units are the following:

Sidewall units. Any wall in a room, except outside walls, can be employed to accommodate a sidewall diffuser. These are of the "straight-line" type, consisting of a number of vanes slanted to provide the proper aspiration effect and diffusion pattern. The vanes direct the air parallel to the surface of the diffuser, so that it is gradually mixed with the air in the room.

Under-the-window units. The location of equipment under the window has been a favorite one since the days of the cast-iron radiator. It is by now accepted that this space is expendable. In addition, there is, of course, the sound reason of taking care of a heat gain or heat loss at the spot where it is most noticeable, and this is in the proximity of the windows. High-velocity diffusers may be mounted in sill or wall discharge, horizontally, vertically, or slanting, depending on circumstances. The air is directed upward along the wall, entraining the cold or warm air from the windows. The air moves up to the ceiling, across the ceiling, and thus throughout the room in a draftless pattern.

Double-glazed windows and insulating glass have greatly reduced the discomfort of the window areas, but structural considerations sometimes make this area an ideal location for the diffuser.

Ceiling units. When neither walls nor under-window spaces are available, the ceiling may be utilized as a base for the

TABLE I: Comparison of All-Air High-Velocity Air Conditioning with Other Systems Used in Hotels[a]

	All-air high velocity	Multiple unit for small spaces	Water and air high velocity	Standard low velocity	Window unit
Initial cost[b]	1	1.34	1.25	1.18	.62
Installation economy[c]	2	4	3	5	1
Individual room control	Yes	No	Yes	No	Yes
Quiet operation	Yes	Some noise	Some noise	Noise and cross talk in ducts	Considerable noise
Maintenance in room	None	Periodic cleaning of coil and drain pan	Cleaning of coil, drain pan, and air nozzles	Periodic cleaning of coil and drain pan	Annual inspection of compressor; removal of dirt and lint from finned coil surface
Floor space required (under-window unit only)	1-2 sq ft	4-7 sq ft	4-5 sq ft	1½-2½ sq ft	None, but requires window space instead

a Based on system designed for medium-sized hotel with rooms approximately 20′x10′ with 9′-6″ ceiling.
b Expressed as a multiple of the cost of the all-air high-velocity system.
c Least expensive rated 1, next least expensive 2, etc.

diffuser. Ceiling diffusion is the most efficient, since the air may be directed into the room from an advantageous height. Ceiling diffusers may be either round or square.

high-velocity compared with other systems

A general comparison of the all-air high-velocity system and four other types of systems used in hotels is shown (*Table I*). Since the conditions would vary from building to building, the comparison is based on a medium-sized hotel with rooms of approximately 20′x10′, with a 9′-6″ ceiling. Chosen as specific points of comparison are factors of installation, cost, operation, and maintenance, which are of most interest to hotel operators and which are subject to the widest variations among the five systems.

It will be noted that the "window-box" unit is rated as the least expensive method of air conditioning on a number of points, but this unit has been almost universally vetoed because of its appearance, its short life (about a third that of other systems), and the frequent maintenance required.

Under "Economy of Installation" are included the necessary alterations incurred during installation, since these have a close influence on the total cost of installation. The revenue loss incurred during installation cannot be estimated, but it will obviously be roughly proportional to other alteration costs. The table includes approximate figures for the amount of floor space required, which applies only in cases where under-window units are used. This does not include the amount of space taken up by ductwork in the various systems.

Not included in the table are savings of space for ductwork and cost of operation. The former would depend on individual characteristics of the building—although in all cases the all-air high-velocity system presents an advantage in this respect. As regards operating costs, it has been stated that the cost of fan operation is higher in high-velocity systems, but present evidence would indicate that a properly designed high-velocity system can be operated as inexpensively as a low-velocity system. The high temperature differentials possible in a high-velocity system make it possible to substantially reduce the air quantities and consequently the cost of fan operation.

There is, generally speaking, no appreciable difference in the components between an all-air high-velocity system and a low-velocity system. Any component that has proved satisfactory in a low-velocity system should work equally well in high velocity. Equipment for heat transfer, humidity control, air cleaning, and, to a certain extent, automatic control, is the same.

One great advantage of high velocity over low velocity is the ease of balancing, as it is possible to balance more accurately and more easily an all-air high-velocity system than it is to balance a low-velocity system. The all-air high-velocity attenuator-diffuser unit has a calibrated pressure tap which enables the operator to select the air quantity desired by using a calibration chart and a screw driver for adjustment.

The all-air high-velocity air-conditioning system has given to the trade a new tool for better living through air conditioning. So far, the surface has only been scratched as regards the potential for this system. As the principles come to be more widely known, it is undeniable that increasing acceptance will follow.

sculpturing by heat

From earliest times, Man has left to posterity permanent records of himself, and the most enduring of these are in stone. Ancient and modern edifices all testify to the great importance of the architect. Design and construction are his responsibility and frequently he specifies procedures to be used in fashioning stone. His goal is that all such structures shall be considered as ageless as time itself.

Now along comes Linde Air Products Company with a new concept of granite fashioning that basically is almost as old as Man himself. Some 50,000 years ago, he discovered how to produce fire and quite likely he noticed that local heat would flake and spall certain rocks. Later, translating this observation into practical application, he made his stone axes and hammers. At about this same time, he probably learned that by means of fire he could crack and break boulders. Thus, very early in his history, Man learned some constructive and destructive uses of fire. I guess every architect knows the ravaging effect of unleashed fire on granite columns and slabs, so when Linde said, "Let us use high temperature, high velocity flame on granite," it appeared they were flying in the face of Providence, and it was with a keen appreciation of all these aspects that the thermal texturing of granite by flame has been pursued with great caution and it seems to me utterly without fanfare. In thermal texturing, use is made of pure oxygen, a fuel gas which may be acetylene or propane, and water. While much work has been accomplished without using water, its use provides such excellent insurance against unwanted heat that Linde recommends water be employed in all thermal texturing applications otherwise believed impractical. The reason for the liberal use of water is that it is a better conductor of heat than is granite and so a granite slab may be recessed by repeated passes of the flame, and at the end of the operation be just as cool as before the operation commenced. Thermal texturing is brought about by the action of flame heat on the stone which it causes to spall off in controlled amounts. Only those particles which fly off are really hot, for the flame is passing over the stone too fast for heat to soak in and the cooling method assists greatly in preventing this happening. The appearance of all thermally textured granite has one thing in common. It is fresh and vibrant with the glint of the quartz, feldspar, biotite, and the like, quite undisturbed and always in evidence. The results must be seen to be appreciated fully. I seen 'em.

food-service consultant

The next time you worry your little head about the services of a food-service consultant perhaps you ought to turn to the following schedule of services. You should know that these services do not usually include traveling time and expenses from the consultant's home base. Also, make certain your consultant has a Valuable Papers Floater Insurance Policy for possible loss of, or damage to your precious drawings and magnificent specifications. Look here now.

Complete service consists of:

1. Preparing sketches for space allocations.
2. Preparing plan of equipment and roughing connections.
3. Assisting engineer in location of roughing and equipment capacities.
4. Preparing budget estimates.
5. Preparing specifications of all equipment.
6. Assisting in selection of bidders.
7. Assisting in receipt of bids and award of contract.
8. Checking contractor's roughing and detail drawings.
9. Advising plumbing, electrical, heating, and ventilating contractors of proper locations of roughing lines.
10. Attending of progress meetings during construction period.
11. Inspecting equipment in shop during fabrication.
12. Inspecting equipment in field after installation.

For the above complete services, the charge is 3% based upon the total cost of the food-service equipment specified by the consultant.

Partial service is available in the following groups:

Group A: Above Items 1 to 5, inclusive—2% of total cost of above-mentioned equipment.

Group B: Above Items 1 to 8, inclusive—2½% of total cost of above-mentioned equipment.

Group C: Above Items 8 to 12, inclusive—1½% of total cost of above-mentioned equipment.

Total cost of equipment shall include delivery and erection.

The above rates do not include the cost of reproduction of drawings and specifications for bidding and contract purposes. All original copies of drawings and specifications shall become the property of the architect.

Invoicing will be as follows:

Complete service: 2% after award of contract; 1½% after final approval of contractor's drawings; ½% after final inspection of equipment.

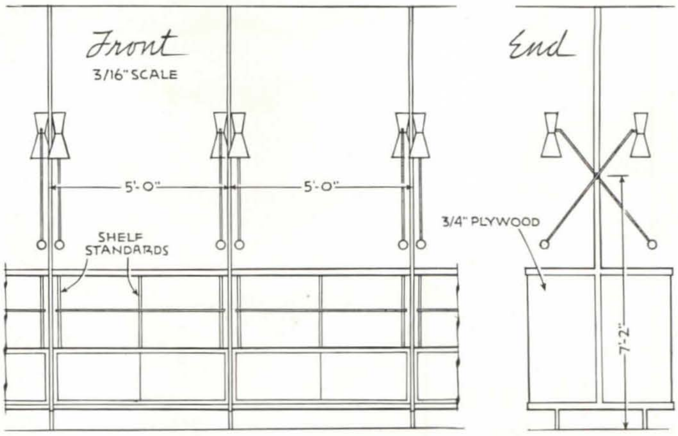
Partial service: Group A — full 2% after award of contract. Group B—2% after award of contract; ½% after final approval of contractor's drawings. Group C—1% after final approval of contractor's drawings; ½% after final inspection of equipment.

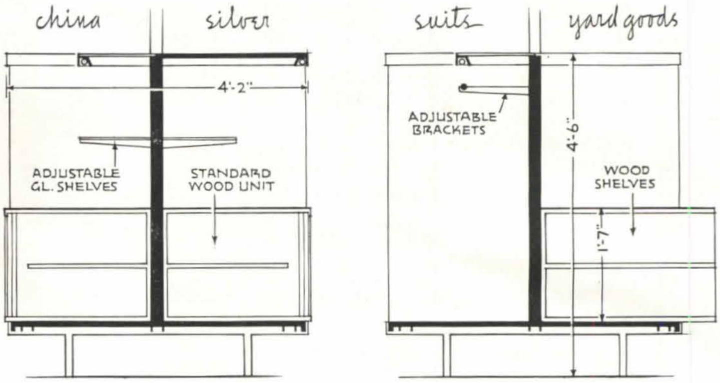
See how we worry about you!

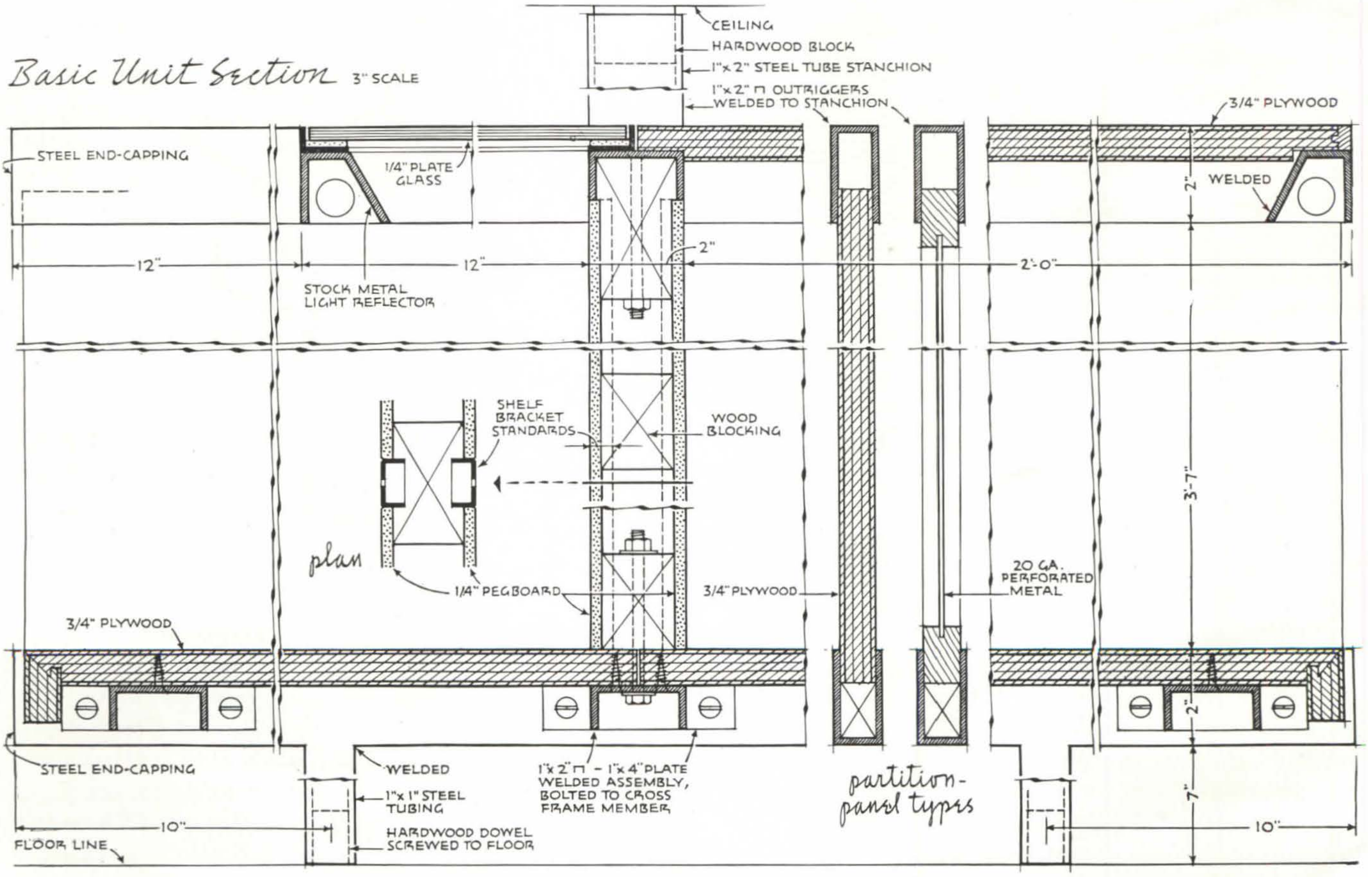
p/a selected detail

display unit

ALEXANDRE GEORGES



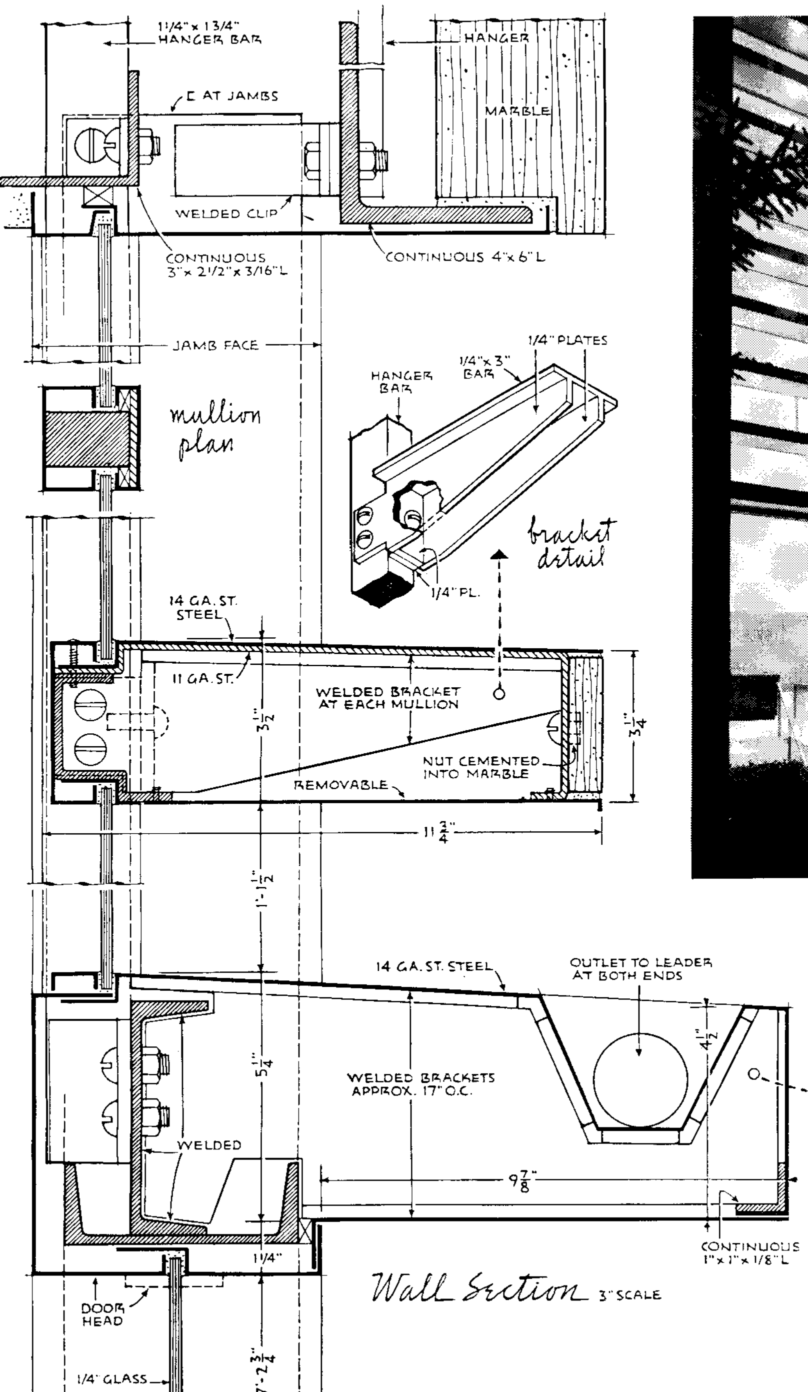


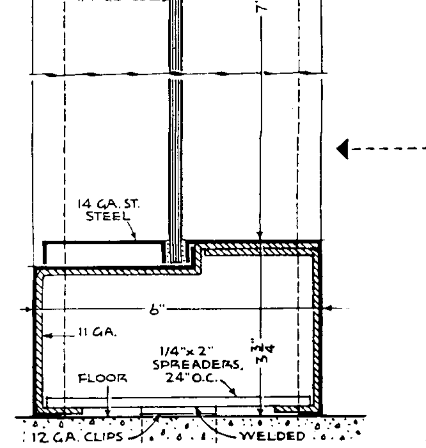


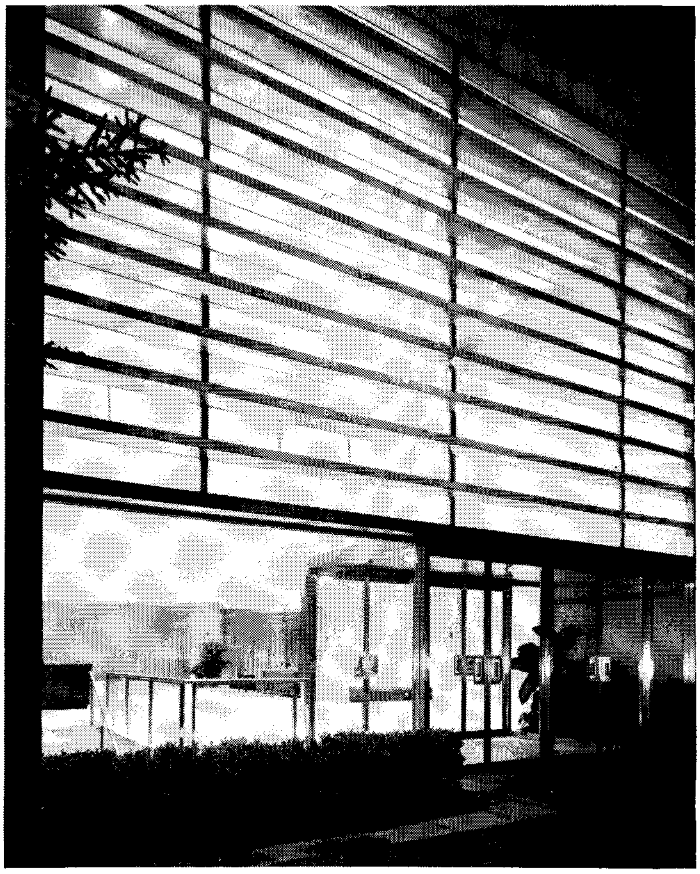
DEPARTMENT STORE, Langley Park, Md.

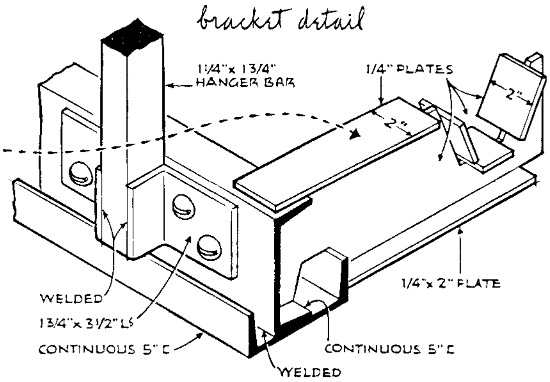
Meyer Katzman, Interior Architect

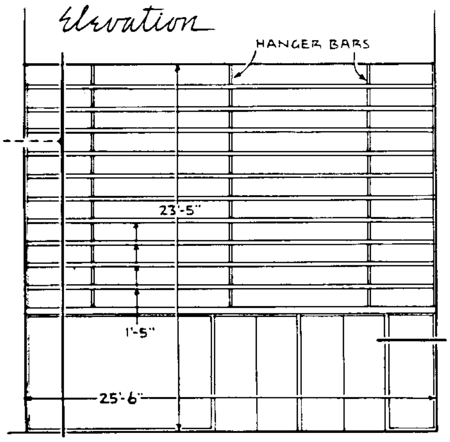
sun shade

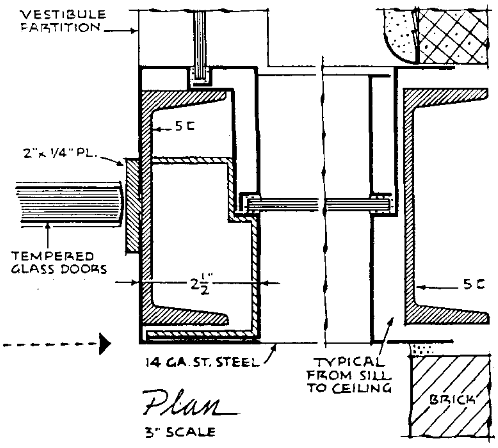





EZRA STOLLER







OFFICE BUILDING, Greenville, S. C.

Carson & Lundin, Architects

Beautiful solution to a problem in division! A glowing wall of translucent patterned glass . . . dividing space but sharing light. Practical? Definitely! Blue Ridge Patterned Glass Panels and matching SECURIT® Interior Door (tempered for hard usage) are carefree. Never need painting . . . always look sparkling new. So many design problems work out so well with patterned glass.

Medical Arts Building, Scranton, Pennsylvania

Partitions and Doors of

BLUE RIDGE PATTERNED GLASS

BLUE RIDGE GLASS CORP.

Made by BLUE RIDGE GLASS CORP.

Sold by LIBBEY·OWENS·FORD GLASS DISTRIBUTORS

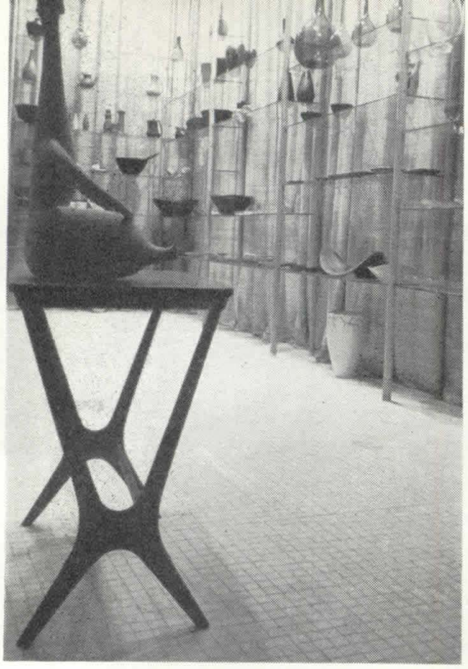
LOF GLASS

LIBBEY·OWENS·FORD GLASS CO.
608 Madison Avenue, Toledo 3, Ohio

Please send me your folder "Blue Ridge SECURIT Interior Glass Do
I would also like a booklet of ideas for using Blue Ridge *Patterned*
in ☐ homes . . . ☐ other buildings. (Check one or both.)

NAME (PLEASE PRINT)________________

ADDRESS________________


Raymond Jacobs

Madison Avenue showroom of International Designers Group, new distribution agency for the work of European and American designers and craftsmen. Glass shelving for display of accessories is supported by oiled birch poles, backed by unbleached raw silk. Paul Secon, Designer.

Louise Sloane

SHOWROOMS

Showmanship, taste, purposeful handling of space, informed and imaginative use of materials – all blend to provide the contemporary formula for effective showroom design. In the three examples we show this month, you will find them in generous supply.

Designer Edward Wormley, with Associate Edward Crouse, has utilized all of them in his distinguished sales offices for a Connecticut manufacturer of light- and voltage-control equipment. The space, in a New York office building, has been utilized to accommodate not only private offices and an equipment display but also a "one-room apartment" for demonstrating the company's dimmer control in a residential setting. Wormley has enriched the suite with fine textiles, beautiful woods, brilliant colors, and choice accessories – to create a sense of spaciousness and quality. Since light control is the "product" to be sold, each area uses a different lighting scheme, and each serves the double purpose of utility and product-demonstration.

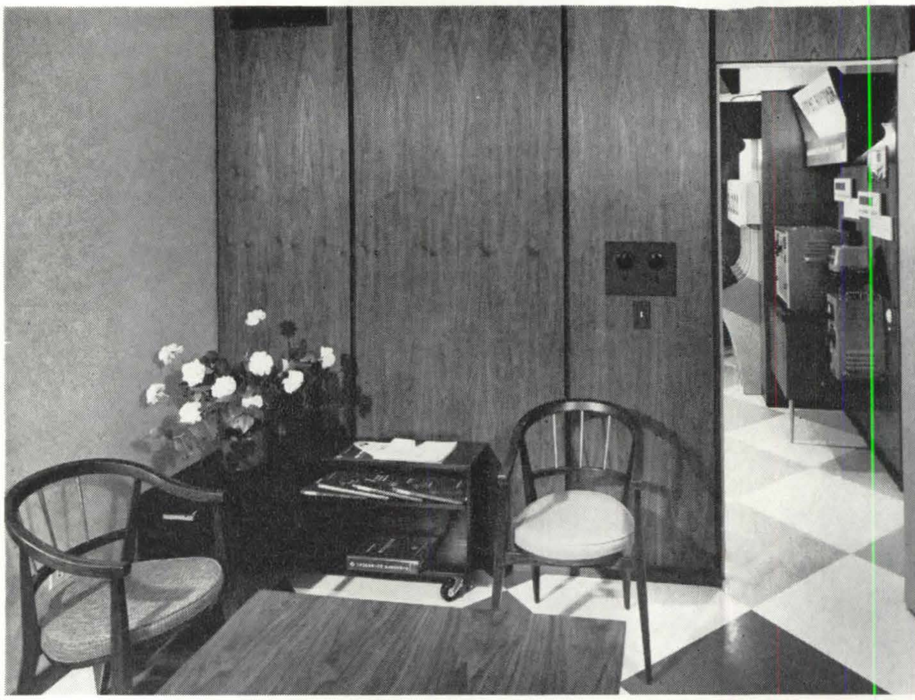
Designer Eugene Tarnawa, in his showroom for a coat manufacturer, creates customer demand at the point of sale, by focusing attention on the merchandise in a setting that is colorful and lighthearted. Deft handling of partitions both segregates by price-lines and provides open display, while an ingenious device of notching the pipes on which the coats are hung permits full vision of tailoring details. Simple materials have been imaginatively used to give a (deceptively) costly look.

Architect Gerhard E. Karplus suggests the Northwestern origin of his sportswear manufacturer client in a New York showroom, by choosing such outdoor materials as driftwood, flagstone, sandblasted cypress, and brick. The setting is apt for display and sale of sportswear. A free-form plan makes maximum use of the relatively small space, to provide accommodation for sales booths, salesmen's desks, offices, and waiting area.

showrooms

client | Superior Electric Company
location | New York, New York
designer | Edward Wormley
associate | Edward Crouse

Photos: J. Alex Langley



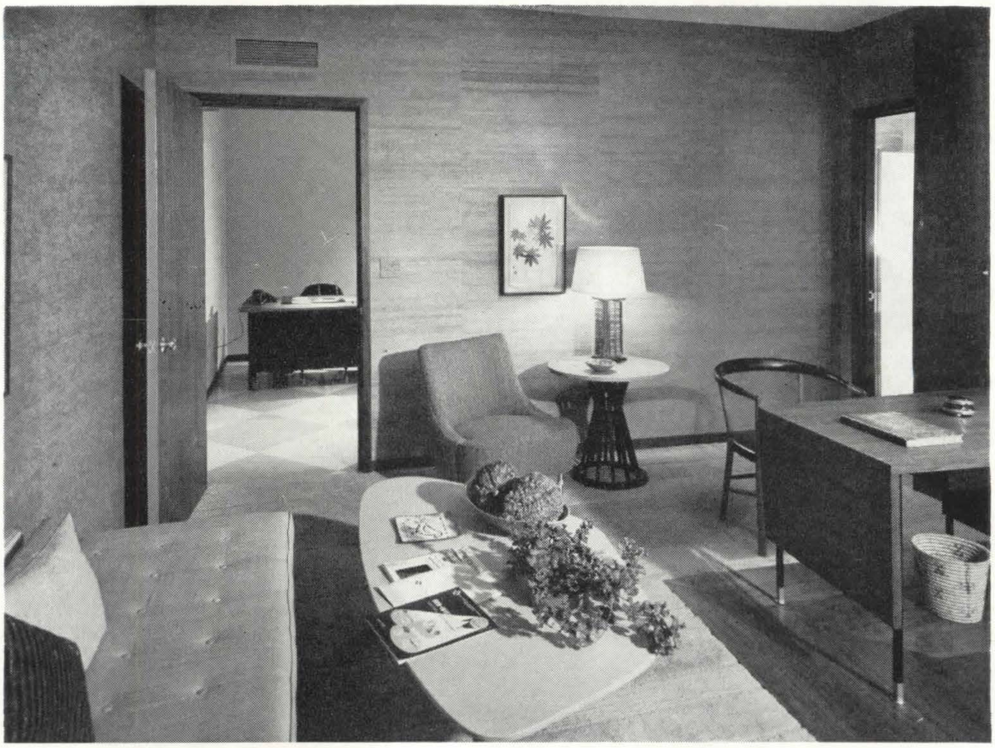
general office

Entrance foyer leads to voltage-control-apparatus exhibit and offices beyond. To the right of the foyer, a residential apartment display demonstrates the multiple effects of the "Luxtrol" dimmer in a rich and handsome setting. White rectangle is projection screen for film demonstrations.

data

Design Theory: Three private offices, a general secretarial office, an industrial equipment display area, and a "one-room apartment" residential display area serve the requirements of the metropolitan sales staff of a Connecticut manufacturer, and at the same time demonstrate the company's light- and voltage-control apparatus.

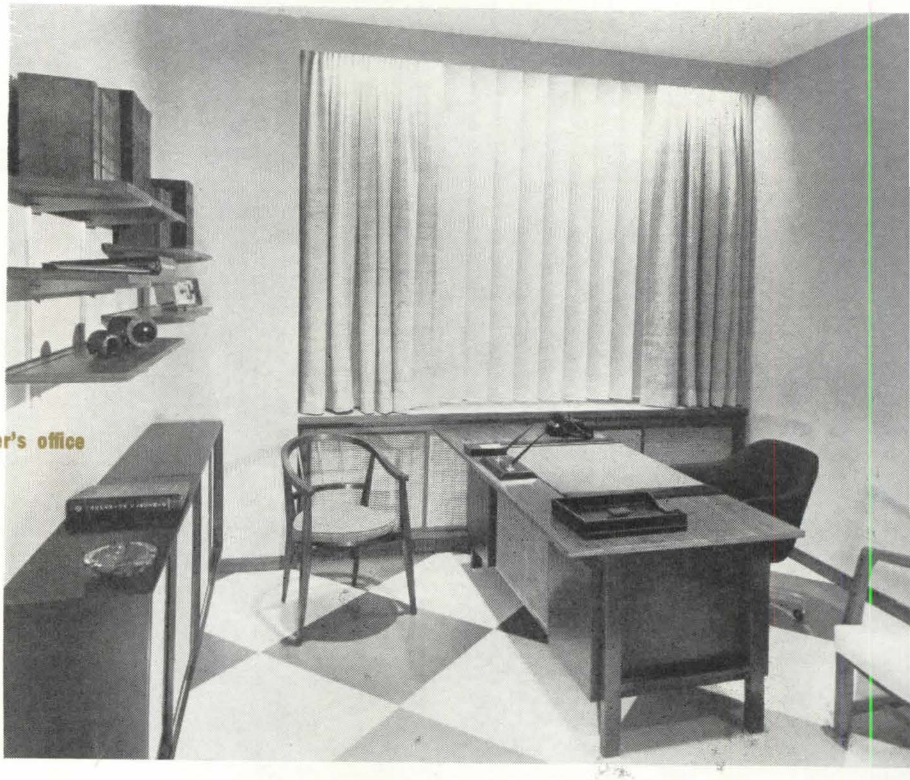
Color Plan: General tone is muted, with some walls of paneled wood, others painted in retiring colors. Strong accents occur in floor and furniture. Vinyl-tile 27" squares, in emerald green, Bristol blue, and Flame, with cream-white for contrast, cover the floor. Upholstered furniture is in bold butter yellow, red-orange, lacquer red, Bristol blue, and a mixed weave of emerald green and Bristol blue; except for desk chairs, which are black.



residential display room

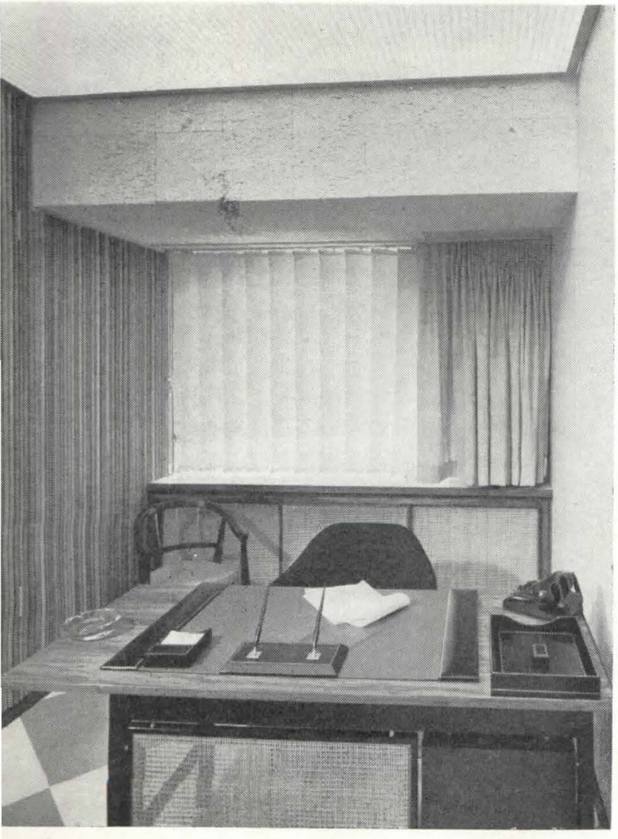
showrooms

Superior Electric Company (continued)



assistant manager's office

salesman's office



data

cabinetwork

Display: Rundbaken Displays Inc., 1125 Main St., E. Hartford, Conn.

windows

Blinds: Thru-Vu Vertical Blinds, Rye, N.Y.

furniture, fabrics

Furniture: Dunbar Furniture Corporation of Indiana, Berne, Ind.; Knoll Associates, 575 Madison Ave., New York, N.Y.

Fabrics: Cheney Greeff and Co., Port Chester, N.Y.; Jack Lenor Larsen, Inc., 36 E. 22 St., New York, N.Y.; Mauretania Fabrics, 838 West End Ave., New York, N.Y.; Rancocas Fabrics, Burlington, N.J.; Thaibok Fabrics, 3 E. 52 St., New York, N.Y.; Jofa, Inc., 45 E. 53 St., New York, N.Y.

lighting

Installed and Portable: all "Luxtrol" dimmer - controlled / Superior Electric Co., Bristol, Conn.; Century Lighting Inc., 521 W. 43 St., New York, N.Y.; Kliegl Bros., 321 W. 50 St., New York, N.Y.; Artcraft Lighting Co., Inc., 248 McKibbin St., Brooklyn, N.Y.; Design International, 6 E. 53 St., New York, N.Y.; Finnish-American Trading Corp., 41 E. 50 St., New York, N.Y.; Garden City Plating & Mfg. Co., 23 W. 47 St., New York, N.Y.; Lightolier, Inc., Jersey City, N.J.; Hansen, 978 First Ave., New York, N.Y.; Beacon Artisans, 330 E. 26 St., New York, N.Y.; Albert Hagmayer, 10 E. Goethe St., Chicago, Ill.

walls, ceiling, flooring

Walls: Eagle-Ottawa Leather Co., Grand Haven, Mich.; Murals, Inc., 16 E. 53 St., New York, N.Y.; Katzenbach & Warren, 575 Madison Ave., New York, N.Y.; Vermont Marble Co., 101 Park Ave., New York, N.Y.; Decorators' Showroom, 316 E. 47 St., New York, N.Y.

Ceiling: "Travertone"/ Armstrong Cork Co., Lancaster, Pa.

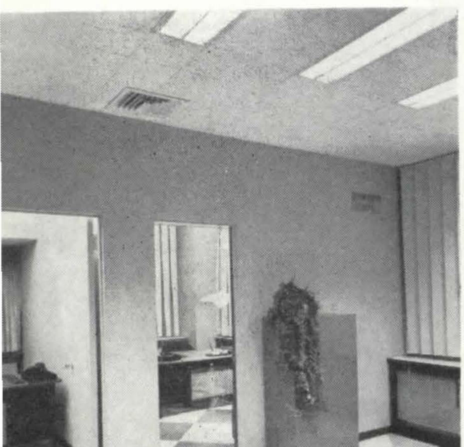
Floors: American Biltrite Rubber Co., Trenton, N.J.; Edward Fields Co., 509 Madison Ave., New York, N.Y.; Vermont Marble Co.

accessories

Desk Sets: Clark & Gibby, 20 E. 41 St., New York, N.Y.

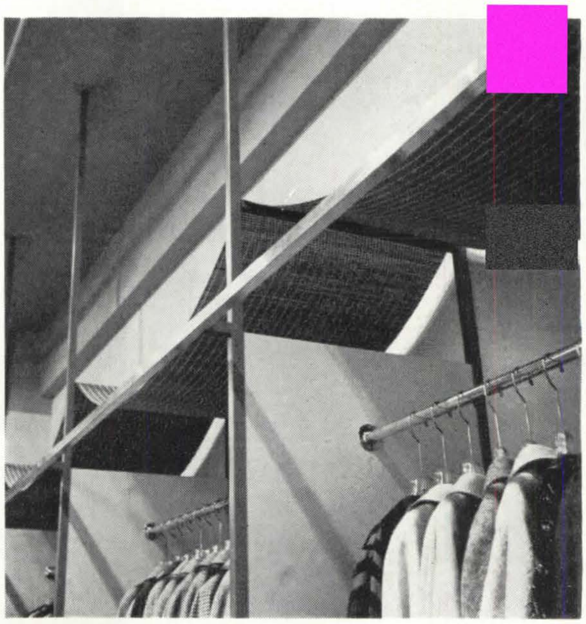
Objets d'art: America House, 32 E. 52 St., New York, N. Y.; Bonnier's, 605 Madison Ave., New York, N.Y.; Peridot Gallery, 820 Madison Ave., New York, N.Y.; Betty Parsons Gallery, 15 E. 57 St., New York, N.Y.; Victoria Tree, 211 E. 49 St., New York, N.Y.

manager's office, two views



secretarial area

showrooms



client	Weatherbee Coats Inc.
location	New York, New York
designer	Eugene Tarnawa
associate	Robert Price

Photos: Marilyn Silverstone

data

Design Theory: Point-of-sale display in a moderate-priced coat showroom, accomplished by open booths, vivid colors, spotlighted merchandise.

Color Plan: Ceiling half blue, half purple. Sidewalls and dividers, apple green. Floors, gray. Aluminum horizontals, walnut basswood canopies.

partitions

Panels: plywood/ painted or papered.
Uprights: aluminum.
Canopies: walnut basswood/ Holland Shade Co., 999 Third Ave., New York 22, N.Y.

furniture

Tables: white "Formica" tops/ Allan Gould Designs, Inc., 166 Lexington Ave., New York, N.Y.

Chairs: white glass fiber/ designed by Charles Eames/ Herman Miller Furniture Co., Zeeland, Mich.

lighting

All: incandescent, to show true fabric colors/ Lightolier, Inc., Jersey City, N.J.

walls, ceiling, flooring

Walls, Ceiling: plaster, painted/ Martin Senour Co., 2520 S. Quarry, Chicago, Ill.

Carpet: mauve-gray/ Mohawk Carpet Mills, Amsterdam, N.Y.

Delivery Area Floor: hard-surface, to accommodate garment push-trucks/ Kentile Inc., 58 Second Ave., Brooklyn, N.Y.

client	White Stag Mfg. Co.
location	New York, New York
architect	Gerhard E. Karplus

data

Design Theory: Eastern showroom for Portland, Oregon, sportswear manufacturer called for rugged Northwest atmosphere, accomplished through choice of natural materials (driftwood, cypress, flagstone, brick). Relatively small space required to accommodate showroom, salesmen's room, waiting area, and offices, achieved through free-form plan.

Color Plan: Pastel walls (gray, white, yellow, cocoa) repeated in chair upholstery. Carpet mixture of brown, beige, white. Draperies mustard and orange on white.

cabinetwork

Divider-Storage: architect - designed/ Ebner Woodwork Co., 319 E. 64 St., New York, N.Y.

partitions

Materials: White "Formica," gray walnut, sandblasted cypress/ United States Plywood Co., 55 W. 44 St., New York, N.Y.

furniture, fabrics

Tables: White "Formica" tops, black wrought-iron bases/ architect-designed.

Chairs: Knoll Associates, 575 Madison Ave., New York, N.Y.

Upholstery Fabrics: Dan Cooper, 15 E. 53 St., New York, N.Y.

Draperies: "Summer-Silk"/ Laverne, 160 E. 57 St., New York, N.Y.

lighting

Recessed Plastic Squares: Kent Mfg. Co., 490 Johnson Ave., Brooklyn, N.Y.

Recessed Spotlights: Century Lighting Co., 521 W. 45 St., New York, N.Y.

ceiling, flooring

Furred Ceiling: "Rocklath" on furring channels/ United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

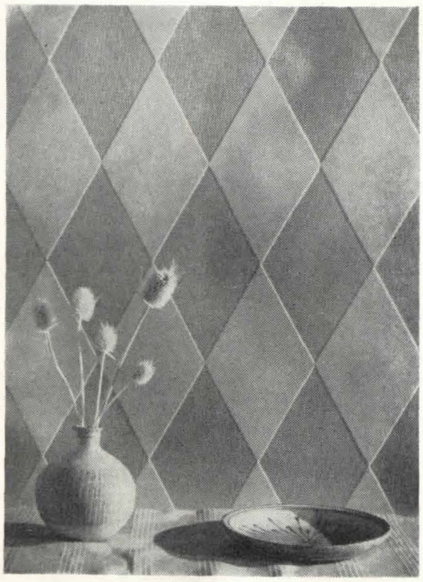
Acoustic Finish: "Travertone"/ Armstrong Cork Co., Lancaster, Pa.

Carpet: Oregon Flax Textiles, Salem, Ore.

Cork and Asphalt Tile: Armstrong Cork Co.

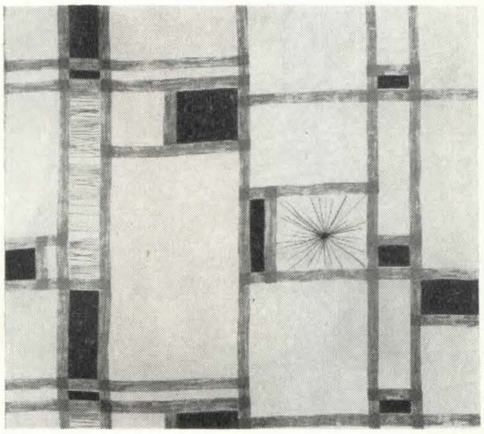
Photos: Ben Schnall

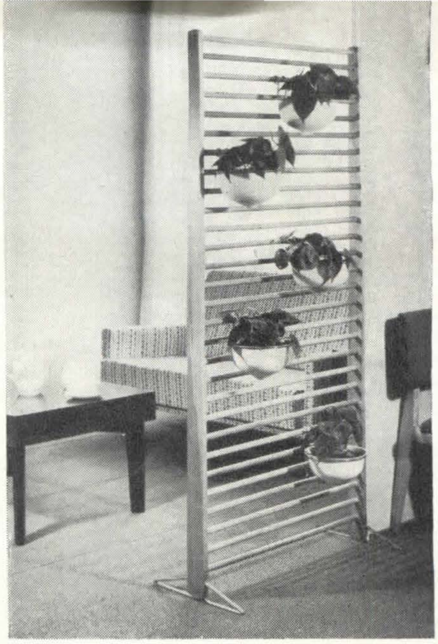
p/a interior design products



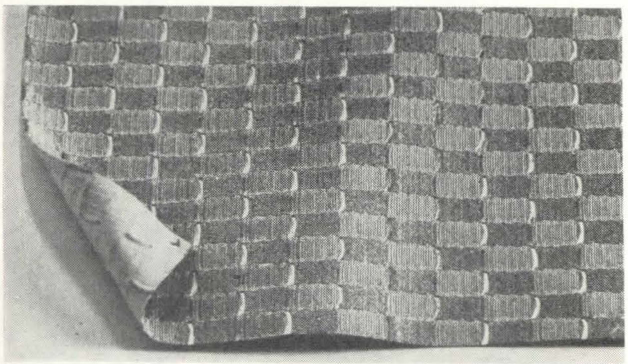
Velvet Wallpaper: "18 Carat"/ diamond-shaped flock motif/ 13" repeat/ hand-flocking on metallic ground/ 30" wide, 36 sq ft per roll/ **retail:** $16.50 per roll/ **Fine Art Wall Paper Co., 575 Madison Ave., New York 36, N. Y.**

Linear Sheer: "Museum Plaid" from "Executive Suite" collection of contemporary drapery sheers/ hand-printed on white Fiberglas/ 48" wide/ in olive-and-lacquer, black-and-mustard, red-and-blue, turquoise-and-olive, charcoal-and-yellow/ **Cheney, Greef & Co., Inc., 4 E. 53 St., New York 22, N. Y.**

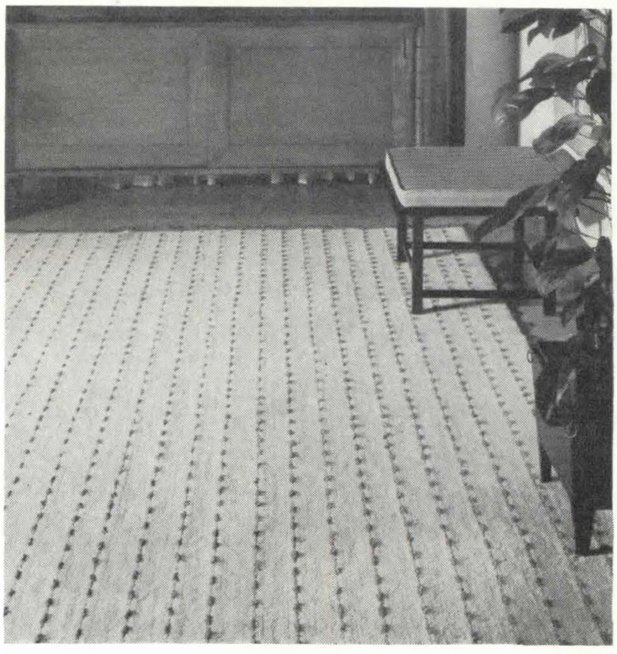




Planter-Divider: natural-birch or stained-walnut finish/ satin-brass supports/ 29 rungs/ mat-white metal containers in brass rings to hook over rungs/ $5\frac{1}{2}$' high x 28" wide/ **retail:** $39.50 with 10 containers/ designed by George Nelson for Howard Miller Clock Co., available through: **Richards-Morgenthau & Co., 225 Fifth Ave., New York, N. Y.**



Wall Fabric: "Lustra-weve"/ shimmering pattern with satiny thread outlining alternating rectangles of duller surface weave/ washable, flame-retardant "Vicrtex"/ **L. E. Carpenter Co., Inc., Empire State Building, New York 1, N. Y.**



Area Rug: "Norland"/ thick high-and-low nubs forming irregular length-wise lines against a plied-rayon tufted background/ latex backing/ matching heavy fringe/ on a natural background, stripes of blue-gray and rose-beige; taupe and rose-beige; Aqua and Desert-beige; Spruce green and Pearl gray; gold and orange; ultramarine and Kelly green/ $2\frac{1}{4}$' x 4', 3' x 5', 4' x 6', 6' x 9'/ **retail:** $9.95 for $2\frac{1}{4}$' x 4' size/ **Cabin Crafts-Needletuft Rug Mills, Dalton, Ga.**