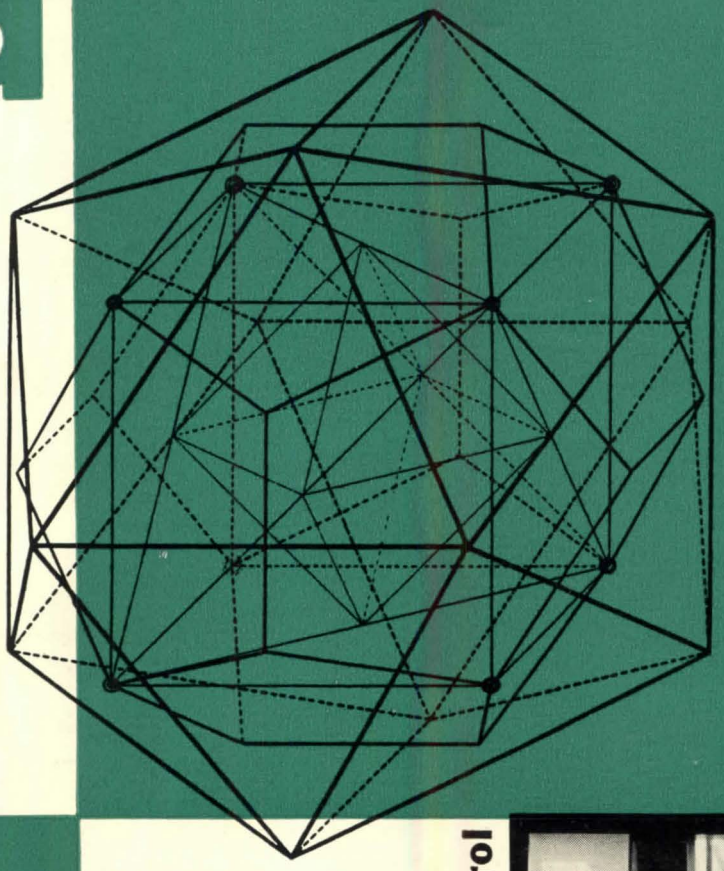
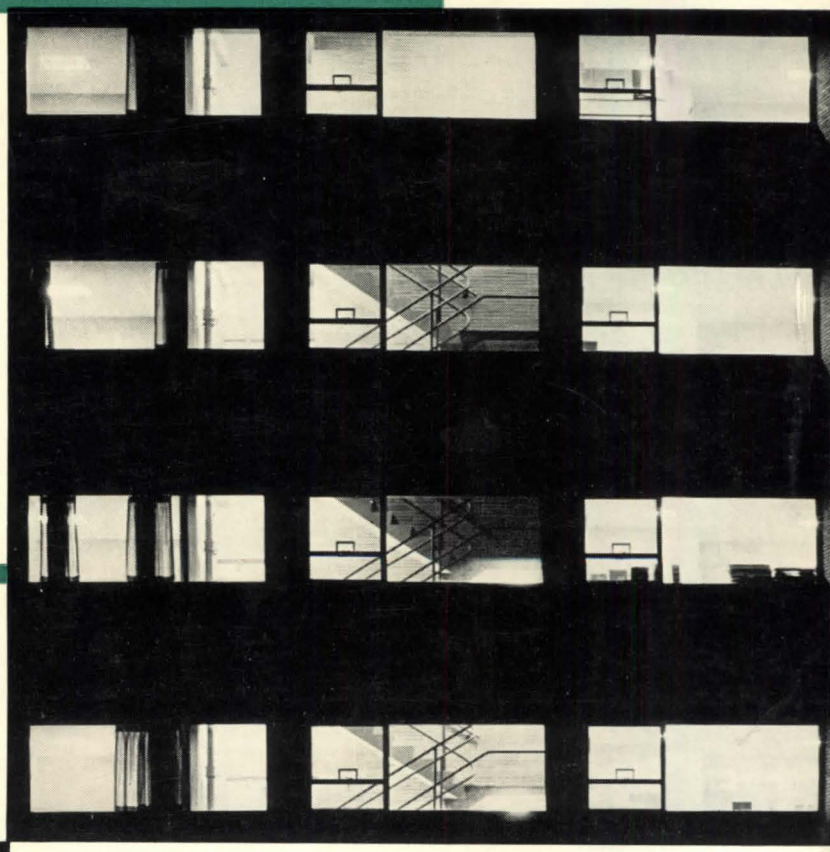
pa Progressive Architecture



environmental control



d's largest architectural circulation

12

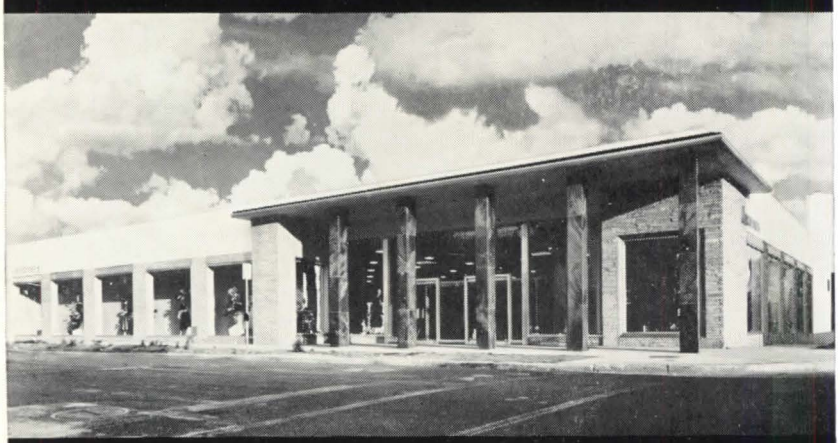
december 1954

commercial buildings

Sears Roebuck Store, Compton, California. Architect—Stiles Clements, Los Angeles, Calif.; Contractor—L. E. Dixon Co., San Gabriel, Calif. Pozzolith Ready-Mixed Concrete supplied by S. H. Bacon Materials Co., Huntington Park, Calif.

better quality concrete here with POZZOLI H

Cooper's Department Store, Fresno, California. Architect—Leo Roselyn Co., San Francisco, Calif.; Contractor—Harris Construction Co., Fresno, Calif. Pozzolith Ready-Mixed Concrete supplied by Stewart & Nuss, Inc., Fresno, Calif.



Jacobson's Store, Birmingham, Michigan. Architect—Arthur O. A. Schmidt, Detroit, Mich.; Contractor—E. J. Swink, Birmingham, Mich. Pozzolith Ready-Mixed Concrete supplied by Boice Builders & Supply Co., Pontiac, Mich.

● These stores are representative of many commercial structures where Pozzolith was employed to produce better quality concrete.

The most important basic factor affecting the quality of concrete is the *unit water content* (water required per cubic yard of concrete). See Bureau of Reclamation's current Concrete Manual, Page 130.

Pozzolith, through dispersion of cement, is the key to producing *lowest unit water content*. Thereby it insures reduced shrinkage, low permeability, increased bond to steel and long life.

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p/a newsletter

December 1954

Business activity in latter months of 1954 indicates trend toward a stable economy, reports U. S. Dept. of Commerce. Expected gross national product of $356 billions is only $9 billions under 1953, despite marked decrease in defense spending.

Record-breaking construction expenditures, 4 percent higher than 1953, are a significant factor in stabilizing national economy. U. S. Depts. of Commerce and Labor estimates, based on first nine month's activity, predict total volume of construction will approach $52 billions; of this $36.5 billions will be spent for new construction, $15 billions for maintenance and repair. Substantial gains in residential construction account for major portion of the total volume, as does increased private spending for commercial, religious, educational, and recreational buildings. Public outlays rose slightly—for educational facilities, highways, sewer and water systems. Federal expenditures for military facilities declined 37 percent.

Increased volume of work already in architects' offices indicates that construction activity will continue undiminished in 1955. P/A's annual Business Forecast of architects' business throughout the country reveals sustained increases in commercial, educational, health, and public use facilities, although industrial and residential construction is expected to drop.

FHA, strongly aware of the need for competent architectural services, set up a 14-man advisory committee to study good housing design with quality construction and incorporate its findings in future legislation. New architectural and technical standards committee includes Walter A. Taylor, Director of AIA Dept. of Education and Research, and Architect Morgan Yost.

Modular Measure will be the subject of a research conference, December 9 in Washington, sponsored by Building Research Institute to evaluate the performance of modular co-ordination to date and indicate new ways in which it can reduce building costs. Featured speakers will include Architects Max H. Foley, New York, and Edward X. Tuttle, Detroit.

"It is imperative that architects contribute to their own welfare," emphasizes Douglas W. Orr, president of American Architectural Foundation. A minimum of $100 is asked of every architect in the country toward the foundation's drive for $1 million which will be used for applied research in new technological advances, particularly in the fields of light, color, sound, decentralization of industry and commerce, and solar energy.

Albert Christ-Janer, educator, of New York University, stressed need for greater industrial support of education in a speech at Society of Industrial Designers' conference last month and urged support of projected National Arts Center for New York. . . . William M. Stuart, president of Martin-Senour Company, volunteered his leadership to solicit funds from industry for financing new building which will house the Institute of Design and Department of Architecture and City Planning, Illinois Institute of Technology. . . Design commission for Seagram House on New York's Park Avenue has been awarded to L. Mies van der Rohe and Philip L. Johnson.

Turn page for WASHINGTON PERSPECTIVE

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; Gilbert E. Cochran, H. Burton Lowe, Merald F. Lue, 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. Re-entered as Second Class Matter September 21, 1951, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Volume XXXV, No. 12, December, 1954. In Art Index, Architectural Index.

Frederick Gutheim Washington Perspective

The prospect of further mandatory design standards for school buildings is not one to make many school architects stand up and cheer. But it is a real prospect if Federal aid for school buildings is granted by the new Congress which meets next month. The coming session will face, in earnest, the question of Federal aid to education—and to this observer it seems likely to be enacted in some form. We need $7.5 billions of new school construction, and available resources total only $4.5 billions. Only Federal aid can fill this gap.

Until now, those favoring Federal aid for schools have glossed over questions that might divide their effort to mobilize support. The nearer we get to some kind of action to meet the 370,000-classroom shortage, the more tough how-to-do-it questions have to be faced. One of these is the desirability of writing into any Federal-aid bill some school construction standards. Whether the object of such standards be to secure economy, to prevent waste of Federal funds, to avoid compliance with the worst of the restrictive state codes, or to further the cause of progressive school design—difficulties lie ahead.

Any statement of standards will involve the question of their enforcement. Experience in the Public Works Administration, one of the few prior ventures into Federally-aided school construction, showed that you could write standards into Federal-aid contracts but neither state nor Federal authorities were likely to enforce them. A recent check on state education department personnel reviewing local school building plans demonstrates they aren't in a position to do the job any better than they did 20 years ago. Only 15 states have more than one man working on school plant problems. Thirty-seven state departments approve building plans prior to construction, but there is almost no effective follow-up. If we are going to rely on state educational and design standards to pattern the spending of Federal aid (the position taken by the authoritative National Council on School House Construction) is it reasonable to assume they would do more than they do with their own state funds?

The kind of standards makes some difference—but not much. Only one of the various Federal-aid bills has attempted to put this into legislative form, on a square-foot-per-pupil formula. This isn't the way out. There is a generally accepted set of standards, formulated by the NCSHC over several decades and further revised only last year. But they are thought of as guides rather than as standards. Most architects like this distinction. Bitter experience with codes designed to protect special building interests has soured them on inhibiting, design-restrictive standards. But they meet an administrative demand. Schoolmen can be counted on to insist on them—and on more supervision, too. They know that while architects may be morally responsible, they aren't liable when the roof falls in. The administrator wants to point to the book to show he did it the right way.

Federal aid for schools is going to involve some resolution of the standards dilemma. It won't be found by writing ceiling heights into Federal legislation, although the temptation to standardize and mass produce must be great in a program of this scale. The best bet is to make the states formulate their own standards, to improve them, and to assume the responsibility for enforcing them. Present state performance indicates a big research and educational job is needed, too. This is the best formula which other Federal-aid programs have found—particularly the Hill-Burton hospital program. When a state writes its school building program, it naturally faces the standards question because this determines school building needs and the over-all cost of the program. Unless it has some standards, it can't prepare a program. The Federal approval of the state program, with the standards wrapped up in the package, allows some administrative discretion, some give and take, some periodic review with opportunity for gradual improvement. State officials can then approve drawings for compliance with individual state standards.

The state conference to inventory educational needs, and the 1955 White House conference, which the administration has offered as a holding action *until* agreement can be reached on Federal aid, would do well to explore this subject. This is the place for architects to make their contribution to this question. Certainly some provisions for standards will have to be incorporated in new proposals for Federal aid to education.

PROGRESSIVE ARCHITECTURE

December 1954

FOR SUMMER COMFORT,

the U. S. National Bureau of Standards rates multiple layers of aluminum FIRST

among all insulations it tested, as reported in its booklet,
"Effect of Ceiling Insulation upon Summer Comfort," BMS52.
(You can get it at our expense.)

To be comfortable in summer you must ward off unwanted heat rays or radiation. Most heat flow thru a *roof space* in summer is by radiation. There is no convection down, and little conduction thru low density air.

Temperatures can reach over 140° F. in some attics. With an absorptivity for heat rays of only 3%, reflectivity 97%, and emissivity 3%, multiple accordion aluminum is an effective shield against summer heat. The slight mass of its components, air being preponderant, makes it very low in heat storage.

COST OF AIR-CONDITIONING REDUCED

This shield against radiant heat lifts part of the load from house-cooling equipment, reducing installation and up-keep costs. But the building, which is *not* artificially cooled, needs this shield even more!

Multiple accordion aluminum is also markedly effective against radiation through a *wall space.*

Air of higher outside temperatures will support more vapor than the cooler air inside a building. Often vapor flows from the outside to the inside of the house, obedient to the law of physics that vapor travels from areas of greater to less density.

Multiple aluminum has long, continuous metallic sheets on *both* sides which are almost impervious to water vapor. Infiltration under the flat, stapled flanges is slight. The scientific construction of multiple layers of aluminum, fiber and air spaces, minimizes condensation formation on or within this type of insulation. Timber rot, crumbling plaster, peeling paint, etc. are minimized.

COST OF EDGE-TO-EDGE INFRA
Multiple Aluminum Insulation
installed in new construction between wood joists, material and labor
Type 6-S under 9½¢ sq ft.
Type 4-S under 7½¢ sq ft.

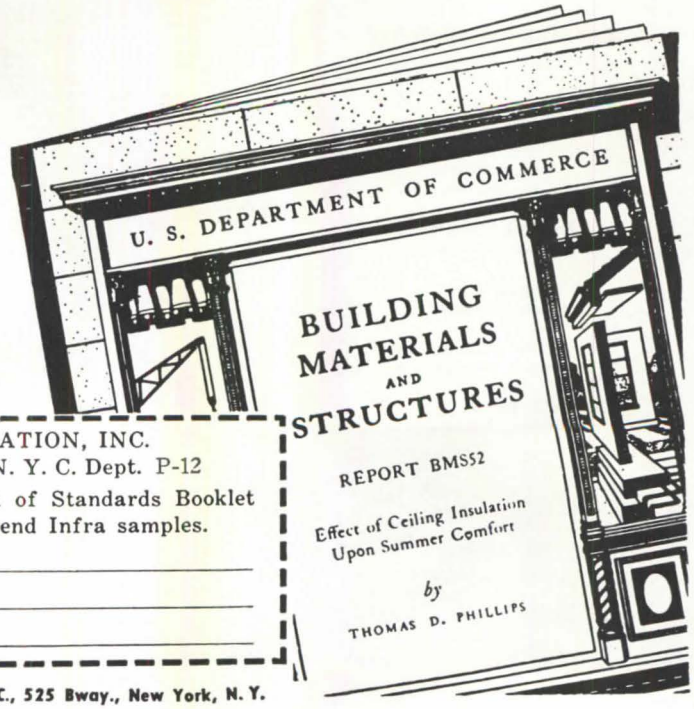
CAUTION: *We do not recommend that vapor barriers be placed on both sides of all insulations.*

IN WINTER, NEED FOR INFRA EVEN GREATER

The low conductivity, the slight heat ray absorptivity and emissivity of multiple accordion aluminum, and the retarding of inner and outer convection by the multiple layers of metal and fiber, amazingly effective in summer, assume paramount importance in winter when this 3-fold bar to outward heat flow cuts fuel bills and increases comfort.

To obtain MAXIMUM, **uniform-depth** protection against heat loss and condensation formation, it is necessary to use the new **edge-to-edge** multiple aluminum*, **each** sheet of which stretches from joist to joist, and also all through the flanges for further vapor protection as well as permanent attachment of each sheet.

*Patent applied for.



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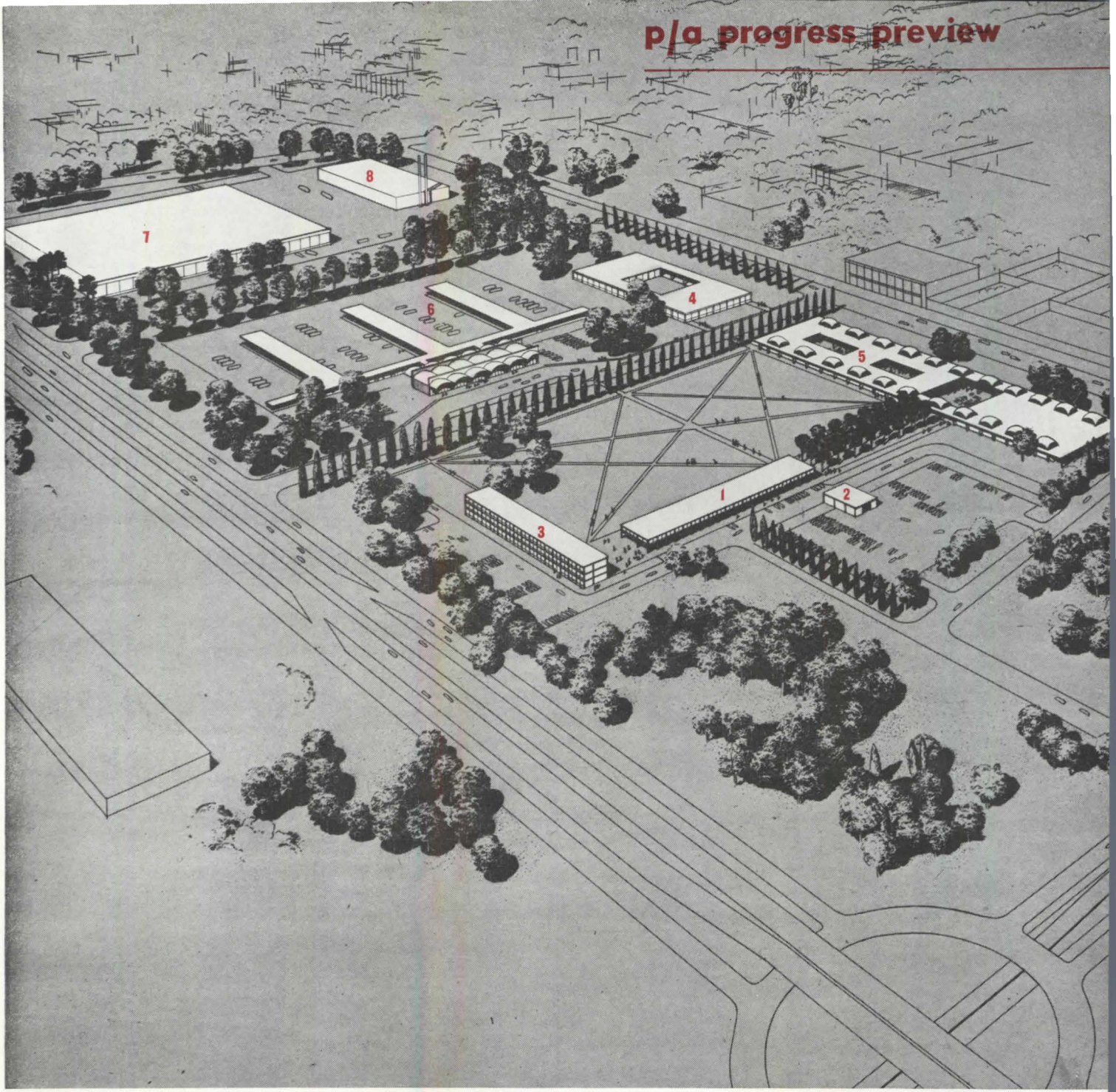
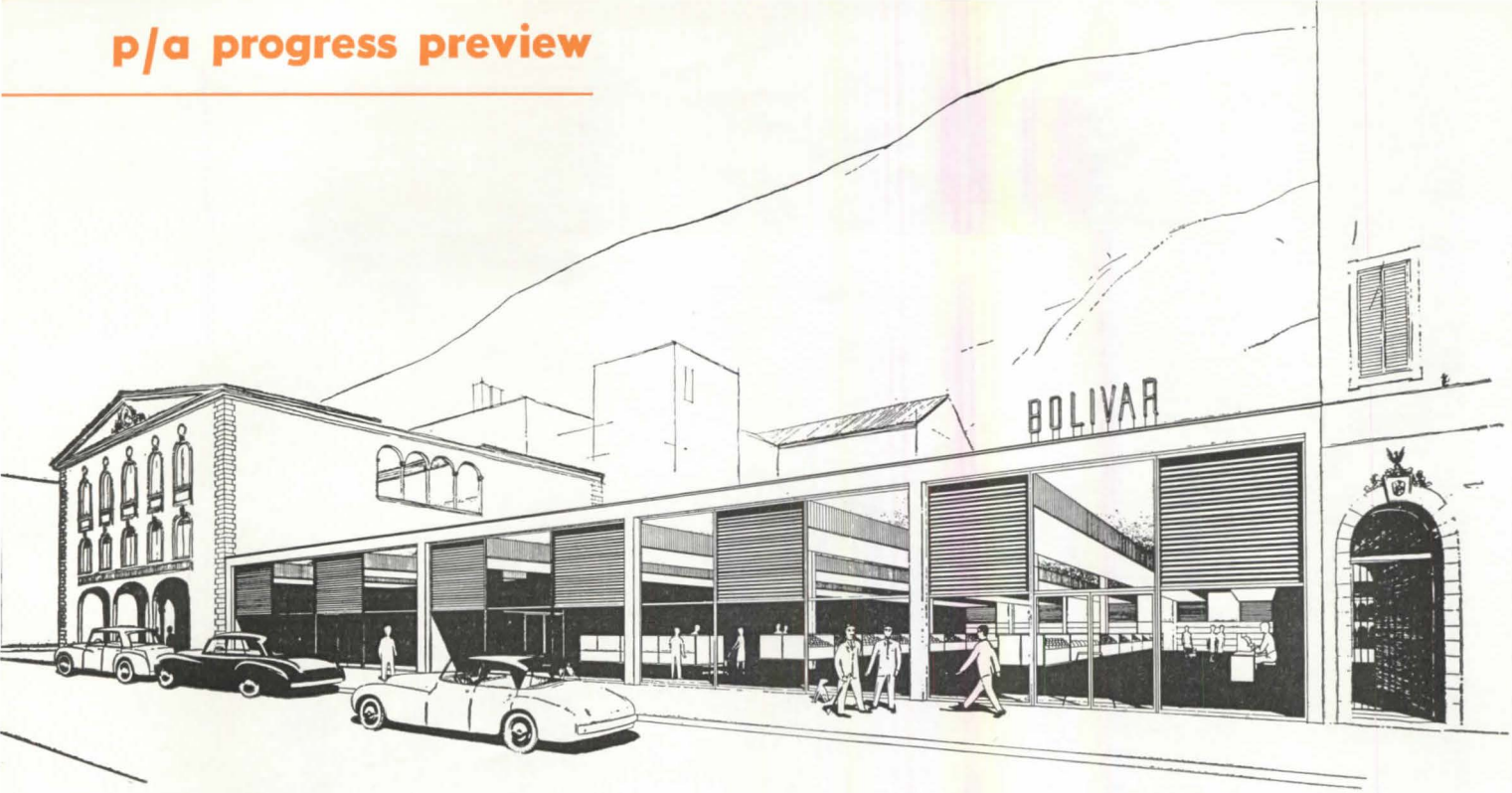


municipal services center for Bogota, Colombia

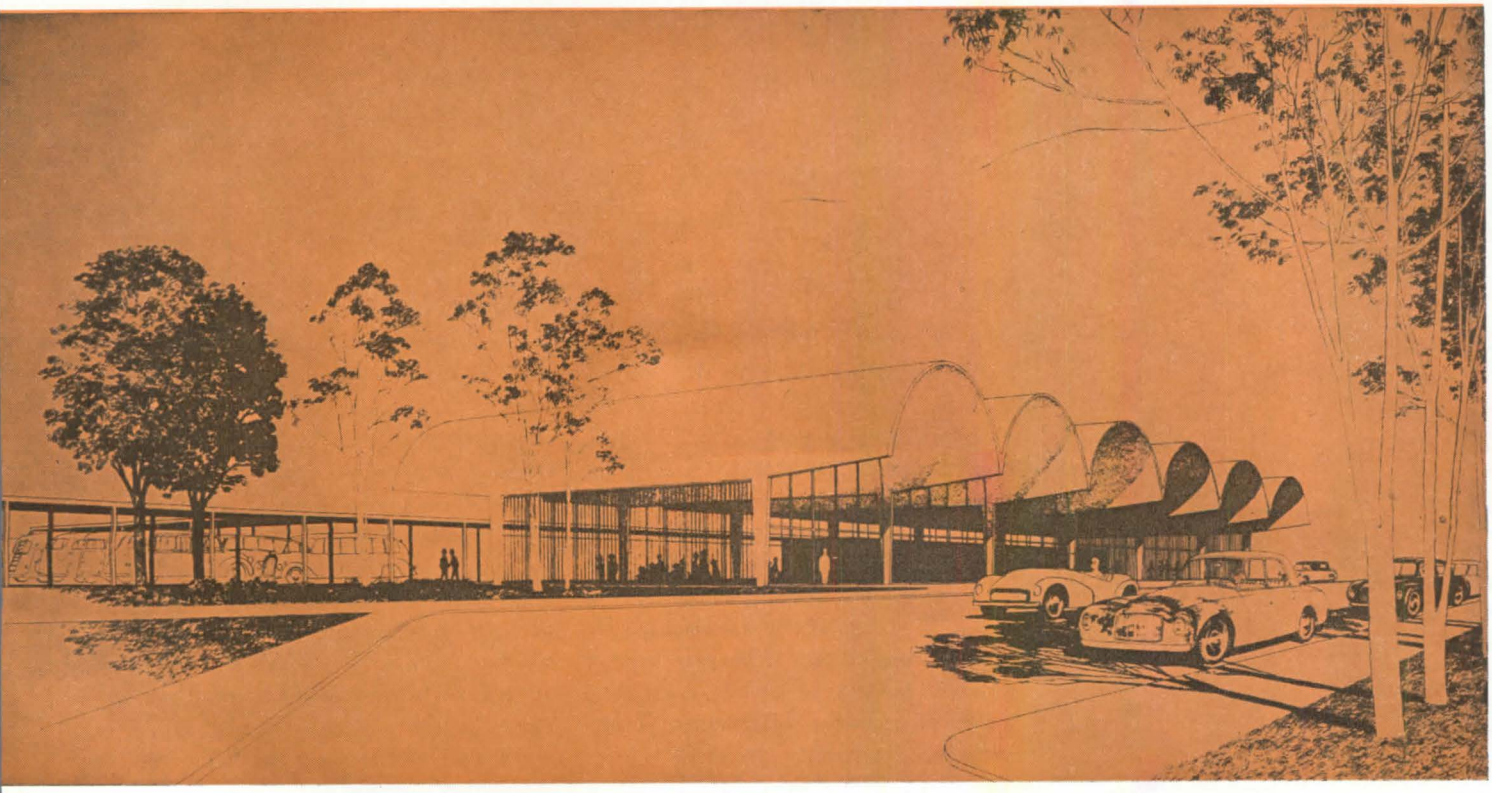
It is estimated that within 10 years Bogotá's population will have risen to one million. To cope with the prospective civic problems implied by such expansion, the municipal authorities have engaged the firm of Skidmore, Owings & Merrill to plan a Municipal Services Center at the outskirts of the city. Local architects and engineers will carry through the actual provisions of the master plan.

The proposed structures are spaced widely in landscaped settings. A building for the Department of Traffic and Transportation (1) borders the south side of the central plaza. Provisions for motor vehicle inspection (2) and barracks for the traffic police (3) are nearby. To the east of the plaza are buildings to house administrative offices (4) and social services, such as a children's day nursery and first aid station. In this area, shops and other facilities (5) for development by private interests may be located at some future date. The northern section of the plaza is bounded by a central intercity bus terminal (6) which also accommodates certain municipal buses. A warehouse for the storage of foodstuffs (7) and a milk processing plant (8) occupy the northern section.



Standard retail shops for the sale of fish, meat, vegetables, fruit, dairy and bakery products (above) *will be located at various points through the city. Their operation will be closely co-ordinated with that of the central warehouse under supervision of the municipal authorities.*

To relieve traffic congestion within the city, bus traffic to and from the suburban area surrounding Bogotá will be concentrated at a single terminal (below) *within the site.* Renderings: Dale Byrd



the architect's role

Dear Editor: It's high time that the true organizer and creator of society (the architect) is brought into his just place in the community.

Today, instead of the people searching for the architect who can best express their wants and feeling through an organic structure, they go to the builder that has the largest ad and shouts the loudest. These builders attempt to fit the people with a social misfit. If we are to live in an environment that expresses the priceless possessions of the 20th Century, we are in dire need of an architecture that examplifies this culture.

To accomplish this truly, all possible mediums of human contact must be explored. This includes such possibilities as radio, television, magazines, and especially newspapers. This is an effort which must be activated by the architect himself, in conjunction with the architectural organizations and publications, before he is drowned by the seller of birthrights (speculative builder).

If our cities are to rid themselves of the confusion and congestion, so that order will reign supreme, we must develop a culture which expresses the individuality of the citizens. This is accomplished only by a high form of architecture, since it displays the advancement, or the lack of advancement, which the community has made.

BURTON D. GLASS
Chicago, Ill.

church art

Dear Editor: I enjoyed very much seeing the fine chapel at Wrightsville Beach, N. C., by Leslie & Charles Boney (August 1954 P/A). However, I am sorry you did not have room for the excellent mural by Claude Howell at the rear of the nave. This colorful triptych is a brilliant example of American church art—a field far too neglected by our congregations, architects, and artists. G. E. KIDDER SMITH
Springfield Center
Otsego County, N. Y.

planning and landscaping

Dear Editor: I wish to present a few personal views. From time to time I have jotted down ideas that this writer would like to see given attention by your staff; namely, more technical articles dealing with urban planning and the strides in the field of Landscape Architecture—most notably the recent registration of landscape architects in the State of California and the trend in Pennsylvania, Michigan, New York, and Massachusetts.

Recently Congress passed the revised public housing bill. As you know, this bill carries provisions for grants-in-aid for small communities requiring planning. The professional planning field is dangerously low in its supply of qualified planners and the situation is becoming more acute with each passing month. Because our planning schools and universities have, to date, been unable to keep up with this need, it seems to me some articles focussed on this problem would be in the public interest.

An article dealing with the "neighborhood concept of planning" might serve as a starter. This subject could branch into further articles concerning the need for circulatory standards, performance zoning legislation, and techniques of capital budgeting.

The heart of the problem lies in the Government's provision that a professional planner develop a master plan for each of the small localities before urban renewal loans are considered. I believe this is a field where the architects should be concerned; however, since very few architects in this country have had adequate training to meet this problem, their close bond and everyday public contact would awake the public for acceptance of designs they will have to conceive for areas where urban renewable programs will be undertaken.

Within the scope of Landscape Architecture, increasing pressure is being developed, in areas where governmental and civic groups are concerned, for adequate grading and planting plans. This is not the design of outdoor steps with 1 to 1 step ratios, 4 percent ramps and "sod" to cover vast lawn areas. Planting plans are sometimes "left up" to the nurseryman, who in all fairness, cannot hope to integrate architectural design and site-planning principals, because he doesn't have the training. The mere presence of shrubs and trees about a building, be it a house or hotel, is not enough. Too many structures with fine architectural style are ruined by inadequate site treatment. Of interest might be some articles dealing with design based on planting materials, i.e., texture, shape, and color. The use of new grasses and their economic sphere related to the conventional "sod" treatment, would be a good subject.

Some years ago, rather extensive ex-

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G. E. Kidder Smith

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periments were conducted to determine the temperature relationship between walls using planting treatment as against those not using any material either at the base or covering the surface—a mean difference of 6° was found—negative in summer and positive in winter!

Another subject might be the difference in real estate values for different developed areas. What is the difference in areas developed where existing trees are saved, as against ripping all trees out to start "afresh" (and in many cases 75-100 years behind times)?

A growing need is to be found in the field of recreation design, field houses, playfield layout for municipalities. How often is a track included at a ridiculous cost to the taxpayer in relation to the few served. And many times the playfield orientation does not favor those players whose recreation time should be respected. The sun should not be in the eyes of the batter or catcher—simple mathematics show reasons for this—yet how many times is home plate turned in a southwesterly direction on civic plans prepared by unqualified persons?

I hope this has not been too detailed; however it is my honest appraisal of your magazine. I have subscribed to PROGRESSIVE ARCHITECTURE since 1951 and I am going to renew my subscription two years hence. In the meantime the best of luck to you in your search for new ideas.

JOHN W. AULT
Towson, Md.

incense for the missing

Dear Editor: You have disrupted my life, put a scare into me, and otherwise generally upset me! When your August issue arrived, I (as usual) turned to OUT OF SCHOOL. No OUT OF SCHOOL! I think it took an hour of search to find your minute notice. No big black border of mourning, no abject apologies, no announcement that Carl Feiss was spending this month vacationing on Mars and mail service was so slow that his article had not arrived on time.

There lies my magazine on the table, staring up accusingly at me, unread. How can I read it when the introduction, the mood piece, the *raison d'etre* is missing?

Besides, the mere intimation that the column is not a permanent fixture in the magazine, is very unsettling. What would happen to the countless letters I am

(Continued from page 19)

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planning to write to Columnist Feiss, the comments, the letters of appreciation or criticism, etc.?

As an architectural student profoundly unsatisfied with my education, its progress and my own, I look each month to OUT OF SCHOOL in hope that, perhaps now, perhaps next month, he will have an answer for me. By all means, if you plan to send Carl Feiss again to Mars, warn us at least six months in advance so that we may arrange our vacations for the same time, thus avoiding the necessity of facing an empty magazine again.

ANN BZIK
Brooklyn, N.Y.

P.S. To be honest, the only criticism I have of P/A is that sometimes the print is too fine for my overtaxed draftsman's eyes.

rapport, rationale, and Mrs. Murphy

Dear Editor: Mort Hoppenfeld's discourse on architectural criticism in your September issue, "aimed at the student/critic (professor) relationship" presents to me additional evidence of the shocking alienation of architectural education from architectural practice in our top-level schools. As one who is responsible for a good deal of the humanistic element in an architectural school, I have rarely received a more blatant warning of the damage that can be done by oververbalization and the indiscriminate application of esthetic theories to architecture.

The most immediate protest against Hoppenfeld's viewpoint is aimed at its overpreciousness, which by now has become symptomatic with a good many architectural students. Their main concern is to make sure that their feelings are not hurt and their egos not shaken by their teachers. "Criticism must be without the use of stigma (*sic!*) words such as *beautiful* and *ugly*, *good* and *bad*." Not that we can blame them for this emotional cowardice. They belong to that unhappy generation reared by us, their elders, on the confused premises of self-expression and relativity. Hoppenfeld's misunderstood quotation of Taine* and his statement that "one cannot constructively criticize a completed work except from the premises of its origin" are double-indemnity clauses against any critical challenge. If only the "hierarchy of interests" is "categorized and arranged, then all will speak the same language."

But, alas, to all practical purposes architecture is not a "problem" in which "the elements of subjective relation between viewer and object must be reconciled and a common denominator found." Architecture is so many dwell-

(Continued on page 20)

* *Taine, successor of Viollet-le-Duc at l'Ecole des Beaux Arts, was an historian. His philosophy of resigned pessimism is hardly applicable to buildings under construction.*
S. M-N.

(Continued on page 16)

(Continued on page 19)

ings, mills, railroad stations, college dormitories. It is not architectural criticism that "is vague, unorganized, inconsistent and unconstructive, lacking the rationale and clarity of a positive approach," but the client who commissions these buildings. There is a story current in Eastern Europe that illustrates the common viewpoint of this client. A marriage broker introduces a chaste young girl to a wealthy bachelor who—after looking at her—insists that she undress. The broker overrules her shocked protest with glowing descriptions of the young man's wealth. Clad in nothing but her tears, the chaste young woman exposes herself to the ordeal of critical evaluation. Finally the young man turns away, saying: "I don't like her nose."

Mrs. Murphy who is responsible for, say, 90 percent of the domestic buildings, and Mr. Murphy who heads the Board of Directors, the building fund, the Advisory Committee of the cherished factory, school, or hospital project, do not want to "discuss dogmas," nor are they interested in their architect's "concept of feeling." Their attitude is characterized by a-rational obsession with details, by some subconscious concept of the acceptability of a building, and by a highly rational attitude toward cash. They cannot, under any condition, be persuaded to consider the architect's design in accordance with a "grading system" on "a modular chart with a pre-established hierarchy of values and a set of criteria by which the project would methodically be fitted to the pattern of each element."

It might be assumed that even Mrs. Murphy would concede that a fine elevation rates higher as an architectural achievement than the plumbing, but she would strongly rebuff an architect who protests "an unreal unity" between that façade and the plumbing. It is perhaps the only mysterious element in architecture that a building is *not* the sum total of adequate separate solutions, but a new "Gestalt" that *is* either good or bad, beautiful or ugly.

It seems to me that Hoppenfeld suffers from a bad case of confusion in applying to architecture the current maxims of art criticism, as if a building were a painting or a piece of sculpture. The painter can count on a fairly uniform attitude toward art in his patrons. The architect cannot. He must be trained to understand and convince any human speciman who is capable of accumulating enough cash to build. It is for this tough, subtle, exciting, disgusting, rewarding, and shattering game that architectural criticism must prepare and harden the student. Because—as Roosevelt once replied to a critic, "To be a GOOD president, one first has to be President!" In other words, to be a good architect one first has to be a commissioned architect.

SIBYL MOHOLY-NAGY
New York, N.Y.

a suggested program of action for the AIA

The American Institute of Architects, the only organization of national significance in the architectural field, is in a position to make tremendous advances for the good of the profession and the improvement of architecture. Several important studies of the Institute and of the practice of architecture have recently been completed and published. In the opinion of the architects whose names appear below, these studies suggest the need for an integrated program of action by AIA. Such an integrated program might be outlined under four main headings as follows:

To Improve Quality of Output From Practicing Profession

A program of advanced professional education,
A program of organized research,
Improved AIA publications,
Raising of standards of Fellowship in AIA,
Restudy of office practice methods and legal documents.

To Improve Movement from School Through Apprenticeship to Practice

Closer co-ordination of work of AIA, ACSA, NAAB, and NCARB,
A regular and accepted Architect-in-Training program of Apprenticeship,
Co-ordination of architectural registration requirements.

To Improve Functioning and Widen Membership of AIA

Democratic election of officers by mail ballots,
Strengthening Regional AIA structure,
Improvement of Committee functioning,
Outside study of functioning of AIA,
Regular reports to membership,
Improvement of disciplinary and judiciary action,
Membership campaign directed to younger architects.

To Improve Public Understanding and Acceptance of the Architect

A widened public relations activity at national level,
A co-ordinated public relations campaign at local level,
Co-ordination of AIA public relations with that of other groups,
Education about architecture in nonarchitectural schools.

The Profession. The architect in the United States today is in an important professional and economic position. There are approximately 20,000 registered architects in the United States at the present time, of whom something over 9000 are AIA members. About 12,000 active firms are practicing architecture. These firms, plus various departments and bureaus of architecture, employ around 140,000 people, in addition to their principals. Between $20 and $25 billions in building construction is erected each year from designs by and under supervision of these architects.

The entire building industry—one of the largest areas of industrial activity in our country—revolves around this architectural practice.

Many other professional activities depend on the architect as inceptor or co-ordinator. Relation of architect and planner is increasingly important.

Sixty-eight architectural schools with an enrolment of about 10,000 students exist today. The graduates of these schools become apprentices and presumably move on to employed or self-employed practice in architecture.

The AIA. Growing at a tremendous rate in recent years, the American Institute of Architects has undoubtedly suffered growing pains. A number of criticisms have been leveled at the Institute, most of which fall into the four categories outlined above: that insufficient attention has been paid to quality of output in architecture; that the profession has not co-ordinated movement from school through apprenticeship to practice; that the Institute itself needs strengthening in structure and membership; and that the general public does not have an understanding of the role of the architect. Because of insufficient action on these matters, the critics say, AIA does not appeal to the younger architects; its membership is less than 50 percent of the practicing architects in the country; it is not as effective as it should be in improving the architect's status in society.

Those active in the Institute, many of whom devote long hours gratuitously to work at Chapter, Regional, and National levels, reply that membership in AIA has grown by large numbers in recent years; that its activities are limited by budget; that improvement in functioning depends on activity and interest from grass-roots members; that its interest in technical, professional, and design matters is constantly increasing; that both a Commission and a Committee have recently reported and made recommendations for improvement.

The Burdell Commission. The Commission for the Survey of Education and Registration, set up under President Ralph Walker in 1950, and known as the Burdell Commission, from its Chairman, Dr. Edwin S. Burdell, conducted over a period of years a comprehensive statistical and analytical survey of architectural practice, education, registration, and apprenticeship. Its final report, published by *Reinhold* last year in two volumes as *The Architect at Mid-Century*, is a veritable mine of information about the profession. One of its final Chapters contains 43 specific recommendations to the AIA, sponsor of the Commission's studies.

The Committee on Organization. This Committee of Institute members was set up at the Seattle Convention of the AIA in 1953, to study structure and functioning of the Institute. It reported at Boston in 1954, too early to have co-ordinated its findings with the final Burdell Commission report. Its own report, in the form of Resolutions with explanatory appendices, was referred to the Board of the Institute for action during the year.

The Suggested Program. This Program, outlined above, amplified in the pages that follow, is suggested as an Agenda for the Institute endorsed by a group of architects who are members. It is an attempt to co-ordinate the findings of the two studies mentioned above, and fit them into an over-all program for improvement—a program which, if adopted, could become the framework for these and many other *wishes translated into action.*

It is recognized that not all of the Suggested Program could be afforded in the present AIA budget. It is our belief, however, that if such a program were fully presented and budgeted, ways could be found to finance it.

It is also recognized that some of the suggested items are being accomplished, to a certain extent, now, and that others are being considered or have been recommended by the Board of the Institute. It is our feeling that these things would be given greater impetus if they were co-ordinated with the other suggested activities. The adoption of an *integrated program*, translated by a series of resolutions into *action*, seems to us the important thing at present.

The following amplified discussion of the points in the Suggested Program is in four parts:
* A brief outline of the problem, as seen and presented by practicing architects, members, and nonmembers of AIA.

* Quotations from the Report of the Commission for the Survey of Education and Registration (The Burdell Commission). These quotes are identified as BCR (Burdell Commission Report) items. The references (R-41) are to Recommendations in this Report (Recommendation No. 41) or to page numbers.

* Quotations from the Report of the Committee on Organization, submitted to the 1954 Convention of AIA. These quotes are identified as CO (Committee on Organization) items. The references (IV) or (IV app.) are to the Resolutions in that report, or to amplification of the sections in the Appendix to the Report.

* Conclusions and recommendations based on the three parts above. In each case, there is suggested an outline of a resolution which might be brought before the next National Convention —outlines which can be embroidered at will.

TO IMPROVE QUALITY OF OUTPUT FROM PRACTICING PROFESSION

A Program of Professional Education. More than 40 percent of AIA members hold no degree in architecture. A large proportion of those who attended architectural schools did so before present technical and design curricula were established. Any practicing architect, as any professional person, needs refresher courses from time to time. Present "seminars" are often at a low level, and in any event are available to only a small percentage of practicing architects.

BCR R-41. The Commission recommends that the AIA expand its program of stimulating the professional growth and stature of all members of the profession by developing and conducting a comprehensive program of advanced professional education suited to needs of all candidates, employes, and practitioners.

CO IV app. We believe that very properly there is demand by the membership for emphasis on . . . continuing interest in a guidance of education at all levels, including undergraduate, preprofessional training and practice. Our status in society must rest fundamentally on our professional competence.

We agree fully with the two reports.

RESOLVED, that the Department of Education and Research confer with the appropriate Committees and report to the membership on a planned program of advanced professional education, with an outline of the steps necessary to accomplish it and the cost to the profession.

A Program of Organized Research. The AIA Director of Education and Research has made a careful study of the research that is necessary and possible in architecture. The Burdell Commission report devotes much space to an analysis of research. Four years ago, a Committee was set up to study this problem. The Architectural Foundation is now raising funds for research purposes. What seems to be lacking is a planned program pulling all these activities together.

BCR R-40. The Commission recommends that the AIA devote its most serious thought and its most sustained effort to develop, implement, and lead a comprehensive and effective program of organized research in all phases of architecture, building, and practice; that it enlist all possible means and agencies to join in a concerted campaign to expand the boundaries of architectural knowledge; and that it work with utmost energy to secure ample and continuing support for the conduct of such research; all to the end that the profession of architecture and the building industry can better fulfil the building needs of the American people.

CO IV app. We believe . . . there is demand for . . . a continuation and expansion of our research programs to help assure our profession a continuing position of leadership. Research is basic to the advancement of living standards of our people through their improved environment.

We agree fully with the two reports.

RESOLVED, that the Department of Education and Research confer with the appropriate Committees and report to the membership on research possibilities, recommend a planned program and the steps necessary to implement it, with an estimate of cost to the profession.

Improved AIA Publications. Compared to the publications of other professional societies in the United States, and to publications of other architectural societies abroad, our present unco-ordinated *Journal* and *Bulletin* seem to many to fall short of what AIA publications should be.

BCR p. 417. The profession lacks entirely any medium comparable to the *proceedings* which form such valuable repositories of technical knowledge in the sciences and technologies.

CO III (12). That the *Journal* and *Bulletin* be merged into one magazine as soon as possible.

CO III (13). That a Director of Publications be employed with the establishment of the combined magazine.

CO III app. (3). One of the best means of good professional relations is through exchange of ideas in graphic and written form. We should not be afraid to publish what is

of interest and benefit to our members, regardless of what the commercial magazines publish. We should make comparisons with the publications of the RIBA and the AMA in our own country.

We agree in general with these recommendations, and further suggest that a study be made so that the AIA publications and the commercial architectural publications supplement one another and become parts of a well-rounded program of architectural journalism. It is possible also that the publishers and editors of the commercial publications might be able to offer technical advice and assistance.

RESOLVED, that a conference be called including appropriate staff members and Committee members of the AIA, editors of successful regional AIA magazines, and representatives of the three national commercial architectural magazines, and that a report and recommendations, with an estimated budget, be submitted to the membership.

Raising the Standards of Fellowship. The present procedure and criteria for advancement to Fellowship in the AIA result in great inconsistencies. In some instances, advancement is purely a reward for long "service" to the Institute, and has no relation to professional competence; in other cases it is purely a reward for design ability, and has no relation to professional service. Neither report mentioned this matter, but comment from the profession is strong on the subject.

We recommend the following procedure:

RESOLVED, that a Committee be set up to restudy the bases for advancement to Fellowship in the AIA, and that a report be made to the membership on the advisability of adopting criteria indicating distinguished performance of a well-rounded nature, rather than the present isolated reasons for advancement.

Restudy of Office Practice Methods and Standard Documents. At present a study of office practice methods is being made by a Committee of the AIA. Now it seems necessary to restudy the AIA Standard Documents in relation to present methods of practice and recent court decisions. Lawyers have suggested modernization of some clauses in the General Conditions. One quick poll indicated that of 15 prominent firms questioned, only two use the AIA owner-architect contracts. There is no standard form for an architect-owner contract based on lump sum proposals, a method used now by many firms. Documents and office practice procedures should be co-ordinated and modernized. Nothing was said on this subject in either of the reports.

We recommend the following procedure:

RESOLVED, that a Commission be set up, composed of lawyers with experience in our field, architects representing small, medium, and large offices, contractors, and representative clients, to restudy with complete objectivity the present AIA Standard Documents in relation to today's procedures, and to report to the membership.

TO IMPROVE MOVEMENT FROM SCHOOL THROUGH APPRENTICESHIP TO PRACTICE

Closer Co-ordination of AIA, ACSA, NAAB, NCARB. It is reported that the first joint meeting of representatives of the Association of Collegiate Schools of Architecture, the National Architectural Accrediting Board, the National Council of Architectural Regis-

BCR R-3 through R-29. (These recommendations all have to do with this matter. A number of specific suggestions are made for co-ordination.)

tration Boards, and the Committee on Education of the AIA took place last year. It seems very obvious that co-ordination of education for architecture, apprenticeship in architecture, registration to practice architecture, and architectural practice itself is a requisite for the full development of the profession. It seems equally obvious that AIA is the logical co-ordinator, and should take steps to accomplish co-ordination. Since this was its principal function, a large part of the Burdell Commission report is given over to this subject.

We concur generally with the recommendations of the Commission.

RESOLVED, that a conference be called immediately of the appropriate staff members, officers, and Committee members of the AIA, members of NAAB, NCARB, and representatives of ACSA, to discuss the recommendations in the Burdell Commission report, to formulate a program based on them, and to report to the membership. RESOLVED, further, that several joint meetings of these bodies be held each year.

A Regularized Apprenticeship Procedure. At present the architectural school graduate drifts from office to office, heading toward ultimate practice in an unplanned way. AIA pays lip service to an apprenticeship which does not exist in fact. The passage from school to registration should be made orderly.

BCR R-30. The Commission recommends that the AIA, enlisting the support of ACSA, NCARB, and NAAB, develop and establish an AIA Candidate Training Program. . . . The Commission further recommends the preparation of suitable guidance manuals for candidates, advisers, and advising committees.

BCR R-31. The Commission recommends that the AIA accord all candidates enrolled in its AIA Candidate Training Program the Title, Architect-in-Training.

We concur heartily with these recommendations.

RESOLVED, that steps be taken at once, in conjunction with ACSA, NCARB, and NAAB, to institute an AIA Candidate Training Program, with approved candidates designated as Architects-in-Training.

Co-ordination of Architectural Registration Requirements. At present there is great inconsistency in type and effectiveness of registration laws and, despite the NCARB certificates, almost no reciprocity, because of the inconsistency. There is also widespread criticism of the type of examination required. The Burdell Commission, with this one of its prime concerns, studied the matter fully, and made a number of specific recommendations.

BCR R-32 to R-37 inclusive. These recommendations propose uniform registration laws, a study of examination methods, and exploration of the possibilities of a National Registration Examination.

BCR Appendix C. This is a considered statement of elements for a model Registration Law.

We concur heartily, and suggest as action:

RESOLVED, that immediate steps be taken to draw up a uniform registration law. RESOLVED, further, that a joint committee of AIA, NCARB, ACSA, and NAAB institute a study of examination methods, using the data accumulated by the Burdell Commission, and report to their members. RESOLVED, further, that a study be made of the advantages, disadvantages, possibilities, and difficulties of a National Architectural Registration Examination, and that a report be made on this to AIA membership.

TO IMPROVE FUNCTIONING AND WIDEN MEMBERSHIP OF AIA

Democratic Election of AIA Officers by Mail Ballot. Much of the criticism of the AIA by younger and more progressive architects rises from a feeling, whether justified or not, that the Institute is still a "closed club" controlled by a "clique" which refuses

to allow criticism or more democratic governing procedures.

One constant cause of criticism is the fact that AIA national officers are elected by Delegates at National Conventions, rather than the total membership. The feeling is that this is not a democratic expression, since those "delegates" are often members who can afford the time and expense of going to Conventions, rather than truly elected representatives, and that these delegates do not carry the expressed wishes of their Chapter members. Since several hundred delegates can elect an officer, this is action by about 1 percent of the registered architects in the United States.

CO app. II (f). "The universal popular vote method is opposed . . . for the following reasons: ballots must be checked for *validity* . . . : . . . a 30 percent return is the maximum to be expected; the present procedure is more democratic . . . ; how long Conventions would stand up other than as educational seminars, if mail ballots were adopted, is a serious question. . . ."

CO II (5). That study be given looking to . . . a substantial reduction in the number of delegates to the Annual Meeting.

CO II (8). That by-law changes be made to limit the Presidency of the Institute to one year. . . .

We disagree with the Committee's report on direct election, and each of its stated reasons. A 30 percent return would mean election by about 3000 architects instead of the present several hundred (which would be reduced even more if CO recommendation II (5) were adopted). We go along with the recommendation for one-year terms, believing that this would make it possible for outstandingly able architects to assume the Presidency, if it were possible for them to be elected.

RESOLVED, that the membership of the AIA be polled to determine its wishes regarding direct mail-ballot election of national officers, with advantages and disadvantages clearly and objectively stated.

Strengthening Regional AIA Structure. The AIA should be a "grass roots" organization. Caliber of the Regional Directors is most important. Direct and continuing contact between National officers and staff members, on the one hand, and between Regional and Chapter groups on the other is also important. While Regional Conventions have been strengthened in recent years, they are too often poorly conducted and without relation to national affairs. While the caliber of Regional Directors has improved tremendously, they are still too often elected on the basis of seniority rather than outstanding ability.

CO app. III (c). Contacts we have in our respective regions indicate that those at the Octagon often have little real understanding of the situation with reference to the average member at the grass roots. Even members of the Board soon forget how little they knew before their contact with the Board and Staff.

CO II (9). That a by-law change be made to limit the term of a Regional Director to two years.

CO II (12). That . . . the Regional Director become the Chairman of the Regional Conference.

CO II (6). That the Regional Conventions be emphasized and made of prime importance to the individual practitioner.

CO II (7). That the dates of Regional Meetings should be co-ordinated through the national staff to minimize conflicts.

We concur with these recommendations, but go further:

RESOLVED, that a statement be prepared and sent from the Octagon to all members, on the importance of the Regional structure of the Institute, and the responsibility of the membership in electing Regional Directors.

Improvement of Committee Functioning. Many Committee Chairmen and active Committee members feel that the present Committee setup is not efficient—even with the new "vertical" representation. Faults reported are: that Chairmen are sometimes appointed for "political" reasons; that membership is too often inactive (implying poor appointments); that effective Committee members are not reappointed, so that there is no continuity; that Commitee contact with staff is not always close; that Committee contact with the Board is almost nonexistent; that Committee recommendations are often ignored by The Board.

CO III (2). That the Board should assign the details of operation to the Executive Director and staff and give much more of its own time to the consideration of and establishment of policies on the relation of the Architectural Profession to Society.

CO III app. (a). There seems to be much criticism, for which there is little defense, of the AIA lack of any established policy with relations to many important matters. . . . The present practice of the handling of too much executive detail by The Board also prevents sufficient consideration being given to the reports of Committees. Everyone who has served on The Board and many who have served on Committees know of cases as a Committee giving much time and effort to a

study resulting in a report and recommendation to The Board, which because of lack of time . . . was given inadequate consideration. . . .

CO II (21). That Committees of the Institute be re-examined to the end that in all appropriate instances National Committees be correlated with Chapter Committees; and that, where appropriate, membership on National Committees shall be appointed one per region by the membership of the Regional Committees of the same name and functions.

CO II (22). That members of National Committees without Regional counterpart be appointed by the Board in the best interest of the Institute rather than necessarily on a regional basis. . . .

CO II (23). That in the appointment of Committees, the principle of continuity be respected.

We concur with these recommendations, but go further (the "principle of continuity" should be *enforced* rather than *respected*, for instance):

RESOLVED, that the Committee setup of the AIA be re-examined; that members be continued for overlapping terms of years, unless removed by the Chairman; that the Board act upon, or report to the membership, all Committee reports each year; that Chairmen of regular Committees be invited to attend Board meetings at least once a year; that a report from each Committee be included in the annual Board report, for the membership to evaluate.

Outside Study of Functioning of the Institute. This was proposed in a resolution from the Washington Metropolitan Chapter at the Seattle Convention in 1953. It failed of passage by a narrow margin, after a substitute suggestion had been made, of a study on organization by a Committee of Institute members. That Committee reported at Boston last year and its recommendations are the ones quoted herein as CO proposals.

CO III (5). That because of the rapid growth of the Institute in the past seven or eight years, an investigation be made by professional counsel as to the advisability of revision of accounting methods and the possible addition of mechanical accounting equipment.

CO III (1), to CO III (7) and CO IV (1). These are specific recommendations on staff organization; they deal with setting up a permanent staff on the basis of tenure; with internal responsibility; with editorship of AIA publication; and with reconstitution of the Department of Education and Research.

We neither approve nor disapprove these recommendations, but believe that a professional study of the functioning of the Institute is still needed. The Institute's budget is now very large, and its responsibilities to the architects of the United States are great. Like any business organization, it should have itself studied not by itself, but by a professional counsel—not just for accounting methods, but also for its whole structure and operation.

RESOLVED, that a firm of professional business consultants be retained to make a comprehensive study of the functioning and the structure of the AIA.

Regular Reports to Membership. The AIA at the present time has no traveling Field Secretary. Regional Directors try to visit all Chapters in their Regions, for contact between membership and the national body, but this attempt is sporadic and unorganized.

BCR p. 454. The hazard of a national organization is the temptation to accord it independent and determining status. Distance precludes intimate observation of its mechanics and under the aura of national prestige it may reduce the provinces to passive waiting for authoritarian directives, thus withering the very grass roots of its vitality.

CO III (9). That greater emphasis be put on an interchange of information and understanding between the individual architect and the Board and Staff.

CO app. III (c). In spite of past experiences, we believe that the idea of Field Representatives is sound. The appropriate staff member should be given every aid and encouragement to make a success of this field work.

CO III (10). Be it further resolved that Regional Directors be required to visit each of their Chapters at least once a year. . . .

We concur with these suggestions, and believe they should be co-ordinated:

RESOLVED, that a Field Secretary be appointed, whose duty it shall be to work with and through the Regional Directors in assisting them to maintain contacts between Chapters within the various Regions, and the national body, staff, and Committees.

Improvement of Disciplinary and Judiciary Action. Much cynicism about the AIA results from known abrogations of the Obligations of Good Practice and the Mandatory Rules of the Institute. It is a question whether some of these Obligations and Rules are out of date and should be revised. The point made by many architects is that *if* these standards are to remain on the books, they must be enforced, or the AIA looks silly in the eyes of both members and nonmembers. Three steps seem to be necessary to improve this situation: (1) widen AIA membership; (2) discipline immediately any member who transgresses; (3) make the public more aware of the value and the implications of AIA membership. Then punishment would mean something; at the present time loss of membership for a period seems to be no penalty at all.

CO (1) to CO (5). These recommendations have as their purpose the strengthening of Regional Judiciary proceedings, reviewed at the National level, without "influence of latent personalities."

We concur with the suggested changes in and strengthening of Judiciary procedure, and suggest further:

RESOLVED, that the Judiciary Committee study and report to the membership on means of tightening up disciplinary action within the Institute. RESOLVED, further, that the principles of the Obligations and Mandatory Rules be stressed in national public relations activity.

Membership Campaign Directed to Younger Architects. The median age of registered architects in the United States is 45.5. Only 1 percent of the AIA membership is under 30 years of age; 7 percent of nonmember architects are in this younger age group. 25 percent of AIA members are under 40; almost 40 percent of the nonmembers are this young.

A report made to the New York Chapter last year by a Committee on Younger Architects showed these figures: 17.6 percent of Chapter members under 40 in 1953; only 15.6 percent in this age group in 1954. In other words, the age level had risen appreciatively in one year.

No recommendations were made in either the BCR or the CO reports, on this subject. However, the New York Chapter report has very specific recommendations which deserve consideration by the AIA at national level. They include: elimination of age limits for licensing; taking of some licensing tests on graduation; revamping of NCARB processes; sponsorship of lectures, awards, competitions, study-workshops; placing younger persons on Committee; strengthening student Chapters; graduating dues more equitably.

We consider this a serious and basic problem, and recommend as follows:

RESOLVED, that a national committee be set up on the Younger Architect and the AIA to study programs which might be of interest to and aid to the young man in the profession such as advanced professional education, regularized apprenticeship, co-ordinated registration, promotion of competitions, sponsorship of research projects, and others. RESOLVED, further, that on the basis of recommendations of this Committee, an active campaign be conducted to draw younger architects into the Institute.

Widened Public Relations Activity at the National Level. The Public Relations Committee of the AIA, John Root, Chairman, has done an excellent job, with the professional help of Ketchum, Inc., of outlining and recommending public relations activities to Chapters and individuals. However, very little has been done at the national level. Spasmodic publicity releases from the octagon are not well or consistently handled. There is no national speakers' bureau. There is no consistent attempt to place articles on architecture in national popular media. Exhibitions and Awards are not well publicized. Radio, TV, and motion pictures have not been utilized by the national organization, on a nationwide basis.

BCR p. 9. . . . a vigorous and continuing educational campaign designed to emphasize the importance of architectural quality.

BCR p. 453. Through the pooling of resources objectives which no local group could afford become capable of realization.

CO III (11). That a Speakers Bureau be set up at the Octagon.

Fully appreciative of the present work being done, we believe strongly that an aggressive national public relations campaign is now needed.

RESOLVED, that the Public Relations Committee be expanded to include working subcommittees on newspaper publicity, magazine publicity, booklets and brochures, radio and TV, moving pictures, and exhibitions and awards. RESOLVED, further, that the Committee study and report to the membership on the cost of a planned campaign of public education on the value of the architect to be conducted at the national level.

Co-ordination of Public Relations Activity at the Local Level. While some Chapters and Regions have done an excellent job in public relations, there is little co-ordination among local groups. Exchange of information, suggested and successful projects passed from one Chapter to another, etc., seem badly needed. Continuity of Chapter Public Relations Committee membership also seems necessary; too often, when new Committees are appointed, all previous experience is lost. Above all, these Chapter PR activities need to be co-ordinated with an over-all national campaign.

We therefore suggest the following:

RESOLVED, that the appropriate Staff members confer with the National Public Relations committee and its counsel and with the Regional Directors, on ways to co-ordinate local public relations activity, exchange information on local efforts, achieve a continuity of local campaigns—and relate these activities to a national public relations campaign.

Co-ordination of AIA Public Relations with Activities of Other Groups. A great part of the "selling" of design services to the public is as important to other professional groups, and to other building industry groups, as it is to the architects. Since a national public relations campaign would be very costly, it would seem sensible to see what correlation of efforts could be made with engineering societies, landscape architects, planning organizations, and so on, as well as with real estate, contracting, home building, and building-materials manufacturers groups.

We therefore suggest the following:

RESOLVED, that the Director of Professional Relations, together with the *Public* Relations Committee, the Committee on Collaboration of Design Professions, the Committee on the Home Building Industry, and the Joint Committees with the Producers' Council and with the Associated General Contractors, investigate the possibility of a great joint public relations campaign on a level to which all could subscribe.

Education About Architecture in Nonarchitectural Schools. One important reason for the lack of public understanding about architecture is inadequacy of teaching about the subject at primary, secondary, and even college level, to nonarchitectural students. This has also resulted in poor vocational selection.

BCR R-4. The Commission recommends that the AIA, in conjunction with ACSA, cause to be prepared and circulated an up-to-date manual which will present to vocational counselors and students of secondary schools the opportunities, nature, and qualifications of careers in architecture.

BCR R-6. The Commission recommends that the AIA investigate the feasibility of preparing workbooks for use in elementary and secondary school classes, designed to familiarize all such students with the importance, influence, and appeal of good architecture in community life. These workbooks should also explain the work and contribution which architects provide in attaining a convenient and attractive community.

BCR R-20. The Commission recommends that the AIA urge ACSA and the schools to develop course offerings through which nonarchitectural students of their institutions can have the opportunity to study, understand, and appreciate the character, values, and importance of architecture of high quality, and the manifold and essential contributions which it makes to satisfactory living.

We concur heartily, and believe that this is a joint responsibility of AIA and ACSA. Experience of architectural schools which have accomplished something in this line (traveling school exhibits prepared by Pratt Institute, for example) should be drawn upon.

RESOLVED, that the Director of Education and Research work with the appropriate Committees of the AIA and the ACSA on a program of education about architecture in nonarchitectural schools at all levels, making use of the analysis and recommendations in the Burdell Commission report.

The architects whose names appear below, members of the AIA Chapters indicated, endorse this SUGGESTED PROGRAM OF ACTION for the Institute. Further, they urge that grassroots members not only endorse the PROGRAM, but see that it is carried out in a democratic fashion, by presenting it and supporting it at Chapter, Regional, and National levels.

It is our hope that a number of Chapters, between now and the time of the next National Convention, will thoroughly discuss and adopt the suggested resolutions and carry them to the Convention. We believe that by action on an integrated Program such as this, AIA can become a more effective instrument assisting the architect to fulfil his professional responsibilities

Richard Aeck, Georgia
A. L. Aydelott, Tennessee
Robert E. Alexander, Southern California
Fred Bassetti, Washington State
Pietro Belluschi, Oregon
William Breger, New York
Robert G. Cerny, Minneapolis
Henry S. Churchill, New York
Alexander S. Cochran, Baltimore
Thomas H. Creighton, New York
Vernon De Mars, Northern California
Arthur Fehr, Central Texas
Carl Feiss, Washington-Metropolitan
O'Neil Ford, West Texas
William W. Freeman, Vermont
Bruno Funaro, New York
Walter Gropius, Massachusetts
Roger Halle, New York
Don Hershey, Central New York
James M. Hunter, Colorado
A. Quincy Jones, Jr., Southern California
Henry L. Kamphoefner, North Carolina
Louis I. Kahn, Philadelphia
Sidney L. Katz, New York
Robert Woods Kennedy, Massachusetts
Morris Ketchum, Jr., New York
Vincent G. Kling, Philadelphia
Ernest J. Kump, Northern California
Robert A. Little, Cleveland
Robert M. Little, Florida South
Maynard Lyndon, Southern California
Marion I. Manley, Florida South
Francis J. McCarthy, Northern California
John Lyon Reid, Northern California
Isadore Rosenfield, New York
Jan Ruhtenberg, New Jersey
Eero Saarinen, Detroit
Thorne Sherwood, New York
Ben John Small, New York
Chloethiel W. Smith, Washington-Metropolitan
G. E. Kidder Smith, New York
Harold T. Spitznagel, South Dakota
Richard G. Stein, New York
Eugene D. Sternberg, Colorado
Hugh A. Stubbins, Jr., Massachusetts
Arch B. Swank, Dallas
J. Robert F. Swanson, Detroit
Edgar A. Tafel, New York
Paul Thiry, Washington State
Frank E. Watson, Florida South
William W. Wurster, Northern California
Minoru Yamasaki, Detroit

it's the law

by Bernard Tomson

Many contracts between owner and contractor (particularly contracts with governmental agencies) explicitly provide that each contractor employed on the project will co-operate with other contractors and co-ordinate his work with such other contractors. Two recent decisions by the United States Circuit Court of Appeals construing such a provision, one in New York and one in Mississippi, reached opposite conclusions as to the legal liability of one contractor to another contractor for improper performance.

The New York case (*Brotherton* v. *Merritt-Chapman & Scott Corp.*, 213 F. 2d 477) involved two contractors who had been awarded contracts with the United States to construct a portion of the buildings for a hospital. The contract with the government in each instance provided:

"The contractor shall obtain all required licenses and permits. He shall be responsible for all damages to all persons that occur as a result of his fault or negligence in connection with the prosecution of the work."

The contract further provided:

"The government may award other contracts for additional work and the contractor shall fully co-operate with such other contractors and carefully fit his own work to that provided under other contracts as may be directed by the contracting officer. The contractor shall not commit or permit any act which will interfere with the performance of work by any other contractor."

The plaintiff contended that the defendant, by unreasonably delaying the site preparation, and thereby making it impossible for the plaintiff to have access to the site on which the work was to be performed, had caused him great expense and increased costs. The Court, however, took the position that the provisions of the contract above quoted were intended solely for the government's benefit, and not for the benefit of other contractors. The contractor in default would be responsible to the government, but not to another contractor who sustained damages because of such default.

The United States Circuit Court of Appeals in Mississippi, however, reached a contrary conclusion in a similar case (*M. T. Reed Const. Co.* v. *Virginia Metal Products Corp.*, 213 F. 2d 337). The plaintiff in that case had been awarded a contract by the Mississippi State Building Commission for the general construction of a library building for the University of Mississippi. The defendant had been awarded a contract by the Commission to furnish and install a metal section of steel book stacks. Another contractor was awarded a contract to install the plumbing and heating. Each contractor, in his agreement with the State Building Commission, specifically agreed to co-ordinate his work and to co-operate with each other contractor so as to facilitate and expedite the completion of the building. Performance was limited to 300 days.

The general contractor alleged that, due to the failure of the defendant to furnish and install expeditiously the steel book stacks and to co-ordinate his efforts with those of the plaintiff, he, the plaintiff, sustained substantial damages. The defendant contended that it only owed a duty to the owner and that the plaintiff was but an incidental beneficiary of the contract between the defendant and the State Building Commission and could not maintain an action for damages.

The Court, in reversing the trial judge's dismissal of the suit, pointed out that the promise of each contractor to the owner that he would co-operate and co-ordinate his work with every other contractor was an inducement to each such other contractor to enter into his contract with the owner. In holding that the plaintiff was a direct beneficiary of the defendant's contract with the government and could maintain an action for damages, the Court stated:

"Upon the facts . . . and under our interpretation of the written contract, we agree with appellant that it was a direct beneficiary of the contract of appellee with the state building commission, which obligated the appellee to co-operate with appellant and co-ordinate its work with that of appellant so as to enable both of them to complete their respective jobs on time. The building could not have been completed without such mutual obligation on the part of each of the contractors, and the obligation so to do was a part of the consideration that induced each of the contractors to undertake its particular job at the agreed price."

The negligence of one contractor can, and often does, cause hardship and damage to other contractors furnishing services on the same project. Under the present state of the law, a contractor cannot be certain that he will be permitted to maintain an action against another contractor who has caused him damage because of the latter's failure to perform properly, unless the owner's contract with each contractor specifically so provides. It is in the interest of the owner that such a provision be contained in his contract, as it would be further insurance of adequate and proper performance on the part of each contractor.

ENVIRONMENTAL CONTROL

All architecture—all building, for that matter—involves the control of environment. By the size and shape of the areas defined, by the relationships established between interior and exterior areas, and by the nature of the structural enclosure, the existing surroundings are disciplined for human use. To the extent that these decisions and selections produce an efficient, integrated, and beautiful environment furthering the function for which it was intended, the result becomes genuine architecture.

In addition to the design and technical factors of plan, structure, and expressive form, precise control is immeasurably assisted by the variety of materials, equipment, and mechanical devices that produce artificial lighting, heating and other interior conditioning, and acoustic treatment.

This issue explores several aspects of architectural-engineering control of environment. The technical problem of air conditioning two department stores in a shopping center is analyzed. Another article discusses what may be done to provide better diffused lighting by means of luminous ceilings. A third study focuses on sound control in the private house. The featured presentation is devoted to a hospital that not only functions with extreme efficiency, but is also a delight to the eye—creating an environment where health thrives.

A traditional Japanese house exemplifies the beautiful human scale and amenity that result from a sensitive awareness of the esthetic discipline. A contemporary American house demonstrates what new dimensions and delight can come within adherence to spatial discipline. And organization of plan, structure, and design to control a difficult climatic condition is illustrated by a school in Texas. This school, incidentally also reflects a relatively new type of social environment, since it must serve as a community center as well as an educational tool.

Perspective of Cross County Shopping Center, Yonkers, New York. Major department stores flanking center are John Wanamaker's (left) *and Gimbel's* (right). Rendering: Schwartz

two department stores: air conditioning

by William J. McGuinness*

Fast nearing completion, the new Cross County Shopping Center will be one of the largest concentrations of shopping facilities in the East. It occupies 68 acres at the junction of the Cross County Parkway and the proposed New York-to-Buffalo Thruway in Yonkers. This new trade area, designed by Architect Lathrop Douglass and opened initially in April 1954, will provide more than 1,000,000 sq ft of merchandising and office space in 12 buildings. Parking facilities will accommodate 5400 cars. The two major department stores in the group are John Wanamaker of New York and Gimbel Brothers; the former will open its largest suburban branch in this new development. The design of the air-conditioning systems for these two stores is the subject of this article.

Historically a trading post, this area has long held potential value as a center of modern trade. John Wanamaker had owned part of the property for a number of years, but it took the vision and enterprise of Sol G. Atlas, who acquired this and adjacent parcels of land, to promote and manage the complete, integrated shopping center.

It is reasonable for the shopper to expect the same kind of planned composition in a shopping center that he would find in a good general store. This explains the status of the two department stores flanking the development; instead of competing, they supplement each other. This fact had been found to be true in existing urban areas and has been applied here in studied fashion. By agreement between the respective owners, the gross construction area of both Wanamaker's and Gimbel's is exactly the same; each has about 206,000 sq ft and plans for expansion are similarly balanced.

air conditioning

In designing the air-conditioning and heating systems, careful co-ordination—from the very inception of the project—of the architectural, structural, and mechanical requirements, together with the merchandising needs of the clients, resulted in systems ideally suited to the two buildings and in both cases a great deal less costly than many similar installations. Douglass was quick to initiate conferences between the clients, his own design staff, and the mechanical engineer, Sidney Barbanel. Because of the close collaboration in the initial planning, Douglass delivered to his clients just about the absolute maximum of floor space for selling; while Barbanel was able to place his equipment in such a way as to avoid use of selling floor space, as well as shorten the lines of supply between interrelated equipment.

Two buildings with the same use, identical area, similar shape, and the same number of stories might conceivably have inspired identical mechanical solutions, from a less imaginative engineer. Barbanel, however, took the best advantage of site conditions and the difference in the needs and wishes of the two clients to develop systems very different in arrangement, although quite equal in efficiency and economy. Wanamaker's, for instance, because of its 3-level hillside location, required no basement and wanted the penthouse for an employes' cafeteria. The conventional use of penthouse or basement for conditioners would have required additional construction. In the case of basement space, the fact that the building rests partly on rock and partly on piles in swamp would dictate expensive construction, involving blasting in one case and in the other an expensive self-supporting basement floor slab with waterproofing. An additional determining factor was the desire on the part of the Wanamaker engineers to use air-conditioning package units, as they had in many other buildings. Their experience with these units had been good. Easy replacements or repairs could be made without shutting down an entire system and the elimination of trunk ducts offers a great saving in space and expense. Unit conditioners for heating and cooling located near the conditioned space—largely in mezzanines—were suggested. The relatively nonbulky lines to handle steam, steam condensate, and the supply and return of condenser water were run from remote locations of boilers and cooling towers. Distributing ducts run in straight lines directly out from the units, with no trunks and within the ceiling plenums. The steel girders of the building are run parallel to the ducts so that floor to floor heights could be kept to a minimum. The plenums return the air which is picked up at ceiling level by registers perforating the ceiling. In this way, all service is from above and the sales space is entirely clear, adding many thousands

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of dollars to the sales potential and demonstrating the value of a co-ordinated whole—architectural, structural, and mechanical.

Gimbel's, on the other hand, freestanding and not against a hillside, felt the desirability of basement space—for merchandising, not for air-conditioning equipment. In fact, they wanted every inch of basement space that could be provided within the building walls. They had no objection to a central plant. Therefore it was proposed to free the basement completely of all mechanical equipment and put the entire plant, boilers, transformers, and all, in a central penthouse on the roof.

However, Gimbel's did not want future vertical expansion to surround a penthouse full of equipment, nor did anyone want the future expense and confusion of raising all this equipment at the time of expansion. (As Wanamaker's expansion was in part lateral, this situation did not apply there.) Douglass and Barbanel, continuing to work in close collaboration, then proposed raising the entire penthouse with all its equipment a full story above the roof, on columns. This would allow full vertical expansion for one story, except for the small areas occupied by down-feed trunk ducts. It would also create a striking composition in mass, which would be a feature of the building visible for miles. This solution makes a fundamental difference in the expansion possibilities of the two stores. Gimbel's can expand 67,000 sq ft on its roof. Wanamaker's will take its controlled and equalized expansion horizontally. This is a logical plan, because Wanamaker's is built against the slope of a hill while Gimbel's stands clear. Barbanel's early suggestion for Gimbel's of a single central vertical core for the delivery and return of air to the several stories was put aside, despite its substantial economy, in favor of two cores, one at each wall, in order to have no obstruction to the view of the store from the escalators.

the Wanamaker plant

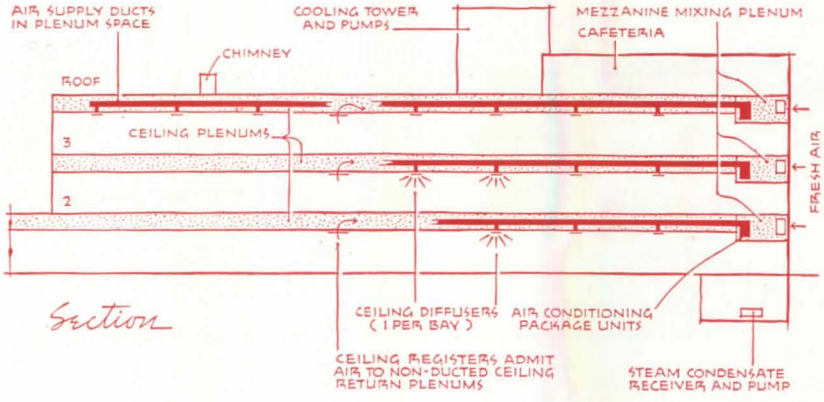
Heating and cooling are accomplished by 30 unit conditioners, each having a capacity of 20 or 25 tons of refrigeration. Each is quite complete in itself. All are served by centralized steam boilers and cooling towers. The heating plant is located on the second floor (mid-height with respect to all units) in a building alcove away from the unbroken rectangle of sales area. Small stack height is offset by the use of induced draft flues. Since the boilers are at ground level on their side of the building, subsoil oil storage within 50 ft is possible. Steam for the units is available in steam headers at the three mezzanines (and cafeteria penthouse) and is piped there in welded, insulated pipe—provided with expansion loops as required—hung in a furred ceiling space. There are two boilers. Their combined output is 133 percent of the connected design heating load at zero degrees. Thus in mild weather, one boiler carrying 67 percent of the critical (zero weather) load is sufficient for the system. This is true also of Gimbel's. Similarities and differences between the two systems are shown *(Table I)*. Steam-condensate receivers and pumps collect the condensate at a low point—a pit below the first floor—and return it to the boilers. A small amount of convector radiation is served by the steam plant. It will be seen from the illustrations that there is a minimum of external glass in both buildings. At these few locations, strip convectors prevent cold down drafts. There is no burden on the boilers for snow melting, because this small installation is electrically powered.

The cooling towers, served by pumps located in proximity to them, are close to a vertical axis marking the center of the general location of all conditioning units. Thus, a minimum of piping connects the condenser water headers in the three mezzanines with the cooling tower penthouse, adjacent to the cafeteria penthouse.

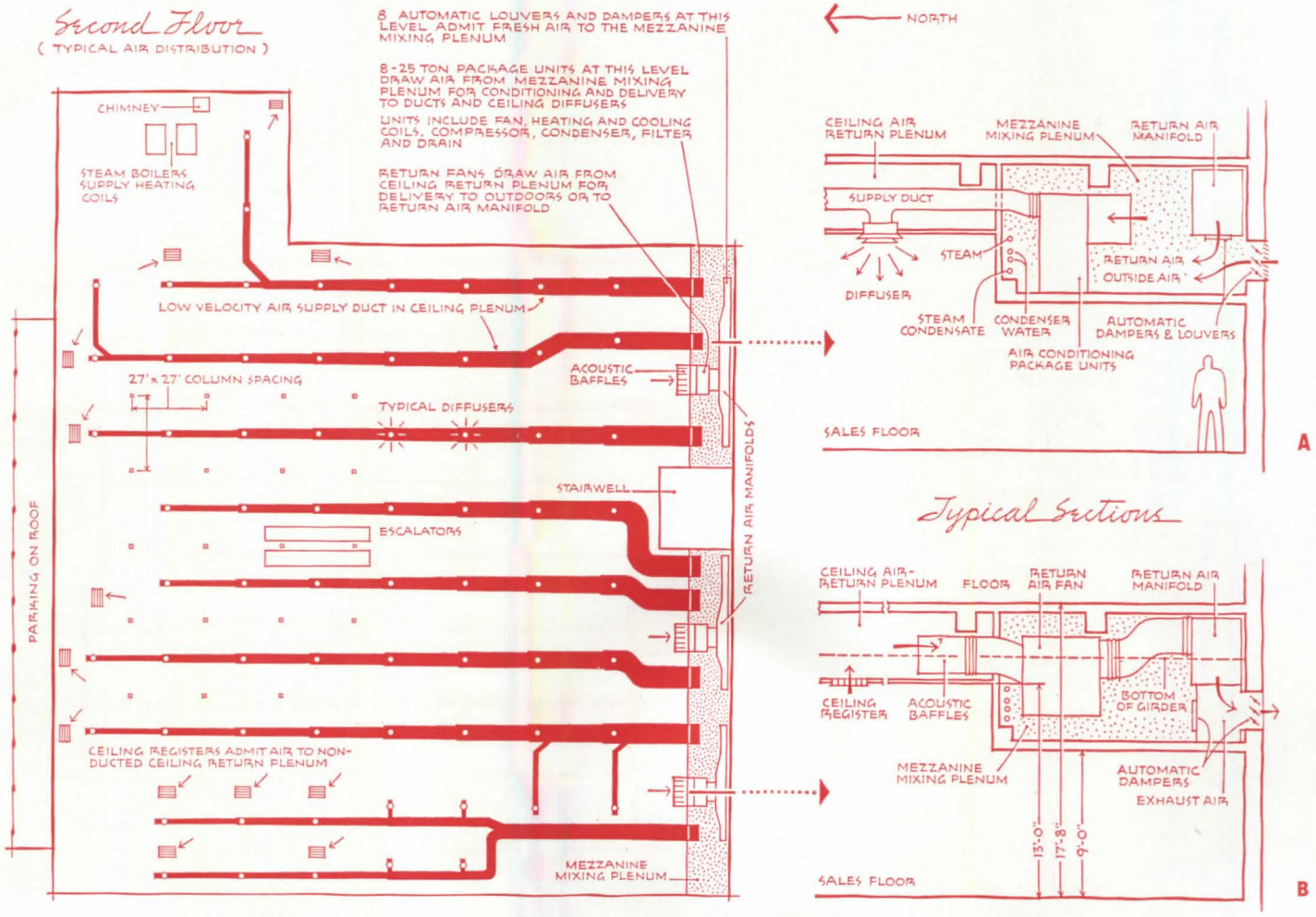
Each air-conditioning unit contains a compressor, condenser, heating coil, cooling coil, filters, and fan. Heating coil connects to steam, condenser to condensing water circuit and then to the cooling towers. Fully automatic controls effect temperature and humidity control in summer and temperature control in winter. Provisions are made for adding equipment to humidify in winter, if this should be desired later. Paper filters are on rolls which can be rolled out and torn off when a change is needed. The quiet operating blowers on ball bearings assure silent operation, which is further guaranteed by sound-absorbing, lined baffles on the short return ducts from the ceiling plenums and by acoustical lining for the first 30 ft of all supply ducts.

During summer and winter operation, fresh air is added in the amount of about 25 percent of the air circulated, based upon approximately 10 cu ft of fresh air added per minute for each occupant. In the mild weather of spring and fall when no heating or cooling is required, the system will circulate 100 percent outdoor air, filtered but not otherwise adjusted. The mezzanine stories have waterproof floors and constitute air plenums. From these plenums the unit air conditioners take air to be conditioned and delivered to the supply ducts, which require no covering since they pass through a plenum containing conditioned return air. Diffusers—one to each bay—distribute the air evenly. It returns to the ceiling return plenum through ceiling registers remote from the location of the units and toward the far end of the conditioned space. The area of the return air registers is roughly twice that normally used, making the registers the path of least resistance to the hung ceiling rather than the cracks between the acoustical tiles. This will also minimize streaking of the tiles.

The air circuits on the second floor are typical of the system (*Wanamaker diagrams*). The ceiling return plenums are put under suction by return fans which operate concurrently with the conditioning unit fans. The air is virtually pushed out by the unit fans and sucked back to the mezzanine plenum by the return fans. These return fans deliver the return air not to the mezzanine directly but to three return-air manifolds. Reference to section A (*Wanamaker diagrams*) shows how the return air from the manifold and controlled outside air mix in the supply plenum. The units draw from this mixture to condition the air for use. Section B in this illustration indicates the method of discharging all the air to the outdoors in which instance the automatic dampers between the manifold and the plenum are full shut and the inlet damp-



RENDERING : GLUSHAK



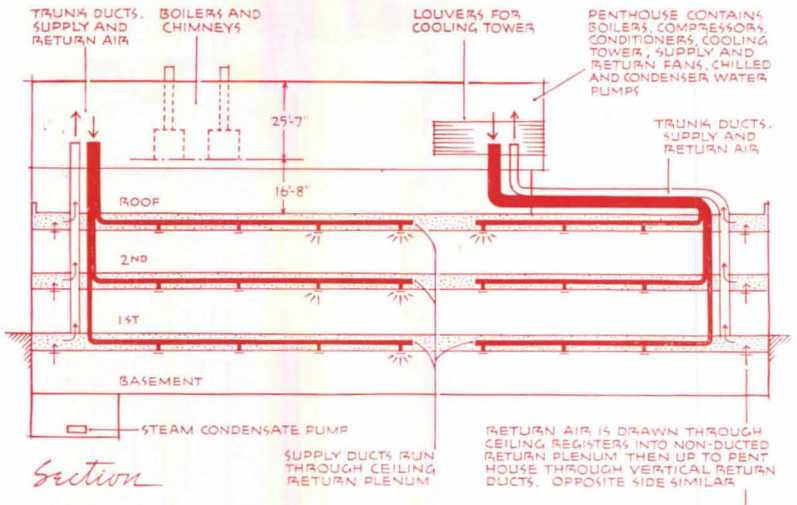
ers admitting fresh air are full open. This is the mild-weather setting when no heating or cooling is used. A comparison of this air handling arrangement with that of a conventional system shows the saving in return ducts and in trunk supply ducts. Normal speeds are maintained in all ductwork and the standard pressure drop due to friction is 1/10 of an oz per 100 ft of duct length.

the Gimbel plant

With all equipment except the condensate receiver concentrated in the penthouse, this system is in distinct contrast to that of the Wanamaker building. The extremely short runs for service between the vital equipment easily offset the extra expense for the conventional duct layout. Further savings in expense and space are effected by the fact that it is a high-velocity system resulting in much smaller ducts.

The air-handling section of this installation is very similar to that of Wanamaker's up to the point where the branch supply ducts and the ceiling return plenums join the vertical trunk ducts. Each story is served by one diffuser per bay and by branch supply ducts in each bay

RENDERING : SCHWARTZ



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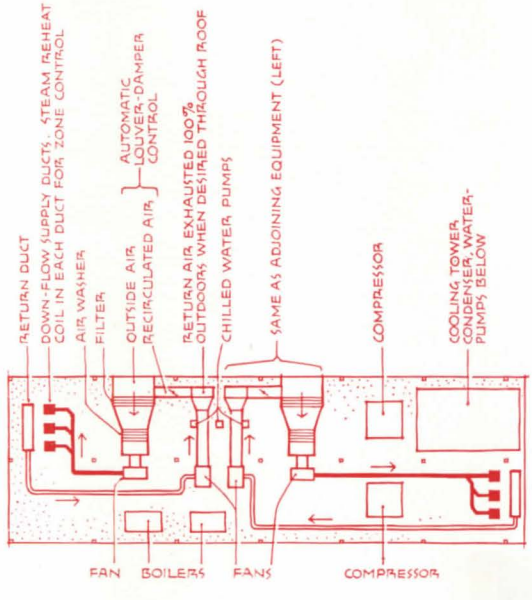
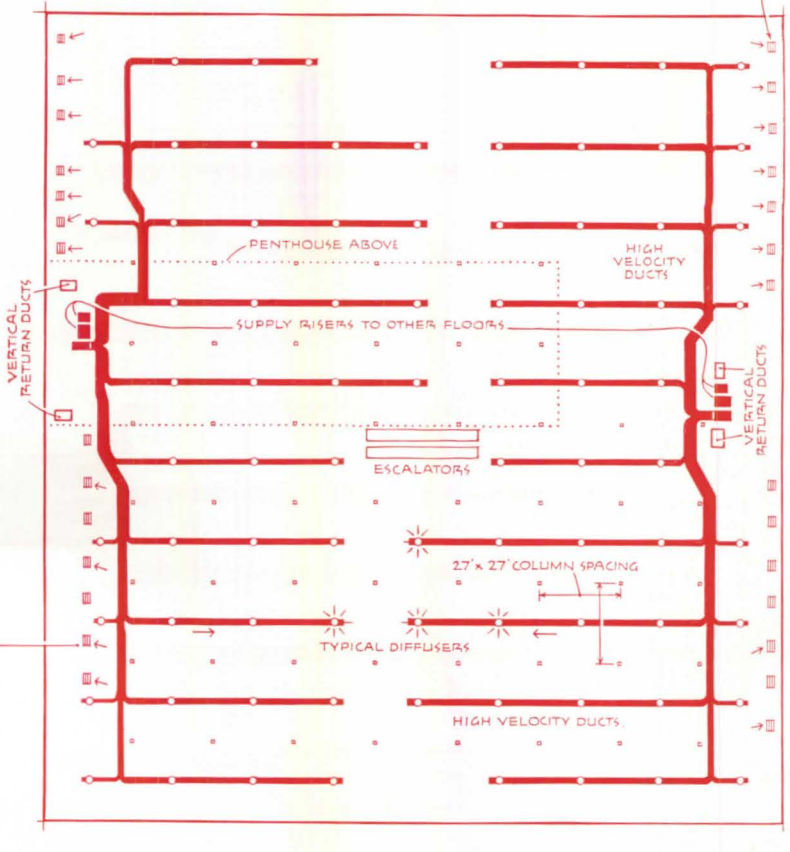


Penthouse (SCHEMATIC EQUIPMENT DIAGRAM)



Second Floor
(TYPICAL AIR DISTRIBUTION)

(*Gimbel diagrams*). These ducts are only half the length of the building and all connect with horizontal supply cross-headers. These in turn are supplied by down-feed trunk ducts carrying the conditioned air down from the central plant in the penthouse. Air flows from the high-velocity diffusers to ceiling registers most remote from the furthest diffuser. The air is sucked into a ceiling plenum from which it is collected by vertical return trunk ducts on each side of the building. These are connected to the return fans in the penthouse. Supply and return ducts at the west end of the building are connected to the central plant by horizontal ducts that are individually boxed-in on the roof. All ducts are relatively small because of the high velocity. The return registers are smaller than those of Wanamaker's because a normal face velocity is maintained. This is possible because there is a tight plaster ceiling through which return air cannot be drawn, as it can through the acoustical squares of Wanamaker's.

Placing the boilers on the roof can be justified readily in spite of the added structural requirements. Obviously, had they been located at ground level, a specially built, self-supporting floor would have been required because of the marshy terrain. Correct draft is maintained by

induced-draft fans in the flue. The advantage of the close proximity of heat and heating coils is quite obvious. As in the case of Wanamaker's, the boilers also serve a small amount of convector radiation below windows. In addition, at Gimbel's they serve a small snow-melting plant, separately operated on the far side of a converter and protected by antifreeze. The conditioning units are of the classic central-unit type complete with filters, return-air recirculation, addition of controlled outside air, air washer, reheat arrangement for zone control, and cooling facilities connected directly through a refrigeration cycle. Just as the boilers supply heat directly to the coils, so the compressors and cooling towers are directly adjacent to the conditioners. The cooling towers are equipped with large louvers which are a design feature in the penthouse story. Pumps are located directly below these cooling towers.

When it is desired to circulate all outside air, without heating or cooling, the return air is exhausted through the roof. At the same time fresh air without recirculated air is handled by the supply fans of the conditioning units. The Gimbel design was submitted for comment to Engineer Charles Leopold of Philadelphia, who had frequently been engaged by Gimbel's for consulting services. He endorsed the system with a very few minor changes.

comparative data

The similarities and differences in the two systems are shown (*Table I*). The cost of each, per ton of refrigeration, will be seen to be not much more than half of many air-conditioning installations. This, together with the efficiency and adaptability of the systems is the final measure of the design. It is apparent that all of the functions of air conditioning, ventilation, and heating are most adequately provided for. Gimbel's has a slightly greater potential cooling capacity, which is being installed now against future expansion. The expansion, in the case of Wanamaker's, will be taken care of by the addition of extra unit conditioners. The slightly greater rate of air circulated in the case of Gimbel's is due to a higher sensible heat factor. In almost all other respects, an identical or close comparison exists in the rating of equipment for these similar buildings. The ingenuity and adaptability of the two solutions for these similar stores and the achievement of a maximum of fully conditioned and unobstructed sales area as well as interesting functional design is greatly to the credit of Lathrop Douglass, Architect, and Sidney Barbanel, Engineer.

Table I—Comparison of Facilities

Item	Wanamaker's	Gimbel's
Area	206,000 sq ft	206,000 sq ft
Stories	1, 2, 3, penthouse	Basement, 1, 2, penthouse
Location of boilers	2nd floor	Penthouse
Connected heating load	25,000 sq ft edr (steam)	
Location of air-conditioning units	3 mezzanines	All in penthouse
Cooling load	725 tons. Units added later	880 tons. Includes provisions for all expansion
Air handled	200,000 cfm	235,000 cfm
Fresh air added	10 cfm per person or about 25 percent of circulated air	
Ventilation	100 percent outdoor air if desired	
Sound precautions	Some at supply and return	More because of high velocity
Duct design	Air speed 1500 ft/min Pressure drop 1/10 ounce per 100 ft of duct	Air speed 3000 ft/min Static regain method of sizing
Bay size	27' x 27'	27' x 27'
Fuel and draft	No. 6 oil and induced draft	
Approx. installation cost of heating, cooling, and ventilating based on tons of refrigeration	$550/ton	$550/ton
Building expansion, vertical	40,000 sq ft	67,000 sq ft
Amortization period for equipment	10 years	20 years

luminous ceilings—a tool for everyman

by Domina Eberle Spencer*

Research of 10 years ago laid the basis for creating the modern luminous ceiling. Five years ago the first commercial luminous ceilings were installed. Today, luminous ceilings are available from a half-dozen companies, and architects are designing luminous ceilings for entire buildings. In fact, about four million square feet of luminous ceilings already have been installed in offices, drafting rooms, libraries, classrooms, stores, banks, laboratories, machine shops, and homes. Another six million square feet are in the specification stage in architects' offices. The luminous ceiling is a new tool that allows the architect to produce a more effective environment.

why luminous ceilings?

This development of luminous ceilings as a practical tool rests on two parallel developments: the establishment of criteria for lighting design, and the invention of methods for calculating interflections.

Lighting should be designed to provide the luminous environment most suited to human visual requirements. The first step was to determine what distribution of light in the field of view would permit optimum vision. A study of available visual data[1] showed that vision continued to improve as the adaptation helios (generalized brightness) was raised from starlight to sunlight, *provided the background was uniform.* In a uniform field, to which the eyes have become adapted, the more light we use, the better we can see. The old idea that there is a "correct" amount of light for each type of visual task is false. The amount of light to be used is largely a matter of economics: we use as much light as we can afford.

Nonuniform surrounds[2] must also be studied, for we want to live in interesting luminous environments which are full of variety. How much nonuniformity can the human eye employ beneficially? Just as the photographic film can properly record only a limited range of helios, so the human eye has a comparatively narrow range of simultaneous adaptation. If the range of a photographic subject is too great, highlights are overexposed and details in shadows are lost. If the helios of the luminaire is too great, the adaptation helios of the eye is frequently greater than the helios of the work. Glare results and optimum vision is impossible. The eye can perform at its best only if it is permitted to become adapted to its task. In a suitable luminous environment, the eyes should be free to rove at will without encountering a large change in their state of adaptation.

To obtain the optimum luminous environment (from the levels used for interior lighting today up to those found in natural daylight), it has been found[3] that a 3:1 adaption helios criterion should be satisfied. This means that the adaption helios should be no more than three times the helios of the work, even if one stares directly at the brightest part of the luminaire. Also, the adaptation helios should not fall to less than one third of that for the work, when one looks at the darkest region of the luminous environment.

This does not mean that small regions of the luminous environment may not have considerably greater variation than 3:1, but it does mean that large surfaces such as walls, windows, and large luminaires should vary from the helios of the work by no more than 3:1. Such an environment contains all the variation that the human eye can encompass while enjoying optimum vision. Direct glare, unwanted shadows, and reflected glare are eliminated, yet there are soft, transparent shadows which provide optimum modeling[4] of the human face. A luminous environment results, in which human beings are free to perform their tasks, unfettered by restrictions imposed by glare and shadows.

Once a criterion for the optimum luminous environment had been developed, the second step was to determine how it could be realized. The interflection method[5] can predict the distribution of light produced by any type of lighting. Previously, illuminating engineers had possessed no method of calculating the helios distribution in rooms and had dealt only with the prediction of the reading on a light meter placed on the desk. With the interflection method, it is possible to calculate how much light is incident on both horizontal and vertical surfaces and the helios of walls, ceiling, floor, and furniture for every possible type of lighting and with any combination of wall, ceiling, and floor reflectances.

A study of all possible methods of lighting rooms[6] showed that the criteria for an optimum luminous environment could be satisfied—for shapes of room varying from the cubical to an infinitely large room—if the entire ceiling is the source of light, and if wall reflectance is at least 0.50 and floor and furniture reflectances are at least 0.30. Thus, high reflectances are desirable for room surfaces, and the entire ceiling should be a source of light. This conclusion is neither fad nor fashion—but can be expected to be of permanent value.

the birth of luminous ceilings

There are two ways in which the entire ceiling can be made the source of light:

(1) *Incandescent or fluorescent lamps can be suspended below the ceiling.* If suitable translucent reflectors of glass or plastic are hung below the lamps, it is possible to make the helios of the luminaire match the ceiling. Such luminaires were first designed by George Ainsworth, who thought of attempting to reproduce the pleasant outdoor conditions of a few minutes after sunset. Both the incandescent and fluorescent versions of the luminous-indirect luminaire produce a very good approximation to the optimum luminous environment if they are carefully designed and employed with suitable room reflectances. Hanging luminaires of this type have met criticism, on esthetic grounds, from some architects, who feel that the ceiling becomes cluttered, and from some janitors, who think it is too much trouble to wash the reflectors once or twice a year. Luminous-indirect luminaires are now produced by a number of lighting fixture manufacturers.

(2) *Incandescent or fluorescent lamps can be placed directly on the ceiling.* Beneath the lamps, a horizontal sheet of diffusing material is hung at such a distance that the diffusing material appears perfectly uniform. The diffusing sheet covers the entire room. Lighted from behind, it becomes a truly *luminous ceiling.*

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It is impossible to say exactly when such a luminous ceiling was first built. Custom-built installations of this type had been employed for decades (utilizing daylight as well as artificial light) in museum lighting. Enterprising illuminating engineers—such as Arthur Brainerd, Wesley Mowry, and Howard Sharp—had built a few luminous ceilings with incandescent or fluorescent lamps.

However, a decade ago no one seriously considered the idea of lighting entire buildings with economical luminous ceilings. In additon, methods for the prediction of the performance of luminous ceilings had not been developed, so that previous luminous ceilings were built on a hit-or-miss basis, rather than scientifically designed. The foundation for the *design* of luminous ceilings was laid in a paper[7] published in 1950. While this paper was in preparation, the search for suitable methods of constructing luminous ceilings began and the first *designed* luminous ceilings were built at MIT[8] and at Brown U.[9]

The practical development of luminous ceilings as a useful tool for the architect has involved a search for a suitable diffusing medium, the development of hanging systems, and the study of combinations with acoustical treatment, air conditioning, and sprinkler systems.

A study[7] of the required optical characteristics of the diffusing material showed that both transmittance and reflectance should be approximately 50 percent with absorption at a minimum. If the transmittance is much greater than 50 percent, the diffusing sheet does not adequately hide the lamps.

From the point of view of optical characteristics, the best diffusing material found to date is ordinary tracing paper! Stretched on wooden frames and secured with Scotch tape, tracing paper was actually used in the first experimental luminous ceiling built at Brown University. The system was entirely satisfactory as a demonstration of the appearance and distribution of light obtained with a luminous ceiling. It was, however, considered impractical because of the difficulty of keeping the paper stretched smoothly on the frames and because of the fire hazard associated with the flammable paper.

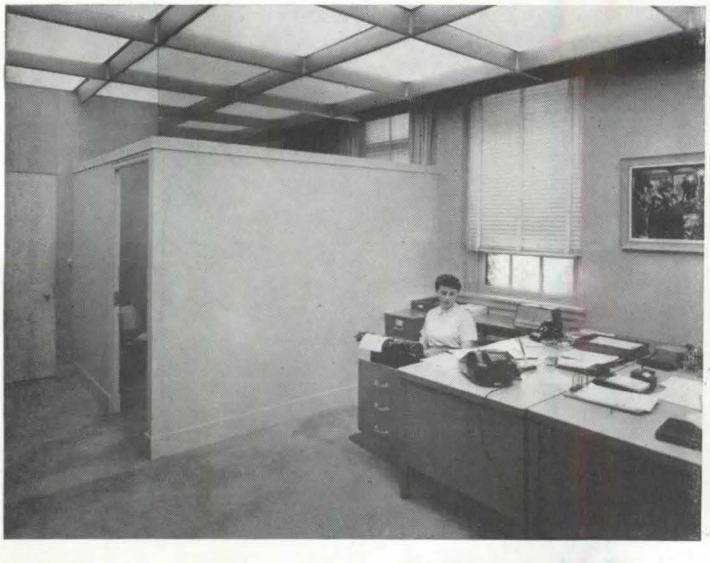
Diffusing glass has been used in museum lighting and might be considered suitable for luminous ceilings. It has been discarded for commercial luminous ceilings because of weight and fragility.

A study[7] of all available diffusing materials revealed only two likely possibilities: the plastics methyl methacrylate ("Plexiglas" or "Lucite") and vinyl ("Vinylite"). The first experimental luminous ceilings built at MIT[8] employed 3′ x 4′ panels of ⅛-in. corrugated methyl methacrylate resting on steel supporting rails on 3′ centers. In order to provide acoustical correction, the MIT Lighting Committee[10] used acoustical fins 6 in. deep, hung from the supporting rails. The acoustical fins were made of perforated steel enclosing pads of glass fiber. The fins used in the MIT classroom were painted white but appear light gray against the luminous ceiling. In this classroom, the reverberation time was

Figure 1—luminous ceiling in lobby of Remington Rand Building, Los Angeles, contains 3′ x 4′ sheets of corrugated-acrylic-plastic supported by acoustic baffles (right).

Figures 2 and 3—a new form of luminous ceiling employs arched sheets of acrylic plastic in metal frames resting on criss-crossed bars of perforated metal with glass-fiber packing for acoustic treatment (below). *Metal frames are hinged and drop open to permit access to lamps and easy cleaning of plastic* (below right).

Photos: courtesy F. W. Wakefield Brass Co.



reduced from four seconds to about one second by the acoustical baffles. A similar acoustical treatment was first employed commercially in the Fitchburg Youth Library.

The combination of acoustical fins with luminous ceilings has been widely used. A lobby lighted in this way, using methyl methacrylate, is shown (*Figure 1*). It has the disadvantage that the thick panels of methyl methacrylate must be pieced every four feet: these joints are an esthetic drawback to this method of suspension.

A different method of combining acoustical fins and thick sheets of methyl methacrylate has recently been made available commercially (*Figures 2 and 3*). Arched sheets of methyl methacrylate are mounted in hinged metal frames. Easy access to lamps is provided, and the piecing of plastic sheets between supports is eliminated. Acoustical fins may be used in the supports shown.

With suitable choice of thickness and pigmentation, methyl methacrylate can provide excellent optical characteristics. A few commercial installations have employed too transparent a sheet. The result is a spotty ceiling through which the lamps are plainly visible. The chief disadvantage of methyl methacrylate is its high cost and the fact that, in the formulation that has been widely used, it burns at the rate of soft wood. In some localities, methyl methacrylate is not approved for installation in luminous ceilings because of the fire hazard, or sprinklers may be required both above the sheet and beneath it. Recently, a new formulation of methyl methacrylate, which is rated as self-extinguishing, has been made available in some panel sizes.

Despite the disadvantages of high cost and possible fire hazard, luminous ceilings of methyl methacrylate have been well received by many architects and about a million square feet have been installed.

At the time the MIT Lighting Committee was planning its experimental luminous ceilings, the author was planning similar experiments in a series of offices at Brown University and designing the lighting of the Fitchburg Youth Library. Neither budget would allow the use of such expensive material as methyl methacrylate, also the president of Brown University insisted on the use of a nonflammable material. So a further search was instigated for an inexpensive, nonflammable plastic with suitable optical properties. Leonard F. Martin joined the search and it was he who found a suitable lightweight plastic in the lining of a cold cream jar. The material was "Vinylite." Sheets of 0.0010" thickness had excellent optical characteristics but did not have enough rigidity to be supported without tension. It was suggested by Carl Koch, architect of the Fitchburg Youth Library, that the vinyl be corrugated for rigidity. According to the plastics experts, very thin vinyl could not be corrugated.

In August 1949, Martin was the first to corrugate thin vinyl sheeting successfully in continuous rolls. The corrugated vinyl was later christened "Marlux." It was first installed in August 1949 in an office at Brown University. Corrugated vinyl is now employed by the majority of luminous ceiling manufacturers.

Advantages of corrugated vinyl are its low cost, light weight, ease of handling and cutting, and nonflammability. The first "Marlux" installation employed simple strips of wood on which sheets of plastic rested. Today, much more elaborate hanging systems are used (*Figure 4*). Sections may be up to three ft in width and any desired length. Vinyl may be rolled for convenience in installation and is easily cut with scissors to fit irregular contours. The material has been listed by Underwriters' Laboratories as suitable for installation beneath sprinkler systems without interfering with the opening of the sprinklers or the resulting distribution of water.

The disadvantages of thin corrugated vinyl which are most often mentioned by architects are its light weight and the possibility of discoloration. Actually, the light weight is hardly a disadvantage. In place, corrugated methyl methacrylate and vinyl are very similar in appearance. A light material is more easily installed and removed for cleaning. The vinyl is kept in position by means of clips which fasten onto the tracks on which it rests. All plastics discolor somewhat with age; however, methyl methacrylate discolors much less than vinyl and is suitable for use both with luminous ceilings under radiation from fluorescent lamps and for direct exposure to sunlight. It is known that some formulations of vinyl will blacken under severe exposure to ultraviolet. Vinyl should not be used where it will be exposed to direct sunlight but for horizontal luminous ceilings there is no sunlight exposure. The ultraviolet from the fluorescent lamp is not sufficient to produce rapid discoloration of the vinyl, provided it is mounted at least six inches from the lamps. Installations which have been used for five years do not show

Figure 4—glass-block panel above luminous ceiling in classroom contributes daylight; Architects—Sargent, Webster, Crenshaw & Folley. Lightweight corrugated-vinyl-ceiling is rolled back for maintenance (left).
Figure 5—sample offices with troffers and luminous ceilings (below).
Photos: Norris Studio and Phil Olsen; courtesy Marlux Corp.

appreciable discoloration and may be expected to be satisfactory for another five years.

Recently available is a new vinyl sheet which, in accelerated tests, shows a decrease in the rate of discoloration under ultraviolet. This is attained at the expense of the heat distortion temperature, which is 135 F instead of the 140 F of the type of vinyl sheet which has been widely used. Many architects prefer to risk a slight discoloration rather than the accelerated deflection associated with a lower heat distortion temperature.

Hanging systems employing thin corrugated vinyl are available in a number of forms. If it is desired to minimize the contrast between supporting rails and diffusing plastic, transparent plastic rails are available. For a sharp line of demarcation aluminum rails may be used or, if acoustical correction is desired, acoustical fins may be employed. One manufacturer uses thin corrugated vinyl in square metal frames, hung from rods at the corners (*figures 6 and 7*). With the available translucent, opaque, and acoustical supports employed by manufacturers today, luminous ceilings can be installed in a wide variety of patterns. Methyl methacrylate, vinyl, and the acoustical fins can be made in any color. Interesting effects have occasionally been obtained by using borders or patterns in colored plastic or colored acoustical fins with standard white plastic.

In combination with air-conditioning systems, it has been shown[11] that luminous ceilings can be exceedingly effective. While air diffusers set in walls or projecting through apertures in the plastic can be used, it is also possible to eliminate all visible evidence of the air-conditioning system. Both supply and exhaust may be placed above the plastic if the plenum is divided into two sections. Another possibility is to supply air through the luminous ceiling and place exhausts in walls or floor. Air flows from plenum to room through the spaces between the corrugated plastic and the supporting rails. The space which can be used for air intake or exhaust varies from one to two percent of the luminous ceiling area. Tests[11] have shown that use of the luminous-ceiling plenum for air-conditioning supply does not introduce an appreciable amount of dust into the plenum, even in typical city conditions (near the New York Central tracks in Cleveland, Ohio). Supply or exhaust through the many air spaces of a luminous ceiling gives such an even air distribution that air currents are not noticeable a foot below the plastic. Thus, with luminous ceilings, it is possible to eliminate both the drafts and the visible diffusers and to provide air conditioning without making the occupants aware of its presence.

where luminous ceilings?

The most obvious applications for luminous ceilings are in those locations in which exacting visual tasks are performed for long periods. The first luminous ceilings were installed in offices, classrooms, drafting rooms, and libraries. Some executives can afford the more elaborate forms of luminous ceilings for their reception rooms or private offices. In studying plans for extensive building projects, some architects feel it worthwhile to build typical offices lighted in several different ways for comparison. A mock-up which resulted in the choice of the economical form of luminous ceilings—using corrugated vinyl—by the Ford Motor Company is shown (*Figure 5*).

Perhaps the most important of all visual environments is the classroom. Not only do children benefit from the ability to see easily and comfortably, but permanent advantages may be given to them by enabling visual habit to develop and young eyes to grow in a visual environment adapted to human needs. According to Dr. Darell Boyd Harmon, a major reduction in visual difficulties is effected if children can develop in an environment free of the visual hazards of glare and shadows. Many other physiological and psychological benefits also result. Since the first luminous-ceiling-lighted classroom was built at MIT, many schools throughout the country have adopted luminous ceilings. They are especially justified in new construction, where much of their cost can be offset by employing economical forms of ceiling construction possible only with luminous ceilings. The thin corrugated vinyl is generally chosen for classrooms, both because of its low cost and nonflammability.

Luminous ceilings were used in the Fitchburg Youth Library in 1950 and have since been employed in a number of other libraries (*p. 107, September 1951 P/A*). They are also applicable in locations which traditionally have been lighted by crude "factory" systems. Visual tasks in the machine shop, for example, are often more difficult than those of classroom or office. Both the task and the tool are of polished metal. Exasperating reflections of bare lamps are a characteristic of the typical factory; however, excellent visibility of polished tasks results under luminous ceilings. Scratches and markings of the scale are clearly visible against a uniform background of low helios. Tests in the machine shop at Brown University[12] showed that the maintenance characteristics of the luminous ceiling compare favorably with those of traditional types of factory lighting.

Luminous ceilings also have been used in applications where their esthetic simplicity and the attractive modeling of the human face and other three-dimensional objects are of particular importance. A circular drive-in bank recently built in Maine is shown (*Figure 6*). Here Carl Koch has combined the essential elements of vault, counters, and luminous ceiling in a unique building which does little more than provide a frame. Even in store lighting, luminous ceilings have found application. The effectiveness of lighting automobiles on the showroom floor—as they will be lighted outdoors—by a large expanse of uniform ceiling is often used as a selling aid. Characteristics of the automobile itself are emphasized, while the reflection of the luminous ceiling in the polished surfaces is comparatively unobtrusive. Another effective application of luminous ceilings is also shown (*Figure 7*). A store front of corrugated methyl methacrylate with colored letters of the same plastic appears to continue right through the window and into a corrugated-vinyl luminous ceiling.

Home lighting should certainly be designed to fit the visual requirements of human beings. Where simplicity and good vision are paramount, as in the bathroom, kitchen, or study, luminous ceilings have been installed in much the same manner as the large-scale commercial installations. Luminous ceilings can be used in every room in the house, but may be employed more flexibly and with more variety in the "decorative" rooms.

Still other special applications in which luminous ceilings are especially indicated are photographic and television studios, operating rooms, power stations, and airfield control rooms. More attention should be given to modeling of the human face

in television studios. Whether the face is being photographed or televised, the desired variety and optimum modeling[4] can be obtained by combining a luminous ceiling with a luminous wall. In the operating room, absence of reflected glare from instruments and the shadowless lighting of both horizontal and vertical surfaces are desired. Here a luminous ceiling, occasionally supplemented for special operations by one luminous wall, is excellent. Both in the power station and airfield control room, details must be seen on both horizontal and vertical surfaces without encountering direct or reflected glare. Luminous ceilings have been used with success in power stations and are recommended exclusively for airfield control rooms by the CAA.

the future

Today, we have reason to expect a significant expansion in the application of luminous ceilings. No major changes in methods of construction or in plastics are likely in the near future, though there is some hope that the characteristics of low cost, light weight, nonflammability, higher heat-distortion temperature, and ability to withstand exposure to sunlight without blackening may someday be combined into a single diffusing material for luminous ceilings. In the far distance lies a radical development. If the electroluminescent lamp developed by Sylvania can be produced at sufficiently high helios and sufficiently low cost, luminous ceilings may someday consist of lamps alone. Flat, square sandwiches of conducting glass, phosphor, and metal plates may someday be fastened directly to the ceiling. As the lamps would cover the entire ceiling, no diffusing material would be needed. One such luminous ceiling has been built, but is impractical since the lamps are not sufficiently bright and the cost is very great.

If luminous ceilings are to be used by every architect, a fundamental change will be needed. The lighting can no longer be added as an afterthought. It must e designed into the building from the very beginning. Structures, air conditioning, acoustics, and lighting should not be designed as separate entities. Architects and engineers must co-operate and work closely together throughout the planning stages. Finally, when colors for room surfaces are chosen, the architect should give close attention to the exact specification of the colors. The reflectances of materials used should be determined and the recommendations of at least 30 percent floor and furniture reflectance, at least 50 percent wall reflectance, and 80 percent reflectance above the plastic should be satisfied. Tempting departures should be carefully checked by the lighting designer to determine their effect on the luminous environment. By such co-operation, it is possible today to realize the optimum luminous, acoustical, and thermal environment in an effective, economical, and interesting fashion.

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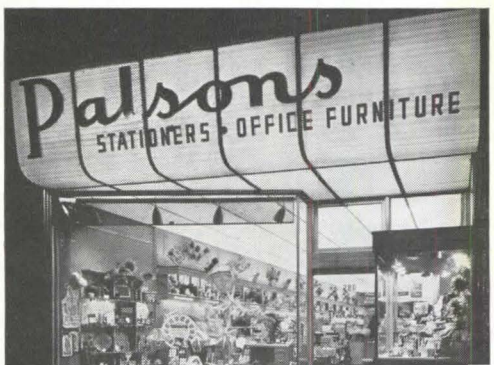


Figure 6—luminous ceiling in York National Bank, Old Orchard Beach, Me. (above); *Architects—Carl Koch & Associates.*
Figure 7—this store unifies acrylic-plastic store front with vinyl-plastic ceiling on interior (right).

Photos: Ezra Stoller and Edwin B. Luce Co.; courtesy Marlux Corp.

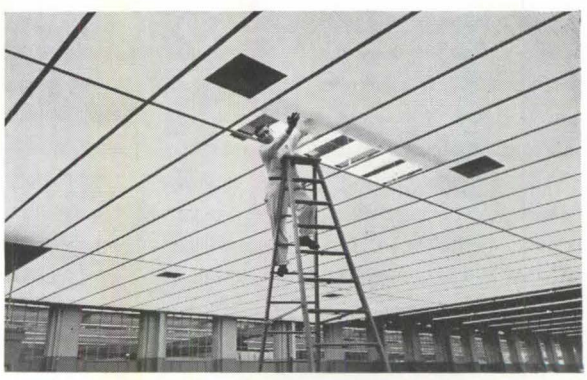


Figure 8—workman completes luminous ceiling installation above drafting tables in the Engineering Administration Building of the Ford Motor Company, Dearborn, Mich. (above). *Continuous slim-line fluorescent light sources are hung above corrugated plastic. Diffusers slide back to expose lighting units for service.*

Photo: courtesy Luminous Ceilings, Inc.

sound control in residences

by Groff Conklin

In discussing architectural acoustics, the tendency too often is to think only in terms of the control of sounds originating *within* an enclosed space, and to underemphasize the importance of sound transmission through walls and floors. From the available literature, this seems to be almost as true in the consideration of residential acoustics as it is of sound control in auditoriums, schools, offices, factories, and the like.

Of course, good acoustical environment is of great importance, whether in a 12′ x 20′ living room or a 100′ x 150′ theater. The science of acoustical design and the production of efficient sound-absorbing materials are both in an advanced state of development, thus today it is not difficult to achieve reverberation control within rooms in residences.

But the home, man's castle, usually does not need protection against unpleasant or painful noises within any one room quite so much as it needs insulation against the passage of noise from the outdoors, or from noisy rooms to quiet rooms. Therefore, this article will be devoted primarily to a report on the planning methods, types of construction, and varieties of materials that can reduce sound transmission annoyances to a minimum in the well-designed house.

why noise control is important

It has only been in recent years that much attention has been paid to the problems of noise in and around the house. In the past, people have simply borne with the noises their neighbors or the general environment have produced, or else they have moved away. But with the advent of smaller and more lightly constructed homes, and with the great increase in noise in the newer, more closely built-up communities, psychologists and physiologists have had occasion to examine the hazards to emotional and physical health caused by excessive noise in and around the dwelling.

In most cases, sounds commonly encountered in residential areas cannot cause serious or permanent physiological disabilities, except occasionally with persons who are already ill. On the other hand, temporary psychological disturbances do occur when one hears an unusually loud or sudden noise and, if such noises are common in the environment, decreased levels of health may possibly result. As Vern O. Knudsen & Cyril M. Harris put it, in their *Acoustical Designing in Architecture*[1]: "Although it is difficult to measure fatigue, many observers agree that excessive noise exacts a heavy toll in frayed nerves and physical exhaustion." The authors continue, "No one has determined the price we pay in loss of sleep resulting from avoidable noises. Several years ago, one of the authors kept a record of the number of times he was awakened each night. Approximately three-fourths of all the awakenings could be attributed to noise."

Another aspect of the noise problem is pointed out by Richard H. Bolt & Robert B. Newman in their chapter on "Control of Noise" in The American Public Health Association's *Construction and Equipment of the Home*[2]: "We are adapted to a continual background of noise; the complete absence of it is unnatural and, at least at first, annoying. Furthermore, a certain amount of background noise is useful in masking intruding noises that we do not want to hear."

In general, however, too little noise is rarely a problem in modern homes. Too much noise, on the other hand, particularly of a discontinuous, sudden, or shrill type, is an increasingly common complaint. Noises of this sort mean sleeplessness, irritability, nervousness, and lowered personal effectiveness. Furthermore, noises that are almost automatically accepted in an office or a factory, whether they are loud conversation, operation of office equipment, running of various types of machinery, intruding sounds of street traffic, or combinations of all of these, are ruinous in the much quieter atmosphere of the home. Quiet is as necessary to serene and relaxed living as privacy, warmth in winter, and security against the uncertain vicissitudes of our industrial society.

[1] *John Wiley & Sons, Inc., New York, 1950.*

[2] *Public Administration Service, Chicago, 1951.*

noise standards

The admittedly complex subject of noise control in the home is made still more difficult for the architect by the fact that one man's annoying noise may be another man's quiet. One client may be almost unaware of the fact that noises can be bothersome, while another may demand a standard of silence approximating that of Proust, to whom the sound of a fly buzzing in his study was sheer torture.

This means that the problems of acoustical control are such that the architect is almost forced to find out from the client and the members of his family what their individual reactions are to various types of noise. For example, a nervous person who wakes up at the slightest sound should have a bedroom that is protected against every sort of sound annoyance, while someone who is not bothered by average noises would not need this sort of protection.

It is thus literally impossible to establish criteria for noise control for the "average" family. However, it *is* possible—and almost essential—to establish the basic criteria for a quiet environment, both outdoor and indoor, since many of these desiderata can be obtained at almost no cost to the client, by careful advance planning. In other words, environmental sound control means careful selection of community, site, and house location, and equally careful planning of the house for segregation of noise-producing areas from quiet ones. Sound control by means of structural techniques and materials selection will be costly, while a little thought given to noise isolation by planning can easily save the client money that might otherwise have to be spent for sound insulating and absorbing materials and construction.

environmental sound control

Even if the client has already selected

the site (unfortunately only too often the case), it is still good practice to present him with a list of the most important causes of noise in any residential environment, so that he will know what he faces if he insists on building in a community in which there are known to be various noise hazards. Such a list is presented (*Table I*) which is not only suggestive of the necessity for special sound-control treatments in a house to be built on an already-chosen noisy site, but—even more basic—should be a guide to the selection of a site, if the client has not already bought one.

One of the most objectionable noise problems in our modern air-age society arises from the proximity of airfields and regular air lanes. As Doctor Bolt has pointed out, low-flying planes on regular routes and planes roaring up from a nearby airfield are about the most inescapable and nerve-racking noise producers of our time. This is likely to be especially true in the newer suburbs, since airfields, like such suburbs, tend more and more to be located in outlying areas away from urban centers and from the older, inner belt of suburban development—usually too built up to provide the room needed for an airfield. A great deal of future discomfort can be avoided if some attention is paid to the problem of airplane noise, although it is true that it is not always possible to be sure that at some future time—say when helicopter commuting becomes more common than it is now—an intrusive "air park" may not be located in the area. Community protests will be the only means of preventing such future noise hazards.

house planning

The principles of segregation of function in the modern house are well understood by architects in general, although they do not often occur to the client until they are explained to him (*Table II*). One of the more common problems in this connection is the location of the children's bedrooms. Parents sometimes want these rooms near the living quarters so that if, during the evening, the youngsters awake and start crying they can be heard. The fact that most children *can* sleep through an amount of racket that would keep the average adult sitting on the edge of his bed is sometimes used by thoughtless parents as a further reason for this unsound location of bedrooms: "The children don't mind the noise." But physicians generally agree that children need quiet when they sleep, just as much as adults do. Too much noise can make a child irritable and unhappy after he wakes, even though he may seem to be sleeping soundly through it.

The best program for planning a modern home is to isolate *all* bedrooms from noise-producing areas, wherever possible.

Table I: Environmental Sound Control Factors

community

1 Restrictive zoning regulations, rigidly enforced, against noise-producing, nonresidential uses such as through truck traffic, commercial and industrial establishments, public institutions of various types, etc.
2 Adequate distance from shopping centers, railroads, truck routes and toll highways, etc.—"adequate" in the sense that the noise produced by these elements will be almost indistinguishable from the background noise level of the community.
3 Avoidance of airports and regular air lanes.

site

1 Location on a street with a minimum of through traffic, a cul-de-sac being preferable.
2 Reasonable distance from noise-producing community buildings such as schools, hospitals, fire houses, churches with bells or carillons, etc.
3 Restrictions in the zoning ordinance or deed of sale making it impossible for future homes to be built so close to existing houses that noises from neighbors' activities could be annoying.

location

1 Suitable distance from street to reduce possibility of street noises becoming bothersome.
2 Orientation, when possible, so that existing contours and existing or future plantings will serve as acoustical barriers.
3 Safe distance from possible noises at rear of lot, in particular to protect against children's play yards and adults' workshops near existing or future homes.
4 When necessary, planning for outdoor acoustical barriers between the house and noise sources. Brick or stone walls, solid-wood fences, earth embankments, thick plantings of nondeciduous, densely foliaged shrubs or trees, or combinations of these, are suitable for the purpose.

Table II: Sound Control Factors in House Planning

1 Windowless wall and/or garage located as sound barrier against the greatest source of noise (street, neighbors, shopping center, etc.)
2 Segregation of quiet rooms from noise-producing rooms by distance: bedrooms away from living, food preparation, and utility rooms; studies isolated from play areas, hobby rooms, party rooms, workshops, etc.; places for quiet conversation protected from general living area or from music room by separation or by placing in an alcove off the main living room, etc.
3 Placement of bathrooms, hallways, utility rooms, and other usually quiet areas so that they serve as sound barriers between various quiet rooms and the noise-producing areas; location of fireplace and any other interior masonry walls to serve the same purpose.
4 Insulation against sound transmission between bedrooms by closets built against regular walls—not "closet walls" which have only a thin plywood or fiberboard backing as the sole barrier between the two rooms.
5 Inclusion in plan and specifications for noise-producing rooms of adequate sound-absorbing treatment, whether by design of furnishings or specification of acoustical materials, or both. Particularly important in moderate-sized homes with open kitchens, combined living-dining room areas, and general "family rooms," and also in children's playrooms and adult workshops or hobby rooms.

sound-control terminology

Before one can even begin to discuss the relative merits of different structural systems and materials from the point of view of sound absorption and insulation, it is essential to have some understanding of acoustics terminology and of the various types of sound measurement used in the acoustical profession. Sound is an astonishingly complex thing, beside which heat (and cold) and light, and their measurement and control, are relatively simple. For example, sound can be measured for its intensity level (or sound level) in *decibels*; for its loudness level in *phons*; for its frequencies in *cycles per second*; and for its "annoyance level," for which, up to the present, there is no reliable measure except the *subjective reactions* of each individual. Definitions of these terms and of associated terms used in measuring the sound-control properties of materials and structures, are given (*Table III*). The American Standards Association, Standard Z24.1, *Acoustical Terminology*,[3] is recommended for more technical definitions.

sound absorption

The science of the control of sounds within a room, by special design and by the use of sound absorbing constructions and materials, has reached a relatively advanced state. Regarding materials—acoustical tiles and plasters[4] of innumerable types, heavy drapes and thick carpets, and even many types of furnishings, can be used with great effectiveness to control reverberation in noise-producing areas such as halls, stairways, kitchens, living-dining areas, music rooms, workshops, rumpus rooms, and children's playrooms. Data on acoustical design and on sound-absorbing materials and their uses in Michael Rettinger's "Home Acoustic Treatment" (May 1949 P/A), Paul J. Washburn's "Sound-Conditioning Materials" (October 1952 P/A), the pamphlet *Sound-Absorption Coefficients* (Acoustical Materials Association, New York), and in Bolt & Newman's "Control of Noise"

[3] *American Standards Association, Inc., New York, 1951.*
[4] *"Most acoustical plasters available at the present time are not suitable for use in residences since they offer difficulties in cleaning, washing, and decorating." (Knudsen & Harris, op. cit.)*

Table III: A Glossary of Major Acoustics Terms Used in Architectural Practice

decibel:
A logarithmic unit "which denotes the ratio between two amounts of sound pressure. It is customary to compare the pressure of all sounds with 0.0002 dynes per square centimeter. This . . . approximates . . . the minimum sound pressure that is audible to the human ear . . ." (Knudsen & Harris). "One sound level is 10 decibels greater than another if its sound energy or intensity is 10 times greater than the other; it is 20 db greater if it is 100 times larger, and 30 db greater if it is 1000 times larger . . . Sounds at the upper limit where hearing becomes painful are 120 db greater than sound levels at the threshold of audibility—an energy ratio of 1,000,000,000,000 (one million million)." (Albert London, "Noise Reduction in Dwellings" Architectural Record, October 1949.)

intensity or sound level:
The intensity of a sound, measured by a standard sound-level meter, in dbs above the standard reference intensity of 0 db (0.0002 dynes per sq cm). "Except under special conditions, the sound level is about equal to the intensity level" (Bolt & Newman).

frequency:
The number of vibrations a given sound makes, in cycles per second (cps). "Frequency is a physical phenomenon; it can be measured by instruments, and it is closely related to, but not the same as, pitch—a psychological phenomenon" (Knudsen & Harris).

phon:
A unit of loudness level rather than intensity, of sound; it is used to measure:

loudness level:
"The loudness level, in phons, of a sound is numerically equal to the sound . . . level in decibels of a 1000-cycle reference tone which is judged by listeners to be equal in loudness" (Knudsen & Harris). It is "a measure of the subjective impression of loudness" (Bolt & Newman). Loudness level is not commonly used in architectural acoustics, primarily because it is so subjective, and also because "we have no simple and accurate way to measure it at present" (Bolt & Newman). Nevertheless, it may be a factor, particularly where sounds of unusually low or high frequency are a problem.

sound-absorption coefficient:
The fraction of incident sound energy at specific frequencies that is absorbed by a surface; the remaining fraction is reflected. Used to specify sound-absorbing materials and surfaces.

noise reduction coefficient:
"The average of the absorption coefficients at 256, 512, 1024, and 2048 cycles per second, given to the nearest five per cent" (Bolt & Newman). Not always a suitable measurement for the effectiveness of sound-absorbing materials and structures, particularly if the sounds to be reduced are especially intense at the higher frequencies. (Note: In the "Proposed American Standard Recommended Practice for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Floors and Walls," First Draft, July 1954, issues for discussion by the American Standards Association, test frequencies are recommended as follows: 125, 190, 250, 375, 500, 750, 1000, 2000, and 4000 cycles per second, which would bring American practice more or less into conformance with British methods. However, all U. S. tests to date by the Bureau of Standards have been on the basis of the existing standard test frequencies given in the earlier part of this definition.)

transmission loss:
"The number of decibels by which sound energy which is incident on a partition is reduced in transmission through it" (Knudsen & Harris). In general practice, the transmission loss (TL) is the unit of measurement of the effectiveness of a material or a construction in providing sound insulation. The TL in most residential situations need only be based on the sound transmission loss averaged over the frequencies listed under Noise Reduction Coefficient (above).

noise reduction:
"The difference between the sound levels in two spaces or conditions," expressed in decibels (Bolt & Newman). Usually used "to express the degree of isolation of noise between two different rooms . . . The transmission loss (TL) measures an inherent property of a given wall or other barrier. The noise reduction (NR) . . . involves not only the transmission loss of the various intervening elements, but also the areas of these elements and the amount of absorption in the receiving room" (Bolt & Newman). Noise reduction is not referred to in this article, since it involves more complex measurement techniques that are usually the province of the acoustical engineer, not the architect.

Table IV: SOUND INSULATION VALUES OF VARIOUS CONSTRUCTIONS AND MATERIALS

Type	Weight sq ft	Av. TL in db*	Source	Panel	Impact NR, db
(a) Walls: masonry					
Cellular-concrete blocks, ¾" plaster one side	45	46	NPL	35	
4" hollow pumice-cement-block, ½" plaster one side	21	35	London	k	
4" cinder block, ½" plaster both sides	28	45	NBS	144	
4" hollow pumice cement block, ½" plaster both sides	25	40	London	m	
4" hollow clay tile, ⅝" plaster both sides	28	38	NBS	140	
4" hollow clay tile, 1" shells, ⅝" plaster both sides	38	44	NBS	141	
8" brick panel, ½" plaster both sides	97	51	NBS	80	
9" brick panel, ½" plaster both sides	95	52	NPL	40	
4" brick panel, ½" plaster both sides	—	47	NBS	26	
4½" brick panel, ½" plaster both sides	53	45	NPL	36	
2" brick panel (4" brick set on edge), ½" plaster both sides	32	42	NBS	85	
3⅞" glass-block partition, unplastered	—	41	NBS	155	
(b) Walls: frame, single; 2" x 4" wood studs, 16" o.c.					
⅜" plasterboard both sides	5	35	NPL	59	
¾" plasterboard both sides	8	40	London	q	
⅜" plasterboard and ½" plaster both sides	13	38	NPL	61	
⅜" plasterboard and ½" plaster both sides	15	35	NBS	202	
½" soft fiberboard both sides	4	32	NBS	206	
½" fiberboard lath and ½" plaster both sides	13	41	NBS	205	
¼" plywood both sides, 2 layers glass-quilt in interspace	3.3	32	NPL	58	
⅜" plywood both sides, light-cotton fabric glued one side, heavy-cotton duck glued other	4.6	31	NBS	179A	
Metal lath and ½" plaster both sides	20	39	NBS	165	
(c) Walls: frame, double					
2" x 4" wood studs staggered, ⅞" plaster on metal lath	20	50	NBS	175	
2 sets 2" x 2" wood studs 2" apart, ½" fiberboard stood loose and overlapping in 2" space, ½" fiberboard lath and ½" plaster on both outer faces	14	52	NBS	220	
1" x 3" staggered studs, ¼" plywood glued to both outer faces, ½" plasterboard nailed to both plywood faces	7	46	NBS	215	
(d) Walls: frame; resilient clips and nails 2" x 4" wood studs, ½" plasterboard and ½" plaster both sides					
(1) resilient clip as shown	14	46	NBS	414	
(2) resilient clip as shown	14	47	NBS	418	
(3) nail with head encased in thin cardboard, metal lath square over cardboard, felt pad between stud and lath	14	47	NBS	412	
(e) Doors					
1¾" solid-oak door as ordinarily hung	—	20	Sabine	S1	
2½" solid door, rubber gasket sides and top, felt strip at bottom	—	28	BMS	181	
(f) Windows					
D/S annealed window glass	—	27	Geiger	E	
¼" plate glass	—	31	Geiger	E-1	
double glazed and sealed units:					
(1) DSA, ¼" air space, DSA	—	28	Geiger	A	
(2) ¼" plate, ¼" air space, ¼" plate	—	33	Geiger	A-2	
(3) ¼" plate, ½" air space, ¼" plate	—	36	Geiger	B	
(g) Floors					
2" x 8" wood joist, ½" fiberboard lath and ½" plaster ceiling, 1" subfloor and 1" finish floor	14	45	NBS	701	11
do except floor: 1" subfloor, ½" fiberboard, 1" x 3" sleepers, 1" finish floor	16	50	NBS	702	12
do except floor: 1" subfloor, ½" fiberboard, nailing strips, 1" subfloor, ⅜" finish floor	—	58	NBS	114C	22
Same as panel 702 except ceiling: 2" x 4" ceiling joists 4" o.c. from floor joists (suspended ceiling), same finish as 702	17	54	NBS	706	25
4" reinforced-concrete slab, ceiling on furring strips, ½" fiberboard lath and ½" plaster, bare concrete floor	54	57	NBS	116A	1
do except floor: 1" x 2" sleepers, 1" rough flooring and ⅜" finish floor	58	60	NBS	116B	30
Same as 116B, except ½" fiberboard between concrete and nailing strips	58	60	NBS	116C	33
(h) Floor Finishes					
Carpet on underfelt on wood floor			BRS (G)		10
Finish floor over glass felt over subfloor			BRS (G)		10
Carpet, heavy, no felt, on concrete slab			Lindahl		10
3/16" linoleum on felt on concrete slab			and		12
½" cork tile on concrete slab			Sabine		20
⅜" rubber tile on concrete slab			"		7
5/32" asphalt tile on concrete slab			"		0
2" x 3" sleepers, ¾" wood floor, on concrete slab			"		19

*"Average TL" in U. S. practice is the average between 128 and 4096 or 256 and 1024 cps. In British practice it is the average between 200 and 2000 cps.

References:

NBS — National Bureau of Standards Report BMS 17 and Supplements

NPL — National Physical Laboratory (England) Report, *Sound Insulation of Partitions*, 1948

London — Albert London, "Noise Reduction in Dwellings," *Architectural Record*, October 1949

Sabine — P. E. Sabine, from Knudsen and Harris, *Acoustical Designing in Architecture*, John Wiley & Sons, Inc., N. Y., 1950

Geiger — P. H. Geiger, from Knudsen and Harris, op. cit.

BRS (G) — Building Research Station at Garston (England), from Knudsen and Harris, op. cit.

Lindahl and Sabine — R. Lindahl and H. J. Sabine, from Knudsen and Harris, op. cit.

and Knudsen & Harris' *Acoustical Designing in Architecture* (both previously cited) will supply almost all the information needed by the residential architect.

However, as pointed out before, the major noise control problem in homes is not absorption. It is insulation—the reduction of noise passing through walls, floors, and ceilings. Sound absorption requires only surface treatments, while sound insulation usually involves basic structural procedures. This means that careful advanced planning is needed for control of noise transmission. Of course, acoustical tiles should also be installed at the time of contruction to avoid the extra cost of a double ceiling finish; but carpets, drapes and so on are naturally added after the house is completed, more often than not for decoration rather than for acoustical function. Sound-insulating structures and materials, on the other hand, are integral parts of the building, and to reduce sound transmission through building sections after the structure is finished always involves extensive and costly alterations.

requirements for adequate sound insulation

In the present article, we are concerned entirely with residences, and not with urban houses or apartments. The problems of sound insulation in urban areas are greatly complicated by the higher levels of outdoor noise in cities, the very wide variations in the pitch of such noise, code requirements that often make adequate sound insulation very costly, unusual requirements for party walls, etc. For effective sound insulation in suburban and country locations, the problem is considerably simpler, since for outer walls the only important element is the background noise level of the community.

Acoustics engineers are generally agreed that a sound transmission loss (TL) of 45 db for outer walls is adequate, except in extreme circumstances either of exterior noise or of sensitivity on the part of the occupants.

Indoor walls and floors, when they must serve a sound-insulation function greater than normal, should also have a TL of at least 30 db. In unusual circumstances the loss should be as much as 45 to 50 db, as will be seen.

What types of structures and materials will provide those levels of sound insulation? Unfortunately, test data in this area are not always consistent. The major sources of information are the National Bureau of Standard's 1939 Report No. BMS-17, *Sound Insulation of Wall and Floor Constructions* (to be reissued this year together with its two supplements, dated 1940 and 1947), and G. H. Aston's *The Sound Insulation of Partitions*, published by Great Britain's National Physical Laboratory. Neither of these publications is in any way complete, nor are the results from one laboratory wholly comparable with the other, since testing methods and panel construction techniques have never been finally standardized, either nationally or internationally.[5]

Furthermore, the degree of error inherent in the figures presented by these reports is difficult to assess, since the lack of perfect diffuseness of sound fields, the relatively small size of the test panels, and several other factors tend to contribute to inaccuracies that are almost impossible to evaluate.

Nevertheless, these reports contain almost all the tests that the architect can rely on. The data presented (*Table IV*) contains the more important results, as regards home construction, to be found in them. Other tests reported in this table are taken from Knudsen & Harris, previously cited.

One general warning must be offered: it is of the greatest importance that sound insulating walls and floors be of the best possible workmanship. All cracks and sound paths should be eliminated by tight construction and, if necessary, by special sound-deadening strips or pads. Sounds can travel through cracks to a degree which can reduce the insulation value of the structure almost to uselessness. Special attention should be given to the elimination of sound-path cracks around baseboards, electrical outlets, plumbing pipes, ducts, doors and windows, and other discontinuous elements in the structure.

[5] *A tentative national standard does exist and is widely used by American laboratories. This is the* Tentative Recommended Practices for Measurement of Airborne Sound Transmission Loss of Building Floors and Walls, *No. E90-50T, issued by The American Society for Testing Materials, Philadelphia, Pa.*

exterior walls

The problem of selecting exterior wall construction with adequate sound-insulating qualities is made difficult by the fact that no tests, as far as can be discovered, have been made on such standard cross-sections as a wood-frame wall with sheathing and shingles (or siding) on one side and lath-and-plaster on the other. These walls are believed to be adequate in most situations, but there is no scientific proof of this. Attention is directed to the data on masonry partitions (*Table IV*), since these have by far the best sound-insulating qualities of any of the standard constructions tested, and since they are much more commonly used for exterior walls in houses than they are for interior partitions. In this connection, it is worth reporting that, as a general thing, the heavier a wall cross-section the better its acoustical-insulating properties. There are exceptions, such as an unplastered cinder-block wall, which has little insulating value, and a wood-frame wall in which the plaster lath is attached with resilient clips, which has considerable value; but usually the weight rule holds true.

Of course, any window or door in a wall, when open, will destroy its sound-insulating value. Even when closed they cut it considerably, but not enough to make the wall useless. It is stated in BMS 17 that "An opening of one square foot will transmit four times the sound energy that is transmitted by the entire structure with closed windows."[6] This same report also provides a moderately simple formula for calculating the over-all sound transmission of a wall that includes windows and doors; similar information will be found in Knudsen & Harris (*op. cit.*), under "Noise Insulation Factor."

Rooms that need to be particularly quiet either should have shallow, wide windows high in the wall, or (if ventilation can be achieved by other methods) no operable windows at all. Doors should be heavy and insulated with rubber or felt strips, to keep noise from entering through the cracks between the door and its frame.

The problem of outdoor noise entering

[6] *Dr. Bolt comments that this is true only for a particular wall area and wall type. In other situations the ratio "might be 2, or 10, or even 1000!"*

the home through open windows and doors is almost eliminated in the home with year-round air conditioning, particularly if the windows are double glazed—as they should be for economical air-conditioning installation and operation. The windows will be generally kept closed and outdoor noises will be practically unnoticeable against the quiet background murmur of the air-conditioning unit.

sound insulation inside the house

A complicating factor in the control of sound transmission through walls and floors inside the house is the fact that there are two distinctly different types of sound to be considered, and that the effective control of one often does nothing to alleviate the other. Transmission of air-borne sounds from one room to another can be controlled by one sort of structural method; transmission of impact sounds resulting from the striking of hard objects, from heels to children's toys, against a surface, or from vibration of machinery and equipment fastened to the surface, often requires quite different methods of construction and types of materials for adequate deadening.

Control of air-borne noises. The passage of air-borne noises through interior walls or floors, when not reduced by distance, can be controlled by construction with a TL of at least 40 db and (around bathrooms, utility rooms, and particularly noisy playrooms or workshops) occasionally between 45 and 50 db. In practice, special sound-insulating construction is rarely used in private homes, except around such rooms. Because the constructions are usually costly, adequate isolation from noise should be achieved whenever possible by the techniques of area segregation.

Noise-producing rooms, particularly baths and utility rooms, should be provided with relatively sound-proof doors, as well as efficient sound-insulating walls and floors. In these rooms, of course, windows to the outdoors are either nonexistent (as in most utility rooms) or unimportant, since the noise level in such rooms when in use is likely to be higher than the background noise level outside.

Control of impact noises. In all homes, but particularly in two-story structures, the control of impact noise often is a matter of considerable importance. Some of the impact sound-transmission losses for floors reported in BMS 17 are given (*Table IV*), as are a few others taken from publications by the British Building Research Station at Garston, by R. Lindahl & H. J. Sabine, and (for glass) by P. H. Geiger; these data, except for those from the Bureau of Standards, are taken from the Knudsen & Harris book. More detailed information on this difficult problem can be found in their volume, and also in Bolt & Newman's chapter in the American Public Health Association's book (previously mentioned). Bolt & Newman's data are particularly valuable, since their paper deals exclusively with residential acoustics. The authors state that *impact noise reduction*[7] through a noisy floor to quiet rooms below should average between 15 and 20 db.

These authors make a pertinent point concerning the lateral transmission of impact sounds along floors from one room to another on the same level. They point out, for example, that a double masonry wall has a very high TL; "but if this wall is laid on a thin slab that runs continuously under the adjacent spaces, more sound will travel through this slab than through the wall, thus apparently reducing the TL of the wall." The lateral transmission of sound along floors is not likely to be a serious problem in most homes, unless it happens that a workshop or home hobby room with power machinery adjoins a "quiet" room. Should this be made necessary by the plan, it would be advisable to break the continuity of the floor by some means; but this involves special design problems which are outside the scope of this article.

Reduction of vibration-noise transmission, through and along floors and through walls, often is a problem in small homes with warm-air furnaces, year-round air conditioners, various types of kitchen and laundry appliances, etc., which are rigidly fastened to the floors or walls. Special felt, cork, or rubber mounts are available which can greatly reduce this type of impact noise transmission if it is thought necessary. Often it can be avoided by selecting equipment which is known to be quiet in operation.

For the reduction of vibration noise through duct systems, insulating duct liners or acoustical filters can be used, but the best practice is to avoid the need for such treatments by specifying tight and rattle-proof ductwork and quiet-operating fans or blowers in the central air-conditioning or heating units.

Plumbing noises can be annoying, and precautions should be taken to minimize these sounds as much as possible. The worst noise usually comes from toilets, and the client would be well advised to agree to specification of the quiet-flushing whirlpool-type of equipment, which costs only $15 to $30 more than the standard varieties. Drain lines should be isolated from the structure (i.e., free standing, not in direct contact with the walls or floors), or, if this is not possible, should be insulated with felt or some form of asphalt-damping compound. As Bolt & Newman state, "The detailing of . . . plumbing layouts is complex, and must be done with care if satisfactory results are to follow," acoustically speaking. The design of a truly quiet system calls for consultation with an expert on the subject.

Knudsen & Harris make the point that the rooms in which telephones are located should be free of excessive reverberation, so that conversation can be conducted without difficulty. It is also important that the phone not be located so that its bell or the conversations over it will annoy others. Best practice is to provide a special nook or recess for the phone, acoustically treated, if necessary, so that sounds will not reverberate excessively or pass through the walls of the recess into adjacent rooms.

conclusion

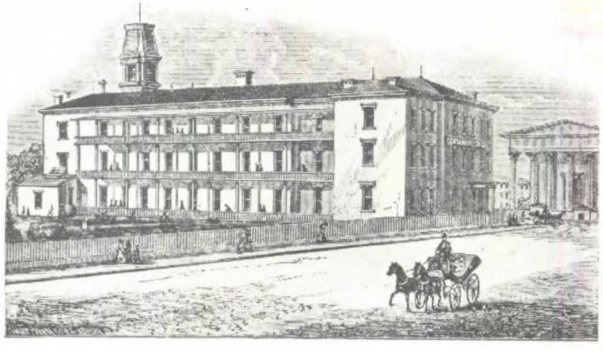
The techniques for sound insulation described in this article should be adequate to solve all but the most recalcitrant conditions. If it be agreed that such conditions are unavoidable, the architect will be well advised to call in an acoustics engineer with special experience in sound-insulation work. The subject, particularly when it concerns stubborn problems, is forbiddingly complex, and the consulting of an expert, in unusual situations, will turn out to be an economy in the long run.

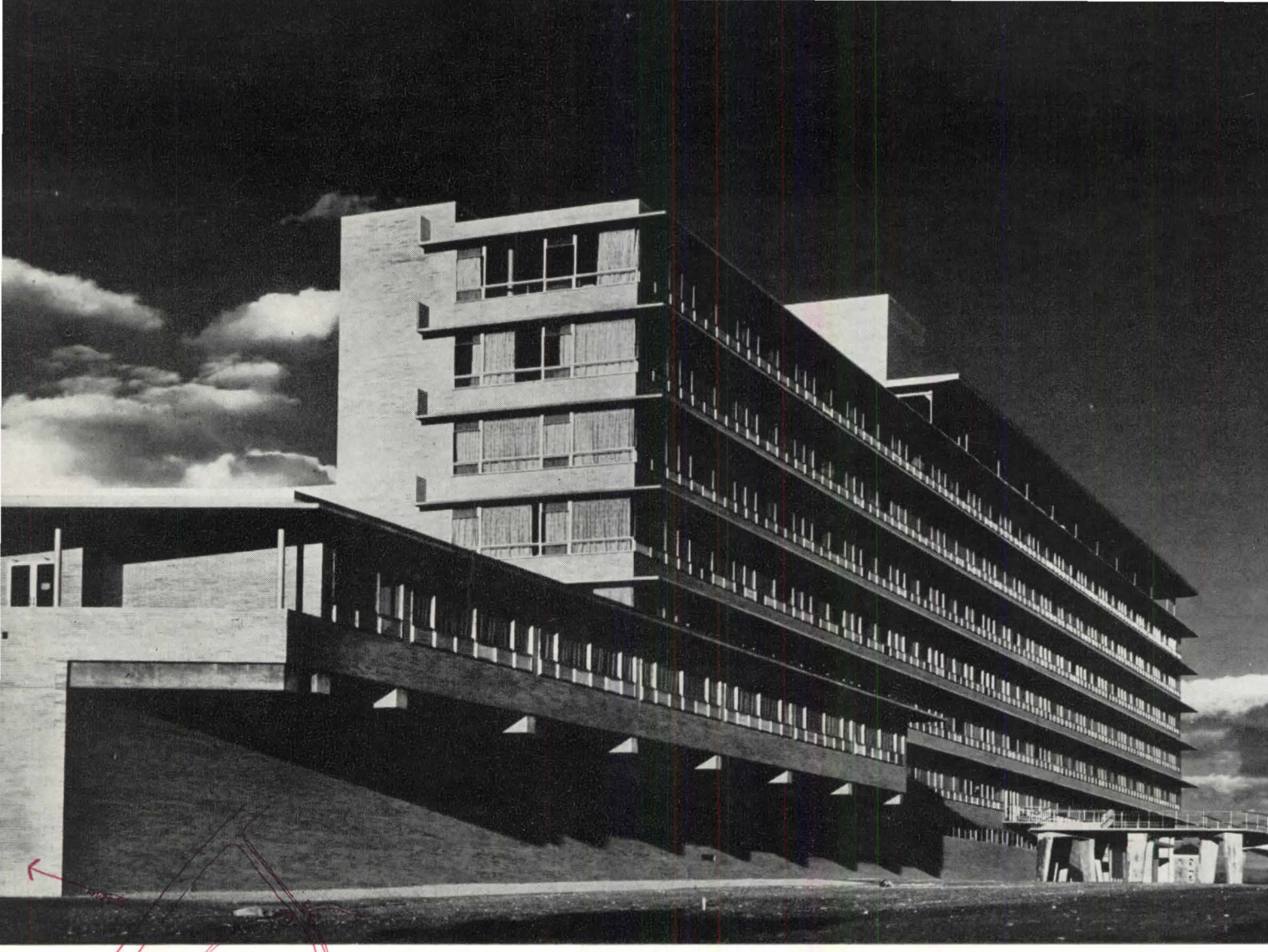
[7] *Arbitrarily defined as the reduction, in decibels, below the level of impact noise generated by the same source on a bare concrete slab.*

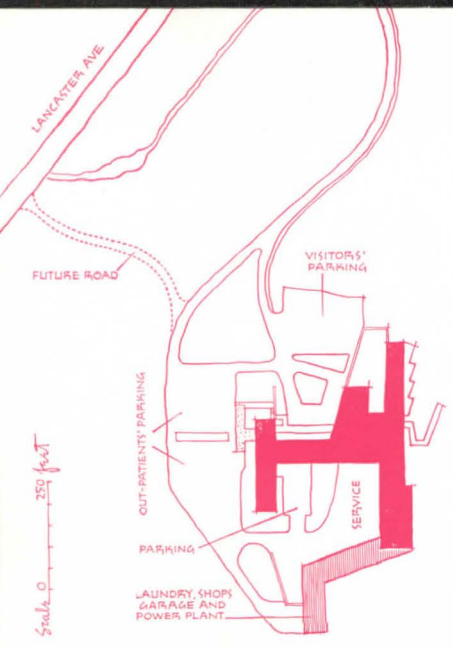
hospital / health center

location	Overbrook, Pennsylvania
architect	Vincent G. Kling
associate-in-charge	Harry Ahrens
project manager	Albert E. Beck
landscape architect	Thomas W. Sears
structural engineers	Gravell & Duncan
mechanical engineer	A. Ernest D'Ambly
general contractor	Wark & Company

The German Hospital—1884







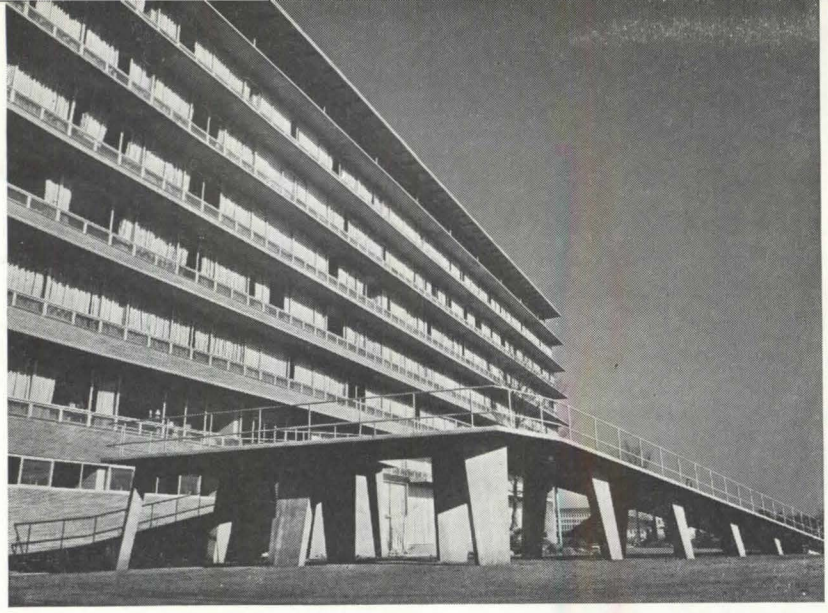
Once in a blue moon there appears a building in which all of the known technical and planning advances of its type are incorporated, a fresh solution has been found, and all elements are so synthesized and expressed in the finished design that a new level of architectural excellence is reached. One such, in our opinion, is Vincent Kling's splendid new Lankenau Hospital and Health Center presented here.

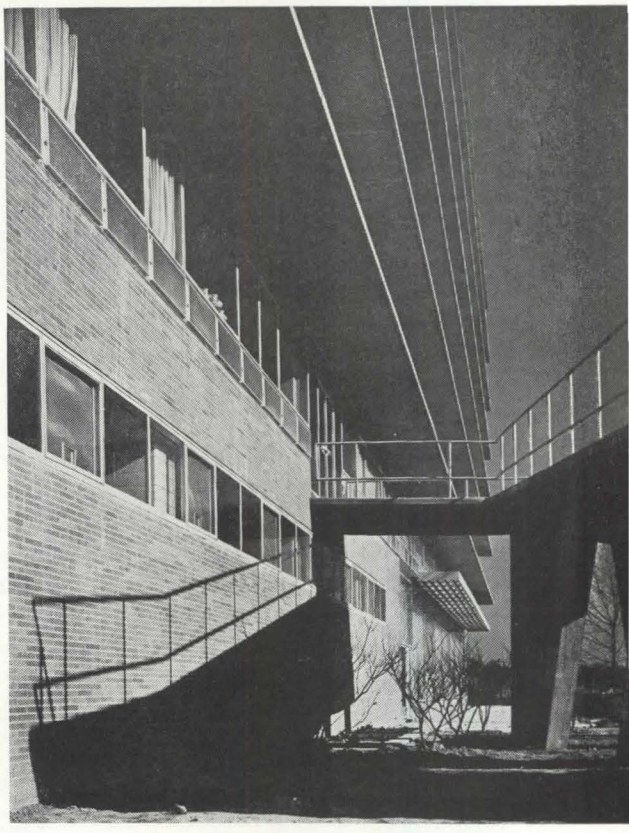
Lankenau, as an institution, is 94 years old, having been founded in 1860 as The German Hospital by a group of the German-born who migrated to Philadelphia after the Napoleonic wars. President of the hospital from 1869 to 1901 was John D. Lankenau, for whom the hospital was later named.

At Girard and Corinthian Avenues, the hospital grew and grew until eventually it crowded the site; the buildings became obsolete; amenities were nonexistent; and there was no room for expansion. Surveys showed that in the Overbrook area, just outside the city line, there was no general hospital to serve some 250,000 persons living within a 2-mile radius. When the Overbrook Golf Club property became available, it seemed an obvious choice for the new hospital.

In site organization and plan, the new Lankenau checks as a remarkably well-ordered and efficient working hospital. Few hospitals anywhere can boast so handsome a site as the former golf course —92 acres of beautiful rolling land, with fine trees and lawns. The buildings crown the highest portion of the land. The six-story nursing-unit at the south end of the building *(acrosspage* and *above)* is not only shielded from sight and sound of hospital traffic, but the patients' rooms look out over the serene slopes of the golf course to—in the distance—the Philadelphia skyline.

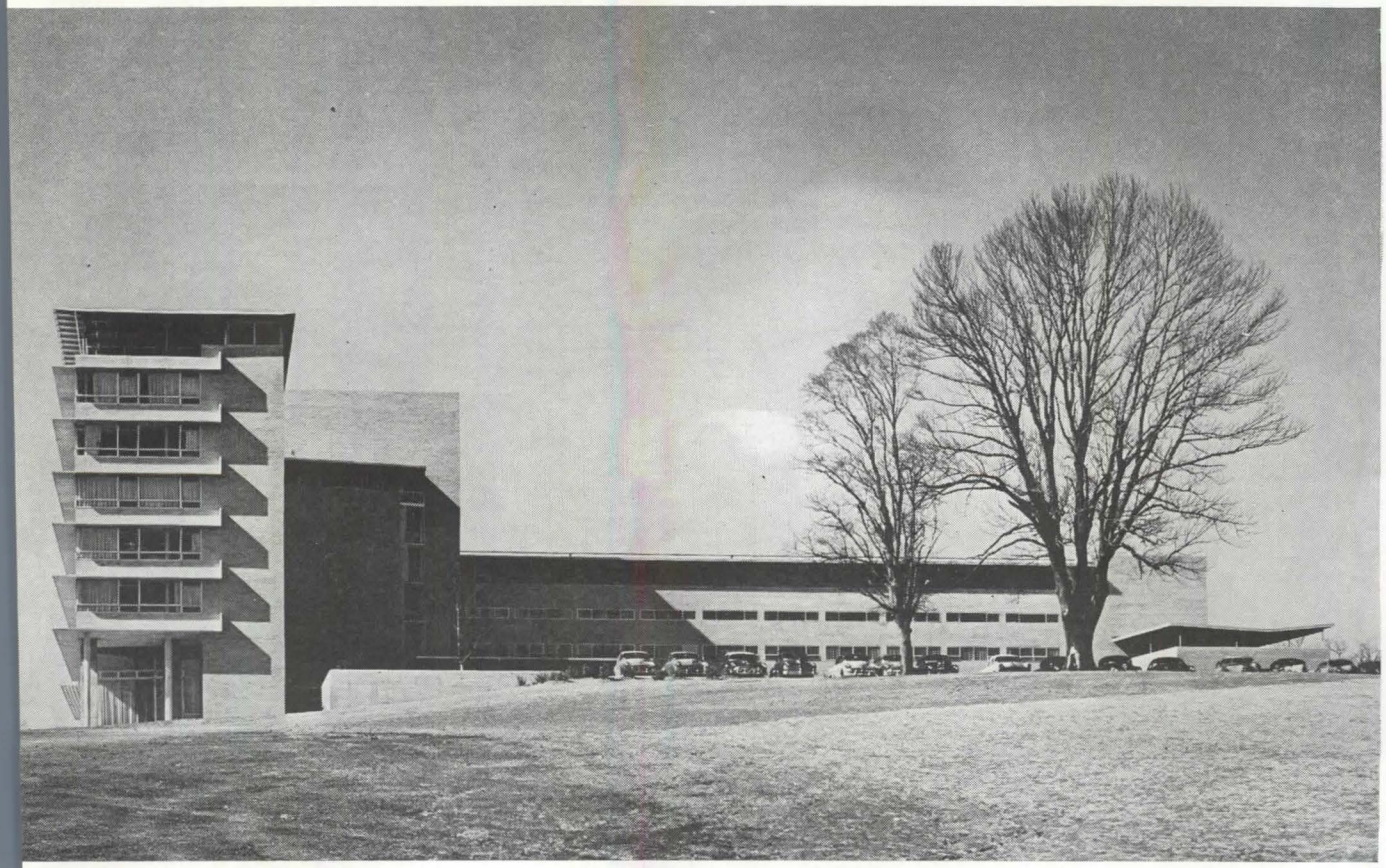
Consultants to Kling in the planning of this forward-looking hospital were Don C. Smelzer, M. D.; Lucius R. Wilson, M. D.; and Daniel E. Gay, who was Consultant-Director of the Lankenau Hospital during construction.





The main approach driveway, which curves up the hillside (see plot plan), *divides near the summit into three roadways leading to separate parking areas serving the main hospital entrance* (below, *center*); *the out-patient-clinic unit* (below, *right*); *and, to the west, the emergency-service court.*

Near the center of the south wall, a U-shaped ramp supported on splayed, concrete bents (above and right) *leads down to grade from public space on the first floor.* Photos: Lawrence S. Williams



Disposition of the major elements follows advanced hospital-planning practice—the nursing-unit wing at the south end of the scheme; the parallel, health-center clinic, including out-patient department, at the northern end of the structure; and a connecting unit (which is used by both in- and out-patients) in which are housed the ancillary diagnostic services; therapy rooms; operating and delivery rooms; a conference room; and offices for doctors and administrative personnel.

The typical nursing unit (as shown on the fourth-floor plan) occupies the south wing of the second, third, fourth, fifth, and sixth floors. In the ancillary-service wing the diagnostic suites, radiography, X-ray, and therapy departments are on the second floor. The third floor consists chiefly of laboratories and the fifth floor houses labor and delivery rooms and nurseries.

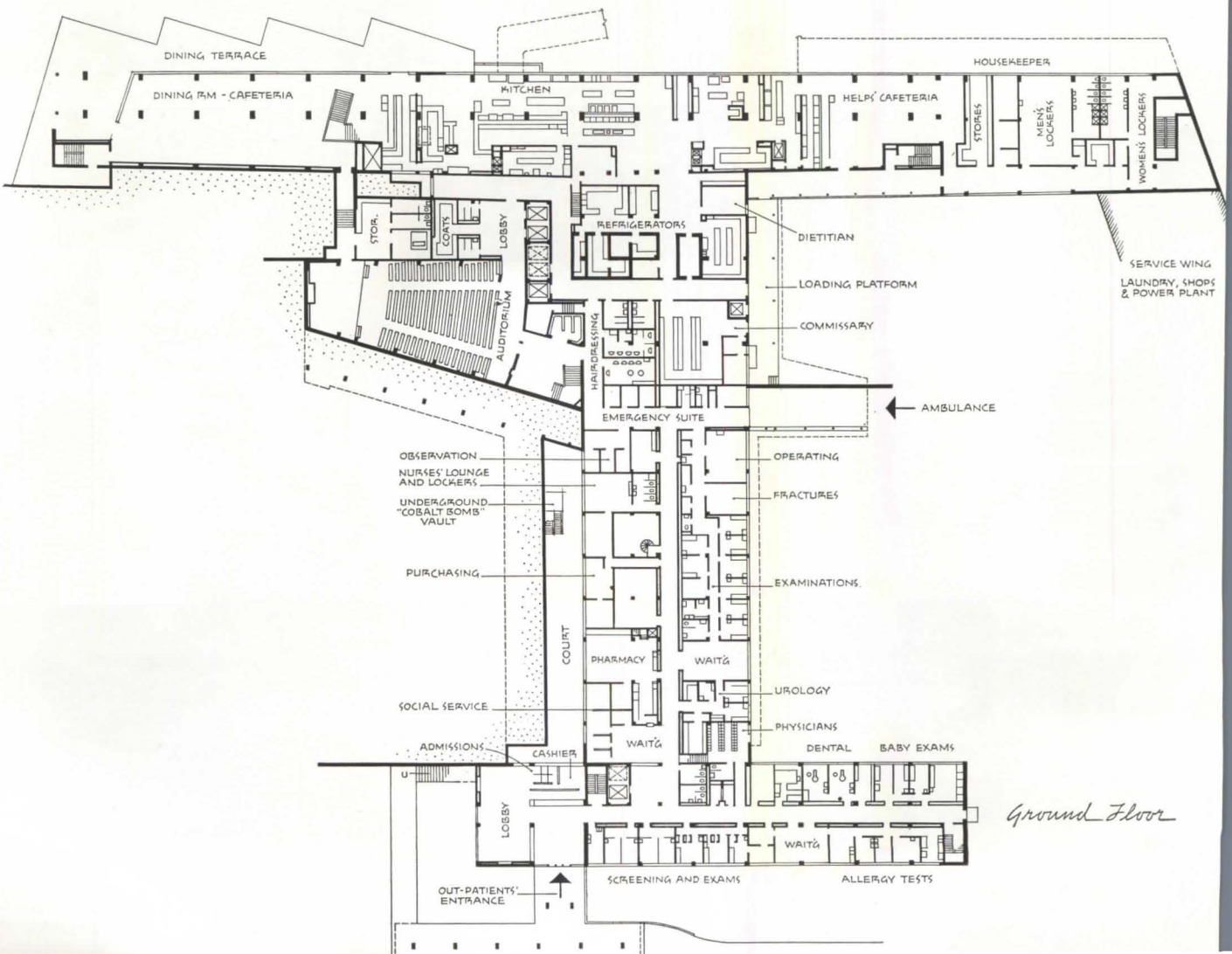
If Lankenau were seen as merely a first-rate general hospital, however, one would miss much of the extraordinary significance of the project. For within the scheme, there are numerous, exceptional elements—ones that echo a basic change in thinking about health care today and that may further condition hospital planning tomorrow. These elements all revolve around the current emphasis on *preventing* illness before one needs a hospital bed; treatment when patients are in an ambulatory condition; avoidance of the need to use the costly hospital beds at all—except for the acutely ill. A companion consideration—one that is expressed architecturally in the cheerfulness and elegance of the hospital's appointments, in the beautiful natural surround, and rich landscaping—is the determination to have bed patients reach an ambulant stage and quit the hospital just as soon as is consonant with proper health care. This is an exceptional instance of environmental control—specifically to create an environment where health will thrive.

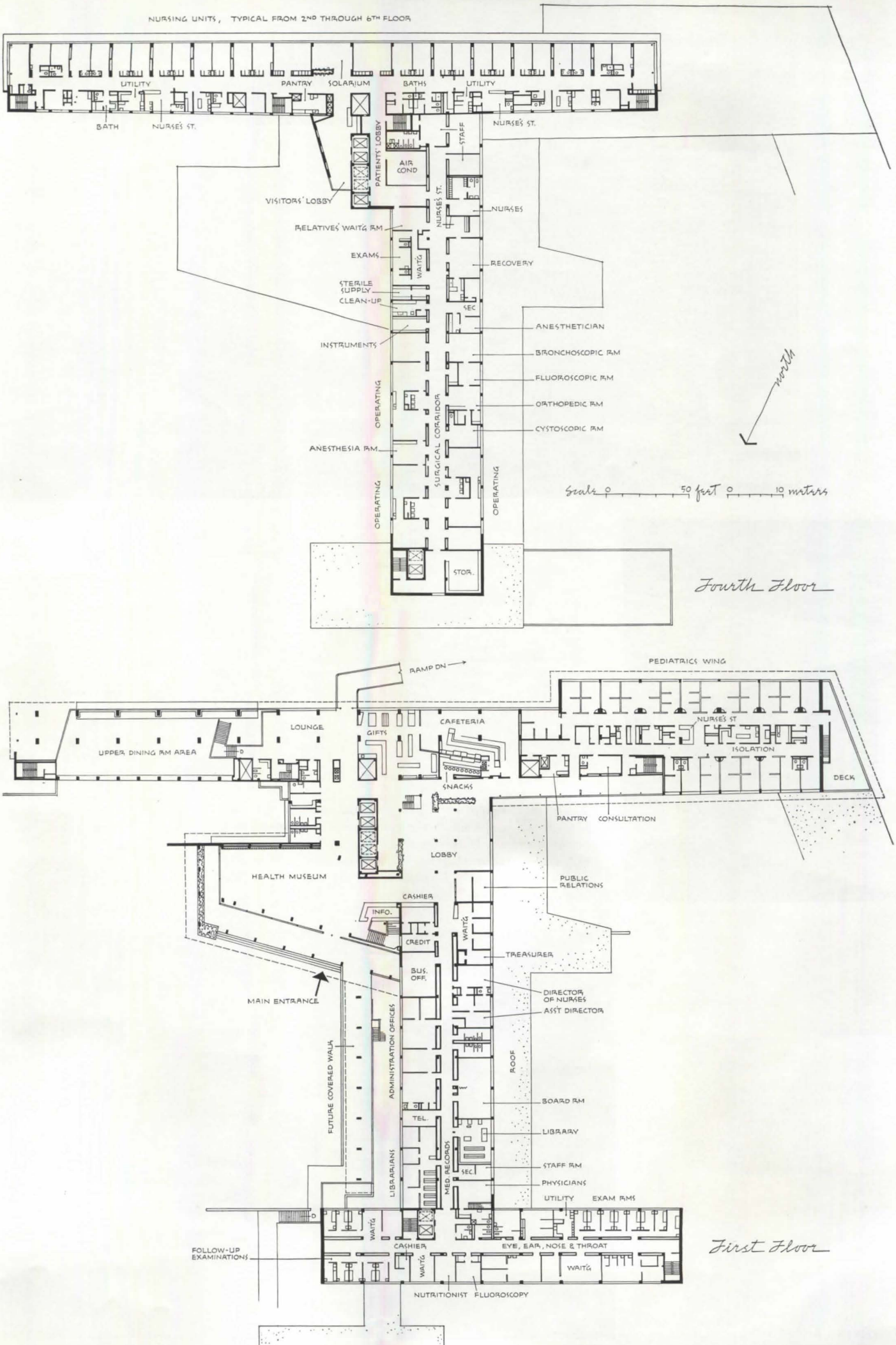
In line with the emphasis on maintaining health and preventing illness, unique public-education facilities are included in the building. Adjoining the main lobby is a Health Museum and, on the floor below, a 335-seat auditorium. Sole purpose of these provisions is to help people *stay* well.

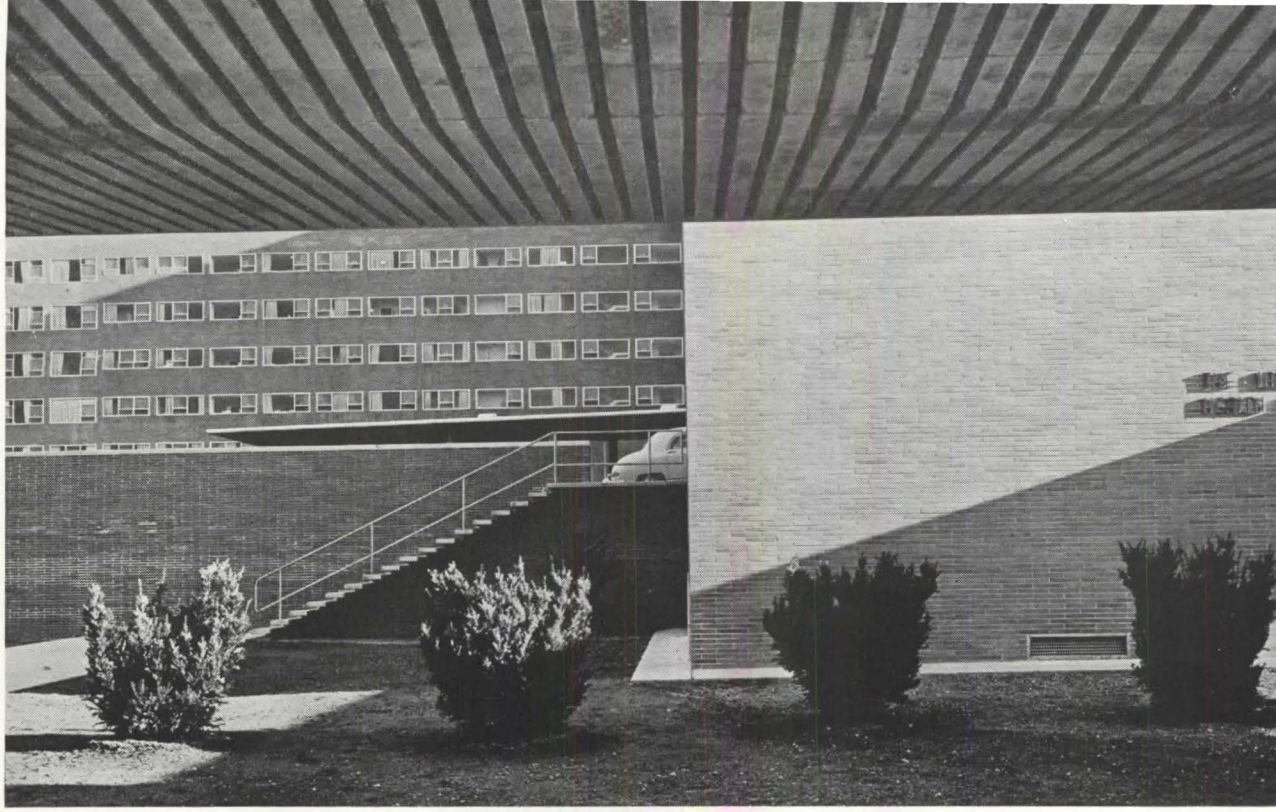
The size and completeness of the clinics in the out-patient wing are yet other evidences of the health-maintenance program. With early diagnosis and therapy, many avoid hospitalization altogether.

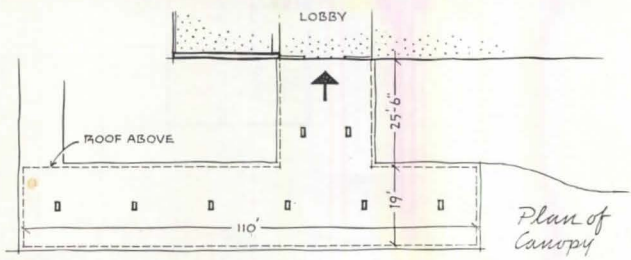
A plan refinement in vertical transportation is the complete separation between visitors and in-patient traffic. The central elevator bank is flanked by two lobbies—the one to the east for visitors; the one to the west for patients being moved to surgery, X-ray, labs, etc.

The major portion of the hospital—all of the area within the basic H shape of the building—has a structural-steel frame, with pan-type concrete floors. The "appendage" units—the auditorium-health museum element and the shops-laundry-boiler-room wing—are of concrete, rigid-frame construction.




NURSING UNITS, TYPICAL FROM 2ND THROUGH 6TH FLOOR
UTILITY
PANTRY
SOLARIUM
BATHS
UTILITY
BATH
NURSES ST.
NURSES ST.
PATIENTS' LOBBY
STAFF
AIR COND
VISITORS' LOBBY
NURSES ST.
NURSES
RELATIVES' WAITG RM
EXAMS
WAITG
RECOVERY
STERILE SUPPLY
CLEAN-UP
SEC
ANESTHETICIAN
INSTRUMENTS
BRONCHOSCOPIC RM
FLUOROSCOPIC RM
ORTHOPEDIC RM
CYSTOSCOPIC RM
OPERATING
SURGICAL CORRIDOR
ANESTHESIA RM
OPERATING
OPERATING
STOR.
north
Scale 0 50 feet 0 10 meters
Fourth Floor
RAMP DN
PEDIATRICS WING
LOUNGE
UPPER DINING RM AREA
GIFTS
CAFETERIA
NURSES ST
ISOLATION
DECK
SNACKS
PANTRY
CONSULTATION
LOBBY
HEALTH MUSEUM
PUBLIC RELATIONS
CASHIER
INFO.
CREDIT
WAITG
TREASURER
BUS. OFF.
MAIN ENTRANCE
DIRECTOR OF NURSES
ASST DIRECTOR
FUTURE COVERED WALK
ADMINISTRATION OFFICES
ROOF
BOARD RM
TEL.
LIBRARY
LIBRARIANS
MED RECORDS
SEC.
STAFF RM
PHYSICIANS
UTILITY
EXAM RMS
WAITG
CASHIER
EYE, EAR, NOSE & THROAT
FOLLOW-UP EXAMINATIONS
WAITG
WAITG
NUTRITIONIST
FLUOROSCOPY
First Floor





A T-shaped canopy provides sheltered passage for outpatients who come up to the clinic wing at the north end of the hospital. It is significant that the clinic entrance and waiting lobby (below) *are as handsome and inviting as those of the main hospital—a far cry from the "clinic in a dingy basement" tradition.*

Lankenau has practically every known electrical device to assist patient comfort and staff efficiency, according to the Harry F. Ortlip Co., electrical contractor. Fifty-five different types of lighting fixtures were used. Communication between patients and nurses is instantaneous. The patient pushes a bedside button. This sounds an audible signal at the nurses' station, illuminates a light over the door to the patient's room, and indicates a pilot lamp adjacent to the patient's listing on the nurses' master-control board. The nurse can speak directly to the patient by pressing a key on the master station.

A staff-paging system extends through the entire building, so that doctors and others may be reached immediately. There is also a doctors' register system that tells which physicians are in the hospital at any given time.

A pneumatic-tube system (with sixteen stations) distributes important messages, instructions, patients' records, pharmaceuticals, pathological specimens, etc., in a matter of seconds.

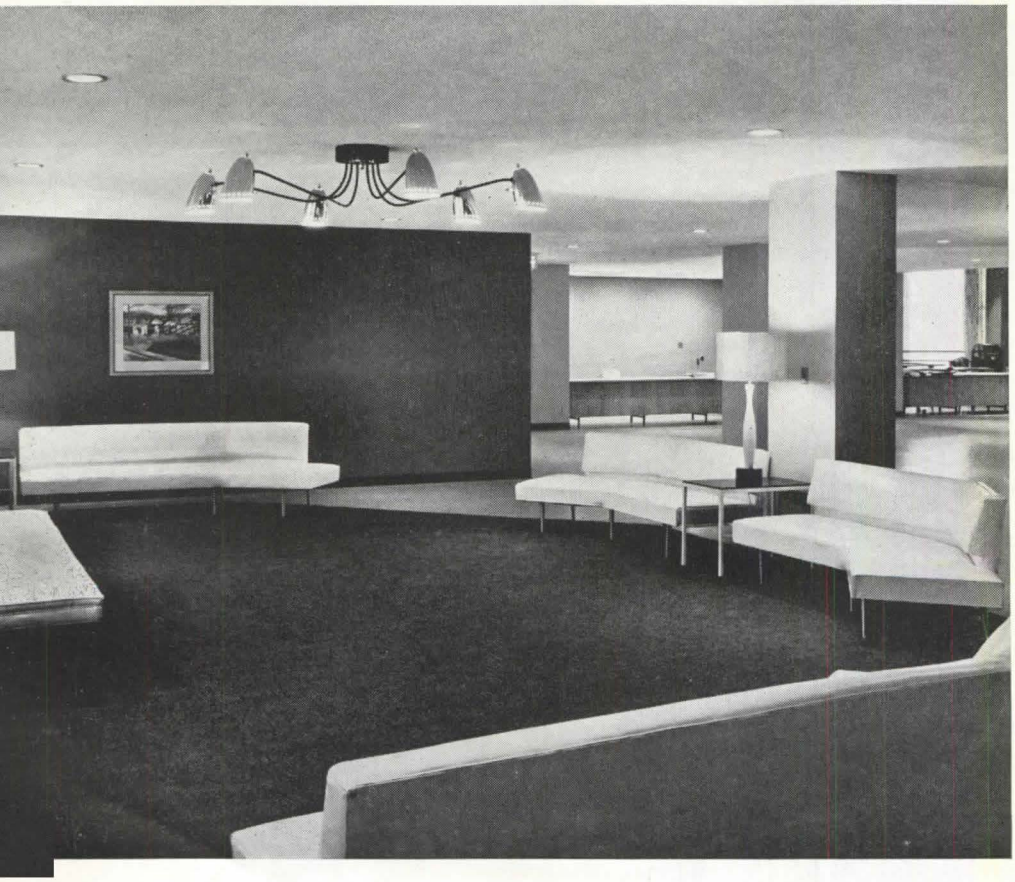
Similarly, provisions for safety are as complete as modern knowledge allows. In the first place, the building is of Class A fireproof construction. Five emergency fire towers are incorporated in the building. The hospital has its own fire-fighting system, with standpipe lines feeding from rooftop water reservoirs. In the fourth-floor operating suites and maternity-obstetrics areas on the fifth, which are fully air conditioned, special methods of handling and purifying the air minimize danger of explosion.

All areas where ether or other explosive anesthetics are administered have static-arresting floors to control the discharge of the static electricity from personnel without causing electric sparks.

Heating derives from oil-fired boilers which generate steam at 125# pressure. The steam is carried to three mechanical rooms in the basement of the hospital, where it is used to generate hot-water that serves a forced hot-water convector system. James M. Anderson was mechanical contractor.

Seen from the northeast, the six-story nursing-unit mass is at left, with the main hospital entrance (right) *at the intersection with the technical wing; low unit with butterfly-canopied roof is the clinic-outpatient unit. At present the hospital contains 320 beds, but the laundry, power plant, kitchen, surgery, laboratories, X-ray, etc., are all sized so that no major reconstruction will be required as the hospital expands to its eventual patient load of 500.*

The wall across from the information desk in the hospital's main lobby is of the same handsome salmon-colored brick as is used for exterior walls. Used extensively in interior areas, such as elevator lobbies, corridors, etc., it is laid up with joints aligned.



The lobby lounge, like all public areas, is comfortably inviting, even luxurious—more like a resort hotel than an institution. A continuing consideration was to avoid the austerity that so often is part of the hospital surround, to have Lankenau a pleasant and cheerful place for the community —as well as patients—to visit.

The public is expected to come to the 335-seat ground-floor auditorium (left) *to attend lectures and movies related to health care. The room is also used for staff meetings.*

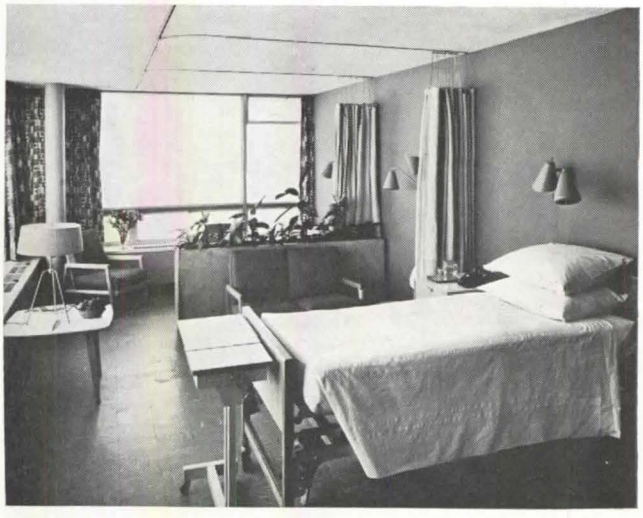
The two-story-high main dining room (below), *which seats 350, is sunny and colorful. See* SELECTED DETAIL *of the wood staircase.*

School children in the area make regular trips to Lankenau to visit the museum (left), *with its varied and changing exhibits and animated displays. The museum flanks the main hospital entrance.*

A public waiting room (right) *adjoins the public elevator lobby on each nursing-unit floor. The all-glass corner wall overlooks the beautiful countryside. Here, as throughout the hospital, ceilings are acoustic plaster.*

A nurses' station (above) *is centrally located in each half of the typical nursing-unit floor. Floors are rubber tile.*

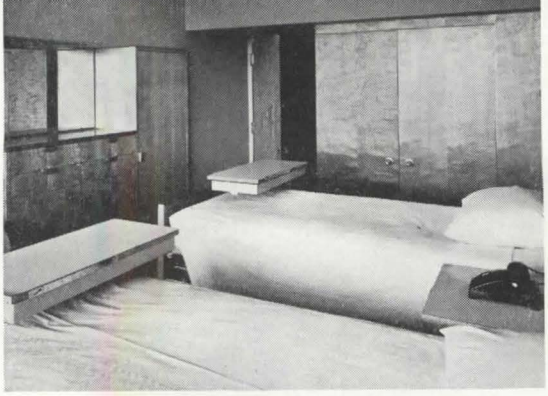
A three-bed room may be converted into a deluxe private room (right).



Materials & Methods

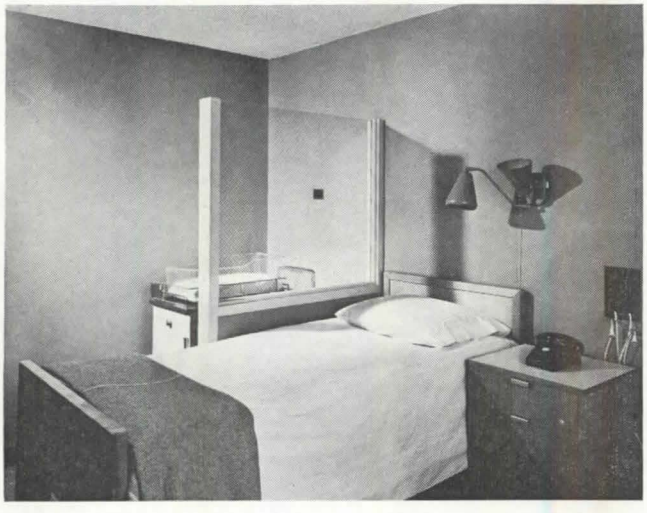
construction

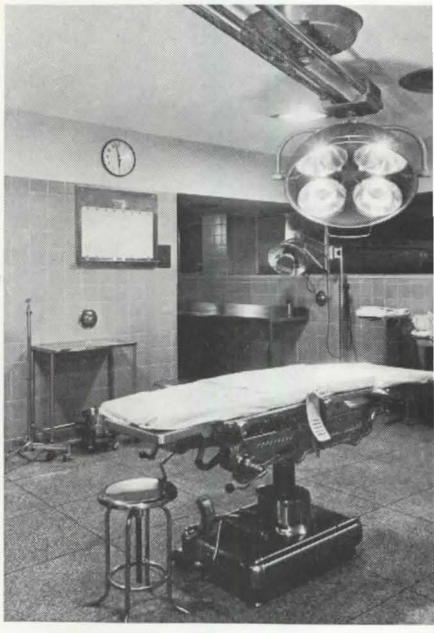
Foundation, frame, floors, walls, roof: reinforced-concrete foundation: reinforcing steel—Bethlehem Steel Company, cement—Lone Star Cement Corporation; reinforced-concrete frame (auditorium, museum, shops, laundry, and boiler room); steel frame (main wings); steel—Bethlehem Steel Company; exterior walls: brick—Standard Clay Products Company; interior walls: glazed structural block—West Virginia Brick Company; floors: reinforced concrete on steel pan form; roof: reinforced-concrete slab. **Wall surfacing:** exterior: brick—Standard Clay Products Company; interior: plaster, glazed structural block—West Virginia Brick Company; rest rooms, toilets: ceramic tile—The Mosaic Tile Company. **Floor surfacing:** asphalt tile—Hachmeister, Inc.; rubber tile—Flooring Division, The B. F. Goodrich Company; ceramic tile—The Mosaic Tile Company; terrazzo (operating rooms, corridors)—Roman Mosaic & Tile Company, Inc. **Ceiling surfacing:** acoustical plaster—Kelley Island Lime & Transport Company. **Roof surfacing;** built-up roofing—Barrett Division, Allied Chemical & Dye Corporation; quarry tile—The Mosaic Tile Company. **Waterproofing:** membrane waterproofing—Warren-Ehret Company; water repellent for below-grade concrete—Western Waterproofing Company. **Insulation:** accoustical: perlite—Perlite Corporation, acoustical plaster—Kelley Island Lime & Transport Company; thermal: cane fiberboard—The Celotex Corporation; X-ray protection—Ray Proof Corporation. **Roof drainage:** drains—Josam Manufacturing Company. **Partitions:** toilet partitions—Sanymetal Products Company, Inc. **Windows:** stainless-steel sub-frames (nursing wing, south side)—John G. Leise, Inc.; aluminum fixed and projected sash—J. S. Thorn Company; rolled and plate glass—Pittsburgh Plate Glass Company; skylights—Wasco Flashing Company. **Doors:** folding doors—New Castle Products; flush panel doors with birch face veneer—United States Plywood Corporation; aluminum overhead doors—Overhead Door Corporation; elevator doors—Otis Elevator Company; plate-glass entrance door with aluminum frame—John G. Leise, Inc. **Hardware:** lock sets—Schlage Lock Company; door closers—LCN Closers, Inc., Russell & Erwin Division, The American Hardware Corporation, and Oscar C. Rixson Company; hinges—McKinney Manufacturing Company; door stops and holders—Glynn-Johnson Corporation; push and kick plates—Electro Plastics Corporation; panic exit—Russell & Erwin Division, The American



The typical 2-bed room (right *and* above) *has a wall-to-wall window on the southern, view side; flush storage units conserve space and simplify cleaning.*

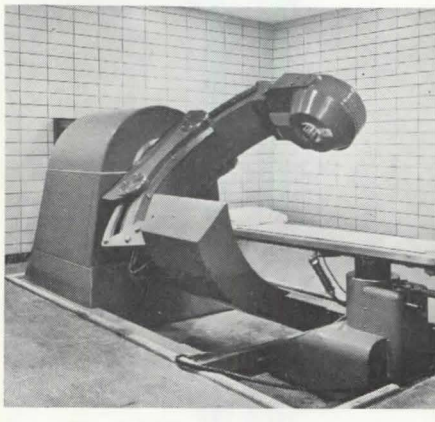
Though most babies are in nurseries, some maternity rooms provide "rooming in" service in corner alcoves (below).





The typical operating room (above right) *has tile walls and static-arresting flooring.*

A "cobalt bomb" instrument for cancer treatment (right) *produces radiation equivalent to that of $50,000,000 worth of radium.*



Hardware Corporation; special door pulls—John G. Leise, Inc. **Paint and stain:** exterior and interior—Pratt & Lambert, Inc.

equipment

Kitchen: food and dish conveyor unit—Lamson Corporation; dishwashers—G. S. Blakeslee & Company; coffee urns—S. Blickman, Inc. **Laundry:** American Laundry Machinery Company. **Intercommunication, public address:** Executone, Inc. **Public seating:** American Seating Company. **X-Ray:** Picker X-Ray Corporation, Westinghouse Electric Corporation, and Franklin Xray Company. **Therapy:** cobalt 60-beam unit—Atomic Energy of Canada, Ltd. **Elevators:** hoisting equipment and cabs—Otis Elevator Company. **Lighting Fixtures:** Gotham Lighting Corporation; Hub Electric Company; Kurt Versen Company; Prescolite Manufacturing Corporation; Silvray Lighting Company; Smithcraft Lighting Division, A. L. Smith Iron Company; Swivelier Company, Incorporated; Revere Electric Manufacturing Company; Wilmot Castle Company. **Electrical distribution:** service-entrance switch, panelboards, and multibreaker—Westinghouse Electric Corporation. **Plumbing and sanitation:** tubs, lavatories, and water closets—American Radiator & Standard Sanitary Corporation; toilet seats—C. F. Church Manufacturing Company; flush valves—Sloan Valve Company; accessories—Hall-Mack Company; wrought pipe—Bethlehem Steel Company; **shower cabinets**—Fiat Metal Manufacturing Company; casework—Jamestown Metal Products, Inc.; pneumatic tubes—Standard Conveyor Company; incinerator—Incinerator Engineering Company; sterilizers—Wilmot Castle Company. **Heating:** hot-water convector type, forced circulation; boilers—E. Keeler Company; oil burners—National Airoil Burner Company; convectors—The Trane Company; piping—Bethlehem Steel Company; unit heaters—Warren Webster & Company and John J. Nesbitt, Inc.; pneumatic controls—Johnson Service Company; ventilators—The Swartwout Company; heating and ventilating units—John J. Nesbitt, Inc.; circulating pumps—Bell & Gossett Company. **Air conditioning:** sprayed coil type unit—American Blower Corporation; reciprocating compressor, evaporative condenser—Westinghouse Electric Corporation; grills—Tuttle & Bailey, Inc.; diffusers—Anemostat Corporation of America; filters—Trion, Inc.; ventilators—The Swartwout Company.

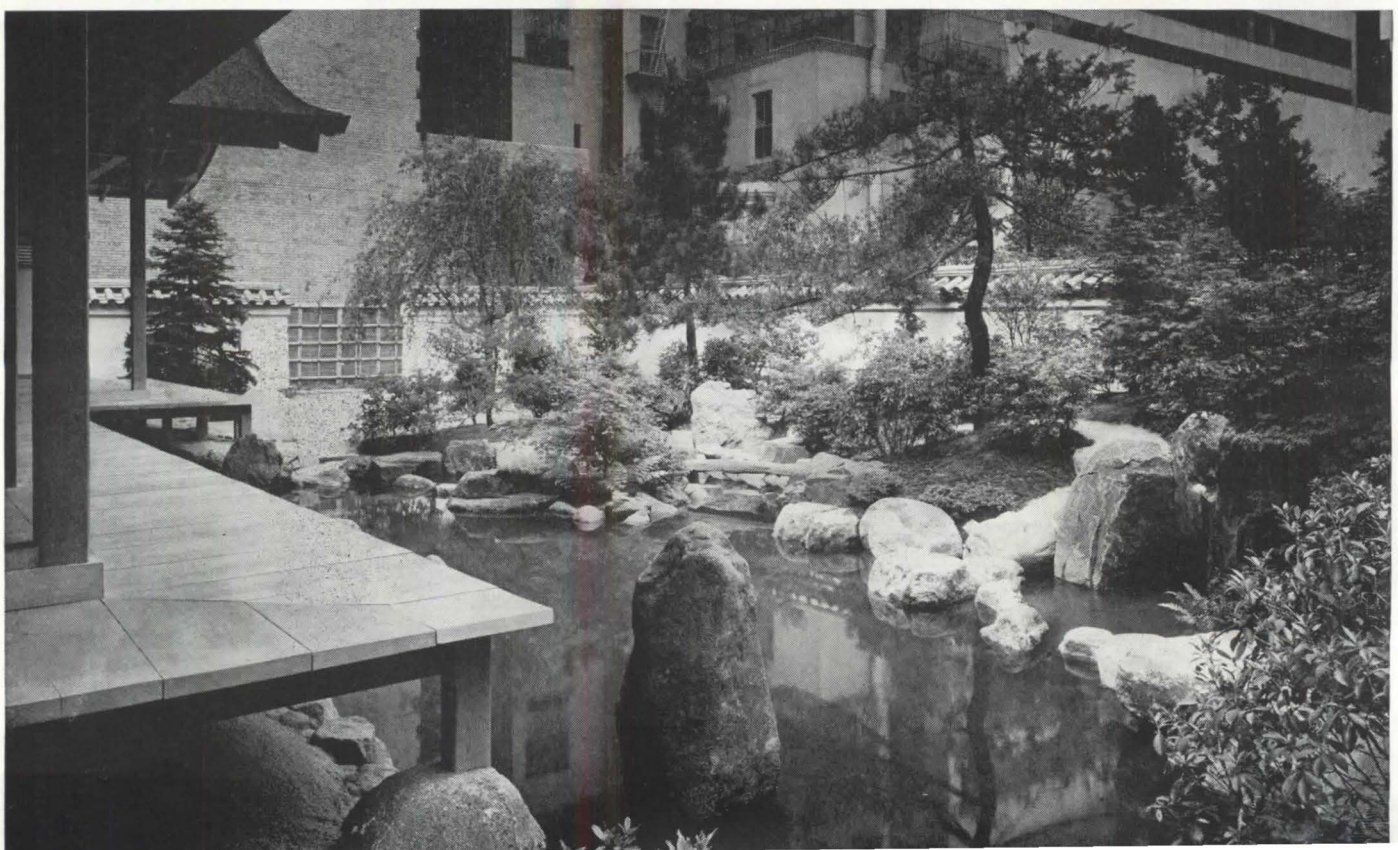
a traditional Japanese house **the esthetic discipline**

"The tea-masters held that real appreciation of art is only possible to those who make it a living influence," writes Okakura Kakuzo in The Book of Tea.

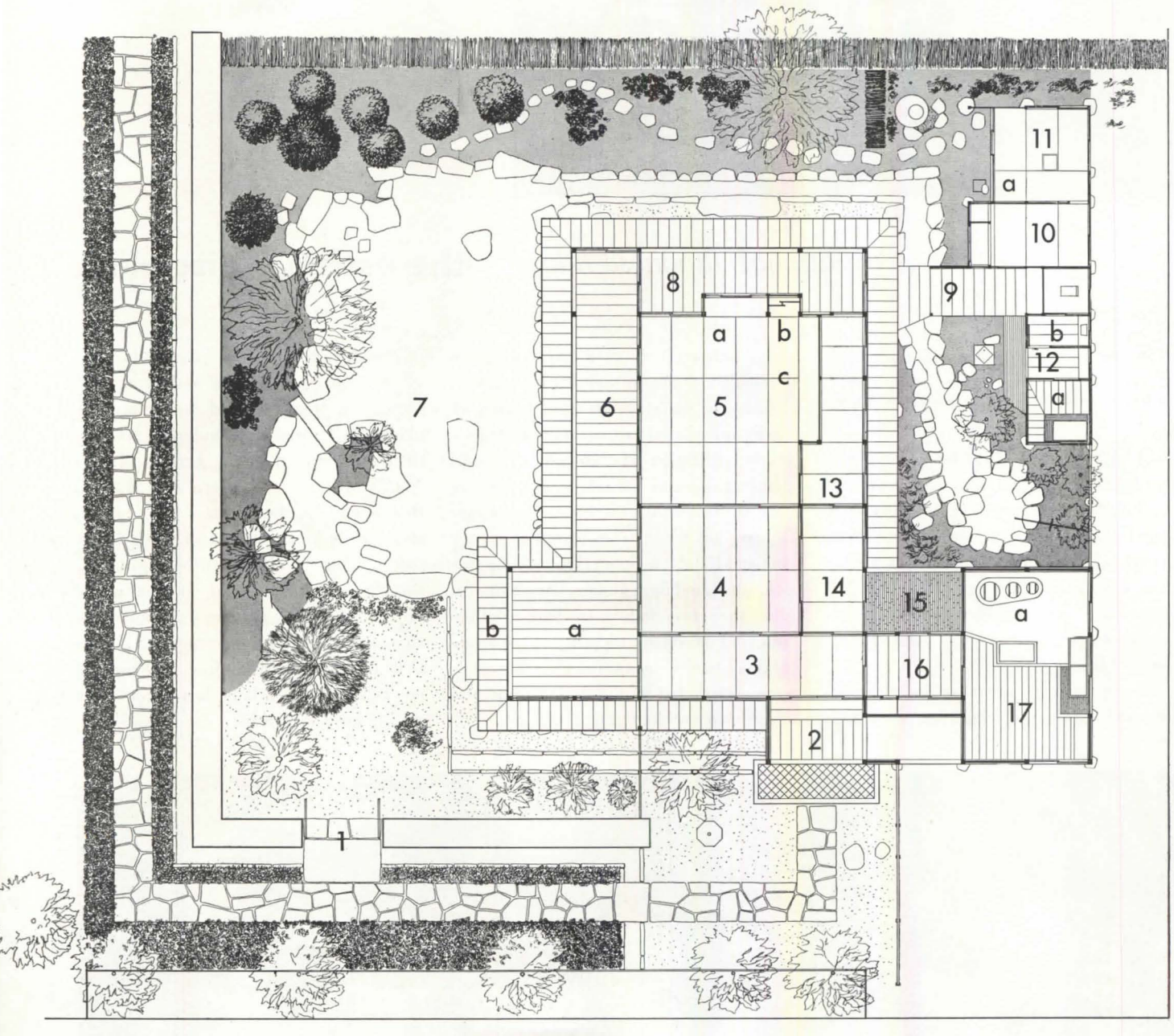
Not only did the Japanese tea-masters prescribe the forms for the tea-ceremony and social deportment. They also regulated manner of dress, design and usage of household utensils, the study of decorative objects and flowers and, in the 16th Century, widely influenced Japanese architecture and its closely related landscape planning.

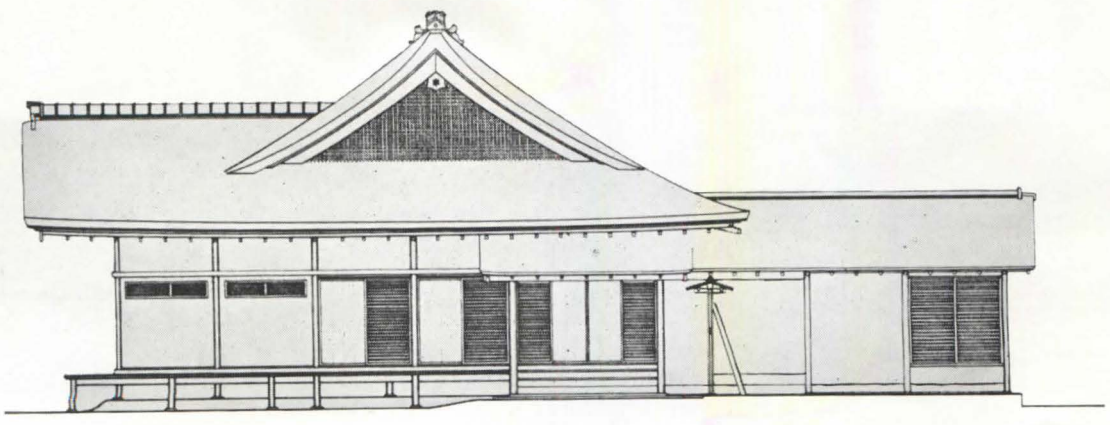
Since then the Japanese architect has worked within this tradition, perfecting and refining rather than striving for individuality or the uncommon. He achieves richness in his structures not with arbitrarily introduced ornaments but through subtle utilization of exposed structural elements, natural materials, and meticulous craftsmanship. Such contemporary features of Western architecture as the post-and-lintel skeleton-frame construction, the modular system, flexibility of plan, the close indoor/outdoor relationship, and ornamental quality of the structural system (*see* ARCHITECT'S DETAILS) were anticipated by the design principles of such an architectural discipline.

The house on these pages, modeled after prototypes of the 16th and 17th Centuries, was designed by Junzo Yoshimura. It was first built in Nagoya, then reassembled in the garden of New York's Museum of Modern Art. Though this particular house, with its garden, might have been the seat of a scholar or priest, it could also have belonged to a farmer or craftsman or anyone whose appreciation of beauty was an important element of his daily existence. It is here that an esthetic discipline has evolved an architecture—which has become the setting for a way of life.

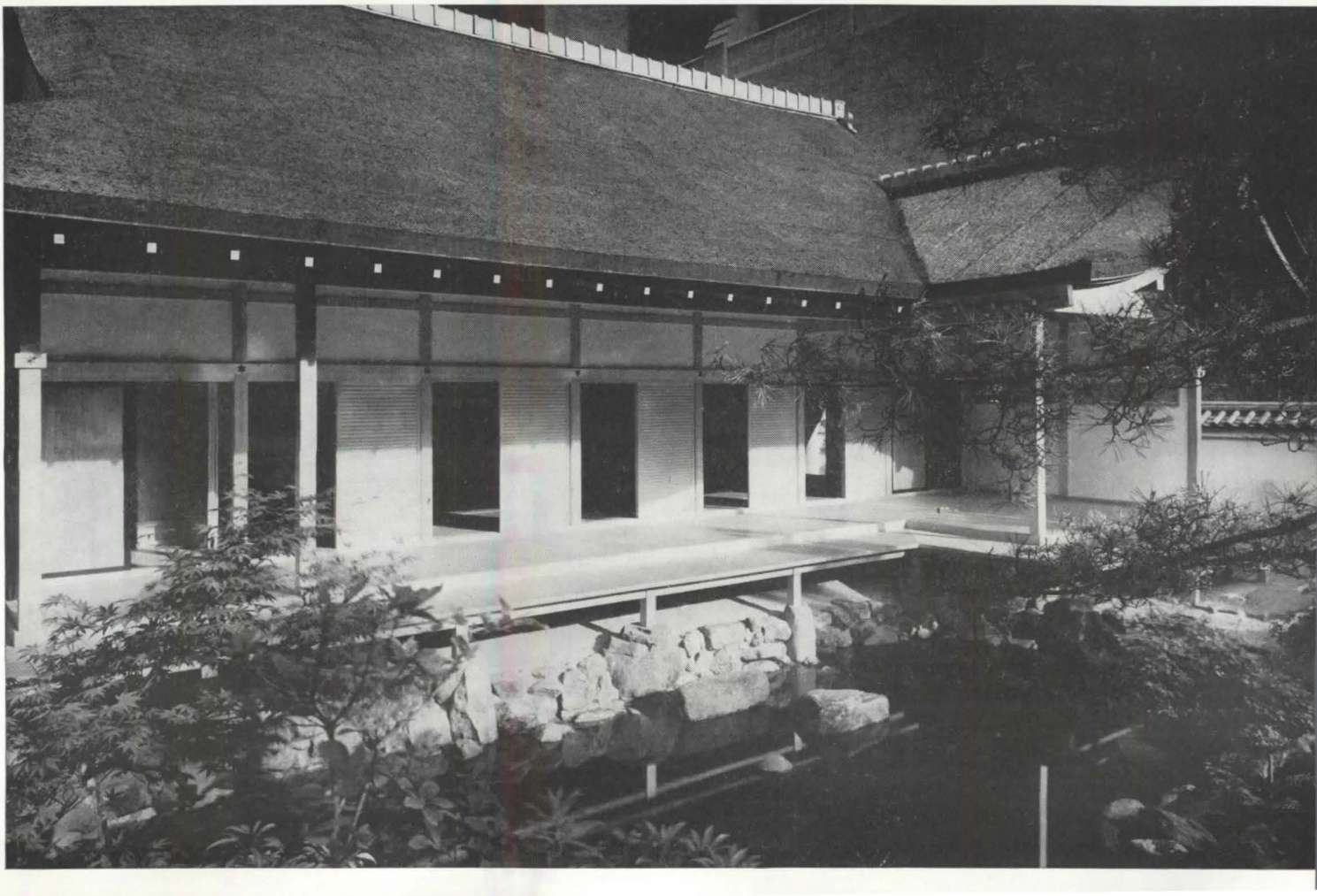


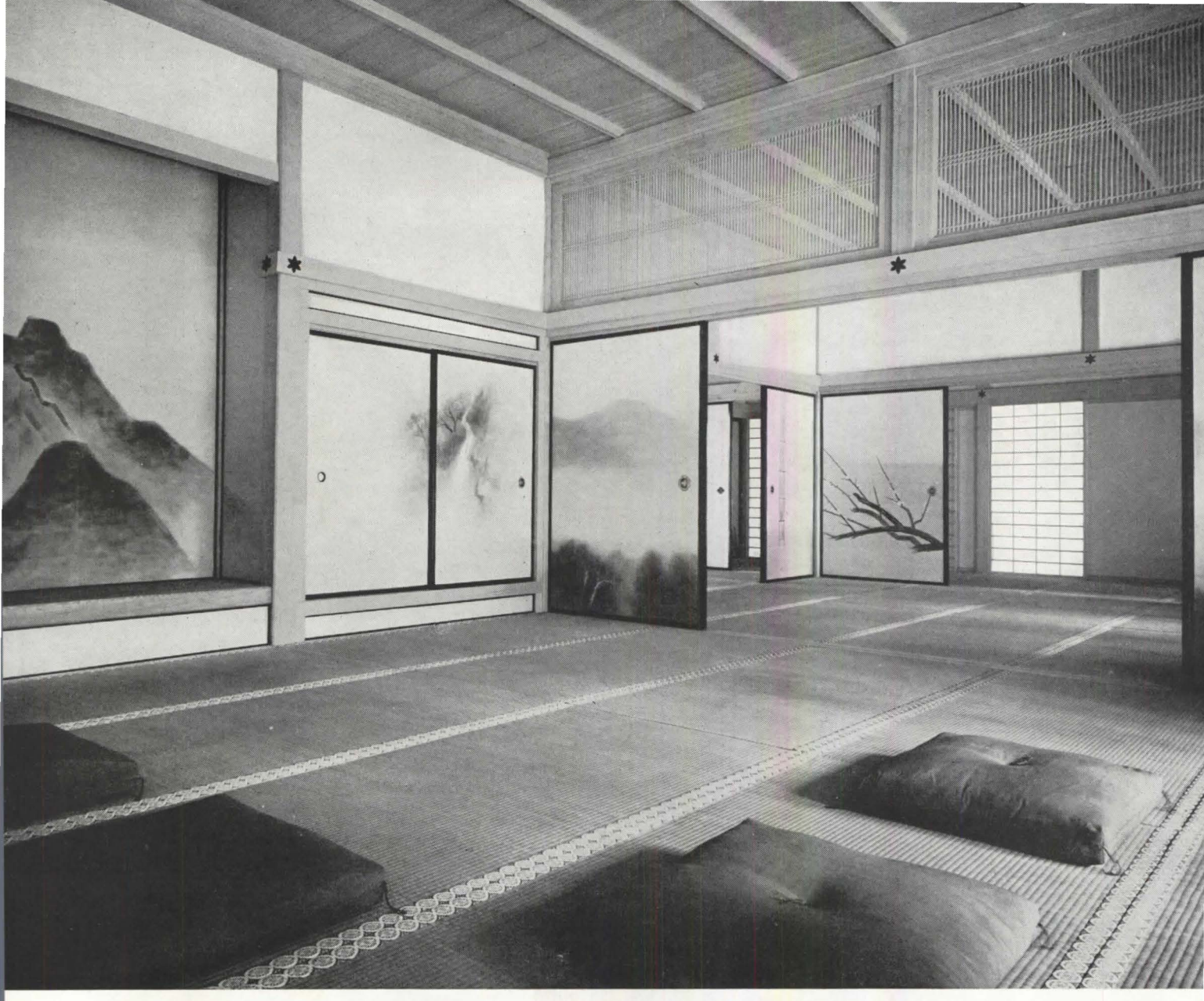
House and garden (below) *were assembled by Japanese craftsmen, under the direction of the architect. The wood used for the main building is hinoki, a Japanese cypress. Layers of hinoki bark serve as shingles for the roof. The garden, executed in the* sansui *style, represents a Buddhist image of paradise with heaven symbolized by a mountain in water.*

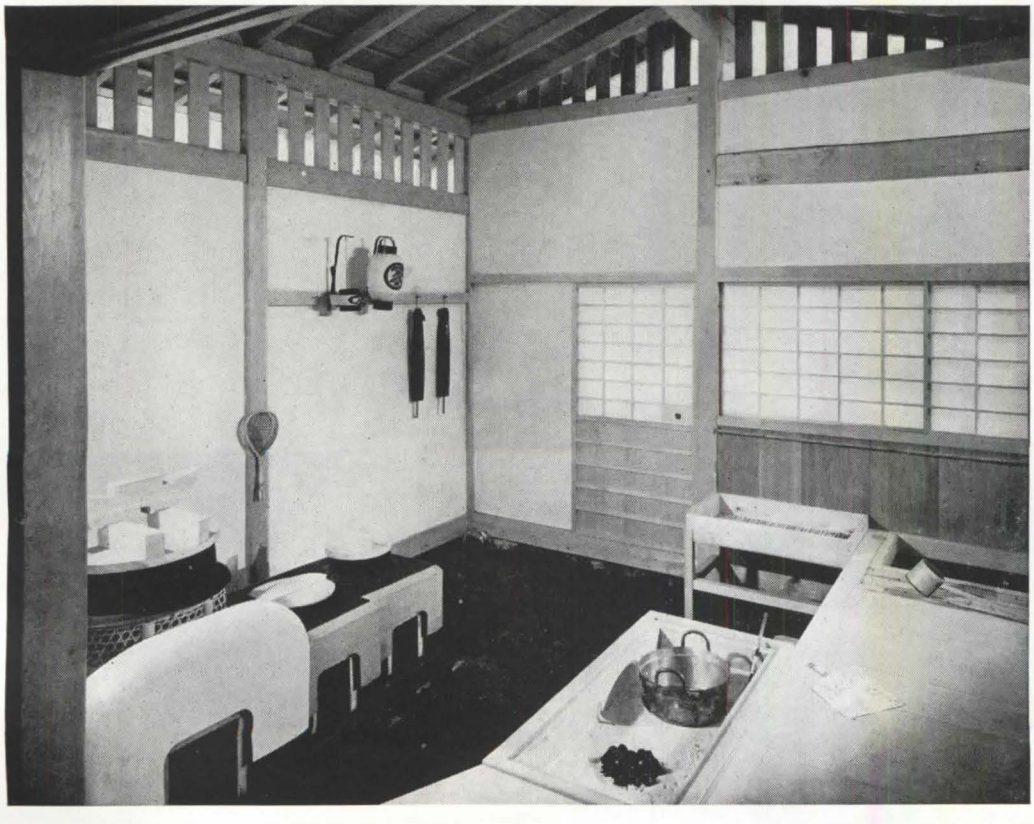




1. GARDEN ENTRANCE, originally used by honored guests *(photo, right)*
2. GENKAN, family entrance
3. GALLERY
4. SECOND ROOM
5. SHOIN ROOM, main room of the house. (a)-*shoin:* desk; (b)-*chigai-dana:* shelves; (c)-*tokonoma:* alcove for the display of works of art
6. VERANDA (a)-*chumon:* originally a vestibule for the garden entrance; (b)-*nure-en:* outer veranda
7. GARDEN designed by the architect and Tansai Sano. Consultant: Ethelbert Furlong. Gardens are seldom used as outdoor living areas but are primarily to be seen from the rooms and broad sheltered verandas *(below)*. The composition is based on stone formations in water, and cryptomeria, pine, moss, and sand.
8. SIDE VERANDA
9. BRIDGE to tea-house and bath
10. MIZUYA, tea-house pantry
11. CHASHITSU, tea-ceremony room. (a)-*tokonoma:* alcove for display of paintings or flowers.
12. BATH, main room. (a)-sunken wood tub; (b)-toilet
13. STORAGE ROOM
14. GALLERY
15. SERVICE VERANDA
16. PANTRY
17. KITCHEN (a)-stove





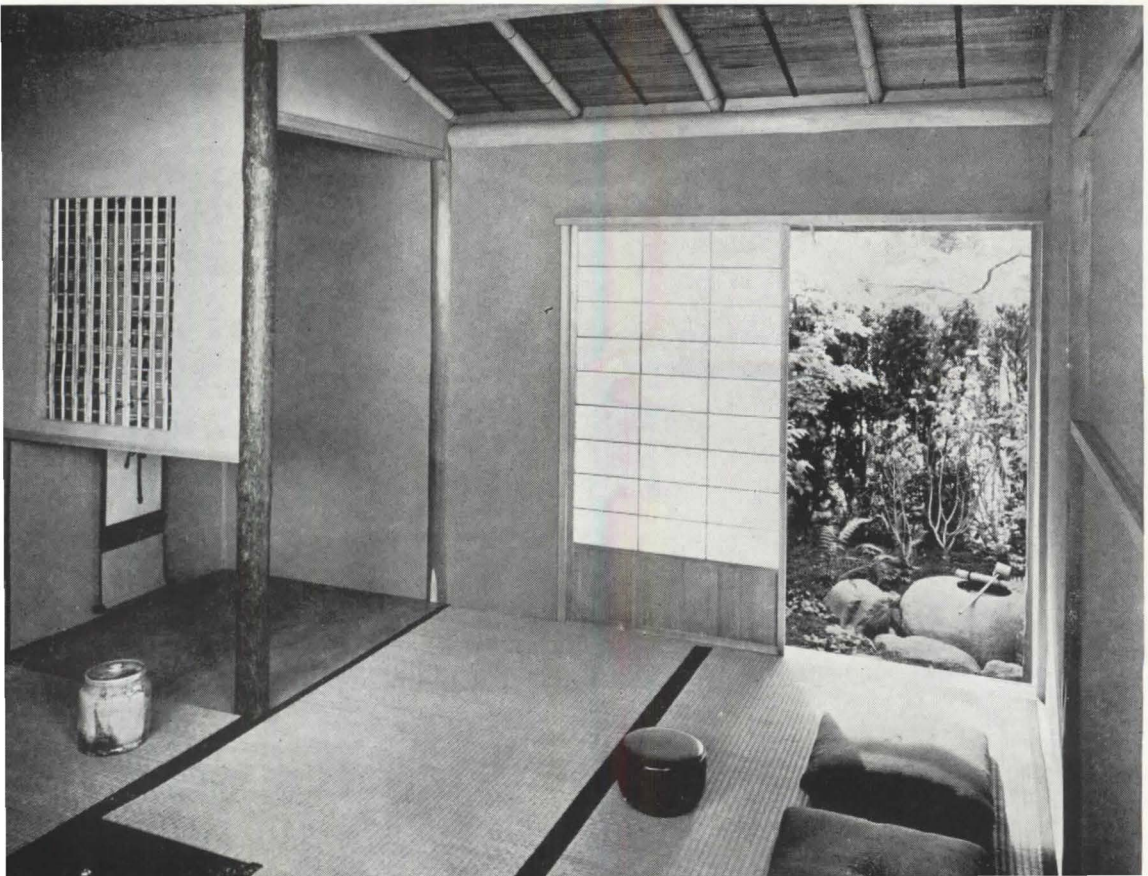


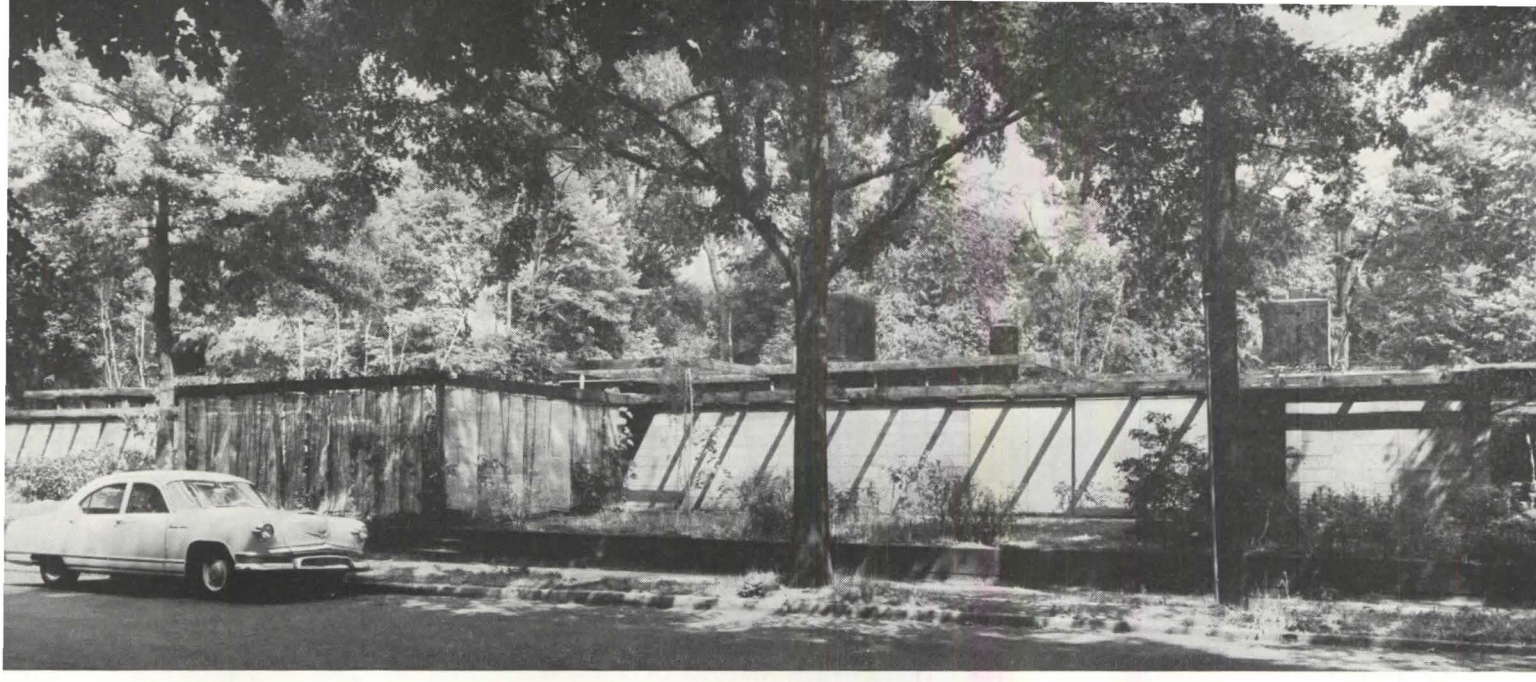
By removing the sliding wall screens, the main room of the house (left, *foreground*) *may on special occasions be combined with the adjoining Second Room. When not actually in use, portable screens, chests, bedding, and cushions are stored away. Mats of rice-straw, called* tatami, *cover the floors of the main rooms.*

The stove in the kitchen (acrosspage below) *is made of earth and waxed plaster.*

In the bath (right), *sliding lattice made of waxed paper permits a view of the garden.*

The tea-ceremony is a ritual designed to encourage the contemplation and intelligent appreciation of works of art, including the objects used in the tea service. A special room or separate house is set aside for the ceremony. Guests enter the tea-house (below) *from a formal entrance in the garden. The stone basin holds water for washing hands before the tea-ceremony.* Photos: Ezra Stoller





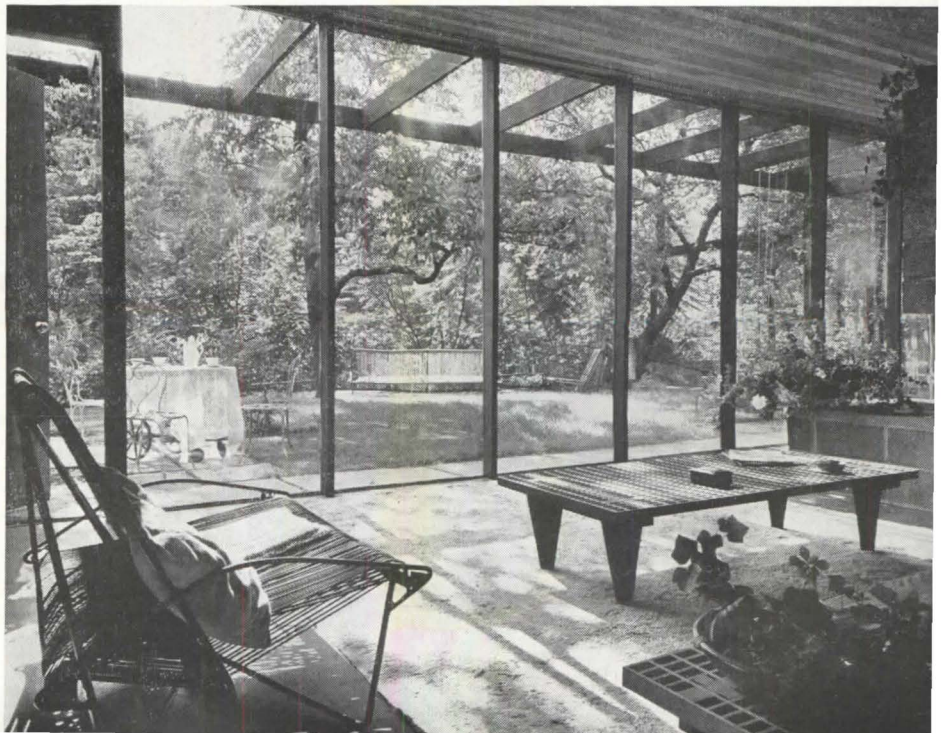
a contemporary American house **the spatial discipline**

Although this composite residence is small in scale and modest in size, it is as notable an instance as we have seen of subtle fusion of garden and dwelling spaces.

James C. Rose, the designer, is a landscape architect-site planner. When the time came to build this exceptional complex—a house for his mother; a studio for himself; and a "one-room apartment" unit for his sister—he added supervision and general contracting to his better known talents. Robert Barker was the builder.

Though the three elements compose and may be used as a unit, space is so disciplined that each has complete independence and privacy, and each indoor area has its outdoor spatial extension. Studying the photographs of the luxuriant environment for living that Rose created from this long, corner site in Ridgewood, New Jersey, it is difficult to believe that it offered "no natural advantages. . . . With the exception of two linden trees, two wild cherries, and a small grove of ailanthus and sumac, there was no existing growth." Land along the east boundary—a public-service access strip—is permanently protected.

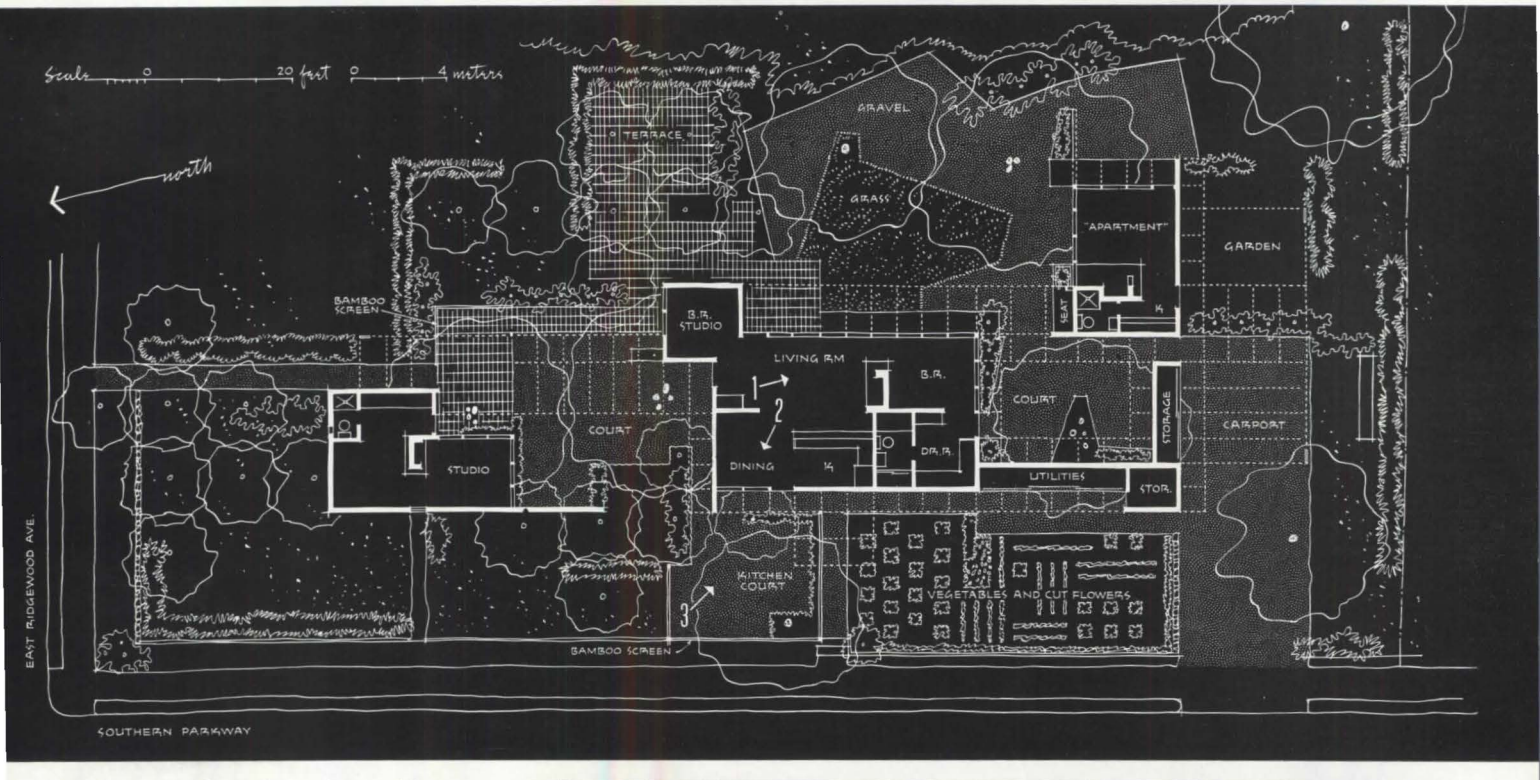
The goal, Rose says, was "to design an environment." Hence, he consciously avoided the house *plus* garden approach, in favor of integrated indoor-outdoor space.



2

From the street, the group appears (acrosspage) *to be a handsome wall of lightweight-aggregate block and wood, with trellis and clerestory projections.*

Photos (except as noted): Lionel Freedman

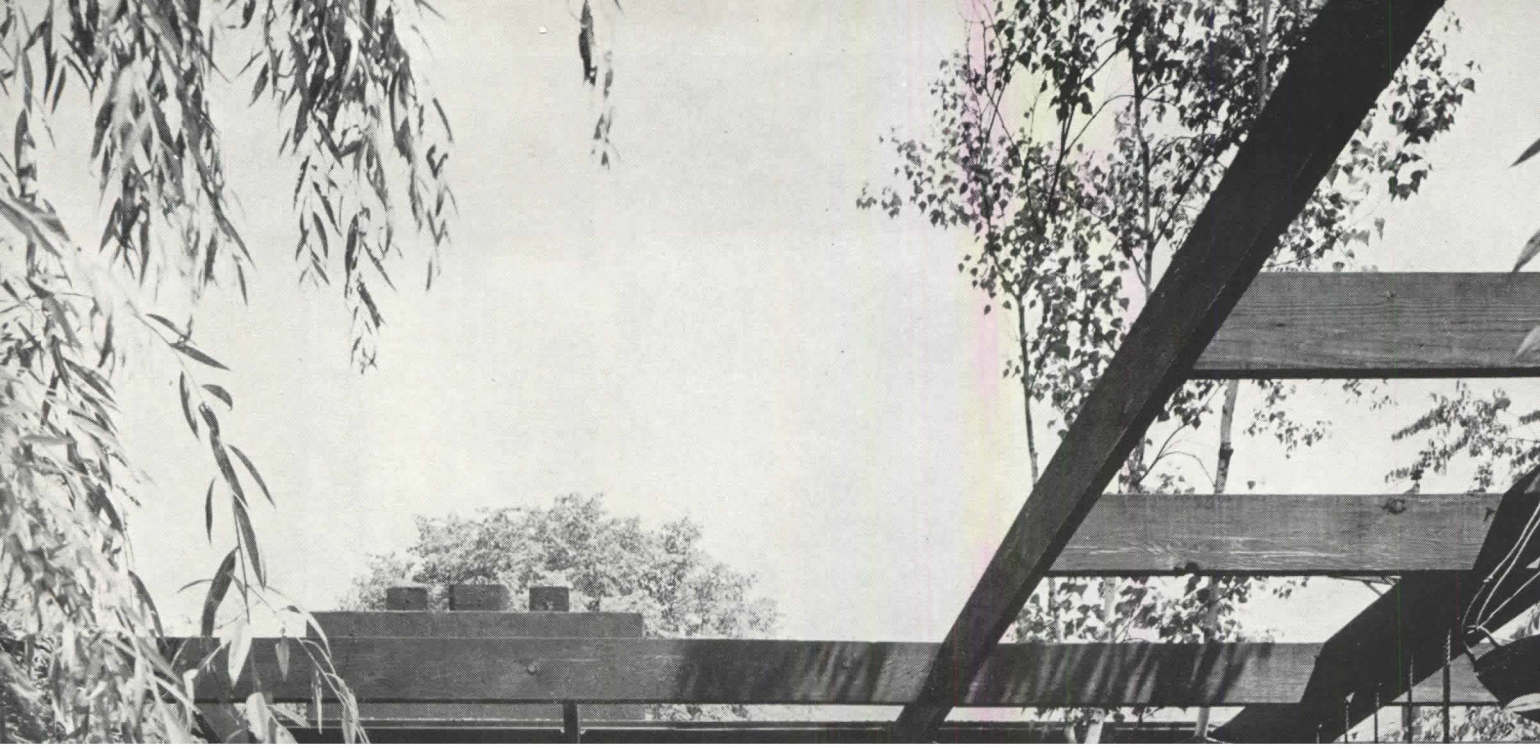


3

On the street side, a frame hung with woven-bamboo screens defines a garden that becomes an outdoor addition to the dining corner (top *and* right).

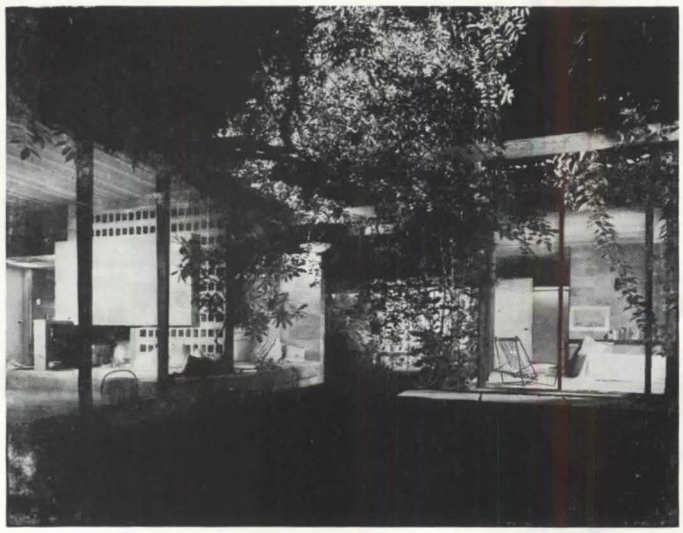
In the central unit—Mrs. Rose's dwelling—the living space and east lawn form one continuous indoor-outdoor space (acrosspage).

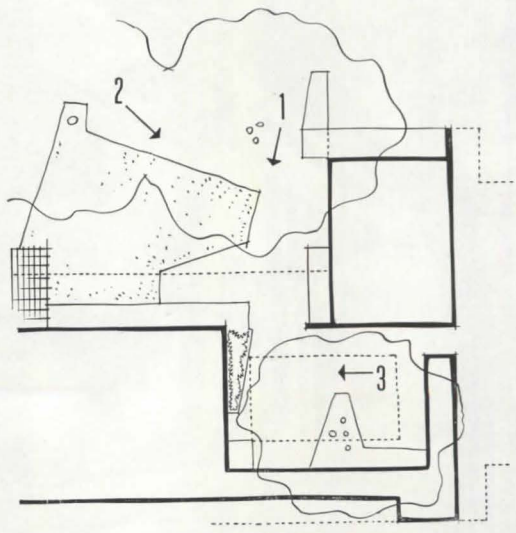
Photo: Lonnie Wasco



1

2



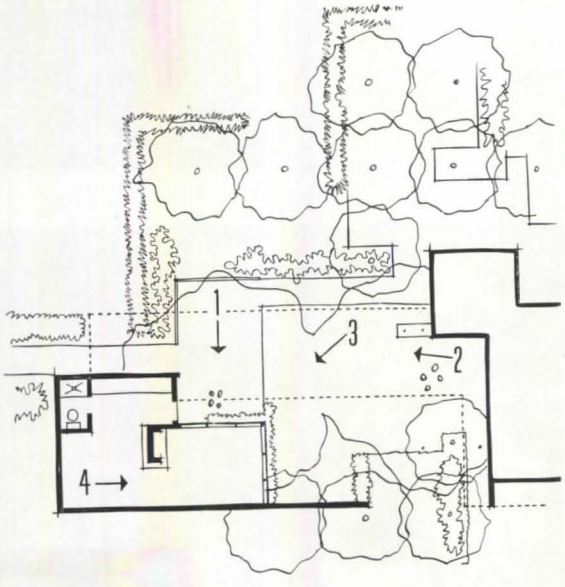


*A small garden court is tucked between the end of Mrs. Rose's house (*acrosspage, *background) and the back of her daughter's dwelling (right of photo). This secluded corner also appears in both pictures on this page—at left of photo above; and center in the background of the one at left. In the latter, the fireplace of Miss Rose's apartment is seen through the glass wall at left.*

Photo acrosspage: Lonnie Wasco

1

2



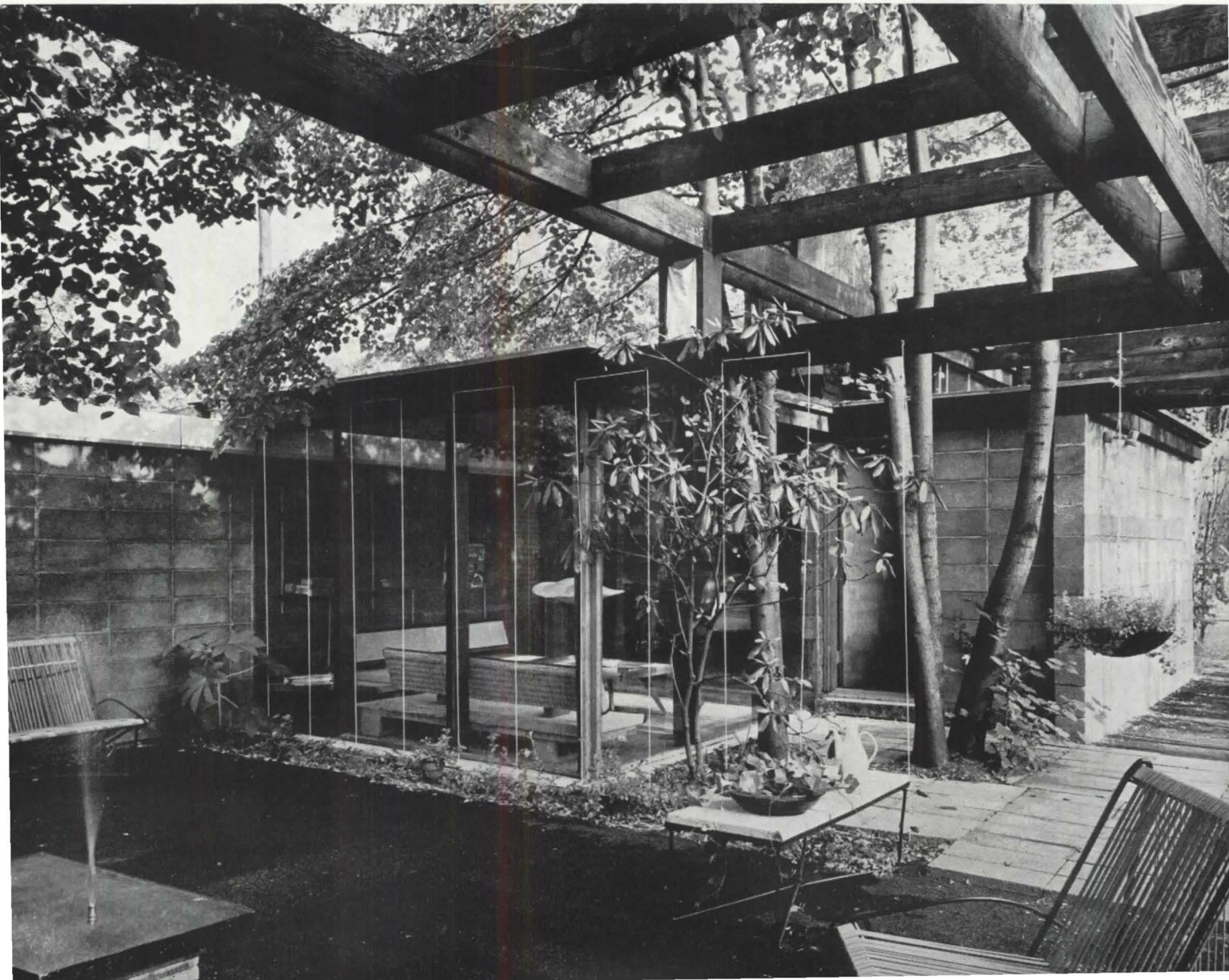
Rose's own studio is at the north end of the group. Plain hose nozzles are variously installed to provide a play of water, while spiraled bamboo screens, foliage, flowers, and paving enrich the space. Such things are all part of Rose's theory of flexibility. They may be entirely different next year.

With plants inside the Rose studio (right) *and furniture in the garden extension* (below), *space is disciplined to form a rich pattern for living.*

Photos: Lonnie Wasco

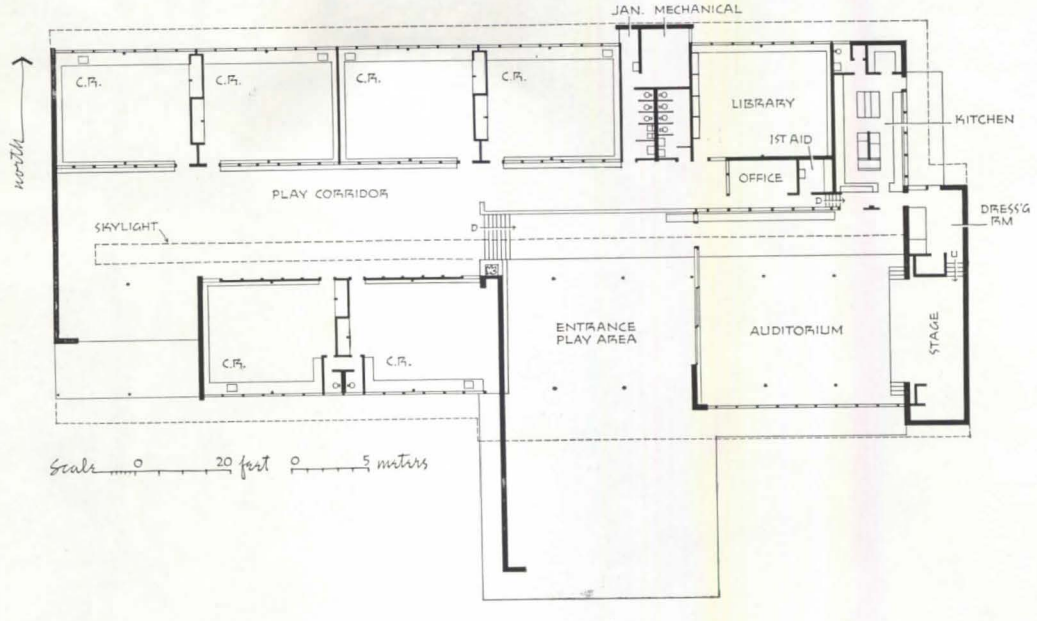
4

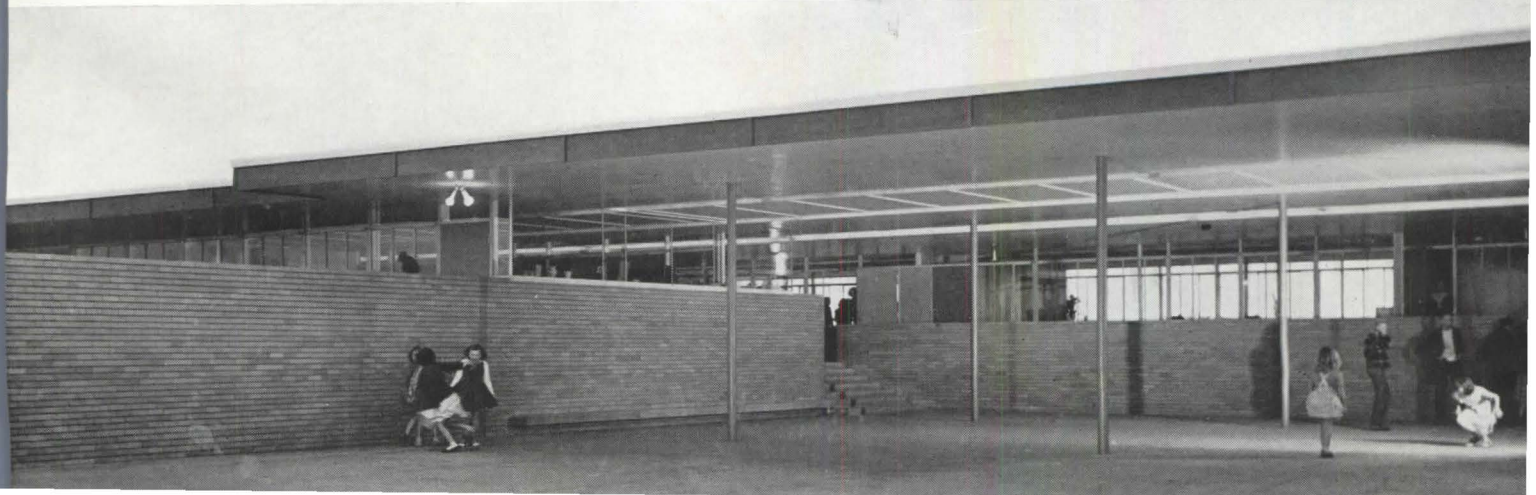
3



elementary school / community center

location	Industry, Texas
architects-engineers	Caudill, Rowlett, Scott & Associates
mechanical engineer	J. W. Hall, Jr.
general contractor	Walter Droemer

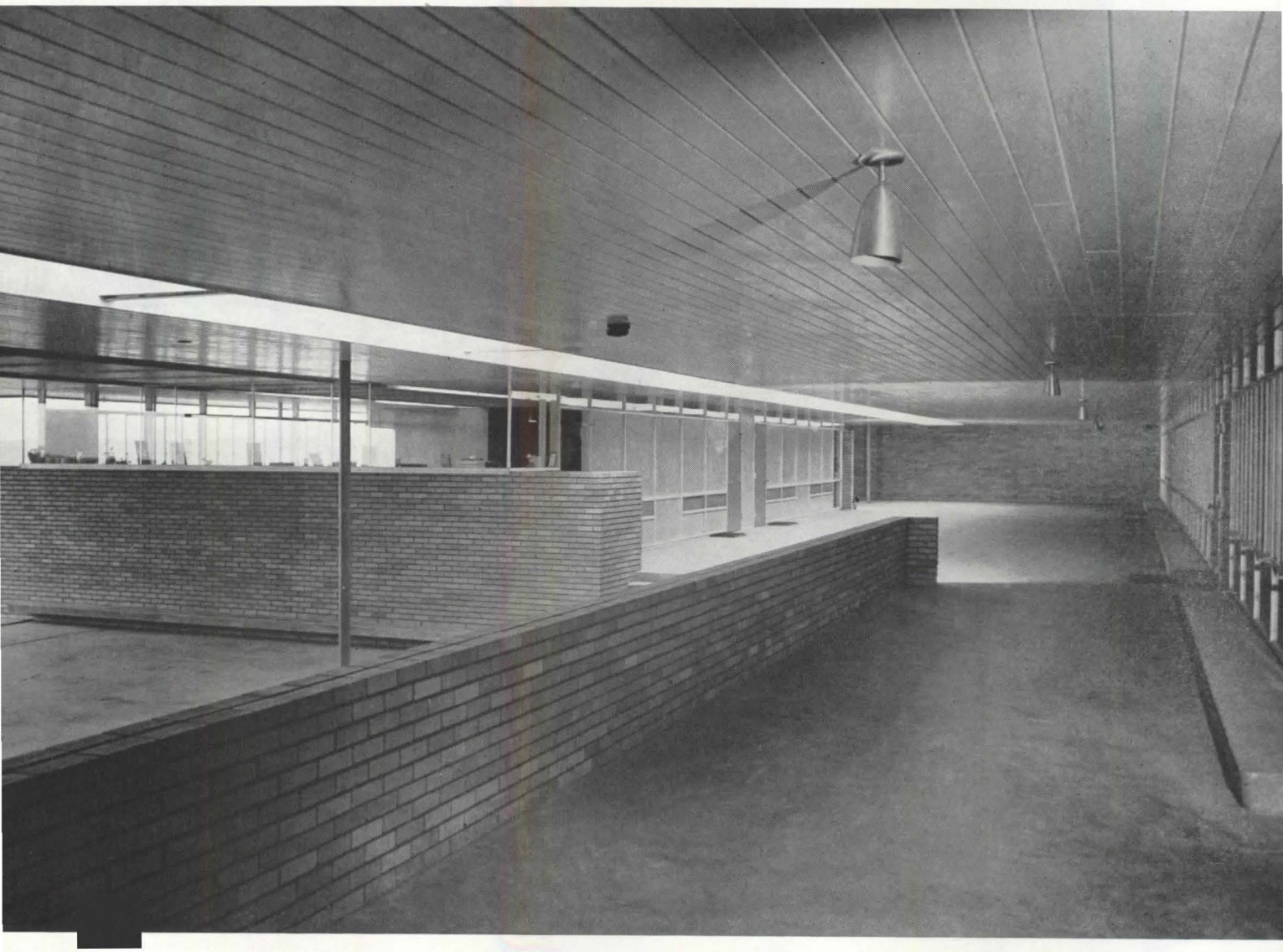




Although the program just called for a new elementary school, the architects in studying the requirements found that the existing building also served as the principal community meeting place. Therefore, they agreed, the new school must provide for adult cultural, recreational, and social activities, as well as improved school facilities.

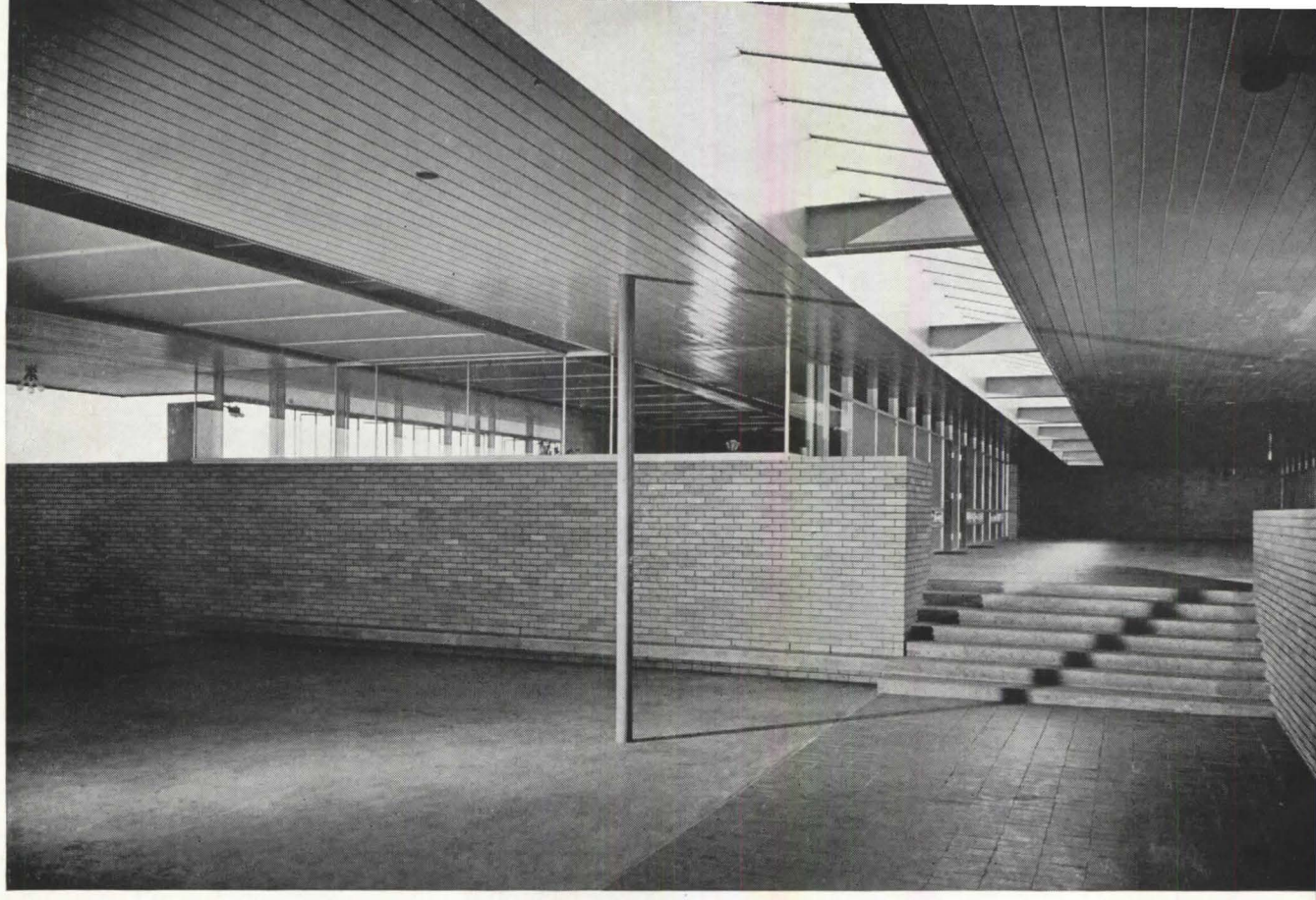
The classrooms are therefore arranged to double as meeting rooms for the townspeople. The auditorium—a dining and all-purpose room during school hours—will be used at other times for such events as community suppers, wedding showers, and firemen's meetings. By sliding aside glass doors at the rear of the auditorium the space can be enlarged to accommodate even larger crowds, as on the occasion of the annual "home coming party." The broad play-corridors (*below*) for use by the children during inclement weather, easily take the overflow of such gatherings.

It is not only this versatility in planning which distinguishes the school. With their thoughtful design the architects also have created a sympathetic environment for the joint community activities of this rural locality.



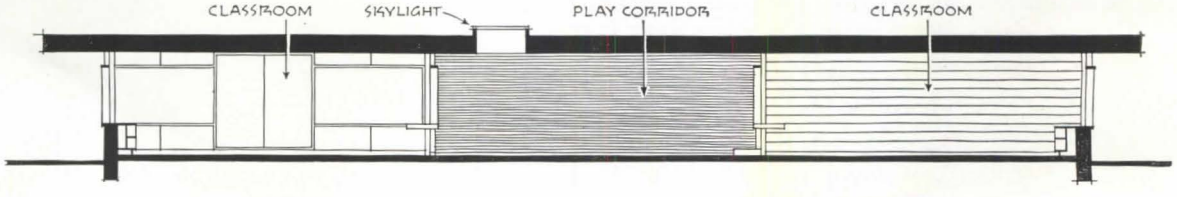
Most of the children and adults come from scattered farm houses to the new school (acrosspage top) *in cars or buses. Low-roofed classrooms are on higher ground than auditorium; thus, despite two ceiling heights, roof level can be uniform.*

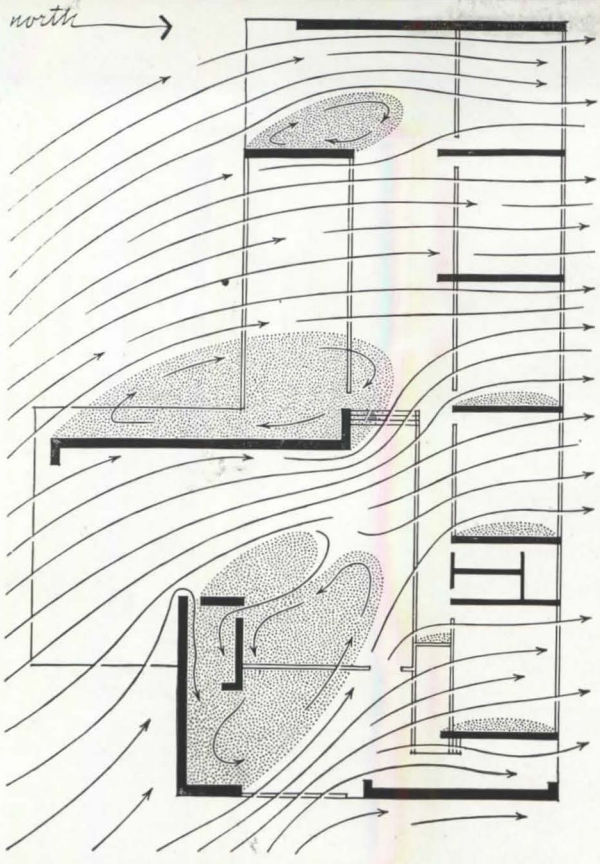
Entrance play area (left) *together with auditorium and play-corridor* (above) *can accommodate large crowds.* Photos: Ulric Meisel



A continuous sky-light (above) *extends through the entire length of the building to introduce light into the corridor. Tests made by the Texas Engineering Experiment Station indicated that adjoining classrooms would also benefit from this light source. Readings of 30 ft-c measured at 30" above the floor, at a sky brightness of 1000 ft-L, were predicted for these areas.*

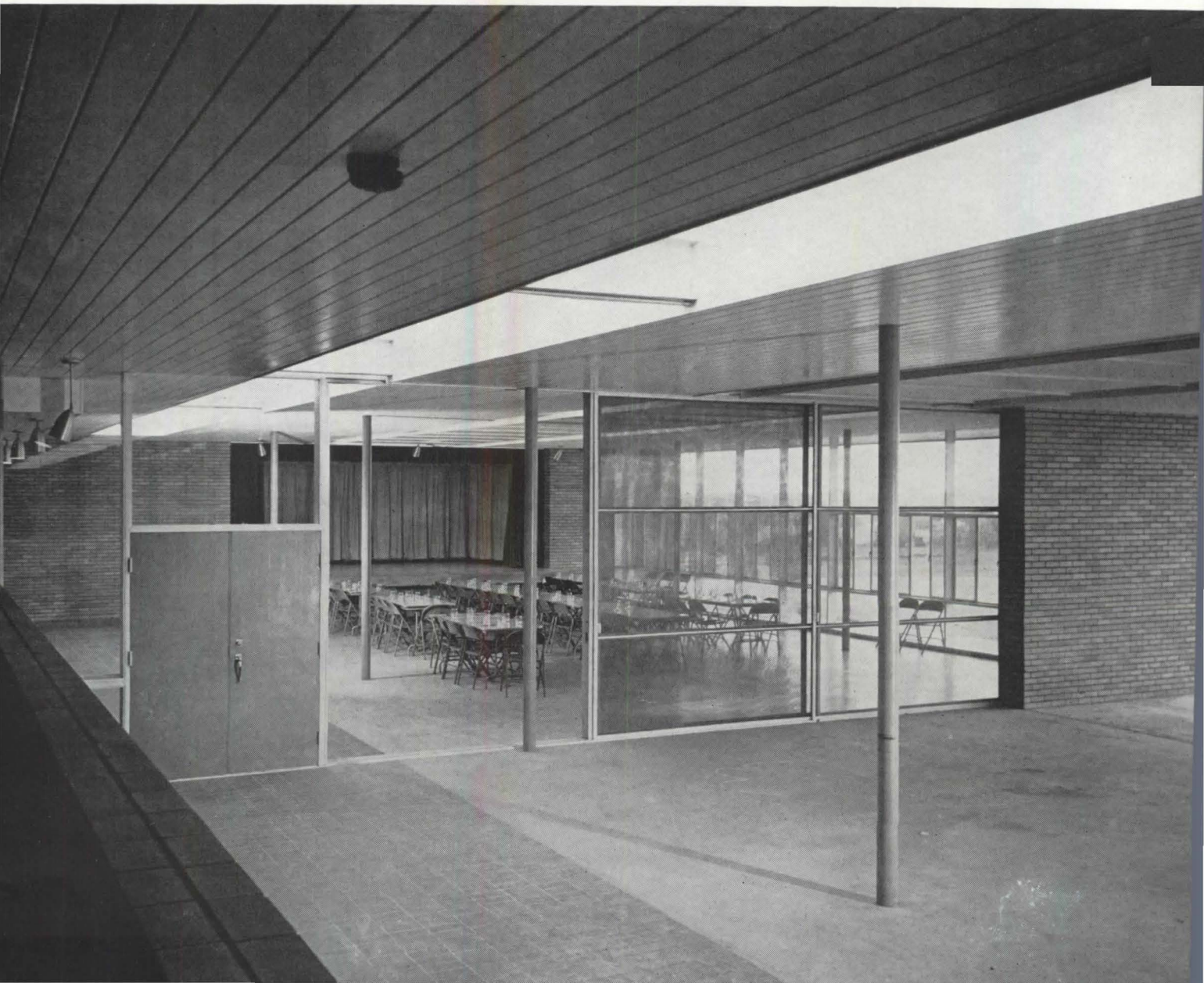
Bands of steel casement windows (left) *may be opened to aid through-ventilation. Overhang provides sun control.*

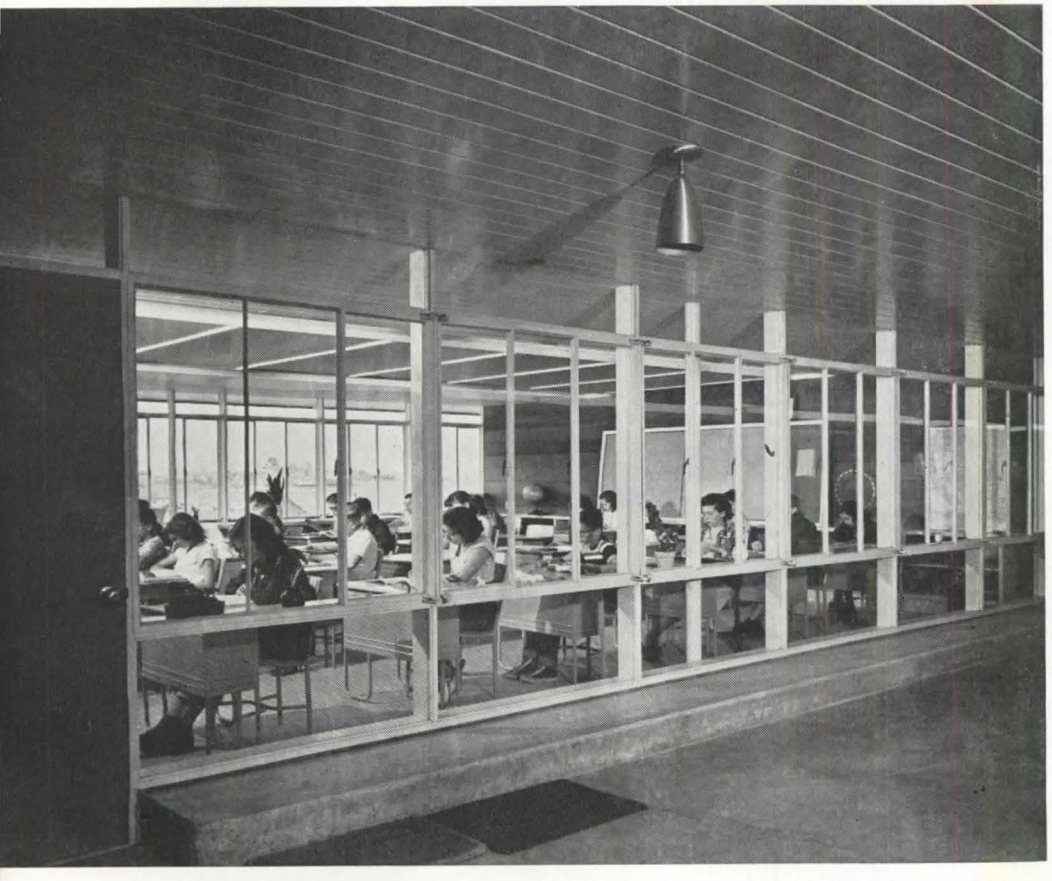




elementary school/community center

Ventilation test (left) *was made by the Texas Engineering Experiment Station. As a result of this test, fenestration in the auditorium* (below) *was redesigned. The window openings were placed on the south wall rather than, as shown on the test diagram, the east wall. The projecting brick wall scoops the southeast breeze into the building.*

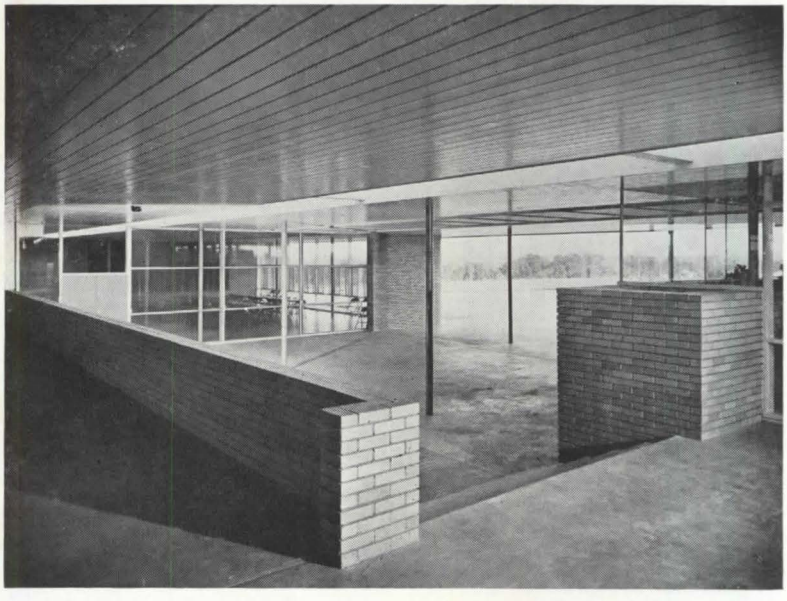




Broad corridor (top) *is for year-round school and community use. Window wall of classroom* (bottom) *opening onto play-corridor has wireglass in lower portion, operating casement windows above. Seat in front of window-wall protects glass.*

The structural system consists of steel beams and wood joists on steel-pipe columns (right). *None of the walls are load bearing. Floors are concrete slabs on fill.*

The brick used is a deep pink, columns and doors are copper red. Ceilings are V-jointed wood, painted white. Light-yellow plywood panels fill the space between the recessed light fixtures (below). *Book shelves and work counters are light green, with tan linen laminated plastic tops.*



government as client-2

by Siegmund Spiegel*

This month we conclude Spiegel's discussion of the particular problems of dealing with the Government as Client.

5. ***Proposals.*** Once the above factors have been given consideration, the task of making the proposal can commence. Using, as an example, an *Architect-Engineer's Proposal Form* as required by District Engineers' Offices, one will find that the proposal must be broken down into minute components, falling roughly into the following categories:

Preliminaries. (While this includes items such as site plans, building plans, outline specifications, preliminary design analyses, preliminary cost estimates, etc., it is important to analyze the extent of detail required beforehand. Preliminary data required generally is equal to semifinal documents.)

Detailed Plans. (This includes such items as final site plan, utility and paving plans, plans for separate building, specifications, design analyses, quantity take-off, cost estimates, shop drawings, etc.)

Indirect Cost of Labor. (Sick and Vacation Leave; Standby time.)

Administrative Overhead (This itemizes such cost items as rent, light, secretarial services, telephone, supplies and reproductions, travel, project manager, etc.

These four items are then totaled and profit at 10 percent is added to show the grand total of the proposal.

It is to be noted that costs of Preliminaries and Final Plans must show, for each individual building, the number of drawings required (this is an important item which may influence the final fee); the number of man-days required for drafting (@ $——/ day); the number of man-days required for design and supervision (@ $——/ day); and the totals for each individual item.

While it will be difficult to assess each item as to its true value of cost, it is important that the estimate be as realistic as possible. Just as the architect prepares his detailed estimate, so will the government negotiator prepare a similar breakdown, using the "curves" primarily as a guide for checking his own and the architect's detailed figures. The main reason for relative accuracy lies in the fact that frequent changes of program are made. If, for example, a building is omitted (and this is likely to happen at any stage of the work), the cost figure appearing in the proposal for the respective item of work is used as a basis for reducing the amount of the contract. Unrealistic preparation of the proposal may easily result in a serious situation, due to improper weighing of component parts.

Since proposals to the architect from his consultants will, in most cases, be on a lump-sum basis, he will have to proportion their fees into the over-all analysis. In other words, he will have to break down each fee he has to pay, to fit into the detailed breakdown enumerated above; and he must be prepared to renegotiate with his consultants, should the scope of work be revised.

Once his figures for the proposal have been worked out, a good way of checking the total is by estimating roughly the construction cost of the project and applying a percentage figure for fee, which the particular type of project generally would call for. If this check shows the figures to be in line, it can be assumed that the proposal is sound; should the figures be far apart, a careful re-examination is suggested.

miscellaneous cautions

Should the government agency award a contract of a "Classified" nature, considerable expense may have to be incurred in connection with special storage equipment, in order to comply with the security regulations applicable.

Most government contracts require a great amount of administrative work, correspondence, and multiple copies. It is advisable to provide an adequate budget for this item.

Depending upon the contract, the volume of shop drawings to be checked may prove to be much larger than is normally the case in work for a private client. This is due to the contractor's obligation to furnish such documents as certificates of compliance, for most of the materials used.

Since more than one individual of the agency may accept submissions, it is obvious that receipts should be obtained for all items of work submitted.

Many government contracts will contain a "renegotiation" clause. If such a clause is included, particular care must be exercised in keeping accurate records. Especially in large contracts, renegotiations may prove to be extremely troublesome.

federal government agencies selection of architects

The AIA has done a great service to the profession by preparing the booklet, *Federal Agencies Contracting for Building Designs.* This booklet not only lists the respective offices to be contacted but also gives an excellent synopsis of principles governing selection of architects, and the types of contracts awarded by each.

In addition, there is a valuable statement concerning selection of architects-engineers in the booklet, *USAF Policies . . . Governing Selection of Architects-Engineers* prepared by the Office of the Assistant Secretary of the Air Force, Materiel, Washington, D.C. Study of this publication is a *must* for anyone wishing to work with federal agencies.

Some offices may not be aware of the procedure for selection of architects, which came about following AIA negotiations with USAF some time ago. If this procedure is not being followed by an individual contracting agency, an architect may cause it to be. If the architect's action is appropriately taken and directed, it will support, not detract from his professional standing.

conclusions

The cautions expressed in this article may, at first glance, seem discouraging to an architect seeking government commissions. In reality they are but a few basic fundamentals which, for the most part, are obvious. Once they are understood and followed, work for a government agency may well turn out to be rewarding—and less troublesome than for an individualist private client who has strong ideas of his own.

* *Architect, Office Manager for Mayer & Whittlesey, Architects, New York, N. Y.*

spec small talk

by John Ben Small

for good stonework

Now listen, dear reader: if you do not extract good material from the following for your limestone specifications, it is your own darn fault. This is the latest version issued by Indiana Limestone Institute, to which I doff my paste pot in gratitude:

All too frequently, nowadays, it is difficult to secure sufficient (or any) laborers who are really experienced in the proper handling of cut Indiana Limestone out of cars and trucks, in storing and distributing it through and around buildings under construction. Some laborers have the idea that, because the material is stone, it can be handled roughly without damage. Of course, nothing could be farther from the truth.

The arrises (or edges) should be carefully guarded against snipping and breakage by avoiding the use of pinch bars in moving pieces of cut stone and by setting them down without force or jarring. If pinch bars are used, place an old rubber tire or tube between the bar and the stone.

Where the use of rollers is necessary, care should be used that these rollers be of wood.

Sliding stone down truck skids should always be done by using the back of the stone in contact with the skids—never the face or top or bottom beds.

Additional protection may be had by using as a bed or cushion, the excelsior usually found in the car or truck.

Never set the stone down against the earth. This avoids staining from moisture and mud.

Always set the stone on wooden skids which are first covered with a waterproof paper. This will help to prevent the appearance of white skid marks, resulting from the skids having drawn any moisture from the stone at points of contact. This is especially advisable where cut stone must be unloaded and stored for a long period before setting. Avoid chestnut, walnut, oak, certain firs, and other woods containing tannin.

All stone stored at the site or elsewhere should be carefully covered with waterproof paper to keep it as clean as possible before setting.

Don't set dirty stone or neglect the washing of stone before setting.

Don't use salt to thaw ice on the face of cut stone or to thaw ice in anchor or lewis holes.

Don't permit wash from concrete floor construction or scaffolding to run down onto walls during construction.

Don't permit oils or grease, or compounds containing them, to come in contact with the stone. This also applies to new ropes, which usually contain tar.

Don't set stone in mortar containing ordinary portland cement.

Use a recognized nonstaining cement. This is also recommended for use in mortar for backing-up material.

Don't slab stone work against concrete work without first having painted the face of the concrete with a heavy coat of asphaltic waterproofing compound.

Don't use sand of questionable quality in setting and pointing mortars.

Don't allow smoke from hoisting engines or salamanders to mar the face of cut stone.

Be sure that all projecting courses, sills, entrance cheek blocks, entrance doorways and all stonework exposed to traffic contact of other trades, are properly and carefully protected with wood.

And above all, don't leave unfinished walls uncovered at night or during heavy rains *at any time*. This will prevent staining of the stone and the later appearance of white efflorescence on brickwork, as well as on the stone. Failure to follow this advice has been the cause of much trouble, dissatisfaction, and expense.

When stone has arrived in a broken or damaged condition, the attention of the carrier's agent should be called to the condition and a notation as to the damage be acknowledged by him. This is necessary because the shipper holds a receipt from the carrier showing that the shipment was in good order when received by the carrier. Claims for such damage must be based upon the possession of freight bills bearing the notation of the damage.

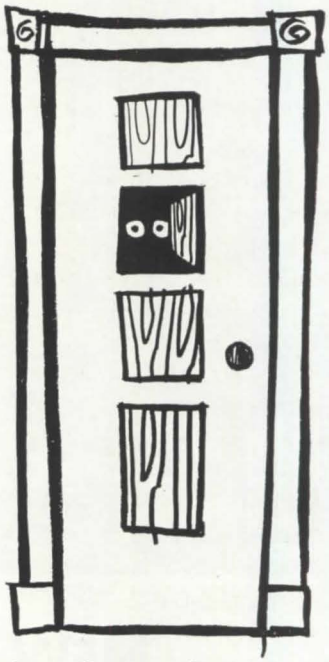
Boiled down, all the above simply means co-operation and ordinary care. Result—greater satisfaction, a better-looking job, and minimized trouble, dissatisfaction, and expense. And, thanks for helping me fill the column!

more door flaws

Here's a letter you (also) may find interesting:

Dear Mr. Small: You probably do not remember me—but I'm the guy who had his arm in the sling in Boston when he introduced himself to you. I told you I was a regular reader of SPEC SMALL TALK in PROGRESSIVE ARCHITECTURE, but I suppose you hear that stuff from a lot of people. In this case, I definitely think it is worth a letter to congratulate you on the subject of your article in the July issue. I have already referred two architects to the article.

Some architects might accuse you of dreaming up that horrible specification, but I am sure it is an oft-founded realism. I am of the opinion that specification writers frequently depend upon the "standards of the industry" to protect themselves against generalized specifications. Furthermore, when some particular industry's standards deteriorate, the specification writer gets caught.

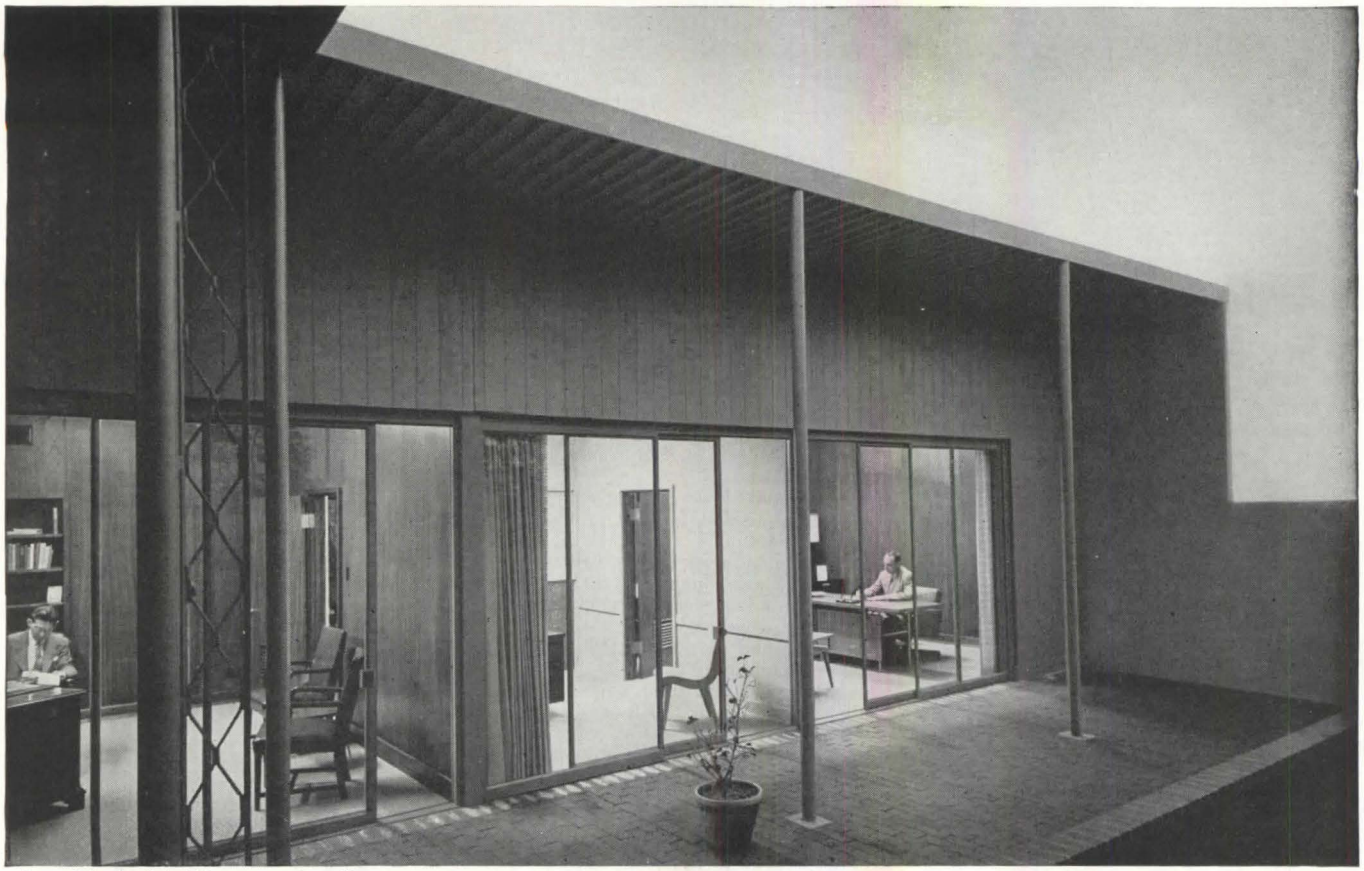


My observations, countrywide, lead me to believe that the door-industry standards have fallen badly in a highly competitive market. Some doors are being made with the assumption that they will hang in the opening without hardware. For instance, the old self-imposed industry standard on door thickness used to be plus or minus 1/32", yet I have measured 1¾" doors which are a scant 1⅝" thick. We see hollow-core doors with an adequate lock block, which prevents the use of anything other than the minimum backset; and we see top rails no more than 1½" deep, which throw the two lower screws of a surface-applied door closed down into the hollow-core area (which, in turn, necessitates the use of through bolts which are not attractive).

I am also sure that design is not the motive behind the increasing use of 6′ 8″ doors, because design involves comprehension of *scale* and a 6′ 8″ door on a school is *not* in scale with this crop of 6′ 2″, 6′ 4″, and 6′ 6″ youngsters we are growing today. We feel that some good door salesman has sold the profession on the lower case of 6′ 8″ door *v.* 7′ 0″ doors—without pointing out that the saving per door is lost in building the additional four inches of wall above the door (job costs being of course higher than factory costs).

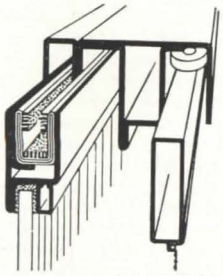
In addition to accepting my compliments on your article, I hope you may find that some of these random thoughts will be stimulants to further objective comments on this subject in your column. If you feel that they are prompted by a too subjective chain of thinking, I hope that you will challenge and correct me. W. J. HODGE, Vice-President
LCN Closers, Inc.

Fight, anyone?

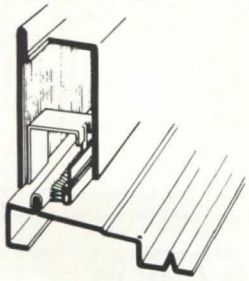


Avery Adhesive Label Corp. executive offices
George Vernon Russell, Architect, A.I.A.

NEW IMPROVED WEATHERSTRIPPING DEVELOPED FOR ARCADIA DOORS



HEAD OF DOOR is weathertight with mohair pile that provides continuous weatherseal protection in top channel guide of door.



SILL WEATHERSTRIPPING is weathertight with new mohair pile feature. Weatherstripping is adjustable for continuous weathertight seal.

national member of Producers' Council, Inc. Distributors located in Canada, Puerto Rico and all parts of the United States.

Since November 1952, Arcadia Metal Products has featured mohair pile weatherstripping in the top channel guide of the sliding section of the door. Success of this feature, introduced first in the sliding door industry by Arcadia engineers, led Arcadia to develop a similar weatherstripping for the sill. Shown here is the new mohair weatherstripping for the bottom rail of the door and other Arcadia standard weatherstripping details. Arcadia doors are weathertight!

Architects and engineers are enthusiastic about adjustable feature of new mohair weatherstripping in bottom rail of door at sill. By means of a new spring-steel retaining clip, Arcadia engineers have devised a method for easy adjustment of weatherstripping to assure a continuous weathertight seal in all Arcadia installations. Write for complete details.

Specify Arcadia steel-framed sliding glass doors when you want weathertight installations — units for single glazing or double glazing. Stock and custom sizes.

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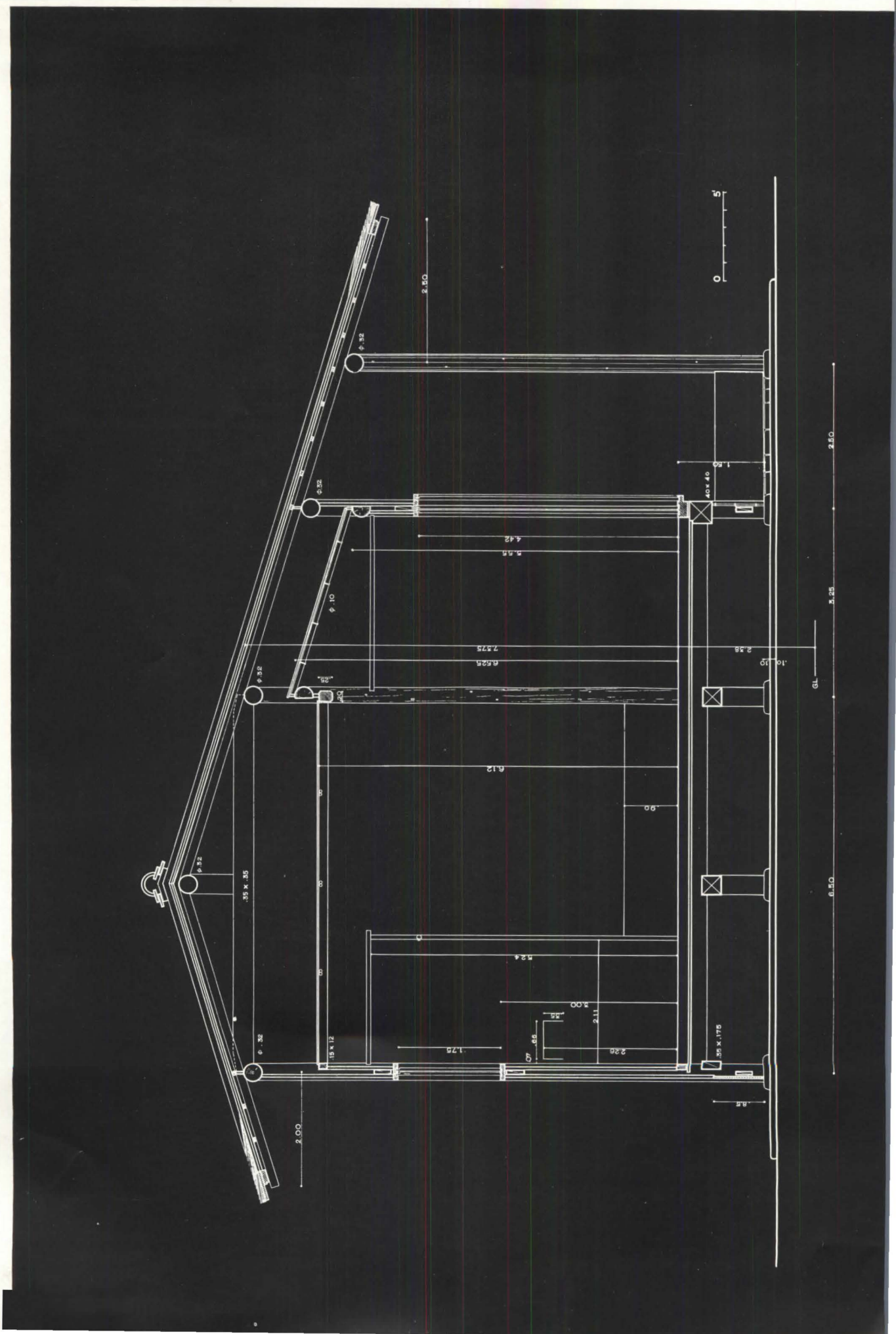
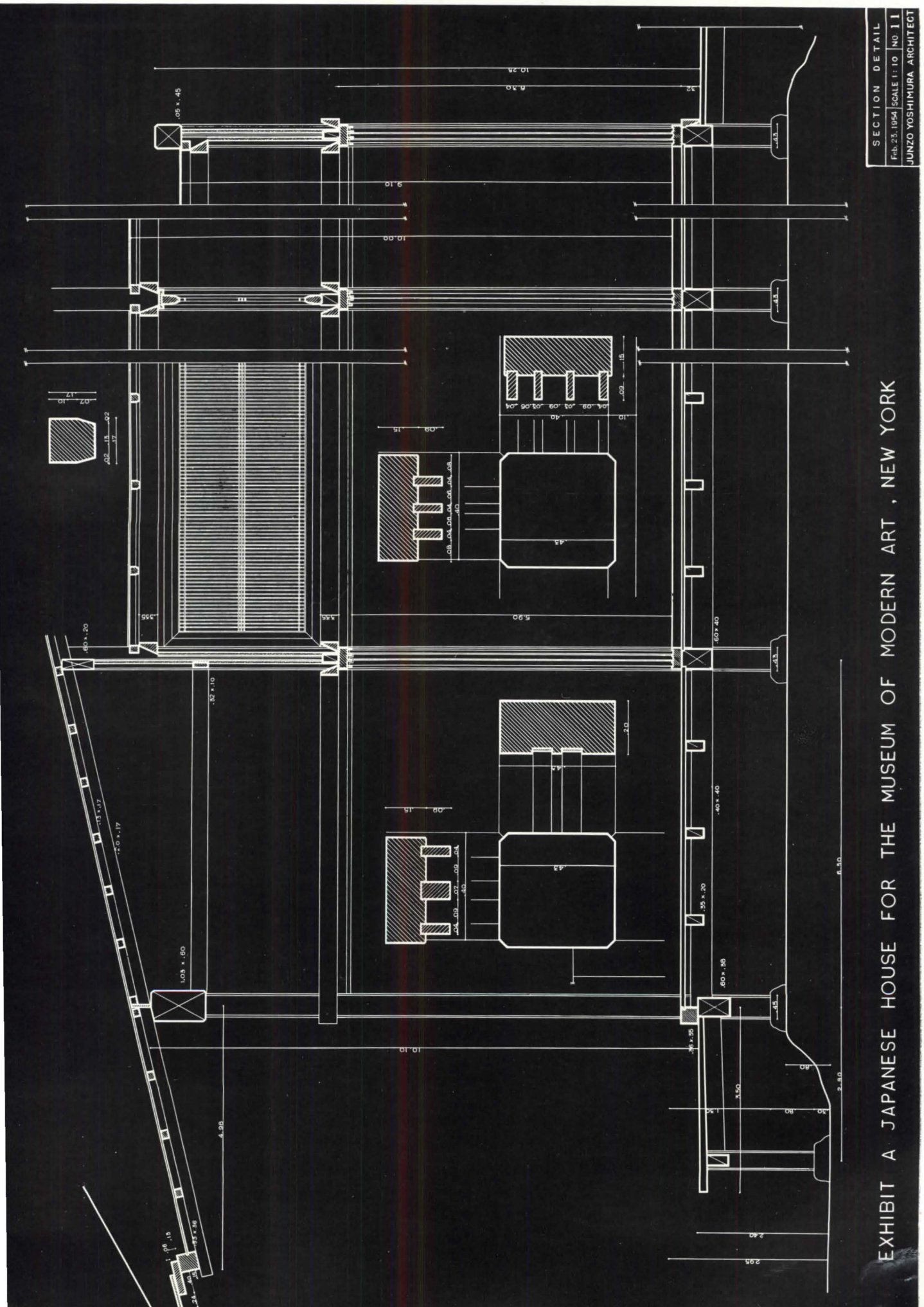
LAWRENCE S. WILLIAMS

HOSPITAL, Overbrook, Pa.
Vincent G. Kling, Architect

structural details: Japanese House, Museum of Modern Art, New York, N. Y.




SECTION DETAIL
Feb. 23, 1954 SCALE 1:10 NO. 11
JUNZO YOSHIMURA ARCHITECT
EXHIBIT A JAPANESE HOUSE FOR THE MUSEUM OF MODERN ART , NEW YORK

Waiting room of the Veterans Hospital, Milwaukee, Wisc. This is a heavy-traffic area, yet the floor-maintenance burden will be light, year after year. It was planned that way by specifying and installing flooring made of BAKELITE Vinyl Resins—"Vinylast" Floor Tile by **Vinyl Plastics Inc.**, Sheboygan, Wisc.

It pays to **ANALYZE** your flooring plans

ASK YOURSELF: what are the major features flooring material should combine? Beauty and luster are essential, of course...and there should be a large selection of colors and patterns. Long wear and easy cleanability are vital. These two go together . . . to keep up the beauty . . . to keep down the cost. And don't forget resiliency for foot comfort, and ease of installation.

How many types of flooring offer *all* these benefits? No matter how many you consider, *only one type provides every fundamental requirement to a high degree.* Flooring "made of BAKELITE Vinyl Resins" is your sure and simple specification. It stands for highest quality in the resins that bring you so many flooring advantages. No other type of flooring provides so much.

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Page Beauchamp

offices

The contemporary office is still primarily a work area, but one in which the business-like look has given way to colorful interiors with an almost home-like atmosphere. Business people spend at least a third of their time in their offices and react favorably to an attractive setting.

The two examples chosen this month are particularly interesting in contrast. The basic colors are the same, but the final effects are completely different. The smaller office has used *tints* of color which lend an airiness to the space, whereas the larger one, using *intense* yellows, red-oranges, and blues, has a more brilliant effect.

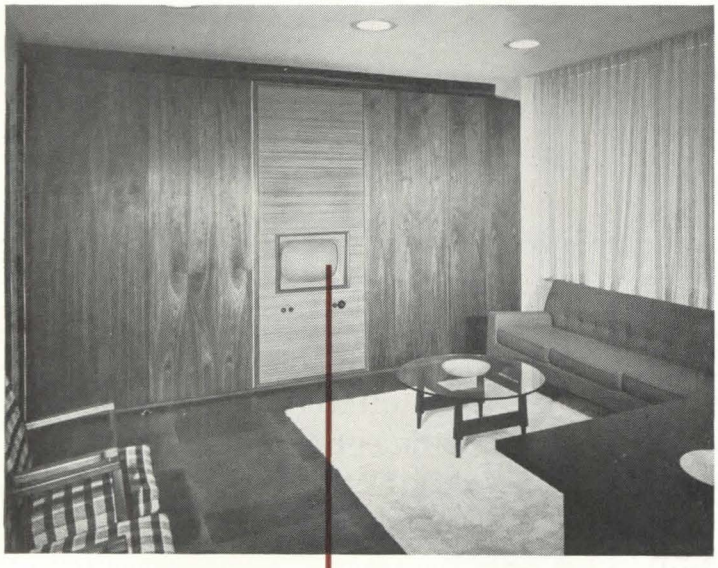
An L-shaped desk was chosen in both instances, combining the work and conference areas in one unit. The seating areas are divorced from the desk area, so that they may be used for informal discussions yet brought into the group for larger conferences.

Traffic flow and ease of operation, of course, are great considerations in the over-all planning of offices. Often, the most open plan is the most successful solution. General areas, used by all employes and visitors should be readily accessible without passage through work areas, and supplies, reference material, and secretarial areas should be centrally located.

For over-all appearance, unbroken planes of color or texture are more effective and conducive to work than many unrelated divisions of space. As in all good design, the simplest and cleanest solution is the most effective.

offices

space	executive offices
location	New York, New York
interior designers	Designs for Business, Inc.



television unit

bar unit

data

cabinetwork

All Cabinetwork: custom-designed by Gerald Luss/ executed by Ezra Blank Associates, 117 Lombard St., Brooklyn, N. Y.

doors

Doors: flush hollow metal/ black baked enamel finish/ Aetna Steel Products Corp., 730 Fifth Ave., New York, N. Y.

furnishings and fabrics

Chairs: Lehigh Furniture Corporation, 16 E. 53 St., New York 22, N. Y./ fabric: Arundell Clark, 25 E. 73 St., New York, N. Y.

Sofas: custom-designed by Luss/ executed by Cumberland Furniture Co., 686 Lexington Ave., New York, N. Y./ fabric: Jack Lenor Larsen, 60 E. 69 St., New York, N. Y.

Tables: Lehigh Furniture Corporation.

Conference Table: custom-designed by Luss.

Curtains: cotton mesh/ Isabel Scott Fabrics, 17 E. 53 St., New York, N. Y.

walls, ceiling

Walls: painted plaster.

Ceiling: "Stria"/ Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo, Ohio

flooring

Executive Offices and Secretarial Area: "Kencork"/ Kentile, Inc., 58 Second Ave., Brooklyn 15, N. Y.

Board Room: "Nobility" cotton chenille/ Needletuft Rugs Division of Cabin Crafts, Inc., 7 E. 35 St., New York, N. Y.

Corridors and Reception Area: "Amtico"vinyl tile/ American Biltrite Rubber Co., 115 Assumpink, Trenton, N. J.

For a pleasant yet stimulating working atmosphere brilliant yellows, cobalt blues, and red-oranges were contrasted here with off-white, light gray, and black. The executive suite (five offices and board conference room) is located so that it is readily accessible to other areas (pages 136-137). The secretarial pool is right outside these offices, and the board room may be reached from the reception area without passing through the offices.

Executive offices are used as much for entertaining clients as for regular work routine. A major portion of the offices is the informal seating area bounded by an executive desk, designed for work and conference, and a storage wall which may house television, a personal closet, storage facilities, and refrigerated bar unit. The storage wall serves as a service core, but flush paneling conceals all of the working parts.

offices

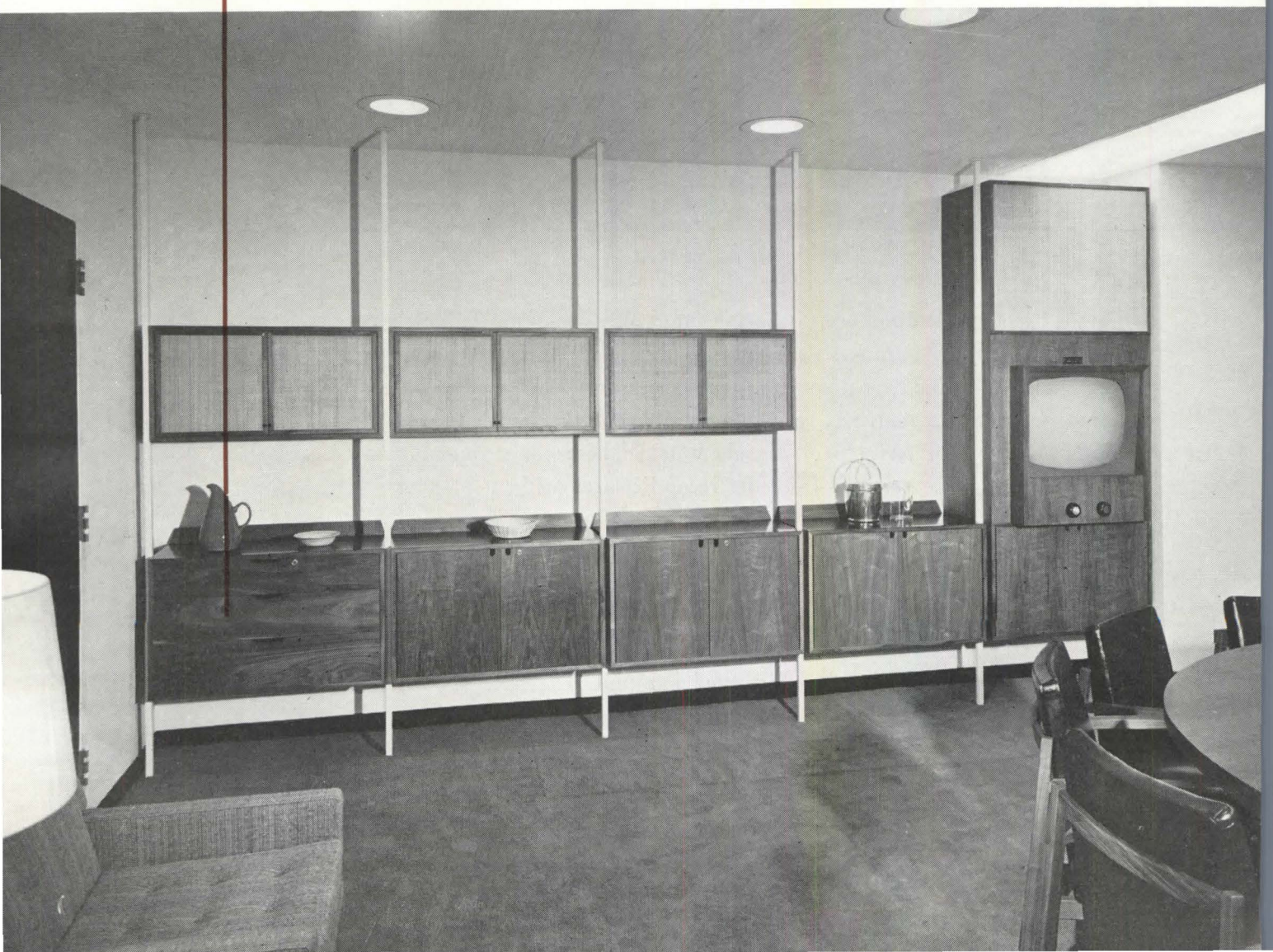
space	board room, reception area, secretarial pool
location	New York, New York
interior designer	Designs for Business, Inc.

The larger conference room is used for director's meetings, interoffice sales meetings, general office conferences, and informal meetings, with necessary facilities for luncheon meetings. The suspended cabinets contain china, crystal, and other serving appointments, and a kitchen adjoins the room. A round table permits all participants to be equidistant.

The reception room is entered immediately from the elevators and provides a warm, welcoming introduction to the firm. A 12-foot sofa and 20-foot bench accommodate seating. The flooring is brilliant yellow; walls are white with one "accent wall" of charcoal gray. Upholstery on the sofa incorporates these colors, with an accent of red-orange.

The secretarial pool is the passageway of the executive suite, accessible, yet cleanly organized so that it seems a natural unit of the adjacent wall.

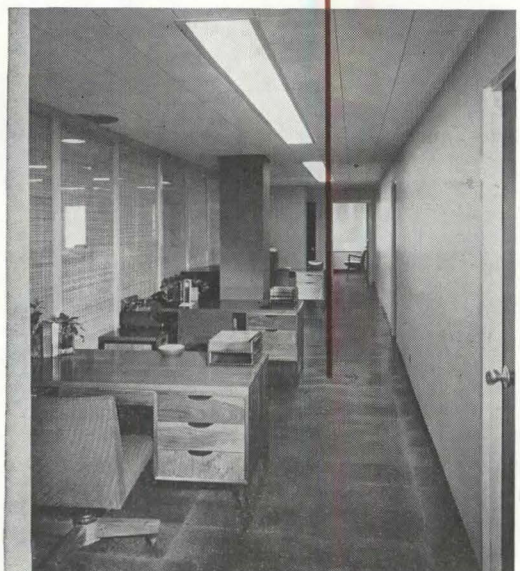
storage wall



conference table

reception area

secretarial pool

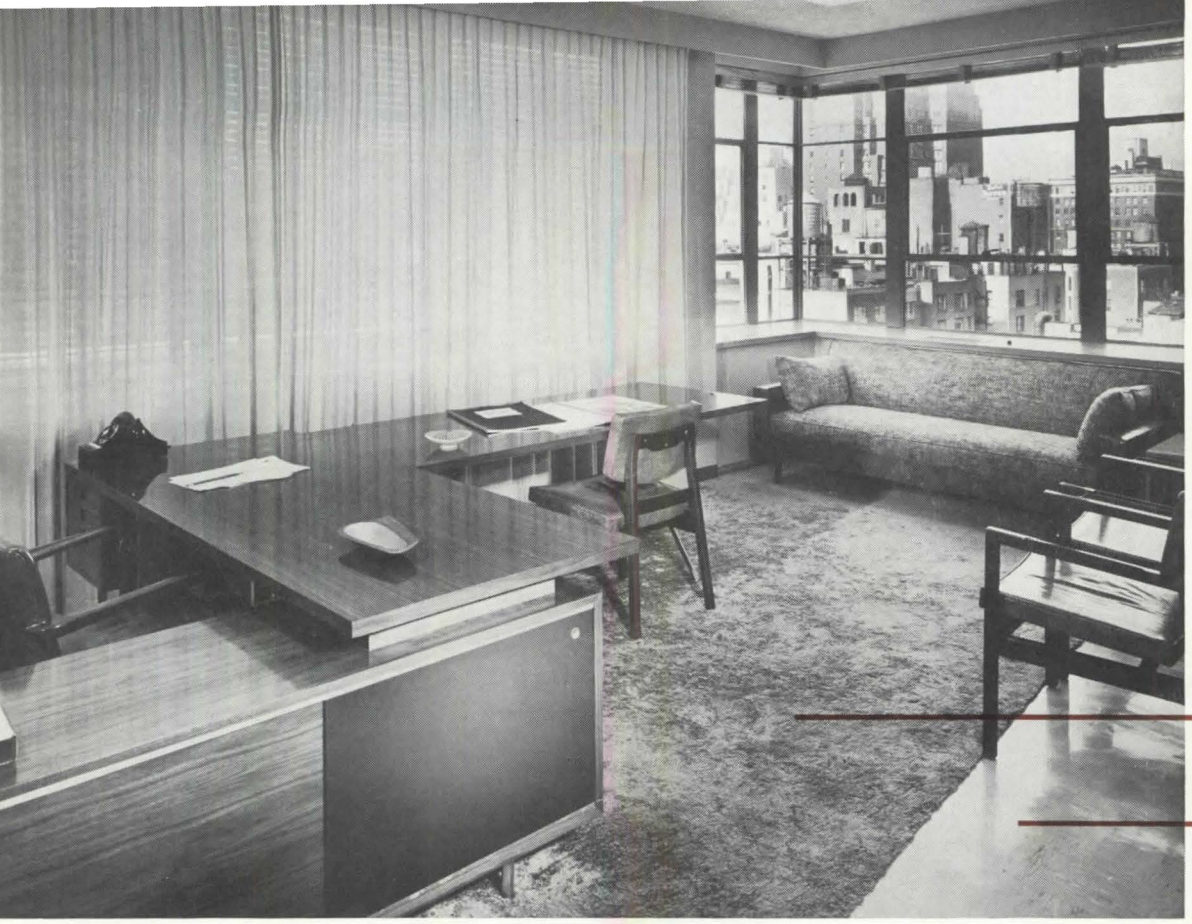


offices

space	office, reception area
location	New York, New York
interior designer	Eleanor Le Maire

The solution of this design problem offers an effective, eye-pleasing result. Space was limited, yet requirements were great. Areas must serve a multitude of purposes. Space was fully utilized by means of angled walls and recesses. Light, atmospheric colors—sea foam, willow, blue smoke, cloud blue, and sun yellow—were experty chosen and placed to create the look of openness. Curtains cover completely the banks of windows on two sides of the office, yet allow a diffused penetration of sunlight.

linen-textured cotton draperies



office area

cabinetwork

Wall Cases: custom-designed by Eleanor LeMaire/ gray-blue stained oak exteriors blue-smoke lacquer interiors/ executed by A. Bitter Construction Company, 721 E. 133 St., New York, N. Y.

doors and windows

Doors: "Securit"/ Libbey-Owens-Ford, Nicholas Bldg., Toledo 3, Ohio.

Windows: existing.

furnishings and fabrics

Desk and Conference Table: #7230L desk top, #6720 storage unit, #SC-22 screen, #PM-3 drawer unit, #7230X table/tawny walnut finish/ Herman Miller Furniture Company, Zeeland, Mich.

Chairs: walnut finish/ Jens Risom Design Inc., 49 E. 53 St., New York, N. Y.

Sofa: walnut frame/ upholstery, blue leather, blue-and-black upholstery/ Al Huller Furniture Co., Inc., 1780 Broadway, New York, N. Y.

End Tables: bronze legs, Botticino marble top/ Edgewood Furniture Co., Inc., 334 E. 75 St., New York, N. Y.

Curtains: "Dublin," sea-foam color/ La France Industries, 119 W. 40 St., New York 18, N. Y.

lighting

Lighting: Lightolier, Inc., 11 E. 36 St., New York, N. Y.

walls, ceiling, flooring

Walls: painted plaster and burlap/ H. B. Wiggins Sons, Bloomfield, N. J.

Ceiling: acoustical tile/ National Gypsum Co., 325 Delaware Ave., Buffalo 2, N. Y.

Flooring: "Brocatelle" Kenrubber/ Kentile, Inc., 58 Second Ave., Brooklyn 15, N. Y.

Carpet: gray-green cotton chenille/ Waite Carpet Co., Oshkosh, Wis.

reception area

furnishings and fabrics

Desk: steel case, gray linoleum top.

Sofa: black lacquer frame/ upholstery: blue-and-black fabric/ designed by Paul McCobb.

Chairs: #DKX-1, and -2/ black lacquer finish/ upholstery: red-orange Naugahyde/ Herman Miller Furniture Company.

walls, ceiling, flooring

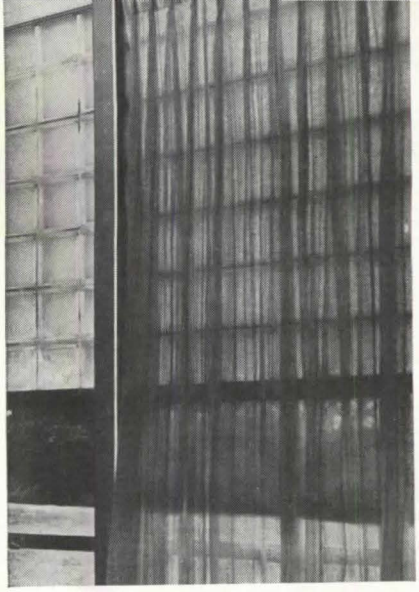
Walls: painted plaster/ burlap covered H. B. Wiggins Sons.

Ceiling: acoustical tile/ National Gypsum Co.

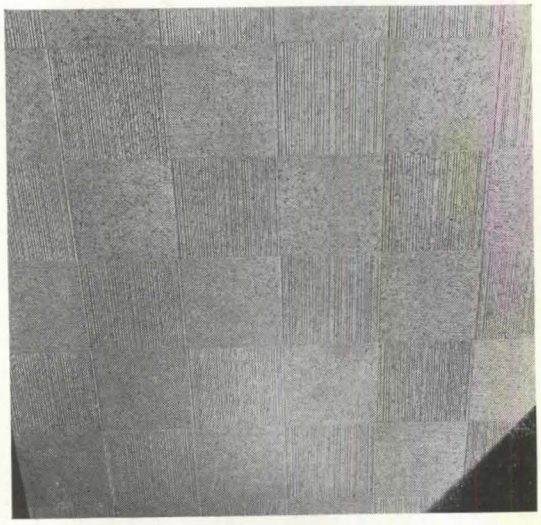
Flooring: "Bardilla"/ Kenrubber/ Kentile, Inc.

Carpet: cotton chenille/ Flemish blue/ Waite Carpet Company.

p/a interior design products



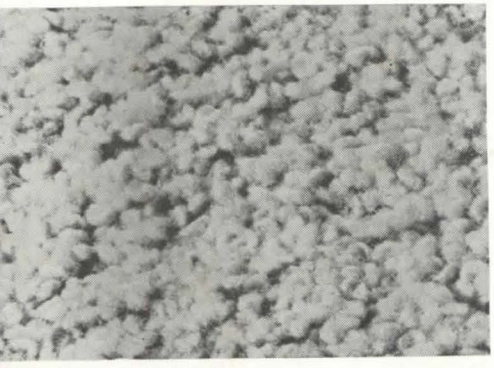
Acoustical Tile: "Stria"/ painted with "spatter" design/ available 12" square, or 12" by 24"/ fireproof/ **Owens-Corning Fiberglas Corporation, Nicholas Building, Toledo 1, Ohio.**

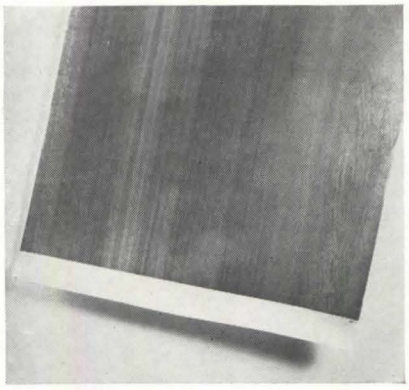


Spun Saran Cloth: "Infinity Fireproof Diffusion Cloth"/ allows daylight to enter, but filters glare from light or reflections/ fireproof, may be cleaned by any method/ **Edwin Raphael Co., Inc., Holland, Mich.**

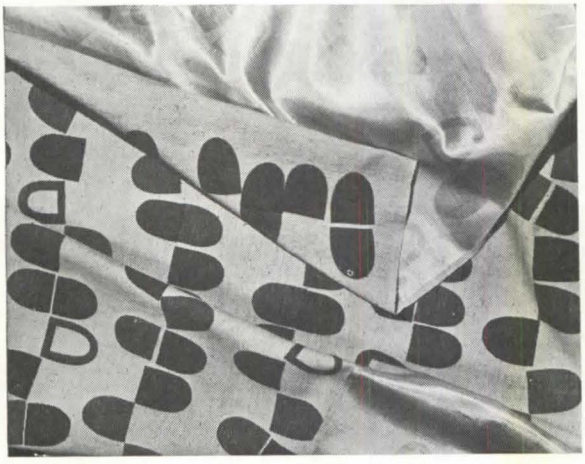
Wall Covering: "Microveer"/ wood veneer, 1/120th", affixed with waterproof adhesive to paper backing/ protective surface added during manufacture/ available in parquet or plain maple, limba, beech, cherry wood, spruce, ash, elm, walnut, makory, and okume/ applied like wallpaper/ **retail:** $9.65 for 32 sq ft/ **David Feldman & Associates, 525 Walnut St., Cincinnati, Ohio.**

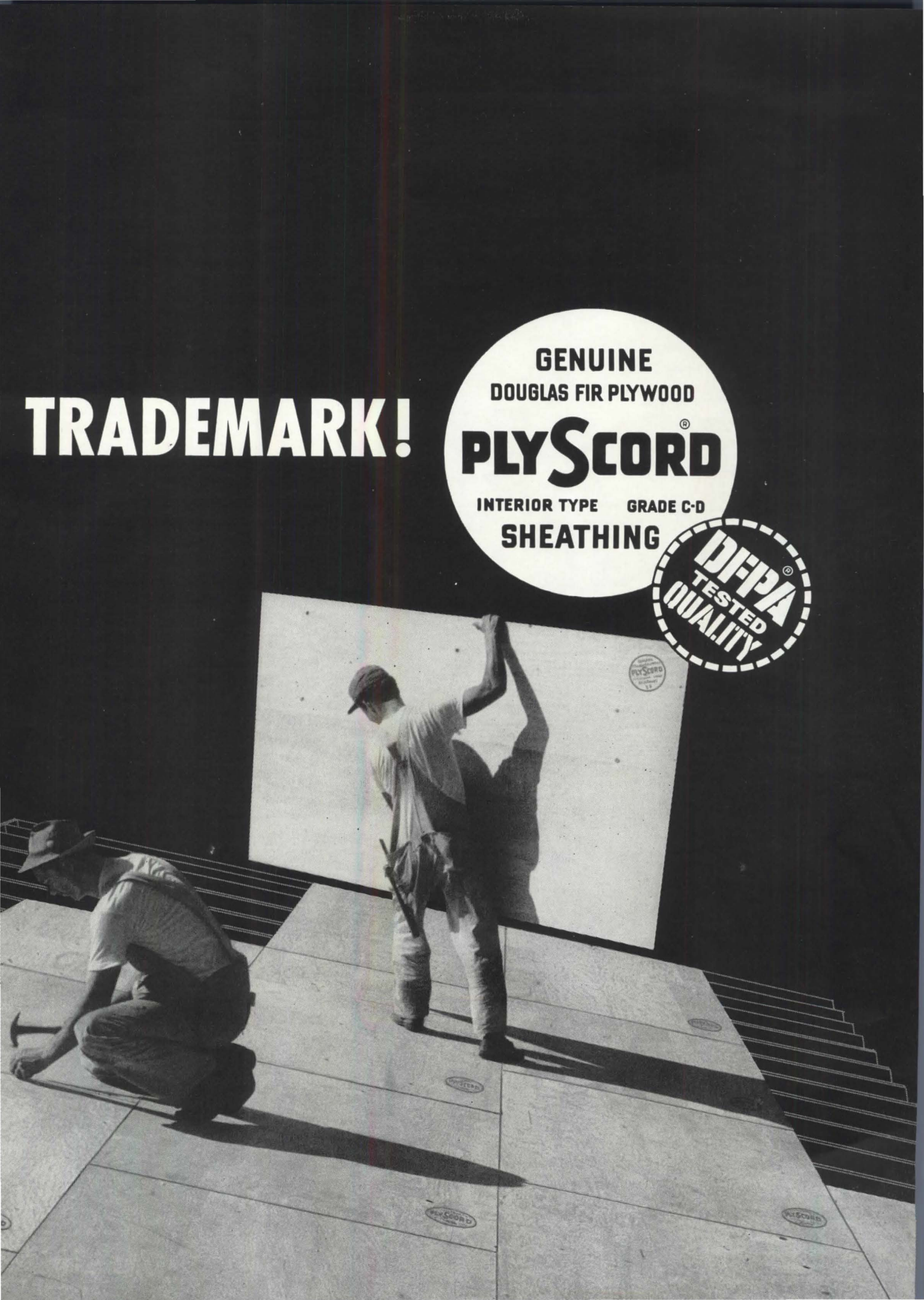
Nylon Carpet: "Shag'lon"/ all-nylon chenille/ rough-textured shagginess achieved by crimping of long fibers/ may be custom-dyed at no extra charge/ manufactured by Nye-Mait Company/ **Raymond & Heller, Inc., 295 Fifth Avenue, New York, N. Y.**





Drapery Fabric: "Infinity Rayon-Backed Linen"/ needs no lining/ printed on face in seventeen designs by Pipsan Saarinen Swanson, Dave Zeese, and Harry Carptenter/ back in solid color/ **Edwin Raphael Co., Inc., Holland, Mich.**

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TESTED
QUALITY

out of school

by Carl Feiss

"But after he has learnt the main types and subspecies, some unclassified individuals will always remain. These are the joys, the sorrows, and the horseflies of the teacher's life. . . .

"A class, like a teacher, never stands still. It progresses, or it deteriorates. If it does not learn, it forgets. If it does not change, it ossifies." Gilbert Highet*

Merry Christmas! And a little present to you, in the form of another outstanding guest for this month's column, Olindo Grossi, Dean of the School of Architecture, Pratt Institute, Brooklyn, New York. When you check your files, you will discover that we have published here a good number of personal expressions about their teaching philosophies by the heads of architectural schools. We expect, in time, to complete the roster, although in limiting this column to three or four guests a year, it would take about fifteen years to go the rounds. By that time, I would hope, the AIA and the AIP, in collaboration with the Association of Collegiate Schools of Architecture, Student Chapters of the AIA, and the various architectural and planning committees interested in technical education, would be publishing a monthly magazine. It is a singularly stupid situation that limits so important an area to such cramped space.

In these guest columns, each writer is asked to tell what he thinks is special or significant about the school he directs. He is given no restrictions other than as to length. Therefore, we have patently and properly prejudiced papers. They are all the better for it! Here is Lee Grossi, architectural educator and architect:

•

Responses to a recent poll of the membership of a local chapter of the AIA suggest the need for additional studies in many different areas of architectural education. If all suggestions were incorporated within a curriculum, the duration

(Continued on page 170)

* *To be read by all teachers at the collegiate levels and also required by this columnist of all newly appointed, part-time, design teachers who think they can teach because they can design. Only 95¢ in the drugstores:* The Art of Teaching *by Gilbert Highet, Vintage Book K-1, 1954.*

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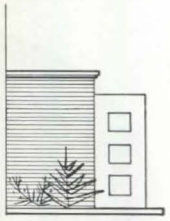
out of school

(Continued from page 166)

of study would of course be excessive. A detailed analysis of the structure of our curriculum at Pratt Institute (similar in many ways to that of many schools) may shed some light on the nature of efforts being made in schools to produce architects. The kind of training the student of architecture is receiving today, inevitably is creating tomorrow's thinking architect; in essence, the future of architecture is being determined, for better or for worse, in schools of architecture. Architects, however, may best understand the approaches and the curriculum of a school of architecture by visiting the classroom and taking part with the students in judgment of design problems and by participation in class recitations. Such meetings provide reciprocal benefits such as the reassessment of values and the broad professional objectives of architecture which may ensue. It is generally agreed that in evaluation of student work, greatest stress should be placed upon the demonstration of a student's ability to think creatively and analytically.

At Pratt Institute, our program, directed toward the total growth of architectural talent, provides a basic system of sequences in the various disciplines, with emphasis on certain specialties, on the flexible administration of courses, and on the traditions and facilities of the Institute. These sequences, noted academically from elementary beginnings to advanced terminations, are continuously subjected to experimentation; are integrated with other courses; and, in final analysis, remain primarily an outline for order and coverage of subject matter. This replaces the routine repetitive system that would merely lead a student mechanically through successively more difficult and complex stages. We are informal—our end is the teaching of architecture for the profession, not the development of a rigid academic program. Our program is so flexible that we change it often to meet the growth of the creative field. The student's participation in class discussions and in open judgment of design problems, as well as in an organized system of student government,

(Continued on page 174)



ABOVE: Clean, fresh design in classrooms is heightened by the high level of evenly distributed illumination from LUVEX fixtures. LUVEX is one of the very few fixtures with low enough cross-wise brightness to allow this type of "across-the-room" lighting layout.

LEFT: The kindergarten is cheerful and kind to young eyes. Good lighting, such as this LUVEX illumination, is important in helping children get their school life off on the right foot. Learning is a process 80% controlled by the eyes. Youngsters in this kindergarten won't be denied the opportunity to see properly, even those sitting in the back of the room.

THE FIRM OF TAYLOR, FOSTER & YASKO of Stevens Point and Wausau, Wisconsin, designed the Jefferson School addition. At left is George Foster; center, Karel Yasko; right, Gage Taylor. Engineer was John K. Primm, P. E., Manitowoc, Wisconsin. The Electrical Contractor was Merkle Electric, Marshfield, Wisconsin.

BELOW: This spacious area serves as a multi-purpose room. The exposed wood beams and steel roof deck form an interesting overhead pattern. Day-Brite incandescent lens boxes are mounted directly to the roof deck to furnish a novel and effective lighting layout. Recessed Duo-Frame lens boxes light the stage.

out of school

(Continued from page 170)

contributes intellectually to his maturing processes. Articulate expression of approaches and concepts, together with graphic expression, is encouraged.

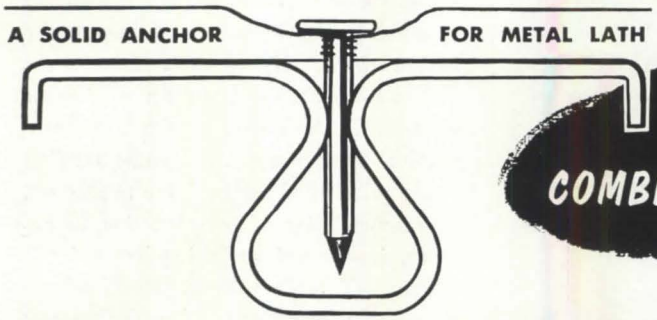
The general-education value of the nonprofessional work required is fundamental, in terms of providing an intellectual and cultural base for the technical and professional work. In our five-year curriculum, about one quarter of the work is devoted to nonprofessional studies in the fields of the social and the physical sciences, the fine arts, English literature, and techniques of communication. These courses, which are carefully distributed throughout the five-year period, make the student continually aware of the significant relationship of architecture to society. While this approach creates certain administrative difficulties, it has decided value in terms of our ultimate goal of integration. These courses are offered in as broad a manner as is possible. They are concerned with basic and general concepts to which we meaningfully relate the program of professional study. An example may be noted in the social studies courses—sociology, government, economics—which provide useful bases for design and planning theories and applications that are specifically studied in later courses.

In our teaching of architecture, we analyze and integrate the three basic elements of architecture: materials and methods, planning, and esthetics. Course instruction not only offers the student insights into this concept but also is especially closely related to design problems. In this way, many projects in their completed study include materials, structure, and research data. The student is directed to see architecture as a whole, not a series of separated parts. This is our major aim.

The major sequence of design is so related to and dependent upon other studies that it could well be called "architecture" instead. This emphasis of design begins in the first year with the course, "Introduction to Architecture," in which students are taught the fundamental concepts of elementary planning, structure, and esthetic theory. The problems in-

(Continued on page 178)

IS SPEED OF ANY CONSEQUENCE TO AN ARCHITECT OR STRUCTURAL ENGINEER?



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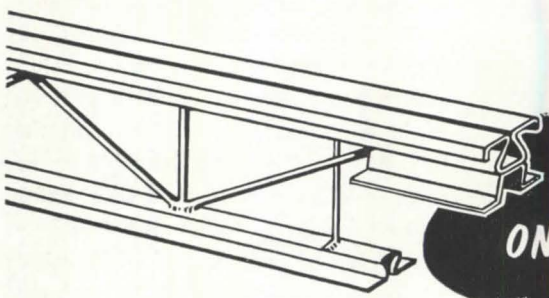

FACT NO. 2

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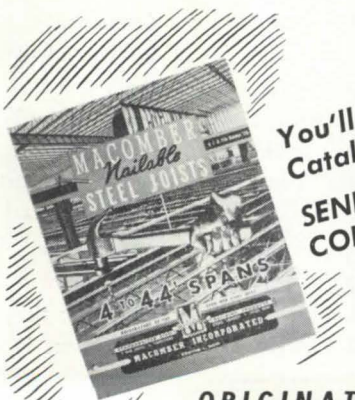

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out of school

(Continued from page 174)

volved in the design of a small object, such as a chair, are studied and then are followed by those problems relative to the design of a small structure. Toward the end of the year, the freshmen participate as teams in the planning of a large community. In this study, the understanding of the relation of one building to another, or responsibility of one function to another, is stressed early in the student's training. Too often, architectural education has concentrated upon the narrow immediate problem at hand—as an item separated from other social and esthetic considerations. This awareness of interrelationships can well begin with elementary work.

At the same time, during the first year, the student studies the purely esthetic phases of design analysis, in which basic and related problems in two- and three-dimensional abstract design are presented. Elements of design such as lines, planes, volumes, values, textures, color, and structural forms are clearly presented in order that the student learn the functional and potential capabilities of each. It is to be noted that, as in architectural design, the student is not entirely dependent upon a framework of historical art forms but is encouraged to work out his own compositional relationships.

In two-dimensional work, the student probes space concepts in graphic media, such as pencil, charcoal, crayon, and water color. In the three-dimensional design, development of maximum powers of visualizing space is a major objective. Creative expression is encouraged through the manipulation of such media as clay, plaster, wood, wire, and sheet metal; the significant experience for the student is in creation, not in the achievement of technical proficiency.

•

Design in the second year examines very simple structures, which are closely analyzed for complete elements of form and detail. Such problems are related to courses in materials and methods of construction. One problem involving model construction is usually required in each semester of design. One team problem is

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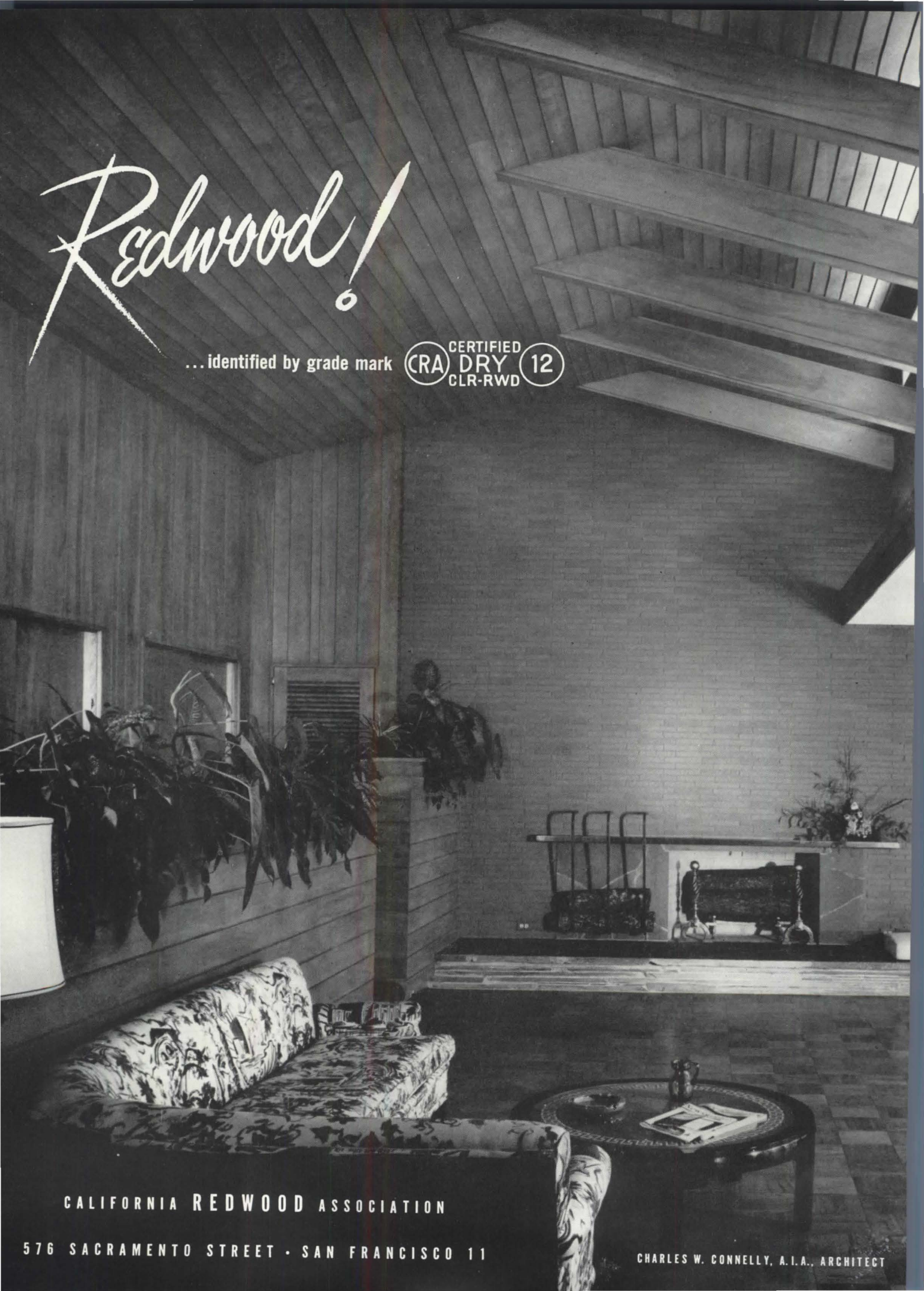
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CHARLES W. CONNELLY, A.I.A., ARCHITECT

out of school

(Continued from page 178)

usually scheduled each semester, principally for the value of having students working with each other (even though such work is more difficult). Problems become more complex and more thorough as the student progresses, and a variety of experimental approaches are encouraged. Often, a schematic program is issued, and the class is required, through its own research, to complete the details of the written requirements. "Clients" are sometimes invited to appear, in order to guide the design concept.

Design criticism directs the student toward the analysis of the problem and suggests avenues for development. Actual solution in detail is not suggested. Critics spend two afternoons, or six hours a week, with their students. The maximum number of students allotted to a critic in this period of time is 15; hence each student is entitled to 24 minutes of criticism a week. This amount of time is actually increased for group criticisms.

Choice of problems is left to the critics, who check with past issues. The problem subject is selected for the developmental contribution it may afford the students. As often as not, the problem is one which the critics themselves wish to explore. Occasionally, outside competition provides further stimulus.

Design problems are also issued in construction courses as part of the work required in those courses. To be sure, while the value of the construction elements is emphasized, it is fruitful for the student to realize that any one course reflects importantly on any other course. A substantial amount of design is also taught in Graphics, where buildings with fine detail and form are used for the shadows and perspective exercises.

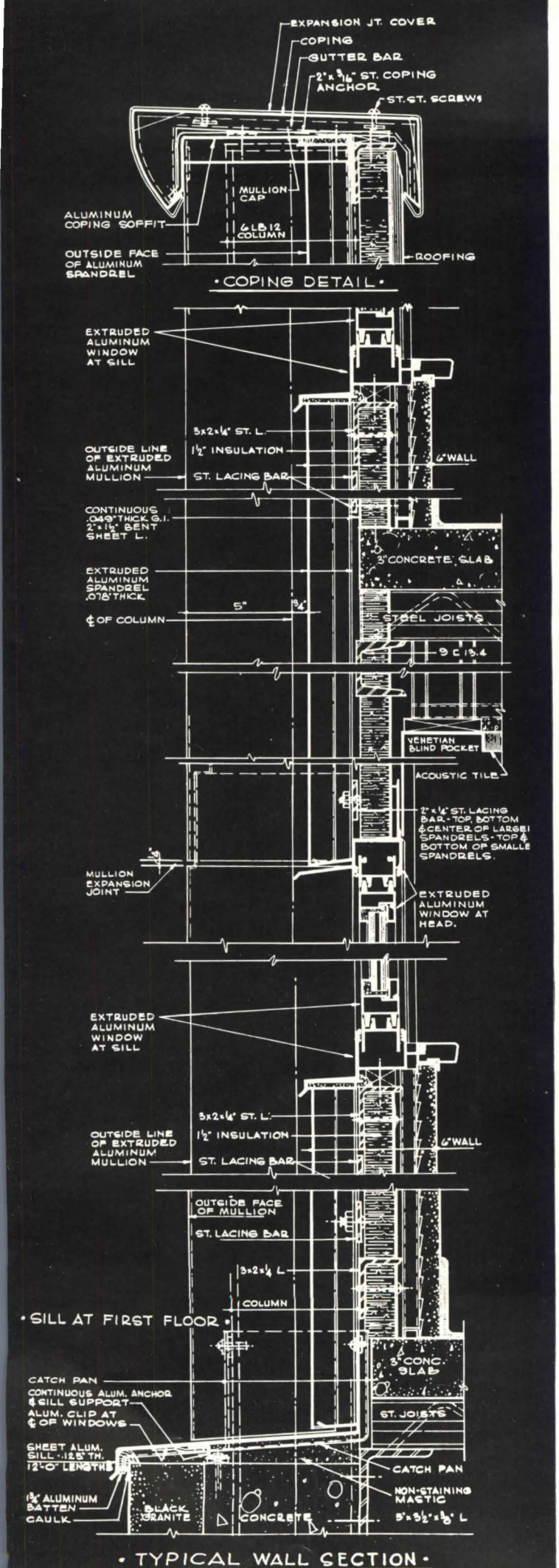
•

In the fourth year, the major problems submitted to students are a team problem on housing and the competition sponsored by the Brooklyn Chapter.

In senior design, group problems are undertaken by teams of three or four students. Town and community planning problems, including large-scale housing and water-front developments, have been

(Continued on page 190)

Alcoa Architectural Colors used for first time in new Aluminum Office Building



Advantages of Alcoa Aluminum for Curtain Wall Systems...

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• Construction Advantages

1. Smaller foundations, lighter structural steel framework.
2. Larger and fewer wall facing units.

Ease and speed of wall erection (when anchoring and alignment devices are properly engineered).

1. Reduces labor costs.
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Aluminum curtain walls in color give striking individuality to Alcoa's Cincinnati office building

Alcoa Architectural Colors in aluminum curtain wall construction are used for the first time in the new Alcoa sales office building in Cincinnati, Ohio.

The wall facing panels on the front are composed of pre-assembled Alcoa® Aluminum Extrusions prefinished in gold. Aluminum wall facing panels on the rear of the building have a sparkling blue finish. Mullions, windows and other trim are natural aluminum color.

By combining the texture of the extruded aluminum panels with enduring, nonfading *Alcoa Architectural Colors*, the architect has endowed this new building with a striking individuality.

The use of color in exterior aluminum walls gives you an important new design element to add to your "kit of architectural tools." *For Alcoa Architectural Colors mean you can now design in color when you design in aluminum.*

But there's a lot more than color to the story of this new building in Cincinnati.There's a story, too, of savings in fabrication, construction, maintenance and usable floor space brought about by the use of Alcoa Aluminum for curtain wall systems.

Erection of the wall components is simple, rapid and relatively low in cost. Extruded aluminum mullions, windows and facing panels are shop assembled into one unit and anchored into place between columns. Rigid glass fiber insulation is installed behind the panels from the inside. The interior finish is plaster applied to metal lath on furring channels.

Total thickness of the wall is but 6 inches, with the flush interior surface unbroken by columns. Wall weight is less than 13 pounds per square foot and heat transmission value is .118 Btu/hr/sq ft/°F, both extremely low.

To achieve the effect of continuous windows, as well as take advantage of the lightweight wall, 4 x 6-inch columns are spaced 4 feet on centers. This not only eliminates the need for piers, but also permits interior partitions to be installed at increments of 4 feet.

Window jambs are retractable to allow the vertically pivoted window sash to reverse for easy inside cleaning.

Copings, window sills, interior trim and many other practical and economical uses of Alcoa Aluminum have been incorporated into this new structure.

For complete information on this or other architectural applications of Alcoa Aluminum, call your local Alcoa sales office. You'll find the number listed under "Aluminum" in your classified directory. ALUMINUM COMPANY OF AMERICA, 1890-M Alcoa Building, Pittsburgh 19, Penna.

ALCOA ALUMINUM

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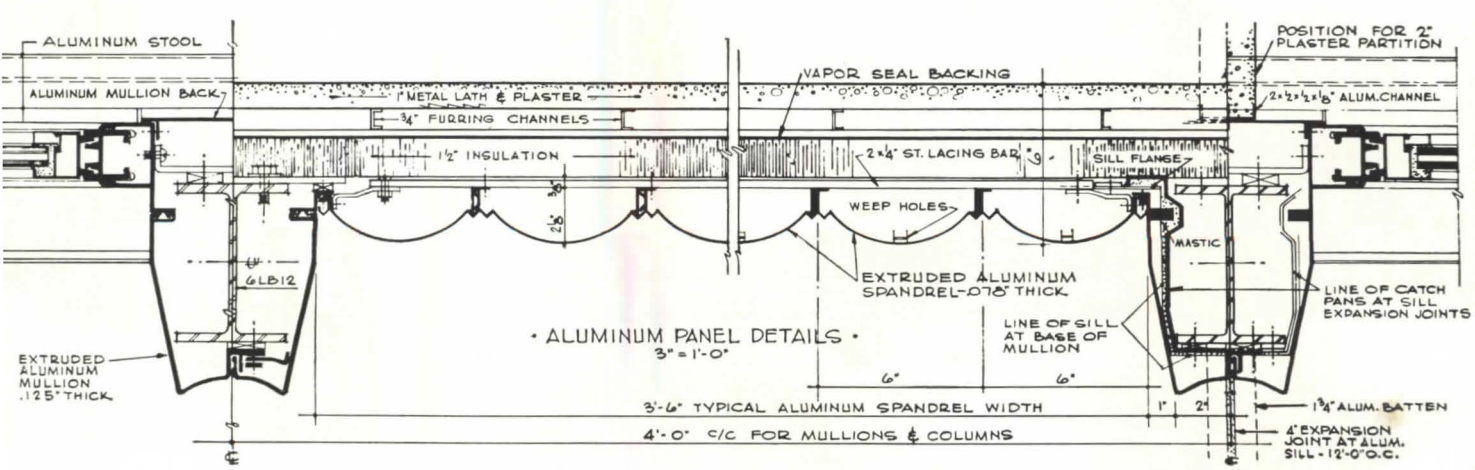

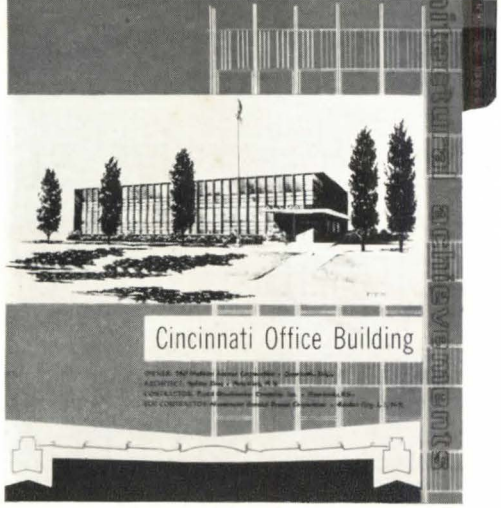

Alcoa offers architectural details of new Cincinnati office building

Complete details of the aluminum curtain wall used in the new Cincinnati office building are being distributed by Alcoa. This latest application of the Alcoa Aluminum wall system will be of interest to all architects and designers, since it introduces the practical combination of texture and color in curtain wall construction.

For complete information and your copy of Alcoa's architectural details on this new building, call your local Alcoa sales office. You'll find the number listed under "Aluminum" in your classified directory. ALUMINUM COMPANY OF AMERICA, 1890-M Alcoa Building, Pittsburgh 19, Pennsylvania.

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out of school

(Continued from page 193)

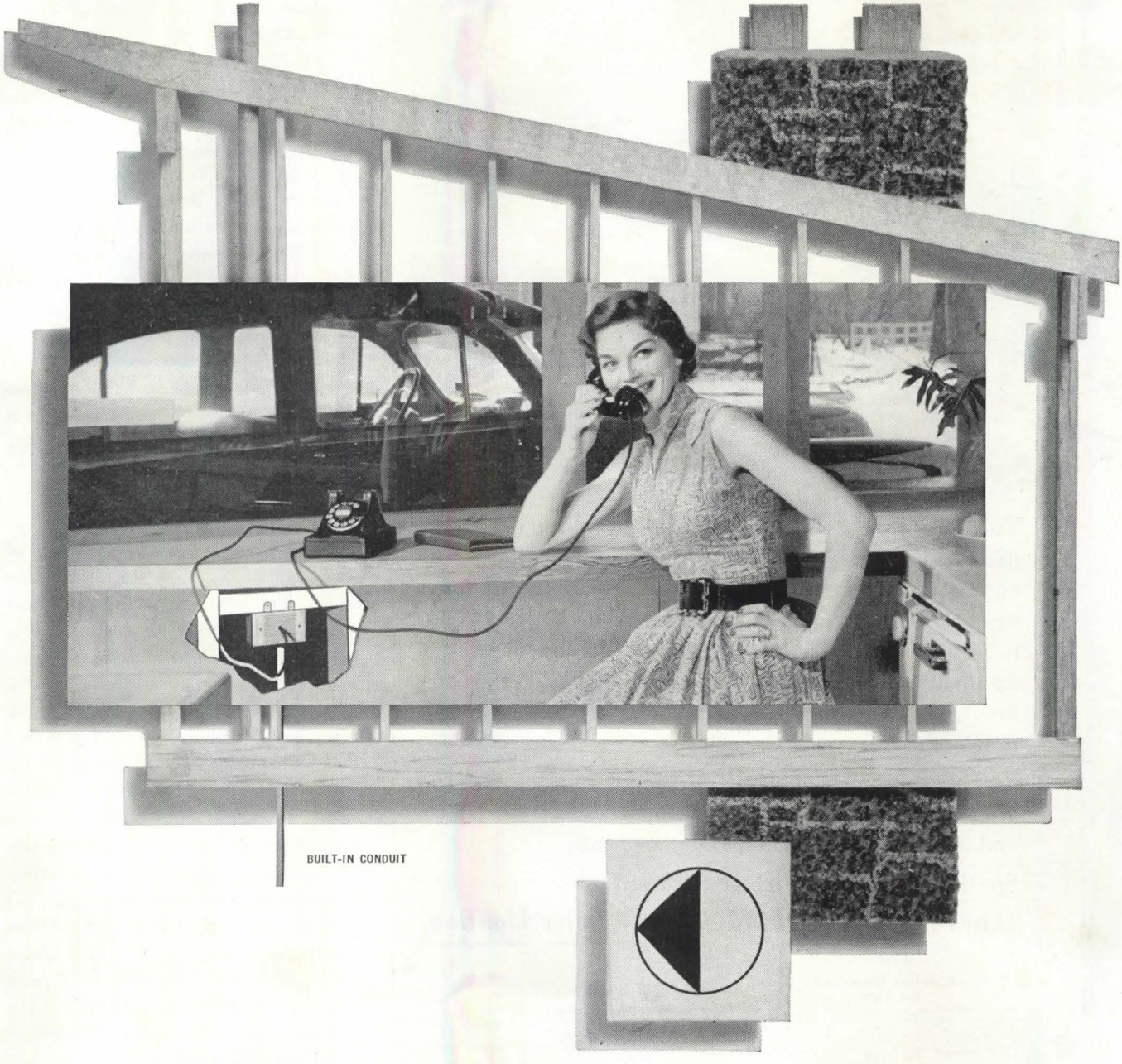
ing this tradition is a realistic one: our efforts are directed toward solving what we believe are the genuine problems of architecture—the problems of man's environment. Architecture is building, and our imagination in this discipline must relate itself to practical elements.

Another traditional association which we are pleased to possess is one which we continue to maintain with the well-known Art School and its many art and design studios. Students, through elective courses, may study in the art departments; but perhaps our greatest asset, in this sense, is the stimulating atmosphere so rewarding to the members of the student body and faculty.

A fortunate association for our student body is the rich relation of the Institute to New York City—its people, its culture, and its building—and to the architectural profession. Many members of the profession, who have given generously of their time as critics, judges, advisers, and friends, have been a source of encouragement and stimulus. Our students are members of the Student-Associate Branch of the Brooklyn Chapter of the AIA and directly benefit in the association with that active chapter.

We are fortunate in our relation to the city in that many senior students have been able to work part time in architectural offices. This transitional training is important because it minimizes the change from school to practice. Students are strongly encouraged to work during the summer on construction jobs and in offices. We give a great deal of attention to the placement of our students.

While courses should relate readily to practice, it is also the special duty of the school to aid the student in his development of a philosophy of architecture, which may not be as easily acquired later in office practice. This outlined program commences and concludes with the vigorous point of view that the architect possesses constantly growing perceptions. Formal education begins this process. Our greatest measure of success is related to the extent that our graduates carry it on.



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out of school

(Continued from page 182)

used as recent group projects. The concept of the thesis—that it be a significant original contribution to our body of knowledge—is what guides us in the development of the thesis program in the last semester. Its objective is the integration of all aspects of the curriculum; and, in this study, the student must demonstrate that he is ready to assume his responsibilities in the profession.

The technique of the "open judgment," which is employed for the grading of design problems, continues to have great merit. Here, the course in speech is closely integrated with school presentation. The student is permitted to set forth his approach to the problems, the difficulties he experienced, and the reasons why he developed the solution submitted. The value of literate, verbal architects cannot be underestimated.

In applied theory and design, the approach of the faculty is strongly influenced by the pioneers of modern architecture, and an analysis of their work and their philosophies is developed as an aid in the orientation of the students' design studies. A serious effort is made to keep the students alert to changing and future concepts, for perhaps the greatest failing of architectural education in the past has been the lack of respect for current changes in techniques and their appropriate expression. Yet, while we express today, we do not ignore the past. The problems that earlier cultures have resolved are still tremendously important.

Another major sequence within the curriculum is that of materials and structures, which begins in the second semester of the first year and continues throughout the course of study. This complex is integrally related to studies in the physical sciences, such as physics, statics, and strength of materials. The properties, manufacture, uses, and applications of materials suitable for structural and nonstructural use in buildings are first studied. Even at this stage, there is an emphasis on the experimental, creative, and economical use of materials. Various types of structural assemblies are then studied in terms of their economic and

(Continued on page 192)