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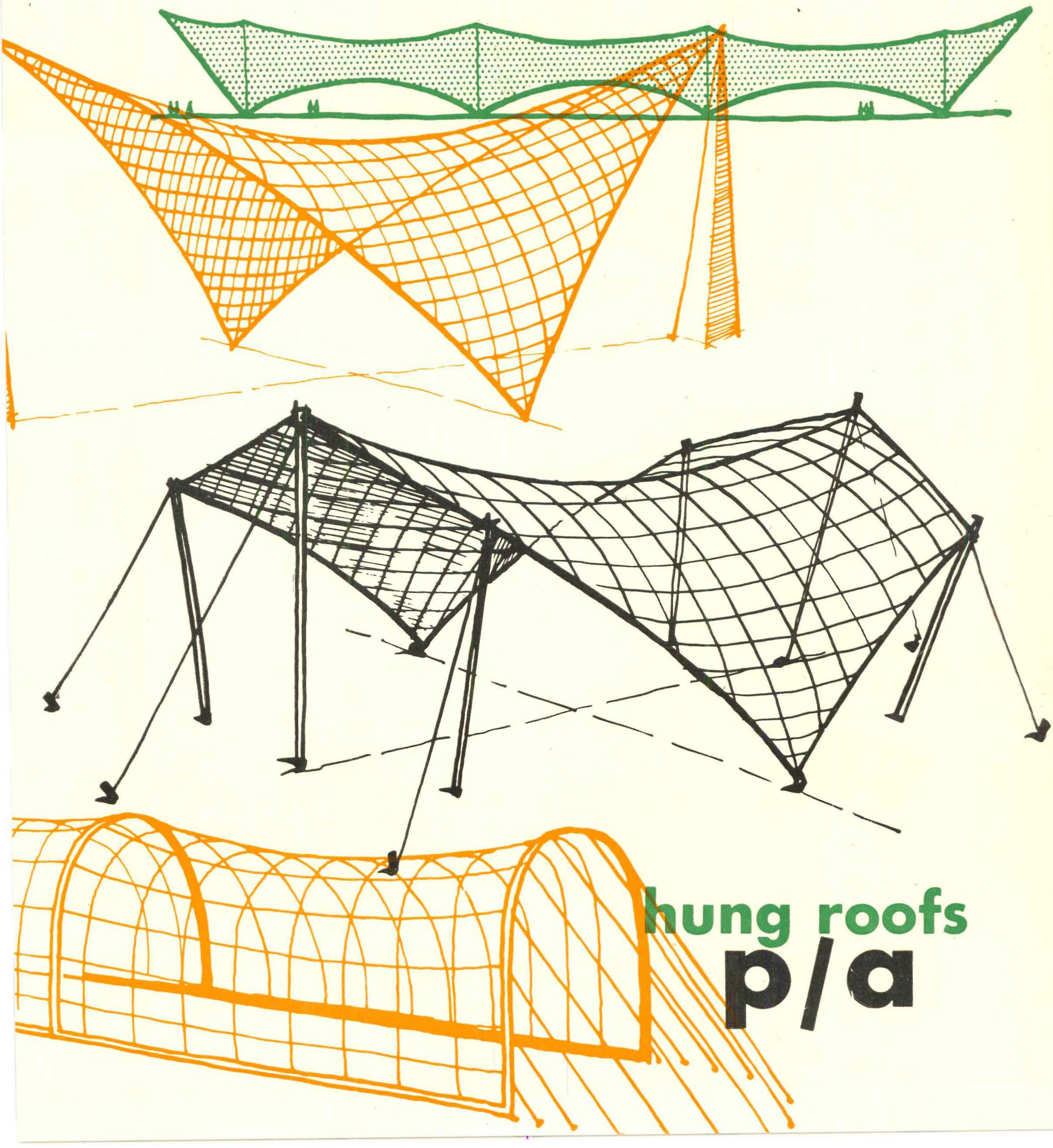

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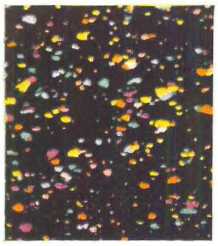
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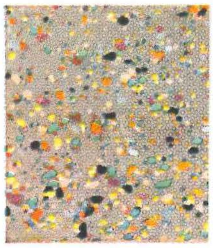
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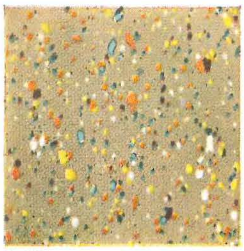
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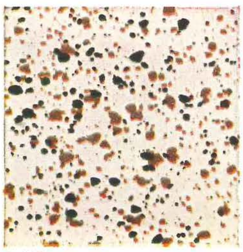
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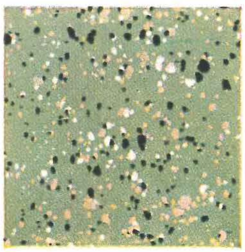
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March 1956

p/a PROGRESSIVE ARCHITECTURE

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

It's the Law by Bernard Tomson

P/A Office Practice *article on the Exclusion of Churches from neighborhoods zoned for residences only.*

IT'S THE LAW (*February 1956 P/A*) discussed zoning regulations which attempted to exclude public or private schools from residential districts. May a zoning ordinance exclude churches from residential areas?

Until recently, the courts had almost consistently reversed the actions of administrative officials acting under zoning regulations which operated to exclude the erection of church buildings in residential districts. In the leading case of *State ex rel Synod of Ohio* v. *Joseph* (Ohio), 39 N.E. 2d 515, the ordinance restricted a district to single-family dwellings but provided that churches (among other public and semipublic buildings) could be erected by obtaining a special permit from the zoning commission and the village council. The special permit was denied and suit was brought to compel the authorities to issue it. In granting this relief, the Court seriously questioned the constitutionality of any enactment which flatly prohibited the erection of churches in a residential district, but based its holding on the administrative application of the ordinance rather than on the constitutionality of the ordinance itself.

The authorities had sought to sustain their denial of the special permit on the grounds of public health, safety, morals, and welfare because of the increased noise, traffic congestion, parking difficulties, and the effect which a church structure would have on surrounding land values. The Court, however, on the basis of the particular facts involved in the case, eliminated each of these factors in turn, and stated its conclusion as follows:

"We conclude that respondents' refusal to grant the permit to erect the church in the residential district so long as land was available in the business district was not authorized by the ordinance from which respondents derived their powers. And we further conclude that the administrative act of respondents in refusing a permit to erect a church in the residential district, there being no adequate showing that this exclusion of the church was in furtherance of the public health, safety, morals, or the public welfare, was arbitrary and unreasonable and in violation of relator's rights under the State and Federal Constitutions."

The rationale of the relatively few cases on this aspect of zoning was simply and basically stated by the Supreme Court of Texas in *City of Sherman* v. *Simms*, 183 S.W. 2d 417, in these words:

"To exclude churches from residential districts does not promote the health, the safety, the morals, or the general welfare of the community. . . ."

That rationale was contradicted in no uncertain terms in *Bishop* v. *City of Porterville* (California) 203 Pacific 2d 823, where petitioner sought to compel the issuance of a permit to build a chapel and classrooms for religious worship and study in a single-family district. The Court found that the zoning regulations had a substantial relation to the public health, safety, morals, and welfare in the following words:

". . . since the city had power to zone the property herein affected, strictly for single-family dwellings, there was no abuse of the power in prohibiting the erection and construction of church buildings therein. It is a matter of common knowledge that people in considerable numbers assemble in churches and that parking and traffic problems exist where crowds gather. This would be true particularly in areas limited to single-family dwellings. There necessarily is an appreciable amount of noise connected with the conduct of church and 'youth activities.' These and many other factors may well enter into the determination of the legislative body in drawing the lines between districts, a determination primarily the province of the city.

"A single-family residence may be much more desirable when not in an apartment-house neighborhood or adjacent to a public building such as a church. The municipal legislative body may require that church buildings be erected to conform to health and safety regulations as provided in its building code and we see no reason to hold that churches may be erected in a single-family residential area when a duplex, triplex, or other multiple dwelling can lawfully be excluded therefrom. The provision in the ordinance for a single-family residential area affords an opportunity and inducement for the acquisition and occupation of private homes where the owners thereof may live in comparative peace, comfort and quiet. Such a zoning regulation bears a substantial relation to the public health, safety, morals, and general welfare because it tends to promote and perpetuate the American home and protect its civic and social values."

The Court dismissed the petition on the ground that it failed to state a cause of action and the appeal from this decision was dismissed by the United States Supreme Court for want of a substantial federal question (338 U.S. 805).

The question has not been settled by the U. S. Supreme Court. It will be interesting to see whether the trend of future decisions will follow the line of reasoning used in the *City of Porterville case.* As recently as June, 1955, a New York lower court said:

"While no one can deny that churches and schools promote the general welfare and good morals of every community, it is equally true that every type of edifice in a community must be erected in its proper area in order to promote the best interests of all citizens. In our nation we are proud that government agencies do not eliminate those worthy institutions which shall forever be free, but merely regulate the areas in which they shall be constructed and maintained. Without such regulations, the result would be disorder and chaos, particularly in more populous communities such as Brighton. Our narrow, traffic-laden streets testify too eloquently to the failure of our earlier Legislatures to enact regulatory laws in these and kindred matters." (*Matter of Diocese of Rochester et al.* v. *Planning Board of Town of Brighton, et al.*, 207 Misc. 1021.)

Mechanical Engineering Critique

by William J. McGuinness

P/A Office Practice column on mechanical and electrical design in architecture is devoted this month to the subject, Adequate Wiring in Existing Apartment Houses.

Wiring in 80 percent of the existing apartment houses in New York City is inadequate for the present demand, and only one building in 10 has sufficient wiring for the new appliances that families intend to buy, according to J. O. Covington, Manager of the Adequate Wiring Bureau of the Consolidated Edison Company of New York. This situation is national; similar reports come from most other large cities. The amount of current needed for electrical living has approximately doubled every 10 years for the past several decades. The fact that national sales of items like electric broilers and room air conditioners have increased fivefold in *five* years lends credence to this claim of wiring inadequacy.

Until recently the apartment dweller has suffered more from this deficiency than the home owner. Rent controls have discouraged owners from improving electrical service to tenants who could not be charged for the improvement. A recent change in the regulations of New York's Temporary State Housing Rent Commission has solved this problem to the advantage of both landlord and tenants. An example of how this change permitted the improvement of wiring in one group of apartment buildings suggests similar possible action for other owners.

Castle Village is an apartment community just north of the George Washington Bridge in New York City. It was built by Dr. Charles V. Paterno in 1939 (its architect, George Fred Pelham, received an AIA medal for its design) and ownership has remained in the same family. The management by Nehring Brothers, Inc., and their project manager, John J. Marger, has supported Dr. Paterno's original intention of maintaining an ideal community. In spite of good electrical planning, the use of many new electrical appliances had made the wiring inadequate. Tenants were forbidden by their leases to install or use electric broilers, air-conditioning units, dishwashers, clothes washers, or dryers. Being human, some of the tenants ignored these restrictive agreements. When it was found that half of the apartment circuits were overfused and about 10 percent of them plugged with cut fuses, an investigation disclosed the fact that 200 broilers and many other forbidden items were in use. The danger from this overload made the owner liable to summonses from the Department of Water Supply, Gas, and Electricity. The restriction against the use of new electrical appliances made both tenants and owner unhappy; furthermore, Consolidated Edison was unable to find channels through which it could supply current to eager customers. Largely due to the efforts of the Department of Water Supply, Gas, and Electricity and Consolidated Edison, the Temporary State Housing Rent Commission agreed to grant owners in similar circumstances a mandatory rent increase from all tenants for the purpose of defraying the cost of complete rewiring. This work was undertaken at Castle Village and after nine months is now nearing completion.

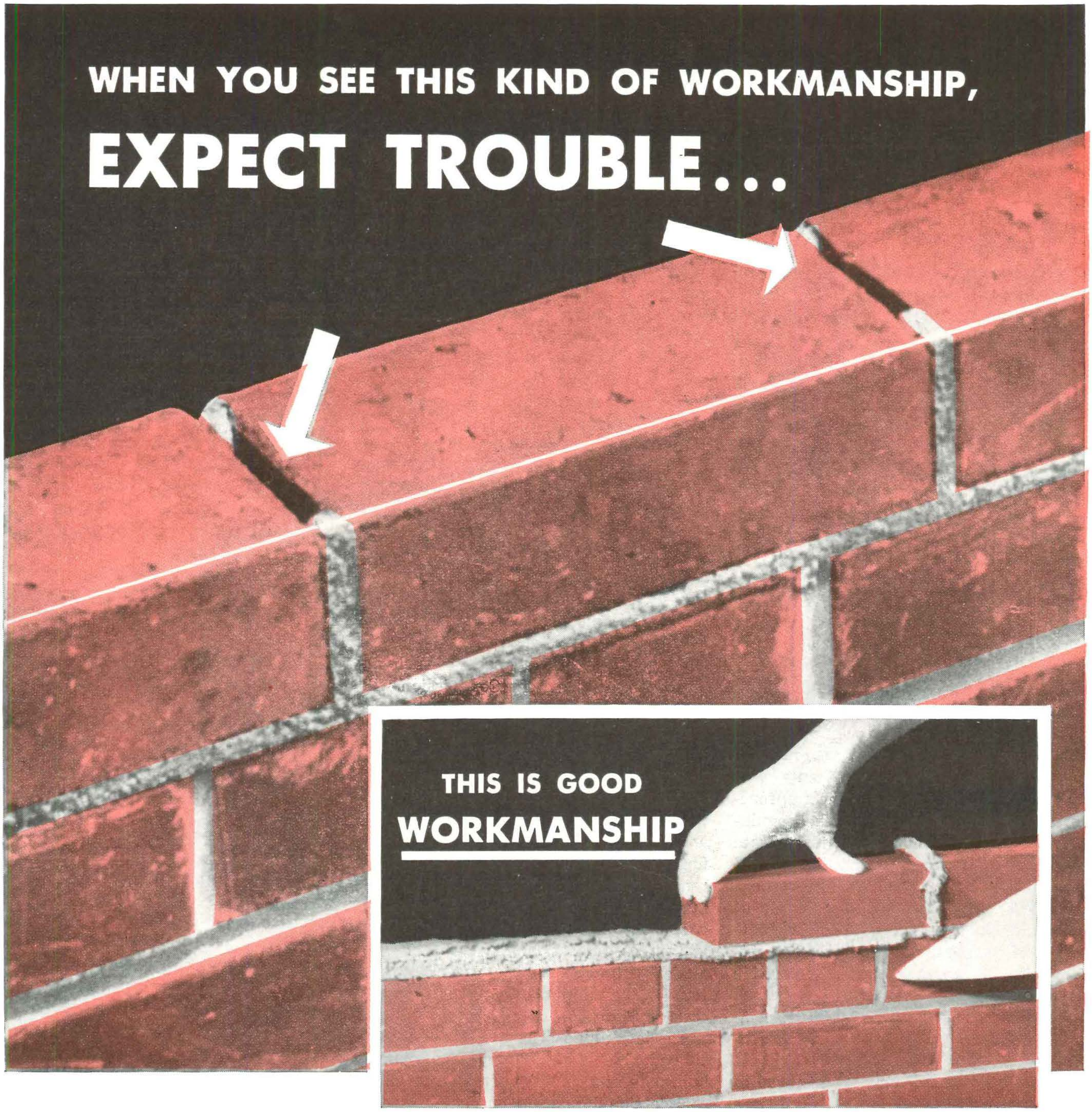
In approving a request for such an improvement, the Rent Commission will act only on the basis of a survey made by the utility company. Castle Village's survey, made by Consolidated Edison, showed that the total demand had increased from 290 kw in 1940 to 490 kw in 1954—an increase of 67 percent. As a result of this and other pertinent findings, authorization was given for a rent increase to pay for additional wiring. Drawings and specifications were prepared by Muzzillo & Tizian, Consulting Engineers, and a contract was made with Pozner Electric Company for the installation, at an approximate cost of $175,000.

Castle Village consists of five cross-shaped 12- and 13-story apartment buildings, reasonably identical; each is complete and independent as to equipment. This equipment separation was maintained in the new work. There are nine apartments on each floor of each building and the entire community includes 582 apartments, comprising 2180 rooms. A permanent rent increase of 88 cents per room per month was granted. The basis for this figure is derived from the standard regulation that the rent increase shall pay for the principal cost of the improvement within seven years. It will be seen that the additional rents will amount to about $175,000 within that time. If the money is borrowed at five percent interest, the rent increase will be absorbed for an additional six years. Cost of additional current is adjusted generally. In the case of air conditioners, the tenant will be subject to special charges.

Apartments which were previously served by not more than 22.8 amp now receive 49. Circuits have been increased in number and No. 12 wire has replaced No. 14 within apartments. A separate appliance circuit has been added in every kitchen; in each living room and master bedroom a separate air-conditioning outlet is provided near a window. Significantly, the existing conduits within the apartments were adequate to contain the new wiring. Electric cooking (ranges) had not been part of the original scheme and is not contemplated now. All wiring is assigned to other, much needed equipment.

The old main service in each building had consisted of a 4″ conduit carrying four conductors of 500,000 cir-mils size. In each case this service has been duplicated by new conduit and conductors of the same size, doubling the capacity. The original vertical distribution was by two risers, one in each of two utility closets in public halls. This system remains and four new conduits (two at each utility closet) parallel the old routing. In each closet at each floor, two panel boxes, one old and one new serve the several local apartments. The fuse capacity to each apartment totals 45 amp. The separate circuits to air conditioners are fused only at the utility closet under the control of the management and this circuit is connected only upon the Rent Commission's approval of the charges. Plug fuses are used instead of circuit breakers. Service at 110 v and 220 v is brought to the panel boxes at each floor but, to date, only 110 v has been used in apartments. The only evidence of change in the apartments is a short section of exposed molding conduit leading from a nearby outlet to each new air-conditioning outlet. The halls show no change and the basement installation is extremely neat. In the electrical-service entry room the new equipment stands next to the old and jointly they serve the two riser groupings previously described.

Covington points out that by avoiding the high temperatures of conductors carrying overloads, the wire insulation may have its life prolonged as much as 15 years. This and many other advantages are sure to accrue from this well-planned installation.



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The Value of Simplified Drafting Standards

*by Hans W. Meier**

I had occasion recently to help put together a set of "Drafting Standards." As we began, someone asked, "How important are drafting standards, anyway?" That is such a provocative question we agreed to a search for the answer.

Drafting standards, we found, are among the most important tools in successful drafting-room management. At the same time, they are often the most neglected. Most large offices, and a great many smaller ones as well, have documents variously entitled "Drafting Standards," "Office Manual," "Routine Book," etc. The extent and detail range from a single sheet tacked on the wall to elaborate loose-leaf books with decimal indexes. Many offices dictate everything, including the style of lettering; others leave much to individual discretion. Symbol lists vary from a bare minimum to several pages. North arrows are generally shown (and what a variety) and frequently there are rather concise statements on how to dimension a drawing. Some manuals are followed with almost religious fervor and others . . . well, "We haven't been doing it that way lately."

The diversity of these standards, in both scope and method, is amazing. Yet, there is a common intent running through all of them: to establish a consistent approach to the drafting problem. How well they accomplish their purpose seems to depend on: (a) how well the real function of drafting has been analyzed; and (b) how wisely the standards are administered.

the function of drafting

Drafting has one function and one function only: to communicate information. In this sense it is like writing, except that the customs and symbols of drafting infinitely extend the power to communicate an idea. Try to write *un*illustrated instructions for building an Empire State Building or, for that matter, building a dog kennel. Almost impossible! There are nearly half a million ways to arrange our 26-letter alphabet into four-letter groups. The possible combinations into 10- or 12-letter groups is staggering. Yet, it takes something beyond that vocabulary to describe how to flash a simple roof coping and get the message across. The added vocabulary is composed of the lines and symbols we use in drafting. Because of this extra power, drafting provides the clearest means of transmitting information from one individual to another. Skill in drafting, then, is a skill in handling this transmitting apparatus; an ability to get a clear message across to the other fellow.

Luckily, there are not many draftsmen left who consider the drawings themselves to be an end product. This subjective approach, which ignored the building but turned out drawings as a work of art, was a phase drafting passed through a generation or more ago. The mark of skill was not so much the ability to compile information in the simplest, most accurate manner, but rather the ability to draw meaningless ornament, with duplications and refinements that contributed nothing but confusion to the over-all job.

Not for a minute should we dismiss "good drafting," but let's be sure what good drafting is. In terms of writing, again, we can compare basic skill in drafting to the basic skill of handling a typewriter (although, admittedly, drafting is a lot harder to learn). It is one thing to type a contract neatly, it is quite a different thing to compose the contract. The first requires a typist, the second requires a lawyer. A draftsman is assumed to have the basic skills of drawing clean, crisp lines and of producing disciplined lettering. That kind of "good drafting" is essential. Developing the proper contrast of lines and organizing the details on a sheet both contribute to the clarity of communication. But there is another skill required, beyond that of basic drafting. It is the skill of translating the designer's idea into meaningful drawings that tell the complete story, leave no room for doubt, and yet carry no burden of extrinsic clutter. Drafting standards should help to achieve that sort of detailing.

The function of drafting is to communicate information; the function of drafting standards is to ensure clear communication by providing consistent method. Many drafting standards are

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* *Project Manager for Daniel, Mann, Johnson & Mendenhall, Architects-Engineers, Los Angeles, Calif.*

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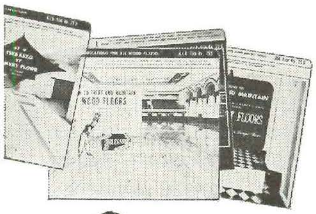

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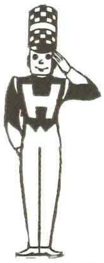

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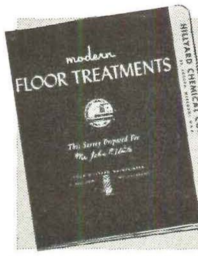

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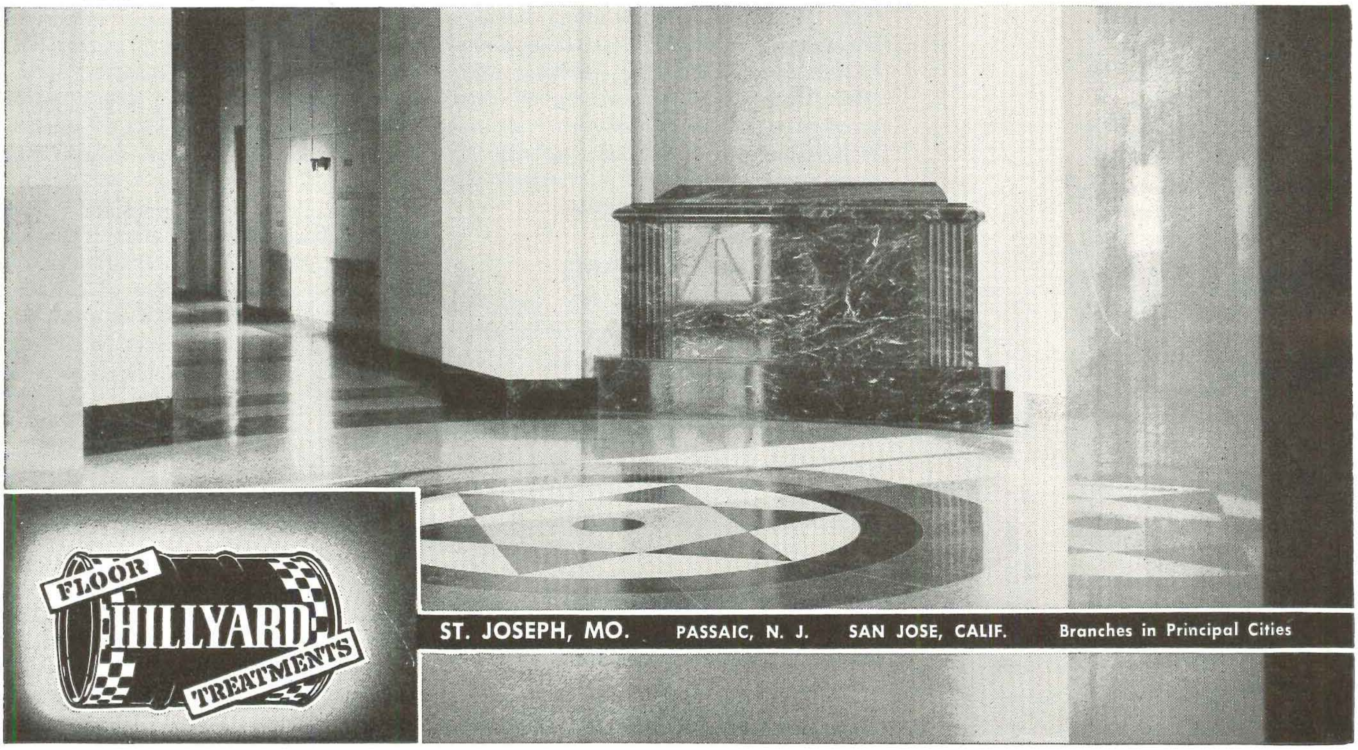

The Value of Simplified Drafting Standards

used only in the narrow meaning, as examples of line work which basic drafting should meet. In so doing, they fall short of the much greater need: the need for establishing uniform drafting practice within the firm.

what can be standardized

We then had to ask, "In view of this philosophy, what should we standardize?" The answer, it seemed to us, depends on the policy of the individual firm.

Our policy was to save as much construction cost as possible by producing clear, thorough, and accurate drawings. Not the least important aspect of this policy was, wherever practicable, to show information in the right place, but to show it only once. This forces everyone to the same source for information and avoids the frequent discrepancies where drawings have been hastily revised. It is an effective technique but must be used with discretion. So we elaborated on the "principle of single statement," just as we elaborated on our system of organizing details on a sheet and on the various other techniques we prescribed for work in the drafting room. We found these standards to be quite intelligible to new personnel, especially when accompanied by examples of the finished product.

There is a running battle among chief draftsmen as to whether lettering can, or should be, standardized. Proponents say the value of uniform lettering throughout a job outweighs the changing of life-long habits which may be involved. They point out the general untidiness of drawings containing two or more distinct styles of lettering. They feel the lack of consistency makes it a little more difficult to read the drawings as well as taking away the chance to accent certain notes by purposely switching the style or size of lettering. Opponents of standardized lettering say that draftsmen must be allowed individuality in lettering or they lose any feeling of self-expression and thus lose interest in the work.

Perhaps here is where wise administration is really called for. The value of consistency is unquestioned. Yet, that consistency is demanded of human beings—the most notoriously individualized creatures on earth. No standard should be established which is incapable of being enforced. If an office is not ready to back up a demand for fairly consistent lettering of a particular style, then it should not "standardize" on it.

simplifying the standards

Many well-intentioned standards require almost impossible variation in line thickness, size of symbols, type of stippling, etc. The purpose—to set up a symbol with but a single meaning—is admirable. But in practice the subtlety is lost when it becomes either hard to draw, or hard to read, or both. The simpler the indication, the more chance it will be adopted, used, and correctly translated.

If a symbol is accompanied by a legend in the drawings, there is not much point in duplicating the identity every time the symbol is used in the work. Yet, so often a section is faithfully cross-hatched and then noted in half a dozen places "brick." In fact, since the word "brick" is so much easier to show than a lot of diagonal hatching, the use of hatching at all is sometimes questioned. It can be argued that hatching is an accepted symbol and thus makes a drawing easier to read. This is perhaps true, and a departure from accepted practice warrants careful study. But when hatching or stippling is used, it can be used economically and still tell the story.

Complex systems of "broken" lines to indicate piping, etc., can generally be simplified a great deal. In 1950, the Department of Defense issued its *Military Standard Mechanical Symbols* in which no less than 32 distinct types of lines are called for! Except in extreme cases, three or four types of broken lines, at the most, can tell everything that needs telling, especially if the letters S for sewer, or G for gas, etc., are shown at regular intervals in the symbol and are explained in the legend.

Simplifying drafting standards, like simplifying anything else in production, requires a patient analysis of just what has to be done. Simple drafting standards are as essential to the practice of architecture or engineering as a dictionary is to the practice of writing, and in about the same way. Properly used, they make sure everyone working on a set of drawings is speaking the same language and that the language is brief, clear, and to the point. The more simplified this language, the more chance your message will get through intact.

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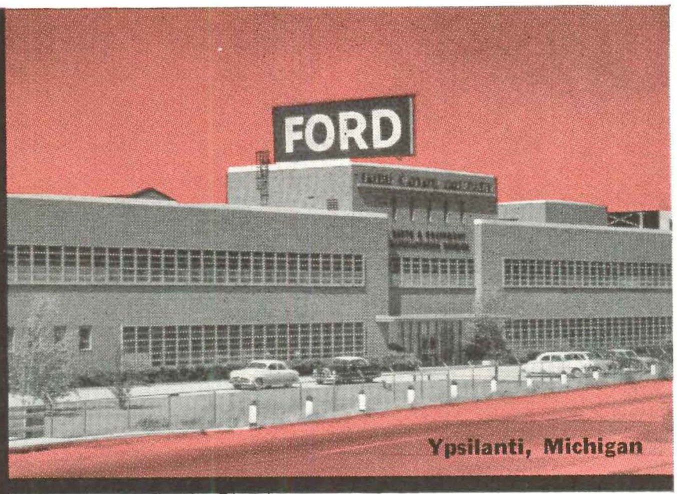

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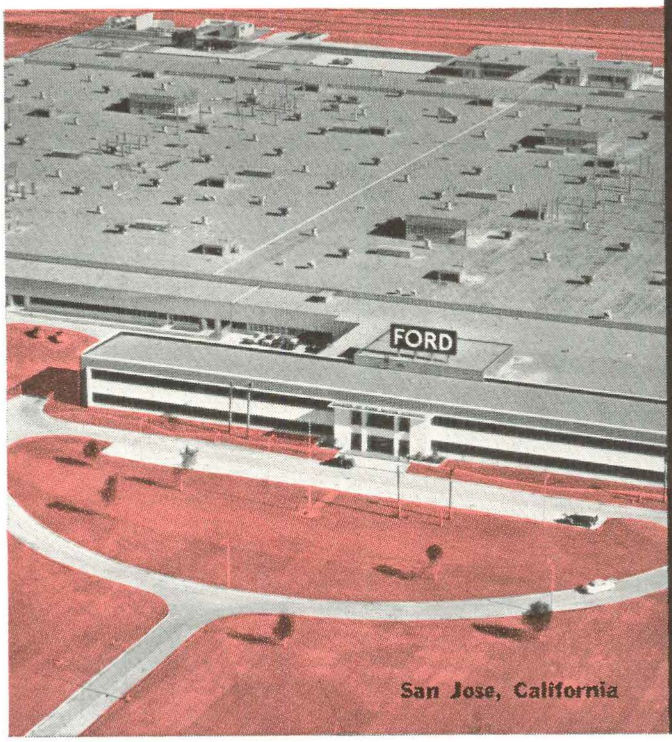

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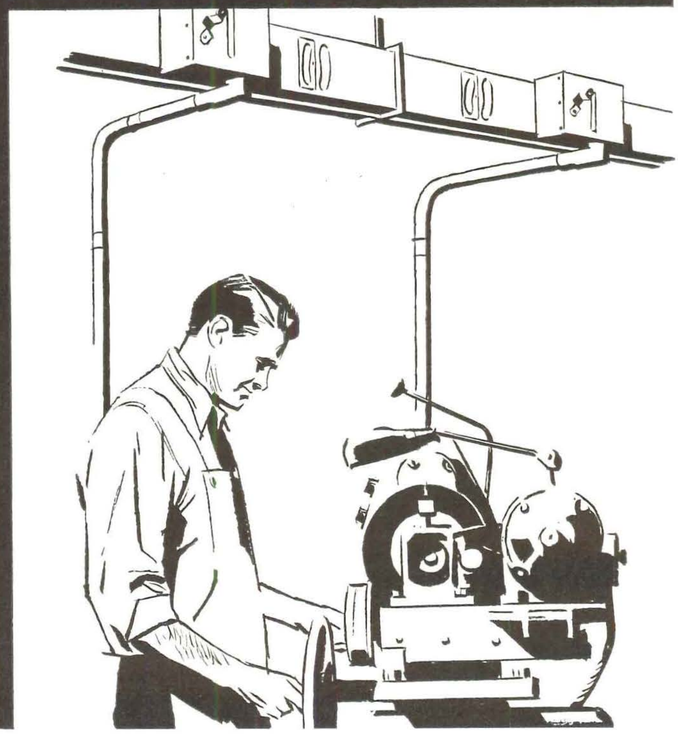

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Awards Hailed as Incentive to Better Architecture

Dear Editor: We wish to thank you and your organization for putting on this annual competition as it surely is an incentive for improving the Architecture in our country and it serves as a terrific public relations program for the architectural profession.

We have received good publicity in local papers. JYRING & WHITEMAN
Hibbing, Minn.

•

Dear Editor: We again commend P/A for being an active sponsor for Progressive Architecture.

ELMER J. MANSON
Lansing, Mich.

•

Dear Editor: Your hospitality at Detroit couldn't have been more splendid. I certainly enjoyed every minute of it. WILLIAM M. PENA
Bryan, Tex.

•

Dear Editor: Thank you for the P/A Design Award.

Eero feels the competition has become one of strategic importance in America. It really should help further the cause for good architecture.

ALINE B. SAARINEN
Bloomfield Hills, Mich.

•

Dear Editor: Let me congratulate you on a well-handled Program, and express our appreciation, not as Award winners but just as plain, everyday, old architects, to PROGRESSIVE ARCHITECTURE for the wonderful, stimulating jolt this Awards Program gives to our profession.

KARL VAN LEUVEN, JR.
Detroit, Mich.

•

Dear Editor: Congratulations on the Awards Program, and on the fine contribution which PROGRESSIVE ARCHITECTURE is making toward the emerging Golden Age of Architecture. ALEX. LINN TROUT
Detroit, Mich.

•

Dear Editor: I should like to thank you most sincerely for the enjoyable and interesting meeting in Detroit. I not only thoroughly enjoyed meeting the P/A staff, but also found it very stimulating to talk shop with a number of architects whom I had never met personally before. The occasion was well-worth going a long distance to attend, and I certainly hope that we shall earn the right to do so again sometime in the future.

FREDERICK E. EMMONS
Los Angeles, Calif.

•

Dear Editor: We have all enjoyed your excellent presentation very much. Thanks! GEORGE REED
Miami, Fla.

•

Dear Editor: I want to take this occasion to thank you for including me in your Awards Banquet in Detroit and I should like to compliment P/A on this particular program. I especially liked your statement to the effect that too often changes are made in the construction that detract from the original design and you felt that recognition should be made of the original design.

RAYMOND S. KASTENDIECK
Washington, D. C.

•

Dear Editor: I wish to take the opportunity to thank you for the splendid reception and progam which you gave us in Detroit last month. I be-

(Continued on page 14)

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

ABP

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REINHOLD

(Continued from page 13)

lieve that your P/A Awards Program is doing more to stimulate independent architectural thinking than any other such effort I know of. Along with others I appreciate the strengthening of standards other than that of commercial success. I truly hope that I shall be fortunate enough to have a similar opportunity to meet you in the future.

CARL LOUIS MASTON
Los Angeles, Calif.

•

Dear Editor: I always eagerly await the January "Design Awards" publication of the coming year's leading designs. The forward look is stimulating to all who want to see architecture evolve. The designs as a group signal a moderate step forward in the refinement of the current trend. The architecture is of a high standard though not as provocative as it has been in the past.

OLINDO GROSSI, Dean
The School of Architecture
Pratt Institute
Brooklyn, N. Y.

•

Dear Editor: Again we wish to thank you and PROGRESSIVE ARCHITECTURE for the opportunity of participating in your Awards Program. We sincerely feel you are to be commended for promoting this type of program. We believe, as you, that publicity of this type aids the architect immensely; persuading the client to accept competent, Progressive Architecture.

ROBERT G. EDWARDS
Elyria, Ohio

•

Dear Editor: I want to express the sincere appreciation of both myself and Seppel Clauss for the delightful trip to Detroit. We enjoyed every minute of it and I guess we haven't yet stopped talking about the old acquaintances renewed, the new acquaintances made, and some of the more exciting Saarinen details.

JOSEPH H. YOUNG
Scranton, Pa.

•

Dear Editor: Your issue is very exciting and we are happy to be included.

HARRY WEESE
Chicago, Ill.

(Continued on page 16)

WHEN YOU CHANGE YOUR ADDRESS

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

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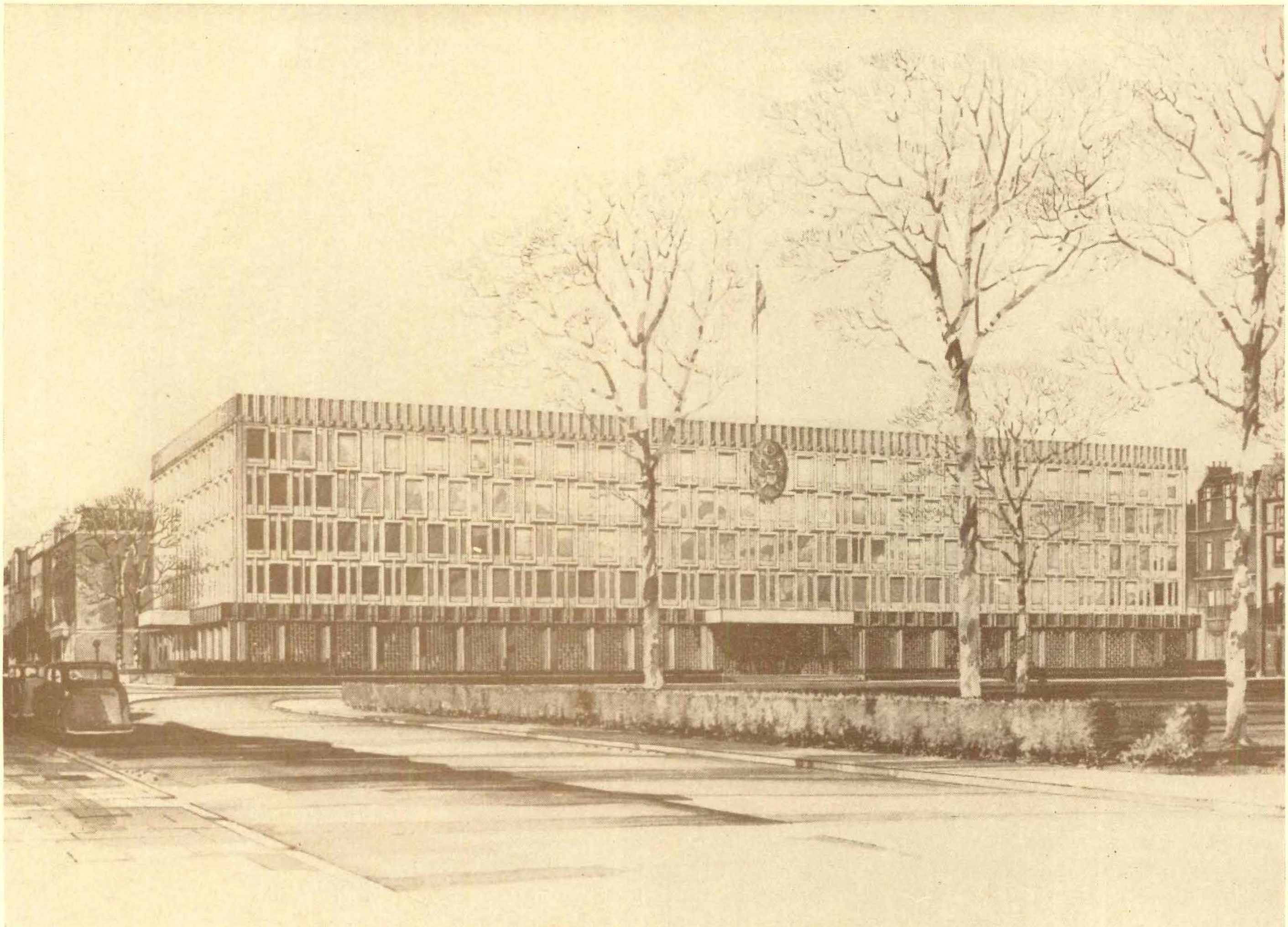
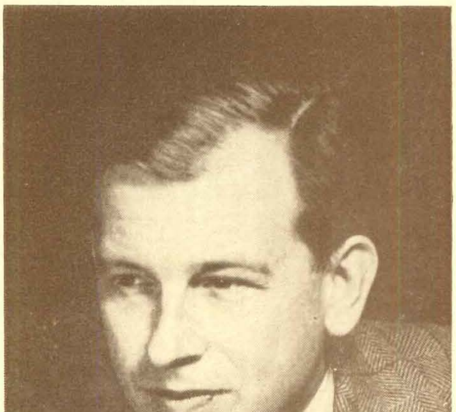


SAARINEN TO DESIGN EMBASSY



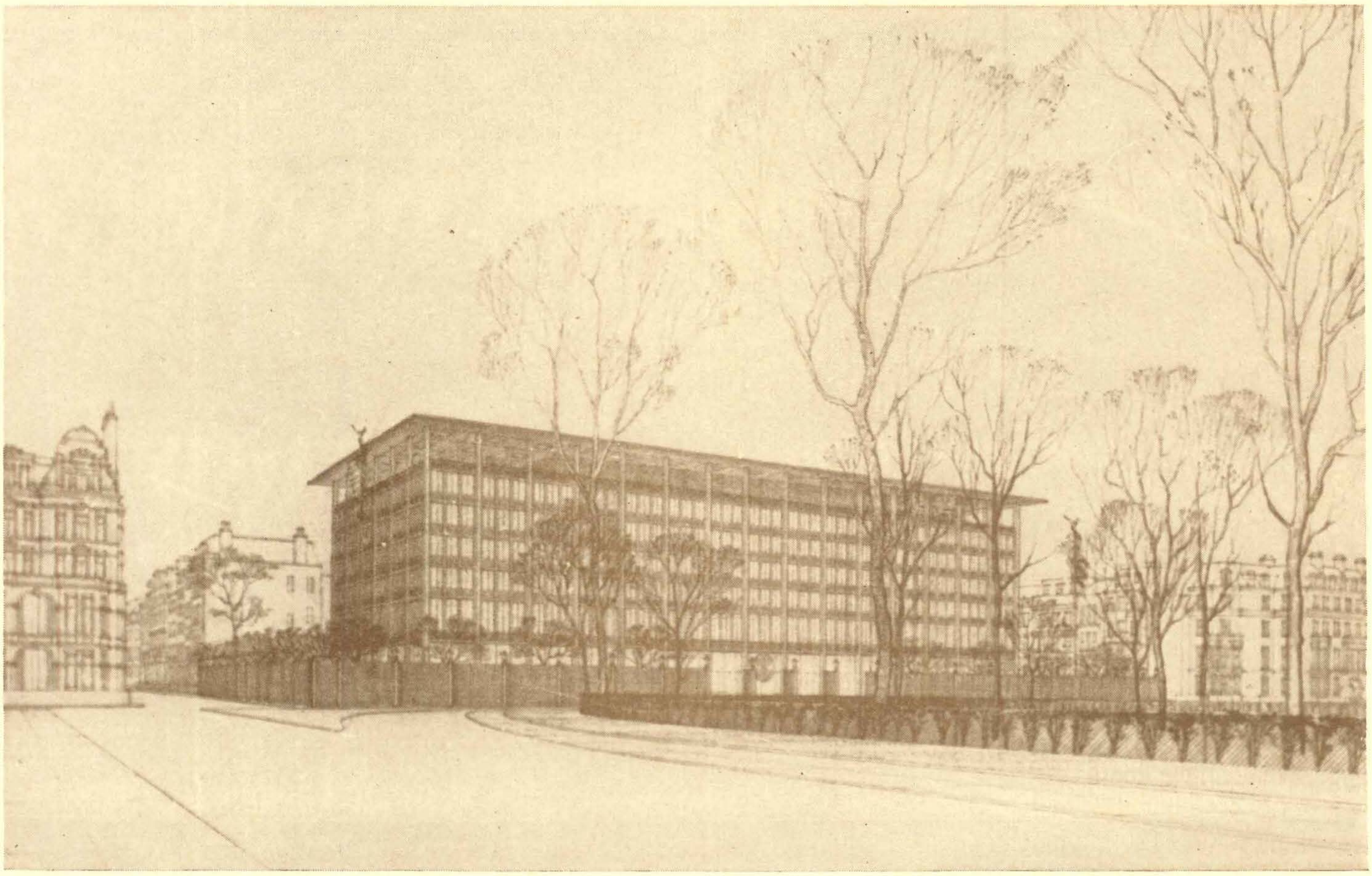
WASHINGTON, D.C., Feb. 20 — On the basis of his submission (*above*), Eero Saarinen has been named winner of the State Department's competition to select an architect for the new American Embassy in London.

Saarinen (*right*) and eight other U. S. architects were invited to enter the competition, which required the design of a building —in the contemporary idiom—to harmonize with its Grosvenor Square surroundings. The present Embassy, located on the east and opposite side of the square, will be sold upon completion of the new structure in mid-1958.

Special commendation was awarded to Edward D. Stone by the Jury composed of Pietro Belluschi, Henry Shepley, and Col. Harry McBride (Chairman), all of the State Department's FBO architectural advisory group; Ralph Walker, representing the AIA; and three State Department officials.

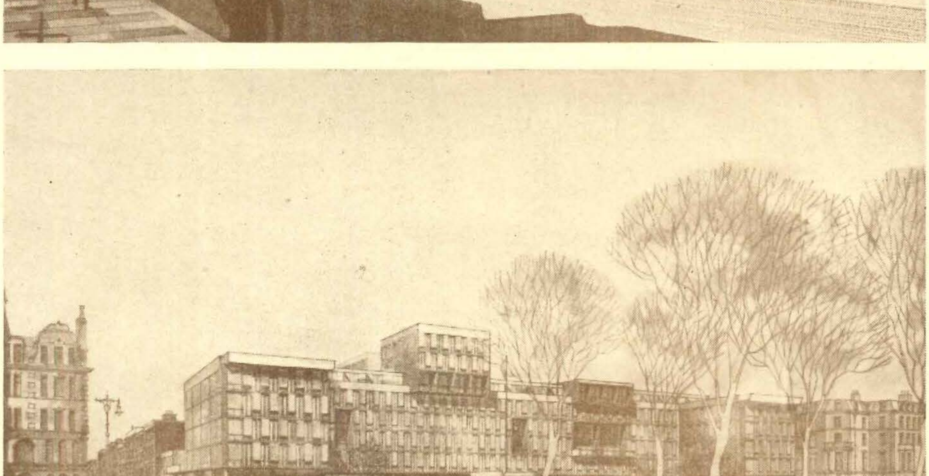
The eight competition submissions (*above* and *following pages*) were photographed at the State Department in Washington by Robert Phillips: Black Star.

LONDON EMBASSY COMPETITION



Submission by Edward D. Stone won Special Commendation

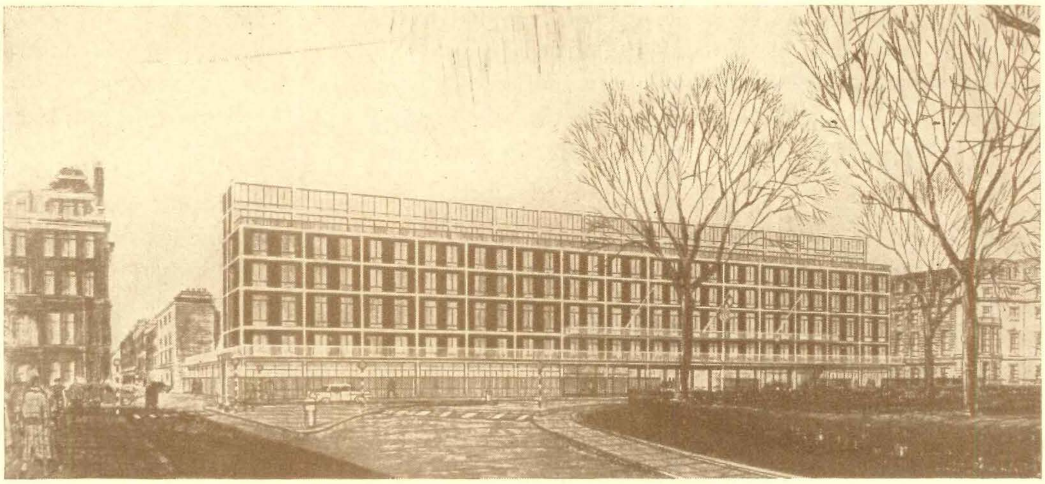
Submission by Hugh Stubbins, Jr.



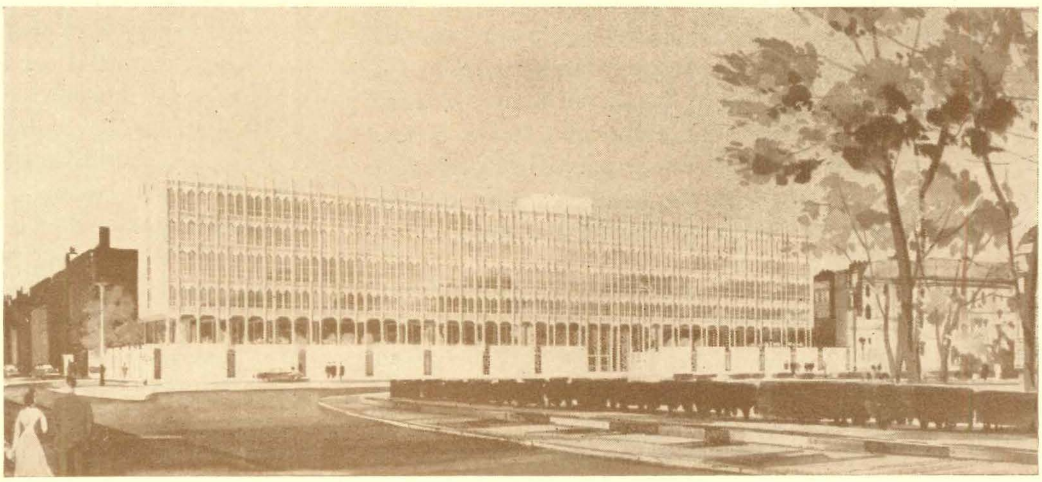
Submission by José Luis Sert

Submission by
Anderson & Beckwith

Submission by
Ernest J. Kump



Submission by
William W. Wurster



Submission by
Minoru Yamasaki

Washington Report

by Frederick Gutheim

Finding a site here and deciding what to build in the way of a cultural and convention center is a fascinating springtime activity for a 21-man Commission, whose report to Congress is due with the cherry blossoms before May 1. The Commission is made up of representatives of Congress and Presidential appointees. Set up last year, it still has no money—and got off to an understandably slow start—but the original assignment of the National Civic Auditorium Commission has since been extended for three months, and an appropriation for $125,000 for its planning work seems assured. While many difficulties remain, a promising beginning has been made on a public undertaking of great national importance.

The Capital is deplorably lacking in major cultural facilities. It also lacks, of course, the political power to initiate projects like the St. Paul arts center, the Rochester or Syracuse auditoriums. It has no opera house, no symphony hall, no civic theater. Despite the importance of the city as a convention center, it has no convention hall. Periodic events of great national significance, including the President's Inauguration and the Inaugural Ball, take place in improvised shelters or makeshift locations. These conditions have resulted in frequent humiliations. Sadler's Wells Ballet, for example, has to choose between the convention hall of the Daughters of the American Revolution, totally lacking in stage arrangements, or a movie theater where the ballet scenery is marshalled in an alley under tarpaulins. After a few struggles against hostile physical environment, major opera by-passes the capital.

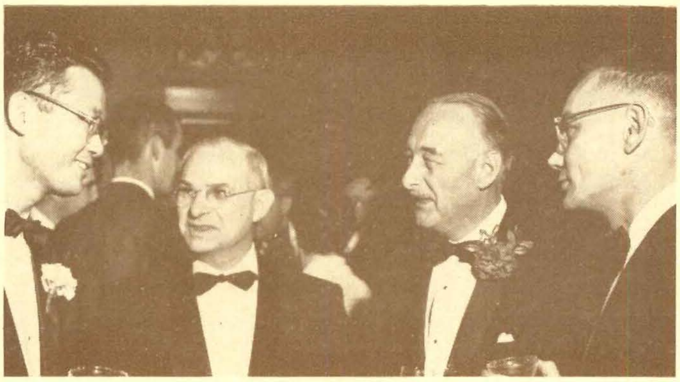
There are governmental and international overtones as well. When the much-publicized Salute to France (a co-ordinated display of theater, dance, music, and art) visited Paris last spring, the prospect of a reciprocal gesture by the French in Washington was quickly scotched. Experts in the field of communications have pointed out that no major cultural opening for the appreciation of Asian, African, or South American arts, for example, could be made until these unfamiliar performances could be presented in surroundings calculated to emphasize their interrelationships and essential unity. To the U.S. Information Program, busily engaged overseas in dissolving the image of the United States inhabited by gum-chewing barbarians, the conspicuous lack of cultural facilities in the national capital is a perpetual embarrassment. U.S. aid has helped Berlin, Vienna, and other cities re-establish opera houses, but it has done nothing at home.

Such considerations set an international standard for what is about to be recommended here, a standard one suspects the Commission itself has not yet fully appreciated. Indeed, they might have done well to travel around the world a bit and get some idea of the real magnitude of their task. Or, at the least, interview the cultural-relations attachés of the local embassies. It should be clear that the problem is essentially a qualitative one. To create a concert hall that is musically significant, acoustically outstanding among the world's great music rooms, a dignified and socially attractive place of assembly, admits little compromise with such considerations as other uses to which the space may be put, the size of its audience, its location, or similar factors. If a theater is to be created where the building itself has a genuine influence upon the audience, actors, and even the playwright, that must be the paramount objective, accepted by the architect and by all concerned. Having convinced the world that we are rich and powerful, cost can hardly compromise with quality. Whatever we do must aspire to be the best of its kind.

So far, this has not been the direction in which the Commission and its planning staff have been thinking. Headed by Pereira & Luckman, the planners have been trying to determine by some occult research the correct size of the elements in the civic auditorium complex. They are thinking in the range of a theater with 1500 seats; a music hall of 2500 to 3900 seats; a civic auditorium of 6000 to 20,000 seats; an amphitheater of 100,000 seats; and such other elements as a Presidential Hall, a Hall of States, and a tourist information facility. After the decision on size, the planners will then tackle the question of various central city and suburban sites. Locations on Roosevelt Island in the Potomac River, in the Southwest Redevelopment Area, and overlooking the Anacostia River are among those being considered.

In short, the Commission's staff appears totally bemused by the pragmatic aspects of their problem. Their development committee is headed by Barney Balaban, who made a commercial success of Paramount Pictures, probably as much by air conditioning its theater houses (before the antitrust lawyers in the Department of Justice got into the act) as by anything he did to produce first-rate movies. A cultural center that works, as the box office says it ought to work, certainly seems in the making. It is probable that Congress will also equate popular success of this sort with political acceptability. But the Commission itself is able to take a rather longer view of what it proposes. Already it appears to have surmounted an apparently irreconcilable conflict between local interests wanting a cultural facility, chiefly for music, and equally powerful local interests who wanted a boxing arena and 18,000 passenger convention hall. The latter are still in the picture, but in a subordinate role. It also seems to have squelched a real architectural horror proposed by Robert W. Dowling, a real estate tycoon and theater owner, who is a commission member: an "accordion" building with movable walls that could accommodate everything from chamber music to ice shows and national political conventions. Altogether there is room to hope that out of the present effort to gestate something, will come a project of which the nation can be proud, which it will want to build.

KLING STONOROV CLENEAY FRADLEY ROTH



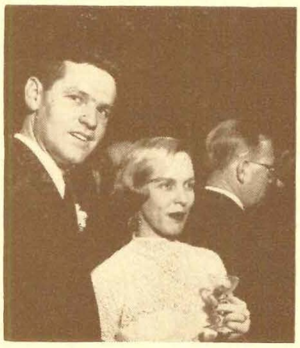
MATSUMOTO SMITH CREIGHTON TARAPATA

THIRD ANNUAL P/A AWARDS DINNER

MR. & MRS. RUSSELL MRS. GRUEN HOLMES

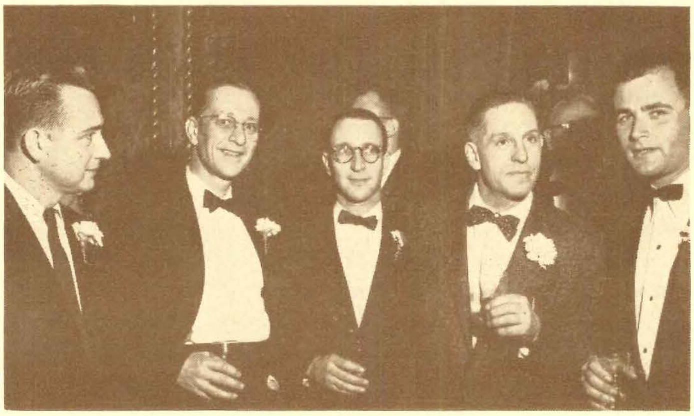
DETROIT, MICH., Jan. 20—More than 300 architects and their wives gathered here tonight at the Hotel Whittier to witness presentation of Awards and Citations in P/A's third Annual Design Awards program (January 1956 P/A). The meeting was a joint gathering of the Detroit AIA Chapter and P/A guests.

Chapter President Suren Pilafian welcomed the assemblage, and Tom Creighton presented the Award plaques, Pietro Belluschi, Dean of the School of Architecture and Planning at MIT, spoke for the Jury, and Walter Reuther, Chairman of the Building Committee of the Citizens Redevelopment Committee that sponsored the Detroit redevelopment project that won this year's First Design Award, delivered an address. Both talks will be published in April P/A.



MR. & MRS. DESMOND

JYRING KLEIN STEGNER



YOUNG CABOT GEDDES CLAUSS LUNDY

MR. & MRS. AGREE DART ELTING GRUEN CURTIS

News Bulletins

• ARCHITECTURE FOR THE GOOD LIFE will be theme of 88th Annual AIA Convention, to be held in Biltmore Hotel, Los Angeles, May 15-18. Convention will open with keynote address by John Ely Burchard, Dean of School of Humanities and Social Studies at MIT; seminars, relating to theme, will explore community planning, safety, new materials and techniques, and esthetics.

• Talbot F. Hamlin, Professor Emeritus of Columbia University, has been awarded Alice Davis Hitchcock Medallion by Society of Architectural Historians, for his recent book on America's first professional architect, Benjamin Henry Latrobe.

• Grand Award of $5000 in Ferro Corporation's Porcelain-Enamel Design Competition was won by Henry S. Brinkers, research architect at University of Illinois, for his community youth center. Prize winners in elementary-school category were: 1st, Horacio Caminos and Eduardo F. Catalano; 2nd, Stephan M. Goldner, C. Chadburne Shumard, and Hanford Yang; 3rd, Thomas Lam. Community youth center prizes went to: 1st, C. K. Chen and L. C. Chen; 2nd, Cecil D. Elliott and George Matsumoto; 3rd, Donald Goodhue.

• New York Chapter, AIA, presented its 1956 Arnold W. Brunner Scholarship, a $2400 grant, to Caleb Hornbostel, Manhattan Architect, for handbook of basic construction materials, Materials for Architecture, to be published by Reinhold.

• Competition to stimulate original thinking on relationship between residential interiors and exteriors is being sponsored by the Morton Arboretum, Lisle, Ill. Prizes and fees totaling $15,000 are offered for two- and three-bedroom houses, six of which may be built as permanent exhibit of residential landscape planting. Competition (open to architects, draftsmen, and students) closes May 7, 1956; for program, write: Howard T. Fisher, AIA, Architectural Adviser, Morton Arboretum Small House Competition, 332 W. Washington St., Chicago 6, Ill.

• Conference on Urban Design and Role of Planner, Architect, and Landscape Architect in Design and Development of Cities will be sponsored by faculty and alumni of Harvard Graduate School of Design, April 9-10.

• General Bronze Company will fabricate architectural-bronze curtain wall for new 38-story House of Seagram, New York. This metal, to be oxidized, will cover 55% of envelope; remainder will be pink-gray glass.

• Exhibition of work of Ludwig Mies van der Rohe, commemorating 70th birthday, will be held March 27-April 14 in IIT's new Architecture-Planning-Design Building, which he designed.

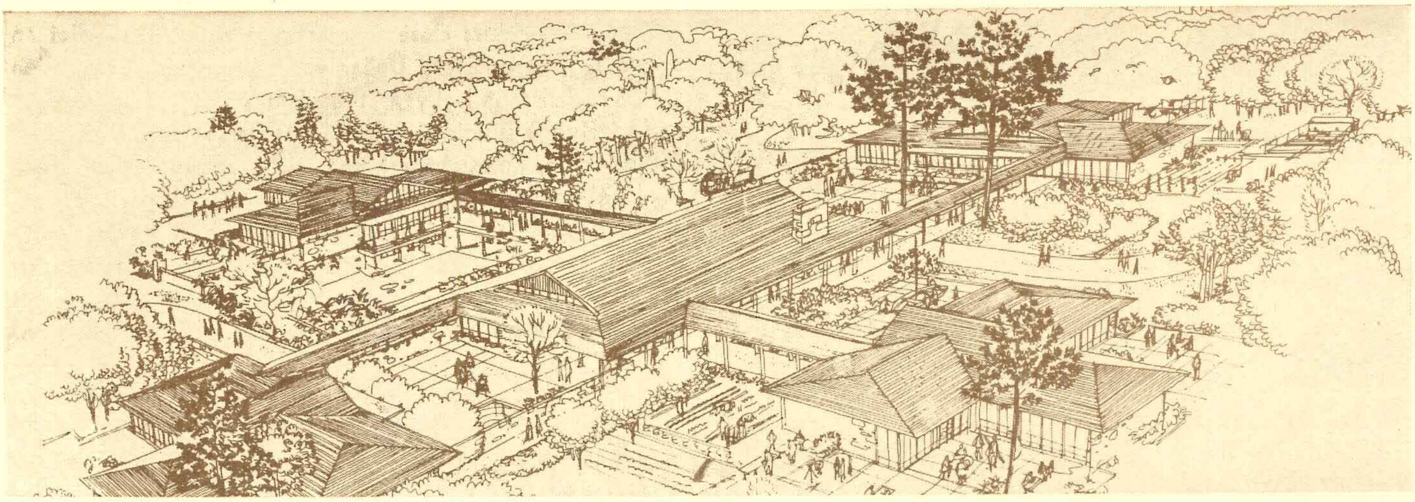
• Although 470,000 new classrooms in next five years—or about 45,000 units above present annual rate—has been set by U. S. Office of Education as "reasonable" goal to overcome existing shortage, replace obsolete facilities, and provide for enrolment increases at elementary, secondary, and college levels; money spent for new public schools in 1955 was only 14% over previous year despite increased construction costs, while spending for private educational facilities dropped 6% from 1954. . . . U. S. Dep'ts. of Commerce and Labor predicted 10% rise in expenditures for public schools in 1956 and 5% boost in private schools; but reports for January '56 show outlays for public facilities increased only 4% above same month in '55 (to $190 millions), while spending for private schools dipped 2% (to $41 millions).

• Paul Schweikher has resigned from Chairmanship of Yale University's Department of Architecture to head Department of Architecture, Carnegie Institute of Technology.

• The Society of the Plastics Industry is sponsoring an international competition to encourage ideas for new uses of plastics in residential design. Total of $3250 in prizes, for best houses and best feature areas utilizing plastics, will be awarded at 7th National Plastics Exposition at New York Coliseum, June 11-15. Competition (closing May 20, 1956) is open to architects, draftsmen, and students. Register with: James T. Lendrum, AIA, Professional Adviser, SPI Plastics House Competition, Mumford House, University of Illinois, Urbana, Ill.

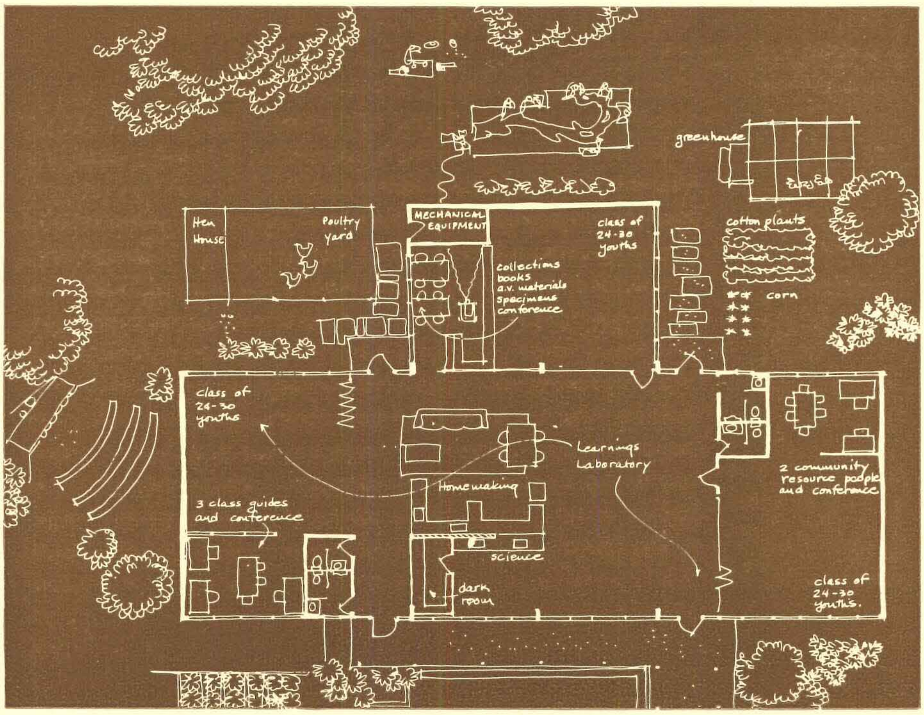
• Charles Downing Lay, 78, landscape architect, died in Stratford, Conn., Feb. 15, after life-long service to his profession—as a founder of Landscape Architecture magazine in 1910, author, Landscape Architect for New York City Department of Parks, Consultant for 1939 New York World's Fair, and as recent founder of Housatonic Valley Planning Association.

• Three new commercial projects, notably the Sheraton-Dallas Hotel, have recently been announced. . . . Union Dime Savings Bank, Manhattan landmark located at northwest corner of Sixth Avenue and 40th Street, is being demolished to make way for 32-story, air-conditioned office building designed by Kahn & Jacobs and Sydney Goldstone (acrosspage, two photos at left). Bank will occupy first three floors; remaining office space will serve New York's main textile center. . . . $40-millions Southland Center in downtown Dallas (acrosspage, center), designed by Welton Becket & Associates, Mark Lemmon, Consulting Architect, will include 28-story Sheraton-Dallas Hotel, 42-story tower for Southland Life Insurance Company, and 2000-car underground garage. Entire second and third floors of project, 175,000 sq. ft., will be taken by Hotel for lobby, restaurant, and largest ballroom in Texas. . . . Development of upper Madison Avenue, Manhattan, will be furthered by new home office for C.I.T. Financial Corporation (acrosspage, far right), located between 59th and 60th Streets. Harrison & Abramovitz are Architects for 8-story, polished-black-granite and stainless-steel structure, which will feature provisions for latest electronic equipment.



TOMORROW'S SCHOOL NEEDS DISCUSSED

by George A. Sanderson

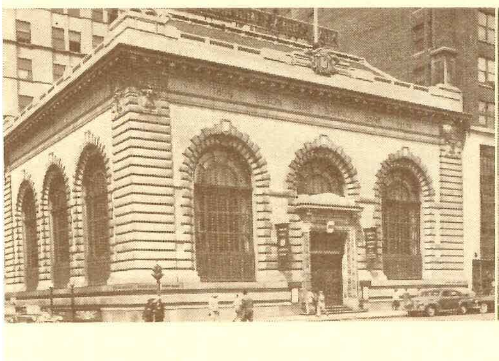


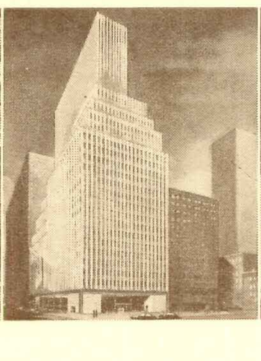
Two of the 28 drawings from John Lyon Reid's office —ranging from an analysis of total community needs to pieces of furniture—merely indicate parts of one possible "Secondary School of the Future." The cluster, an individual school within a high school, shows four "home units" joined to a central commons building. Interior space of each of the units is arranged—or rearranged—to meet the needs of a particular class or age group.

ATLANTIC CITY, N. J., Feb. 20—Crowding this resort city's hotels, Convention Hall, and Boardwalk this week was the annual Convention of the American Association of School Administrators. In addition to the thousands of educators, school officials, and product manufacturers' representatives who attended, there were school architects on hand from every quarter and an exhibit of contemporary school designs sponsored jointly by the AASA and AIA, occupying what seemed to me like an acre of exhibit space.

One of the most provocative exhibits of particular interest to architects was a 33-ft-long display of "The Secondary School of the Future," a venture sponsored by *The School Executive* magazine (Dr. Walter D. Cocking, Editor), which will report on it fully in its March issue. The result of five years of research and study by leading educators and architects, this final synthesis was developed by Archibald B. Shaw, Superintendent of Schools in Scarsdale, New York, and John Lyon Reid of the San Francisco architectural firm, John Lyon Reid & Partners.

The exhibit, which charted the course of a typical boy through his educational years from 14 to 17, emphasized the need for a so-called Partnership Program in which his community experiences, on-campus experiences, and the community resources are integrated in such a way that he increasingly feels himself to be part of his community.





Financial News

by William Hurd Hillyer

Consumer credit will have a marked effect upon architectural practice during the remainder of the year. However, in seeking causal connections its role should not be confused with that of residential building credit. Although the two are often totaled together, because they involve individual obligations and are usually liquidated in monthly installments, they are different in origin, opposite in purpose. This is evident from their respective designations: one consumes, the other shelters. Rapid depreciation puts the automobile into expensive brackets; by contrast, the home is an investment, with a value which may be maintained or even enhanced by timely upkeep and repairs.

Already, with spring upon us, consumers are finding it harder to meet their obligations than a short while back. A Boston banker is quoted as saying, "Most of the debt is owed by the middle-income group . . . earning \$3000 to \$7500 a year. They're sticking their necks too far out in relation to income." As these are the people whose housing needs engage the architect's attention most pressingly, their plight may soon reach a point where design may have to be modified or shelter curtailed. Complains a member of the Washington panel, National Association of Home Builders, "You have to sell every house three or four times, because when your customer goes to the permanent lender and tells how much he owes on car and furniture, he gets turned down."

Consumer credit and mortgage credit are presently dissimilar as to volume trend. Plottings of their respective curves reveal a percentage spread: the (\$5 billions) 20% increase in automobile, personal, and other consumer paper during 1955 compares with a partly estimated 15% increase in nonfarm mortgages of all types. Huge as was the homebuilding total for '55—some 1.3 million nonfarm dwelling starts—it was still below the 1.4 million 1950 record.

The current "slippage" is seriously noted by The National City Bank of New York. Coupled with the downward revision of automotive production schedules, it is thought to signify a narrowing and slowing of the so-called "business advance" and possibly the reaching of a long expected "crest."

By way of reassurance—even if this authority is right and a leveling or slackening period has set in, the impact will be swifter and greater upon the fast-maturing automobile and other noninvestment paper, than upon the longer-term obligations secured by improved real estate. The arithmetic is simple. A \$2400 car indebtedness means a \$108 per month payment for two years, while a \$12,000 VA 25-year home loan amortizes at only \$66.72 monthly against a presumably sound real-estate investment. That is to say, the home loan requires slightly over half the monthly payment for a debt five times as great. (This fact, by the way, should prove heartening to hesitant clients.)

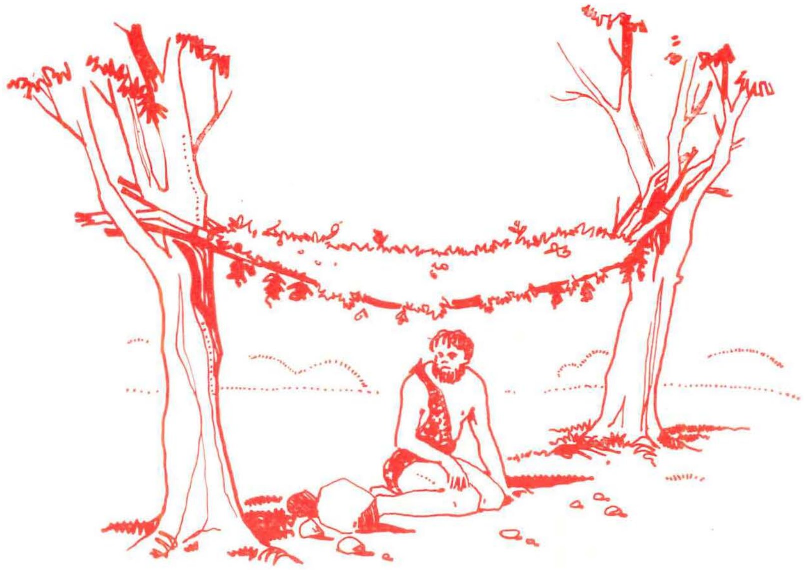
Meanwhile, bankers close to mortgage demand predict an active second quarter. Dollar volume of new construction will be higher than last year, President Welch tells his Savings and Mortgage Division, American Bankers Association. Notwithstanding, mid-February conditions are such that major banking opinion regards the rise in various parts of the economy as no longer uniform. "Neither, however, is the leveling out or decline," one observer avers. Some sectors, "like housing, may be nearing the end of the adjustment period. Others, like automobiles, are now in the adjustment process."

• Swollen suburbia is presenting new problems countrywide, to architects as well as businessmen. Its once liberal open spaces, that only yesterday bred easy-sweeping horizontal designs for residence and retail construction, are now shrinking and will soon exert vertical pressure to accommodate teeming areas. Industries move in, trucks block traffic, stores are overcrowded, a Wall Street Journal survey reveals.

• Automation is another morrow-verging development which will soon modify architectural design in the nonresidential field. The effect of internal banking functions upon bank building layout has already been noted on this page (December 1955 P/A). These functions are now objectified with automation aid. Central accounting systems are being installed by bankers to link main offices with branches and correspondents. One large Georgia institution centrally processes installment loans for 39 correspondent banks.

• General economic factors are at the moment mixed, but with plus signs still predominant:
Industrial volume output-total declined slightly the first week in February, but is still ahead of this time last year;
Automobile output was 10% below the corresponding week of '55 (ending Feb. 3);
Increased orders from construction industries helped to expand the unfilled order backlog in structural and allied steels;
Biggest rises were in heavy engineering contracts, followed by industrial, commercial, and private mass housing;
Bank clearings are running ahead of '55 in 25 leading cities.
On the other hand,
Business failures multiply—11% more numerous than last year in February's first week;
Consumer markets are losing momentum because of auto and housing slowdowns;
Federal Reserve restraints are still causing tightness of money and credit.

• Investment in new plants and buildings, up 20% for '55, is expected by bankers to advance measurably during the current year. State and local government outlay, notably for schools, likewise exhibits an upward trend. These various expenditures will be supported by a steady increase of personal income (\$3 billion up from November's annual average) together with individual savings and pile-up of corporate profits. Ratios between sales, inventories, and bank loans are considered "healthy" in competent quarters. As New York's largest bank sees it, "with this firm underpinning" the adjustments that seem to lie ahead should be handled without undue strain.



hung roofs

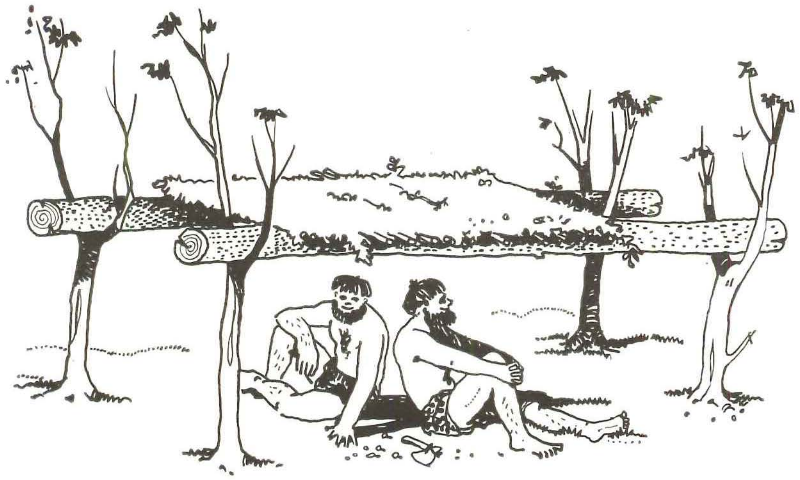
by Fred N. Severud and Raniero G. Corbelletti

Recently, sufficient interest has been aroused in hung roofs to make it timely to present some of the basic fundamentals of this type of structural design. Our presentation will be kept simple and direct, so that the basic principles are not confused by technicalities. Accordingly, no construction details will be shown. The main purpose of this discussion is to stimulate interest in this new field and to point out basic conditions under which hung roofs can be economical, practical, and graceful. The subject is so exhaustive that should all the many variants be considered, the text would become cumbersome and confusing.

Any imaginative designer can readily recognize the various possibilities for combinations of some of the elements that will be discussed. It is hoped, however, that hung structures will be approached with proper caution. It would be very unfortunate indeed if serious mistakes, made at the beginning of what seems to be a significant development in this field, were to discredit structures of this kind in the eyes of the public. This could easily happen, for example, if the subject of aerodynamic stability were not carefully and expertly analyzed. Many of the types shown would have the tendency to flutter if not sufficiently stabilized. Let us remember, then, that from the outset "fluttering" tendencies must be nipped in the bud. Although it will be impossible to deal fully with this all-important phase here, various means of stabilization will be touched upon. With this sign of caution along the road, let us be on our way.

Severud is a partner in Severud-Elstad-Krueger, Consulting Engineers, New York, N. Y., and Corbelletti is a member of Giurgola, Corbelletti, Merz: Design Associates, also New York.

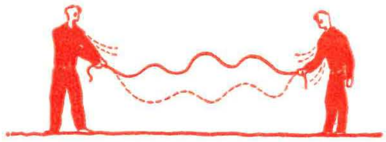
hung roofs



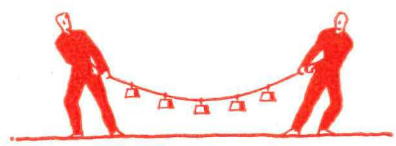
A man is shown sitting under a primitive hung roof (*preceding page*) which may not be as primitive as it looks, since it has some important elements in it that are worth considering. Although the hung roof may attract the eye, we should also look at the supports. There we see two husky trees that the man did nothing to bring about. The trees were there, so he took advantage of their great power in resisting pull. If it hadn't been for those sturdy trees, his elegant hung roof made of saplings could not stay up in the air. Rather, it would have to be supported by members that can resist bending. As an indication (not a measure) of the efficiency of hung roofs (where they are appropriate), working stresses in steel cables are as high as 80,000 psi, whereas those of steel in bending are only 40,000 psi. A roof supported by two logs in bending is illustrated (*above*). (We have shown two men, because it would take both to lift those heavy roof members.)

From the very beginning, then, it is important to have in mind two basic elements: (1) the hung structure itself; (2) provision for vertical supports and resistance to pull. The two are so intimately integrated that it is hard to think of one without the other. In any structure where a hung roof is considered, the abutment situation must be carefully explored. Just as the sturdy trees were already there, sometimes abutments are "found"—as in two buildings, or two wings of one building, for example, which often offer resistance to pull in a similar manner to the husky trees. Just as the trees have an unused capacity to resist pull, often the building's elements are in the same position. But more about this later. First, let us get into some of the elements of the hung structure.

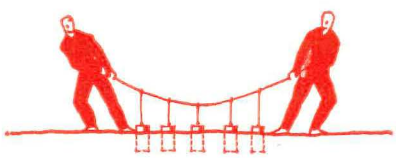
As shown (*below*), a single rope handled by two men is extremely flexible.



When heavy loads are attached to it, it becomes more stable;



even more so when these loads are anchored to the ground.

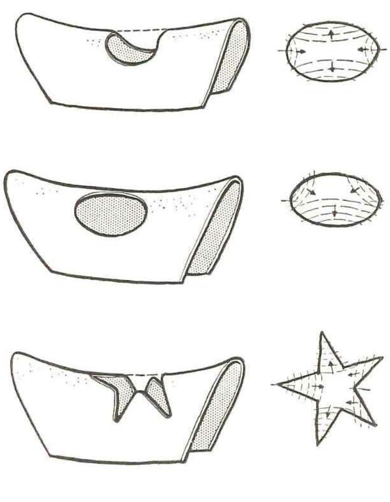


Here again it is also well to be conscious of the supports. Note that when the loads are attached to the rope, the two men on the ends must brace themselves against the pull. Instinctively they slant their bodies in such a manner that the eccentricity between the body's center of gravity and the supporting feet will help to create a stable condition.

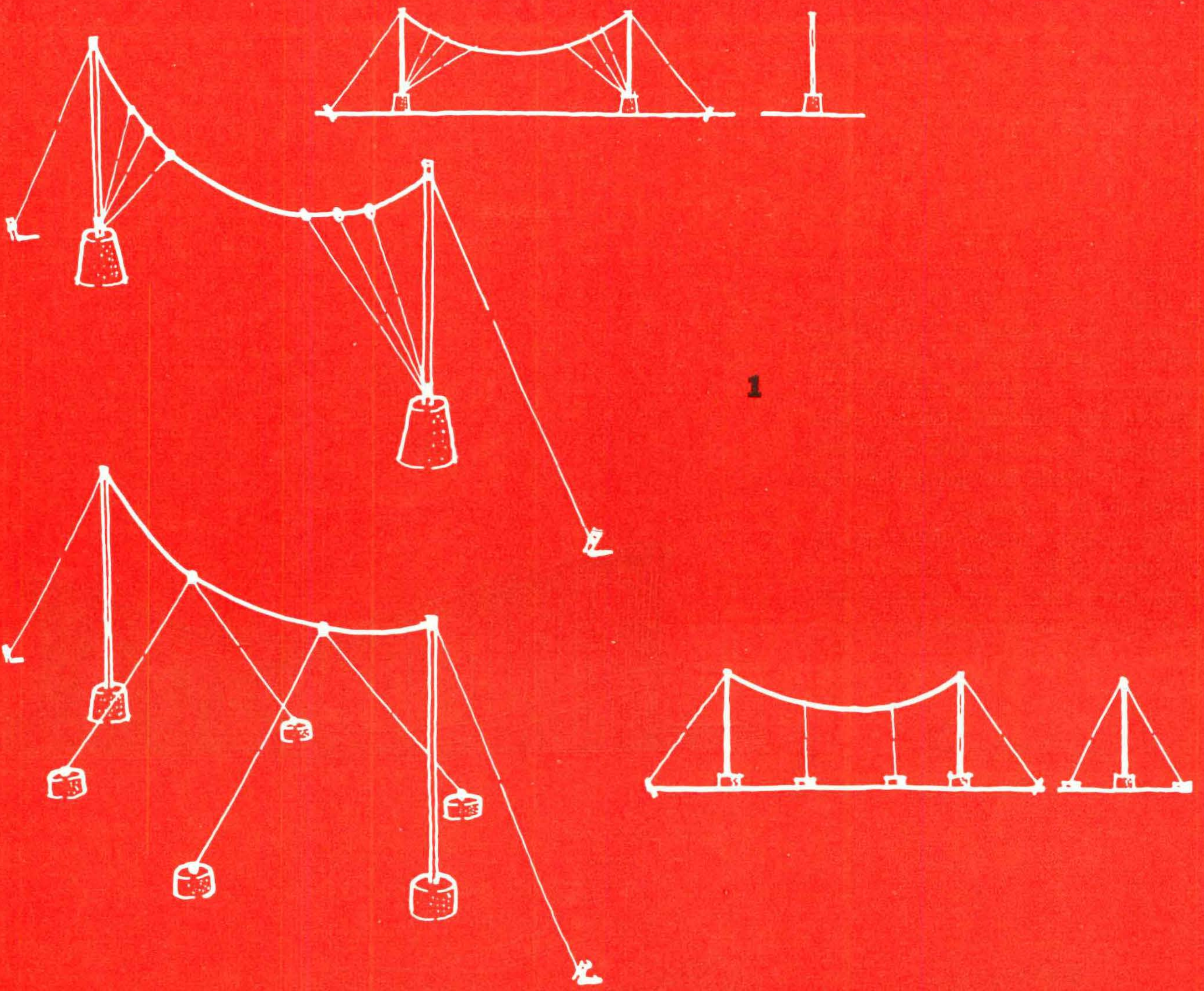
In order to concentrate better on the hung element, a different kind of support, one that is well known, is shown (**1** *acrosspage*). The pull is not resisted by the support, but instead is resisted at a fixed point at a certain distance from the supports.

In these sketches we want to concentrate on creating stability in a space structure. Since hung structures are mostly used to define open spaces, we cannot stabilize the rope by vertical wires, as shown previously. This would defeat the purpose of an unobstructed space. The necessary stability can be gained by guy wires drawn to the supports or, as shown, by spreading the fixed points sufficiently apart so that the required space remains unobstructed.

How much usable space can be obtained and how stabilization can be achieved by running stabilizing wires over several cables is shown (**2**). The bottom sketches (**3**) show how we need not necessarily keep to straight lines; but that a curvature can be achieved which will in itself create a stable condition. This leads us into the saddle shape (*below*). These sketches show



that any shape, be it symmetrical or asymmetrical, cut out of a saddle, will be stable provided the ends and the perimeters are fully anchored.



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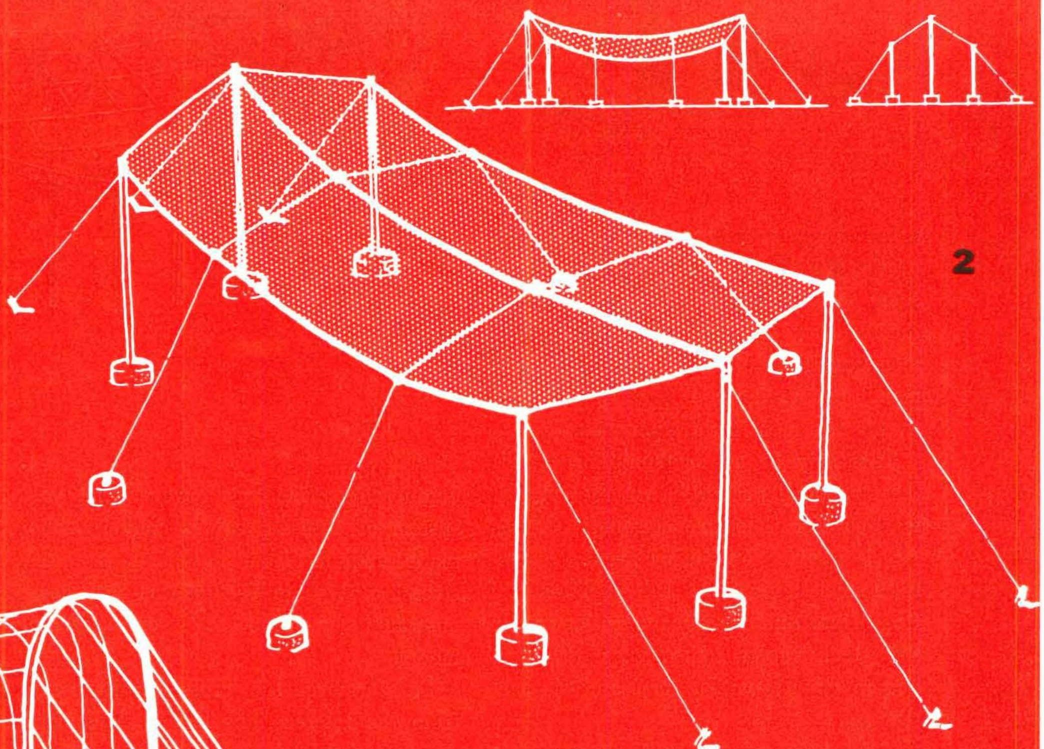

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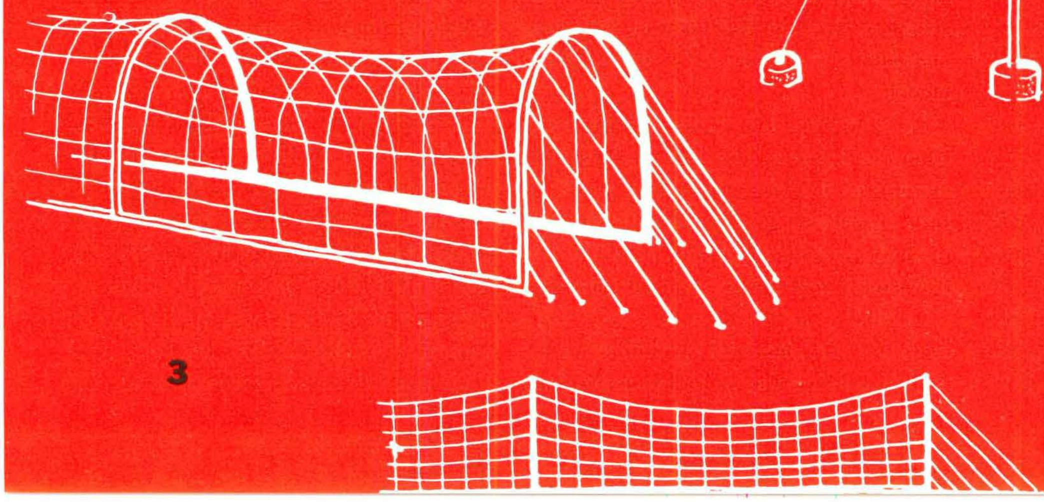
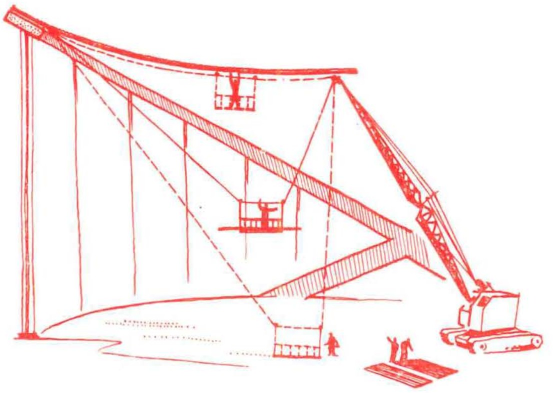


3

hung roofs

With some of these basic principles in mind, let us analyze the well-known Raleigh Arena, executed by Architect William Deitrick, based on the brilliant concept of the late Matthew Nowicki. Since so much has been published about this Arena, let's assume that we need not go into the details. The sketch (**4**) shows clearly the basic structure.



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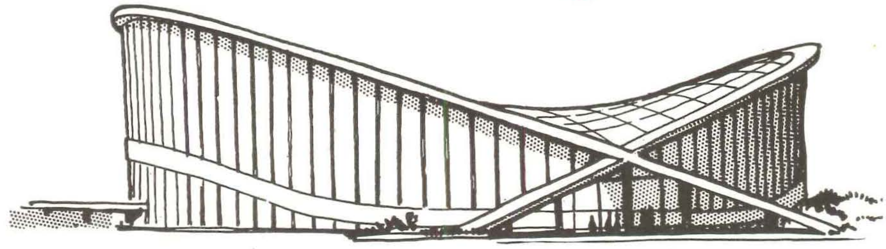

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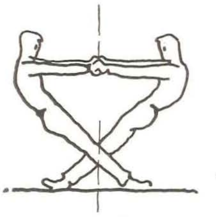
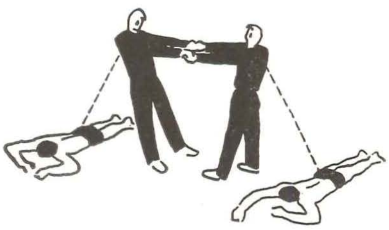
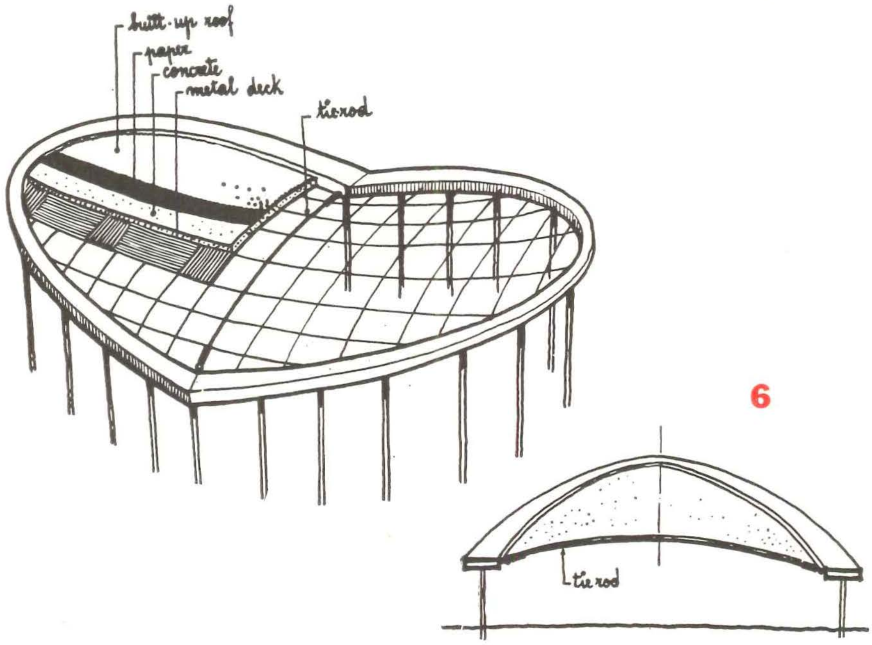
The action of the two arches may be considered similar to that of two men in a tug-of-war. Their weight, leaning back, is in dynamic stability, with pull in their





arms. Conventional suspension systems, on the other hand, are static and require some sort of tieback. This is shown by the two men standing up straight. These men require two extra men, the "deadmen," to provide the stability achieved by the two men in the upper sketch.



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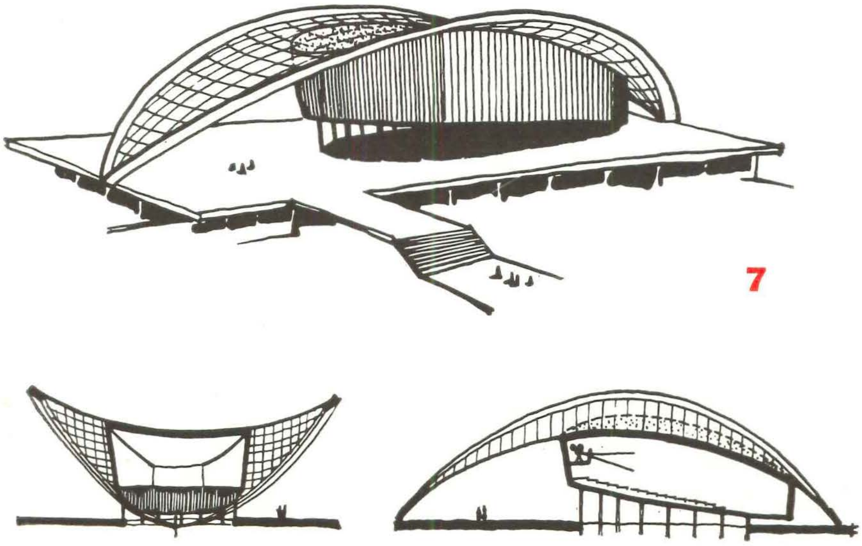
This may be an oversimplification of the structural principle, but the concept is accurate. The two parabolic arches (**4**) supported on the fireproofed structural-steel columns of the pavilion, are frozen into this tug-of-war position, while the steel cables (the arms of their human counterparts) span and support the roof.

The shape of the roof—a saddle—gives the opportunity to resist both downward and upward forces. The catenary system, spanning between the arches, resists downward forces, and the arched cables passing over the saddle resist uplift. It was soon realized from engineering principles, however, that this system of crossing cables could not be made immune from fluttering, by prestressing alone. This fact was also demonstrated by wind tests on a scale model.

Furthermore, the cross cables away from the intersections lost their convex curvature. It became necessary, therefore, to provide guide cables at the ends of both systems of cables. With this provision, prestressing could be omitted.

Originally a fabric roof was considered, but the material available at the time of bidding was more expensive than the roofing adopted—a steel decking covered with rigid insulation and roofing. With this relatively stiff roof deck, the tendency to flutter is reduced, but not sufficiently to risk elimination of the guy wires, which are designed to take the full unbalanced load without the benefit of the roof deck. Not only safety is involved, but also the integrity of the roofing membrane. The guy wires are connected to the main cables with Crosby clips, which are a kind of U-bolt. A pressure of 5000 lb was applied to the top of the clip while the bolts were tightened. In some places, several clips



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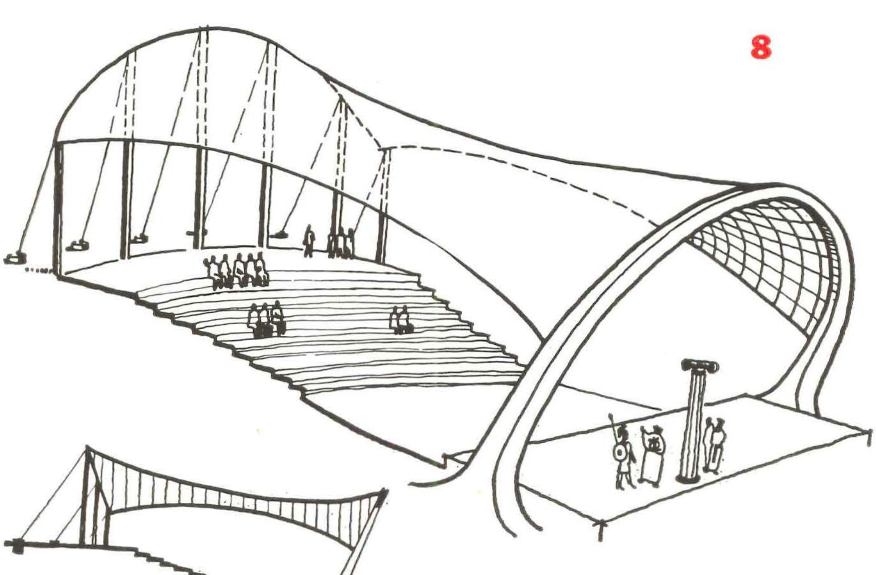

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were used together. To ease impact forces and to make the guy wires effective under varying temperature conditions, these wires are equipped with adjustable springs with load indicators. Much more would be said about fluttering, if this article were to be more of a technical nature. It is thought best, however, to call attention to this very important factor and let it go at that. As previously stated, each problem should be solved by an engineer highly skilled in space structures of this kind.

Before leaving the Arena, a very simple solution to the erection of the roof deck will be cited. Walking about on planks laid on cables might have made the workers a bit jittery. Therefore, a working platform, with proper railings, was hoisted and lowered by a crane attached to one of the arches (**5**). By swinging a crane boom, a large area could be served with each anchorage point of the cable. The platform also serves as a materials hoist for the roof-deck panels.

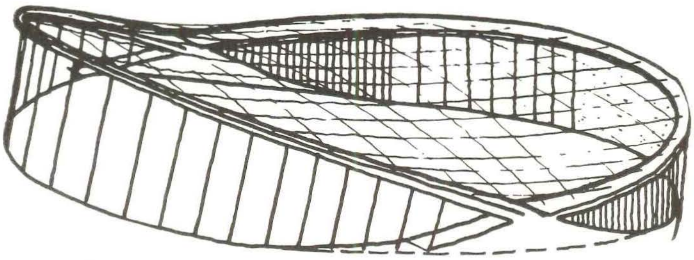
The basic structure of the cafeteria at the Corning Glass Works designed by Harrison & Abramovitz is illustrated (**6**). Although the fundamental shape bears a resemblance to the Raleigh Arena, there are some important differences. Here the arches, after meeting head-on, stop dead, rather than continuing to the ground. The tendency of the arches to spread is resisted by a tie rod in the roof construction, following the curvature of the roof. This creates an interesting structural situation which must be carefully examined. When snow and wind load hit the roof, the roof structure will deflect. This deflection will cause the tie rod to lengthen, so that there will be a certain spreading of the arches. However, if it is properly designed and built, the construction is perfectly stable and practical.

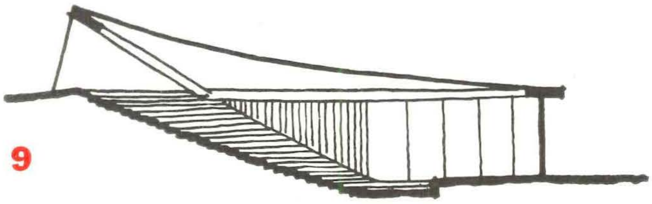
Another feature different from the Arena is that the roof is stabilized by dead weight, obviating the need for guy wires. As will be noticed, there is a metal deck clipped to the cables and on top of this deck two inches of poured gypsum concrete. With the insulation and roofing added to it, there is sufficient dead weight so that roof flutter cannot occur.

Let us now examine the Hall of Congresses in Berlin (**7**) designed by Hugh Stubbins Associates, Architects. Here two sweeping arches span 280 ft without any vertical supports, the cables in the roof preventing their rotation. Under absolutely uniform conditions, stability could be obtained by such a system alone; however, allowance must be made for unequal snow load and wind forces, so that this structure is not stable without an element to provide lateral support. This is found in the building itself. By making the "piazza" roof contiguous with the auditorium roof, advantage can be taken of the great stability of the auditorium against any unequal lateral forces. A rather heavy concrete roof, designed to satisfy sound-transmission requirements, was very welcome structurally. The auditorium roof, being poured solidly around the cables, gave an excellent means of connecting the two elements.

In most of the systems shown so far the anchorages have been of a symmetrical nature, so that the anchorage at one end has been identical to the anchorage of the other. It is important to note, however, that with a hung roof there are great

hung roofs





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opportunities of varying the anchorages at each end. As an example, the basic principles of construction of a proposed amphitheater by Harrison & Abramovitz, Architects, bring some of these elements into focus (**8**). Here we see a familiar sloping concrete arch at one end. However, this arch does not lean back nearly as much as others that are supported vertically. It also has a flare at the base to resist moments. Without vertical support, the arch must be able to resist unequal forces, and that means it must resist not only the cable pull but also the bending caused by such unequal forces. Obviously, the structure must be stable, both with and without snowloads. The entrance anchorage is by rock anchors, recently developed, that provide the necessary security. (Fortunately, hard rock was available.) It should be remembered, therefore, that when rock is present it may well be that an anchorage of this type is the most economical. However, the main reason for including this sketch is to highlight the opportunity of considering a variety of anchorages, whichever the functions of the building and site conditions will permit.

Another interesting feature in connection with this project is that resistance to fluttering is accomplished by end cables that are sufficiently prestressed. As will be noted, these cables have a curvature in both the vertical and horizontal planes. In this position they are highly efficient and will create anchorage in a very efficient and economical manner.

At this point I should like to introduce Frei Otto, a German architect who visited our office while the Raleigh Arena was under construction. He liked what he saw and from that time on has done a great amount of work in this field. In fact, he has written a book about hung roofs which we can recommend for its versatility of presentation and good factual information.[1] We have been in constant communication with Otto since his visit, and it is with his permission that we reproduce some of the sketches from his book, and

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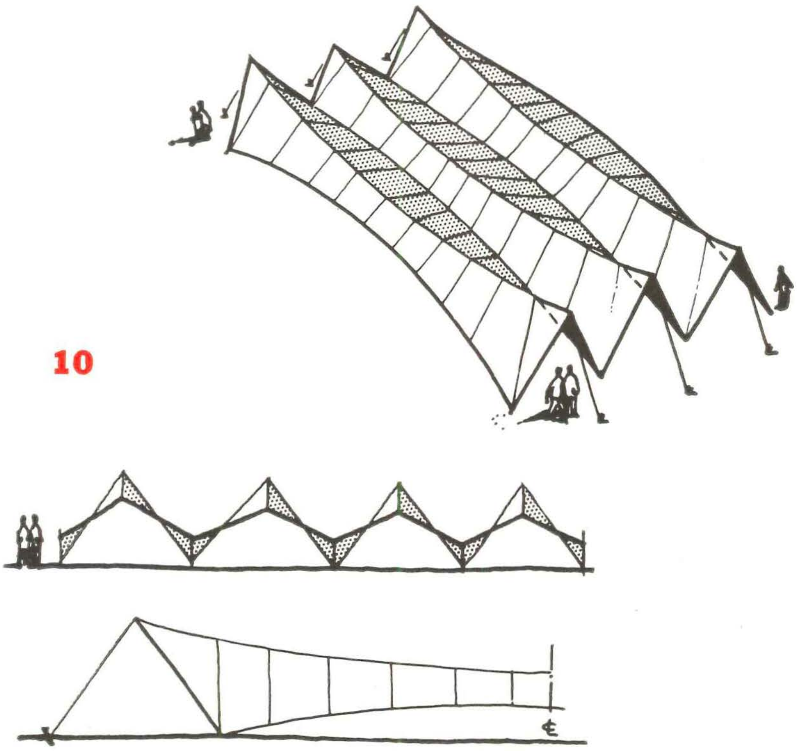

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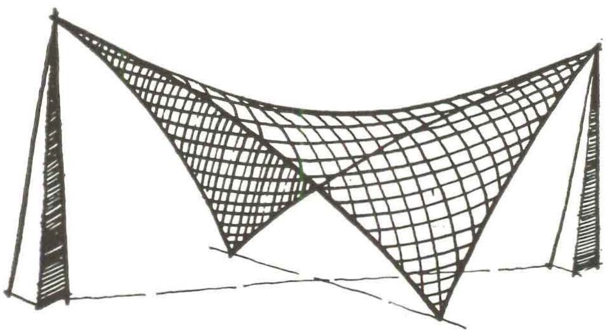

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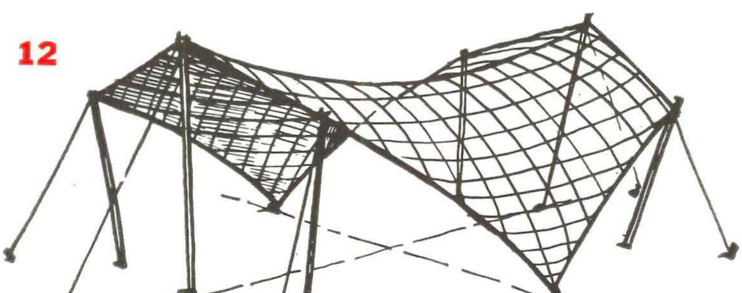

[1]Dr.-Ing. Frei Otto, Das Hängende Dach (Berlin: Ullstein A. G., 1954). *The Hung Roof* (American Distributor: Wittenborn & Co., 38 E. 57th St., New York 22, N. Y.).

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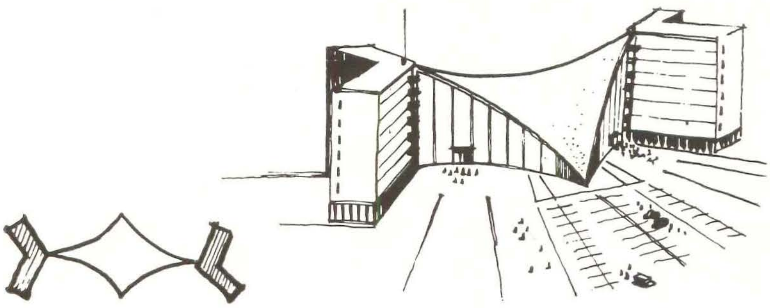

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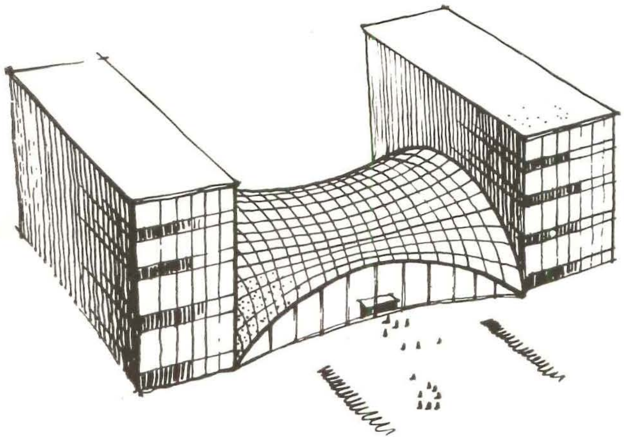

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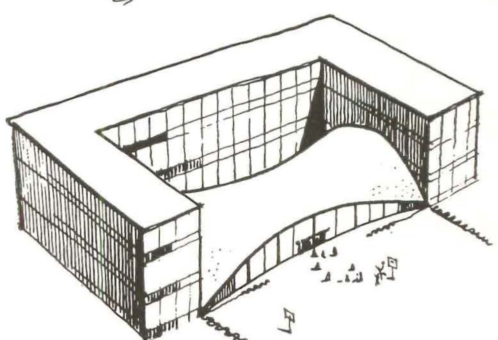

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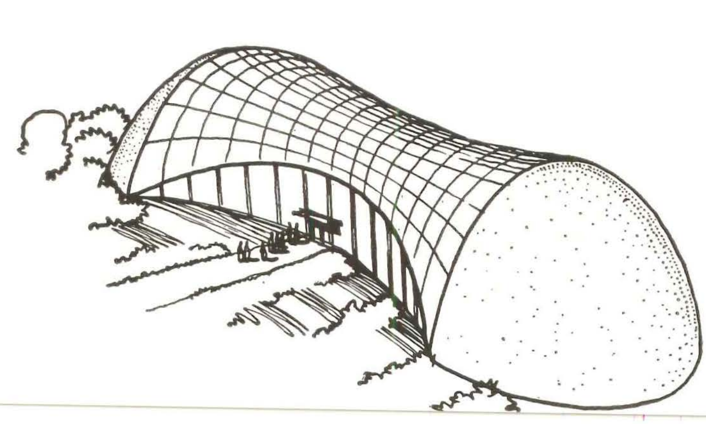


17

say a few words about them. The principle of creating different anchorage conditions is again illustrated (**9**). In one case the arch resisting the pull has a very small rise (horizontally), and in the other it is much larger. This gives opportunity for many very interesting shapes.

A system of creating a zig-zag roof in a very simple and direct manner is shown (**10**). Note here, again, the system is stabilized by edge cables sprung between fixed points. Obviously there is no reason why this system cannot be used to roof a building, rather than just covering the ground as shown.

A few other graceful forms have been selected from Otto's book. One sketch (**11**) shows how high and low anchorages can be gracefully combined. Another (**12**) is based on the same principle, but using six high points and two low anchor points. The sketch (**13**) may look somewhat fantastic, but we are sure it is very realistic, given the proper rock contour. Here a whole valley is covered over, anchoring the hanging structure to the rock. On this note, we will now say goodbye to Frei Otto, though we are certain to hear from him again in this field.

The sketch (**14**) is a modification of sketch (**11**). It shows how the high supports can be formed by buildings instead of separately created abutments. These buildings have unused lateral stability and therefore the abutments are "free." This is the same principle that introduced this discussion (*illustrated on first page*). Both (**15**) and (**16**) show other ways of taking advantage of adjacent structures. The bottom sketch (**17**) should be self-explanatory. The concrete shells furnish stability for both vertical and lateral forces.

At (**18**) is shown a simple triangular form, where cables are anchored to sloping girders in the roof surface. These sloping girders double as sunshades. Because such an anchorage creates heavy bending, it would be more practical under many circumstances to create the form shown at (**19**), which is modified to curve the sides of the triangle into an arch shape, thereby resisting the pull in a more efficient manner.

hung roofs

Let us consider how hung roofs can be formed by a combination of sloping-end arches and intermediate arches in a vertical plane (**20**). The end anchorages are sloping concrete arches. These normally will have vertical supports but they aren't shown since they are not essential for stability if unequal forces can be taken in other ways. The sketch clearly shows how large areas can be covered in a very economical fashion. We have worked on schemes to cover racetracks and similar areas, and it seems that a system of this kind is by far the most economical when dimensions of that magnitude are contemplated.

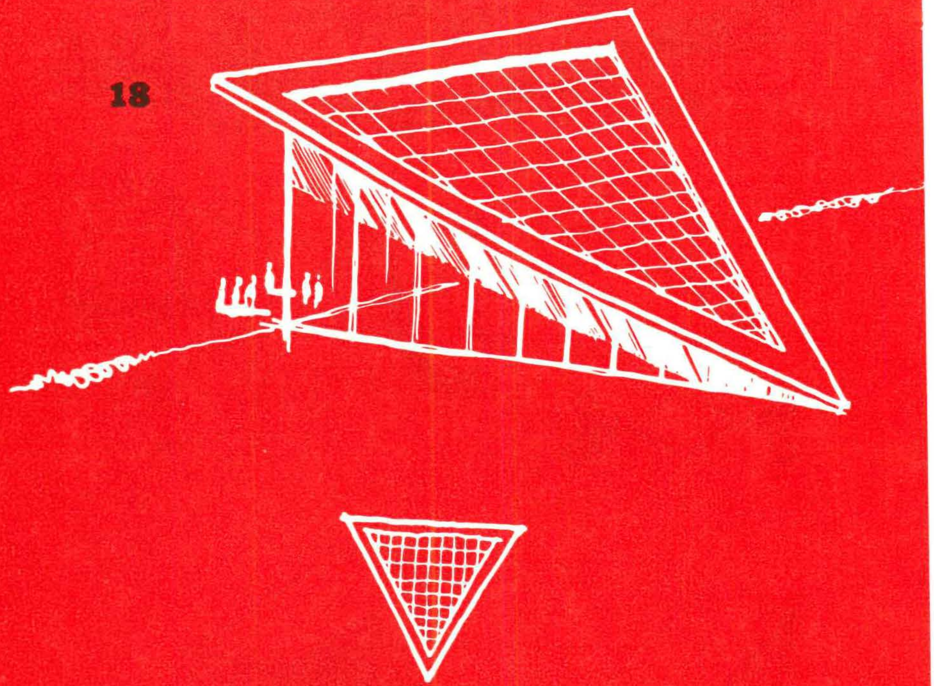
The last sketch (**21**) shows a form that has limited usefulness in itself but does show the versatility of a hung roof. Forms that otherwise would be prohibitively expensive to create in the United States can very readily be formed as the cables are fastened in their proper locations. It is a bit of a chore, however, to figure accurately where the cables should be fastened and what the length of each cable will be. However, electronic computing machines that are now available take the curse off this chore so that this drawback is not of too great a significance.

conclusion

Hung roofs are here to stay. (That has been demonstrated by the fact that the Raleigh Arena weathered two major hurricanes with flying colors.) Many opportunities have been missed and are being overlooked currently to employ this graceful construction medium. If we are to build structures of this kind in the future, from their beginning they must be visualized on the basis of this structural conception.

However, this demands mental training for all of us. May we suggest that this training start by keeping an eye open for opportunities, past, present, and future? By analyzing opportunities missed, projects on the boards now, and future possibilities, an atmosphere can be created wherein hung roofs become an accepted part of structural and architectural thinking.

18



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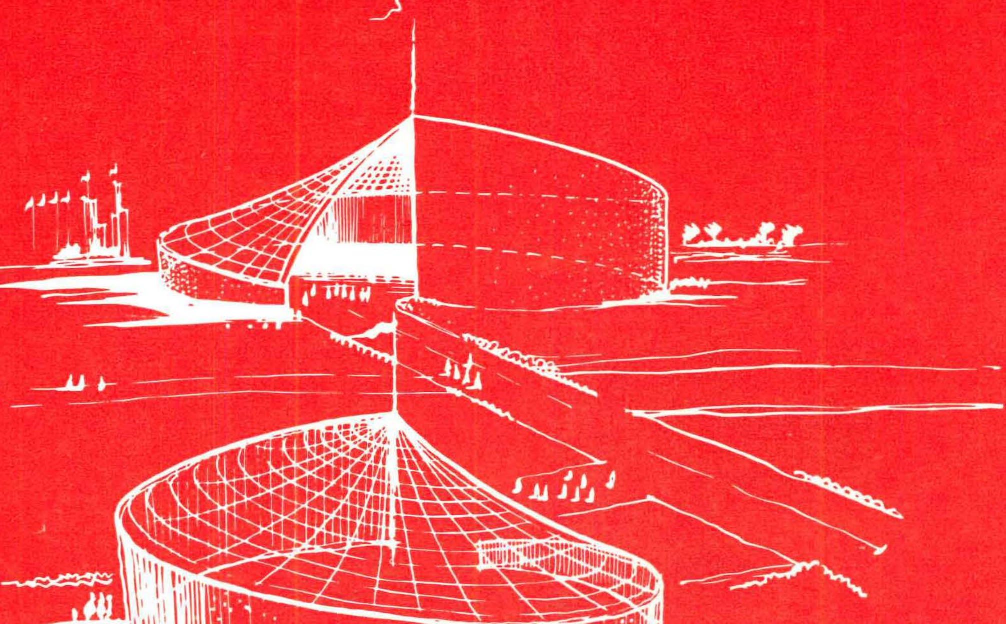
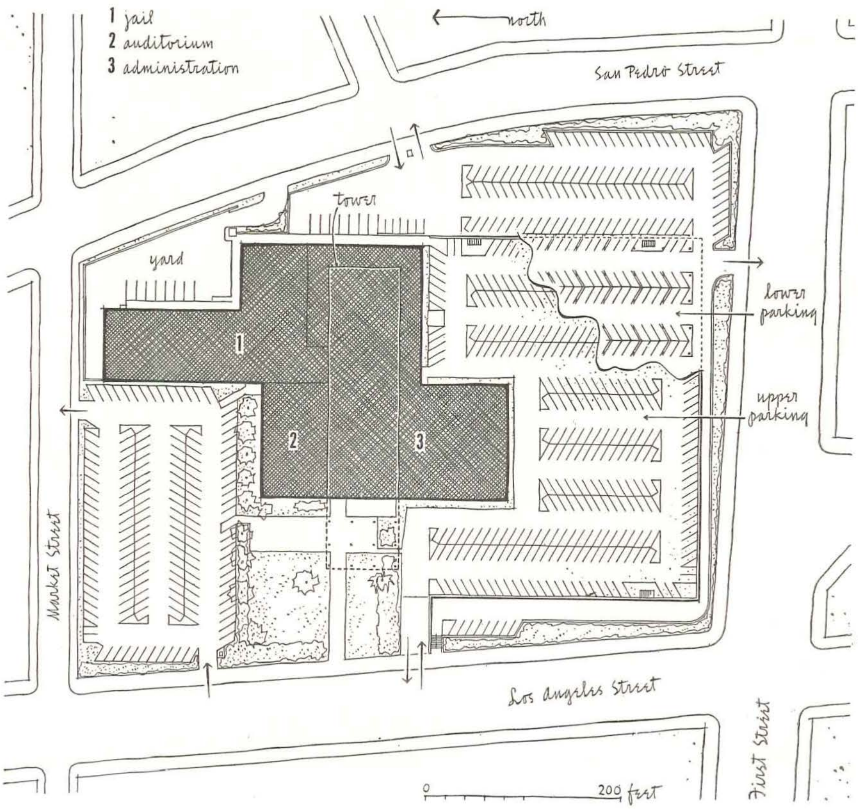


21

police headquarters

location	Los Angeles, California
associated architects	Welton Becket & Associates and J. E. Stanton
director of design	Maynard Woodard
project architect	Francis Runcy



The Police Administration Building of the City of Los Angeles occupies an entire downtown block—a prominent unit in the Civic Center (tall building in photo acrosspage is City Hall). *Use of site slope provides two-level parking for 850 police cars. The public has a separate parking area* (above). Photos: Julius Shulman

police headquarters

Few police buildings anywhere are known for their architectural merit; even less for their use of the related arts, or for landscaping of their sites. In all these respects, the new Los Angeles building is an exception. In addition—and most important—this structure represents a brand-new building design category; one that will be seen increasingly in the years ahead. For under this one roof (except for a very few patrol divisions) are all of the police facilities for the entire city.

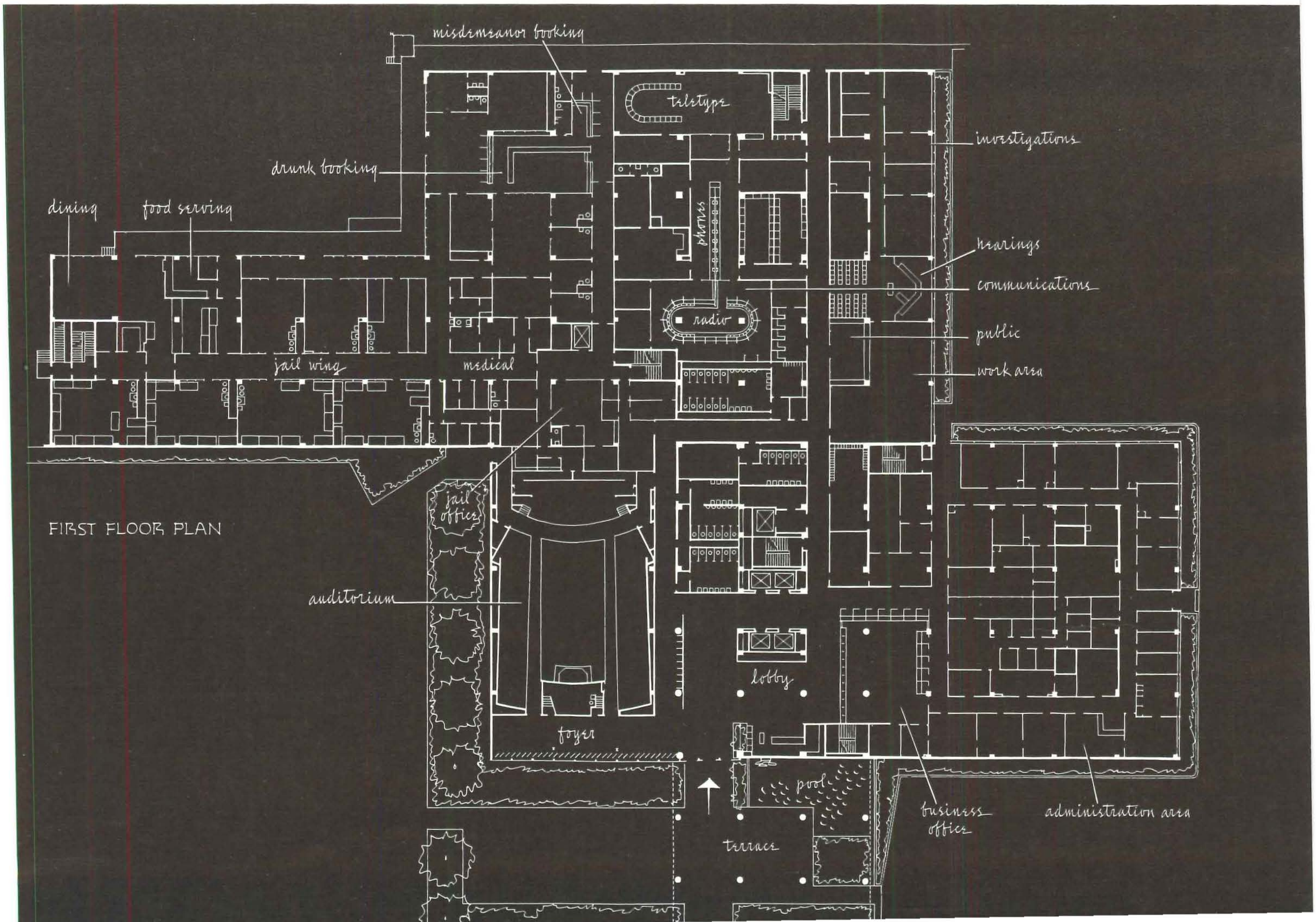
What made such a single building feasible to serve a municipal police department? The answer lies chiefly in the extensive use of the most up-to-date communications systems; electronic devices; and elements of automatic control—new tools that modern technology has provided. Incidentally, these subjects form the base around which the May issue of P/A will be built, and several of the systems used in this building will be discussed in detail in that issue.

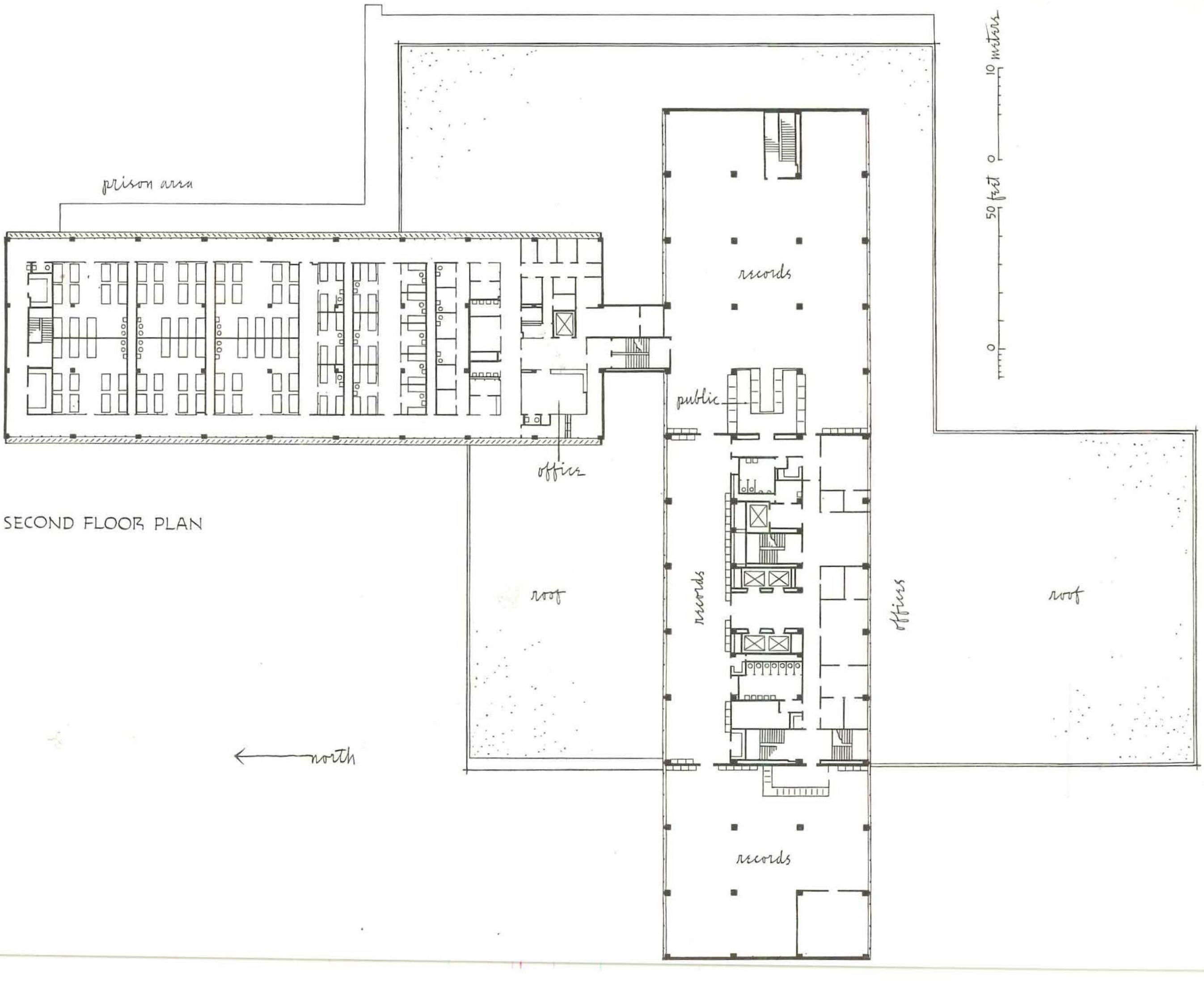
On the ground floor (half basement), which opens directly to the ground-level parking, are facilities used regularly by uniformed officers—locker rooms, assembly rooms, field supplies, etc. In addition to the information center and business offices, the first floor contains the essential communications center (complaints to headquarters; headquarters to street phones and patrol cars, etc.), the Traffic Division, offices of the Police Commission, an auditorium, and the jail. The second floor provides for the felon prison, and the record and identification bureaus. The detective bureau occupies the third floor, and the five upper floors house bureaus and offices.

The reinforced-concrete structure has rigid aluminum sash and spandrels of mosaic tile. Ceramic tile surfaces windowless wall areas. Windows of the east and west walls of the jail wing are light-protected by vertical aluminum louvers; and continuous, perforated, ribbed sheet steel panels are used in the jail (instead of wire mesh) as restraining barriers. Except for the jail, the building is fully air conditioned. Artificial lighting consists of both fluorescent and incandescent fixtures.

Bernard Rosenthal's sculpture, The American Family, mounted on the wall beside the main public entrance (*across-page*) has caused much argument pro and con—and from coast to coast. At last report, it was holding its own.

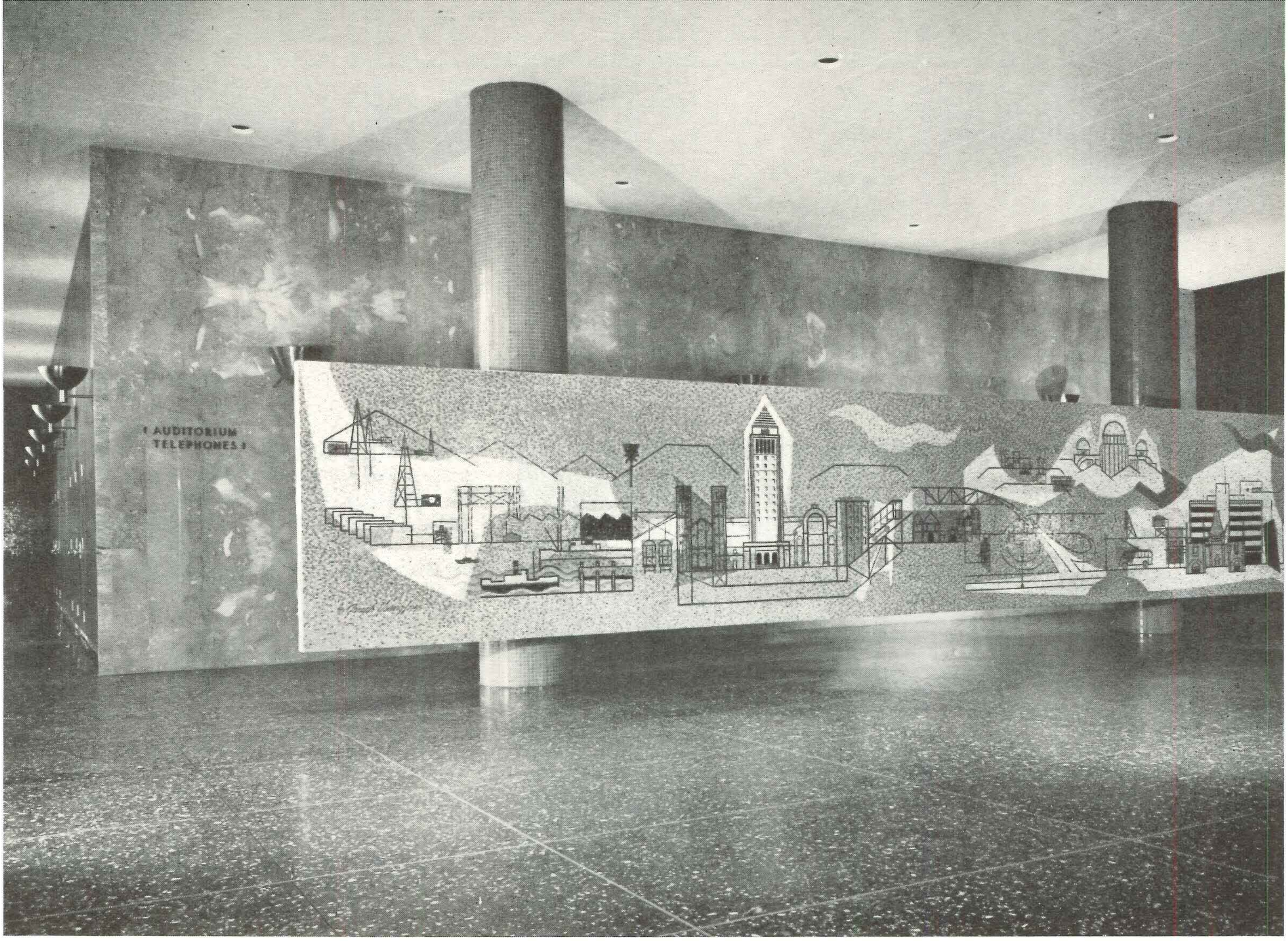
Working with the Architects were Murray Erick and Paul E. Jeffers, Associated Structural Engineers; Ralph E. Phillips, Inc., Mechanical-Electrical Engineers; and Ford J. Twaits Co. and Morrison-Knudsen, Associated General Contractors.




prison area
records
public
office
SECOND FLOOR PLAN
roof
records
offices
roof
north
records
0
50 feet
0
10 meters

police headquarters

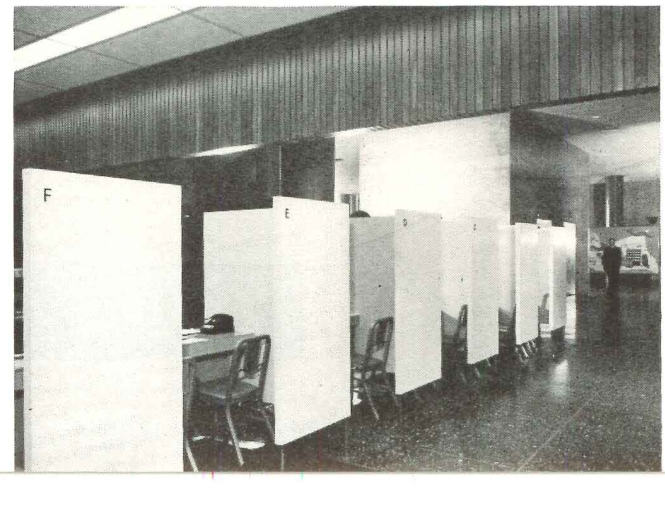
The 400-seat police lineup auditorium (top) opens from a lobby (right) immediately to the left of the main entrance to the building. The audience sees suspects through a big show-up screen, but the suspects cannot see the audience. Special controls make it possible to reproduce the exact light conditions under which victims and witnesses saw the crimes committed.



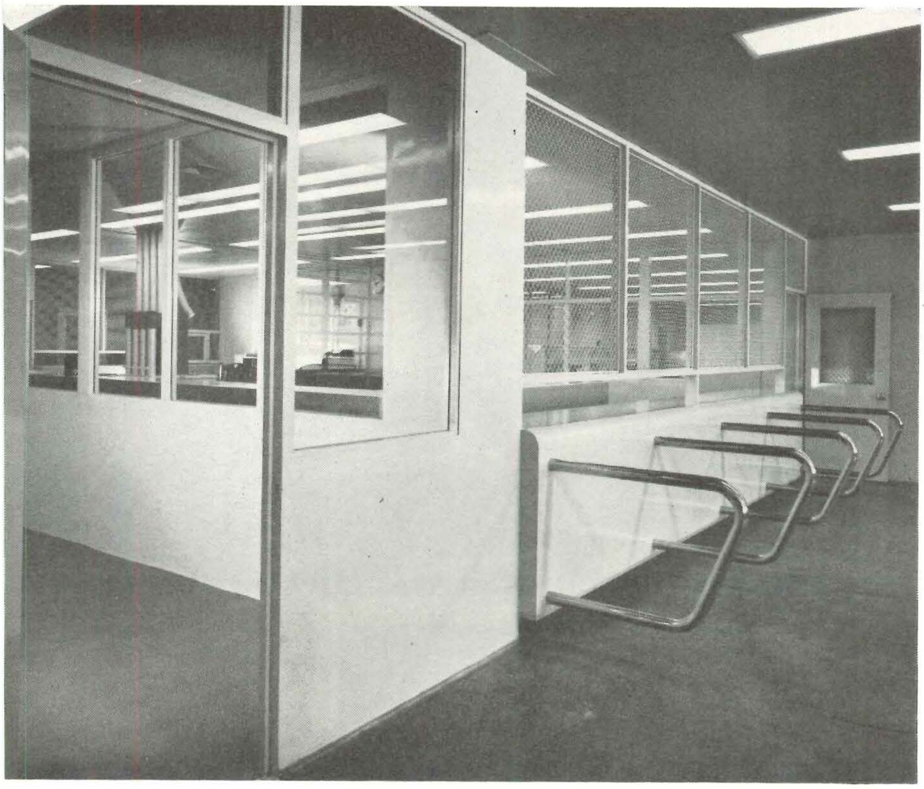
A feature of the richly finished main lobby (above) *is a 36-ft-long, 6-ft-high, cantilevered glass-mosaic mural, designed and executed by Joe Young. The mural, depicting landmarks in Los Angeles history, is anchored to the structural columns by steel I beams.*

At the main information desk (right), *uniformed officers are on duty at all hours.*

Set slightly apart is a series of report booths (bottom) *where either civilians or the police may dictate to stenographers seated at the other side of the desks.*



police headquarters

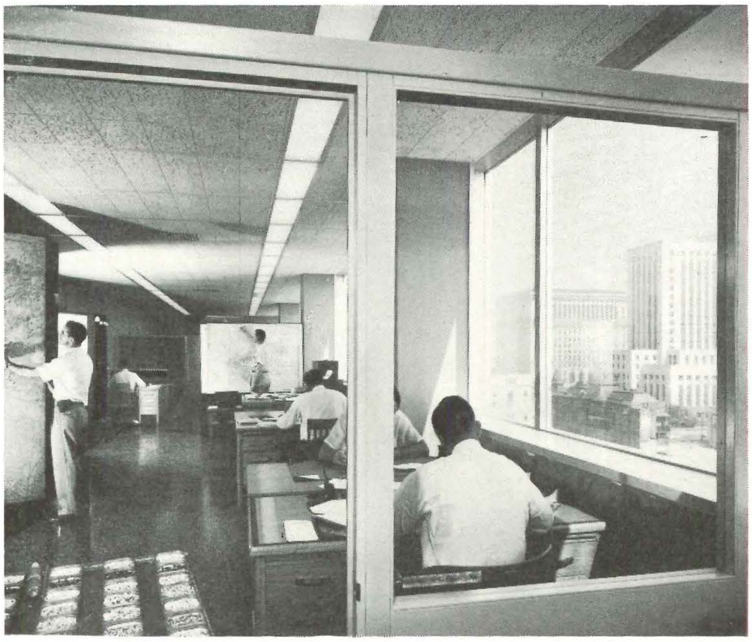


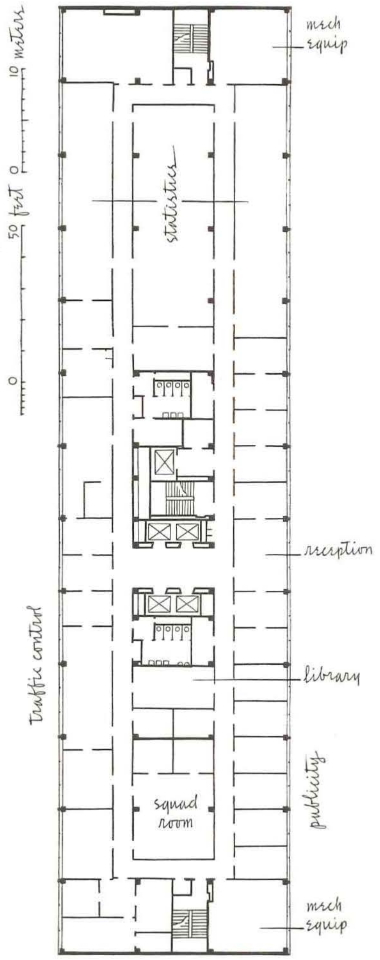
Offenders brought to the first-floor jail are booked at a counter with sturdy handrails (left). *In the room beyond is the Sergeants' desk.*

Ceiling of the corridor of the second-floor felon prison (below) *is finished with perforated-metal acoustical panels. The windows are equipped with exterior vertical aluminum louvers.*

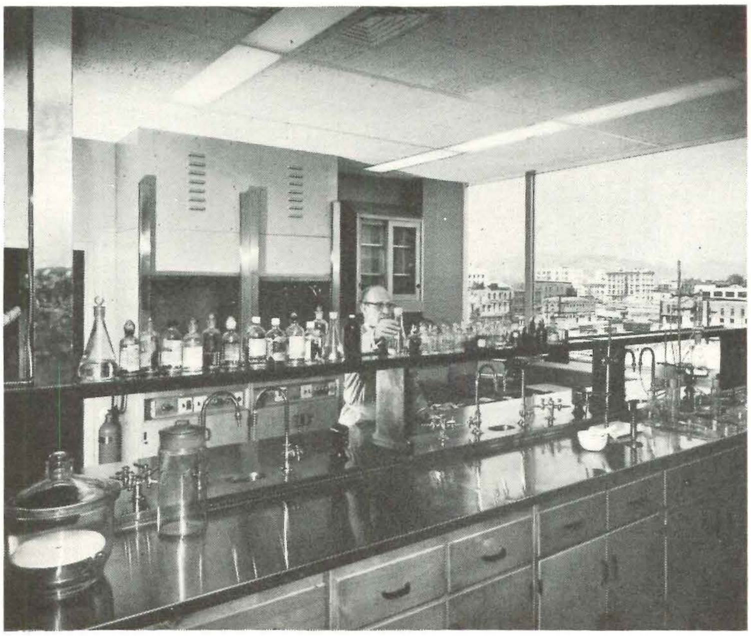
Typical upper-floor plans consist of a central core of specialized rooms, surrounded by a corridor and perimeter offices.

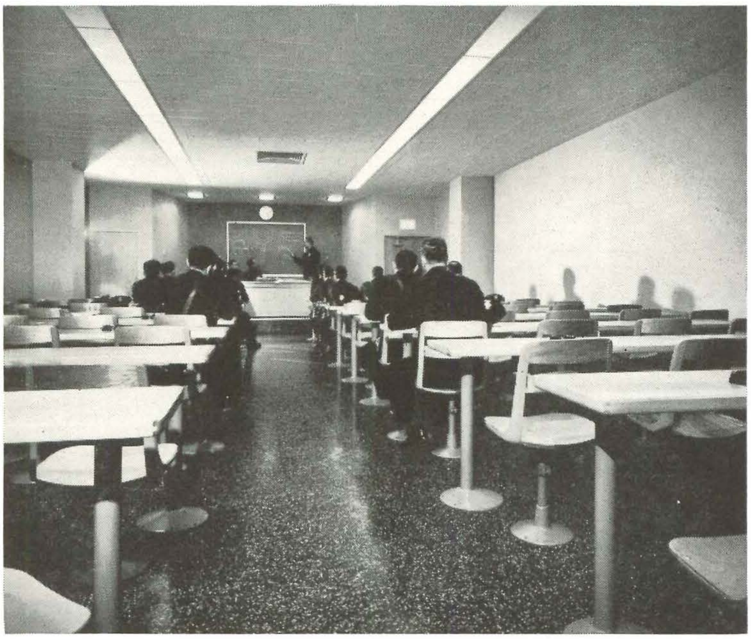
On the seventh floor (plan below) *is the Traffic Services Division* (right), *which correlates data to help improve police traffic enforcement. The big pin maps of the 453-square-mile area served by the department show the locations, times, and types of vehicular accidents.*





SEVENTH FLOOR
(Typical tower floor)





A fully equipped chemistry laboratory located on the north wall of the fourth floor (center) *serves the Scientific and Investigating Division.*

In one of the three assembly rooms on the ground floor (right) *officers are briefed by the officer in charge before departing on beat.*

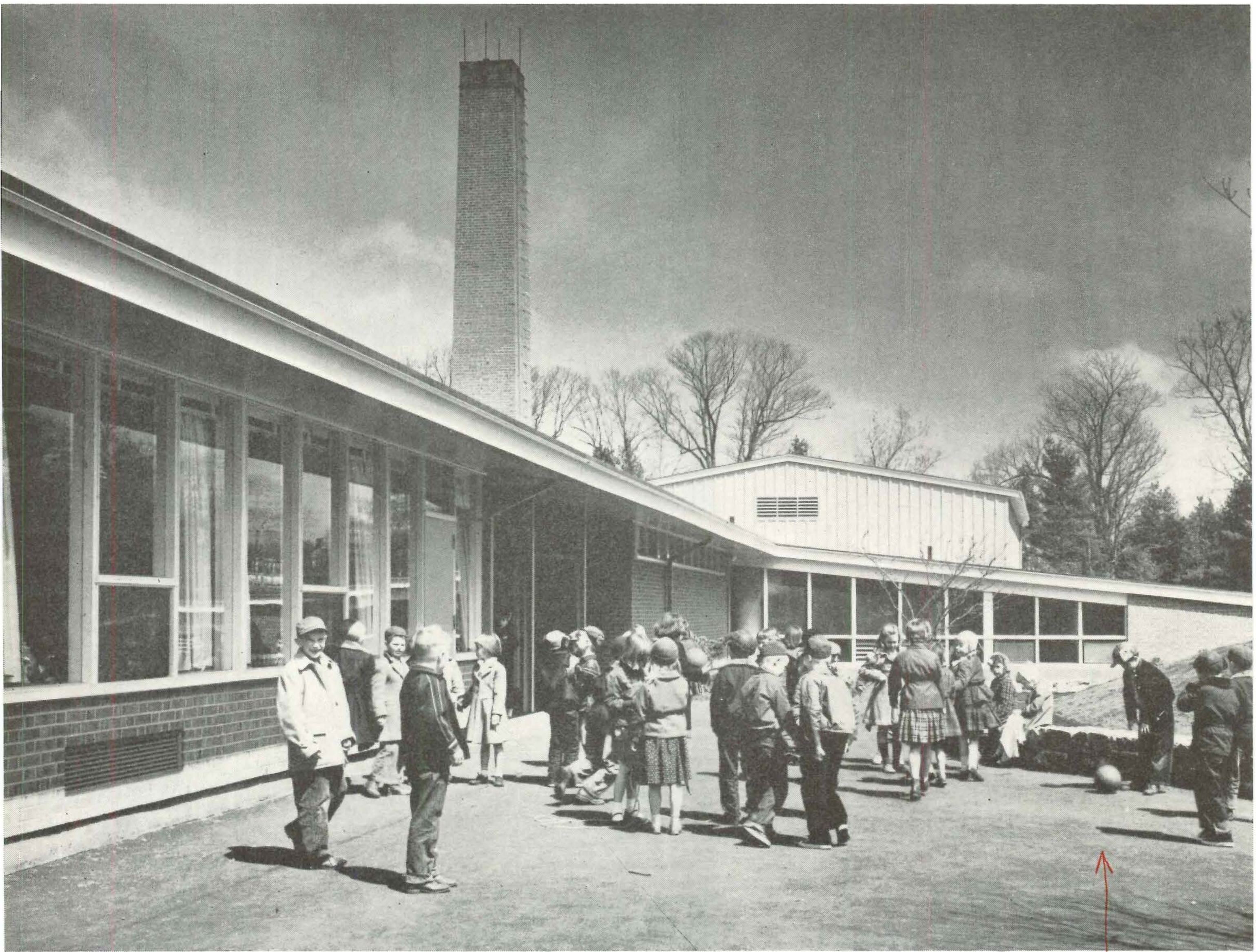
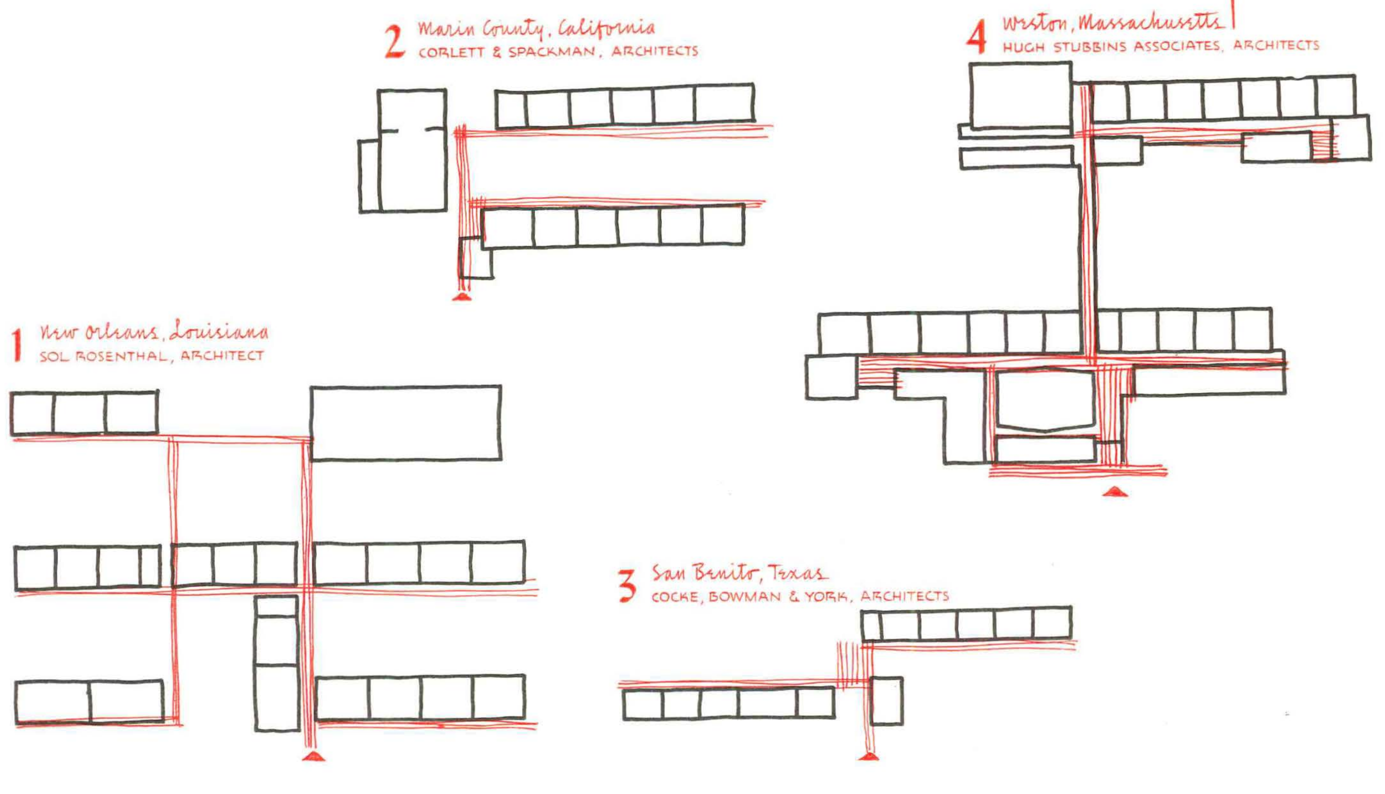
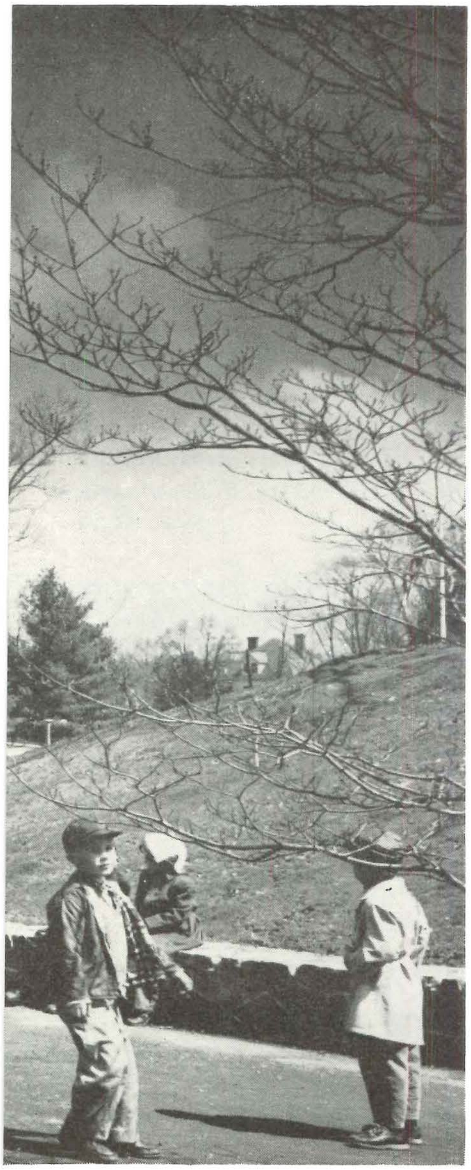


Photo: Gottscho-Schleisner





notes

on elementary schools

by Ilse Meissner Reese

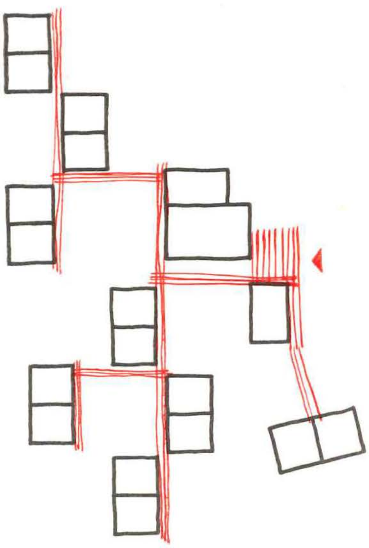
The architects' preoccupation in recent years with the search for optimum lighting, heating, ventilating, and structural solutions has necessarily brought about a certain standardization of school plans. Thus in three out of four recently completed schools (*shown on the following pages*) the finger-plan with single-loaded corridors predominates (**1**, **2**, *and* **3** *below*). All of them are competent solutions typical of most of today's elementary schools. All of the classrooms have bilateral, if not trilateral day lighting. All offer provision for easy future expansion by extending the fingers or by branching out into additional wings. All lend themselves to uncomplicated construction on a modular basis, and are economical to build.

Juxtaposing these solutions with three in the project stage (**6**, **7**, *and* **8** *below*)—all award winners in P/A's recent awards program (*see January 1956 P/A*)—a definite trend toward greater plan variety and concern with architectural forms and spaces is revealed. What has been gained is a reawakening to the fact that architecture is more than the mere solution of technical problems. There is no stereotyped solution among the plans for these future schools which vary from a compact self-contained rectangle (**8** *below*) to an open cluster (**7** *below*) and finally to one (**6** *below*) which, seen in all three dimensions, has delightful and surprising elements reminiscent of an Italian hill town.

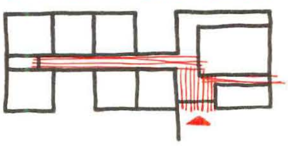
The school (**5** *below*) presently under construction, (*described on page 122*) and also an example of the new design direction, disperses clusters of two classrooms each, over a hilly site, to achieve a playful and village-like complex.

A certain balance between the two extremes—the orderly and functional finger-plan and the recent less inhibited and more dramatic designs—will undoubtedly be struck in the coming years. The school shown here (*left and* **4** *below*) seems to point to this happy middle road, for it offers most of the advantages of the finger-plan without sacrificing pleasurable visual relief. The adept handling of levels, variation in lighting, widening, and narrowing of corridors, and the sensitive proportioning of spaces make it an outstanding example well worth studying, and a herald of good things to come.

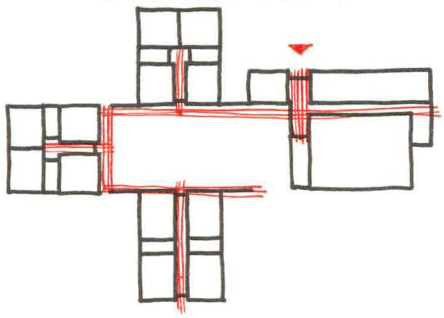
5 Waldwick, New Jersey
KETCHUM, GINA & SHARP, ARCHITECTS



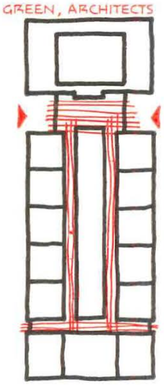
6 Long Island, New York
VINCENT G. KLING, ARCHITECT



7 Lowell, Massachusetts
HUGH STUBBINS ASSOCIATES, ARCHITECTS



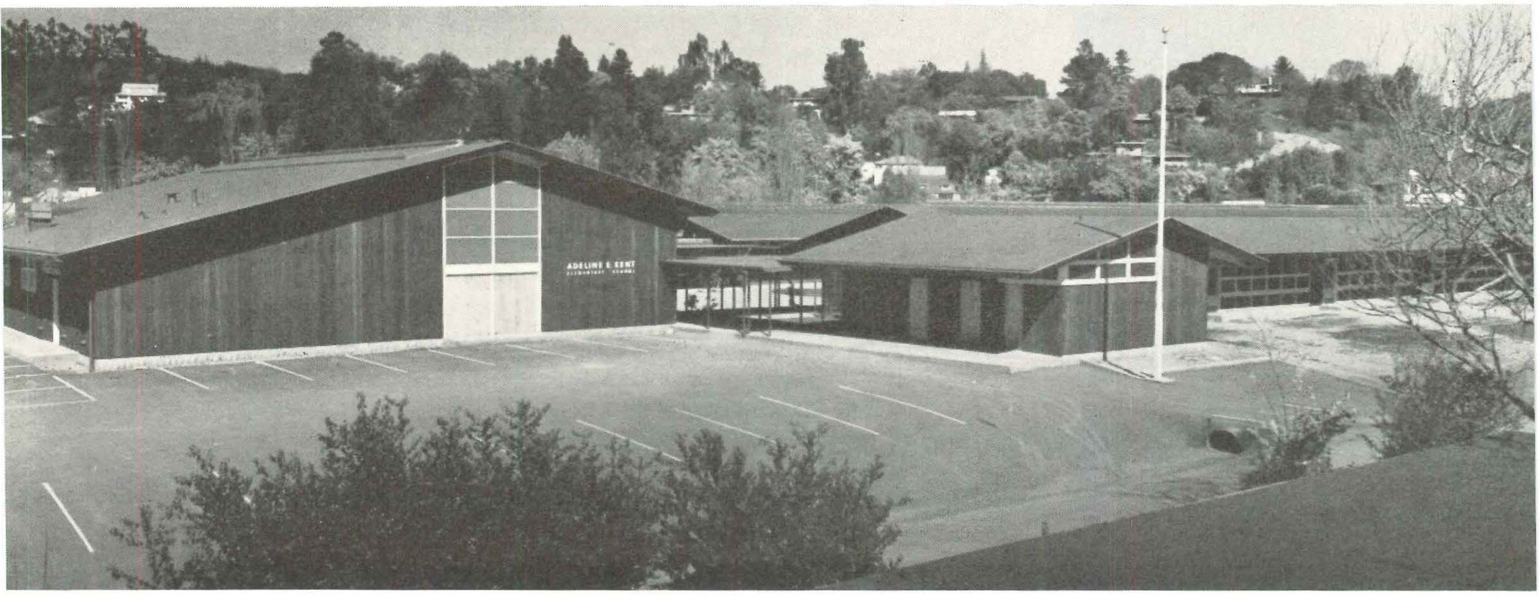
8 Albert Lea, Minnesota
BERNARD J. HEIN and HAMMEL & GREEN, ARCHITECTS

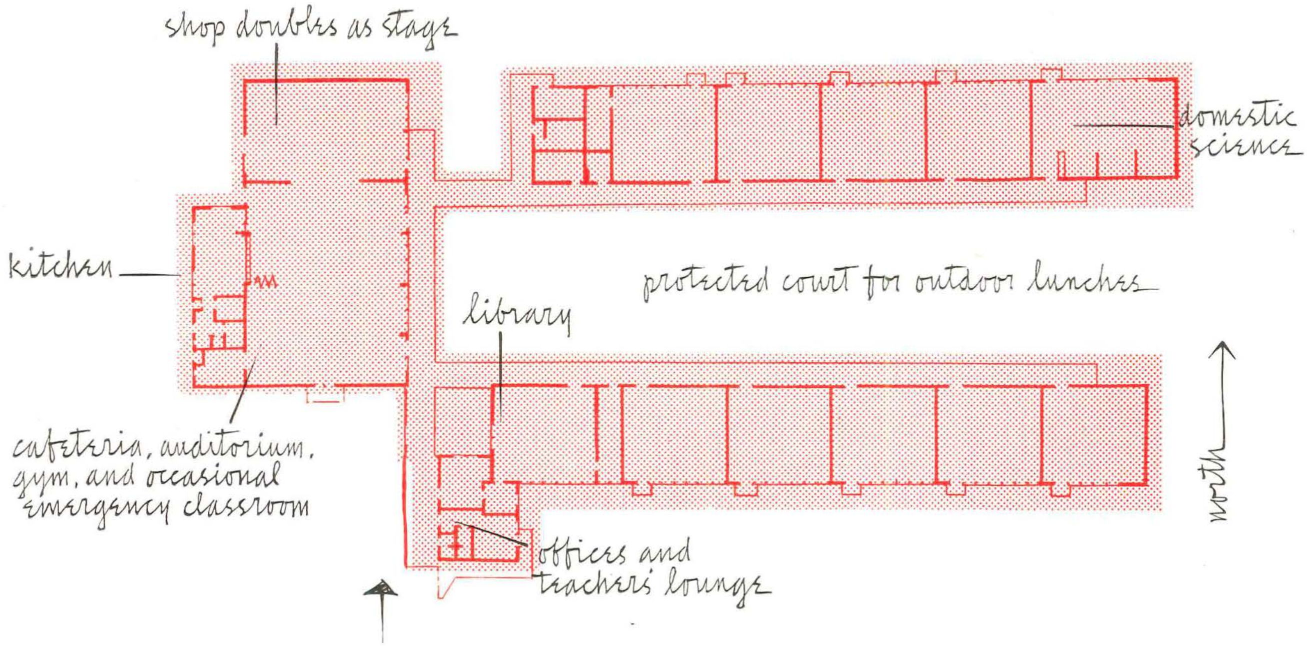


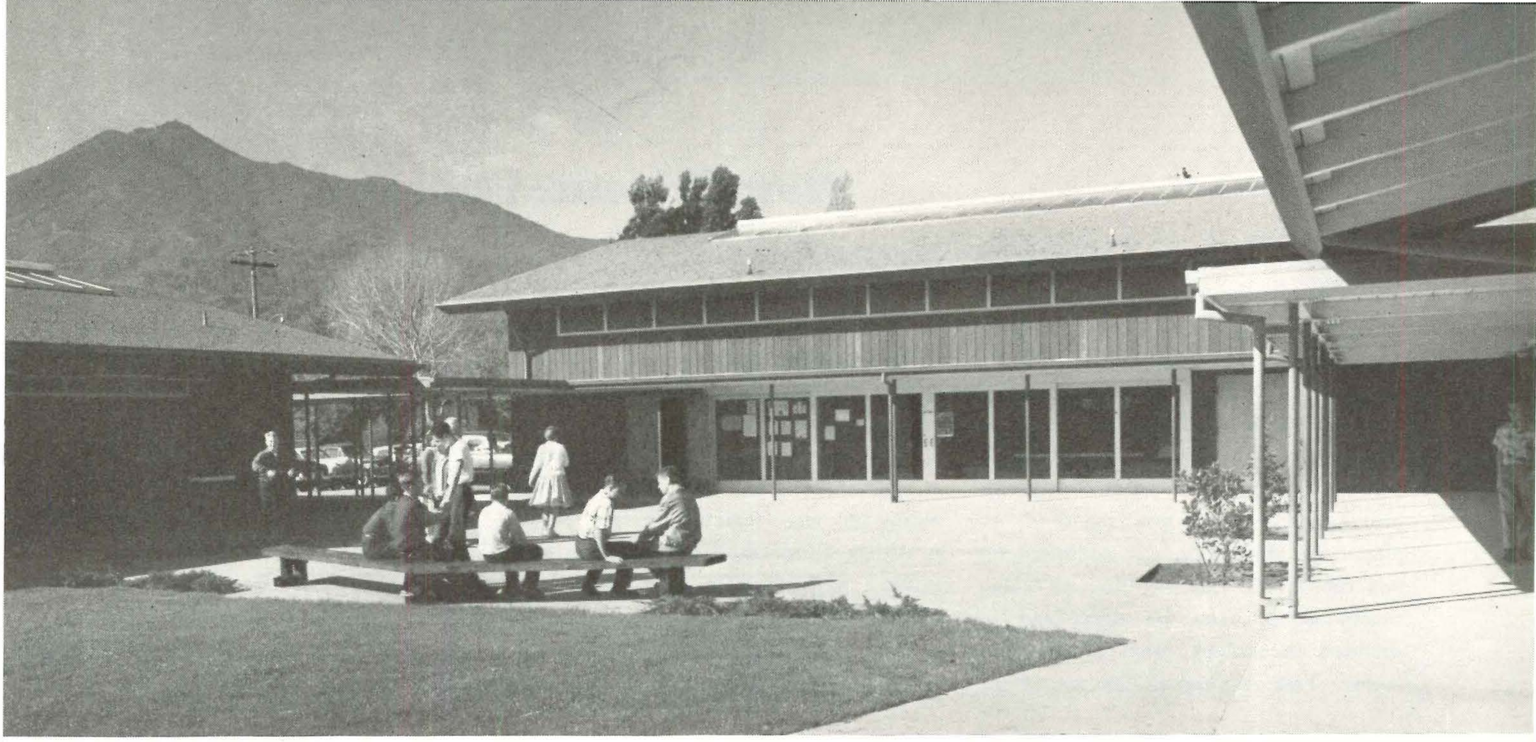
elementary school: **Marin County, California**

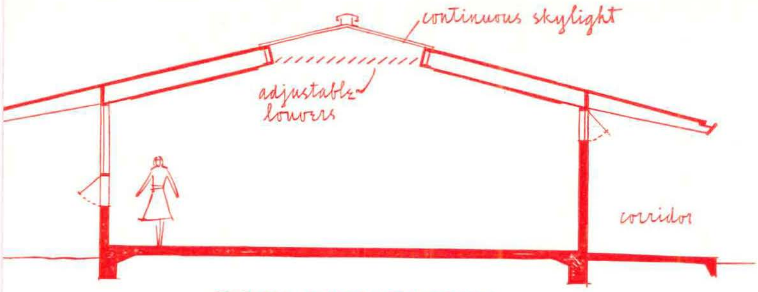
It is not unusual for financial or physical handicaps to turn themselves, at times, into assets, from the design viewpoint. In the case of this school, the physical liability was a swampy site requiring costly compacted fill and 40-foot piles for every structure. This was coupled with a very modest budget, plus timing that coincided with a steel shortage. The buildings had perforce to be of simple construction employing lightweight materials. The result is an unassuming but well-composed building complex in keeping with the residential character of the community. The use of steel was limited to framing the skylights of the classrooms, but its use here did offer the advantage of continuous overhead daylighting. Otherwise, wood is the dominant building material. It appears boldly in the laminated arches of the central multiuse structure. Native redwood surfaces exterior walls; resawn, stained, and sealed, this redwood introduces a soft color without glare; 3/8" plywood treated with stain wax provides the pleasant interior wall surface in cream yellow, gray, and green tones. Radiant heat in the concrete slab was specified for classrooms. "But," say the architects, Corlett & Spackman, "were the job to be done again we would seriously consider convector in lieu of radiant heating. Although radiant heat is comfortable and acceptable, its lag and lack of any ventilation feature is less than ideal." For this school, H. H. Wang was Structural Engineer; G. M. Simonson, Mechanical-Electrical Engineer; Dariel Fitzroy, Acoustical Engineer; E. H. Moore & Sons, General Contractor.

Photos: Phil Palmer

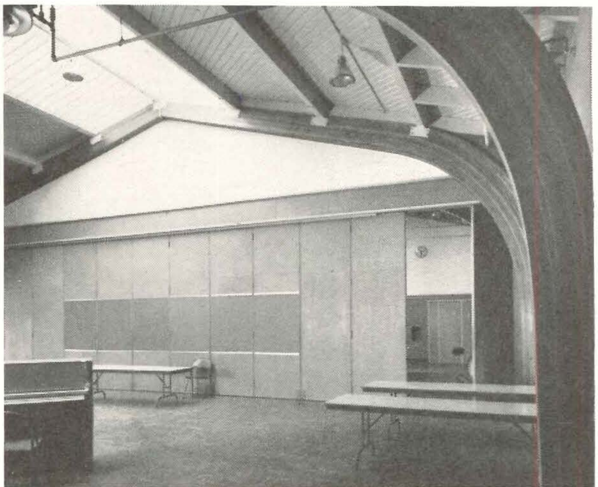


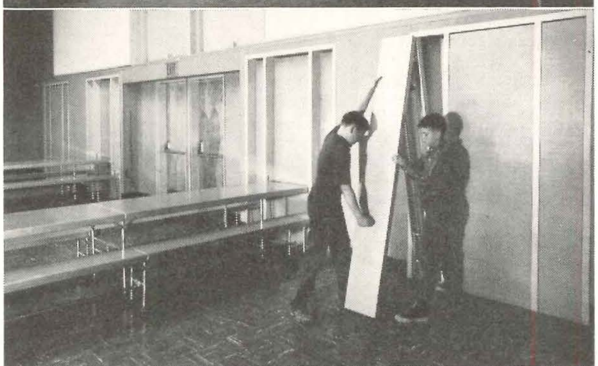


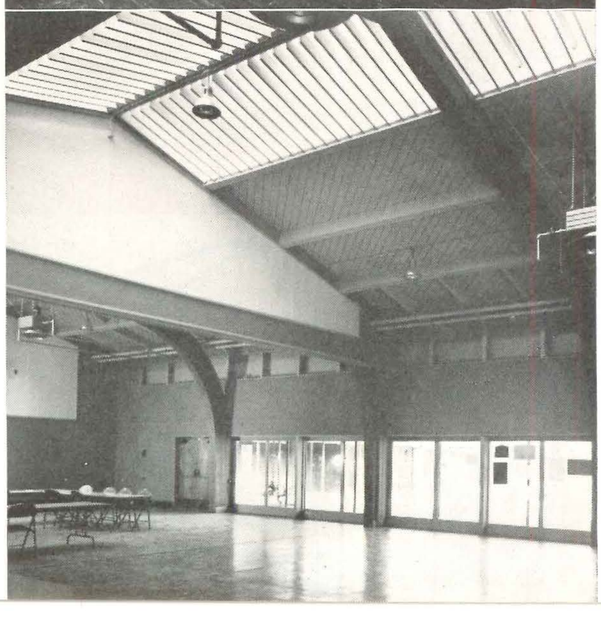




TYPICAL CLASSROOM SECTION

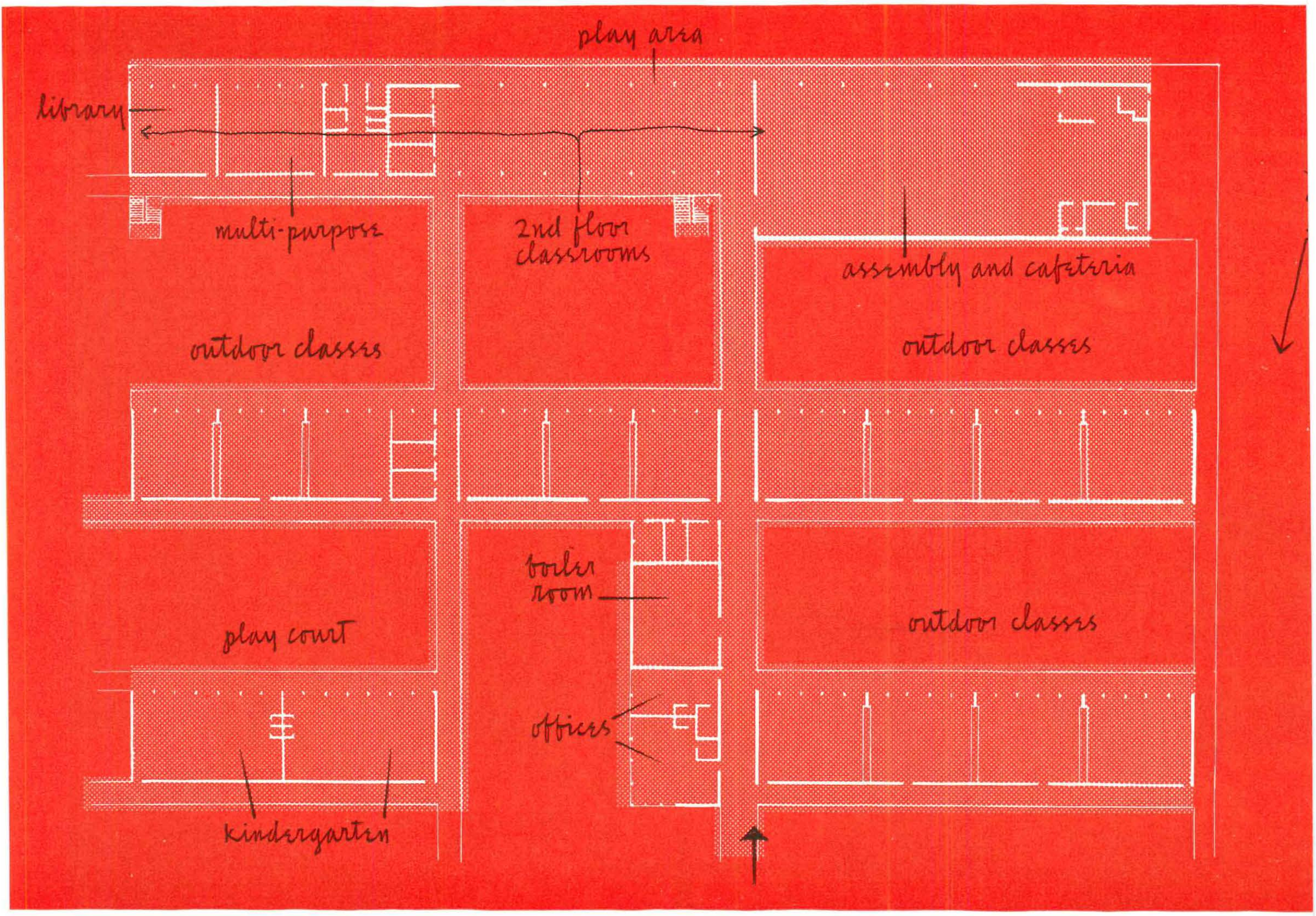


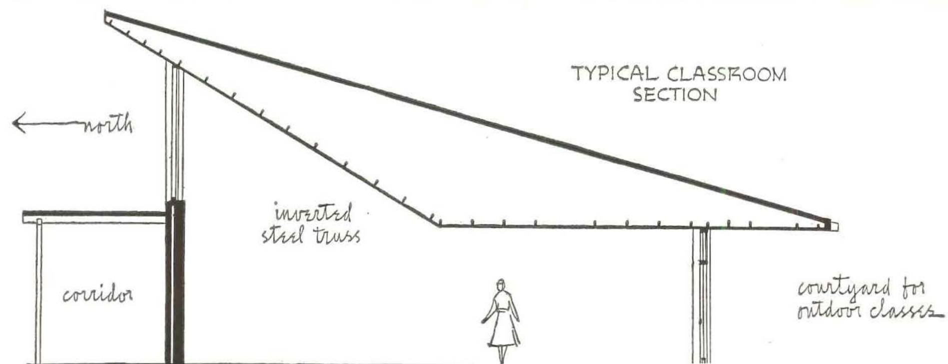


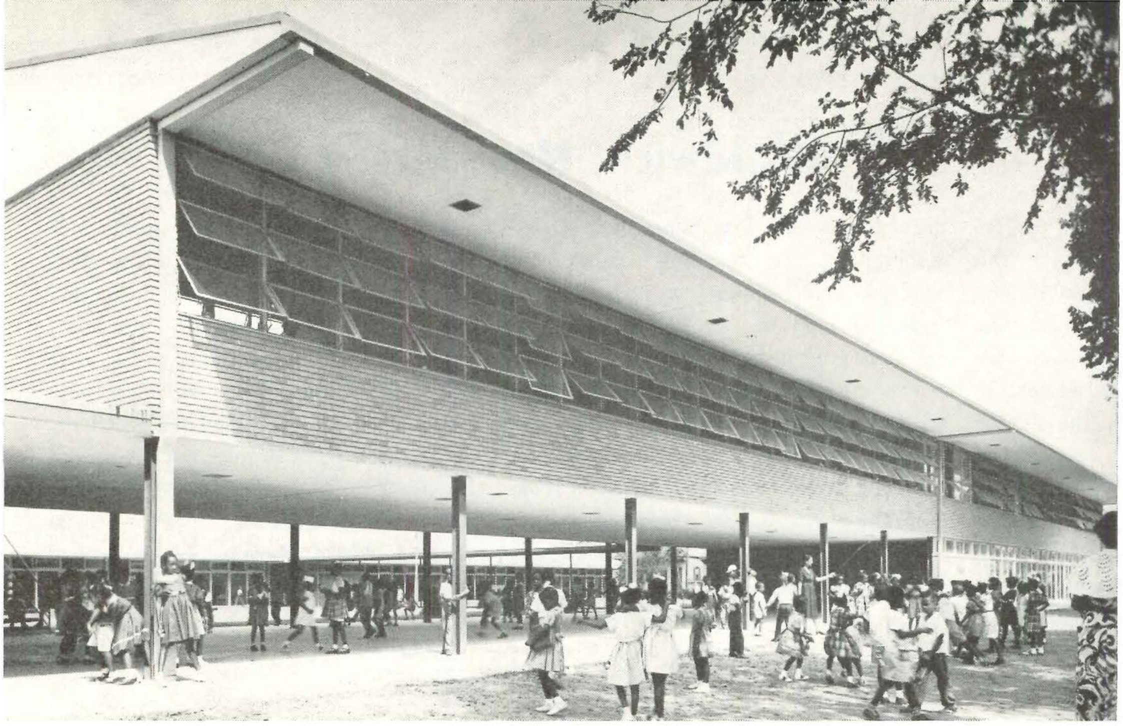


elementary school: **New Orleans, Louisiana**

This school for 750 kindergarten-to-sixth-grade pupils is located in a densely populated area, on a site measuring approximately three acres. It is anticipated that a portion, or all, of an adjoining public park will be available later as a school playground. "Because of local climatic conditions with approximately seven warm months," explains Sol Rosenthal, the Architect for this school, "it was felt that all classrooms should face the south and be shielded in outlook from other classrooms. This resulted in the use of the single-loaded corridors . . . the first utilized on any school in New Orleans." All classrooms, except those for the oldest age group were accommodated on the ground level. Outstanding structural design feature is the inverted steel truss, supported on steel columns placed 8 feet on centers. This inverted truss serves not only structurally but, closed in with a white acoustic tile ceiling, also reflects natural light into the classrooms. Column spacing was based on a 4-foot module followed throughout the entire plan. Vertically, a 2-foot module was adopted. Exterior materials are face brick and colorful porcelain enameled panels. Flooring throughout is asphalt tile and ceilings are surfaced with acoustical tile. Heating is provided by a gas-fired radiant system. Charles R. Colbert was Associated Architect for this school; A. G. Seifried was Landscape Architect; Lewis G. Hooper, Structural Engineer; A. R. Salzer, Jr., Mechanical Engineer; Louis N. Goodman, Electrical Engineer; and Lionel F. Favret Co., Inc., General Contractor.

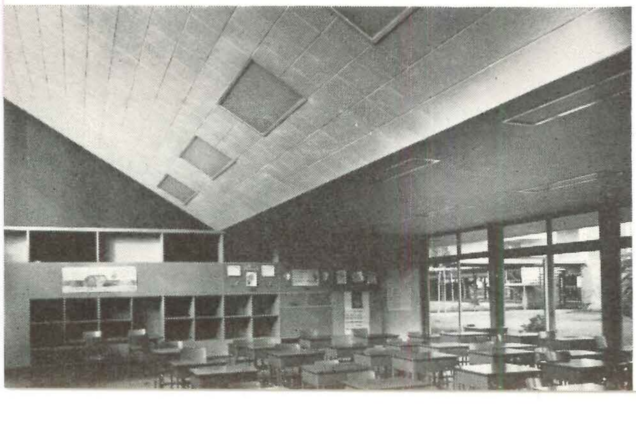






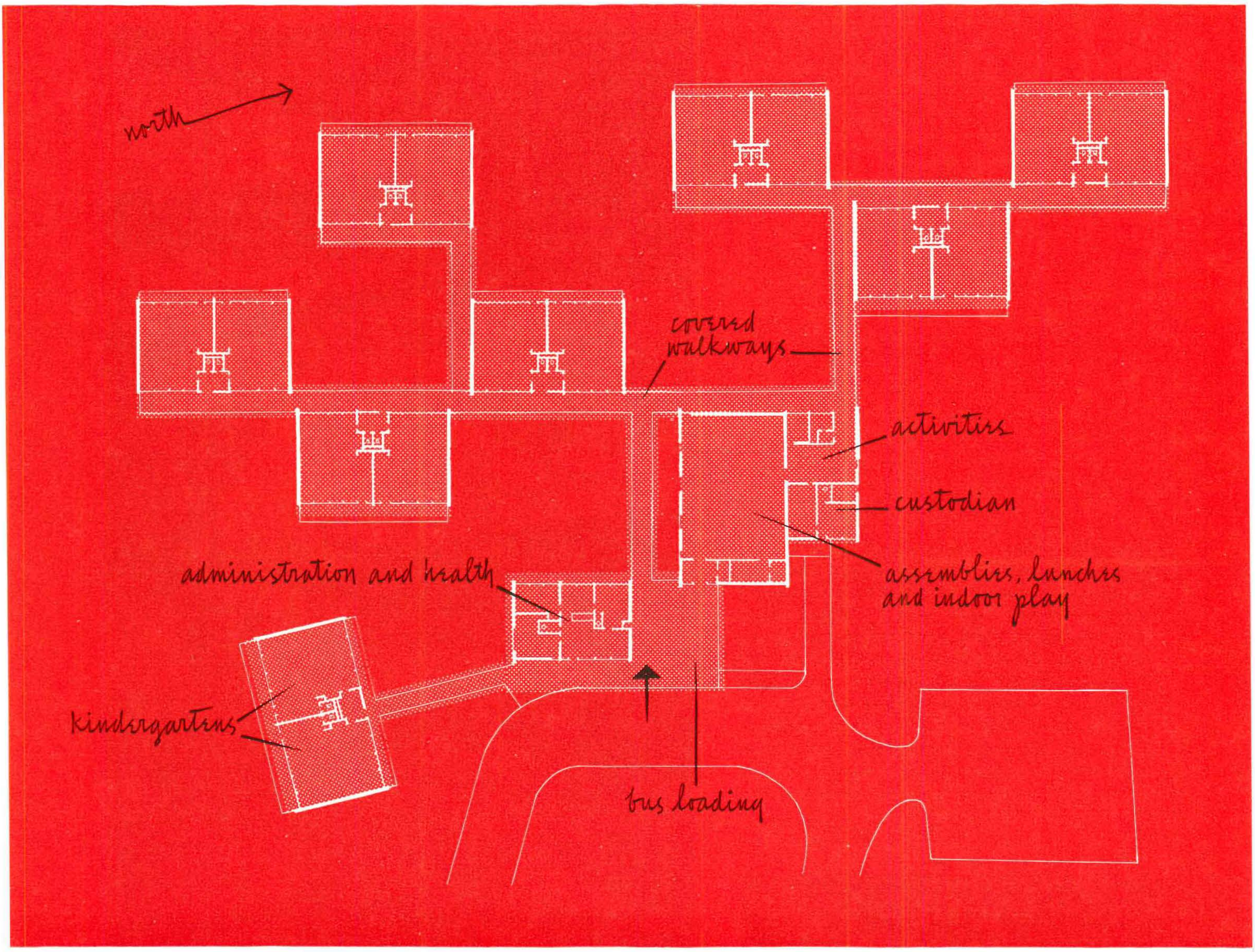
Classrooms (below) *receive natural light through glazed aluminum doors along the south side and through high windows, permitted by placement of trusses. The mild local weather allows outdoor classes in the adjoining court during most of the year. Dividing walls between classrooms are formed of cabinet sections bolted together. These walls may be placed anywhere along 8-foot modular intervals. In anticipation of future changes, additional controls for lights and public-address system have been provided. Artificial light is supplied by fluorescent troffers set flush with the finished ceiling.*

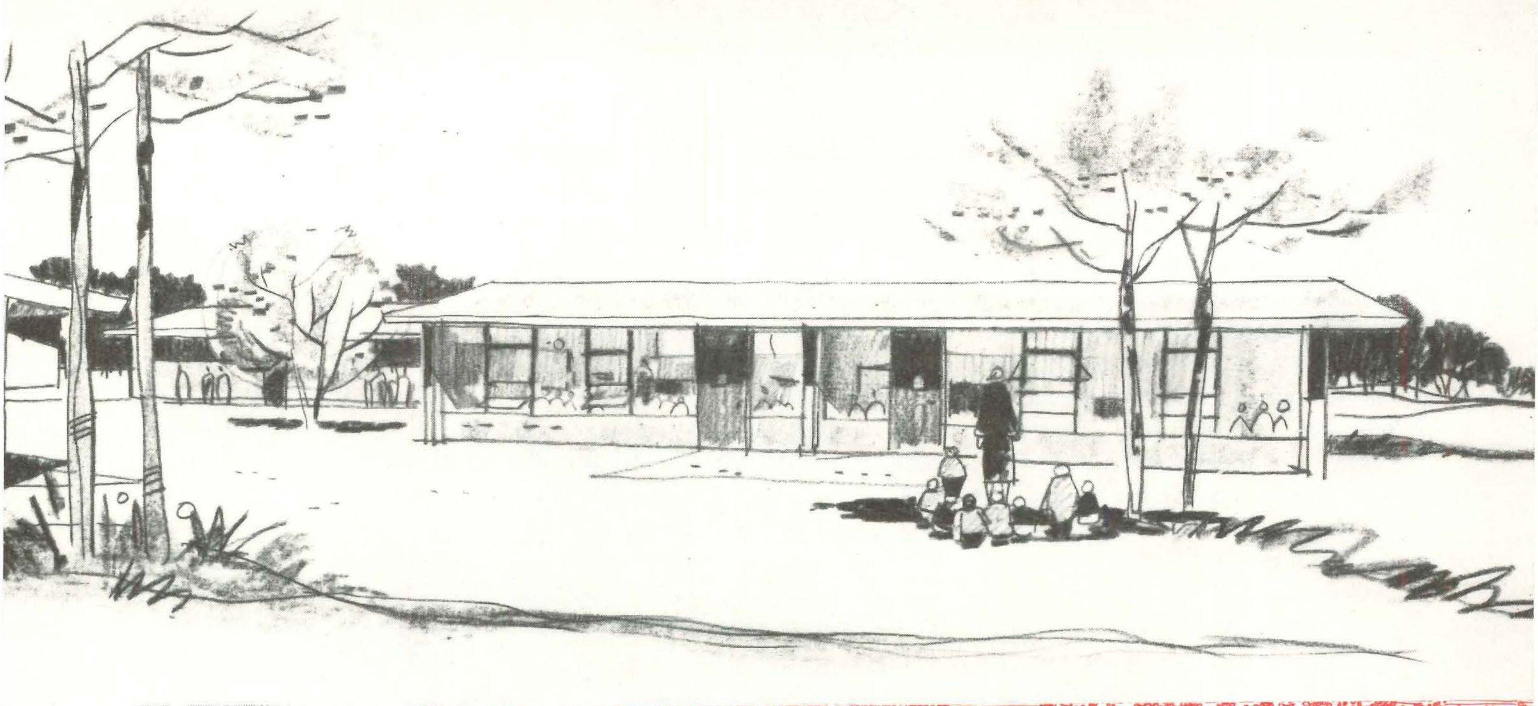
Photos (top, and top right): C. F. Weber
Other Photos: Clarence John Laughlin

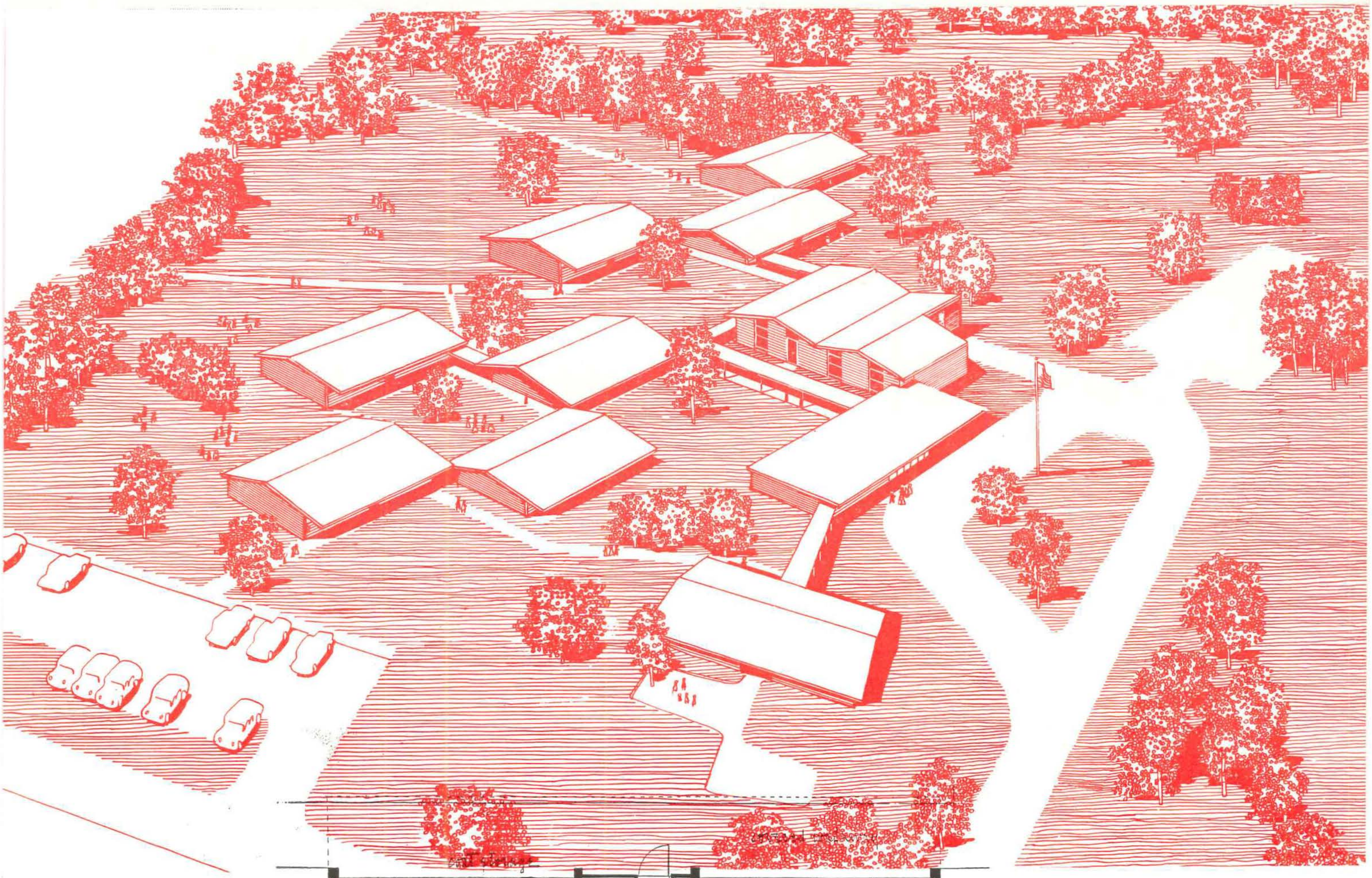


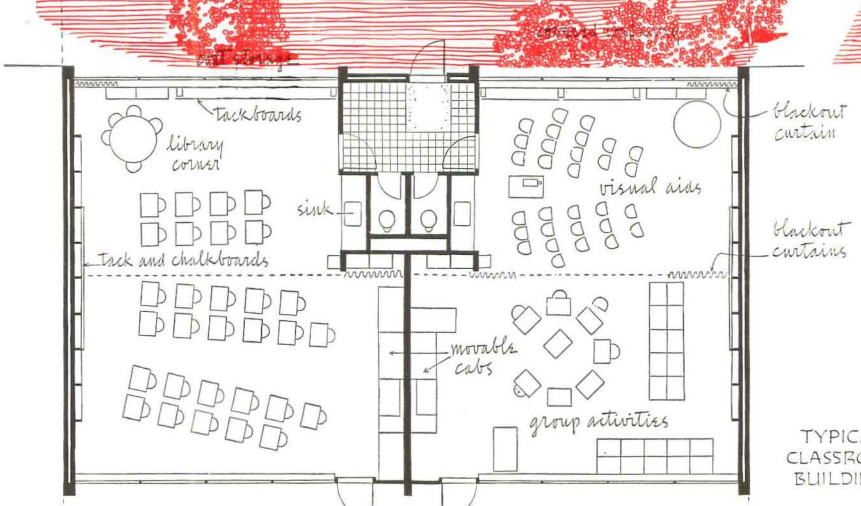
elementary school: **Waldwick, New Jersey**

Indicative of the new and more diversified elementary school plan is this campus scheme, designed by the New York architectural firm of Ketchum, Giná & Sharp, presently under construction in Waldwick, New Jersey. In the development of the plan the sloping site of 13 wooded acres played an important role. To preserve the site's natural features as well as the residential character of the surrounding community, classrooms were grouped in pairs and treated as individual buildings. All of these will be bilaterally lighted through low-silled windows facing outdoor play and teaching spaces and through high windows on the walkway side. All will be heated by individual gas-fired furnaces distributing forced warm air (*see page* 7, *December* 1955 *P/A for detailed account of this decentralized heating system*). For the present, seven of these two-classroom buildings are to be constructed, but expansion is possible in any direction within the site limits and without disturbing completed units. Focus of the whole building complex is a central multipurpose building where pupils will congregate for lunch, assemblies, music practice, and indoor play. Another separate unit houses administration, health office, teachers' room, and storage space. All buildings are linked by covered walks. David Tukey, of Ketchum, Giná & Sharp, is Project Architect, and Jay C. Van Nuys & Associates, Architects, are Consultants on this school. Severud, Elstad, Krueger are Structural Engineers; Tectonic Associates, Mechanical Engineers; and V. Lehmann Construction Company, General Contractor.





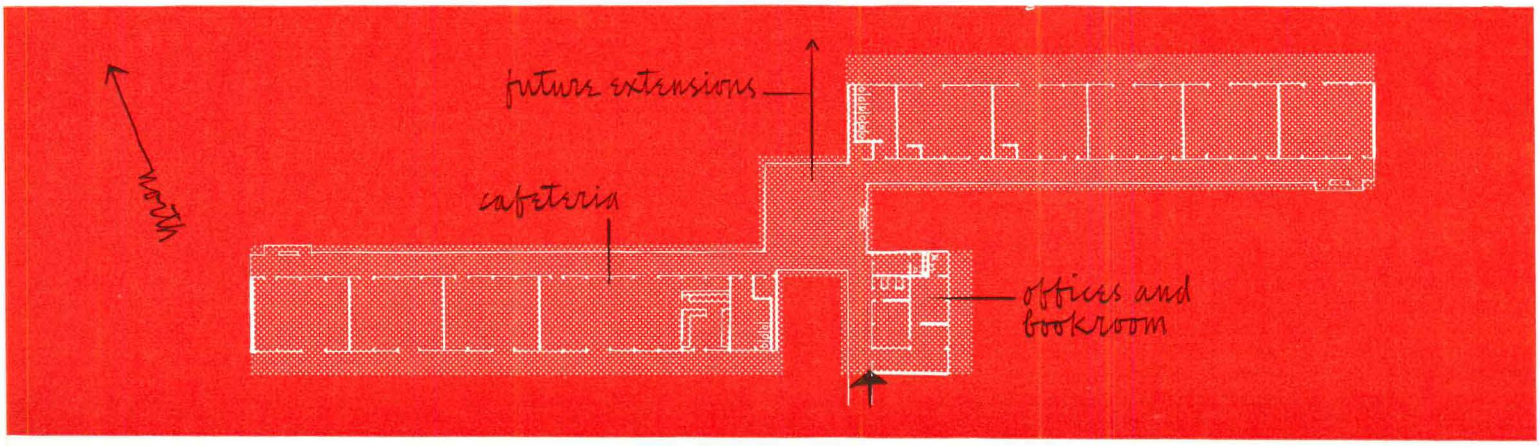


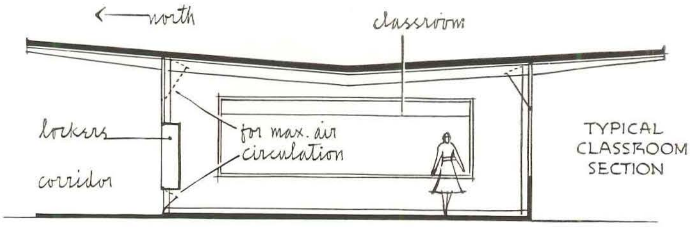


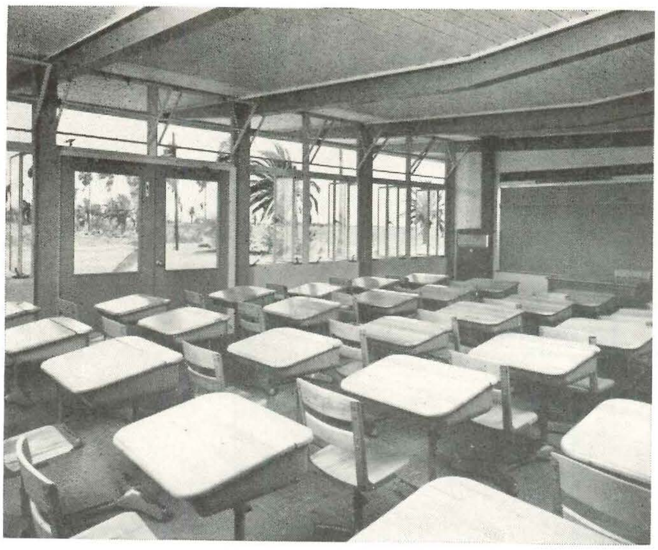
TYPICAL CLASSROOM BUILDING

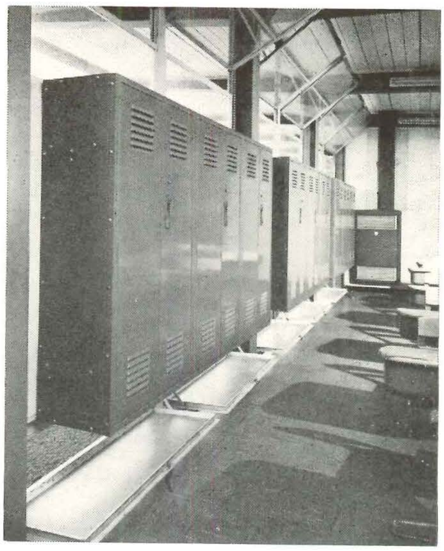
elementary school: San Benito, Texas

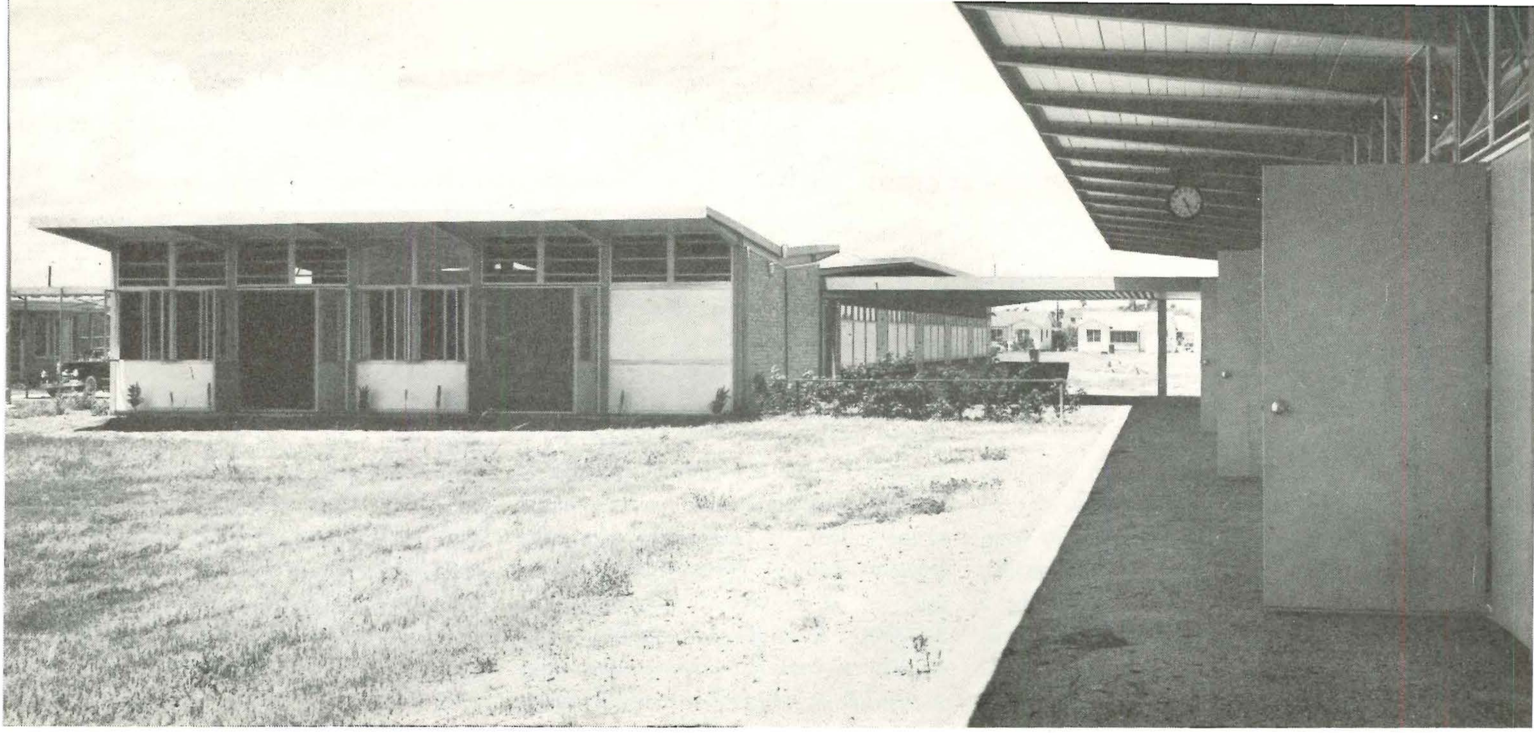
One hundred percent expansion is also foreseen for this elementary school located in the center of a newly developed residential section of San Benito, Texas. At that time the present free-standing canopy will be extended to link with the additional classrooms. Wings are staggered and will continue to be added in this manner to encourage air circulation. Cross ventilation was also a major factor in the design of the classrooms, which have operable windows toward the north and south. Windows along the corridor side, for ventilation as well as daylighting, are placed above and below rows of metal lockers which assist in blocking vision into the classrooms. Extensions of the steel-framed butterfly roof form wide sun baffles and shelters for the open corridors. Artificial lighting is supplied by slimline tubes anchored to the web of the ceiling beams on the side away from the line of vision. Partitions between classrooms are movable and serve as continuous teaching surfaces. For economy a rigid steel frame, using multiple steel bents 7′-5½″ o.c., was chosen. To this frame work, steel sash and precast concrete panels bound in metal, have been attached. End walls of the classroom wings are of brick to add windbracing and pleasant touches of color and texture. Foundations were designed as concrete integral beams and slabs. Roofing is of wood decking, painted and left exposed on the underside, and topped with built-up roofing over 1½″ rigid insulation. Architects-Engineers for this school were Cocke, Bowman & York of Harlingen, Texas, and General Contractor was Parker Construction Co.



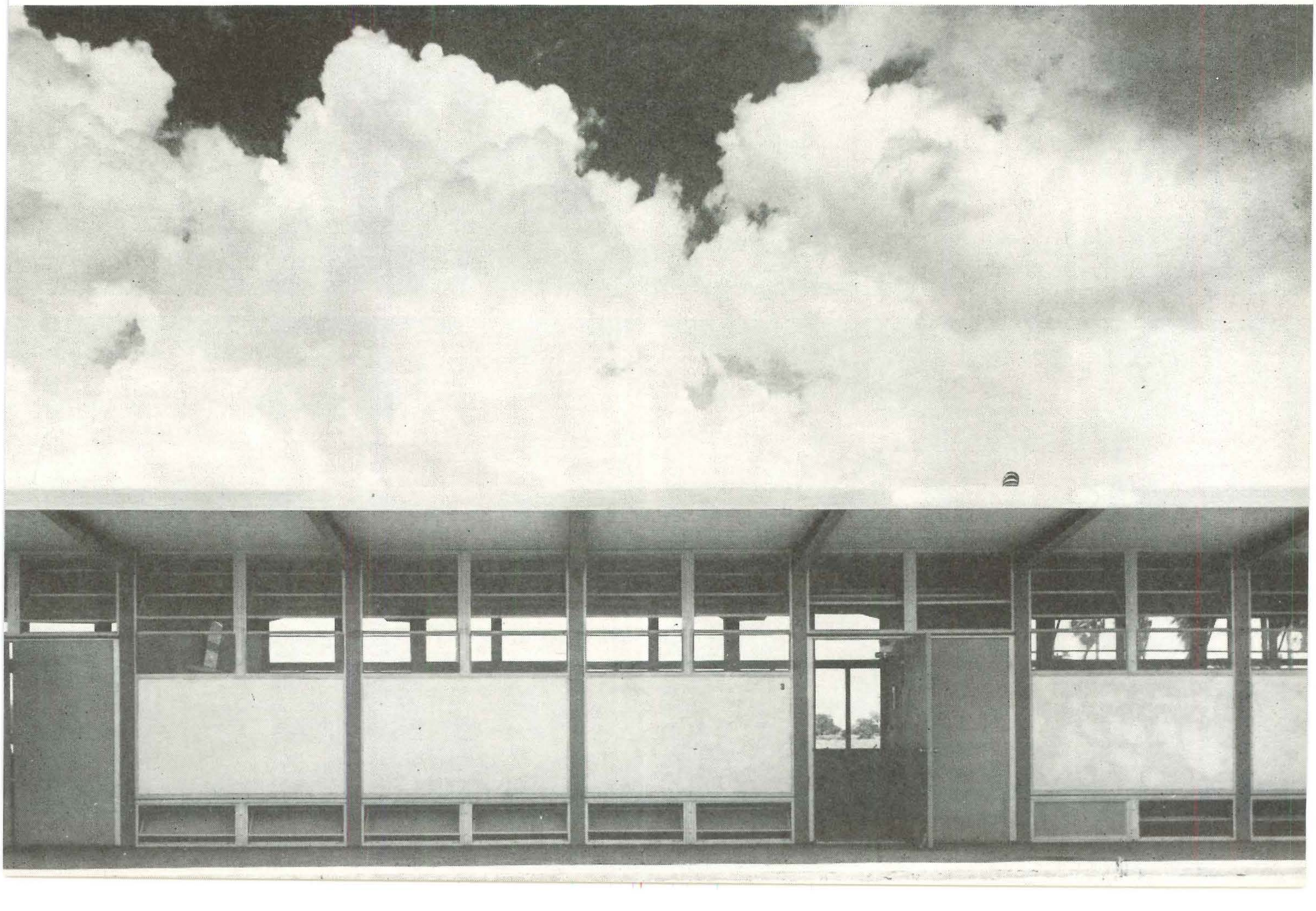








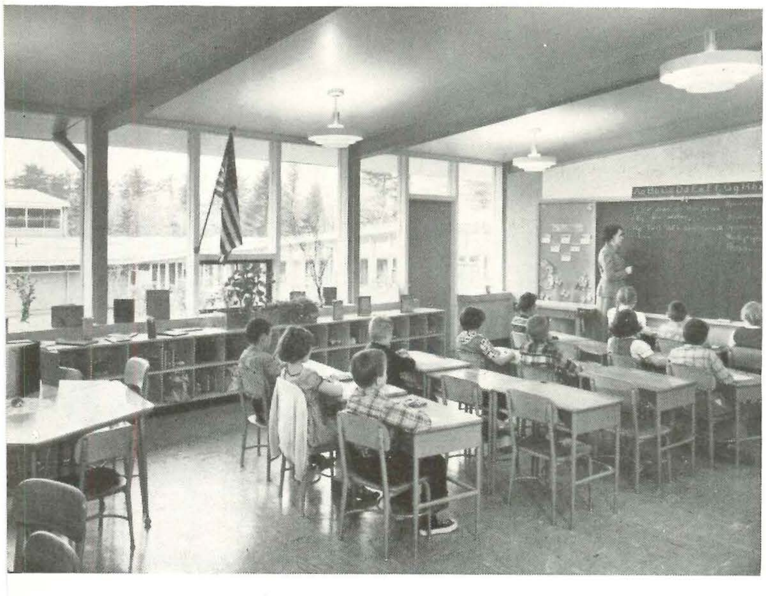
Small building (above) *placed perpendicular to classroom wings contains administrative offices, teachers room, book room, and clinic. Rigid steel bents* (below), *fill-in panels of precast concrete, operating sash, and wood doors have all been organized into a handsome pattern at corridor side of classroom wings.* Photos: Ulric Meisel

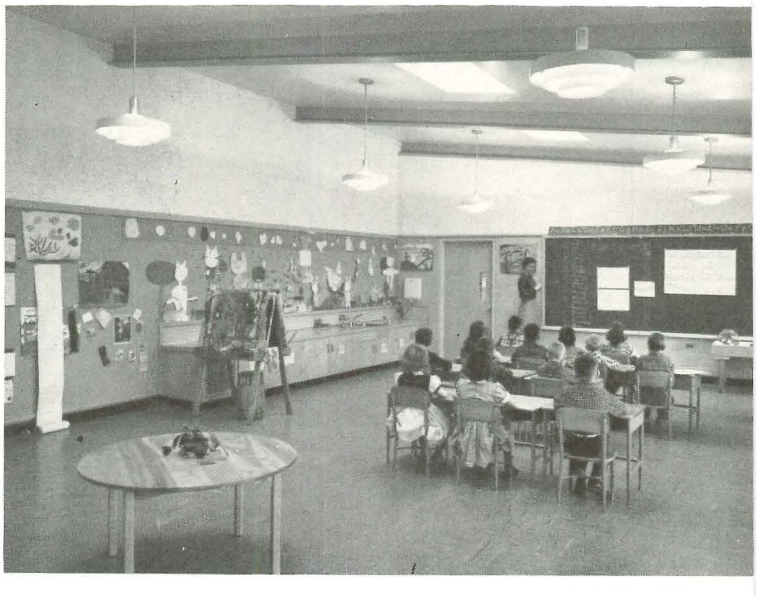


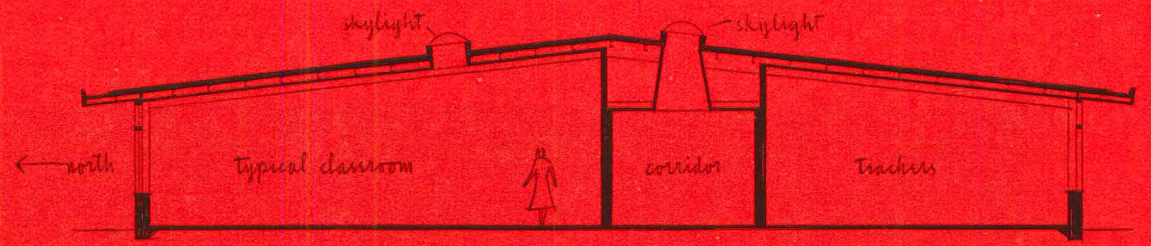
elementary school: **Weston, Massachusetts**

In its project stage, this school designed by Hugh Stubbins Associates was accorded a P/A award citation. Two honor awards have since been added, and a review of the architects' accomplishments on completion of the structure is of interest. An irregular site has been turned to advantage by dispersing the complex into two parts—an upper wing from which the school is approached, and a lower wing—interconnected by a glazed corridor (*below*). Benefits of this scheme are many: existing trees have been salvaged, upper grades are logically separated from kindergarten and lower grades, all but three classrooms have north exposure for constant daylighting and privacy. Classroom arrangements and selection of special equipment were largely based on the recommendations of a special school committee composed of teachers, superintendent, and principal of the school. In consonance with these recommendations, classrooms (*bottom*) are just off square, all have skylights, three-ring incandescent lighting, unit ventilators, built-in counters with sinks and drinking fountains, movable furniture, and ample storage and tack-up space. The basic structure is a welded-steel frame. Exterior walls employ brick or vertical siding with cinder-block back-up. Floors are of reinforced concrete, and roof construction is of perlite concrete on welded-wire reinforcement. Heat is supplied by an oil-fired steam system. Chambers & Moriece were Landscape Architects; LeRoy Hersum, Structural Engineer; R. G. Vanderweil, Mechanical Engineer; J. A. Singarella Co., General Contractor.

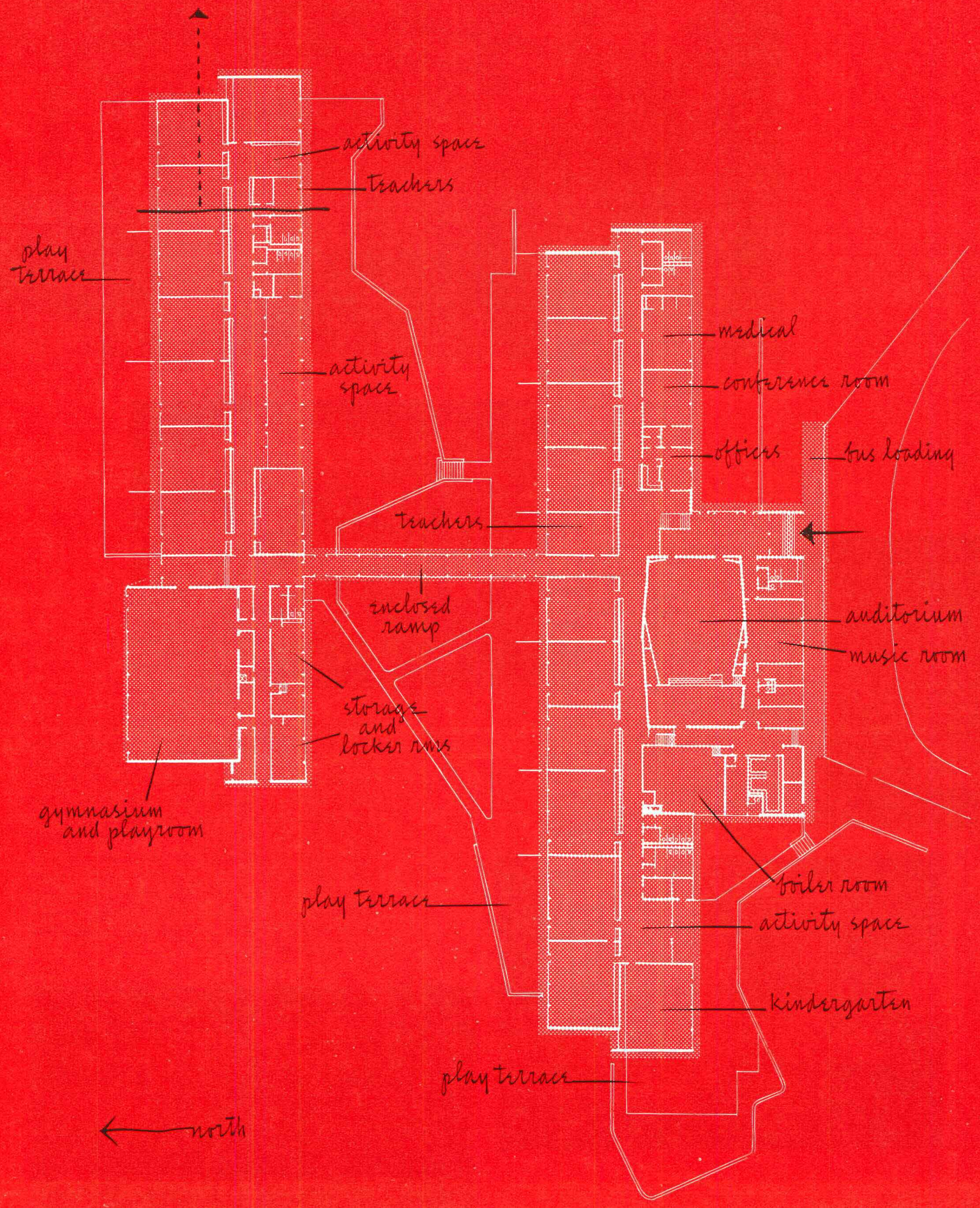
Photos: Gottscho-Schleisner



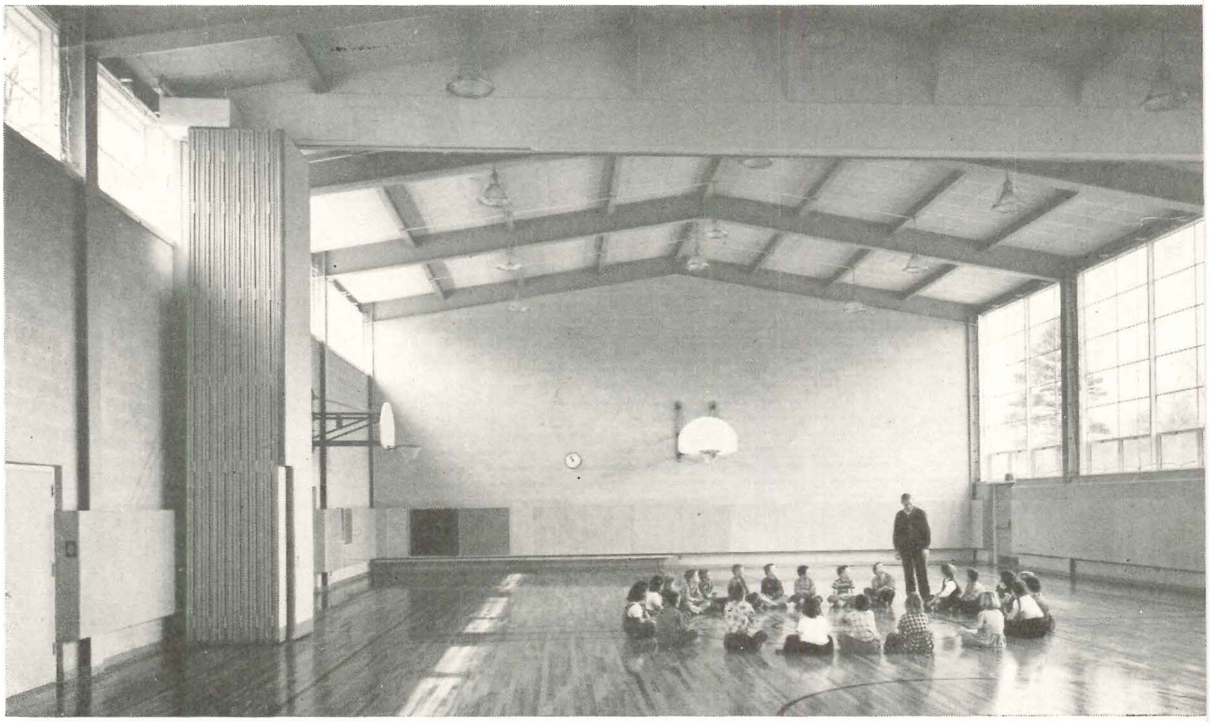


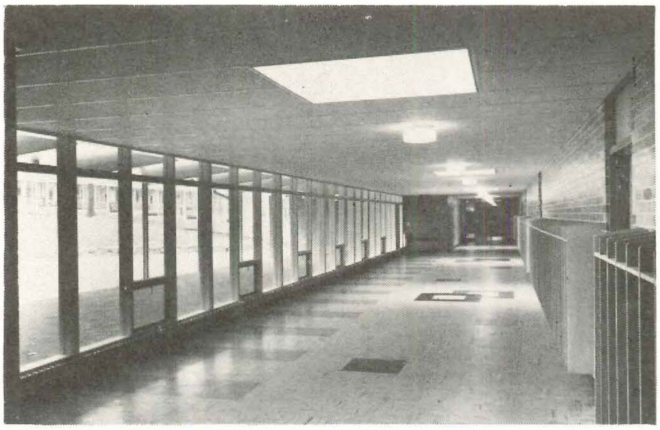


TYPICAL SECTION

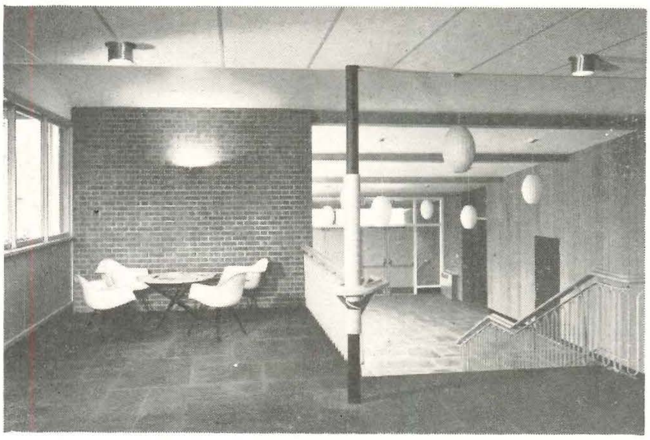


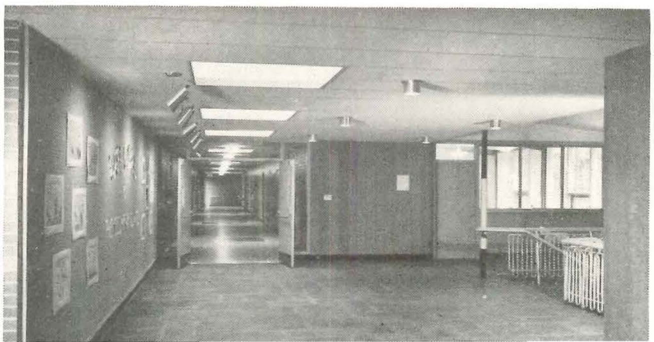
elementary school: Weston, Massachusetts



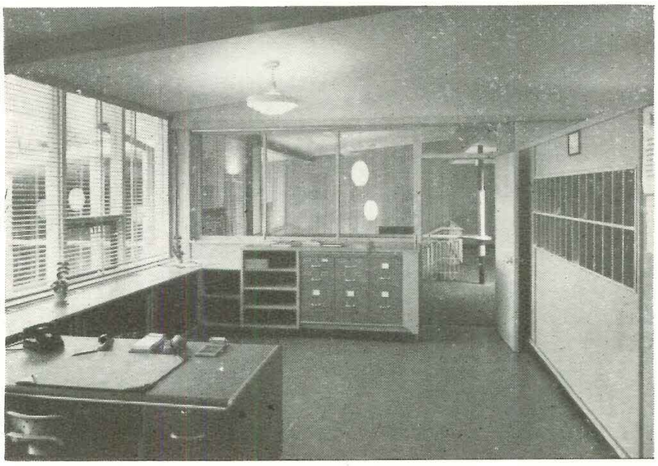


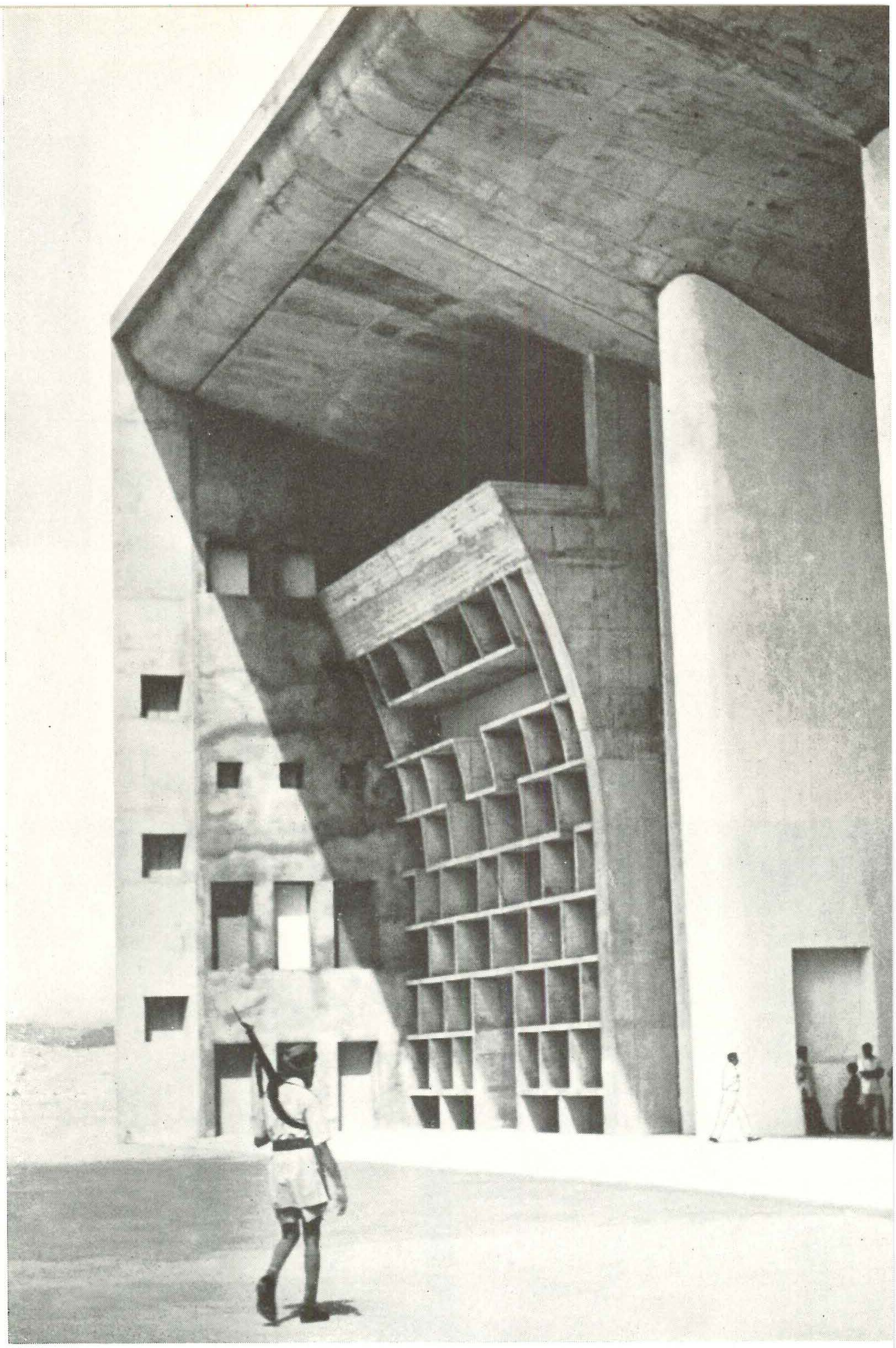
Gymnasium (top), *also used by town recreation department, has separate controls for heating and ventilating. Structural roof planks offer acoustical and thermal insulation. South windows are of heat-absorbing glass. Circulation areas* (below) *are of generous size, pleasantly scaled and lighted. For ease of maintenance, bluestone flooring and glazed-brick walls have been used along the most heavily traveled routes. Wide corridor in the lower wing* (above) *forms activity space. Enclosed ramp* (above left) *connects upper and lower wing. Portion of main entrance lobby* (below) *is set aside as a waiting area* (below left) *for offices.*

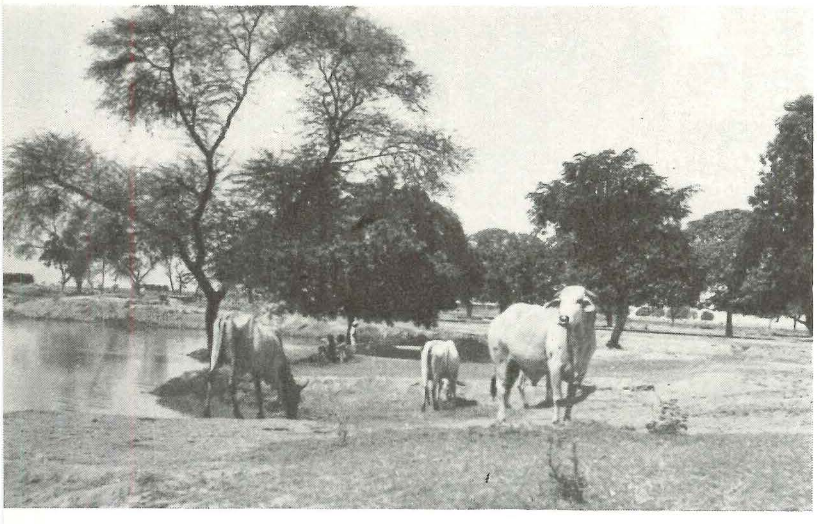


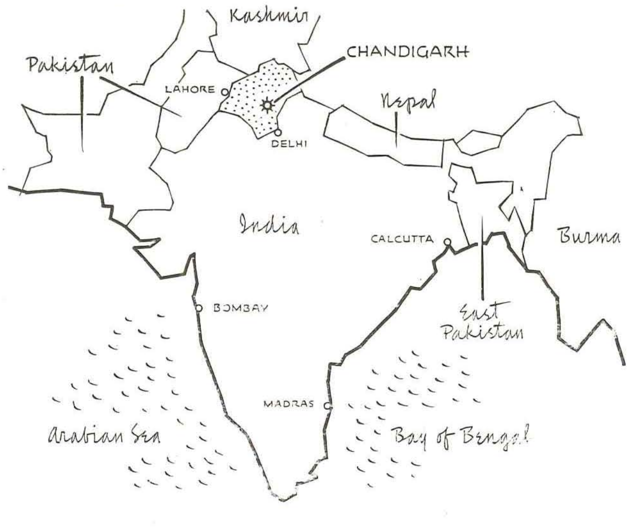


Teacher's rooms (right) are located in both the upper and lower wings. Secretarial office (below) connects with principal's office and overlooks entrance lobby. Auditorium and related facilities are situated near parking area and main entrance (bottom) for convenient use by community groups in the evenings.








Kashmir
Pakistan
CHANDIGARH
LAHORE
Nepal
DELHI
India
CALCUTTA
Burma
BOMBAY
East Pakistan
MADRAS
Arabian Sea
Bay of Bengal

CHANDIGARH

a progress report by George A. Sanderson

When India received independence in 1947, the State of Punjab was split in two. Lahore, the former Capital, went to Mohammedan Pakistan, leaving the Hindu Punjab without a Capital. Administration continued in temporary quarters in Simla, but it was early decided to build a new Capital. Not only that: the government determined to construct the most up-to-date city possible, designed by world renowned architects and planners.

An extensive survey of the Punjab was made in 1950 by the government's chief engineer, P. L. Varma, resulting in selection of an 8918-acre site on a plateau 1300 feet above sea level, at the foothills of the Himalayas. An area of farms and small villages, the place took the name of Chandigarh from the one existing village with a railroad station.

Initial stages of the planning were achieved by Albert Mayer (Mayer & Whittlesey, New York) and the late Matthew Novicki. As it is actually being built, however, the city is the work of a European design team, headed by Le Corbusier. The final scheme is a radical departure from the Mayer-Novicki proposals, but certain basic elements, such as the superblocks of neighborhoods, have been retained. Working with "Corbu" have been his cousin, Pierre Jeanneret; the British husband-and-wife team of architects, E. Maxwell Fry and Jane B. Drew; and a group of Indian architects and planners.

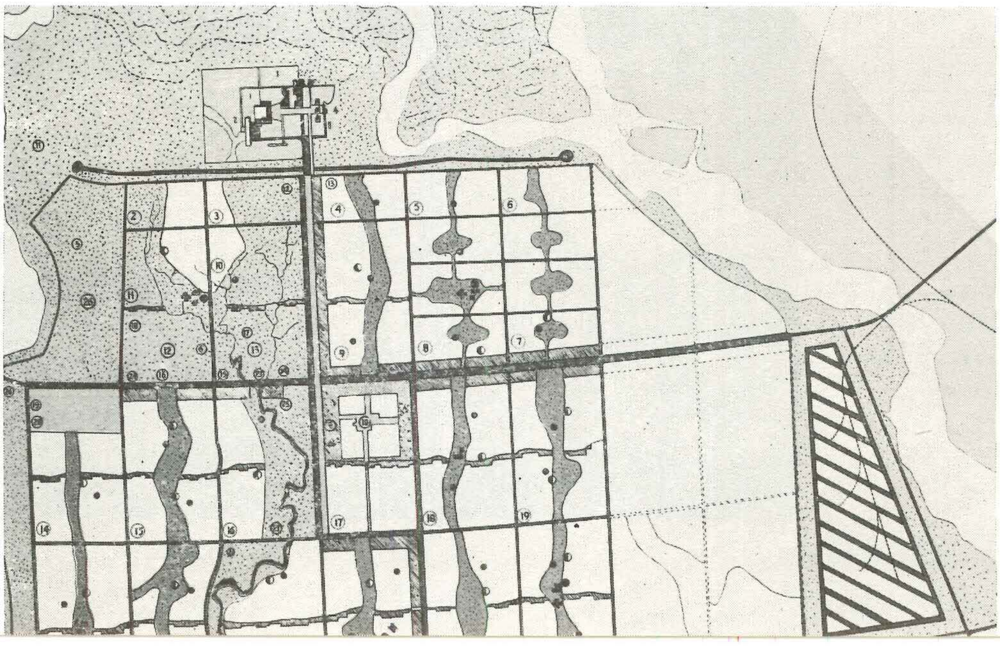
Base of the city plan—initially being built for a population of 150,000, but eventually to be a city of half a million—is a rectangular grid of heavy traffic roads enclosing self-contained neighborhoods (called sectors), each about three quarters of a mile long by a half a mile wide. Population of the different sectors ranges between 5,000 and 15,000 persons. The road-and-sector system almost completely separates vehicular and pedestrian traffic. Each sector is divided transversely by a shopping street, and longitudinally by a park belt—the site of schools, nurseries, community center, etc. The sectors are interconnected by the shopping street, running across, and by park belts, lengthwise.

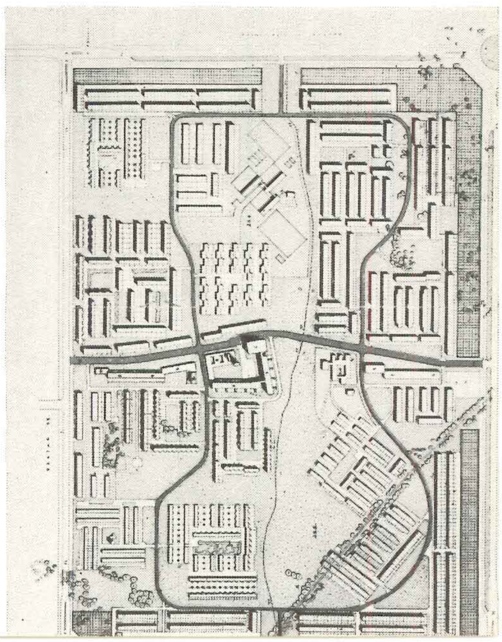
North of the residential neighborhoods—made up of 13 different types of houses, to accommodate varying income levels—is the group of Government buildings. All being designed by "Corbu," himself. First completed unit is the Supreme Court building (*across-page*). Northwest of the city is the University section, where the Engineering College, designed by J. K. Chowdhury, Punjab State Architect, has been completed. On the southeast periphery is the relatively small industrial area.

Le Corbusier likens the city plan to the human body—with the Capital group forming the head; the sectors, the body; and the city center, the heart. The park belts he terms the lungs; the educational area, the left arm, and the industrial area, the right arm.

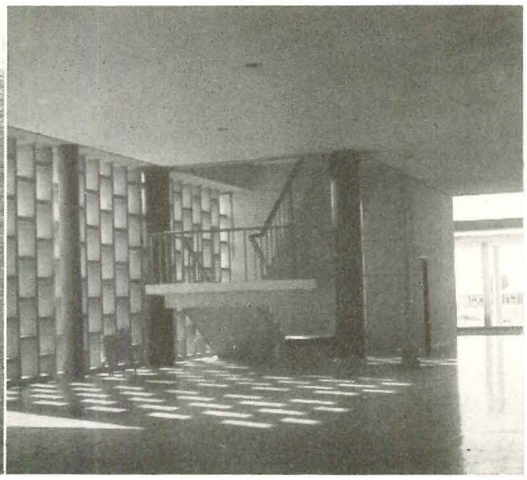
Design of the buildings stemmed very directly from the available materials—chiefly brick—and the extremely variable climate. Winters, though short (December to February) are cold, with the thermometer hovering around freezing. A hot, dry period lasts from March to June; followed by the torrential monsoons, during which insect life multiplies and the weather is hot and humid. This lasts until about September, when dry warm weather ensues before the cold.

The pedestrian can traverse the city in both directions, either as a shopper or a park stroller, without walking on the major traffic streets. Though each sector has its own neighborhood center, there will also be a commercial center.



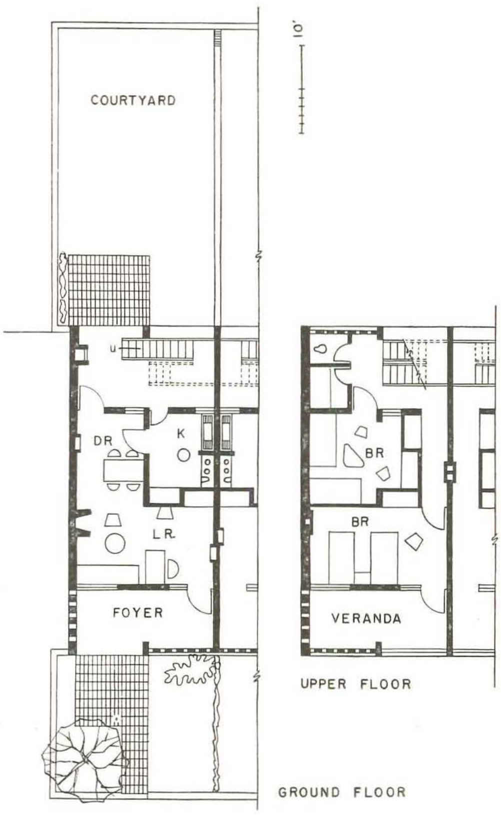


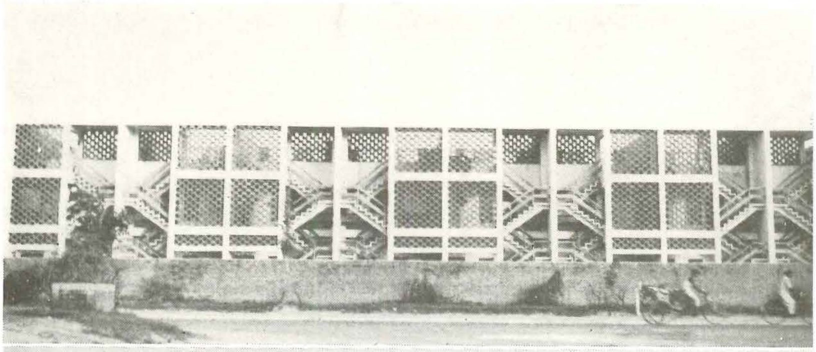
Chandigarh: a progress report

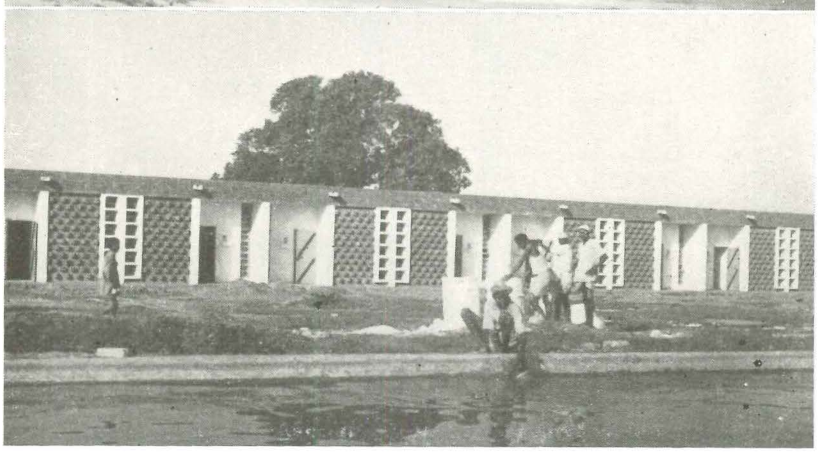


House plans—13 different types for the different income levels—had to be developed to cope with the extraordinary range in temperatures from oven heat to freezing cold. For the winter, a compact, well-insulated house that invites the sun is desirable. When the hot weather approaches it becomes increasingly unpleasant to stay indoors, as after sunset the outdoors is cooler than indoors and much pleasanter for sleeping. By daybreak, the house has lost some of its heat, while the outside air is rapidly becoming hot again. Hence, the custom is to close all doors and windows and draw the curtains to keep in the freshness. During the monsoon, circulation of air is extremely important. It is not possible to sleep outdoors because of the rain, but next best is a protected veranda. If one sleeps wholly indoors, windows and doors must be opened to induce cross air flow.

As a result, all house types—and the two shown below by Pierre Jeanneret demonstrate this—have at least the following elements: a nucleus of rooms suitable for the period of maximum heat, with small openings but always permitting cross ventilation; verandas for sheltered living and sleeping during the monsoon; a garden, backyard, or rooftop for outdoor living and sleeping during hot, clear weather. Even the row houses provided for the very lowest income level (*bottom photo* and *plan acrosspage*) contain these elements—plus bath and toilet facilities.

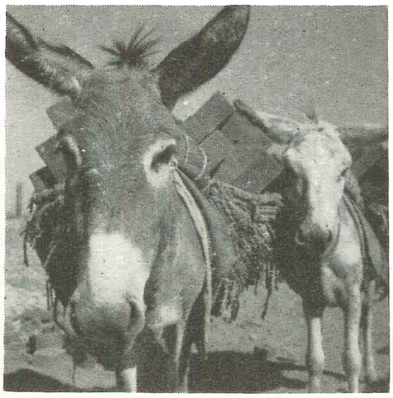


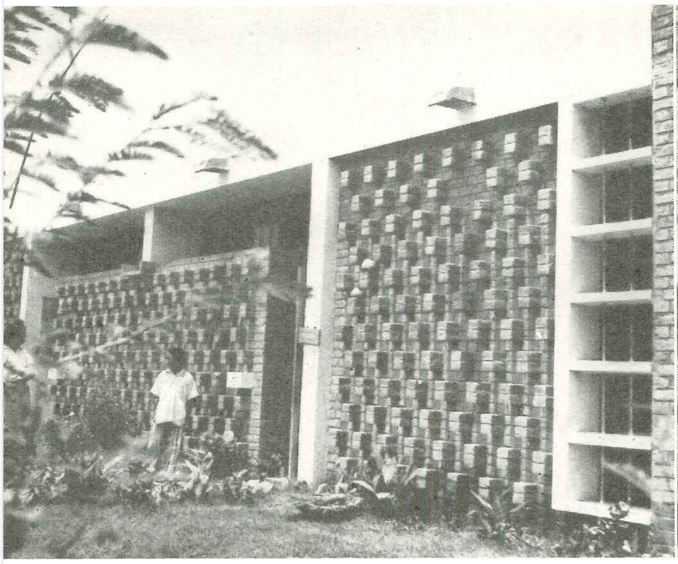


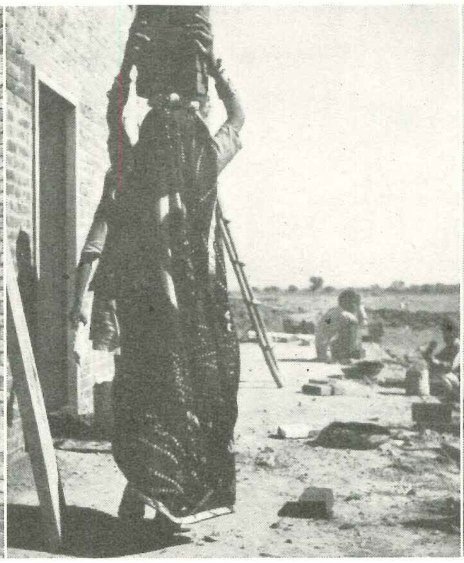


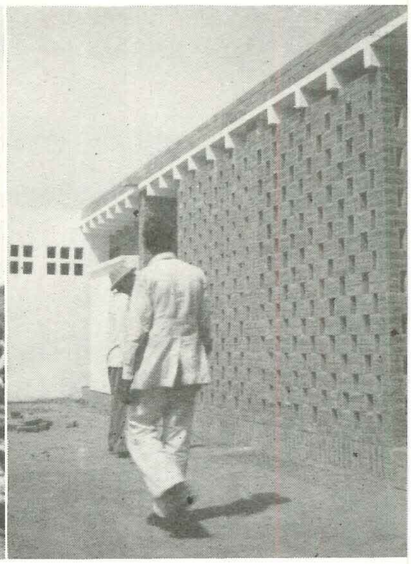
Typical nonresidential structures (acrosspage, left to right) *include shops by Jane B. Drew; a high school by the same architect; and the Engineering College, by J. K. Chowdhury, Punjab State Architect. Widely employed are various pierced screens that allow air flow yet temper the strong sunlight.*

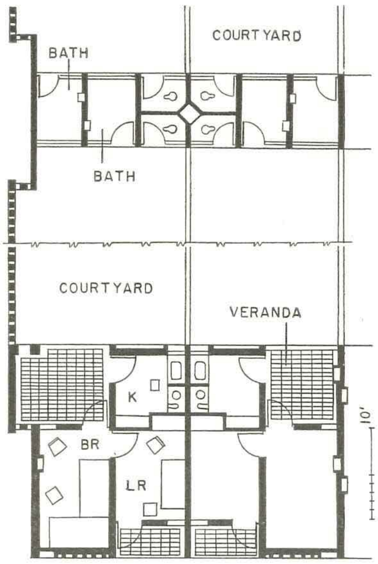
Photos: Ganguli Studios





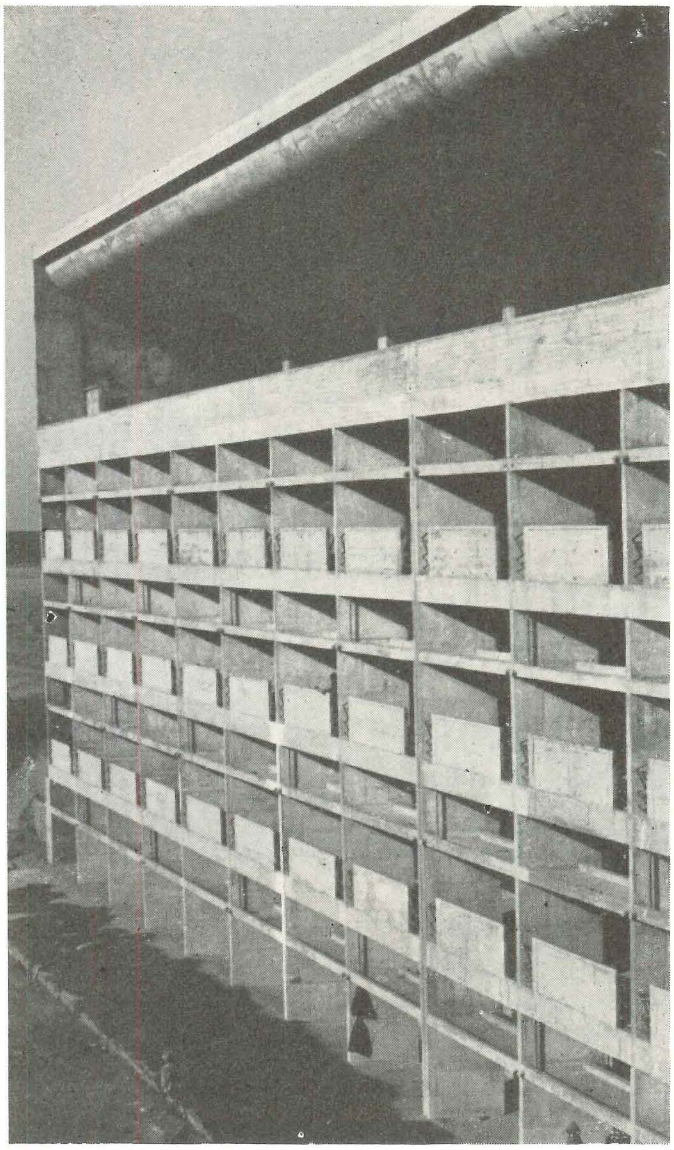


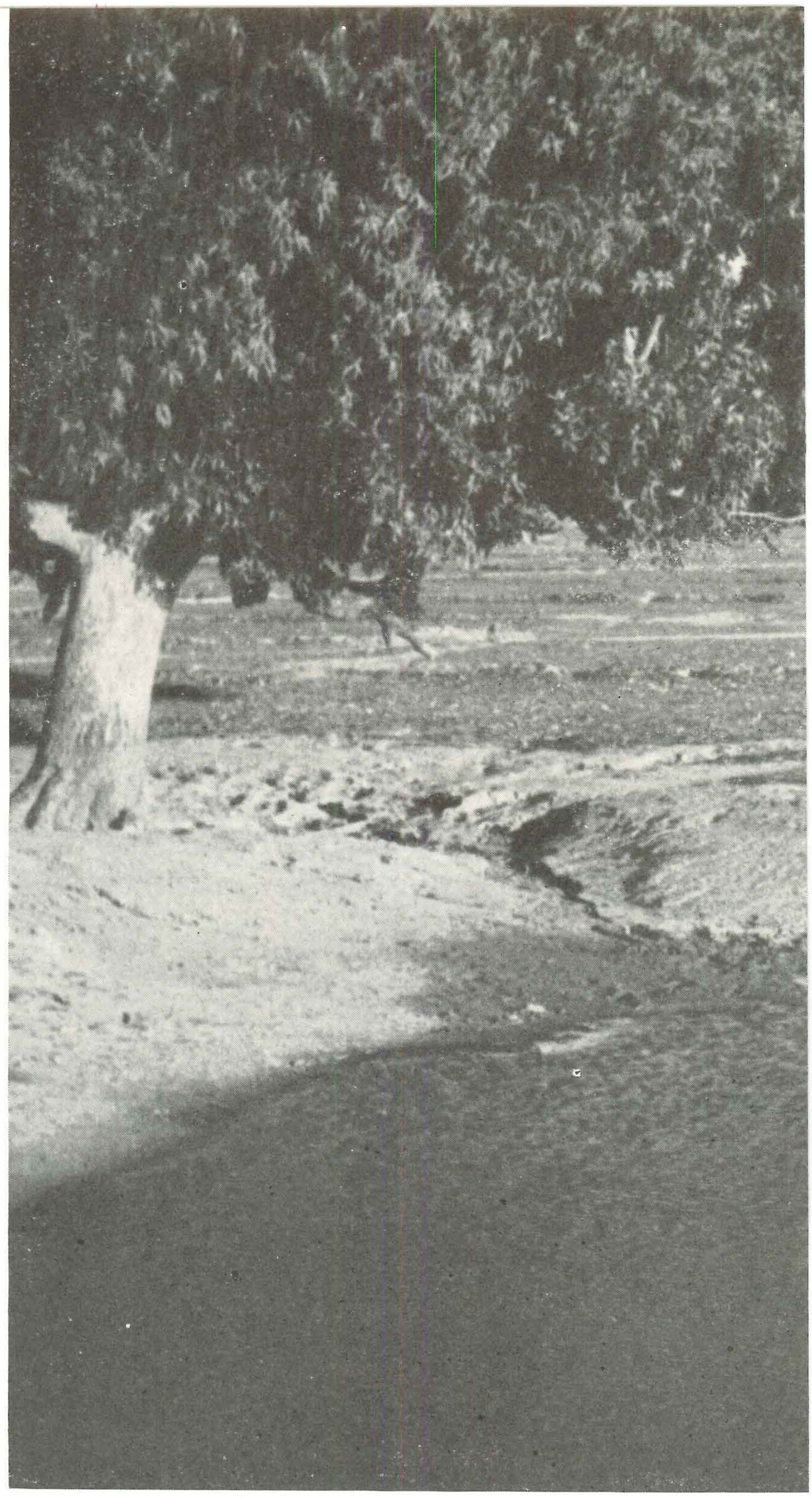


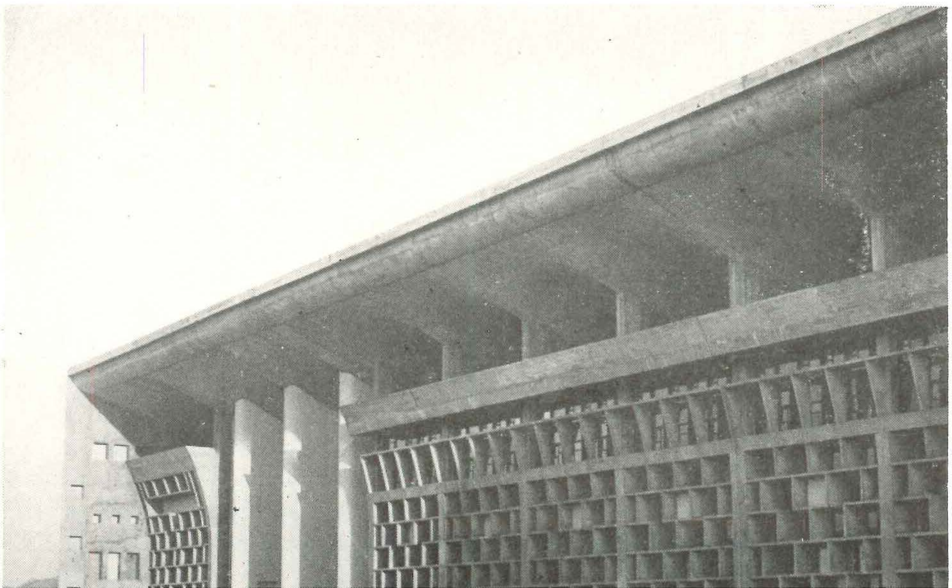


Most residential types have concrete slabs and walls are of brick—which is transported on the heads of women as well as by donkey back. By far the least costly material at Chandigarh, brick has been extensively used. Note the various fresh forms and essays in contemporary design expression that have been developed with this time-honored material—chieflly by Pierre Jeanneret.

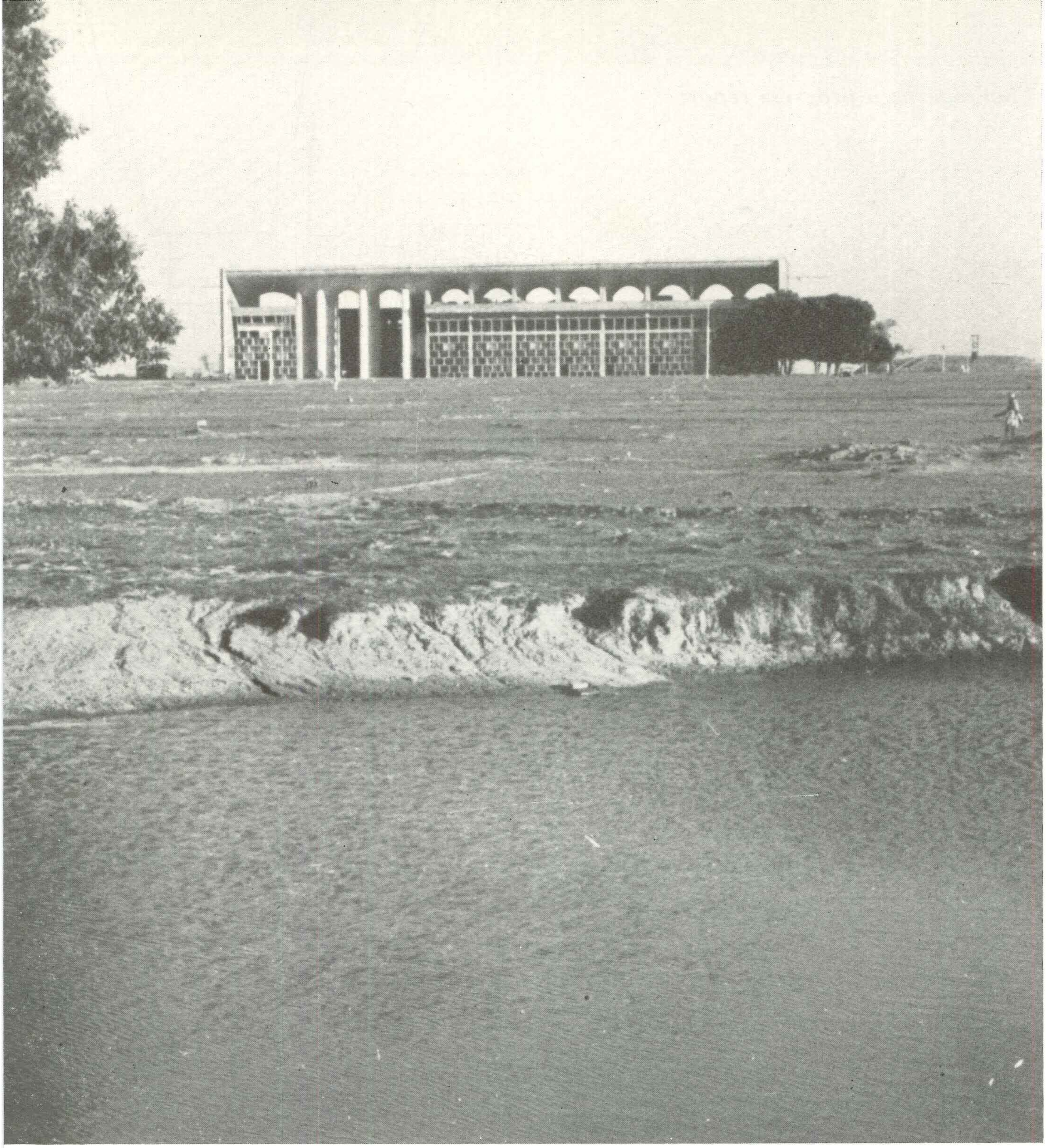
Chandigarh: a progress report







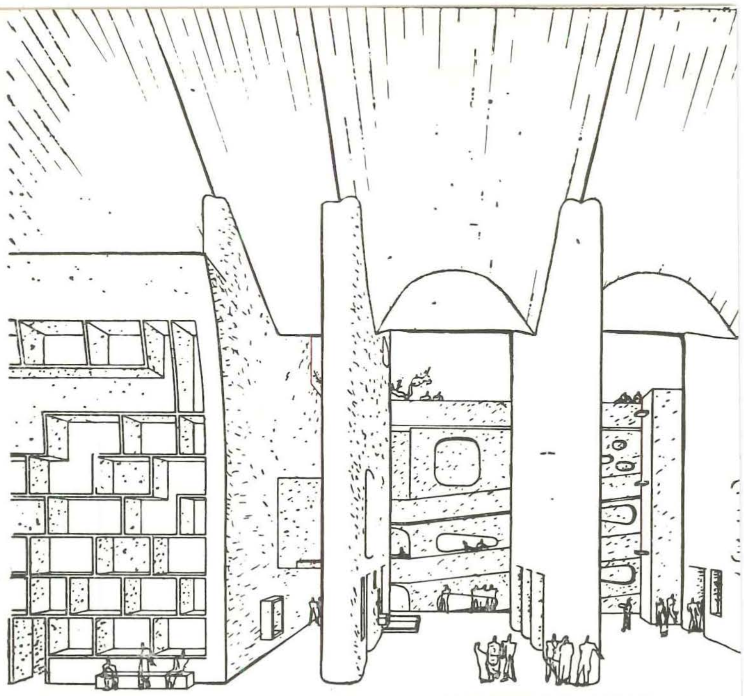
"Corbu" *Chief Engineer Varma*

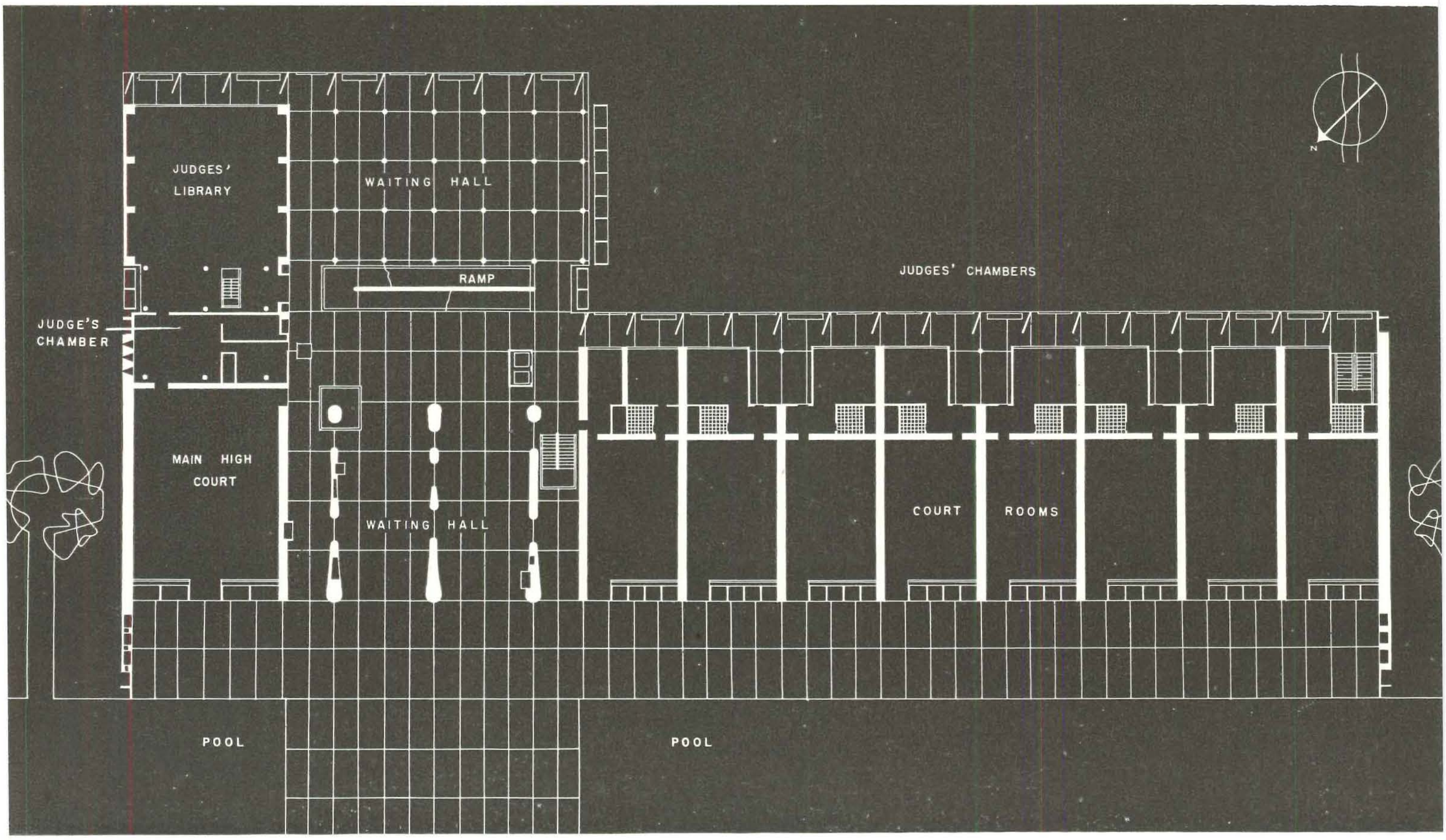


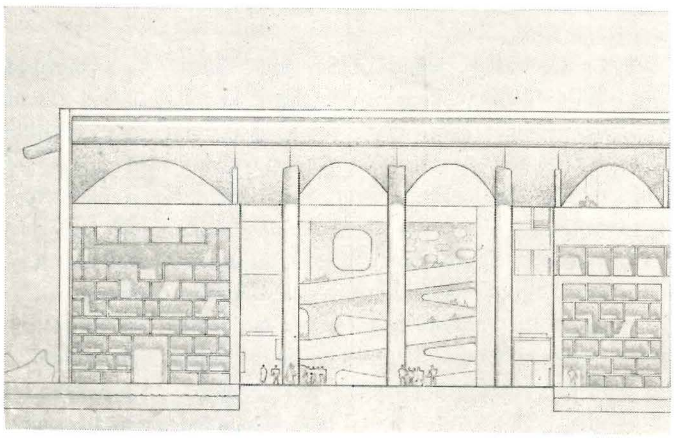
Le Corbusier's amazing Supreme Court building—first element completed in the Government center—is without question the biggest conversation piece in Chandigarh. Basically a reinforced-concrete structure, it uses brick partitions. And, to meet the climatic conditions, the architect boldly raised a structural umbrella above the rooftop, cantilevered out from the main frame. The conoid vaults within this soaring contrivance are nonstructural—of plastered metal lath suspended from the roof slab. Sunlight is variously baffled and diffused along exterior walls of the building through a vigorous grid of *brises soleils.* Rough stone is used to floor open areas, such as verandas, entrance portico, and terraces. Cement and terrazzo are employed in interior rooms.

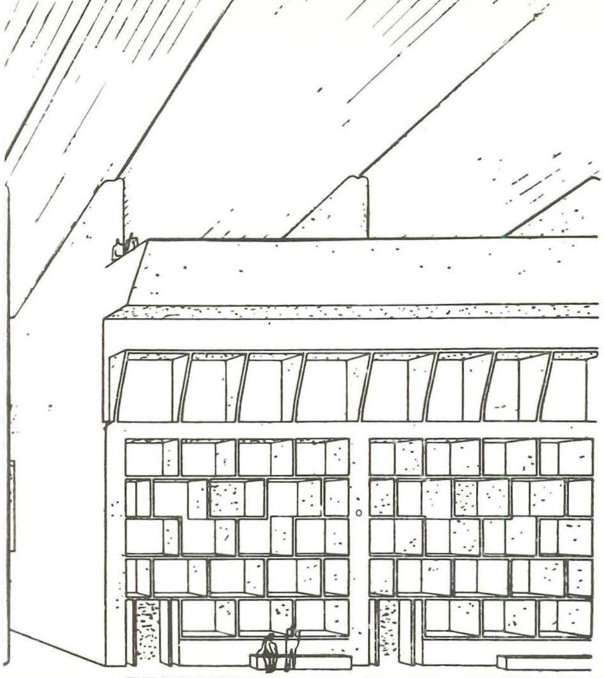
Design of the building is based on the system of harmonic and arithmetic proportions that "Corbu" calls Modulor, the governing proportion of which is the Golden Mean or *Section d'Or*. The bare concrete was left exposed after the formwork was stripped—requiring painstaking study of the formwork, which was detailed months in advance. As a foil to the large expanses of rough textures, the architect has introduced some small, brilliantly colored niches in the design. The Governor's Residence and Assembly building will be the next units built in the Capitol complex.

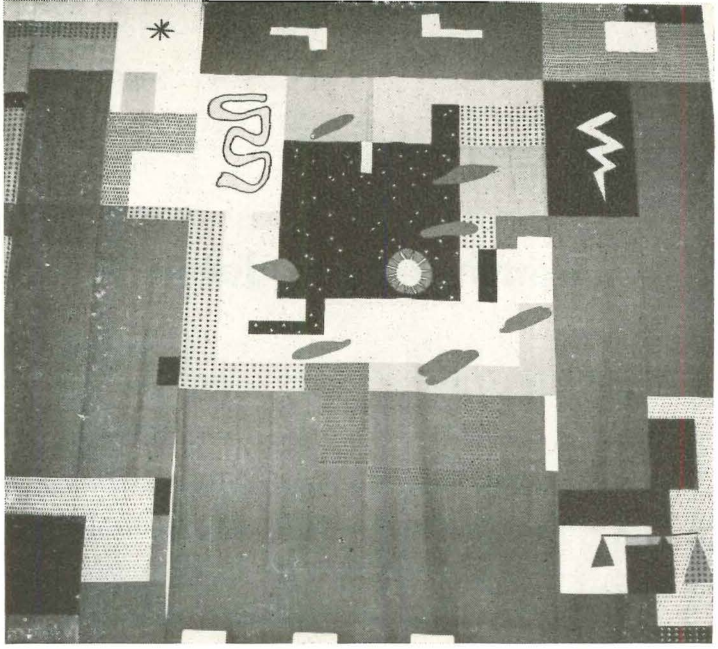
Chandigarh: a progress report

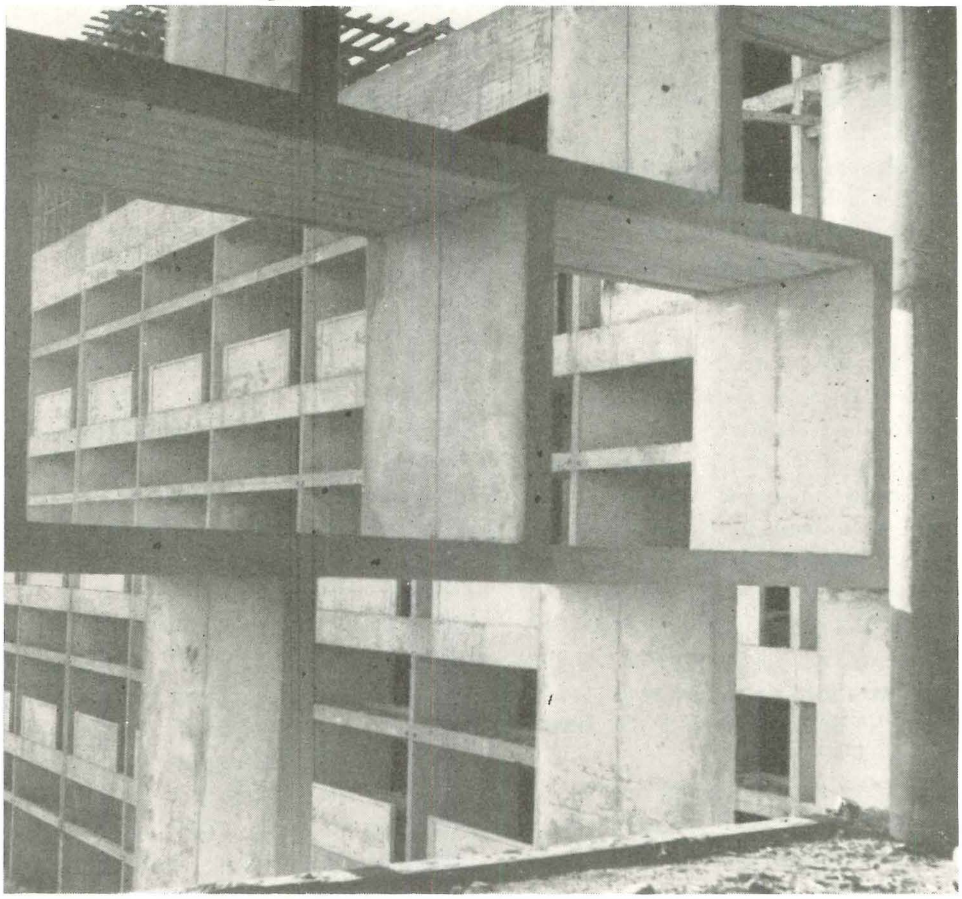






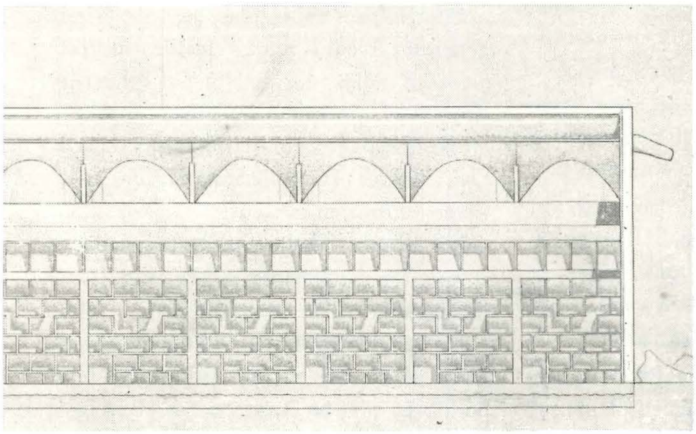


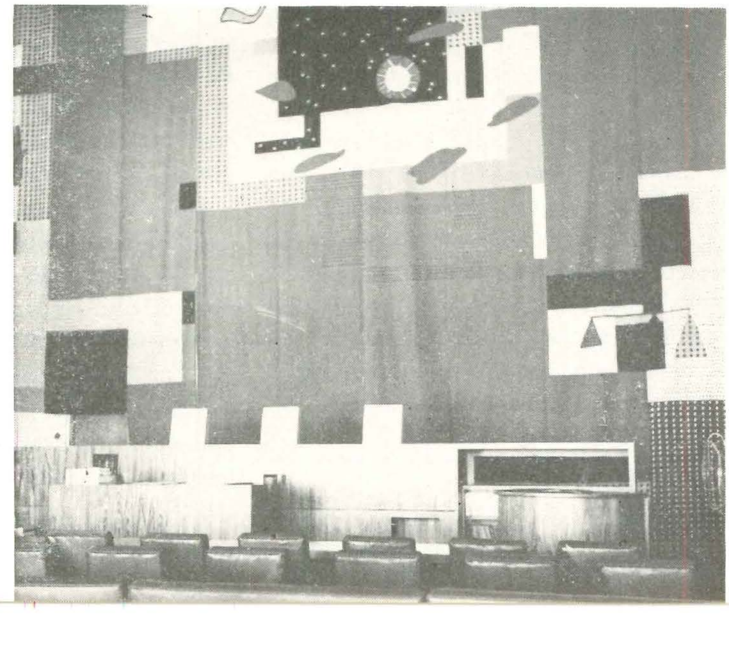




The vast entrance hall—full height of the building—leads to the various interior spaces. On the main floor are nine court rooms and the judges' chambers. Offices occupy the three upper floors; and a restaurant on the fourth floor commands a magnificent view.

The court-room interiors (above and below) are starkly simple, white plastered walls. On the walls behind the judges' benches are woolen tapestries of great richness and bold color—designed by Le Corbusier.





weather tests determine rigid window specifications

by Bruce M. Haldeman*

Specifications for the allowable infiltration of air and water through windows are becoming a standard consideration in today's building picture. Static and dymanic tests to determine window characteristics have been developed as an exacting basis for these rigid specifications. Both specifications and tests are discussed in this article.

Extremely exacting weather tests to determine air and water infiltration through window sash are a recent and significant development in the window industry; likewise, specifications for the tightness of window closure become increasingly important with the hundreds of types and styles of aluminum and steel window-sash available. Air infiltrating during hot summer months in an air-conditioned building, or cold air infiltrating in winter months, can add tremendously to the operating costs of the building. The more framed-glass area a building may have, the more acute the problem of tight seals becomes.

Infiltration specifications for the design and selection of windows are based on weather tests and, thus, should include mention of the test procedure. Attention to these specifications will insure economic operation of a building without raising initial costs for the builder and owner.

Dynamic tests, the real crux of the matter in weather testing, cover wind and water infiltration as well as allowable deflection of the metal membrane in curtain-wall units. Such tests cover those conditions of variable wind pressures normally expected on the face of a building. The precise mechanics of wind forces on a building are not wholly determinate, as these forces vary radically according to the building shape and height, nearby structures, and the surrounding terrain. Wind forces change rapidly and erratically due to these factors and due to the turbulence of the air current itself.

These varying dynamic stresses on the face of a building arise not only from wind-intensity changes, but also from changing low-pressure areas (suction areas) adjacent to the building. These areas affect the internal pressures of the building which, in turn, have an important effect on the air and water infiltration of the face members, as well as the deflection of the exterior-skin members.

Because of severe turbulence in the layer of air built up close to the structure, dynamic pressures from gale and hurricane winds change rapidly in intensity and position. More or less steady wind pressures tend to produce vibratory stresses, while gusty gale winds are inclined to produce simply rapid changes in pressure.

In metal curtain-wall contruction, the allowable deflection of the metal skin, to prevent cracking plaster for instance, can be a critical factor in the design of the spandrel-window unit. Dynamic weather tests of the complete unit design can determine the performance of the spandrel panel, and the metal membrane can be stiffened, if necessary, to achieve greater rigidity in the unit.

Procedures for dynamic weather testing have been established by various research groups and the procedures set forth here are applicable to window and modern curtain-wall construction.

To simulate dynamic conditions for the weather test, the skin structure or curtain wall is installed on the face of a test building, and may or may not be equipped with windows. The test specimen is anchored to I-beams on the interior of the test building, as it would be in an actual building.

In wind and water tests, simulated torrential rainfall is produced by introducing a water stream into the vortex of the wind-generator blade *(Figure 1)*. This water is carried approximately horizontally until it strikes the face of the test specimen. More water is appplied from above and just in front of the test building to assure abundant simulated rainfall between the gusts of horizontally borne water. This simulated rain may be measured in gal/min and adjusted to in./hr for any number of conditions.

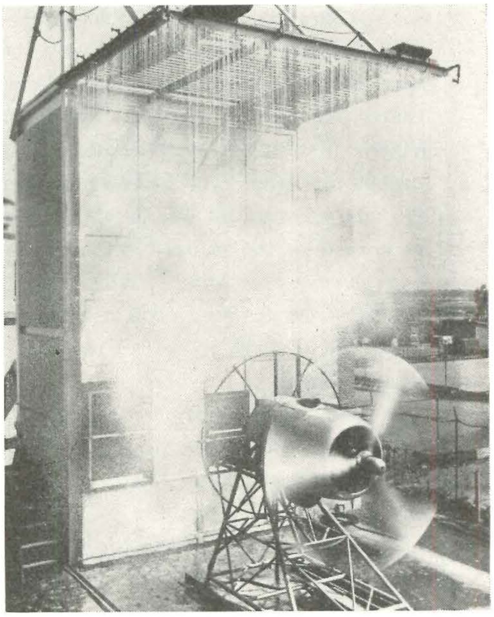
A standard test of 12 min of wind and water is sufficient to infiltrate an easily measurable quantity of water. Air infiltration of any window may also be measured, but if the standard static air-infiltration test has been carried out, this measurement is superfluous, and not suitable for qualitative comparison.

Pitot impact tubes placed at the wind generator record wind velocities at this point in miles per hr. Static tubes or transducers indicate pressures at the face of the building, rainfall apparatus record the amount of applied water, and the water infiltration is measured. Deflection gages placed about the test specimen record the movements of the skin from the interior of the test building.

Due to the layering effect and turbulence of the air on the face of the test building, it is incorrect to record velocities at this face. Specifications should state maximum psf pressure to be used.

* *Research Test Laboratory, General Bronze Corporation, Garden City, N. Y.*

Figure 1—in dynamic testing, a heavy wall of overhead water struck by the air blast from an airplane engine simulates hurricane conditions.



Allowable deflection to be permitted in the individual skin panels along with allowable deflection of skin structural members should be specified. Wind-caused deflection in curtain walls of modern buildings is expected to be greater than the deflection of the structural members of the building proper. Sufficient clearance on the interior of the skin members should be given to obviate possible damage to plaster and other nonloadbearing elements in the building.

A sample specification of the Dynamic Weather Test should read:

"The water infiltration of windows shall not be sufficient to overflow the sill interior with window in closed position and locked. The water infiltration seepage at joints of spandrels, curtain walls of other exterior skin members, shall not be sufficient to spatter the interior-wall assembly, and suitable baffle-gutters shall be provided to collect and lead out such water to the exterior. Said baffle-gutters shall project above slots or holes provided for weepage, and shall shield interior-wall assembly from spatter.

"Inward deflection of any part of spandrel, curtain wall, or other exterior skin member shall not be sufficient to cause skin member to touch any part of nonloadbearing interior-wall members, but in any case the deflection shall not exceed 1/375 of the narrowest span between anchors, or skin-fastening means.

"The velocity of the air stream at the wind-generator blade shall be no less than 100 miles per hr from a 5-ft-radius propeller blade providing at least 400,000-cfm discharge of air at the blade, and in any case the mean dynamic pressure at one point on the face of the test specimen shall be no less than 20 psf (3.85 in. water) as indicated by a standard calibrated manometer and pen recorder. The test specimen shall be subjected to the dynamic test for no less than 12 min and the finely dispersed water drops shall be injected in the air stream in such a manner to apply to the face of the test specimen no less than 4 in. water per hr per sq ft of specimen frontal area (2½ gal/sq ft/hr)."

The already well-standardized static weather tests for window and modern curtain-wall units cover conditions of constant and steady pressure appplied to the window surface by motor-driven propellers or blowers. In the static tests, it is assumed that wind presure per unit area on the test specimen is uniformly distributed.

Air infiltration through the test product is measured as cu ft per min per ft of sash perimeter (cfm/ft). The window or other product to be tested is mounted as a wall between two airtight chambers *(Figure 2)*, and an equivalent wind velocity is applied as static pressure against the exterior face of the specimen in one chamber while the infiltrated air is collected in the second chamber.

A sample specification based on the static weather test should read:

"The air infiltration shall not exceed —* cu ft per min per ft of sash perimeter with unit in closed position and locked, and the static pressure, equal to the pressure exerted by wind at a velocity of 25 miles per hr, shall be 1.560 psf, Enswiler formula. The velocity pressure and infiltrated-air pressure shall be measured by micromanometer of the differential-displacement type with balance,

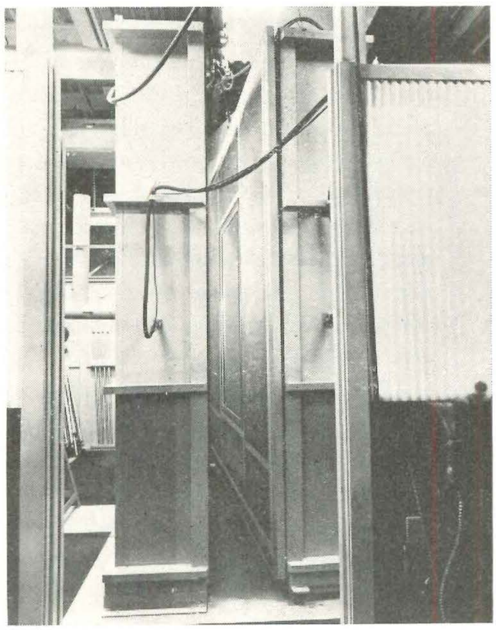


Figure 2—static weather-test chamber—with wall panel and window unit in place—is shown ready for closure.

*"*Recommended maximum values vary according to type and size of window. From recommendations of the Aluminum Window Manufacturers Association:*

for commercial and residential double-hung, casement, and awning windows—0.50cfm;

for residential double-hung and sliding windows—0.75 cfm;

for residential casement and awning and all projected windows—1.00 cfm."

and the infiltrated air shall exhaust to atmosphere through a standard sharp-edge circular orifice in .057 in. plate."

The Emswiler formula mentioned in this specification is a wind-velocity pressure equivalent, generally used only for static weather testing and recognized by leading laboratories and the Aluminum Window Manufacturers Association. This formula is written $P_1 = .00249V^2$—where P_1 is the pressure psf due to wind velocity normal to the exposed surface, and V is the velocity of wind in miles per hr. The Emswiler formula gives a pressure equivalent of 1.560 psf for a wind velocity of 25 mph.

In static weather testing it is assumed that the load caused by the wind is constant. For usual comparative purposes among window designs, a wind velocity of 25 mph is used as a primary criterion since winds above that speed would prevail only in extraordinary cases. At the pressure equivalent of 25-mph winds, sufficient air infiltrates to be measurable.

This infiltrated air is allowed to escape from the test chamber to atmosphere through a standard thin-plate orifice which has been previously tested to find its discharge characteristics: pressure difference across the orifice is equivalent to a certain volume of flow through the orifice. The mean total volume in cfm may then be computed to find the actual infiltration of air—cfm/ft.

A micromanometer measures pressures across the orifice and the equivalent velocity pressure from the induced wind on the test specimen. This method permits accuracy and consistent results that cannot be obtained readily by orifice-velocity measurements alone.

If a rotating-blade, mechanical-type anemometer is used for measuring, inertia may be sufficient to indicate no infiltration at all, yet in fact, there may be considerable infiltration. In the case of a spring-loaded, vane-type meter, friction of the air flow through the impact tube, or meter itself, gives rise to serious error, especially at low velocities.

The accepted laboratory procedure for the measurement of infiltrated air flowing into atmosphere under small differences of pressure** employs a micromanometer of the differential-displacement type with balance.

In writing a specification based on either the static or dynamic test, it is highly important that the static pressure equivalent, psf, for a given wind velocity be stated along with the method of measuring the flow of infiltrated air. This is necessary since there are two different formulas used for relating wind velocity to static pressure equivalent.

In dynamic testing, vibratory stresses set up by dynamic wind forces are more pronounced than static load analyses would indicate, and the impact caused by shifting and gusty winds on the face of a structure have shown the validity of using a higher wind-pressure equivalent than is used for the static test.

From the static test, specifications of the AWMA are based on the Emswiler equivalent ($P = .00249V^2$, namely 25-mph wind provides a pressure of 1.560 psf on exposed surface) and the specification writer should state both wind-velocity and pressure equivalent in his specification so that no misunderstanding can arise.

Now, the above formula is usually used for static weather testing of windows and doors, etc., while a second formula related to dynamic weather testing is used for buildings, spandrels, curtain walls, etc. This second formula, known as the Marvin formula, is stated as $P = .004V^2$.

Although the Marvin formula is used for pressure specifications in dynamic testing, these given pressures vary in intensity during gale and hurricane conditions and are not equivalent to static pressures. For the frame work of Class II buildings, the usual static wind loading for design purposes is assumed to be 20 psf for building heights up to 300 ft, plus 2 psf added increment for each additional 100 ft above the 300-ft level. For dynamic loading of skin structures, it is usually sufficient to specify 20 psf for mean dynamic wind pressure.

The Marvin formula states that $P = .004V^2$—where P is pressure in psf, due to wind velocity normal to the plane, and V is the velocity in miles per hr. In this formula, a wind speed of 25 mph produces a static pressure of 2.500 psf on the whole face of a structure, as opposed to a small window in an airtight test chamber used in the static test. A 70.7-mph wind produces 20 psf and a 100-mph wind a pressure of 40 psf. However, in winds of these gale intensities pressures vary erratically and are not actually equivalent to these static pressures derived under theoretical "ideal" conditions.

For comparative test purposes, it is assumed that pressure per unit area changes rapidly, is suddenly applied and erratic. The usual dynamic-test velocity at the wind generator or engine exceeds 100 mph and the indicated mean pressure per unit area on the test specimen is 20 psf. This is an average value of the constantly changing dynamic pressures, and should be suitably recorded during the test. It must be noted here that the approach velocity of a steady wind decreases rapidly as it approaches the face of the building. This effect is due to a layering phenomenon of the air, and only part of the velocity energy (not all as in a strict impact reaction) is given up to pressure on the face of the building. For this reason, the engine or wind generator should be located as closely as possible to the test building.

** *R. J. Durley, "On the Measurement of Air Flowing into the Atmosphere Through Circular Orifices in Thin Plates and Under Small Differences of Pressure,"* ASME Transactions, *Vol.* 27 *(December* 1905), *p.* 193.

residential steel doors

Steel doors and frames available in sizes to fit standard wall openings for residential construction can now be specified by architects and obtained from six door manufacturers who have formed The Steel Door Institute.

Members of the Institute have recommended voluntary standards of design, construction, and material through the Commodity Standards Division, U. S. Department of Commerce. A new, low total cost for these steel units has largely been made possible by mass production and standardization.

Besides price savings, members of the Institute cite other primary advantages to be gained by use of steel interior doors: maximum strength, easy installation, reduced erection time, sound deadening to eliminate metallic noise, minimum maintenance, and corrosion and fire resistance.

Swing doors can be obtained in flush and semiflush models. Also available are space-saving, sliding, steel closet doors in 3′, 4′, 5′, and 6′ opening widths and a standard height of 6′-8″.

Recommended material standards require that steel used in the doors shall be cold or hot rolled, pickled and oiled in minimum U.S. standard gages. Frames for 1⅜″ doors are 18 gage (.0478); those for 1¾″ thick are 16-gage (.0598) steel. Stiles and panels are fabricated of 20-gage (.0359) steel. Lock and strike, hinge, and closer reinforcements are of 16, 11, and 14 gage respectively, according to the specifications recommended.

Under these specifications, doors and frames can be obtained in the following opening sizes:

1⅜″	1¾″
2′-0″ x 6′-8″	2′-6″ x 6′-8″
2′-4″ x 6′-8″	2′-8″ x 6′-8″
2′-6″ x 6′-8″	3′-0″ x 6′-8″
2′-8″ x 6′-8″	2′-6″ x 7′-0″
3′-0″ x 6′-8″	2′-8″ x 7′-0″
	3′-0″ x 7′-0″

These newly available doors can be provided with louvers at bottom or top or with vision lights. The upper half can also be prepared for glazing, although glass must be supplied by others. Frames can be either fully welded or of the knock-down type. If the latter, they must have interlocking joints to produce square corners securely locked in place during erection.

Hinge location on door and frame is the manufacturer's choice. Location of lock knobs, however, is recommended on the center line of the 6′-8″ doors to permit either a right- or left-hand swing. Locks on 7′-0″ doors should be the same distance from the floor as on the 6′-8″ models. All mortising for hinges and locksets is done at the factory, thereby accounting for a good part of the time saved in installation.

Frames are provided with three adjustable T-shaped anchors per jamb where the frame is to be used in a masonry wall. For stud construction, three welded anchors per jamb are provided. Anchors are 18-gage steel.

Institute recommendations specify that swing doors be sound deadened to eliminate metallic clang. Some manufacturers accomplish this by filling hollow cores with bat-type insulation that is fire and moisture resistant as well as vermin proof. Others apply a heavy emulsion type of sound deadener to the interior surface of the door panels.

Institute members are: American Welding & Manufacturing Co., Warren, Ohio; Diebold, Inc., United Metal Products Division, Canton, Ohio; The Steelcraft Manufacturing Co., Rossmoyne, Ohio; Truscon Steel Division, Republic Steel Corp., Youngstown, Ohio; United Steel Fabricators, Wooster, Ohio; and Virginia Metals Products, Inc., Orange, Va.

A complete resume of specifications for interior steel doors can be obtained from The Steel Door Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

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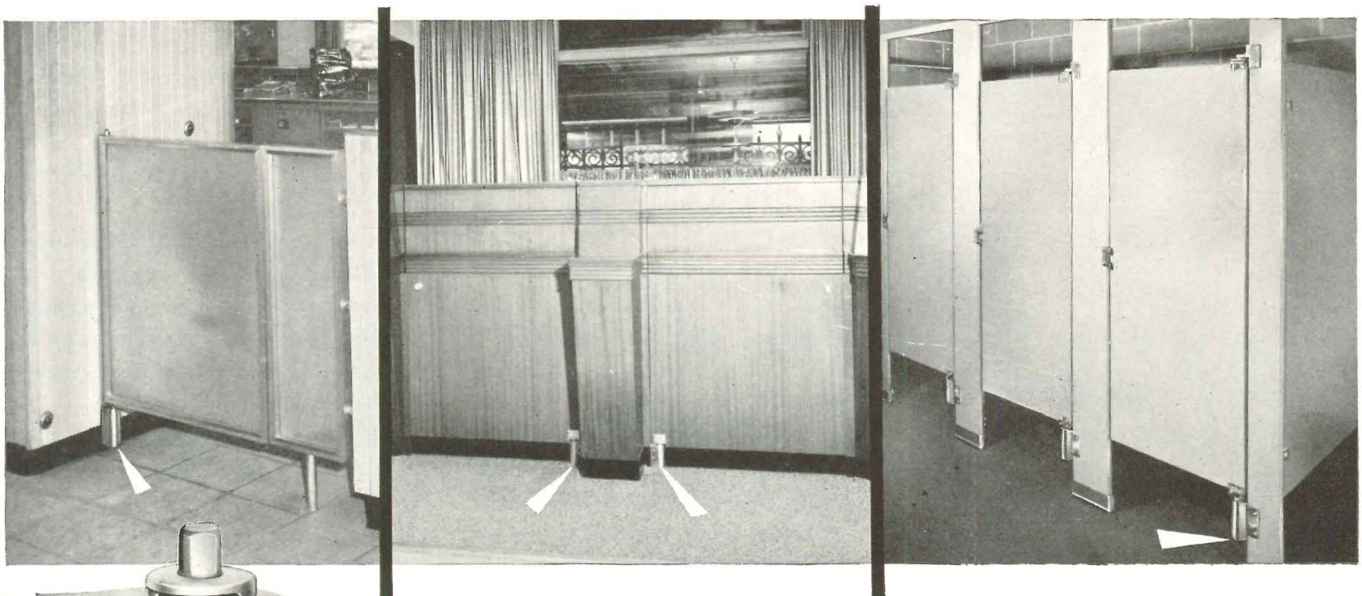

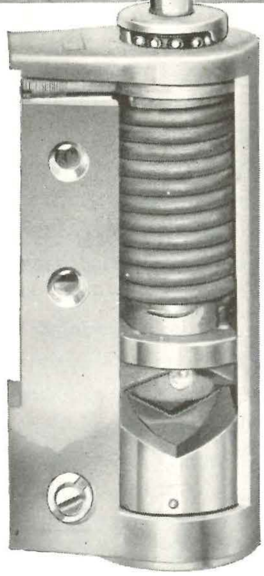

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broken crystal ball

I don't know what is going on in your neck of the woods regarding school costs, but see here! In my own little old metropolitan New York area, since early spring of 1955, school bids have been bouncing in, varying from 1% to 44% in excess of authorizations. The average excess in the group studied is about 19% for new elementary, junior, and senior high schools, additions to existing buildings and renovations. The over-runs are due principally to wage increases, granted and anticipated, increases in costs of materials (especially steel, cement, and copper), and generally higher bids on the part of subcontractors. Where will all this lead us? The architect is backed into a most uncomfortable position. Educators are faced with the knotty problem of cutting back building areas at the expense of the educational program, at a time when school housing is needed so desperately. I don't know what the answer is, other than for us to double our efforts in the direction of more economical solutions.

CRSI

Not too long ago, the Concrete Reinforcing Steel Institute developed a little booklet that told a story pictorially and pungently. In view of the rising cost of steel I found it especially timely and informative. If you saw it, don't bother reading on. For those who may have filed it in the rotary file without reading, cast your eyes on this 11-point summary:

"1. Study the framework of your building as a whole.

"2. Prepare freehand framing sketches, comparing various methods.

"3. Establish column centers to come in partitions, to clear door and window openings, and to provide economical framing. Spacings of from 14 to 15 feet up to 20 to 25 feet are recommended.

"4. Take rough preliminary sizes either from the *CRSI Design Handbook* or by that rule of thumb which suggests making beam depth one inch per foot of span and width one-half of that—increasing somewhat for unusually light loads.

"5. Prepare alternate sketches of any other practical ways of framing the same structure.

"6. Make quantity surveys and cost comparisons of all practicable schemes. This can be done quickly and roughly and still with a fair degree of accuracy.

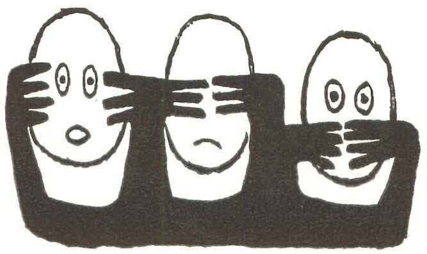
"7. Select that compromise which achieves the best balance between low cost of the building and minimum interference with desired facilities.

"8. Your preliminary framing sketches, made freehand on thin paper, can be printed and distributed to architects, mechanical engineers, and others to establish the general program and eliminate unnecessary changes on finished drawings.

"9. Have a sense of comparative values. A stair header has relatively little effect on the over-all cost, but a whole line of spandrel beams on many stories can become a large item.

"10. Plan your building and visualize how forms would be constructed. For economy, keep beams and columns simple, without haunches, brackets, widened ends or offsets.

"11. You can save in form construction by making the concrete structure sufficiently strong to permit stripping forms in a very short time so as to permit their re-use. Stripping is often permitted when concrete reaches 70% of the ultimate design strength."



rules for specifiers

I have been asked many times what makes a good specifications writer. The following is an enumeration of rules to follow, for up-and-coming specification writers.

1. When a building product manufacturer's representative visits with you, by all means do not give him an opportunity to speak his piece. Interrupt him to tell all you know about his product, especially the story you heard from a distant relative regarding the failure of his material.

2. Always rely on your superb memory and precious collection of outdated catalogs—never open Sweets'.

3. When in doubt in writing specifications, see how cleverly you can devise unclear, impressive language to disguise your ignorance.

4. Always use the standard *AIA General Conditions* without modifications, since these were prepared to cover magically every conceivable condition throughout the length and breadth of our country.

5. No use wasting time and money, always put off writing specifications until the last minute. In order to build up an impressively thick book, ask your secretary to copy the nearest trade association specification (which you must avoid reading, much less edit).

6. Always specify the same item of work in several sections, to make sure you get it.

7. When using ASTM or similar references, never use its particular specification number. No use burdening the contractor with too much information.

8. Never be unduly alarmed lest the specifications agree with the drawings; you could look at the drawings any time after they are out to bid, for happy coincidences.

9. Never admit a mistake! Hide behind previously prepared grandfather clauses.

10. When writing guarantee clauses, insist on your own pet method of executing the work.

11. Insist upon a limited bidding period (Contractors wait until the last moment anyhow). Be sure to include at least 35 alternates (because Contractors just adore these interest-stimulating features).

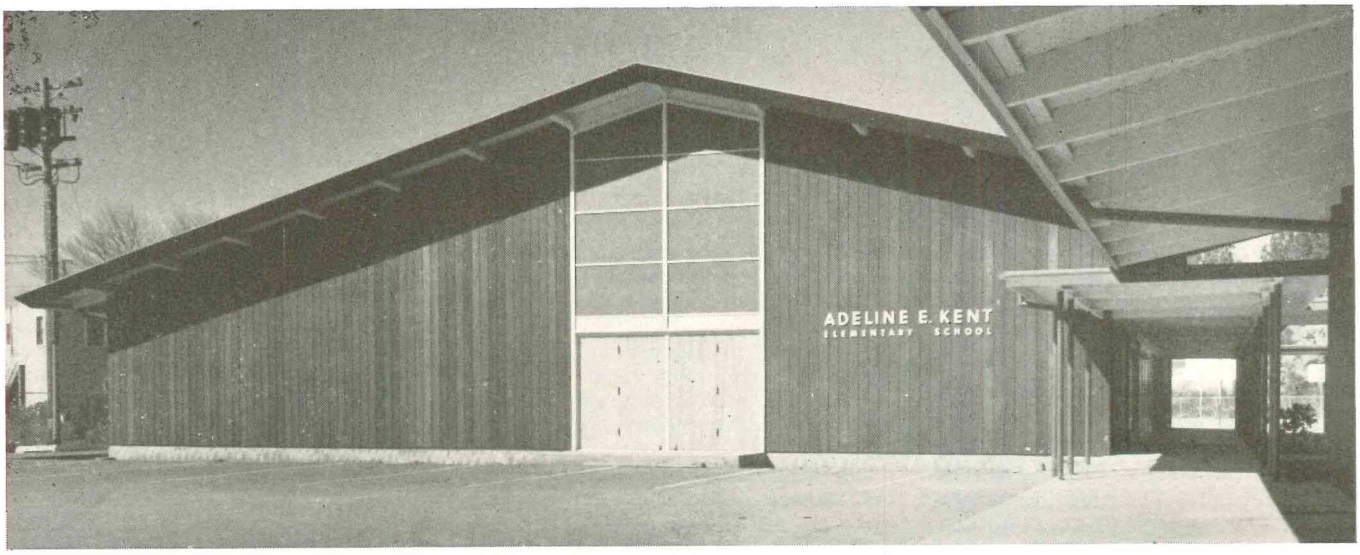
12. Make sure you have a list of job openings handy. You may need it!

new code for lifts

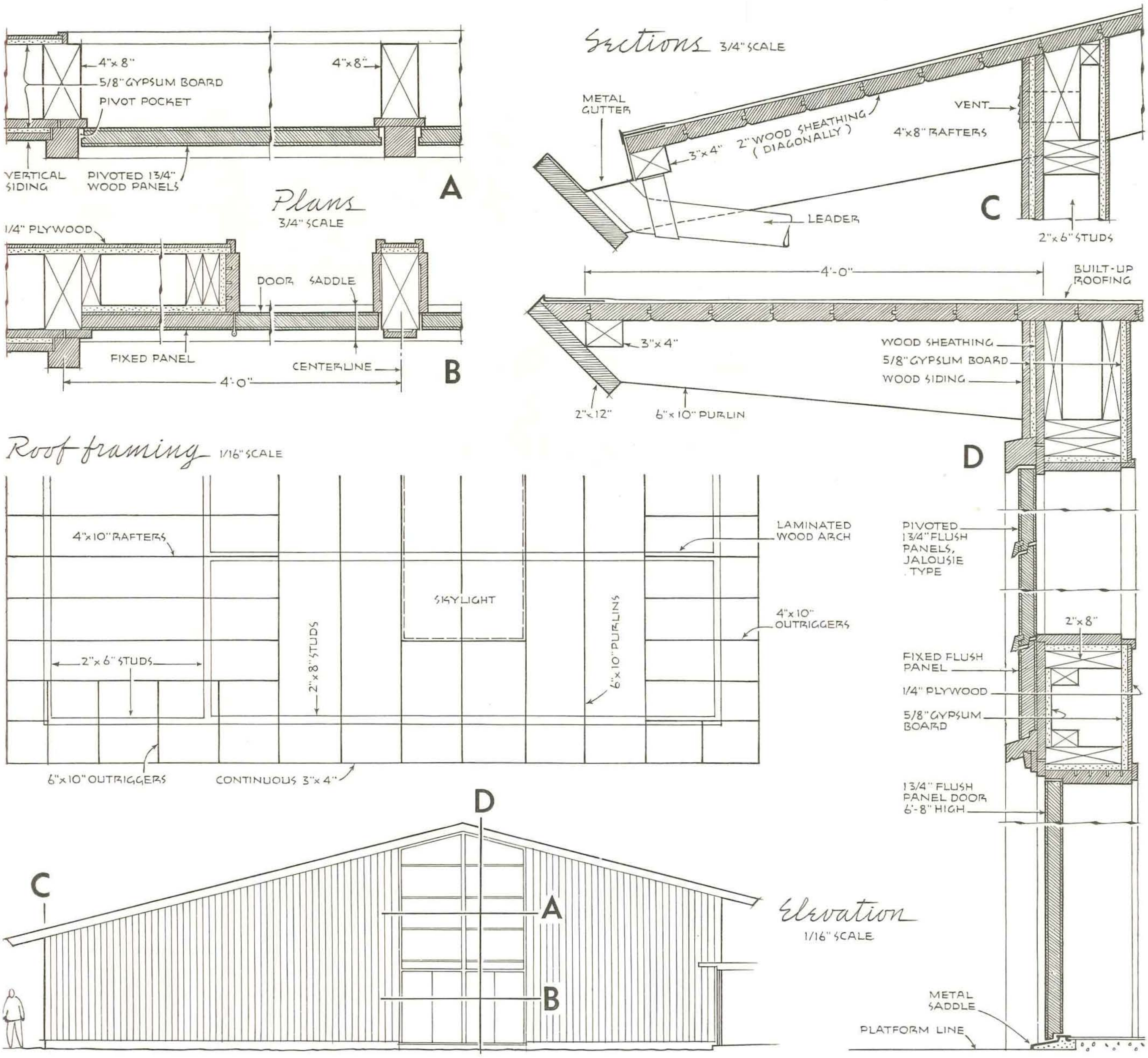
Under the sponsorship of the National Bureau of Standards, the American Institute of Architects, and the American Society for Mechanical Engineers, 14 subcommittees with a total membership of 150 labored and brought forth a splendid buy at $3.50. I am referring to the *1955 Safety Code for Elevators, Dumbwaiters and Escalators* which is happily approved by the American Standards Association and published by the American Society of Mechanical Engineers. Now don't go away, gentlemen. This is really important! You know perfectly well all of us goof at one time or another in the design of elevators. I know of no other tome so neatly engineered to avoid pitfalls. It is not the kind of reading you take to bed with you, but sure is vital guidance to those concerned with safety in this field. Maybe in this day of specialization you are wont to toss this problem in someone else's lap. Even so, this is an important book to have around to check your specialist's special specialty. Now, ASME, may I have my free copy?

p/a selected detail

wall section



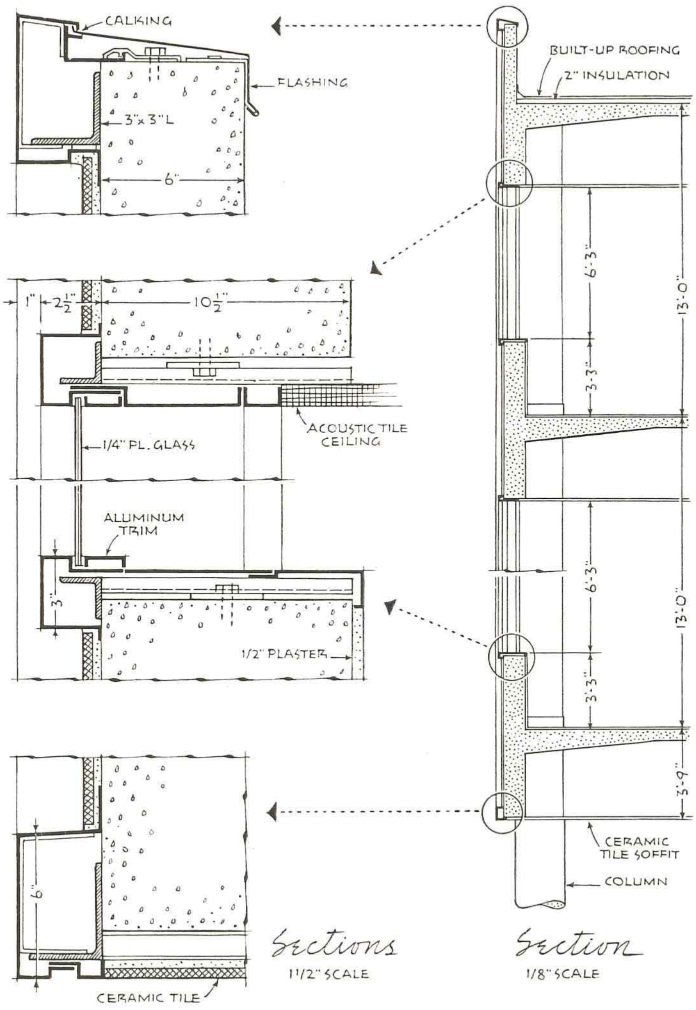
PHIL PALMER



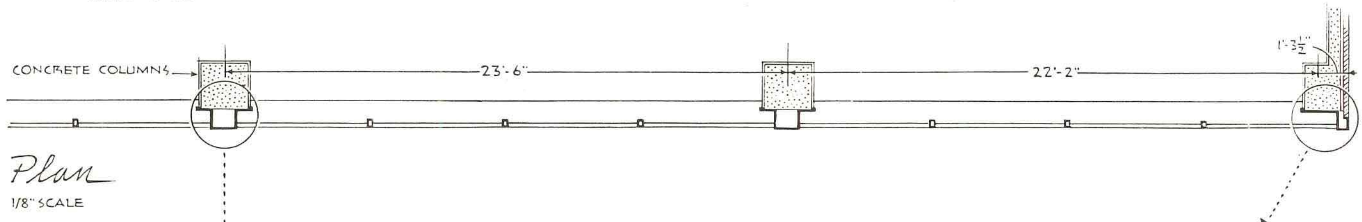
ELEMENTARY SCHOOL, Kentfield, Marin County, Calif.

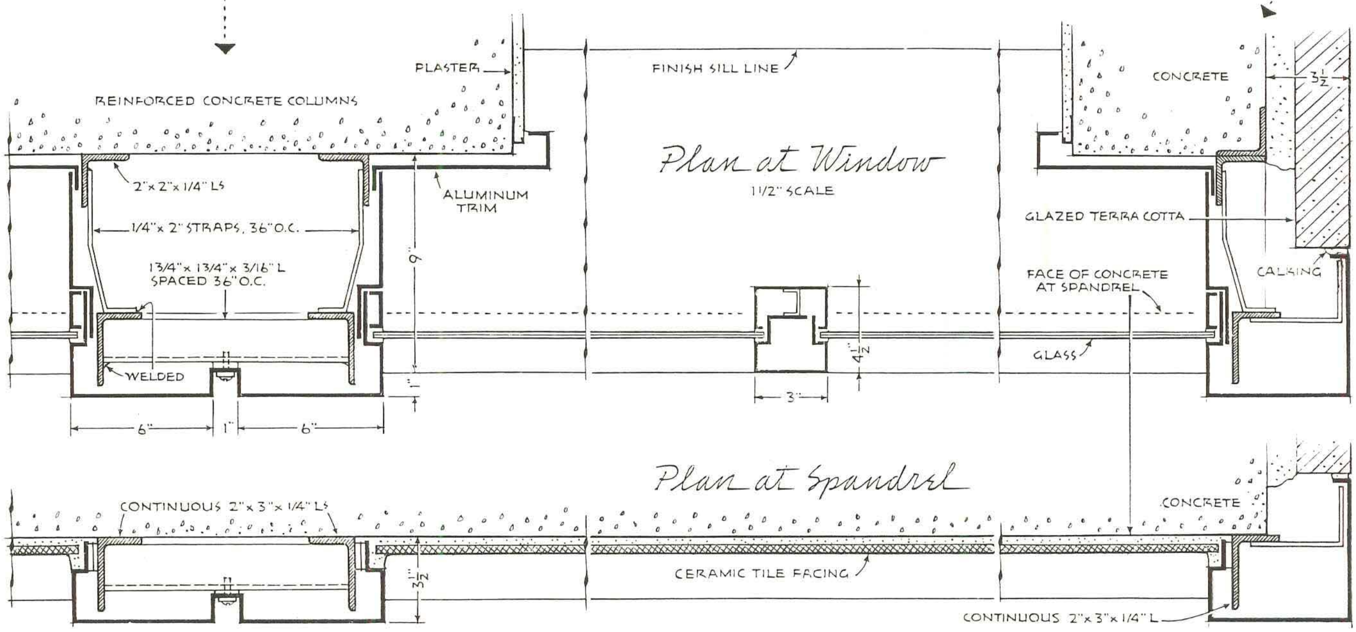
Corlett & Spackman, Architects

wall section




JULIUS SHULMAN





POLICE HEADQUARTERS, Los Angeles, Calif.

Welton Becket & Associates and J. E. Stanton, Associated Architects

multipurpose schoolrooms

Louise Sloane

As a space-saving and economical planning element, the multipurpose schoolroom has won wide popular use. The logical combination of auditorium with gymnasium and/or with cafeteria serves to provide multiple facilities in the most practical, least costly manner. We show five examples of elementary schools where thoughtful planning for the varied uses of the multiple room has accomplished successful results.

In the Lakeview Elementary School, executed for Mercer Island School District No. 400, Mercer Island, Washington, Architects Bassetti, Morse & Aitken designed a gymnasium/auditorium shaped like a musical horn, especially to produce excellent acoustics. The wood ceiling slopes steeply up toward the stage and acts as reflecting soundboard, while the sound-absorbing walls of Haydite block are splayed outward toward the rear of the room, with a sound-absorbing rear wall of perforated hardboard. Windows have been eliminated, since they would just have to be darkened for the audio-visual programs. Brilliant color (orange, yellow) accenting brown, tan and white surfaces, is in key with the lively activities for which the building is used.

Architects Daniel, Mann, Johnson & Mendenhall, for the Manhattan Beach City School District, Manhattan Beach, California, took advantage of the sloping characteristics of the site to create inside and outside assembly areas, with a stage in the middle, adding an amphitheater to the multipurpose cafeteria/assembly space. Vivid colors, selected on the basis of children's own color preferences, contribute gaiety and spirit to the interior.

For the Palm Springs Unified School District, Palm Springs, California, Architects Clark, Frey & Chambers combined cafeteria with assembly facilities, selecting materials especially suitable for both uses. Wall pockets to accommodate folding tables and benches, serving counters that may be closed off, narrow windows, shuttered and easily darkened, all serve to simplify the change from one room function to another.

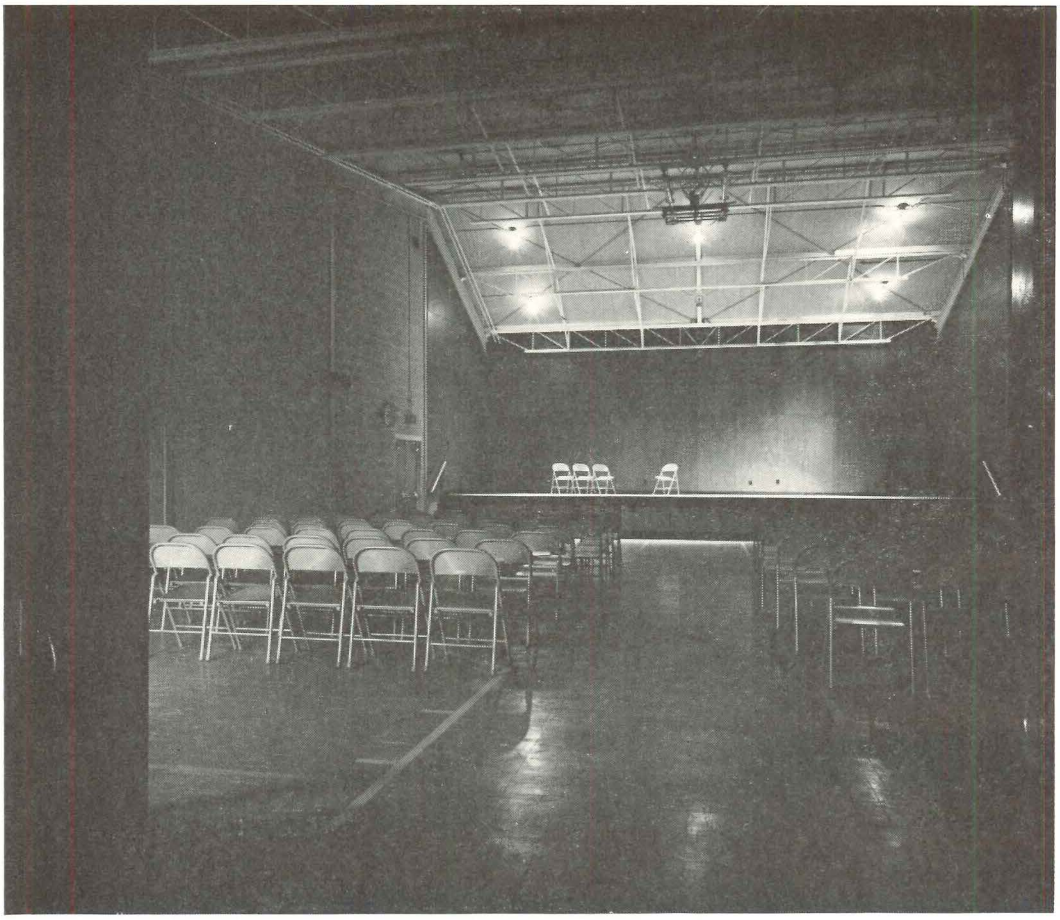
Architects Ganster & Hennighausen incorporated three uses (auditorium/gymnasium/cafeteria) in the room designed for Board of Education, Cook County School District No. 68, Skokie, Illinois. The soundproofed ceiling is equally important for all three uses. The introduction of natural wood for the walls flanking the cafeteria, and for the coat-storage doors, adds warmth and contrast to other surface materials.

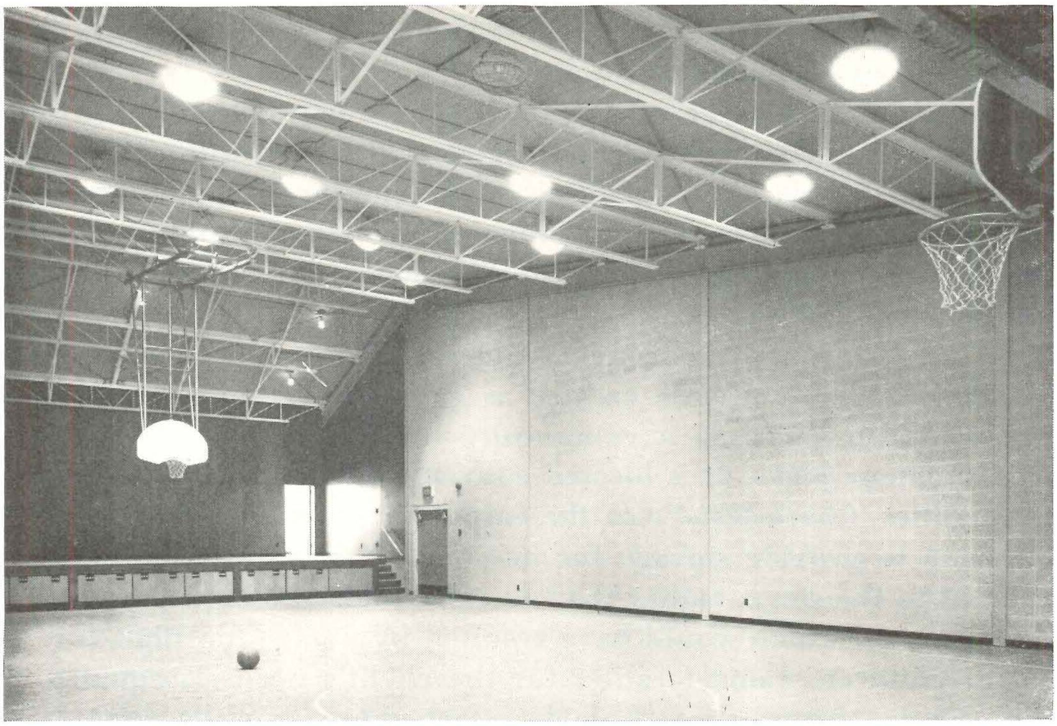
For the Town of Sharon, Connecticut, School Building Committee, Architects Sherwood, Mills & Smith created a combination auditorium/gymnasium that will also serve as a community meeting place for town meetings, dances, amateur plays. It is located convenient to nearby cafeteria and lunchroom facilities. Characteristic of the emphatic planning behind this design is the decision to provide storage for over 400 chairs on trucks in a large closet adjacent to the stage, rather than to raise the stage high enough for chair storage beneath, which would have resulted in a stage too high for best sight lines for children. Consideration for the client's needs is equally well expressed in the provision of wood blocks attached to side walls, spaced to permit easy attachment of 4′ x 8′ pieces of beaverboard for decorations painted by students or community groups.

p/a interior design data

multipurpose schoolrooms

area	auditorium/gymnasium
location	Lakeview Elementary School, Mercer Island, Washington
architects	Bassetti, Morse & Aitken
colors	Mary Bassetti and Emily Morse





Photos: Art Hupy

data

Design Theory: Multipurpose room for 600-pupil elementary school, also used for adult games and evening meetings. Simple shape contributes to good acoustics and extreme flexibility of use. Significant points are: splayed sound-absorbing sidewalls, paneled platform, sound-reflecting ceiling, highly absorbent rear wall, omission of a proscenium, retractable baskets, built-in projection booth, connecting warm-up kitchen. Windows or skylights would have been considered a nuisance—to darken for audio-visual programs.

Color Plan: Bright-orange ceiling, white trusses, light fixture reflectors; light-tan side and rear walls; yellow steel columns; dark-walnut-stain on platform plywood walls; medium-brown asphalt tile, except maple on platforms. Yellow walls and curtains in dressing rooms.

doors, partitions, windows

All Doors and Partitions: General Veneer Company, Los Angeles, Calif.
Windows in Dressing Rooms: Tecler/ Aluminum Products Co., 625 N. Yale St., Seattle, Wash.

equipment

Basketball Baskets: E. P. Finigan Co., San Francisco, Calif.

furniture

Folding Chairs: Virco Mfg. Co., 15134 So. Vermont Ave., Los Angeles, Calif.

lighting

Silver Bowl Diffusers: Smoot-Holman, Inglewood, Calif.

walls, ceiling, flooring

Walls: Graystone Haydite cement block/ Seattle, Wash.

Interior Finish on Platform: stained fir plywood on wood furring.

Interior Finish on Rear Wall: perforated hardboard/ "Hansonite" from Sweden.

Sidewalls: paint.

Ceiling: 2" fir plank/ oil paint.

Floors: concrete slab on grade; "Matico" asphalt tile/ Mastic Tile Corp. of America, N. Montgomery St., Newburgh, N.Y.

area	cafeteria/assembly space/amphitheater
location	Curtis Avenue Elementary School, Manhattan Beach, California
architects	Daniel, Mann, Johnson & Mendenhall
landscape architect	Eric Armstrong

data

Design Theory: Since building program could not support a large assembly cafeteria area, it was necessary to develop available space for dual use. Interiors were made to appear larger by maximum use of glass and at one end by 40'-wide sliding doors, which created a stage outside of the building. This was done by raising the concrete pad and extending the overhang to cover it. Because of the extreme sloping characteristics of the site, it was felt that the stage could also be utilized as an amphitheater at the opposite direction of the building. This created an assembly area—one inside and one outside, with a stage in the middle. By the general topography of the site, this became a cove and the stage can be used during evening functions, even in the cooler winter weather of the Southern California beach cities.

Color Plan: Color plan is based on the thesis that schools are created for children and not adults. The architects studied more than 2000 pictures drawn by the children of this District, in order to find out what colors children choose. This range was interpreted as the color scheme of the building. Ceiling is white with lemon-yellow concrete panels. Walls are dark red. Woods are white ash, with turquoise-green table tops. Plaster wall is white with red accent panels, turquoise-green wainscot. Floors are tan asphalt tile.

doors and windows

Steel sliding doors: Arcadia Metal Products Co., 801 S. Arcadia Ave., Fullerton, Calif.

Windows: stationary windows alternating with aluminum jalousie windows/

furniture

Folding Tables: "In-Wall"/ Scheiber Sales Co., Brightmoor Sta., Detroit 23, Mich.

lighting

Fixtures: concentric rings.

walls, ceiling, flooring

Wainscot: "Kalistron"/ U.S. Plywood Co., 55 W. 44 St., N.Y.C.

Walls: plaster, painted/ White Ash/ U.S. Plywood Co., 55 W. 44 St., New York, N. Y.

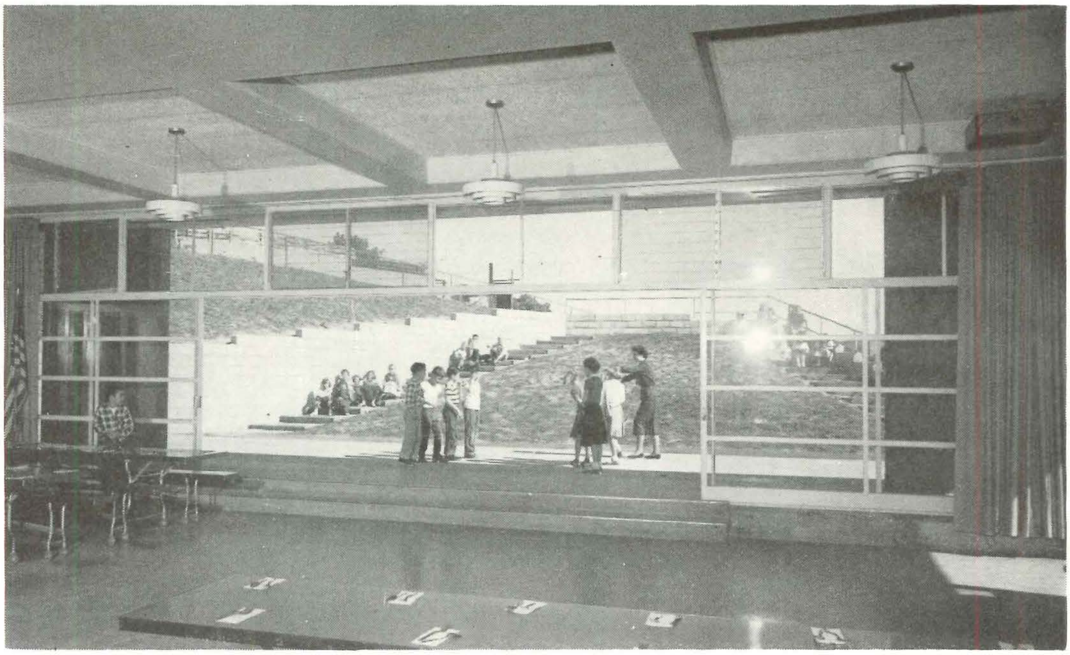
Ceiling: "Insulrok"/ used as form for lifting slab concrete on ground/ when raised into place, it became the acoustical finish for ceiling and was painted white for reflecting value/ Insulrock Corp., E. Linden Ave., Linden, N.J.

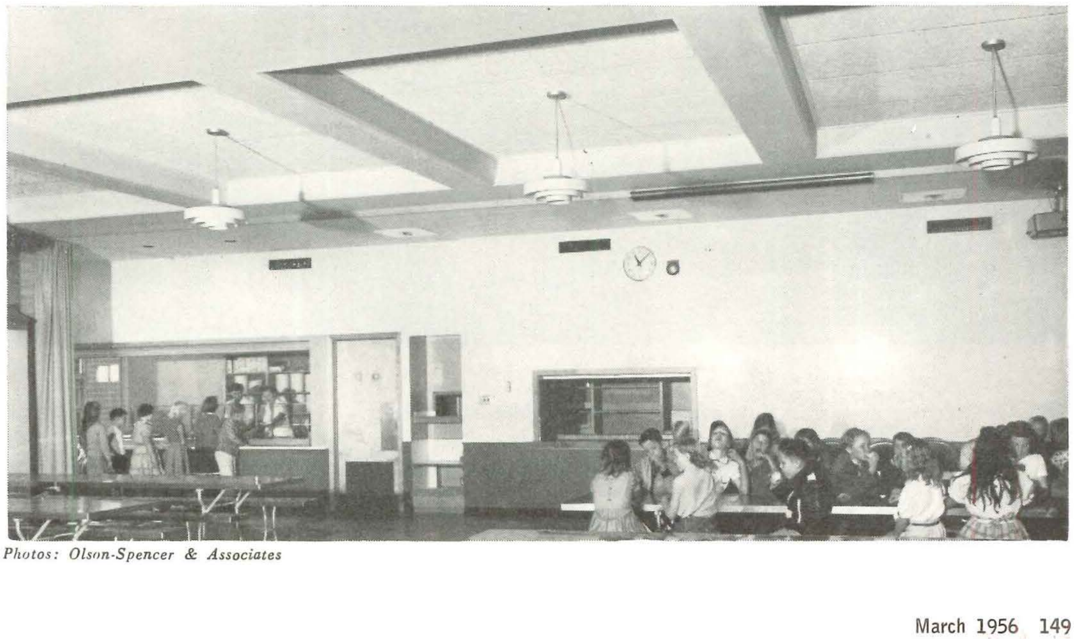
Floors: concrete; "Matico"/ asphalt tile covering/ Mastic Tile Corporation of America, No. Montgomery St., Newburgh, N.Y.

equipment

Tray Slides in Counter Tops: stainless steel.

Aluminum Counter Door at Dish Return: The Cookson Co., 1539 Cortland Ave., San Francisco, Calif.

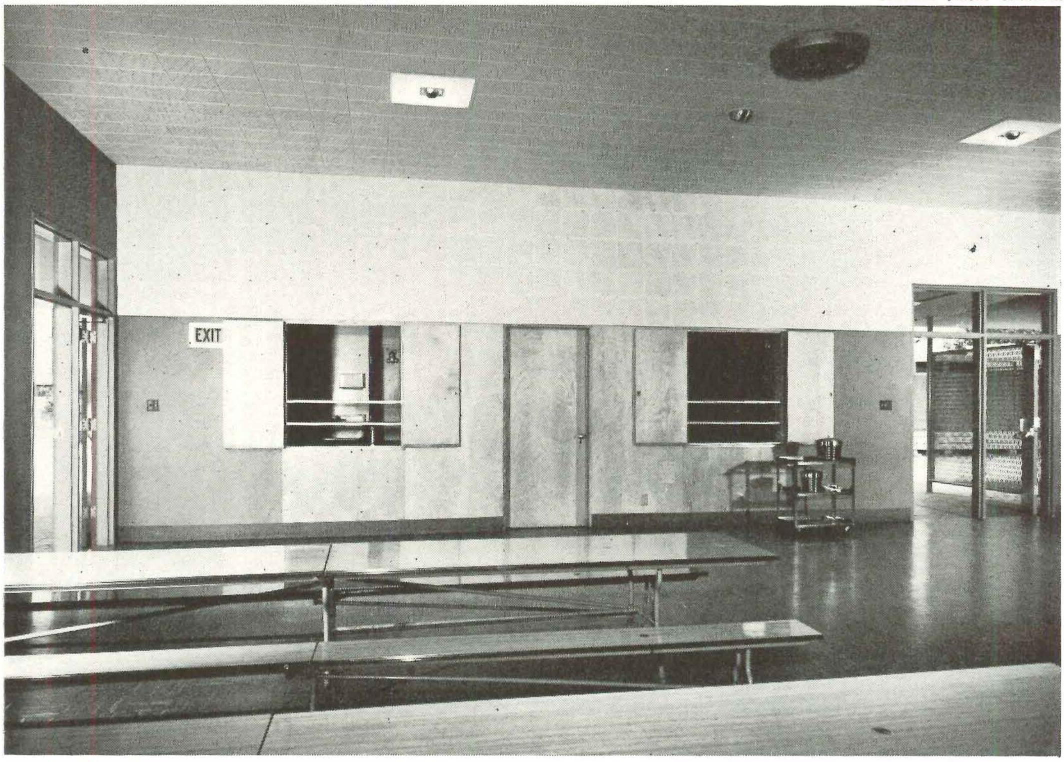




Photos: Olson-Spencer & Associates

multipurpose schoolrooms

Photos: Julius Shulman



data

Design Theory: Multipurpose room to be used as cafeteria/assembly room. Folding tables and benches, grease-proof asphalt-tile floor, serving counters connecting to kitchen for cafeteria use. For assembly use, tables and benches fold into wall pockets, serving counters are closed off, folding chairs are brought in (benches may be used for short programs, but are not comfortable for long periods of sitting). If slide or movie projection is desired, narrow windows between table pockets may be darkened by closing hinged wood shutters. Wide continuous steps to platform create friendly relationship between two areas. Folding tables may be removed from pockets and used on platform or in assembly room for banquets, conferences, etc.

Color Plan: Floor is medium gray, with light natural-finish birch paneling on walls, light wood-grained Formica surfaces on tables and benches to match birch walls. Plaster walls are painted light teal blue in assembly room, beige on platform. Ceiling and upper portion of rear wall are of white acoustical tile.

doors and windows

Doors: Krieger Sheet Metal & Fire Door Co., Los Angeles, Calif.

Windows: steel sash/ Ceco Steel Products Corp., 5601 W. 26 St., Chicago 50, Ill.

equipment

Dishwasher: Hobart Mfg. Co., Troy, Ohio.

furniture

Folding Tables: "Port-A-Fold"/ Schieber Sales Co., Brightmoor Station, Detroit 23. Mich.

lighting

Assembly Room: "Skylike"/ Smoot-Holman, Inglewood, Calif.

Platform Border Lights: Kliegl Bros., 321 W. 50 St., New York 19, N.Y.

walls, ceiling, flooring

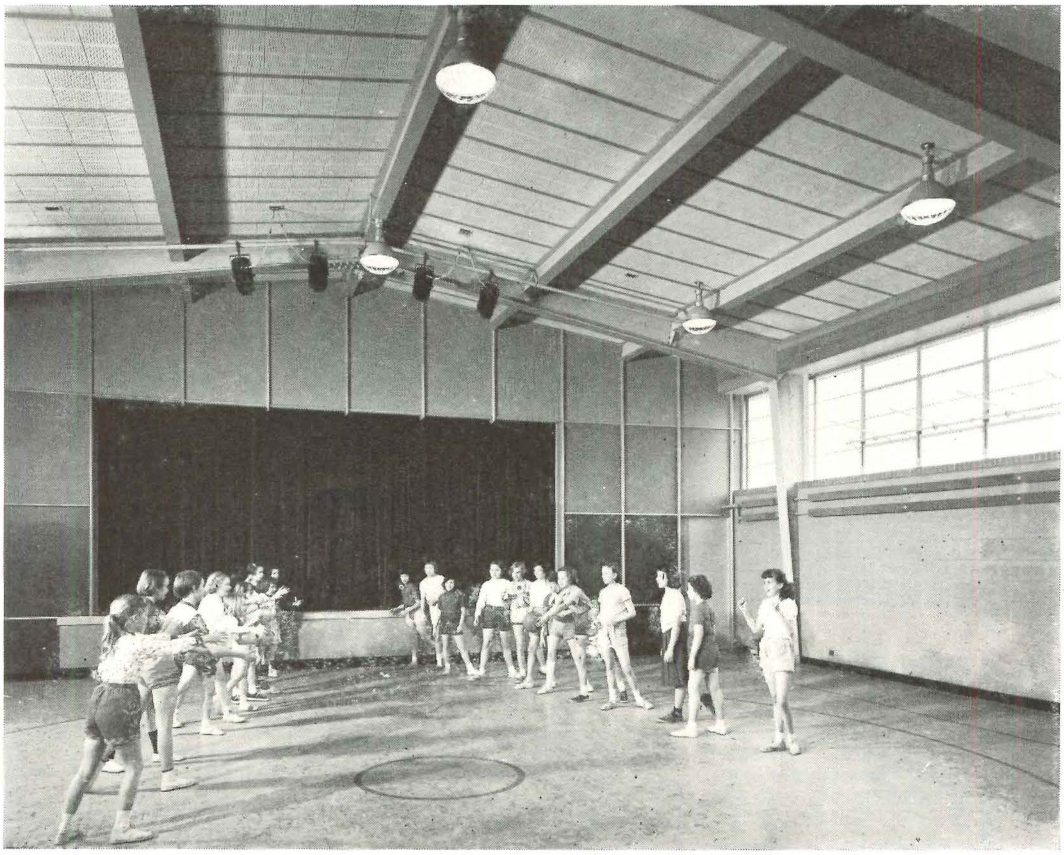
Walls: birch finish/ U.S. Plywood Co., 55 W. 44 St., New York 36, N.Y.

Floors: asphalt tile/ Moultile, Inc., Long Beach, Calif.

Ceiling: "Firtex"/ acoustical tile/ Dant & Russell, Portland, Ore.

area	auditorium/cafeteria
location	Cahuilla Elementary School, Palm Springs, California
architects	Clark, Frey & Chambers

Photos: Hedrich-Blessing



data

Design Theory: Triple purpose room has sound-proofed ceiling, floor inlaid with game lines. All furniture is portable. Cafeteria is at opposite end from stage. Caged, drop ceiling lights.

windows

Steel Sash: Crittall, Inc., Waukesha, Wis.

lighting

Fixtures: Sylvania Electric Products, Inc., 60 Boston St., Salem, Mass.

ceiling and flooring

Ceiling: "Auditone"/ U.S. Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

Floors: asphalt tile/ Tile-Tex Div., The Flinkote Co., 1232 McKinley St., Chicago Heights, Ill.

area — auditorium/gymnasium/cafeteria

location — Jane Stenson School, Skokie, Illinois

architects — Ganster & Hennighausen

p/a interior design data

multipurpose schoolrooms

area auditorium/gymnasium

location Sharon Elementary School, Sharon, Connecticut

architects Sherwood, Mills & Smith

Photos: Joseph W. Molitor

data

Design Theory: Simple, inexpensive enclosure for combination auditorium/gymnasium, which in general form might be reminiscent of Colonial buildings and old farmhouses and barns in immediate vicinity. Sloping gable form used to provide maximum height for basketball play in the center, with low height at side walls to keep the room in scale with small children. Structure, framing, and roof plank exposed. Room also serves for community activities. Ample storage provided by several sets of double doors on inner side wall for convenient disposal of chairs, equipment, etc., when not in active use.

Color Plan: Walls, light neutral gray-pink. Ceiling white. Steel bents are painted to match ceiling and walls, rather than emphasized. Proscenium, natural brick same as exterior. Stage curtain green, acoustical rear wall green to match and to furnish dark background for basketball. Natural-birch woodwork. Natural-cork tackboard. Red glazed-tile wainscot. Floor, gray mottled-vinyl tile, athletic games inlaid.

doors and windows

Doors and Adjacent Wainscot: natural birch/United States Plywood Corp., 55 W. 44 St., New York, N. Y.

Recessed Hardware: Schlage Lock Co., 2201 Bay Shore Blvd., San Francisco, Calif.

Windows and Window Frames: Hope's Windows, Inc., 84 Hopkins Ave., Jamestown, N. Y.

equipment

Nailing and Fastening Blocks: wood blocks permanently fastened to steel bents and to side walls for decorations.

Stage Curtain and Track: blue-green satin tweed, metallic-flecked/I. Weiss & Sons, 445 W. 45 St., New York, N. Y.

Tackboard Between Rear Doors: Natural cork/Armstrong Cork Co., Lancaster, Pa.

lighting

Fluorescent Luminaire: The Miller Co., Meriden, Conn.

Plastic Skylights: "Wascolite Skydomes"/provided with spring roller darkening shades/Wasco Products, Inc., 87 Fawcett St., Cambridge 38, Mass.

walls, ceiling, flooring

Front Wall: special variegated common brick.

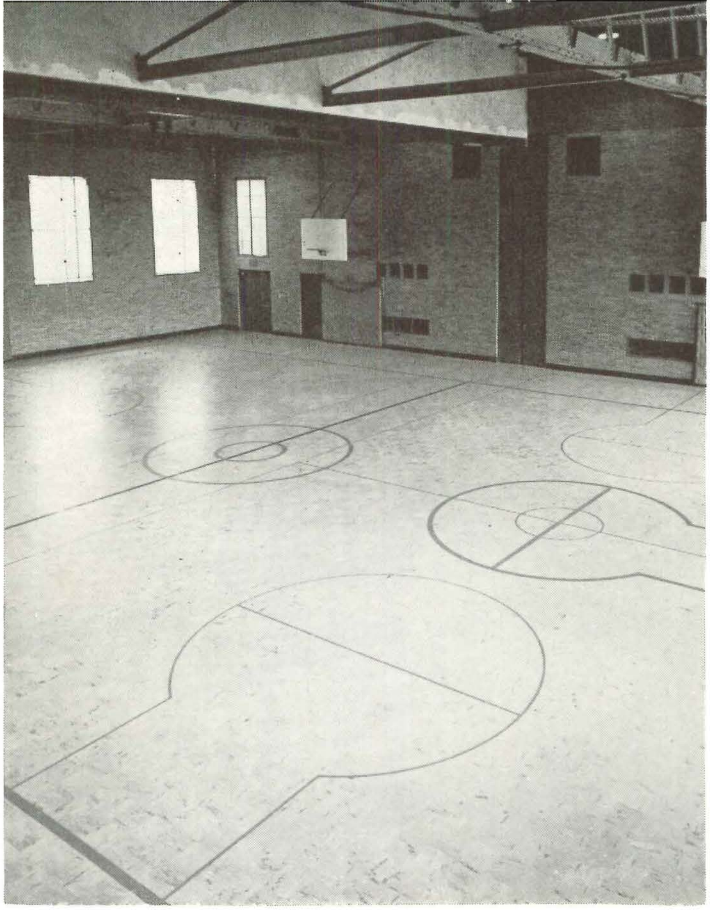
Wainscoting: glazed tile/Marblox, Kenilworth, N. J.

Rear Wall: perforated "Transite"/Johns-Manville Corp., 22 E. 40 St., New York, N. Y.

Ceiling: concrete plank/Insulrock Corp., Linden, N. J.

Gymnasium Floor Underlayment: latex rubber/The Flintkote Co., 1232 McKinley Ave., Chicago Heights, Ill.

Inlaid Floor: vinyl asbestos tile/Kentile Inc., 58 Second Ave., Brooklyn 15, N.Y.



p/a interior design products

resilient flooring

Gymnasium: "Terraflex"/ vinyl-asbestos tile/ inlaid game lines/ Hamden High School, Conn./ **Johns-Manville Sales Corporation, 22 E. 40 St., New York 16, N.Y.**

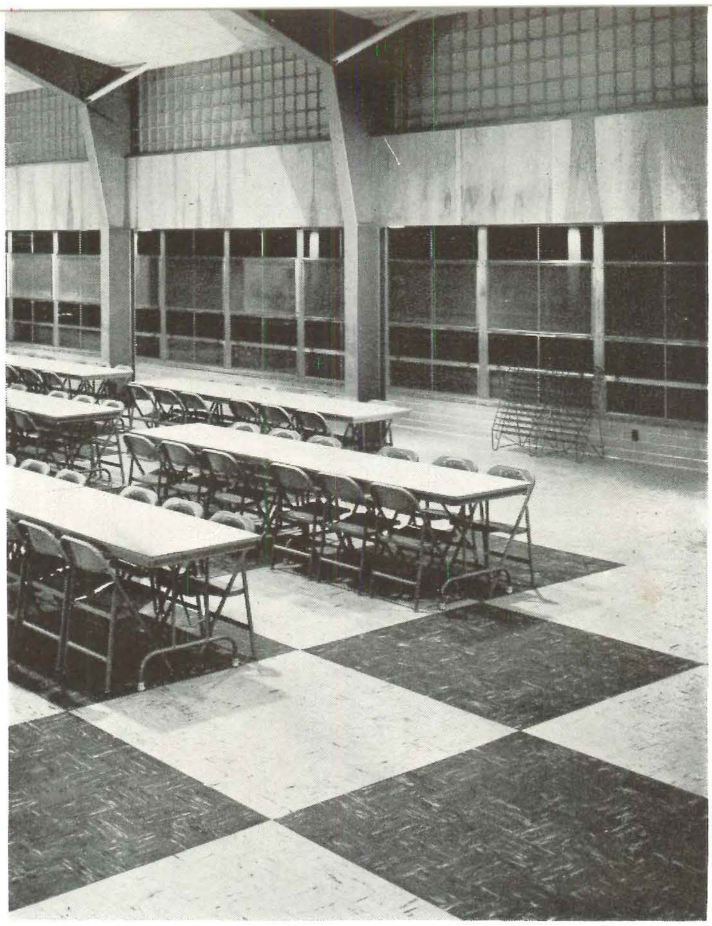
Auditorium-Gymnasium: "Koroseal"/ tile in green/ basketball and volley ball courts with permanent boundary lines in 2" white feature strip/ for contrast, red molded-rubber cove base around room, black alongside stage/ St. Patrick's Center, South Hadley Falls, Mass./ **The B. F. Goodrich Company, Flooring Division, 36 Nicols Ave., Watertown 72, Mass.**

Gymnasium: "Flexachrome"/vinyl-asbestos tile/ inlaid game lines/ The Gunnery School, Washington, Conn./ Architects Sherwood, Mills & Smith/ **The Tile-Tex Division, The Flintkote Company, 1232 McKinley St., Chicago Heights, Ill.**

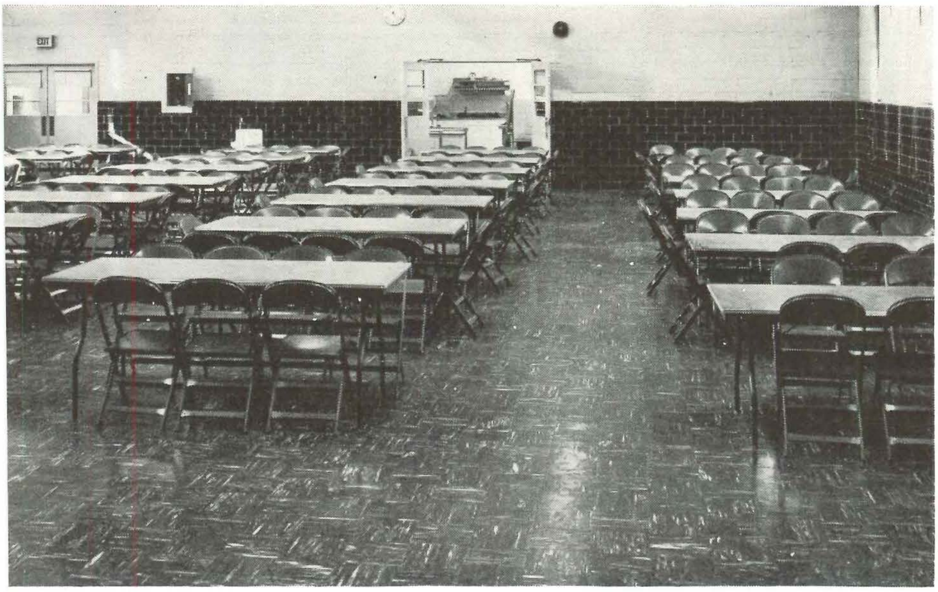
p/a interior design products

resilient flooring

Cafeteria: "Azphlex Vinylized Tile" contrasting color blocks of aqua and tan/ McCallum High School, Austin, Tex. Architects Page, Southerland & Page/ **Azrock Products Division, Uvalde Rock Asphalt Co., P.O. Box 531, San Antonio 6, Tex.**



Cafeteria: "Kentile"/asphalt tile/ color "Rouge Acajou"/ Hillsboro Township School, Somerset County, N.J./ **Kentile, Inc., 58 Second Ave., Brooklyn 15, N.Y.**



Kindergarten: rubber flooring/ custom-designed insets, clock and illustrated alphabet border/ St. John's of God Parish Kindergarten, Chicago, Ill./ **The Goodyear Tire & Rubber Company, 1144 E. Market St., Akron 16, Ohio.**