AIA

JOURNAL

OF THE AMERICAN INSTITUTE OF ARCHITECTS

SOLAR AND RADIANT HEATING — ROMAN STYLE
by Edwin Daisley Thatcher

THE BRAZEN ROOF AND THE BROKEN TRUMPET
by Henry S. Churchill, F.A.I.A.

MARCH 1958

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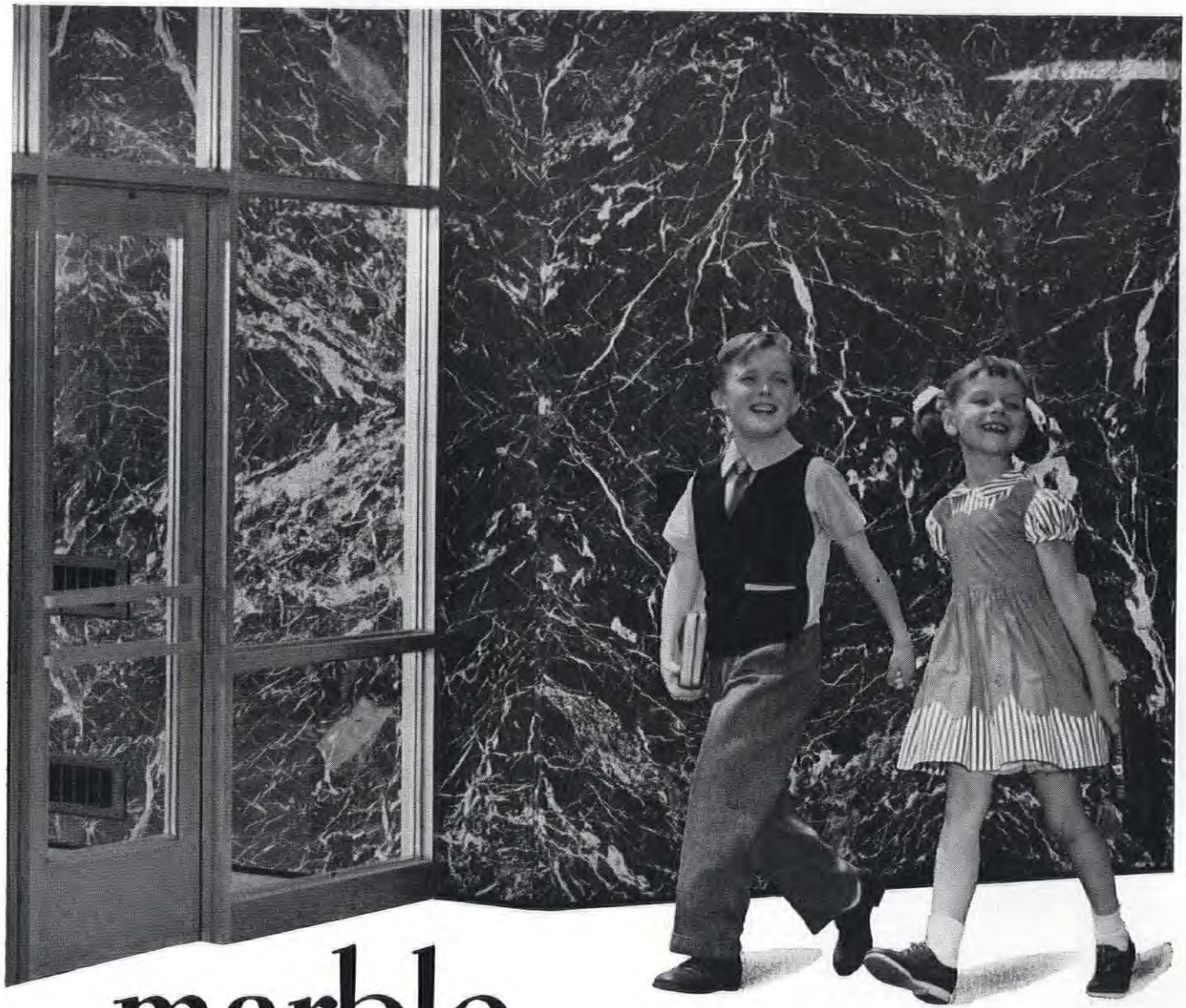
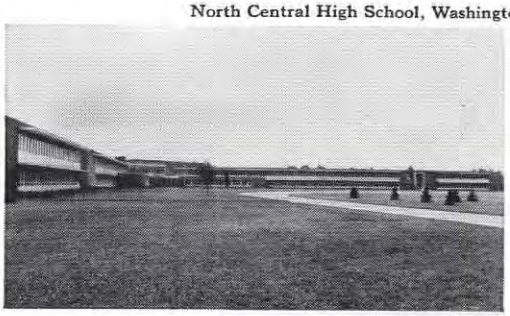
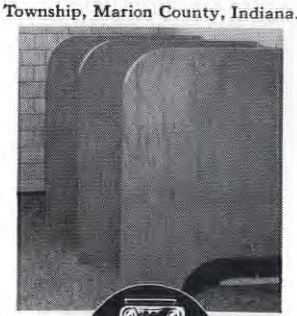


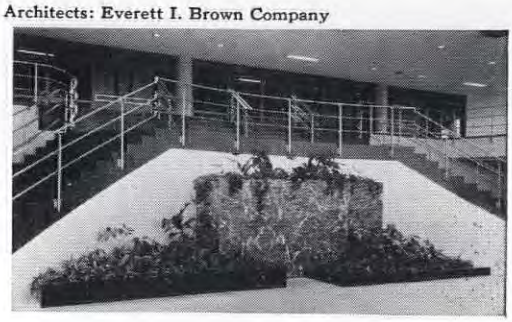
marble *for* TRUE ECONOMY *in school building*

In comparing the cost of marble with the cost of other materials, it is important not to be *trapped* into considering only the *initial* cost. A painted plaster wall, for instance, costs less per square foot to install than marble. Yet, because the cost of maintaining a plaster wall is so high in comparison with marble, the apparent savings have been lost within a small number of years. In fact, unless you have determined to tear down your new school within ten years, marble is less expensive than most other materials you would consider.

North Central High School, Washington Township, Marion County, Indiana. Architects: Everett I. Brown Company







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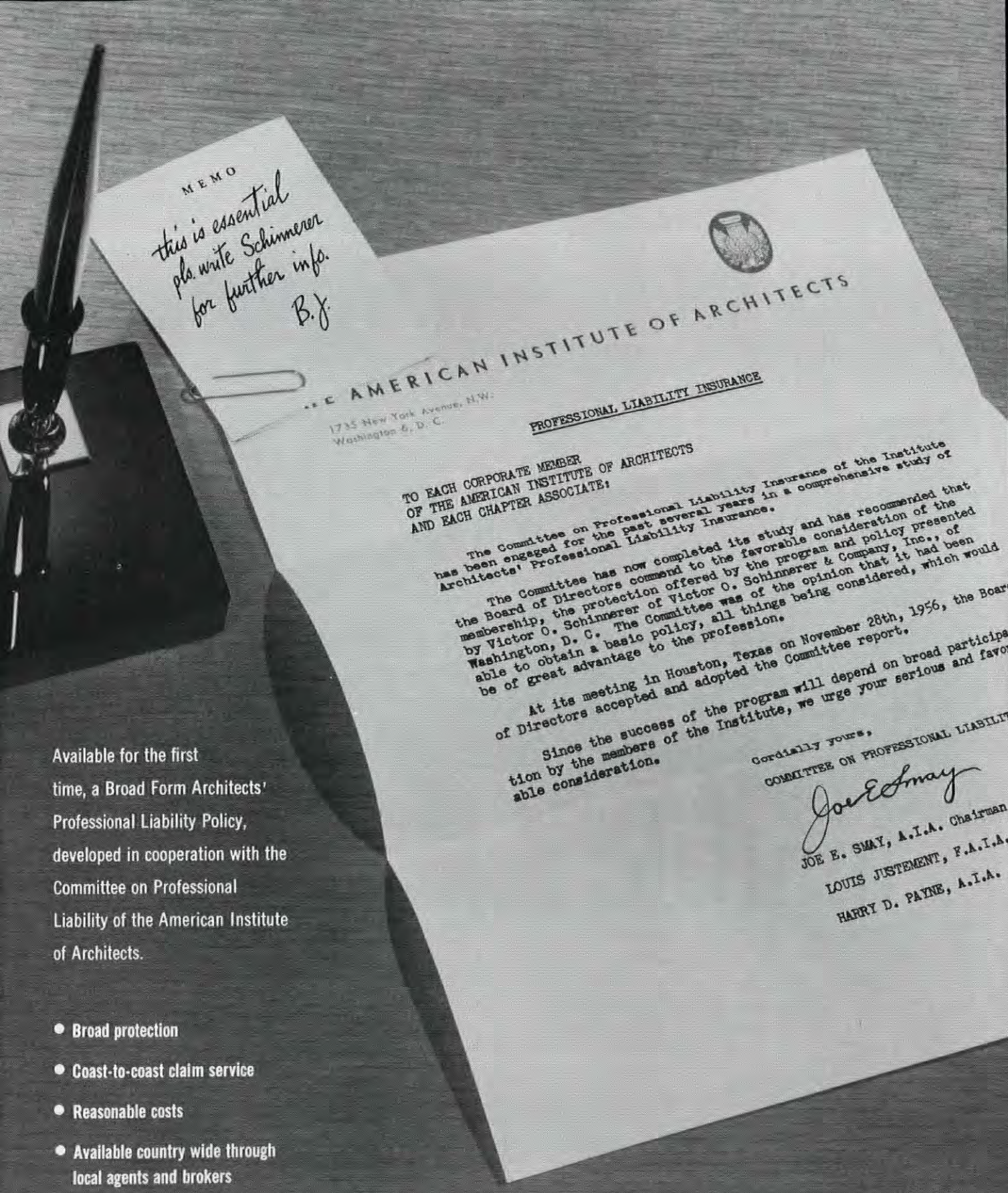

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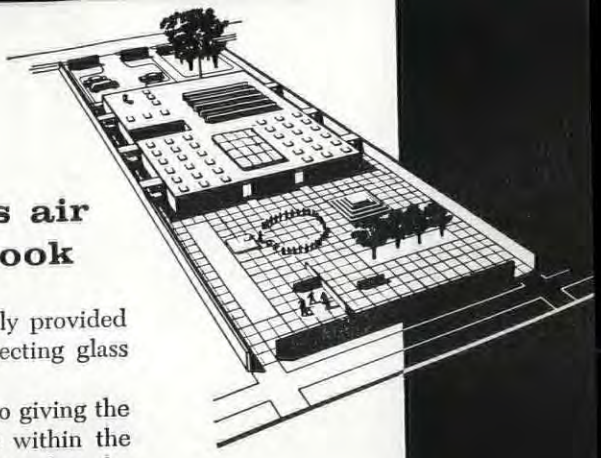

Hellmuth, Obata & Kassabaum designs air conditioned school with the "inward" look

Air conditioning solved the problem of an extremely restricted school site in the middle of a city block for Hellmuth, Obata and Kassabaum, St. Louis architects. In designing this proposed elementary school for kindergarten through sixth grade, they have made telling use of air conditioning as the key to the solution. By treating it as an integral part of the design, they have created a bright, charming educational world-within-a-world for a typical drab city neighborhood.

The entire site is enclosed in a solid masonry wall. The school turns inward and makes its own controlled environment of indoor-outdoor space. Except for the office rooms overlooking the open fore-court, the school has no windows onto the exterior. Instead, each grade classroom has a glass wall opening onto a roofed interior garden, which, like the rooms themselves, is liberally provided with skylights and heat-rejecting glass blocks.

The garden, in addition to giving the sense of space and nature within the building itself, is also designed to be used as an active teaching area, equipped with small animal cages, a fish pond and bird cages as well as plants and flowers. The kindergarten room opens onto its own private outdoor courtyard.

In addition to these features, the plan also includes such approved amenities as separate entrances for each classroom, a multi-purpose room with dropped center area and raised roof to increase flexibility of functions and efficient grouping of administrative and service areas. Structural system and materials were developed to provide maximum efficiency of air conditioning.

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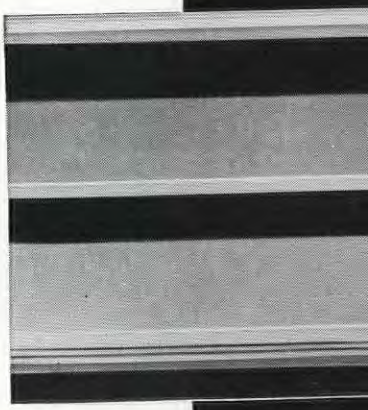

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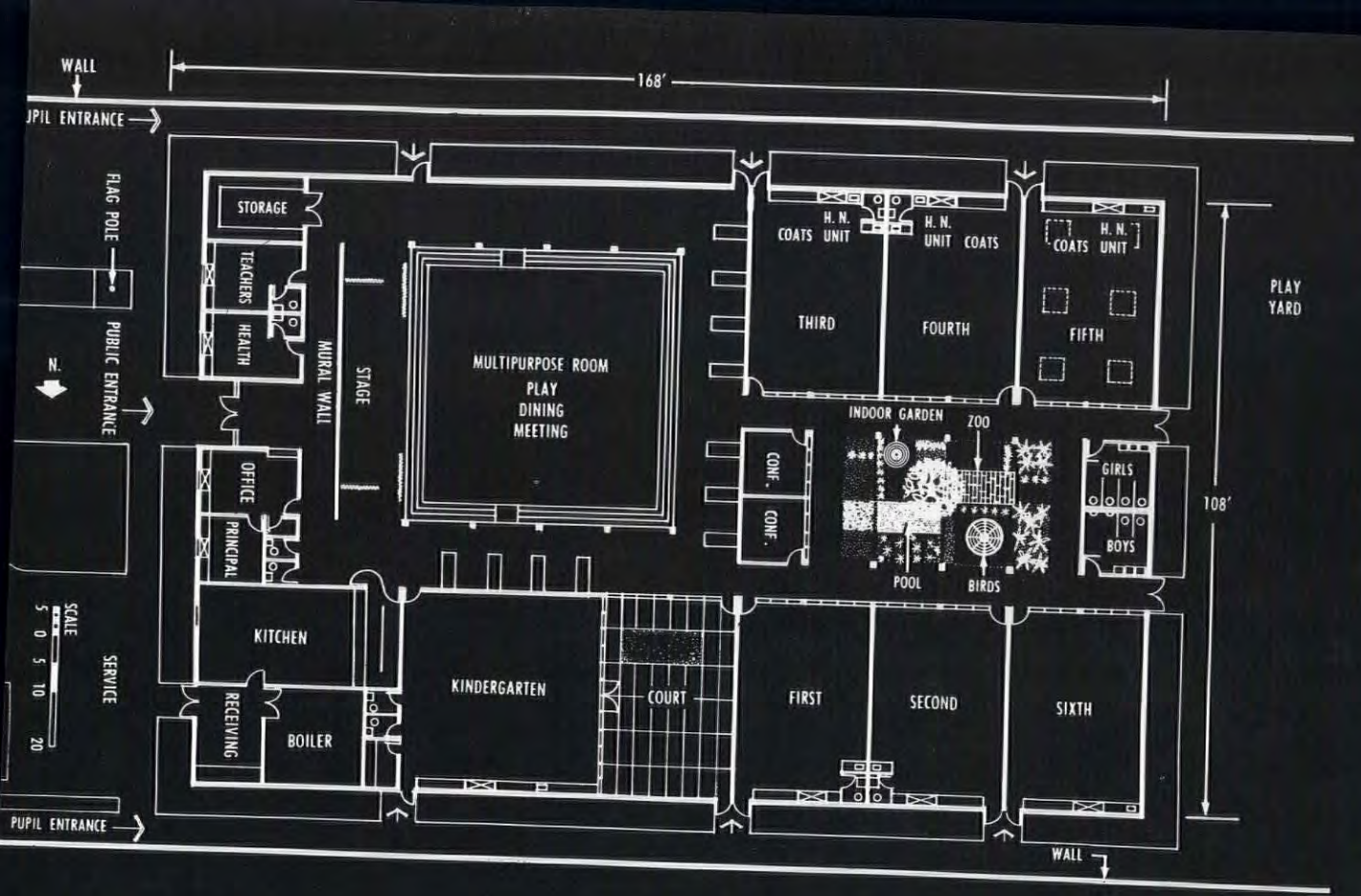

air conditioned school design

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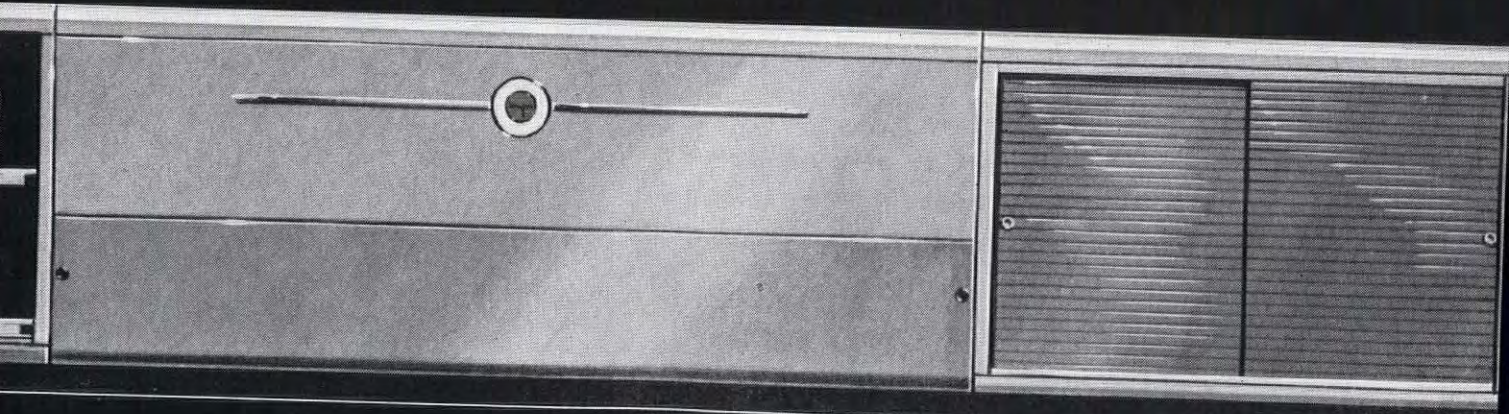

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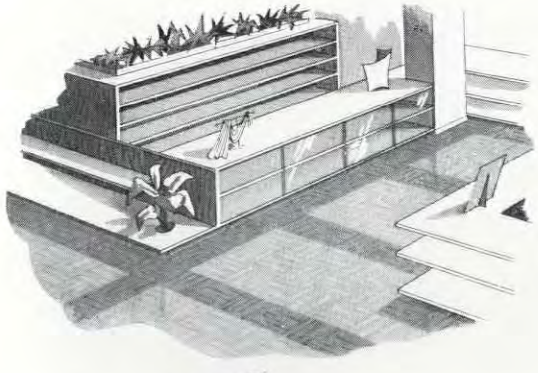

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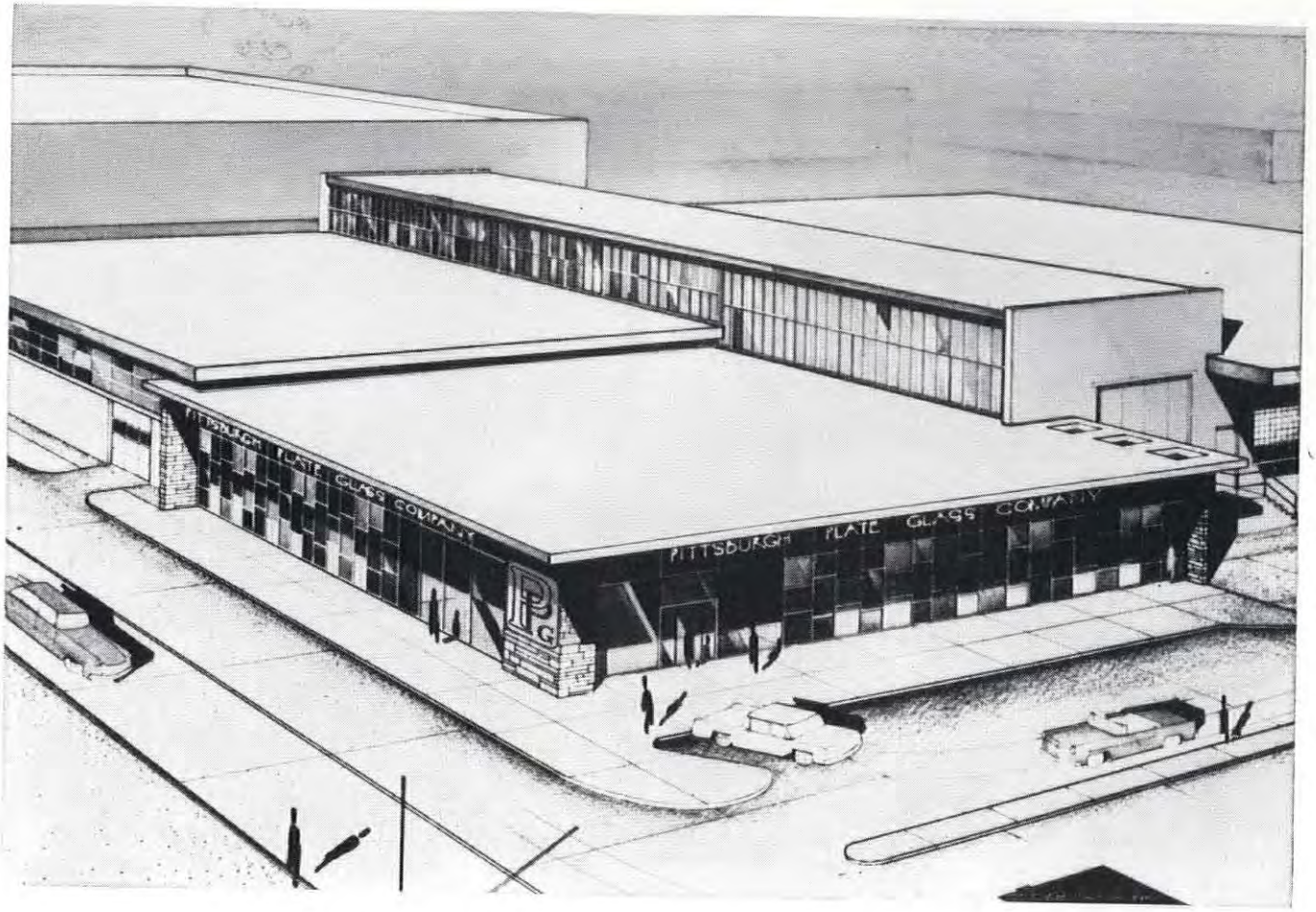

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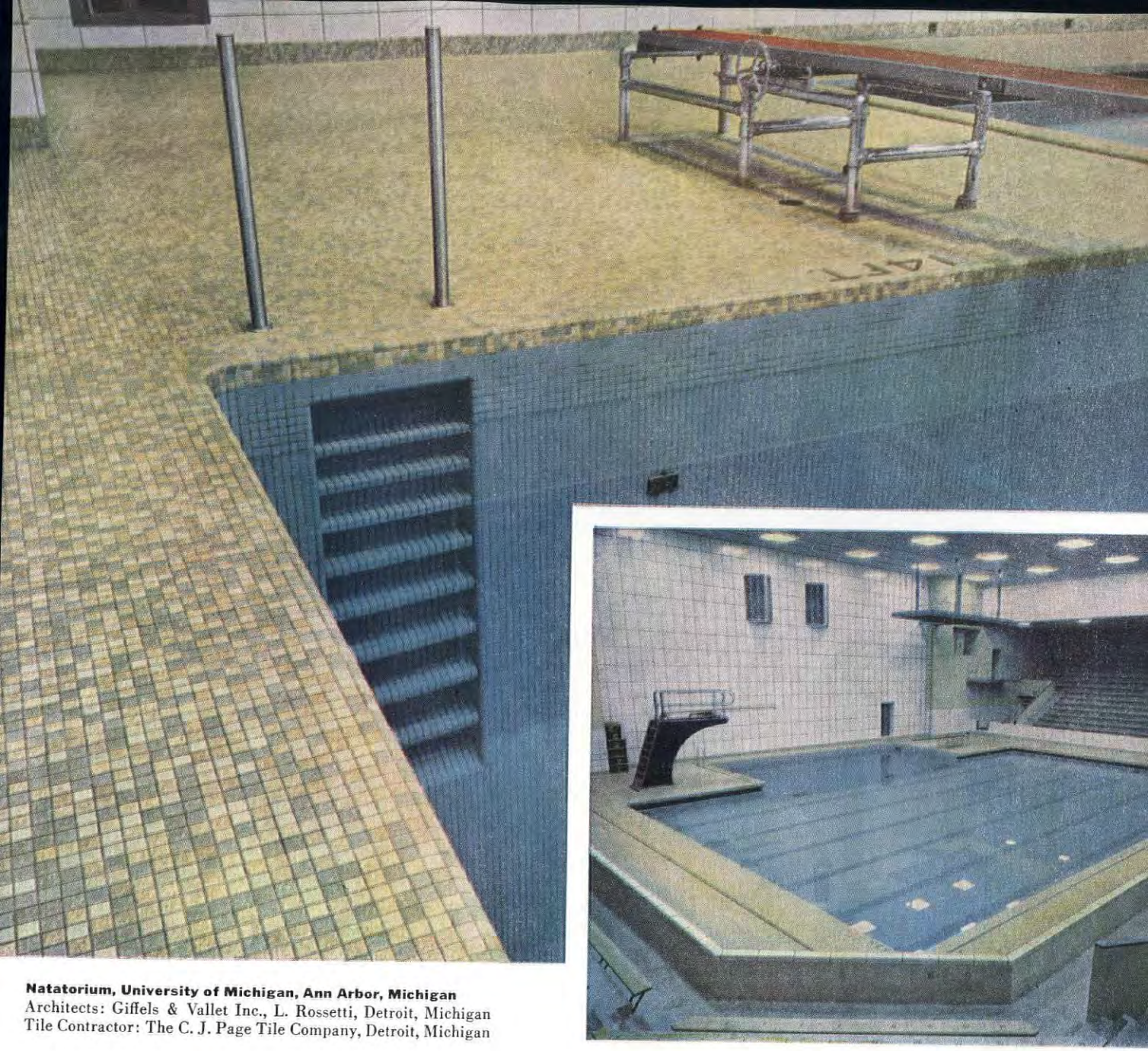

Natatorium, University of Michigan, Ann Arbor, Michigan
Architects: Giffels & Vallet Inc., L. Rossetti, Detroit, Michigan
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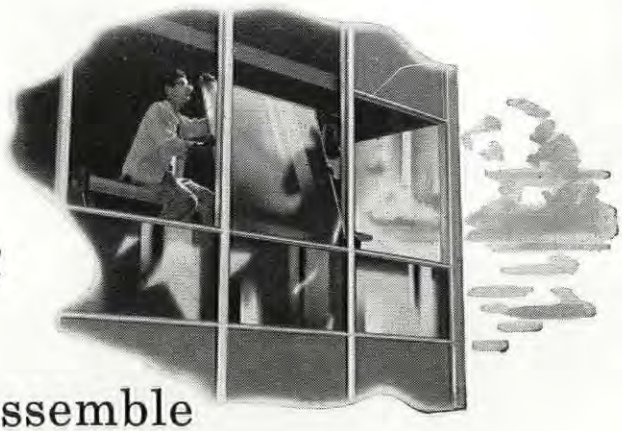

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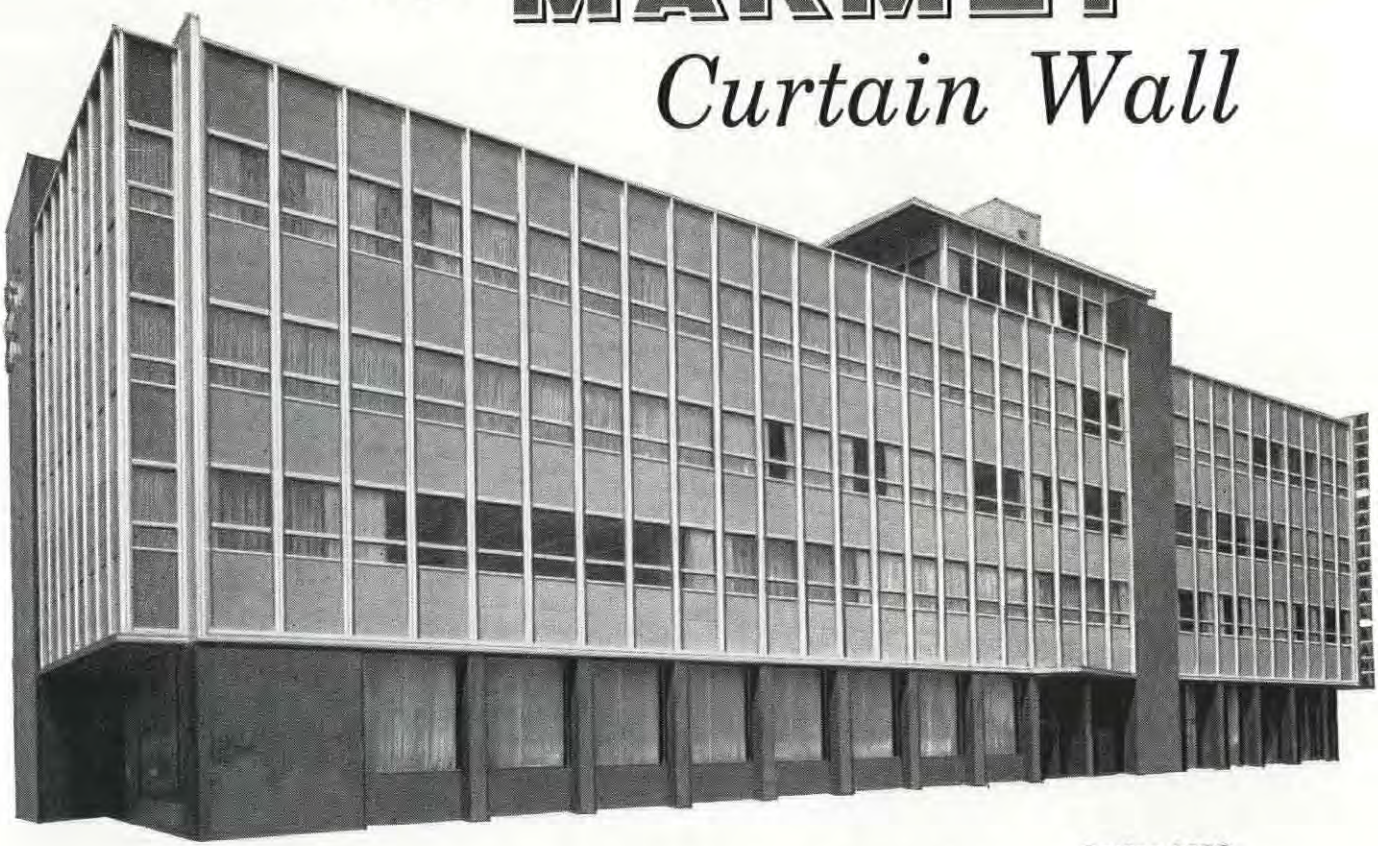

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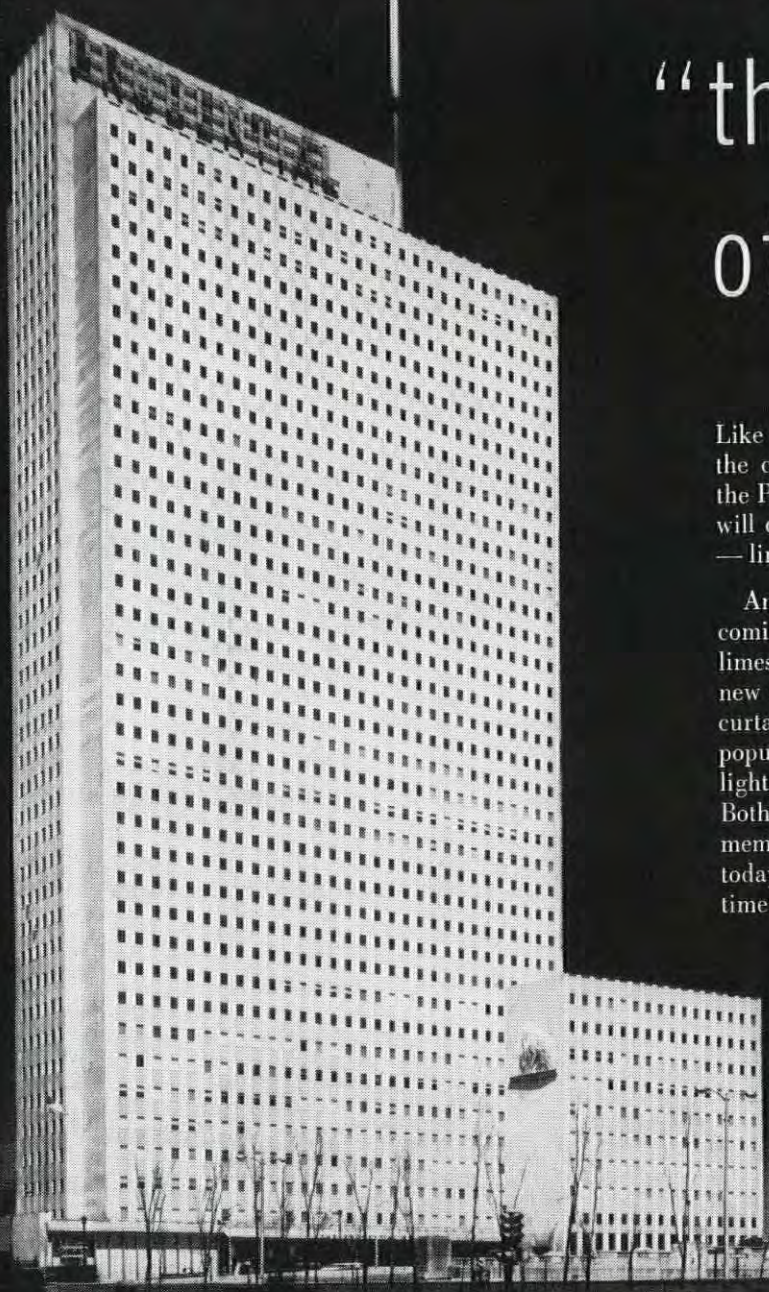

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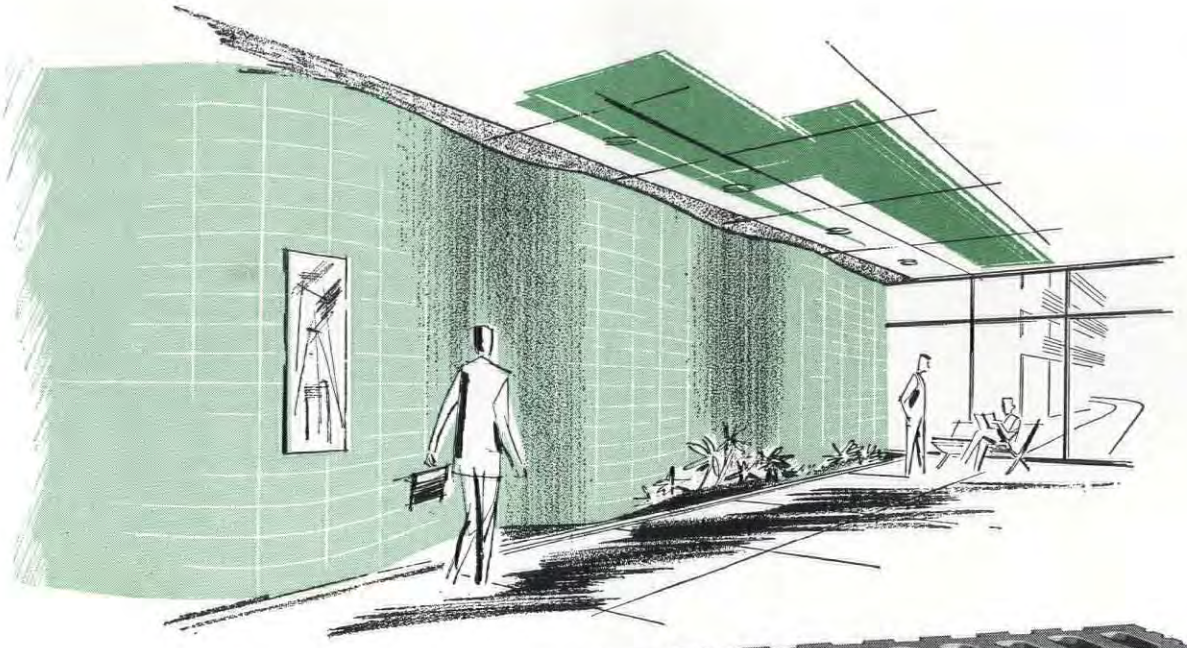

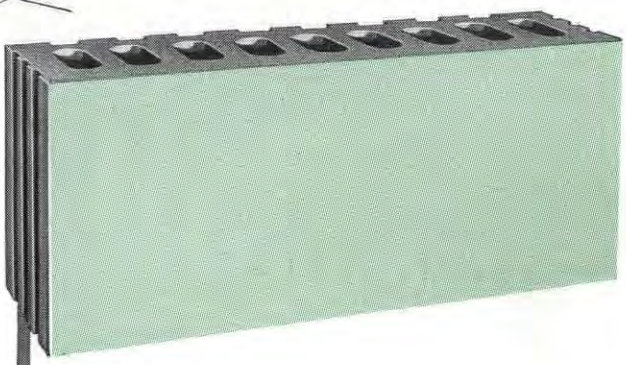

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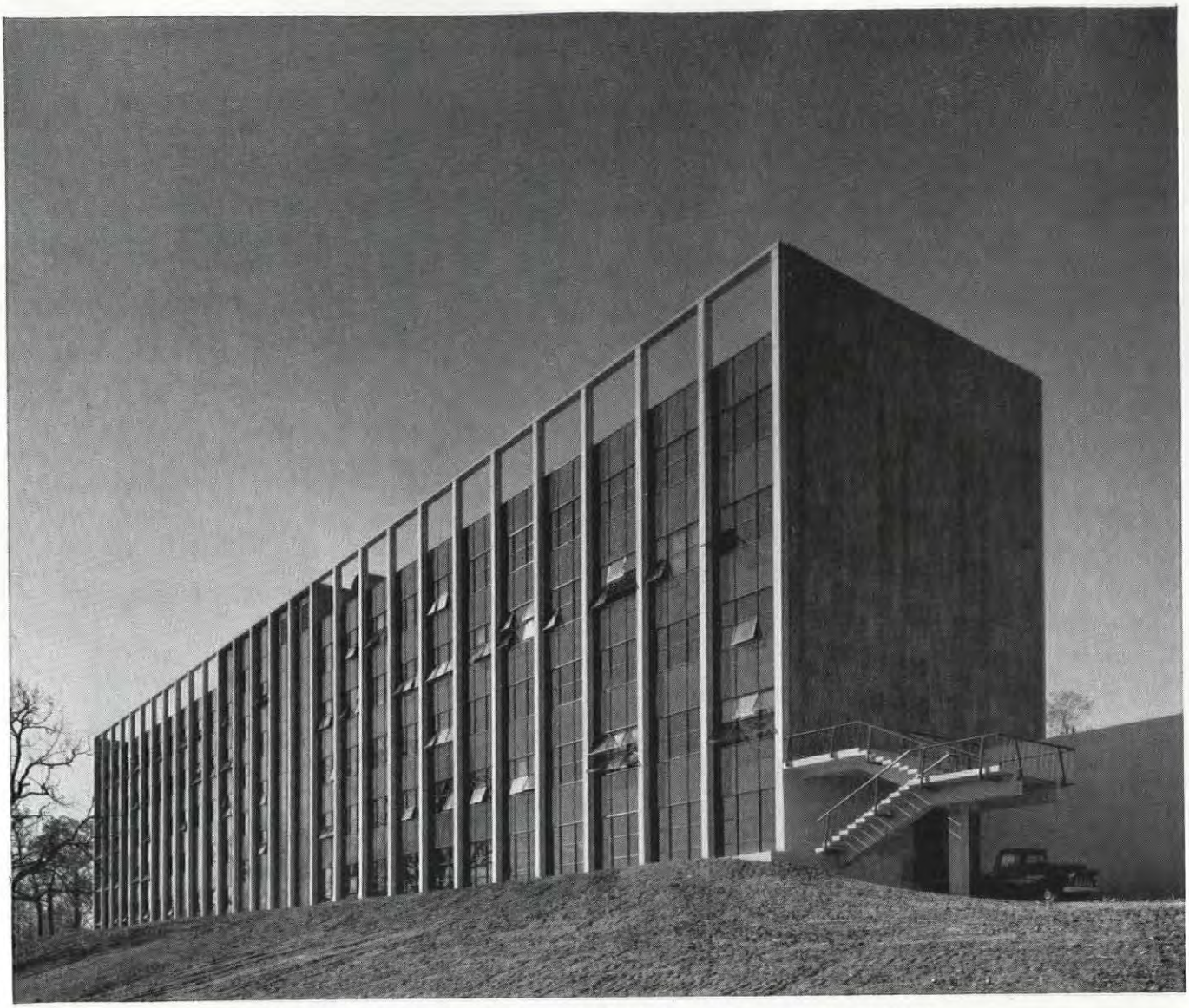

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VOL. XXIX, NO. 3 MARCH 1958

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PHOTOGRAPH BY JACK B. GUSS

Businesslike Architecture

By DAVID C. BAER, *Chairman of the Office Practice Committee*

ARCHITECTURE SHOULD BE FUN! So states Henry Saylor in a recent *Journal* editorial masterpiece. Such authority should not be challenged, and I subscribe fully to the premise projected.

Many current aspects of this revered profession apparently reduce the measure of pleasure obtained from its practice by a large segment of our fellow architects. That such "offensive" responsibilities are increasing is real cause for alarm among these gentry.

Business and architecture now are intermingled. To qualify as architects we must build that which we plan. Further, there are certain procedures, and I may add, responsibilities, connected with spending peoples' money for buildings. It may be inconvenient but it is logical that many of our clients should call for sound and recognized procedures for spending and accounting for such money.

To some of our brothers in practice this apparently smacks of regimentation. It is considered something that actually should be ignored with conscious effort. Authority for the above statements comes from the tabulation of replies received in the Survey of Architectural Practice recently completed by the Institute.

Less than one-half the practicing architects use a date stamp to fix the date that mail, shop drawings, and other items arrive in the office. With so small a percentage using such a simple but universally recognized office tool, it is not surprising that a similarly small percentage have adopted other recognized and standard office procedures and aids.

Over 50% of our offices have no established standard dimensions for working drawing sheets or have ever had such sheets preprinted. Less than 25% of these offices prepare a budget of office expense for each job and less than 35% normally set up an office job progress schedule or make use of an "Indirect Expense Factor" in allocating indirect office expense to job production expense. Only 7% have a prepared statement of the procedure to be followed in processing a job through the office.

Almost 250 separate forms and aids to office procedure were received as samples from selected larger offices in answer to direct requests.

Our practicing members, however, do not follow these leaders who were canvassed in devising or adopting such aids to practice. Only 25% maintain either a temporary or permanent directory of firms or individuals identified with each project. Only one-half keep a written record of drawings issued; and only the same proportion actually obtains an estimate of cost for each project or sets up a check list of shop drawings required. Only 25% maintains a record of samples to be furnished, or a check list of insurance required for the project. Less than 15% provides a place on drawings for owner's approval signature.

In the matter of obtaining commissions for the office and maintaining client relations, less than one-half of our architects in practice report that they maintain a brochure of their firm's experience; have printed material on the architect's usefulness and function; or follow a policy of sending out photographs, press facts and releases to public opinion channels.

Less than one-half follow the standard and basic accounting principle of charging an hourly or per diem rate for principals' time chargeable directly to a project being handled on the basis of a multiple or direct personnel expense.

An important segment of our practitioners ob-

viously still subscribes to the theory that business and architecture should not mix. Perhaps they fear that fun will vanish if business principles and procedures are accepted and adopted.

The architectural profession should be coming of age at this, the beginning of the Institute's second century. Architects in practice should recognize that adopting adequate standard office procedures and aids to practice is actually being sensible and intelligent.

Sound standard office procedures would assure better practice and fewer adventures into trouble. An increase in time for the pleasantries of practice should result in more fun.

Standardized procedures adaptable to the practice of most of our architects can be developed. The business in architecture need not blank out the fun if business procedures are simplified, standardized and then relegated to their essential place in the background. As architects we should be good businessmen but not at the expense of enjoying and having fun from the practice of architecture.

Action Taken in Cases of Unprofessional Conduct

DISCIPLINARY actions as shown in the following tabulation have been taken by The Board of Directors of the Institute at its November 11-16, 1957 meeting:

Member	*Violation*	*Penalty*
Samuel Feingersch Brooklyn Chapter	Mandatory Rules No. 14 and 15	Censure
Daniel J. Zimmerman Indiana Society of Architects	Mandatory Rule No. 12	Termination of Membership as of Nov. 16, 1957
C. Dale Dykema Florida Central Chapter	Mandatory Rule No. 13	Censure

In the latter case, the member had permitted a publication of his work in a non-periodical magazine, which showed his work exclusively, and was supported by advertising, in violation of Mandatory Rule No. 13. He admitted having some doubts as to the ethical propriety of his action, but he did not consult with The Secretary or The Board to resolve it. The Secretary, therefore, takes this opportunity to caution all members accordingly.

EDWARD L. WILSON, Secretary

A Comment on Contract Procedures

IN A RECENT CASE an architect's plans showed a stoop at an entrance to a housing project without any railing at the edge. A child fell off and was injured. The project was sued by the tenant who secured a verdict in his favor. On appeal the decision was reversed on the ground that the lack of the railing was an obvious and not a concealed defect and the tenants used it at their own risk.

This involves a rather fine legal distinction which is beside the point of this comment, which is that if the decision against the owner had been sustained he might very well have felt that the architect had been negligent and quite possible brought suit against him. This would have involved a suit that presumably would have been covered if the architect had taken out Errors and Omissions Insurance.

An architect can easily imagine a number of possible errors of judgment that might involve similar accidents and suits. The practice of the profession is not getting any simpler!

WILLIAM STANLEY PARKER

From the Executive Director's Desk:

Photograph by Van Tassel

IT WAS MY PLEASANT FORTUNE the other day to attend the "accouchement" of a new chapter of the Institute. The new chapter is a "natural," and as it took life in the territory of my original chapter and state association, I became nostalgic, even sentimental. I might have broken down altogether had it not been for the ready wit of Eddie Morris, the evening speaker, who naturally never would allow any evening to sink into the sweet mire of mild pathos. So the Eastern Pennsylvania Chapter, an offshoot of the Philadelphia Chapter, was founded in proper fashion.

The Chapter embraces what is generally known as the Lehigh Valley—one of those delightful Pennsylvania areas whose people are of a piece, whose landscape is of our best, and whose food and drink are superlative. It is good to see the Institute embrace more intimately its geographic territory and start another of its children on the road. One cannot help but reflect, if one has spent a good part of his lifetime with the organization, on the growth of the Institute and of the profession. Truly we have come a long way. We have grown from the little, slightly precious band, pitiful, beseeching, groping, tapping on the doors of the mighty like Elmer the frightened salesman. We are now a host. Invitations reach us in a suitable style. We are heard. We are welcome. We, on our part, have come to recognize that the presence of snobbery in our philosophy is not conducive to progress. Although a touch of snobbery can at times be helpful, when snobbery becomes a paramount faction in an organization then that organization is headed for death by derision. Snobbery, exclusiveness and isolationism crop up from time to time to mar our otherwise healthy progress. Now to assume leadership one must understand. Leaders cannot afford the luxury of exclusiveness.

I trust that I will live to see the day when the Institute has fully attained its stature, and when like its fellow societies in England and elsewhere it will have become in fact, as well as in assumption, the governing body, the directive force of the profession and of the professional from his school days throughout his entire career. This healthy point of view on the part of the Institute, this forward-looking philosophy and this expression of determination do not bespeak a rude assumption of authority. They do, however, indicate that the Institute is alive to its responsibilities to safeguard and advance the profession in a complex and competitive world.

We do not enjoy playing a suppliant role. We do not relish explaining to our questioners, especially constituted authorities, that "No, we do not have the numbers and we do not include students and young men but we really represent our profession"—a statement which is received sometimes "deadpan" but more often with a quizzical smile of doubt. One senses at such times a flowing away of the sands of prestige on which we stand.

There is nothing to prevent us from achieving our major objectives but ourselves, our inhibitions, our "blocks." Myopic inertion and isolationism are common faults in our democracy. I suppose anyone in my position in any organization believes that his people possess these unfortunate qualities to an uncommon degree. However, on reflection I take the optimistic point of view and become persuaded to carry on in the assurance that some day all will be right and that we are probably as well off as the next fellow.

For the last two or three years we have been holding student forums at the Octagon. These have been wonderful occasions. We have learned much and we are encouraged by the calibre of the young men who are entering the profession. There have

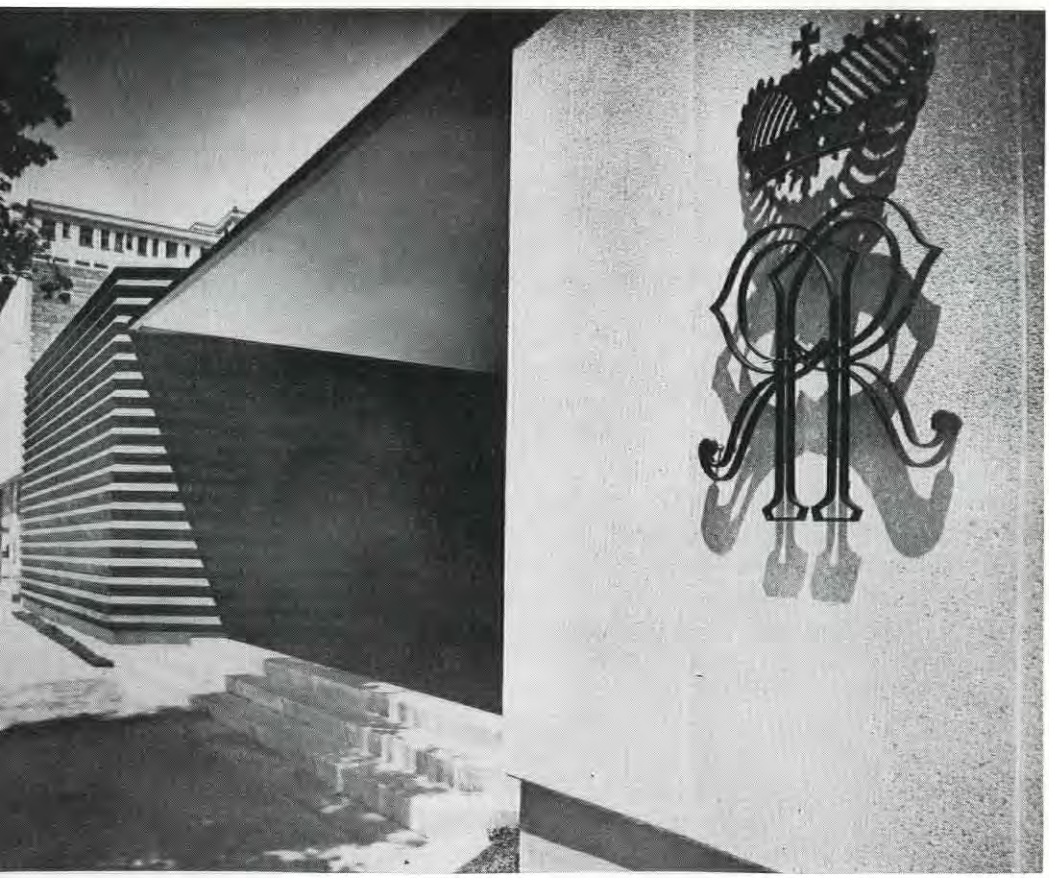
been healthy outbreaks of self-determination on the part of the students and they, in common with their fellow Americans, exercise that gift for establishing an organization which characterizes our people. So no time was lost in bringing into being a national student organization. Some of the elders were horrified at the temerity of youth and at the disregard of existing mechanism and called for a moratorium of student forums until radicalism and rebellion would have disappeared and cool heads brought students to heel. There were others who took an opposite point of view, fortunately. Cool heads are useful; reflection, deliberation (not of the spoken kind) are all the weapons of age. Youth has its weapons. It is the employment of its weapons by youth which makes for progress and a better world—and in our profession for good architecture.

A student group which would sit by meekly and let the elders dictate to it, which would sit listening to us with the vapid smile of belief and blind credibility would, in my opinion, be frightening indeed for it would indicate that that germ of revolt, that spark of progress, so necessary to keep the profession alert and vital and to prevent it from degenerating into a collection of technicians, was lacking. It is a fine thing for students to disagree with their elders, to revolt, to form their own organization (especially when they hope to make their organization an integral force in the AIA). The leaders of student revolts are generally those who lead the profession in later life.

So we are encouraged and we know that shortly the day may be in sight when the attainment of the objectives of the Institute as stated in our By-Laws will become a reality in the fullest and truest sense, and that the profession of architecture will be a dominant factor in our society through the understanding and guidance of its organization.

Edmund D. Purves

FAVORITE FEATURES OF RECENTLY ELECTED FELLOWS



DOUGLAS HONNOLD, FAIA

ENTRANCE TO ROMANOFF'S
Los Angeles, California
Douglas Honnold, FAIA
John Rex, AIA
Architects and Associates

Swann Studio

Public Relations — dealing with government

This is the sixth of a series of articles by ROBERT R. DENNY

GOVERNMENT AT ALL LEVELS can easily be both the friend and competitor of the architect. Experience shows that the sympathy shown by government to the profession often is in proportion to its understanding of the practitioner and his practice This degree of understanding, similarly, depends largely upon the amount of effort which architects exert to create it.

Successful efforts are being made at the national, state, and chapter levels of AIA to create understanding by government in both the legislative and executive branches. In many cases, particularly at the chapter level, improvement could be realized by closer liaison with administrators and legislators.

An examination of architectural activity with government at the national level is significant for two reasons. It reveals that a great deal of work is done by AIA officers, committees, and staff which is often unrecognized by the profession. Second, it is historic that the federal pattern of thinking and operation tends to be repeated at subsidiary levels of government.

What have been some of the architect's problems with Uncle Sam? Expansions in population and the complexities of the economy have created needs for government construction far in excess of available revenues for building. As a result, uninformed persons in government have, from time to time, cast a jealous eye at the architect in looking for places to cut costs. The erroneous impression that money might be saved through establishment of government bureaus and elimination of the use of private architects for federal work has led to architectural bureaucracy in many cases.

As recently as the thirties, nearly all federal design and construction were performed by governmental architects' offices. By virtue of a long, energetic campaign, the AIA and its members have been instrumental in reversing this policy and restoring the private practitioner to his proper place in this important area. A companion problem has been the lack of standard policy and procedure on the federal level. A ray of hope exists here. At the urging of the Institute, the President's task force on standardization and uniformity of federal procurement policies has launched a study of construction policies.

Today, the Octagon through continuous study keeps a close eye on all federal legislation and policies which involve or threaten to involve the architectural profession. Liaison is maintained not only

with federal bureaus but with key members of congressional committees. Testimony is given by members of the profession at appropriate hearings.

Besides serving the profession, this continuous effort serves the public welfare. This is true not only in cases of furnishing advice and guidance to government but in resisting creation, continuation, or expansion of architectural bureaus. In the latter instance, this resistance is based on simple economics. The encroachment of bureaucracy usually results from the misapprehension that architects cost too much and substantial savings could be made by tucking building design under the federal wing. Yet the figures show that, while reputable architectural firms perform their services at 6 to 8 per cent of building cost, the cost of architectural bureaus has been recorded as high as 17.8 per cent of construction. This latter figure was reported by the Hoover Commission task force on real property management.

The Hoover Commission went on to say that the cost of design and construction services incurred by the Atomic Energy Commission amounts to 5.23 per cent of construction costs. The following is quoted from the report:

> "The Atomic Energy Commission has the most efficient design and construction organization and procedures of all the government agencies. AEC takes full advantage of the services of private architect-engineer and construction organizations by contracting all phases of its design and construction work.
>
> "If other Federal agencies could attain the operating efficiency of the AEC, the savings to the government in just the cost of design and supervision of construction, on the basis of present volume of business, would be more than $100 million annually."

It is important to remember that a good case can be made for a *degree* of architectural services in any substantial unit of government. Arguments against the need for such services beyond basic programming, and maintenance and repair should generally be stated in such terms that these factors are recognized:

1. The waste of money involved in maintaining an architectural staff which will be employed on intermittent programs of design work.
2. The higher cost of design in government as contrasted with the services performed by private firms.
3. The greater skill and experience of the private practitioner.
4. The higher standards of design which are realized through retention of private firms.

On the state level, these same problems prevail. To them are added others, principally dealing with fee schedules and registration.

In California, the profession is stuck with a constitutional provision that all state public work must be done by the state architect's office. From year to year, a powerful civil service lobby fights to maintain the status quo. Perennially, the California Council of Architects fights against this wasteful practice.

Recently, the California architects lent a new dimension to their governmental campaign. It is a long-range legislative program which aims to win the understanding and support of the state legislature. Its key premise is that far more than continual "fire-fighting" is necessary to win governmental support; that the profession must tell its story to the legislators on a continuing basis, particularly when the legislature is *not* in session.

"Legislators are harassed and busy people once they get to the state capitol for a session," says Executive Director Melton Ferris of the C.C.A.I.A. "Waiting to get to know them until that time, or expecting to be able to present the profession's story fully during a session is locking the barn door after the horse has been stolen. We are making a concerted effort in California to establish a personal relationship of friendly understanding between architect and legislator. Then, when the chips go down at the state capitol, the legislator will have a foundation of personal knowledge of the profession and of some of its practitioners upon which to evaluate the specific problem at hand."

During the 1957 session, Ferris says, it became apparent that many legislators lacked understanding of the function of the architect and the merit of his work. This was not to say that legislators who were familiar with the profession were necessarily favorably inclined toward it. Those who were so inclined were influenced, it was found, by personal contact and friendship; respect for architects who appeared at the state capitol; political support given by architects individually and as a group; home-town meetings with architects at civic and chapter affairs; favorable reports made on architects by officials of local districts, and favorable attitudes exhibited by contractors, engineers, and others connected with the building industry.

Those generally opposed to the profession, according to Ferris, were found to have been influenced by unfortunate personal experience with architects; unfavorable reports from their districts, particularly from local government and school boards, and by political expediency.

"Our program necessarily has to go to the

grass roots," Ferris says. "What we can do at the state level is dependent upon what is accomplished at the chapter and individual level. The individual is urged to make it a point to know the assemblyman and state senator from his district, and either support him or support someone who can do a better job. The individual is also asked to offer his wholehearted support to his chapter program, and, of course, to remember that the competence of his architectural work is the basis for everything good or bad.

"The chapter is asked to insure that every legislator is known personally by several key chapter members. Ideally, the chapter maintains internal communication on the legislative records of the various legislators and supports those who deserve it; operates a public service program at least once a year which involves a tour of an architect's office, a luncheon sponsored by a community service club, and a tour of a new school; has its women's league provide special events for wives of legislators; and, at least once a year, holds a chapter legislative program at which its legislators hold the spotlight to report on affairs of state."

The state organization itself works with allied industry groups on mutually-desired legislative projects; sponsors state-level programs for legislators; presents testimony before senate and assembly committees, and keeps the chapters informed on progress and needs.

On the chapter level, many types of governmental liaison and participation are possible and, if pursued, fruitful. In the main, we have talked about the architect *with* government. For an example of the architect *in* government—and in civic bodies—we can turn to the city of Baltimore, Maryland.

There, no less than seven members of the chapter hold important municipal and civic posts. Consider this current list:

Chapter president Paul L. Gaudreau, vice chairman of the Baltimore County Planning Board; Chapter vice-president Archibald Coleman Rogers, member of the Planning Council of the Greater Baltimore Committee; Cyril H. Hebrank, member of the Baltimore City Zoning Committee; Richard W. Ayers, member of the City Art Commission; David A. Wallace, director of The Planning Council of the Greater Baltimore Committee; Van Fossen Schwab, Chapter representative of the Joint AIA Urban Renewal Committee of Baltimore City; Oliver C. Winston, director of the Baltimore Urban Renewal and Housing Agency.

As these national, state, and chapter examples demonstrate, participation by architects in community politics is a proper and important part of professional public relations.

The architect who ignores his government is leaving his professional flank exposed, to both his and the public's detriment. It is a relatively easy thing to meet and become acquainted with the man in government, whether he serves in the executive or legislative branch. The latter, especially, depends heavily upon personal contact with the members of his community. He must do so to be elected. Thus, he is available for consultation in his office and receptive to meetings with groups, such as at a chapter luncheon or dinner. It is only common sense to arrange such meetings when public assemblies are not in session, and to make governmental contact an integral part of the architectural public relations program. In specific campaigns, it is also good sense to enlist support from other community groups to present a united front to government.

Effective governmental liaison cannot be maintained on a sporadic, "fire-fighting" basis. It can't be "put off" till the fire breaks out. Putting the matter philosophically, procrastination is sometimes more than the thief of time. Thomas De Quincey described it as one of man's gravest sins.

He expressed it rather oddly but extremely well in discussing the crime of murder:

"If once a man indulges himself in murder, very soon he comes to think little of robbing; and from robbing he next comes to drinking and Sabbath-breaking, and from that to incivility and procrastination."

(*Next Month*: *Public Relations for the Architectural Office*)

Friends

Some friends I like because of
And others quite in spite of
But those who like me best in spite of
Are the ones I like the most because of.

—HUBERTUS JUNIUS

SOLAR AND RADIANT HEATING—*Roman Style*

The Open Rooms at the Terme del Foro at Ostia

By EDWIN DAISLEY THATCHER

In these days of solar houses and radiant heating,
we can well afford to humble ourselves a little
as we contemplate the accomplishments in these fields
of our Roman predecessors nearly two thousand years ago—
without our much-vaunted "modern" know-how.
Mr. Thatcher has condensed this from his full report contained in the Memoirs of the American Academy in Rome, *Vol. 24, 1956.*
The illustrations are reproduced with permission of the American Academy.

In the ancient port of Ostia, fifteen miles down the Tiber from Rome, stand the ruins of the Forum Baths. Although these Baths are in many respects typical of the standard Roman establishment, they are unorthodox in both their plan and in the openness of their southern facade. An inquiry into the probable reasons for this singularity has helped in our understanding of the philosophy of Roman architecture, and in this regard the Forum Baths are of more than ordinary historical significance. The same inquiry, however, has revealed notably successful solutions to the problems of site planning and building orientation, and above all to the problem of providing human comfort through practical and efficacious heating. The Forum Baths, therefore, are more than an archaeological curiosity; particularly with respect to their heating system, one might almost call them a pilot plant, provided by a colleague who had solved a problem we are daily faced with ourselves and who had moreover attained the solution in a way that we can recognize as being remarkably familiar.

The Forum Baths are the largest establishment in Ostia. They were built in the middle of the second century after Christ and were in use throughout Constantine's time and possibly for a hundred years thereafter—until the barbarian invasions and the end of the Western Empire. This establishment was therefore in use for at least two centuries, and perhaps for three. The northern half of the bath building is typical of most Roman structures of its kind in being rigidly symmetrical about a large central hall (Room 21 in Fig. 1) that is generally called the *frigidarium,* or cold room. The southern half of the building, however, departs radically from this symmetry in having seven chambers, each different from the other, arranged in a stepped pattern that, in contrast, seems at first to be almost whimsical. Moreover, the five chambers forming the southern facade (Room 1 to Room 5) possess exterior walls that are almost entirely taken up by great windows. All the archaeological evidence points to the fact that these windows were unglazed. Since Rooms 1 to 5 were the principal heated rooms of the establishment,

THE TERME DEL FORO FROM THE EAST.

it is apparent that their open windows are unique, to say the least, for they present a problem in both heating and orientation that we are only lately equipped to deal with ourselves. That the problem was successfully solved by the architect of the Forum Baths is implicit in the fact of the building's use for more than two hundred years. The successful solution is confirmed, moreover, by a detailed inquiry, in modern terms, into the functioning of the building and the functioning of its heating system.

The Function Of the Roman Bath

The operation of the Roman baths, or *thermae,* can be most easily realized by comparing them with modern Turkish baths, which are their direct descendants by way of the Byzantine Empire. These offspring, however, have dropped in their descent many of the features of the *thermae* and retain only the bare essentials: sweating rooms, a cold plunge, and facilities for massage. For the great *thermae* were not only places in which to bathe; they were social centers where one could read, listen to poets and orators, gossip, conduct a little business and play a little politics as well. All but the smallest had spacious *palaestrae,* or exercise yards, and if food shops were not incorporated in these establishments, they were generally found near-by. It is indeed not at all difficult to imagine spending a whole day, pleasantly and profitably, in such accommodating surroundings.

The precise Roman ritual of the bath is still not wholly clear, but we know that the climax of the performance was a hot bath in the *caldarium,* a chamber analogous to our steam room. The active bathers could start the sweat by exercise, usually in the *palaestra;* the sedentary ones could warm up in the *tepidarium,* a moderately heated room in which a light robe might be worn to encourage perspiration. The bathers might then pass on to a room of high, dry heat—the *laconicum*—and thence into the hot pools of the *caldarium.* After these there was the choice of a cold plunge in the *frigidarium,* a drenching with buckets of cold water, or a more gentle denouement by way of the *tepidarium,* where

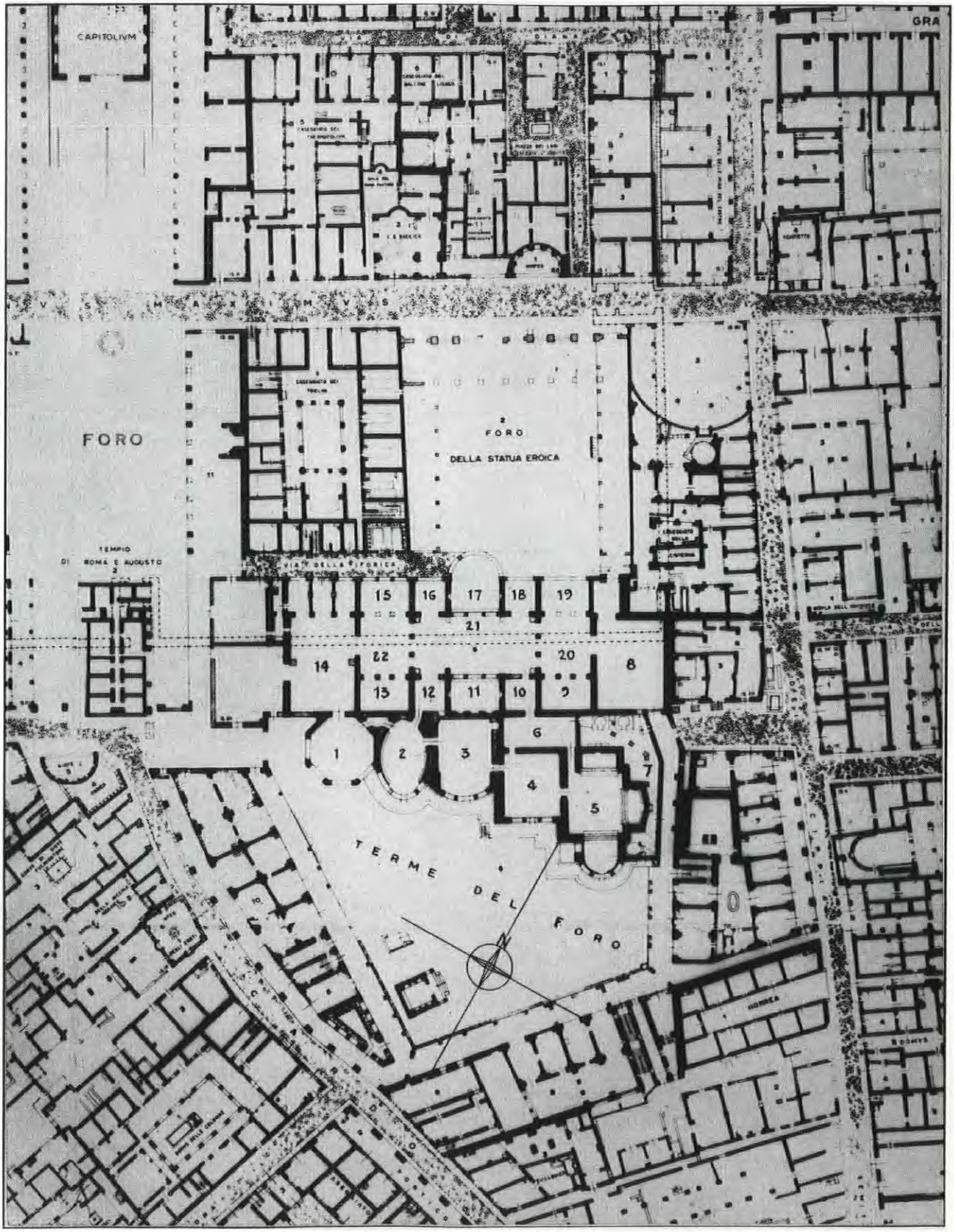


FIG. 1.: GENERAL PLAN

one could cool off slowly. Since the cleansing process comprised annointing with oil, then sweating, and finally scraping off the oil, dirt and sweat with a *strigilis,* or scraper, water was not of great importance as a direct cleansing agent. The hot pools of the *caldarium* were principally used for an enjoyable soaking after the bather had been scraped, or had scraped himself.

It is quite likely that there was no precise ritual of the bath. A good bathing establishment was flexibly arranged so that the bather might follow his own canon. This would seem to have been the arrangement of the Forum Baths. The rectilinear northern half had as its focus the *frigidarium* (Room 21) with its cold plunges (11 and 17). East and west of this great hall were lounging rooms or libraries (9, 20, 19 and 13, 22, 15) and beyond them the entrance lobbies (8 and 14). These lobbies gave access to the Forum, to the streets on the north and east, and to the *palaestra.* The two square rooms (10 and 12) south of the *frigidarium* were technically *tepidaria* in that they were moderately heated, but they were essentially vestibules leading to the hot rooms along the south facade. Their mates to the north (16 and 18) were also heated and evidently served as refuges for those who found the atmosphere of the *frigidarium* too rigorous.

Of the five rooms along the south facade, Room 1 was a sun room, or *heliocaminus,* connected by a small heated passage with Room 2, a *laconicum.* Rooms 3 and 4 were less highly heated than Room 2, but were not so cool as the ordinary *tepidarium* and were therefore sweating rooms of a kind for which there seems to be no title in the standard nomenclature of the baths. Room 5 was a *caldarium,* with three hot pools; Room 6 was another sweating room, or *sudatio;* and Room 7 was a service area containing the water heaters for the pools of the *caldarium,* as well as the hearths for heating this room. All along the south front of the building, from Room 7 to Room 1, runs a low service passage from which the heating hearths were fired; the roof of its vault projects several feet above the level of the *palaestra* and forms a kind of terrace.

The skillful disposition of these rooms gave the bather a variety of choices. If he were not the vigorous type and eschewed exercise, he could start the sweat with a sunbath in the *heliocaminus* and could then pass into the *laconicum* to complete the treatment. From here he could go through Rooms 3 and 4 to the *caldarium,* or he could cut the ritual short by going directly to the *frigidarium* through Room 12. On the other hand, he might start the sweat in Room 6, which he could reach by way of Room 10, and then go into the *caldarium;* and he might go back the same way, or through Room 4. The six rooms seem to have been purposely arranged in two groups: one around the *laconicum* with Room 12 as its access, and the other around the *caldarium* with Room 10 as its access. The first group might be said to emphasize dry heat and the other to emphasize wet heat, but they were so arranged that the bather could enjoy the subtle variety of either, or both.

The Site Posed a Problem

Outside the six rooms lies the *palaestra,* of a trapezoidal shape and bounded on three of its sides by buildings with colonnaded porticoes that were erected at the same time as the bath building and were clearly part of a unified scheme for the whole complex. They contained shops and quite possibly rooms for lounging or entertainment of one kind or another. The long building to the southwest, on the street called the Cardo Maximus, had a food shop at its western end and a latrine at its triangular eastern end. The building to the northeast, on the street called the Semita dei Cippi, contained the cisterns that supplied the bath water. This latter building was at least three stories in height, but the other two buildings bordering the *palaestra* were no higher than two stories. There were at least five external entrances to the *palaestra*: the most imposing at the western end, from the Forum; two from the Cardo Maximus, at either side of the latrine; one from the Semita dei Cippi by a narrow passage into the southeast portico; and another from the same street, across the courtyard of the building containing the cisterns. Taken with the entrances to the bath building itself, these entrances to the *palaestra* afford a flexibility of access to the whole complex that is concomitant with its importance in the city and that represents a skillful exploitation of the site conditions.

For there can be little doubt that the architect was presented with a difficult problem in having to fit his scheme to a site that was in no way ready-made for a bathing establishment. The Forum, of course, could not be encroached upon; the Cardo Maximus had existed as a main artery from the first small beginnings of the city; the Semita dei Cippi was also an existing street, as was the Via della Forica, along the north front of the bath building. To the southeast there are warehouses and a fuller's establishment that pre-date the bath complex and evidently precluded any movement in that direction. To the north and northeast of the bath building are earlier structures along the Semita dei Cippi that very likely represented a restriction of the site in that quarter. And across the Via della Forica was

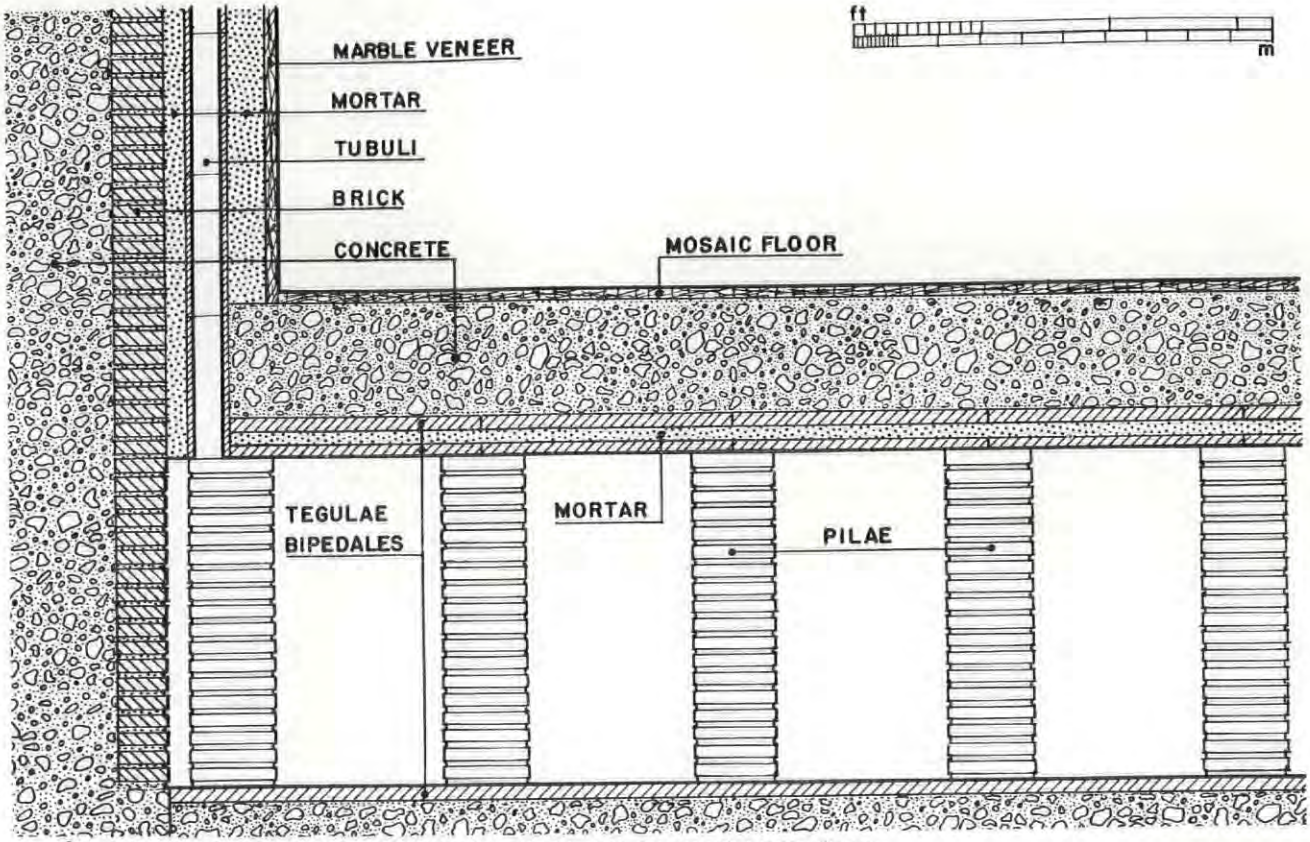


FIG. 2: SECTION SHOWING HYPOCAUST BELOW FLOOR AND TUBULUS-LINED WALL.

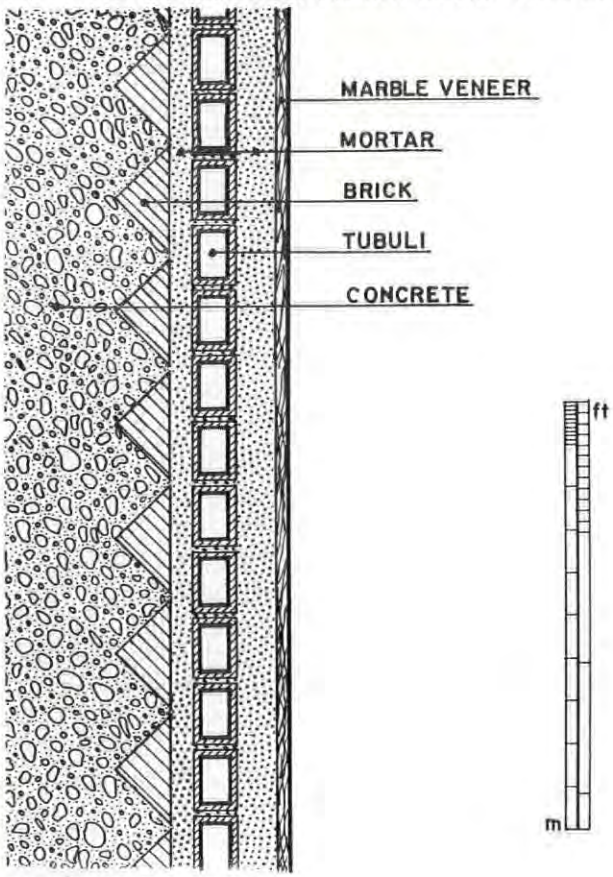


FIG. 3: PLAN OF WALL

another earlier building, fronting on the Decumanus Maximus—the main street of the city—that was apparently too important to be molested, although its neighbors to the east were subsequently demolished to create the Foro della Statua Eroica.

The architect was thus presented with a piece of ground that was not only irregular, especially for a tradition of planning that had preferred to emphasize four-square symmetry, but was also awkwardly oriented for convenient location of the bath building according to the established precepts of the time. For Vitruvius specified that the hot rooms of baths should face southwest in order to gain the benefit of the afternoon sun in winter, and this specification has been almost universally adhered to in all the Roman *thermae*. One finds the minor axes of these buildings running northeast-southwest, with their hot rooms ranged along the southwest side, as in the Baths of both Caracalla and Diocletian, in Rome. The minor axis of the Forum Baths, however, lies about 30 degrees east of south and is therefore turned 75 degrees out of the prescribed position. This unorthodox orientation was quite evidently dictated by the restrictions of the site, although it is tempting to also ascribe to it a client's stubborn insistence that the building lie square with the Forum and parallel with at least one street!

With the prescribed orientation in mind, it is understandable why the south facade should have been given its unique stepped pattern: The architect was gaining as much sunlight as possible and at the same time providing protection against northeasterly weather. The projections of the rooms, particularly those of Rooms 4 and 5, not only achieved the latter purpose, but also furnished reflective surfaces and, thereby, considerable diffuse solar radiation.

The Roman recognition of the value of sunlight as a heating medium is readily established by Vitruvius, as well as by many other Latin writers. Moreover, the evidence also includes a recognition of the sun's value in what might be called the therapeutic sense. In fact one might go so far as to say that there was a sunbathing cult among the Romans that was not unlike our own.

This comprehension further explains the fenestration of the five rooms along the south front: The great unglazed windows were not a *tour de force* but an honest attempt to open up the wall as much as possible for a legitimate purpose. What made this openness possible, however, in rooms that were nearly all designed as sweat-rooms, was the Roman heating system.

Roman Radiant Heating

It has long been recognized that the Roman system of heating by means of a hypocaust was a form of radiant heating. Unlike our modern installations, however, the heating medium was the mixture of smoke, combustion gases and excess air from an open fire. The hypocaust, therefore, was essentially an apparatus, or chimney, for drawing off this mixture by natural draft. It was, in the main, horizontal, in the shape of a hollow floor. At one end of the hollow space was a hearth and at the other was a vertical flue. The flue provided the draft that drew the mixture of smoke, gas and air through the hollow floor, thereby heating it. As this system developed from its beginnings in the first century before Christ, the number of vertical flues was increased until they lined the walls of many heated rooms. The walls, as well, then became heating surfaces and rooms of high temperature had both a warm floor and warm walls, while rooms of lower temperature continued to have unlined walls and only a warm floor. Moreover, there is evidence of a few installations where even the vaults were lined with flues, so that one was literally enveloped in a radiant cocoon.

The hollow floor was composed of concrete on a base of two-foot-square tiles which were supported on pillars of brick about two feet six inches high and spaced two feet on centers in both directions. The flues, when they were not used as wall heaters, were circular in section and of terra cotta. Those that lined the walls and produced a radiant surface were of generally rectangular section; from a rather improvisatory beginning, when they were nothing more than roof tiles on end, they passed through several stages of development until they culminated in an efficient terra cotta tube with average interior dimensions of three inches by four. A section through one of the hypocausts of the Forum Baths is shown in Fig. 2, and a plan of the wall lining in Fig. 3.

Essentially simple, and not in any way so primitive as it first appears on only casual inspection, the hypocaust system of heating provided the ideal means for achieving a condition of comfort in the typical enclosed space of Roman architecture—a high-ceilinged chamber, the volume of which was relatively large in comparison to its floor area. This is particularly true of the vast halls of the *thermae,* where the achievement of comfort by heating the air volume of these spaces would have been highly impractical, if not impossible. The system, instead, applied itself most directly to the basic condition for human comfort—the inhibition of human heat loss—by providing warm surfaces that would inhibit this loss through its two broadest avenues—conduction and radiation. By inhibiting the loss in this manner, the system could therefore concern itself only indirectly with the air temperature, or in extension, with the loss through convection.

It is hardly safe to assume that the Romans had any idea, in the modern sense, of the physiological principles of human heat loss and heat generation, although it would not be too surprising had they had. But there is no doubt that they realized the efficacy of using radiant surfaces for comfort, because the development of the hypocaust system that can be traced over a period of six hundred years, shows an increasing awareness of this efficacy. It might be stated that the five open rooms of the Forum Baths represent the culmination of this development, although there is now little doubt that these chambers were not the only ones in Roman architecture to combine the seeming incongruity of open windows and high temperature. So far, however, they represent the clearest and most dramatic examples of this achievement. In these rooms the architect, handicapped by a site, or a program, that did not allow him the full use of proper orientation, nevertheless employed the heating method and his own ingenuity to produce a successful solution.

The success of the solution has been demonstrated by an analysis of the five rooms according to that method of modern radiant heating design

which deals primarily with the regulation of the rate of heat loss from the human body, rather than with the rate of loss from the structure itself. It concerns itself principally with the conditions under which a human being may be comfortable and only secondarily with the structure that provides these conditions. The man, not the structure, is the starting point.

The adaptation of this method to an analysis of the open rooms resulted in the following procedures: (1) establishment of probable heating surface temperatures; (2) derivation of air temperatures from these surface temperatures and from design conditions of wind and temperature; (3) determination of relative humidities from the derived air temperatures and from design conditions of humidity; (4) establishment of surface temperatures under various conditions of solar radiation; (5) calculation of the heat loss of a nude, normal adult in this environment.

The establishment of heating surface temperatures was based on the assumption of an average floor surface temperature of 100 degrees Fahrenheit. This assumption was necessary because of the paucity of information regarding the fires in the hypocausts, which otherwise would have provided a logical beginning. In assuming a temperature of 100 degrees, however, one errs on the low side, if at all, for the evidence from Latin literature indicates that the *thermae* were highly heated indeed. Moreover, it is reasonable to suppose that these establishments were heated to at least the same temperatures as modern Turkish baths, or from 110 to 120 degrees Fahrenheit, and the more so since the mention of "bath shoes" in Latin literature implies a protection against a hot floor, perhaps by wooden clogs not unlike our own. Furthermore, the fact that 100 degrees is in fact tolerable to bare feet gives a kind of empirical confirmation of this temperature as a working basis for analysis.

Therefore, assuming 100 degrees as the floor surface temperature, it was possible to closely approximate the temperature of the mixture of smoke, gas and air under the floor; and from the temperature of this mixture the surface temperatures of the walls were found. A mean radiant temperature was thus established, which not only affected the human subject, but also the air temperature of the room.

Since the rooms were virtually open at one end, design conditions had to be established in greater detail than would ordinarily be necessary in contemporary work, particularly those conditions of wind direction and velocity. The Italian meteorologists are generally of the opinion that the weather in ancient times, for the region around Rome and Ostia, was not greatly different from that prevailing now. The ancient writers, by their references to familiar phenomena, seem to confirm this. Accordingly, the year 1953 was chosen as an appropriate base upon which to construct a set of design conditions. A study of the hourly data for that year reveals a cold season of five months, from November to March, with January and February as the coldest months and December, March and November as increasingly mild, in that order. They also show the northerly winds as prevailing during this period, with the strongest winds blowing not only from the north, however, but also intermittently from the southwest. January and February, besides being the coldest months, are also the most humid and, as might be expected, the southerly winds from the Mediterranean bring the moister air.

Although design conditions which reflect the extremes of wind velocity and air temperatures are unrealistic, in that a combination of the lowest temperature and the highest velocity rarely occurs, and certainly did not occur in 1953, these extremes were nevertheless used as a kind of factor of safety for the analysis. Therefore the lowest air temperature recorded under a north wind was combined with the highest velocity for that wind. The average relative humidities under both northerly and southerly winds, for the months of January and February, were then added.

Considerations Of Solar Radiation

Although diffuse solar radiation, especially in the form of reflection from the *palaestra* and from the projecting walls mentioned above, must have added more than a little to the total radiation absorbed by the open rooms, it was disregarded because of the uncertainty of accurately calculating its effect upon the interior of a building. Direct solar radiation, only, was used as a design condition, and since the intensity of solar radiation varies with the degree of cloudiness, the meteorological data for both cloud-cover and heliophany—or the incidence of sunlight —were employed in the deduction of direct radiation values. In order to simplify the calculations without materially affecting the results of the analysis, radiation values for all degrees of cloudiness were not found, but only those for clear sky conditions (when the cloud-cover is not greater than 2) and for average conditions (when the cloud-cover is between 3 and 7). These values were further differentiated for the hours of 10:00, 12:00 and 14:30 because of the evident limitation of use of bathing rooms. For the references in ancient literature point to a customary bathing period from noon to 17:00, with its peak at about 14:30, and imply the use of

the baths at night as being generally confined to the relatively few indigents and disreputables who were apparently not welcome at other times. In the establishment of surface temperatures under solar radiation, the lowest radiation values for the year—those for December 21—were employed. As a comparison, however, values for March 21, June 21 and September 21 (the spring equinox, summer solstice and autumn equinox) were also found and the shadows cast upon a plan of the rooms at these four significant dates of the year. This graphic method clearly demonstrated the penetration of sunlight through the great windows of the rooms and, as was expected, showed the largest areas of sunlight on December 21 and the smallest on June 21. Moreover, although the unit radiation on December 21 is lowest, the total penetrant radiation for that date was more than twice the total for June 21.

The design conditions, then, were set up for both northerly and southerly weather as encountered during January and February, with solar radiation values for December 21. They were as follows:

air temperature	—−1.0 deg.C	2.8 deg.C
wind	—n.; 16.1 kph	s.w.; 11.4 kph
relative humidity	—63%	78%
solar radiation	—1) clear sky	1) clear sky
	2) average	2) average

The way in which these conditions affect human heat loss may be expressed most simply in a parallel form, as follows:

air temperature	—loss by convection
wind velocity	—loss by convection and evaporation
relative humidity	—loss by evaporation
solar radiation	—loss by radiation

These conditions, however, did not affect the human loss directly, but only through their action on the rooms and through the reaction of the rooms on them. Their impact on the structure produced a change in both the structure and themselves, and this change in both determined the action of the structure in providing a comfortable environment.

The analysis of the rooms was of course predicated on their reconstructed form as well. Today most of their walls are preserved to at least doorhead height. A fragment of the vault of Room 2 is still in place and the spring line of the vault of Room 4 can be identified. The columns and pillars of three of the great windows are standing; an impost block on one of the columns of Room 5, and a lintel—or horizontal mullion—on the pillars of Room 4, provide definite details of the fenestration. This evidence, combined with our knowledge of the principles of Roman architecture, permits little guesswork in reconstruction, and the original shapes of the rooms were undoubtedly close to those shown in the sections of Fig. 4. Rooms 1 and 2 were domed, the ovoid dome of Room 2 gracefully complementing the plan and making this room one of the most inviting of the five. Rooms 3 and 4 were barrel-vaulted, the vault of Room 3 becoming ungulate over the bowed south wall. Room 5 was roofed with intersecting barrel vaults, one of which merged into a half dome over the projecting apsidal end. In the domes of Rooms 1 and 2, as well as in the main vault of Room 5, there must have been circular openings for ventilation, similar to the one in the dome of the Pantheon. Vitruvius specifies these and they are found in many bath vaults still standing; the relatively modern term, *oculus,* is used to describe them. The size of their free opening was controlled by a shield-like metal disc (a *clipeus*) directly beneath them, that could be raised or lowered by a rigging of chains. In Rooms 3 and 4 it is likely that ventilation was effected by windows in the lunettes of the north walls. From socket holes in those door sills still in place, it was inferred that all door openings of the rooms contained doors on pivot hinges, so that in their original form the rooms could have been more or less tightly closed in all but their exterior walls, or thrown open for highly effective ventilation.

Each of the rooms, therefore, was analysed not alone under the design conditions, but under these conditions in combination with five conditions of infiltration, as follows:

(1) with a northerly wind and doors and *oculus* closed;
(2) " " " " " one door open and *oculus* closed;
(3) with a southerly wind and doors and *oculus* closed;
(4) " " " " " one door open and *oculus* closed;
(5) " " " " " doors closed and *oculus* open.

Under analysis, all the rooms but Room 1 performed admirably under these five conditions of infiltration; that is to say, they were able to keep the "nude, normal adult" comfortable by inhibiting his heat loss below his rate of metabolic generation. Some of the rooms, under the more open conditions of infiltration, required the help of solar radiation to achieve this condition of comfort. But with their doors and *ocula* closed, none of the rooms but Room 1 required solar radiation as an aid to its heating system. In other words, under cloudy skies and the most extreme conditions of winter wind and temperature, they were able to maintain the comfort of their bathers.

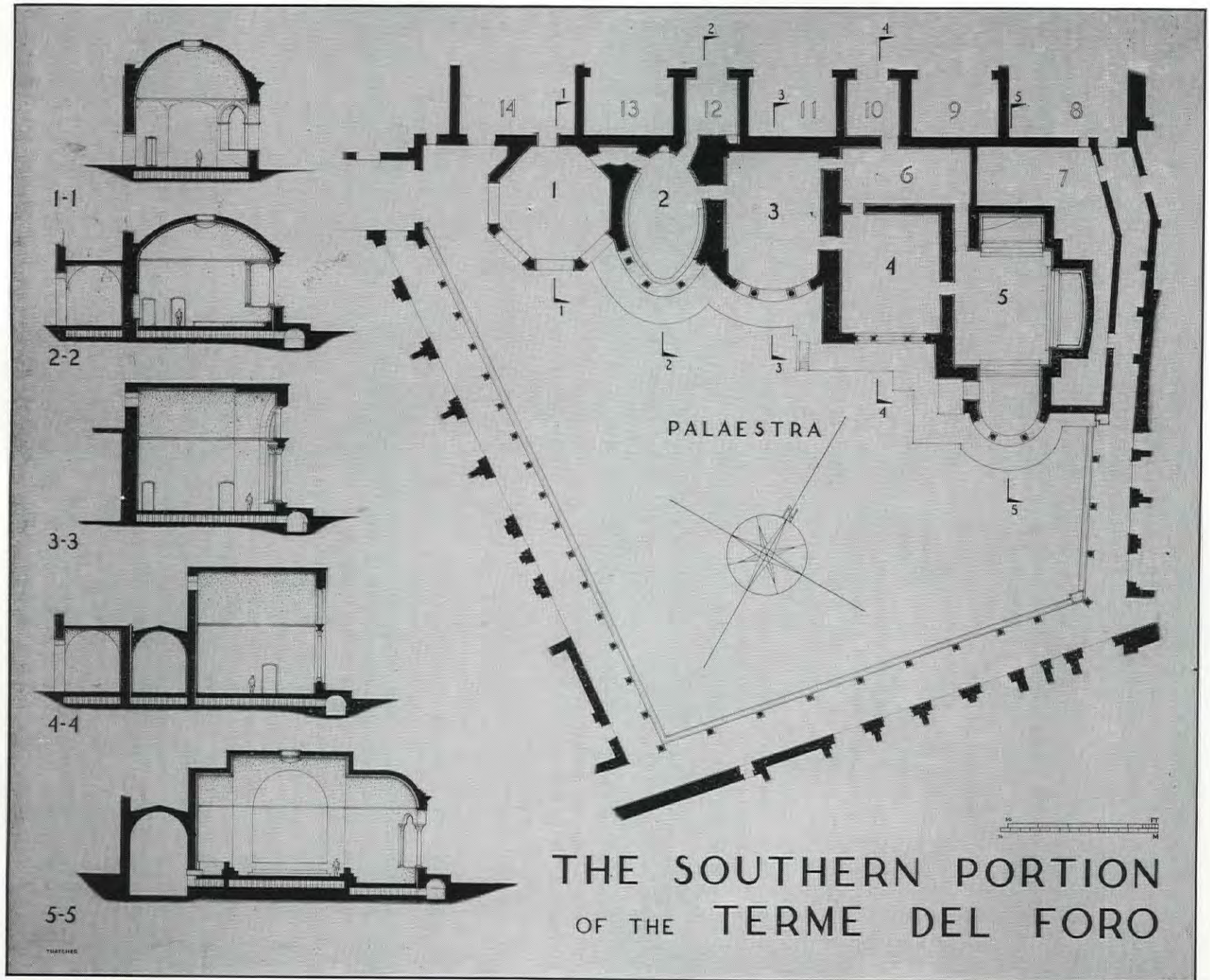

1-1
2-2
3-3
4-4
5-5
PALAESTRA
THE SOUTHERN PORTION
OF THE TERME DEL FORO

FIG. 4

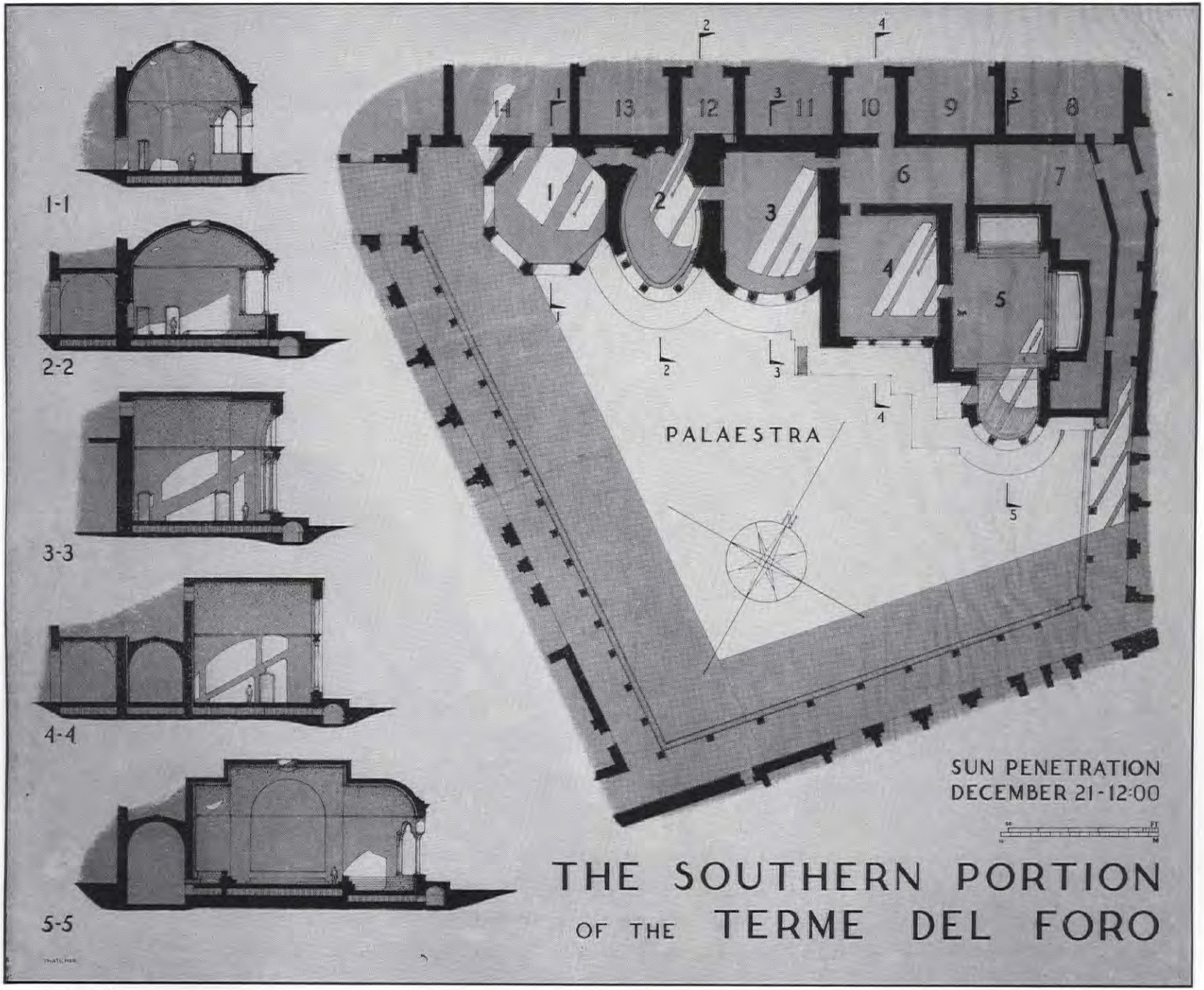

1-1
2-2
3-3
4-4
5-5
PALAESTRA
SUN PENETRATION
DECEMBER 21-12:00
THE SOUTHERN PORTION
OF THE TERME DEL FORO

FIG. 5

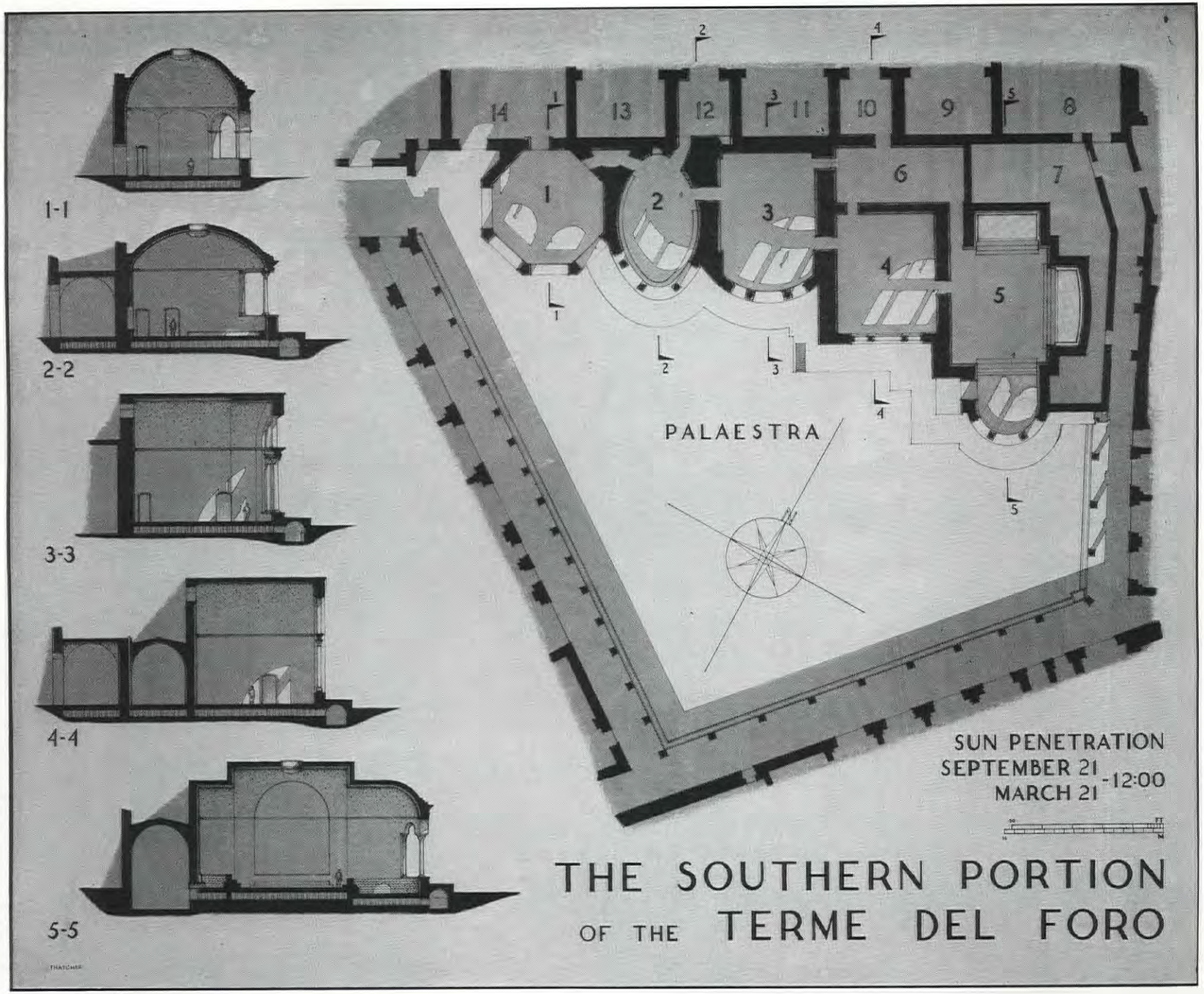

1-1
2-2
3-3
4-4
5-5
PALAESTRA
SUN PENETRATION
SEPTEMBER 21
MARCH 21 -12:00
THE SOUTHERN PORTION
OF THE TERME DEL FORO

FIG. 6

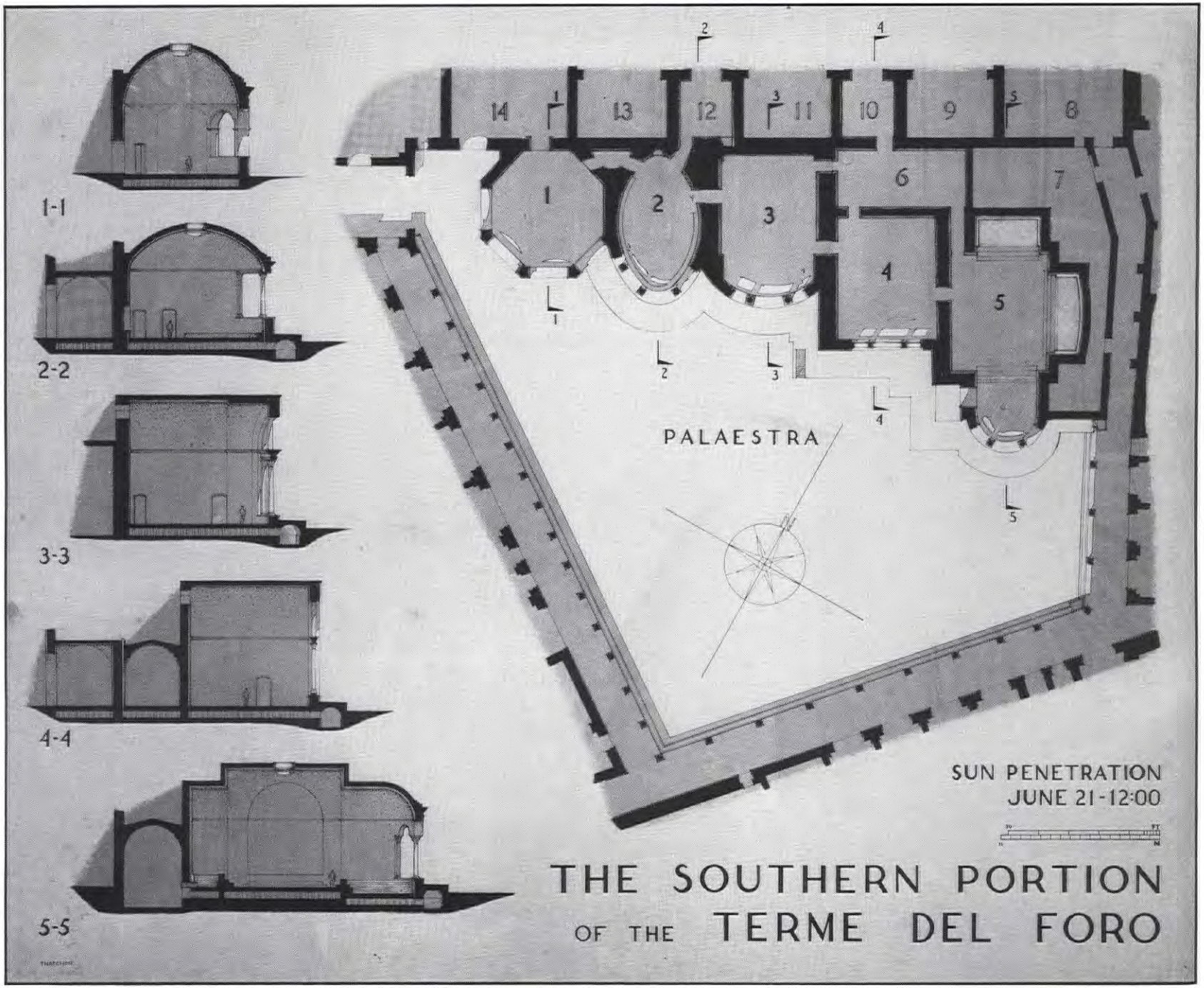

1-1
2-2
3-3
4-4
5-5
14
13
12
11
10
9
8
1
2
3
4
5
6
7
PALAESTRA
SUN PENETRATION
JUNE 21-12:00
THE SOUTHERN PORTION
OF THE TERME DEL FORO

FIG. 7

The chart of Fig. 8 compares these rooms under the five conditions of infiltration and is a synthesis of the results of the analysis. It shows the conditions of solar radiation that were necessary for the adequate performance of each room. Room 5, the *caldarium,* performed excellently under all conditions of infiltration in even cloudy weather. Unless their doors and *ocula* were closed, Rooms 2, 3 and 4 needed help from the sun, Room 2 least of all. Of the five, Room 1 alone depended on sunlight. With only a radiant floor, it was lightly heated in comparison with the others; nor was it protected on the north by spaces of intermediate temperature, such as those rooms numbered 10 and 12 that formed buffers between the cold *frigidarium* and Rooms 6 and 2. When the sun shone, Room 1 enjoyed almost constant sunlight throughout the day and, properly enough, it received the greatest amount of solar radiation during the winter months and the least in summer. It was clearly a room for sunbathing—a *heliocaminus*—but even with this special function it was usable on 67% of the days from November to March, when only 68% of the days in this season had any sunlight at all; in other words, it was usable 98% of the time. It is perhaps more obviously characteristic of the skillful planning that typifies the whole complex than any other single space therein. Its orientation and fenestration are, of course, nearly ideal for its purpose, but even the apparent neglect of any protective vestibule on the north is found, upon investigation, to be logical. For the prevailing northerly weather in winter usually brings clear skies and bright sun, and under these conditions the unprotected north was no liability because solar radiation more than offset the infiltration from that quarter. Nor did the great windows, exposed to a strong southwest wind, limit the room's usableness, for southerly weather in winter is rare, generally cloudy and does not permit sunbathing. The final proof of this room's unique adaptation to the weather, the sun and the site is found by analysing it with its windows glazed: It would then have been usable for nude bathers on all the sunny days of the season, instead of on 98% of them; and the increase of 2% would have been due only to the protection against southerly air afforded by the glass. It hardly seems logical to glaze a room that is usable, unglazed, 98% of the time, and the less so when glazing would have nullified its evident function as a sunbathing room. For glass, and especially the rather opaque Roman glass, would have shut out the sun's "tanning" rays.

As for the other four rooms, their successful functioning depended not only on their own heating systems, but on the rooms of intermediate tempera-

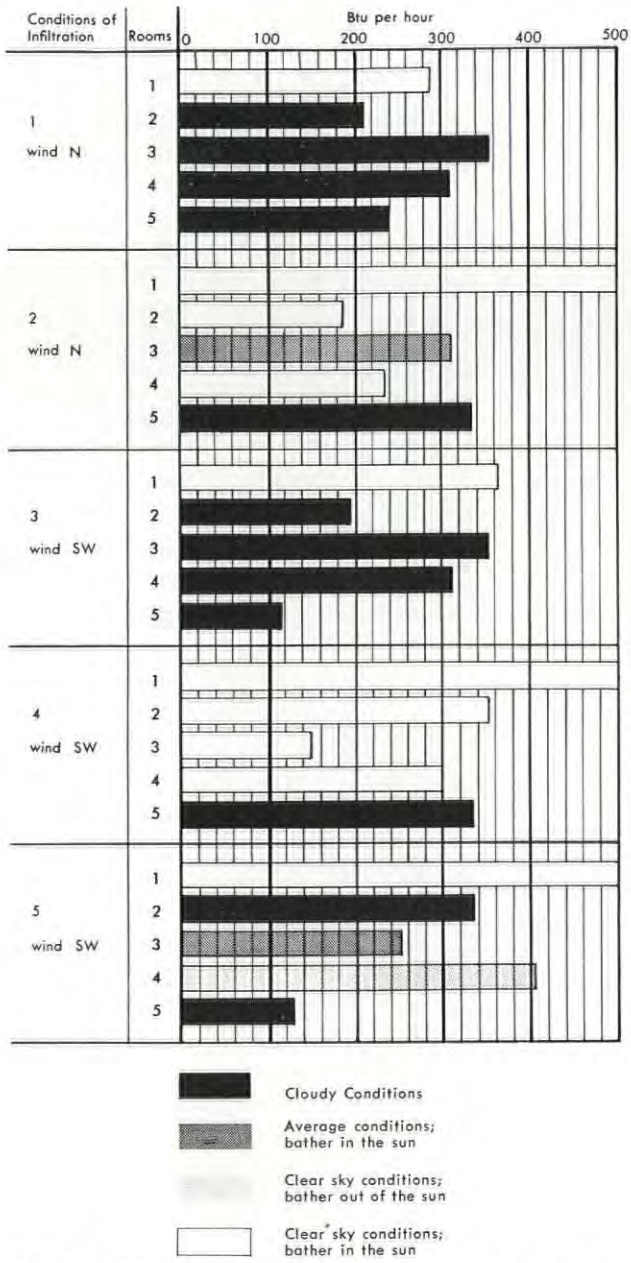


FIG. 8: ROOM COMPARISON IN TERMS OF HUMAN HEAT LOSS.

ture that shielded them from the colder parts of the building. Room 2 was warded by the small heated vestibule separating it from Room 1, as well as by Room 12. Room 10 screened Room 6, and the latter served as a buffer for 3, 4 and the *caldarium.* In the early days of the Forum Baths, Room 3 had opened directly into 12; by the fourth century, however, this access had been closed and Room 3 was well protected by 2 and by 6. The *caldarium* was not only well shielded, but also well enough heated that its southern pool could offer the anomaly of outdoor bathing in a steam room. This combination of cool air, sunlight and hot water, with a steamy refuge

close at hand, was the ultimate touch of luxury for an establishment that must have been known for its sophisticated variety.

The final elements of the plan that assured its success were the buildings surrounding the *palaestra*. The two-storied buildings to the southeast and southwest were tall enough to act as windbreaks, yet low enough to let in the winter sun; the higher building to the northeast gave maximum protection against the worst weather. It is also significant that the *palaestra's* Forum entrance was opposite the *heliocaminus*, for it not only permitted the afternoon sun to reach this room, but also provided the only real ingress for occasionally bad southwesterly weather. Since the *Heliocaminus* was rarely usable in such weather, however, this room could therefore be considered as invulnerable to it and, at the same time, as a protection against it for the other rooms to the east.

Man Is the Measure

Consideration of the whole complex of the Forum Baths reveals an unusually skillful disposition of its elements, in which the handicaps of the site were largely overcome and in which the maximum advantage was taken of the climate. The bath building itself was obviously carefully studied, to take form as a readily functioning entity that provided flexibility of circulation for large numbers of people, as well as variety of operation. The heating system was designed integrally with the building and was not imposed upon it as an afterthought, so that a harmonious relationship existed to produce a comfortable environment, either in resistance to the natural forces of the weather or in cooperation with them. A successful solution to the problem of a bathing establishment was achieved, and by means of a structure that was original, that was uniquely adapted to its site and its climate, and that must have been esthetically exciting.

The implications of the Forum Baths for contemporary architecture are both historical and practical. Historically, these Baths provide another piece of evidence to show that the philosophy of Roman architecture was not so different from our own: That there was much the same sense of function and much the same feeling for space and its organization. And, perhaps surprisingly, there was the same use of man as the measure of the design, as reflected not only in the building plan, but also in the principles of radiant heating.

This evidence, however, need not be relegated only to historical considerations, for the fact that Roman and contemporary architecture have much in common can provide us with a few lessons and perhaps some inspiration, particularly when we can recognize familiar techniques of analysis and design that were as valid for our colleagues then, as they are for us today. At the least it can have the salutary effect of demonstrating that while we might be able to build bigger than anyone else, we do not necessarily build better; and that good architecture has the same flavor, no matter what the vintage.

Practically, the Forum Baths provide a clear expression of the advantages of proper orientation and a respect for the conditions of the climate, advantages that have been re-discovered and intelligently re-applied only lately, relatively speaking, and that are already in danger of neglect through a mistaken reliance on gadgetry. It would therefore not be amiss to permit the Romans to remind us that we are in the business of designing shelter and that there is more perception, logic and efficiency in using natural forces than in fighting against them, and that any other course leads almost inevitably to a *tour de force* and to what is, at at bottom, bad architecture.

Not least of all, however, the Forum Baths demonstrate most dramatically the efficacy of radiant heating, particularly in spaces of large volume. The drama of the demonstration is of course in the open windows, which at first may seem to be a *tour de force* in themselves but are, on the contrary, a straightforward device for achieving sunlight and fresh air, as well as an intangible sense of spatial release and union with the outdoors. They serve, however, to emphasize the signal quality of the heating method, which is a direct application to the essential problem—not to make the structure comfortable, but the people in it. Man is the measure, as he must be in all good architecture.

Corrigendum

In the December *Journal* we printed an article by Joe E. Smay entitled "A New Look at Professional Liability Insurance," and in introducing Mr. Smay stated that he was the Director of the Department of Architecture at the University of Oklahoma.

A letter from Mr. Smay puts us straight. He says "I did serve as Director from 1929 to 1942 but now the position is a 'revolving' one and is now held by J. Palmer Boggs. I am listed as Professor of Architecture."

Our apologies to Mr. Smay and to Mr. Boggs.

BELOW: EMBASSY OFFICE BUILDING, LIMA, PERU—KEYES & BUILDING, BANGKOK, THAILAND—JOHN CARL WARNECKE,

EXHIBITION OF FOREIGN BUILDINGS DESIGNED FOR THE DEPARTMENT

". . . a new form of expression for our needs,
a form in which the architecture graciously pays the homage due
an established style
from a Government that is a guest."
—From the Citation of Honor presented to the Office of Foreign Buildings by The Institute at the Centennial Convention.

At The Octagon through April

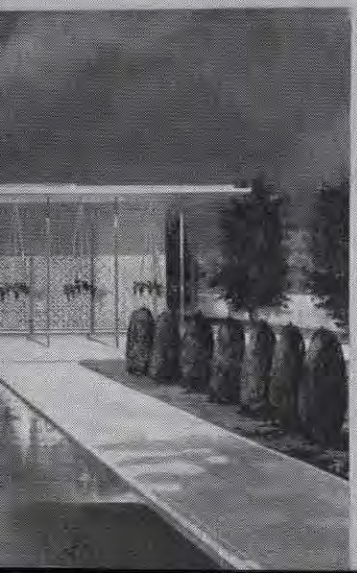
EMBASSY OFFICE BUILDING, ATHENS, GREECE—WALTER GROPIUS, ARCHITECTS COLLABORATIVE

E, ARCHITECTS; LEFT: EMBASSY OFFICE

EMBASSY RESIDENCE, TEHRAN, IRAN—VICTORINE & SAMUEL E. HOMSEY, ARCHITECTS

OF STATE

EMBASSY RESIDENCE, SANTIAGO, CHILE—PAUL THIRY, ARCHITECT



ABOVE: EMBASSY OFFICE BUILDING AND RESIDENCE, RABAT, MOROCCO—KETCHAM, GINÁ & SHARP, ARCHITECTS; LEFT: EMBASSY RESIDENCE, NEW DELHI, INDIA—EDWARD D. STONE, ARCHITECT

Apologia Pro Procrastinatione Nostra

Edwin Thatcher, architect,
Went to Italy to inspect
Hypocausts of bath and home
Straddling all the roads to Rome.

Looking hard, he peered and
prodded,
Reading tomes until he nodded,
Figured, contemplated, measured
Many rooms the ancients treasured
In the days when men knew not
Television and such rot,
Motorcars, and movies silly,
Radio blare of songs hill-billy,
But, instead, for just a "penny,"
Flocked to baths of which so many
Were most sumptuous to behold—
Lavish marble, stone and gold—
And complete with every "must"
Which we cherish 'til we're dust—
Beauty-parlors, and masseurs
Who would strive for groans or
purrs;
Bars for drink and bars for food;
Libraries for every mood;
Nooks philosophers preferred
While the chattering, careless herd
Exercised, and bathed, anointed,
Then dispersed to their appointed
Banquets, or their meager rations.
Men alike in all their passions!

Fascinating history!
But within—a mystery!
And on Thatcher there devolved
Quite a problem to be solved.
This, a matter *re* exposure,
Heating, "openness" and closure,
He began, quite innocent
Of the time that would be spent
Proving archeologically
With unfurling formulae,
Using language that explains
Data *technical*—to *BRAINS!*

After months of calculations,
Classical evaluations—
Plutarch, Columella, Pliny,
Livy, Seneca (that meany!)
Checking sun and heat and cold,
Rainfall *now,* and as of old,
Wind and compass deviation—
Fodder for all computation—
Averages, graphs and drawings,
BTU's, and endless pawings
Over pamphlets, over books,
He *succeeded*—so it looks—
In the proof that Roman ancients
With intrepid toil and patience
And great engineering skill
Built their baths for sun to fill
Through one whole unglazéd wall,
Usually a façade of tall
Pillars. In extremes of cold
Canvas stretched by Romans bold
Helped allow the throngs to sweat
In the "open" rooms! As yet,

Few know of the Roman "know-
how."
Don't they rate a little kowtow?
—Mrs. Edwin Daisley Thatcher

Reference Material Requested

The Institute has received a request from the United States Information Service in Khartoum which reads in part as follows:

"Hassan Atabani, Chief Architect of the Sudan (his office and staff are part of the Ministry of Works), is anxious to be in touch with American architects and engineers. He also wants American reference material for his office library.

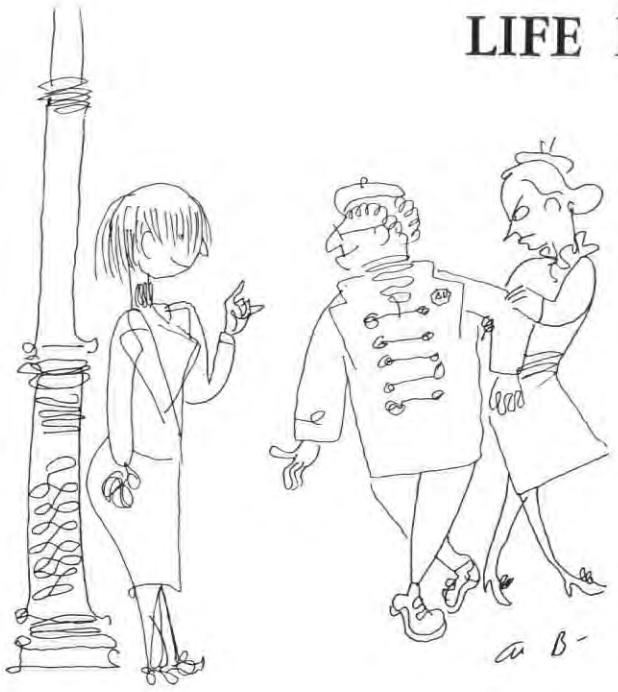
"Behind this latter desire there lies a quite legitimate history. Last September Atabani attended the First International Seminar on Hospital Construction in Geneva. There he met colleagues from many lands, including Moreland Griffith Smith of Sherlock, Smith and Adams of Montgomery, Alabama. As the result of his visit to Geneva Mr. Atabani has obtained architectural collections for his staff library from West Germany, Britain, Egypt and India. Whether he obtained these collections gratis or for cash is not known. But the question is beside the point since Mr. Atabani cannot obtain dollars to buy American books and magazines.

"Mr. Atabani's desires would seem to be made-to-order for a 'People-to-People' project. Therefore, the post wonders whether The American Institute of Architects might be able to collect some books for Mr. Atabani's office."

We are putting Mr. Atabani on the complimentary mailing list of the *Journal,* and the AIA library will send him what books it can get together from its duplicate collection. But this is a bigger opportunity to express international professional good will than that. Many members must have duplicate or surplus books which they could send him, and we are sure Mr. Atabani would be pleased to enter into correspondence with American architects. The books cannot be too elementary, as this is a primitive area and their need for technical know-how is very great. In fact, there is a large amount of manufacturer's literature which contains much useful technical information, and should be as useful a guide in Sudan as many books. The only stipulation is that the books or material be in reasonably good physical condition.

The Washington office of the USIA suggests that individuals sending a small number of books send them directly to Mr. Hassan Atabani, in care of Public Affairs Officer, American Embassy, Khartoum, Sudan. Anyone wishing to send a large number of books will please send them to the *Journal* office. We will turn them over to the USIA, who will take care of the shipment. We hope there will be a generous response to this request.

LIFE IN A MARTINI GLASS:



Cher Boss, I am sitting munching une croissant and buvezing une chasser de coffee black and trying to focus on the Place de la Concorde, a double breasted coccotte, the Arc de Triomphe and my wife's new fur, when the concierge delivered a letter from my olde colleague in Amerique, who shall remain nameless because he is having a wife and a petite grandchild and an unmarried daughter and must be protected from the juveniles with switch blade T squares who would maul him.

Ah, it is as I am theenking, dat ole davvil Architecture she is raising her reinforced concrete head, and just as I am breathing in my last few dentils before returning to the Glassed In Shores.

My vieux confrère writes . . . "We have been reading your column 'Through a Martini Glass' as now currently appearing in the AIA publication, and feel better qualified than most of your readers to really enjoy every word of this nonsense. I hope that the article by Lewis Mumford—'The Sky-Line' carried by *The New Yorker* magazine for October 5, 1957, sharply criticising the great man Le Corbusier, will encourage you to get into some serious discussion on the subject of such bogus socialism executed in three dimensions and touted to the unsuspecting junior architects via 'the Avant Garde' group as being one of the finer examples of 'social planning,' etc. To judge from Mumford's article, the housing job in Marseilles is even worse than I have always felt it was and is, and I would hope that you or Lewis Mumford will continue to hack away at the false foundations of these dilletante architects that are flooding our shores with their cast-off architectural garments.

If I seem bitter on this subject it is only because I hate to see the younger architects close their minds to anything but architecture and new architectural thought bearing the label 'made in Europe.' In other words, I am trying to influence the character of your 'Through a Martini Glass' from the backward glance to the forward look, and I hope that I have known you long enough to make this suggestion without causing any offense."

Well, Boss, anybody who can instill any sense of responsibility in me, and especially in trying to make me look forward instead of looking backward deserves my unstinting effort, and so here I sit, typing forward when I should be right out there in the clammy cold dampness of Paris in November with, seemingly, the only people who are still free and unfettered and unhampered by a gouvernante.

I have seen European architecture several times since the Birth of the Blues and most of it seems over-rated and dull and the descriptions sound better when translated into the English from the French, German or Taliesin.

What most Modern Architects should be sentenced to is a couple of nights in their solitary cell blocks in the restored cities of Europe, such as Saint Malo, Rouen, Marseilles, St. Lo, Florence, Pisa, Vicenza and other achievements of the glorification of the hideous. It's Sunday in Philadelphia everyday for the poor devils who first suffered the ugliness of living for awhile in their bombed-out buildings, only to be saved with new structures in the cold and clammy beauty of unrelieved concrete. For miles on end it seems a succession of contrived dullness and monotony.

We landed in Algeciras, Spain, which is a big hotel flanked by a railroad station and a small Spanish town. After about a day of rest we wandered into the village to get a couple of castanets and a G string for my mandolin. Damned if little Saarinen hadn't been there or at least one of his disciples. There used to be a lovely square enclosed by sunbaked buildings with iron grills and gay senoritas feeding parrots and waving fans at you. In the open square was a market filled to the brim with the farmers from near and nearer all selling their wares and smelling up the fresh air and gathering around them every fly, flea, roach and mosquito from here to Olde Gib across the bay.

Now somebody must have latched onto a copy of the *Architectural Record*. You name it and they have enclosed the market portion of the square with a solid reinforced concerete flying diaper resting on five unsteady pins. This achievement encases all the peasants and their vermin in a breath of air wet with the dew of condensation. I could have wept or maybe I should have stayed at home and read Baedeker on Olde Seville.

Well, here I sit in Paris, being sulky about my attitude toward Lally, so I about faced. First, I went right out and bought myself a Sevillano black porkpie hat, changed my trifocals to horn rimmed, let my hair grow long and started muttering. I had my cartes de visite printed double elephant size and spelled out Fellow of the Americaine Institute of Architects. I even got a record of how to speak French so even a concierge or a flic can understand you. Boss, I worked at it. The net result is that all my French friends tell me to keep it up and they can learn to speaking the English like Maurice Chevalier. I sent my card up to the Colonel at the Q.M. to see if he would grant me permission to buy a cake of Ivory soap for my wife so I can get my nylons laundered proper, but the Sergeant came out and looked at my engraved card and looked at me and said, "Look pop, youa retired colonel or somethin' special because in this man's army we don't allow nobody to buy even a cake of soap without a uniform and script, but I will personally stake you to a haircut and if you come out from behind them cheaters and get a hat, there is girls in Paris which are preferring old men and maybe you can have a good time even without washing the shirts."

I was terribly hurt but I knew he was right so I took his advice, bought a beret and a copy of the *Herald Tribune* and forgot to speak French while walking down the Champs Elysées. In five minutes I was a success, two postcard salesmen offered me pictures which my colleagues posed for thirty years ago, a brazen hussy hooked my free arm and gazed appealingly at my wife, six cops helped me across the street and a couple of street bankers offered me more francs for my dollars.

Well, I guess I am doing my duty toward that forward look for this month, but in parting let me add that I refuse to read Lewis Mumford, as my correspondent suggests, without an advance payment of a thousand bucks. First, he got me all upset because he thought the United Nations Building faced the wrong way. Then, I think, he thought it was better and facing the right way and maybe *he* had been facing the wrong way. I read him on Philadelphia and he thinks Penn Center is a great achievement. Do I have to read Mumford to decide what I think about the Corbusier Apartments at Marseilles? I saw those apartments three years ago, decided that it was a great achievement in Chicago as railroad siding housing of fifty years ago and the same old malarkey of slum clearance jargon in French. The Marseilles job is in a park twenty miles from any slum and near the race track. It is solid and dull concerete ruining what was once a lovely park with lots of genuine trees and atmosphere.

The only saving grace is that it is lifted on pilings or pilotes so that the first living floor is feet above the ground. Pilotes or pilings as a main entrance to a large building are about as unlovely as the piles under Steeplechase pier but they are a Godsend to the Frenchmen. Corbusier is a Frenchman and he must have read a book where it says Architecture must be useful as well as beautiful. The average Frenchman prefers to use walls, fences, grass plots, trees, shurbs, and or any handy outdoor convenience to express himself against rather than enter his home and violate the sanctity thereof. When I was last there the inhabitants of the Marseilles Apartments had made great use of these pilotes and the place was being well dedicated and probably is being appreciated more and more. Of course, in America we have Mr. Crane and Mr. Hajoca as a substitute for Pilotes.

Sir Ian MacAlister

WORD HAS belatedly reached the *Journal* office of the death on June tenth of Sir Ian MacAlister, for many years (1908 to 1943) the distinguished Secretary of the Royal Institute of British Architects. Sir Ian was an Honorary Associate of the RIBA and an Honorary Member of the AIA. In his passing, the Institute has lost another old and good friend.

John Knox Shear

IT IS WITH REGRET that the *Journal* records the death of John Knox Shear, architect and distinguished editor of *Architectural Record*.

A member of the Institute since 1949, Mr. Shear was head of the department of Architecture at Carnegie Institute of Technology before his appointment as editor of *Architectural Record*.

The Brazen Roof and The Broken Trumpet

HENRY S. CHURCHILL, FAIA

IN *Perspecta 4,* the recent issue of the *Yale Architectural Journal,* which, by the way, is an excellent and stimulating from time-to-time publication which should be more widely known, there appears a thought-provoking piece by Vincent Scully, Jr. entitled "Toward a Redefinition of Style."

It is thought-provoking because it is so thoughtful and yet as thought-concealing. Professor Scully writes in the jargon of the New Art Criticism which I believe has evolved to conceal the utter bankruptcy of mind of the average art critic. But Scully's mind is not bankrupt, as his previous writings have shown, as well as this essay, and it seems to me too bad that he should not hold himself to the high standards of clarity of expression which are so admirable in the critical work of Henry-Russell Hitchcock in his own field, and so pre-eminent in that of T. S. Eliot on poetry, and perhaps supreme in those writings of Valery, in which architecture comes to exquisite and sensitive life.

Architecture, it appears, is about to enter a new phase, a stylistic syncretization of Mies, Wright and Le Corbusier, of which Notre Dame du Haut de Ronchamp is the prototype. Ronchamp, it seems, is the New Parthenon and an Ivory Tower, but "instead of rising tensely upward towards its center, as the Parthenon does, it splits out of its Euclidean envelope in a weight-lifting lunge to the southeast corner," and, standing on its ideological Acropolis it then "swings upward from it into a splendid sound, itself a 'brazen trumpet,' and an acoustic bell."

Corbu paved the way for this in the Unite de Habitation, a piece of sculpture which is neither mere enclosure of space, such as Wright's work, nor just a "thinly stretched membrane" such as that of Mies and his disciples. It derives from greater sources, from pronaos and megaron (the "megaron-like apartments"), from the peripteral colonnade, "felt empathetically." And, "Since, however, we empathetically experience upright bodies in terms of our own, the building becomes a humanist one."

This defines the New Humanism, for the chapel on the hill, lunging to the southeast, with its own "apsidal megara" to keep the continuity, is a next easy, and inevitable, super-conscious step. Ronchamp is "both cave and column," and is a high symbol, a "fixed temenos, rooted in the caverns of the earth, but turning toward the open sky," a protest against the rootless, flowing images of Wright, the ambient planes of Mies, euphora such as "Huck and Jim, fugitives and spectators in a dream-like time" floating down the river of a vanished frontier. Thus Ronchamp presents the consciously ironic symbols of "the pierced fortress wall which is no fortress, the roof that breaks apart, the threatened door."

It seems fair to ask: Are these the elements, ironic or no, of the future, are these the manifestations of a "brazen trumpet" and "a shaft which is inflexible and free"? Could it be, perhaps, that instead these are the symbols of a rationalist failure unable to find redemption in a belated faith? At its best it reveals a nostalgic yearning for Byzantine obscurantism, a confusion of God with man which Corbu, unlike Wright (whose strength comes from within himself) has not the courage to admit: The false fortress, the quaking light, the collapsing roof,

the "threatened door" through which no truth can enter; these are not the New Humanism but the Old Despair.

Let us look again, at the risk of being old-fashioned, at the fortress-cathedral of St. Cecily on the high banks of the river Tarn; at St. Louis in Paris, where interior space and exterior form are not mere ambient concepts but a singular reality; we might even look at the Manufacturers' Trust Company, an ambience, unconsciously ironic, that retains on the mezzanine a gilded iron altar as a vestigial symbol of a faith now buried in Fort Knox. From St. Cecily to Ronchamp, from St. Louis to Taliesin West, from the false Florentine fortress of the Federal Reserve on (O irony!) Liberty Street to the inflated ambience of the New Economics—a curious series of progressions for which anyone may make their own substitutions.

So there we have it: Corbu, the expounder of the New Humanity, Mies-Bunshaft the expounder of the New Economics. Remains only F. L. W.

Professor Scully points out Wright's affinity to Whitman and others of that generation, noting that Wright's "infinitely extending axes" are compulsive, like Whitman's Open Road and Mark Twain's River, endlessly flowing. Later, however, after Mies had achieved, in the Barcelona Pavilion, his "international synthesis of the nomadic and permanent," Wright was compelled by his need for movement to go on from axiality to circumferentiality, because "only the complete continuities of the circle can answer his need, and his poetic imagery remains close to the nineteenth-century symbols of the road, the sea, and the river." He then, as I understand the text, swims under water* until he emerges on a Mayan platform "outside of classic humanism" and ". . . the building fabric is still expressed not as a sculptural body but as a flexible and opening sheath which defines a channel of continuous space. Along this dry river the viewer is compelled—through a building which is pure ambient—to carry out that journey which culminates the myth."

Dixit. I had thought, once upon a time, that the axiality of Wright's earlier work, including the magnificent Beaux Arts plan of the Imperial Hotel, represented a Search for Peace by a Westering Pioneer driven by the Furies of Disaster: lightning, fire, arson, sudden death, public contumely; and that his later hexagonic modulization was the effort of his id to create a hive in which his queen-bee complex would feel at home. I am glad to find that, after all, he is still the expounder of the Novum Organum.

So we come at last to the same conclusion, I think, Professor Scully and I: That style is indeed the expression of intangibles, that there will be, that there is, the promise of an architecture based on a new humanism, a new economics, a new organism of the spirit; for these, however, definition remains as yet undefined.

But not Ronchamp, nor the Bank, nor even the new synagogue outside Philadelphia, point the way. The world of Mies is flatulent and powerless and thin; Wright's great and poetic world is pre-atomic, natural, not scientific; Corbu understands his world not at all. Ronchamp is an end, not a beginning. Fulfillment cannot be poured from an empty vessel. The way is open to the young men, the heritors of a new world—and a new and affirmative spirit, or there will be no new world to celebrate, and that seems ridiculous. Not since Prometheus has there been such a future opened to man's imagination.

* metaphorically, of course.

LEE LAWRIE, internationally known American architectural sculptor, has been awarded the honorary Doctor of Fine Arts degree by Washington College at Chestertown, Maryland, during a convocation celebrating the college's 175th anniversary. Featured in the program was the unveiling of a statue of George Washington, done by Mr. Lawrie. Among his major works are the Bok Tower in Florida, the Nebraska State Capitol Building, the statue of Atlas in Radio City. He was consultant to the Architect of the Capitol in Washington, D. C.

HENRY R. SHEPLEY, of Boston, architect and designer of the New York-Cornell Medical Center, has been chosen to receive the Gold Medal for Architecture of the National Institute of Arts and Letters for 1958. He will receive the honor at the Joint Annual Ceremonial of the National Institute and the American Academy of Arts and Letters in May. He was born in Brookline, Massachusetts, and was educated at Harvard and the Ecole des Beaux Arts. He is now senior partner in the firm of Shepley, Bulfinch, Richardson and Abbott.

CALENDAR

March 5-6: Building Research Institute, Plastics Study Group conference on plastics in building illumination, University of Houston, Houston, Tex.

March 15: National Science Foundation Steering Committee, Boston, Mass.

March 17-18: AIA-IES-NCSHC Joint Committee, School Lighting, Ann Arbor, Mich.

March 19-21: University of Michigan School Lighting Conference, Ann Arbor, Mich.

March 21-April 20: Sixth Annual Miami National Ceramic Exhibition, Joe and Emily Lowe Art Gallery, University of Miami, Coral Gables, Fla.

March 25-26: Twenty-seventh annual meeting, Inter-Society Color Council, Sheraton-Park Hotel, Washington, D.C.

March 25-April 29: Exhibition of New Buildings Designed for the Office of Foreign Buildings, Department of State, The Octagon, Washington, D.C.

March 29-April 1: AASA Cleveland Convention, Cleveland, O.

April 17-19: South Atlantic Regional Conference, Sarasota, Fla.

April 17-October 19: Brussels World's Fair, Brussels, Belgium.

April 18-19: Great Lakes Regional Conference, Morris Inn, Notre Dame, Ind.

April 18-19: Middle Atlantic States Regional Conference, Belvedere, Baltimore, Md.

April 21-23: Building Research Institute, seventh annual meeting, Shoreham Hotel, Washington, D.C.

April 28-May 2: Board of Directors Meeting, The Octagon, Washington, D.C.

April 29-May 11: Twenty-first Annual Maryland House and Garden Pilgrimage.

May 8-9: AIA Committee on Hospitals and Health, Mayo Clinic, Rochester, Minn.

May 9-June 15: Exhibition of School Architecture, The Octagon, Washington, D.C.

May 18-21: American Institute of Decorators' 27th Annual Conference, Sheraton-Plaza Hotel, Boston, Mass.

June 11-14: Annual Assembly of The Royal Architectural Institute of Canada, Ottawa, Canada.

June 22-27: Annual Meeting, American Society for Testing Materials, Hotel Statler, Boston, Mass.

June 27 thru summer: Exhibition of Contemporary Danish Architecture, The Octagon, Washington, D.C.

July 7-11: AIA Convention, Hotel Cleveland, Cleveland O.

July 13-August 23: Ninth Annual Design Workshop, Institute Tecnologico de Monterrey, Mexico. Additional information may be secured from Professor H. L. McMath, School of Architecture, University of Texas, Austin 12, Texas.

July 20-28: Fifth Congress of the International Union of Architects, Moscow, Russia.

September 25-27: Seventh Annual Conference, Western Mountain District, Continental-Denver Hotel, Denver, Colo.

October 2-4: North Central Regional Conference, St. Paul, Minn.

October 8-10: Gulf States Regional Conference, Biloxi, Miss.

October 9-12: Northwest Regional Conference, Harrison Hot Springs, British Columbia, Canada.

October 15: New York District Regional Conference, Rochester, N.Y.

October 15-19: California Council, AIA, annual convention, Monterey, Calif. California-Nevada-Hawaii Regional Conference will be held as a part of this convention and will meet on October 17.

Mid-October: Western Mountain District Regional Conference, Denver, Colo. Date to be established later.

October 30-November 1: Central States Regional Conference, Kansas City, Mo.

NECROLOGY

According to notices received at The Octagon between December 31, 1957 and January 29, 1958

CLARKE, FRED H., Steubenville, Ohio
CONNELL, JOHN F., Denver, Colo.
CROSBY, HAROLD E., McKeesport, Penn.
CROWE, ROBERT B., St. Petersburg, Fla.
DAY, ROBERT C., Stockton, Calif.
EDWARDS, HARRY L., Silver Springs, Md.
FREED, URSA L., Aberdeen, S. D.
GELDERS, LOUIS, Wilton, Conn.
GLOVER, LOUIS A., Houston, Tex.
HOLMSTRAND, FRANK E., Decatur, Ill.
MACKAY, WILLIAM H., Meriden, Conn.
MARTIN, HENRY A., Rochester, N. Y.
MCLEAN, PAUL F., Pittsburgh, Pa.
MEYER, THEODORE A., Ft. Lauderdale, Fla.
MILLER, CHARLES T., Seattle, Wash.
PAGE, CHARLES H., Austin, Tex.
PETERSEN, JOHN E., Miami, Fla.
REID, ROBERT, Cambridge, Mass.
RODERICK, HARRY T., Columbus, Ohio
SHEAR, JOHN KNOX, New York, N. Y.
SHEFFEY, ROBERT A., Bluefield, W. Va.
SMITH, WILLIAM JONES, FAIA, Chicago, Ill.
STANHOPE, ALLAN B., Wilmington, Del.
STEWARDSON, JAMES, London, England
THOMPSON, IVERSON G., Marshall, Tex.

SHARP FOCUS

A MAJOR BREAK-through is overdue in the college portion of architectural education and training. A necessary accompaniment is the growing acceptance by the practicing profession of their responsibility for large parts of the total education job: the Architect-in-Training program for the unlicensed younger men, and Post-Graduate programs for all ages.

Some relief of the pressure on the professional schools to become trade schools to produce completely proficient head-draftsmen will enable most of them to continue with some experiments, minor innovations and the decennial tinkering with the curriculum. But no significant change may be expected in the existing degree-granting schools. They will continue to orbit around one or both of the two traditional foci: (Fig. 1)

(1) *Structure,* the means for enclosing space. Schools of this persuasion, the bolts, rivets and gadget boys, usually under engineering administration and intellectual climate, will continue to teach as if the most important thing is that the building must stand up, whether or not it is worth standing up, economically, functionally or aesthetically.

(2) *Visual Esthetic,* pleasing the eye. Schools of this type, the lace-cuff boys, the crew-cut long-hairs, have their most congenial companionship with the art-historians and the philosopher-estheticians. Although they have occasional infatuations with geodesic domes and warped thin shells, they look down their noses at mere engineering.

In design, the client, the function and the structural system must all be forced into a preconceived theoretically "perfect" geometrical abstraction.

For them architecture is a Fine Art, capital F and A, apprehended only through the eye, (and the ear), requiring a vast amount of explanatory verbiage. Their graduates can talk architecture with much more facility than they can draw it. (There are always a few schools, difficult to classify, built around the dogmatic but dimly defined ism of a cult-hero. The graduates are often observed to be more indoctrinated than educated, some with the invincible ignorance of a fundamentalist in religion.)

Most schools, of course, oscillate between or orbit elliptically around both foci, achieving better balanced diets, but all of them tend to ignore Man, the Whole Man, the presumed beneficiary of the ministrations of our profession, and his unavoidable natural environment.

The new mid-twentieth century school will probably have to be entirely new, in a university which has no school of architecture, where there are no vested interests, traditional habits, faculty deadwood on tenure, or Chinese Walls around departments.

The new school will face up to the fundamental function of the profession: to create an artificial environment for human activities which will successfully counteract and/or capitalize on the natural environment, and which will give maximum satisfaction to humans functionally, socially, fiscally and in terms of a total sense of well-being, the new esthetic.

The new program will of course include most of the ingredients of existing curricula but in different proportions and relationships, most of them taught more efficiently. Also there must be new elements, available in the well-rounded university but so far almost entirely unutilized.

The major differences will be in emphasis and focus, and in the attitudes in the students. The foci will be: (Fig. 2)

(1) *Nature,* (excepting mankind) against or with which we design for the benefit of man. The subject matter will include the Earth Sciences; geography, geology, plant materials, climatology, solar energy, seismology, etc.

(2) *Man,* as a psychological, physiological and social being. The subject matter will include the Social and Behavioral Sciences; psychology, physiology, anthropology, sociology, economics, providing an understanding of man *as he is now known,* individually and in groups, not merely what Aristotle, the Great Books and the philosophers have speculated about him. The new aesthetic for the complex art which we claim to master, will study man's total reaction to all stimuli, his apprehension, four dimensionally, of space, light and color, sound and heat, and his individual and group behavior in the presence of combinations of these stimuli. (The fourth dimension; time, as in moving thru space, Architecture being entirely unique among the arts in this respect.)

The students will be armed with knowledge of esthetic theories, old and new, so that they will not fall for each flamboyant Messiah who comes proclaiming another set of Eternal and Absolute Truths.

Mathematics and the physical sciences and their applications in technology, along with materials variously processed, will be understood and used as resources, as important media of the art, but not to be exploited as ends in themselves. The architect so educated will determine from human needs the varied criteria and general design of equipment to be manufactured—he will not be content to be a catalogue-hunter and gadget-assembler.

Similarly, the process of design and education in its orbit will invoke the professional skills of analysis, synthesis, graphics and communica-

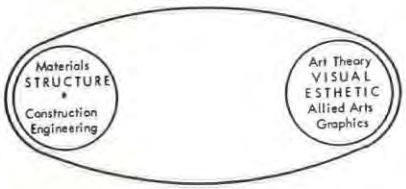


FIG. 1

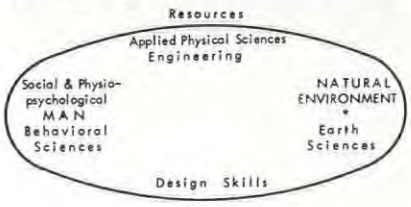


FIG. 2

tion, which will have been taught early and efficiently. The graphic arts will be taught only as tools for study and communication, not as substitutes for an architecture of space and substance. The project method, architecture's contribution to higher education, will be used with discretion, but even more broadly, involving students from various other disciplines.

The architect so educated will be regarded neither as the cosmetician of the building industry, nor as just another kind of technologist. He will be better equipped to serve man expertly in his conquest of nature, and he will be an artist in recreating the environment for man's wants and needs—a creative coordinator of varied special resources—an art quite unrelated to the graphic and plastic arts and vastly more complex.

WALTER A. TAYLOR, FAIA

A Letter to The Executive Director:

a statement concerning the right of an architect to assist in drafting construction contracts.

Dear Mr. Purves:

We wish to advise that various Bar Associations are currently giving active consideration to a study of unlawful practice of the law. We have no real evidence of the extent to which they are considering the drafting of contract documents by Architects, but in at least one city the Bar Association is in communication with the local AIA Chapter in this connection.

Some lawyers make the broad assumption that the drafting of contracts is a legal function reserved to lawyers. This attitude was evidenced in a Michigan case in 1950. In that case the judge rescinded his first decision—declaring the Architect's contract void because he had agreed to draft contracts,—and left the point to be tried on its merits. The case was later compromised so no actual court decision was secured. We know of no court decision on the question dealing directly with the practice of an Architect. We believe any such claim is unsound for the following reasons:

In the AIA Owner-Architect Agreement forms (A-102 and B-102) the statement of what the Architect agrees to do includes the words *"assistance in the drafting of* proposals and contracts." Since any construction contract is based primarily on plans and specifications, and since they are the functions of an Architect and, through registration and license laws are the legal function of Architects, no construction contract can be properly drawn without the assistance of an Architect.

Such contracts also involve legal problems and provisions and the agreement forms provide that *"The Owner shall provide all legal advice and services required for the operation."* This provision makes it clear that there is no assumption of legal duties by the Architect.

We believe that members should be reminded of these two provisions and call them to the attention of any lawyer who intimates that Architects are illegally practicing law when they "assist" in the development of their contract documents.

It is possible also to refer to a Pennsylvania court decision (Childs vs. Smeltzer 315 Pa. 9, 171 Atl. 883, 111 A.L.R. 19, 28 (1934) in which the Court said:

"There can be no objection to the preparation of deeds and mortgages or other contracts by such brokers so long as the papers involved pertain to and grow out of their business transactions and are intimately connected therewith. The drafting and execution of legal instruments is a necessary concomitant of many businesses and cannot be considered unlawful. Such practice only falls within the prohibition of the Act when the documents are drawn in relation to matters in no manner connected with the immediate business of the person preparing them, and when the person so drafting them is not a member of the bar and holds himself out as specially qualified and competent to do that type of work."

We feel that architects should not be unduly concerned by such a claim by a lawyer, but should know how to answer it simply and completely by referring to the terms of the AIA Owner-Architect Agreement form which we feel any thoughtful lawyer would recognize as a complete answer to his claim. To this end we suggest that a copy of this letter be transmitted to the members of the Institute asking them to report any instance of such a claim that comes to their attention.

Very truly yours,

JOHN T. CARR LOWE, Institute Counsel

WILLIAM STANLEY PARKER, Consultant on Contract Procedure.

Library Notes

Gifts to the Library—July 1 to December 31, 1957

FRANZ BADER
"Les Vitraux de Chartres"

JOHN A. BRYAN, AIA
Two pamphlets

JOHN HUTCHINS CADY, FAIA
Collections of photos of American architects

CATHOLIC UNIV. OF AMERICA. Department of Architecture—Library
Six periodicals

THEODORE I. COE, FAIA
"Salbus" by C. Barman

COLONIAL WILLIAMSBURG
"Proceedings of the Presentation of The Williamsburg Award to The Rt. Hon. Sir Winston Churchill."

ETIENNE DU NESAIL DU SUISSON
His study "Première contribution a l'étude de l'influence du degré—d'urbenisation et du déroulement des raisons cur les taux de mortalité dans le Région Parisenno"

BLANCHE E. FICKLE
Her "Hotel Management and Related Subjects, 1956"

E. J. GAMBARO, FAIA
Excerpts from "History of St. Phillips' Church in the Highlands" Centennial programs of Brooklyn Chapter, AIA. Two magazines and clippings

FREDERICK GUTHEIM
File of "Urbanistica"

SAMUEL WOOD HEMILL, AIA
Balboa Park Citizens Study Committee
Final Report

MISS CATHERINE HEINA
Her bibliography on office buildings

JOSEPH N. HETTEL, AIA
18 books and 20 pamphlets

ARTHUR W. HOLMES, AIA
Seven books, two magazines, one pamphlet, one photo

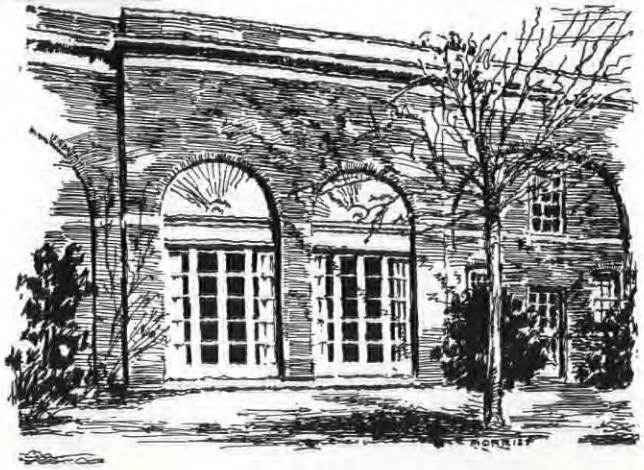
BRYDEN B. HYDE, AIA
His article on "Evesham"

INDIANAPOLIS HOME SHOW, INC.
50 House Designs for 1956, and 1957.

MORRIS KETCHUM, JR., FAIA
His "Shops and Stores"

SAMUEL LANDSMAN
One magazine

EMIL LORCH, FAIA
Two reports, National Council of Architectural Registration Boards



LOS ANGELES CITY PLANNING COMMISSION
Reports 1952-1956

GORDON D. MACDONALD
"Apartment Building Construction Manhattan, 1902-1953" Supplement No. 3

NATIONAL COUNCIL ON SCHOOL HOUSE CONSTRUCTION
Proceedings 1954-56

NEW YORK SOCIETY OF ARCHITECTS
Year Book 1957/58

HORACE W. PEASLEE, FAIA
Pamplet on Professor Babcock

C. W. PHILLIPS, SR.
Brochure on Connecticut General Life Insurance Company

POLISH PEOPLE'S REPUBLIC EMBASSY
"The Old Town of Warsaw"

HENRY HOPE REED, JR.
Program of walking tour

ROBERT G. RICK, AIA
25 magazines from the files of the late Kai Leffland, AIA

MISS LUTCH M. RIGGS, AIA
Two sketchbooks of Edward Clark Cabot and one volume

COLEMAN W. ROBERTS
His report "A Pattern for Charlotte"

ROYAL INSTITUTE OF BRITISH ARCHITECTS, Library
5 books, 23 pamphlets

SAN DIEGO, CALIF. MAYOR
Balboa Park Citizen's Study Committee. Final report

DELOS H. SMITH, FAIA
"I freschi delle loggie Vaticane inventati da Raffaele Sanzio"

SMITHSONIAN INSTITUTION LIBRARY
50 books and pamphlets

FREDERICK TILP, AIA
"A Nation Builds"

HARRY B. TOUR, AIA
One magazine

VOORHEES, WALKER, SMITH & SMITH
"Ralph Walker, Architect"

H. H. WAECHTER, AIA
Three of his articles

Letters to the Editor . . .

EDITOR, *Journal of the AIA:*

I am finding the *Journal* so pleasing that I want to add a P.S. to the thanks I have already expressed.

I keep it on my desk at home and use it to get my mind off the day's work. I start at the first page and read till I am free, then take it up again the next night. Yesterday was a tough one. I came home as "tight as a tick." The marker in the *Journal* stood at the Archcrostic. It was so delightful that I went to bed completely relaxed. Thank you for publishing it and thank you again for the magazine.

CARROLL RIKERT
Supt. Buildings & Grounds
Northfield Schools
Mount Hermon, Mass.

EDITOR, *Journal of the AIA:*

Studies in the application of solar energy have resulted in developments in unusual fields. We note in the *Newsletter* of the Association for Applied Solar Energy that Giorgio Nebbia of the Universita degli Studi di Bologna, Italy is experimenting with a solar still.

If successful, a smokeless still of this type should give the revenooers pause.

JOSEPH A. SCHAUT
St. Marys, Pa.

EDITOR, *Journal of the AIA:*

Have we not reached a point where we can dispense with this free advertising constantly given to a few selected members of our profession in the pages of the *Journal*, in TV interviews, and in newspaper and magazine articles? It has reached a point of sickening proportions.

Under the title of "Chicago Dynamic" the January number of the *Journal* devoted six pages to pure drivel and double talk. Just what did this article get across to anyone? I doubt very much if the participants could or would attempt an explanation. Over and over again this rot is repeated. I am actually very sick of Shangri-Las and Mile High Buildings designed by a few architects for clients that never existed. While the public remains confused over these weird creations, publicity is gained by the architect. Perhaps the greatest confusion takes place in the minds of the younger members of the profession who have yet to discover the avenues they will choose to travel within the profession.

In closing, may I pass on a bouquet to John Van Pelt for his letter which you added to your January issue of the *Journal.*

ELLIOTT L. CHISLING
Hollywood, Florida

EDITOR, *Journal of the AIA:*

Sixty years of experience in the profession separate correspondent John Van Pelt's point of view (January *Journal*) from mine. Yet many of the perceptive remarks contained in his letter are ones with which I heartily concur, in spite of the fact that I did not, as he did, attend the Ecole des Beaux-Arts but rather received my education under the influence of Bauhaus principles and those of LeCorbusier.

As a relative newcomer to architecture I agree with Mr. Van Pelt when he writes that, ". . . the suggestion that such important rewards [as the AIA centennial medals] of merit could have been bestowed for anything other than attainment of the highest expression in the art of architecture, the most important of the fine arts, was a serious mistake."

He and I are of the same opinion when he states, "Today, from results, it would appear that many architectural firms are not dominated by great artists; in some one might conclude there is no artist involved."

I, too, am cheered by Edgar William's comment, ". . . the practice of architecture is more than a complex matter of business and technical knowledge. It is essentially a matter of spirit, of creative genius."

Where we do not share common ground, however, is when Mr. Van Pelt confuses the philosophy of the Bauhaus and other newer architectural movements with the mediocre abuses of that philosophy by various "architects" in the interests of expediency. Surely no one can seriously believe that the founders and teachers of these movements would for a moment rank New Orleans' new "curtain-walled packing case" equal to New York's graceful City Hall in architectural merit. The men of integrity associated with today's influential movements are even more disturbed, I'm sure, than the elder generation of American architects with the barren, ill-proportioned, unrefined monuments to bad taste which are rising throughout this country. To a sensitive architect, regardless of his generation or training, a work of architecture is judged on its own performance and not on the basis of whether it follows the "rules" of a particular school of thought.

In all styles of architecture there have been the sensitive creators and the charlatans. Time has erased the meaningless works from the scene in the past as it will erase today's in the future. When today's mediocrities and hoaxes are long since gone there will remain the works of Wright, Maybeck, Mies van der Rohe, Kahn, Johnson, Bunshaft, Pei, Paul Rudolph and others.

The talent is there; it remains for the citizenry to use it.

ELLIOT WILLONSKY
New York, New York

EDITOR, *Journal of the AIA:*

Bob Anshen called me the other day to ask if I knew how the camel got in the sad shape he is in. I didn't know so he informed me that he was a horse that had been designed by a committee!

Congratulations on the interesting January issue. When is Bendiner going to be recognized in the literary world as Bemelman's equal?

GEORGE COOPER RUDOLPH
New York, New York

The Editor's Asides

This will be an account of the Editor's busy month of January.

First of all, I spent the 6th, 7th and 8th in Philadelphia, attending a conference of association editors—two days of talks on the many problems of editing a professional publication, and an opportunity to meet other editors and talk over our common headaches.

But there was more to the trip than that. The first day I went out to the University. I can report to my fellow alumni who haven't been back there in twenty or thirty years that nothing has changed. That is, nothing has changed physically, but there has been a tremendous change intellectually. Things are certainly different from what they were in Popsy Laird's day! I went to have a chat with Louis Kahn, who has promised to write something for the *Journal*. I listened in while Lou gave a crit to a graduate student. Bendiner is right, Louis *is* a genius! At least, he is an inspired teacher. In talking to this boy, Lou used the word "glory." How long since we have been able to apply that word to architecture—of the present, that is? You've guessed it, Louis was talking about the past—the Baths of Caracalla—pointing out how much we can learn from a closer study of ancient buildings, not to copy their forms but to try to recapture the basic approach of their designers and their ability to create dynamic space magnificently enclosed.

I dropped in Al Bendiner's office, and nothing would do but that I come home for dinner, which I gladly did. Under the influence of good drink and good food, Al and Betty said "Let's have a party tomorrow night! Who are your old friends in town?" So we *had* a party, with good drink, good food and good talk. What hospitality!

On the 17th, the Washington-Metropolitan Chapter had a luncheon meeting featuring the *Journal* and honoring Henry Saylor. Henry outlined the checkered career of the Institute's publications, and introduced his successor. After my bow, the imported speaker of the day was introduced—none other than Al Bendiner again, who kept the company chuckling for a good half-hour.

On the 21st I took a plane for Kansas City, where I was to speak that night at the Annual Dinner of the local chapter and install the new officers. Well, that was the day of KC's "big snow." So my plane stopped at St. Louis and I spent seven hours going the rest of the way by train. Meanwhile I had found out by phone that the dinner had been postponed a night. The next day John Murphy, the incoming president, took me to see the exhibit at City Hall of KC/80, the Kansas City Chapter's magnificent plan for the development of downtown Kansas City, of which you will read more in the *Journal* later. Then Frank Slezak, the outgoing president, drove me through snow-banked streets to see the sights of the town.

The dinner was a success, despite the fact that half the members still couldn't get out of their driveways. A lively and public spirited group in KC, and a hospitable one.

On the 25th I went to Richmond to appear on a panel on architectural journalism at the annual convention of the Virginia Chapter, along with Tom Creighton, Dean Fitz Patrick of the University of Virginia and Dean Currie of VPI. The panel appeared to go off successfully, in spite of my contributions. The dinner dance in the evening was a great success, and the featured speaker was—guess who?—the ubiquitous Mr. B., who once more rolled his audience in the aisles!

The 28th and 29th I spent in the hospital, *not* driven to it by my dissipations of the month, but under orders for a long-needed check-up. This gave me plenty of time to reflect upon my recent experiences and to catch up on a little reading.

From the 30th through February 2nd, I attended some of the sessions of the annual meeting of the Society of Architectural Historians, of which I have been a card-carrying member for some years. Enjoyed some of the papers very much, especially one by Professor Walter W. Horn, of the University of California, Berkeley, "On the Origins of the Medieval Bay System." About twenty-five years ago, when I first started to make a serious avocation of the study of architectural history, I came across a book, "Origins of Christian Church Art" by Josef Stryzgowski. It stated the theory that the structural system of the Gothic churches of northern France had its origins in the wooden churches of Sweden. The theory was never taken seriously in view of the apparently obvious development of the system step-by-step from the Romanesque churches.

Now Professor Horn has come forth with a masterly study of the wooden barns, market halls and other secular buildings of France and England, of which there are many hundreds still standing which have never had scholarly attention, and advances the theory that the bay system of the medieval churches may have been determined by the then well-accepted practice of building wooden buildings in bays, rather than by a development from the barrel-vaulted Romanesque churches. He thus suggests that perhaps Stryzgowski ought to be re-examined.

After Dr. Horn's talk, Kenneth Conant told the audience that this was perhaps a history-making moment in the study of architectural history, because of the amazing evidence that Horn had presented!

The meeting concluded on Sunday with a six-hour bus trip in the snow, organized and led by Dr. Richard H. Howland, president of the National Trust. We saw everything from the apparently doomed East Front of the Capitol to the house FLW designed for his son in Bethesda. And we got home in time to see Sam Wilson, FAIA, on Dave Garroway's "Wide Wide World," talking about the Ursuline Convent in New Orleans, built in 1734.

All told, it was a busy month!

Materials of Construction:

their properties and methods of test

By ARCHIBALD T. McPHERSON
Associate Director, National Bureau of Standards

THE MAJOR ROLE OF THE National Bureau of Standards in the field of construction is that of measuring the properties of materials, both new and old, and providing methods of test. Properties of materials and methods of test are neither spectacular nor glamorous, nor does the layman even think of them when he views magnificent structures created by architects and engineers. However, the engineer knows full well that his designs must be based on detailed and reliable information about the materials he is using and that such information can be obtained only by accurate and painstaking studies carried on over a period of years. Likewise the engineer knows that the components of a structure must be tested before use so as to insure that each item will have the necessary strength, durability, and resistance to environmental conditions to serve its intended purpose.

The creative design and engineering we are discussing in this symposium does not have for its object the durability of the pyramids, or the beauty of the Taj Mahal, or the sleek, graceful lines of a yacht, but rather the mundane, practical, everyday objective of cost reduction.

If first cost were not a factor, construction practices would be very different. Consider, for example, the matter of roofs for buildings, which is a major problem of the Bureau of Yards and Docks. An ideal roofing material would have the following characteristics:

- It would be permanent and unaffected by tropical rains, desert sunshine and heat, or arctic cold, and internal moisture conditions.
- It would be flexible and easily worked so as to facilitate application.
- It would be a good conductor of electricity so as to carry away lightning strokes without setting fire to building.
- It would be fireproof and not destroyed by flames, even if building were consumed.
- It would have a pleasing color so that even the admiral's wife could not complain about exterior appearance of officers' quarters.

There is such a material! It has these and many other highly desirable characteristics. It could be guaranteed unconditionally for 10,000 years. Furthermore, the government now has a large supply in storage. This material has been used for roofing with complete satisfaction. One of the better-known installations is the Shwe Dagon Temple in Rangoon—with a roof of pure gold that is said to be ⅛ to ¼ inch in thickness.

This temple was built prior to 1564. It was destroyed by the earthquake of May 1930, and was rebuilt using the original gold for the roof. The building is 368 feet high and contains on the roof and elsewhere 25 tons of gold and 100 tons of silver.

Gold is scarcely to be considered by the Bureau of Yards and Docks as a roofing material, since the stockpile at Fort Knox is in the custody of the Army. However, for the purposes of the Temple, which the builders designed to last for untold centuries without blemish, change, or even tarnish, a roof of pure gold may well be the most economical roof.

This extreme illustration has been cited to emphasize the fact that true reduction in cost is brought about by designing a structure so as to give the intended service in the most economical manner. This sort of design can be done only if there is thorough knowledge of initial properties of the materials and of the manner in which those properties change with time and exposure to environment. Development of information of this kind is one function of the National Bureau of Standards, assigned to it by Congress in the basic act creating the Bureau.

The competence of NBS in its investigations on materials of construction lies in the breadth of its scope and its ability to bring to bear on any particular problem a variety of resources in physics, chemistry, mathematics, and engineering. Thus, for example, studies of transient heat flow during fires that were only highly empirical are being reduced to a science by close collaboration between fire-prevention experts and

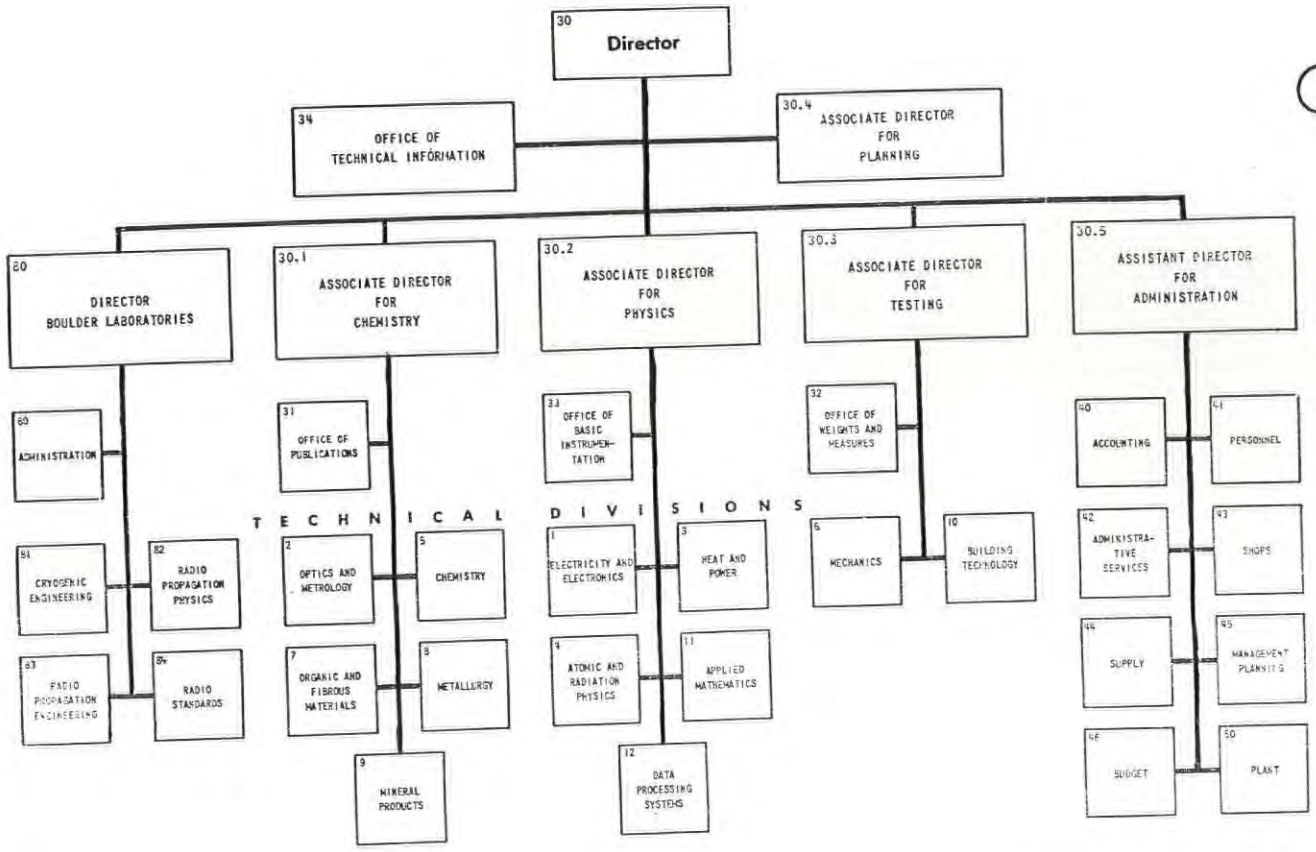


FIG. 1

mathematicians in a computer laboratory. The properties of asphalt, a highly important material of construction, are being studied in the context of research on fundamental molecular structure of polymers, since chemically, asphalt is a polymer and has much in common with other substances made up of large molecules.

The organization (Fig 1) of NBS indicates the number and variety of resources that can be brought to bear on problems relating to materials of construction. Much of the work in which you are interested heads up in the Division of Building Technology, but important materials of interest to this group are also dealt with by the divisions of Metallurgy, Mineral Products, and Organic and Fibrous Materials. Techniques and methods of test are contributed by other organizational units concerned with electricity, metrology and optics, heat, atomic physics, chemistry, acoustics and mechanics.

Reference has already been made to the computer services provided by the Division of Applied Mathematics. Another highly important contribution is made by the statistical engineers of this division. Through the development and application of probability mathematics, they have been of great assistance in design of experiments for measuring properties. Sampling and testing have been put on a rational basis. Through research at NBS and elsewhere on the theory of extreme values, the engineer's "factor of safety" need no longer be a "factor of ignorance" as it has sometimes been called. In every structure and every component of a structure there is a risk of failure. Different degrees of risk can be tolerated, depending on application. By extreme value mathematics it is now possible to calculate strength or design needed to reduce chances of failure to one in a hundred or one in a million—as may be called for by the application. Savings in cost through these techniques can be very great.

With this rather extensive introduction, consideration will now be given to some specific materials and their properties and methods of test.

PROPERTIES OF MATERIALS

Porcelain Enamel for Curtain-Walls

Use of porcelain enamel as a coating on steel curtain-walls is only one of several applications that has made use of the Bureau's extensive studies of the composition, properties, and methods of test of this material Other important applications include use of enamels as protective coverings of metal parts that are subjected to high temperatures in jet aircraft engines, chemical plant equipment, and stoves.

A ready method of obtaining a substantial cost reduction in large buildings is through use of lightweight curtain-wall construction. In such a structure the frame carries all the load and the wall merely serves to provide insulation and keep out weather. If walls are made of brick or stone masonry, the weight of the structure is considerably greater than if the walls are made of thin metal panels with a suitable thermal insulation sandwiched in between. Cost savings come in lower labor costs

and in reduction of weight of structural framework due to lower design loads.

NBS is not studying curtain-walls as such but is concerned with the properties of several materials that go into curtain-walls, including porcelain enamel on steel.

Selection of the most durable porcelain enamel is important in a building of this type. One of our groups at the Bureau has been studying weathering behavior of porcelain enamel for over 15 years. As a result of these studies it is now possible, by applying a simple laboratory test, to select an enamel coating that will maintain its initial gloss and color and also protect metal from corrosion for 15 years or longer.

A Bureau report describing this study is available.* One finding that should be of interest is that, unlike most materials, an enamel finish is just as resistant to salt air as to other types of atmosphere.

Joint-Sealing Materials

Buildings and most other large structures are made up of structural units of masonry, metal, or glass joined together and made weathertight by mortar, caulking compounds, gaskets, and the like. These sealing materials are often the Achilles' heel of buildings. The ruins at Martund in the celebrated Vale of Kashmir were once magnificent monumental buildings. The individual stones are for the most part undamaged and retain their individual shape and form. The action of weather, particularly frost and ice, on masonry joints is said by archeologists to have been the principal factor in wrecking the buildings.

NBS is starting an investigation of the properties of a new type of mastic for sealing joints in concrete, brick and stone masonry. The study will include development of laboratory test methods which will be eventually incorporated in a government specification.

This new mastic differs from conventional oil and synthetic-resin based plastic compounds in that it consists mainly of a synthetic rubber-based liquid without a volatile component. The base material is mixed with an accelerator immediately before application. The compound cures in the joint making solid rubber in about 24 hours.

For the past ten years polysulfide synthetic rubber-based compounds have been used by the aircraft industry for integral-wing fuel tank sealing. The compound proved effective by maintaining excellent adhesion to aluminum framework and by remaining flexible over temperature range of −65° to +180°F. It has also been used for several years to seal wooden decks of aircraft carriers.

Successful use of this type of mastic in aircraft has suggested its use as a joint sealer in masonry structures around windows, between panels, in curtain-wall and cast stone construction, for sealing flashing and expansion joints, and in any joint where some movement is expected and where air- and water-tightness is required. For the past few years polysulfide synthetic rubber compounds have been used by private industry in curtain-wall construction and to a lesser extent by government agencies in sealing concrete structures.

Some preliminary tests and observations already made at NBS on synthetic-rubber mastic indicate that its successful use in masonry will not be secured as easily as in its use on metals such as in the aircraft industry. For example, adhesion of mastic to porous masonry appears to be more of a problem than with glass, metal and enameled metals. Some other properties that will be studied and for which tests will be developed where necessary are cohesion, hardness, and durability at high and low temperatures, staining, color retention, shrinkage, viscosity, flow, and others.

Several samples of rubber-based compounds, including silicone and neoprene compounds, have already been placed in joints of an experimental concrete panel structure where mastics will be observed in actual service.

METHODS OF TEST

Fire Resistance

Fire is an ever-present hazard to buildings and their contents. For some types of occupancy the degree of hazard may dictate selection of materials and type of construction. Around the turn of the century engineers spoke quite confidently of fireproof construction. The great Baltimore fire and similar experiences led to an understanding that it is not enough to make structural elements of a building from fire-resistant materials. Trim of a building and contents are also important.

When new materials of construction are under consideration, too often the effects of fire exposure are thought of only after all other development work has been completed. In many cases this may seriously limit acceptability of a construction to building and code officials. In the government there have unfortunately been occasions where large production contracts have been let and constructions produced before serious consideration was given to possible fire hazards involved. This is partly a result of the great difficulty of predicting results of fire exposure when construction is in the preliminary planning stage. However, estimates can be made of fire endurance of structures and efforts are continuing at the Bureau to improve techniques of making these predictions, by providing engineering design data and recommended techniques for their proper use.

Acoustical Properties

Another property of new materials and new types of construction often overlooked at design stage is transmission of sound. Nearly everyone is familiar with apartment houses in which acoustical properties are such as to create an objectionable sound level and invade privacy. Many are also familiar with auditoriums in which lack of adequate acoustical design and planning have necessitated expensive alterations before the auditorium could be used.

Measurement of sound absorption by materials and transmission of sound by various floor and wall

* Fifteen-Year Exposure Test of Porcelain Enamels (BMS 148) by Dwight G Moore and William N Harrison 1957 (Supt of Documents, US Government Printing Office, Washington 25, DC 15c)

constructions is difficult and expenposedly identical measurements made ficant discrepancies between supsive, and there are sometimes signiin different laboratories. The Bureau is actively working toward development and acceptance of standard methods of test that will eliminate these differences.

Ignition by Lightning and Static

Increasing use of metals in construction introduces fire hazards from lightning and also from induced static discharges between metal components, including metal-foil insulation. Tests made of an ungrounded metal-roofed structure show that considerable structural damage can result when lightning strokes go to ground through the structure. When metallic siding is used and is not bonded to the roof, sparks jumping from roof to sides can ignite such materials as hay and straw which may be stacked under such a roof. Roof should be carefully bonded to metallic siding and siding should be grounded at several points where such combinations are used.

Foil and foil-coated thermal insulation are being widely used for home building—behavior of such materials when lightning strikes buildings is now being studied. It has been found that a sheet of foil one mil (.001") thick and 16" wide will carry enough current to start a fire in combustible material. Tests are now being made to determine how such insulation may be effectively and economically grounded.

Test Methods for Underground Pipe Systems

While the Federal government suffers substantial losses from fire, even larger losses result from corrosion of metals, rotting of wood and thermal insulation, and other forms of deterioration. The Bureau has given particular attention to problems in connection with underground piping.

Several million dollars are spent annually by the Federal government for new underground steam and hot-water distribution systems and for replacement of systems that have failed. In the past, heat loss of underground piping has been computed on the basis of measured thermal conductivity of dry insulating materials, whereas it is now known that the insulation of many underground pipes is damp periodically or continuously in service. Moisture is the principal cause of underground-piping system failure. Moisture may remain in insulating material after being prefabricated in the factory or applied in the field—insulation may be wetted during installation because of inclement weather; or vapor-barrier materials may deteriorate in use and permit water to enter insulation. Explosions have occurred which have completely wrecked portions of an installation when steam was admitted to a system with wet insulation surrounded by a relatively tight jacket.

An apparatus has been designed at NBS for measuring heat loss per unit length of a section of insulated underground piping under conditions simulating those in service. A 14′ section of piping is mounted along longitudinal center line of a box 4′ wide, 12′ long, and 4′ deep and pitched slightly toward outlet end. Center third of specimen is isolated by internal baffles as a measuring section and end sections serve as guards to provide radial heat flow from the measuring section. Dry steam at a controlled temperature is admitted to the pipe and condensate from the measuring section and guard sections is collected separately and weighed. Pipe is surrounded by earth in a typical test and water-table can be established and maintained at any level from 2′ below to 2′ above center line of pipe by means of standpipes near the test specimen.

This apparatus has revealed that some poured insulations never dry out underground, that some systems do not exclude ground water from hygroscopic insulating materials, and that some materials crack and permit water to reach steam piping. Actual heat loss per unit of length of an underground system has been found from these studies to be several times that computed from thermal conductivities of dry materials. It has shown that water penetration is the principal cause of failure of such systems and that adequate moisture barriers are the chief design problem in present practice. Information developed should result in better specifications for underground insulated piping systems, a better correlation of system design and terrain where it is to be used, and development of materials and methods that will reduce the number of failures in underground steam and hot-water piping systems.

Cathodic Protection

Cathodic protection is the method whereby ferrous structures are protected against ravages of corrosion by application of direct current. While most general application is for underground oil and gas transmission lines, it is finding increased use for underground steel-structural members of buildings and for water-heating and storage tanks. In the latter case protective current is supplied by magnesium, zinc, or aluminum anodes, providing a galvanic cell in which steel will be protected and less noble metal corroded. In the cases of underground structural members and transmission pipe lines, current is supplied through rectifiers and ground beds of suitable materials. Although bare pipe can be protected from corrosion by this method, cathodic protection is ordinarily used in conjunction with protective coatings to reduce the current required. Applied current will prevent corrosion caused by permeability of the coating and loss of its adhesive properties with age.

The role of NBS in research pertaining to cathodic protection has been directed chiefly to study of criteria for determining current density required for complete protection. Bureau research has shown that steel in soils varying in pH between 2.9 and 9.6 can be protected against corrosion by maintaining steel at an electrical potential of —0.85 volt measured between steel and a copper-copper sulfate reference cell. The Bureau provided a theoretical basis for this potential, use of which previously was based on empiricism. Bureau studies have also shown that current required to achieve the protective potential of —0.85 volt can often be determined from the charac-

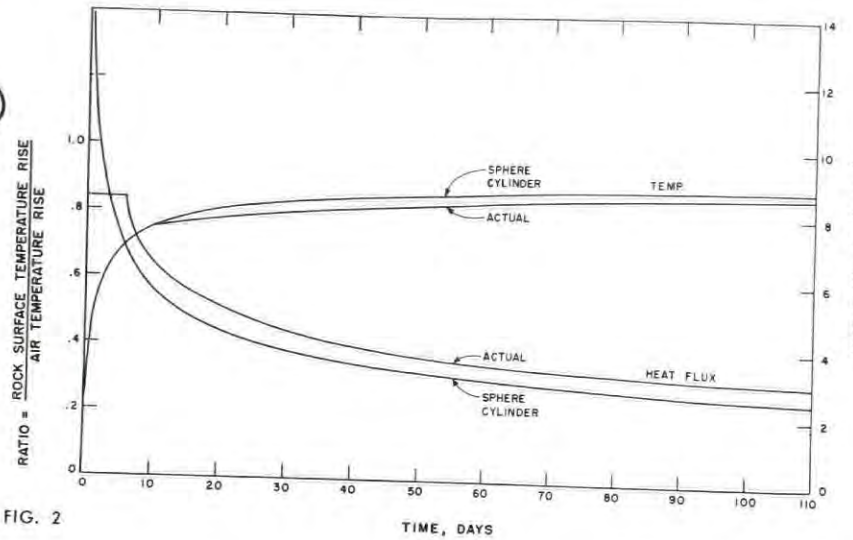


FIG. 2

teristics of cathodic polarization curves obtained by applying increasing linear increments of current to the structure in question.

Measuring Cooling Load of Refrigerated Structures

Problems of moisture in relation to heat transfer occur in refrigerated structures of all kinds, and nowhere are they more troublesome than in refrigerated trailer trucks where weight of water condensed in thermal insulation not only impairs insulating efficiency but also may reduce legal pay-load of the truck by several hundred pounds.

In investigating this problem, Bureau scientists have developed a method for measuring cooling load of refrigerated structures. Conventionally, heat transmission of refrigerated enclosures, such as warehouses and trailers, has been measured by releasing heat at a known rate inside the enclosure while controlling the ambient temperature around the structure until a steady state is reached. This method is simple but it involves heat flow in the reverse direction—it usually is carried out at a higher mean wall temperature than that occurring in use of the structure—and it does not reflect the effect of movement of water or water vapor in insulated walls. A metering heat-sink method has been developed at NBS for measuring cooling load of refrigerated structures while operating at normal temperature differences and reflecting any heat transfer caused by air and moisture leakage into insulated space. Method involves circulating chilled brine through a cooling coil in the refrigerated structure and an external calorimeter in series. Temperature changes produced in brine by the cooling coil is compared with that due to a measured electrical heat input to calorimeter. These data enable calculations of refrigerating effect of the cooling coil with selected temperature conditions inside and outside of the refrigerated structure. This test will facilitate design and development of improved insulated structures for various ranges of temperature.

Heat Transfer in Underground Structures

One of the newest types of permanent constructions that has only recently been exploited on a large scale is one of the oldest known to man. Caves of the Paleolithic period have been found in such an excellent state of preservation that even the walls do not need redecoration.

As you know, with rock of a suitable type, it is possible to construct large underground structures at a cost not greatly in excess of conventional construction above ground designed for equivalent stability of temperature throughout the year. The original cave dwellers no doubt found their homes unpleasantly cold, damp, and poorly ventilated. The Bureau has made both theoretical and experimental studies of heating, cooling, and air conditioning of underground structures.

A mathematical analysis of heat transfer between underground chambers and surrounding rock has recently been completed with the aid of the Bureau's computational facilities. Subsequent experiments in an actual underground room have confirmed the accuracy of general mathematical solutions for simple cases of an infinite cylinder and a sphere and have provided correction factors for representative shapes. Room used was 100′ by 35′ by 10′ in dimensions and was located a few hundred feet underground. Thermal properties of rock were determined by accurate measurements at the Bureau. Within the chamber 385 thermocouples were installed in the air, on walls and in rock at depths up to 12′. Heat was supplied electrically to maintain air temperature at 75°F and measurements of heat supplied and temperatures in the rock were continued for 110 days. The temperatures at different depths in the rock at the end of this time are shown in accompanying graph.

Cement and Concrete

Because of the importance of cement in construction of dams, locks, and other permanent structures, as well as highways and airstrips, NBS has conducted extensive investigations over a period of many years on composition, properties, and methods of test.

Chemical Analysis: Because chemical analysis has been a slow-time-consuming, and exacting operation, the Bureau is engaged in exploratory work toward developing x-ray fluorescence methods for analyzing Portland cement for acceptance purposes. Very recent developments in improved instrumentation make this line of attack appear quite promising. Development of better analyzing crystals and methods of bending them to concentrate x-rays, more sensitive counting devices, and pulse-height discriminators now make it possible to determine elements of atomic numbers as low as 12 (magnesium). For some time x-ray fluorescence methods have been in use for determination of elements of

higher atomic numbers by manufacturers of steel and other alloys—for chemical control of production. We have some evidence that precision of the order of about 2 parts in 600 can be obtained in determination of calcium in cement by x-ray techniques—which is about as good as can be done by the use of present chemical methods. We believe that other common elements can also be determined by this means. Preliminary estimates indicate that two or three people using this method could do the work now being done by about twelve people, and results would be available sooner. This speeds up acceptance of cement in addition to reducing cost to government agencies for whom we test.

Accelerated Measurement of Drying Shrinkage: In another project the Bureau has recently completed pilot test methods which would reduce by a factor of 5 to 10 the length of time it takes to measure drying shrinkage of concrete masonry units at room temperature. Method consists of removing a lamina about ⅜" thick from end of a masonry unit at a right angle to the face shell and measuring length changes with a Whittemore strain gage. The method is indeed promising and good agreement has been achieved between whole units (which require between 30 and 60 days of test) and thin laminae for autoclaved units of three different types of aggregate (which require about 6 days of test).

Evaluation of Cracks in Concrete at Surface of Reinforcing Steel: It has also recently been demonstrated in the structural engineering laboratories of NBS that modern deformed reinforcing bars will aid in reducing the width of crack at the interface between steel and concrete in addition to reduction of width and spacing of cracks at surface of concrete. This was demonstrated by means of tensile bond specimens designed to simulate a portion of the tensile zone of a reinforced concrete beam between two successive cracks. Application of these deformed bars, therefore, should provide for superior durability and greater strength.

UP-TO-DATE BUILDING CODES

Materials of construction can hardly be discussed without turning to regulations which govern their use—namely, building codes. The Bureau participates in three phases of work on codes:

- It develops technical information on which certain codes are based.
- It serves as sponsor for a number of codes—important ones at present are National Electrical Safety Code, Code for Protection Against Lightning, and American Standard Building Code Requirements for Masonry.
- Most codes that the Bureau sponsors are made broadly available through publication as government documents. The Bureau's responsibility for a code ends with publication. It has no authority to enforce observance of codes, and does not even actively support their adoption by other government agencies.

A great deal has been said and written about shortcomings of building codes because of their restrictiveness in regulating use of some materials and because they adversely affect construction costs. Because codes are written in the interest of public safety and health, they must restrict and even forbid use of certain materials and they must require certain minimum amounts of materials—all of which cannot be done without incurring some resentment and also affecting cost of construction. Probably there never was a time when interest was keener or activity greater in development of improved building-code requirements and in their uniformity.

Today, when new materials and new methods of construction are brought forth so rapidly, it is a difficult task for those logically responsible for preparing building codes to keep abreast of the times. A building code can become obsolete or outmoded very rapidly today if the authorities have not taken steps to make use of ever-increasing amount of information about the properties and uses of materials.

In the light of present-day knowledge, it is no longer necessary for new materials and methods of construction to await their turn and be approved only after long and rigorous trial. By accepted test methods, it is possible to tell fairly accurately what may be expected of a given element of a structure under certain conditions and to investigate new materials in a way that will determine without long delays whether they are capable of doing what is claimed for them. Thus, performance standards can be developed and laboratory tests can provide the information upon which acceptance or rejection of a material may be based.

TECHNICAL NEWS

the joint committee of the AIA & the producers' council

The Committee held a Meeting in Oberlin, Ohio, January 9, 1958, at which the following were among the subjects considered: The Modular Building Standards Assn., Informational & Educational Films for Architectural Schools, Adult Education & Informational Meetings, Second Conference on Guaranty & Maintenance Bonds, The 1958 Building Products

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SCHOOL PLANT STUDIES

School Plants In Emergency and Disaster

Walter Rein, AIA

- WHY SHOULD ARCHITECTS LOOK INTO THIS PROBLEM?
- THE DANGER
- HOSPITALS AT A MOMENT'S NOTICE
- CLASSROOMS
- TEACHERS' WORKROOMS
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- SHOP BUILDINGS
- HOMEMAKING CLASSROOMS
- CAFETERIA
- WAREHOUSE
- WATER WELL
- PLANNING AT LOCAL LEVEL
- WHO PAYS?

NOTE:

THIS IS THIRTIETH OF A SERIES OF PAPERS PREPARED BY MEMBERS OF THE AIA COMMITTEE ON SCHOOL BUILDINGS, & BY SELECTED SPECIALISTS, TO MAKE LAYMEN AWARE OF SCHOOL BUILDING PROBLEMS & TRENDS & TO STIMULATE DISCUSSION. THEY ARE NOT INTENDED TO BE DEFINITIVE LAST WORDS & CARRY ONLY THE AUTHORITY OF THEIR RESPECTIVE AUTHORS. THE SERIES WILL BE EDITED BY THE COMMITTEE & ISSUED BY THE AIA DEPARTMENT OF EDUCATION & RESEARCH UNDER SPONSORSHIP OF THE AMERICAN ARCHITECTURAL FOUNDATION. MANY NEW SUBJECTS ARE BEING WORKED ON & CONTRIBUTED ARTICLES ARE WELCOME. WIDE-SPREAD DISTRIBUTION TO LAYMEN & EDUCATORS IS MADE OF THESE NON-TECHNICAL ARTICLES IN REPRINT FORM.
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SCHOOL PLANTS IN EMERGENCY AND DISASTER

by Walter Rein AIA

EVEN SUPERFICIAL INVESTIGATION of a modern school plant indicates easy conversion into an efficient disaster emergency reception center or hospital. Those features which are not identical or similar, or which a hospital would require but not a school, are readily adaptable from facilities usually available in school plants. This approximation could be made even closer *if we would but plan new schools for emergency service from the start.*

As a rule, a school plant consists of groups of buildings arranged according to use—central, peripheral, or in a finger plan. At least classrooms proper are connected with one another, as the local climate requires, by covered or enclosed walls or corridors, usually between 6′—10′ wide.

The different facilities could be transformed easily to serve emergency needs if a few specific requirements were incorporated in school plans.

WHY SHOULD ARCHITECTS LOOK INTO THIS PROBLEM?

Architects have a contribution to make to civil defense and effective preparedness for emergencies of all sorts. Civil defense information sheets issued by FCDA and the US Office of Education recommend consultation with school engineers (who service heating plants) and with school nurses on planning of school shelters and emergency hospital facilities. Architects would be equally well, if not better qualified to help. The AIA Hurricane Committee is already working on programs of operation for disaster relief rendered by our schools whenever disaster strikes, in flood, earthquake, tornado, hurricane, explosion, or fire. It seems obvious that scope of this committee should be extended to include civil defense.

THE DANGER

In 1955, when bombs were far less destructive than those of today, when neither sputniks nor ICBMs were a reality yet, a number of official information sheets were issued emphasizing necessity of preparing for mass exodus of urban populations in case of an attack warning. At that time it was reported that a test bomb explosion had made a crater 175′ deep and that at a distance of 15 miles from ground zero people would require fallout-proof, shelters in order to survive.

Only a few months ago, many of our citizens would still have discarded as far-fetched the view that we are exposed to nuclear attack—not any longer. All of us are now aware of powerful technical possibilities in the hands of our adversaries.

According to FCDA, an attack releasing just under 400 megatons (400 million tons) of energy would result in an estimated 40 million casualties, with 16 million killed the first day. 2,500 megatons would kill an estimated 104 million people. Clearly, planned mass exodus would be a futile undertaking. The new situation calls for new analysis.

Researchers at the large Naval Radiological Defense Laboratory point to the fact that there is no way to "run and hide," that shelters and rehabilitation facilities are the only answer—without alternative. This was again emphasized recently by Dr Edward Teller and Dr Vannevar Bush who spoke before the Senate Preparedness subcommittee. Dr Teller used the expression "passive defense" when he stressed need for shelters and for preparatory steps to restore the country physically and economically after a nuclear attack.

It is clear that these serious warnings mean that we have to get ready for the worst and should not expect that an enemy would waste his efforts with anything but his most destructive weapons. This is the view also of the Naval Radiological Defense Laboratory and civil defense administrators share it.

Shelters designed to save people under nuclear attack are quite different from bomb shelters which some of us may have seen or used during the two world wars. They now have to afford protection against possible injury from blast, heat, light, initial radiation, and radioactive fallout.

Modern bombs, according to Air Force Secretary Quarles, destroy everything within a 12 mile radius, cause serious damage for 40 miles, mass casualties from radiation for 90 miles and dangerous radiation for 175 miles around. There is no fleeing from these effects anymore. It would seem to be a wise precaution and an excellent investment if our new schools as well as other public and semi-public buildings were equipped with adequate shelters.

It is assumed that such an initial attack would take such proportions as are thought to be required to knock out our country in one big swoop. Schools in those areas which were spared would be commandeered and would become centers and gathering places for survivors from stricken areas. Therefore, schools ought to be prepared to care for everyone possible.

Oceans have ceased to be barriers against destructive attacks by an enemy equipped with ICBMs, U-boats, supersonic planes, and H-bombs. We are now more open to enemy attack than, say, Belgium was to German attacks. It is one of the most unpopular task of community leaders to keep unpleasant realities before the eyes of the public and to promote measures of precaution and preparation *before* any type of disaster strikes. Working for precautionary measures is, however, not without rewards. It is gratifying to restore in our fellow man some feeling of security by creating visible and tangible manifestations of readiness and preparedness, thereby directly improving his health and well-being. Architects can make important contributions in this extension of their public professional service.

The problem of preserving human lives and reducing human suffering under H-bomb attack has been approached from various angles. Plans

for evacuating entire urban populations upon alarm or warning must be discarded as unrealistic. Neither means of transportation nor roads populations would have to travel over are available for a mass flight—nor would there be time to flee far enough, since radius of destructive force has increased with size and kind of bombs. Actually, loss of life might be increased many times by the fact that the masses of people on clogged roads—within a diameter of 350 miles from explosion—would be entirely unprotected and exposed to radiation. The old recommendation to duck into a ditch must be termed almost naive in the face of radiation and fallout dangers. The whole evacuation concept has been shattered by Senator Dirksen's recent revelation that our elaborate Distant Early Warning Radar System (DEW line), just completed at tremendous expense, will not detect missiles in time.

The idea of defending a city has also been abandoned as hopeless in the face of modern means of destruction. Our forces will attempt to intercept projectiles on their way, before they reach their targets. Beyond that, we must try to protect human lives by shelters, and to restore some semblance of bearable living conditions after destruction of accustomed environment. To this end, our schools should logically be enlisted and prepared.

While totalitarian countries can enforce construction of ample shelters as a condition of building permits, we prefer to rely upon voluntary cooperation. To stimulate such cooperation is one of our pressing tasks—leadership is needed. If we do not provide for disaster relief ahead of the disaster, there will be no relief.

In a community located within the effective radius of an atomic explosion, merely saving lives would not do. When the time comes that the fires have been extinguished, the radiation has sufficiently abated, and the survivors could venture to dig themselves out from their shelters, they would all be in need of care. Many would be sick or injured, and the whole population would be indigent, helpless, destitute, by destruction or poisoning of water supply, food, clothes, and shelter. Decontamination would top the list of their immediate wants. Radiological contamination of large areas would reduce availability of local resources and facilities. Recovery, testing, rehabilitation, and decontamination will become an immediate and paramount problem.

At that moment, disaster centers, ready and equipped to furnish water, clothes, food, and shelter would be true blessings. Hospitals, *empty* hospitals, to minister to sick and injured, would be invaluable. There would not be one person among all who had been able in that extremity to save their skins, who would hesitate to give any of his earthly possessions for a ready-made receiving center open to him.

Existing hospitals, insufficient in peacetime, could not meet sudden emergency needs of mass casualties. To add to this dilemma, it must be assumed that hospitals situated in an attack area would be obliterated along with all other structures. H-bombs are non-selective.

Our school boards could well seize the initiative by insisting that their schools incorporate at least a minimum of preparatory measures which would make schools suitable emergency hospitals and receiving centers in times of disaster. Architects, when studying plans, would find that a large number of preparations listed below could be incorporated without curtailing requirements of school construction program proper. Such incorporation of facilities for the school's second duty will not lead to record low cost figures per square foot of school plant, or per student, but the well-being of the community as a whole should be a paramount responsibility—achievement of some record low cost figure a secondary consideration.

Measures preparing the school for service as a disaster relief center would make the school still more important to the community, would further more intimate relations between school and community. Community organizations should be invited to visit the school plant, to inspect its facilities and preparatory measures, with the aim that members of the community should become thoroughly familiar with them in order to be able, if necessary, to take over certain emergency functions.

HOSPITALS AT A MOMENT'S NOTICE

Modern school plants should be prepared to provide:

- shelter and cover with filtered ventilation
- capabilities for feeding, housing and care of hungry and homeless
- casualty care, first-aid station
- emergency hospital care
- medical supplies, water, blankets, clothing
- health and sanitation requirements
- fire protection
- decontamination
- family rehabilitation, counsel, referral

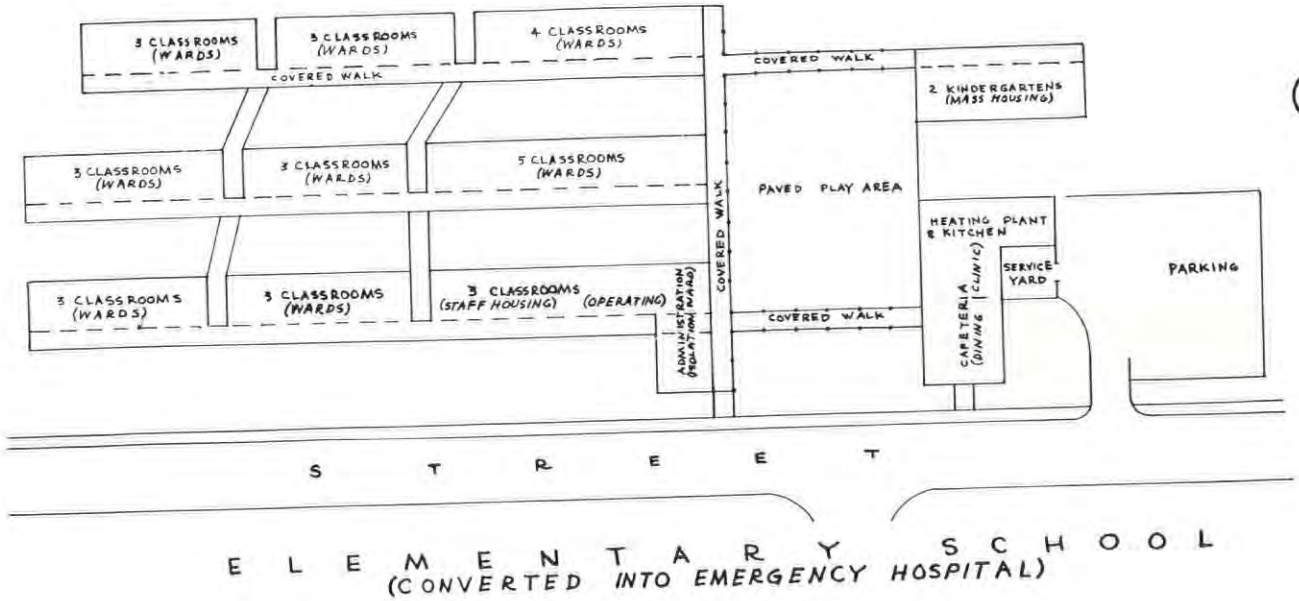
Far more than mere shelter is ready at hand in our school plants, if we will but recognize potentialities.

CLASSROOMS

Obviously, academic classrooms would make most comfortable *wards*. Heating, ventilation and lighting are efficient, floors and walls are hygienic, acoustical treatment reduces noises, colors are restful and pleasing, there are often drinking fountains in the classrooms or nearby, and ample toilet facilities. Many classrooms are even equipped with blackout curtains, now used during periods of audio-visual education. Stretcher bearers could well negotiate normal 36″ wide classroom doors—for wheeling beds in and out of wards, a door width of at least 40″ would be preferable.

TEACHERS' WORKROOMS

Some school plans show teachers' workrooms or offices between classrooms. From these rooms, teachers can watch adjoining classrooms through glass panels. These rooms are often equipped with a sink and counters with cabinets underneath. Naturally, these workrooms would become ideal *nurses stations*. In the cabinets, blankets, linen, pillows, sterilizers, drugs, splints, and many other items which a nurse must have



at hand could be stored. If room has telephone or speaker connection with administration area, as they often do, so much the better.

Where school structures of more than one story in height are considered for auxiliary use as wards, there should be an elevator of sufficient size to allow for a stretcher or bed with two attendants. *Service elevators,* often planned for such buildings, could be dimensioned and located accordingly—which may make them more efficient for either task.

COVERED PASSAGES

Covered passages between buildings obviously facilitate conversion. Walks could be used, of course, to move patients from one building to another, for instance, between ward and operating suite. Walks would also enable doctors, nurses, stretcher bearers, and ambulant patients to get around in any weather without exposure, as well as facilitate distribution of food by carts.

HEALTH CENTER

Most schools have a health center, either in a separate building or in a wing, often near administration. In larger schools, such a health center often consists of a reception room, a nurses' room, restrooms with cots for boys and girls, toilet rooms, and at least one treatment room with good-size storage. Sometimes, there are additional doctor's and dentist's rooms. Restrooms are usually arranged in such a manner that nurse can watch both rooms from her desk through glass panels. Those rooms would make *isolation wards* providing real safety from cross infections or spread of contagion.

Other rooms of health centers will be found suitable for conversion into *operating suites*—size and general layout permitting. These rooms, too, should be planned from the start for both purposes and should be equipped with proper utility connections. It will be found that installations required for possible limited operating suites will be just as usable for health center's normal functions.

ADMINISTRATIVE OFFICES

Administrative offices would probably continue to be used for their original purpose, or at least some of them, to accommodate reception center or *hospital management*—their built-in facilities would be just right for either purpose.

CAFETERIA, MULTI-PURPOSE ROOM

All persons housed at reception center need food in addition to clothing and shelter. It will be a tremendous load on cafeteria and the homemaking kitchens to prepare and distribute this food. Cafeteria must be expected to work around the clock and should be planned accordingly, especially storage areas.

MEETING ROOMS

In some schools, there are rooms for parent-teacher meetings, lounges for teaching staff and other accessory rooms, usually with lavatories, toilet facilities and conveniences for preparing snacks. These suites could be used to house *medical staff.*

SCIENCE CLASSROOMS

For an emergency hospital to function properly, a *pharmacy, laboratory, pathological examination room,* and *morgue* would be desirable. With some planning, these facilities can be satisfactorily contrived in our high schools from biology, physics and chemistry classrooms without too many extra installations that would not be required for classroom use proper.

SHOP BUILDINGS

Wood, metal, auto, and radio shops of the school are vital for a disaster center and hospital. Importance of metal and woodworking shops for maintenance and repair work is obvious. It would be up to auto shop to keep ambulances in good repair, while radio shop would keep radio communications open. A 2-way radio station would be found a great blessing—since the flood disaster they are now standard in New England hospitals—and they have obvious educational possibilities.

An auxiliary power plant or an emergency generator, available in

many schools, would be essential, as the normal power supply cannot be expected to be available in such an emergency as we are preparing for.

SHOWER ROOMS

These large showers, usually near gymnasium, will prove to be of highest value for decontamination of multitudes of people who were exposed to nuclear facilities.

HOMEMAKING CLASSROOMS

These classrooms contain housekeeping, sewing and cooking equipment and can serve well as diet kitchens, nurseries, even maternity wards, laundries, and manufacturing shops for clothes and bed linen.

AUDITORIUM, GYMNASIUM, MUSIC OR DRAMATIC ARTS BUILDINGS, SPORTS FIELDS

If such facilities are available, they will in all likelihood be used to augment other facilities to house those multitudes of refugees from disaster areas who, after having been decontaminated and provided with clean clothes, may not be in immediate need of medical attention but are destitute and homeless.

Probably, tents or barracks will have to be erected on sports fields and play grounds to house those who have no place to go.

WAREHOUSE

Storage is one of the biggest problems. The school warehouse, if there is one, will as a rule prove too small. Sufficient storage facilities are one of the critical items which would have to be planned just for the second—emergency—duty of the plant, unless a centralized warehouse is maintained by the school district somewhere nearby.

INCINERATOR

School incinerator would safely dispose of all combustible waste not emanating dangerous radiation.

WATER WELL

A very critical item in any disaster will be water supply. Water is vital for survival, but normal supply will, in all likelihood, not function or water may be poisoned by flood, fallout or chemical warfare. For this reason, every school plant should have its own, independent water well and pump system to provide at least one source of potable water in the area. Such installations pay for themselves, even though the emergency for which we are preparing may never occur. In the New England floods, hospitals were served with fresh water by tank trucks—but no means of connecting truck to plumbing was available—this would be an easy provision to install in a school.

DRIVEWAYS, PARKING

Driveways planned to carry school buses or supply trucks, are fully adequate to carry ambulances. Storage of spare parts and automotive fuel is one of the problems for which a solution must be found.

PLANNING AT LOCAL LEVEL

By necessity, foregoing suggested uses of existing school facilities for emergency hospitals and receiving centers can be only an outline and do not present a complete program. Neither is this the place to go beyond such generalized suggestions, nor would wide variation in school plants and their physical makeup permit statement of rules which could be followed by the majority.

We hope to have shown, however, that school plants can readily be made into self-sustained islands of assistance and service. There may be more buildings or fewer—they may serve different purposes or may be combined and laid out in various ways suggesting quite different solutions for emergency use. For this reason, a recipe for conversion planning would be of little value.

Such planning can only be done at local level. If possible, the architect who planned the school in the first place, if he has experience in hospital requirements, should be entrusted with conversion planning.

If the school is still on the drafting boards, the architect in charge will know best whether his experience in hospital planning is sufficient or whether he should call in a hospital expert. It would be folly, indeed, if we should fail to make these relatively few and simple preparations.

The wisdom of designing our new schools with their emergency function in mind can hardly be overemphasized. Double function design should be made mandatory for all new schools.

WHO PAYS?

Funds might be spent, in numerous ways, were they available, for our children's education. Those districts which can still finance their schools by bond issues, may find it easier to convince the electorate of the desirability of the school if the plan provides for tangible disaster relief and protection for the population in addition to teaching facilities for their children. If the people can be made to understand that their money will pay off doubly, will serve two different purposes, will buy two commodities at almost the price of one, that the buildings erected with the funds will serve double duty, they may be more inclined to vote in favor of a school bond issue.

The states, hard pressed to finance school buildings in districts which have exhausted bonding capacity, have so far been unable to finance anything but traditional essentials.

Federal aid for school construction, if it had been adopted by Congress, might have been another way to finance a conversion program because financing disaster aid is a federal responsibility:

- Public Law 875 provides for continuing means of assistance by the federal government to states and local governments to alleviate sufferings and damage resulting from major disasters
- Public Law 134 provides for donation or loan of surplus federal equipment and supplies to states for use or distribution by them under Public Law 875.
- Public Law 107 authorizes federal assistance in providing temporary housing or other emergency shelter for disaster sufferers.
- Public Law 480 provides for making maximum efficient use of surplus agricultural commodities
- Executive Order 10427 of 16 Jan 1953, provides that the Federal Civil Defense Administration, acting on behalf of the President,

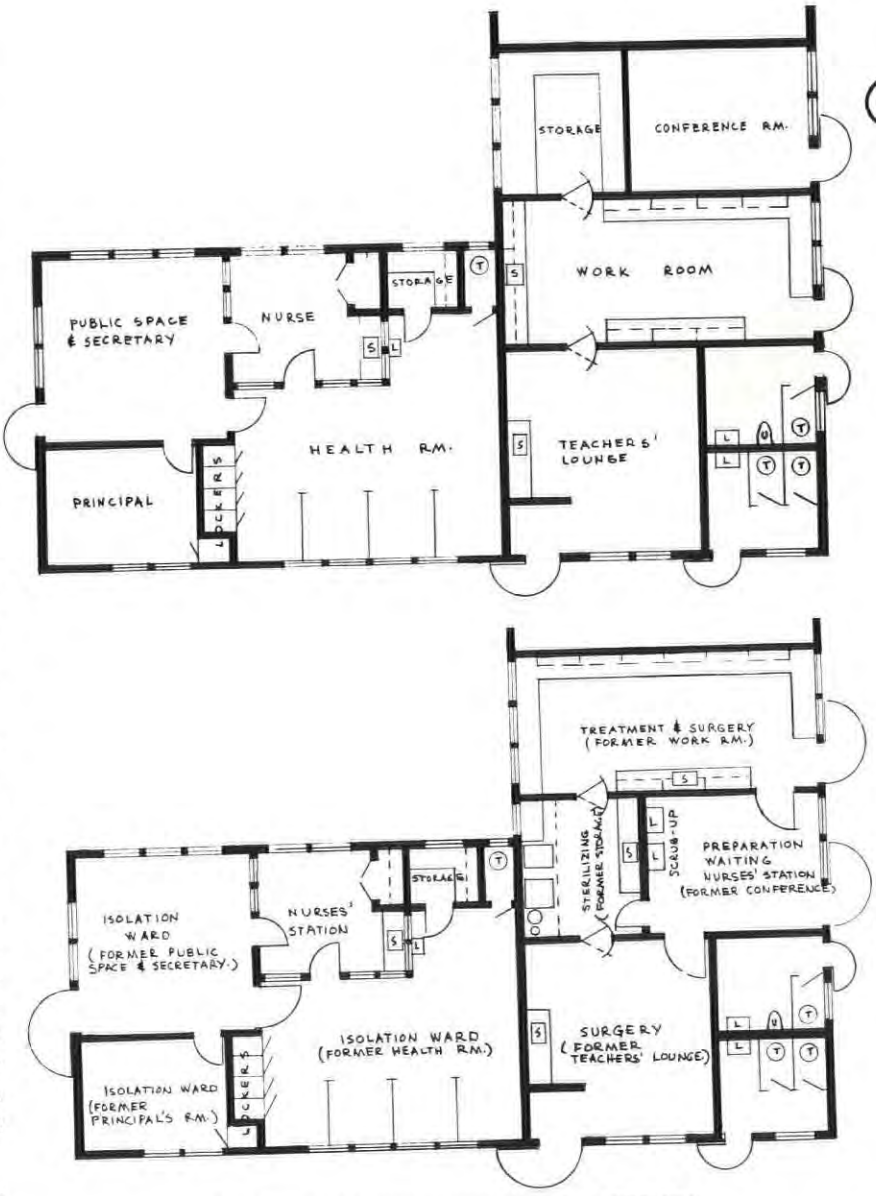
shall direct federal agencies to provide assistance in major disaster.

CD Information Sheet 31 * lists among the duties of CD wardens to "help set up improvised camps, assist in emergency feeding, lodging, registration, first aid, decontamination, and caring for dependent persons and children at assembly and reception areas or other encampments."

Therefore, to get federal funds allotted for the purpose of preparing our schools for emergency hospital and reception center duty should be possible under existing legislation since a comparatively small expenditure would bring a large return, not only in progress in a sadly lacking development, but also in the great emotional value of restoring a certain feeling of security, a reassurance that our government is doing something effective to protect us from the residual and perhaps worse consequences of an enemy attack.

So far, civilian protection is wanting to an alarming degree. The President is said to have now under consideration a civilian shelter program costing $22 billion over a 10 year period. Here seems to be a step in the right direction. Part of this money, once available, should be coupled with a program as outlined above to mobilize and prepare our schools for their second duty as emergency hospitals and support centers.

* *The role of the warden in the H-bomb area.* 1955. (Supt of Documents, US Government Printing Office, Washington 25, DC 5c)



SCHOOL PLANT CONVERTED FOR DISASTER USE

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Engineering bulletin no SE-219
The Charter Corporation
West Conshohocken, Pa

Engineering bulletin no SE-220
Tanasee, Inc
P O Box No 66
Alcoa, Tennessee

Engineering bulletin no SE-221
Hillcrest Homes, Inc
Salina, Kansas

supplement to engineering bulletin no SE-149—dated 5 October 1950
American Houses, Inc
S Aubrey & East South Sts
Allentown, Pa

supplement to engineering bulletin no SE-174—dated 2 June 1953
The Thyer Manufacturing Corporation
2857 Wayne Street
Toledo, Ohio

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National Homes Corporation
Lafayette, Indiana

supplement to engineering bulletin no SE-206—dated 16 April 1956
United States Steel Homes, Inc
Charlestown Road
New Albany, Indiana

supplement to engineering bulletin no SE-204—dated 5 March 1956
Ivon R Ford, Inc
McDonough, NY

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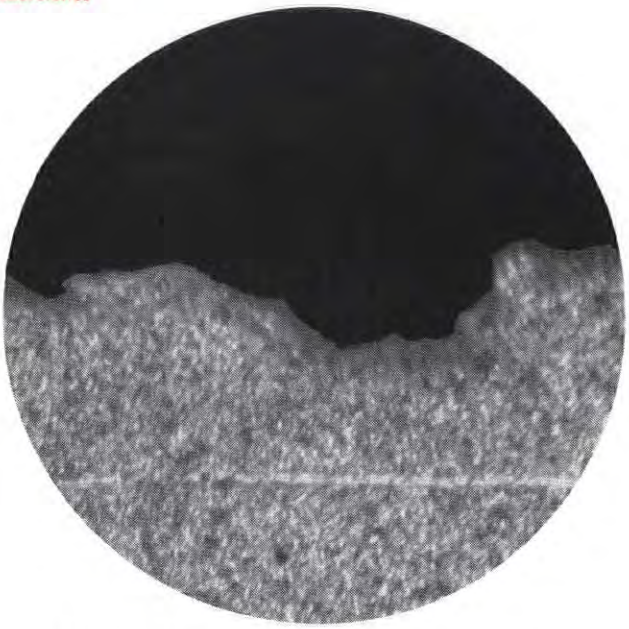

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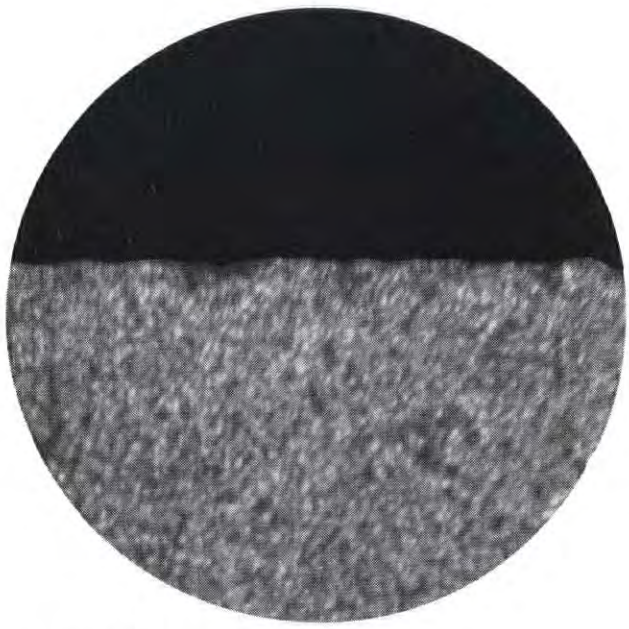

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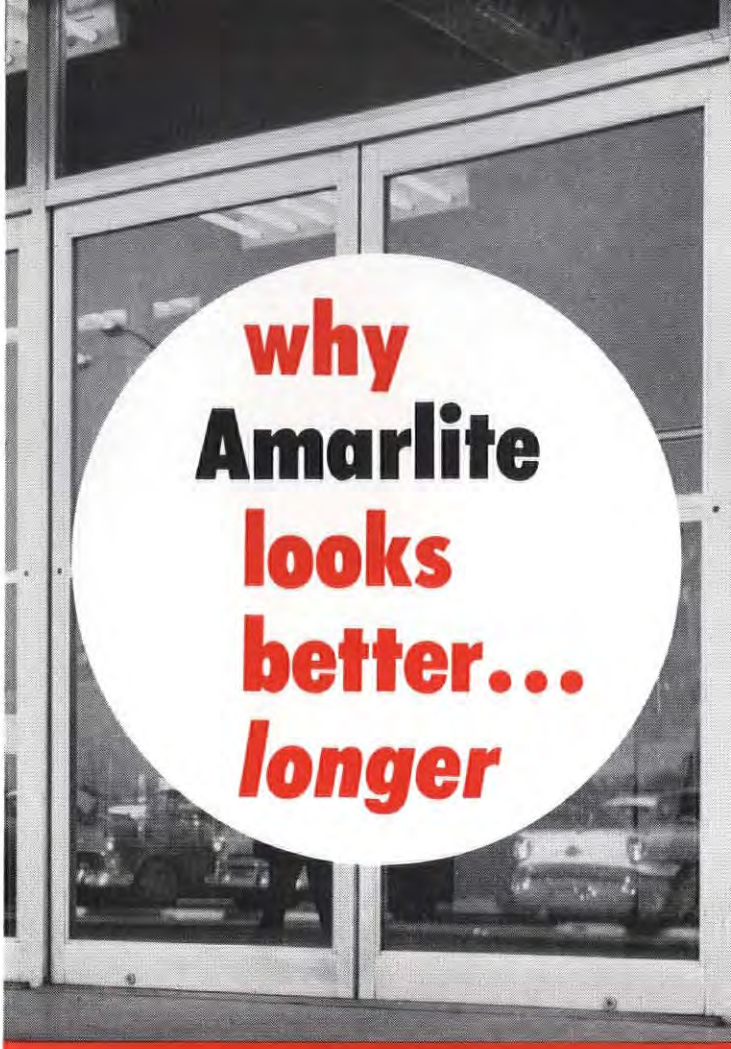

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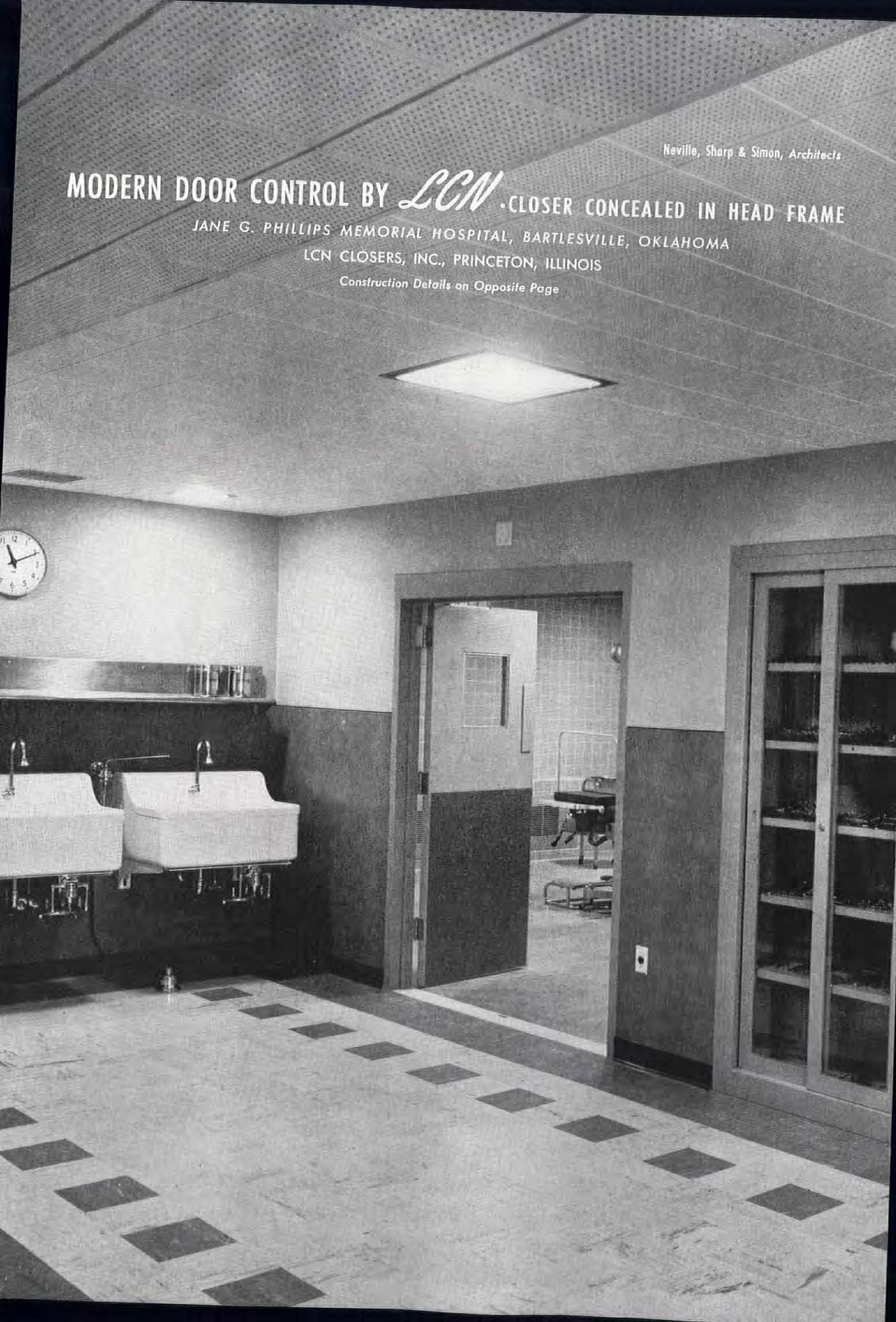

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Armstrong Vinyl Wall Tile—a vinyl-asbestos compound—is listed under the Label Service of Underwriters' Laboratories, Inc., and will meet the rigid building codes of schools, hospitals, and other institutional buildings. The soft colors and gentle textured effects provide good light reflectivity in rooms and corridors. The smooth vinyl surface resists dirt, grease, and "hand-smudging," is quickly wiped clean. Vinyl Wall Tile is flexible. It can be snugly fitted to any wall contour, and its high dimensional stability prevents shrinking and curling. Available in 9″ x 9″ tiles, the installed price over sound plaster or plasterboard runs about 45-60¢ per sq. ft.

A highly flexible sheet vinyl material

Armstrong Vinyl Plastic Surfacing combines the characteristics most desirable in a wall and counter-top material: beauty, exceptional ruggedness, and extreme flexibility. It can be hand-fitted easily to curved and square edges, sharp corners. It is recommended for tables, shelves and counter tops as well as for walls. Vinyl Plastic Surfacing has the exclusive Armstrong Hydrocord backing. It is unaffected by moisture, gives long wear, does not shatter on impact or buckle with heat. The satin-smooth surface is very easy to clean, resists abrasion and staining. Vinyl Plastic Surfacing is available in a variety of colorfast pastel shades, in rolls 30″, 42″ and 72″ wide. Costs only 55-75¢ per sq. ft. installed over a clean, smooth base.

Other wall and counter-top materials

Your Armstrong Architectural-Builder Consultant will be glad to help you select materials for walls and counter tops, including Armstrong Linoleum, Vinyl Plastic Corlon, and Corlex (a rigid high-pressure plastic laminate surfacing). He can bring you design and technical assistance from the Armstrong Bureau of Interior Decoration and Research and Development Center. Call your nearest Armstrong District Office or write to Armstrong Cork Company, Lancaster, Pennsylvania.

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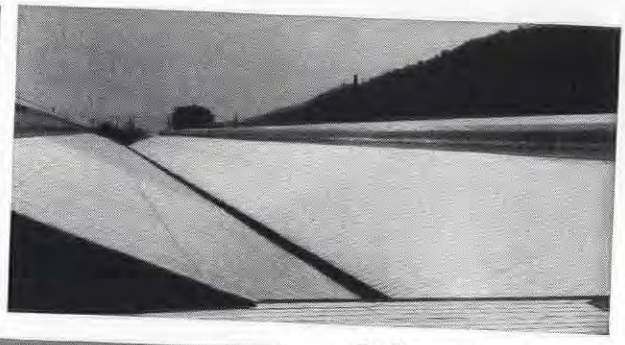
Armstrong Vinyl Plastic Surfacing on counters at the Lunchroom, Capewell Department Store, Oakland, Cal.

How special ARMCO STEELS provide unique advantages in architecture

Building Panels



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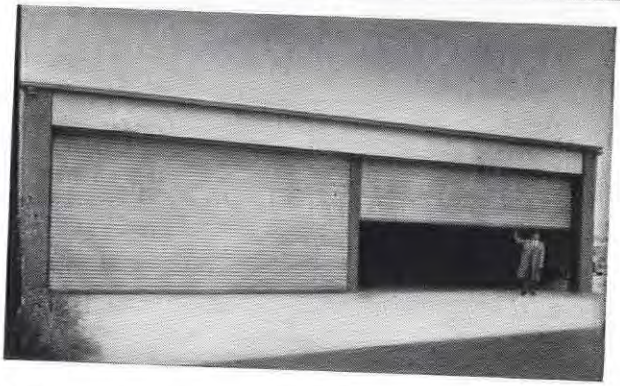

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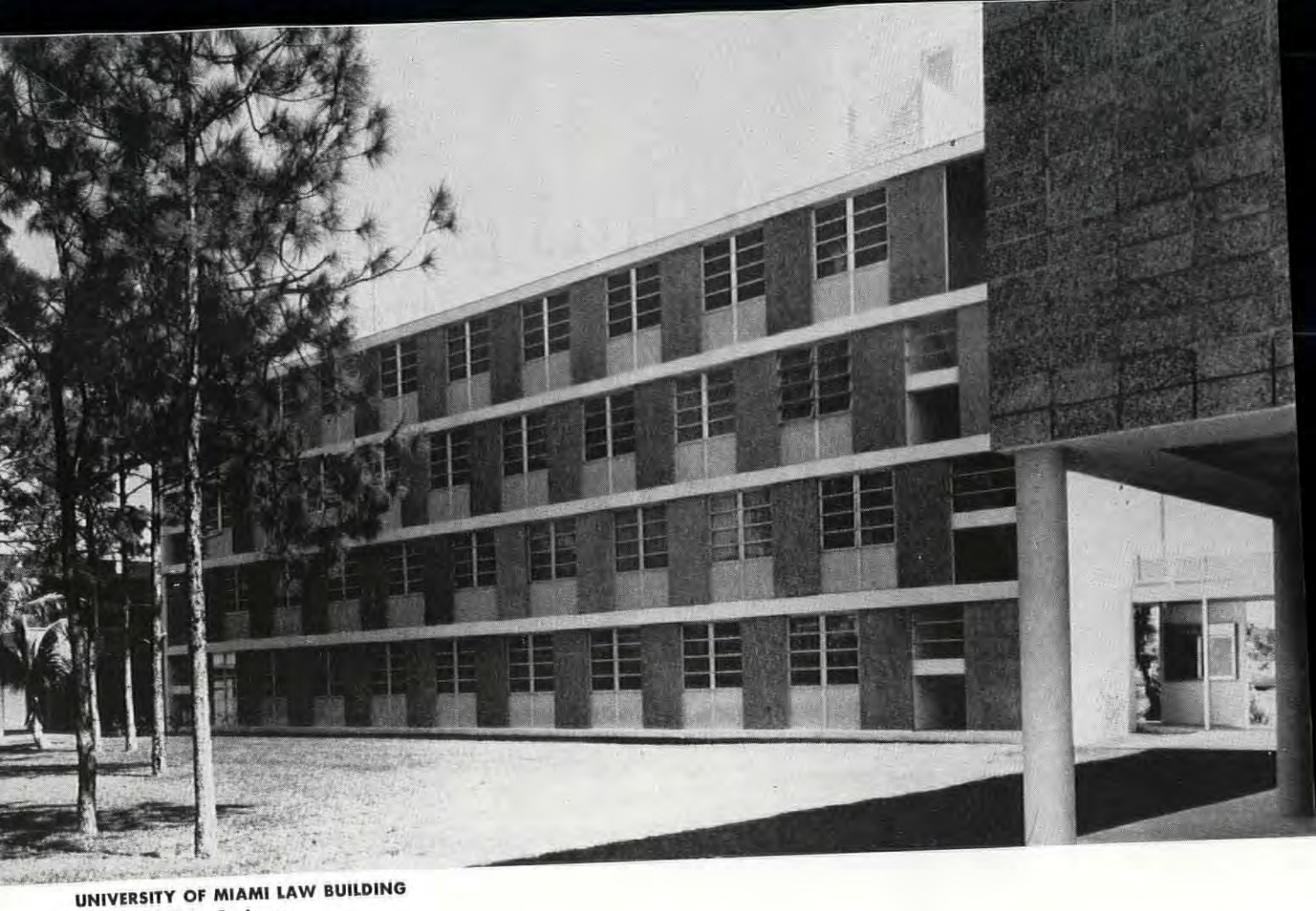

UNIVERSITY OF MIAMI LAW BUILDING
Curtain Wall by Ludman

Architect: Robert M. Little, Miami, Fla.
Contractor: Fred Howland, Miami, Fla.

the architect's vision sets the pace for the future . . .

by Lawrence Field

The plans an architect draws today may well determine the architecture of the future.

When an architect does project the future in his plans, he must find the materials with which to implement that vision.

For example, within very recent years, curtain walls have introduced new dimensions of freedom in design and given the architect a new fluidity of line, and a cleanness of structural concept and mobility.

Eminently practical, ingeniously adaptable, curtain walls have enlarged the architect's horizon and, at the same time, achieved a valuable saving in construction time and costs.

The Ludman Corporation was one of the first to pioneer in the engineering development and successful installation of curtain wall in hundreds of buildings of every kind. Its engineers are constantly formulating new methods of treatment, new ways of handling curtain wall design. As a result, Ludman Curtain Walls offer practical expression of architectural concepts . . . allow the architect almost unlimited extension of his ideas.

Ludman Curtain Walls match architectural vision with superb window engineering that reduces construction time and costs, yet is always beautiful, efficient and flexible. They combine window and wall in one easily handled, quickly fastened, labor saving unit. Maintenance is virtually nil.

Ludman Curtain Walls are easily adaptable to any wall treatment desired, offering a wide range of materials, color and texture for interior and exterior walls.

Patented Auto-Lok aluminum awning windows, intermediate projected windows, or other Ludman windows, co-ordinate with curtain wall treatment to increase the grace and effectiveness of the proposed structure.

Furthermore, an architect can always rely on the Ludman Engineering Division to keep pace with his vision, from proposal drawings through completion. This service is available to the architect at all times through his nearest Ludman Engineering representative.

Ludman know-how, based on years of actual curtain wall experience, has proved of aid to architects the country over.

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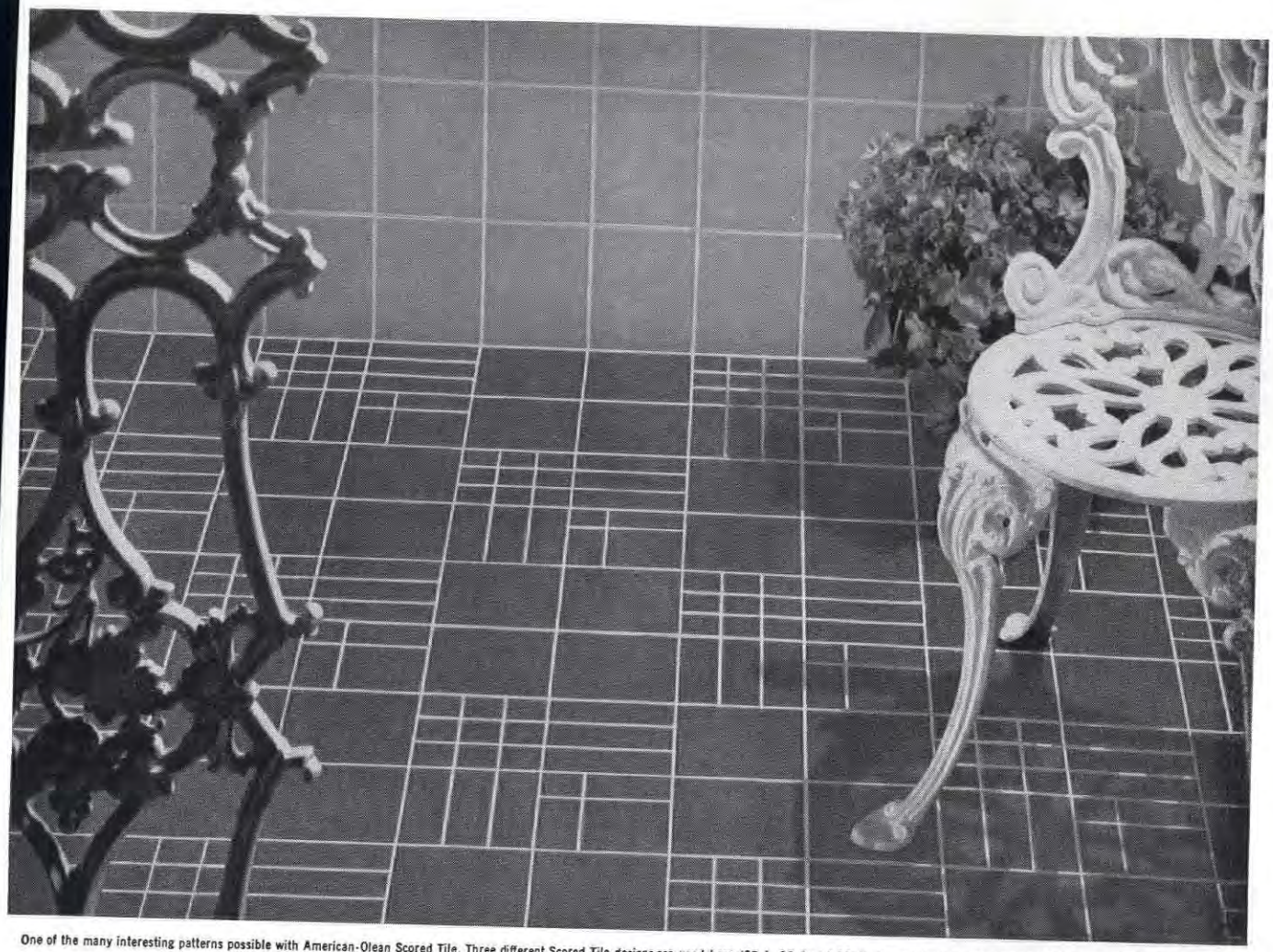

One of the many interesting patterns possible with American-Olean Scored Tile. Three different Scored Tile designs are used here (SD-1, SD-3 and SD-4), in combination with unscored 4¼" squares in Crystalline Glazes.

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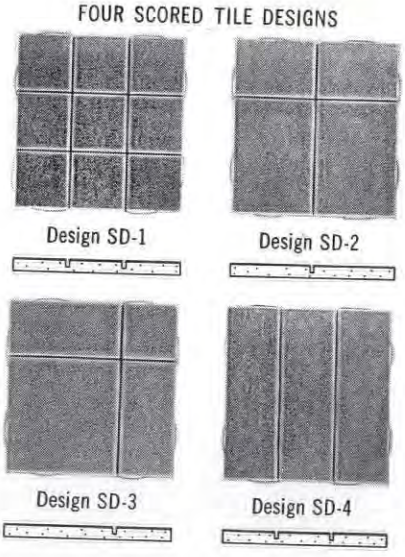

Design SD-1

Design SD-2

Design SD-3

Design SD-4

Full color booklet shows many of the Scored Tile patterns. Send for Booklet 1001, "Crystalline Glazes and Scored Tile".

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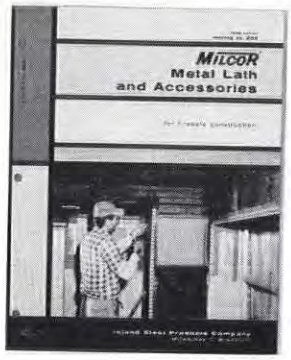

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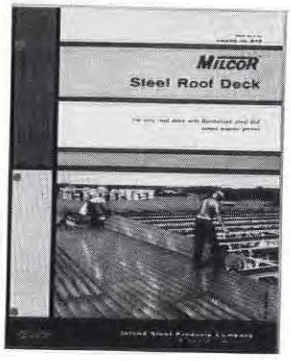

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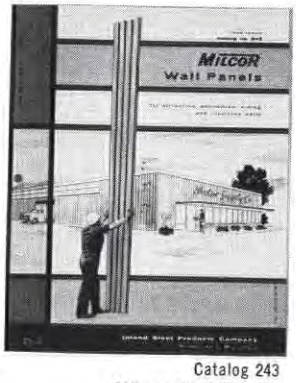

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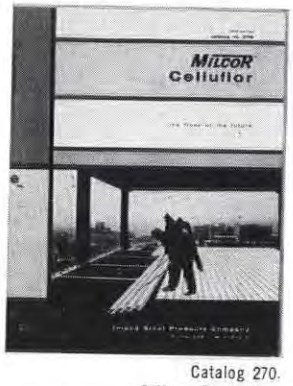

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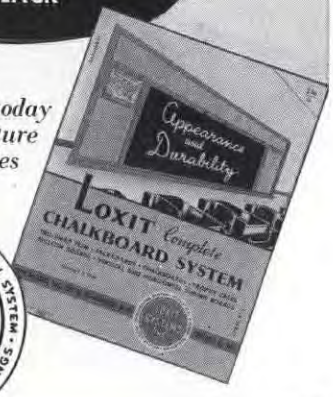

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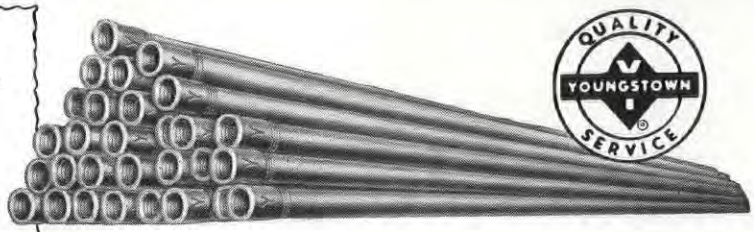

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