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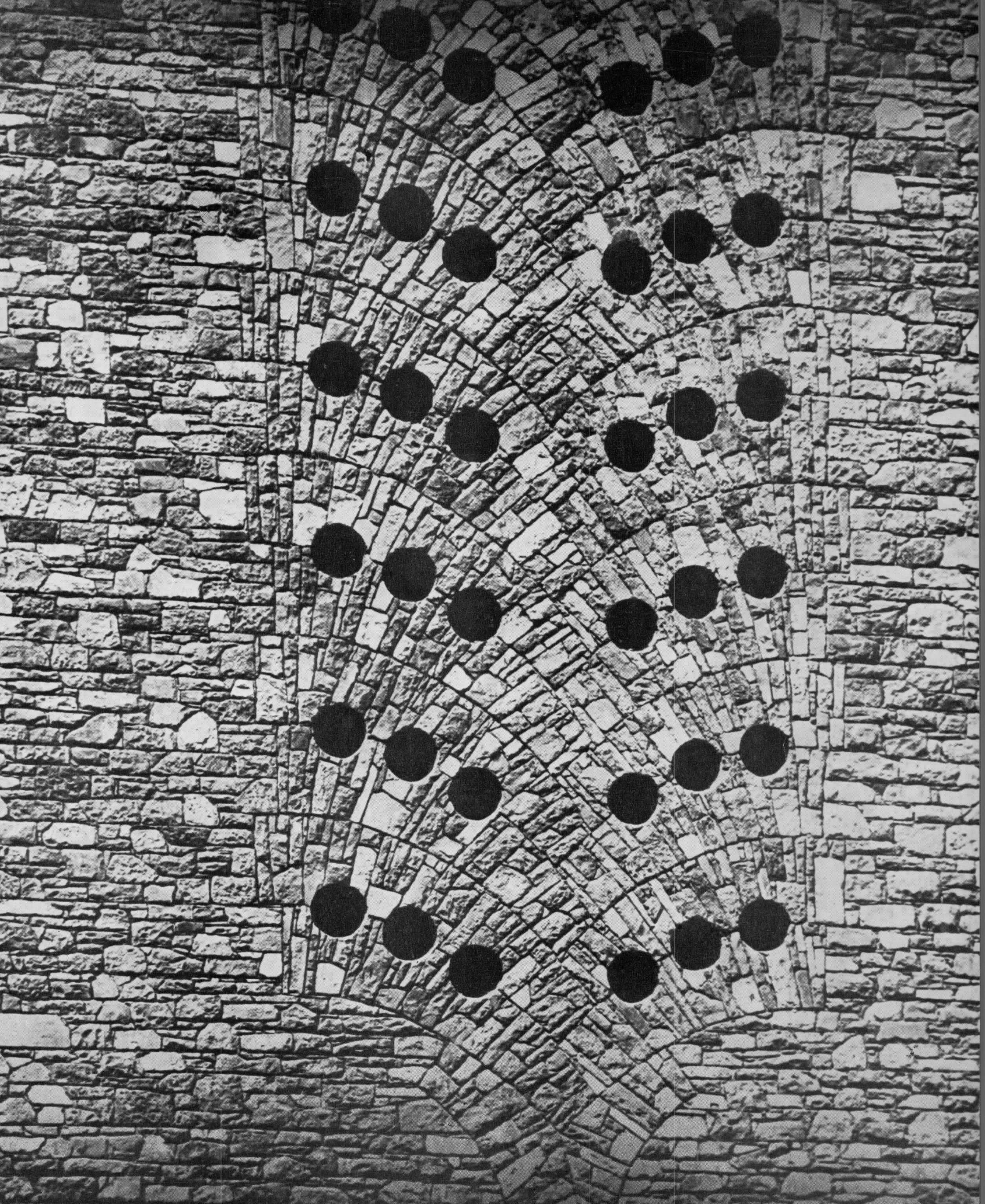

JUNE 1957

BUILDING TYPES STUDY 247 : CHURCHES

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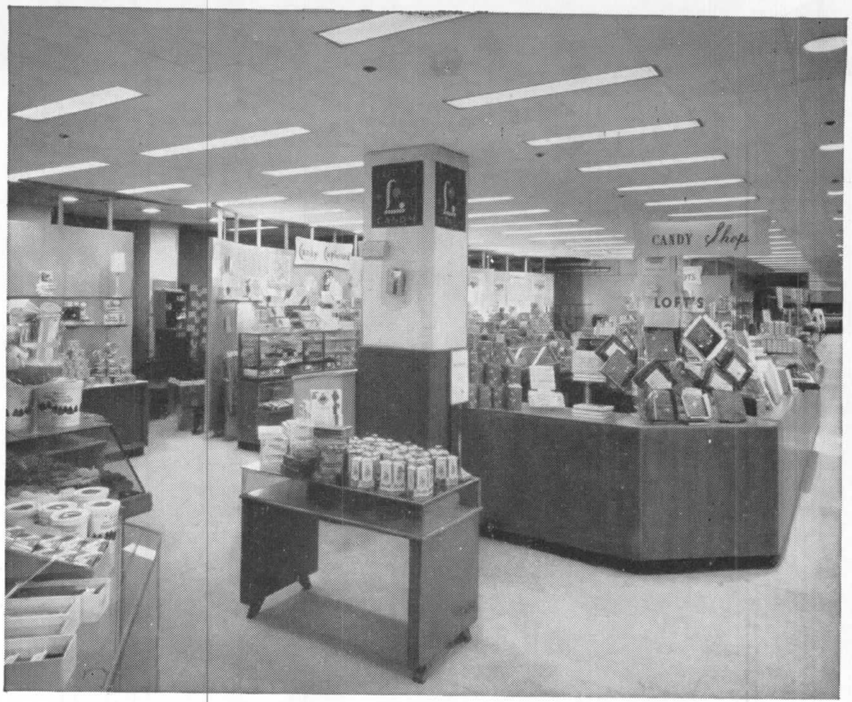

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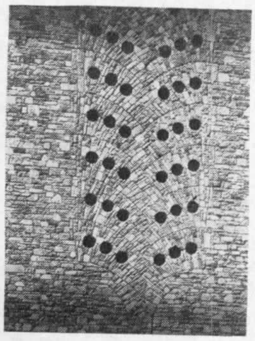

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HOPEFUL START ON A LONG JOURNEY: A NEW CENTURY BECKONS

BY JOHN ELY BURCHARD

A Very Special Observer Writes a Very Special Report on the Centennial Convention of the American Institute of Architects

WHAT A PARTY IT WAS, this 120-hour Centennial Birthday. At such an affair many messages are sent your way. You receive those to which you are tuned. This is a very personal account of some of the messages that got through to me.

The party had everything. There was evensong in the National Cathedral. There were aerial tours over Washington in planes too fast for the purpose. Red-coated Marines played music amidst the palms of the National Gallery and there was a concert by the National Symphony Orchestra. There were boat trips, and banquets, and orations, and citations, and unfinished motion pictures and lots and lots of speeches.

There were presents to the A.I.A. on its birthday. The Danish architects presented their Gold Medal; the Japanese, a carved replica of three ancient Noh masks; there were books, old and new; and a fine moment when Jerry Hryniewiecki, president of the Association of Polish Architects, tied an ancient and colorful Polish sash around the middle of Leon Chatelain.

There was humor, quite a lot of it. Most symptomatic perhaps was that provided by Gilbert Chesterton as quoted by Edward Weeks in the keynote, "Sleeping under a hedge is not a new form of architecture."

Some important guests were missing. The only evidence of Walter Gropius was the picture of his fine design for the State Department in Athens. Mies was present only vicariously too. He had a building in Gutheim's exhibition; he appeared in the film by Time Inc. But the man who should most have been there and was not was Frank Lloyd Wright.

His *shadow* was everywhere. Four of his buildings were in the exhibition. Ralph Walker inserted a toast to him in his banquet address (along, however, with Maybeck, Dudok and Stein). Louis Skidmore predicted in an interview that the future would not find so many opportunities for "maverick geniuses." The Danes awarded Wright a Gold Medal in New York in the morning and another to the A.I.A. in Washington the same evening. At the second Centennial if only one American architect of our times is remembered it will be Frank Lloyd Wright. He was not at the first.

The foreign contingent was larger than usual and more interesting. Mr. A. G. Mordvinov from the USSR was solemn, uncommunicative, cautious, correct and dull. Mr. Hryniewiecki from Poland spoke English volubly, was open and gay. Our friends from Western Europe and Latin America seemed somehow less exotic now.

The top guests were all present, of course. The three charming young men from Spain, Senors Cesar Ortiz-Echague, Manuel Barbero Rebolledo, and Raphael de la Joya, survived the consistent and ineffable mispronunciation of their names by President Chatelain. They gracefully received the $25,000 honorarium for the first R. S. Reynolds Memorial Award and promised to spend it all in a hurry in the United States.

Top guest was Ralph Walker, recipient of the unique Centennial Medal. No one can do justice to Ralph in a few lines. The Institute surely planned nothing symbolic in awarding the Gold Medal to Skidmore, who epitomizes the well-run team and perhaps the wave of the future, and the Centennial Medal to Ralph, who symbolizes the extroverted individual and perhaps King Canute. The most important question underrunning the entire affair was to be found epitomized in the lives of these two men.

There are many reasons why Ralph deserved the highest award from that society of which he has been so brilliant and outstanding a leader. He does not have a neutral personality and few people are neutral about him. But even those who dislike him could not in the end, I think, have felt that a distinguished award was undeserved. Many may have wished that there might have been a second award for quite different purposes and to be given to the man who was not there. I wished that.

Ralph's acceptance of the award was completely in character. He chose the work of his to be shown and its nature revealed a romantic side of him that many do not know. He had his acceptance address elegantly printed complete with personal hallmark. The address itself was in characteristic prose even to the French title, "Sans dogme, sans monotonie."

IT IS perhaps time to say more about the messages of the week. Here are some I received.

There was little concern with history or the suggestion that we might learn anything from it. The exhibition was, of course, mostly historical but even then it placed its emphasis on prophecy. Mr. Weeks, the keynoter, did refer to his book-reading youth when there had been spaciousness and time and people would read long articles. If Mr. Weeks was right and people would no longer read more than a few words at a time, I could not help wondering whether they will spend many minutes looking at any work of art, including architecture. Does this mean that the work of art must express *all* in what can be comprehended in a first glance? Can an essay in *Truth* be written in 1500 words? A sobering thought. Perhaps Mr. Weeks is not wholly right. I hope not.

But, save for occasional such reminiscences, history was rejected. Pietro Belluschi said of the previous century that, like man's adolescence, it had been but a period of preparation. Carl Feiss called it the "hundred primitive years." *Sans nostalgie, sans larmes*.

This meant also that almost nothing was heard in Washington that would have lifted the heart of Henry Hope Reed and his wistful cohorts in their effort to get us back into the Villard House. A reporter for a tabloid did pick up Reed's predictions and essayed some interviewing around the hotels. This was pretty unproductive of hope for Reed. The regular speakers were even less so. None of the exhibitions of contemporary material showed any ground-swell for neo-Georgian. Henry Luce summed it up by saying, "The 20th century Revolution of Architecture has been accomplished."

The gala opening of Frederick Gutheim's exhibition, *One Hundred Years of Architecture in America*, drew 6000 people through a violent thundershower. The first to arrive was the Russian Ambassador, Mr. Georgi Zaroubin. I was hard upon his heels. Mr. Zaroubin declined to comment. I cannot decline.

The truth is that this exhibition had many admirable qualities and it is not quite fair to criticise it save at length. But it is not fair either to ignore it. The trouble is that it is too personal for an official Centennial show which it is said is even going to be sent abroad. Mr. Gutheim needed protection against his personal whimsies and his determination to be different and he did not get it. The theme was not clear; we did not see the best 65 buildings of the last 100 years, nor the most representative always. We saw no "anonymous" architecture. Minor people were included to the absolute exclusion of such giants as Burnham, Root, Gropius, Neutra, Belluschi, Breuer, to name but a few. Obvious buildings by others were often left out in favor of less obvious and actually less representative works and this was true for Upjohn, Sullivan, McKim, Eliel Saarinen and even Richardson. The underestimate of the effect of Mies van der Rohe was doctrinaire and unfair as was the overestimate of Maybeck, Green and Gill. I say nothing of the un-Polkian Hallidie Building. Worst, perhaps, the show did not begin to suggest the effect of Frank Lloyd Wright over the last half century. Each of these strictures is arguable and can be countered. But that is the way it looked to me.

The great transparencies promised much but had their disappointments too. The photographer W. Eugene Smith did well to include people in most of the pictures but he fell for the old notion that a building can be divorced from its surroundings and the newer one that the way to show a building is to pick a detail that most resembles a Mondrian painting.

Perhaps the main messages of the party were in the various exhibitions, but there were a lot of words and many of them were winged. There was a serious effort to come to grips with five problems through panel statements on the new world of technology and ideas, on environment and the individual, on the arts in modern society, on the future of the city and on the new world of economics. Many of the panelists wandered off the subject or even made political speeches; some of the subjects, and in my view the most important ones, were recurrent in other panels and a systematic replay does not seem rewarding.

For example, the problem of the arts in modern society got sidetracked into a discussion of government and the arts which might much better have been devoted to the more critical issue of the relation of the arts to architecture today. Probably the most important symptom of this panel was that even in planning a great forward look the architects did not think it worthwhile to summon distinguished contemporary painters and sculptors to say what they thought of the present relation between architecture and its allied arts. It would have a different cast of course. As to the question before the house, it came down to a discussion of the perennial worry by the American citizen about his relations to his government. Miss Lillian Gish, the actress, wanted a Cabinet Officer for the Arts and wanted it very much. Dr. Howard Mitchell, the conductor, was the most analytical and ended up by wanting to be cautious about the whole idea. Mr. Friedlander, the sculptor, was enthusiastically negative, principally, I gather, because he thought the decisions would be made by people who were not sympathetic to the work of "rational contemporaries." I can only assume that Mr. Friedlander is a "rational contemporary."

The session on The New World of Economics also wandered around. Charles Luckman, the moderator, said that an economist was a man who was often wrong but never in doubt. Dr. Schmidt from the Chamber of Commerce of the United States made statements which would not surprise anyone who knows that body, and Walter Reuther cried that it was neither economics nor technological ineptitudes which kept America from being all she should be, but rather our moral attitudes. This session closed with some interesting tariff proposals by the businessman James Ashley, who on most matters seemed much closer to the labor leader than to the economist from the Chamber of Commerce.

The other three panels on technology, environment and the individual and the city provided common themes and the most important questions and I will try to put these altogether after speaking of a few other significant matters.

It will be realized that all this talk was in strange contrast to the subject matter of early meetings of the A.I.A. as reported in Henry Saylor's "The A.I.A.'s First Hundred Years." Richard Upjohn, for example, spent an early meeting expressing the opinion that "the introduction of color in exteriors is a matter of questionable taste, as weakening the force of the design of the building, particularly in our climate."

This convention did not spend much time on esthetics. In his acceptance address, Ralph Walker got in a few licks. "We will want once more to recognize the poetry of magnificent rhythms, for whenever in the turmoil of a material civilisation the voice of the poet becomes the singing commercial, rather than the epic, whenever the painter willfully drips paint instead of depicting the godlike — the speed of the approaching folly is rapid indeed. . . . While the bloody job of stripping a tiresome distinction from the past was necessary, we cannot always face a future in which we, doglike, constantly pick at the dry bones of structure. . . . While I have little hope that I may live to see them realized, I would in closing, salute those of you now living and those yet unborn who will work to achieve our dreams; our dreams which we, as architects, should ever enclose in lasting beauty." Eloquent and characteristic.

But I found equally characteristic and more eloquent and pointed the simple sentences of Belluschi's perorative speech. "The dismal aspect of our cities and suburbs . . . will not be relieved by the cosmetic approach of applied beauty . . . but rather by a greater awareness on the part of all of us of the meaning of the forces which motivate our society and the understanding the average person has of the role that total environment plays in his life. . . . Beauty is not a static quality."

It was significant too to America that the international note was so insistent. I do not refer to the obvious fact that there were foreign delegates. But the note was everywhere. It was in the exhibition of the brilliant jobs done for our State Department, by Weese for Ghana, Stone for New Delhi, Gropius for Athens and the contrast with the abject Federal work at home. It was evident in *Time's* film with quotations from so many American architectural leaders free from the suspicion of any American or even English accent. There were the displays, demonstrating again and again how much our architectural debt is to Spain, Finland, France, Germany, Italy, Japan. One of the most interesting awards was to the American citizen, Antonin Raymond, born in Czechoslovakia, for buildings built in Japan. Robin Boyd of Australia was quite right to tell the press that there might not be any such thing as an "American" architecture, even though he was unfortunate enough to be misunderstood as saying there was no good American architecture, quite a different observation. Mies was right to say in the film that he doubted there would be a specifically American architecture, that architecture was "supranational." It has always been so in history, for science as well as for architecture. The desideratum is not, as I thought Mr. Luce was doing, to claim too much for America: to assert that the 20th century revolution in architecture "has been accomplished mainly in America — no matter how great our debt to European genius": but rather to walk more softly, to play our part as well as we may, as part of a greater world drama. Most of the visual evidence of the convention supported that view. We were doing pretty well about individual buildings although we heard over and over again that our cities were getting uglier, hour by hour.

I liked, too, the way American democracy could be seen in action. There were sensible resolutions urging that the National Capital be rebuilt slowly over fifty years, that the East Front of the Capitol be left unchanged, that the Jefferson National Expansion Memorial in St. Louis be completed. The biggest test came on another issue.

Mrs. Agnes Meyer, one of our greatest liberals and leaders of good causes, addressed the Convention on the question of a National Cultural Center with which it was entirely sympathetic. She has worked unselfishly for years on this project, has been helped by eight well-known architectural firms nationally distributed, and has got things well along, although all the political hurdles have not yet been jumped. She has a good chance of getting the last fine piece of land in monumental Washington, in Foggy Bottom, near the Lincoln Memorial. Now she wanted the support of the Convention and also to tell them that the Commission was going to hire the eight firms to design the final building, "the most important building in America." This was in the face of a resolution a year ago that this building should be the subject of a competition.

The subsequent debate touched on most of the issues of contemporary architecture. Should there be a national competition in a matter of this sort? Will it produce the finest building? Can any eight firms together do so well as any one would alone? Why do we so like to make these elephantine marriages of architectural firms these days? The convention ended by endorsing the project and commending the architects for their preliminary services and resolving again that there should be a competition.

During this debate too there was a great deal of reference to Pericles. Mrs. Meyer seemed to me to show she was not quite a Pericles when she said, "The architecture of this complex of buildings, if it is to express not temporary but enduring values, must be modern and yet classical. It must avoid eccentricities. It should not be so modernistic that it has no relationship to the past, for then, it could have no relationship to the future." I felt that for all her great citizenship, Mrs. Meyer did not understand the relationship between client and architect or how great architecture is attained. That was the moment when I dozed off.

I fancied I heard Pericles saying, "*We are right, Athenians, to desire to build this great Center of the Arts in our great city for we have always been venturesome and ingenious and tasteful. We are right to desire that it shall be a fine example of our craft and be as enduring as the Gods shall deem it right. . . . It has seemed much better to me to bring together a committee of architects of undoubted respectability but of widely differing talents and tastes so that everything controversial may be cancelled out. Thus we will get a temple to Athena which no one will be able to criticize. No one will dislike it very much and that is perhaps more important than that some should love it. It is perhaps the inevitable consequence for architecture which the people of a democracy must pay for either with their hard budgeted taxes or with the pittance left to them to give after the taxes have been extracted.*"

I woke to remember that I was still in Washington, D. C.

The subject of this dream was on many people's minds during the convention as it is also on many non-architectural American minds these days. It can be summed up by asking whether the individual can any longer weigh anything or be creative or productive save as a member of a group. Behind the recognition that he must often group with others to accomplish anything large, rested the individual's fear that in becoming a member of a committee, he would end by being a conformist, by becoming "patternized," as Tillich put it, and thus personally frustrated and unable to make his greatest contribution to a society which still needed originality while doing so much to suppress it.

But it was surely the technological questions which paved the way for most concern. Not very much was said about atomic power and bombs, about automation and mass communications, about brainwashing or interplanetary travel. On the whole it seemed to be taken for granted that this kind of change could not be stopped and that no one should try. The problem was not to be bemused by it or afraid of it, not to identify it with progress, but to do the best one could to understand it and to use it for the benefit and not the harm of man, so that progress might then ensue.

Population increases did come in for a good deal of attention. Dr. George Kimble, geographer, indicated that we would have seven billion people on the globe in 2057 as opposed to two and one half billions now. This meant to him that land would be very scarce. Worse than that everybody would be trying to use copper and iron and other things at the present American rate and this meant that everything would be running out. His solution was austerity, self-imposed before it was too late. Hardly anybody else shared the pessimism of this neo-Malthusian.

More people were concerned with other problems of population pressure and its urban distribution. Millicent McIntosh expressed the modern paradox that even with our present "unprecedented opportunity and privilege . . . we are faced as human beings with human problems that seem impossible to solve." High among these problems, it seemed to Dr. Paul Tillich, was the problem of environment. There was no such thing as total environment, he asserted. The environment was selected by each man from the whole and thus environment was by no means synonymous with surroundings. This was an important cud for architects to chew on. We all found the modern environment very ugly. Maybe others do not. Are we being too selective of the ugly?

Tillich emphasized, as Weeks, Belluschi, and McIntosh also did, that there is still an urgent need for privacy in our lives and that contemporary architecture ought to be more thoughtful about this.

One of the great mechanical destroyers of privacy was found to be the automobile. Everybody was sorry about it but no one proposed abolishing it, or even making it smaller. Belluschi told us there were 70 million now and would soon be *100 million*, "using up and demanding enormous amounts of land, killing, maiming and patronizing the pedestrians, riding high over our communities, bringing congestion and blight." Weeks did not like the idea of sitting in the picture window watching all the cars go by. "Sleeping by a thruway is not the most desirable form of American architecture." It remained for Carl Feiss to draw the most powerful picture. "Without adequate overall planning, without prevision of the social consequences as well as the physical, we are blasting through the cities great Panama Canals for the next 100 million automotive vehicles. . . . Whatever Autopia will turn out to be it will not be a city of the past. Whatever it will be in the future, it ought to be planned and designed for man and man's places, and not just for machines."

These populations and these machines conspired to make the city which was also regularly anathemized but never written off. Pietro Belluschi guessed that there would be 340 million Americans in the next hundred years and most of them in cities. Yet except for Bennett Cerf, who thought everything in America was fine right now, everybody wanted the city to be different than it was getting to be. And John Knox Shear reminded his audience that "in the century that has commenced this week for the architects of America, the city must be their initial and essential and ultimate concern."

I have myself been as loud as the next man in the purple prose I have provided against the city and I know much of it is true; but I wonder if the song was not a little vehement in Washington. There were gloomy forecasts of "urban sprawl" extending from Maine to California as it now does from Los Angeles to San Diego but I remember an extensive list of oases in the sprawl. Carl Feiss warned us that we must avoid pollution of land as assiduously as we avoid pollution of water and air. Belluschi spoke of the derby hat and all the other architectural "cuties" that devastate our landscape, and Henry Luce was all too right to remark that the American people had not had all this forced upon them, "they chose it." Feiss again drew the most dramatic indictment: "The relentless tide of undesign has washed over us, swirled around us, and spread the long streamers of road-town into the virgin fields, miles out from here." Then he made an important reiteration of what Lewis Mumford had said in different words many years ago in *Sticks and Stones*. "Comprehensive architecture is the new imperative."

ALL THIS thinking of the whole city was, of course, correct; but it raised two types of questions. First, were architects inevitably static minded and if so would the century put them out of date? Bronk may have said something more prescient than any one else, something quite disturbing to makers of cities had they stopped to ponder it. "I foresee an ever greater mobility for man. What will be the consequence of this, no man can say. . . . If I were an architect, I would think that man would be so mobile that he would have quite different needs, for houses in which he would choose to live for but a time . . ." And while most were more willing to think of the static and the better city and to concern themselves with questions of who should make it, John Shear asked: "Is it of great import WHO is to take the credit as long as the community's interests are well-served? Does there exist, really, an expert on the total city; does there exist an expert on the living of life?" And "Is it not true that *many* must care if *many* are to profit; and that it is the continuing concern of the few to induce the many to care?"

The problem of who was to do it brought us squarely back to the question of the individual and the government, the individual and the committee, and for the last time. Charles Eames remarked as he received his medal for craftsmanship that he had just got in under the wire, since the time was drawing nigh when "anonymity is not going to be a dirty word." Ralph Walker hoped that the next Centennial medalist might still be regarded as "an architect, a philosopher, and a humanitarian, but more important that he be thought of as an individual." Belluschi was most realistic: "We may remember that while men of genius and a great variety of approaches by gifted individuals are needed to stimulate us, the great body of buildings forming our cities and the very structure of our new communities will be produced by earnest, intelligent painstaking realists who by their day-to-day effort, by their ability and willingness to be part of a team and to accept the realities of life, will succeed in making their influence felt in the communal process of giving form to a healthier, happier and wiser society."

SO THE battle raged but the trend was towards collaboration. Carl Feiss again was powerful: Buildings "have been the highly personal, frequently egocentric, often beautiful expressions of great men acting as individuals, creating as individuals, and building individual monuments to their genius and the genius of their extraordinary times." But these are only islands, "isolated footholds in a swamp."

That the collaboration was needed seemed generally agreed. How it could be achieved without "patternization" seemed less certain. Paul Tillich, depressed by Long Island housing, thought it a disturbing symbol of loneliness in a crowd, breeding as well as confirming the "patternization" of present day industrial society. He thought it might be impossible to break this up from outside but that it might and almost certainly would be broken up from within.

"Symbols of non-conformism will always appear in the midst of surroundings which try to compel adjustment to models and patterns. We are made by our environment and we make it at the same time. . . . Symbols cannot be produced intentionally. They are born and grow and die. But one can tell how they are conceived and born: out of the personal passion of individuals who in total honesty and total seriousness penetrate into the demands of the material with which they work, who have a vision of the form which is adequate to their aim, and who know that in the depth of every material, every form and every aim something ultimate is hidden which becomes manifest in the style of a building, of a poem, of a philosophy."

This brings us back to the beginning and to Weeks' quotation from Churchill. "We shape our buildings and afterwards our buildings shape us." Would there be some magnificent "no-sayers" in the years to come? Would we shape better buildings in larger groupings? Would our cities survive and even be better in every way? Would the individual survive? No one was really pessimistic. Almost everyone, after he was through scolding or peering apprehensively, turned out to be an optimist. Americans, it was clear at the beginning of the second century of the American Institute of Architects, were still primarily Transcendentalists. So, most of the time, I guess, am I. But let me remind you as I said in the beginning that people hear the messages they want to hear.

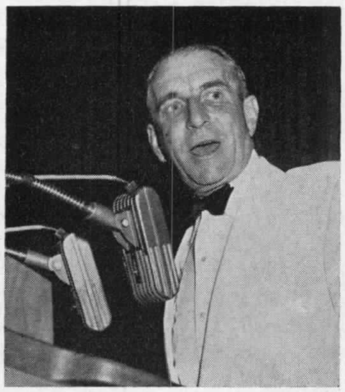
It may as well end with the phrase Detlev Bronk quoted from Robert Louis Stevenson, "to travel hopefully is a better thing than to arrive." It was a hopeful five-days journey.

THE NEW WORLD OF TECHNOLOGY *and the New World of Ideas were subjects of the first general session of the convention, with Nathaniel A. Owings (right above) as moderator. Speakers: Dr. Detlev W. Bronk (left), president of the National Academy of Sciences, on technology, and Paul G. Hoffman (center), U. S. Representative to the U.N. General Assembly, on ideas*

A NEW CENTURY BECKONS:

Centennial Sessions Search for Context In a Memorable Series of Seminars

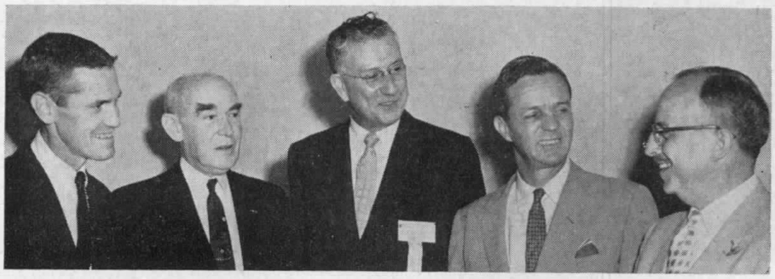
ENVIRONMENT AND THE INDIVIDUAL occupied the session moderated by Dean John E. Burchard of M.I.T.'s School of Social Studies and Humanities, shown at right with (left to right) speakers George T. Kimble, geographer; Dr. Millicent C. McIntosh, Barnard president, and Dr. Paul Tillich, theologian and University Professor at Harvard



Keynoter: Edward A. Weeks, Jr.

THE ARTS IN MODERN SOCIETY — Bennett Cerf, Random House publisher, made the major address on this subject at session moderated by John Detlie. Above: Mr. Detlie, and three panel speakers on Government and the Arts — Dr. Howard Mitchell, conductor of the National Symphony Orchestra; Miss Lillian Gish, actress; and sculptor Leo Friedlander

Closing speaker: Pietro Belluschi



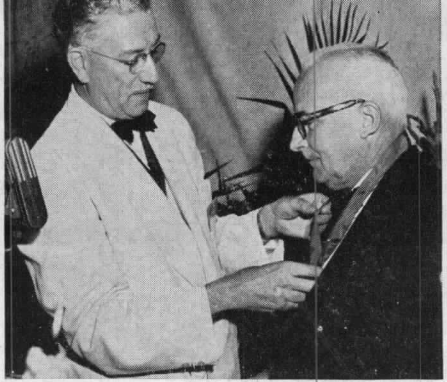
THE FUTURE OF THE CITY — Moderator John Knox Shear, editor-in-chief of ARCHITECTURAL RECORD, *with speakers Philip M. Talbott, U. S. Chamber of Commerce president; A.I.A. President Leon Chatelain Jr.; Senator Joseph Clark; and Carl Feiss*

THE NEW WORLD OF ECONOMICS — James Ashley, Libbey-Owens-Ford public relations director, Dr. Emerson P. Schmidt, U. S. C. of C., moderator Charles Luckman, and Walter Reuther, AFL-CIO

Photos on pages 9–12 by Hugo Brooks and (courtesy A.I.A.) Cameramen, Inc.

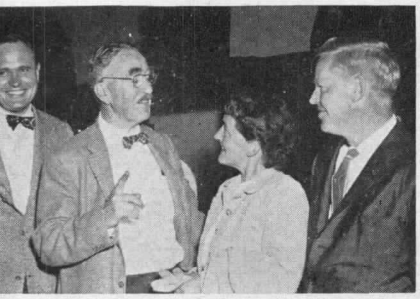
A NEW CENTURY BECKONS:

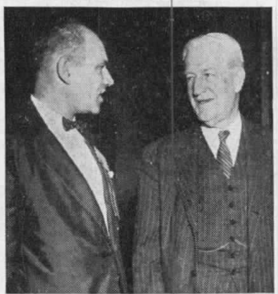
4300 Celebrate Its Beginning at A.I.A.'s Biggest and Most Festive Convention



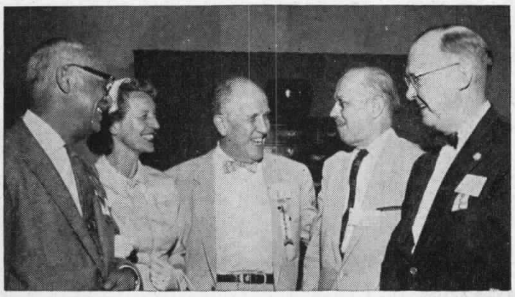
LOUIS SKIDMORE receives the 1957 Gold Medal, A.I.A.'s traditional "highest honor," from President Chatelain

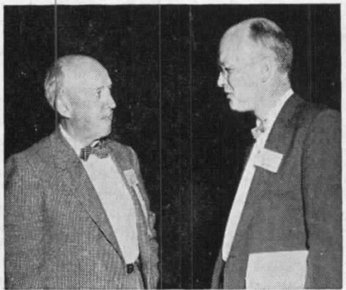
RALPH WALKER receives scroll for his Centennial Medal of Honor recognizing "the brilliance of his contribution"



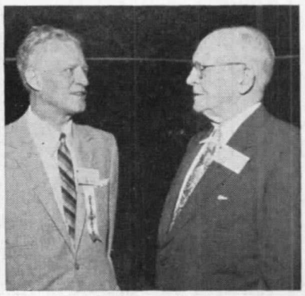


CELEBRANTS — Californians John Carl Warnecke, Kenneth Reid, Mrs. Ernest Kump, and John Worsley. . . . Harvard's Dean José Sert and Mrs. Sert. . . . Bernard Rothschild of Atlanta and William Stanley Parker of Boston. . . . James Follin of Washington with Earl Heitschmidt of Los Angeles. . . . A.I.A. gets gift from Gumpoi Matsuda, Japan Architects Association





Fritz Gutheim with John Shear. . . . Wallace Bonsall, Pasadena; Mrs. Walter Taylor; Detroit's Clair Ditchy; Mr. Taylor, A.I.A. education and research director; and George Lindeberg, Pasadena. . . . James Britten, Greenfield, Mass., and the new dean at Florida, Turpin Bannister. . . . Host Chapter members Arthur Keyes and Don Lethbridge with Antonin Raymond



A.I.A. Executive Director Edmund Purves with Host Chapter Chairman Frank Duane. . . . Clarence Stein of New York with Robert Fischer of Architectural Record. . . . Mrs. William Brown, Mrs. Robert Cutler, Mrs. Walter Severinghaus and Messrs. Severinghaus, Cutler and Brown, all of S-O-M; and Harold Sleeper of New York with A.I.A.'s technical secretary, Ted Coe

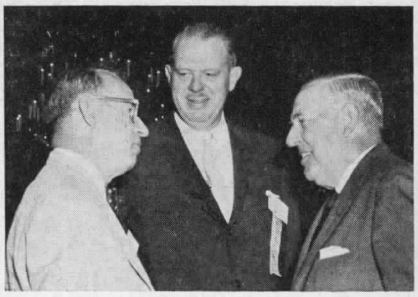
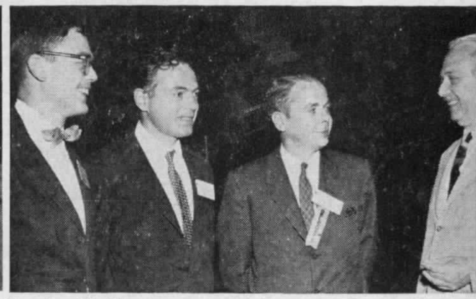
THOMAS S. HOLDEN, Dodge vice chairman (and an honorary member of the A.I.A.) with the special exhibit prepared under his direction as a Centennial salute to the A.I.A. It took a reflective look at pertinent events of the A.I.A.'s first 100 years, in the last 66 of which F. W. Dodge Corporation, and most especially its Sweet's File, Dodge Reports and Architectural Record, *played a part. Designed by architect David Leavitt, the exhibit got a "distinctive display" award in Product Exhibition*

CHARLES EAMES receives the Craftsmanship Medal. Fine Arts Medal went (in absentia) to painter Mark Tobey

R. S. REYNOLDS JR. presenting first annual R. S. Reynolds Award to three delighted young Spanish architects

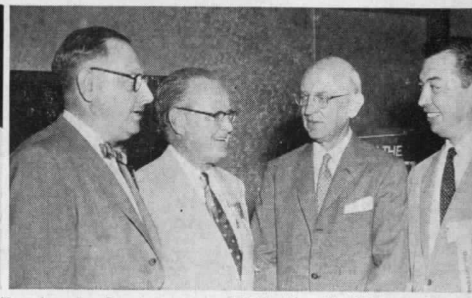
SKIDMORE, OWINGS & MERRILL — Louis Skidmore (center) with Nathaniel A. Owings (left) and John O. Merrill (right)



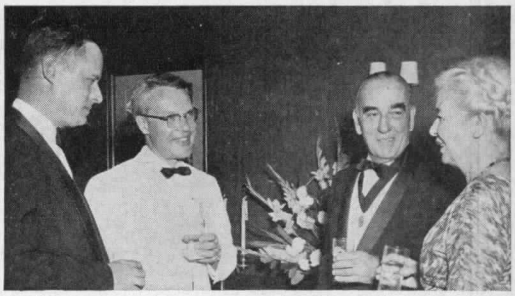



U.S.S.R.'s A. G. Modvinov with U. S. A.'s Ralph Walker: both vice presidents of Union Internationale des Architectes. . . . Mr. and Mrs. Norman Schlossman of Chicago with (at left) Chlooethiel Smith of Washington, D. C. . . . Publishing Director Judd Payne of Architectural Record with California's Donald Beach Kirby and Paul Hoffman. . . . Dean John E. Burchard of M.I.T. with the three Weese brothers, architects all — Ben, just finishing at Harvard; Harry; and John



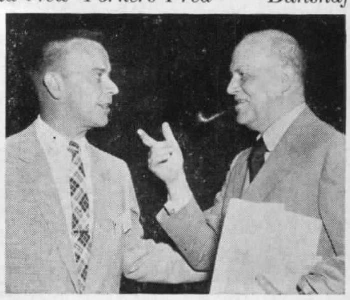


Canadian guests Douglas Kertland, R.A.I.C. president, and C. J. G. Carroll, secretary, with English visitors Kenneth Cross, president, and C. D. Spragg, secretary, R.I.B.A. . . . New Yorkers Mr. and Mrs. B. Sumner Gruzen and Mr. and Mrs. Benjamin Smith. . . . Little Rock's Howard Eichenbaum, H. Griffith Edwards of Atlanta, Tom Brood, Dallas, Bob Elkington, St. Louis


George B. Allison, L. A.; First VP John Richards, Toledo; Mrs. Ulysses Rible, William G. Balch and Mr. Rible (new director), all L.A.; Walter A. Domann, Milwaukee. . . . James Hammond of (S-O-M), Chicago and New Yorkers Frederick G. Frost Jr., Perry Coke Smith and Miss Elizabeth Coit. . . . S-O-M's Gordon Bunshaft and Walter Severinghaus



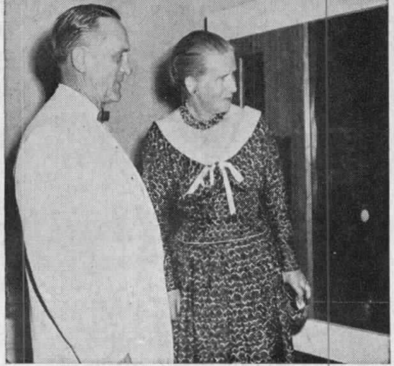



New Yorkers Frank Voorhees, Lorimer Rich and Chester Price. . . . Prof. Walter Bogner of Harvard and Mrs. John Knox Shear. . . . Edwin B. Morris Jr., Assistant to the Executive Director (mainly responsible, under Mr. Purves' direction, for developing the Centennial Convention program) and William Lescaze of New York. . . . Mrs. Raymond J. Ashton, Salt Lake City, Mrs. Edgar Williams of New York, A.I.A. Past President Mr. Ashton and Kenneth K. Stowell of New York

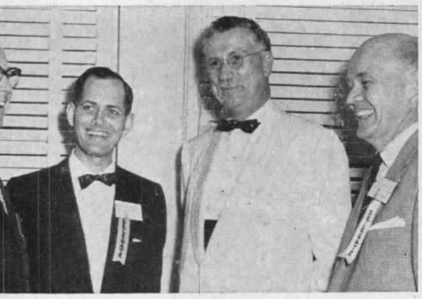
THE RECORD REPORTS

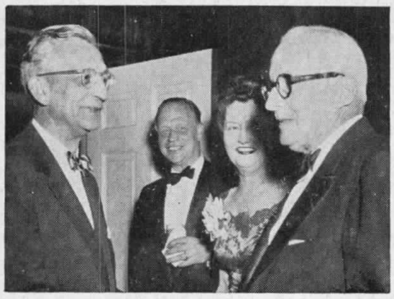
A NEW CENTURY BECKONS:

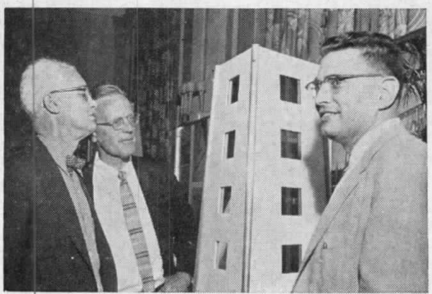
The Mood of the Welcome Is Gala — National Gallery to Constitution Hall, Shoreham to Sheraton Park

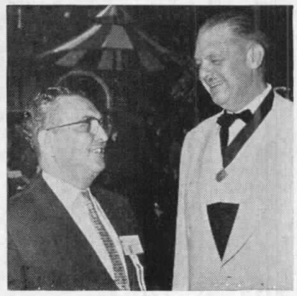


At the President's Reception opening the "One Hundred Years of American Architecture" exhibit at the National Gallery — Director Donald J. Stewart of Portland, and Mrs. Stewart. . . . Exhibition Director Frederick Gutheim and Mrs. Gutheim; Alexander Cochran of Baltimore, exhibit committee chairman, and Mrs. Cochran

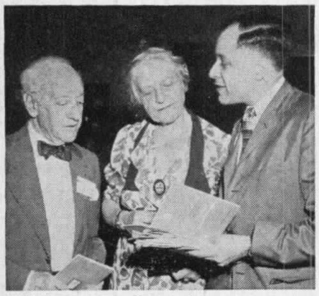


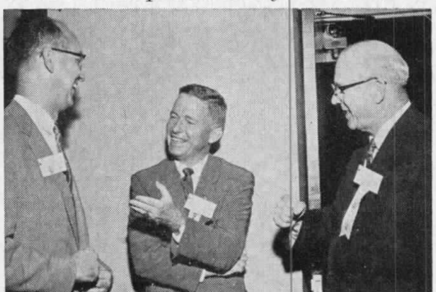






Regional Director Ulysses Rible and Cornelius Deasy, Los Angeles; President Chatelain; and William Stephen Allen Jr. of San Francisco. . . . Frank Lopez of AR, Mr. and Mrs. Robert Cutler, and Louis Skidmore. . . . Philadelphians Henry Churchill, Newcomb Montgomery and Morris Milgrien. . . . David C. Baer of Houston, who received this year's Kemper Award, and Don B. Kirby

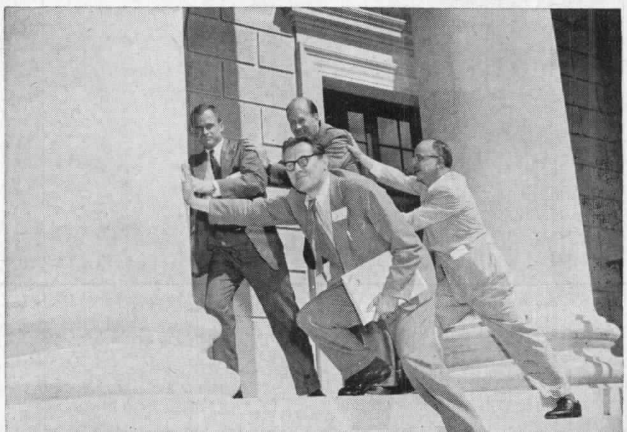




Carl Warnecke of Oakland with John Shear . . . Mr. and Mrs. Julian Clarence Levi and Jeffrey Ellis Aronin of New York. . . . J. Winfield Rankin, A.I.A. Administrative Secretary and one of this year's new honorary members; George F. Pierce Jr. of Houston; and A.I.A. Secretary Edward L. Wilson, Fort Worth. . . . Charles F. Cellarius, Cincinnati; Mrs. Raymond J. Ashton, Salt Lake City; Mrs. Cellarius; Mrs. Edgar Williams and Mr. Williams of New York

S-O-M-'s Robert Cutler with Ralph Walker and Philip Skidmore (son of Louis Skidmore). . . . Another gift from abroad, presented by Flemming Grut, president of Danish Architects. . . . James Hornbeck of AR, Louis Redstone and Kenneth Black of Detroit, and Gumpoi Matsuda of Japan. . . . Frederick J. Woodbridge and Mr. and Mrs. Aaron Kiff of New York

Alexander C. Robinson III of Cleveland, A.I.A. Centennial Committee chairman (right in photo at left), with Mrs. Robinson and W. B. Potter of Eastman Kodak at exhibit. . . . Trying out a pillar at Constitution Hall — G. E. Kidder-Smith and Bancel LaFarge of New York, Carl Feiss of Washington and (foreground) the amiable Polish visitor, Jerzy Hryniewiecki



FOR SUMMER COMFORT,

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

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

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

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

COST OF AIR-CONDITIONING REDUCED

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

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

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

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

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

IN WINTER, NEED FOR INFRA EVEN GREATER

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

To obtain MAXIMUM, **uniform-depth** protection against heat loss and condensation formation, it is necessary to use the new **edge-to-edge** multiple aluminum , **each** sheet of which stretches from joist to joist.

THERMAL VALUES
Infra Type 4 Parallel Insulation

Down-Heat	**C .042*=7⅞" non-metallic insulation†**
Up-Heat	**C .105*=3⅛" non-metallic insulation†**
Wall-Heat	**C .068*=4¾" non-metallic insulation†**

Cost installed between wood joists, material and labor, about 8¢ sq. ft.

Type 6 also available

Can be purchased everywhere through your preferred local dealer.

*Determined by method of National Bureau of Standards in H.H.F.A. Research Paper 32.
†Calculated on basis of limiting thermal values cited in Fed. Specs. LLL-f-321b; HH-I-585; HH-I-521c; HH-I-551a.

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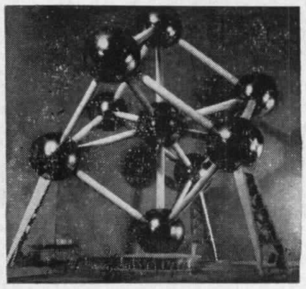
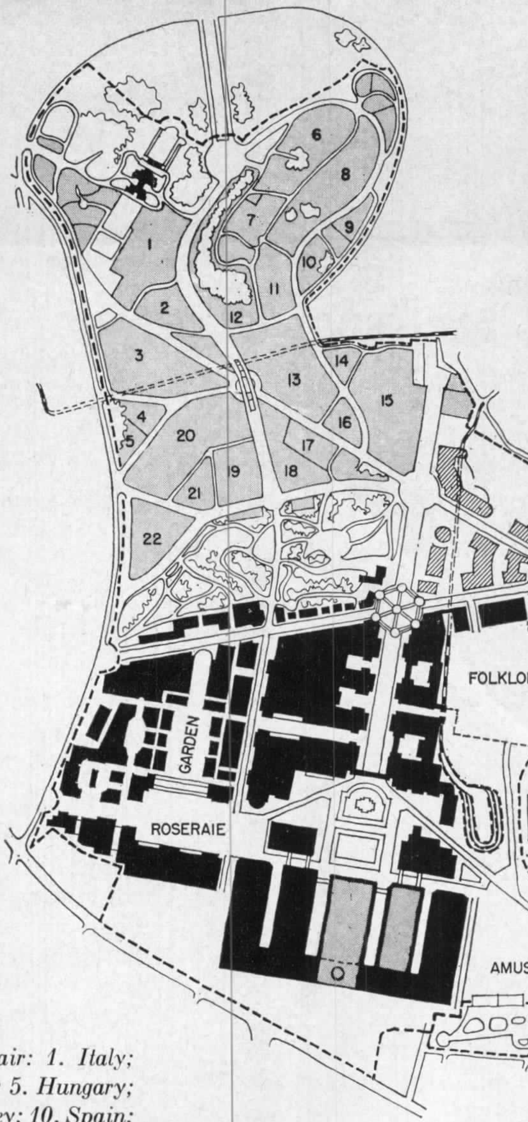
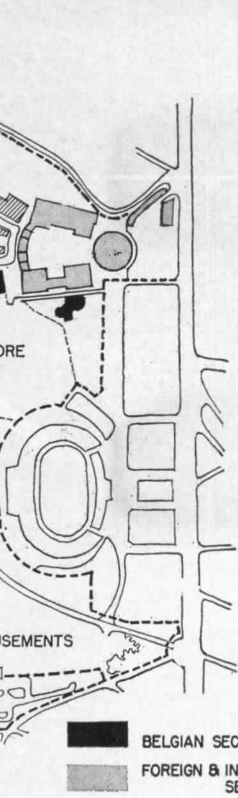
THE RECORD REPORTS
ARCHITECTURE ABROAD







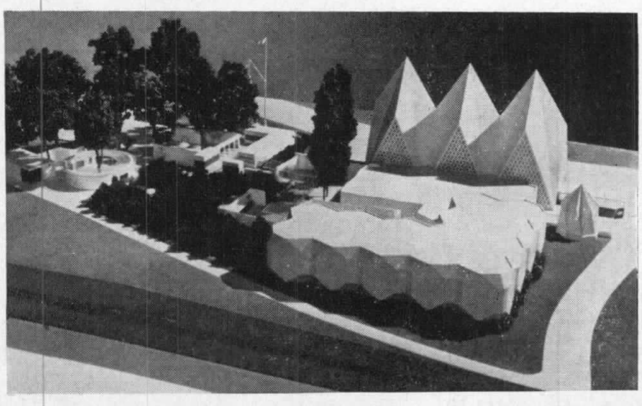
MAN AND ARCHITECTURE: BRUSSELS WORLD'S FAIR '58

Brussels will be the scene of the first major international exposition since the New York World's Fair of 1939 when it opens its Universal and International Exhibition April 17, 1958. Centered around a theme of humanism, the fair will have exhibits from 50 participating nations, seven "supranational" organizations (e.g., the United Nations, Benelux, the International Red Cross) and the Belgian Congo, as well as international science and art exhibits.

Among the buildings currently under construction on the 500-acre site at Heysel Park: the Atomium (top of the page), the "theme structure" of the fair (A. and J. Polak, architect, and A. Waterkeyn and A. Becker, engineers); the French pavilion (1 — G. Gilbert, architect); the British pavilion (2 — Howard Lobb and Partners, architects); the Soviet pavilion (3 — Alexandre Boretski, Urii Abramov, Victor Doubov and Antoli Polanski, architects) and the Canadian pavilion (4 — Charles Greenberg, architect). The U. S. pavilion, de-

(Continued on page 316)

Plot assignments in the foreign section at the fair: 1. Italy; 2. The Vatican; 3. the United States; 4. Bulgaria; 5. Hungary; 6. Germany; 7. Portugal; 8. Great Britain; 9. Turkey; 10. Spain; 11. Switzerland; 12. Greece; 13. France; 14. Morocco-Tunisia; 15. the Netherlands; 16. Austria; 17. Norway-Finland; 18. Poland; 19. Canada; 20. the Soviet Union; 21. Rumania; 22. Czechoslovakia



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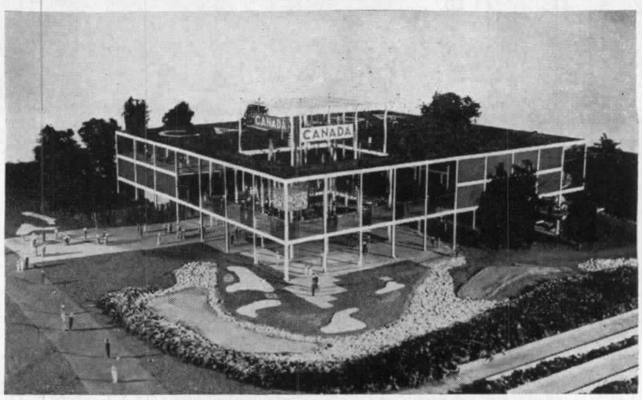

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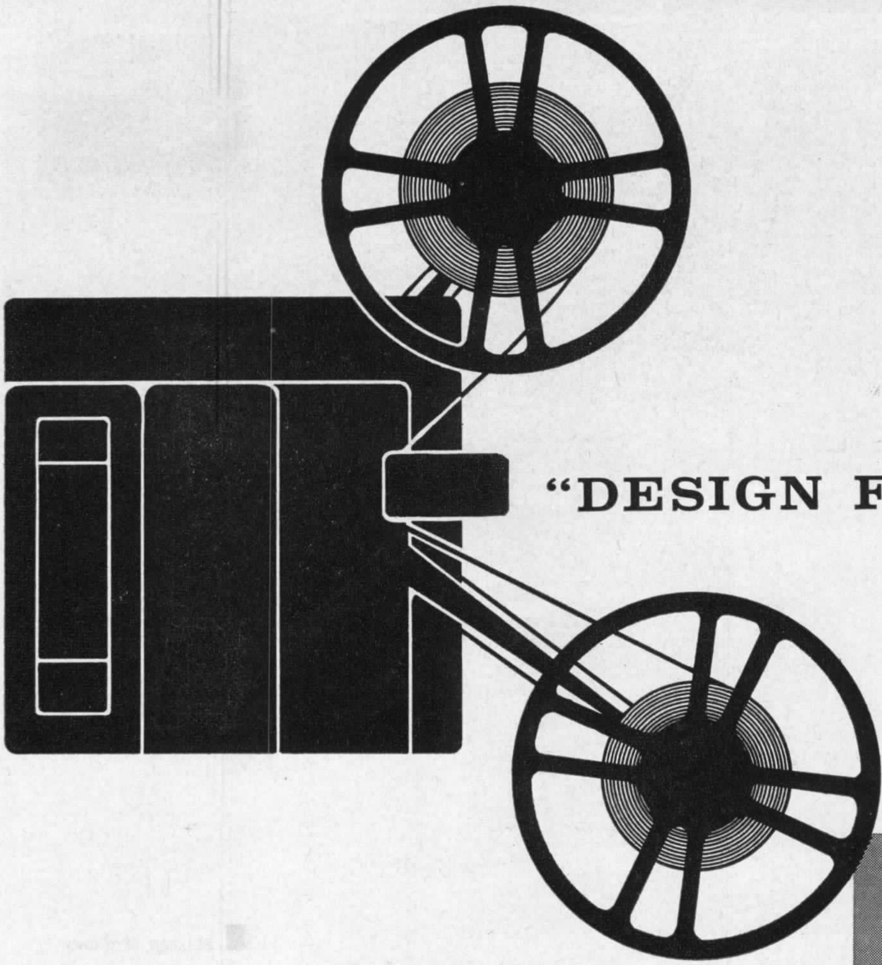
(More news on page 16)



"DESIGN FOR BUILDING WISELY"

A KENTILE, INC. FILM TO BROADEN PUBLIC AWARENESS OF THE SERVICES OF THE ARCHITECT

To help increase public knowledge of architectural services, Kentile, Inc. has produced a full-color, educational film, "Design for Building Wisely."

This 5-minute, non-commercial film was supervised by the American Institute of Architects, approved by the National Congress of Parents and Teachers, and the National Federation of Women's Clubs. It shows the help an architect can give a prospective homeowner from initial planning to final construction.

Currently, the film is being distributed to TV stations for use on their Women's Home, Interior Decorator and Farm shows. The A. I. A. is also arranging with local chapters to show the film to their members.

If you, or any group in your area, would like to show this film, prints may be obtained at no cost by writing to Kentile, Inc., 58 Second Ave., Brooklyn 15, N. Y.

A SERVICE TO ARCHITECTS FROM

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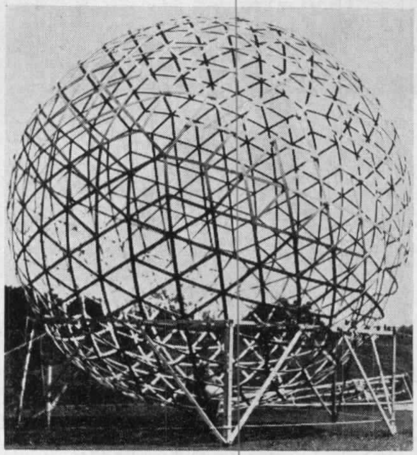
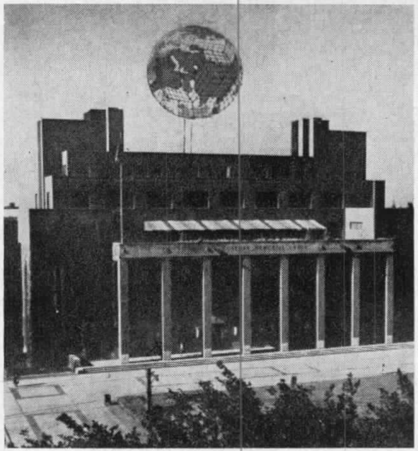
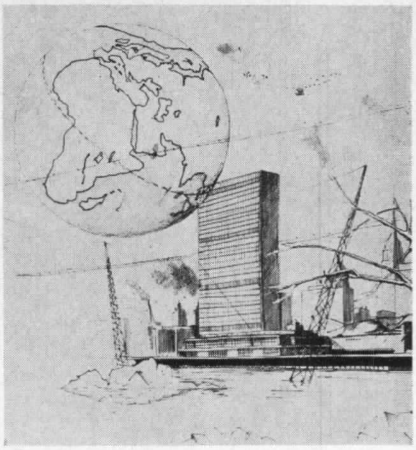
AVAILABLE IN SOLID VINYL · VINYL ASBESTOS · CUSHION-BACK VINYL · RUBBER · CORK AND ASPHALT TILE . . . OVER 150 DECORATOR COLORS!



Right: 1952 structural study for 20-ft miniature earth, built by Fuller group at the College of Architecture, Cornell University. Far right: Mr. Fuller and the 10-ft model Minni-Earth built by architectural students at Minnesota





Right: perspective of Minni-Earth as it would appear mounted on the Minnesota campus; it would be supported by steel wires attached to four masts mounted on existing penthouses. Minnesota students also designed Minni-Earth installations for the East River, opposite the U. N. Building (far right) and the Pentagon

FULLER GROUP COMPLETES STUDY OF GEODESIC "MINNI-EARTH"

Combining his two foremost interests, navigation and structure, Buckminster Fuller, leading a student group at the University of Minnesota School of Architecture, has completed preliminary studies of "Minni-Earth." When, and if, finished, Minni-Earth will be a one-millionth scale model of the earth.

This early study, on which some of the 30-student team worked for three years, produced a 10-ft model Minni-Earth, with mathematical calculations completed for a three-way great circle grid. One of the knottiest problems to be solved at this stage was the coordination of this three-way grid with conventional latitudinal and longitudinal coordinates; a team of six mathematicians, working with electronic computer, evolved "an *omni*-triangulated great circle grid of the world coordinated at one deg increments with conventional latitude, longitude grids at deg, min and sec increments."

Following this, the students plotted geographic data on "the Geodesic omni-triangulated great circle grid." Mr. Fuller claims that "this data at 1:3,000,000 (approximately) is so detailed as to constitute flyable data, showing every small lake, river, railroad and highway." Posting was done on triangular vinyl sheets, now being printed.

The structure of the real Minni-Earth, based on the same grid as the model, will have an outside diameter of 50 ft, an inside diameter of 40 ft. The shell will be built of 2160 "truncated tetrahedrons", supported by the five-ft deep truss of the globe's framing, and removable — "a triangularly sectioned phantom file-case drawer." Students will be able "to introduce secondary structural components within each of their truncated-tetra file-drawer frames, which secondary structural elements will, when totally assembled — present the world's geographical configurations, viewable either from the center of the sphere or from outside the sphere, as an open lace-like pattern."

"The outer five-ft zonal depth of Minni-Earth," as Mr. Fuller describes it, "will be appropriately subdivided (like an onion) by concentric spheres, with the radius magnitude of each sphere exaggerated to render clearly visible the separate strata of the Minni-Earth's complex interior. At inner level will appear the ocean's bottom conformation. Outward of this will appear continental shelves and sea level contours. The basic oceanographic stream data will be shown. Outward of this will occur successively the sky's graded spheres each readably codified in respect to chemical thermal, electric magnetic and pressure limits. In the outer atmosphere will be shown the jet-stream's thin doughnut-shaped ranging and its west-to-east 300-400 mph rotation."

The primary advantage of Minni-Earth, in Mr. Fuller's view, will be for astronomical observations. Students could enter the globe, via an opening through the Indian Ocean, and mount a platform at the center; any celestial observations made over "Minni-London" would be accurate for actual London. "The inhabitants at center of Minni-Earth," says Mr. Fuller, "have a rational vision of celestial phenomena, regarding which the inhabitants of big Earth are partially blind. Minni-Earth will thus come to constitute what might be classified — both scientifically and popularly — as a *True Planetarium.*"

(More news on page 21)

HORIZON . . .

new Movable Hauserman Wall System offers an unlimited medium for creative expression

HORIZON, the revolutionary new wall system conceived by HAUSERMAN, is a giant step toward giving the architect an opportunity to do whatever he wants in designing non-residential interiors. For HORIZON is offered in the widest possible choice of panel materials—genuine wood, aluminum, glass, and steel with baked enamel. To this selection, add innumerable combinations of HORIZON post patterns, panel-joint treatments and colors, hardware, glass patterns and wall finishes. The resulting interior is a distinctive executive office area that reflects custom design at far less than the cost of custom fabrication.

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FIVE BUILDINGS PREMIATED IN WESTERN MOUNTAIN AWARDS PROGRAM

Awards of excellence were presented to the buildings shown here in the Western Mountain District, American Institute of Architects, annual honors program: 1. Barrows Furniture Store, Phoenix — Ralph Haver, architect; 2. Green River School, Green River, Utah — Dean L. Gustavson, architect; 3. United States National Bank Building, Denver — James S. Sudler, architect; 4. Mountain Savings and Loan Building, Boulder, Colo. — Hobart Wagener, architect; and 5. Apache Street School, Farmington, N. Mex. — Flatow & Moore, architects

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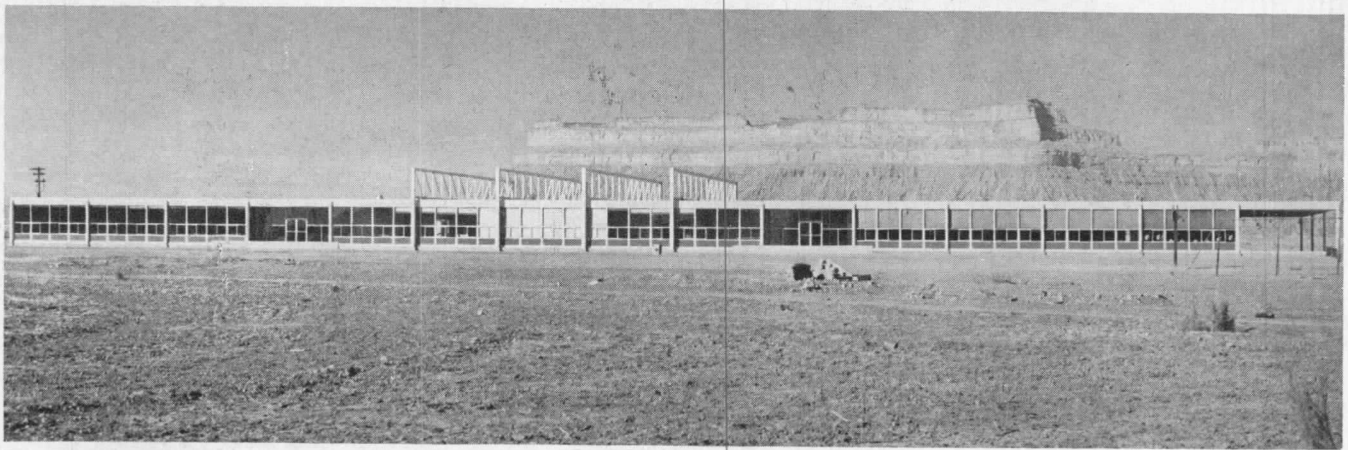

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(*More news on page 28*)

Lobby of Smith-Douglas Co., Inc., building, Norfolk, Virginia. Architectural Woodwork: Elliot and Co. Architect: T. David FitzGibbon.

Cherry Paneling by Weldwood

The beauty of wood is incomparable. And you can see over 100 actual installation photographs–like this–in the brand-new booklet, "Weldwood Functional Beauty for Business and Institutional Interiors." Your copy is free. There is no obligation. Simply write to—

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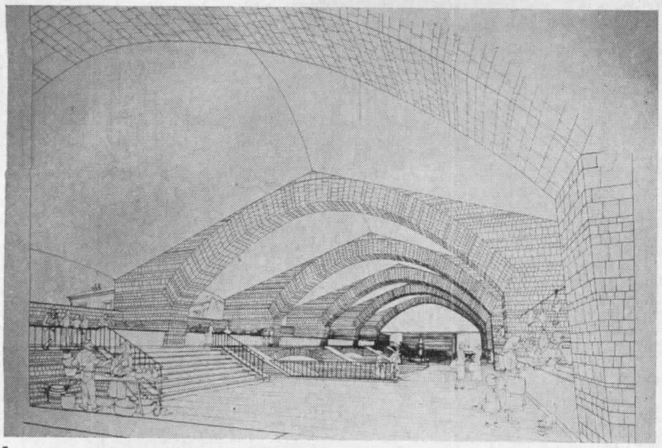

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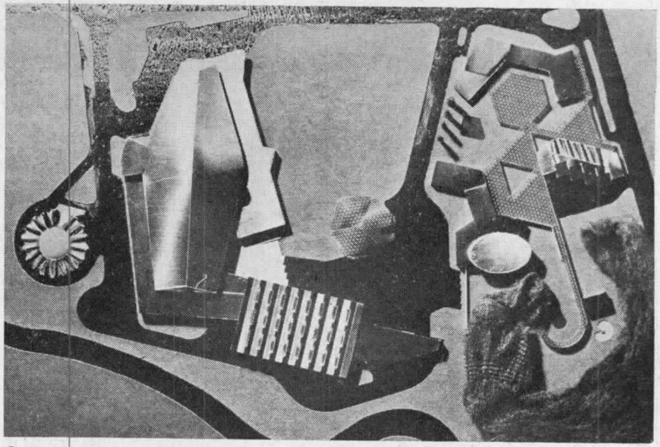

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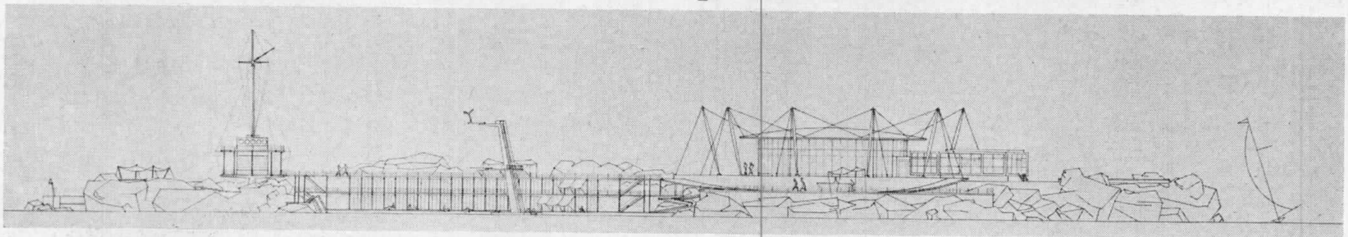

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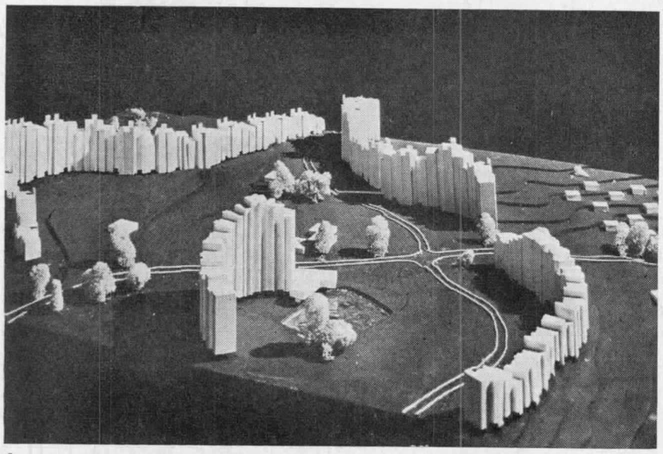

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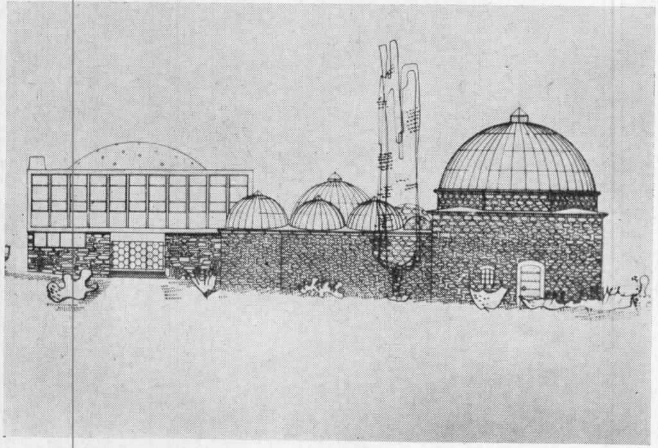


5

6

1. Italy — covered market for Orvieto; M. Vagnetti, student; Faculty of Architecture at Rome. 2. Belgium — slaughter house; Enrico Castellani, student; Ecole Nationale Superieure d'Architecture et des Arts Decoratifs, Brussels. 3. Greece — seaside resort; Eleftherios Apostloo, student; Advanced School of Architecture, Athens. 4. Switzerland — "New Town" study; advanced work by student team; Swiss Federal Institute of Technology, Zurich. 5. Yugoslavia — sanitation museum (addition to ancient baths); Branco Bulic, student; Faculty of Architecture, Sarajevo. 6. Rumania — study of Corinthian Column; Adrian Oprea, student; Institute of Architecture, Bucharest

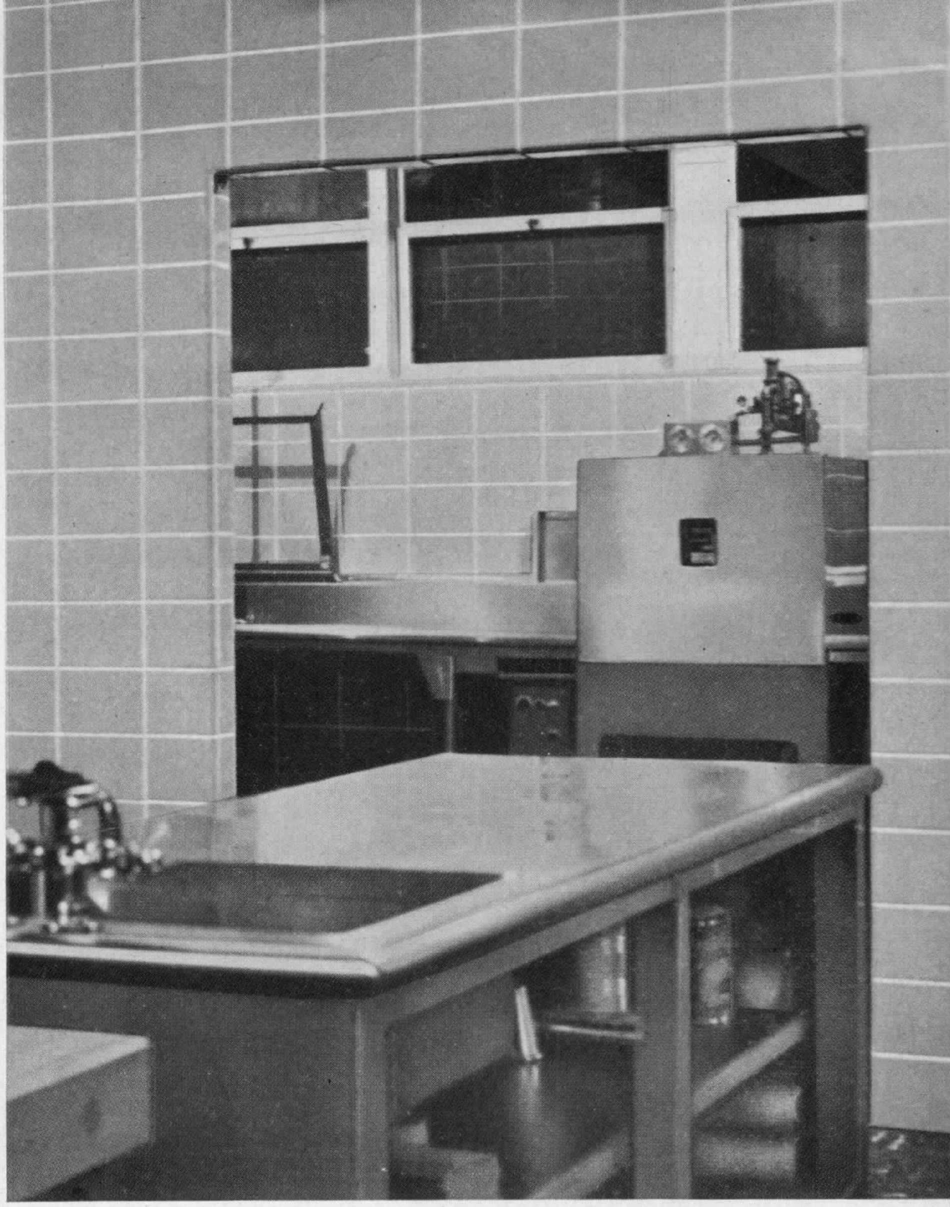
ARCHITECTURAL STUDENTS FROM 15 NATIONS JOIN EXHIBIT

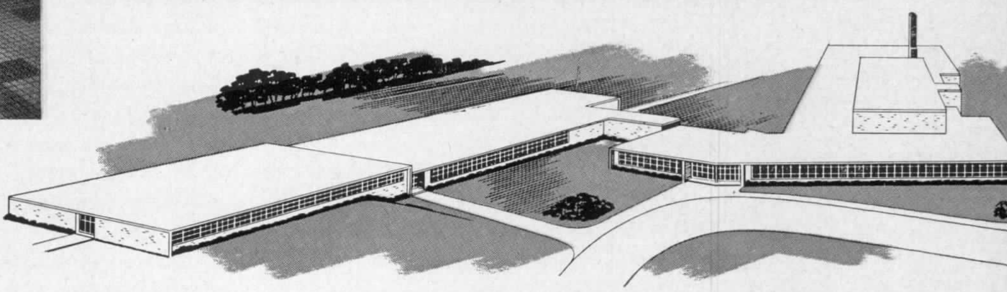
In an international exhibition sponsored by the National Institute for Architectural Education, work of architectural students from 28 schools of architecture around the world was on display. The nations represented in the exhibit included Austria, Belgium, Canada, Cuba, Czechoslovakia, Greece, Italy, Japan, the Netherlands, Norway, Rumania, Switzerland, Turkey and Yugoslavia. The U. S. was represented by the winner and runner-up of the Lloyd Warren Fellowship competition.

The drawings and photographs exhibited appeared to prove that the fight for modern architecture has indeed been won, in the schools, at least. The only exceptions to this rule were the entries from Rumania, where students divided their time between studies for peasant dwellings and monuments; their work all carried the stamp of an exacting discipline in draftsmanship (cf. cut 6). The work of the Italian students showed the same discipline. In Czechoslovakia, the only other Iron Curtain country represented in the exhibit, students showed considerably less fidelity to tradition than did the Rumanians.

The exhibit, on view April 23 through May 4 at the Carnegie Endowment for International Peace in New York, is scheduled to travel in this country.

(More news on page 32)





Glen Lake Elementary School, Glen Lake, Minn.
Architects: Bissell & Belair, Minneapolis, Minn.
Tile Contractor: Dale Tile Co., Minneapolis, Minn.

Romany•Spartan tile selected for Glen Lake school

The advanced thinking of our architectural designers, their skillful blending of modern and traditional material, and their utilization of new building techniques are providing America with the world's finest school buildings.

In this program, ceramic tile is playing an important part. New setting methods offer new opportunities to use tile where cost or weight is a factor. And Romany•Spartan offers a complete line to fill every functional and design need. Little wonder that more and more architects the country over are specifying Romany•Spartan.

If you'd like design help or more information, contact your nearby Romany•Spartan representative or write United States Ceramic Tile Company, Department R-13, Canton 2, Ohio.

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UNITED STATES CERAMIC TILE COMPANY • THE SPARTA CERAMIC COMPANY

a WASHINGTON *report by Ernest Mickel*

JETS AND AIRPORT DESIGN: CAA LOOKS FOR EASY DEVELOPMENT

The rash of spectacular and somewhat alarming statements about airport design changes that would be imposed by the advent of the jet age has come and gone. A "second look" at the future planning requirements — as far as they can be assessed from the performance of prototypes and engineer calculations from the drafting board — has led government officials in the Civil Aeronautics Administration and many airplane manufacturers to this conclusion: present planning and construction at the big airports, in both runways and terminal structures, will be able to accommodate the jet transports of the known future.

In other words, the demands these larger planes with their increased capacity would make on the physical facilities of airports does not loom so large and unmanageable today as it did a few short months ago.

This does not discount certain problems, many of them as yet unknown, that will come with increased technological development of aircraft. But CAA convincingly tells you it sees no architectural confusion in the year-by-year job of designing new and expanded airports.

The agency insists, for example, that every new bit of construction, be it runway improvement or the development of an entirely new complex, as far as possible look at least a full decade in advance. Improvements should be designed and constructed so that they can handle traffic adequately for the next 10 years, one spokesman said. At the end of that time we can think about the second stage of construction — the expansion that might then be required.

Still, in any discussion of airport design for the future, the unknowns creep in. Experiments are going forward with the vertical take-off principle, particularly in military circles. Immediately ahead, says a recent CAA publication (*1960–1965–1970 Civil Aviation and Federal Airways Forecasts*) are several engineering developments which may increase further the utility of general aviation aircraft. Considerable research and development is being directed toward various aspects of steep take-off and landing problems. Development also is continuing with helicopters and convertiplanes.

But these are continuing considerations that bear only indirectly on the problem of the architect designing a new or expanded airport today. He necessarily must deal with the "knowns" as developed by his clients.

CAA's first request to the architect is that he consult initially, not after he has prepared sketches, with the agency's architects and engineers. They are in each of the four regional centers — New York City, Fort Worth, Kansas City, and Los Angeles. It was pointed out that much time and effort can be saved if the architect acquaints himself with CAA knowledge and requirements *before* he touches pencil to paper.

What are some of the more certain problems?

Volumewise, the American-Flag industry is committed to purchase around 400 pure jet and prop-jet airliners: cost $2.6 billion. These do not include the Viscounts already delivered. Of the jet airliners now on order, 213 will be pure jets.

A typical big jet airliner, says Stuart G. Tipton, president of the Air Transport Association of America, may weigh close to 300,000 lb compared with 145,-800 lb for the largest airliner in regular service today. It will have a lift capacity of 40,000 lb compared with 23,640 in the big airliner today. In tourist configuration, it will offer up to 150 seats compared to 95 seats now available on a typical large tourist-class plane.

Jet transports are expected to arrive on the commercial aviation scene from two to three years hence — late 1959 and 1960.

These facts are not now posing any particular engineering problems, say CAA and the airlines themselves, in the construction of airfields. Mr. Tipton states that the average jet transport flight on the average day can be expected to require some 8000 ft of runway. This may jump to 10,000 for a heavily-laden intercontinental jet. Here added fuel requirements push the needed runway length somewhat. Comments Mr. Tipton: ". . . We do not anticipate elaborate changes in the country's airport system as far as length of runways is concerned. . . . There are some places, like Washington (D. C.), where the runways are too short to take jets. Unfortunately, I would be unable to indicate a percentage of airports that must be changed. I can only say this: that the airlines and the managers of the airports of the country are working closely together in re-examining the airports and examining the service, the jet service contemplated out of these fields. It is a cooperative effort in which we expect to have airports and airplanes ready at the same time."

CAA is estimating that by July 1, 1961, 466 of the large new jet transports will have been added to the airlines' fleet which today numbers some 1800 planes. The government agency has worked out a table, based on preliminary data supplied by manufacturers, indicating that effective runway lengths at more than a score of U. S. airports could today send jet planes of the known type, and those on order from drawing board status, non-stop distances ranging from 800 to 4600 statute miles.

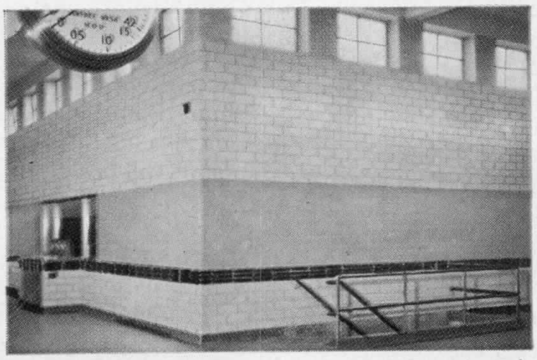
There has been much discussion of the design changes that might be required in air terminal facilities, largely because of the added passenger loads and new type plane handling facilities. Here again CAA is optimistic that the normal evolution of terminal building architecture will solve all problems. They point to the latest designs with confidence that the facilities will be able to handle the relatively small additional passenger burden that jet transports will inflict in the earliest years of their appearance.

Beyond that time, as the number of jet transports in use increases? No one knows. CAA Administrator James T. Pyle, who some time ago said an architectural genius might be required to solve their terminal building problem, now states:

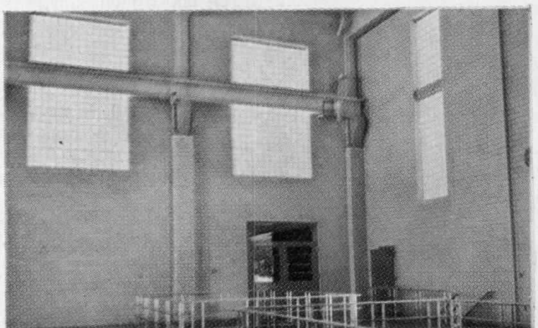
"Our job is to have the airways, the airports and the services ready for air commerce when it increases in size, and it takes a combination of informed guesses by veteran forecasters to do it. . . . We're in a fast league forecasting in an industry that shows this kind of growth: Domestic revenue passengers increased from 2.5 million in 1940 to 17 million in 1950, to 38 million in 1955 and 42 million in 1956. We look ahead and forecast 118 million in 1970. Of only one thing are we certain: the figures are going to be bigger."

(*More news on page 36*)

Increased production meets demands for genuine STRUCTURAL FACING TILE!



Filtration plant corridor combines good looks and good visibility with walls of glazed Facing Tile in light cream and soft green shades.



Structural strength plus low maintenance make Facing Tile ideal for industrial interiors. *Nottingham Filtration Plant, Euclid, Ohio. Consulting Architects: Small, Smith and Reeb; Consulting Engineers: Havens and Emerson.*

Another important reason for specifying Structural Facing Tile for load-bearing interior walls!

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And as every experienced architect knows, structural clay with ceramic finish is ideal for commercial and industrial structures, schools and hospitals. Builds walls and beautiful, durable finish in one . . . resists hardest usage, stays lovely with a minimum of maintenance, and without refinishing.

Your clients will welcome the wonderful advantages of Structural Facing Tile . . . *and on-time completion.*

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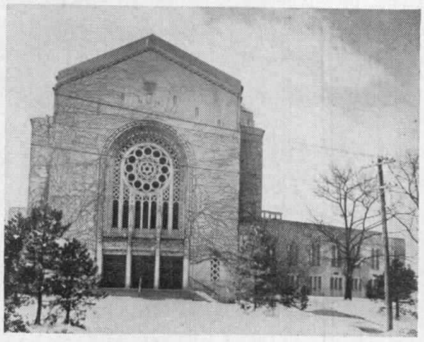
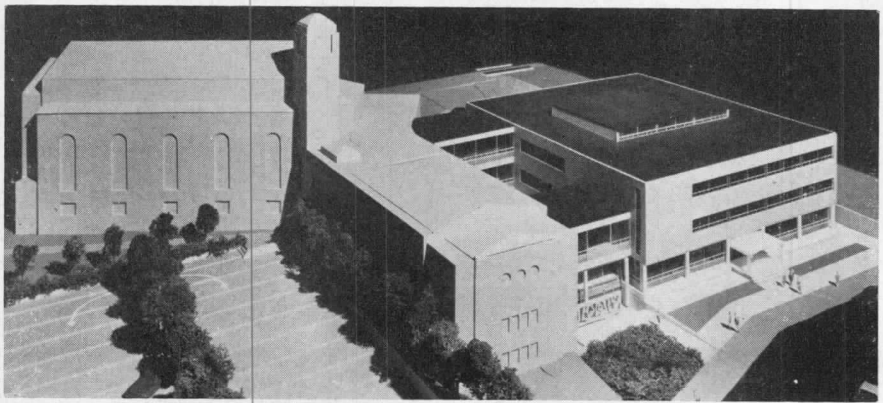
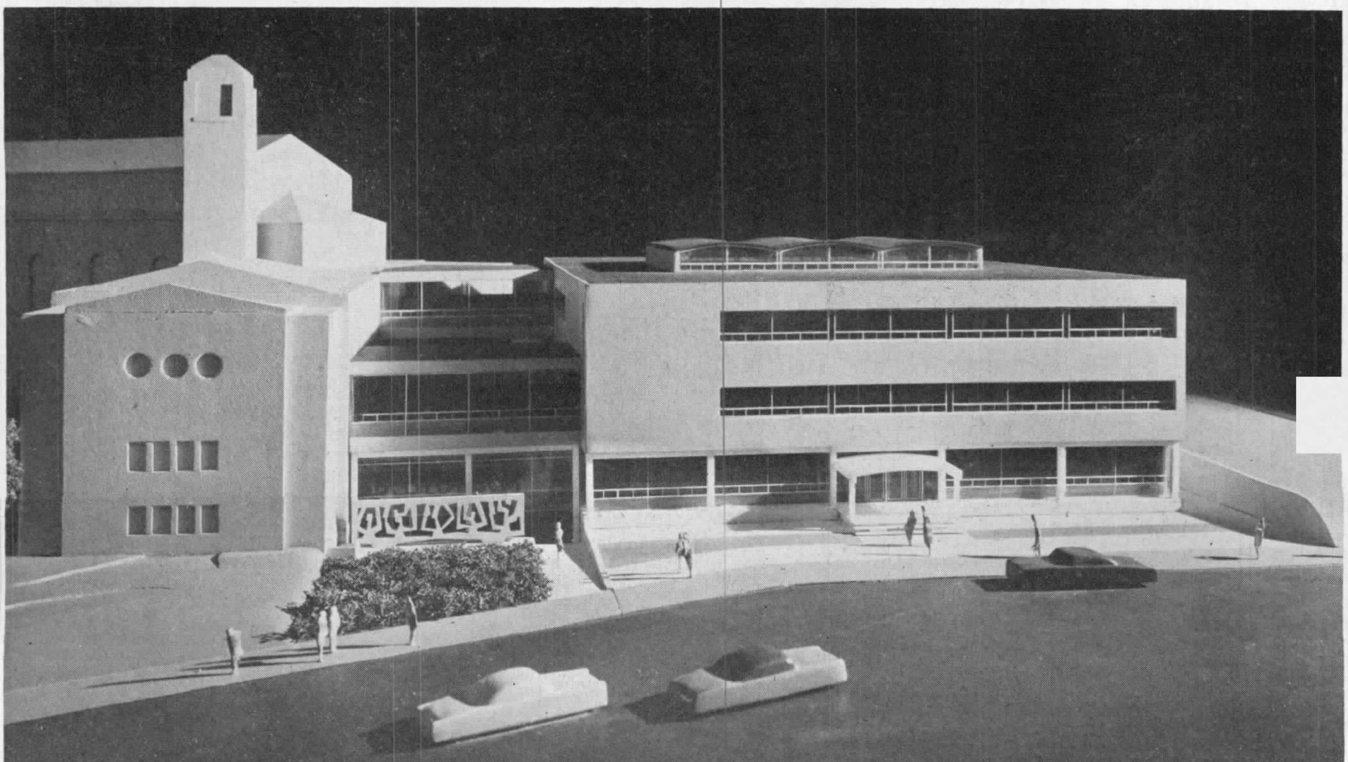
AN OLD SYNAGOGUE GETS A NEW ADDITION



A frankly contemporary solution to the problem of a major addition to an old building has been evolved by the architect, Jack Brenzel, John B. Parkin Associates, in this project for Holy Blossom Temple, a reformed Jewish congregation in Toronto. The proposed addition provides increased facilities for child education, youth activities and adult social activities. "The primary concern," the architect writes, "is to build a new education and social center that will be in keeping with the standards of today, maintaining an entity of its own and, at the same time, tying it both physically as well as esthetically to the existing sanctuary and school." The major functional problems, those of separating the areas used by the children and youth from those used by the adults and of connecting them with related areas in the existing building, have been solved by putting the school on the two upper floors and the adult auditorium on the lower two and connecting them to the old building on each floor by means of two glass "necks." As for the esthetic problem, the architect writes: "In order to maintain a sympathetic relationship with the existing sanctuary and school, the exterior walls are of exposed concrete. The texture resulting from the concrete mix and the horizontal forming boards is repeated in the new structure. The 'slot' type window in the two upper school floors is an attempt to further the relation. The Roman arch found in the existing sanctuary windows is used in the new building in the form of a barrel vault canopy at the entrance to the school and in the barrel vault clerestory. The sculptured concrete screen on the north side visually carries the exterior material from one building to the other."





(Continued on page 40)

As attractive in business as it is gracious at home...

rich, lustrous Craftwall wood paneling!

Rib Room . . . Hotel Roosevelt, *New York. Here guests from the world over dine in an inviting atmosphere created by rich walnut Craftwall.*

New guest room in the home of TV stars Peter Lind Hayes and Mary Healy gains light-hearted charm from walls of elm Craftwall.

Craftwall has that genuine hand-rubbed look . . . professionally pre-finished to give the most durable wood finish known . . . every "plank" selected to show the superb, natural grain.

Today, home-like charm sets the mood being created for many commercial and institutional locations—offices, smart shops, restaurants. Achieving it becomes so much simpler with Craftwall wood paneling.

Craftwall has such special richness and warmth. And what versatility for you in its nine distinctive woods: *Elm,* two kinds of *Birch, Cherry, Maple, Knotty Pine, Oak, Mahogany* and *Walnut*. All are beautifully finished to a glowing, durable luster that resists scuffs and stains. Craftwall needs no waxing either . . . cleans with a damp cloth. Clients are assured minimum upkeep, work and expense.

Craftwall ¼" panels come in modular sizes (48"x96", 48"x84", 32"x64", 16"x96", or longer)—particularly valuable on modernizing jobs where speed is so important. You can recommend Craftwall wood paneling with complete confidence. It's backed by a written lifetime guarantee to your client. Craftwall could be the answer to many of your current design and wall treatment problems. Why not send the coupon for additional details? (In New York, visit our Roddis Rockefeller Center Showroom —620 Fifth Avenue.)

Roddis also offers custom Hardwood Paneling . . . Doors . . . Wood Finishes . . . Adhesives . . . Plywoods and Hardboards

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Please send me your Designer's Idea and Fact File on Craftwall wood paneling.

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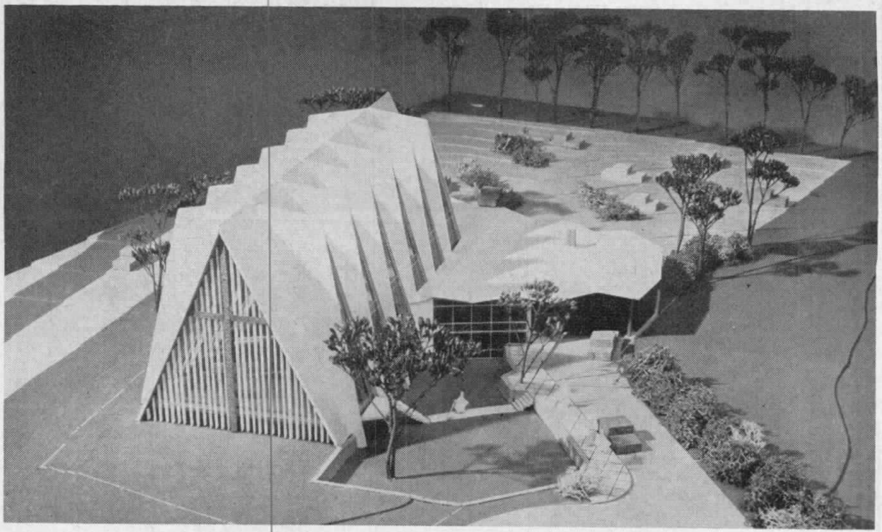
NEWS FROM CANADA

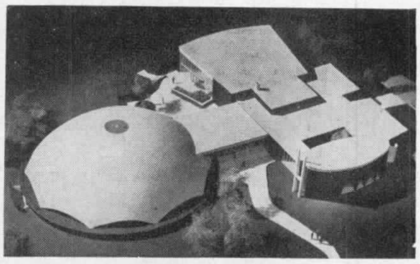
(Continued from page 36)

CONTEMPORARY EXPRESSION FOR TRADITIONAL SPIRIT

This design by Architect James A. Murray for the Yorkminster United Church near Toronto is an effort to respect traditional philosophies of church building in a structure that also expresses the religious spirit of today.



The project is being constructed in stages, with the nave and chancel first to be completed; a Sunday School wing and parlor (at right in model photo) will be next. The structure is a series of groups of four laminated wood beams rising to a height of 55 ft from the floor of the nave; foundation and exteriors are reinforced concrete.



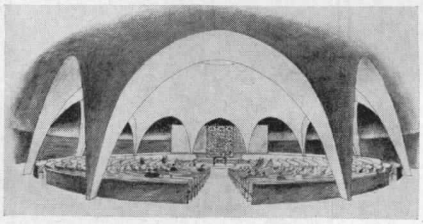
ADATH ISRAEL SYNAGOGUE: ANOTHER TORONTO PROJECT

A new synagogue for Adath Israel congregation is under construction in North York Township near Toronto.

The sanctuary is "in the round," the architect writes, "similar to the Elizabethan stage." It will seat about 800, and will be enclosed by a dome spanning over 100 ft and rising about 40 ft from floor to top.

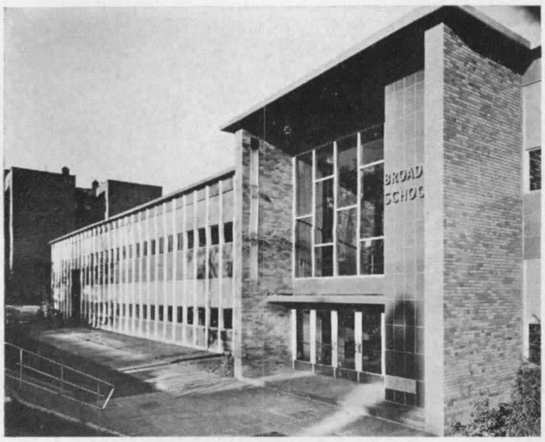
Other facilities to be provided include a social hall for about 400; a small chapel, oval in shape, seating about 125; a number of classrooms and smaller meeting rooms; offices and service facilities.

Architect for the project is Irving Grossman *of Toronto.*



(Continued on page 44)

BROADWAY SCHOOL
NEWARK, N. J.
Kruger & Fava—*Architects*
Walter Kidde Constructors, Inc.—*Builder*
Spandrel panels and entrances are in Mountain Green Ceramic Veneer units 20" x 20" x 1¼".



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No building material is more stimulating to creative design than Ceramic Veneer, the modern architectural terra cotta. Unmatched in versatility of form, color and texture, it fits into your plans for smart, functional schools where color is used to keynote youth, generation after generation. You have full freedom in the selection of colors and textures because Federal Seaboard custom-makes every unit, large or small—plain surfaces, sculpture, or decorative panels—to your precise specifications. Big-city grit and grime are resisted by the fire-hardened surface, which requires only simple soap-and-water washings for retention of original beauty. For interiors as well as exteriors, in schools and other public buildings, Ceramic Veneer is in a class by itself—for quality, appearance, permanence and price. Without charge we will gladly furnish construction detail, data, color samples, and advice on preliminary sketches involving use of Ceramic Veneer.

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THE RECORD REPORTS

NEWS FROM CANADA

(Continued from page 40)

AN ARCHITECTURAL LOOK AT THE FUTURE OF VANCOUVER

Following publication of a report, "Downtown Vancouver, 1955–1976," by its Technical Planning Board, Vancouver's city council invited various professional, business and civic groups in Vancouver to study the conditions described and recommend what should be done to halt further decline in business volume and assessment values. (Whereas 10 years ago, in the metropolitan area of Vancouver, eighty cents of every consumer dollar was spent downtown, today only fifty cents is spent there.)

The most exciting answer proposed to the problem so far is "Project '58", an ambitious scheme aimed at restoring the ailing section of the city to full economic health. It is the work of an association of architects, consisting of Wells Coates, Arthur Erickson, Geoffrey Massey, Peter Oberlander, and E. J. Watkins, architects, urban planners and designers.

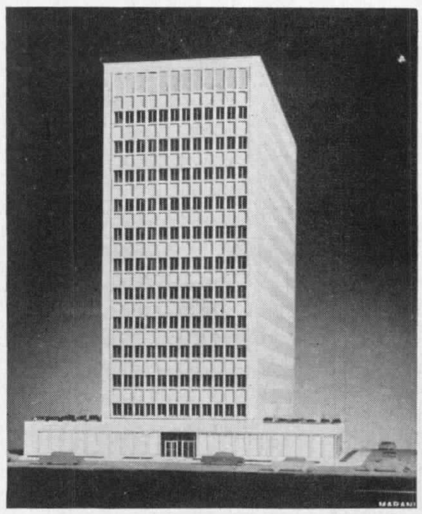
These professionals, who have private sponsorship, realize that the success or failure of so momentous an undertaking as the complete renewal of Vancouver's business, commercial and cultural core, rests on public acceptance. Therefore, they have undertaken to prepare a "living" display of their concepts of a new city center, timed to coincide with the B. C. Centennial in the summer of 1958.

The exhibition — final goal of "Project '58" — will provide, in the form of models and renderings, a comprehensive visual translation of numerous analytical studies and forecasts, made in collaboration with various professional, business and civic groups as well as city departments.

One of the parties most vitally concerned is, of course, the Downtown Business Association. To this body, the "group of five" has suggested formation of a redevelopment corporation. Such a body would be the entity through which all affected interests could channel their ideas and proposals.

Curtain was lifted on "Project '58" on April 17, at a joint meeting of the Vancouver Chapter, Architectural Institute of B. C., and the Vancouver Branch, Community Planning Associa-

(Continued on page 46)



SHELL OIL BUILDING, under way in Toronto and scheduled for completion late in 1958, will be 13 stories high but designed for extension to 20 stories. Structure is to be welded steel. Estimated cost is $6 million. Architects: Marani & Morris. General contractor: Redfern Construction Co. Ltd.

THE RECORD REPORTS

NEWS FROM CANADA

(Continued from page 44)

tion of Canada. The five-man team, appearing as the program feature, urged that immediate action be taken to stave off decline of the city's heart.

ALBERTA ENGINEERS ELECT AT CONVENTION IN CALGARY

Holding its 37th annual meeting in Calgary, the Association of Professional Engineers of Alberta elected Dr. J. C. Sproule of Calgary president. He succeeds J. Graham Dale of Edmonton.

New vice president is Dr. G. W. Govier, also of Edmonton. Elected to council for three-year terms were C. W. Coote, Edmonton; W. D. Stothert, Edmonton; R. N. McManus, Edmonton; and R. D. Hall, Lethbridge. B. A. Monkman of Calgary was elected for a two-year council tenure. J. F. McDougall is registrar of the association; executive secretary is A. E. McDonald. Both are located in Edmonton.

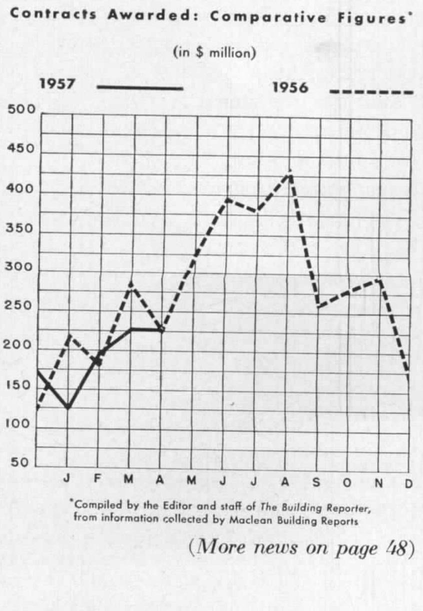
The Alberta engineers gave life memberships to two long standing members of the association — H. R. Younger and Frank Tempest, both of Calgary.

In addition, an honorary membership was bestowed upon Rt. Hon. C. D. Howe, Federal Minister of Trade & Commerce and a professional engineer in his own right, who was a guest speaker at the meeting.

In his address, Mr. Howe emphasized the need for more engineers in government. He termed the profession as "about the most outstanding of any I can imagine. Today the engineer is the most sought after of all the professional men," he said.

Contracts Awarded: Comparative Figures*

(in $ million)



*Compiled by the Editor and staff of *The Building Reporter*, from information collected by Maclean Building Reports

(More news on page 48)

Design for Hospital Entrance by Belluschi and Skidmore, Owings & Merrill

"CERAMIC TILE...FOR PERMANENT COLOR CLARITY, DURABILITY AND MINIMUM MAINTENANCE"

BELLUSCHI AND SKIDMORE, OWINGS & MERRILL

Belluschi and Skidmore, Owings & Merrill bypassed the institutional look . . . made ceramic tile color a therapeutic factor in this refreshing hospital entrance design . . . and guaranteed long life and low maintenance with well-considered ceramic tile specifications.

Tile's unique beauty, design flexibility and durability were all fully recognized. Imaginative use of standard tile units achieved an air of relaxation, efficiency and rigid cleanliness. Beauty is only the eye-catching part of the story. Consider the design from a hospital trustee "cost-accounting" viewpoint.

There's a tile floor to fight foot traffic for years with minimum wear and maintenance. The glazed tile wall at the right will gleam brightly on generations of patients. Take the inside-outside penetrating wall in the center—vivid proof of how tile's fired-fast colors can take extreme exposures. Note the smaller tiles facing the front of the reception desk. These fireproof surfaces will never need waxing, costly maintenance or replacement.

If you demand beauty, durability, long-range economy or design flexibility, you will find that ceramic tile provides them all. Your local tile contractor will give the details on the wide range of colors, textures and sizes. Specify ceramic tile on your next residential, institutional or commercial building. Both you and your client will be glad you did.

The Modern Style is CERAMIC tile

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PROPOSE ADVISORY PANEL ON PUBLIC ARCHITECTURE

The move to establish a broader approach to the design of Federal buildings gained new momentum last month with the introduction of identical bills in the House by Representatives Frank Thompson Jr. (D-N. J.), H.R. 7106, and Henry S. Reuss (D-Wis.), H.R. 7071.

These measures purported to meet the objections interposed earlier by the General Services Administration to other Thompson-Reuss efforts to amend the Public Buildings Act to expand the Fine Arts Commission and require Federal government officials (GSA's Public Buildings Service) to advise and consult with it on the architectural concept of new public buildings. It remained to be learned exactly what GSA's reaction to the new proposals would be, however. The Public Works committee to which the new bills were referred, had asked GSA to comment.

The new suggestion called for an advisory board of government architecture and decorative art which would provide advice and consultation on "the design style and decoration" of Federal buildings constructed throughout the country.

So important was the development to architects that Leon Chatelain, president of the American Institute of Architects, advised the office of Representative Thompson that he would schedule a discussion of the new legislation at the 89th annual convention in mid-May. AIA obtained multiple copies of the draft bill and in general it was thought that architects would support the new proposals. [They did; see page 8Aff.]

In its draft form, the legislation would compose the new board of 11 members including four architects, one architecttural historian, one landscape architect, two painters, one sculptor, one expert in the craft arts, and one expert in interior design. The GSA administrator would be directed to advise and consult with the Fine Arts Commission on District of Columbia construction and with the new board group on other Federal buildings. This course would be required "in order to establish the highest possible standards for architectural design, style and decoration for Federal public buildings, and methods of achieving such standards. . . ." The legislation made this important distinction — such advice and consultation would be with respect to general standards and methods, referring to specific buildings only where the GSA requested such reference.

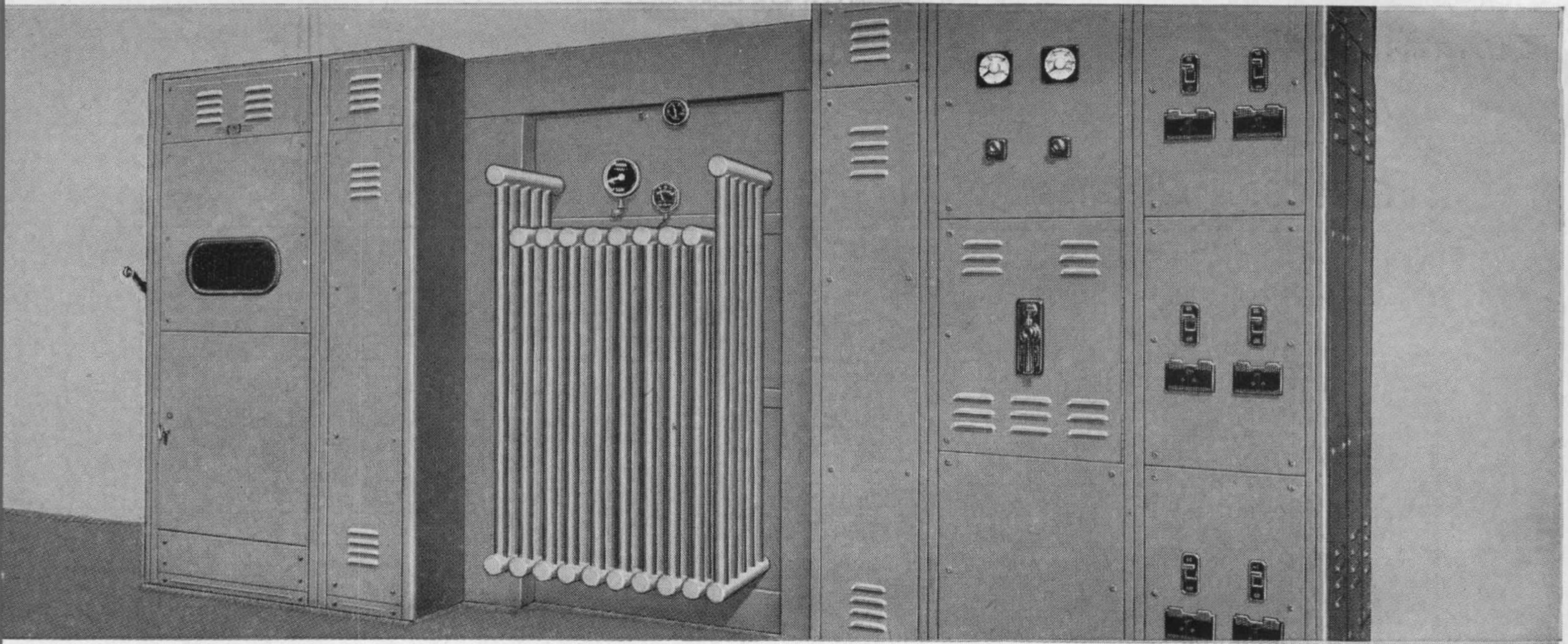
Appointments to the proposed board would be made by the President of the United States from among private citizens who enjoy wide recognition in their respective fields. He also would name the chairman. For precedents to "qualify" their proposals, the bills' authors cite the advisory committee of architects to the State Department on foreign buildings and the President's presented plan for a Federal advisory council on the arts in the Department of Health, Education and Welfare.

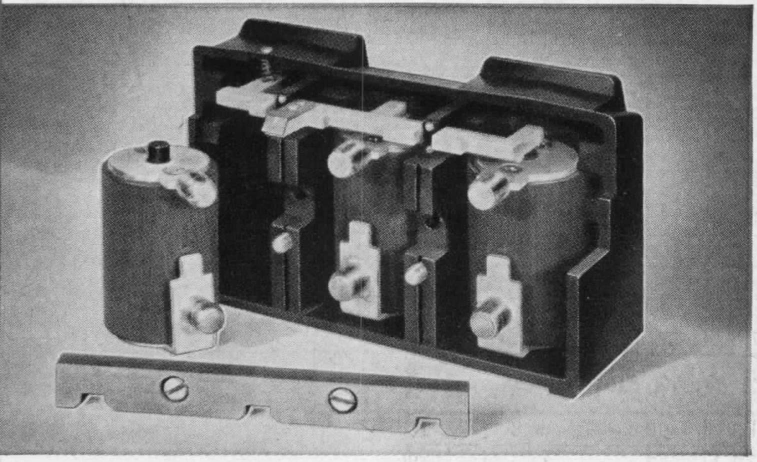
LEASE-PURCHASE REVIVED AFTER 3-MONTH "FREEZE"

The dormant lease-purchase construction program came to life May 9, with announcement of the Administration decision to lift the three-month "freeze" on all construction work under this act.

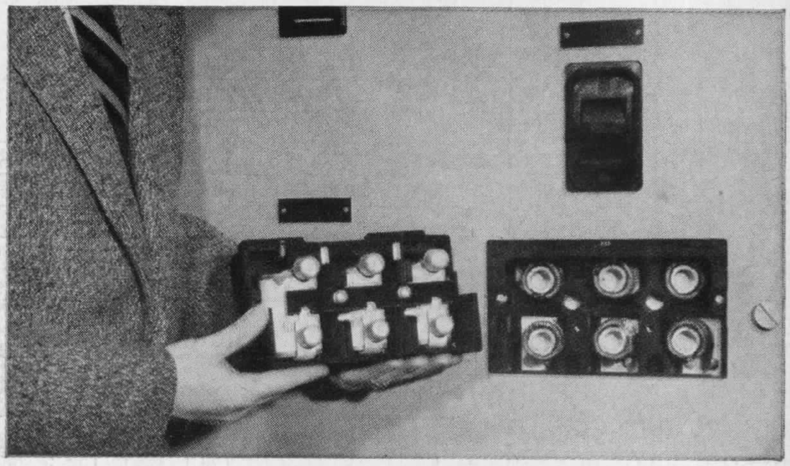
The announcement was made by

(Continued on page 300)





Four frame sizes of the 100,000 RMS ampere IC rated "Cordon" current-limiting breakers are now available—100, 225, 400 and 600 amps; 600 volts AC; 250 volts DC.



Mounted in molded cases, the Amp-traps are accessible from the front of the substation for speedy replacement. Consult a BullDog field engineer for complete details.

Now... Unit substations with new "Cordon" current-limiting breakers

Provide greater protection against high short circuits at less initial cost

Now, get the additional protection of this newly developed I-T-E Breaker in BullDog unit substations! "Cordon" current-limiting breakers protect circuits where fault currents may reach 100,000 RMS amperes . . . limit short-circuit currents of high magnitude to a fraction of their possible value. In one compact device they combine the advantages of standard thermal magnetic breakers with current-limiting characteristics of Amp-traps*.

These "Cordon" breakers bring real savings, too, since they can be used where more costly air breakers were once required. Amp-traps are mounted in a molded housing on the load side of the breaker. When any Amp-trap opens, all poles of the breaker open, thereby preventing possible single phasing.

Let a BullDog field engineer give you all the facts . . . show you the many safety and economy features of unit substations and complete BullDog electrical distribution systems.

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BULLDOG

ELECTRIC PRODUCTS COMPANY

A DIVISION OF I-T-E CIRCUIT BREAKER COMPANY

THE RECORD REPORTS: CONSTRUCTION COST INDEXES

Labor and Materials **U. S. average 1926–1929 = 100**

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

	NEW YORK					ATLANTA				
	Residential		*Apts., Hotels Office Bldgs.*	*Commercial and Factory Bldgs.*		*Residential*		*Apts., Hotels Office Bldgs.*	*Commercial and Factory Bldgs.*	
Period	*Brick*	*Frame*	*Brick and Concr.*	*Brick and Concr.*	*Brick and Steel*	*Brick*	*Frame*	*Brick and Concr.*	*Brick and Concr.*	*Brick and Steel*
1930	127.0	126.7	124.1	128.0	123.6	82.1	80.9	84.5	86.1	83.6
1935	93.8	91.3	104.7	108.5	105.5	72.3	67.9	84.0	87.1	85.1
1939	123.5	122.4	130.7	133.4	130.1	86.3	83.1	95.1	97.4	94.7
1946	181.8	182.4	177.2	179.0	174.8	148.1	149.2	136.8	136.4	135.1
1947	219.3	222.0	207.6	207.5	203.8	180.4	184.0	158.1	157.1	158.0
1948	250.1	251.6	239.4	242.2	235.6	199.2	202.5	178.8	178.8	178.8
1949	243.7	240.8	242.8	246.4	240.0	189.3	189.9	180.6	180.8	177.5
1950	256.2	254.5	249.5	251.5	248.0	194.3	196.2	185.4	183.7	185.0
1951	273.2	271.3	263.7	265.2	262.2	212.8	214.6	204.2	202.8	205.0
1952	278.2	274.8	271.9	274.9	271.8	218.8	221.0	212.8	210.1	214.3
1953	281.3	277.2	281.0	286.0	282.0	223.3	224.6	221.3	221.8	223.0
1954	285.0	278.2	293.0	300.6	295.4	219.6	219.1	223.5	225.2	225.4
1955	293.1	286.0	300.0	308.3	302.4	225.3	225.1	229.0	231.5	231.8
1956	310.8	302.2	320.1	328.6	324.5	237.2	235.7	241.7	244.4	246.4
Jan. 1957	315.7	306.2	327.8	338.7	331.9	239.8	238.1	245.5	248.1	250.8
Feb. 1957	316.5	306.5	329.5	341.2	335.1	239.8	238.1	245.7	248.7	250.8
Mar. 1957	316.5	306.5	329.5	341.2	335.1	239.8	238.1	245.7	248.7	250.8
	% increase over 1939					*% increase over 1939*				
Mar. 1957	156.3	150.4	152.1	155.8	157.6	177.8	186.5	158.4	155.3	164.8

	ST. LOUIS					SAN FRANCISCO				
1930	108.9	108.3	112.4	115.3	111.3	90.8	86.8	100.4	104.9	100.4
1935	95.1	90.1	104.1	108.3	105.4	89.5	84.5	96.4	103.7	99.7
1939	110.2	107.0	118.7	119.8	119.0	105.6	99.3	117.4	121.9	116.5
1946	167.1	167.4	159.1	161.1	158.1	159.7	157.5	157.9	159.3	160.0
1947	202.4	203.8	183.9	184.2	184.0	193.1	191.6	183.7	186.8	186.9
1948	227.9	231.2	207.7	210.0	208.1	218.9	216.6	208.3	214.7	211.1
1949	221.4	220.7	212.8	215.7	213.6	213.0	207.1	214.0	219.8	216.1
1950	232.8	230.7	221.9	225.3	222.8	227.0	223.1	222.4	224.5	222.6
1951	252.0	248.3	238.5	240.9	239.0	245.2	240.4	239.6	243.1	243.1
1952	259.1	253.2	249.7	255.0	249.6	250.2	245.0	245.6	248.7	249.6
1953	263.4	256.4	259.0	267.6	259.2	255.2	257.2	256.6	261.0	259.7
1954	266.6	260.2	263.7	273.3	266.2	257.4	249.2	264.1	272.5	267.2
1955	273.3	266.5	272.2	281.3	276.5	268.0	259.6	275.0	284.4	279.6
1956	288.7	280.3	287.9	299.2	293.3	279.0	270.0	288.9	298.6	295.8
Jan. 1957	289.7	281.1	290.8	302.0	297.2	283.1	272.7	297.2	307.6	303.5
Feb. 1957	289.7	281.1	291.0	302.6	297.2	283.1	272.4	296.9	307.4	303.4
Mar. 1957	289.0	280.8	290.6	302.2	296.7	283.1	272.4	296.9	307.4	303.4
	% increase over 1939					*% increase over 1939*				
Mar. 1957	162.2	162.4	144.8	152.2	149.3	168.1	174.3	152.9	152.2	160.4

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

index for city A = 110

index for city B = 95

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

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

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

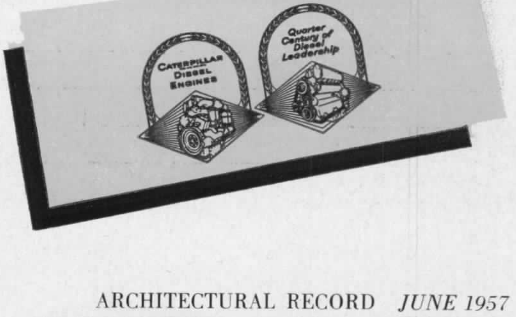
Conversely: costs in B are approximately 14 per cent lower than in A.

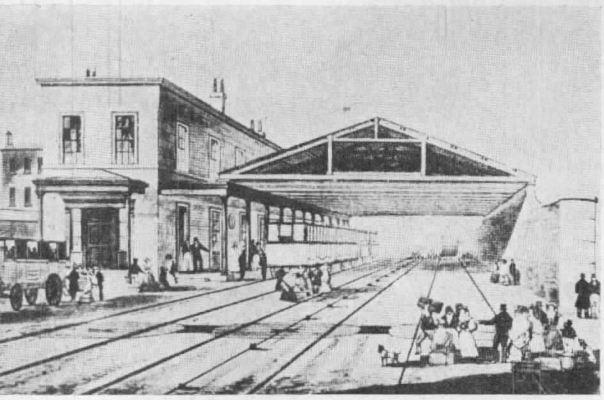
$$\frac{110-95}{110} = 0.136$$

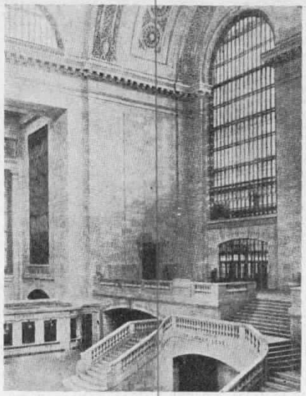
Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926–29.

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


HOTEL SUBURBAN


Caterpillar Diesel Engines
Quarter Century of Diesel Leadership





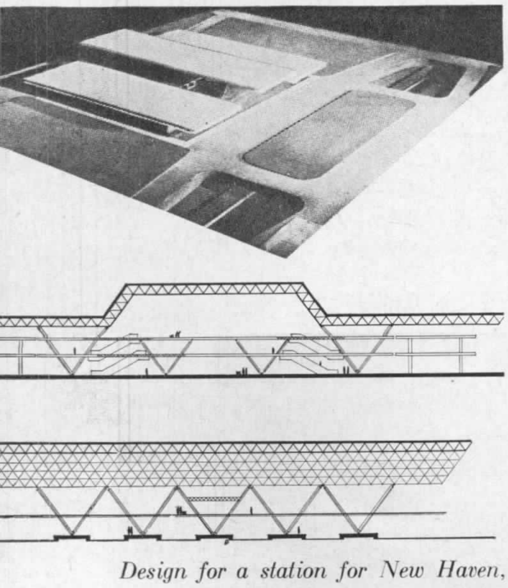
Liverpool, Crown Street Station. John Foster II, architect (?), George Stephenson, engineer, 1830; Right: New York, Second Grand Central Station, Concourse, 1903–13

The Railroad Station. By Carroll L. V. Meeks. Yale University Press (New Haven, Conn.) 1956. 202 pp., illus. $7.50

BUILDING FOR THE IRON HORSE — A STUDY IN 19TH CENTURY DESIGN

By **MARJORIE B. NOYES**

Rome, Second Stazione Termini. Angiolo Mazzoni and E. Montuori, architects, Leo Calini, engineer, 1931–51



Design for a station for New Haven, Conn. By Duncan W. Buell, 1953

Railroad stations, during the century before aviation, stood as the gates of the world's major cities. They were then, and still are, among the most heavily trafficked buildings in the cities. Architects and planners today are still trying to solve the problem of getting the passenger to and from the train with as much speed and comfort as possible. This involves not only planning pedestrian traffic, but also baggage facilities, restaurants, rest rooms, ticket and information booths and, in many cases, small shops. The magnificent opportunities to develop great spatial relations in railroad stations offer aesthetic appeal and invite engineering ingenuity.

In *The Railroad Station*, Carroll L. V. Meeks has used the passenger railroad terminal as a vehicle for studying the architecture of the Western world since 1800. He chose the building type because it is especially representative of the new problems of design posed by the Industrial Revolution. His purpose is to reveal the possibility for a re-evaluation of the 19th century architecture as a single style dominated by the practice of picturesque eclecticism much practiced and admired in that period.

Railroad stations represent not only the work of exceptionally able architects. This does not mean that railway architecture was either mediocre or unimportant. Its value as a sample is that it is representative.

Another basis for accepting stations as typical of the building activity of the last century is their connection with one of the great problems of the period — the resolution of the relationship between architect and engineer.

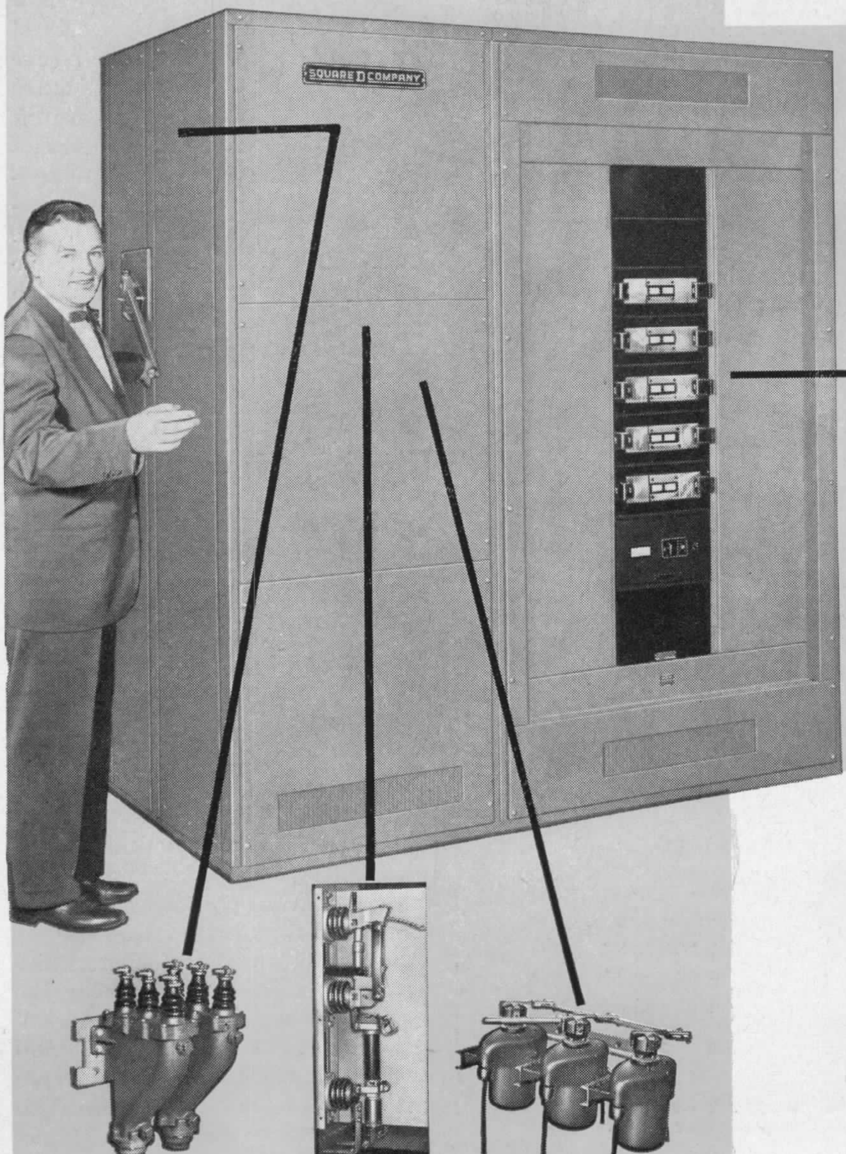
In presenting his theory, Mr. Meeks has organized his text well and with considerable interest. In chronological order, he relates the problems of railroad station design, giving us a brief but adequate background of the development of the railroad as well as the architectural engineering and artistic developments of the terminals. In the first chapter the author analyzes the entire picturesque eclectic period.

The period between 1830 and 1845 represents the pioneer stage of railroad stations. It is to be remembered that there was no functional precedent for the depot and that every solution had to be invented. The author proposes that the most logical ancestor to the railroad station was the toll-house from which the most characteristic feature of the 19th century station may have evolved — that of the train shed.

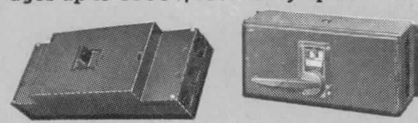
English railroad stations as well as English railroads of this period established the patterns for the whole world. It was at Crown Street Station, Liverpool, that the peculiarly 19th century phenomenon — the train shed — was born. The train shed can be said to typify the inventive spirit of that century. Engineers seized upon the potentialities of the new material, iron, and began to set new records for spanning.

(Continued on page 62)

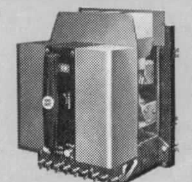
SQUARE D's NEW Unit Substation IN POWER-STYLE CONSTRUCTION

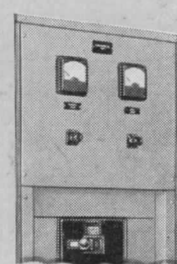


Designed to match Square D's Power-Style switchboards and control centers, these new Unit Substations meet NEMA, ASA, and AIEE standards. Available from 75 to 500 KVA; in primary voltages up to 4800V; secondary up to 600V.

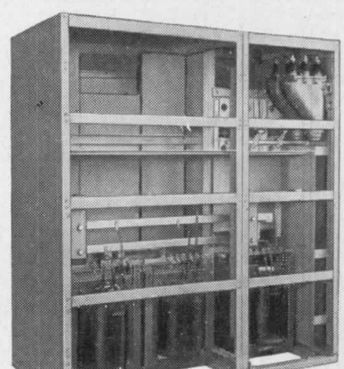


Molded case circuit breakers (*left*) up to 800 amperes and QMB Saflex fusible switches (*right*) up to 600 amperes are available in compact panel construction.





Large air circuit breaker (*above*) up to 1600 amps can be combined with a short panel in one section.



REAR VIEW

3 single phase, dry-type transformers individually mounted on base in ventilated enclosure—heating and vibration held to a minimum. Transformers easily accessible for maintenance and inspection. When no air circuit breaker or metering equipment is used, entire area at top left is available for pull box.

Potheads, fused or unfused load break air-interrupter switches and fused or unfused oil-filled cutouts are available. Air-interrupter switches and cutouts are easily accessible from front of Substation.

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE!

SQUARE D COMPANY

REQUIRED READING

(Continued from page 58)

From this first experimental and inventive period the author continues to portray the development of railroad stations and picturesque eclecticism through to the present time.

The period from 1890 to 1914 saw the gradual movement away from picturesque eclecticism which was to grow into the completely new movement of modernism (for want of a more precise term). It was during this period that the present Grand Central Station was built in New York City. The author describes this as one of the outstandingly successful stations in history. That many contemporary architects agree with Mr. Meeks was recently borne out by the many protests voiced when the station was threatened with destruction to make way for a new, more contemporary terminal.

In the final chapter the author sums up his thesis with an application for the present and the future. He feels that now, as the tumultuous period of whitewashing tradition and privilege is coming to an end, a wiser view can be entertained. As time passes the indubitable merits of picturesque eclectic buildings will be more widely recognized. "In the days to come calculated use will be made of such 19th century experiments . . . and both trainsheds and shopping arcades may be studied as the starting points for new development." The entire study makes a great point for the originality and rugged individuality of the 19th century architect and engineer in contrast with the present trend toward conformity.

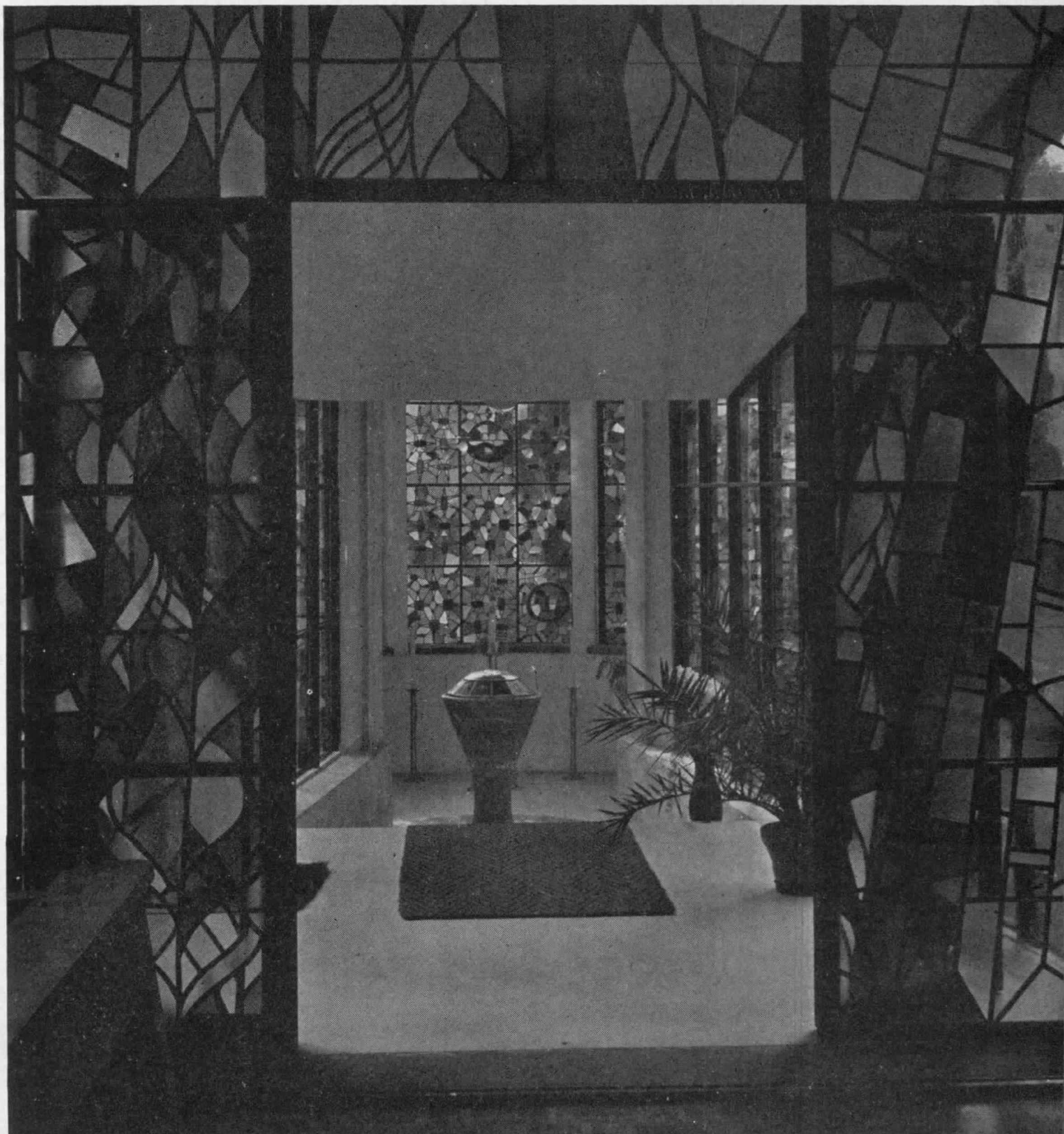
Whether or not the reader agrees with the author (and there will be many who do not), this is an interesting and scholarly book — if only for its historical content. There are many photographs and drawings to illustrate the text. This reviewer wishes that the illustrations accompanied the text and that the text were not quite so encumbered by a multitude of footnotes and references — these might be better exchanged with the photographs which are inconveniently grouped at the back of the book.

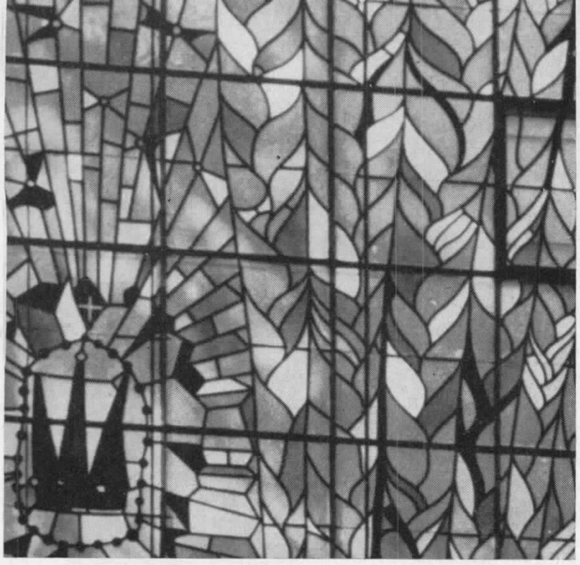
The Railroad Station was awarded the Hitchcock Award by the Society of Architectural Historians for the best history of architecture book in 1956. Carroll L. V. Meeks is associate professor of architecture and the history of art at Yale University.

(More reviews on page 372)

JUNE 1957
ARCHITECTURAL
RECORD

7 GERMAN CHURCHES





IN THE REBIRTH OF A

by G. E. KIDDER SMITH, A.I.A.

Architect, church consultant, author, lecturer, and member of the Commission on Architecture of the National Council of Churches. The research, most of the photographs, and layout of this article are also the work of the author

THE POSTWAR church-building activity in West Germany is without question the most audacious and stimulating in Europe. Rising from the ashes of war's incredible destruction, seeking, probing, striving towards the answers of today's church in today's ethos, these new churches have a conviction that bursts with imagination and lessons. For here will be found no warmed-over pastiche or faint-hearted aping of ancient forms, but the very firm conviction that church building today can contribute just as much to the religion and culture of our time as it has throughout the greatest periods of architecture. For the history of architecture is largely the history of religious buildings, and a review of the world's great architectural achievements will show that virtually all were as advanced, as "modern," for their time as possible. Indeed the buildings of the 12th to 14th centuries that we call Gothic — those now considered the finest churches of Christendom — were initially held to be so outlandish that they were named for rude barbarians. There is thus an historic, traditional concept of continual progress in religious building. The West Germans today accept this as a challenge; they feel that it is unthinkable for the church to retreat into the worn-out mold of the past. The church to survive must go forward, not backward.

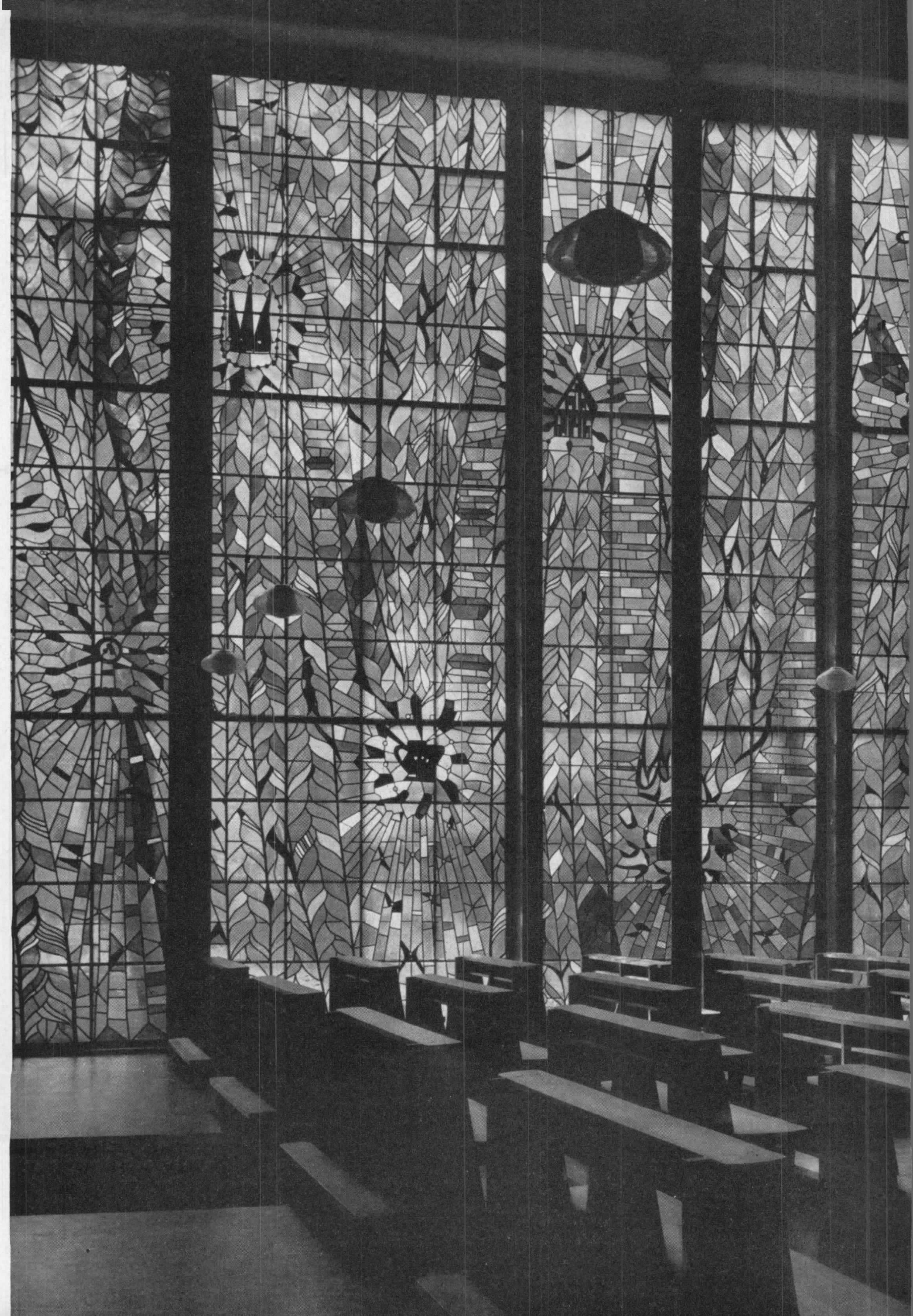
The prime center of this resurgence is the Rhine Valley, stretching from the Dusseldorf area in the north almost to the Swiss border (where another great church movement is active). Cologne might well be termed its capital, with strong local movements in Frankfurt and Saarbrucken. And although West Germany as a whole is somewhat more Protestant than Roman Catholic (roughly 55 percent to 45 percent), the greatest church-building activity both in quantity and quality has been Catholic. However, this has taken place not in the traditionally Catholic *länder* of Germany, which strangely enough have produced little new work of merit, but has been sparked in the predominantly Protestant Cologne area. The reasons for

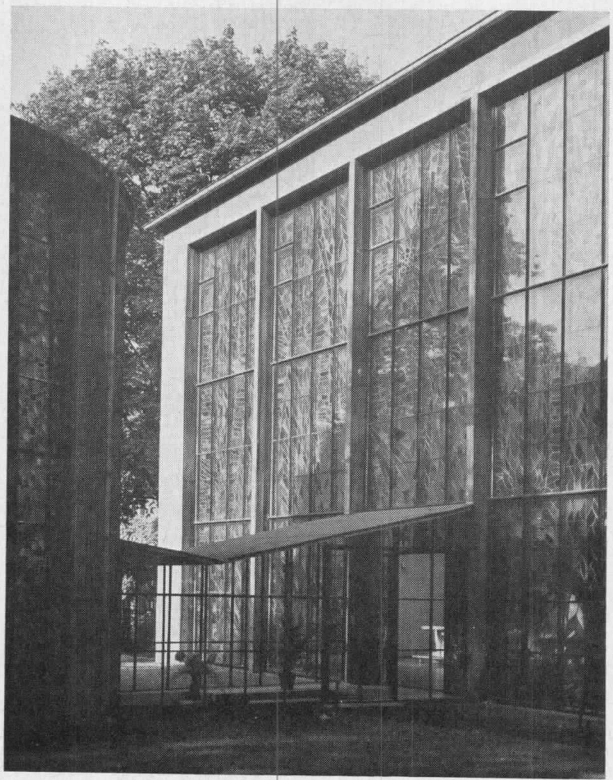
GREAT TRADITION

this are illuminating. One, the destruction in the Rhine-Ruhr basis was extremely heavy, necessitating large-scale rebuilding. In the Cologne diocese alone, for example, some two hundred new Catholic churches have been built in the last few years. Two, the Roman Catholic Archbishop of Cologne, Joseph Cardinal Fings, was convinced when the war ended that his church must make every effort possible to bring into the fold the shattered, troubled youth of Germany. The older people already belonged to the church; the young were largely drifting and psychologically uncertain about the future in general, let alone the church in particular. To bring the younger generation into the church the church must speak to youth in the terms of youth; it must let them know that religion is just as vital in our time and just as in tune with our time as it was in the past. To do less would be an admission of virtual religious bankruptcy. The physical expression of the house of God would of course be a vital — perhaps the most vital — factor in this challenge. An uncompromisingly bold and stimulating architecture would let young and old alike know visually, tangibly. and immediately that the church was indeed an alive dynamic organism. It could scarce speak of its concern for the future in the clothes of the past. And it need hardly be pointed out that all churches in all countries must so speak to survive. Thirdly, and finally, Archbishop Frings was particularly fortunate in the success of his church-building program in that Dominikus Böhm and Rudolf Schwarz were both Catholic and both residents of Cologne. These two, together with Otto Bartning, the famous Protestant church architect, were responsible for the magnificent series of modern churches built in Germany in the 1920's and early 30's — another post-war church movement and one whose rationale and development largely parallels the present one. Germany then as now was the leader in Europe in new church work. After this last war, when Böhm, Schwarz, and Bartning began to have extensive opportunities to express themselves again after a generation of vipers, they brought to their tasks their early experience of new church building matured by a long gestation of soul searching and provocative reflection. Their work which we shall now see has, as a result, few equals anywhere.

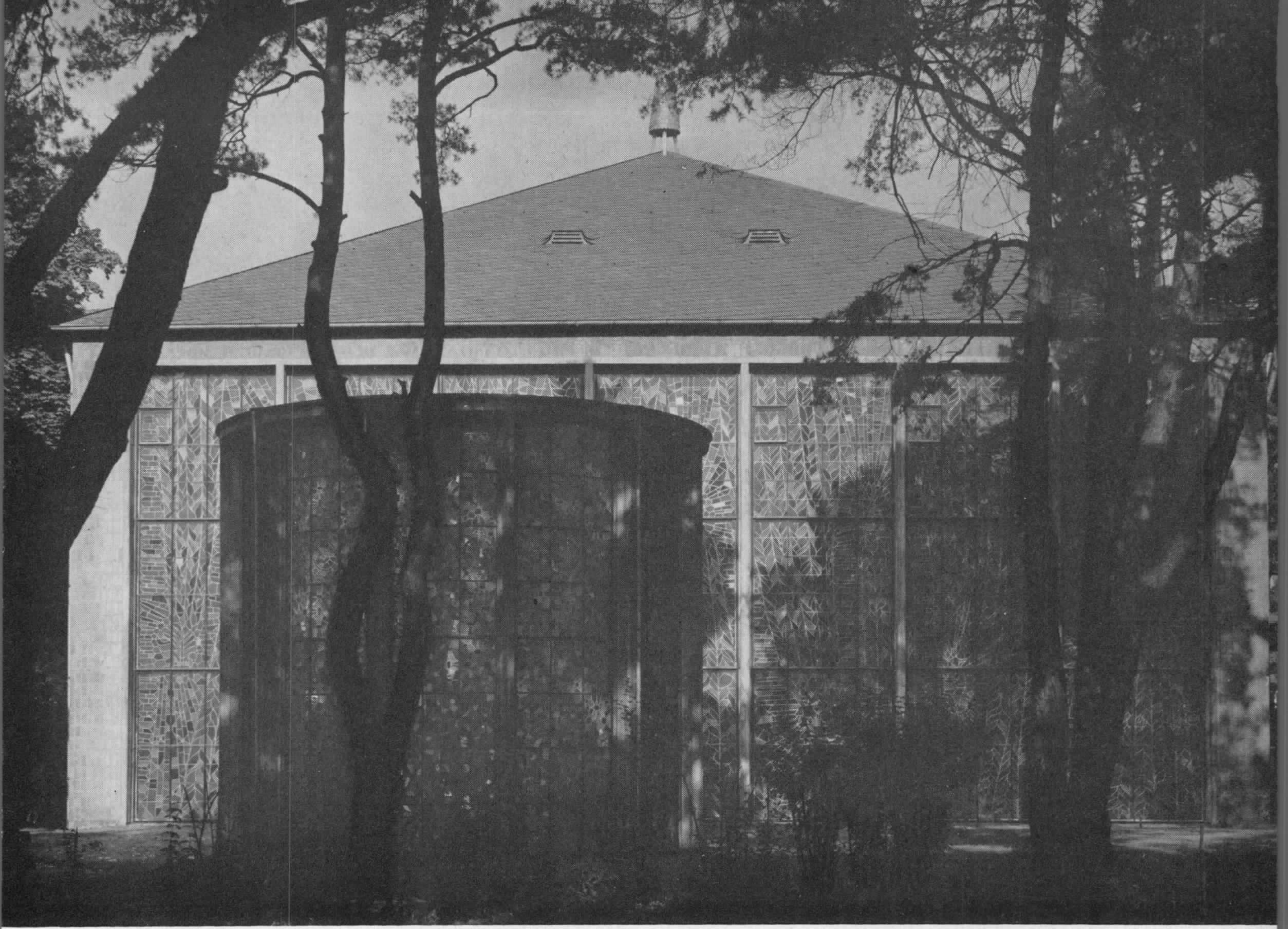
Before beginning with the individual churches it is well to keep in mind several general points concerning them. One of the most apparent features is that all of them, Protestant and Catholic alike, appear somewhat severe and spartan. There is none of the coddled luxury found in the U. S. A., but an almost businesslike, yet spiritual, directness. There are several reasons for this: One, so many churches are being built following war's destruction that there is not enough money at present for much embellishment. In numerous cases this will come later, although all agree that ideally architect and artist should cooperate from the inception. Two, because of the Nazi-enforced "hibernation" there are not as yet enough front-rank large-scale artists in Germany — painters, muralists, mosaicists, sculptors, glass designers — who are architecturally minded or trained. Brilliant exceptions will be found (beginning with the glass shown overleaf), but in general the art is not up to the architecture. Thirdly, the Rhinelanders themselves — as opposed to the Bavarians — are somewhat restrained in their use of exuberance and richness.

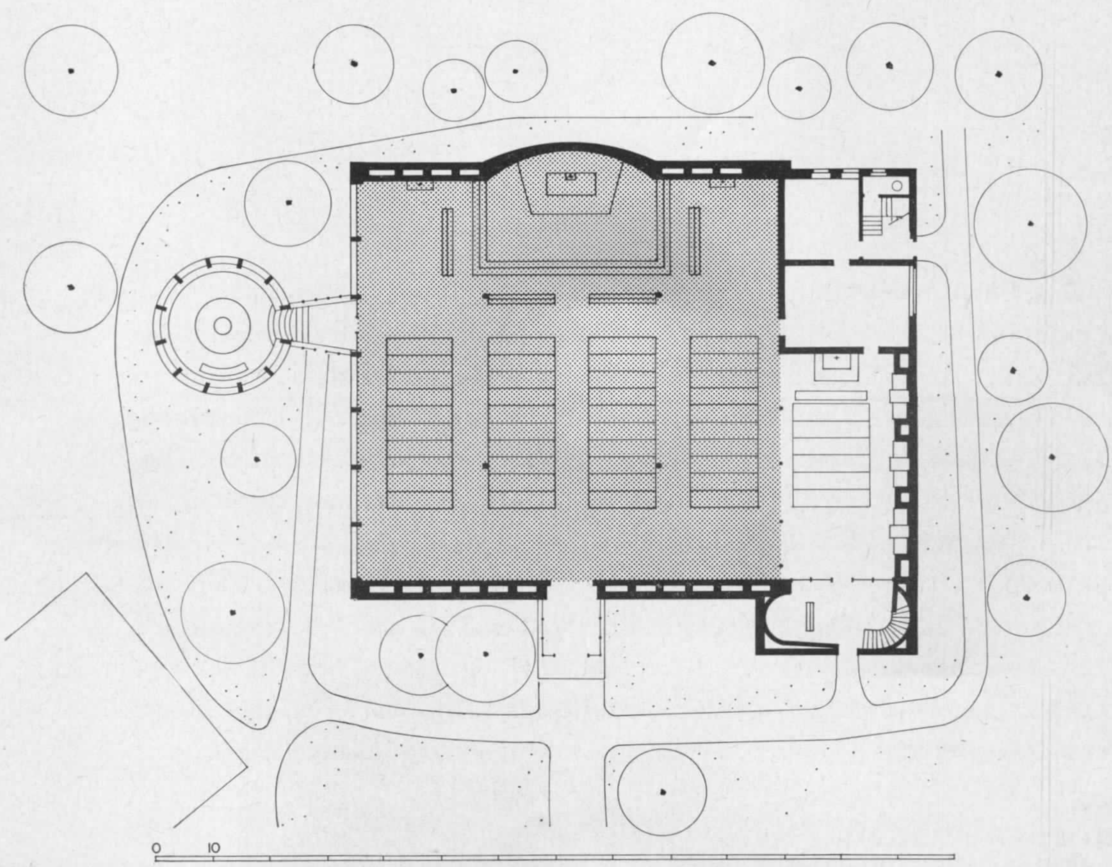
Another general point to remember in the churches shown here is the very strong and direct use of materials. There is no shilly-shallying about concrete, for instance, but a frank and revealing honesty. A third overall point concerns the lighting, especially the artificial. This difficult art is often accomplished with regular stock fixtures, but in each church the result seems tailored to the conditions, sympathetic to the architecture, and effective to the parishioner. Finally these churches are not shaved-down boxes with volume only: they are living, spiritual, three-dimensional spaces, spaces for worship, spaces for reverence to God.





1 MARIA KÖNIGIN, Goethestrasse, Cologne-Marienburg (Dominikus Böhm, architect). The glory of this wonderful church lies not in its solid square form but in its weightless elegant wall of glass and its adjacent baptistery, all designed by the late father of the modern church movement in Germany who died in 1955. The great sparkling silver-gray window, set in a black painted steel frame, has a pattern of abstracted leaves and branches into which fourteen symbols of the Litanies of Mary in yellow, green, and red antique fragments are woven. Through this are felt the actual trees of the park outside. Beyond, as a detached jewel separated by clear glass lies the circular baptistery ablaze with its own colored panes. The nave itself is supported within by four simple lally columns, like tent poles, painted bright red as a foil to the gray of the windows and waxed oak of the floors. The exterior was suppressed to keep it in character with the quiet residential neighborhood.

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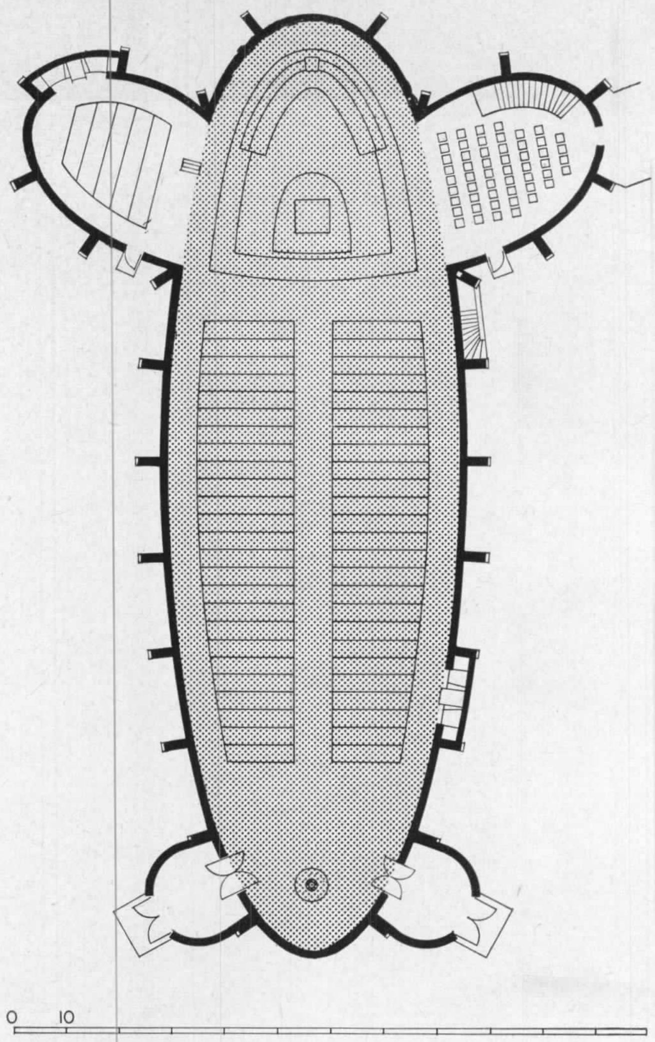
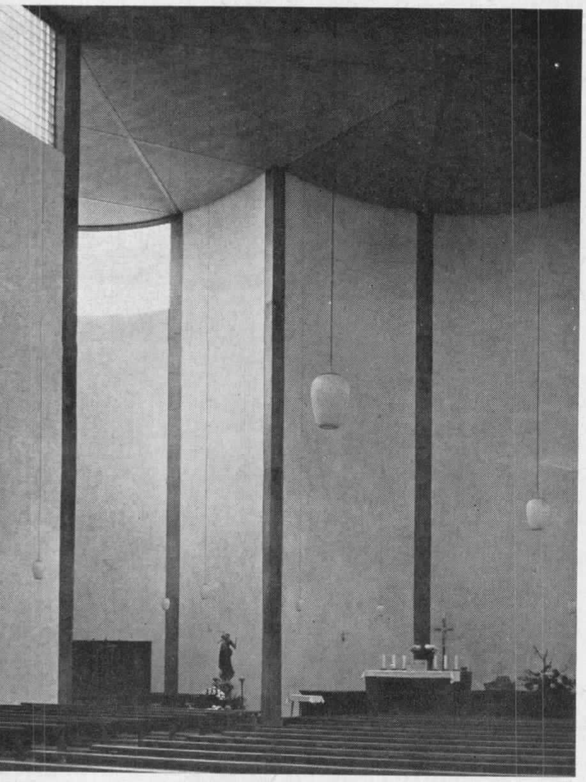
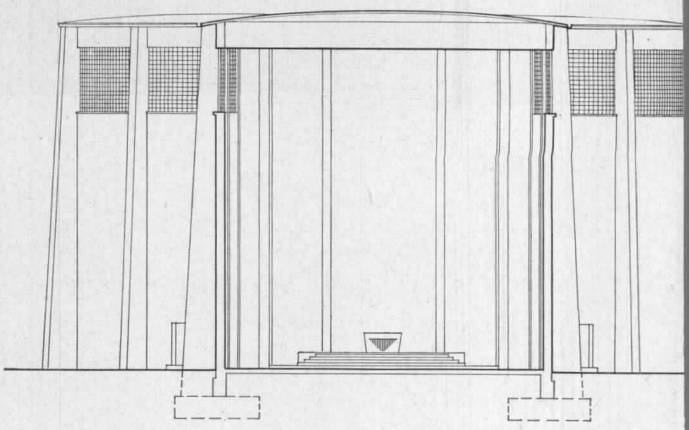


2 ST. MICHAEL, Rotlintstrasse, Frankfurt-on-Main (Rudolf Schwarz, architect). Ein Feste Burg Ist Unser Gott: A Mighty Fortress is Our God, and in the smashing strength of this church — like some great ship plowing through eternity — Schwarz has achieved one of the strongest churches yet designed. Disdaining comeliness without or pleasant glass within — the church is lit by commercial glass brick — a detached retreat from the outer world with a strangely moving inner beauty has here been realized. The modified ellipse of the plan, pointing the four directions of the worldly compass, has been used since the Renaissance in Germany, but never with such simple dignity and power. The single altar was designed as a freestanding square so that the priest could officiate on any side, facing the nave on Sunday and either chapel on less crowded weekdays. The daily worshipper would thus feel comfortably in touch with the high altar at all times. The baptismal font is

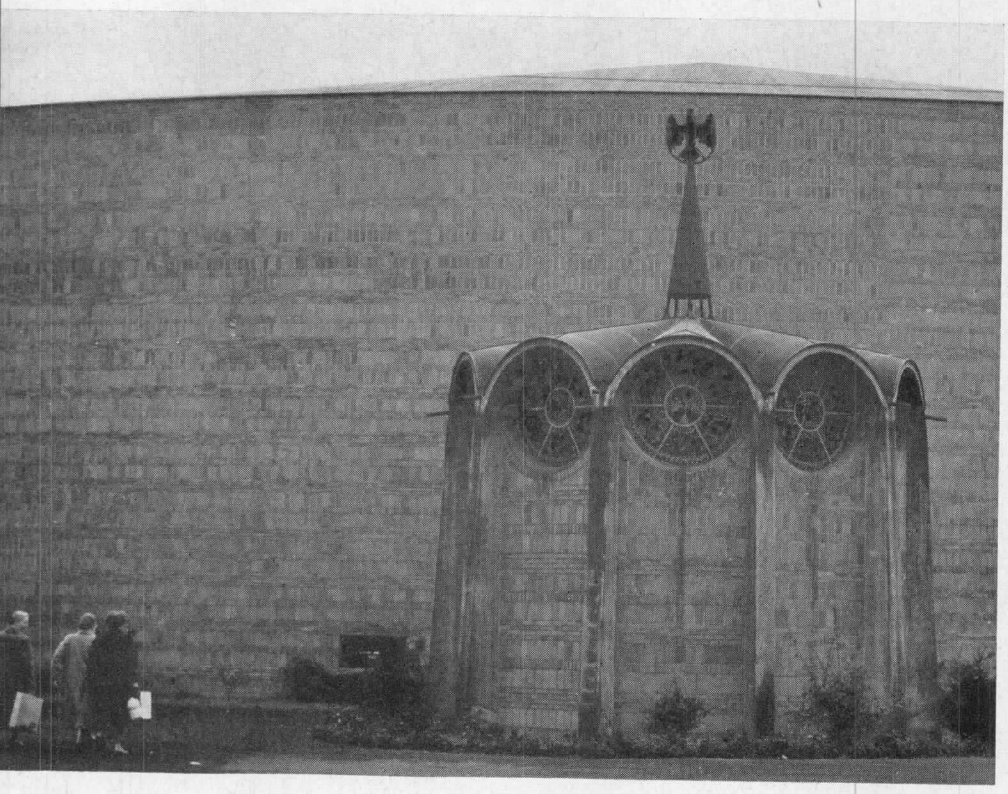
Photo on opposite page, Arthur Pfau



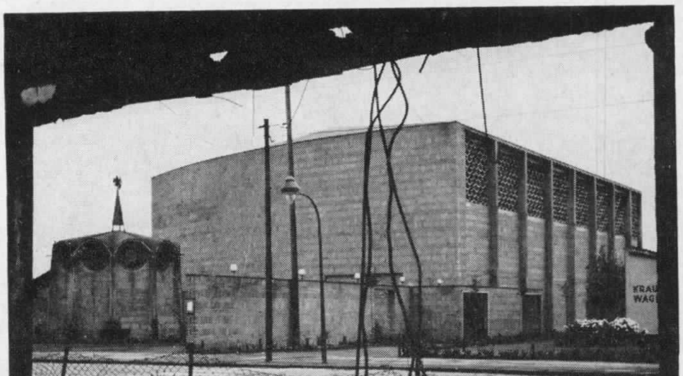


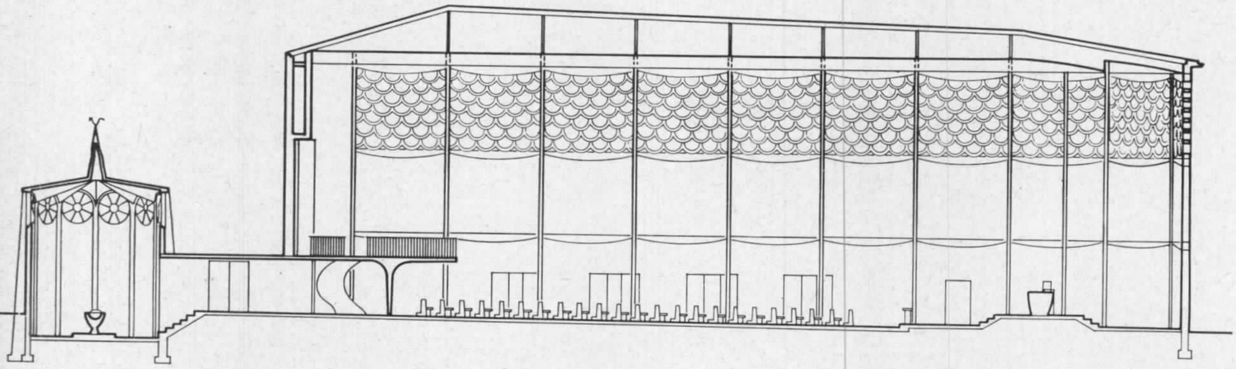
2 ST. MICHAEL

at the opposite pole of the ellipse from the altar. Schwarz wanted to wall off the distractions and worries of the outside world through his interiors, and by bringing the parishioners to a holy room of inner beauty to send them home refreshed and spiritually strengthened. Note how the lofty cross section with its high clerestory band of light contributes to this effect. The left chapel (above) contains the confessionals and Stations of the Cross; the right chapel accommodates the choir and a stairway leading down to the crypt. St. Michael's is constructed with a reinforced concrete frame whose ribs are set every five meters apart. The cavity walls are of brick, red without, set in the exposed concrete frame; lightly stuccoed and painted white within. The floor is black quarry stone which is also used to face the inner concrete frame. The ceiling is light blue with gold ribs. Note the careful accents of the simply suspended simple lighting fixtures. A detached belfry will be added.

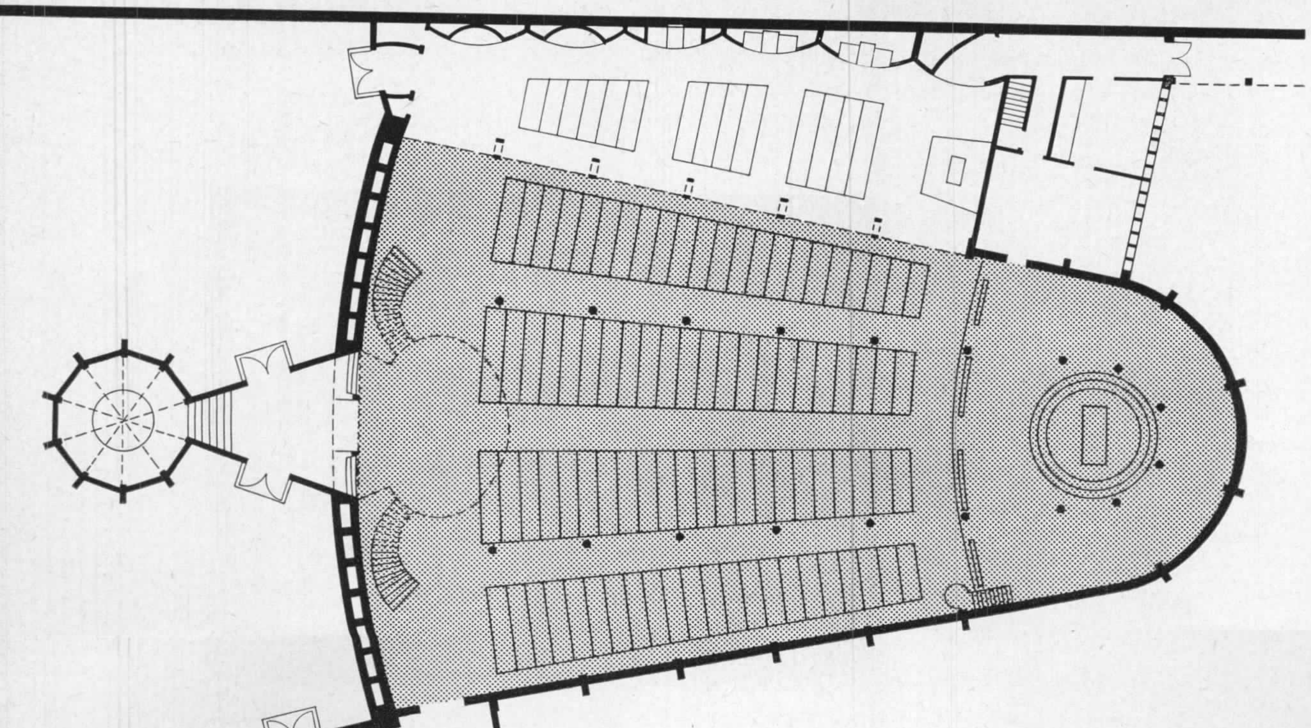


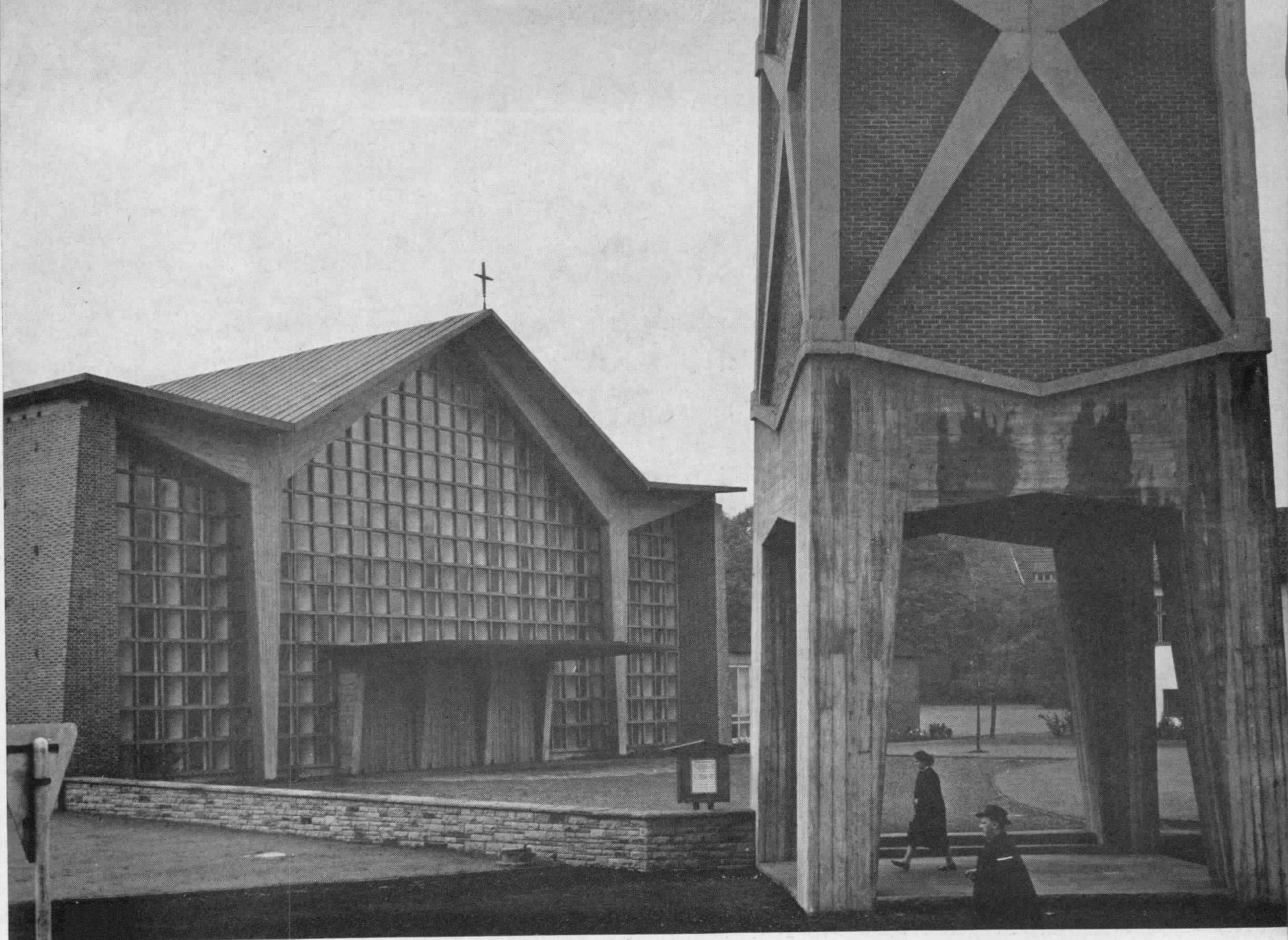
3 ST. ELIZABETH, Moselweisserstrasse, Coblenz (Dominikus and Gottfried Böhm, architects). In a heavily bombed depressed section of Coblenz the Böhms, father and son, have created a church which handles well the difficulties of its site. As seen above, and in the plan overleaf, the church is set back from the sidewalk so that a small entry plaza — eventually to be landscaped with trees — is created. Thus the distractions on either side are walled off and minimized upon entering and leaving the church. In addition this space permitted the Böhms to play off the intriguing geometry of the projecting baptistery against the calculated plainness of the slightly bowed facade. Within, a room of quiet dignity has been achieved, although somewhat overly forested with eighteen columns. The natural illumination is a continuous clerestory placed high to shut out the surroundings. Sight baffles of open tile set in a fish-scale pattern minimize glare on the sides.



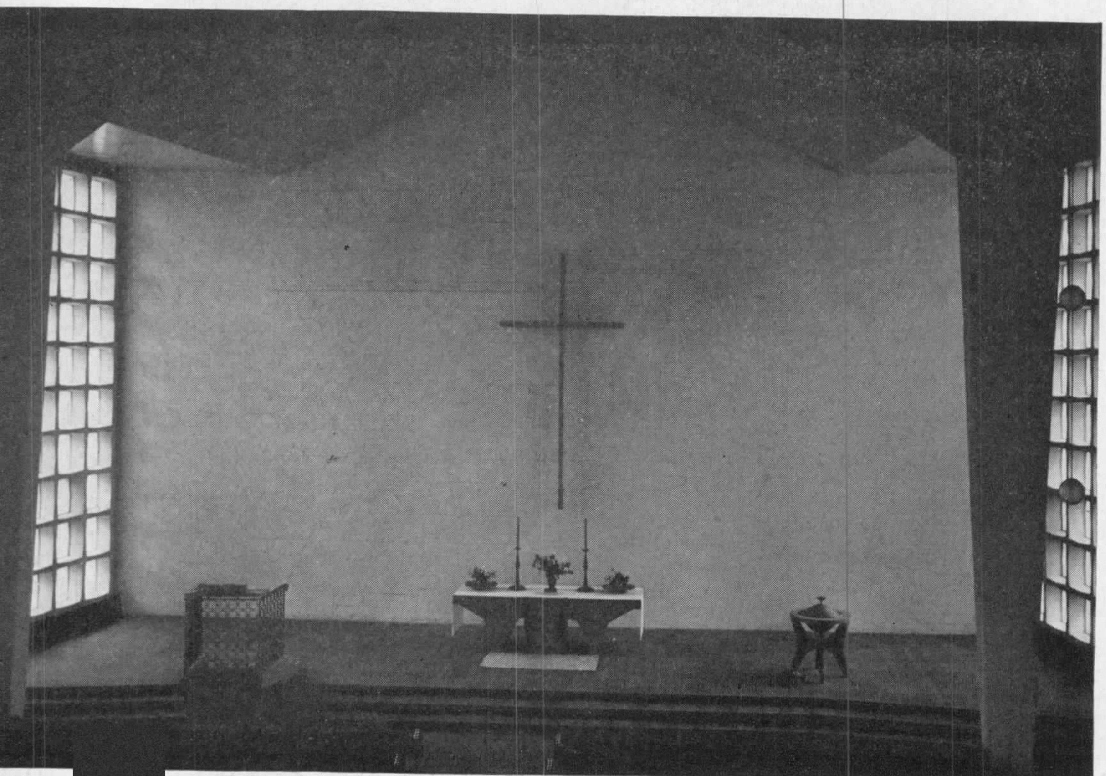


3 ST. ELIZABETH

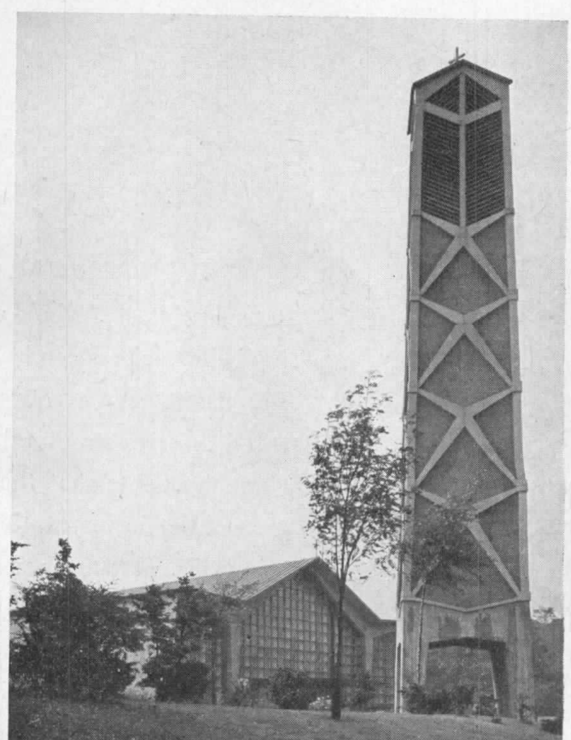


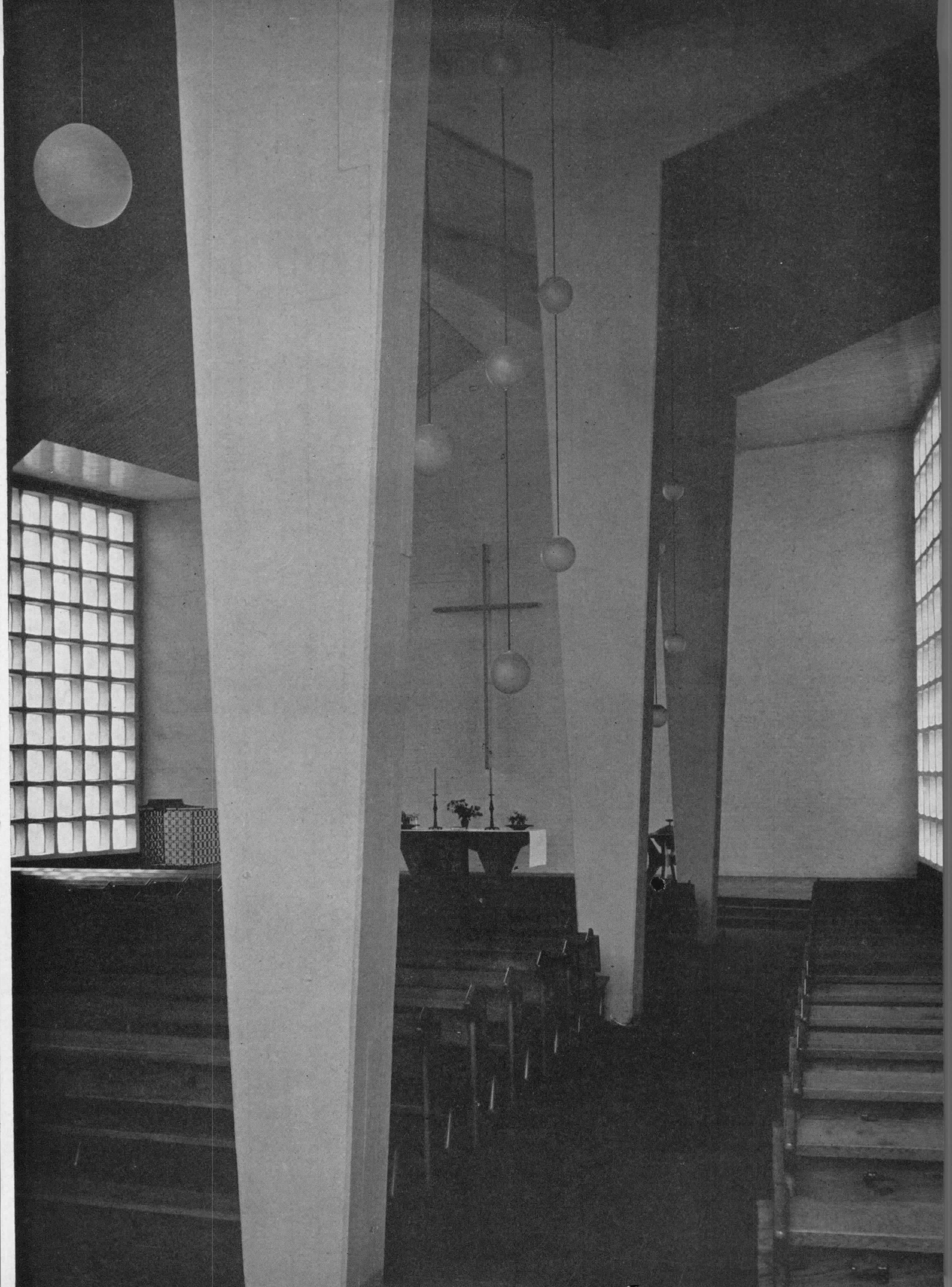


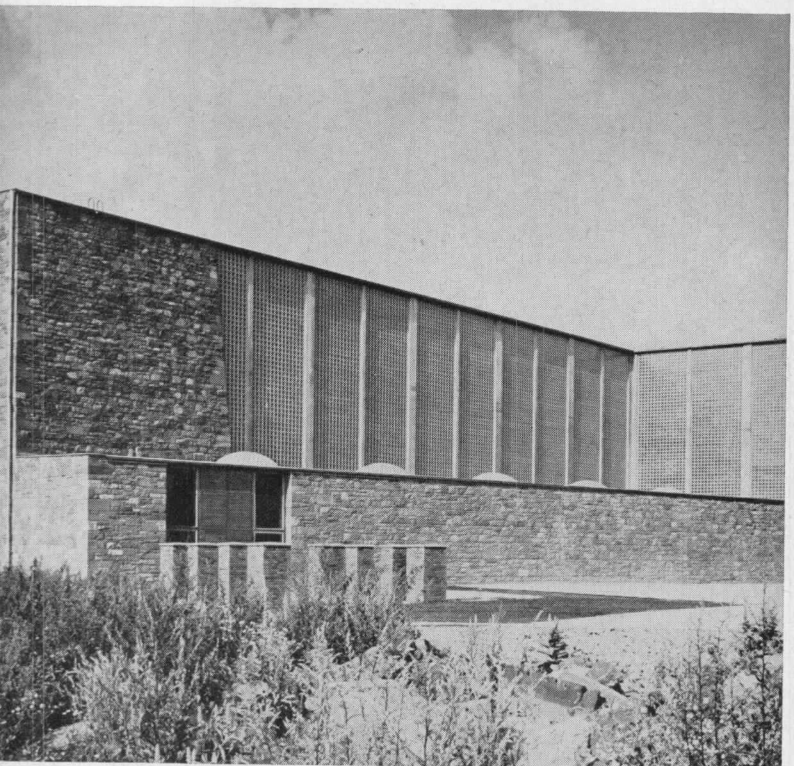
4 EVANGELICAL CHURCH, Bonnerstrasse, Düsseldorf-Benrath (W. Köngeter, architect). A bold and spirited structural pattern starting with the freestanding belfry, expressed clearly in the facade and continuing within, distinguishes this Protestant church between Düsseldorf and Benrath. The bell tower, of prefabricated concrete structural units with brick backing, is probably the most striking in Germany. Note that the framing of the church proper is carried out beyond the glass of the facade, stating clearly that the unbroken flanks of brick are merely curtain walls. Having been thus prepared for the structure within, the unabashedly exposed concrete frames of the nave come as no surprise. The only finishing treatment given these handsomely tapered supports was a coat of white paint. The sanctuary wall, which like the side walls is of brick, was also painted white. The floor is red tile. For acoustical reasons the ceiling is of wood.

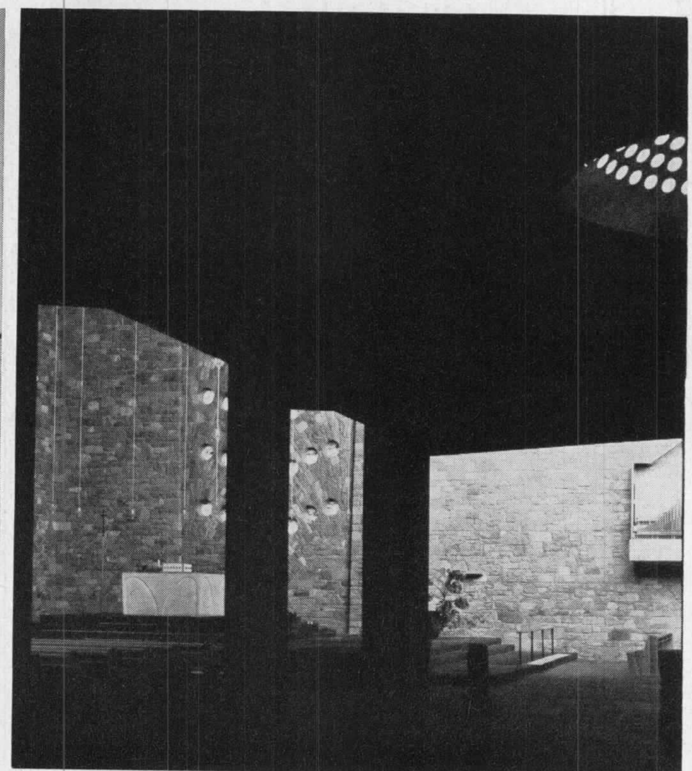


4 EVANGELICAL CHURCH



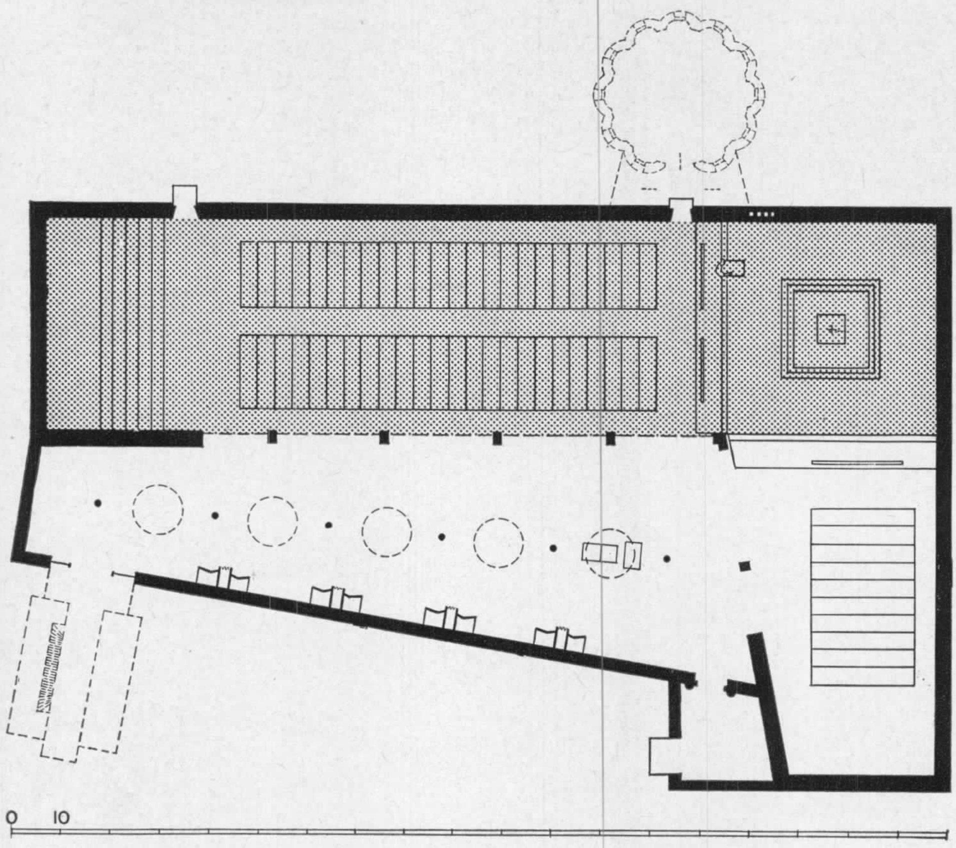






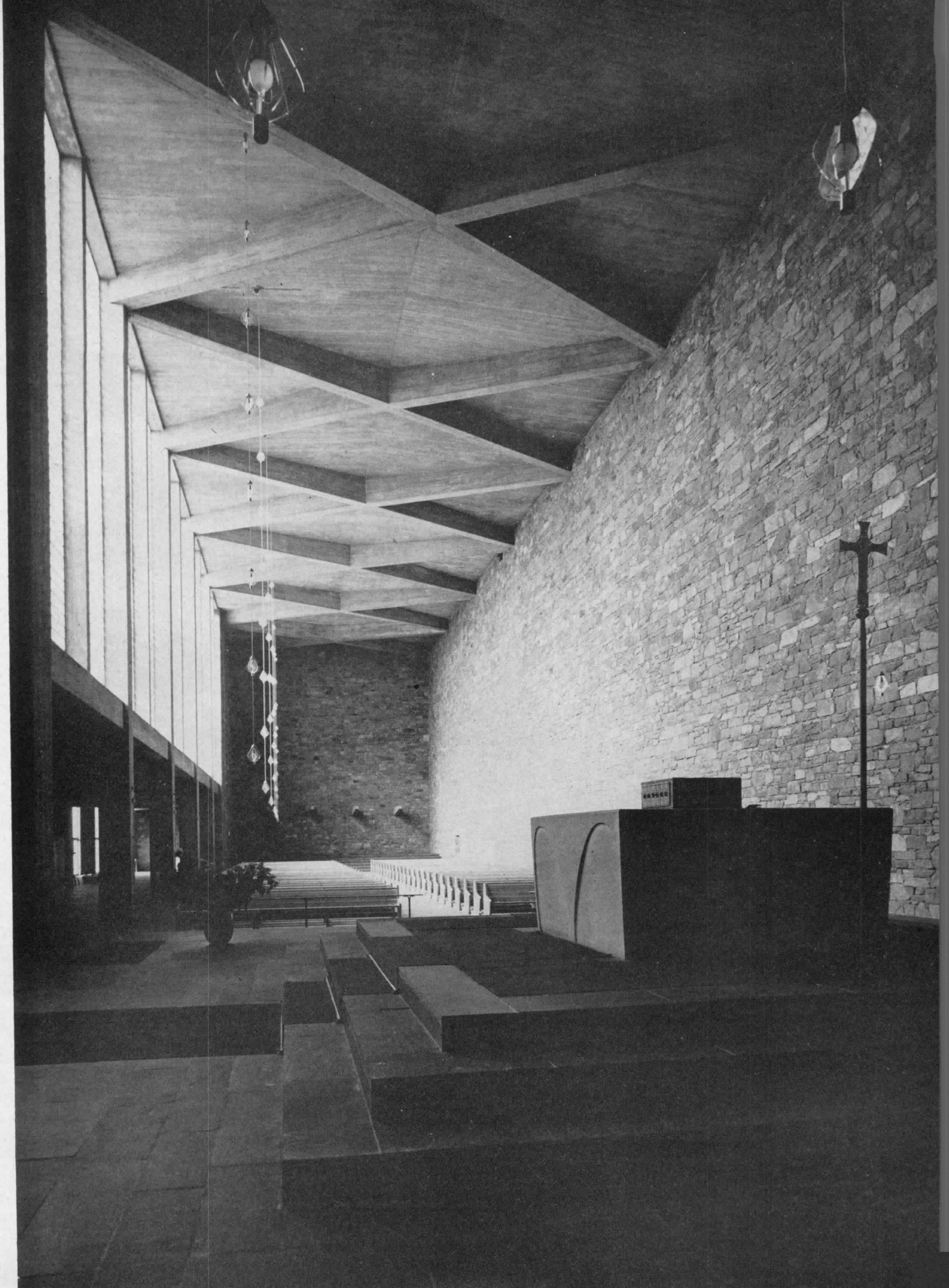
Arthur Pfau (also page 177)

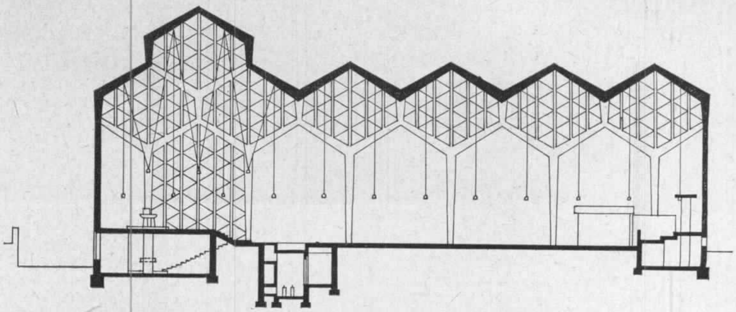
5 ST. ANNA, Annaplatz, Düren (Rudolf Schwarz, architect). This pilgrimage church to the mother of the Virgin Mary — whose relics are contained within — is only one of many that have stood on this site for the last 1,200 years. Yet it is more than doubtful whether this small village near Aachen, a village almost totally leveled by war, has ever seen a church as superb as this. For Schwarz in his latest work has begun to explore the impact of spatial succession and counterpoint, and he is as successful with it as with the purified forms that characterized his earlier churches. Among the greatest of these spatial impacts is the approach which takes one in under the low pilgrimage foyer and then throws one against the somberly impressive height of the nave. (Compare the "surprise" entry to St. Mark's Square.) Beyond, at right angles to the main nave, the shorter secondary nave can be felt rising upward. This is used mostly on weekdays. Both naves are bounded by a

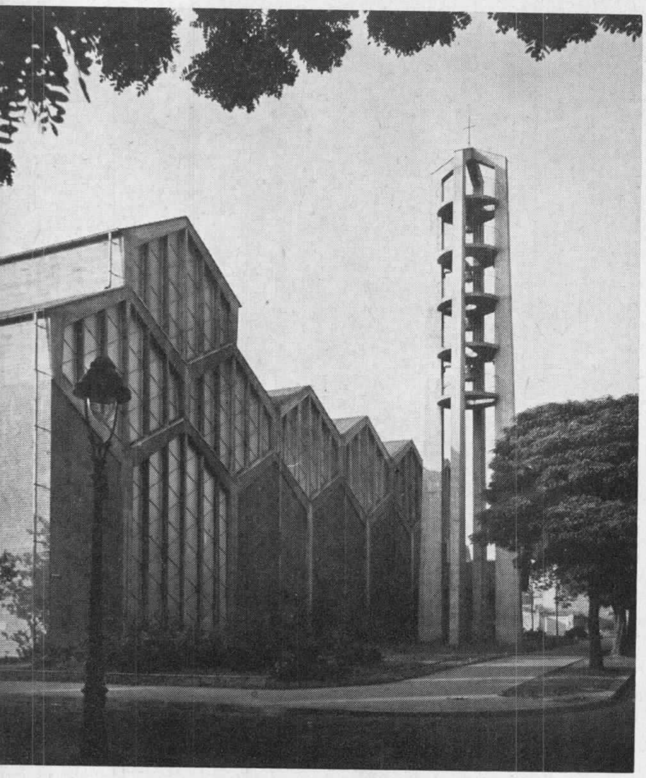


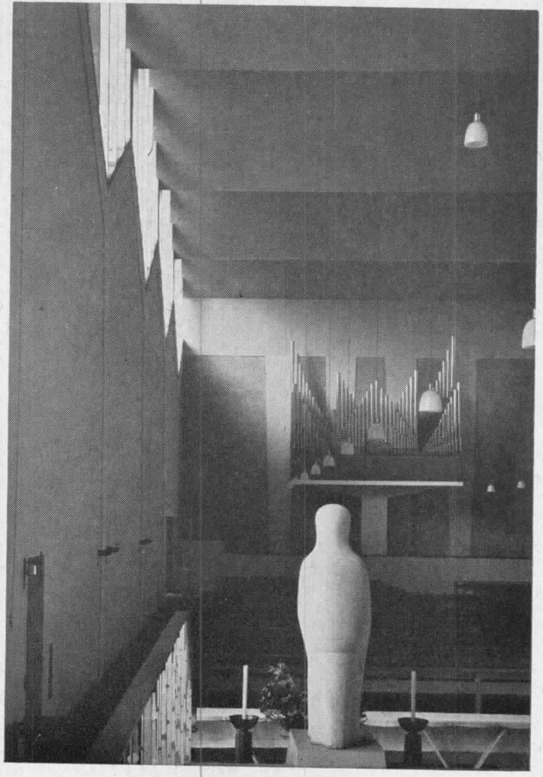
5 ST. ANNA

massive solid wall on one side and a deep clerestory on the other. Glass blocks have rarely been employed so effectively. The stones (which make this one of the largest recent stone structures in Europe) are of warm earth colors, and were reclaimed from war's bombardment. Most had been consecrated in the previous church. By the right-angle meeting of these high solid walls, Schwarz wanted to convey the feeling of protection — a refuge. The floor is of black slate, the ceiling of raw unpainted concrete. The artificial lights in strings of eight in the naves and in single strings back of the altar are a delicate foil to the general massiveness. Behind the simple block of the altar, and penetrating the wall to the outside, is a symbolic tree of life rising from floor to ceiling. The uncompromising severity of the exterior — windowless except at the inner corner — will be softened in the future by a detached belfry in front and semi-detached circular sacristy on the long north side.

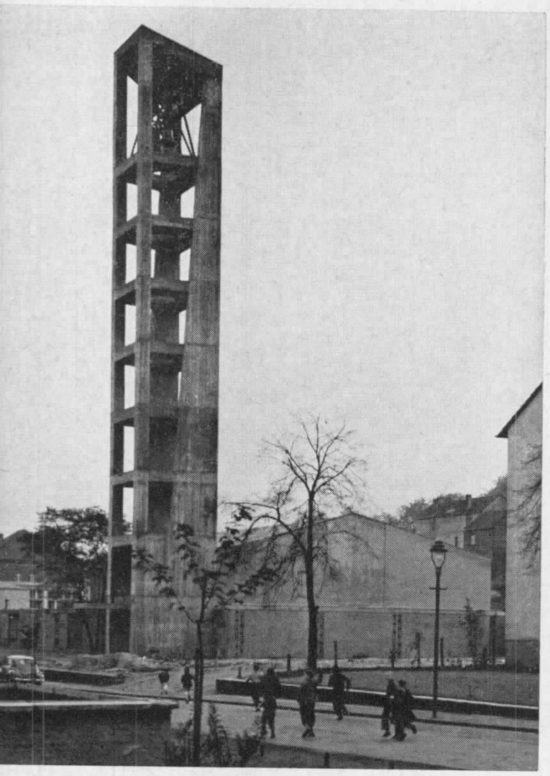




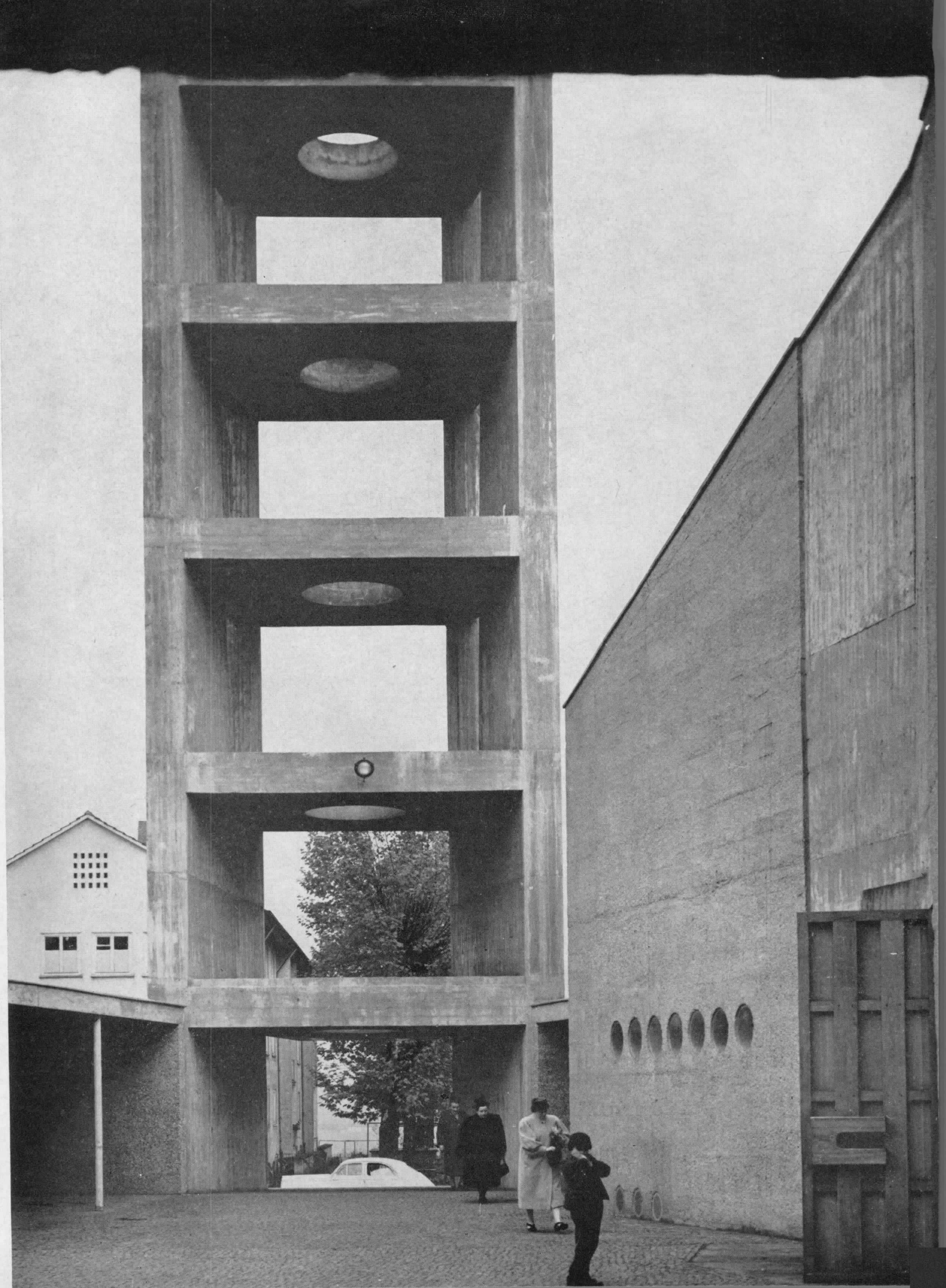


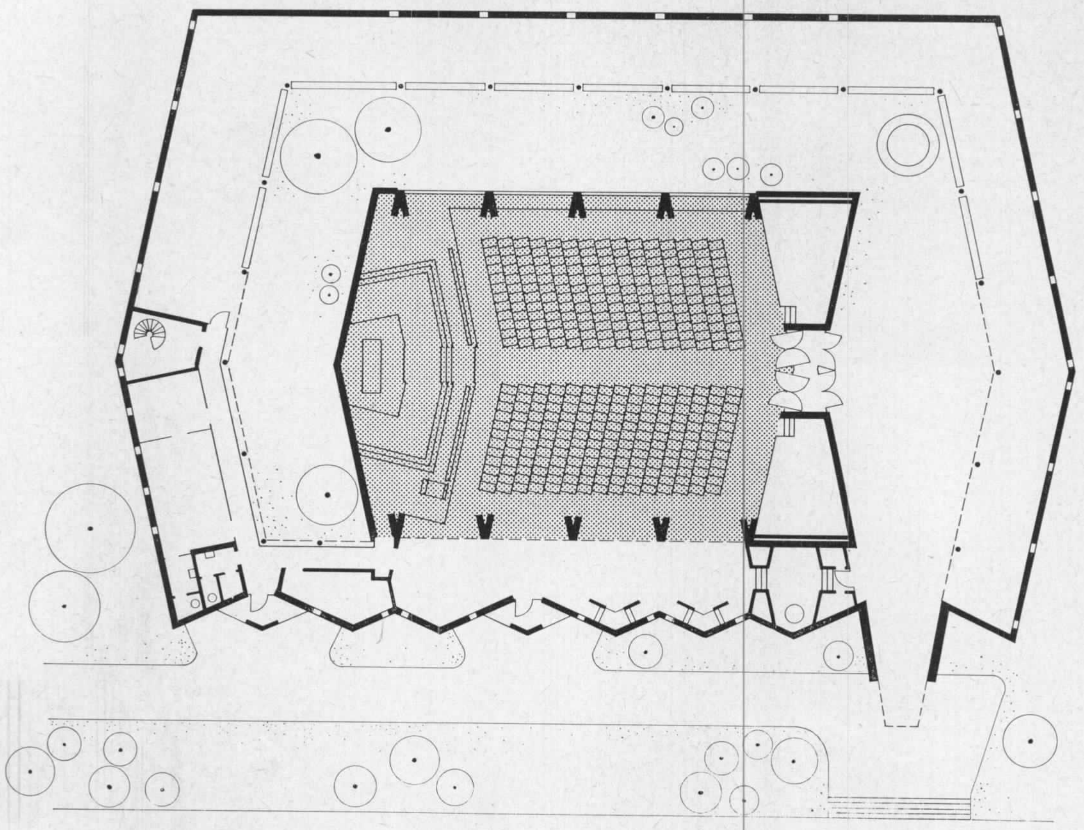


6 ST. JOSEPH, Braunstrasse, Cologne-Braunsfeld (Rudolf Schwarz and Josef Bernard, architects). In an essay of constructivist expressionism unusual for Schwarz, a church of powerful structural interest has been realized notwithstanding a spartan rectangular shape. The lateral walls are framed by six reinforced concrete "Y's" which are equally exposed inside and out. On top of these runs a clerestory of lozenge-shaped units which let the roof planes parallel the Y framing. The folded planes of the roof are of light concrete panels. The walls between the framing are of brick, exposed without, plastered and painted within, except at the chancel where the honeycomb windows are brought to the ground and extended up an extra lozenge. Although the glass is translucent, and hence restrains some of the illumination, the light in the church approaches the clinical in intensity. All structural members are white; wall light blue; floor tan.



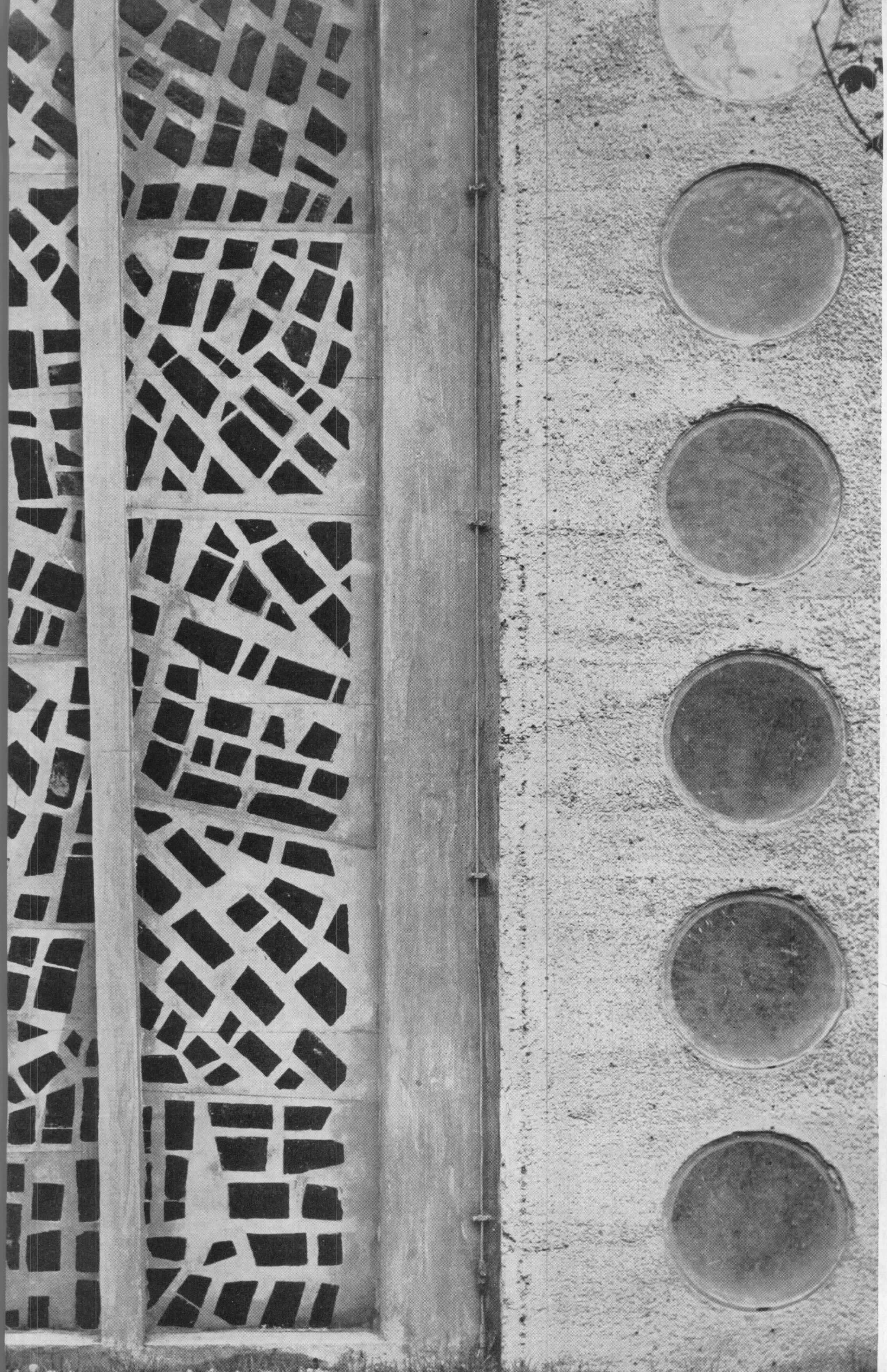
7 ST. MAURITIUS, Glockenwaldstrasse, Saarbrücken (Albert Dietz, architect). This church is one of the very few in Europe, or elsewhere for that matter, to realize — and solve — the problem of the churchly approach. For one pushes open a door and enters most churches too abruptly, and leaves too shatteringly, with no visual or spiritual preparation. However in St. Mauritius one is physically introduced to the "church concept" by an entrance forecourt and cloister. (Compare the 12th-century St. Ambrogio in Milan.) In addition to being an intermedium between the secular and the religious, the semi-enclosed front court not only enables but encourages one to stop and chat with one's friends or the minister. In a way it extends the feeling of brotherly love of the church beyond the front door. The cloister in addition permits one to stroll back and forth under cover collecting one's thoughts or talking with a friend. One approaches this entry under the





7 ST. MAURITIUS

splayed bell tower. The interior of St. Mauritius — the saint was a 3rd-century martyr — is a simple, almost colorless foil for the magnificent windows which fill most of both sides. These are made of irregularly shaped multi-colored blocks of glass several inches thick set in concrete — and called *betonglas*. Designed by Professor Boris Kleint of Saarbrücken and executed by Gabriel Loire of Chartres, they are among the finest abstract windows to be seen in Europe. The whole room is flooded with colored light from them. Structurally the church is supported by reinforced concrete bents splayed to make a roof of triangular sections. (Note the angled entrance and chancel walls in plan.) Radiators are located between these bents just above floor level and concealed fluorescent lights between them at the top. There are no visible lighting fixtures. The nave, which seats four hundred, is augmented at the rear by a small chapel and the choir.



THIS NEW SHELL GAME

Function, Structure, Symbolism — or Art?

by ALBERT BUSH-BROWN, *Assistant Professor, Architectural History, Massachusetts Institute of Technology*

GIVEN ANOTHER DECADE or two of relief from austerity, we shall have lost that animus of financial economy which kept modern architecture honed sharp by functionalism. Already the third generation of modern architects pry at the fetters of their professional fathers and grandfathers. They doubt that economical adaptation to physical use produces good form, and few — even those who love new structural systems — are so naive as to believe that an efficient plan or structure necessarily originates handsome elevations.

All this skepticism within modern architecture is healthy; we are now critical of modern design while still favoring it. But the skeptic's position is not clear: will functionalism be sacrificed to monumental shells? And if so has the new shell game any ground rules? Is our search to be directed towards symbolic expression? Or do we seek that perfection of form — for art's sake — which we have tried every way of avoiding? Surely, by now we should realize that it's not identical to good function, or equivalent to structural expression, or morally valuable, nor even economical. Yet recent forays into thin-shelled monumentalism, subordinating function so often, seem to strive for symbolism or structural novelty, rather than architectural beauty.

Exactly the dilemma confronting symbolists and functionalists today faced architects about 1875 in a way clearly revealing issues confused in the modern situation. There were then two camps: the Ruskinians and the Huxleyites, both armed to the teeth, the former with moral symbolism, the latter with mechanistic utility, and they built ramparts and fought, without ever creating a great work of architecture.

The Ruskinians were well entrenched when at Baltimore in 1876 Thomas Huxley, the distinguished English biologist, triumphantly assaulted their position by admiring a motley collection of ugly but highly useful structures that had been quickly and inexpensively remodelled for use at the new Johns Hopkins University: "It has been my fate to see great educational funds fossilize into mere bricks and mortar, in the petrifying springs of architecture, with nothing left to work the institution they were intended to support. . . . Whenever you do build, get an honest bricklayer, and make him build . . . just such rooms as you really want, leaving ample space for expansion." Huxley envisioned for the Hopkins a vast group of serviceable laboratories and museums of science; "then, if you have a few hundred thousand dollars you don't know what to do with, send for an architect and tell him to put up a façade. If American is similar to English experience, any other course will probably lead you into having some stately structure, good for your architect's fame, but not in the least what you want."

Huxley's advice upset young architects almost as fully as his theories about evolution angered religious fundamentalists. For only recently, in 1857, had architects founded the American Institute of Architects to press by concerted action against apathy towards art and reliance upon "the honest bricklayer" in matters of building. Their task was made no easier by having a scientist espouse amateurism in an America already disposed toward frugality and insistent upon the democratic right of all men to decide any matter, even matters of taste. Nor did Huxley's opinion reinforce that sense of inferiority which European-oriented architects engendered by convincing merchant princes and manufacturers that America would have no worthy culture until she was refaced in the image of Bourges and the Baths of Caracalla.

How effectively the campaign of the professional architects sold American clients on an archaeological architecture is today everywhere evident, much of it detestable and soon to fall victim to that ubiquitous American pastime of destroying things, but some of it good for artistic reasons. Yet, an esthetic argument was not the chief selling point in the campaign for monumental architecture — but, rather, expression, which of course may refer to regionalism, or to structure, or to materials, and has in any case nothing whatever to do with formal beauty. For the Victorian Gothic architect, expression included all of these things, yet was most concerned with symbolism, especially of morality.

John Ruskin was the leading exponent of moral expression in art. His lectures about art were Messianic sermons, melodiously phrased, and they spellbound audiences with a potion blended of one part aesthetics

"Not until the National Academy of Design at New York . . . did the Society (for the Advancement of Truth in Art) find in America any architecture worthy of their praise."

Weber, courtesy Harvard University

"When at last it was completed, Memorial Hall (Harvard) was a picturesque, imposing mass of red brick . . . topped by cast-iron cox-comb . . . dreadfully effective when washed by moonlight."

and two parts ethics. No one today can for a moment seriously believe his theme, published in *The Seven Lamps of Architecture* in 1849, that what is good morally will be great esthetically and since Gothic architecture alone reflects a Christian society, we must endeavor to correct modern corruption by building Gothic Revival monuments.

Yet it was exactly that collection of inaccurate observations and *non sequiturs* which captivated Victorian pocketbooks and sentiments so beguilingly that a group of young architects at New York in 1863 founded that delightfully exclusive institution, The Society for the Advancement of Truth in Art. Dedicated to promoting Ruskin's ideas, the Society attacked Renaissance style, believing with the Englishman, "it is the moral nature of it which is corrupt. It is base, unnatural, unfruitful, unenjoyable and impious." In their magazine *The New Path*, the Society published essays written from a Ruskinian bias, and so popular was their reception that Ruskin thanked an American editor for a "heartier appreciation and a better understanding of what I am and mean, than I have ever met in England." Not until the National Academy of Design at New York, constructed between 1862 and 1865, did the Society find in America any architecture worthy of their praise. That building, designed by Peter Bonnet Wight, was the Society's greatest triumph: a colorful palace in Venetian Gothic style, it was a bit of whimsy livening the scene with tracery and brick patterns polychromed in reds, ochres and yellows. Following the example set by Ruskin at the Oxford Museum, Wight himself brought to the stone-cutters natural foliage to be studied as models for the capitals. For Wight believed that decoration should be designed by artisans; he wanted "to give workmen opportunity to think."

Having moralized the stones of New York, the Ruskinian muse perched on the shoulder of Charles Eliot Norton at Cambridge, where Harvard's distinguished professor of Fine Arts successfully inspired many an undergraduate to believe that "we have, as a nation, painfully displayed our disregard of the ennobling influences of fine architecture upon national character. . . ." Like his close friend Ruskin, Norton was persuaded that morality and esthetics were inseparable: "The highest aim of education is the development of character and the best means to this end is culture of the imagination, a faculty best nourished by study of the fine arts." This belief led Norton to attempt to enhance the beauty of environment at Harvard by taking active part in overseeing the character of Memorial Hall, built in 1865–1878. His hopes were high when Ware and Van Brunt's Gothic design won the competition, for he saw in it a large, Cathedral-like fabric containing a theater, dining hall and a noble memorial transept to be dedicated by inscriptions and images in colored glass to the dead of the Civil War. Norton even inspired Ruskin to express interest in the building. When at last it was completed, Memorial Hall was a picturesque, imposing mass of red brick with colorfully shingled roofs topped by cast-iron cox comb — dreadfully effective when washed by moonlight. But the building was a tragedy of errors in design, and Norton himself later admitted that "a great educational influence has been perverted." It was his misfortune not to find any modern architecture meeting his standards for beauty and morality; as late as 1904, Norton still sought an ideal: "Every one who recognizes the importance of fine architecture as an influence in the education of youth . . . must regret the loss of opportunity to enhance the dignity and beauty of Harvard College by means of the character and arrangement of the buildings. . . ."

The Huxleyites too thought Memorial Hall a failure. One of them, Clarence Cook, a convert from Ruskin's parish, excoriated the tastemaker-architect and his merchant prince: "The Museum of Fine Arts [Boston] and the Memorial Hall in Cambridge [both Victorian Gothic] . . . are examples of what comes of building getting into the hands of the literary, critical men, art-students, with their heads crammed full of remembered bits of Old World architecture, and their portfolios stuffed with photographs of more and more bits. . . . Where architects abound, the art of building always deteriorates." This was an extreme position and demonstrably false, but it seemed to Cook that American architectural history from Williamsburg to Memorial Hall had run steadily downhill. He admired the fine craftsmanship, ornamentation and design in cottages and farm houses built by anonymous carpenters in the pre-Revolutionary period: "The general excellence that marks the dwellings of any people is a proof of the non-existence of professional architects among that people. . . . Did architects design the houses of Venice? Architects may have designed the bad ones, but never the good ones."

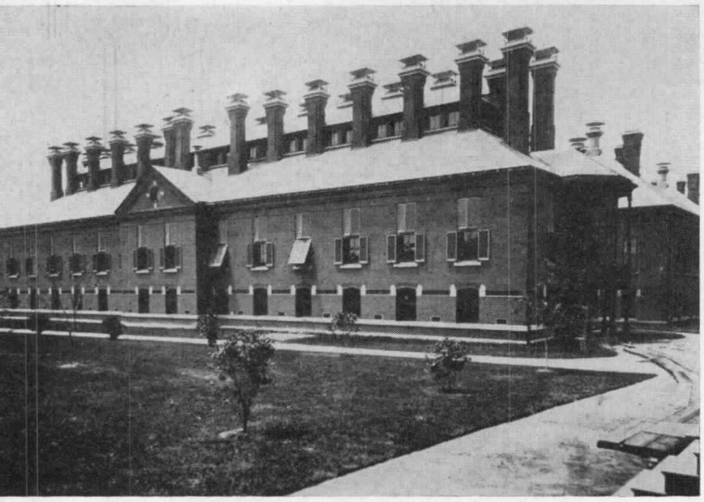
Cook's attack against the architectural profession drove home the wedge of functionalism fashioned by nineteenth century engineers and scientists. Utility was a watchword for industrial society. American designers of machinery found in strict adaptation to use a principle guaranteeing performance and beauty; John Willis Griffiths, designer of the first extreme clipper ship, lectured the East Coast at mid-century, announcing the idea that form produced in accordance with functional needs not only sails fastest and carries large cargoes, but is beautiful. It was this mechanistic principle that caused scientists to dispute Ruskin's handicraft morality; thus Daniel Coit Gilman, President of the Johns Hopkins University set before Ruskin the technological splendor of machinery: "Ruskin may scout the work of machinery. . . . But even Ruskin cannot suppress the fact that machinery brings to every cottage of our day comforts and adornments which in the days of Queen Bess . . . were not known outside the palace." Gilman saw in machinery not merely material production but beauty, which to him was apparent in the Brooklyn Bridge, in ships such as the "Aurania," and in complex machine tools such as Rowland's dividing engine, which "has beauty of its own, not that of the human form nor that of a running brook, but the beauty of perfect adaptation to a purpose. . . ."

Quite obviously Gilman would not want for his university at Baltimore "a medieval pile" — "but a series of modern institutions; not a monumental, but a serviceable group of structures. The middle ages have not built any cloisters for us; why should we build for the middle ages?" Coupled with his dislike for medievalism was Gilman's disdain for what he regarded as the technical incompetence of professional architects. His laboratories at the Hopkins were to be filled with machinery for heating and ventilation, for supplying gas, water, and light, and for removing offensive dust and gas — all arranged by "a professor who looks after these things in advance — instead of an architect who forgets them altogether."

Typical of what that professor produced in the way of architecture is the Ward Pavilion at the Johns Hopkins Hospital. It was designed by a physician, namely John Shaw Billings. His concept for a hospital differed sharply from the traditional large block or converted mansion set up as a charitable house where the poor came to die; his was to be a modern institution built upon a plan fit to obtain "ventilation and heating and light and sunshine, as curative agents." He adopted the plan of having one-story detached pavilion wards, a plan advocated by practitioners such as Florence Nightingale, whose observations made during the Crimean War provided much statistical information about the curative performance of various types of building. Additional medical information some of which originated from a report made to the French Academy of Sciences in 1788, suggested the dimensions of each pavilion. Set upon north-south axes so that the sun gained access to both sides on each day, each pavilion stood apart from the others so as to gain ventilation and insulation. Walls were made double in thickness, enclosing a hollow space that insulated the ward. Further attention to utility appeared in the abundant provisions made for heating and ventilation, the consolidation of plumbing, and the plan which enabled a single nurse easily to supervise a large number of patients. These arrangements made the ward an efficient machine.

Such a machine physicians had long hoped to build. One doctor blamed architects and trustees for the backward state of hospital design: "Unfortunately, physicians have rarely the privilege of building hospitals: and even if they are permitted to suggest the plans, they find them so manipulated by trustees or architects that the essential points are . . . thoroughly obliterated." Nearly all physicians echoed Huxley's lament about the useless expenditures made by architects; thus Dr. Francis Henry Brown wrote in 1879: "Architects are tempted with permanent materials in their hands, to devote too large an expenditure to display and effect, making the buildings expensive in indirect proportion to the use for which they are intended."

But perhaps the most serious among the physicians'



" . . . *Ward Pavilion at the Johns Hopkins Hospital . . . designed by a physician, John Shaw Billings . . . 'to obtain ventilation and heating and light and sunshine, as curative agents'* "

Courtesy Harvard University

" *'How a museum should be constructed and arranged, so as to combine the maximum utility with economy of space and of money, will be best shown by an account of the Museum of Comparative Zoology at Harvard . . .'* "

charges against the architect was that he strove for monumentality. Experience during the Civil War with temporary, wooden barracks had convinced Surgeon-General Woodworth that "the old, magnificent hospitals, built as monuments for all time, will be abandoned for the simple pavilion of indefinite existence; and the only strictly permanent parts of the modern hospital will be the executive building, kitchen, laundry, and engine-house." English opinion, as expressed by Dr. Galton, agreed: "Do not build for a long futurity. Buildings used for the reception of the sick become permeated with organic impurities, and . . . they should be pulled down and entirely rebuilt on a fresh site periodically." This was also the belief held by Billings whose report to the trustees at the Hopkins said that "no hospital should be constructed with a view to its being used more than fifteen years." For he subscribed to Dr. Brown's view that "A hospital should never be an architectural monument. . . . Simplicity, almost severe in its character, should mark its construction. Ornament increases the original expense and requires continued care and work." Thus for the Hopkins Hospital, Billings decided that "no utility should be sacrificed for the sake of architectural ornament, and the main purpose . . . should be fully worked out in the plans before any attention was paid to external appearance. . . ." One glance at the "external appearance" resulting from Billings' functionalism reveals how far removed was the professor-scientist from the Ruskinian-architect; it is a wall of ice.

Exactly this esthetic glacier of functionalism pushed up that vast terminal morain, the University Museum, built at Harvard during the nineteenth century. There, where Norton attempted to turn Memorial Hall into an "ennobling influence," was a scientist with ideas similar to Gilman's, Norton's own cousin, Charles William Eliot. A chemist who had planned a laboratory at the Massachusetts Institute of Technology, Eliot early adopted utility as his standard in architecture. Ruskin never amused him, not even for a moment; beauty demonstrably had nothing to do with morality: "I have been much struck with the fact . . . that the love of a place, of a form, of an image, of an altar, of its flowers, furniture, decorations or implements, has nothing whatever to do with a moral life, with religion so-called." He admired simple, mason-built buildings of the early nineteenth century. Architecture, it seemed to Eliot, deterred progress: "Our way of building for the present generation only is the best way. . . . It is not well that a house should last a century — it becomes unsuited to the improved habits of *succeeding* generations. The same is true of public buildings."

Utility — blended with Eliot's notion of flexible, even expendable, structures — conditioned the plan and bleak appearance of the University Museum, begun at Harvard in 1858. That museum is largely a monument to one great man, Louis Agassiz, the biologist, who intended his museum to be a center for object-directed education about flora and fauna and the laws governing their growth. The Museum's factory-type structure, consisting of cast-iron columns imbedded in brick walls and carrying brick vaults, enclosed many isolated, fireproofed rooms, two stories tall, with balconies running around their perimeters. Such rooms enabled Agassiz to exhibit a series of biological ideas, assembling within one exhibition all the animals and plants, whether mammoth or microscopic, whether stuffed specimens or fossils, needed for displaying a new typology. The animal kingdom could be exhibited from several points of view: variations in legs, beaks and proportions of heads in accordance with function; all animal types living in one environment; perfect specimens of animal types on each of the continents. Here was a museum building that enabled scientists to exhibit the "vast connections between animals, both fossils and moderns."

The uniqueness of that American museum did not escape the notice of English scientists. One of the great naturalists of England, Alfred Russel Wallace, gave Agassiz full credit for a great advance in architecture: "How a museum should be constructed and arranged, so as to combine the maximum utility with economy of space and of money, will be best shown by an account of the Museum of Comparative Zoology at Harvard." Wallace, like other scientists, objected to the traditional sort of museum, either new or a remodelled palace, "with large halls where the visitor is lost in the maze of the cases, which, to him seem placed without purpose and filled only for the sake of not leaving them empty." What use to biology were large halls, magnificent staircases, lofty galleries, enormous colonnades, sculptural decoration, pilasters, cornices and well-lighted spaces, all wasted? He agreed with Agassiz's decision to ignore any architectural merit, gaining the "advantage of comparatively small rooms, intended for a special purpose and for that alone. . . ."

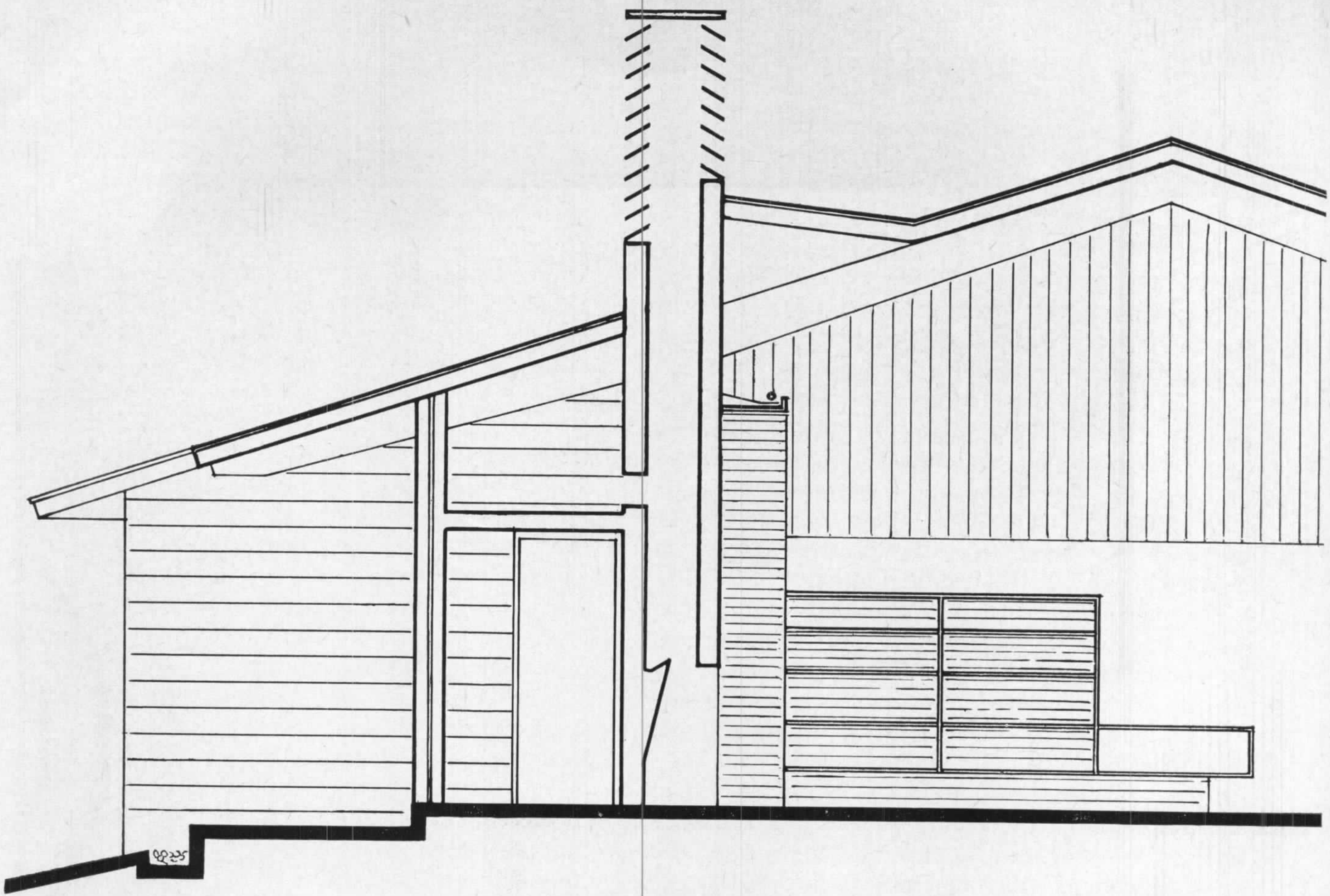
This sort of architectural sacrifice to scientific use excited praise from the English scientist, who disliked Victorian Gothic monuments such as the Museum of Natural History at South Kensington because they taught nothing about biology. A dozen visits to the Museum at London would not instill the lessen so clearly told at Harvard — "the lesson that each continent has its peculiar form of life, and that the greatest similarity in geographical position and climate may be accompanied by a complete diversity in animal inhabitants." Nor did Wallace's admiring glance fail to note the irony that principles announced in Darwin's *Origin of Species*, published in 1859, were best visible in a museum planned by Agassiz, who opposed evolutionary theory: "It is surely an anomaly that the naturalist who was most opposed to the theory of evolution should be the first to arrange his museum in such a way as best to illustrate that theory, while in the land of Darwin no step has been taken to escape from the monotonous routine of one great systematic series of crowded specimens arranged in lofty halls and palatial galleries, which may excite wonder but which are calculated to teach no definite lesson."

Such a compliment to the American trait of evaluating utility to science and education higher than artistic merit naturally fanned the fire of those who believed that Cook was surely right when he attacked the architect for being a literary man with a portfolio stuffed with photographs of Old World architecture. But Charles Eliot Norton was equally right when he took Agassiz to task for failing to create in the University Museum a beautiful building: "What provision has been made that in its outward aspect it shall correspond with the worth and grandeur of the collections it is to hold and the studies that are to be carried on within it. . . ? Convenience of internal arrangement has been sought without regard to external beauty. . . . Its bare, shawdowless walls, unadorned by carven columns or memorial statues, will stand incapable of affording support for those associations which endear every human work of worth . . . as the ivy clings to the stone, adding beauty to beauty. . . ."

Norton's question to functionalists is today's dilemma. True, modern architecture is not faced with so blatant an avoidance of visual amenity. We have achieved much by means of functionalism, not only because we have in machined forms a positive aesthetic, but also because mature functionalists have sought performance satisfying more than physical use. Modern, enlightened functionalism has brought architecture into public esteem.

Yet, public approval of the modern architect's quest for performance would be greatly enhanced were buildings also admirable for being beautiful, thus making their performance complete. No need to be squeamish about beauty! Generations of men agree in attributing beauty to many buildings, both old and recent. Their agreement rests upon finding that all great architectural compositions are unified. That unity we know to have been accomplished by inspired attention to rhythm, scale, emphasis and subordination, inflection and balance. These — now as always — are the hallmarks of beautiful architecture. Neglected, as they were by the Huxleyites and Ruskinians, the result is not art, however novel, however useful, however symbolic.

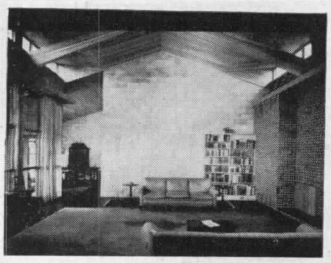
There are now on many sides critics and architects seeking appropriateness in monumental forms. The shells are manipulated by expert prestidigitators. All compromise utility; few achieve beauty; some would even impute symbolism to the new forms. They rightly suspect that physical utility is not enough; but their quest for symbolism ignores the fact that only the beautiful solution becomes a powerful symbol. Subordinate function they will! But, unless its replacement is beauty, not symbolism, we risk losing everything gained by modern architecture. For many symbols fail to be beautiful; whereas nothing beautiful fails to be expressive. This fact Wright and the great Parisian Beaux-Arts men, Richardson and Sullivan, clearly saw to be the answer to the dilemma. To ignore it by seeking symbolism or structural novelty has never done architects anything but harm.

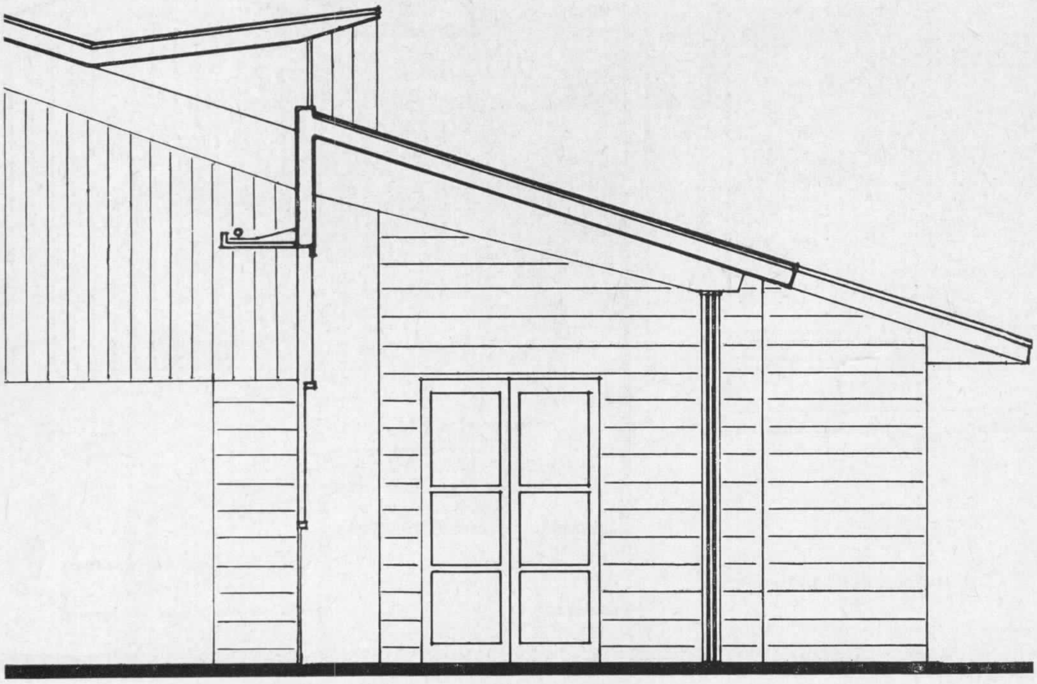


THE FRANTZ-TALCOTT HOUSE, PRINCETON, N. J.

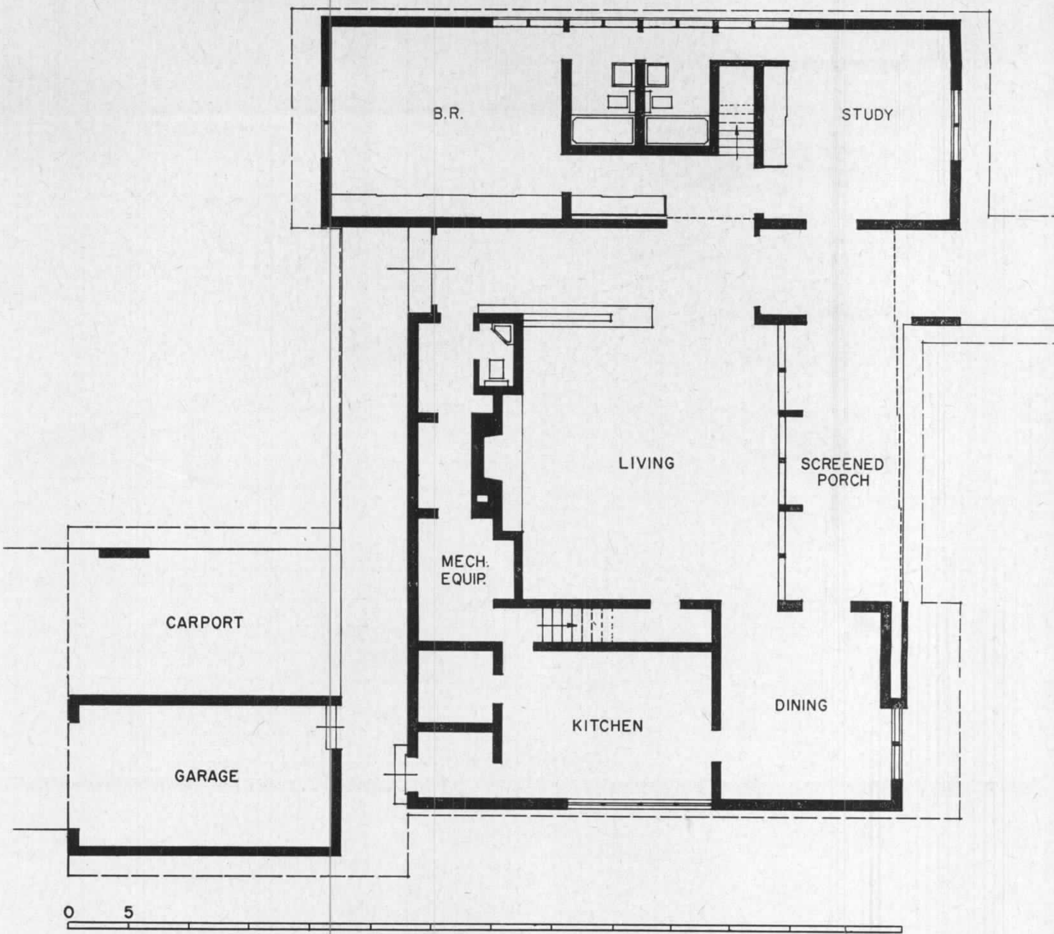
Kenneth Kassler Associates, Architects; Lewis C. Bowers & Sons, Inc., Builders

Joseph W. Molitor





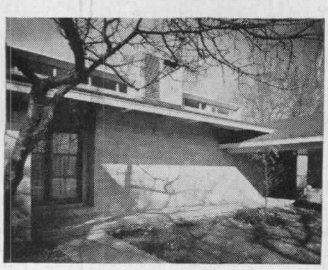
UNDER A CRISP CEILING of vertical-grain Douglas fir boards the space of this house achieves an authentically expansive quality in both the height and light afforded by long clerestories under the lifted extensions of a "gull-wing" profile. Though set pleasantly in the middle of an old apple orchard, there is little in the street approach

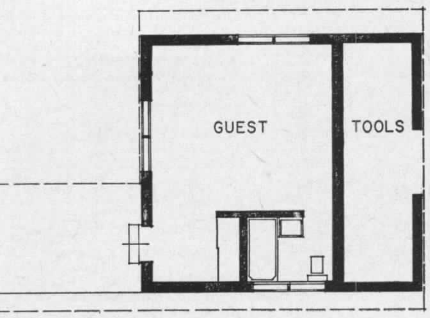


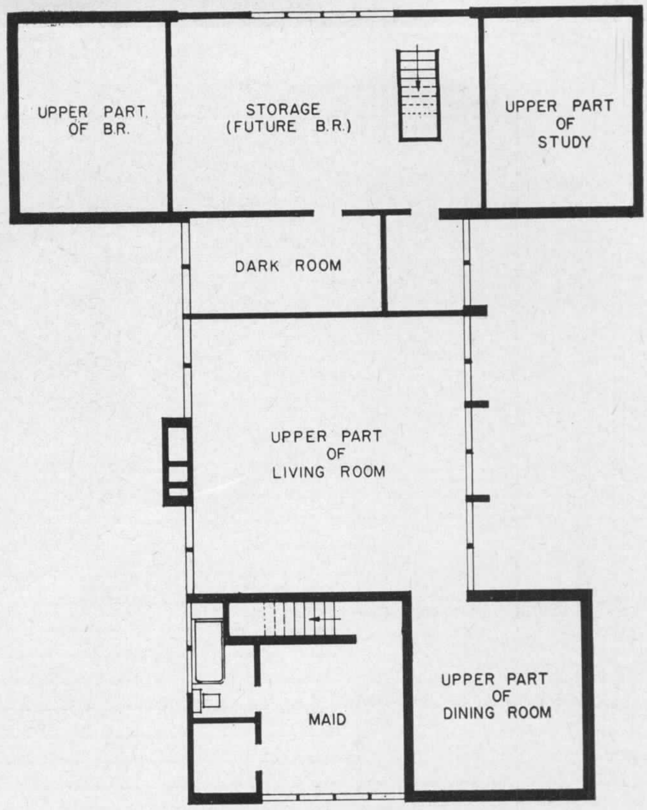
GROUND FLOOR

to suggest the sensuous and convenient spaces which develop inside. From the sheltered carport walk a recessed entry opens into a long-vistaed passage which runs first through the subdued light of the hall and grows progressively brighter as it crosses the rear porch, the covered walkway, and terminates in the garden guest-

Joseph W. Molitor

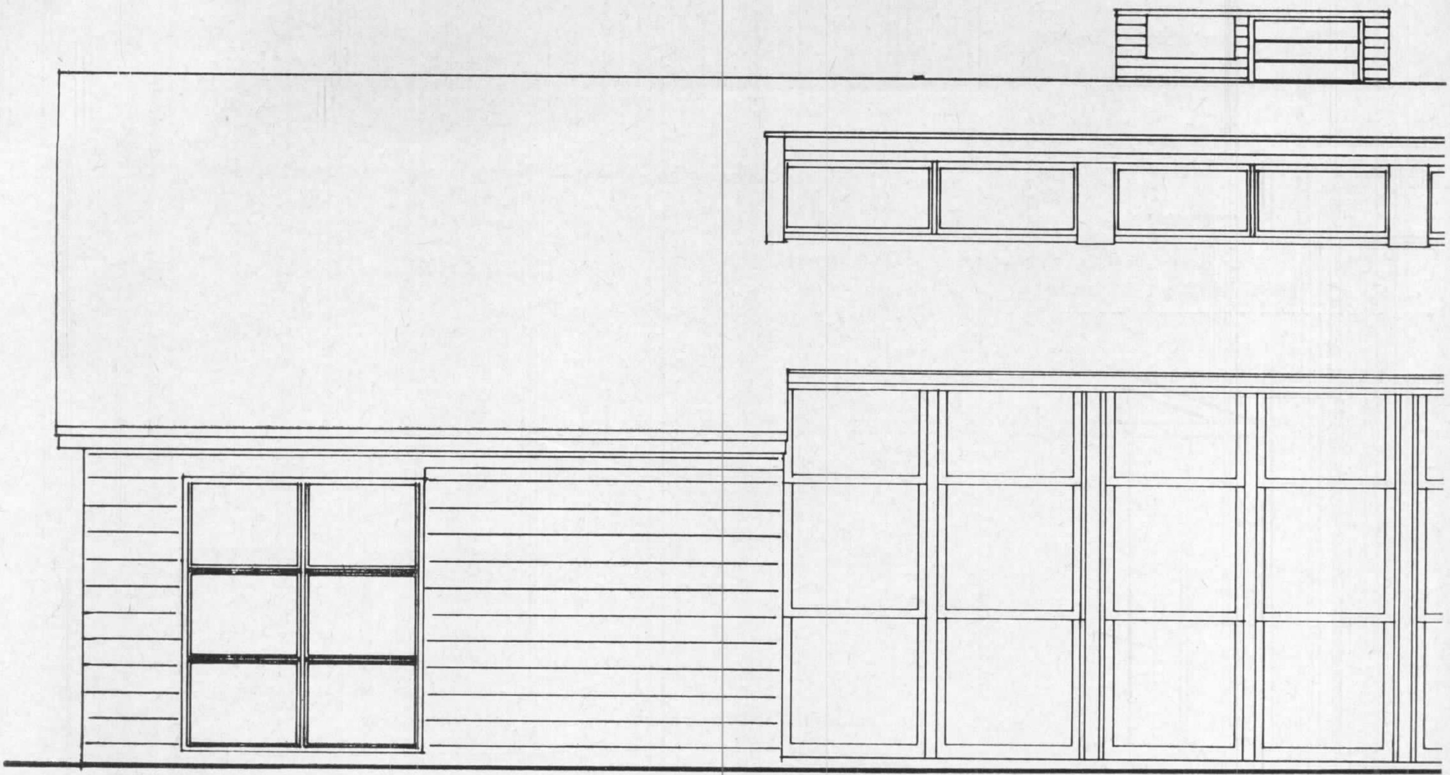






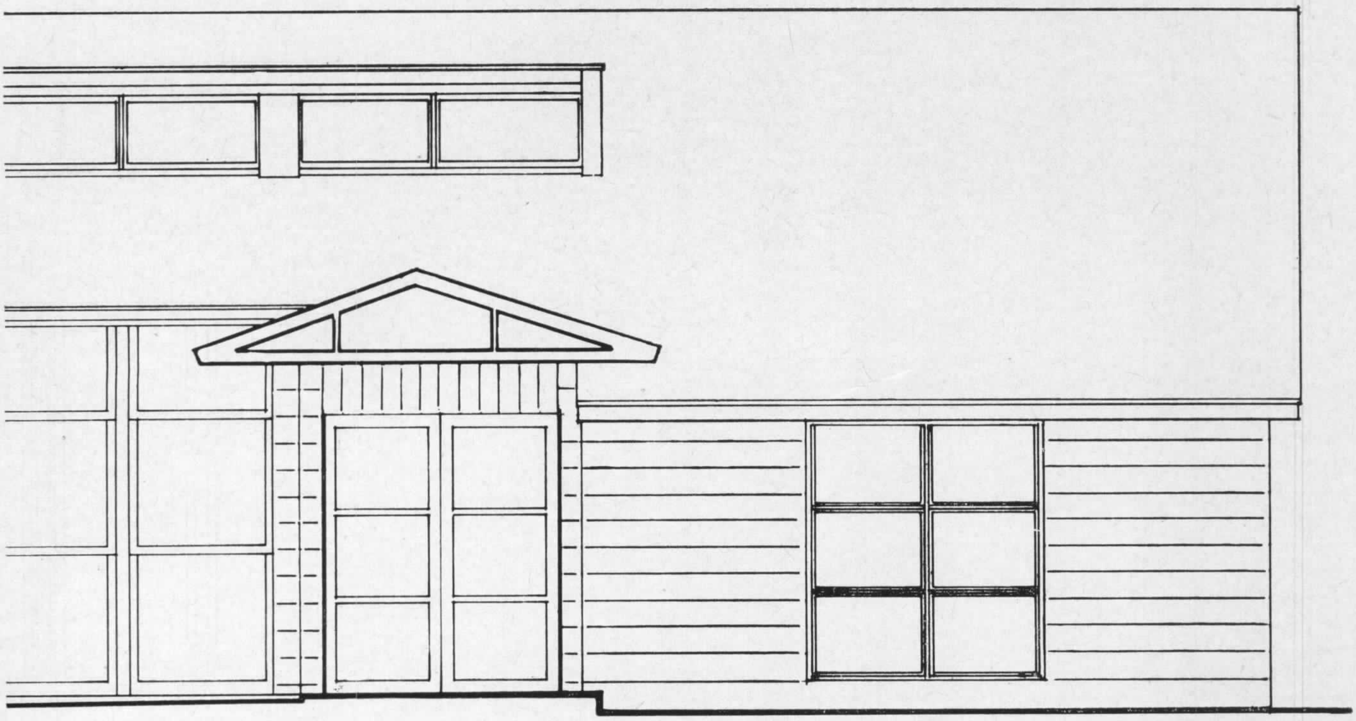
SECOND FLOOR

house. Just as pleasant as this skillful, centralizing axis is its coordinate counterpart which begins in the dining room, crosses behind large sliding screen panels, and finishes in the study. Access to this from the living room is through a bank of high, triple-hung windows, and is one of half a dozen complete circuit trips that can be

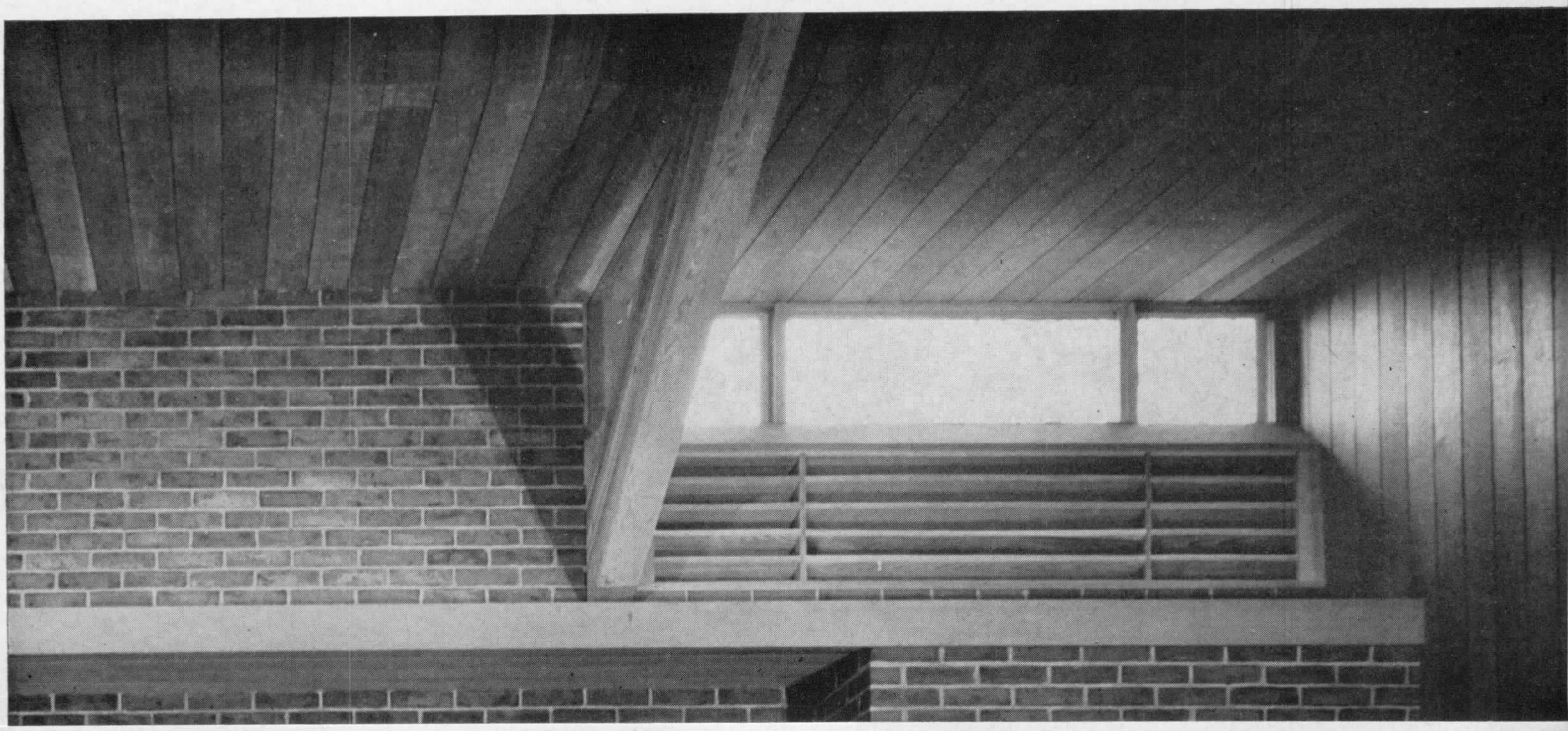


made through the spaces without retracing one's steps. In an essentially small house this is an enormously effective device in terms of convenience and sense of space. Unpainted block has been used for all exterior cavity walls and is simply effective except where it is seen together with the chimney brick. That conjunction and the

Joseph W. Molitor



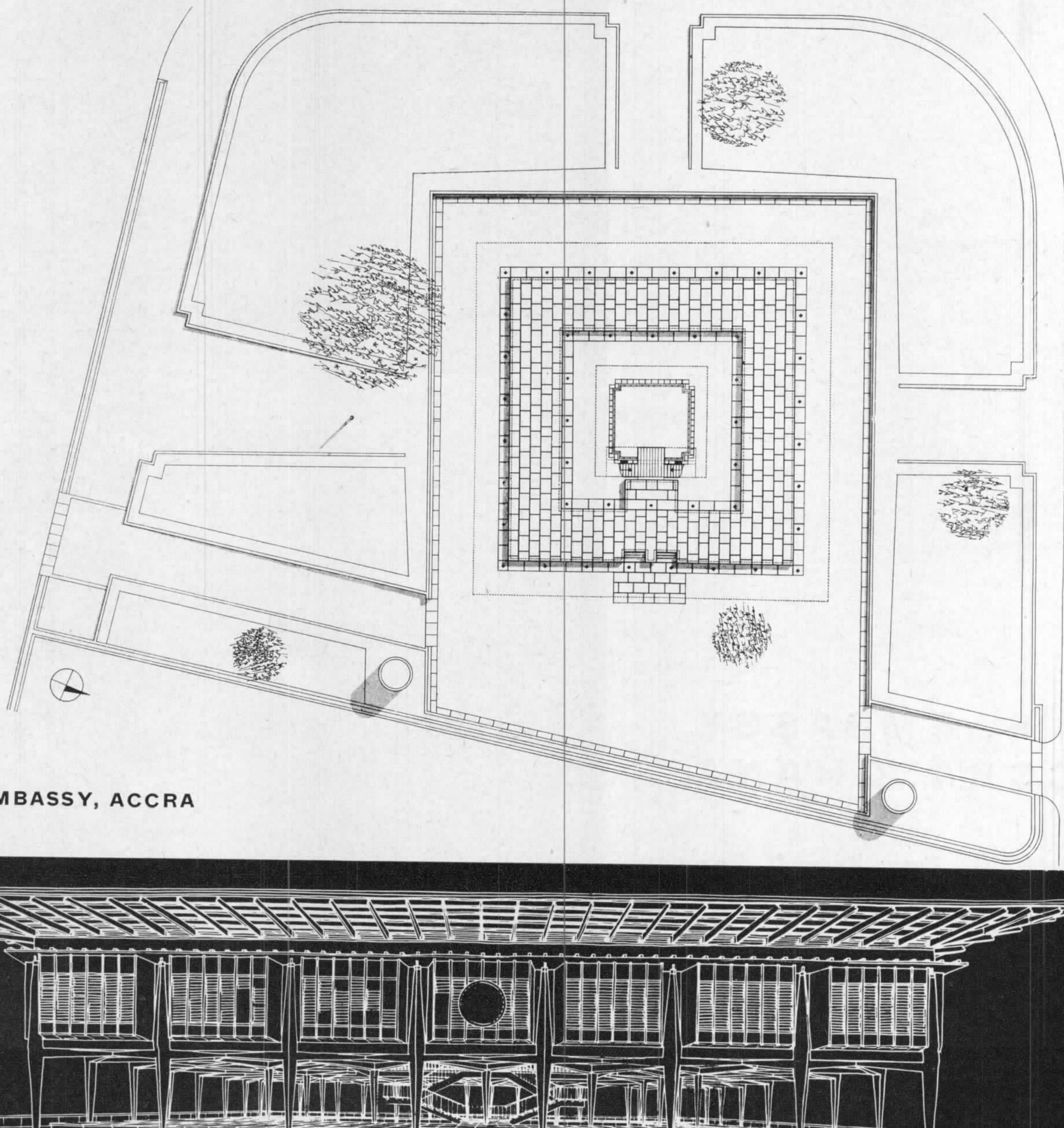
one between garage and house roofs will be questioned by some — particularly in a house that is characterized by great order as well as by great plasticity. The owners are two women archaeologists returned from many years in Greece as members of the American School of Classical Studies. Devoted as they are to the realities of an-



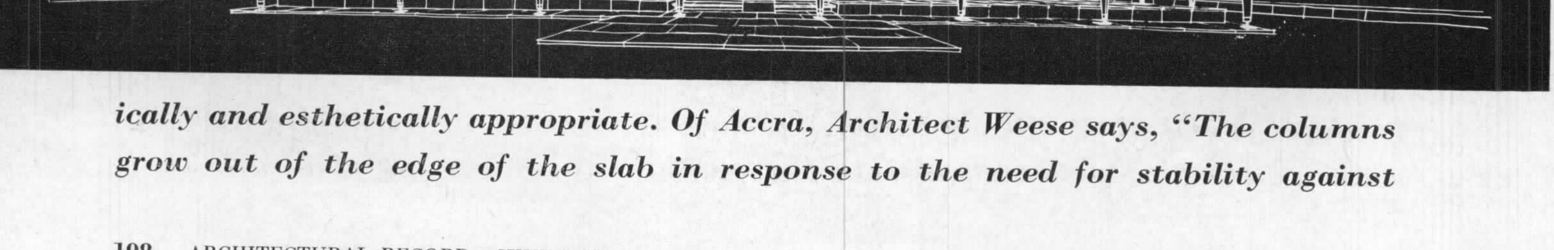
An embassy building will be successful when it brings an appropriate presence *to the local scene. Such a structure will be composed of a familiar fabric the climate will smile upon, and will convey to those who see it a character dignified but not pompous, sprightly yet not bizarre, restrained but not timid, efficient, cordial, and to a degree interestingly foreign — although very much at one with its setting. It is unlikely that any single building could express all of these qualities to many people, yet this design displays most of them, and this is the measure of its achievement.*

For Accra, the scheme is essentially a hollow square raised above the ground for security, breeze and termite protection. It is one room deep next an inner verandah that looks down upon the central pool and the open geometry of the stairway.

The jalousies and 10 ft overhang will break down the merciless sun and sky-glare; through ventilation will come via the prevailing breezes as they blow under the parasol and in over the ceiling through an especially contrived plenum. Air conditioning will be installed, but power is unreliable.



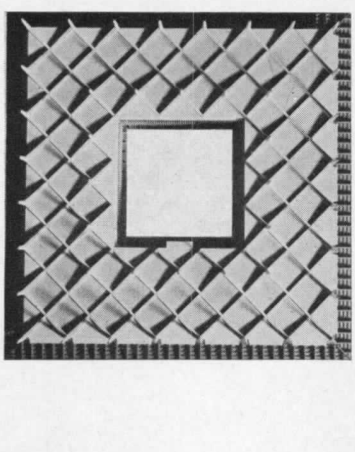
U. S. EMBASSY, ACCRA

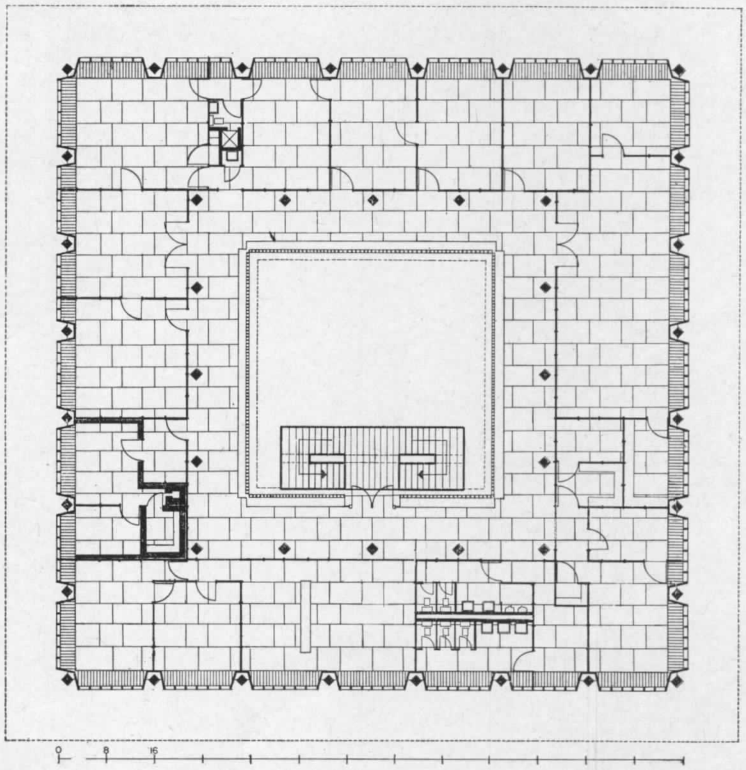


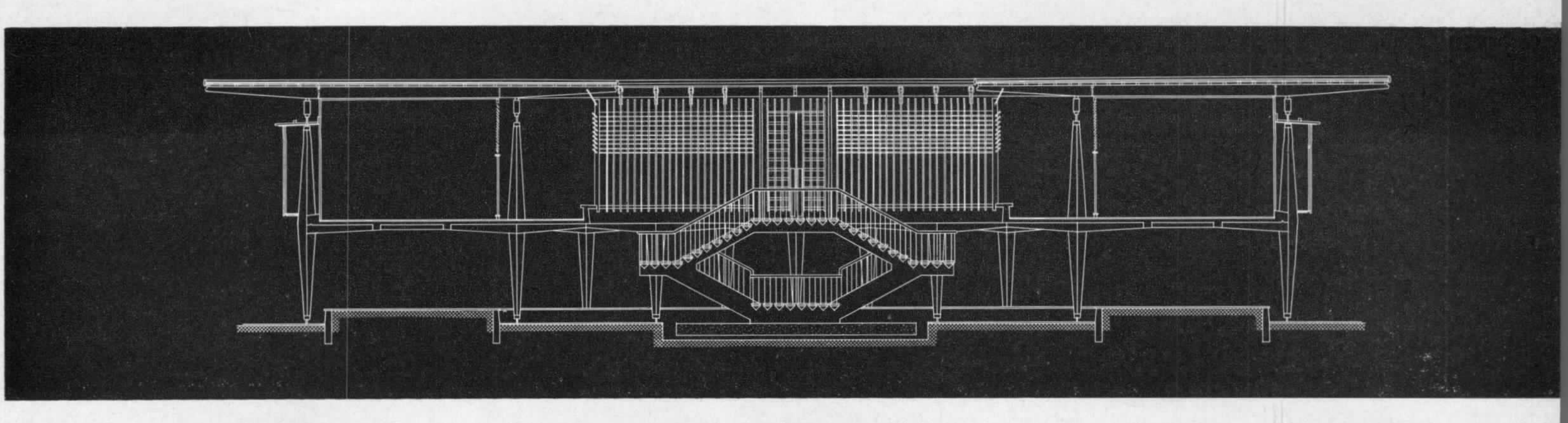
ically and esthetically appropriate. Of Accra, Architect Weese says, "The columns grow out of the edge of the slab in response to the need for stability against

Due to the local popularity of pseudo-Mediterranean architecture, wood — the only indigenous building material to be had — fell into disuse. For the embassy however, mahogany — readily available and cheap — will be extensively used. Stained a rich red-brown, it should contrast interestingly with the concrete, which will be painted white.

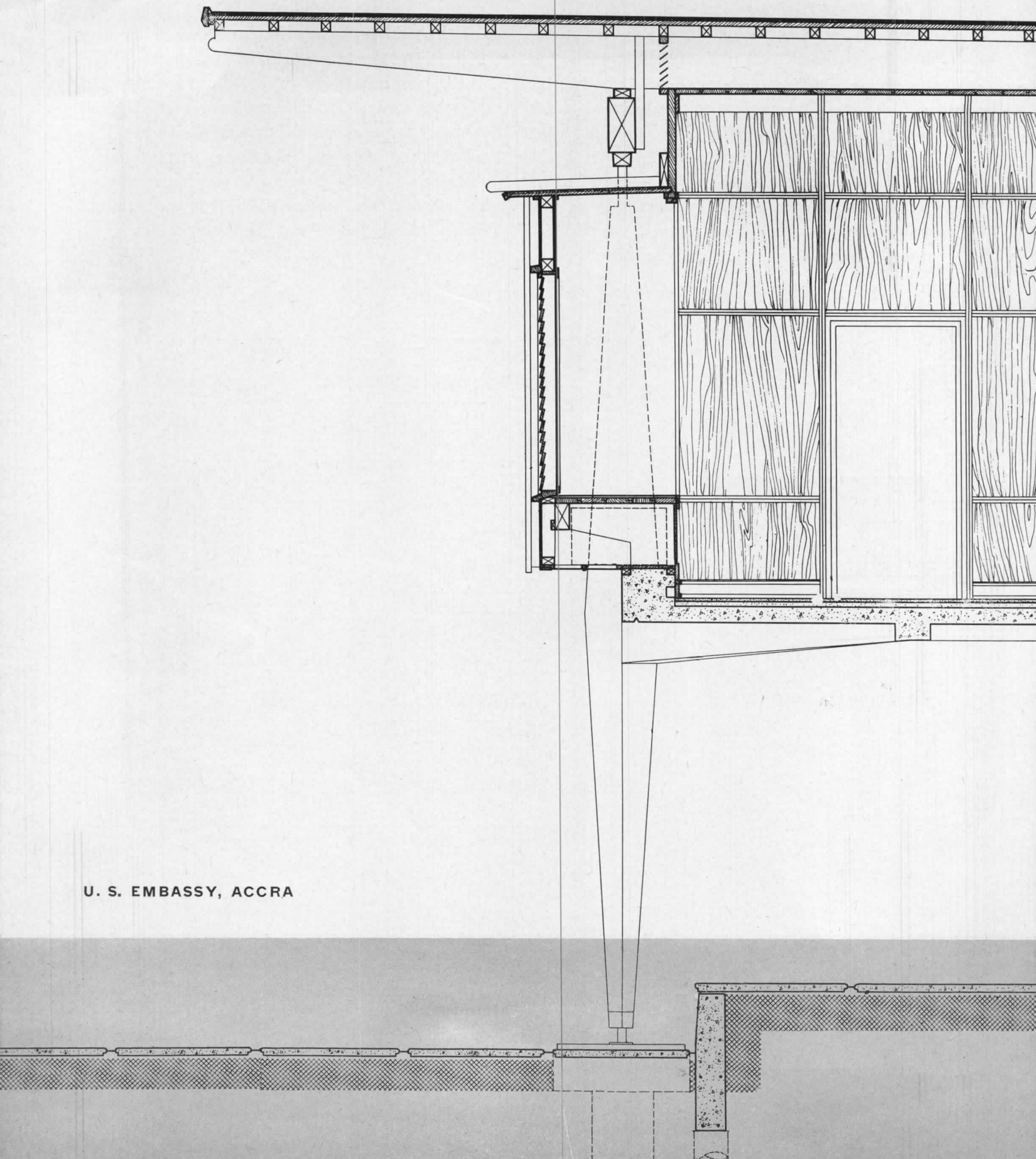
The earthquake-resistant structure, a raised hollow-square concrete platform framed in diagrid, will be carried on shaped concrete columns placed in a shallow moat floored in red laterite earth. A raised platform will extend under the building proper. The columns will be square in cross-section, tapering from 6 in. at the ferrule to 16 in. at the root; the top and bottom metal pins will be 2 in. in diameter. In plan, the columns are rotated 45 deg. and staggered to meet alternating intersections of the diagrid. This rotation and staggering of columns enables corners to be turned in the diagrid system without altering the pattern. The shaped and interlacing members make a decorative pattern for the soffit — a sometimes neglected surface.





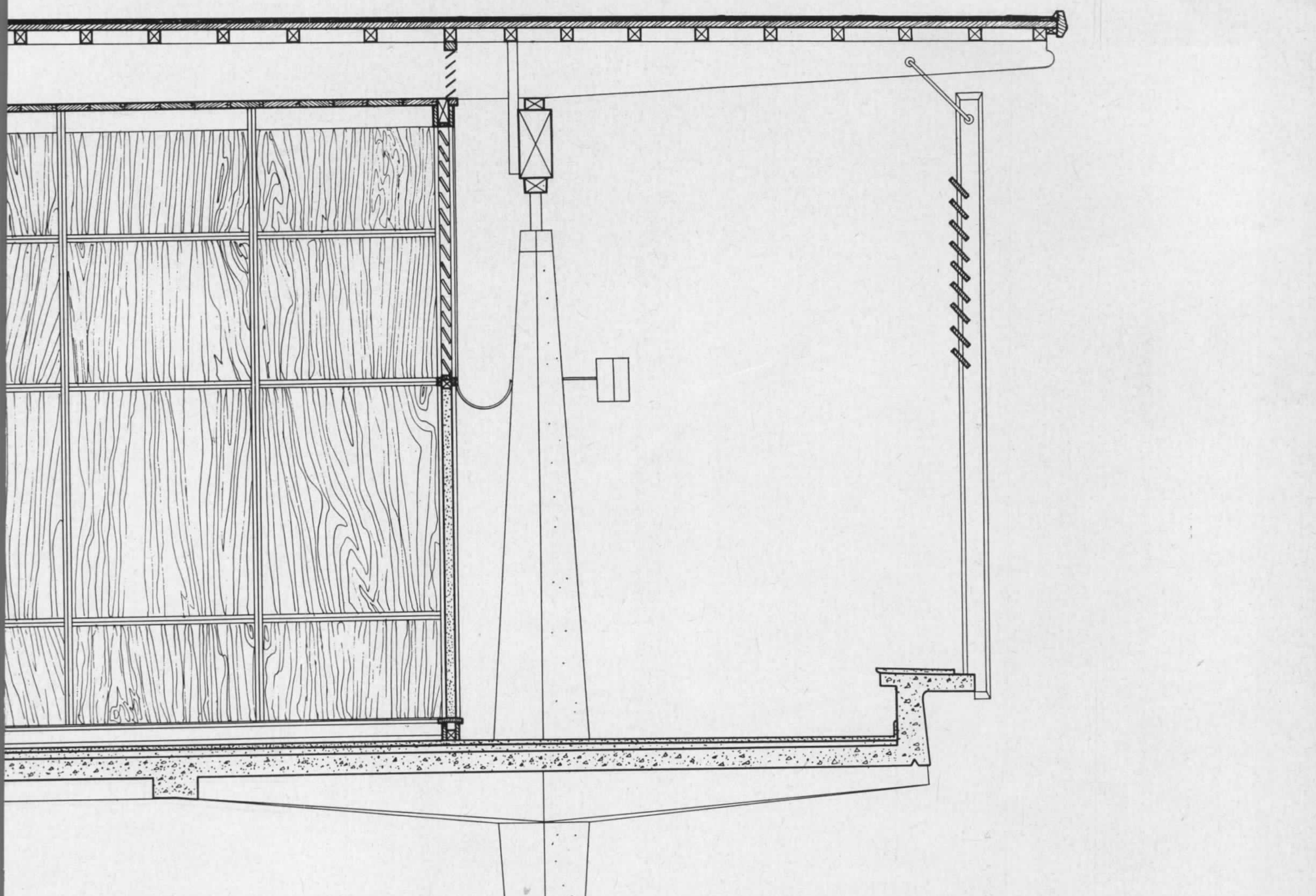


earthquake and wind. Their squared and tapered forms are reminiscent of wood; of spear points or finials or buttresses as found in sub-Sahara mud architecture. They

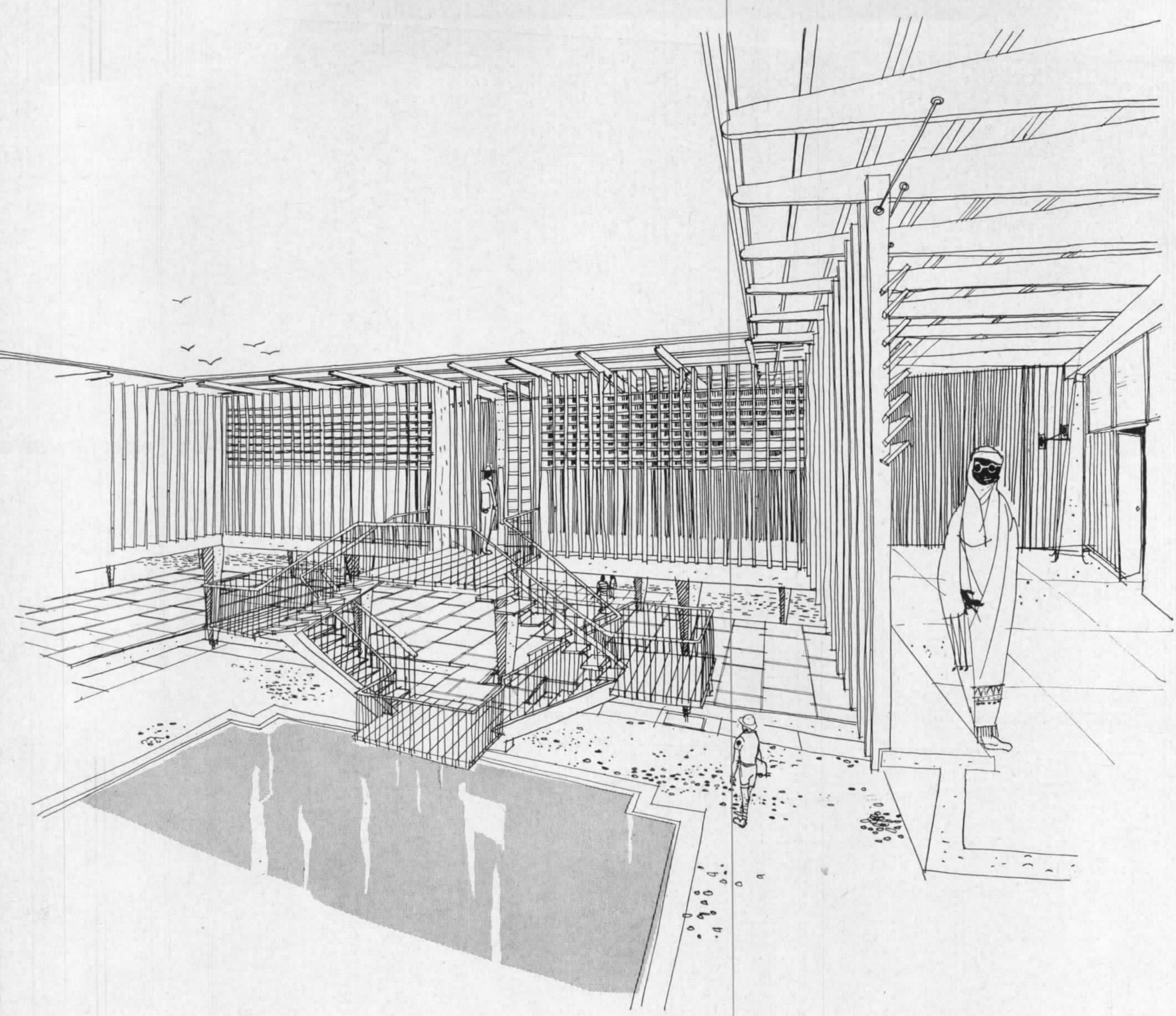


U. S. EMBASSY, ACCRA

are akin to the stalagmite ant-hills of red earth found everywhere in the land, and with the multiplicity of wood members in the parasol and slatted infilling, convey

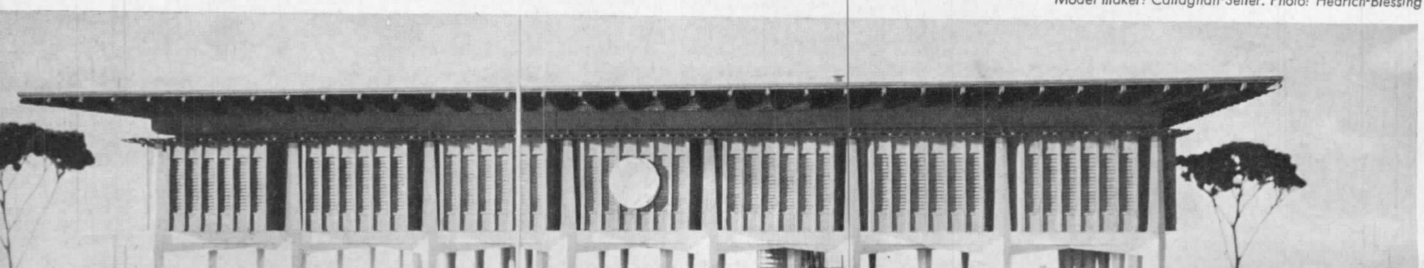


some of the richness of imagery and decoration in the African psyche. These forms are nonetheless functional; the decorative effect stems from express-

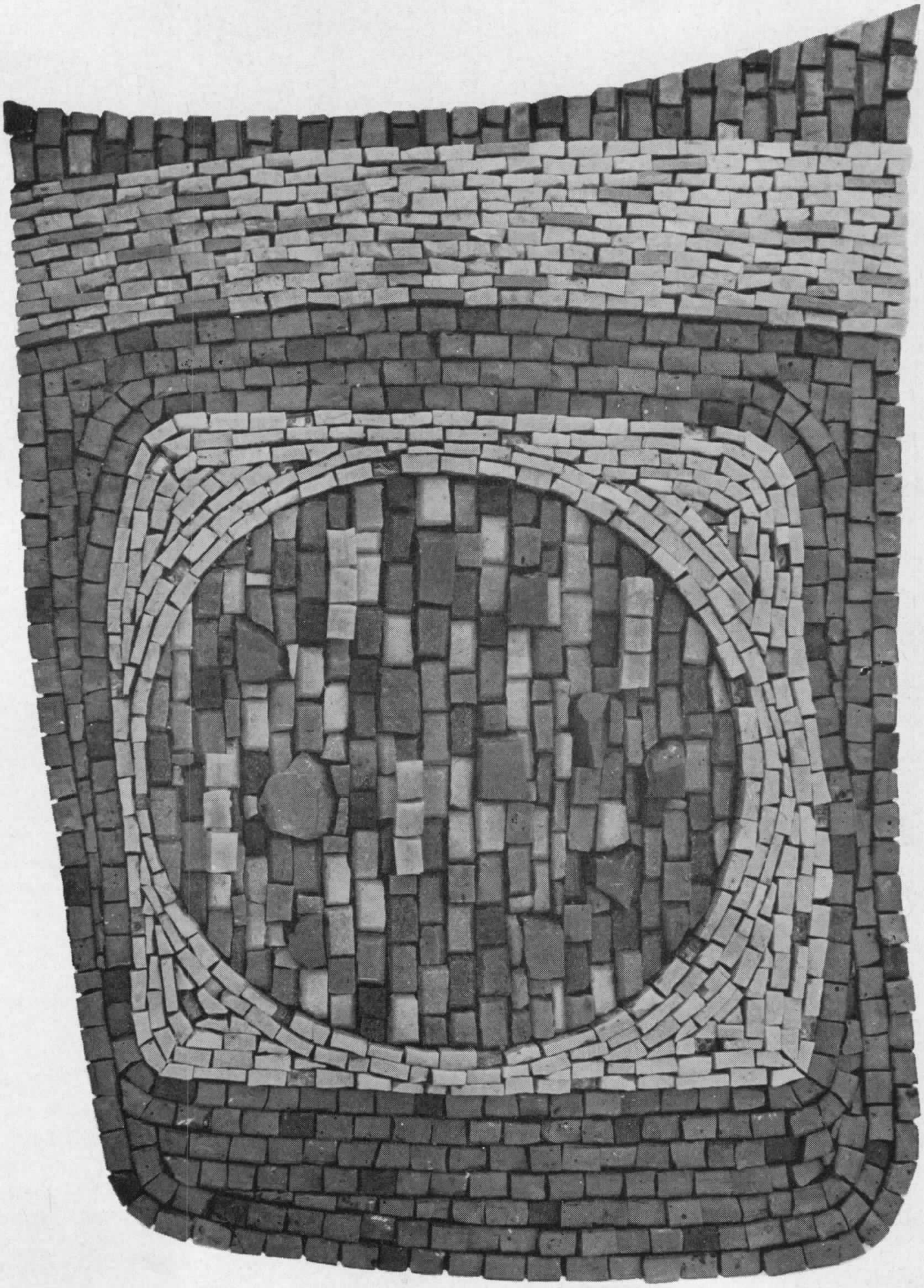


U. S. EMBASSY, ACCRA

Model maker: Callaghan-Seiler. Photo: Hedrich-Blessing

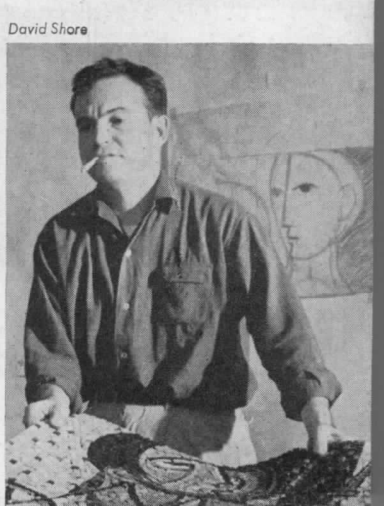


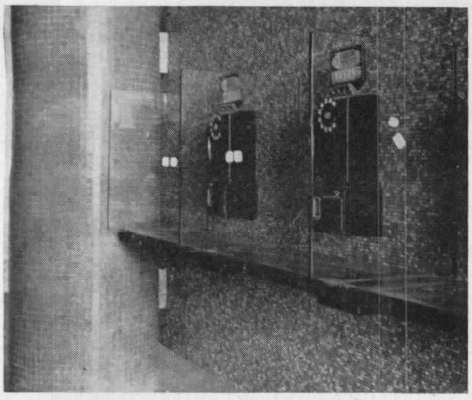
ing the structural unit and from its proliferation into a spatial pattern that attempts to characterize African aspirations for architecture."



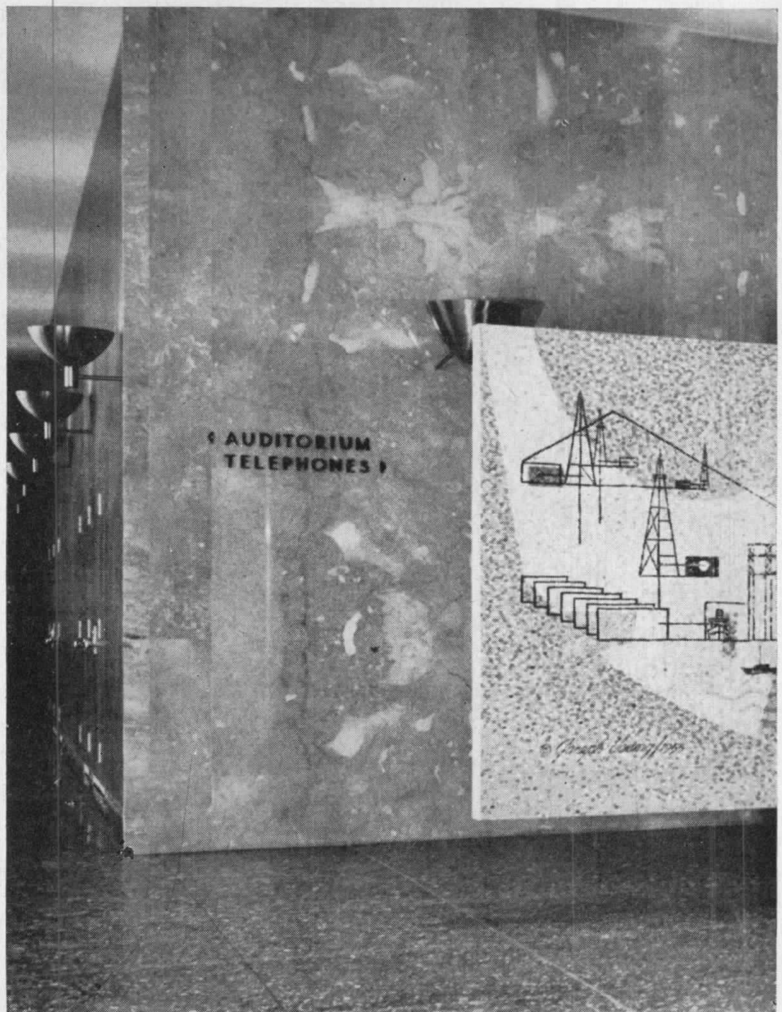
MOSAICS BY JOSEPH YOUNG

David Shore





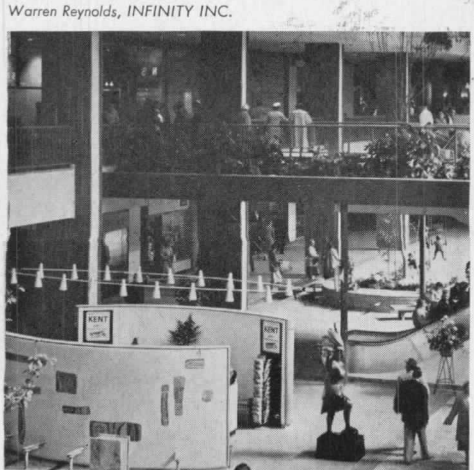
Los Angeles Police Facilities Building Mural (right) depicts city's architectural growth, shields telephones (above). Architects: Welton Becket & Associates and J. E. Staunton



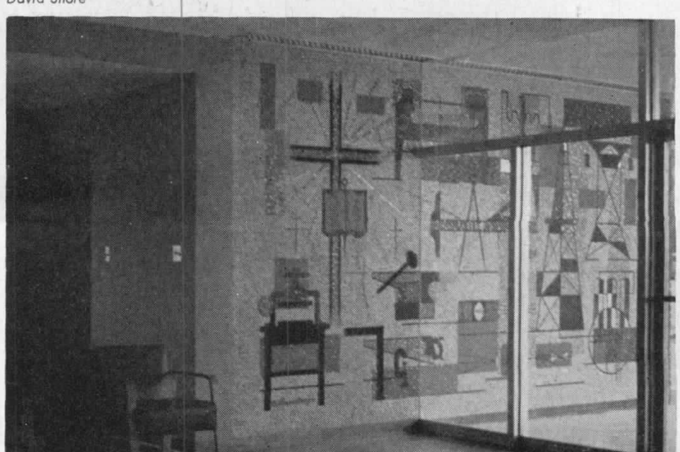
Julius Shulman

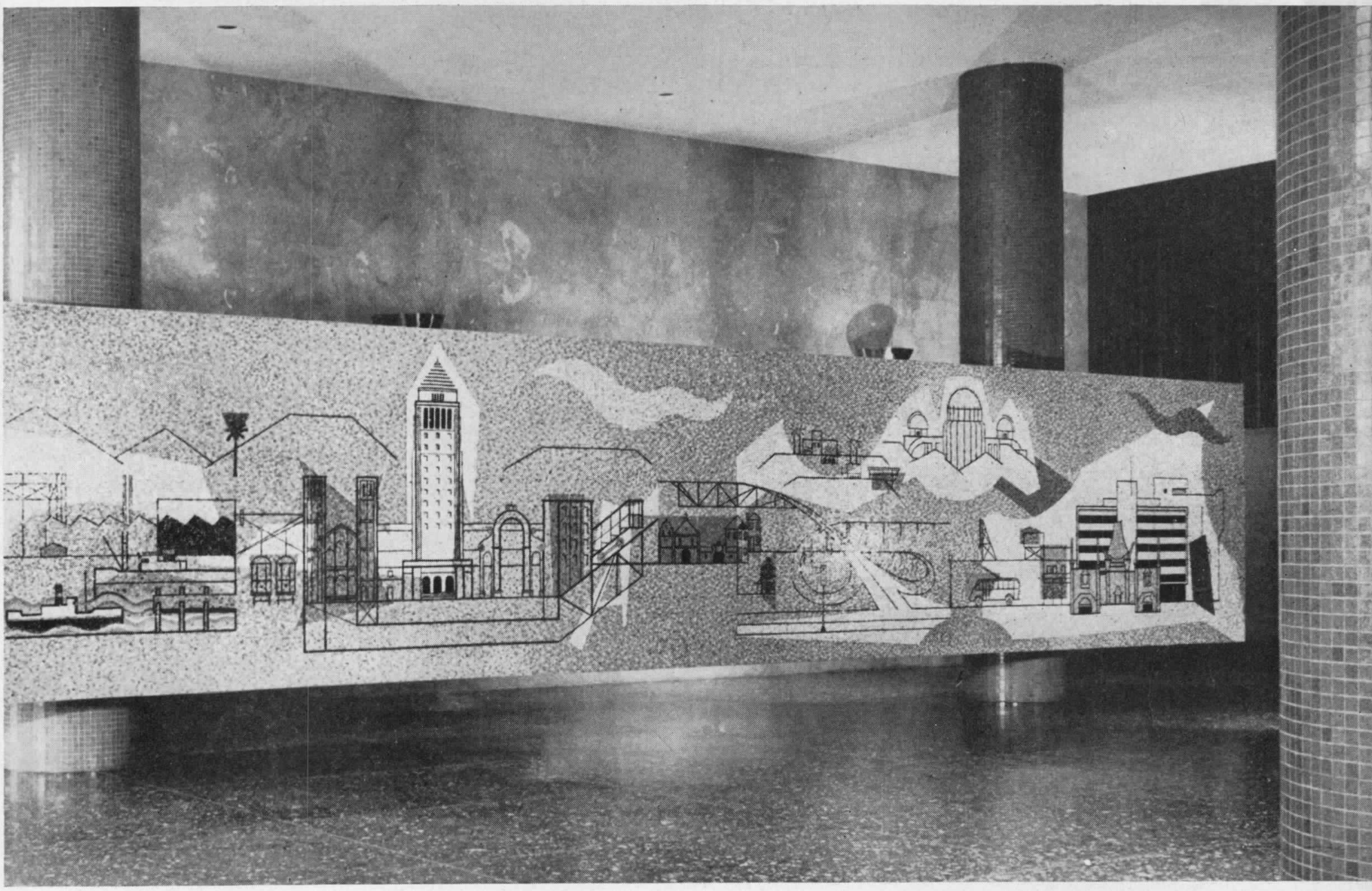
Mosaic detail on preceding page is from mural forming tobacco shop in Southdale Shopping Center, Minneapolis (bottom left); Victor Gruen, Architect. Left: illuminated plastic screen with water flowing over surface for garden of Los Angeles house; Alfred T. Gilman, Architect. Below: entrance mural for Don Boscoe Technical High School, South San Gabriel, Calif.; Barker and Ott, Architects

Warren Reynolds, INFINITY INC.



David Shore





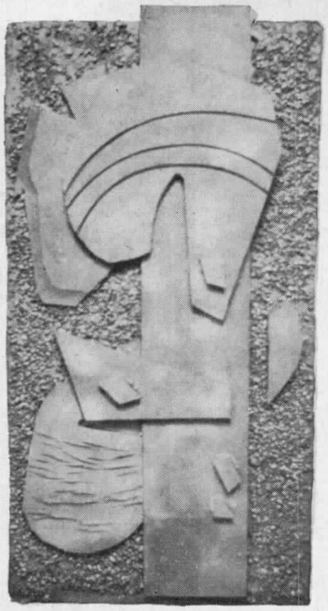
To the word tradition . . . we must add the word *creative* . . . and we begin to make sense. For it is the *creative*, positive forces of the past that offer . . . evidence of the possibility of *integration* of the arts in our time."

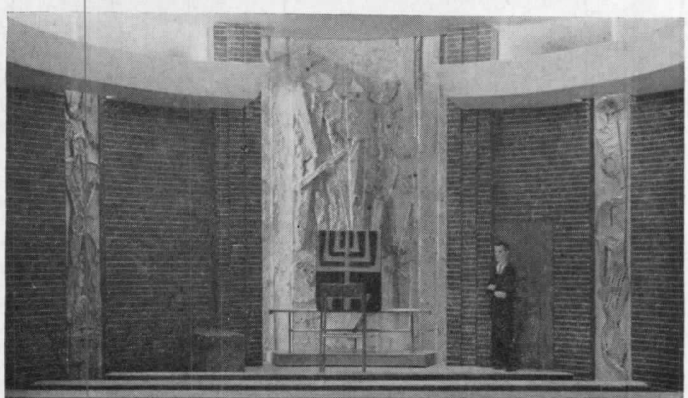
Such is the personal philosophy that led Joseph L. Young to turn from journalism to develop one of the earliest architectural art mediums — mosaic murals — into a contemporary idiom for walls, floors or architectural facings.

Young specializes in designing and personally executing murals for contemporary architecture, and concentrates on working closely with the architect and his client. Unlike most artists who work on large-scale mosaic projects, Young stoutly insists that a true integration of the art is only possible when an artist uses both creative design and craft skills, and personally executes every operation to assure the realization of drafting board concepts.

From original sketches, full scale cartoons are drawn, with each cut of the tile in mind. Then, like a huge jig-saw puzzle, the parts (tesserae) of Venetian glass are cut to shape in the studio, and carefully assembled in reverse on a paper backing. After all revisions are made, the mural is divided into sections and carefully moved to the building site. The mosaic faces of the sections are then pressed by tile setters into special concrete spread over the area to be covered, and the paper is peeled from the surface. After cleaning and polishing, the murals are quite permanent, and periodic cleaning requires only a simple washing down of the surface with a hose. Fifty or more colors are generally incorporated in each mural.

In Europe and South America, where the craft has been handed down from father to son, mosaic has been, until recently, much better known than in the United States. And in the past, the general custom for American architects and tile contractors wishing to use mosaic, was to order sectional inlays by the square foot sent over from Italy. Import duties, unavoidable delays and lack of control tended to restrict the use of mosaics. But with the current resurgence of interest in the medium, many skilled artists and craftsmen are developing here.





Two of Joseph Young's important commissions have been for Temple Emanuel, Beverly Hills, Calif.; Sidney Eisenshtat, Architect. Top right is a completed mosaic for temple lobby, depicting study, assembly and prayer. Right: study of mosaic bas-relief panels for chapel (detail above) shows seven days of creation

Joseph Young first became interested in mosaics while traveling in Italy on an Edwin Austin Abbey mural painting fellowship during 1950. Originally interested in fresco painting, he became so fascinated with the contemporary possibilities of mosaic that he stayed as a guest of the American Academy in Rome to study with a "mosaic family" of artisans. A native of Pittsburgh, Pennsylvania, Young now has his studio in Los Angeles, California, and follows the tradition of precise, patient craftsmanship by cutting the stones and prefabricating each mosaic section by hand.

Young has completed major mosaic mural commissions for a number of civic, religious and educational buildings — including the ones pictured here. His latest work (shown in project form above) for the Temple Emanuel Chapel in Beverly Hills, reveals a highly interesting new development in his style.

Previous work consisted mainly of large-scale flat mosaics, such as the 36 foot by 6 foot cantilevered mural for the Los Angeles Police Facilities Building. In these he sought for vibrant, rich colors and "ambulatory perspectives" — or directional designs to be seen in passing from a series of viewpoints, and thus not impede with the natural flow of traffic. In others, he used series of abstracted mosaic inserts — such as those for Southdale Shopping Center, planned in coordination with Victor Gruen, Rudy Baumfeld and Dike Nagano.

In the new work, a series of tall vertical panels depict the Biblical seven days of creation. They are conceived as sculptured bas-reliefs, with a textured background and highlights of brilliant mosaic.

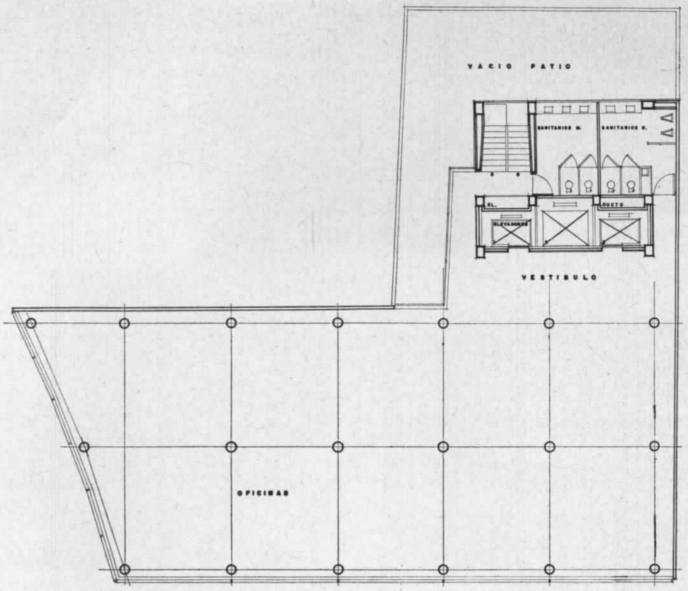
Young has been given one-man exhibitions on both East and West Coasts and has won numerous awards throughout the country. He was a guest panel speaker at the 1956 A.I.A. convention. Apart from mosaics, Young has also worked in such traditional mediums as fresco, encaustic, egg tempra and stained glass, as well as contemporary mediums of glazed tile, silicates and plastics.

Currently, he has also been occupied with two projects to provide information on mosaics; a film, "The World In Mosaic," stressing the role of mosaics in architecture through history; and a book, "A Course In Making Mosaics" (Reinhold).

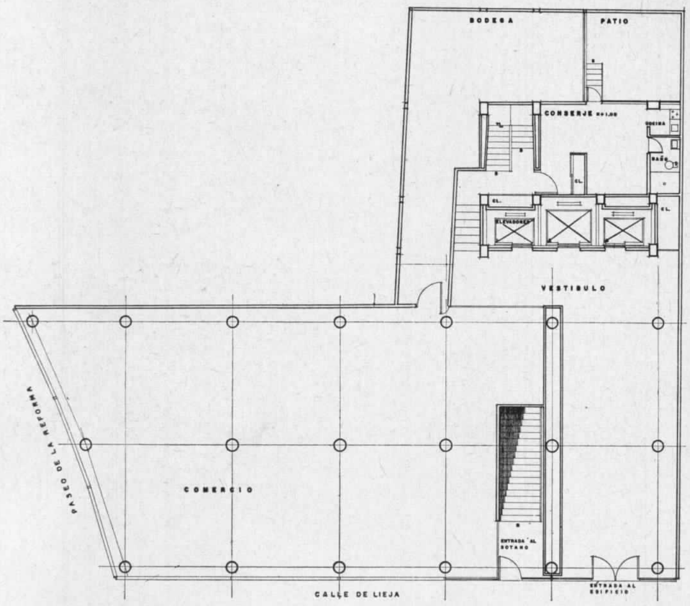
TWO OFFICE BUILDINGS

1: Mexico City, Mexico; Juan Sordo Madaleno, Architect

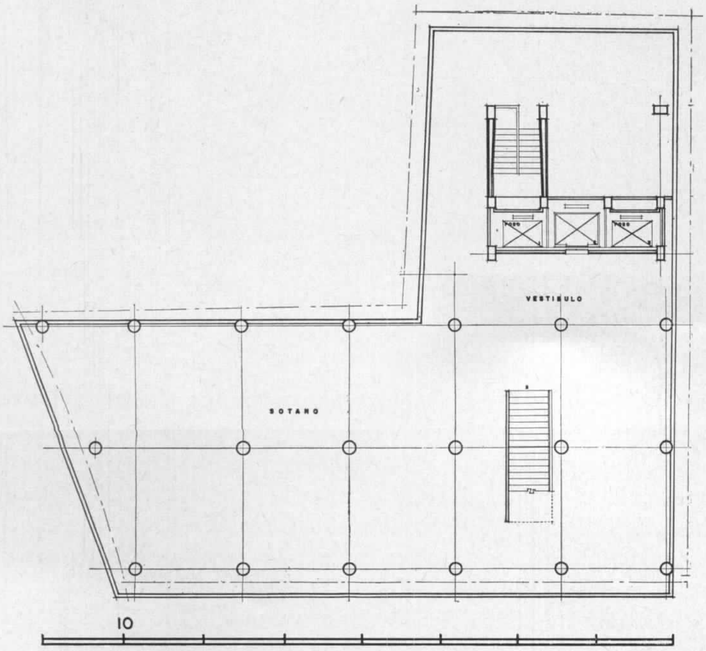
THESE TWO COMMERCIAL BUILDINGS — one in Mexico, shown above and on the two following pages; the other in Atlanta, Georgia, on subsequent pages — have much in common. Both are examples of interesting wall construction; both are on busy urban thoroughfares; both are surrounded by light and air and greenery. They have their differences: The Mexican building's site is small and so is fully occupied by the structure; the Atlanta site, as will be seen, is large. The Mexican building's location on the broad Paseo de la Reforma, tree-lined and fountain-decked, provides as an integral part of the city-scape the open pleasantness which the Atlanta location did not. The Mexican building's lot size and soil conditions, and the local demand for office space, were all factors in determining the size of the building — small in comparison to the Atlanta structure.



Typical upper floor



Ground floor



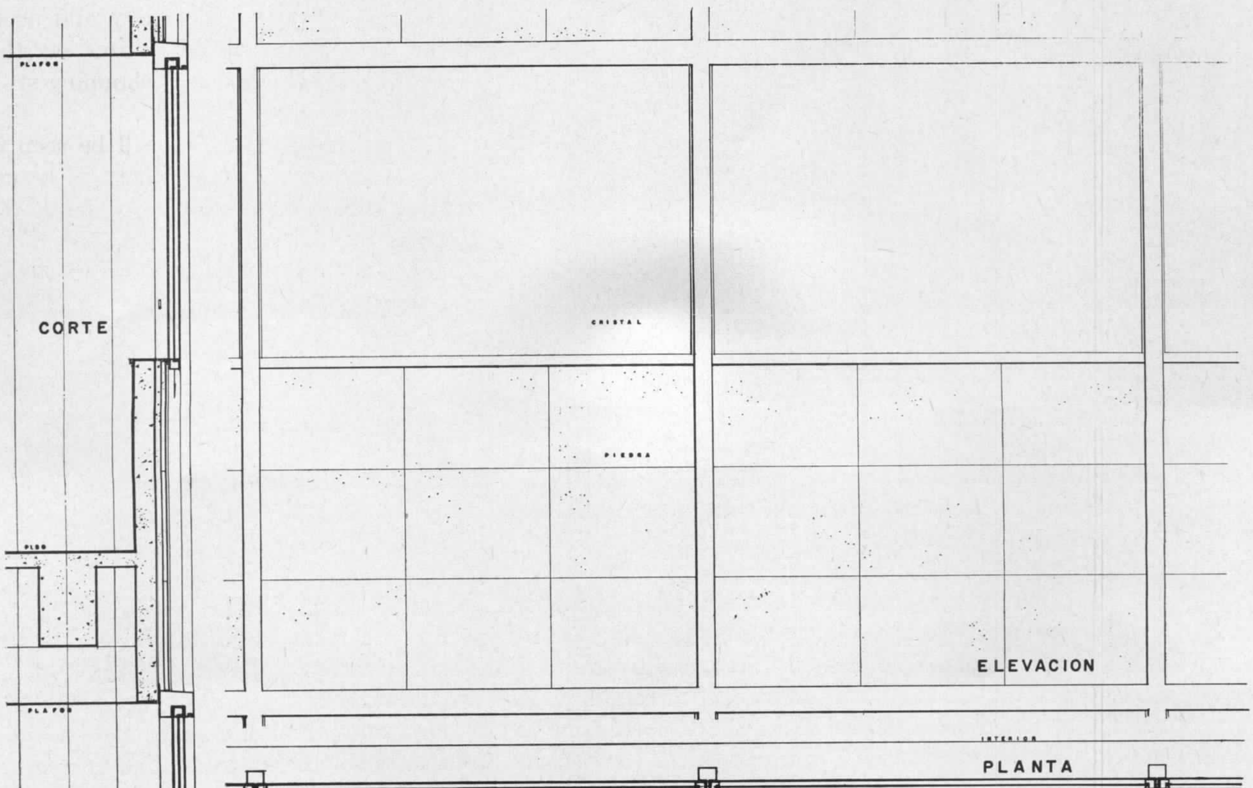
Basement

TWO OFFICE BUILDINGS

1: Mexico City

In using the small site's entire area, it was found that devoting the inner leg of the L-shaped plot to the vertical service core produced the maximum rentable area. Aside from this offset core, the structure is laid out in simple double bays; the entire frame is reinforced concrete. Note that the floor at ground level is store and shop space interrupted only by the lobby and access to the basement; this capitalizes on the advantages of the excellent shopping street on which the building faces.

The building skin, as will be seen in the drawings on the facing page, is actually a thin stone veneer which protects the exterior of the reinforced concrete spandrels, and steel-framed sash which slide vertically past the stone facings.


PLAFON
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CRISTAL
PIEDRA
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INTERIOR
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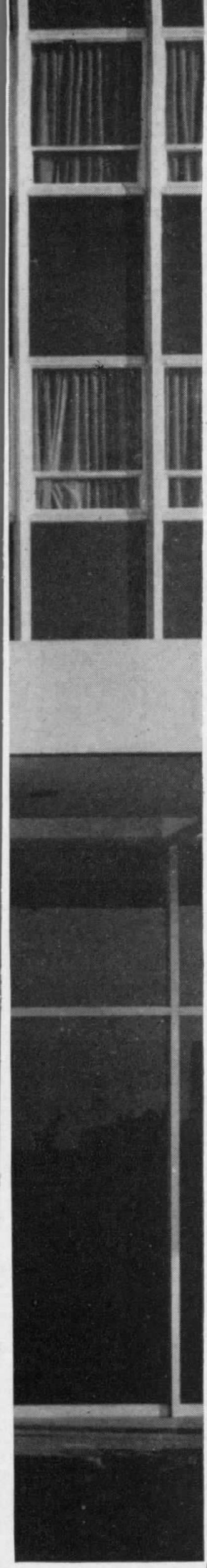
EXTERIOR
5

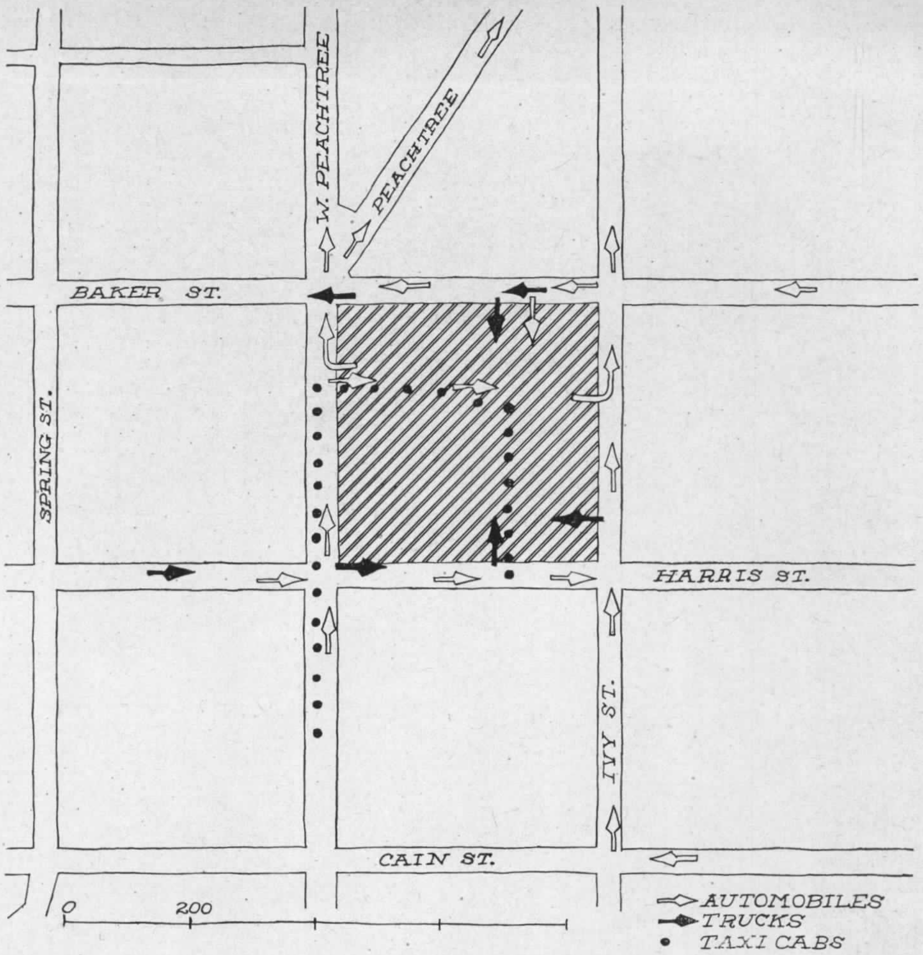
TWO OFFICE BUILDINGS

2: Atlanta, Georgia

Peachtree-Baker Building; Alexander & Rothschild, Architects; E. L. Daugherty, Landscape Architect; A. L. Ferry, Interior Consultant; W. H. Armstrong, W. E. Edwards, Structural Engineers

THIS IS THE FIRST completed element of the proposed Peachtree Baker Center, which is shown in model form directly across-page. The Center is an overall plan for development of a 400-by-400-ft city block on the edge of Atlanta's downtown commercial district. Traffic conditions on the fairly narrow streets surrounding the site, the rather rugged topography and the value both practical and esthetic of assuring to tenants openness, air and a pleasant view, were among the factors which led to the decision to organize the buildings around a

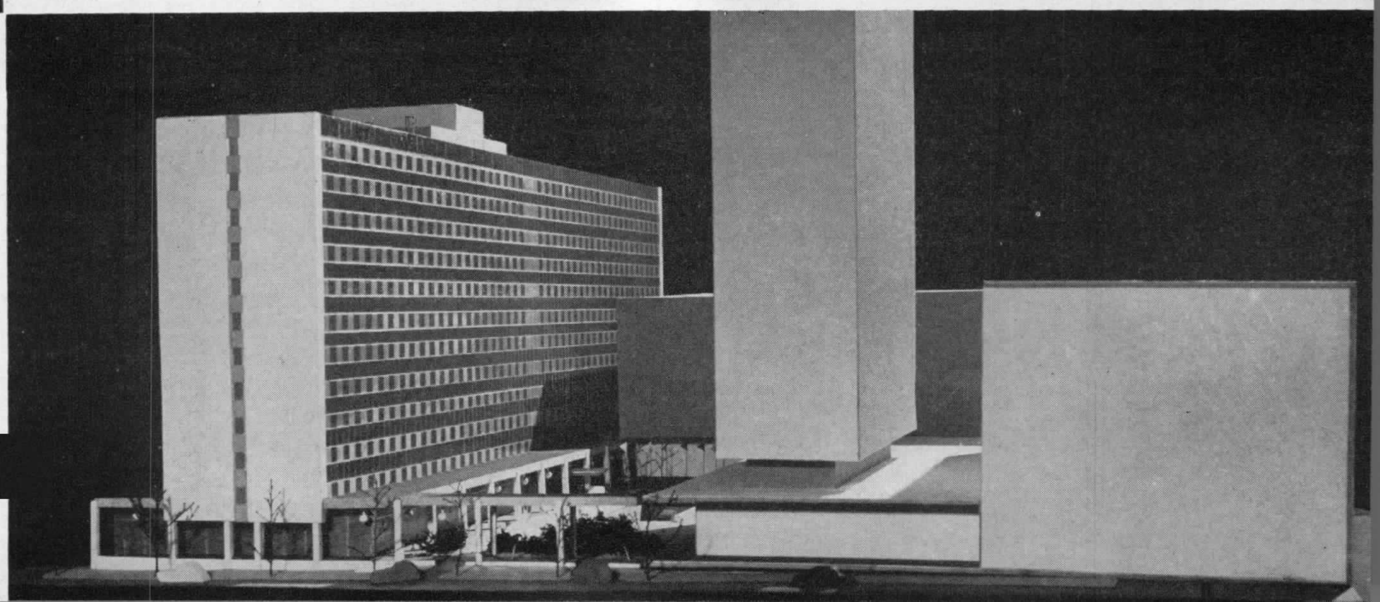


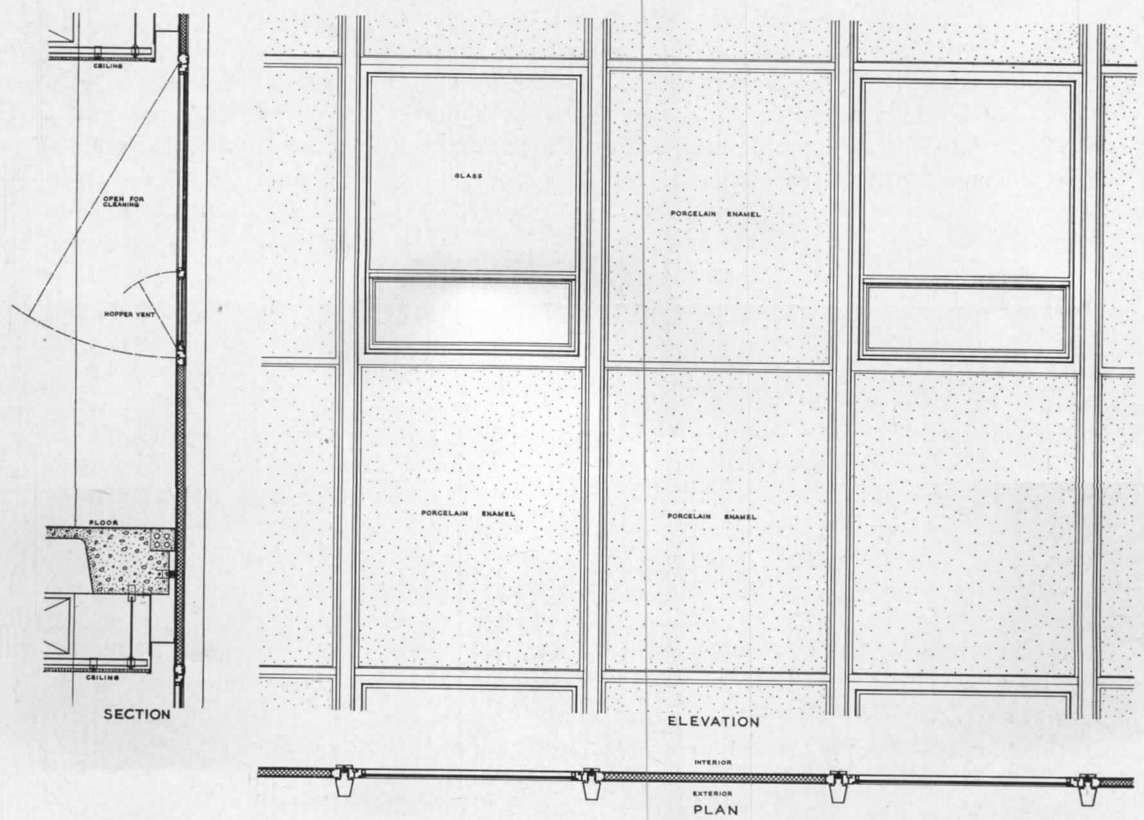


central court; all the structures are to have lobbies opening to this plaza. Underneath is a large parking garage. The Peachtree-Baker Building, owned by Consolidated Realty Co. of Atlanta, was constructed in accordance with requirements of the U. S. General Services Administration; it is for the most part occupied by the U. S. Internal Revenue Dept. and affiliated agencies.

Pedestrian and public and private transportation traffic flow constituted a major problem. Peachtree Street is heavily traveled; the other three surrounding streets are one-way; Atlanta's new expressway system will, at one nearby point, discharge into Baker Street; truck traffic approaches the Center from Harris and Baker Streets. After consultations with the city traffic department the above scheme was developed, with the drive-in court (shown in model below) for access to the buildings and the underground garage. Due to the slope of the land, entrances to the garage and for truck unloading from other streets are at grade level.

Photos (except of model) by Joseph W. Molitor

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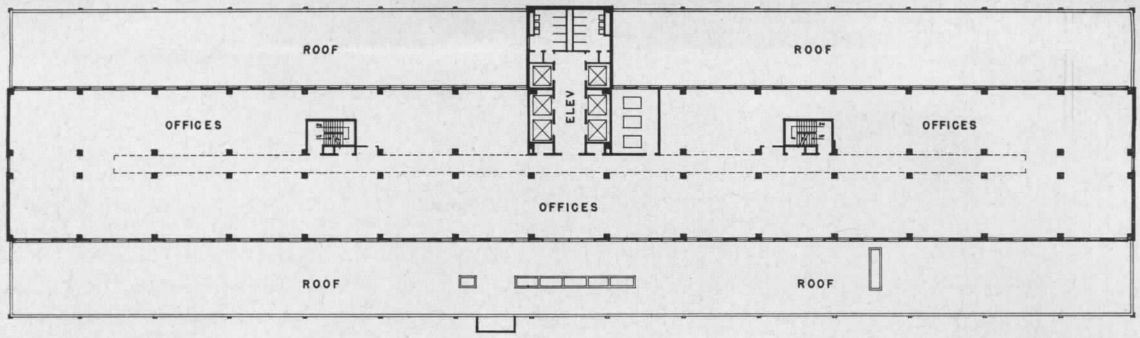
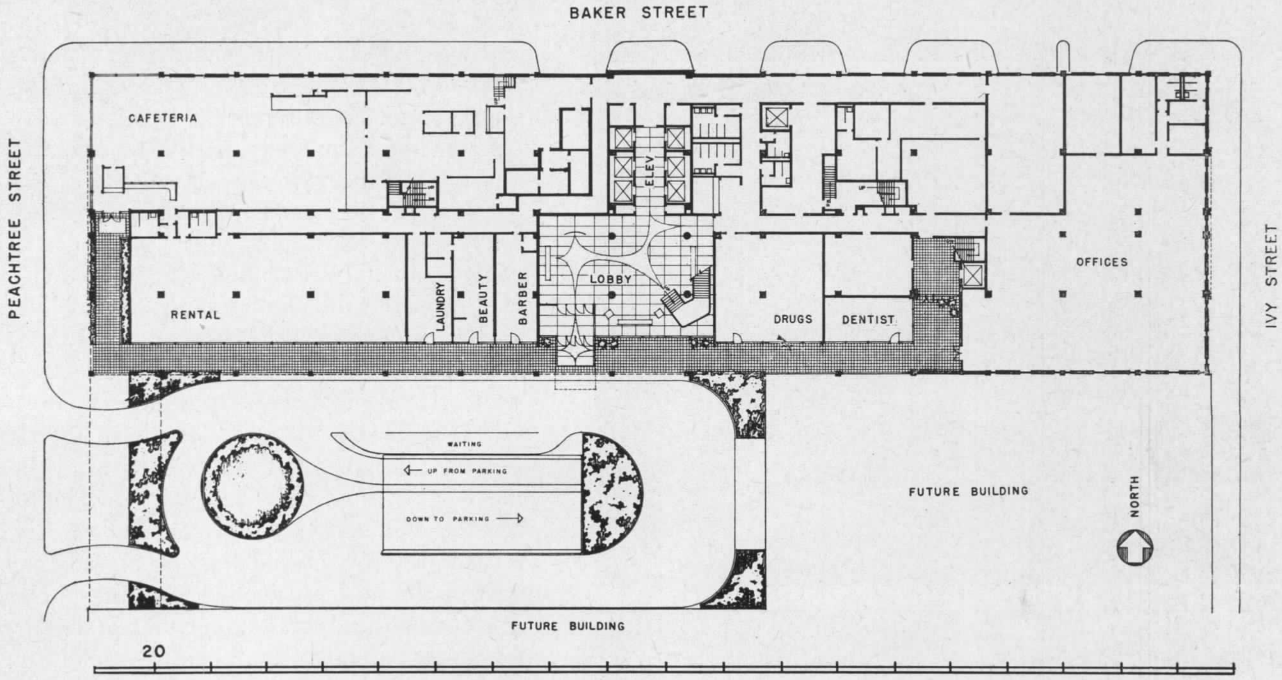


Typical upper floor



TWO OFFICE BUILDINGS

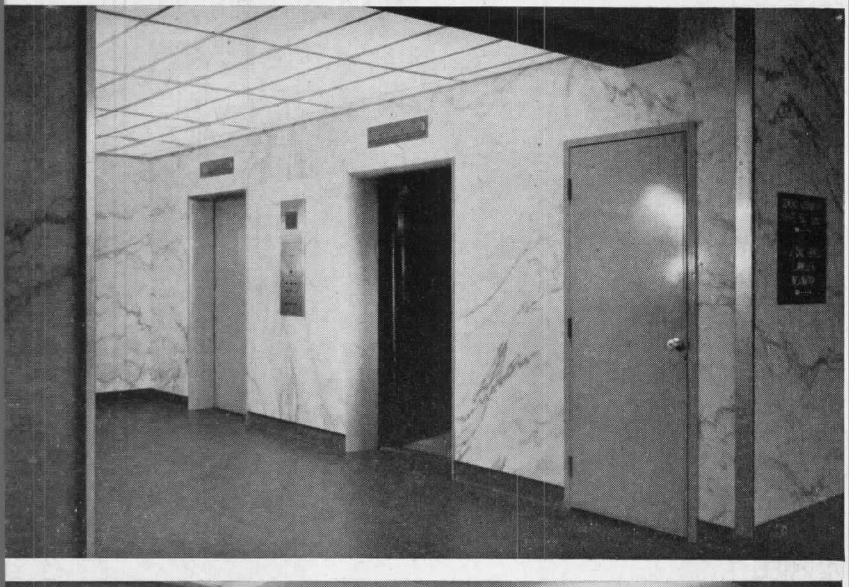
2: Atlanta, Georgia

Peachtree Street runs along the ridge which is the backbone of Atlanta, and the site of the Peachtree-Baker Building consequently slopes abruptly — Ivy St. is some 25 ft lower than Peachtree. This was used to gain entrance to the building at different levels, aiding in smoothing internal and external traffic flow and making parts of what might otherwise have been basement space available for office purposes. Above the ground floor, width of office floors was set by G.S.A. at 52 ft 8 in., their standard for optimum office layout; and bays were similarly standardized at 26 ft 6 in. The structure has concrete columns and joists. The service core tower was pulled out of the main office block to simplify framing and provide an accent on the long façade.

The colonnade along the court and part of the Peachtree St. sides of the building is intended to unify storefront appearance and provide a covered pedestrian way leading to the building lobby. Underneath, the paving is red brick as a reminder of Atlanta's once-traditional brick sidewalks. Walls at ends of the building, on the service tower and penthouses are glazed white brick; a pattern of glass block is set into the elevator shaft.

North and south walls of the office tower are lightweight curtains of porcelain-enamel panels insulated with 1½ in. of glass foam and ¼ in. asbestos backing. Vertical mullions, horizontal division strips and frames and sills of windows are aluminum as shown in details. The building was very rapidly enclosed thanks to the fact that the curtain-wall panels were prefabricated; the time saving was estimated as three months.

Corridor partitions are concrete block plastered both sides. Office partitions are movable.



TWO OFFICE BUILDINGS

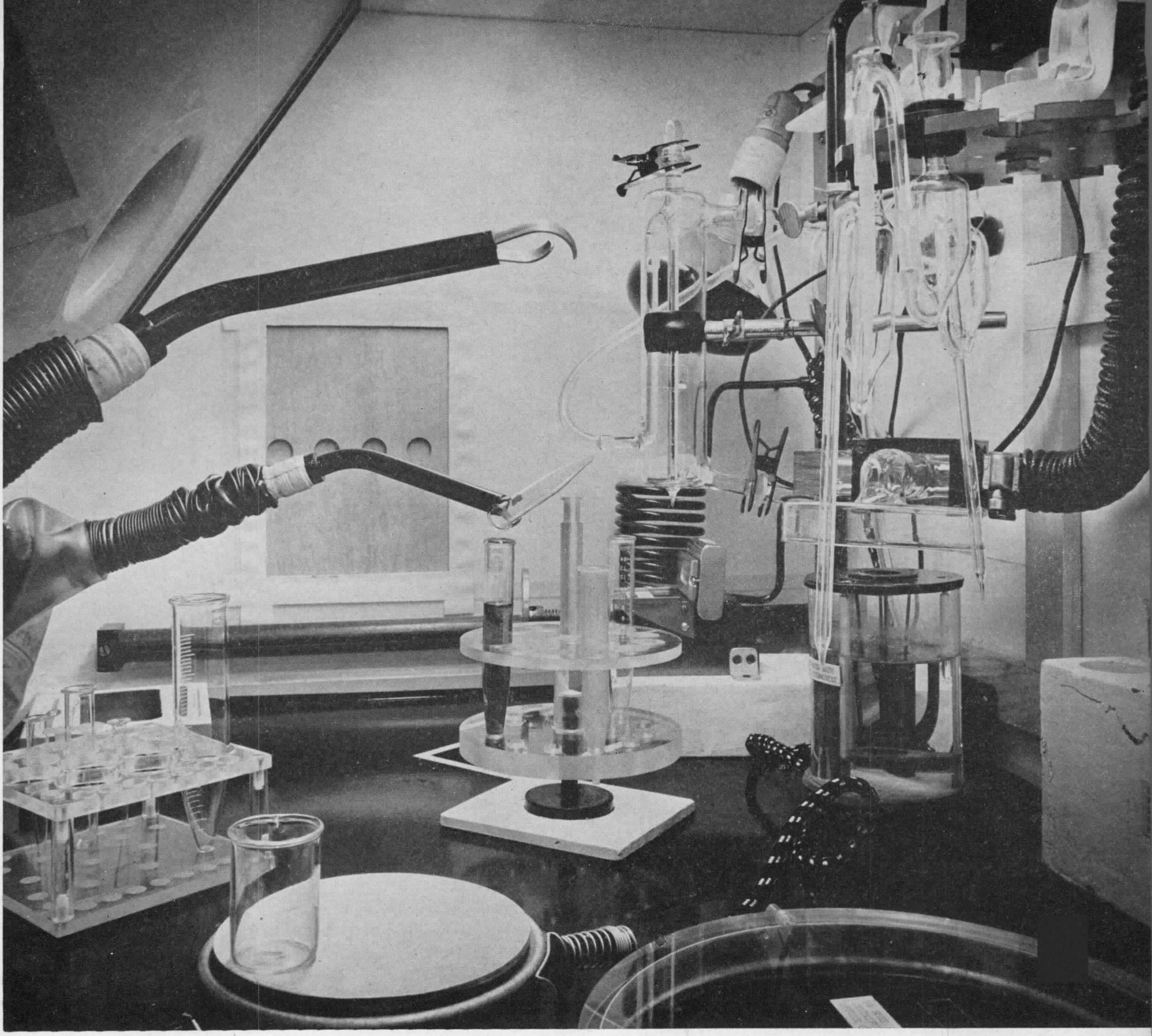
2: Atlanta, Georgia

Glass fiber curtains were used in place of venetian blinds on all windows to simplify maintenance. The walls in the corridor are covered with vinyl plastic of different colors and varying shades of colors to break the monotony of the uninterrupted length. Color schemes of floors and walls change from floor to floor to give distinction to each. Floor tile in offices and corridors is asphalt. Doors to offices are hollow metal with metal door frames. Toilet rooms on each floor have ceramic tile floor and wall tile to wainscot height. Metal partitions were used. Elevators are self-service or attendant-operated, fully automatic.

The main entrance lobby is approximately in the center of the building, facing the south colonnade and landscaped court area. Walls and columns are clad in Alabama white marble with vertical aluminum division strips between the panels. The floor is terrazzo; in it is a pattern evolved from the movement of people through the lobby area. A monumental open stair leads to the second floor of the building, where a great part of the business dealing with the public is transacted. Glass fiber curtains and comfortable contemporary furniture make the lobby an attractive meeting place or waiting room.

Heating and cooling for the nine office floors of the building is provided by a chilled water-hot water system, using a 420-ton centrifugal refrigeration machine for the cooling operation. All equipment is located in the penthouse. Each office floor has three air-handling units, one for each zone (north, central and south) controlled by an electronic pneumatic control system which allows any one zone to be cooled while others are being heated. Ducts along the ceiling take hot or cold air from the centrally located fan rooms to the offices.

The first floor and basement have various kinds of heating and cooling systems, depending on the uses of the areas and the lease arrangement with the tenant. Several package units and a central unit are used, heat for those being provided by the Georgia Power Company central steam system. There are also seven heat pumps installed, taking care of the heating and cooling of individual stores, which occupy relatively small areas.



Inside a "Berkeley box": a completely enclosed laboratory for work with radioactive materials Dean Stone-Hugo Steccati

ARCHITECTURE, ATOMS AND A PEACEFUL WORLD

Second in a series of articles on the architectural implications in the design of buildings in the nuclear field, prepared with members of the Committee on Nuclear Facilities, A.I.A.

Type of Radiation	Alpha (α)	Beta (β)	Gamma (γ)
Nature	Particles (helium atom)	Particles (*electrons*)	Electromagnetic rays
Penetration	Weak	Moderate	Deep
Ionization	Strong	Light	Strong
Means of Hazard	Inhalation Ingestion Absorption through skin		Exposure to ray
Damage due to Hazard	Burns by contact Accumulation in body areas Cell destruction		Extensive internal damage Radiation sickness Death
Shielding	Rubber gloves Glass Distance (inches)	Materials of high density and low atomic number: Metal Glass Plastic Rubber gloves	Materials of high density and high atomic number: Lead Steel or Iron Concrete Water

Radioisotope work involves mainly three types of radiation: alpha, beta, gamma. Since effects are irreversible and cumulative, special protection against their hazards is necessary

Building Area	Use	Control
COLD Public	Offices Conference rooms Counting (shielded) Shops Storage (radiation-free) Lunch rooms & lockers First aid Boiler & Fan rooms	Positive pressure
INTERMEDIATE Low-level, semi-hot radioactivity	Laboratories (low level) Shops & Storage (radioactive material) Health Physics Health Chemistry Change rooms & Laundry (if any)	Negative pressures Air controls Filters Enclosures (hoods, boxes, junior caves) Local shieldings (of varying thicknesses) Remote control manipulators.
HOT High-level radioactivity	Hot cells Cave Isotype storage (bulk) Decontamination Hot equipment storage	Negative pressure Air control Filters Shielding Equivalent thicknesses: 6-in. lead 9-in. steel 28-in. concrete 68-in. water "Master-slave" manipulators

Progressive isolation of radioactive work areas locates "hot" (radioactive) areas for least accessibility. Shielding, ventilation are prime means for controlling hazards

Photos on opposite page courtesy of UCRL (Berkeley)

LABORATORIES FOR RADIOACTIVE RESEARCH

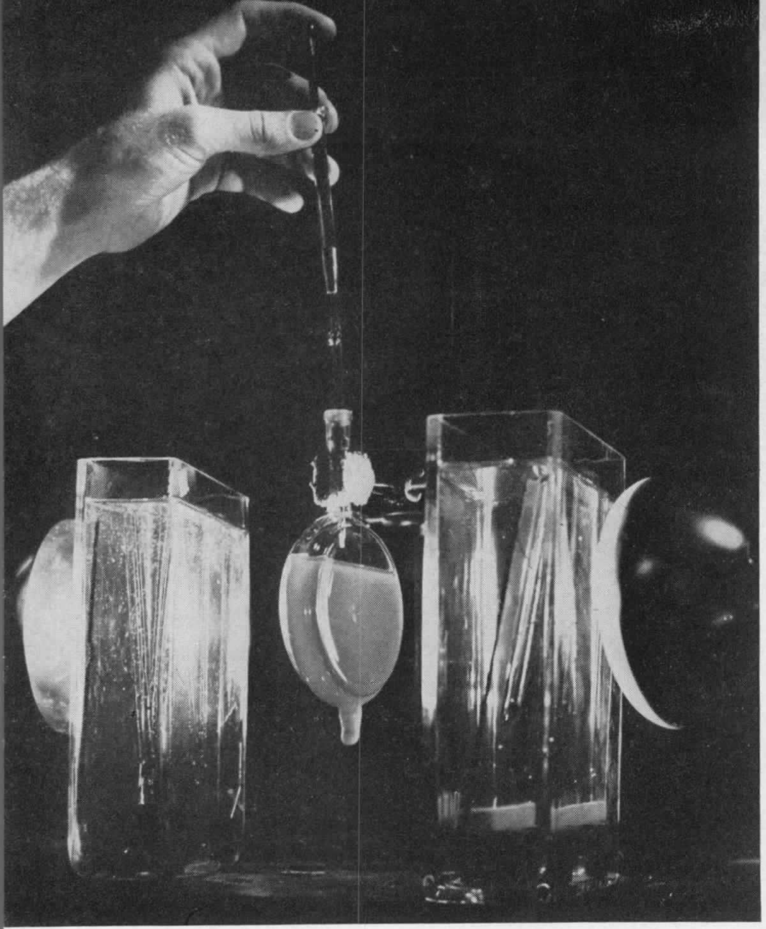
By **BERNIS E. BRAZIER, A.I.A.**
Committee on Nuclear Facilities

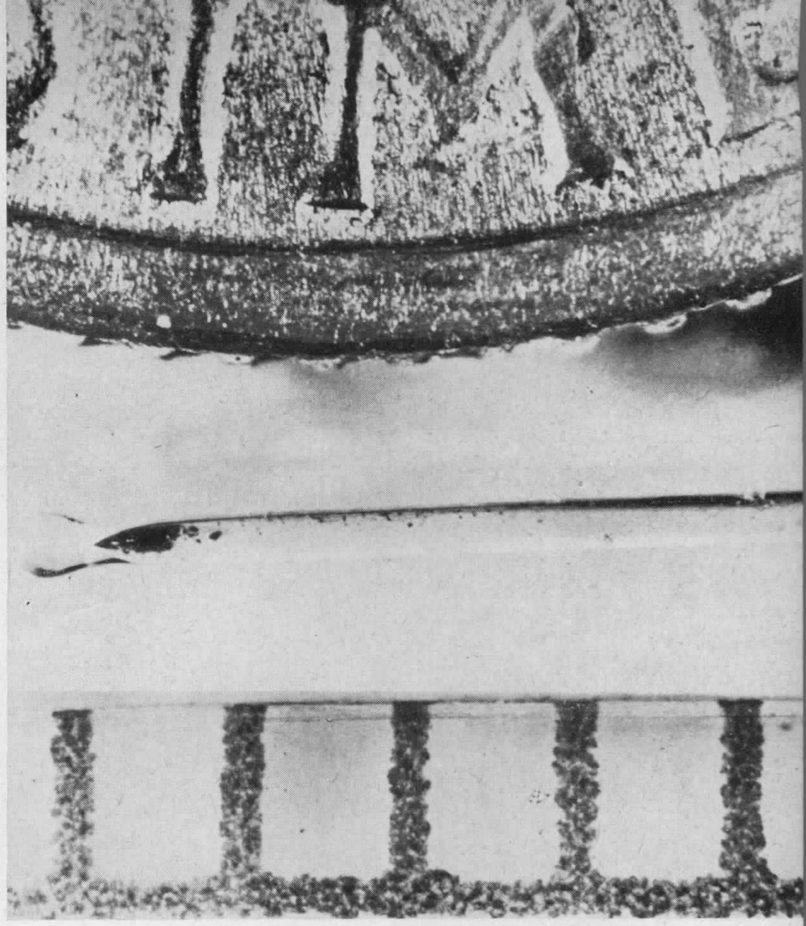
and **ELISABETH K. THOMPSON, A.I.A.**

LABORATORIES are all very much alike — in their basic requirements. The differences between them come from the conditions imposed by the specific field of research for which each provides. Superficially, a radio-chemistry building, for instance, is not very different from an ordinary chemistry building. But the nature of the materials processed in the radiochemistry building is such that the design of the building, as well as the operation of the laboratory, is very different from that of its non-radioactive prototype.

The basic needs of conventional laboratories — work space, routine equipment storage, good ventilation and light, fume hoods, sinks, benches — are equally basic in nuclear laboratories but everything about them is governed in the nuclear building by imperative considerations of protection for personnel (and for building and equipment) from the invisible and insidious radioactivity of the materials used in nuclear research.

To design for these considerations, the architect needs an understanding of the peculiar properties of radioactive materials, of the hazards involved in their handling and of the means for protection from them. The increasingly widespread use of the phenomena of radioactivity in such fields as industry, medicine and agriculture, as well as in pure research, means that the architect can expect more and more to be confronted with the need for at least a conversant knowledge of the





Use of radioisotopes *in industry, medicine, agriculture as well as research has increased rapidly in ten years since isotopes first became available. Potential for future is that radioisotopes may be greatest peaceful use of atomic energy. Basic research, using isotopes, has solved some of mystery of photosynthesis (left), chemical process by which plants convert water and carbon dioxide in sunlight to carbohydrates, releasing oxygen. Some man-made isotopes exist only in minute quantity (c.f. dime, MM scale above), like neptunium, made by bombarding uranium (right)*

basic principles which govern the design of buildings where radioactive materials are used.

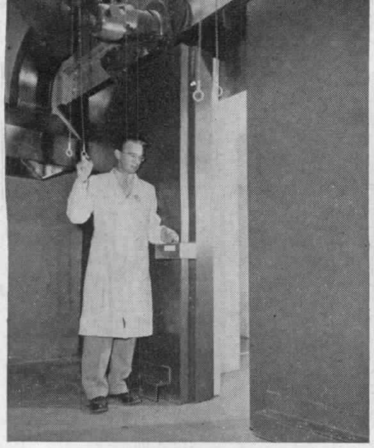
Isotopes and Radioactivity

Radioactivity — the spontaneous release of energy in the form of radiation — results when the nucleus of an element is unstable, in which state it tends to break up. In the process of disintegration it gives off particles of high energy (alpha and beta particles) and, in some cases, electromagnetic rays (gamma rays). Only a few elements which occur in nature are naturally radioactive; uranium and radium are familiar examples of these. There is also a much greater number of radioactive elements and isotopes (elements chemically identical to other elements but with different atomic weights) which have been made in accelerators and reactors. Some 900 radioisotopes of the usually stable elements have now been produced artificially, and their quantity production in reactors has made them readily and inexpensively available.

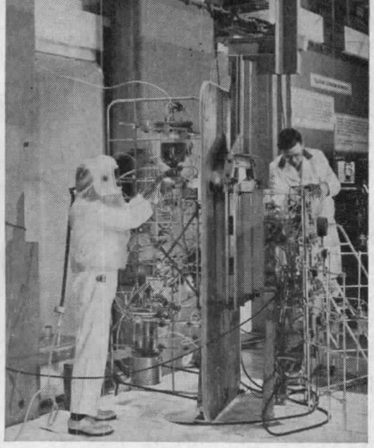
Each radioisotope or radioelement disintegrates, or gives off radiation, at an individual rate, eventually transforming itself over a period of time (which varies with the material) into a stable, or non-radioactive, form of matter. The period in which this takes place is called the half-life of the material. Radium, for instance, has a half-life of 1622 years; a given amount of radium will be only half as active 1622 years from now as it is today; and in another 1622 years only one quarter of the original activity will remain. The half-life is an important factor in evaluating the radioactivity of a material and consequently in determining the requirements for handling it. The shorter the half-life, the more highly radioactive the material.

The hazard involved in handling radioactive substances is due to the ionizing effect of their radiation — alpha, beta and/or gamma rays — on living tissue; if taken into the body through nose or mouth or through a cut or abrasion, they can kill some body cells. The specific damage varies with the particular material which is the source of radiation since each has different properties for producing deleterious effects. Some are bone-seekers, some are specific area or organ seekers, some affect the blood cells, and so on.

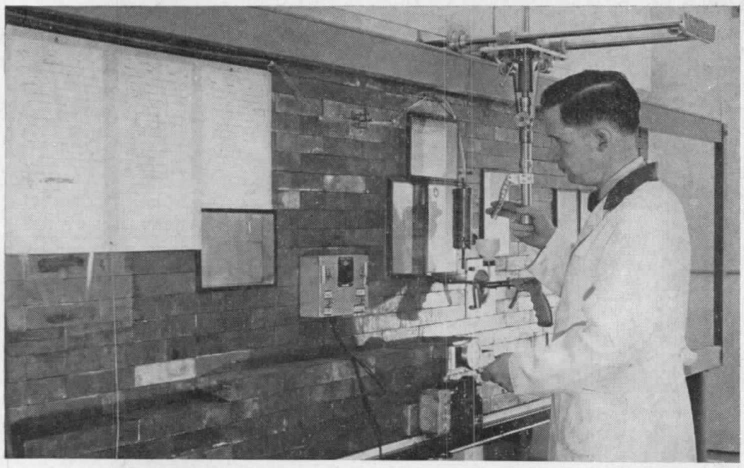
Working with these various kinds of emissions is hazardous, not only because they can harm living tissue both externally and internally, but because equipment and buildings can be contaminated invisibly with their radioactivity and this contamination can in turn harm living things. To protect against this radiation, distance and certain kinds of materials are effective. Materials, varying in thickness and in type with the radiation source, are therefore the answer to providing safe working conditions. The choice of material



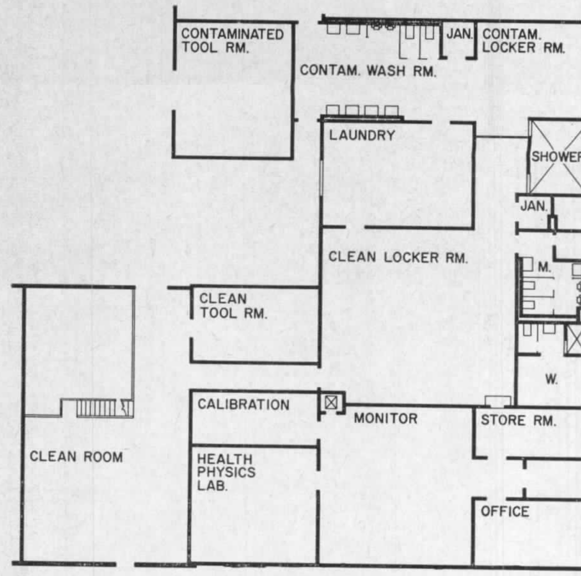
Phoenix Memorial Laboratory



Brookhaven National Laboratory



Brookhaven National Laboratory



Dilute, Disperse, Decontaminate. *In "DDD" labs control of radioactivity hazards includes use of protective clothing (top right) particularly in some phases of work, like decontamination; continual monitoring (top left); permanent shielding walls of lead or concrete, heavy steel doors; contaminated-to-clean-area flow for personnel in certain work (see diagrammatic plan, right). Small "hot" cell (below) has lead brick shielding wall fixed lead glass windows, manipulators. Operator, outside, is protected as any "spill" would be in cell. Radioactive waste is diluted, then dispersed*

and of necessary thickness for an experiment is made by the health physicist, not by the architects, but it is the architect who must provide the proper structural base for its support and the necessary amount of space to accommodate it.

From Philosophy to Building Plan

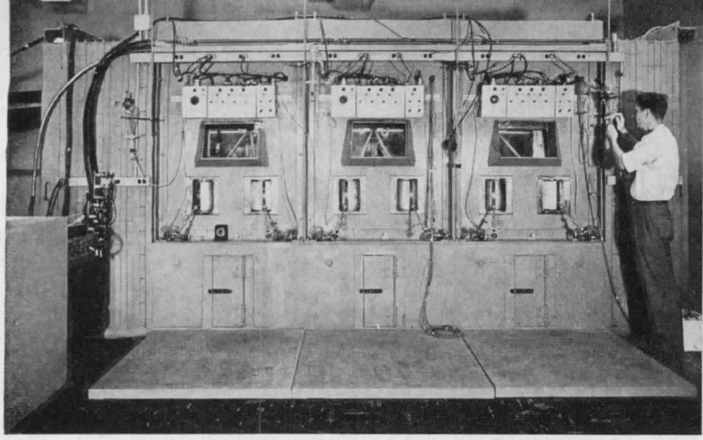
More than in most building types, it is the philosophy of operating procedures, not the physical requirements themselves, that determines the design of a nuclear building, and this is particularly true of the nuclear laboratory. The program of physical requirements follows, and is thoroughly conditioned by, the underlying concept of the handling of radioactive materials. In the few years in which laboratories have been built specifically for research in radioactivity, the same set of conditions has engendered the development of two quite different philosophies of laboratory operation and, consequently, of two types of laboratory buildings.

The first of these starts with the premise that since, at low and intermediate levels of activity, radioactive materials are used in open hoods with only local shielding, extensive — and expensive — decontamination is inevitable. Known as the "dilute, disperse and decontaminate" (or DDD) philosophy, this theory of laboratory operation grew out of traditional operation practices in conventional laboratories. In the early days of work with radioactivity, when little was known of the phenomenon itself and less of its effects, this work was done in existing laboratories with ordinary equipment and only such precautions to provide protection against radiation as tongs to put distance between operator and radiation source, local shielding in open hoods, and increased flow of air to carry off radioactive particles.

Under such conditions contamination, even in the most carefully run laboratory, was a constant possibility. Consequently an elaborate system of precautions and of techniques was gradually developed, based on the continuing use of known operating procedures. Tongs became remote control manipulators and sensitive "master-slave" controls for handling laboratory equipment; experiments involving high levels of radioactivity were set up behind massive, permanently placed concrete or lead shielding walls which enclosed large-volume "cells" or "caves" and required floors designed for unusually heavy loads, and foundations and footings designed to take them. Hood design remained about the same, but increased knowledge developed better filters and ventilating equipment providing a greater volume of air for more efficient exhaust.

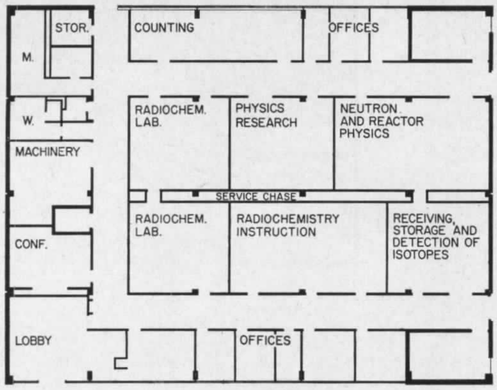
"Dilute, Disperse, Decontaminate"

From these beginnings the "DDD" philosophy evolved,

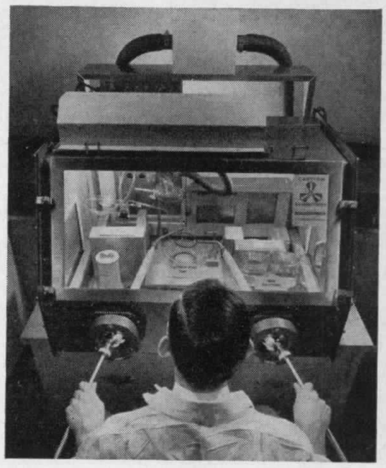


UCRL (Berkeley)

G. M. Isotope Laboratory



Georgia Institute of Technology



G. M. Isotope Laboratory

Concentrate, Confine. *"CC" design approach isolates radioactivity, confining it to mobile, pressurized, ventilated box which is true lab. Manipulators, rubber gloves, protect operator. If spills occur, contamination is in box only. Lead shields, fitted to box, protect in high level work. In kilocurie work, box is moved behind demountable 6-in. lead brick "cave" wall (top left). Control through total enclosure permits flexible use of space and open, simple plan and construction (Georgia Tech Radioisotopes Laboratory, Atlanta, Ga. John W. Cherry, arch.)*

and through it the great laboratories at AEC and AEC-sponsored establishments. Usually located in a remote part of the country, to minimize the possibility of any kind of contamination of large centers of population, these institutions have developed certain principles of planning which in themselves tend to provide a measure of protection. In site planning and in building plan, the general principle is to progress from "cold" to "hot" (high level radioactivity)* area, passing through intermediate areas en route.

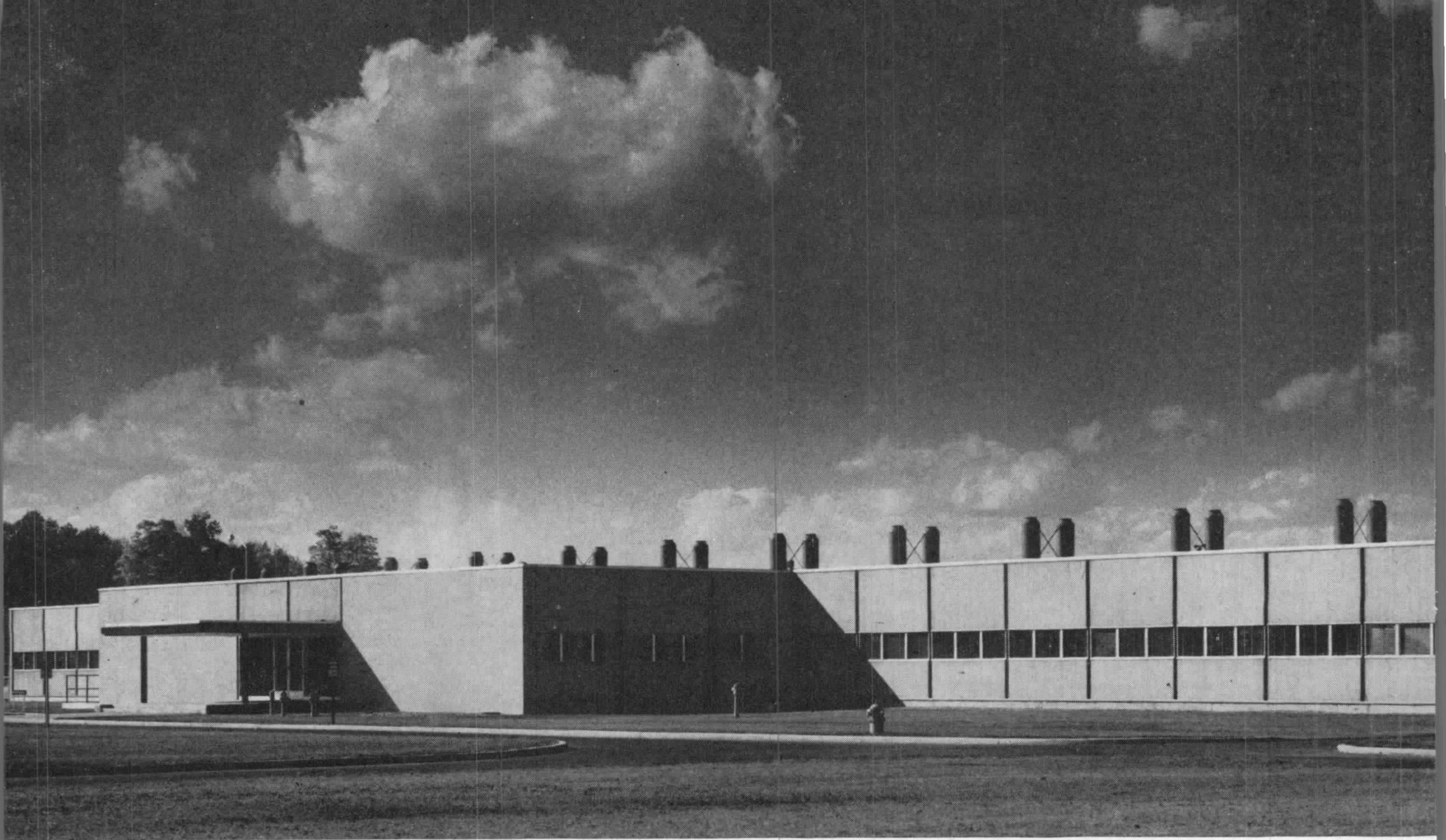
This greatly simplifies exclusion from dangerous areas of all but those persons most directly concerned with those areas and fully familiar with the necessary conditions of operation in them. The same principle governs air flow in a building; the flow is from positive-pressure halls to offices to still lower-pressure laboratories.

Between the extremes of "cold" and "hot" areas are the intermediate areas where work with low-level (microcurie † or less) and "semi-hot" (millicurie level) is done, usually in laboratories of conventional type but with increased air flow to hoods, particularly in the semi-hot laboratories. Because of the higher level of activity in these, filtering must be more precise, shielding of denser materials and of greater thickness (two feet of concrete or equivalent). Even with the large volume of air (600 to 2200 cfm, depending on the radioactivity of the material in use) which is necessary in these hoods to prevent any possible blow-back of contaminated particles, further precautions, such as restrictions against smoking, eating and even powdering the face or renewing lipstick, have to be enforced as protection against inhaling or ingesting radiation. Considerable care is required to prevent "spills" of radioactive materials on equipment, benches, walls and floor, and continual monitoring of areas by health physicists is essential to maintain safe operating conditions.

The "counting room," where radiation counts are recorded with extremely sensitive instruments, is in a special category as far as location is concerned. Since radioactivity from sources other than that which is being counted can affect the readings of these instruments, this room has to be located away from external radiation and usually the room itself has walls which

** Actually, the definition of low, intermediate and high levels of radioactivity varies with each laboratory. Scientifically, the basis for various interpretations of these terms is the radioactivity of the material involved. Its particular properties, half life, biological effect and the quantity to be used are the determining factors for its qualification at one of these levels. As knowledge of the properties of each radioisotope has increased, and as techniques for handling them have developed. the range of each level has been extended.*

† The curie (C) is a measure of the rate of particle emission. It is the number — 37 billion — of disintegrations per second from one gram of radium. The roentgen *(R) is a unit for measuring the quantity of X-or gamma rays.* The roentgen equivalent physical *(rep) is a measure of the radiation dose in terms of absorption in tissue.* The roentgen equivalent man *(rem) is a measure of biological effect in terms of the particular properties of a radioactive material.*



General Motors' Isotope Laboratory *at Technical Center, Warren, Mich., designed on "CC" plan is example of industry's growing interest in research for new applications of radioisotopes. Plan is based on "contamination gradient", with "cold" areas at front, all radioactive labs at rear under negative pressure; "hottest" rooms — decontamination and source lab — are at each end. Each lab has its own exhaust system; each fan has maximum rate of 1400 cfm. Exterior walls are prefabricated concrete panels hung on steel frame.* ***Argonaut Realty Co., designers***

function as shielding to exclude outside radiation and so prevent "technical contamination".

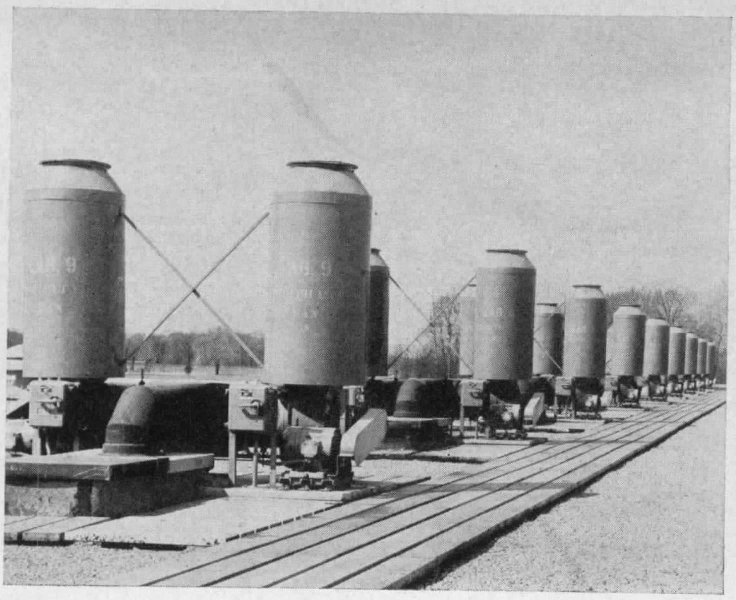
"Hot" areas are usually located below grade or in a hillside, wherever possible, to take advantage of the natural shielding afforded by earth. The "caves" or "cells" in these hot areas are of special design and provide a complete enclosure with walls of concrete, three feet thick (or more, depending on the degree of radioactivity involved and the work to be done), or its equivalent in lead. The operator, standing outside, uses remote-control manipulators ("master-slaves") to handle equipment inside the cell; dense lead glass windows, mirrors, periscopes and other optical devices let him see what goes on inside. In some cases radioactive sources are brought into the cells in heavy lead shipping containers; in other cases these are moved by remote control to the cave through a channel filled with water deep enough (depth depends on quantity and material) to act as a shield.

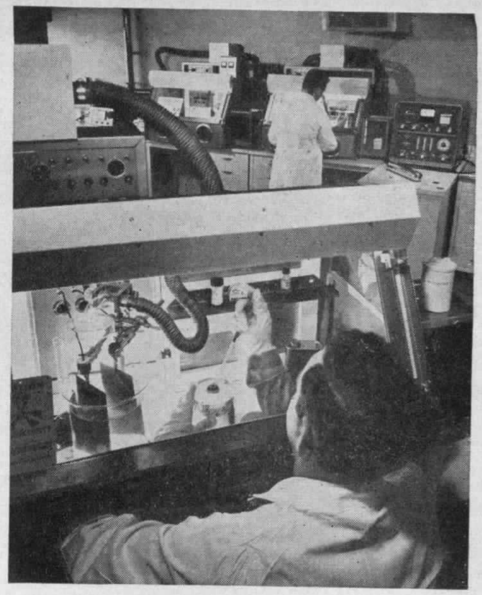
After certain experiments are completed, a highly radioactive cell has to be decontaminated before another experiment can be performed in it. Sometimes the degree of toxicity is such that the cell has to be allowed to "cool" before decontamination can take place, an inconvenient and expensive, if unavoidably necessary, loss of operating time.

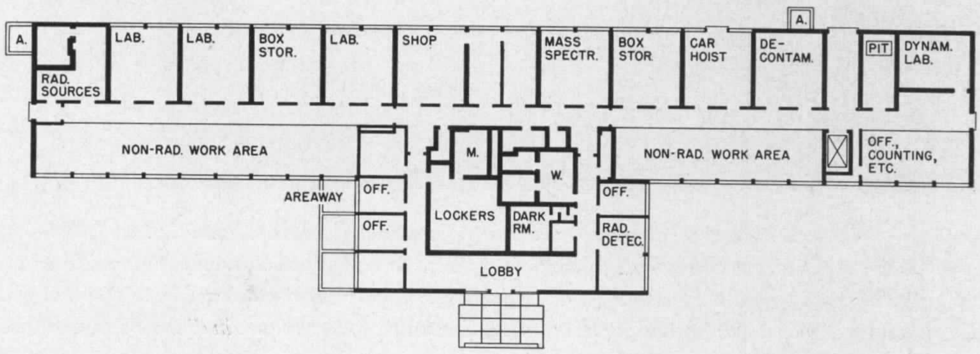
Tools and equipment too must be decontaminated. They are disassembled, scrubbed, cleaned and stored until "cool" enough for reuse. Since the concentration of radioactivity from this process is liable to be fairly heavy, this department is located either in the building's "hot" area or in an entirely separate area.

Protective clothing is worn during work. In low-level work, this consists of a laboratory coat over regular clothing; in higher level work, special clothes, head and shoe covers and, in certain areas for certain kinds of work, a clean-air mask, are required. The worker must leave his contaminated clothing in a "contaminated" locker area, take a shower, dress in his regular clothing in a "clean" locker room, and leave the building without returning to the contaminated area. Special facilities for laundering contaminated clothing are provided and the wash water from them carefully monitored and diluted (and sometimes chemically treated) before discharge to sewers.

Contaminated water from laundering the protective clothing needed in "DDD" laboratories — which in a large laboratory can be considerable — becomes, there fore, a problem for serious consideration. Although the volume of radioactive wastes from a laboratory is by no means as large as that from a reactor plant such as Hanford, it is nevertheless not a negligible factor, and should be considered in the overall plan.







Since everything that becomes contaminated must be disposed of by special means, the greater the volume of radioactive waste, either liquid or solid, the more complex and extensive the disposal problem.

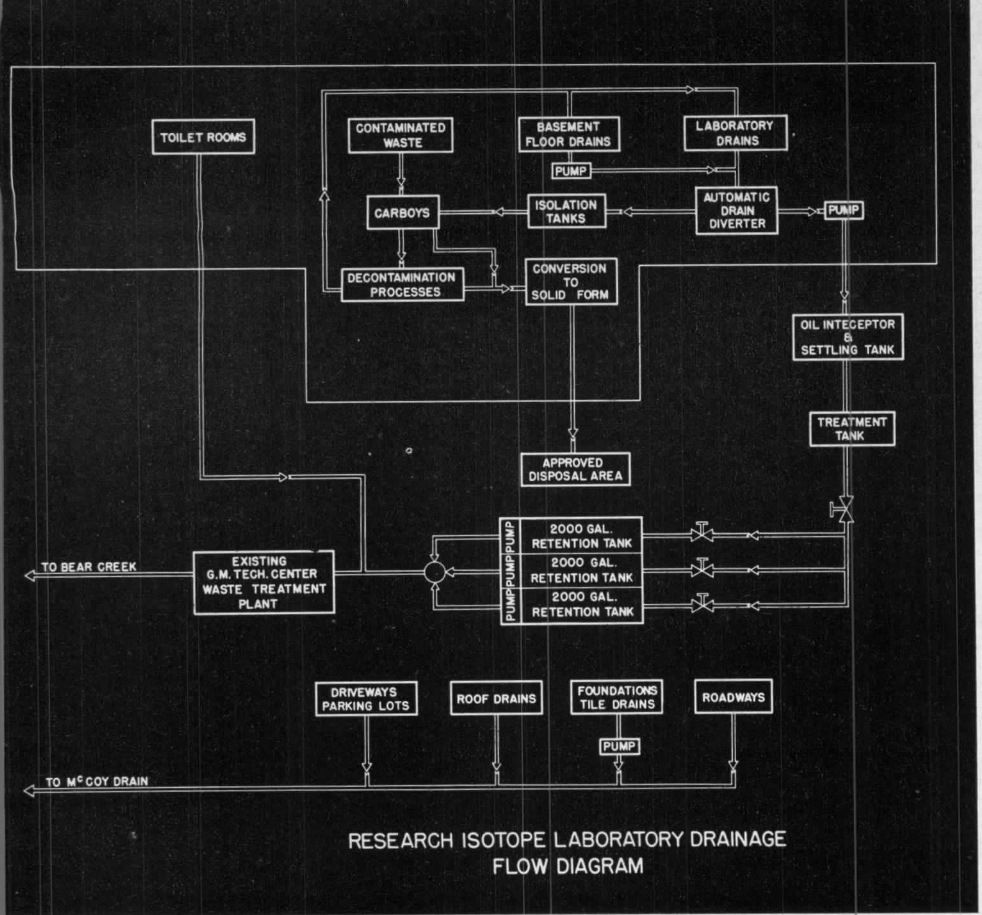
The Box is the Laboratory

In the conventional research building, the laboratory is a whole room. But in many of the new radioactive research buildings now being built in many parts of the country, the true laboratory is a box, and the room in which it is placed may contain half a dozen such "laboratories." In essence, this is the other philosophy of laboratory operation in current — and increasing — use today. Although developed, like the "DDD" philosophy, from methods used in conventional laboratories, the "concentrate and confine" (CC) philosophy is a new concept of laboratory procedures. Its application results in a less complex kind of building in which the use of its space more nearly approaches the scientist's ideal of complete flexibility than has previously been possible.

Its premise is that total control can be accomplished by total enclosure of the radioactive material used in an experiment, and that contamination can be limited to the area of this enclosure. Since the area of enclosure is that of a box (its dimensions vary with the need of the specific experiment), de-contamination is greatly simplified. Even more important, the total control over radiation provides a means of assuring personnel protection and of minimizing contamination of equipment and building.

This concept of control by concentration and confinement, developed by Nelson B. Garden, chief, Health Chemistry, University of California Radiation Laboratory at Berkeley, permeates the entire operation of the laboratories which use it. The heart of this philosophy is a transportable plywood, plastic or metal box with a sloping glass front, equipped with remote control manipulators (or gloves for lower level work), filter, exhaust duct, and waste disposal receptacle, already encased in concrete to facilitate its shipment to a designated "burial" ground.

By confining the radioactivity entirely to the box, the chance of a "spill" on laboratory bench, floor or walls is minimized; by keeping the box under negative pressure and placing the filter at the box, radioactive dust and particles are stopped at their source. By exhausting (through a flexible 4-in. duct in the negatively pressurized work area, then to exhausters on the roof) a two or three foot cube, the amount (5–12 cfm for practically any laboratory operation) of air flow is reduced to about a hundredth of the amount of air flow required for safe work in a hood. This means not only a much less expensive operation but greater environ-



G. M. Isotope Laboratory

UCRL (Berkeley)

Waste disposal *is serious problem since anything contaminated must be disposed of specially. In "DDD" labs waste is diluted before discharge to sewers or burial; in "CC" labs most radioactive waste is collected in carboys at boxes. After chemical treatment, sometimes necessary, waste is stored in holding tanks (right) until assayed and, if activity is negligible, released to sewer. Waste disposal flow chart for G-M Isotope Lab shows typical "CC" system with systems for lab and for normal building water; automatic drain diverter detects radioactivity, traps it for special disposal*

mental safety since the volume of air exhausted to the outside is very much smaller.

The "Berkeley box" (so called because it was developed at the University of California Radiation Laboratory) has no real limit in size or, apparently, in use. Plants have been raised in radioactive soil in a box; animals, as small as rats and as large as cows, have been housed in boxes and their radiation-laden bones and tissue have been cremated in an electric furnace in a connecting box; milling machines are used in large boxes; all usual chemical processes are done regularly in boxes. By fitting the ordinary box with a lead shielding equipped with view window and manipulators — it is then called a "junior cave" — the maximum safe level of radioactivity can be appreciably raised. If the box is placed behind a 6 in. lead "cave" wall, this level can be increased to the kilocurie range. With additional inches of lead shielding, the level at which safe work may be done with radioactive material can be raised still further.

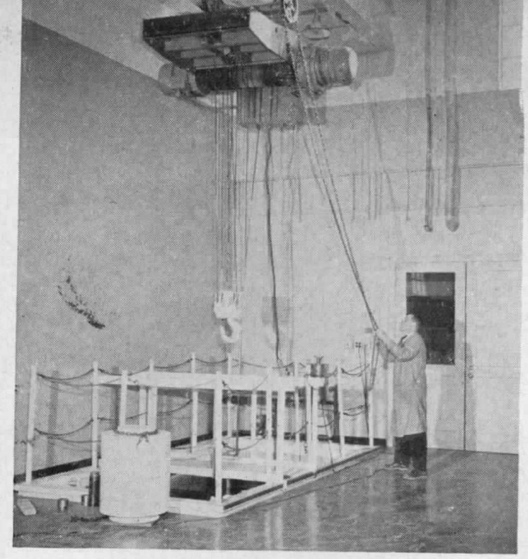
The mobility of the boxes makes possible not only versatility in use of the laboratories, but permits a more rapid turnover in laboratory space since there is no "down" time. At the end of an experiment, the box is moved to the decontamination room where it is either cleaned up (in a decontamination box) and put back into service or it is allowed to "cool" until it can be cleaned, or if too "hot," encased in concrete for disposal.

Design for Flexibility and Good Housekeeping

If control of radioactivity is the determinant of the design approach, flexibility is the basis for the plan, and ease of maintenance — the scientist calls it "good housekeeping" — is the criterion for selection of materials and equipment. None of these factors can be considered alone.

Modular planning and equipment make for flexibility and simplify replacement, inspection and monitoring. Demountable partitions of metal, concrete block or, in "CC" laboratories, of wood or glass, make interior changes easy. Assembly of utility lines in a service chase facilitates expansion horizontally and vertically. Non-porous materials do not absorb radioactivity and unbroken surfaces have no cracks through which it can seep. Accessible piping and ducts simplify monitoring and recessed light fixtures gather neither dust nor radioactivity. Filtered air at the intake puts less load on filters at the exhausts.

The evidence of the past is that new materials, improved nuclear research tools and refinement of techniques will make it possible for scientists to do in the next five years what is impossible today. Architecture, as well as science, faces a challenge in that prediction.



Bulk storage *of radioactive material requires controlled conditions to prevent personnel and technical contamination. Heavy shielding—lead, concrete, or water — and isolated location in building are essential. Pool at Battelle Memorial Institute (right) stores lead container under 14 ft of water; crane is needed to handle casks. Pit, before grade, at G-M Lab has 3-ft concrete walls (left)*

SPECIFIC LABORATORY NEEDS FOR SPECIAL RESEARCH

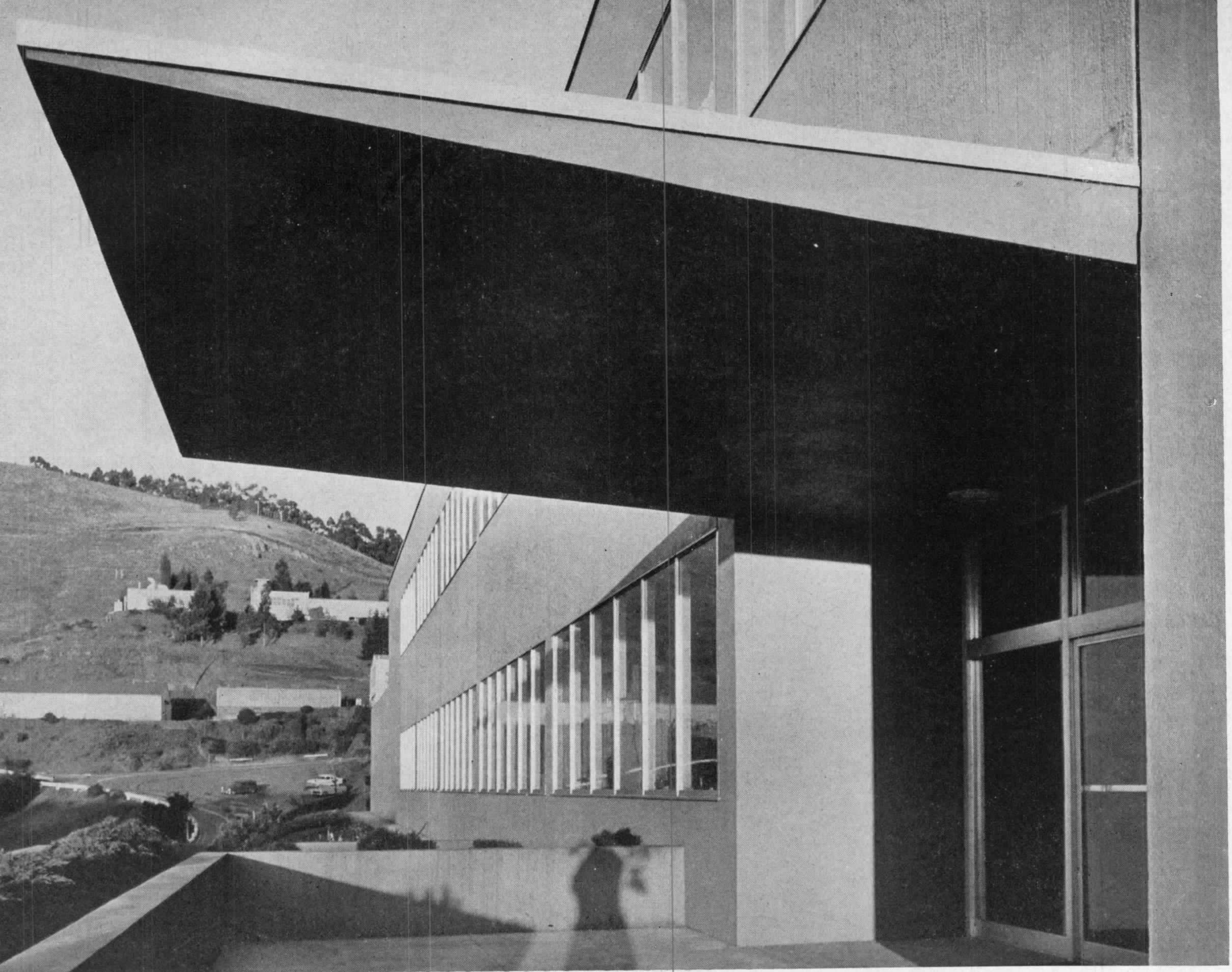
G. E. Hanford Atomic Products Operation

Biological research labs have been built on both "DDD" and "CC" concepts of lab use. Animal housing facilities are sometimes provided in lab building proper, sometimes in separate pens as at Hanford (right). Box labs of special design (left) provide completely controlled environment and mobility of unit for more flexible use of space; care of animal and experiment conditions are simplified

Phoenix Memorial Laboratory

Greenhouse is sometimes part of agricultural research labs. Box labs are also used for controlled environment experiments. Plant food utilization, genetics are studied

These hot cells for large-scale high level work have 3-ft barytes concrete walls with a 3-in. steel shell, thick lead glass windows, "master-slave" manipulators for remote control of processes in cell



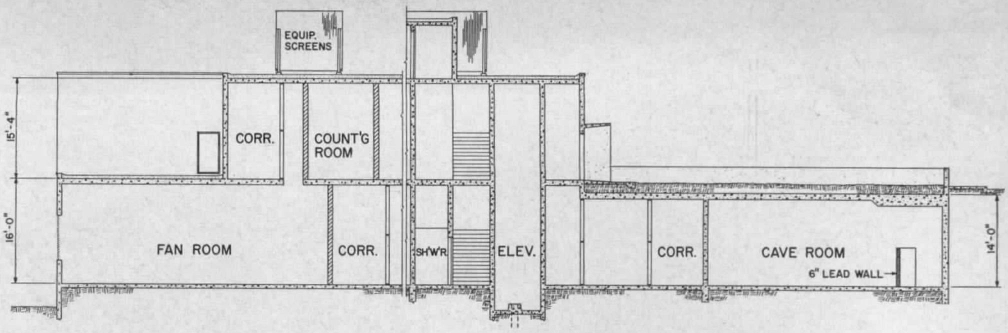
LABORATORY FOR RADIOACTIVE RESEARCH

Radiochemistry Building, University of California Radiation Laboratory,* Berkeley

As the last building to come from the office of Eric Mendelsohn and his associate Michael A. Gallis, architectural interest in this building is implicit. As the first building in which the concepts of the "concentrate and confine" philosophy of nuclear laboratory techniques have been fully translated in architectural terms, it has a special significance. ***Eric Mendelsohn, Architect; Michael A. Gallis, Architect; G. M. Simonson, Mechanical and Electrical Engineer; Isadore Thompson, Structural Engineer.***

THERE were four main design considerations: progressive isolation of areas where work would be done with penetrating radiation; circulation within the building and access from outside for trucking of radioactive materials; space for mobility — important because of the portability of the Berkeley boxes, heart of the "concentrate and confine" philosophy; structural capacity for heavy floor loads (especially shielding). Equally important was selection of materials for corrosion resistance, decontamination, ease of replacement and accessibility. The building's "cold" area is near the entrance; besides offices, library, rest rooms, etc., there is a low level counting room in this area because of the minimum amount of technical "contamination" (interference with instruments from radioactivity). The "hot" area is at the rear, under ground for maximum shielding effect. The two halls on the first floor were needed because of security regulations originally in effect. Demountable partitions will facilitate remodeling this space as needed. Because of its flexible space, open design and simple construction this building has become the prototype for a growing number of research buildings for industry and private institutions.

* *Operated under contract with U. S. Atomic Energy Commission*



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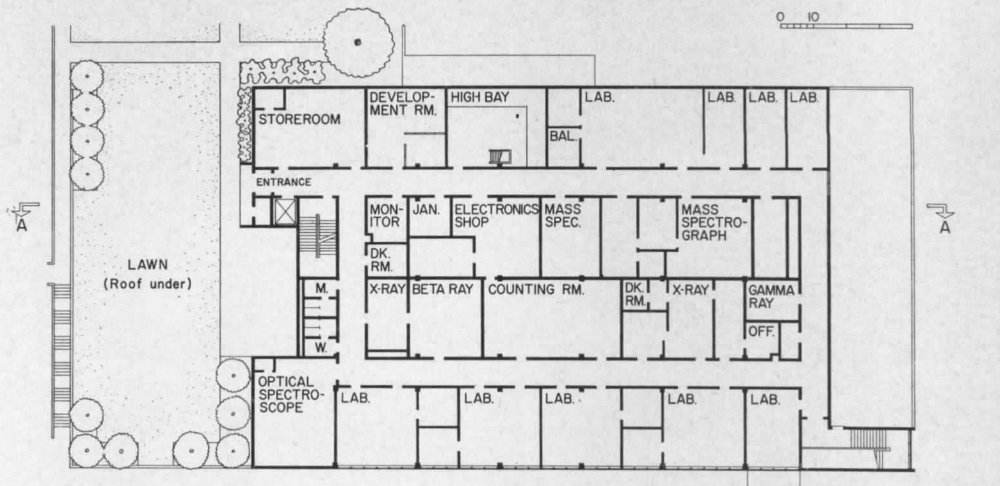
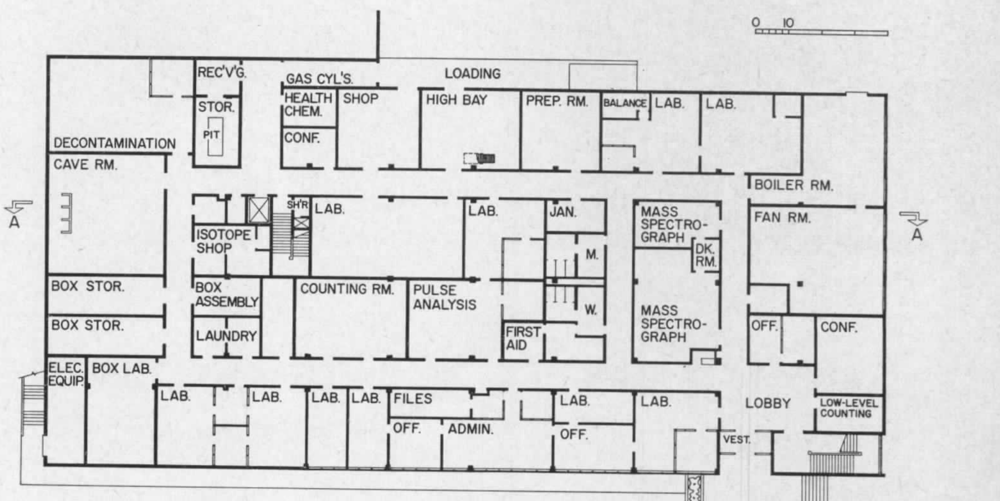


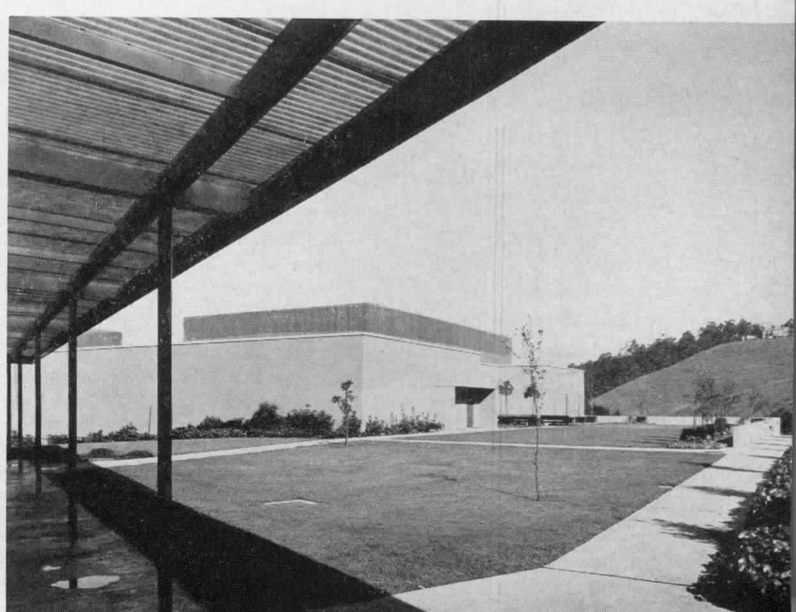
SECOND FLOOR PLAN

From stair tower view is over San Francisco Bay to Golden Gate and to Marin County. All administrative offices are on north side of building; other sides of building have no windows. Second floor level opens onto grassy terrace which covers "cave" room and leads to cafeteria building (below, right)

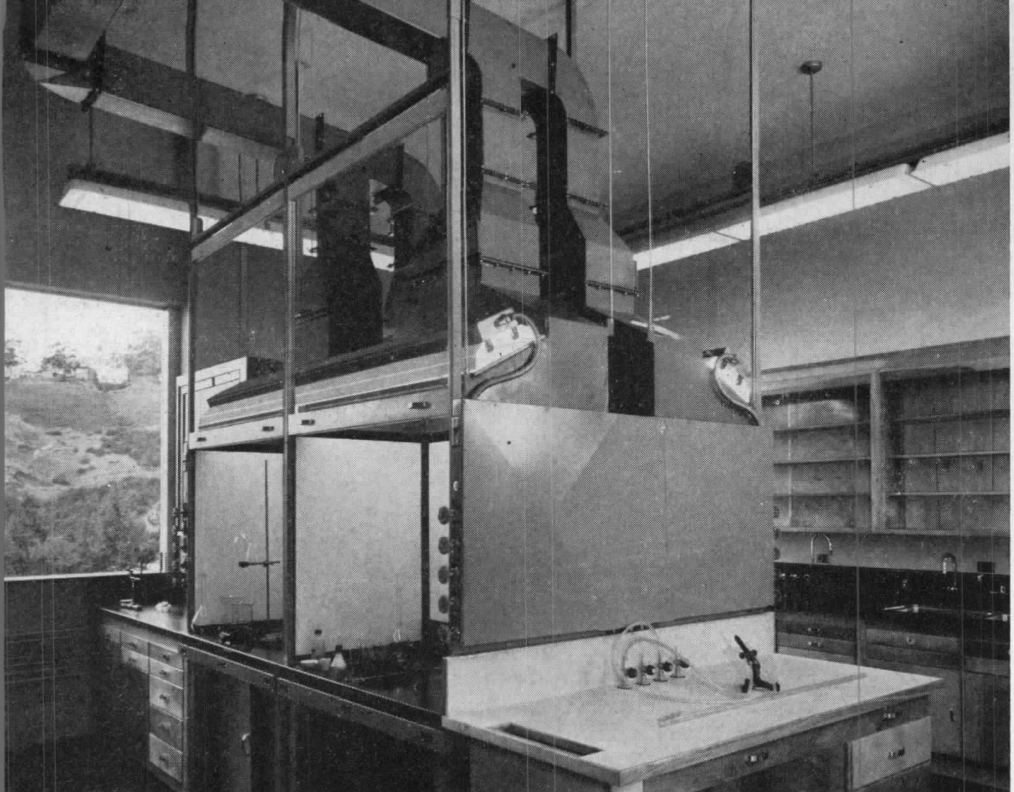


FIRST FLOOR PLAN

Dean Stone – Hugo Steccatti



UCRL (Berkeley), Dean Stone—Hugo Steccatti except no. 3



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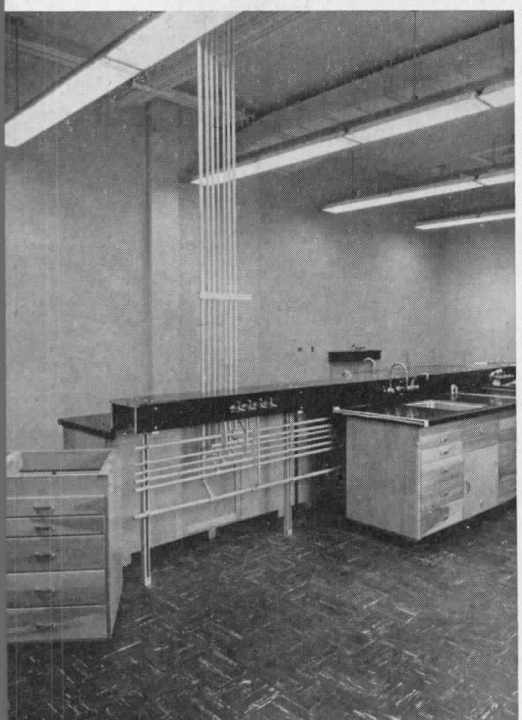

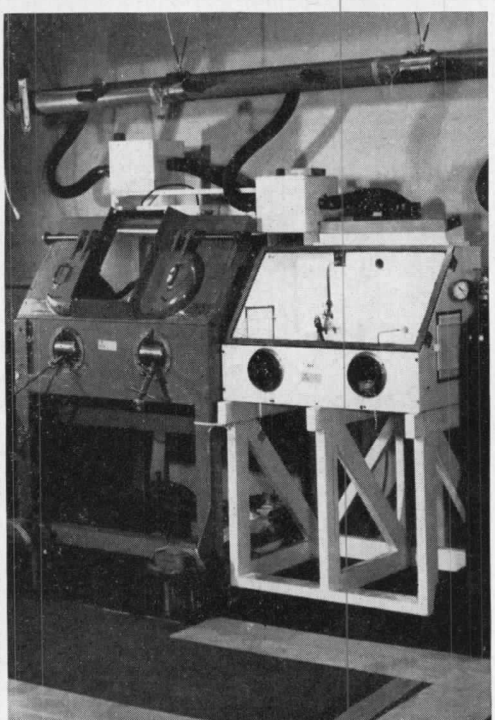

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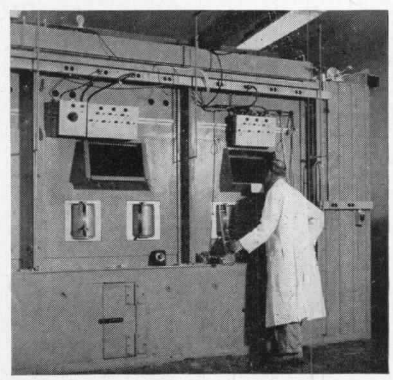
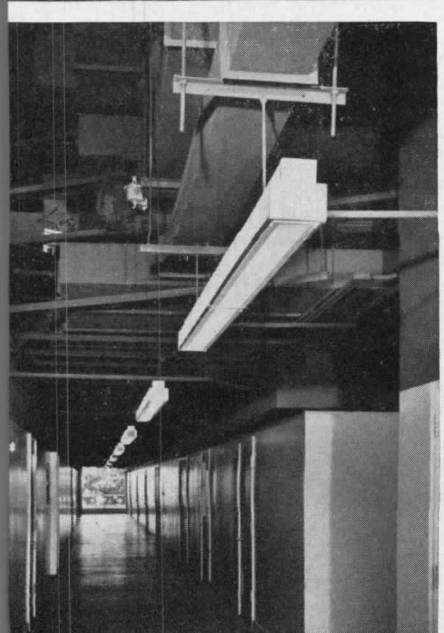
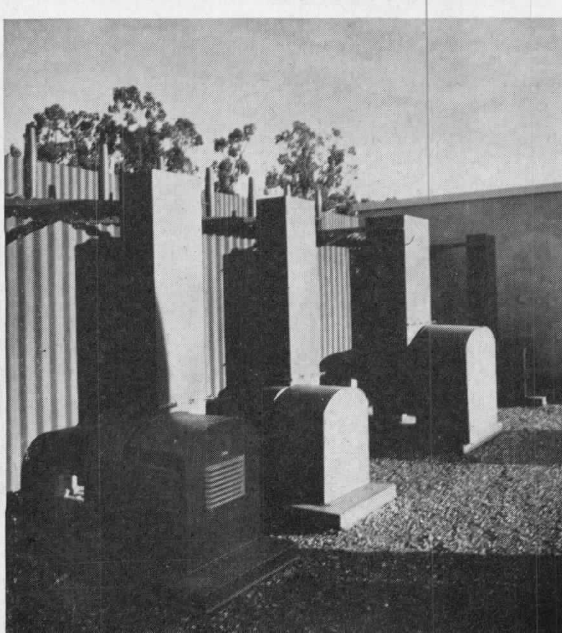


6

1. All hoods are demountable, hung from ceiling, so box labs can be substituted, or used in room beside hooded bench. Each lab has shower over door way for emergency use. 2. Piped services are racked along wall, between benches, or suspended from ceiling, are easily accessible since modular lab furniture is not built-in. 3. "Berkeley boxes": for low-level work, box on right is of metal mounted on wood dolly; "junior cave" (left) is mobile lead shield. Two-inch leads connect boxes with non-corrosive 4-in. manifold duct in negative-pressure labs. 4. All ducts, piping, etc. run in open corridor ceiling for accessible inspection, maintenance. 5. Corrugated screens mask jagged roof outline of exhausts and fans — individual systems for each lab. 6. Hillside protects "cave" on three sides, extra thick concrete ceiling and earth terrace above. Floor is designed to carry 600 psf uniform loading for movable lead shielding wall





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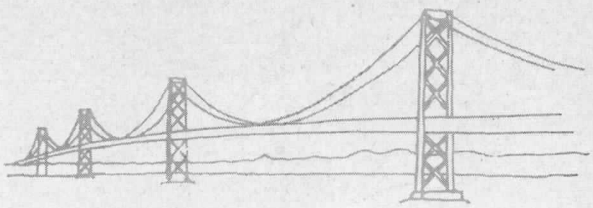
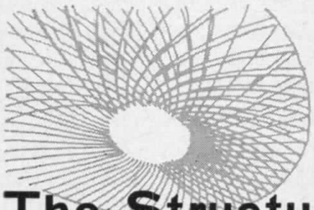
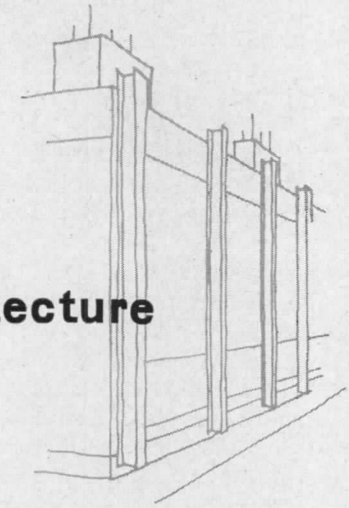
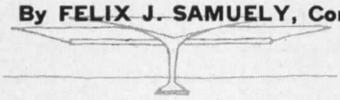


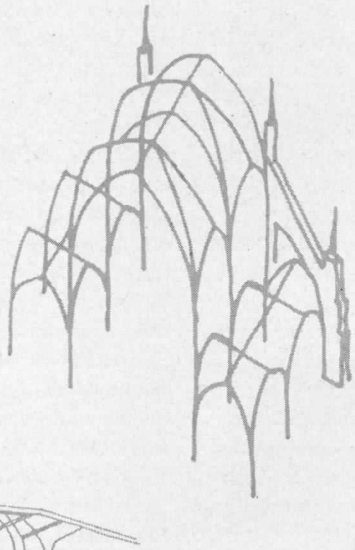


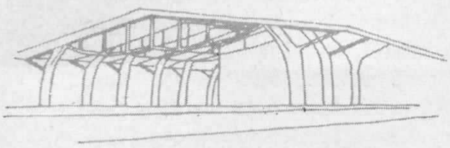


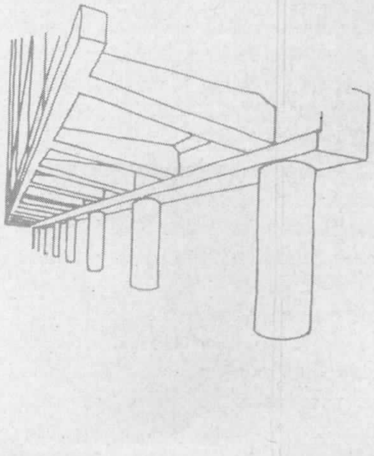
The Structural Engineer and Architecture

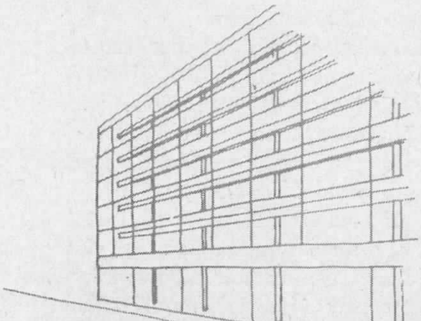
By FELIX J. SAMUELY, Consulting Engineer, London, England



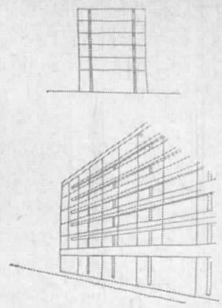








The Structural Engineer and Architecture



By FELIX J. SAMUELY, Consulting Engineer, London, England

THE PHILOSOPHY of structural engineering may be said to encompass three different themes.

(1) Structural engineering as such, with absolute ideals which the structural engineer should try to live up to.

(2) Structural engineering as part of the building process. It may play an important part, e.g. in a bridge or long-span roof, and sometimes less important; it is particularly unimportant in a one- or two-story house.

(3) A more personal theme, dealing with the position of the structural engineer in the building trade and his collaboration with other members of the industry, primarily with architects.

These three themes are not of equal importance. I believe that the ideals of structural engineering as such can be explained in a few words, and that they are not all "absolute." A structural engineer should provide that construction which best fits a given building, but, alas, there are so many considerations to be taken into account that we often come right away to structural engineering as part of the building process.

Long span bridges are the only type of construction where other considerations are so subordinated to the structure that it is almost correct to say that what is structurally best is best for the whole bridge. This is what should distinguish the bridge engineer from the one who deals with other structures, be they foundations, dams, or the structure for a big hall. The bridge engineer can start with an absolute picture of loads and deduce both shape and construction from it; the building engineer should look around all the time and make sure that what he produces is right in other respects. I intentionally say "should," because this is probably one of the greatest failings of a number of structural engineers — that they behave like bridge builders even when dealing with *multi-story* buildings; that they consider their structure to be absolute; that they tend to recommend the cheapest structure although this may lead to a more expensive building, and even if this is not the case, make the building as such uneconomical or unsightly.

I would certainly not agree that there is ever a framework, or even a material, that is absolutely the best. We may sometimes deceive ourselves by looking at one consideration only, e.g. economy, and call the cheapest possible structure (under certain circumstances) the best. But this cheapest structure — if indeed such a thing exists — may be lacking in many amenities; it may result in insufficient, or at least inconvenient, headroom, the planning layout may become awkward, or the appearance may suffer badly. Due to faulty education — and indeed this is an international weakness — engineers may not always take these things very seriously, but they can all be easily converted into values either of personal or national importance, final values often lost for the sake of a much smaller immediate structural gain. Some aspects may affect only the client or people in the building, but others can affect everybody. For instance, an ugly elevation may bother many more people than those who use the building.

The prime criterion for a structure as such is that there should be no waste. As long as an advantage is gained by spending more initially — in time, costs, appearance, amenities — this extra cost is worth consideration; if no such advantage is discernible, there is no justification for more than the minimum expenditure — the remainder is just "money poured down the drain."

The difficulty is, however, that while the structural engineer is usually the guardian of economy in structure, others, especially the architect, have other problems in mind, particularly amenities and appearance. They will often find it difficult to analyze these in terms of money. The structural engineer, being reared on economy, speaks an entirely different language. Only understanding collaboration can bring forth the compromise which is important, and each person involved has to learn the other's language.

I have come to the conclusion that for the majority of structural engineers, or all those who have to compromise with other interests, the first theme is a very dangerous one and "absolute" ideas should be avoided altogether.

Let us then consider structural engineering as seen from the point of view of the building as a whole. The structure has obviously first and foremost the function of making the building stand up. This is of less consequence for a small house than for a high building, a wide hall, or a bridge. Again, a structure is sometimes almost self-sufficient, as in the case of a bridge; or sometimes, for instance in multi-story buildings, there are so many other considerations to which the structure is to be fitted that they may alter the conception of the structure altogether.

The structure may thus be considered to be of varying importance in different buildings, and we see later on that this fact may have a great influence on architectural treatment. At this juncture I would say that, in my personal opinion, a good engineer must not only understand the structure and its possibilities, but also the mutual effect of structure and other building elements. These include primarily the function of the building, which he can often enhance by suitable positioning of columns, correct arrangement or omission of beams, etc.; and the appearance of the building, inside and out, which of course is dictated by the architect, but the principles of which should be understood by the engineer, again in order that he may contribute to it. There are the services which he can try to accommodate within the confines of the structure in order not to waste more space than necessary, and indeed to save cost. There are heat and sound insulations. And an understanding of acoustics and illumination, as well as general building construction, will not come amiss to the engineer.

There is no point in going into greater detail on all these items, which have to be solved individually, but it is rather important to consider the interaction of structure and architectural expression, and if I may be allowed to digress for a moment, I would like to explain my attitude on this.

The question to what extent structure should be expressed architecturally has exercised the minds of architects through many centuries, and if in early medieval thinking a clear solution to the problem cannot be distinguished, even then an intuitive approach at least must have existed, which can be deduced from the buildings which remain to our times. It does appear, by and large, that it is "economical" (if economy just means the minimum initial outlay of money) to let the appearance of a building follow structural, or indeed nowadays other practical lines, but it has again and again been pointed out that economy in this sense cannot be the sole arbiter of our lives or else we should still be living in caves. One might generally come to the conclusion that probably the economical trend comes more to the fore in times when we are hard up than when we are able to spend freely. Of course, wealth or poverty may not be expressed only in terms of money. The lack of full availability of materials to build with, or the labor to do so, appears to militate just as much against functional lines as does indeed wealth in terms of purchasing power.

Our own times appear to be ruled by very contradictory factors. We have at our disposal building methods which even two generations ago were hardly dreamed of, but the demands of an improved standard have grown possibly even more quickly. More money than ever is being spent on each individual, but the life of the majority of people is a constant fight with "need." The influence of these contradictions on architecture can easily be distinguished. There are those architects who take the attitude that they would like to follow structural lines wherever possible, particularly with large and monumental buildings, while others adhere to the opinion that the elevational treatment today can and should be completely dissociated from the structure — hence the rather remarkable fact that the "new brutalist architecture" and the curtain wall can exist at the same time.

The problem that interests the engineer very much in all this is "How does he fit in?" Is he merely the handmaid who carries out the wishes of the architect, or can he add something more than mathematical analysis to the value of the building? He can do several things. He may produce the economy, or he may provide such a construction as gives advantages to the building which can possibly be expressed in dollars in the functioning of the building rather than in the initial outlay, or possibly be of more abstract value.

Often the engineer may be instrumental in developing the architecture. Where the architect is willing to base appearance on structure, it is up to the engineer to develop structures that are capable of expression. There will often be possibilities of which the architect is unaware, and it is up to the engineer to inspire the architect. This is when collaboration between architect and engineer is most fruitful. The engineer might also, if the architecture is not based on the structure, at least see to it that the structure is based on the architecture.

Let me consider these three points, and particularly enlarge on the last one, in which I have a great personal interest.

I must confess that I am always suspicious when the word "economy" appears on the horizon. I believe indeed that more money is wasted in the name of economy than on anything else in the world. The cost of a structure as such is necessarily a yardstick for economy, but an engineer may make a saving in other ways. He might, for instance, come to the conclusion that it is better to introduce additional columns where the architect has omitted them, or alternatively, he may realize that he does not necessarily improve the building by pressing the architect to reintroduce them.

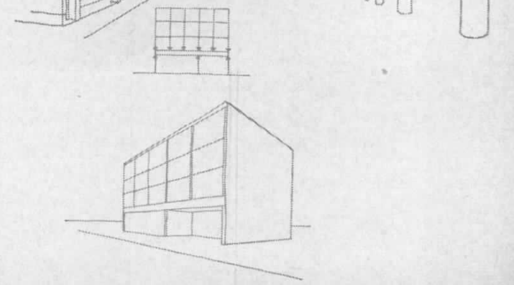
I have frequently found that an architect, or indeed a client, welcomes being informed how much additional flexibility would cost, so that he can decide whether this expense is worthwhile, a decision that can be made on a scientific basis only with the collaboration of an engineer who has rid himself of the idea that cheapest is necessarily best.

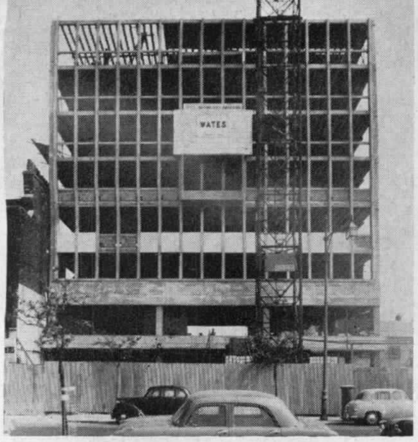
The structural engineer, of course, has not to think only of shapes, strength and economy. Modern structure has to fulfill quite a number of tasks besides these. The question of sound and heat insulation, the possibility of incorporation of services, are important items, the latter particularly coming more and more to the fore. In some instances very thick floors are provided for all the services to be incorporated. This is quite expensive, as it means considerable extra height and weight. Here again, early collaboration between the mechanical engineer, structural engineer and architect can be of very great value, and it is up to the structural engineer particularly to devise a construction that can easily house the services.

Before explaining what I mean by either the engineer supplying the architect with an idea or the engineer following the architect in the design of the structure, I must deviate even further and say a few words about the esthetic value of a structure in general, and the degree of functional expression possible in structure. Where structures are easy, even in relatively harassed times like the early Middle Ages, structure has not found its expression in the elevation of the building. Such simple houses as are left to us from the 12th century do not base either elevation or inside treatment on the structure, and the fact that many more churches than houses remain to us from this period often misleads us into thinking that all medieval building was functional. Building a church of any magnitude was a structural feat, and to do anything but pure Gothic arches would have overtaxed the builders of that time or have made it impossible to carry out their intentions. We can learn from them for our own time that it is more likely that a structure becomes eminent in architectural treatment if it is in itself an extraordinary problem, while if other than structural considerations are more important it is likely that the structure would not be completely visible, or it may even disappear altogether. If a substantial bridge has anything but structural expression we should consider it universally ugly, but we do not often think of giving structural expression to a one or two-story house.

Now where an architect chooses to base the appearance of a building mainly or entirely on structure, the engineer's position and the possibilities for his contribution are fairly clear. He will have to show the architect several possibilities, and in designing these he will be well advised to relax and forget any mathematics, although it is quite likely that later one or the other of the suggestions will have to be dropped for reasons of practicability. Personally, I have often found that a completely visual approach often leads more quickly to the right shape than any amount of analysis. The more types of construction that can be put forward the better, and if there is a difference in cost this should be pointed out.

There is, however, one thing that the engineer must never forget. It is a common fallacy to think that what is





right necessarily looks right. There are many reasons why this should not be so. In the first instance, every bit of construction is a "structure" on its own, but it will be seen together with other parts of a building, or other buildings. (A staircase may, strictly speaking, require a structure quite different in appearance from the rest of the building.) The most correct construction may look right if that part of the building stood on its own, but may need considerable modification because of its surroundings. Secondly, all the functions of a building (additional to the structural one) may combine to make the obvious structural solution very awkward, or even impossible. The man who has learned to balance all these things is the architect, and if he succeeds in finding a compromise that does not cripple any one of the components he is a good architect. If the engineer had learned to do so he would be an architect, but if he has not learned to do so his task is to make suggestions, and even to defend such suggestions, but not to make the ultimate decision. And he has to accept the ultimate decision of the architect with good grace, because life will be unbearable for him if he does not do so.

However, this does not mean that the engineer must now restrict himself to analysis only. As stated before, if the architecture is not based on structure, the structure can be made to fit the architecture, and not be just any odd assembly of columns and beams that happens to fit. It is my firm belief that what should be sought under all circumstances is a unity of structure and appearance, a unity of purpose. Often it turns out to be altogether less costly to have a more expensive structure, but at the same time avoiding a false ceiling or similar contrivance. If a flat ceiling is produced because it is required for the use of the room underneath this is reasonable, but if it is there merely to hide away an otherwise ugly structure, I feel very doubtful about the wisdom of the arrangement. It would be better to have a structure that is not so ugly. If the architect does not make a feature of the structure, that is no reason why the structure should not fit into his building esthetically, and conversely, if every engineer were intent to fit his structure to the architecture more architects would be willing to show the structure and make a feature of it, or possibly use the structure for a suitable pattern.

The photos show an example of a recently completed office building in London for the National Dock Labor Board (Architect — Frederick Gibberd). In this case an external framing has been worked out between the architect and engineer, which at the same time provides the architect with the pattern that he requires for the elevation, and gives the engineer sufficient bearing capacity. The structure forming a pattern has thus become suitable to be shown. Compare this with what is usual today, namely, columns at larger centers and a curtain wall hiding them, and we find that:

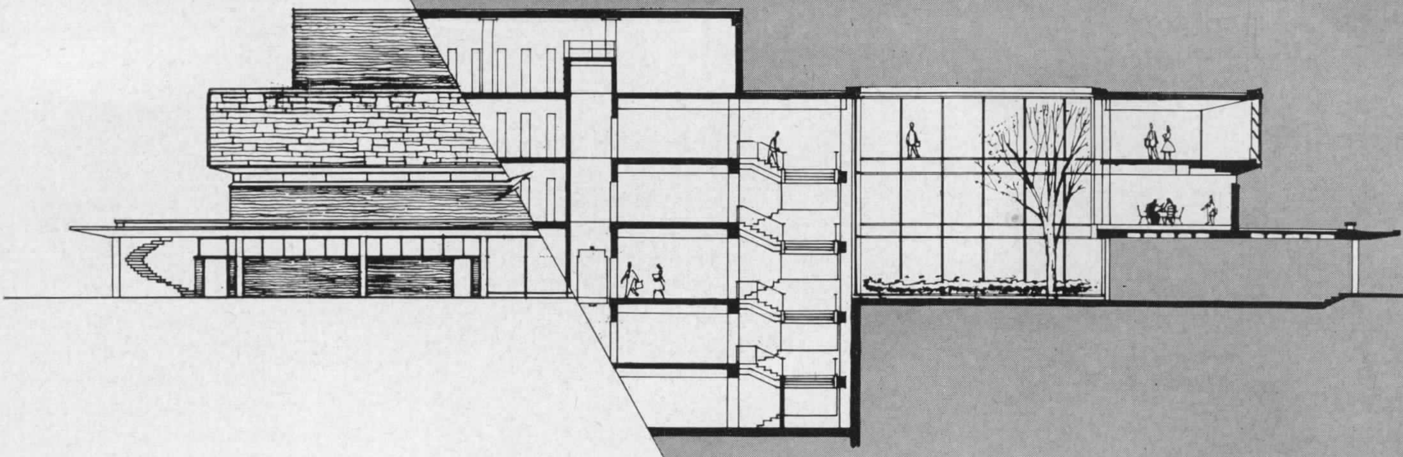
(a) the structure is slightly more expensive,
(b) the overall costs are much less,
(c) the lighting facilities are much better, because the edge beam has a short span and can be lost in the floor thickness,
(d) the planning is easier, because there are no free-standing columns,
(e) there is a greater variety of elevational treatment than with a curtain wall.

The above example illustrates particularly how important it is to have proper collaboration between engineer and architect at the design stages of a building. Also I feel that the fact that the finished structure already gives a complete impression of the building as a whole is an asset, and is worth while being repeated.

It may have been noticed that while actually discussing the structural engineer's contribution to the building I had to refer repeatedly to the third of these — the collaboration of engineers and architects. This is not a theme easily discussed in the framework of an article which deals with a more abstract problem. So only a few words may be said, which are by no means exhaustive. Nevertheless it is advantageous to point to the core of a problem which appears to be the same all the world over. Building has become so complex that great specialization has taken place. There are many people (architects, engineers, contractors and suppliers) who become only concerned with their own contribution — sometimes large, sometimes small. They fail to realize that more would be achieved all around if, instead of the "Tower of Babel," everybody were to understand something of what the other man is trying to express. This could be achieved if the authorities that organize education understood the importance of the problem, and if time were spent on telling everybody in the building trade what is really important and why the other man is so often insistent on doing something contrary to our own inclinations.

One heaven-sent opportunity for the collaboration referred to is afforded today by folded slab roofs for large spans. Such folded plate roofs can be very expressive of their function — much more than standard roofs in the past — and they are at the same time economical. There is great variety of shapes, not all equally advantageous from a financial point of view, but giving a considerable amount of latitude and often being useful for other reasons, such as arrangement of ventilation, acoustics, etc. Such roof constructions can be in concrete (often precast), they can be latticed, in steelwork or timber. Very often a latticed folded slab construction in any of the above materials carrying a lightweight roof will be found extremely economical.

It has occurred to me that one of the reasons why, during the last century or so, there has been a particularly marked discrepancy between function and appearance, is the fact that construction was pressed into plane conceptions, while of course appearance was always three-dimensional. When, as appears to be the tendency now, construction is also becoming three-dimensional, it will often be easier to find a solution that satisfies both the engineer and the architect.



Air Conditioning for Books and People

By IAN GRAD and ALFRED GREENBERG, Fred S. Dubin Associates, Consulting Engineers

John M. Olin Library, Washington University, St. Louis. Murphy and Mackey, Architects; Neal J. Campbell, Structural Engineer; Fred S. Dubin Associates, Inc., Mechanical Engineers

LIBRARIES HAVE A NUMBER of air conditioning problems not often encountered in other building types:

(1) While the ratio of people to floor area in libraries with open stacks is quite low, still comparatively large quantities of air must be circulated to keep the books "conditioned" as well as the people.

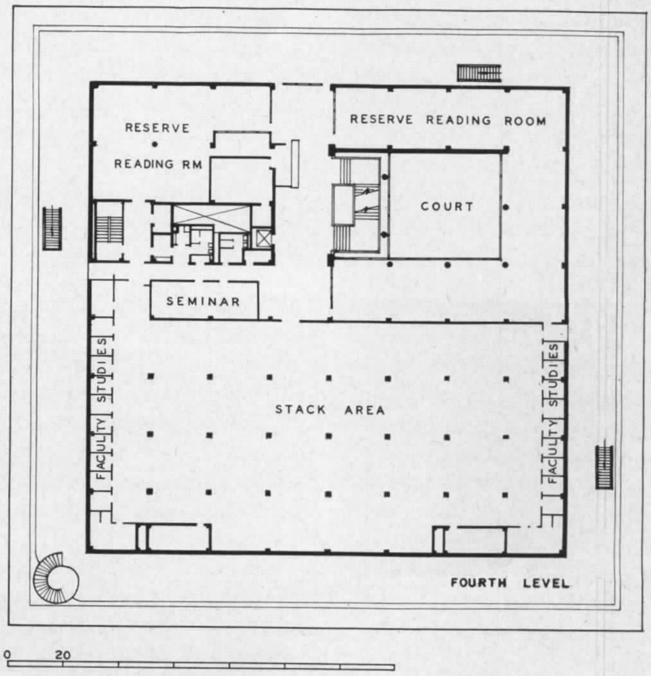
(2) Cooling load due to heat given off by people will vary widely. For example, conference and seminar rooms may have an occupancy load of 10 sq ft per person, while the stack area will average 80 to 100 sq ft per person. The areas with differing occupancies thus have to be carefully zoned.

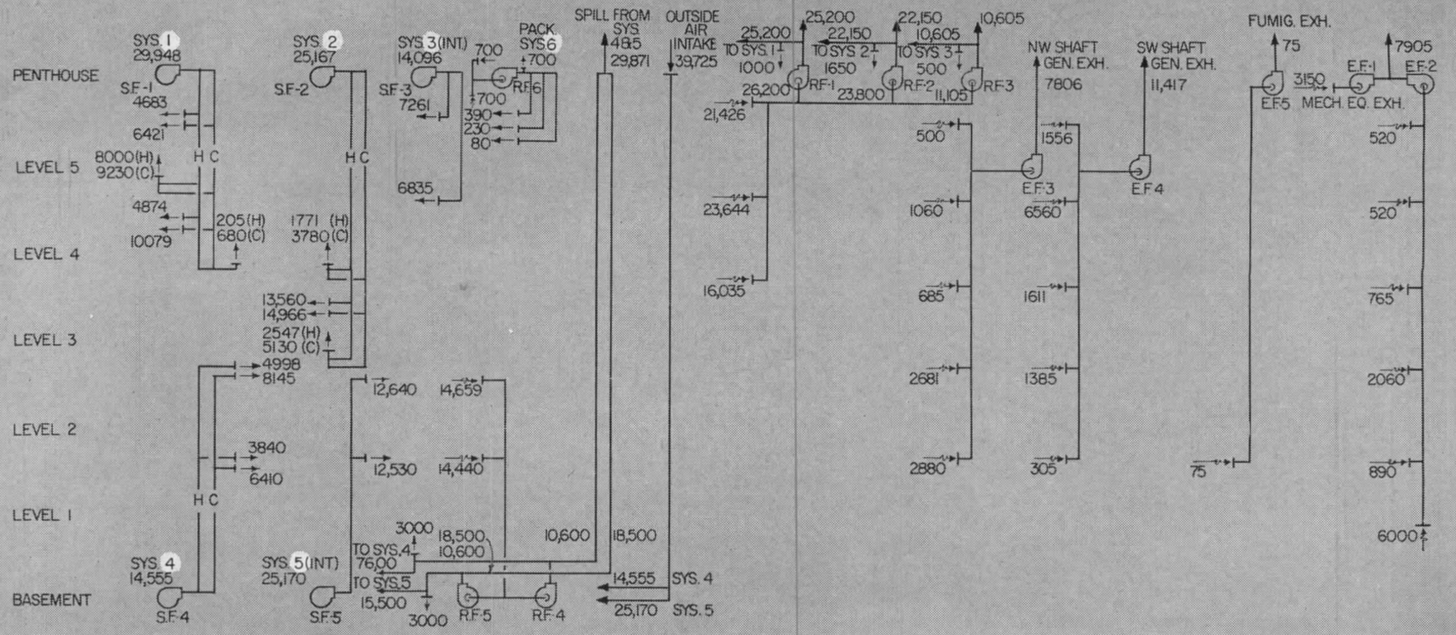
(3) Clean air is not only desirable, but necessary so that books will not become soiled.

(4) The sound level of the air conditioning system must be low enough to prevent distraction, but cannot be so low that normal sounds will seem obtrusive. (It's well known that the air conditioning systems in some libraries have been so quiet that people complained the building was "noisy.")

(5) A university library, such as described in this article, often operates 16 hours a day six days a week; somewhat less on Sunday. Thus ventilation equipment may have to run as much as 5000 hours per year. Such constant usage means that heavy-duty, long-life equipment must be used.

A search of both domestic and foreign literature disclosed that there is very little information available on the air conditioning criteria for modern libraries. However, the comfort criteria for people engaged in a variety of activities have been pretty well established. To determine what would be the best at-





mospheric conditions for books we conferred with paper manufacturers, and, oddly enough were told that optimum conditions (76 degrees and 50 per cent relative humidity) for preserving paper were practically the same as those for people — certainly a fortunate coincidence. Since stack areas are normally in the interior of the library, the cooling load is mainly due to lights, and less air, at a lower temperature differential than is required for other areas, is needed. In this case, a minimum air movement of six air changes per hour was used to maintain uniform temperature conditions.

Temperature limits for the Olin library are 72 F (winter) and 78 F (summer). While 76 F is optimum for both people and books, to maintain this temperature under worst summer conditions would have required an increase of over 12 per cent in the refrigeration tonnage. In the winter it is planned to maintain exterior spaces at 72 F, so the stack areas will be 72 F also to have uniformity throughout. The humidity is controlled at 50 per cent with a permissible variation of plus or minus 5 per cent. Stack areas are conditioned 24 hours a day. The exterior areas are not normally conditioned at night. However, the humidity in areas fringing on the stacks is not allowed to go below 50 per cent. Due to the heat storage capacity of the masonry walls and the books in the library, it is anticipated that conditions late at night will not vary much from occupancy design conditions. Where there is lots of glass, such as the ground floor and the court, low limit controls will not let the temperature drop below 55 F at night.

The air conditioning system is designed to handle the most extreme conditions. Due to the uncertainties involved in thermal storage, undoubtedly field adjustments will be necessary to establish the best 24-hr control setup.

Research shows that from a practical and economic point of view an overall ambient sound level with the air handling systems running should be no greater than 40 db. A level of 35 db is considered by many the low limit since it is felt that below this, stray noises may be accentuated due to the low background noise level. In addition, the added cost of equipment and acoustical treatment would excessively increase the cost of the job.

All equipment such as fans, pumps and refrigeration machines are set on proper vibration eliminating devices to minimize noise transmission from this source. The discharge ductwork of all double duct supply fans is lined with acoustic material to produce a maximum duct noise level of 52–55 db. Where necessary, the discharge end of all turbulators and mixing boxes is acoustically lined to produce a maximum sound level in the ducts of 37 db. This, when added to a 37 db room ambient with no air system being operated, will produce a 40 db level when the air systems are turned on.

One of the biggest maintenance problems in a library is keeping the books clean. All too often, even in air conditioned libraries, book stacks are covered with layers of dust due to the inadequacy of the air filtering system and/or the lack of proper maintenance. About 80 per cent filter efficiency is considered adequate from the standpoints of cleanliness and economy. However, to increase the life of the 80 per cent filters used for this application, pre-filters having 35 per cent efficiency will also be installed.

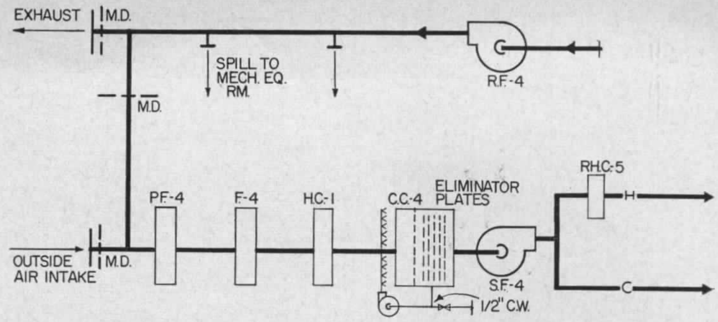
The Olin Library is a five-story structure with two stories below grade. The 1st, 2nd, 4th and 5th levels have interior open stack areas. In general, the perimeter of the building contains the special purpose rooms such as conference rooms, faculty studies, reading areas etc. Level 3 is on campus level and consists of the administrative offices and reading areas. Several architectural design features were incorporated to eliminate almost all of the sun load. These include (1) a promenade deck, (2) structural louvers, and (3) overhang above strip windows. This served the dual purpose of reducing the refrigeration load and eliminating the need for zoning of the air conditioning systems according to building orientation as well as function

In addition evaporative spray piping will be installed on the roof to reduce air conditioning costs by about $8,000.

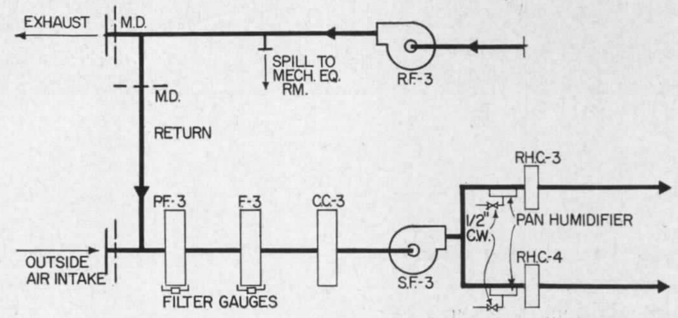
The two lower level and the two upper level stack areas each have their own conventional (single duct) air handling system including pan humidifier sections for humidity control. All other areas will be served by three modified dual duct air handling systems. Large areas which lend themselves to zone control will be handled by means of turbulator boxes which mix the hot and cold air proportionately for the right temperature.

An interesting application of zone control is being applied to the rows of

M.D	MOTOR DAMPER	R.F.	RETURN FAN
P.F.	PRE-FILTER	S.F.	SUPPLY FAN
F.	FILTER	E.F.	EXHAUST FAN
H.C.	HEATING COIL	H.	HOT DUCT
C.C.	COOLING COIL	C.	COLD DUCT
RHC.	REHEAT COIL	P.	PUMP



Systems 1, 2, 4. Dual duct supply feeds exterior spaces which have special rooms adjacent to one another with various occupancies, calling for separately controlled conditions. Hot and cold air is mixed to satisfy room or zone thermostats. System 4*, only, has a preheat coil after filters because larger outside air requirement would make outside and return air mixture too low otherwise, and perhaps cause freezing of water coils*



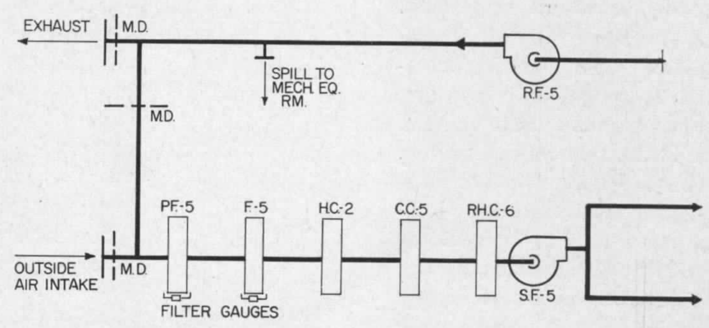
System 3. A single-duct system serves the stacks on levels 4 and 5. Pan humidifiers suit the purpose for a low-density area such as stacks. Reheat coils are employed on level 5 to compensate for roof heat loss, and on level 4 to temper supply air in summer which has to be quite cool for level 5 because of heat gain through the roof (spray keeps it at 90 F)

faculty study rooms. Each row, consisting of from nine to 22 rooms will be handled by one turbulator box. The lights in each row will be ganged on a single switch so they are all on or off. For the floors above grade this will present a desirable uniform architectural appearance outside the building. Since these rooms will be occupied by only one person, most of the time, the major portion of the variable load will be due to outside air conditions. Therefore, an outside master thermostat can be tied into a submaster to re-set a discharge duct thermostat which will proportion the hot and cold air quantities as required. For rows of rooms below grade, only the preset discharge ductstat will be required. Here the human heat load is the only variable and can be compensated for by the setting of the discharge ductstat. The savings due to elimination of individual room control will offset increased lighting costs for at least 30 years.

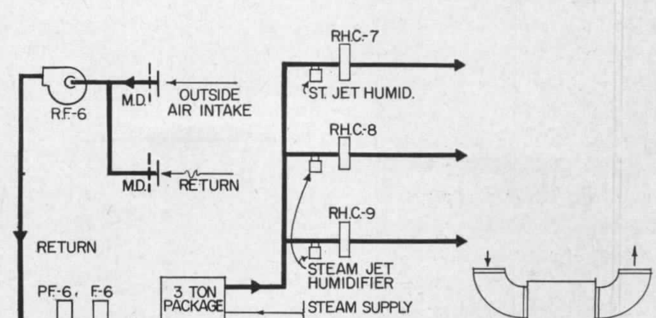
All private offices, conference rooms, seminars, etc. will have individual room controls due to the nature of the periods, types and levels of occupancy.

All zone and individual mixing boxes will have thermostatic and static pressure controls. The latter, though adding slightly to the cost of the mixing boxes, will give the systems more stable operating characteristics.

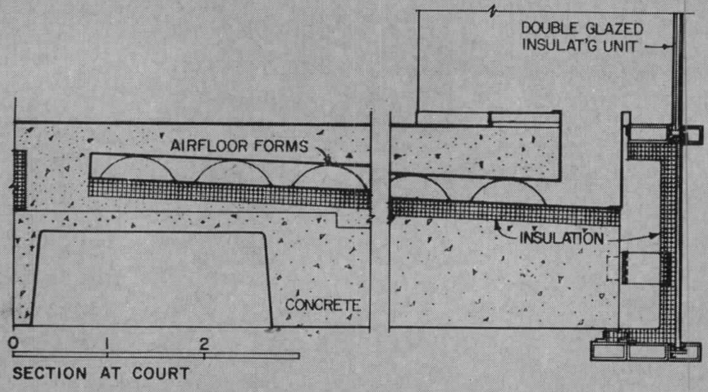
The dual-duct systems are run at as low a velocity as is consistent with the space available for ductwork. These systems are in the medium velocity (4000 fpm is tops), high pressure range, and although initial ductwork cost is increased, the power economy effected



System 5. This is an interior single-duct system supplying the below-grade stack areas. As with system 4, which is dual-duct for below-grade areas, a preheat coil is needed directly after the filters because of the larger outside air requirement on the lower levels



System 6 (Rare Books). Valuable and old books, documents must be kept under close temperature and humidity control 24 hr a day. A 3-ton package unit conditions this space in the Olin library. Moisture can be raised by means of steam jet humidifiers which are appropriate for this small, integrated system. A separate cooling tower is used



An unusual air distribution detail is the use of special metal forms to provide air channels while still allowing sufficient structural strength in the slab. Reason was that waffle slab had no space to run a conventional duct. Continuous air along glass at court counteracts drafts

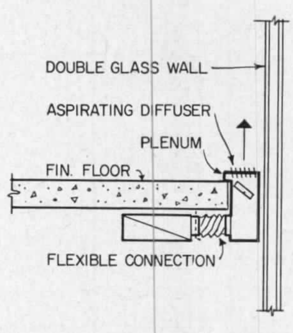
by reducing the system static pressures due to the larger ducts justifies this procedure. In addition, it reduces the possibility of objectionable duct noise.

Ductwork is above hung ceilings where they occur. Since space conditions made it impossible to run a complete system of return ductwork, the hung ceiling is used as a return air plenum. Every effort was made to locate the return air registers for proper air circulation. This is complicated by the fact that registers nearer the shaft will tend to pull more air than those farther away. Therefore registers were placed equidistant from the return air shaft ducts which were run out 8–15 ft from the shaft wall and acoustically lined. Return air plenums at return air fan inlets were also acoustically lined to prevent noise transmission down the shaft.

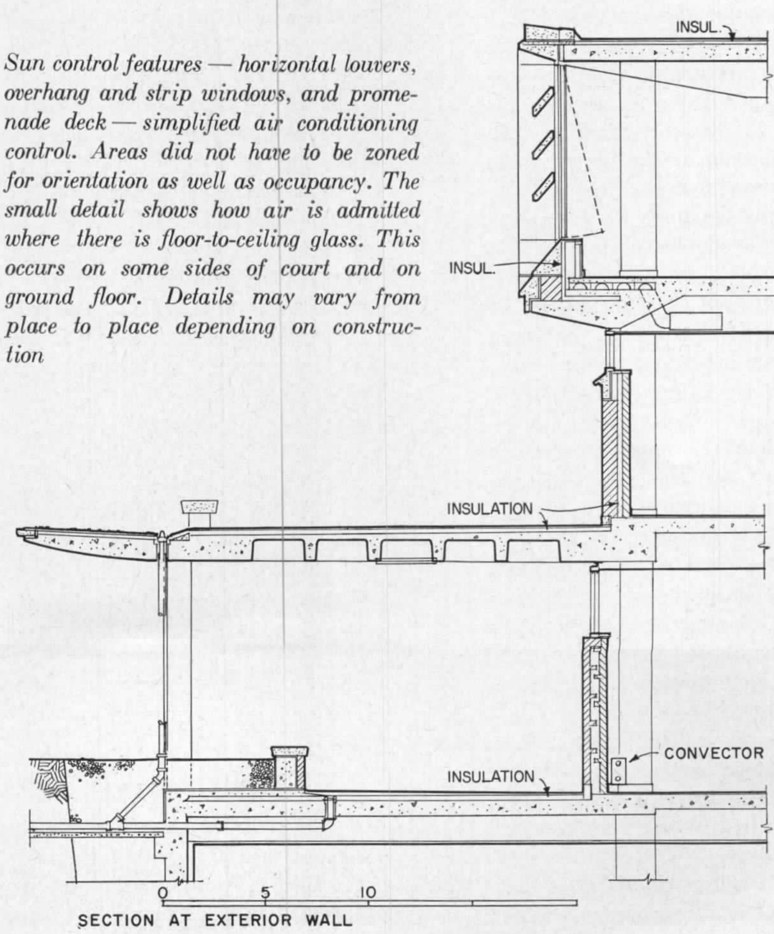
Separate and complete systems of exhaust air were designed for areas or rooms that might have heavy smoking, toilets, photolabs., etc., All such rooms have 100 per cent exhaust.

A portion of the top floor is set aside for a rare book area which includes a vault, exhibit and reading room and rare book stack area. A separate 3-ton, direct expansion air conditioning system is used to provide 24 hour service.

The refrigeration equipment is located at the lowest level and consists of a closed cycle absorption system operating on 5 psig waste steam from turbines in the university power plant. At some future date it will be possible to provide the unit with 12 psig steam and thus have an additional 100 tons of air conditioning capacity for some other building in the area.



Sun control features — horizontal louvers, overhang and strip windows, and promenade deck — simplified air conditioning control. Areas did not have to be zoned for orientation as well as occupancy. The small detail shows how air is admitted where there is floor-to-ceiling glass. This occurs on some sides of court and on ground floor. Details may vary from place to place depending on construction



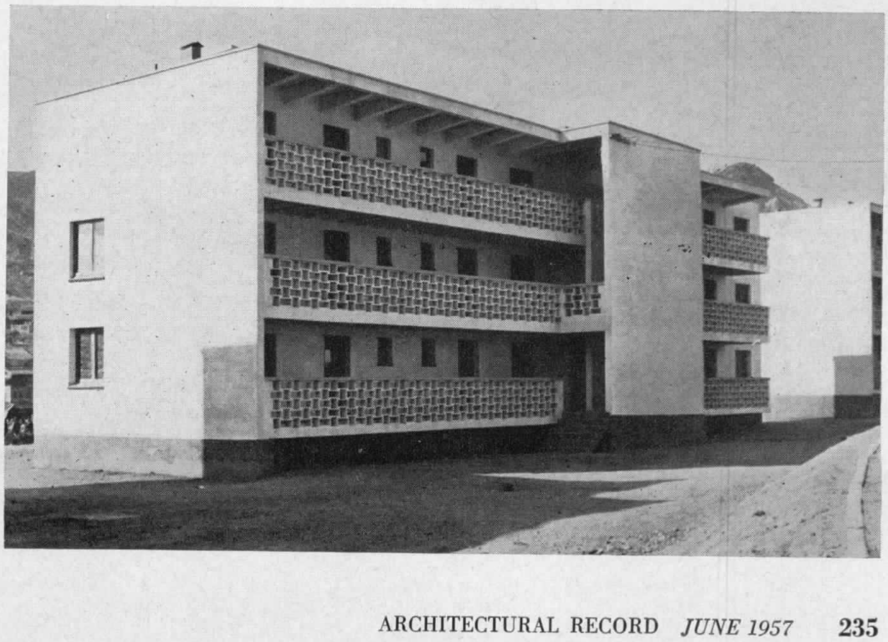
NATIVE MATERIALS, MODERN METHODS BUILD HOMES FOR KOREA

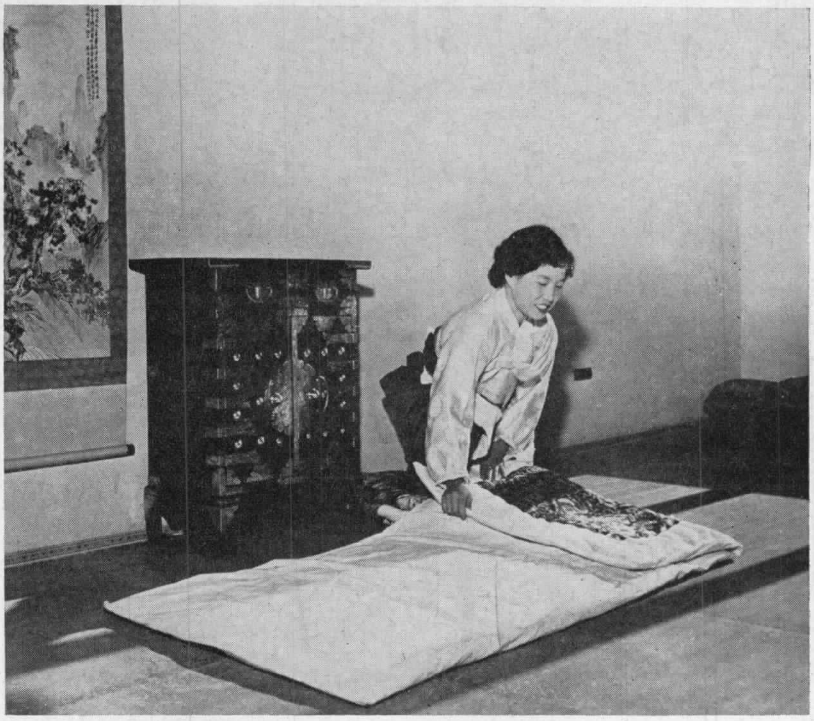
A MODERN HOUSING DEVELOPMENT nestling on a hillside near Independence Gate in Seoul, Korea, served as a full-scale classroom in which Korean construction men learned at first hand how, with modern building methods, the sparse materials native to their country could be used to provide much-needed large scale housing at low cost. Built under the Homes For Korea program, the project was designed to make efficient use of available materials and manpower without, as technical director Carl G. Lans put it "revolutionizing the Korean mode of living."

Because Korea's high density population makes it necessary to house the greatest possible number of families in the least possible area, multi-story units were developed for the project. The four three-story apartment houses and 52 two-story row houses in the model village house a total of 100 families, demonstrating graphically how maximum land usage can be achieved without sacrificing light, ventilation, or open areas for play and landscaping.

Both types of units are constructed of concrete block, with floors and ceilings spanned by prestressed concrete beams. The decision to use concrete, even though cement had to be imported, was arrived at primarily through a process of elimination, beginning with lumber which is unavailable in the Republic. Practically the only building material Korea possesses in large quantity is clay — and, while the country has numerous brick plants, these are operated only on a small scale and there are no facilities at all for the manufacture of clay tile. So it was decided to import a small, inexpensive sintering hearth with which the clay could be converted to a clinker, that, when ground, would provide a lightweight aggregate suitable for the on-site manufacture of concrete block. In addition to being fireproof, the completed blocks proved to have a greater insulating value than standard blocks, a factor of particular importance in Korea's cold climate. For the exterior walls, two wythes of 4 in. block with an air space between are used; the interior partitions are formed of single rows of hollow block.

The concrete beams used for the roof and floor construction were also manufactured on the site, by a prestressing method which saved up to 90% of the steel required for ordinary concrete beams. Developed by the Pacadar Corporation of Puerto Rico, the method





Centuries-old Ondol system uses hot gases from kitchen stove (above left) to heat floors in present-day dwellings.

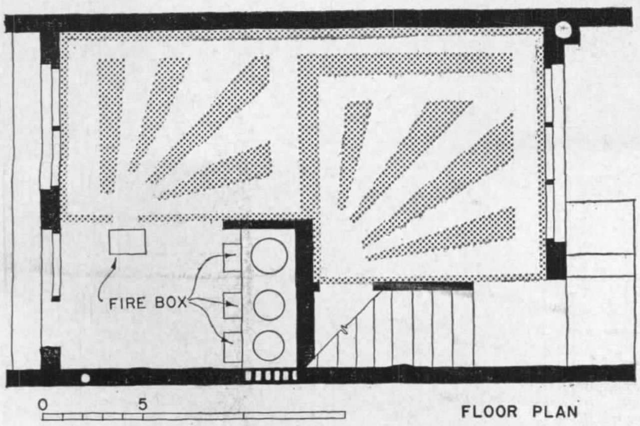
employs a 600 ft long casting bed with high-strength wires stretched over its entire length. After the wires have been pretensioned to 85 per cent of their ultimate strength, the concrete is vibrated into steel forms of various lengths and allowed to set before being placed in compression by the releasing of the tension on the steel wires. The resulting beams, which weigh about 20 lbs per linear foot, can be easily handled, and have the added advantage of allowing construction work to proceed even in winter's freezing temperatures. Cast in an inverted T-shape, the beams were laid up 3 ft, 3 in. on center to form the skeleton framing. Precast concrete filler blocks shaped to rest on the beam flanges provide a flat slab for floors and ceilings.

Although the new housing units have many features — plumbing, for example — that are relatively unfamiliar to their inhabitants, life within them goes on in the time-honored way. The Koreans, who have very little furniture, continue to "live on the floor," eating their meals seated on pillows around low tables, and sleeping on bed-rolls on the floor. And the same radiant floor heating system that for centuries has made this practice comfortable has been adapted to the new homes. In the row houses the traditional Ondol system is retained intact, with combustion gases from the kitchen stove flowing through a labyrinth of chambers under the floor slab to a chimney at the far end of the room, heating the floor en route. Grills are used in the second floor, with supplementary space heaters in the upstairs rooms. In the apartment houses, this system has been modified to use the hollow spaces in the floor construction as ducts for a warm air heating system. Heated air forced through these cells is convected through floor registers near the outside walls, and circulated over the room to the return.

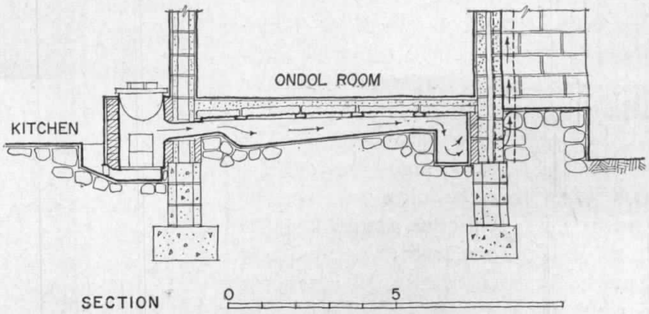
Designed by a team of American and Korean architects, the project was built by Korean labor under the supervision of architect Carl G. Lans, technical director of the Homes For Korea Program. Sponsors include the American-Korean Foundation, the National Association of Home Builders, Webb & Knapp, Inc., New York, N. Y., and several building materials manufacturers.

(More Roundup on page 248)

ONDOL HEATING SYSTEM



FLOOR PLAN



SECTION

USEFUL CURVES AND CURVED SURFACES: 19—Cones

By SEYMOUR HOWARD, Assistant Professor, Pratt Institute, Architect associated with Huson Jackson and Harold Edelman

If every point on a plane curve is joined by a straight line to a point not in the plane of the curve, a cone is generated. Each straight line is called an element (or generator) of the cone; the curve is called the directrix. Since there is an infinity of possible plane curves, there is an infinity of possible cones. Every cone is a developable surface.

It helps in constructing a cone to know that every section of the surface is a curve of the same general type or degree as the directrix curve. All sections parallel to the plane of the directrix curve are curves which are parallel to the directrix curve (i.e. they are of the same shape, but larger or smaller.)

This fact is of value in drawing perspectives, since perspective projection consists essentially in drawing sections of a cone. Every second degree curve (conic section) drawn in perspective will therefore be a second degree curve. And every third degree curve will be some third degree curve; every transcendental curve (trig. functions, etc.) will be a transcendental curve.

The second degree or quadric cone is the one most used. Such a cone will be generated by using an ellipse, parabola or hyperbola as the directrix. These do not constitute different cones, in the way different cylinders are generated (see Sheet 17) but all generate cones of the general type:

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = \frac{z^2}{c^2}$$

Or, where $k = \tan\ \alpha = \dfrac{a}{c}$ and

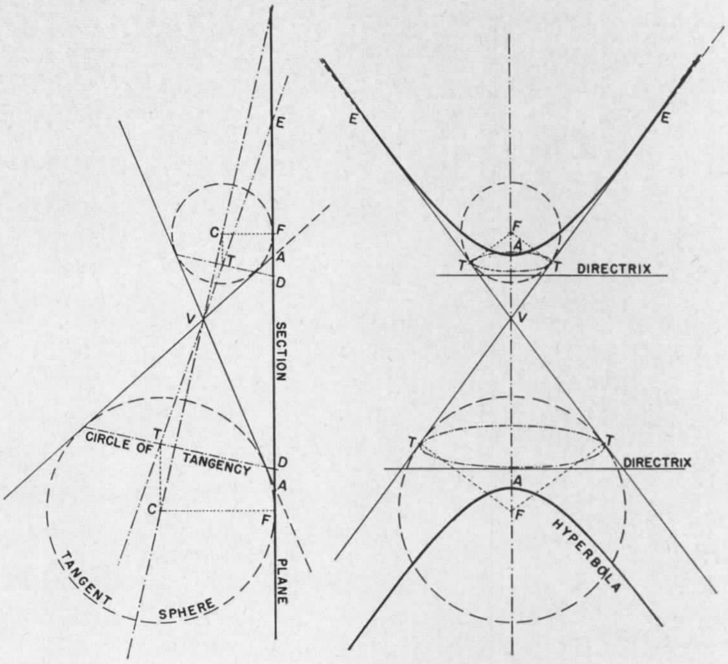
$l = \tan\ \beta = \dfrac{b}{c}$

$$\frac{x^2}{k^2} + \frac{y^2}{l^2} = z^2$$

See drawing of the general elliptic cone on Sheet 20.

All sections of this cone parallel to a tangent plane of the cone are parabolas; all sections which cut only one nappe or sheet (surface on one side of the vertex) are ellipses,

(Continued on Sheet 20)

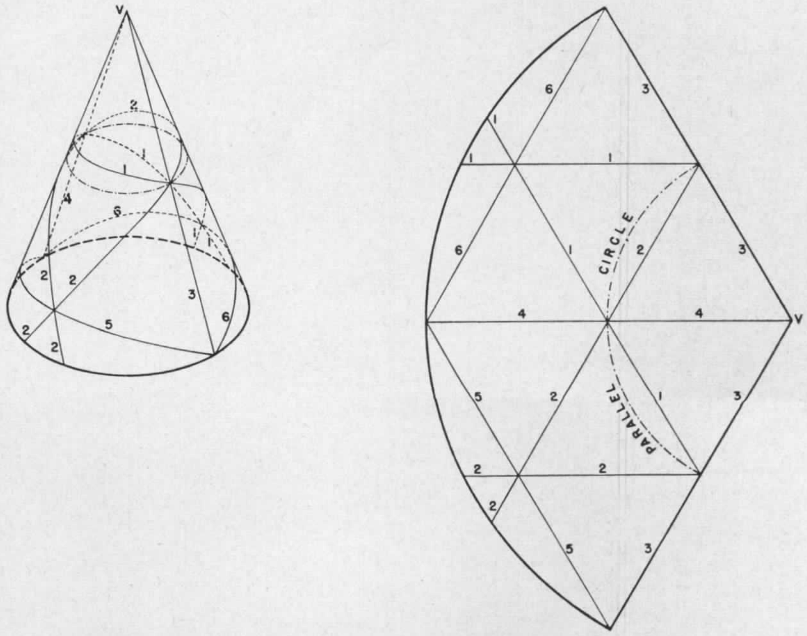


Elevation of Cone

Section Plane (True Plan)

Section of a Right Circular Cone By a Plane Which Cuts Both Nappes

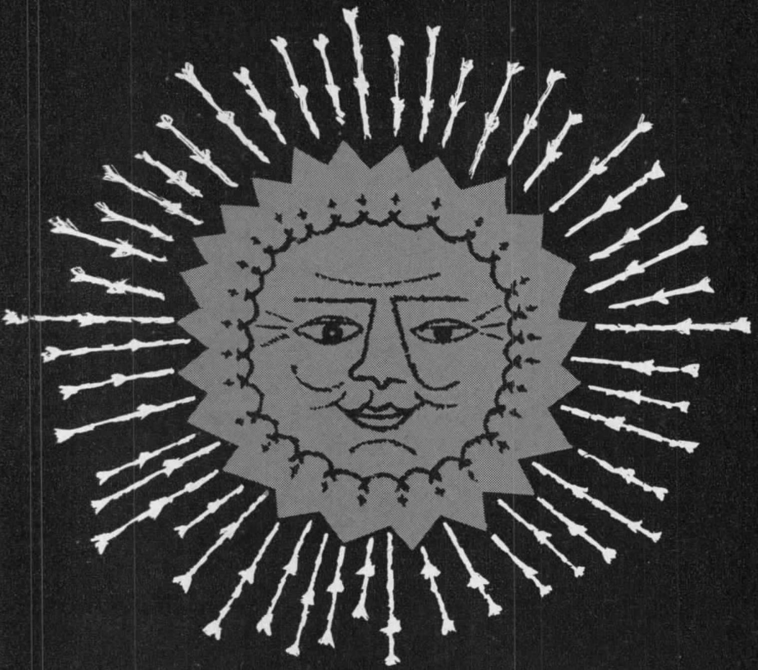
(See also Sheet 20 for text)



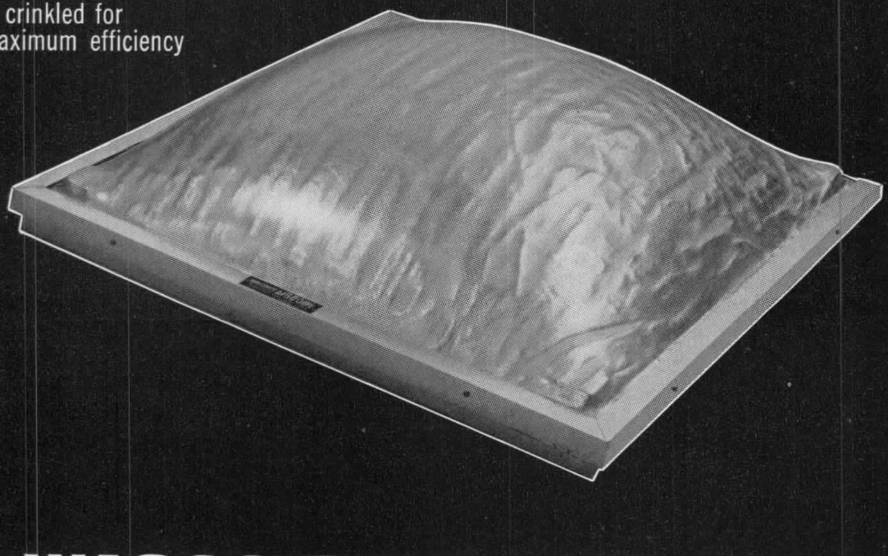
Isometric Projection of a Right Circular Cone and Its Development, Showing Geodesics

(See also Sheets 20, 21 for text)

NEW WASCOLITE REFLECTADOME* WITH SOLATEX SILVER



NOTE how Solatex Silver is crinkled for maximum efficiency



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Write immediately for full details on exciting new Reflectadome, the one Skydome that does all 3! — reduces heat . . . eliminates glare . . . controls daylight.

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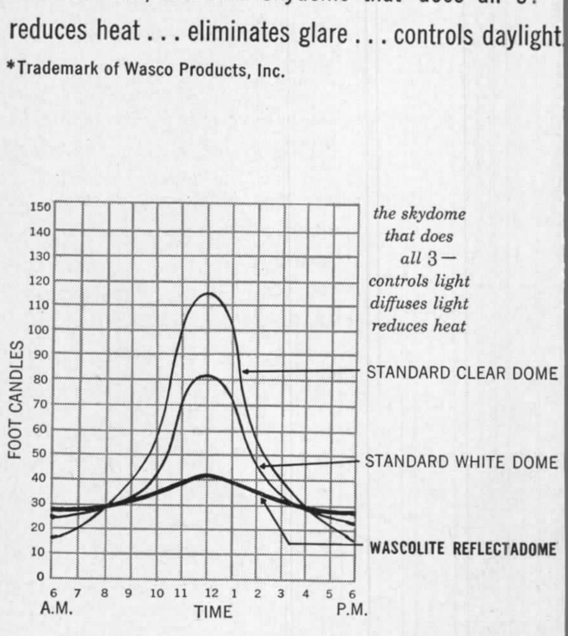
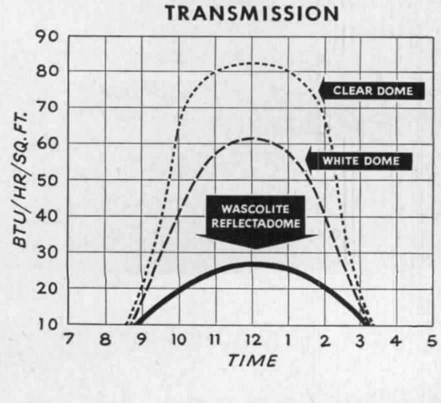


RADIANT HEAT TRANSMISSION



USEFUL CURVES AND CURVED SURFACES: 20—Cones

By SEYMOUR HOWARD, Assistant Professor, Pratt Institute, Architect associated with Huson Jackson and Harold Edelman

the circle being a special case; and all sections which cut both nappes are hyperbolas.

It often happens that a pair of conjugate diameters of an ellipse are known, but not the major and minor axes. In the figure below (which shows the same ellipse as used for the generator of the general elliptic cone shown) the conjugate diameters Q_1CQ_2 and P_1CP_2 are known along the isometric axes. (Q_1CQ_2 and P_1CP_2 are defined as conjugate diameters if the tangents at Q_1 and Q_2 are parallel to P_1CP_2 and if the tangents at P_1 and P_2 are parallel to Q_1CQ_2.)

To find the major and minor axes, draw P_1A perpendicular to CQ_1. Make $P_1B_1 = P_1B_2 = CQ_1$ The line bisecting the angle B_1CB_2 is the major axis D_1CD_2. The minor axis is the line E_1CE_2 at right angles. Then find F, the midpoint of CB_2. Join P_1 to F, cutting CD at G and CE at H. The distance P_1G equals the semi-minor axis CE and P_1H equals the semi-major axis CD.

In the case of the isometric projection of a circle, the conjugate diameters are the 30 degree axes and the major and minor axes are along vertical and horizontal lines. Knowing P on the 30 degree axis, the line corresponding to PF can be drawn directly at 45 degrees.

The cone most often used, because it is the simplest, is the right circular cone, in which the directrix is a circle and the vertex is on the straight line which is perpendicular to the plane of the circle and which passes through the center of the circle. The equations of the right circular cone simplify from those of the elliptic cone to:

$$x^2 + y^2 = k^2z^2$$

and, in cylindrical coordinates:

$$r = kz$$

and in spherical coordinates, where ϕ is the co-latitude:

$$\phi = \text{constant} = \alpha.$$

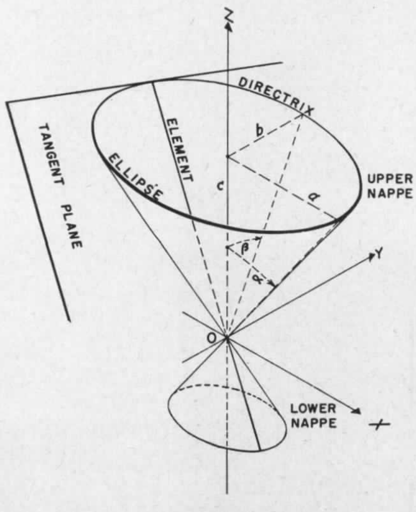
The properties of the sections of the right circular cone are discussed on Sheet 2 of this series and also are the same as mentioned above under the general elliptic cone. In order to show clearly how the foci and directrices of the conic sections can be found geometrically, the diagram on Sheet 19 has been drawn showing a plane which cuts both nappes; the section is therefore an hyperbola. (The ellipses and parabolas are found in a similar fashion. See also the similar construction for the section of a cylinder, which gives an ellipse, on Sheet 17.)

Draw the two spheres which are tangent to the cone and to the section plane. Find the intersection of the plane of the circle of tangency with the section plane. This line is the directrix of the hyperbola. The point of tangency of the sphere with the section plane is the focus. It is also the projection of the center of the sphere. With the directrices and the foci established, follow one of the procedures of Sheet 6 for drawing the hyperbola.

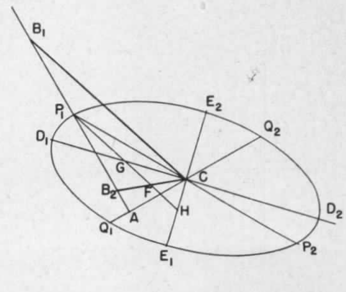
Note that the traces of the sides of the cone as projected can be located by drawing on the elevation a line through the center of the sphere parallel to the section plane. The point T where this intersects the circle of tangency is a point on the trace. The line joining this point to the vertex is the edge desired. The point E is the intersection of this edge with the section plane.

The most useful way to draw a right circular cone so that it can be drawn in any projection, including perspective, is to utilize spheres which are tangent to the inside of the surface of the cone. The spheres are circles in any projection and the cone is always tangent.

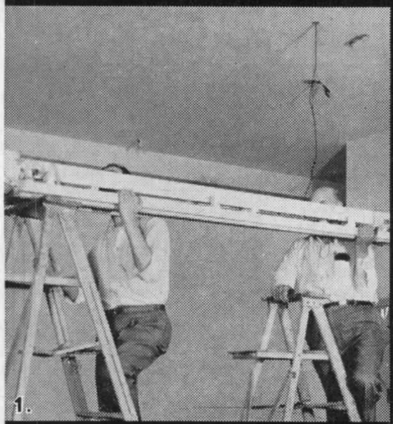
To develop the surface of a right circular cone, drawn an arc of a circle with the vertex as center and an element (straight line on the side) as radius. Measure off on this arc a length equal to circumference of the base circle. Join end points to vertex. (See drawing, Sheet 19.)

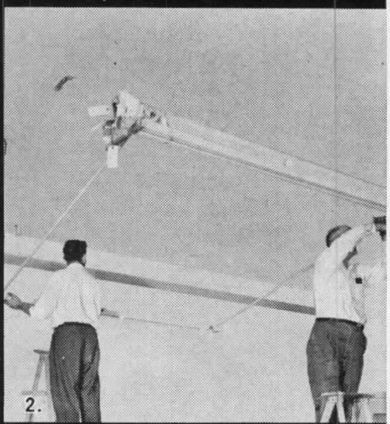


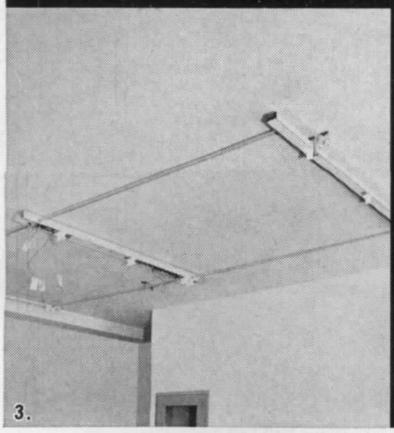
General Elliptic Cone (Isometric Projection)
(See also text on Sheet 19)

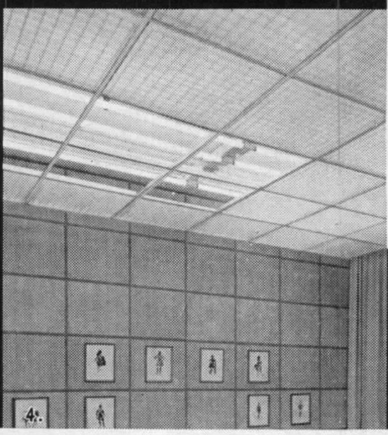


Conjugate Diameters of An Ellipse









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Ask your Curtis representative for his professional assistance in applying the Strato-Lux principle to your lighting requirements.

1. Clamp hangers are mounted to ceilings or stems. Pre-wired grid is lifted to ceiling, inner packing intact.

2. Large channel is suspended from clamps. The small channels are moved outward, spaced by locked-in tubing, and suspended from clamps.

3. Additional grids are installed as required.

4. Spoke hangers are mounted to grid. Inverted "T" framework, is attached, lamps and CurtiCell panels are installed.

CURTIS LIGHTING, INCORPORATED
6135 W. 65th St., Chicago 38, Illinois

CURTIS

in California
242 S. Anderson St.
Los Angeles 33, California

●

in Canada
195 Wicksteed
Toronto 17, Canada

USEFUL CURVES AND CURVED SURFACES: 21 — Cones

By SEYMOUR HOWARD, Assistant Professor, Pratt Institute, Architect associated with Huson Jackson and Harold Edelman

Geodesics can always be found by drawing straight lines on this developed surface when flat. One triangular net of geodesics which might be used structurally is shown. The development, of course, gives the true area of any portion of the surface.

The lines of curvature on a right circular cone are the straight elements (or meridians), lines 3 and 4 on the drawing on Sheet 19, and the parallel (or latitude) circles, only one of which is shown here as a dot-dash line.

Note that the parallel circles are not geodesics, although the elements are. The parallel circles show as arcs on the development.

The conical helix (not shown) is the space curve which lies on the surface of the right circular cone and which makes a constant angle with each parallel or latitude circle. Its plan projection is a logarithmic spiral (see Sheet 13). It is not a geodesic line.

To develop any arbitrary conical surface (see drawing): Given the plan and elevaton, divide the length of the directrix curve into any convenient number of parts by a series of points, here 16. Draw the straight line elements joining each of these points to the vertex. Starting with number one, find the true length of each element, by setting V'V as the true height of the vertex and V'1 as the true plan projection. The hypotenuse V.1 is the true length. For the development, from the vertex draw a line V1; then swing an arc of length V2 from V, and from 1 swing an arc of the true arc length 1.2; where these intersect is the developed position of 2. Continue in this way until all the elements are drawn. Then draw a smooth curve through all the numbered points. It will be noted that the accuracy of this method depends on the number of elements used, since the chord lengths are used as arc lengths in the development.

The elements are also lines of curvature; the other lines of curvature are found by drawing arcs on the development with the vertex as center. One such line is shown here as a dotted line. These can then be transferred to the plan and elevations or other projections. These lines of curvature are helpful when using rolls to bend a flat plate into a cone; the axes of the rollers can be inclined, and the lines of curvature which are at right angles to the elements must form closed curves.

Pyramids are surfaces generated by joining every point on a polygon to a point not in the plane of the polygon. They may be used to approximate cones or for their own sake.

For areas and volumes of pyramids and cones see Time-Saver Standards, third edition, page 17.

ERRATA AND ADDENDA

Sheet 14. Methods of Study

Soap solution recommended: Dissolve 10 grams of dry sodium oleate in 500 grams of distilled water. Mix 15 cubic parts of this solution with 11 cubic parts of glycerine.

Sheet 17.

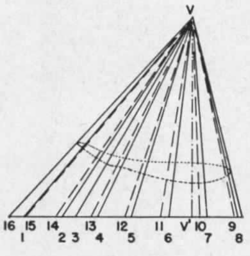
In the equation of the right circular cylinder and in the equation of the circular helix, the angle should be Θ (agreeing with the diagram) and not ϕ. (ϕ is the angle which the helix makes with a generating element of the cylinder.)

At the bottom of the page, for areas, surfaces, etc., the reference should be to page 17 of Time-Saver Standards in lieu of page 25.

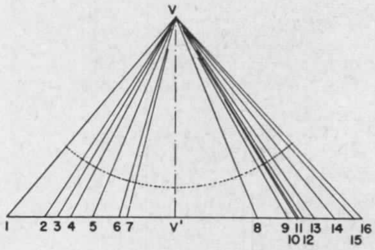
Sheet 18.

The second sentence should read:

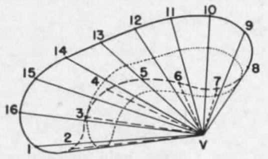
There are only three regular tessellations (patterns) in which all the polygons are identical. There are only eight semi-regular tesselations, in which all the polygons are regular but not identical; all the sides are of equal length.



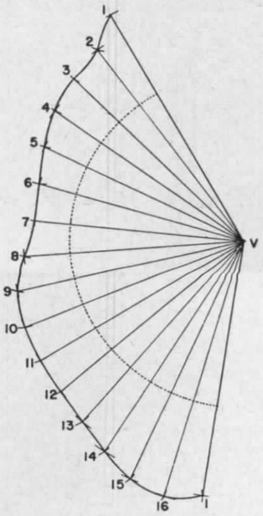
Elevation



True Lengths of Elements

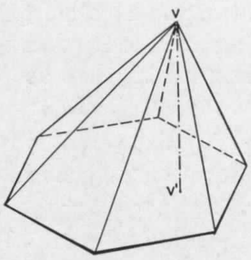


Plan



Development

Development of an Arbitrary Cone



An Oblique Regular Hexagonal Pyramid

Recessed type lighting complements the appearance of this suspended acoustical ceiling of Armstrong Arrestone.
VANDERCOOK & SONS, INC., CHICAGO, ILLINOIS. JOHNSON & JOHNSON, ENGINEERS-ARCHITECTS, INC. AIRTITE, INC. ACOUSTICAL CONTRACTOR.

How to select lighting for

Since lighting and acoustical treatments almost always make use of the ceiling area, it is good practice to consider them together, rather than as separate elements.

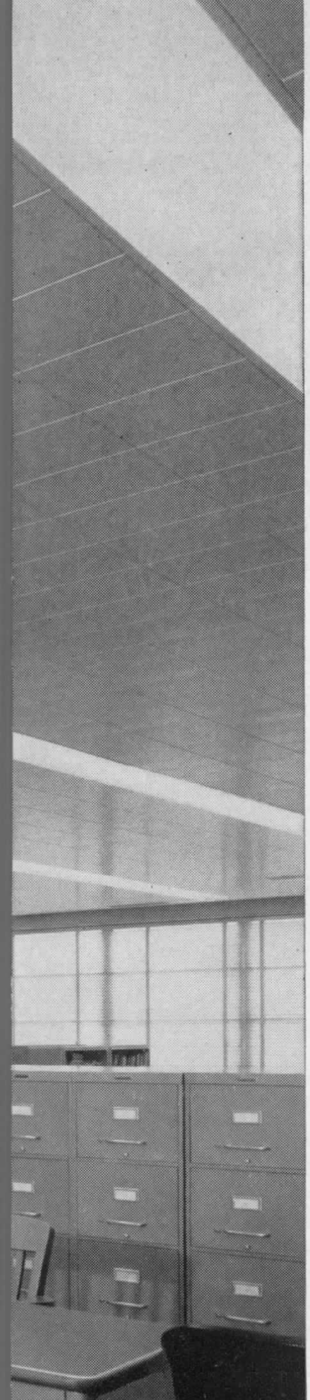
When selecting any type of lighting fixtures, it is always advisable to consider the effect they will have on the appearance of the acoustical ceiling.

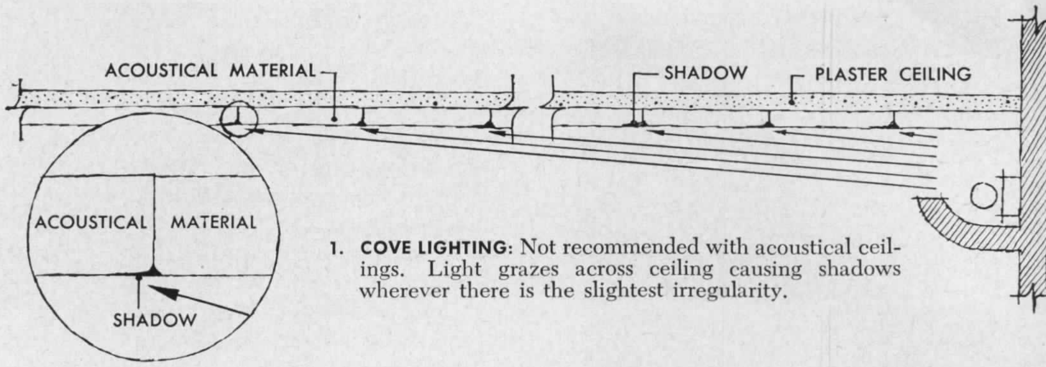
Fixtures located close to the underside of the ceiling, such as cove lighting, are generally unsatisfactory. In such cases, light grazes across the ceiling and emphasizes variations as small as .005 of an inch.

Window-wall lighting and semi-recessed fixtures often create the same uneven ceiling effect. Yet both can be used with acoustical ceilings if grazing side light is eliminated. With window-wall lighting, this can be done with a valance, draperies, or venetian blinds. Shielding around the outside of semi-recessed fixtures accomplishes the same purpose.

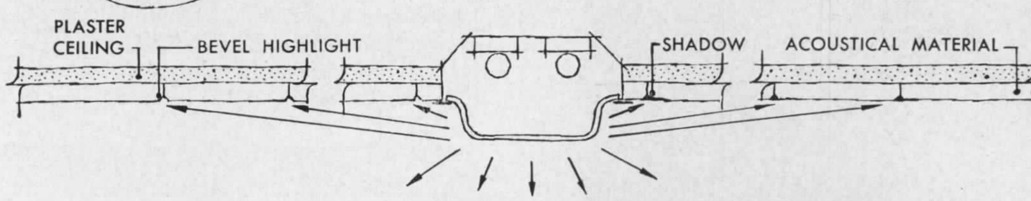
Surface mounted fixtures can also be troublesome in causing ceiling shadows. However, this type of fixture can be shielded to prevent low-angle glaring light from grazing across the ceiling.

The most functional of all types of lighting is the flush recessed fixture commonly used with suspended acoustical ceilings. Besides providing excellent illumination, this type of installation eliminates

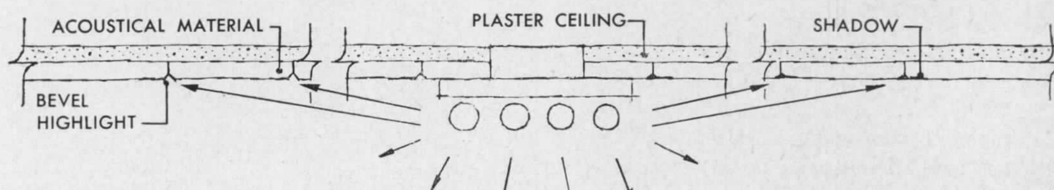




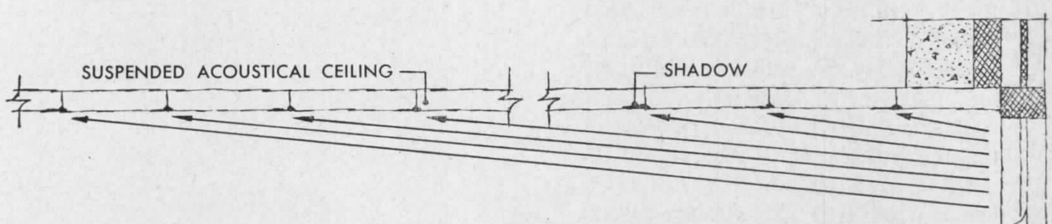
1. **COVE LIGHTING:** Not recommended with acoustical ceilings. Light grazes across ceiling causing shadows wherever there is the slightest irregularity.



2. **SEMI-RECESSED LIGHTING:** Creates the same effect as cove lighting unless fixture is shielded to prevent side light from grazing across ceiling. It may also emphasize bevel highlights, even on a level ceiling.



3. **SURFACE MOUNTED LIGHTING:** Creates much the same effect as cove lighting, unless the fixture is shielded to prevent low-angle glaring light from striking the ceiling.



4. **WINDOW-WALL NATURAL LIGHTING:** Critical horizontal light accentuates ceiling irregularities. A valance, draperies, or venetian blinds minimize grazing light.

an acoustical ceiling

the shadow problems of side lighting and complements the appearance of an acoustical ceiling.

Regardless of the type of fixture selected, its maximum efficiency will still depend upon light-reflecting surfaces in the area where it is used. That is why all Armstrong Acoustical Ceiling Materials have a factory-applied white finish with a light-reflection value of "a" (more than 75%), as listed in the current Acoustical Materials Association Bulletin. These materials diffuse light evenly, without annoying glare.

Your Armstrong Acoustical Contractor can give you complete information on selecting the best type of lighting for acoustical ceilings, as well as data on the entire line of Armstrong Acoustical Ceilings. You'll find him listed in the Yellow Pages. For your free booklet on the latest sound-conditioning materials and methods, write to Armstrong Cork Company, 4206 Rock Street, Lancaster, Pennsylvania.

Armstrong

ACOUSTICAL CEILINGS

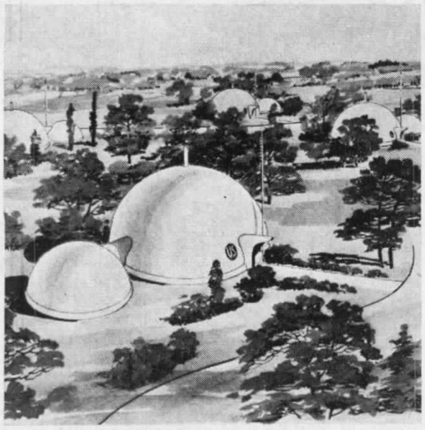
Cushiontone® • Travertone* • Arrestone®

Minatone® • Corkoustic® • Crestone®

*TRADE-MARK

(Continued from page 236)

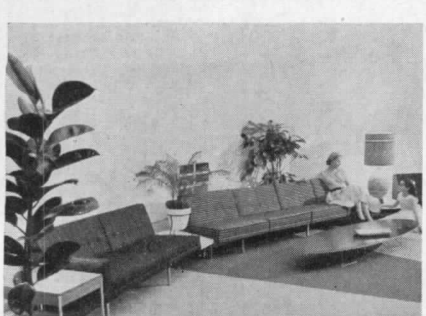
PLASTIC BUBBLE EVOLVES FROM WAREHOUSE TO AIRHOUSE



Dressed-up with a floor plan by Frank Lloyd Wright and interiors by Herman Miller, the inflatable plastic "igloos" first introduced as low cost portable warehouses are staging a sortie into the realm of housing. On the strength of the successful debut made by an experimental model of the Air House at the International Home Exposition held in the New York Coliseum, its fabricators, the Irving Air Chute Company of Lexington, Ky., are now aiming a somewhat modified version at the consumer market for beach houses, vacation homes and semi-permanent housing of all kinds.

The new Air House, like its more utilitarian predecessors, is basically an inflated shell of tough vinyl-coated nylon fabric, which is blown up like a balloon and supported by a constant stream of low air pressure. Its two adjoining hemispheres, — one 38 ft in diameter and 19 ft high; the other 24 ft in diameter and 12 ft high, — are securely anchored to the ground at its base by a sausage-like tube filled with sand or water.

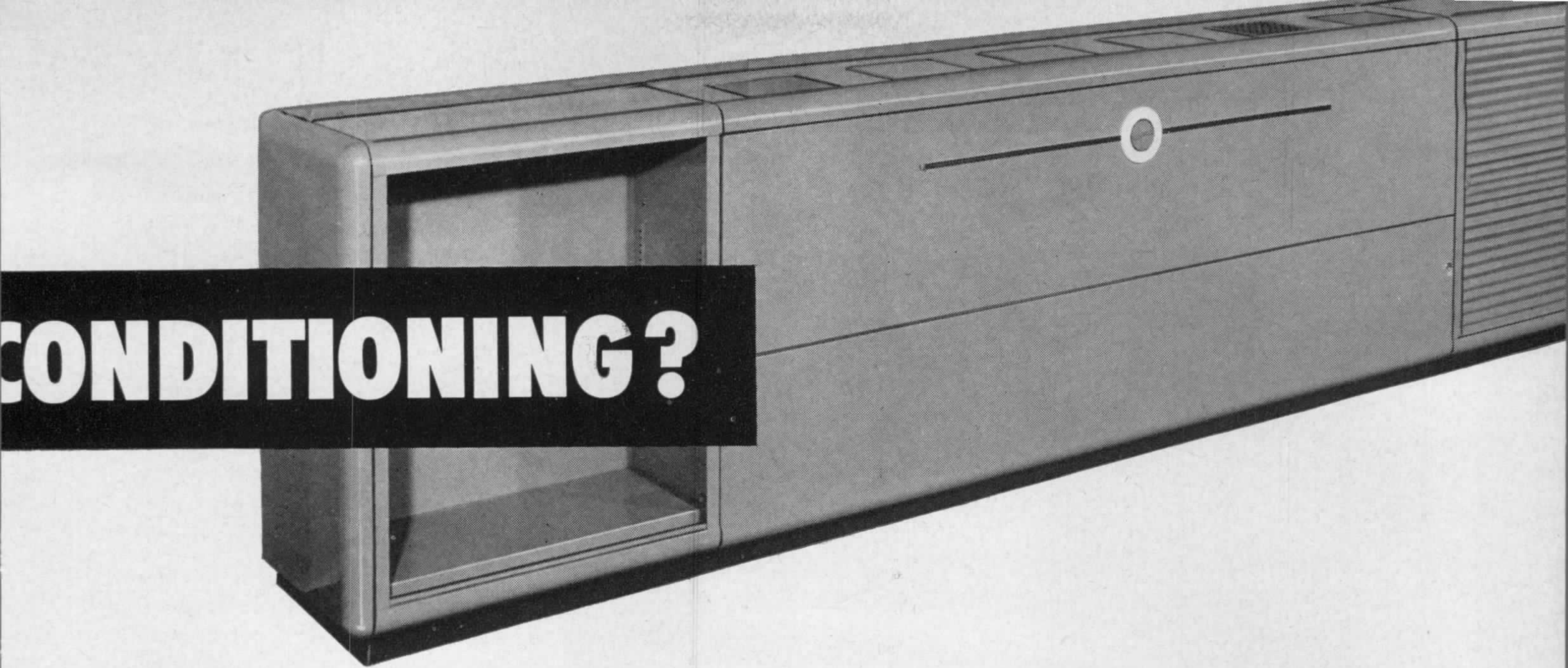
In the industrial models, air support has been supplied by inexpensive blowers; the demonstration house uses air pressure from a combination heating-cooling system consisting of two conditioners located about 2½ ft away from the outer perimeter of the domes. Two dampers regulate the amount of outside air introduced to the structure to compensate for air lost by leakage and through openings. Air loss is further reduced by the use of a revolving door in the outside opening.



In the demonstration model, half of the larger dome is used for the living room, while the remaining half contains the dining room, fully equipped kitchen, study and bath, with an all-purpose family area along the curved outer wall. The smaller dome is used for sleeping.

Because its *Fiberthin* shell requires no foundation or support other than that of the air pressure and can be folded up into a small lightweight package, the Air House is portable. This, as was pointed out in a recent description of the house, holds certain advantages for people with nomadic leanings. At the first sign of restlessness, they can simply turn off the air blower, let out the water in the base, fold up the house, throw it in the car trunk — and move on.

(More Roundup on page 252)



Plan with the new HerNel-Cool II

INSTALL IT *NOW*—AIR CONDITION *LATER*

Nearly every school would benefit from air conditioning *now*—as have offices, theaters, hospitals and homes. Unfortunately, the money to provide it isn't always in the current school budget. The HerNel-Cool II year 'round unit ventilator solves that problem.

These units can be installed now so that the school enjoys all the usual benefits of the famous Herman Nelson DRAFT|STOP system—heating, ventilating, natural cooling (with outside air), and control of window downdrafts. Only the addition of a chiller in the boiler room is needed for complete hot weather air conditioning.

It can be provided initially or at any future time. When it is wanted, air conditioning can be secured without disruption . . . and without expensive alteration and installation charges.

HOW THE SYSTEM WORKS

HerNel-Cool II units provide individual temperature control for each room, automatically. Most of the year they provide heat, ventilation, or natural cooling (with outside air) as the room requires. When a chiller is installed in the boiler room, HerNel-Cool II units also function as air conditioners.

In hot weather, the units switch automatically to mechanical cooling, with chilled water circulating in the same piping that carries hot water during cold weather. The cost is far less than separate heating and air conditioning systems—both for installation and operation.

Would you like more information? Just write to Herman Nelson Unit Ventilator Products, American Air Filter Company, Inc., Louisville 8, Kentucky.

AAF herman nelson UNIT VENTILATOR PRODUCTS

AMERICAN AIR FILTER COMPANY, INC.

System of Classroom Cooling, Heating and Ventilating

HOT WATER OR STEAM UNIT VENTILATORS

AMERVENT FOR MILD CLIMATES

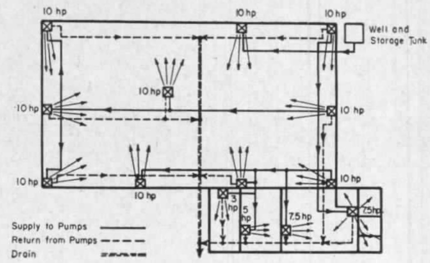
ELECTRIC UNIT VENTILATOR

UNIVENT GAS FIRED UNIT VENTILATOR

ANY FUEL, ANY CLIMATE—There is a Herman Nelson Unit Specifically Designed to Give You More Classroom Comfort Per Dollar

TECHNICAL ROUNDUP

WATER-TO-AIR HEAT PUMP CROSSES CLIMATE BARRIER



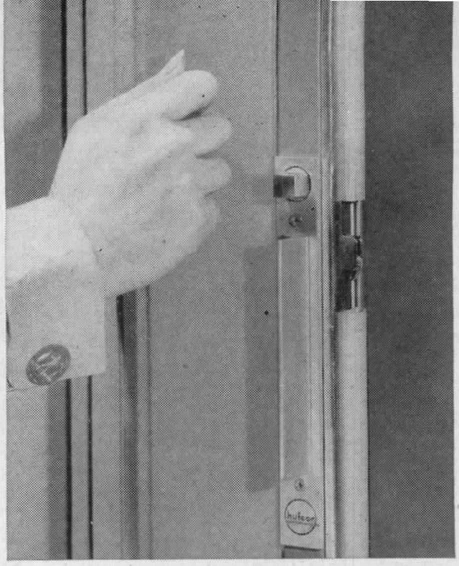
A barrier to the use of heat pumps in cold climates has been crossed — appropriately enough — by a manufacturer of heat pumps. Recognizing the inability of the conventional air-to-air pump to supply adequate heat in below freezing weather without supplementary heating equipment, the American Coils Company has installed in its new Farmingdale, N. J., plant a 123 hp packaged system that uses well water rather than outside air as its source of heat. By taking advantage of the relatively stable temperature of water stored under ground, the company's engineers were able to design a system that will maintain comfortable temperatures inside the plant even when outside temperatures drop below zero, and will operate more efficiently during the summer months because the well water remains far cooler than the outside air. The water-to-air system in the plant uses 14 standard ACI-H units with a total capacity of 2,000,000 Btu's for winter operation, and 1,470,000 Btu's for summer cooling. Water for the heat pump system is pumped from a 505 ft deep well located just outside the plant, supplying water to a 10,000 gallon capacity storage tank at an approximate pressure of 60 pounds per inch. From there it is delivered to the individual heat pumps through copper piping buried beneath the concrete floor of the plant. Installation of the storage tank, which is insulated against temperature changes by two feet of earth, permitted the pumps to be equipped with a water-saving automatic valve that controls the amount of water each unit draws by regulating head pressure. The tank also supplies water for domestic use and fire protection.

Because the system requires no ductwork, installation costs were cut by from $40,000 to $50,000, in addition to the reduced operating costs. Elimination of the ductwork also allowed greater freedom in planning the plant layout.

(More Roundup on page 256)

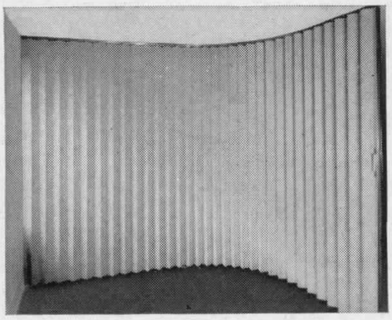
only Hufcor

offers you superior sound resistance... plus:

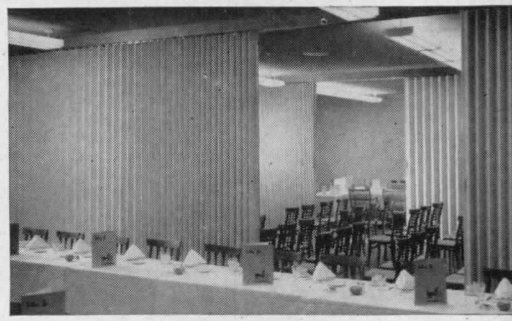


"Knockable" Hufcor covers are made of 5-ply laminated vinyl and tough, high strength fiber board. Distinctive handle latch of anodized aluminum is unique both in appearance and function—a Hufcor exclusive.

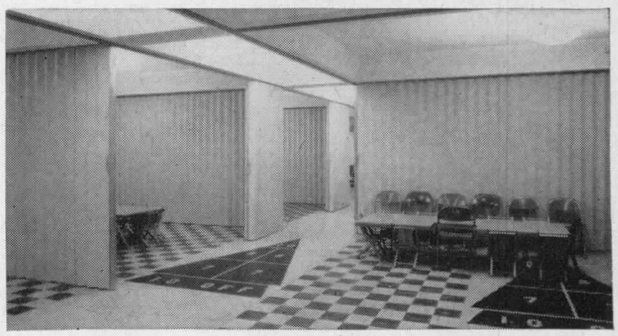
straight crisp lines
less stacking space
smooth action
wrinkle-free covers
symmetrical beauty
resistance to impact
interchangeable covers
quick installation
flame resistance
semi-rigid covers
designer-approved colors
complete line of accessories



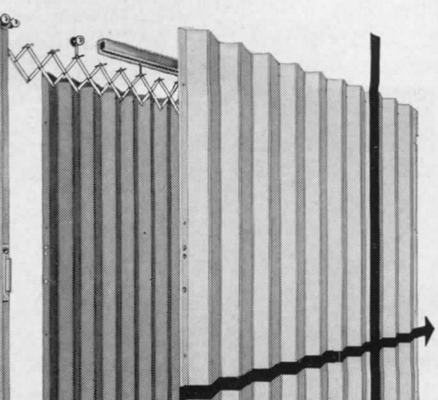
Hufcor accordion doors on curved track operate easily and uniformly without alteration. There is no binding.



Complete areas can be closed off with the trim, rigid Hufcor. No need to fear damage from large crowds or active children. Hufcors move easily by hand.
Valley Ho Hotel, Scottsdale Arizona.
Architect: E. L. Varney & Associates.



New areas can be made from old with Hufcor. Pivot switches, glide switches, multiple meeting posts, rolling posts, recessed channel, and other accessories all provide complete flexibility for room division. Mt. Calvary Lutheran Church, Janesville, Wis. Architect: R. H. Bierman, Milwaukee.



This exploded view of Hufcor shows the simplified, trouble-free, pantograph system. The straight, rigid lines of the covers make Hufcor the "architecturally correct" door.

HOUGH

Manufacturing Corporation, Janesville, Wisconsin

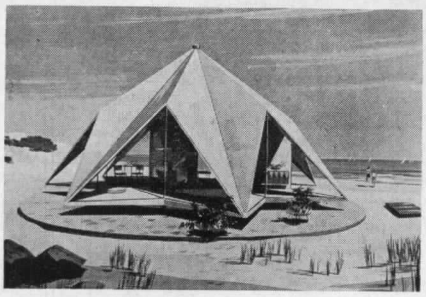
In Canada contact: CANADIAN VENTILATING SHADES, LTD., Peterborough, Ontario

Dept. AR

Gentlemen:
Please send me complete information on the Hufcor Accordion Door______. Have representative see me______.

*Name*________________
*Firm*________________
*Street*________________
*City*________ *Zone*____ *State*____
____ *Architect*____ *Builder*____ *(Other)*____

ALUMINUM AND GLASS TEPEE TURNS TO FOLLOW THE SUN



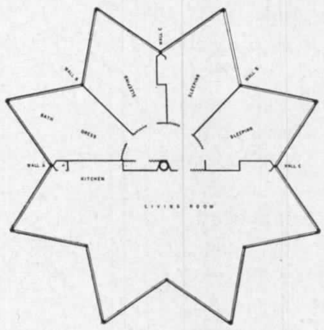
Aluminum triangles clustered tepee-style around a central "tent pole" cap a revolving beach house that will spin on a turntable to allow its occupants to keep the sun where they want it.

Fanning out from a height of 15½ ft at the center, the conical structure forms an eight-pointed star 37 ft in diameter at the base. Its roof is made up of sixteen triangular aluminum panels joined in pairs, with their long edges meeting in deep valleys which extend from the points of the star to the tip of the central aluminum column. Where the short edges of the triangles come together, the roof flares out to add height to the openings below.

The "walls" of the beach house are triangular glass panels which fit into the inverted V-shaped grooves formed by the roof. Pivoting outward around a center mullion, they are backed by gold-anodized aluminum screening that will allow ocean breezes — sans insects — to sweep through the house.

Interior partitions are low walls radiating from an areaway around the central column. Half of the floor space is devoted to the living area, including kitchen and dining alcove; the other half is divided into three bedrooms and a combination bath and dressing room.

Designed by architects Harrison and



Abramovitz of New York, the whirling beach house is the latest creation commissioned under Alcoa's Forecast program of designs in aluminum (ARCHITECTURAL RECORD, February 1957, p. 242.)

"COMFORT ENGINEERING" CUTS HOME HEATING-COOLING COSTS

A two-year test program on 172 homes located throughout the country is currently being conducted by Owens-Corning Fiberglas Corporation to determine whether an average-size (1200 sq. ft) home can be heated and cooled all year for $10 a month. Although the homes represent many sizes and types, they all meet the "comfort engineering" minimums set up by Tyler S. Rogers, technical consultant for Owens-Corning. These standards include proper shading of glass areas, maximum use of insulation and the ventilation of attics or roofs. Since the floor areas vary widely, and fuel and power rates vary in different cities, the results are being determined by relating each individual test house to a standard 1200 sq. ft floor area using fuel and power at the national average rates. Figures now available from 120 houses in the test indicate that heating and cooling costs are averaging $10.64 a month, less than 10 per cent above the target figure.

General Electric 480Y/277-Volt Distribution System Permits $50,000 Savings at New Sheraton Hotel

MODERN HOTEL COMBINES FLEXIBLE LOAD CENTER SYSTEM, HIGH VOLTAGE LIGHTING TO CUT EQUIPMENT, INSTALLATION COSTS

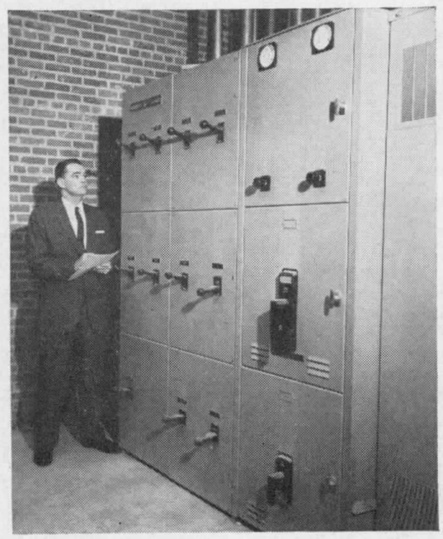
Rising 22 floors above Philadelphia's Penn Center, the ultra modern Sheraton Hotel combines the latest in construction details with an efficient high voltage electrical power distribution system which is currently being installed in many commercial buildings.

Designed to provide maximum comfort and services for hotel guests, the new Philadelphia Sheraton Hotel has incorporated a General Electric 480Y/277-volt electrical system which permitted savings of $50,000. To design this modern system, G-E engineers worked closely with consultants Slocum and Fuller; and architects Perry, Shaw, Hepburn, and Dean. The electrical contractor was Keystone Engineering Corporation. One feature of the system is the installation of G.E.'s new quiet, dry-type, general purpose transformers. These low-noise-level transformers add further comfort for Sheraton Hotel guests.

From primary switchgear at the incoming line through secondary distribution and protective apparatus, General Electric system-engineered equipment provides highly reliable power at the Sheraton.

To see how General Electric can help you achieve significant savings with a 480Y/277-volt electrical distribution system, consult your nearest G-E Apparatus Sales Office or write to General Electric Company, Section 680-11, Schenectady, N. Y.

FLEXIBLE double-ended load center unit substation with integrated units furnishes highly dependable power close to load.



COMPACT low voltage switchgear and distribution switchboard protect low voltage side of "packaged power" system.

Engineered Electrical Systems for Commercial Buildings

GENERAL ELECTRIC

QUIET General Electric dry-type transformers, with low-noise-level characteristics, help improve sleeping comfort for Sheraton guests.

DECORATIVE LIGHTING enhances main ballroom. High voltage lighting in many areas of hotel permits low-cost use of combined light and power system.

COORDINATING THE PROJECT were M. Savitt of Slocum and Fuller, H. Cohen and L. Evelev of Keystone, T. S. Duff of Slocum and Fuller and A. M. Cook, G.E.

THE RECORD REPORTS

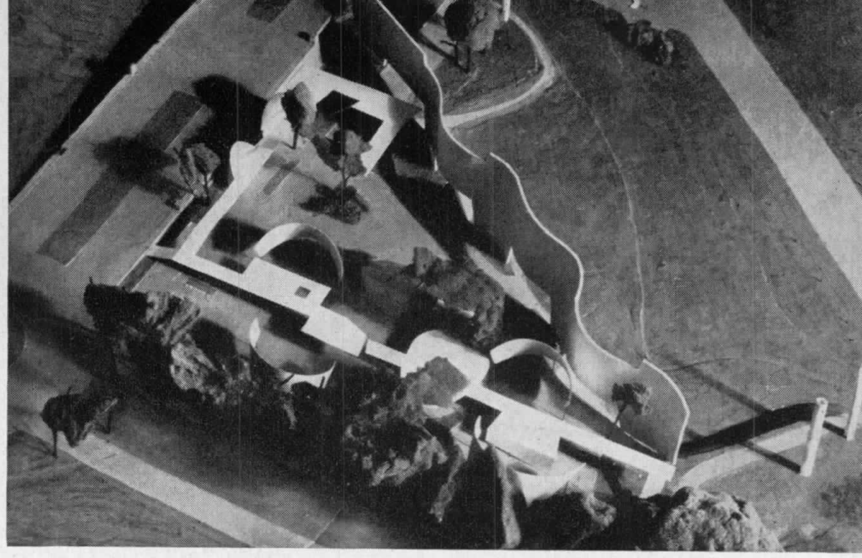
ARCHITECTURE ABROAD

(Continued from page 14)

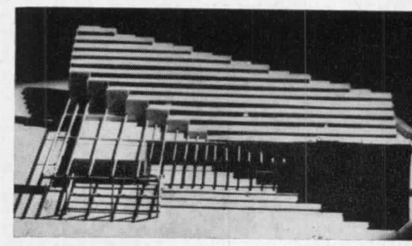
signed by architect Edward D. Stone, was reported in the February issue of ARCHITECTURAL RECORD.

The Atomium

The Atomium, which will be 360 ft high, will house a restaurant in its uppermost "atom"; other sections have been rented to the participating countries for



Above the Polish pavilion, Solatan, architect. Below: the Finnish pavilion; Heima Pietila, architect



displays of atomic research. The central shaft of the Atomium will contain the elevator; other sections will be connected by escalators and stairways.

"Logexpo"

In addition to the exhibition buildings, the Belgians are also furiously constructing housing accommodations for the 30 or 35 million visitors expected next summer. "Logexpo," the government agency formed to handle this influx, plans the "world's largest motel," to accommodate 4000 people in 2000 rooms; a 2500-room hotel; a trailer camp for 500; and a camping area. Reservations will be made electronically.

Design Requirements

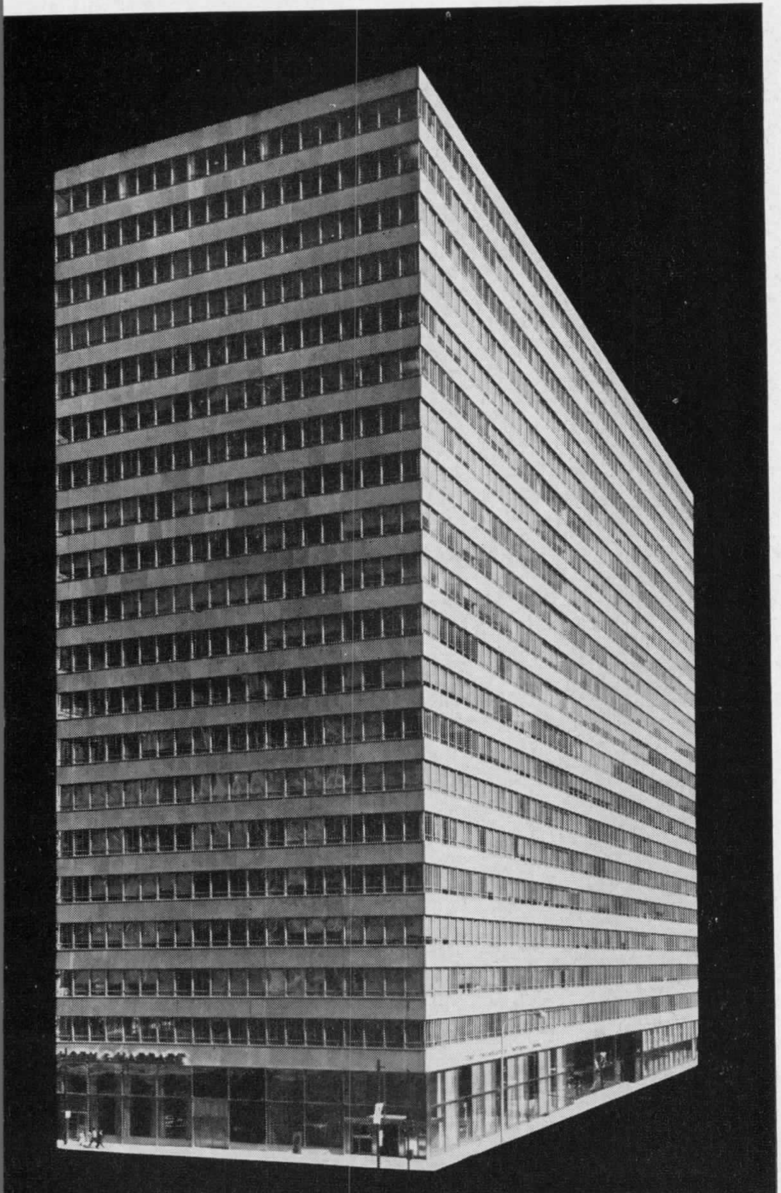
Architecturally, the Belgian officials exercised no control over the design of the foreign pavilions — their only requirement was that the participants build on 70 per cent of the area allotted them. Without knowing what sort of architectural solutions would be proposed, it "seemed imperative" to chief architect M. van Goethem "to avoid severe alignments and to substitute pleasant curves which would reveal at each turning a pavilion in green surroundings, and isolated as far as possible." The only overall view which visitors will have of the foreign section will be from the 1310-ft-long elevated walk to be built over the area.

The Belgian architects were more

(Continued on page 320)

Curtain Walls

and Windows



3 PENN CENTER, Philadelphia, Pa. Architects: Emery Roth & Sons. Contractors: Caldwell-Wingate Construction Co. Combination fixed and ventilator windows adapted from a standard Lupton design.

These three new high-rise buildings exemplify modern planning and construction. All three were designed with famous LUPTON components. Indeed, LUPTON has always been in the forefront of the curtain-wall movement . . . and for good reason:

The characteristics of LUPTON Aluminum Curtain Walls and Windows result in unusual planning flexibility with either stock or custom units. The wide range of LUPTON styles, in both metal windows and curtain walls, frees you for truly creative planning with utterly reliable materials. *You* design LUPTON-made installations; LUPTON executes your wishes, in manufacture and frequently even in erection. LUPTON's undivided responsibility for the job assures you exact compliance with your instructions, and effects multiple savings for your clients.

SEE SWEET'S (Sections 3 and 17) for the Michael Flynn Curtain Wall and Metal Window Catalogs, and write for further specific information. A call to the nearest LUPTON representative (see the Yellow Pages under "Windows—Metal") will bring fast action—without obligation.

LUPTON

METAL WINDOWS • CURTAIN WALLS

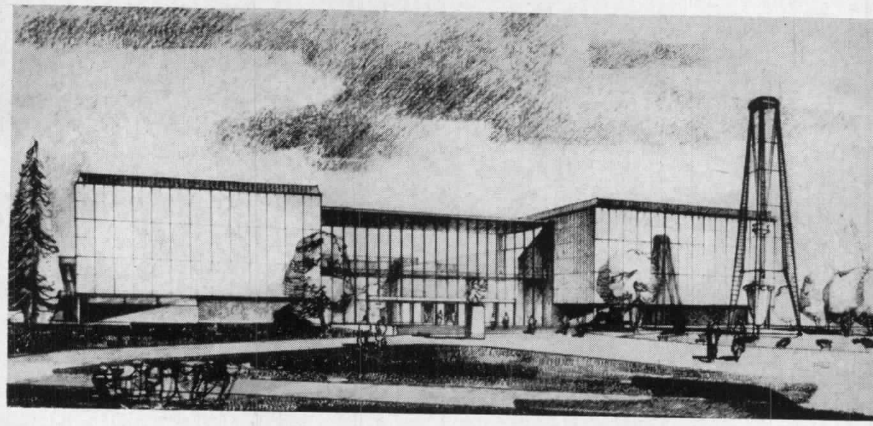
MICHAEL FLYNN MANUFACTURING COMPANY

Main Office & Plant: 700 E. Godfrey Ave., Phila. 24, Pa.

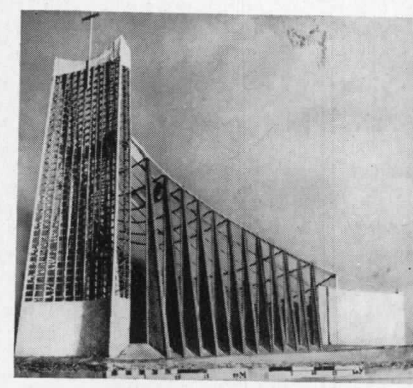
ARCHITECTURE ABROAD

(Continued from page 316)

closely regulated in their designs for the Belgian section, carefully planned for "unity." The height and general outlines of the buildings have been controlled, as has been the color of the building material. "If the frame work to which architects in the Belgian section must adhere seems a little rigid," Mr. van Goethem has said, "it is because



Above: the Czechoslovakian pavilion, Frantisek Cubr, architect. Below: one part — a church — of the Vatican pavilion, P. Rome, chairman of the council of architects; this is the first time that the Holy See has participated as a state in a world's fair



those responsible for the layout planning have wished to show that unity of form does not prevent the varied use of volumes, materials and colors, provided that these are always studied in a fluid sense and not in conventional rigidity. The master plan is to impose a certain discipline throughout the monumental perspective while leaving to each individual architect responsible for the erection of a pavilion the opportunity to show his imagination and ideas of composition. . . ."

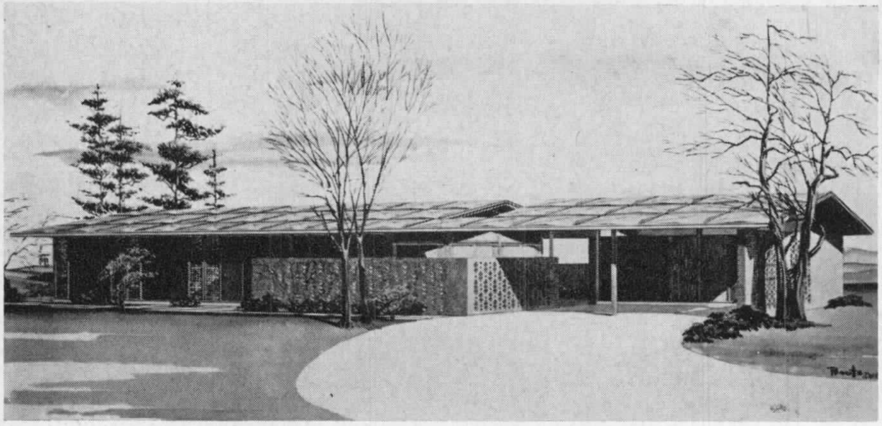
In the case of the commercial concessions to be built in the Belgian section, controls have been relaxed somewhat. Architects were charged, however, to respect the spirit of the other Belgian buildings, and to use a maximum of metal and glass in their designs as "materials which best meet modern building requirements."

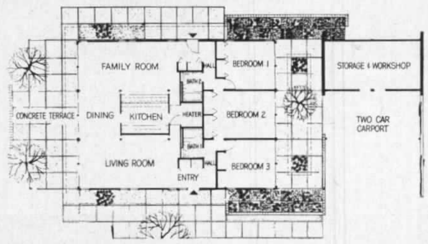
Chief architect for the Belgian section is J. Hendrickx van den Bosch.

The Belgians estimate that the fair will cost an approximate $450 million, $200 million of which will be absorbed by the Belgian government.

PLANS ANNOUNCED FOR 50 ALCOA "CARE-FREE HOMES"

A design by Architect Charles M. Goodman of Washington, D. C., for "the Alcoa Care-Free Home" will be built in some 50 locations throughout the United States for public exhibition this fall, according to plans announced by the Aluminum Company of America.



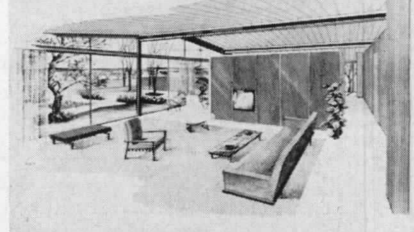


Although the intent is to demonstrate both the esthetic and functional possibilities of aluminum as a material for residential construction, the house is "not an aluminum wonder house," says the Alcoa announcement: "rather, Architect Charles M. Goodman has combined many materials, among them wood, glass, steel and brick, to create a dwelling unparalleled for beauty, spaciousness, carefreeness and liveability."

Aluminum is used for roof and ribbed exterior wall panels, hinged grills over the windows, front door and framing for the sliding glass doors which open onto the patio; also insulation is aluminum foil-backed.

The house will have 1900 sq ft of floor space, planned with the requirements of last year's well-known Women's Housing Congress in mind. It has a family room separate from the living room, a central kitchen, a dining area adjacent to but separate from all of these, three bedrooms, two baths, heater room, 228-sq-ft storage-workroom and two-car carport. Bedrooms, the master 12 by 15 ft, the other 12 by 12, overlook an enclosed garden.

The house is post and beam construction on a slab foundation. The L-shaped wall in front is brick.



(Continued on page 342)

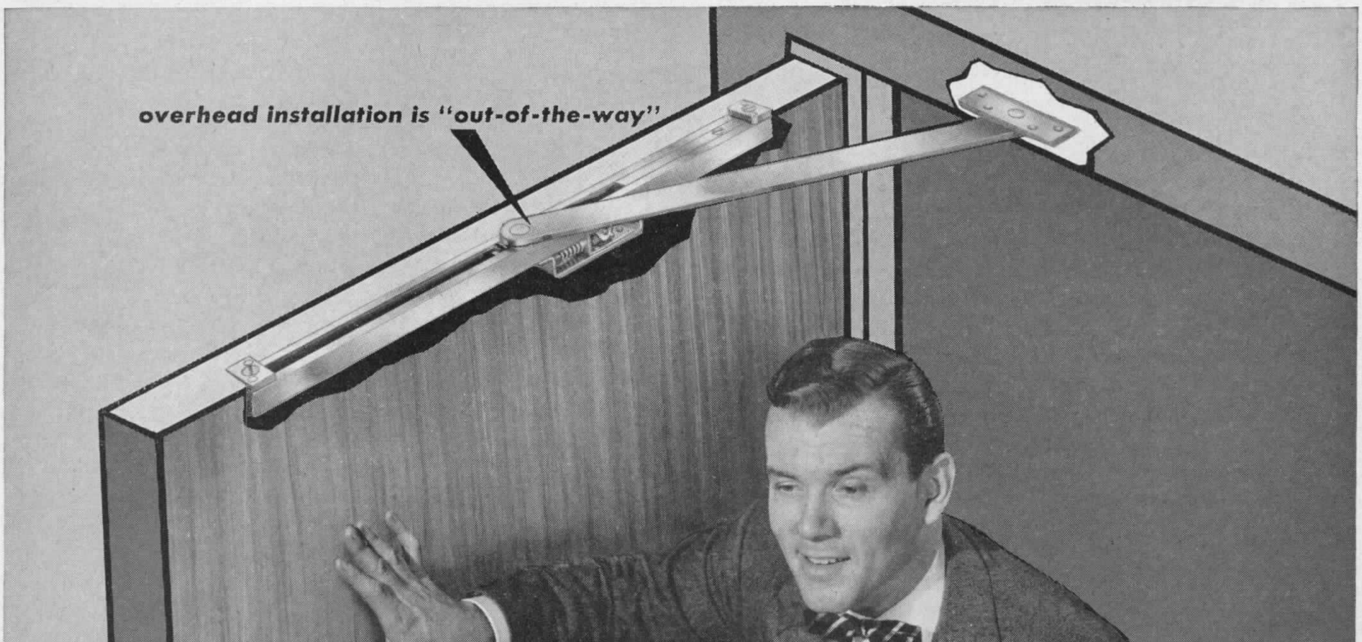
OVERHEAD DOOR HOLDERS

provide a cushioned stop . . .

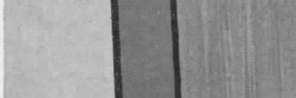
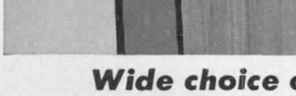
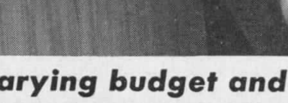
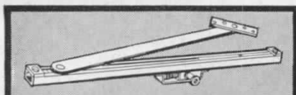
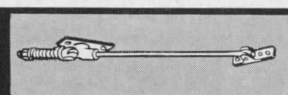
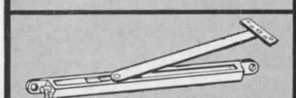
that absorbs the shock of violent openings, avoids damage to glass, jamb, door, wall, hinges and other hardware and cuts down maintenance and repair costs.

hold the door open . . .

during heavy traffic—at school dismissal, factory or office "quitting" time or when the theatre lets out. Heavy wear and tear of continuous opening and closing of the door is avoided.



Wide choice of styles to meet varying budget and installation requirements.

	**GJ 100 • 200 concealed** in top rail of door. Finest for exterior and interior doors.		**GJ 70** for low cost installations.
	**GJ 90 the outstanding surface type.** For exterior and interior doors.		**GJ 300 Series—Friction type** for interior doors. Concealed or Surface.
	**GJ ARISTOCRAT.** Most "practical" for hard usage.		**GJ 500 Series** with shock absorber. Finest for interior doors.
	**GJ 80 good quality** for moderate cost installations.		

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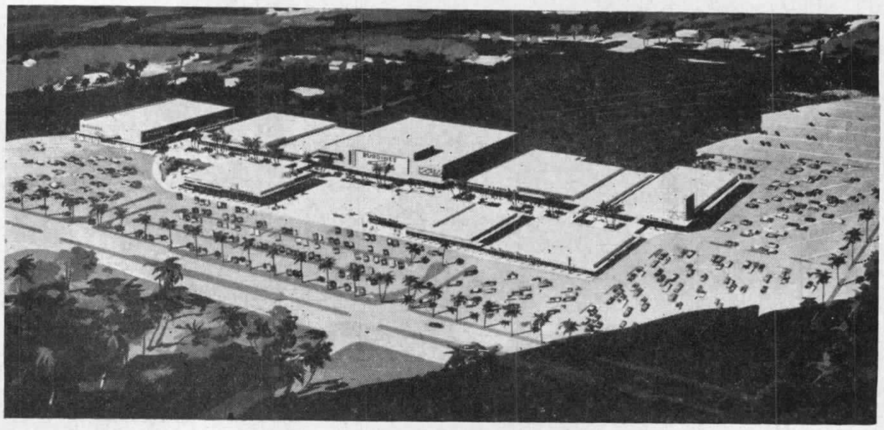
(Continued from page 336)

FLORIDA SHOPPING CENTER IS DESIGNED FOR ECONOMY

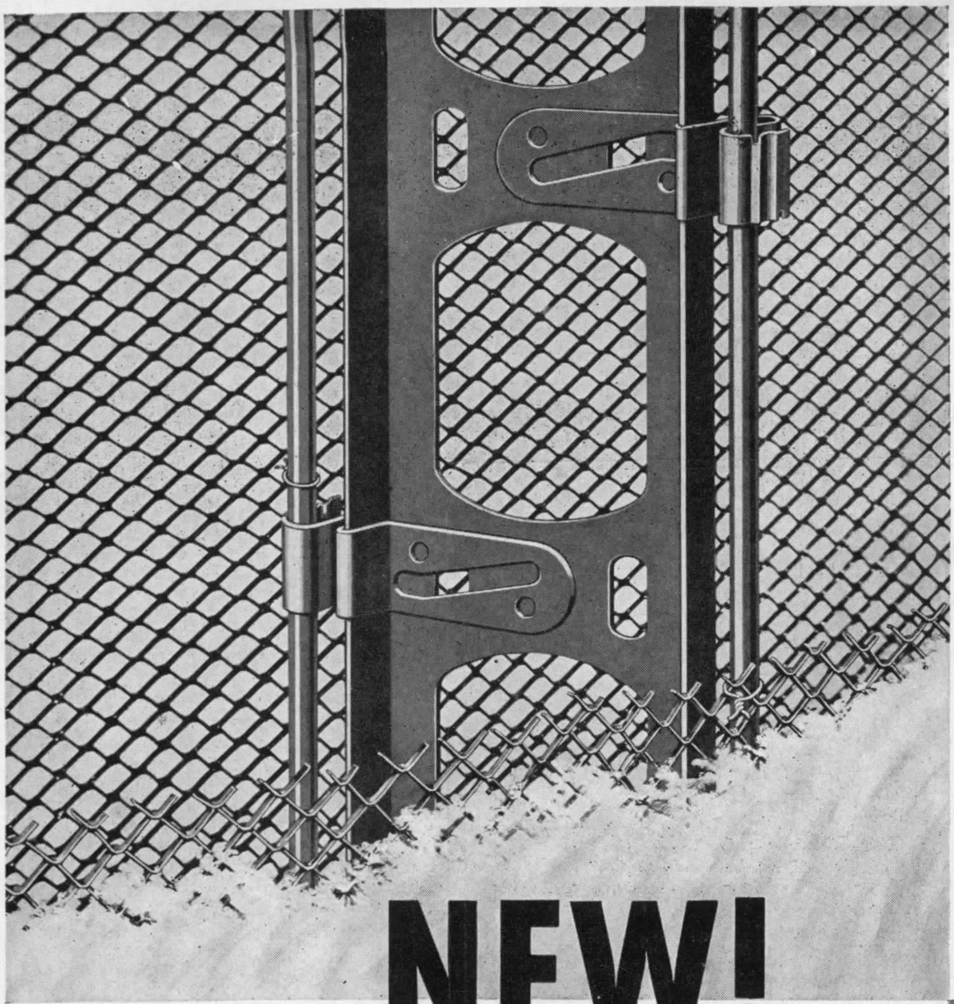


The South's largest shopping center, the 163rd Street Shopping Center in Miami, was completed in May with the opening of "Richards," its second department store. Architects were Gamble, Pownall & Gilroy of Fort Lauderdale; architect Meyer Katzman of New York was responsible for interior design of Richards and consulted with Gamble, Pownall & Gilroy on the exterior.

The $15 million center was, the architects explain, "deliberately designed for stores in the popular, medium-priced field, eliminating frills in construction and decoration and non-essential, costly 'extras' such as cantilevered stairways and decorative fountains or statuary."

The center has a central mall nearly half a mile long, with Burdines' department store in the center, Richards' at the west end, nine major chain stores and about 50 satellites on both sides; parking for 4000 cars occupies 40 of the center's 50 acres.

(Continued on page 346)



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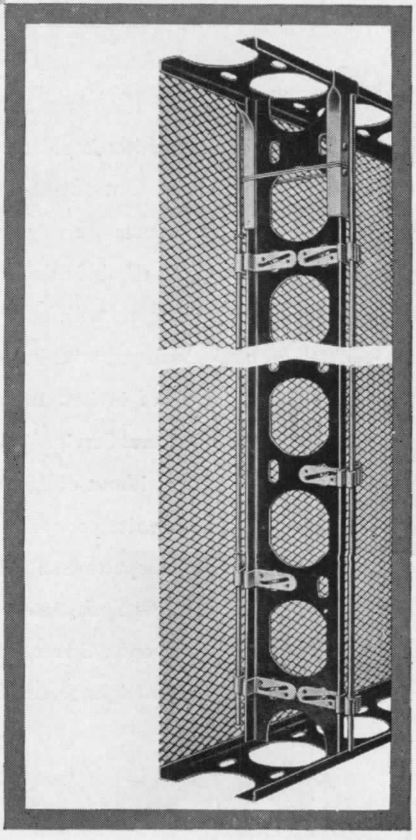
Hush-clip partition system rates sound transmission loss of 56.4 decibels



Now you can design for minimum transmission of sound from room to room, and do it at a reasonable cost —thanks to Penmetal's new HUSH-CLIP partition system.

Utilizing steel studs, track and gypsum plaster over metal lath, the system features a unique clip used in conjunction with a ¼″ pencil rod. Because direct wall-to-stud contact is made only at point of clip, the area over which sound is transmitted is greatly reduced.

The sound loss rating of this combination is unequalled. Tested by a well-known independent research laboratory, the Penmetal HUSH-CLIP system recorded an average sound transmission loss of 56.4 decibels. (Complete test data furnished on request.)

That isn't all. This new system offers the bonus advantage of resistance to plaster cracking. And, since all parts of the system are designed to fit together, the partition is easy and economical to erect.

No other partition system offers so many benefits in one assembly. Send for further information on the HUSH-CLIP partition.

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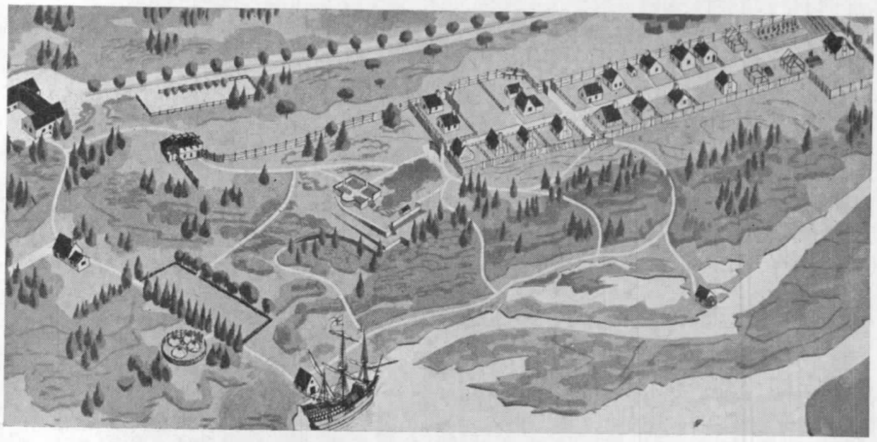
METAL MARK Penmetal 1869 OF QUALITY

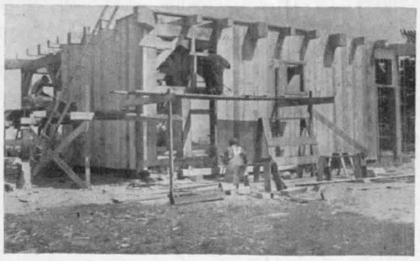
PM-126

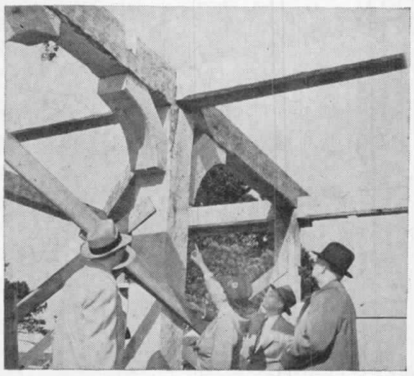
(Continued from page 342)

PLYMOUTH OF 1627 REBUILT TO RECEIVE MAYFLOWER II

"Pilgrim Village," a painstaking replica of the Plymouth of 1627 — the year of its first "census" — is by now well under way on a site two miles south of Plymouth Rock, under the architectural direction of Charles R. Strickland of Boston and the sponsorship of Plimoth Plantation Inc., a nonprofit group dedicated to the preservation of the







"magnificent Pilgrim heritage." All must be ready for the arrival of the Mayflower II, built in England as the gift of the people of Great Britain to the people of the United States, at its berthing place in Pilgrim Village. The reconstruction (see rendering), to be faithful to the last structural detail, will reproduce *First* Street and its 19 thatched dwellings; the Fort Meeting House; a trading post; a grist mill; and an Indian Village. Plymouth's First House and 1627 House (photo second above) and Fort Meeting House (construction photo third above) will be moved to Pilgrim Village. Photo showing typical structure is from recent exhibit in Plymouth.

(More news on page 352)

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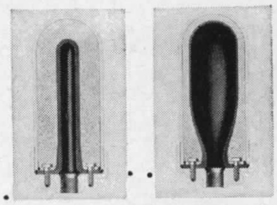

ABSORBO tube and insert shown in normal position, before faucet or valve is opened.

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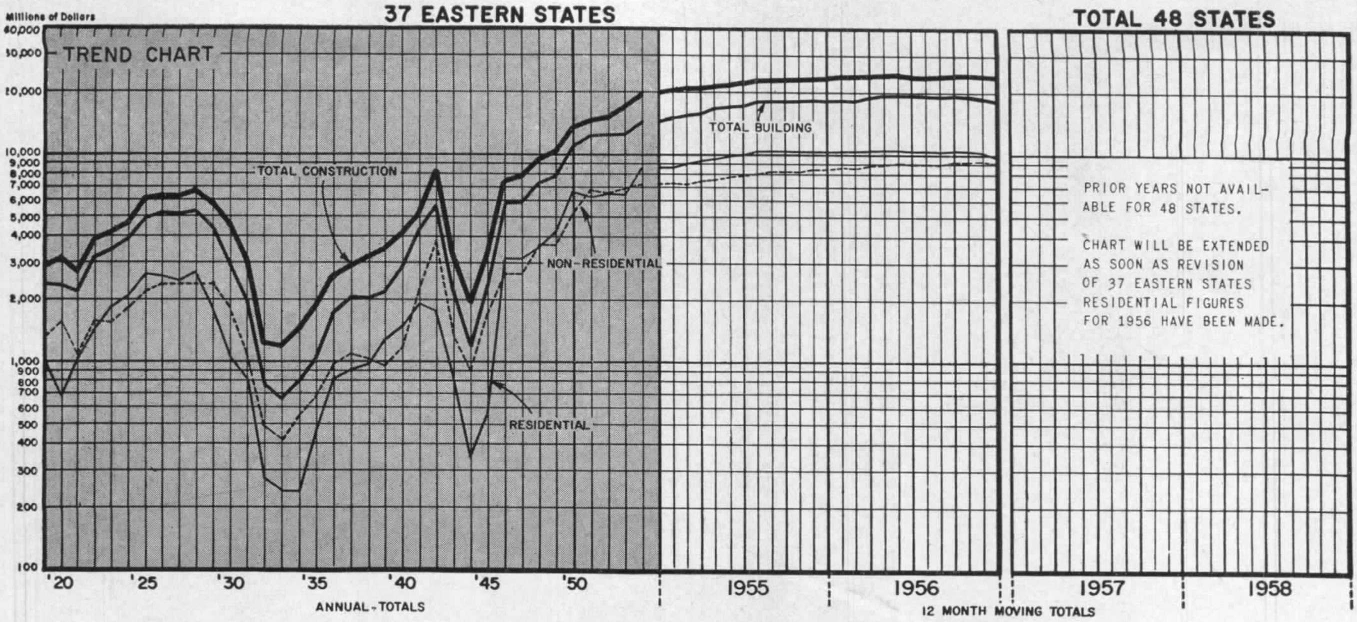
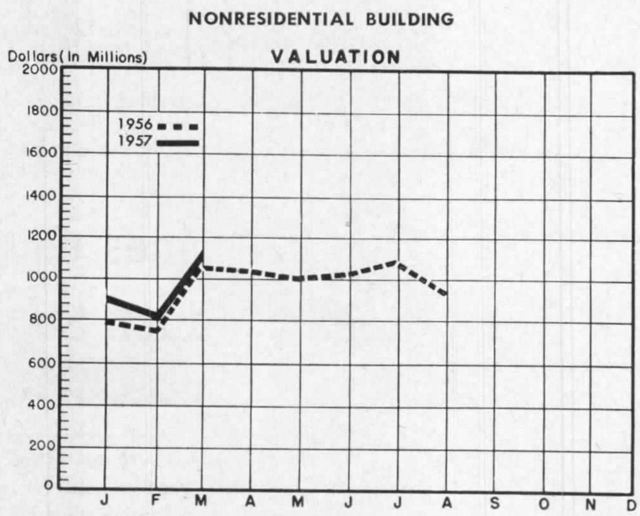
THE RECORD REPORTS: CURRENT TRENDS IN CONSTRUCTION



Charts by Dodge Statistical Research Service

CONTRACTS UP SHARPLY FOR MARCH RECORD

U. S. construction contract totals for March showed a sharp rise of 11 per cent over contracts for the same month a year ago, according to figures announced by F. W. Dodge Corporation. Despite a seven per cent drop in residential contracts, the $3,077,997,000 total was the largest percentage increase recorded in recent months. Much of the rise could be attributed, said Dodge vice chairman Thomas S. Holden, to a number of unusually large contracts. Heavy engineering showed the greatest rise with a total of $878,268,000 for a 69 per cent increase over March 1956. In nonresidential building, up three per cent with $1,092,441,000 in contracts, hospital contracts showed a 100 per cent increase, while both manufacturing and public buildings were far below the totals for March 1956 (for details on another fast-rising field, apartments, see table below). Cumulative totals for the first quarter of the year, compared with the same period of 1956, show nonresidential at $2,826,647,000 up nine per cent; residential at $2,799,340,000 down five per cent; heavy engineering at $1,912,573,000 up 14 per cent; and total construction at $7,538,560,000 up four per cent.



Source: F. W. Dodge Corporation

APARTMENT BUILDINGS

Construction Contracts—Regional Comparison

Valuation (in $ thousands)

Region	3 mos. 1957	3 mos. 1956	% change
I (Boston District)	2,413	4,588	— 47
II (Buffalo, N. Y. C., Phila.)	69,733	46,738	+ 49
III (Atlanta, Birmingham)	35,641	24,703	+ 44
IV (Cinti., Cleve., Pittsbgh.)	27,821	12,115	+130
V (Chi., Detroit, Mpls.)	37,504	16,264	+131
VI (N. Orleans, St. Louis)	3,729	3,311	+ 13
VII (Dallas, Kans. City)	6,450	16,488	— 61
VIII (11 Western States)	85,523	46,807	+ 83
48 States Total	268,814	171,014	+ 57