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BUILDING TYPES STUDY: SCHOOLS
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Colleges with limited land for expansion are constructing new facilities in denser patterns. These structures tend to be larger and more complicated in their spatial organization than single college buildings on generous sites. Examples will include work at the Universities of Virginia and Rochester by Sasaki, Dawson & DeMay.

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Paul Rudolph's design for the new town of Stafford, located on the Potomac about an hour and a half south of Washington, D.C., uses the buildings to accentuate the natural form of the landscape and preserves large areas in an unsplowed field. Some characteristic Rudolph drawings will show the concept in detail.
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TWO GREAT ARCHITECTS HIT BY PUBLIC TASTE

Two great contemporary architects—both of whom I am pleased to call friends—have just suffered the rejection of their projects because of vagaries of public taste. While such rejection of a design is not exactly unknown to architects, the reasons in these two instances struck me as interesting. Both of those architects represent a high degree of sophistication, but this quality had sort of opposite effects.

The first is Marcel Breuer, whose design (done with Herbert Beckhard) for the Franklin Delano Roosevelt Memorial has just been rejected by the Fine Arts Commission of Washington, which must pass on buildings and so forth for the Mall. The second is Paul Rudolph, who was just asked to resign from a group of architects selected to do a school for New Canaan, Conn.

If the members of the Fine Arts Commission protest that they are not the public, I shall remind them that their reaction to the new design for the FDR Memorial is so parallel to the public's reaction to the earlier, prize-winning design by Pedersen, Tilney, Hoberman, Wasserman and Beer which also was rejected, as to make no real difference.

It is clear that there was agreement that contemporary architectural thought and memorials just do not come into phase with each other. Some of the ideas expressed by the earlier award-winners and by Breuer and Beckhard were in essence the same: 1. the Greek temple idea was not presently suitable; 2. the deification of the man commemorated was a rather limited idea of the purpose of a memorial; 3. in this and later ages FDR will be remembered more for his powerful statements than for his personal characteristics; 4. a new memorial did not necessarily have to match in style the famous ones on the Mall, the memorials to Lincoln, Washington and Jefferson; 5. a statue may or may not be the central element. And I should say that most architects would join in these conceptual ideas.

It does seem clear by now, however, that such thoughts do not match those of the general public—a memorial should be a temple or a great shaft, idolatry is the function of a memorial, and there should be a statue equal to that wonderful one of Lincoln.

Or, while trying to assess public reaction, one might simply say that what is wanted is an awesome, monumental quality, something that would bring hordes of visitors, and that, in a design for a memorial, modern architectural thought is rejected. It would seem now that any FDR memorial will have to wait for a closer rapport between designers and those busloads of tourists.

The odd twist comes in the objection to Paul Rudolph as the chief designer in a group doing a school. Here the objection was that an architectural achievement that would bring visitors was just what the townspeople were anxious to avoid. They were actually afraid, says the New York Times, that something architecturally strong might attract new settlers to New Canaan.

The Times story quotes the town's spokesman: "We don't want a monument or an architectural landmark that people will drive miles to see. We just want a school. Citizens here want to be left alone, and some of them were afraid that if we let Rudolph do the school people would read about it in national magazines and say 'Look what Rudolph did in New Canaan; let's move there.'"

The building committee forthwith resigned, so one is entitled to suppose that peace did not reign in New Canaan.

You want to attract tourists, so you have something eclectic and sentimental. You don't want to attract tourists, or residents, so you shun something strong and contemporary.

Well, I suppose there's some sense in there someplace.

I don't feel like drawing any heavy or penetrating conclusions from these two stories. I must say that to me there was a little shock in both of them. It would certainly seem that contemporary architecture has rejected the sentimentality of familiar memorials, but has found no acceptable substitute; has in fact rather scorned the concept of monuments or memorials. If in early history these were great generators of architectural thought, they certainly aren't now. Another great generator of architectural opportunity was the pride of a community in its schools. Many a small town had only the city hall or the school to provide a bit of architectural identity, and there was great pride in the mausoleum styles that then prevailed.

Well, I can at least repeat the familiar observation that the places for great innovative individual architecture have to be carefully chosen.

—Emerson Goble
Things getting crowded? Move to New Mexico

We have heard so much about our crowded cities that it is a relief to read a bit of rebuttal from a recent talk by J. B. Jackson of Santa Fe, editor of Landscape Magazine:

"... We all have more space than we know what to do with. We listen respectfully to Easterners who tell us about the population squeeze and lack of room for expansion and the need to control urban sprawl and protect the open countryside. But when we go 10 miles from where we live we find ourselves in the midst of complete solitude, miles and miles of it. The most serious problem an environmental designer has here in the Mountain West is how to deal with too much space."

Airports getting crowded; shall we travel by bus?

If this timid observer reads anything more about the congestion in the air around airports, he is going to find some other means of transportation than flying, if it's shank's mare. When a two-hour flight becomes three hours because of nervously flying around in a landing pattern, with the pilot more nervous than anybody else, I'm not happy. And I begin to doubt the saving in time, at least in shorter trips.

Planners never can seem to see things large enough. Old Dan Burnham did, we are told, and he not only left us those undying words, but also a "front" for the city of Chicago that has been a real boon for 40 or 50 years.

All the planning for airplanes has been at too small a scale. All the planning for automobiles has failed to appreciate the loads that the highways would attract. Even bus terminals are all too small, and the buses have to fight congestion on the highways.

It would seem high time to get those 120-mile-an-hour trains going, and, of course, those new subway systems where they are planned. It has been pointed out, however, that railroads couldn't take very much of the present travel load without running into overload conditions of their own.

Our much vaunted mobility is seriously threatened. Hurry up with those electronic travel-savers, or the next step will be rationed traveling.

Aerospace planning talent will solve all problems

Where the authors of the statement here quoted can find such self-assurance is a little beyond my imagination, but I thought you might be interested nevertheless. Two "aerospace scientists" have the city planning problems all wrapped up, and they clearly don't need any help (or not much) from architects, engineers, planners and so on. The two with the wisdom are Vernal M. Tyler and Carl F. Asiala Jr., of the McDonnell company. Here is the lead of a recent paper:

"A systems engineering approach involving analysis of large urban problems as an integrated whole by utilizing aerospace engineering techniques can be profitable. A proposed city of the future suggests a basic module of radially disposed pairs of high-rise buildings equally spaced about a one-mile diameter circle capable of housing 865,000 people per square mile. The tower-type complexes which efficiently contain all of the city's socio-economic functions, are interconnected with counter-rotating, stepped-up speed mass transportation systems in an automatically controlled environment. Pertinent social and governmental problems are encountered in implanting such a concept, and in transferring aerospace techniques into non-aerospace areas. Evaluation of present aerospace company departments shows the possible need of acquisition of non-aerospace company techniques in certain specialized areas. Systems approaches to immediate needs in the fields of education, bio-medical systems and mass-transportation systems are causing complete new thinking toward these areas and in aerospace company management. Diversification of the aerospace scientific talent to solving urban problems appears to be not only promising from a profit standpoint, but essential to the safety, happiness, and health of future generations."

"It's not important that architecture be brilliant"

Speaking of great individual design (preceding page) President Charles M. Nes Jr., of the A.I.A. said in a recent speech: "I will now utter a heresy, if I have not already committed it. I believe—in fact many in our profession now believe—that it is not very important whether the architecture of the buildings in a new town or city is brilliant or not. In a stylistic sense, this is, I believe, quite unimportant. Victor Gruen said rather acutely that, if you asked visitors who had just left Rockefeller Center what kind of architecture it had in it, they wouldn't have the slightest idea. They would remember instead the sense of pedestrian space, the alternate feelings of enclosure and openness, the sense of unity, the flowers, the fountains and ice skating rink. What we value in San Francisco is not a handful of good buildings but the dramatic terrain, the light, the parks and terraces, the sense of bridges and water, the sound of the trolley bell."

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ARCHITECTURAL RECORD March 1967 29
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Fine Arts Commission rejects Breuer’s FDR Memorial

The Fine Arts Commission in Washington, D.C., has unanimously rejected the new design for the Franklin Delano Roosevelt Memorial (photo above) prepared by Marcel Breuer and Herbert Beckhard, architects (RECORD January, age 35). The Breuer design, which had been unanimously approved by the FDR Memorial Commission and by a representative of the Roosevelt family, is now in a state of flux, and the chances of its being built are in doubt (see editorial, age 9).

The Fine Arts Commission statement, issued on January 27, reads: “After careful study and analysis, the Commission of Fine Arts has rejected unanimously the new proposal for a memorial to President Franklin Roosevelt.

“The Commission feels that such a memorial requires the highest standard of artistic achievement and significance. The proposed design does not fulfill either criteria.

“The Commission has studied all aspects of the plan and reached its conclusion with great reluctance, aware of the many difficulties that have been faced by the designer and the Roosevelt Memorial Commission.”

Senator Eugene McCarthy of Minnesota, who is the probable next chairman of the Roosevelt Commission, issued the following statement: “It is difficult to believe that the Fine Arts Commission could have unanimously rejected the Breuer plan. In any case, the Commission owes it not more than the simple statement of rejection made in its announcement: it gives us an explanation. This may be a time when the Fine Arts Commission and its advice should be disregarded. My recommendation is that the FDR Commission proceed with necessary Congressional action to construct the memorial designed by Marcel Breuer.” The FDR Commission, composed of four members of the House of Representatives, four members of the Senate, and four outside members, is scheduled to meet March 1 to elect a new chairman to replace Representative Eugene J. Keogh, who has retired from the House.

In another action, a group composed mainly of architects under the leadership of I. M. Pei, has sent a telegram to both commissions in support of the design. The telegram states: “We are concerned about the current deadlock over the design of the FDR Memorial. We respectfully suggest that the Fine Arts Commission, the FDR Memorial Commission, the Roosevelt family, and Marcel Breuer, the architect, meet jointly to find a solution acceptable to all. We wish to express our continuing faith in Marcel Breuer.” Those signing the telegram included: Edward Larrabee Barnes; Peter Blake; Eduardo Catalano; William W. Caudill; Henry N. Cobb; William J. Conklin; Ulrich Franzen; Robert L. Geddes; Romaldo Giugola; John M. Johansen; Philip C. Johnson; Gyorgy Kepes; Morris Ketchum Jr.; G. E. Kidder Smith; Joseph R. Passonneau; I. M. Pei; G. Holmes Perkins; Jose Luis Sert, Rufus Stillman; and Harry M. Weese.

Architecture head named at North Carolina State

Robert P. Burns Jr. has been named head of the Department of Architecture at North Carolina State University, Raleigh. Mr. Burns, 33 years old, has served as a designer for the firms of Eduardo Catalano and Pietro Belluschi, and holds degrees from North Carolina State and the Massachusetts Institute of Technology. He succeeds Dean of Design Henry Kamphoefner, who has been serving as acting head of the department.

First “turnkey” project completed for HUD

Claridge Towers, housing for the elderly in Washington, D.C., is the first building in the country to be completed under the “turnkey” approach of the Department of Housing and Urban Development. “Under turnkey,” said HUD Secretary Weaver at the dedication of the building, “a builder or developer comes to the housing authority with a proposal to build. If the local authority likes the idea, it contracts to buy the finished product at a fixed price. Federal funds are still used in the purchase of the building, but the contractor is able to obtain normal commercial financing for construction.” The turnkey approach realizes a saving of time and money, says Secretary Weaver, and “results in greater involvement both by private construction and financing interests in the development of low-rent public housing, an urgent need in our country today.”

Since HUD announced the new concept early last year, it has received applications from 58 localities in 22 states proposing 14,000 units of housing. There are about 1,000 units under construction, and another 1,500 units under contract. Claridge Towers is a 10-story building costing $5.3 million, and contains 343 apartments—285 efficiencies and 58 one-bedroom units. The project was designed by Bucher-Meyers and Associates, and the contractor was Whiting-Turner, Inc. The project was under the auspices of the National Capital Housing Authority.

THE RECORD REPORTS ON:

Industrial complex provides “daylight awareness” 274
Engineering library will house 150,000 volumes 284
School designed for the mentally retarded 284
Office building will have ground floor arcade 288
University building will house international conference center 288
Heckscher named as New York City cultural head

August Heckscher has been named Administrator of Recreation and Cultural Affairs in New York City, succeeding Thomas P. F. Hoving who is leaving the post to become director of the Metropolitan Museum of Art. Mr. Heckscher’s position makes him head of New York City’s Parks Department. Mr. Heckscher, formerly an adviser on the arts to Presidents Eisenhower and Kennedy, was, at the time of his appointment, director of the Twentieth Century Fund. Speaking about his new post, Mr. Heckscher stated: “We are acknowledging fully, at last, the role of the city in the broad fields of recreation and cultural affairs. We have a chance to do some pioneering here. Everything we do will have the aim of making New York a brighter, gayer place.”

At the same time, architect Arthur Rosenblatt was named First Deputy Administrator of Recreation and Cultural Affairs. Mr. Rosenblatt held the position of director of design of the New York City Department of Parks at the time of his appointment.

Planning exhibit in New York hopes to spur public opinion

“The New City: Architecture and Urban Renewal,” an exhibit of four demonstration projects for upper Manhattan, on display at the Museum of Modern Art, New York City, through March 13, is “put forth for public discussion to suggest a frame of reference within which various interpretations and details are possible.” The exhibit, co-sponsored by the Museum and the City of New York, is comprised of proposals by four teams of architects and planners associated with the faculties of four universities—Columbia, Cornell, Princeton, and Massachusetts Institute of Technology.

Shown above is a construction perspective of the Columbia project—“Housing Without Relocation.” The project calls for a 37-block-long building to be erected in stages over exposed railroad tracks in upper Manhattan. The project calls for a concrete vault to be built atop the tracks with new housing, shops, and community facilities on top of the vault. The proposal is intended to solve the problem of providing “housing and other kinds of renewal without relocating the people for whom such improvements are intended, and at the same time convert neighborhood blights into acceptable components of the visual scene.” Columbia team members include Jacquelin T. Robertson, Richard Weinstein, Giovanni Pasanella, RECORD Associate Editor Jonathan Barnett, and Myles Weintraub.


“All the proposals made in the exhibition are technically and economically feasible,” says Arthur Drexler, director of the exhibition and of the Museum’s Department of Architecture and Design. “Would they yield an urban scene healthier and more beautiful than what we have had? The four teams of architects and the Museum think they would. But do they represent changes we really want? Only the public—which includes officials both elected and appointed—can decide. The exhibition is meant to help the process along.”

Civil engineers cite St. Louis Gateway Arch

The American Society of Civil Engineers has named the Gateway Arch in St. Louis as the "Outstanding Civil Engineer Achievement of 1967." The 630-foot-high arch was designed by Eero Saarinen with Severud-Perrone-Fischer-Sturm-Conlin Bandel as structural engineers. Selection of the winning project was made by a jury of engineering editors, including RECORD Senior Editor Robert E. Fischler.

McLuhan will deliver Purves Lecture at A.I.A. convention

Marshall McLuhan, author of the controversial and thought-provoking book "Understanding Media," (see pages 151-152) will deliver the third annual Purves Memorial Lecture at the 99th annual convention of the American Institute of Architects which will be held in New York City from May 14-18. It has also been announced that architect Robert H. Levy, son of the firm of Waking, Williams of Clearwater, Florida, will receive the 1967 Edward C. Kemper Award. The award is presented for "significant contribution to the Institute and to the profession of architecture."

Warburton named consultant to HUD

Ralph J. Warburton, chief of planning for Skidmore, Owings & Merrill, Chicago has been named a consultant to the Department of Housing and Urban Development. Mr. Warburton will advise HUD on "matters relating to program policy review, evaluation, operations, and liaison with professional, academic, development, and research organizations." Mr. Warburton is the second architect to work with HUD on a consulting basis joining architect George T. Rockrise, who was named adviser on design last June.

Post Office Department names advisory panel

Postmaster General Lawrence F. O’Brien has announced the formation of a 25-man advisory panel to “provide a close link with the engineering, academic and business communities” to help the Post Office Department "apply the latest scientific advances and technology to the postal service." The panel, which is known as the Research and Engineering Advisory Council, is composed of business, industrial, academic and professional leaders and includes architect Ezra D. Ehrenkrantz, Leland W. King, and Charles M. Nes Jr.

more news on page 25
In this library and reception room, two Moduline units have been combined with circular surface-mounted light fixtures.

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INTERAMA exposition hailed as “full-scale experiment in urban design”

An extraordinary collaboration by six architects for a six-building complex will mark the start of construction at INTERAMA, a permanent exposition of the Western Hemisphere nations to be located on a 680-acre landfill tract on a peninsula between Miami and Miami Beach. Architects for the $22 million international area of the Inter-American Cultural and Trade Center, as INTERAMA is formally called, are Marcel Breuer, Louis I. Kahn, Paul Rudolph, Jose Luis Sert, Edward Durell Stone, and Harry M. Weese. The INTERAMA authority is a non-profit agency of the State of Florida. The buildings are Federally financed and will be provided free to the 20 Central and South American and Caribbean nations expected to participate, with each country providing its own exhibits. The international area will be composed of four multi-national structures where each country will be provided living facilities for a commissioner and 15 students to live in and act as guides. Three of these buildings will also contain special facilities for use by all nations. A fifth structure will house the United States Pavilion and the sixth will serve as an international bazaar for all nations. Also planned for INTERAMA are areas for industry, culture and leisure. Robert Brown is architect in charge of INTERAMA, and Edward Stone Jr. is landscape architect.

National Houses, designed by Harry M. Weese, for Caribbean countries including Haiti, Dominican Republic and Trinidad-Tobago, provide facilities similar in program to houses designed by Kahn, Sert and Breuer. Each house will contain reception area, living quarters for a commissioner and family, dormitories for resident student guides, library, study and reading room, salon for small gatherings, and dining area and lounge. Mr. Weese called INTERAMA “a new institution within the world’s fair family of experience, that is, in a sense, theater.”

The International Bazaar, designed by Paul Rudolph, will provide for all participating nations an area to demonstrate and sell crafts and products. Mr. Rudolph points out that there is “considerable coherence at INTERAMA. It came about partially due to the landfill site. The buildings are dependent on water, walkways and planting. They should not be thought of as a series of individual structures, but as a whole. Each architect thought in terms of the whole project.”
The Ceremonial Plaza area, designed by Louis I. Kahn, will provide residential facilities for seven countries—Costa Rica, El Salvador, Guatemala, Honduras, Mexico, Nicaragua and Panama—facing on a plaza to be used by all 20 nations. The buildings are “subdued in favor of the plaza,” says Mr. Kahn. “The seven houses belong to the square. The square is not framed by buildings but is open to the buildings.” Mr. Kahn cited INTERAMA as “a new institution of man,” and added that “it is important to realize the changing character of established institutions and to translate them in architectural terms.”

The Special Projection Theater area, designed by Jose Luis Sert, will provide houses for six nations—Bolivia, Chile, Colombia, Ecuador, Peru and Venezuela—as well as the theater to be shared by all nations. The theater will have 360-degree projection facilities and is adaptable for theatrical performances. “INTERAMA has the same principles and size as the center of a city,” says Mr. Sert. “It serves as a full-scale experiment in urban design. There is a distillation of the designs and open spaces so they all fit together.”

The United States Pavilion, designed by Edward Durell Stone, has two major elements—an exhibition hall and a theater—grouped around a series of tropical gardens. The exhibit, which will cost $5.8 million, will contain a “knowledge bank” for presentation of audio-visual materials. Also included will be residential facilities for 50 students from different nations. “The distinguishing feature of the INTERAMA project,” says Mr. Stone, “is that it has been conceived and planned as a large-scale, permanent, international exhibit area, rather than one following the usual pattern of short-term expositions which have been a great waste of effort and money.”

The Parliamentary Meeting Center area, designed by Marcel Breuer, will provide national houses for four countries—Argentina, Brazil, Paraguay, and Uruguay—as well as facilities for conferences and seminars to be shared by all nations. The parliamentary building will have a seating capacity of 250 and will include observation galleries for the public. “INTERAMA shows that very individual architects can work together,” says Mr. Breuer. “Architecture, in terms of large-scale planning, very much needs such a precedent.”
An addition to the Boston Public Library, designed as a joint venture by Philip Johnson and Architects Design Group, Inc., respects the original library (at left in model photo) designed by McKim, Mead & White by conforming to the height and roofline and using the same pink granite facing material. The new library will provide seating space for 1,000, and could contain 3,000,000 volumes. The 480,000-square-foot addition will contain two underground levels, mezzanine, and eight floors, and will be organized around an interior court. The upper five floors will be suspended from roof trusses, permitting very thin floor construction, so that a full eight floors can be constructed within the height limitation. Structural engineer for the project is William J. LeMessurier.

A campus center at the University of Massachusetts, Amherst, designed by Marcel Breuer and Herbert Beckhard, architects, combines a variety of functions, and this variety is expressed with varying exterior panels. In two underground levels are student union and activity areas. At terrace level are lobby, office and reception areas. Floors two to five contain hotel facilities and apartments. Floors six and seven contain offices for a continuing education program, labor center and conference areas. The top two floors are restaurant facilities including a formal restaurant with outdoor terrace. The center, which will have an exterior of precast and cast-in-place concrete, will contain 287,000 square feet.

An operations center for Manufacturers Hanover Trust Company, New York (left), designed by Carson, Lundin & Shaw, is a 22-story structure with a brick exterior to relate it to nearby brick landmarks. The architects said that the Stockholm City Hall was the reference point for the design of the building. The building, scheduled for occupancy in 1969, will contain 800,000 square feet.

A residential complex in Chicago, designed by Fridstein and Fitch, will have two 41-story towers sharing recreational and service facilities on a terrace above street level. At street level is a parking area for 300 cars. The towers have staggered setbacks at the bases for sun orientation and maximum lake view. One of the towers will be built as a condominium and the other will be a rental unit.
The St. Basil's Parish Church complex, Los Angeles, designed by Albert C. Martin and Associates, will include a church seating 1,100, a basement hall which will accommodate 500, and a three-story rectory behind the church. The walls will consist of 80-foot-high textured concrete towers separated by full-height shafts of glass with three towers rising to a height of 150 feet. General contractor for the 40,000-square-foot complex is Pozzo Construction Company.

A summer beach cottage in Quogue, Long Island, New York, designed by Hobart D. Betts, has been presented the first award citation in the fifth annual house competition of the New York Chapter of the American Institute of Architects. The cedar-shingle cottage, designed for a family of five, was built at a budget of $25,000 and contains two children's bunk rooms, two double bedrooms, two baths, a living and dining room and kitchen.

Over-all view of center (left) shows hotel in left foreground, 60-story office building in center, 25-story office building behind, and 45-story tower in rear. Site plan for center (below) shows L-shaped, five-block, 8.5-acre project area in downtown San Francisco near the harbor. Eight-hundred-room hotel is shown at right.

Embarcadero Center, a $125-million complex proposed for San Francisco and designed by John Portman of the firm of Edwards & Portman, will group its units on a landscaped pedestrian plaza two levels above traffic. Included in the complex are three office towers—one 60 stories (which would make it the tallest building in San Francisco), one 45 stories, and another 25 stories—providing total gross office space of 2.85 million square feet. The office towers are designed to provide a maximum number of corner offices. The 800-room hotel stacks its guest rooms on the semi-pyramidal side of the structure, each room having a balcony. An enclosed garden court will occupy the entire 16 floors of the hotel tower, with clear-sided elevators suspended from an inner wall of the court. An entertainment center will feature three theaters seating a total of 3,600, as well as art galleries and museum. The entire complex will be constructed of pre-cast concrete with a rough-hewn finish. Underground parking is provided for 2,000 cars. Landscape architects are Sasaki, Dawson, Demay Associates.
Design that respects landscape wins Central Park competition

The firm of Kelly & Gruzen has been declared the winner in a limited competition for the design of a $5.7-million police and stable facility in Central Park, New York City. Other firms invited to compete included Whittlesey, Conklin & Rossant, second prize winner; Philip Johnson Associates, third prize winner; the office of Edward Larrabee Barnes; and Marcel Breuer & Associates. In preparing their submissions, each of the architects was assigned a cost estimator from the firm of McKee-Berger-Mansueto, Inc., to assure that each entry could be built within budget. Funds for the competition came from Urban America, Inc., which provided $15,000 for each entrant as well as prizes of $10,000, $8,000 and $5,000 for the premiated entries. Serving on the jury were Thomas P. F. Hoving and Arthur Rosenblatt of the Parks Department; Peter Blake representing Urban America; New York Police Commissioner Leary; architects William Breger, Lewis Davis, Paul Rudolph and I. M. Pei; and landscape architect M. Paul Friedberg. Architect Fred Bentel served as professional adviser.

First prize design by Kelly & Gruzen had the objective of "subtle blending of building elements into land forms which are suited to the tradition of Olmstead's Central Park theme." This design uses the roof of the indoor riding ring as the outdoor riding arena, reducing the project's ground coverage. Indoor rink will have seating for 1,500 while the upper ring will have seats for 1,000 spectators built into a sloping, 15-foot-high earth mound, the major visible form of the entire project. Structural engineers: Farkas & Barron. Key: (1) 86th Street Transverse; (2) outdoor riding ring; (3) corrals; (4) orchard above the stables; (5) police precinct; (6) Vaux building—new horse museum; (7) new foot bridge; (8) reservoir lookout.

Second prize design by Whittlesey, Conklin & Rossant, has only one structure above grade, the roof of the indoor riding ring. Described by Mr. Conklin as "mountain-like landscape forms," the 40-foot-high roof structure has compression rings at the top engaging radial steel columns. Surfaces between the steel radials are formed of concrete with slate. At top of the conical shapes are skylights.

Third prize design by Philip Johnson had the aim of "preserving the park to the greatest degree" so that "the buildings almost vanish." The terrace level is high enough to give a view of the reservoir. "The facades, mansards and dormers, all that is valuable of the Vaux buildings, are preserved in our design," says the architect. All exterior walls and mansard pitches would be bush-hammered brick.
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Great architecture and common sense

Thanks for the January “Behind the Record.” “Preserve It, If It’s Great Architecture” is ably expressed with your great common sense and integrity. All of us have these problems and decisions to make and advise, and I, for one, appreciate your excellent advice.

Thanks, too, for “Chicago’s Multi-Use Giant,” an excellent, comprehensive, and interesting accounting of the design, architecture, structure, and use of this great concept. It was inspiring, too, to read about the great team of technicians who put the complex together.

John N. Richards, F.A.I.A.
Toledo, Ohio

Chicago’s new giant—for giants only?

Your article on SOM’s new John Hancock Center in Chicago was very revealing as far as the determination of design and structure are concerned, but you neglect the implications of the 100-story, all-purpose building in the modern city.

Corbusier advocated a city of towers in which many segments of civilization were to be housed. SOM’s Bruce Graham and developer Jerry Wolman seem to believe in this ideal and neglect the fact that such a structure ignores the humanness of a city: the fact that a city consists of people and that the architect builds for people.

The problem as I see it is one of putting hundreds of apartments high up in a structure which is designed to be the second highest TV antenna in the world. I believe that the human being wants something that he can call his own: something with which he can identify. In a building such as the John Hancock Center, a man becomes a number on an IBM card; in trying to identify his own apartment in the structure it becomes similar to the problem of identifying a single star in the Milky Way. To point out his apartment to a friend one would have to say, “I’m the fifteenth window over from the crossbar of the fourth diagonal brace.” Man becomes merely a number on a grid in a civilization that is becoming too impersonal, denying Man’s individuality. He has another number in a long string of numbers that have been assigned to him. The essential number with Man is one; if Man loses his identity to a computer, or to a number in a grid, the city loses its identity as a place of people and bigness becomes an end in itself.

The responsibility of the architect is to maintain the human scale in building. SOM has become too fascinated with its image as a giant-builder and has forgotten that men design for men.

James T. Biehle
Graduate School of Fine Arts
University of Pennsylvania
Philadelphia

SOM’s John Hancock Center should be considered—among other things—as a needed experiment in finding ways to make the city better for the people who do want to live there and who recognize certain necessary innovations. Undoubtedly, the building will provide more humans who want it with a convenience to the city, and yet it will be a means of almost instant escape into their own private castles in the sky—imagine the magnificent view!

We do not believe that all men need to point out their own window from the street below in order to identify with a building or to maintain their humanness and peace of mind. The aspirations and achievements that such buildings symbolize—whether for one man or the entire race of man—will be enough for many mortals.

—N.L.M.

“Design of Cities”

The story about the book in the January issue is very fine. I appreciate deeply the care and sensitivity with which you have presented the material and also the fine things you have said about the book.

Edmund N. Bacon
Executive Director
Philadelphia City Planning Commission

I just finished reading and looking at the extract from Bacon’s forthcoming book “Design of Cities.” It’s very sharp and exciting stuff, and you have me holding my breath for the finished volume.

William J. Goodman, Chairman
Department of Urban Planning
University of Illinois
Urbana

Purpose versus masterwork

It is with considerable consternation that I find under “Letters” of your January issue, one of your readers claiming that every effort should be exerted to prevent the demolition of the Frank Lloyd Wright Imperial Hotel in Tokyo.

The original section of the Hotel has become so obsolete, that the majority of the guests resent greatly the assignment of rooms in that section in lieu of the newer wings. Accordingly, it is my belief that this is not an area where restoration should be imposed, since, current methods, materials and design demand the replacement of structures used for commercial purposes, regardless of the so called masterwork.

Samuel Z. Moskowitz, F.A.I.A.
Wilkes-Barre, Pennsylvania

Safety violations?

The picture of the instant rehabilitation package in your January 1967 issue, page 175, shows two serious safety violations: 1) People should not be permitted to stand under a suspended load; 2) The cable clips on the wire rope sling are incorrectly installed. The U of the cable clips should always be installed on the dead end of the wire rope.

Jerry Kosro
Chief, Engineering Branch
Department of Housing & Urban Development
San Francisco

I think the large photograph may be deceiving in its perspective. I don’t believe the people were standing directly under the unit, although, it does look like one workman might be headed that way.

—R.F.

The new frontier and ETV

Your story on architectural developments in American Samoa (December 1966) is most interesting. I read it both for its references to the educational TV project there and for my own personal interest in design, having been an editor of Forum in the Henry Wright-Doug Haskell days.

Our White House Task Force on Educational Television in Developing Nations has been giving continuing attention to the Samoa ETV project as a prototype for similar efforts in Asia, Africa and Latin America. Its design—both architectural and educational—will undoubtedly have a great influence in ETV’s development in these areas.

Wilson Dizard
Assistant Deputy Director
Operational Policy
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World fair in 1968 is planned in Texas

Construction is well under way at Hemis-Fair '68, a world's fair sanctioned by the Bureau of International Expositions, which will be held in San Antonio, Texas, from April 6 to October 6, 1968. The fair will mark the 250th anniversary of the city of San Antonio and will be located on a 92.6-acre site 200 yards from the Alamo. Theme of the fair is "The Confluence of Civilizations in the Americas." A 622-foot Tower of the Americas, financed by a $5.5-million bond issue, will dominate the site and will remain as a permanent structure, as will the other projects shown on these pages. Included in the exposition will be a foreign nation sector (10 foreign countries have thus far announced their participation), business and industrial exhibits, and amusement area. Transportation on site will be achieved by a 7,000-foot minirail, a mile of waterways diverted from the San Antonio River, a 1,700-foot skyride and footpaths. Director of master-planning, design and architecture is architect Allison B. Peery. Landscape architect is Robert Copeland with Stewart E. King and James E. Keeter as consultants.
Above: Shown is the top section of the 622-foot Hemisfair tower designed by O'Neil Ford & Associates. At right, from top: Confluence Theater, part of $6.75-million United States Pavilion, designed by Marmon & Mok in conjunction with Donald Deskey Associates, industrial planning consultants, will contain a three-screen, 1,200-seat theater. Three-building, $10.5-million, Civic Center, designed by Noonan & Kroeker & Associates and Phelps & Simmons, will include a 10,000-seat arena, 2,800-seat theater, 3,100-seat banquet hall, and 100,000 square feet of exhibit area. Texas State Pavilion, a $10-million, three-level concrete and glass structure, was designed by Caudill, Rowlett, Scott in association with Callins & Wagner with Mullen & Powell as structural engineers.

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ON THE CALENDAR

MARCH

6-9 Associated General Contractors Convention—San Diego.


20-23 1967 Session, Alberta Association of Architects. Theme: Architectural Education—Banff School of Fine Arts, Banff, Alberta, Canada.

APRIL

1-6 National Planning Conference, American Society of Planning Officials—Shamrock Hilton Hotel, Houston.

1-7 Annual Convention, American Concrete Institute—Royal York Hotel, Toronto, Ontario, Canada.


24-48 48th Annual Meeting, American Welding Society—Sheraton-Cadillac Hotel, Detroit.

MAY

7-10 29th Annual Convention of the National Association of Architectural Metal Manufacturers—Bismarck Hotel, Chicago, III.

8-11 First joint convention of the Consulting Engineers Council/USA and the International Federation of Consulting Engineers—Shoreham Hotel, Washington, D.C.

8-12 ASCE Structural Engineering Conference—Olympic Hotel, Seattle, Wash.

12-14 Annual Meeting, Association of Collegiate Schools of Architecture—Barbizon-Plaza Hotel, New York City.


20-28 International Commission of Illu-

continued on page 70
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Style Leader 125 Entrance Package—shown in Permadoric Medium Bronze No. 38.
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Our new BEAR vinyl foam tape seals, cushions and insulates practically everything... Even people packages

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For the better homes in any neighborhood it's wood panel doors.

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Only panel doors made of wood add so much architectural interest—inside and outside. For this is the nature of wood. Only wood. Tasteful. Beautiful. Natural.

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Dept. AR-37, 39 South La Salle Street
Chicago, Illinois 60603
SYMONS STEEL-PLY FORMS
GANDED AND LINED

Symons and Castagna, Manhasset, New York, contractor; Warner, Burns, Toan and Lunde, architects.

Hofstra University, Hempstead, Long Island, recently constructed a new library tower which expanded their rented facilities three times.

Four 140' high mitered and tapered corner shafts, poured in place, form the library design base. To form these corner shafts, Symons Steel-Ply Forms were assembled in 11' x 15' x 20' gang sections, and lined with Spruce and Pine, 4" wide and varying in thickness. A rough finish was obtained by staggering the varied thickness boards, and by intermingling circular saw cut boards. Symons Forms were chosen because they could be ganged and hold an irregular mitered shape. Also, careful formwork construction was essential to insure that the texture of the rough-sawn lumber butt-joined pattern showed. The mitered corners, which have a 11° angle, were formed with Symons hinged corners. Two gang sections were joined with the corner and a 2" steel filler to complete the formwork. Finishing was easy because Symons Gang Form Ties with their positive breakout and a .225 diameter, left small tie holes which were easy to fill.

Forms may be rented, purchased or rented with purchase option. Architectural Bulletins sent on request.

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MORE SAVINGS WITH SYMONS

continued from page 61

mination Congress—Shoreham Hotel, Washington, D.C.
31-June 3 Seventh Annual Conference, U.S. Institute for Theatre Technology—Barbizon-Plaza, New York City.

OFFICE NOTES

OFFICES OPENED

Hall and Goodhue, Architects-City Planners have opened a San Francisco office at 100 Bush St. They also have an office at 380 Cannery Row, Monterey, Calif.

John Hejdak A.I.A., Architect announces the opening of an office at 207 East 37th St., New York City.

Irwin B. Lefkowitz, A.I.A. has opened an office for the practice of architecture at 100 Stevens Ave., Mount Vernon, N.Y.

Architect Leroy B. Miller, A.I.A. announces the establishment of new offices at 113 North San Vicente Blvd., Beverly Hills, Calif.

O’Kelly, Mendez & Brunner, Architects have opened an office with architectural, planning and interior design services at 21 Kings Place, Great Neck, N.Y. He also has recently opened an office in New York City.

G. John Stevens has opened his own architectural office at 6623 Gratiot Ave., Detroit, Mich.

Jonas Vizbaras/Architect has opened his own architectural office at 518 Willis Ave., Bronx, N.Y.

Irv Weiner Architect A.I.A. announces the opening of his office at 212 East 49th St., New York City.

NEW FIRMS, FIRM CHANGES

Harold S. Bradley, president and partner of Bradley & Bradley, Inc., Architects, Rockford, III. has appointed his son, Charles M. Bradley, president and Richard F. Wolfley, vice president. The 82-year-old firm will continue practice in Rockford, III.

David Castro-Blanco, Robert Piscioneri and Leslie Feder have formed a partnership under the firm name Castro-Blanco, Piscioneri & Feder, Architects to be located at 103 Park Ave., New York City. The new firm will continue the practice formerly conducted as Robert J. Piscioneri & Associates, Architects.

continued on page 109

The VICRTEX representative who helps you when you’re working with vinyl wallcovering is a professional perfectionist. He’ll follow through on the job after you write specifications—He’ll find him on the installation site checking wall preparation, hanging and inspection. Your VICRTEX Man is knowledgeable about every aspect of vinyl wallcovering—he can show you a whole world of color availability, threedimensional textures and design-conscious installations similar to the one you’re working on. Depend on him to be alertly on the job, before, during and after specifying time. It’s easy to work with the best vinyl wallcovering—VICRTEX. You get top quality, easy application and maintenance . . . and conscientious service from your personal VICRTEX Man. Find out for yourself why many leading architects and designers believe VICRTEX is an unbeatable combination of product and people. At your service from Hawaii to the Caribbean.

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70 ARCHITECTURAL RECORD March 1967
If you have a problem on the boards that calls for large luminous areas, our electric Sky-Light is worth your consideration.

Cleanly detailed without exposed hardware, it provides large areas of light and involves none of the costs and complications of luminous ceilings. Sky-Light was engineered to integrate with a conventional tile or plaster ceiling.

A system of coordinated units in six sizes up to 4' x 4' allows you to illuminate large work areas, create traffic patterns and accentuate small areas all with a continuity of design.

The frame is made of matte white, heavy-gauge extruded aluminum that will not bow. The corners are mitered and welded to reduce the trim to a minimum. A deep reveal gives the frame a soft luster which does away with the dark cluttered appearance usually produced by flat runners.

And the structural acrylic diffuser is matte-finished on both sides to completely eliminate reflections from windows or other light sources.

Write us for further information, or visit our showrooms.

We think it's a major step forward in the lighting of large areas.

The Sky-Light is one of the many efforts by Lightolier to better coordinate lighting with architecture.

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(1) Extruded aluminum trim (.125" wall), with mitred, welded corners and matte white finish. (2) Cap screw clamps and precisely aligns fixtures. (3) Structural acrylic diffuser, matte finished on both sides. (4) Fully adjustable pattern mounting hanger, accessible from inside of fixture. (5) Suspension channel.
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The curtains of the Cookson FD10 Series Doors are fabricated from the miniaturized #10 slat, in either galvanized or stainless steel. With a center-to-center dimension of only 1 3/4", this slat has permitted substantial reduction of head and side room requirements.

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Mo-Sai projects an image of strength and solidarity for savings and loan offices

Deeply textured Mo-Sai facing units 9 feet wide by 25 feet tall were used as forms for the poured-in-place concrete structural columns. The few required joints were well concealed, giving the columns a monolithic appearance both inside and out. Random quartz aggregates from dark brown to almost white impart a warm, friendly color. Mo-Sai in contrast with exotic wood paneling was used to create the dramatic teller windows and was also used throughout the unusually beautiful offices. The rough textures and colors of the Mo-Sai were chosen by the architects as an expression of the rugged beauty of the Northwest.

First Federal Savings & Loan, Bremerton, Washington
Architects: Branch, Branch & Garrison
General Contractor: Hainsworth Construction Co.

Mo-Sai Institute, Inc. 110 Social Hall Ave., Salt Lake City, Utah 84111

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Go with the In group!

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Bradley Showers are In with progressive planners because they cut costs and provide complete layout flexibility.

Bradley Column Showers serve up to six users with one set of piping connections. They cut installation costs as much as 80%.

What's more, Columns enable you to use every inch of space. Combine them with our Wall-Saver® Showers and even limited areas can be turned into high capacity shower rooms!

Choose from many types and sizes: 2 to 6-person Columns. Multi-Stall Showers that serve 2 to 6 students. Wall-Savers with 2 or 3 showerheads. Modesty Module® Showers with private dressing rooms for 2 or 4 users. And many more.

Next time you plan a shower room, go with the In group: Bradley Group Showers!

For complete details, see your Bradley representative. And write for latest literature. Bradley Washfountain Co., 9107 Fountain Drive, Menomonee Falls, Wis. 53055.

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LP-gas takes the goose bumps out of a dip


NATIONAL LP-GAS MARKET DEVELOPMENT COUNCIL, Chicago, Illinois 60603

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An exciting new concept! Royalcote LIVING WALL by Masonite Corporation

You're familiar with Masonite Royalcote paneling. Beautiful in its woodgrain patterns. Easy to install. Well, imagine Royalcote hardboard paneling with built-in standards that let you support shelves, pictures and art objects. That's "Living Wall." Comes complete—4' x 8' paneling, matching moldings, picture hooks, shelf brackets, shelves. Versatile. Functional. Now you can give your clients extra value for their building dollars.

See the "Living Wall" display at your lumber dealer's now. You'll find his name in the Yellow Pages. Or just use the convenient coupon.

For more data, circle 63 on inquiry card
**LACLEDE composite joists improve floor construction**

**COMPARABLE JOISTS OF EQUAL LOAD-BEARING ABILITY**

End view silhouette of conventional open web steel joist.

End view of Laclede Composite Joist, showing inverted top chord and extension of web above chord to form shear connector. (Note additional head room).

**Combines the Advantages of Concrete and Steel for**

- LONGER SPANS WITH LESS DEFLECTION
- MORE EFFICIENT STEEL DESIGN
- MORE ECONOMICAL FORM PLACEMENT
- SAVING IN HEAD ROOM
- MORE EFFICIENT AND ECONOMICAL STEEL PLACING AND FORMING
- EQUALLY USEFUL WITH STEEL, CONCRETE AND MASONRY CONSTRUCTION

Here, after extensive research, is the perfect blending of steel and concrete for better construction at lower cost, permitting more efficient steel placement and slab form installation than usually required with many types of steel joist construction. In Laclede Composite Joists, top chords are inverted to form a shelf on which prefabricated deck is easily and quickly placed by one man. Webs extend above top chords, acting as built-in shear connectors which do not have to be welded on. The concrete acts, in effect, as the top chord of the structural system. Laclede Composite Joists are available in a wide range of lengths, depths and load bearing capacities. Write for new technical brochure.

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Planned cost control: an instrument for good design

The rigid cost limits under which most buildings today are designed, could be turned into a useful design discipline rather than—as is most often the case—erupting like “a time bomb set to go off when bids come in.” So said British architect, A. G. Aldersey-Williams in an evocative address to the 1966 RIBA Conference in Dublin.

Last-minute compromise with cost defeats design
Under the title “The Interdependence of Design Decisions” Mr. Aldersey-Williams drew together a number of “random ideas” which he felt had a significant effect on the efficient functioning of the design team. His most pressing concern was with the way in which last minute, ad hoc decisions—made to save expense—often result in uncomfortable, unbalanced or unattractive architectural solutions that do not in the end even have the merit of being particularly cheap. If cost were assessed at a much earlier stage, Mr. Aldersey-Williams maintained, economic solutions could usually be arrived at which did not so seriously compromise the finished building.

Early programed costing retains control at the design phase
To combat these difficulties, he suggested the formulation of a “cost plan” to act as a regulator in design decisions and to give a basis for evaluating where economies can best be achieved. Such a cost plan would establish a “theoretical minimum” for which a building meeting the program requirements could be erected. This theoretical minimum would not be considered as an actual realizable optimum, but would function as a basic datum against which the final cost of the building could be manipulated and compared. The minimum realizable cost might turn out to be datum plus 50 per cent, while to get a really first class interior environment, the client might decide for datum plus 75 per cent. The setting up of such a cost datum should, says Mr. Aldersey-Williams, “enable us to cost design decisions and their implications from the beginning. To put it more crudely, if A does this C1 must do that (to maintain the same performance standards), C2 this, and so on. Therefore, the cost of A’s decision is a+c1+c2+.............. Cost is then the means of weighting conflicting decisions.”

Architect’s judgment remains in control
Of course, as Mr. Aldersey-Williams recognizes, this still leaves the essential problem of “comparing imponderables” to the individual judgment of the architect who must in the last analysis decide “whether a reduction in the standard of sound insulation is worth an improvement in thermal comfort, or whether either are worth more than a better floor finish” but at least the alternatives and their implications are clearly stated before irreversible decisions are made.

And the architect’s commitment to good design is clarified
To those who may complain that knowing the cost of a decision before making it might inhibit the architect to such an extent that “Architecture with a capital A” would cease to exist, Mr. Williams replies that this might not be such a bad thing “since we would certainly have much more good building. In fact, nothing I have said need limit anybody though it might take a good deal more strength of character to make a decision when you know in advance that it is going to cost another $30,000.”

LBJ suggests trust fund to finance highway beauty
A beautiful America is still part of the President’s valiant but glimmering dream of a Great Society, but in the face of continued spending in Viet Nam, it may become more and more difficult to afford the inevitable enabling appropriations.

In order to maintain the highway beautification program, President Johnson has suggested the creation of a special Trust Fund to finance highway beauty as well as safety. If the new trust fund, however, results in a cut in more basic highway spending, the President will find it difficult to get the necessary approval.

Although beauty obviously comes lower in the list of priorities than safety, there is a strong case for combining the two. The removal of bric-a-brac from our highways and the creation of a better ordered and more uniform system of lights and signs are unquestionably important factors in improving both.
Construction pricing and scheduling made easier by new reference manual

F. W. Dodge's new Construction Pricing and Scheduling Manual is a comparatively slim volume which packs a vast amount of information on the cost, labor and time involved in construction of all kinds—from showers installation to road excavation—into its 170 pages. The information is presented in easily readable tabular form with the relevant data under two headings "output per day" and "cost". The "output per day" category defines the number and type of men needed on a job and the amount of work they can achieve in a day; the "cost" category on the other side of the page divides cost into labor and material price; the space in between these two columns gives details of the construction item concerned. Two tables at the front are devoted to an adjustment index for the major building trade costs throughout the country in a form which reflects each city's percentage of the prices shown in the manual. An alphabetical subject index at the back gives all the construction types and items dealt with in the manual.

Revised wording inserted in indemnification clause

Revised wording for subparagraph 4.18.3 of the new contract document has been formally agreed by the A.I.A., the AGC, and representatives of the insurance industry (Record, Feb., page 81). The new wording which will be included in the next printing of Document A 201, "General Conditions of the Contract" reads as follows:

"The obligation of the contractor under this paragraph 4.18 shall not extend to the liability of the architect, his agents or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, change orders, designs or specifications, or (2) the giving of or the failure to give directions or instructions by the architect, his agents or employees provided such giving or failure to give is the primary cause of the injury or damage."

A notice setting out the new wording is being circulated to members by the A.I.A. with instructions to substitute the new clause whenever the present edition of A 201 is used.

Although this may be only the first of a number of modifications, the new wording should certainly relieve contractors of their fears that the hold harmless clause represents any kind of un warranted shelving of responsibility on the part of the architect. Perhaps more significantly it does suggest that continued discussion of the issues between interested parties will be productive.

Tax and investment advice for self-employed architects and engineers

Advice on how to minimize taxes and make sound investments is always welcome particularly at this time of year, so a publication put out by the Consulting Engineers Council under the title "Tax Saving Plans for the Self-Employed" should find an interested readership.

The booklet explains recent amendments to the Self Employed Individuals Tax Retirement Act, which were signed into effect last November. Two of these revisions—specifically supported by the C.E.C.—increase tax-deferiable annual pension contributions from $1,250 to $2,500 for self-employed retirement pensions and allow computation of annual retirement plan contribution on the full amount of net profit rather than the previous figure of only 30 percent.

The booklet gives details of how to obtain tax benefits on retirement plans, how best to invest retirement saving and answers the questions "how much to save, how much is tax-deductible, how are benefits drawn and taxed?" in relation to state and Federal laws. A well drawn index gives a quick indication of the subject matter, how it is approached and of what value it may be to the individual reader. Copies can be obtained, price 50 cents to members, $1 to non-members, from the Consulting Engineers Council, 1135-15th Street, N.W., Washington, D.C. 20005.

How to participate in mortgage financing

On the investment angle, the Institutional Monetary Corporation has put out a brochure explaining the Mortgage Trust Indenture Program, which is a scheme that makes possible greater participation by small and large investors in the potentials offered by large-scale mortgage financing of commercial, industrial and residential projects.

The booklet, which gives details of the formation and operation and the advantages of the program, can be obtained by writing to the Institutional Monetary Corporation, 295 Madison Avenue, New York, N.Y. 10017

A setback for plastic pipe in Ohio as stay-order stops code action

At the eleventh hour, a suit by the Jamison Plumbing and Heating Company of Springfield, Ohio, has apparently halted formal approval of plastic pipe and fittings for drain waste and vent application under the Ohio State Building Code. Despite strong opposition from the Cast Iron Soil Pipe Institute, the Ohio Board of Building Standards was apparently ready to add approved plastic drain waste to the Code as from the beginning of January this year, but the Jamison suit—filed on December 30—automatically produced a temporary stay order.

The Cast Iron Institute is reportedly claiming that this stay order makes the use of plastic pipe illegal in Cleveland, but since that city has a home rule charter, the secretary of the Cleveland Board of Building Standards maintains that the use of plastic pipe is still permissible in Cleveland—provided it meets the city's building code standard.

The wrangle between the cast iron and the plastic pipe industries remains a bitter one, with Counsel for the Plastic Pipe Institute presently considering whether to take action with the Ohio Attorney General's office in defense of the Board of Building Standards' position.
COMMENT AND CONTRACT TABULATION

George A. Christie, Chiel Economist
F. W. Dodge Company,
A Division of McGraw-Hill

Two new clues to 1967 industrial/commercial building

Two important new pieces of economic information have just been made available as a result of a pair of timely surveys by the McGraw-Hill (Publications Division) Economics Department. These reports put some new light on the increasingly problematical short-term outlook for industrial and commercial building.

One of them is a special, interim check-up on last fall's broader survey of businessmen's plans for 1967 capital spending. The other questionnaire asked for corporate executives' expectations for profits in the year ahead. Since businessmen invest in new plant and equipment for the purpose of turning a profit, these two up-to-date measures of corporate plans and expectations are even more meaningful in combination than they are individually.

First, the profit outlook. The economy has been expanding for nearly six years now, and corporate profits have grown with it. But recently the rate of increase in pre-tax profits has begun to slow down. Last year's gain was 8 per cent, while in both 1964 and 1965 profits rose by 13 per cent.

Results of the latest survey indicate that though many corporations expect to improve on last year's performance, the 1967 gain will be considerably smaller and more difficult to achieve. U.S. corporations now expect profits before taxes to rise 4 per cent this year—only half the 1966 increase. Against this background, what are corporations doing about their investment plans?

Capital spending intentions. Here, too, we can see a similar pattern shaping up. Corporate investment in new plant and equipment has expanded spectacularly over the past five years. Between 1961 and 1966, the growth in annual capital spending was 76 per cent, and this past year's gain was still 17 per cent.

Intentions for 1967—as revealed in the most recent survey—indicate further expansion, but at the more modest rate of 6 per cent. And even that represents an improvement over the 5 per cent increase that was being planned at the time of the fall '66 survey. That lower outlook was unquestionably influenced by last year's suspension of the investment tax credit and accelerated depreciation, and the latest (higher) rate probably reflects the result of some second thoughts. Nevertheless, it's clear that in terms of either profit expectations or planned outlays for plant and equipment, 1967 shapes up as the year in which these steeply rising curves start to flatten out.

New contracting In '67. For new contracting of industrial and commercial building (as well as for new orders for machinery and equipment) these recent developments may be even more foreboding. This is because a lot of the 6 per cent gain in expenditures implied for 1967 is already "locked in" with the very strong volume of construction contracts and the heavy backlog of equipment orders that were put on the books in the latter part of last year. Allowing for a six-month or more building period, and up to a year's wait for equipment deliveries, the level of 1967 plant and equipment spending has already been set.

Right now, new industrial and commercial building contracting—which will be having its greatest expenditure impact around mid-year—is actually weakening a bit. The flow of these new commitments for future business-related construction during the next two critical quarters will provide an early test of whether the five-year-long growth of capital spending is merely pausing for a while or is heading for a downturn.

Building activity: monthly contract tabulations

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ARCHITECTURAL RECORD March 1967 83
A real softie—never lets a harsh glare spoil bright surfaces

Sylvania's new Crystalume series makes glaring errors next to impossible.

Crystalume controls direct glare. In schools, offices, commercial interiors. It'll solve another problem for you too: design. It's a handsome-looking fixture. Neat, modern, warmly attractive with its sculptured modular shape.

Installation and maintenance could hardly be easier. Crystalume has a one-piece shield that's hinged from either side. Makes relamping and cleaning quick and simple. And its wraparound plastic shielding minimizes dust and dirt accumulation.

Crystalume from Sylvania, where so many new lighting ideas come from. For any lighting need you have—indoor or outdoor—call your Sylvania distributor. Sylvania Electric Products Inc., Lighting Equipment Operation, 60 Boston Street, Salem, Massachusetts 01971.

SYLVANIA
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For more data, circle 67 on inquiry card
BORDEN DECOR PANEL: Custom Design Screening

The North Carolina Mutual Life Insurance Co. building in Durham, North Carolina, is shown here. Designed by Welton Becket, F.A.I.A., Architect, of New York City, this multi-story structure utilizes custom designed screening of Borden Decor Panel in rich Kalcolor Bronze finish. Created to complement and enhance the character of the building, the Decor Panel screens were custom designed and specified, individually fabricated, and tailored for special erection methods—all within a fixed budget. The savings effected by Borden's fabrication and erection techniques made it possible for the architect to use the handsome bronze finish as well—still within the initial budget.

Sturdy, lightweight aluminum Borden Decor Panel, in both custom and standard designs, is a versatile architectural medium, widely used for facades, screening, sunshades, dividers, partitions, grilles, etc. It is particularly valuable for refacing of existing buildings. For more detailed information on custom and standard Borden Decor Panel:

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PLANTS AT: LEEDS, ALABAMA; UNION, NEW JERSEY; CONROE, TEXAS

When in New York City, see our exhibit at Architects Samples, 101 Park Avenue

For more data, circle 68 on inquiry card
Orderly cost trends permit rational substitutions

Tracking the price vagaries of building materials over the past year has been a bit like following the stock market. Architects have been confronted with a confusion of ups and downs, especially in mechanical and electrical components. Excessive demand explained the over-all direction, which was obviously upward, but internally there was a grab bag of changes. Major suppliers often mixed price increases with some decreases in their product line, employing a logic that apparently defied cost considerations. In reality, many of these mixed price changes were ploys in guideline gamesmanship—the art of raising prices without incurring the government's wrath.

Price changes more orderly as artificial pressures ease
The concept of a 3.2 per cent guideline has now been mercifully retired—after being used by most labor unions as a jumping off point for wage demands—and some price readjustments are taking place. This is primarily true in those industries that were more subject to administration pressures than others, and in general of those that are finding profits trimmed by increased wage costs.

But with the easing of inflationary pressures, the increases that take place this year are not likely to be as sizeable, or as difficult to follow, as they were in 1966.

Substitute materials may warrant a new look
Architects will now be better able to assess the significance of the actual changes that have occurred affecting the economy of using one material in place of another. And with the pace of construction tapering off, a greater premium is being placed on just such cost considerations.

The most obvious areas for weighing the relative costs of materials are where new products are being introduced. But this is an all-of-the-time concern; it is following a period of major price fluctuations that closer attention should also be given to reappraising the relative costs of some traditional substitutes.

One prime example of cost substitution: aluminum vs. copper wire
Until something like a year ago, the saving gained by using aluminum wire was practically negligible. Since then, both products have increased in price, but because world copper supply is limited (in part by political unrest in mining areas) and defense requirements have increased drastically, copper prices have been forced up much higher. As a result, the potential savings in using aluminum wire are now generally recognized to be quite substantial. As a per cent of total job cost, they are, in fact, probably more than is realized.

Depending on size, copper thermostatic-thermoplastic (insulation) wire is approximately two to three times as expensive as aluminum thermostatic wire (THW) with comparable capacity. In most instances, the latter requires a larger (and more expensive) conduit. Including conduit cost, rigid-conduit aluminum THW is still approximately 35 to 45 per cent less expensive than rigid-conduit copper THW. In thin wall electrical metal tube, aluminum THW is approximately 40 to 50 per cent less expensive. While the difference is not as great on the smaller branch sizes, these figures represent the average potential savings in materials cost on most sizes.

Lighter weight means lower labor costs
In addition to the differences in the cost of material, there are some differences in labor costs as well: in the feeder sizes, there is a potential saving on incidental handling since the weight of aluminum wire and cable is approximately one-third that of copper. About 25 per cent less time and effort is required.

But the real savings come on the actual assembly and installation time of the feeder sizes, in particular in laying out, measuring, and pulling the cable. The same size crew is required but less time is involved. The estimating guidelines used by most electrical contractors show that total labor savings on aluminum wire in gages #6 to #2 should be approximately 5 per cent; in sizes #1 to 400 Mcm (thousands of circular mils) approximately 10 per cent; in sizes 500 Mcm to 1,000 Mcm, approximately 12 per cent. Many contractors find that overall savings in labor can be even greater—as much as 30 per cent.

In the branch circuit sizes actual installation costs of copper and aluminum are about the same. In these small sizes, the weight difference is not a significant factor and the degree of difficulty of installation is more dependent on the type of insulation than on the conductor.

Over-all savings average over 1 per cent of the job
In dollars and cents, the savings on materials and labor costs can add up to a substantial figure. The electrical contract is usually about 10 to 15 per cent of the total cost of a job. Approximately 18 to 23 per cent of this sub-contract is for the purchase and installation of wire. Since most of this cost is for the material itself, the purchase of wire is approximately 1.5 to 3.0 per cent of the total cost of the job.

On this basis, the estimated savings obtainable through the substitution of aluminum wire would average over $10,000 on a million dollar job.

Presumably this figure would be larger on certain building types—hospitals, factories, etc.—where the electrical requirements are greater. On these building types, or on multi-million dollar buildings, the increased per cent savings would be a function of the greater requirements, not simply of a larger electrical contract. Larger wire would be needed and in these sizes the saving on aluminum is greater than in smaller sizes, in terms of both material and labor costs.

A late decision may eliminate savings on labor
If, in the early stages of design, these potential savings are not considered to be significant, the architect can always substitute aluminum for copper wire at a later date without sacrificing design. The labor savings, however, on the installation of aluminum wire can usually be obtained only prior to bidding. If alu-
minimum is specified in a subsequent change, the subcontractor is less likely to pass these savings along.

The architect might approach the matter by suggesting that the engineer consider aluminum wire or by giving the contractor an option. The engineer might overlook the possible savings on aluminum wire, preferring to work with the more familiar design requirements of copper wire. The architect must weigh existing preferences against the potential savings. On most projects economic considerations should be the deciding factor.

The potential savings gained through the use of aluminum wire will obviously not be a crucial factor in coming in under a budget. But the extension of this approach to other areas may, by reappraising the relative costs of substitute materials in the light of recent price changes, the architect can undoubtedly reveal similar savings, and hopefully avoid the expense of redesign.

Entrenchment in law fosters abuses in either single or separate contract systems

The apparently inexhaustible controversy of separate versus single construction contracts still rages. A recent flurry is the reported effort of New York's Mayor Lindsay to obtain permission from the State Legislature to allow New York City's construction to be let under a single general contract instead of the four-prime-contract format now required under state law.

Specialty subcontractors (heating, ventilating and air conditioning, plumbing and electrical) have persuaded the legislatures in many states that separate bids from each of these subcontract trades is a superior contracting format. Single contracts to G.C.'s, they insist, breed inordinate bid "shopping", employment of subcontractors of marginal worth, and an inferior construction product all around.

The general contractors, of course, dispute this. How, they ask, can they have responsibility for the over-all performance of a construction effort when they have no authority over the major subs? Efforts to assign the subcontracts to the general contractor for "co-ordination and administration" are no solution, they assert. Co-ordination is not control, administration is not supervision, and lagging construction schedules are often attributable to applications of the multi-contract method.

No system guarantees freedom from abuse
We are often asked to formulate an optimum contracting format. In particular, these questions are pressed: 1) Which system is best from a job management point of view?; and 2) Which system will result in the least construction cost?

Experience has recommended these answers: First, neither system is "best". Both are temptations to abuse. However, if good contractors are employed, the single contract seems to us to offer the best opportunity for timely completion of project goals. In many areas, where construction demand exceeds industry capability, simple economic factors will mitigate against inordinate bid shopping. As a further precaution, the architect should always retain the right to reject sub-standard subcontractors.

Where there is no choice, construction costs go up
The worst abuse, under either system, however, comes from its entrenchment in law. Where the multi-contract system has enjoyed years of mandatory application, costs increase and job control diminishes. Where a single contract bidding procedure is long established by law, the use of low-priced, low-quality subcontractors is an ever present hazard.

Generally, the single contract will produce the lowest bids, but low bids are not the final expression of cost. Weak subcontractors and even good subcontractors whose bids have been "shopped" to below the profit level produce situations resulting in claims for extra compensation and frequent delays.

Control and flexibility are the key factors
For private work, where the architect can monitor the selection of subcontractors, the single contract is, in our opinion, best and cheapest. For public work, we recommend that neither system be entrenched in law. Here the greatest advantage to the owner and his architect is flexibility. The contract system employed should be based on a current evaluation of the market conditions, not on an environment that existed years ago when a state purchasing act was passed. In time, the mandatory separate contract system will develop its own abuses, at least equal to those which led to its adoption. Flexibility and the good judgment of the architect are the answers to this problem.

Consider first costs as a long-term investment
To the owner-occupant, the true cost of a building is obviously the initial cost plus the operating and maintenance costs over the life of the building during its occupancy—less whatever profit he may derive from sale at the end of his occupancy. Yet an initial saving without regard to future costs often dominates the consideration of building costs during establishment of the budget.

Translate cost facts into owner's language
From experience the architect might know that in the long run it would be to the owner's advantage to have a more expensive roof. Unfortunately he might not be able to prove this to the owner.

Here is a point of divergence between the languages pertaining to the concept of "total building cost". Both the owner and the architect may agree with this concept in theory. But to put it into practice the owner has to be shown—in the same dollars-and-cents logic that he applies to an initial saving. The architect may state that an improvement in design will ultimately result in lower maintenance costs and may even quote an approximate figure. These terms may still not have sufficient meaning to the owner in his own language.

Demonstrate specific return on the investment dollar
The owner regards a building as an investment and from it he expects a certain rate of return. The architect, in suggesting an improvement in design, is suggesting a way to enhance the owner's investment. If the owner expects to receive a return of 5 per cent a year on a $10-million investment, he is justified in expecting that an additional expenditure will also return 5 per cent—or close to it.

The architect may then face a doubly difficult task in proving that a real saving exists. First he must determine the maintenance and operation savings that would be gained from a given change in design. This in itself is a problem since data in this area are scarce. And if he does succeed he may then have to determine whether the return from the additional investment will approximate the owner's expected rate of return from the initial investment. If the architect does succeed in presenting his findings in this way, then he is offering proof in terms that the owner can grasp.
Differences in costs between two cities may be compared by dividing the cost differential figure of one city by that of a second; if the cost differential of one city is 25% higher than costs in the second, their costs in the first city are 25% higher than costs in the second. Also, costs in the second city are 75% of those in the first period by dividing one index into the other; if the index for a city in one period is 75% of those in another period by dividing one index into the other, they are 25% lower in the second city. The information presented here indicates trends of building construction costs in 21 leading cities and their suburban areas (within a 25-mile radius). Information is included on past and present costs, and future costs can be projected by analysis of cost trends.

### HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES

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<td>244.1</td>
<td>252.1</td>
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<tr>
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<td>255.1</td>
<td>266.6</td>
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</tbody>
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Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other; if the index for a city in one period (200.0) divided by the index for a second period (150.0) equals 133%, the costs in the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0 or 200.00=80%) or they are 25% lower in the second period.

### ECONOMIC INDICATORS

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<th>Second Quarter</th>
<th>Third Quarter</th>
<th>Fourth Quarter</th>
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<td>286.6</td>
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</tbody>
</table>

**GRAPHIC**: BUILDING MATERIAL PRICE INDEXES

**GRAPHIC**: BASE RATE & BOND YIELDS %
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ing existing industry standards,
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for still more secure seals in dy-
namic building joints. LP® polysul-
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weatherability, temperature serv-
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Network planning: management tool for architects

Characteristics and uses of the precedence diagramming method (PDM) of network planning applied to architectural production processes are described.

The basic function of the PDM diagram is to display the work items represented by rectangles. The PWI's (preceding work items) which indicate the relationships between work items are depicted by an arrow when a serial relationship is indicated or an arrow with a lag factor when other relationships must be expressed.

Each ingredient of the work item shown on the sketch below is essential to the PDM diagram and must be incorporated into the work item rectangle. The following rectangle format is suggested to represent a “work item” in the PDM network diagram:

<table>
<thead>
<tr>
<th>TASK NO.</th>
<th>DURATION IN WEEKS</th>
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</thead>
<tbody>
<tr>
<td>TASK NAME</td>
<td></td>
</tr>
<tr>
<td>EARLY START</td>
<td>EARLY FINISH</td>
</tr>
<tr>
<td>LATE START</td>
<td>LATE FINISH</td>
</tr>
</tbody>
</table>

Time estimating of “work items” is accomplished in the same manner for PDM and CPM-PERT. Time is usually estimated in work days or work weeks. The project schedule will of course be only as good as the time estimates used. Thus, it is of utmost importance that the best estimate possible be obtained.

In PDM, if lag factors are expressed as percentages of “work items”, no estimates of time for lag factors are required. However, if they are expressed in work days or work weeks they must also be estimated.

Usually the time estimating should be the last function in the planning. By this time the project is more clearly understood and, therefore, more intelligent estimates can be made.

Analysis of the network

Computation and analysis of the network is the final step of network planning, and is accomplished in basically the same way in PDM and CPM-PERT. One of the most important determinations in analyzing a network is that of the critical path. For every task three possible early start-late start and early finish-late finish relationships can occur when the network is computed.

Early start can be before late start, which means that early finish will be before late finish. In this case the time duration between the earliest possible start date and the latest allowable finish date for the task is longer than the time duration required to accomplish the task. As a result slack or float time exists in the schedule for accomplishing the particular task, thus allowing a certain degree of flexibility for performing the task. If the over-all schedule is to be maintained, however, the task must be complete by the late finish date.

Secondly, early start can be the same as late start which means that early finish will be the same as late finish. In this case the time duration between the “earliest possible start date” and the “latest allowable finish date” for the task is equal to the time duration required to accomplish the task. Tasks in this category have no slack or float time and are said to be on the critical path.

The third possibility exists that analysis computation will show early start to be after late start which means that early finish will be after late finish. In this case the time duration between the earliest possible start date and the latest allowable finish date is shorter than the time duration required to accomplish the task. So-called “negative slack” or “negative float” time exists in the schedule for accomplishing this particular task. This means that the over-all finish date cannot be met, and that the network must be revised by increasing over-all duration, or by changing work flow logic and time estimates. Both revisions in time duration and changes in work flow logic may be necessary to meet the client requirements. It might be pointed out that if float time exists for every task in a network the over-all time can be reduced.

Networks can be calculated either by hand or by computer. Hand computation is practical only on small- or medium-size projects. When networks are to be calculated by computer, the network data must be noted on data sheets for key punch.

A great variety of reports are available with computer calculation. The tasks can be arranged by number, chronologically by early start, early finish, late start or late finish, by amount of float time, and by performing disciplines on bar charts and in numerous other ways.

How G & R was sold on network planning

To emphasize the significance of network planning in an architect's office, it would be beneficial to briefly cite an experience in the firm of Goleman & Rolfe Architects. In 1963 Goleman & Rolfe and Pierce & Pierce, Architects, were commissioned to design a new $18-million Houston Intercontinental Airport Terminal Complex. It was tremendously complicated since it involved the City Aviation Department and Public Works Department, the City Council, several airlines, and the Federal Aviation Agency. After extensive research and design effort, everyone approved a design concept in April of 1964, and working drawings were ready to begin about mid 1964. The city required that the project be under construction by March 1965. The architects had six months to complete all working drawings and specifications.

Personnel from Goleman & Rolfe had been previously exposed to network scheduling and the firm had actually been using an over-simplified network chart to schedule its work. Also, the firm had specified the PERT method to be used during construction scheduling on a Federal Aviation project. After discussing the problem with the airport engineers it was decided that the only possible hope of completing the contract drawings and specifications on schedule was to take time (two weeks were allowed) and network plan all the contract drawings and specifications (including engineering and specialized consultants’ work). Project control methods consultant (The Service Bureau Corporation) was commissioned. The tasks were outlined and sequenced (about 700 total), time schedules were assigned, and the network was computed. The first com-
puter run indicated the finish date was six weeks past the deadline. The network was reanalyzed to tighten up all possible lag and recomputed. The next computer run indicated the project could be completed on time with no time to spare. It also outlined all the tasks that were on the critical path. Every two weeks the network was up-dated and recomputed, which resulted in a print-out of every task and event. The print-outs also indicated whether or not the task schedules were being met. The project was completed on time. What was thought to be impossible was not impossible with proper prior planning using Network Planning and Analysis as a technique. Incidentally, all computer consultation and computer runs cost $924.68.

Since March 1965, the Goleman & Rolfe staff has enthusiastically adopted network planning and analysis as a management tool. Within the past year all personnel have been exposed to network procedures and all project architects have been trained to network plan their own projects. If a project architect has had no previous experience in actual network planning, it takes from three to five days, depending on the complexities of the project, for him to become skilled enough to network in detail the design development or contract drawing phase of his assigned project. His responsibilities relative to the network are outlined to him by the design co-ordinator or contract drawing co-ordinator, using examples of actual G & R networks as guides. After the initial discussion when instructions are given and questions are answered, the project architect works under periodic supervision until he has networked the project phase to the satisfaction of the firm. The second project networked by the project architect requires practically no supervision except final constructive criticism of the resulting network.

It might be emphasized that almost any network may be calculated by computer at any time. The use of computers is not necessary to successfully use the network, but there are times when their use will make the network more successful. The related airport story is an example. It is wise for architects who are jointly ventured or associated with other firms to co-operatively network associates' tasks separately and then to integrate them into an over-all network.

How the network communicates with clients

The "Master Network," as it is called at Goleman & Rolfe, is a very significant tool that can be used by architects to communicate with their clients during the progress development of a project. The master network is one showing major work phases as events in time and the client's involvement in making these events come to pass. This network includes client conferences in which major decisions should be made. It includes the architect's submittal of concept, schematics and preliminary studies and recommendations. The master network is explained to the client and given to him as a matter of record. The client's involvement is shown as major events in the network diagram. If the client delays making a decision and/or giving approval, the schedule is revised immediately by letter. This approach not only indicates to the client that he is a major participant in the development of his project but it also indicates to him that his timely decisions are of paramount importance. Of course, the architect must fulfill his obligations also. The design development phase is networked simultaneously with, or immediately after, the master network.

Illustration C shows a contract drawing phase network of a small- to medium-size project using the PDM system. The networks will vary in different architects' offices depending on each office's approach to producing contract documents. However, the illustration should serve as a guide to most architects and can be easily understood by all architects.

Network planning is not a substitute for talent, but is an instrument that will allow talent to be used most efficiently. It is not an answer to solve all problems, but it is a technique that will define problem areas that can be given special attention. It makes no decisions, but it is a technique that aids the decision maker.
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Bayne Collins and Harold R. Odom have opened an architectural office at 1113 Beck Ave., Panama City, Fla.

Robert M. Cooke, C. Douglas Cherry, William C. Dobbing and William L. Heuser have formed the consulting engineer firm under the firm name of Cooke, Cherry Dobbing and Heuser located in Hope, N.J., P.O. Box 95.

Ekdaal, Davis and DePew, Architects, Topeka, Kansas announce the appointment of Ralph E. Persson, John R. Adams and Charles J. Burton as associate members of the firm.

Fordyce & Hamby Associates of New York City have named three new partners, Lloyd Sloomanson, J. Karl Justin and Ian Hutton Smith, and three associates, C. Woodford Dayton, I. E. Drescher and Manuel A. Tavarez.

Roland A. Gallimore, A.I.A. and Hamilton Ross, A.I.A. have become associates of the firm of Geddes Brecher Qualls Cunningham: Architects, of Philadelphia and Princeton, N.J.

The firm of J. Norman Stark, A.I.A., architect and associates of Cleveland, has acquired the architectural practice of the late Louis J. Rotman. The staff and office of the late Mr. Rotman, at 31715 Vine St., Willowick, Ohio, will be maintained by Mr. Stark as a branch office.

William R. Webster has been appointed chief architect at the Washington, D.C. offices of Stottler, Stagg, Meredith & Associates, architectural firm.

**ADDENDA**

The RECORD regrets the omission of complete credits for the Christian Science Organization Building in the February issue (pages 137-142). Credits should have been given as follows: architect: Paul Rudolph—job captain; John Damico; structural engineers: Spiegel & Zamecnik; engineers: van Zelm, Heywood & Shadford; supervising architects: Smith, Seaton & Olach; contractors: Felmley-Dickerson Co.

The listing of credits for the Oceanography Research Facility, Bureau of Commercial Fisheries, University of California, San Diego which appeared in the January issue, “Buildings in the News,” (pages 42-43) should have included the architectural firm, Frank L. Hope & Assoc.

Correct credits for the Arrival Plaza at La Ronde at Expo 67 (October, 1966, page 176) should read Sasaki, Strong and Associates, Limited, and James E. Secord. Issaly & Gareau—Lalonde & Pauer Associates were responsible for the design of the arrival station itself.

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Tradition-free architecture for a "free church":
a Unitarian center
by Pietro Belluschi

The term "free church" or "free faith" as used by Unitarians describes their belief in the right of each member of the religious fellowship to engage in his own free yet disciplined search for truth. Since this search may lead him down many diverse spiritual paths, Unitarians consider inappropriate for themselves a church architecture which has been derived from accepted ecclesiastical forms expressing traditional faiths. This makes hard work for the architects Unitarians hire, since even the most innovative designers depend upon traditional or modified liturgical concepts as guides to building a church. And as a result, Unitarian buildings—denied the evocative forms handed down by older faiths—are often dull and disappointing.

Among the churches included in the ever-growing volume of distinguished work by Pietro Belluschi are several for the Unitarian faith. His latest, the Unitarian Church in Rockford, Illinois, designed in association with C. Edward Ware, proves once more that when the program demands it, he is able to design a handsome and successful church without recourse to historical derivation. Said Belluschi: "The beautiful site called for more than the usual effort; it needed a strong symbolic expression, a form removed from the old uninspired ecclesiastical tradition, yet possessing convincing qualities particularly relevant to the special Unitarian commitments. To this end, we endeavored to give the building structural integrity and to fulfill the program given to us with maximum economy, yet without cheapness. We strove to give clarity to the plan, while providing a sequence of visual experiences—relying on good proportions, effective lighting and honest materials."
"We strove to give clarity to the plan." Surrounded by space on a generous ten and one-half acre site, the major elements are easily distinguished from all directions. Looking east (4) and northeast (3) the sanctuary is seen to be linked by the narthex to the fellowship hall. The slope of the site provides full exposure to the classrooms and small chapel below. Elements to the north and south of the entrance court or atrium share a lower roof (2). These include offices, the library, lounge and a small kitchen adjacent to the fellowship hall. A small bridge (5) gives direct access to the hall.
"We relied on good proportions, effective lighting and honest materials." The sanctuary beams and columns are precast concrete in an H-form (see details overleaf). The entire space receives natural light from the east and west through clerestory windows located above the redwood board-and-batten panels between the beams. A narrow panel of glass at the front of the sanctuary provides a focus of strong light on the rear wall and a one-bay-wide panel of glass strips illuminates the entire platform area with east light. The photograph on the right shows these sources of light, as well as the narrow inserts of art glass in the concrete columns, which cast multi-colored reflections into the space. In the photograph of the narthex below, the sanctuary entrance appears on the right.

"If, as Marshall McLuhan observes, 'the medium is the message,' then architecture must create a universe of spaces. The design of a single room can affect its use, but the design of an entire community will be the measure of its success or failure. There must be a sequence of spaces, programmed to fulfill the conscious and unconscious needs of each participant as an individual, as a member of a small group and as a part of the entire community.

"There are five distinct communities reviewed in the following pages: a commercial center, a correctional institution, an office-research complex and two university residential complexes. They belong together, not only because they are the work of the same architects, but because they represent total solutions—a succession of requirements met with a progression of spaces.

"Certain concepts and approaches are found in all the projects:

- Each complex is treated as a community from the very beginning, with architecture as a positive main force. We have mentally walked through it and sensed the heights, the contractions and the opening of spaces.
- Pedestrian circulation is integral to design, not an afterthought, and automobile traffic is kept on the periphery.
- Materials are kept to a minimum to provide continuity and wholeness. The most appropriate material for local construction conditions was selected, consistent with design philosophy.
- A whole range of areas is consciously formed by building units: private, semiprivate and public."

Gyo Obata, principal in charge of design
Hellmuth, Obata and Kassabaum
A new step in the advancement of the shopping center from its earlier "shopping strip" days, toward becoming a more complete commercial sub-city can be noted in this project, now being designed for Houston. In addition to the usual shops and high fashion department stores, the development (to be called West Oak Plaza Shopping Center) will include three office towers, a hotel, and parking for 7,000 automobiles on three levels flanking the center. The Neiman-Marcus organization will locate a store in the development (model photo above, and right in plan) and requested separate architectural services from Hellmuth, Obata and Kassabaum.

A central, enclosed and air-conditioned mall has been planned as the chief organizational and circulation element, and, placed under a skylight, becomes the center's "great space." The mall will be multi-level, with the middle level serving as the main shopping walkway. Stores can penetrate more than one level, where desired. All structures will be white concrete, sand blasted to bring out a beige aggregate.

WEST OAK PLAZA SHOPPING CENTER / NEIMAN-MARCUS STORE, Houston, Texas. Architects: Hellmuth, Obata and Kassabaum, Inc.—Gyo Obata, principal in charge of design (Neiman-Marcus project manager, Jon J. Worstell; project designer, Alvin Lever; West Oak Center project architect, Robert E. Stauder; project designer, Terry F. Cashen); associate architect for West Oak: Neuhaus and Taylor; interior designer, Neiman-Marcus:Eleanor Le Maire Associates; landscape architect: Lawrence Halprin Associates; structural engineer: Elmer Ellisor Engineers; mechanical engineer: I. A. Naman & Associates; food service consultant, Neiman-Marcus: Flamberg and Flamberg.
MEDIUM-CONTROL CUSTODY AND REHABILITATION ARE DESIGNED INTO NEW PRISON IN HAWAII

This institution, for 600 adult inmates, is designed to accommodate the complete range of activities for a community: living, working and recreation, plus special treatment and special handling facilities. Plazas, gardens, and pre-cast concrete grilles for security, underscore the strong emphasis placed on creating an encouraging environment for rehabilitation and training of inmates, so they may be returned to society sufficiently skilled and adjusted to become useful citizens.

In order to protect against obsolescence, a master plan was prepared for the entire 500-acre site at Pauwela Point; the institution, as presently designed (plan, far right) is the first stage of the plan, with future provision for a women's unit, a satellite unit related to the current one, and a farming area.

Special consideration was given to the selection of building materials in view of weather conditions and local construction methods: the whole structural system will be based on precast structural members, with concrete masonry for fill-in walls. The mild climate led to an indoor-outdoor relationship, with covered exterior circulation instead of corridors.

HAWAII ADULT CORRECTIONAL TRAINING FACILITY, Pauwela Point, Hawaii. Architects: Kenneth F. Brown and Ernest H. Hara; consulting architect: Helmut Obata and Kassabaum, Inc.—Gyo Obata, principal in charge of design; project architect for HOK, J. Tom Bear; HOK project team, Daniel B. Gale, Chih Chen Jen, Jerry Martin; structural engineer: Harold Tanimura; electrical engineer: Wynn Nakamura; mechanical engineer: Clarence Nakashima; food service consultant: Flambert and Flambert.
An open garden (sketch, far left) is placed in the center of the housing complex to take advantage of the climate and natural ventilation. Housing units are planned in manageable sizes (above and left) for treatment, counseling, and control. Each unit has a central control point, with inmates’ rooms extending a half level up or down. Each room has sleeping, study, and sanitary facilities.
"CHECKERBOARD SQUARE"
GETS NEW MASTER PLAN
FOR HEADQUARTERS
AND RESEARCH CENTER

The use of architecture and planning to project "corporate identity" makes a striking impact in this new master plan and corporate headquarters for Ralston-Purina, advertised nationally as "Checkerboard Square." Over-all development of existing and future facilities was formed around a walkway spine at ground level; offices were placed on one side, and research elements on the other, of the new headquarters tower. An underground walk was planned to connect all the facilities for protected circulation.

A very dramatic central exhibition space was created in the main tower, to identify the entire complex. The building has typical office space on the upper levels, with two service core areas at the ends. As the building descends to the ground, the office spaces are separated to create a big central, sheltered "place". This space, which will rise vertically for five levels, will contain educational exhibits to show the range of Ralston's corporate activity. The east and west walls of the tower will contain cells for the vertical rise of the mechanical air system. Each floor is an exposed concrete waffle slab, with plenum space above, formed by metal decking, for the air distribution and electrical systems. The exterior will be sandblasted.

A PEDESTRIAN MALL LINKS HOUSING CLUSTERS TO FORM A COMMUNITY AT UNIVERSITY OF MICHIGAN

An extremely pleasant pedestrian walkway is the main organizing design feature of this married-student housing development for 400 families. Not only does it connect the series of mall housing clusters with traffic-free walks, but it provides safe and easily supervised play spaces for the children.

Access by car is established around the perimeter of the development. Seven parking areas are provided, with mounds placed to screen cars from view in the living rooms, and atios. Paved and landscaped walkways connect all areas.

There are some five variations in house plans, ranging from one-bedroom apartments to three-bedroom houses. For privacy and quiet for study and living, major rooms of all the houses face away from the center walkway and play area. The university required designs which could be implemented at a cost comparable to builder-planned housing in the Ann Arbor-Detroit area; to achieve simple and good, but economical architecture, HOK worked with a builder-consultant in analyzing cost alternates and builder construction methods. Materials are fairly uniform: brick and rough-sawn western cedar walls and dark brown sloping shingle roofs.

CORNELL'S NEW
STUDENT HOUSING
FORMS UNIFIED
RESIDENTIAL COMPLEX

The Cornell program for this new residence complex for 1,500 undergraduate men and women stated: "The quality of housing provided for its students by a collegiate institution should be a measure of its educational principles. This implies . . . the creation of a residential setting that will serve to strengthen an individual's potential as a student and as a mature citizen of his community . . . . The quality of his housing should be commensurate with the standards of excellence prescribed for his academic program." Toward this end, details of the program were compiled and written over a six-year period, but the administrators made it clear that design implementation of all these requirements was still completely in the hands of the architects.

The sprightly and extremely interesting residential community shown here is the result of such a far-sighted program. The complex contains eight low-rise houses and two high-rise units grouped around a central Commons building. All the buildings are related in character by brick walls and a sloping shingle roof system, and are arranged to form a pedestrian walkway system which leads through a progression of spaces designed for a variety of uses.

Both high-rise (above left) and low-rise (above) residence building are comprised of suites of single and double rooms for five or six students; six suites comprise a "primary living unit" which has kitchen, living room and group study space; four units form a house, with lounges, laundry, faculty and advisor apartments.
The Commons is the hub of the residence complex for Cornell, and contains administrative offices, library, food service, lounge and other student services and activities facilities. Food service is concentrated on the top floor: students may select from a variety of menus in any of three serving areas and then proceed to any of 14 dining rooms to eat. The exterior reflects these.
Some months ago John Johansen sent us a copy of a review he had written for the American Scholar which took Marshall McLuhan's theory that the new electronic means of communication are going to make a tremendous change in the nature of our society, and set about projecting the kind of changes he thought were in store for architecture. We had been noticing for some time that almost every architect who came into the office had the paperback edition of McLuhan's Understanding Media tucked into an overcoat pocket, or nesting among the model photos in his briefcase, and we began to think that it was time to see whether McLuhan himself was willing to relate his theories of communication directly to the problems of architecture and planning.

A recent trip to Canada provided an opportunity to arrange an appointment at the University of Toronto's Center for Culture and Technology, of which Professor McLuhan is the director. The center occupies part of a wood frame house on a street that is clearly doomed to make way for the University's expansion program. McLuhan and an associate, Harley Parker, were seated at a large wooden table covered with neatly arranged manila file folders. They were, McLuhan explained, embarked on a historical survey of concepts of non-visual space and had just gotten as far as E. E. Cummings and Paul Klee.

Non-visual space seemed a good point at which to begin, and McLuhan obligingly elaborated. The printed word, in his view, had fostered a linear and sequential view of reality, in which ideas seemed to follow each other in order. Electronic communication, however, was so close to instantaneous that several ideas could be received simultaneously. The architect, he continued, still encounters the world in visual terms, "but the spaces created by an age of electronic technology are not visual spaces." Visual space, in McLuhan's terminology, is uniform, continuous, and connected; and associated with traditional concepts of reason, order, and civilization. To explain non-visual space, McLuhan reverts to the kind of reasoning by analogy that pervades both his conversation and his writing; "to a blind man, the most significant space is the gap: for him, as for the Oriental, it is the interval that is important—not the connection; and the interval is tactile and auditory, not visual. Electronic space is also tactile and auditory; the boy who holds a transistor radio to his ear is creating an acoustic space bubble, which is like an aqualung."

It is McLuhan's argument that, in what he calls "the electric age," visual continuity is replaced by a simultaneous field. A McLuhan analogy: "In a space capsule there is no right-side-up." Another, more elaborate sample of analogic reasoning: "The slum is the most avant garde space in our society; it includes all the senses; and avant garde art creates spaces which are exactly like a slum."

McLuhan accounts for the obscurity of his theories with an aphorism: "The future of the future is the present; but the present is so obvious that it is invisible." The corollary of this concept might well be the most convincing explanation yet devised for the history of architecture over the last 200 years: "A new environment does not reveal itself until it has been superseded. The old technologies become today's art forms, so that what appears as today is always yesterday."

Using an analysis of the present to discover the shape of the future might be called McLuhan's basic methodology, and he takes aspects of contemporary culture—that others might consider passing fads—and treats them with enormous seriousness. For example, the new improvised dances of the discotheque strike McLuhan as a response to the simultaneity of a primarily aural environment, whereas traditional ballroom dancing ("uniform, continuous, connected") is a relic of the visual world of print. Similarly, he looks at the cacaphony of the city today and concludes that its future is "a showcase of new technologies." He also observes that the railroad established the spacing of today's cities (a linear sequential pattern) whereas the airplane has made "all cities suburbs of each other," (simultaneity).

McLuhan, however, does not view with alarm. Indeed it could be said that he views with delight. The environment, he remarks cheerfully, is a teaching machine; and he looks forward to man's complete mastery over his teacher: "In the world of space technology, the planet becomes a human artifact, not a natural habitat. In the new satellite environment, the planet becomes Williamsburg; we are going to deal with it tenderly as a cherished archaeological exhibit."

McLuhan foresees that the role of the architect and other creative people will be a primary one in the situation he describes: "The artist leaves the ivory tower for the control tower, and abandons the shaping of art in order to program the environment itself as a work of art."

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A happy thought on which to end, and McLuhan is a convincing speaker; but somehow, in retrospect, it all seemed to become a great deal less simple and straightforward. We therefore decided to send a transcript of McLuhan's remarks to a group of architects and planners across the country, to see what their reactions would be.

In general, the architects' comments showed considerable interest in McLuhan's ideas, and considerable dismay over the way they are expressed. Atlanta architect Fred Bainbridge said that McLuhan's style reminded him of the items that the New Yorker magazine runs under the heading "The Mysterious East." John Hedjuk, chairman of the department of architecture at Cooper Union, suggested that perhaps McLuhan had modeled his discourse on Gertrude Stein's, while Memphis architect Roy Harrover remarked wryly that McLuhan's mode of expression was not uniform, continuous or connected.

Most of the architects contacted, however, agreed with McLuhan's basic premise. Gyo Obata, of the St. Louis firm of Hellmuth, Obata and Kassabaum, said that he agreed completely with McLuhan's view that our environment will be changed drastically by electronic technology; and Roy Harrover stated that "McLuhan seems to me generally to have constructed a vision of our current environment which is quite valid. Although this vision is based upon a study of media in the extremely broad sense of the term, I do feel that it is pertinent to architecture and planning, since any philosophy which affects our attitude to the world around us will automatically affect our architecture."

The concept of non-visual space won a great deal less acceptance. Robert Anderson, a partner in the office of John Andrews, architect in Toronto, pointed out that one could infer "that McLuhan himself encounters the world in visual terms, for the evidence that architects are aware of more than visual form is less apparent, and somewhat difficult to find, but extant nevertheless."

John Hedjuk's dissent was much sharper: "as long as men have eyes, there will be space that a man can see, and this is visual. We now still live in a visual environment, and I suspect that we will continue to do so for some time; nor is visual space necessarily uniform, continuous and connected. As for the comment that, for the blind man, the most significant space is the gap, I would remind Mr. McLuhan that Leonardo da Vinci said that 'Blindness is the sister of death.'" Boston architect Earl Flansburgh added that, just as no amount of phonograph recordings will diminish the need for live performance, in the same way "man is only willing to accept illusionary space—the acoustic aqualung—if he cannot embrace the more complete experience."

John Johansen, in his review in the American Scholar, had postulated a translation of McLuhan's non-visual approach into architectural terms: 'If the images of the electronic world are continuous, simultaneous, nonclassified or noncodified, the viewer will expect all parts and aspects of the building to be made known, to be immediately comprehensible, not as a complete impression but as an all-inclusive image. Build-ings will reveal themselves totally. They will clearly express their elements, functions and processes. The viewer will iden-tify with them, feel an empathy with them. . . . The facade in the traditional sense, no matter how richly sculpted or how irreg-u-lar or bold, will disappear in favor of separate habitable en-closures posed freely in space. . . .

"As modern physics no longer sees a universe which is compact, tightly organized, and in which everything is gov-erned by strict causality, so too, our impressions will not be ordered, controlled, or in sequence . . ."

"Not only is the fixed axial reference point of the Renais-sance out of date; but so also is the 'space-time,' or moving sta-tion point, conceived by Siegfried Giedion—which might be said to represent the mechanical age of the wheel. . . . We will have a new station point of the electronic age; one that is multiple and simultaneous, a 'simul-station.' . . . The total ar-chitectural environment, as McLuhan has said, will be a mytho-logical world in which all things are connected in the human mind and experience, as opposed to the Aristotelian classified world of knowledge and exact definition."

West coast architect Sim Van der Ryn found such an architec-tural interpretation of McLuhan much too optimistic.

"Has it ever occurred to McLuhan that extending man through media can have, and does have, dehumanizing effects? For ex-ample, McLuhan does not touch on the steady erosion of pri-vacy through electronic penetration or the ever-increasing bombardment of urban man's sensory equipment."

There is no doubt that McLuhan takes a much more sanguine view of the future than most of the people who make predictions about the environment. Gyo Obata considered such optimism an implied criticism of the prevailing profes-sional attitude: "I think McLuhan's point about the plane becoming a Williamsburg and a cherished archaeological exhibit is a dig at our professional environmental planners and architects, which, hopefully, will cause us to readjust our think-ing to the changing world."

Others, however, could not agree. Earl Flansburgh pointed out that any attempt at environmental control must still take place "within the friendly parameters of the earth's basic prop-erties." Roy Harrover observed that the ability of the architect to be an interpreter of society was weakened by the contradic-tory pressures of being in control. Robert Anderson put the same thought in even stronger terms: "If we are to 'program the environment,' it must not be 'as a work of art,' for art admits of no imperatives. Programing infers an ever increasing knowl-edge of the sources of human behavior and implies an ever-increasing temptation to control it. Architects must be gov-erned by strong moral imperatives to resist this temptation."

Whether or not McLuhan's view of the future promises the kind of specific architectural results that John Johansen for sees (and it is questionable whether McLuhan sees the future this way himself), most of the architects contacted seemed to feel that McLuhan's attempt to assess the future impact of communications technology deserved to be taken seriously. The aggregate effect of recent technological inventions is still incalculable, and any and all prophecies should be gratefully received.

—Jonathan Barnett
This 40-story office building, underground parking garage, and plaza is a speculative venture, and within the disciplines that imposes is clearly of superior architectural quality. It serves to demonstrate the truth of architect Max Abramovitz' statement that "speculative buildings do not have to look cheap or vulgar; a breakthrough is possible here or there." Erieview is obviously not the same sort of thing as the typical ill-shaped, unattractive ventures we see on every hand, and in which the single, unrelenting objective is maximum rental area at rock-bottom cost.

Yet Erieview has been a commercial success; was 50 per cent rented before construction was begun, and has been fully rented since completion. It is built of durable—but not costly—materials, chosen for visual appeal and low maintenance costs; and is of familiar, tested construction—see details, page 156. The three-member team that developed the project—owner Galbreath-Ruffin, architects Harrison & Abramovitz, and Turner Construction—has worked together on a number of such projects, and has worked effectively in pooling experience and know-how in reducing costs and in developing a sharper sense of real versus assumed values. The resulting buildings have an almost institutional look, secured at rental-market cost.
Plans of a typical office floor and of the lobby floor are shown above; a section through the parking garage underlying the plaza and pool is shown below. The garage is entered either from the building or from the open stair at the opposite end of the plaza; note how the precast concrete fountains function also as ventilators for the garage space. The platform of the bridge spanning the pool is floodlighted and is planned to be used for band concerts, etc.; the portion of the pool beyond it can be frozen for skating. The plaza is paved in two tones of gray concrete.

The telephone company occupies the lower one-third of the building, and the housing of their long-lines equipment accounts for the change in exterior wall treatment for the lower floors.
OFFICE BUILDING, GARAGE, AND PLAZA
ERIEVIEW PLAZA, CLEVELAND, OHIO

ARCHITECTS: HARRISON & ABRAMOVITZ
DEVELOPER-OWNER: GALBREATH-RUFFIN CORPORATION
FOUNDATION ENGINEERS: BARBER, MAGEE & HOFFMAN
STRUCTURAL ENGINEERS: EDWARDS & HJORTH
MECHANICAL ENGINEERS: JAROS, BAUM & BOLLES
ELECTRICAL ENGINEERS: EBNER ASSOCIATES
GENERAL CONTRACTOR: TURNER CONSTRUCTION COMPANY

The lobby, shown above, is finished in black and white marble; has a gray terrazzo floor and acoustic plaster ceiling; has clear glazing held in polished stainless steel surrounds.

Details of the exterior wall—composed of black granite, gray glass, gray-coated spandrel glass, and dark-anodized aluminum—are shown at right. These details are not revolutionary in concept, but are sound, eminently sensible, and thoroughly studied.

Construction contracts were awarded on the basis of an upset price approved by the owner's engineering department. The Erieview base building—with rental areas having a smooth concrete floor slab, plastered exterior walls, acoustical tile ceiling, and lighting troffers—was built for less than $25 per square foot.
LOW-RISE OFFICE BUILDINGS

Small business buildings—the “taxpayers” of the depression era—have become a building type in themselves during the last decade, reflecting not only a general affluence but the measure of individual business success. When well-designed, such buildings contribute to the quality of a neighborhood—even decaying industrial areas—by their own character. Fortunately, an increasing number of these buildings are well designed, as the examples on these pages attest, investing the areas of their location with a new, economically negotiable vitality. In its continuing presentations of small business buildings, ARCHITECTURAL RECORD makes the point that commercially effective design not only does not need to be exhibitionist, but that its reliance on the architectural virtues of restraint and repose, scale and appropriateness nets lasting economic value.

Offices and product display

This handsomely executed building for a concrete contractor displays in its components the variety and quality of his specialty: precast fence panels, tilt-up walls, folded plate roof and poured-in-place concrete in a broad range of finishes. The difficult feat of combining types and textures is achieved by sophisticated selection and juxtaposition of finishes, carefully analyzed connections, precise detailing, and basically simple forms. The landscaped patio at the center of the building is an important part of the office function, used for special events involving large groups of field personnel. The architects were also responsible for selection of furnishings and of color, as well as for landscaping.

Crisp details and an open plan for easy expansion

The open court at the center of this inviting small building developed as the result of additions that became necessary within a year of completion of the original rectangular building; it has become a focus for the whole building. No addition was contemplated when the original building was designed, but the open interiors and the simple window-frame structural system greatly facilitated the addition. The straightforward and precise handling of the structure and of the spaces created, and the wholly appropriate furnishings (most of them products of the building's owner), give the building an air of elegance exceptional in buildings of this kind. The all-glass walls and see-through character of the building make for easy supervision of the offices, and the corridors which enclose the court give free circulation through the building. East and west end walls are of exterior textured plywood, stained; other walls are floor to ceiling glass panels. A heat pump supplies conditioned air.

In this remarkably well-ordered small building, everything has its place, including a computer system. The new wing doubled the size of the original building but added a court and retained the transparent character of the original, with the result that what might have seemed very tight quarters has an air of spaciousness.

Photographs by Morley Baer
Office efficiency in an informal environment

This headquarters office building for a manufacturer of potato chips and similar foods is located on a site adjacent to a warehouse on the plant grounds. The redwood and brick exterior, and the handsome interior with its enclosed second-story court, convey the informality characteristic of the company, and effectively answer the client request for "a building that would function efficiently as an office yet feel something like a home." The brick-floored court serves as a pleasant outlook for the executives' offices which surround it, but is also functionally important as the executive secretarial pool area and as circulation on the second floor. The arrangement allows privacy for executive offices but, as one executive says "is so intimate that we have never needed an intercom system." Cost of the building was $352,600.


Pool and planting, brick and redwood help to create a 'homelike environment', with accounting, purchasing and package design departments on the first floor, executives work upstairs in quiet and with no unnecessary interruptions.
The business and professional center at 320 Ward Street in Honolulu is actually two buildings, joined at one end by a balcony and separated along their length by a landscaped court onto which most offices open. Less conventional than the owner had expected, the design nevertheless met his requirement for a rental office building of economical cost. The building has a prestressed concrete frame, with filler walls of either concrete block or glass. The handsome treatment of the two stairways offsets the disadvantage of second floor location, and parking at each end of the building makes the setting spacious.


Access to second floor offices is by stairway and open balcony, suitable in the tropical Hawaiian climate. Offices which do not overlook the court have deck space between sliding glass walls and metal sunscreen.
Progress report on an analysis system that could permit comparative assessments of cost and benefit at every design stage from schematics to working drawings.

There can be little argument that one of the greatest and most needed benefits the architect could receive from computer technology would be the ability to exercise detailed and accurate control over construction costs.

It has been quite a while since the good old days when anyone could be certain what a building would cost before the working drawings went out for bids. Fluctuating prices and increasing complexity have made all but the most obvious over-all estimates an uncertain business, and the comparative cost of all the possible construction alternatives has tended to slip from the designer’s control. Even the professional estimator needs more and more detailed information; and developing accurate estimates for a number of design alternatives is a cumbersome and expensive process.

Cost vs. benefit
The problem is that the relationship between cost and benefit is quite a complicated one. Moving a wall two inches may add proportionately far more, or far less, to the over-all cost than the change in the space might seem to warrant, depending on the way in which a whole series of complex factors happens to interact. If up-to-date construction data could be gathered on a regional basis and processed by the appropriate computer program, it ought to be possible to calculate the critical points in the relationship between cost and benefit: the exact width of the row house after which the cost may be expected to rise steeply, or the optimum ratio of glazing to solid wall.

Such calculations are theoretically quite possible without a computer; but the arithmetic is so extensive, and so tedious, that in practice it seldom is attempted. Devising techniques for computerized cost-benefit analysis is not so easy either. Programming concepts which are simple enough to grasp in theory, invariably turn out to be difficult to put into practice. Programming a computer is something like writing a set of instructions on how to tie a pair of shoe laces; you have to analyze exactly what the steps are, describing them accurately and in order; and there is always more to it than you think at first.

Research in progress
Making up computer programs capable of a cost analysis for all the steps in the construction process is therefore a formidable task; but one which, once accomplished, would be of incalculable value to the whole construction industry.

Some of the most important work on this topic is presently taking place in...
A small architectural office in the sleepy college town of Chapel Hill, North Carolina. The study began when Chapel Hill architect Arthur Cogswell, and his associate Werner Hausler, received a $30,000 grant from The North Carolina Fund to develop improved means of providing housing for low income families. It soon became clear that the central problem in designing such housing lay in predicting construction cost; and Cogswell turned to another North Carolina architect, David Sides, whose company, Data pro, Inc., had been one of the pioneers in providing computer services for design professionals and building contractors.

Sides and Cogswell, backed by an additional $160,000 from the U.S. Department of Housing and Urban Development, have begun to put together a system that, in the words of a visiting operations researcher from England, will be simple, but devilishly cunning. It should eventually permit the designer to make comparative assessments of cost at each stage, from schematics to working drawings, although the prima development effort at the moment is directed at the schematic phase of design.

How it works
The first thing the designer does is to supply the computer with a geometrical description of the building. Each plane is located on a three-dimensional coordinate system; in other words, the designer designates a point on his building (presumably the lower left-hand corner of the ground floor) as 0, and every other point is located in reference to it.

This information can be put into the computer in a number of different ways. When computer graphic systems based on the Sketchpad program become generally available, the designer can simply draw his building on a cathode ray tube with a "light pen" (see Computer Aid Design and Automated Working Drawings, October 1965, pages 85-97). The designer can also draw his building on graph paper; and a clerk at a computing service center can put the information on punch cards for him. The illustration shows a third method, with the designer typing in the coordinates on a keyboard and monitoring a display which shows how the information has been registered.

Each geometrical plane (walls, ceilings, etc.) is given a code number; and then the areas of each, and the areas of major subdivisions such as the doors and windows, are automatically calculated.

Certain basic data would already be in the computer memory: unit cost information for building materials, hour wage rates prevailing in the area, estimates of the amount of time needed to perform various construction operations.

A computerized cost estimating

A screen shows input form with the dimensional information for one wall filled in. A complete geometrical description of the entire building shell, and all major sub-areas such as doors and windows, is a necessary first step to this computerized cost analysis system. Descriptive process also includes certain basic information about the nature of the building, such as whether glass is fixed or movable, presence of insulation in the wall, and so on.

A screen shows the computer input form for one wall.

How an architect would use a computer to describe a building.
After basic construction data, derived from the experience of contractors in the surrounding area, has been placed in the computer memory, the computer is ready to start calculating cost figures that relate the unit cost of materials, hourly wages, rates of work, and the price of equipment, to the geometrical description of the building supplied by the designer. The output form, above, shows how equipment cost would be displayed.

Labor figures show both an hourly rate and an estimate of the amount of time necessary to perform all the operations required in the construction of the building. Operations information is compiled from the same kind of data presently used by contractors to determine critical path network diagrams. The figures make it possible to see what effect a change of materials would have on labor costs, and would show which was easiest to build.

Cost break-downs for a number of different materials are shown on the screen, above. The computer can display, or print out, total materials costs for the entire building, materials costs for a particular part of the building, or total costs for a single individual material. The designer can also receive comparative cost figures for different materials used in the same situation, can assess the effect of different combinations on over-all cost.

Operations reports combine cost information about labor, materials, and equipment, and comparative operations reports would give the most detailed insight into the complex inter-actions of the different factors that go into over-all cost. By this means the designers of the system hope to be able to develop new kinds of low-cost housing that can embody significant cost savings, although they would be built within confines of present technology.
as well as the data for cost figures for necessary equipment.

The designer would then designate a basic category of construction, such as wood frame, or brick and block walls with steel bar joists, with enough additional information to fill out a general outline specification. As long as the designer is talking about a reasonably typical building, it is then possible to take the same kind of information that is used to draw-up critical path network diagrams (which would also be stored in the computer memory ready for use) and compile a list of the required construction operations.

Cost comparisons
The computer would then be ready to calculate construction costs in a number of different ways, both in detail and in over-all figures; and the designer could receive print-outs of construction costs on an operations basis—and also in terms of equipment, labor and materials. Having once established this kind of cost information, the designer could proceed to modify the building in many different respects, and be able to learn almost immediately the relative effect these modifications would have upon the cost. He could print out detailed cost comparisons for different types of structures, or wall materials; and could also see at once what the monetary value of a change in square footage would be.

Garbage in—garbage out
The above adage—that an information system is only as good as the data that goes into it—is a much overworked expression among computer types, but it is still a valuable qualification to make at this point. The best basic data that is now available to go into the Cogswell-Sides system is by no means garbage, but has certain very definite limitations. Essentially this data would have to be obtained from contractors; and represents the kind of information, based on experience, that contractors use for estimating at the present time. The computerized system can shuffle and cut this information rapidly and usefully, but it can not make it more detailed and explicit. Providing refinement of detail requires a much wider data base, and a constant process of updating; both of which are going to be expensive. You can hear most of the music on a cheap phonograph; but a good stereo set may cost about twice again, on a cheap phonograph; but a good set may cost ten times as much.

The advantages of hi-fi data
If a computerized cost estimating system could be backed up by really sophisticated data collection, it could have a very considerable effect on the relationship between the architect and the contractor. The present time, the architect begins with schematic drawings and eventually produces a highly detailed and complex set of contract documents. The contractor takes these documents and breaks them down into take-offs that end up by approximating the information in the architect's first schematics. As David Sides points out, there would seem to be some wasted effort implicit in this situation. If both designer and builder were using the same cost data, and had equal faith in its accuracy, it might well be possible to simplify both the contract documents and bidding procedures in general. In fact, there would be little left to bid competitively except the contractor's profit margin.

Proving the pudding
Arthur Cogswell hopes to be able to use computerized cost estimating techniques in the design of a number of low cost housing units. His objective is to produce new housing types that have a significantly lower cost than conventional units, without going outside of the existing building technology. It is not necessary to wait for the housing, however, to see the potential significance of the programs; and these programs are certain to improve, becoming more flexible and capable of more complex applications, the more frequently they are used, and the more people work with them.

Research by architects
The fact that this research project was initiated and carried out by architects has some very definite advantages. The computer programs follow the way in which an architect would naturally work, providing a method of evaluating his own designs, rather than attempting to automate the design process. The more typical computer-oriented approach would have been to produce some kind of optimization program that concentrated on generating the cheapest possible building, to the exclusion of everything else. In any event, the major computer companies and other centers of research in computer programming have so far demonstrated relatively little interest in the special problems of the architect, even in the area of computer graphics. The fact that a small architectural office was able to find the financing for a study of this type ought to spur the study of such subjects as adapting computerized drawing techniques to architectural needs. The dearth of apparent interest from other quarters indicates that the initiative for such developments will have to come from the architect.—Jonathan Barnett.
SCHOOL DESIGN MUST KEEP PACE WITH EDUCATIONAL INNOVATION

and provide for both the seemingly constant revisions of teaching methods and equipment and for the best possible environment for learning. For some years now, most everyone has been in ostensible agreement with these objectives. But in the brass-tacks world of actual construction, school design usually continues to be ruled by the more easily understood, brass-tacks qualities: minimum cost, minimum maintenance, minimum political or social controversy.

However virtuous and, in most cases, necessary these last qualities may be, they must be considered as hurdles on the track to better school buildings, and not as ultimate goals in themselves. When they do become the main objectives, the resulting cheap, supposedly-easy-to-keep, usually innocuous, usually rigidly-planned structure becomes quickly obsolete and also becomes a major stumbling block to initiative in advancing teaching and learning techniques.

The current ferment in the field of educational theory, on the other hand, makes the concept of the "best" environment (and, obviously, of the building which creates it) a very difficult one to arrive at. The element of potential and probable change precludes the formulation of any complete set of standards. Even where the most "advanced" educational techniques have been planned and built for, educators employing them are wisely keeping a watchful eye on the need for modifications in method or equipment that may be needed for assuring sound and lasting education. We are probably, and hopefully, only at the beginning of an era of finding out more and more about the learning process. The speed-up in technological advance makes it imperative that each person have more skills and more knowledge. And more and more research programs, with government or foundation backing, are constantly being initiated to explore methods of instilling them.

A plethora of ways to improve education is now actually being tried out: team teaching, variable groupings of pupils, teaching machines, television and other audio-visual aids, ungraded schools, consolidated schools, split-up unit schools,
divisible classrooms and auditoriums, open-plan schools, windowless schools, resource centers, educational parks—one can seemingly go on and on. These will, in due time, all be thoroughly tested, accepted or rejected, improved and added to. Architecturally, the only sure way of coping with them all is to provide sound buildings with a reasonable degree of flexibility, convertibility and possibility of expansion.

But there is another tremendous factor in improving learning where the role of architectural design is more positive, though many people seem to be less positive about it. That is the effect on learning of a student's physical and emotional response to his surroundings. Response not only to heating and cooling and lighting and acoustics and other aids to physical comfort and efficiency, but response to visual and tactile environment, to scale, to openness or enclosure, to all the factors of mental and emotional comfort and efficiency.

This is an area that probably needs, and will certainly get, more scientific probing and measurement, but, after all, isn't the creation of such response what true architecture is all about? After adequate provision to keep the rain out, perhaps the best set of “standards” for a school building today might be something like, “keep it pleasant, but keep it loose.”

A round, open plan is one current answer

One of the “loosest” concepts among the newer schools is the round building with an open plan. And it has a growing list of adherents, including the oracle-of-the-moment, Marshall Mc Luhan, who has predicted that the round school is one of the waves of the future. Arguments in its favor range from the arch-practical to the whimsical. The open plan, in itself, is...
Flexibility of use and concern for the individual child were the chief reasons for adopting a circular plan in this elementary school in Tooele, Utah. Perhaps another reason was to stress enclosure, security and shelter in a rather wild, barren landscape. The solution does, in fact, work well both functionally and psychologically. The interior spaces radiating out from the courtyard to the class or group areas—with the instructional materials center in between—are efficient, pleasant and informal. The courtyard is equipped with a pole supporting three gas infra-red heaters which give year-round heat to stimulate experiments with unusual tropical-plant and pond life.


Obviously the most "flexible"—you just move the furniture. And the round shape "has less peripheral wall, less roof area, less foundation, less waste circulation space" and less resemblance to the sometimes hated "box". Whatever stand one takes, it has to be admitted that the exterior of a round school is a difficult design problem; some that have been built have had more resemblance to a gypsy encampment than to a center of education and development of culture.

A few of the round schools, however, have turned out to be quite successful designs. Scott, Louie & Browning's East Elementary School for Tooele, Utah, shown here, is one of them. While some rudimentary partitioning is used to define classroom areas, it is quite close to being a completely open plan. The architects explain that the shape evolved very logically: "The school board called for a building which would..."
used by those particular students. Combined within the IMC space are the teachers' work and lounge area, audio-visual equipment, book storage and a "messy" project room. The teaching staff is provided facilities for group conferences as well as for individual preparation." Thus, a hub and spokes scheme, with a center court for relief was evolved. Almost every inch of it is "usable" space, and was built for the reasonable cost of $13.65 per square foot.

**Good scale is vital to good school environment**

A very young child's relationship with room and building sizes is very different from that of a full-scale adult; a school must be sensitive to both, for pupils and faculty. The Utah school solves this fairly well with low ceilings for the most part, and some subdivision of the open space. The exterior also has a fairly domestic scale and reflects the school's modest size.

The handling of a big school, though, especially a multi-story one, poses a considerable problem of scale relationship to avoid an overpowering, barracks-like impact on the child. The Pleasant Hills, Pennsylvania, Middle School (above), by Celli-Flynn, exploits a sloping site to great advantage for such a building. The structure is set at the bottom of the slope, with the entry from the top of the bluff into the upper level. Taller spaces on the upper level for the gymnasium-auditorium core are concealed by an interestingly-shaped roof mass. Thus, from the entrance drive, the large school has the appearance of a single story structure with a big, double-pitched, somewhat Hawaiian roof. A covered entry plaza spans the hollow to the school; specially designed gardens will make the approach an extremely pleasant one. Each of the three floors...
exits to grade. In addition, stair towers at the four corners of the circulation corridors minimize and disperse the student traffic. Variable-sized classrooms, including a divisible large group instruction hall, provide for anticipated team-teaching, and further the sense of scale and variety of room spaces for the pupils.

The multi-winged, court-dotted scheme for the Thomas Gilcrease Junior High School in Tulsa, Oklahoma by Donald Honn (shown in photographs above) illustrates another method of avoiding too big a scale for a one-story scheme. Many interiors, including the auditorium, are divisible.

Gilcrease School has 106,000 square feet for approximately 1,000 students. It is located on a 20-acre, rolling site and was constructed at a cost of $1.4 million, for a unit cost of $12.36 per square foot.

A junior high school used extensively for adult evening activity demanded considerable care in planning to provide for a progressive education program on a limited budget. The auditorium—usually the most expensive and least used space in a school—was given 100 per cent usage by central location and three-way divisibility into two medium-sized lecture rooms and one large space. This makes it suitable for team-teaching, assembly, audio-visual education. The over-all school plan is grouped in three separate buildings: cafeteria-auditorium; classroom-resource center; industrial arts and physical education.


Architect Honn comments that, "The design problems presented by the Building and Planning Department of the Tulsa Educational System were remarkably similar to those voiced in this article. Of a more general nature, the superintendent of Building and Planning asked me specifically to 'design a building to fit our educational program'. In our first interview he mentioned the fact that so many of the buildings were designed with no thought to the actual teaching processes that existed and are used. He mentioned specifically team teaching, expanded day programs, adult education programs and the need for more individual study and counselling. The Tulsa School System is no different than any other in that their finances are always short of their needs.

"Our research and examination of the present Tulsa junior high schools indicated that the auditorium was used less than
10 per cent of the teaching time. Since this is the most expensive space in the building it seemed logical to us to find some way to put this space to use 100 per cent of the time if possible. This led to the layout of the auditorium located in the center of the building and with a configuration which can be divided into two medium-sized lecture rooms separated acoustically from, and isolated from the traffic of, the main auditorium. In this way we provided two 130-seat isolated lecture rooms and one 390-seat assembly room. This has proven to be especially usable and fulfills many of the requirements for team teaching, auditorium education, and assembly areas for all purposes.

Our second recommendation was to expand the library area into a curriculum center. By doing this we provided an enclosed librarian and teacher’s workroom area. In this area the teachers have reference material and work space for individual research and lesson preparation away from the classroom. We also provided three small and two medium-sized conference rooms. The small rooms can handle four or five students and an instructor. These rooms are used for group discussion and for counseling and individual or group research. Immediately across the hall from the library four classrooms are equipped with soundproof folding doors which can be used for larger group instruction.

“In plan the building is grouped into three separate and distinct areas: the classroom and instruction area; the cafeteria, auditorium and music section; industrial arts and physical education area. This facilitates segregation of the noisy areas away from the study areas and also made it possible to use only the areas required for evening programs. By use of folding gates any section can be completely isolated and cut off from

A restricted site in between existing elementary and senior high schools demanded a rather compact plan for the junior high which completes the campus. Circulation had to be carefully worked out to allow students from the other schools to make use of communal facilities without interrupting the normal educational program of the junior school. The problem was solved by placing the commons area as a distinct block in the center of the plan with its own access routes from outside and incorporating three circular interior spaces containing library, planetarium and audio-visual unit. The informal seating area around these rooms makes a pleasantly relaxed environment for small group meetings between staff and students from all the schools. The large multi-purpose room across from the commons can also be reached directly from the outside. Structure of the new building is open-web steel joists with red brick walls and white concrete fascia.

the balance of the building. This, of course, saves on mainte-
nance and provides for better supervision of evening crowds.”

The educational “campus” is a growing trend
Though few of the proposed “educational parks”, which
would consolidate an entire town’s school system are under
serious consideration at the moment (see RECORD, February
1966), many towns are creating smaller all-grade campuses by
constructing different-grade schools close to each other on the
same site. Edgewood, Maryland, has recently added a junior
high school between existing elementary and high schools to
create such a compound. Fisher, Nes, Campbell & Partners have
also included facilities within the new building for the com-
bined use of all three schools, and established free access to
the common-use areas (and those used for community func-
tions) in such a manner that they will give a minimum of inter-
ference or distraction to the normal educational schedules.
Such a system can help relieve financial burdens considerably
by making duplication of many facilities and some expensive
audio-visual equipment unnecessary for each school. The con-
cept of a central resources center becomes a natural bonus for
such an arrangement and can be used to promote informal
contact between staff and students.

Change can be planned into “permanent” structures
Another new school which has been added on a site adjoining
an existing senior high school, and which could form the
nucleus of a future all-grade campus, is the John Jay Junior
High School in Cross River, New York, by Norton and Hume,
architects (photos overleaf).

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Sited on the same campus as the existing senior high, this junior high school was planned around a conventional teaching program but allows for the possibility of change to a team-teaching system in the future. A modular, exposed-concrete, two-story classroom building permits expansion at one end, but maintains easy access to the gymnasium and cafeteria-administration buildings on either side.

In order to distinguish the building from the neighboring senior high, which is a loosely-planned group of single-story, steel-frame and red-brick buildings, the new junior school uses a compact two-story plan executed in concrete and white brick. The scale is a careful blend of the formal and informal.


The school had all the usual requirements for low maintenance, reasonable cost, a conventional junior high program, independent identity and no shared facilities. However, unlike many usual schools built from such a program, this school was carefully designed for a possible future change to the middle-school, team-teaching concept, and for future expansion in size. This was achieved by creating separate blocks for functions which would not have to change in the future (gymnasium, administration and cafeteria-auditorium) and placing all classrooms in a two-story central wing that could be changed internally or expanded at one end. Modular planning with an exposed concrete frame, and easily shiftable mechanical and lighting systems will permit easy modification of classroom sizes when required.

The various elements of the block plan are worked into the slope of the site at different levels, and give a very pleasant sense of size and scale. In no aspect, though, does the school give an air of impermanence for its current, standard program. Careful handling of all details add up to a trim sophistication and a sensitive environment for the junior high age level. Concrete and white brick walls contrast with the Senior High.

A more domestic scale is best for the very young

The younger the child, the more every effort should be made to avoid an institutional quality, and to keep a residential, small-scaled environment in teaching areas for them.

A little addition, much more important than its size for respecting the needs of a child, is the North Shore Unitarian Church School, in Plandome, New York by architects Bentel & Bentel. Though it is a religious school, its architectural lessons
A warm, reassuring, yet exciting environment for very young children has been achieved in this charming Unitarian Church School, which was planned as an addition to existing church and school buildings. The architects' aim was to break the building down into small-enough units for individual children to feel a sense of identity and belonging. They accomplished this by expressing each classroom as an independent unit with its own pitched roof—a building form with which all children are familiar, but which has the dual advantage of giving extra ceiling height inside the rooms. The effect of this is enhanced by glazing in the gable ends.

Interiors are simple, but pleasant, with exposed brick walls, informal arrangement of furniture and carpeted floors. The central "worship studio" has a fireplace.


could well be applied to any additions, for the lowest grades, to larger buildings or complexes. In essence, it is a fairly compact, if irregular shaped, little building—but each element is clearly identifiable. In arriving at the scheme, the architects soon decided that, "if the basic unit of a school is the child, then the class is the next larger unit to be considered. The student identifies with the school in a social way through his class. Wouldn't it be desirable for that unit to be identifiable? This articulation was felt to be superior to the repetitive pattern of windows found in so many schools. The child could then see the part that he and his classroom play in the total school.

"Within the classrooms themselves, changes in ceiling height were sought to continue this 'quality of choice' so that different class routines and teaching methods would be encouraged by the many ways the room could be used. Outdoor spaces are designed to relate to the rooms not only to expand the feeling of space, but also to be used during good weather.

"What has resulted from these concepts is a village of classrooms in which every room has individuality, but still remains part of the whole. Light enters the rooms in different ways, and unique experiences await the child as he moves through the grades. Such a free composition had to stand free of the existing school and in fact, the long existing facade acts as an excellent foil for the rambling new school." Carpets and informal seating give warmth and intimacy.

Appropriate school design can help revitalize city areas

Similar considerations of creating an environment compatible to the elementary child went into the planning of the slightly larger Lincoln Elementary School in La Porte, Indiana by the
Perkins & Will Partnership. It is also an annex to an existing school, and carries the added requirement of helping to revitalize the downtown area of the city and provide elementary facilities near the hub area for children who are frequently neglected in school planning.

The educational philosophy of the community in which this school was built was expressed by the Superintendent of Schools: "We believe it is our duty to provide educational opportunities for all children regardless of place of residence, race, religion, economic status or mental ability. We believe that education must be based upon mastery of certain fundamental skills, concepts and appreciations. We also believe that it is our responsibility to provide an environment that is conducive to the learning and development of the child."

The resulting school is a thoroughly modern one with a carpeted library resource center, some divisible team teaching classrooms, individual study spaces and special facilities for remedial reading and the like.

The design itself, however, has been kept relatively quiet and free of stylistic pyrotechnics—emphasis instead has been placed on suitably small scale, warmth and friendliness. Brown brick, bay windows, wood paneling, sweeping overhangs, and mansard roofs with black shingles all relate the building to the residential structures surrounding the site.

On the school's success as a social factor, the architects comment: "The school board's decision to provide a new educational facility in the hub area of the city has given stability to the community and impetus to revitalization. There is a lesson to be learned here for other communities, evidenced by the revitalized spirit in the area, as to what can happen to a portion
of a community that might begin to erode into slum areas. As a result of construction of a carefully designed new school, at very low cost, the neighborhood has become a desirable part of the community in which to live. This should be an inspiration for other cities to revitalize."

There is a lot of school building to be done

After the post World War II baby-boom crop neared university age, many firms concerned with school design began, quite logically, to shift their major attention to college buildings. There is a growing realization, however, that the decline in the rate of increase in school construction is a temporary one: there is a predicted new baby-boom coming, and an enormous number of our older schools are in dire need of renovation or expansion. As it is, our school population is an enormous one. The New York Times reported that 50 million pupils were enrolled in 1966 in the kindergarten through high school grades of our public and private schools. If this number does swell to even greater dimensions, let us hope that the schools now being built can cope with the situation without the temporary classroom expediences of the last go-round.

All the schools shown here form only a tiny sampling of the many good ones which seek to provide a better environment for learning—and only a glimmer of the many ways it can be achieved. Each does, however, offer some lessons, and possibly some inspiration, to counteract the many arguments that good, forward-thinking design is incompatible with minimum cost, minimum maintenance, minimum political or social controversy. If brass tacks are necessary, let them be handsome and lasting ones!
Strongly stated structural framework encloses flexible environment for a middle school

TAC's reputation for good school architecture is confirmed and even reinforced by this design for a middle school for some 1,000 students in Bedford, New York. As demonstrated throughout this study, the major current concerns in school design are to humanize the scale of the buildings; provide for contact between students and teachers at a personal level; compensate for the difficulties of large enrollment and limited staff by flexible classroom arrangements; and stress the importance of the individual child. The Bedford School meets all these requirements in an environment which is at the same time stimulating and reassuring. There should be no sinking feeling in the stomach on approaching this school on the first morning of the school year. As with many larger schools today, the total planning unit is subdivided into houses, in this case three houses grouped around the central octagonal building containing the arts center, library and administration. The auditorium on the upper level is equipped with a movable stage; smaller, acoustically treated art and music rooms are located around one end of the central space, while the library at the other end is accessible via connecting walkways from all three houses.

The site plan exploits a substantial grade change by placing the three houses along the sides of a bowl-shaped hollow surrounding the central building, and connecting the buildings by concrete bridges which form covered walks at the lower level. The high land at the back of the school has been graded for playing fields, and a separate physical education building in the corner of the site takes advantage of a southern exposure to provide year-round play facilities. The reinforced concrete frame of the building has projecting slabs to provide a sun screen. Precast concrete grills and fins provide additional protection.
Innovative school design “breaks the box” by use of satellite classroom units and concrete curves

The tendency of larger schools to wind up as stolid, box-like monoliths has been effectively avoided in this school by a plan which places all specialized facilities in a large central block, surrounded by a series of classroom blocks. Two of these smaller units have been built, with another planned for future expansion. Such a scheme also divides the student body into smaller groups for better relationships and more personalized instruction. Flexibility for different-sized teaching groups is also provided within each unit.

To further emphasize this separation of the parts of the school, different, but related, design techniques have been used for the central block and the classrooms. The center core has swooping, striated concrete walls, pierced by deep-set oval windows; the classroom units are clad by lighter-appearing concrete panels, emphasized by projecting fins and banks of windows. Color is also used to emphasize the design: the core is natural gray concrete, and the inset panels of the classrooms are a beige aggregate with the fin edges and window surrounds natural gray concrete.

When completely finished, with the addition of another classroom unit and extension of the main block, the complex will appear as indicated in the sketch below right.

Skilled use of “pop-up” roofs gives good scale and visual-aids projection space for a K-6 school

This quietly handsome school combines provision for team teaching and extensive use of audio-visual aids, with good scale and a good teaching environment for children.

The school, designed for kindergarten through sixth grade, will currently house 430 pupils in two kindergarten rooms and 14 classrooms. Planned expansion for four more classrooms will raise the capacity to 530 pupils in the future. The classrooms are paired, with soundproof, movable walls between. A centralized library is well related to all the classrooms, and contains a teachers’ research center. In addition to a combination auditorium-cafeteria and a playroom-gymnasium, the plan includes an administrative suite, teachers’ rooms, conference and small instruction rooms and service areas. This variety of available teaching spaces, relieved by several courts, apparently functions quite well for the large and small group instruction methods of the team teaching system. The school principal, Clark Dexter, has commented that, “It works just beautifully.” As to the effectiveness of the sliding, acoustic operable walls between classrooms, he notes that, “They’re as soundproof as a cinder block wall, and move very readily.”

The 12-foot height of the tall roof sections (above) gives an added function as a continuous, interference-free visual-aids projection surface. Central floor outlets have been provided for the overhead projectors that are standard equipment for each classroom. All the other, flat-roofed areas are 7 feet, 4 inches high (below). This roof variation gives the needed space and reasonable room proportions, while keeping a rather small, intimate scale. The architects' stated intention was "to create visually a sort of children's village of low silhouette for the benefit of youngsters and to be in scale with the residential environment." All materials were selected for low maintenance: skeleton steel frame, concrete block walls, vinyl asbestos floors.
Two new buildings for a priory school respect tradition but embrace the future

Two new buildings have recently been added to the boys' preparatory school which forms part of the Portsmouth Priory complex in rural Rhode Island. When the main monastery and chapel were erected (RECORD, July 1959, page 148) Belluschi, who was associated architect for both projects, was concerned to continue the vernacular of the existing farm community and to establish an "interwoven texture" of forms and materials throughout the site, which would characterize both the strength and the simplicity of the order of St. Benedict which it served.

The multi-purpose building (this spread) and the science building (overleaf) are conceived in the continuing tradition of the community: both are simple in form; both are sheathed in natural redwood, with rubble stone retaining walls; both are carefully planned in relation to the complex as a whole. The science building was placed directly opposite the chapel—with the multi-purpose building between—to symbolize the complementary functions of science and religion in the modern world and the Priory's contemporary approach to education.

A 300-seat auditorium is the main feature of the multi-purpose building, which also provides a generous stage and stage house, and a projection room at one end for movie and slide displays. By depressing the central part of the auditorium, the architects were able to make it double extremely well as a dance floor. Student newspaper offices, a printing press, meeting rooms, and offices for various extracurricular activities are all accommodated on the lower floor of the building.
From the outside, the science building is very much a smaller version of the multi-purpose building, with the same redwood detailing, and dominant copper roof. Inside, however, the science building consists of a series of functional, well-planned laboratory and classroom spaces built around a large, central lecture theater. Interior walls and partitions are exposed masonry block; ceilings are suspended acoustic tile. Narrow, floor-to-ceiling windows lighten the rooms and give attractive glimpses of the outdoors, but do not create the physical and psychological difficulties of discomfort and lack of concentration that very large glass areas in schools sometimes arouse.

FINALLY: A LOW-COST COMPONENT SYSTEM FOR HOUSING THAT REALLY WORKS

Carl Koch’s Techcrete system avoids design restrictions, uses simple components, works equally well for low-rise or high-rise.

Techcrete, as the new system is named, is probably the most flexible prefabricated building system for multi-family housing to come along so far in this country. It avoids most of the restrictions—in planning, exterior treatment, cost, and construction complications—which have deterred other systems more rigid or more complex in concept and in application.

At first look, the new system developed by Carl Koch & Associates in collaboration with structural engineer Sepp Firnkas, is so seemingly simple as to belie its potential. But on further examination, the possibilities begin to unfold.

The key to flexibility is a 32-ft-span, open-ended framework of precast concrete units which can be stacked one on top of the other for as many stories as are needed, and extended as much horizontally as the plan dictates. The structure consists of bearing wall panels, which are erected first, and which support 32-ft pretensioned precast planks, 40-in. wide. These floor planks are “clamped” to the walls by post-tensioned steel rods. The remaining two walls can be enclosed with non-load-bearing materials. The basic system goes together very much like a child’s building of blocks.

The system has advantages in design and construction

In brief: 1) The system is economical for both low-rise and high-rise apartment

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I believe that the gap between conventional building methods—which are overgeneralized—and European "building systems"—which for the American market are overspecific—can be bridged by a "system" which originates as a planning process. Of necessity, this planning system starts as the solution to a specific project... but a project which is potentially one of many. Thus our system was first developed for a particular family of plan types. It began under a contract for the Boston Redevelopment Authority to meet the requirements of 221(d)(3) housing for the three renewal areas in Boston.

Looking back at our original criteria for design, it boils down to this short list:
1. A design method to lower first and continuing cost and increase quality.
2. A flexible design method to permit the widest possible range of uses and appearance to meet variations in site, density, local preference.
3. A process which offers the greatest possible opportunity for speeding up and simplifying the process of building from first realization of need to occupancy (a large factor in reducing cost).

In developing the Techcrete system, we chose reinforced concrete as a structural material because of its ready availability, economy, its fire and sound-proofing qualities, its indestructability.

We decided, on the basis of the European experience, that a simple bearing wall system was the most effective way to use the material to meet housing requirements—especially since present-day pre-stressing technology permits wide spans at low cost providing adequate planning flexibility.

Our immediate divergence from the nearest European analogous systems was in our emphasis on planning and appearance flexibility. As designers, our efforts centered on working out a series of planning modules which would permit a small number of interrelated components and sub-components with the greatest flexibility of assembly possible.

This planning method makes use of three main ways to lower cost:
1. The standardization and mass production of interchangeable parts, designed for assembly in a wide variation of ways.
2. A continuing design discipline to encourage the simplification and standardization of equipment, parts and finish, which can, as they prove their applicability and efficiency, become an integral part of the system.
3. A direction of design and assembly of the system components to assure the maximum effectiveness at minimum cost of each custom or unique aspect of each of the separate designs.

We stand ready to help and are anxious to be helped by any architect working on this problem. Our system is not the only answer, but it is one answer... and it will be an increasingly good one if enough of us use it and improve it.

Pure design in the grand manner was, is and will always be part of good building. Functionally adequate buildings can be built without an architect. Our goal as architects should be to strengthen our function, that of a co-ordinator of the building process, into a meaningful accomplishing position, where we can apply our design talent effectively. When and if this is done, it will give building a dimension which most of it now lacks—a unity contributed by design which will make a related whole of the disparate pieces contributed by architect, developer, manufacturer and building authority.

There is no question in my mind that this unity can be accomplished. It can, it must and it will. Our government is taking a new look at how to do it. Industry is getting ready to tackle it on its own. Good or bad, there is one thing certain. In 15 years we will either be working for General Electric, General Dynamics, General Motors, or General Cities—or they will be working for us. Which do you prefer?
—Carl Koch

buildings; 2) the 32-ft span allows an almost infinite variety of plans; 3) the structural envelope has only a few elements; 4) apartment units can be so disposed, floor-to-floor, as to permit stacking of pipes for heating and plumbing; and slots, which are later concreted, can be provided between floor planks to permit horizontal runs of piping; 5) the 32-ft span allows the use of standard 4-foot sheet materials for exterior walls without cutting; and 6) standard construction materials can be used for the non-bearing exterior walls and for partitioning. The exterior walls may be greatly varied in appearance, using either standard, factory-finished siding materials; or bricks; or, if warranted by the project, custom-designed wall panels. Standard types of dry-wall construction can be used for interior partitioning.

This system escapes what could be marketing rigidities of the factory production line while still taking advantage of its economies and factory quality control. That is to say, the system has flexibility without demanding big inventories of a wide variety of factory manufactured components.

But most important, the system makes use of accepted structural technique, existing mass-produced building products, and available heavy-duty construction equipment. At the same time—since both techniques and materials are familiar—only ordinary labor is required, except for the post-tensioning of the structural elements. The trades involved for the Techcrete system in Boston include steelworkers, stone-masons and bricklayers, cement finishers, carpenters and laborers.

The system also has real cost advantages

The first application of the Techcrete system—the 200-family Academy Home project in Roxbury—has been built and occupied for two years. In addition to it another project a block away totaling 385 units (including a number of high-rise units) is under construction and partly occupied. This represents between $8 million and $9 million worth of build-
ing, and works out to about $10.70 per square foot. This is at least a 10 per cent saving over the nearest comparable construction. This saving (in total construction cost) has been effected entirely in the concrete structure, or little more than one-fourth of the total cost of the building. If the market for the system’s standard component can be increased, it should be possible to reduce costs further.

The 32-ft module is based on careful planning studies
During evolution of the new system, which was originally developed for low-rent housing in the renewal and relocation areas of Boston, planning bays (or spans) of 20 to 30 ft were first evaluated. In apartment planning a 20-ft base works well for a three-bedroom unit but less well for a two-bedroom unit. A base of 24 ft is uneconomical in planning single units and too small to permit two living rooms. A base of 28 ft will barely permit two apartments on a bedroom floor, with the possibility of three bedrooms in width, but two living rooms in 28 ft are inadequate as a repeatable standard. A 32-ft base allows two units at either a bedroom or living room level and combinations of one, two, three or four bedrooms are easily obtainable.

A 32-ft clear span was physically possible because of the availability of prestressed concrete floor planks, 40 in. wide and 8 in. thick. Bearing-wall precast panels which support these planks may be 36 ft or more long. And shear wall panels at the stair wells have been cast five stories (40 ft) in height. Thus these units are in keeping with the principle of maximum flexibility using a minimum number of elements. Larger, therefore fewer, parts save time at several stages, starting with initial design and carrying through to site work. The system strikes a balance between the extremes of 100 per cent flexibility with an inordinate number of pieces to inventory, ship and site assemble, and the total absence of flexibility with a wholly factory-built packaged unit. The components combine structure, enclosure, and finish.
Carl Koch refers to the Techcrete system as an open system because the 32-ft-span concrete “boxes” can be stacked to considerable heights (the structure has been calculated for a 32-story building), and arranged in many forms (row houses, back-to-back row houses, quadrefoils—i.e., a grouping of four units within a cross-shaped party wall system). In other words, more room can be provided by simply adding on more units. His prefabricated Acorn house, in contrast, is a “closed” system—the only way that you could get more space was to use more houses. While the Techbuilt house would be classed as a closed system in a sense, the freedom it provides in interior planning is reflected in the Techcrete system.

While the system was first used for low-cost rental housing in Boston ($75 to $105 per month for one- to four-bedroom units), with construction costs running $10.70 per square foot for apartment buildings up to nine stories in height, it is by no means limited to this class of building. In fact, by their exteriors one would not guess that the buildings were low rental. For higher-cost rentals, more money could be spent on interior finishing, heating and air conditioning, and perhaps on special exterior materials. (In the low-cost units, for example, flooring was asphalt tile and heating was hot-water baseboard convectors. While the original apartments in the Boston low-cost housing had individual boilers for each apartment, later buildings employed central hot water boilers.)

The key to structural stability is continuous post-tensioning

Prestressing rods, generally two for each wall panel, running continuously from foundation up through walls to the roof, clamp the floor panels and the bearing wall panels together in a rigid frame. Up to five stories, this is all that would be needed to provide structural stability, including lateral loads. Above this height, shear walls are required to complement the prestressed rigid frames.

The first step is to anchor the first group of rods to the foundation. Then
FROM FACTORY TO FIELD

Both the pretensioned floor units and the ordinary reinforced wall panels are factory-produced. The floor planks are cast continuously by use of an extrusion machine (photos left) after the wires have been pretensioned between anchorages. The planks are then sawed off in 32-ft lengths. At the site, wall panels are guided in place over post-tensioning rods; then the floor planks are set on ledges cast in the wall panels. Finally the rods are post-tensioned by jacks and anchored. The process is then repeated.

THE FINISHED SHELL

The high-rise units (left), which will provide low-rental units in the Roxbury section of Boston, are ready to receive the non-load-bearing curtain walls. These are constructed of standard light-gage steel studs to which are applied insulating sheathing and exterior finish of prefinished asbestos cement panels, steel panels, aluminum siding or brick veneer. Inside walls are gypsum board. Fenestration can easily be varied.

First-floor bearing wall slabs are guided over these rods. These rods are post-tensioned by means of hydraulic jacks, and after the tensioning force has been applied a temporary anchorage maintains this tension which gives stability to the wall panels. Next, another series of 8-ft-long rods is connected by threaded coupling devices to the first set. The second floor bearing wall panels are guided over these rods. After the floor planks for the second floor have been placed, these rods are tensioned, but the tension force is slightly greater than that applied to the first floor rods. This process is repeated, right up to the top story. The result is that the prestressing force is continuous from top to bottom, rather than each floor having its individual prestressing force. The only anchorages providing any restraining action are those at the foundation and at the roof.

The precast shear walls separating stairs are stabilized by being bolted to the walls. These panels are joined vertically by means of dowel connections.

For high-rise apartment buildings, elevator cores will be constructed of story-height precast concrete boxes, stacked one atop the other and post-tensioned for continuity.

While there is no set limit on the number of possible stories, the walls obviously will have to be thicker the higher the building goes. For a 32-story building the bottom three floors would need to be 20-in. thick. A 13-story building could be built with 8-in.-thick bearing walls throughout.

The post-tensioning system is uniquely suited to American practice

For one thing, pre-tensioned planks, while a European development, are not generally used there for apartment building construction because room sizes are smaller and apartment plans are far more standardized than would be acceptable here—thus there is no particular need for long prestressed spans which cost more than ordinary reinforced panels.

Secondly, heavier construction equipment—cranes and trucks—are more readily available in the States than in Eu-
The sectional drawing (right) illustrates how—by providing building entrances at two different levels, and horizontal circulation via walkways—a nine-story building can comply with FHA requirements that tenants will not have to walk more than two stories up or down two stories down. The plan (below left) shows actual horizontal circulation via integral walkways and terrace areas in the Academy Homes development in the Roxbury section of Boston.

THE SLOPING SITE—A VIRTUE

The prestressed open-ended box is highly adaptable to sloping sites and can provide a wide variety of plan configurations. Cantilevered walls support floors for storage areas, balconies, or continuous walkways. These walkways are particularly valuable in providing horizontal circulation so that apartment dwellers can enter a high-rise building somewhere in the middle and walk either up or down two stories, thus eliminating the need for elevators in low-rental housing. The plan (below left) shows actual horizontal circulation via integral walkways and terrace areas in the Academy Homes development in the Roxbury section of Boston.

The system can work on sloped or unstable sites

The modular system is adaptable to a variety of sloping sites, buildings which can be stepped up and down a hillside to allow for grade changes and provide extra dwelling units at the lower levels. It is also possible to build economically over poor soil conditions or even watery marshland with caissons or piles set approximately under the four corners of the units.

A site with a sharp drop-off can be used to great advantage in low-cost housing, since with entrances provided at several levels, elevators can be eliminated. For example, it is possible to have a nine-story building without elevators.
that will still meet FHA requirements (see page 192). With entrances at two levels, people can walk up two floors or down two floors.

Vertical circulation can be handled in a variety of ways depending on whether the apartment buildings are low-rise or high-rise. If high-rise, elevatoring in medium to high-rise apartment buildings may be provided by center-core access or by corridors and stairs in skip-stop arrangement.

For the low-cost housing in the Roxbury section of Boston, both low-rise and high-rise apartment buildings utilize stair slots—one slot between two of the 32-ft modules serves two buildings.

For some of the high-rise units, walkways are provided at some of the apartment peripheries to provide the necessary horizontal circulation that will permit elevatorless buildings. Such walkways, however, need not be confined to low-cost buildings. They may be an amenity in more expensive buildings, serving as an arcade for shops and other facilities.

**Mechanical integration is well worked out—flexible but not fancy**

The Techcrete system does not yet include a prefabbed mechanical core. Emphasis so far has been straight-line alignments of services so that mechanical chases are easily facilitated. Chase space is provided by leaving space between floor planks. As can be seen by examining the floor plans on page 94, it is possible to have a wide diversity of apartment plans while still to a large extent maintaining mechanical chase alignment. The wiring within apartments is run in the cored holes of the prestressed floor planks, and then down or up through the hollow interior partitions in the conventional manner.

**The system will be available to other architects**

In order to further the short-range goal of encouraging application of the current Techcrete system and the long-range goal of continually improving the sys-
While mechanical and electrical services are installed conventionally, the kitchen, bath and heater modules are installed so that the services are lined up. In this way a slot left between floor planks can be used for mechanical chases. Drainage and vent lines can be seen in place in this shell. This photo also shows a perimeter walkway for horizontal circulation, exterior wall studs in place on several floors, and on one floor, the insulating sheathing in place.
100,000 Frenchmen per day proved it, so Paris installs 3 more

For over two years, 100,000 Parisians per day have been carried smoothly and efficiently between subway lines of the Metro on two SANDVIK MOVATORS—moving walks of rubber-covered steel. As a result of this success, three more SANDVIK MOVATORS, each 600 feet long with a capacity of over 12,000 passengers per hour, are being installed at the Metro's Maine-Montparnasse junction. Each MOVATOR is 44" wide—providing ample space for persons with luggage, and passing room for those who wish to walk ahead of others on the MOVATOR. To the Paris Metro as to the new Skaggs Payless Drug Store in San Francisco, SANDVIK MOVATORS provide an exclusive combination of advantages—a heavy-gauge, one-piece endless belt of solid spring steel gives rigidity and no-stretching—grooved rubber covering assures a safe non-slip surface—SANDVIK wide-rib, narrow-groove tread and special landing plate design prevents heel-catching more positively than any other design. Write for SANDVIK MOVATOR booklet or contact Sandvik.
Why cover the corner when you’re going to paint it?

Every exposed corner of every Weis toilet compartment—partition, door and stile is capped with a stainless steel corner reinforcement. Eliminates destructive welding, brazing and grinding which removes protective zinc coating.

*Another Weis idea for greater protection—longer life!*
Acrylic-latex additives create extra-strength new concretes

By John E. Gallagher, Rohm and Haas Company

A greater than two-fold increase in tensile and flexural strength of the acrylic latex modified mortars (graphs left) is only part of their value. The modified cements adhere well to regular concrete, wood, steel, stone and numerous other materials. In addition, unlike the vinyl-acetate and butadiene-styrene latexes used for cement modification, acrylic modified cement systems have good wet-strength properties as well as excellent exterior color stability. Compressive strength is not significantly improved, but this does not alter the effectiveness of the latex cement as a whole (test results below).

The additives replace most of the water and “fill the voids”

Although the development of this acrylic latex represents a great deal of technical knowledge, accumulated by Rohm and Haas in years of making acrylic polymers, it is not known exactly why or how the additives modify the characteristics of cement systems.

Acrylic latex (like other synthetic latexes or emulsions) consists of plastic particles dispersed in water, giving a milky liquid appearance. The latex added to Portland cement systems is related to the acrylic polymers which Rohm and Haas produces for use as vehicles in water-based paints, and is similar to these materials in that it can be spread in a thin layer and will dry to a tough clear flexible plastic film.

The function of the water in an ordinary mortar of 3/1 sand/cement and water is to hydrate the calcium silicate to form a mixture that will flow, then form a gel structure that hardens. Through hydration and evaporation, the gel is left with small void spaces which act as tiny pockets of weakness.

It is believed that when an acrylic latex is substituted for ¾ of the water normally used, the latex enters the mixture—somewhat like liquid marbles—to fill these voids. These highly adhesive polymer particles disperse throughout the cement mortar, thereby reinforcing the structure as well as contributing to the adhesive action between the cement gel and sand. They help to retard water evaporation, air hydration and control shrinkage.

The concrete has been tested for strength, adhesion, weathering

In tests by Rohm and Haas, the modified cement was cast face up over precast concrete, exterior plywood, asbestos cement and other panels. Quartz, marble granite and other mineral aggregates were applied by hand and lightly pressed into the surface with a wooden trowel. The permanence of these versatile panels was verified by various tests. The results:

Typical strength* properties of facing

<table>
<thead>
<tr>
<th>Test result of facing</th>
<th>Tensile</th>
<th>Flexural</th>
<th>Compression</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM C190-39</td>
<td>300 per cent</td>
<td>200 per cent</td>
<td>400 per cent</td>
</tr>
<tr>
<td>ASTM C348-61T</td>
<td>100 per cent</td>
<td>100 per cent</td>
<td>100 per cent</td>
</tr>
<tr>
<td>ASTM C121-54T</td>
<td>100 per cent</td>
<td>100 per cent</td>
<td>100 per cent</td>
</tr>
<tr>
<td>ASTM C109-64</td>
<td>100 per cent</td>
<td>100 per cent</td>
<td>100 per cent</td>
</tr>
</tbody>
</table>

The adhesive strength is such that the facing adheres permanently to the backing and anchors the aggregate firmly.

* Other tests have shown that acrylic latex modified cement facings combine these strength characteristics with excellent weathering properties:

Test results of facing

Freeze-thaw resistance (150 cycles)

- ASTM C291-61T: no effect
- Accelerated weathering:
  - Atlas weather-ometer: 1,000 hours: no effect
- Exterior exposure:
  - 13 months, Newtown, Pa.: no effect

Freeze/thaw and accelerated weathering had no significant effect on the facing—no evidence of aggregate loss or deterioration of the cement matrix is evident. Panels on exterior exposure at Newtown, Pennsylvania exposure station also show no change.
When moisture penetration, cycles of freezing and thawing, and vehicle wear caused the 30,000 sq ft pavement of a Waterbury, Conn. parking garage to crumble, scale and pit, the lot was resurfaced with a 1/4-in. topping of acrylic latex modified cement. Two years later (lower photo) area is in good condition.

- Facings on lightweight concrete were tested for interface adhesion; the base concrete failed in two out of four test specimens. Acrylic latex modified cement facings exhibited less shrinkage than regular cement mortars and proved practically impermeable to water. They have a coefficient of thermal expansion approximately equal to unmodified cement mortars, which is substantiated by the fact that there was no change in the interface shear strength of faced concrete panels as a result of accelerated weathering exterior exposure and freeze/thaw cycling.

Applications: from parking lots to decorative panels

The versatile properties of the acrylic latex modified cement suit it to various applications. It has been used for patching at Rohm and Haas' Philadelphia plant and for resurfacing at a Waterbury, Connecticut parking lot (photo above).

The chemical and stain resistance properties make it ideal for hospitals. The color-fast pastels and whites, excellent adhesion, and the resistance to spalling and cracking due to freezing make it good in troweled or spray-applied decorative cement coatings and stucco such as that on the Cyclorama Building at Gettysburg (photo above).

In addition, acrylic latex modified cement may be used as a bedding coat for decorative exposed aggregate (photos top), in repair for highways and bridges, and in tile grouts and adhesives, brick mortars and underlayments.

Because of its strength, it is being used to cover thin-shell concrete slabs and panels. It is good for patching and grouting, and as a cement paint it is being used for color and decoration of precast concrete components.

Acrylic latex modified cement paints provide weather-resistant coatings which do not deteriorate after wetting and drying, resist rot, fungus and stain-through and give long-lasting color. A clear, durable non-yellowing glaze coating of an acrylic polymer is recommended where acrylic latex modified cement aggregate-faced panels are installed in areas of heavy traffic or where a surface film from smoke, smog or stain is likely to develop.

Cost of a typical formulation:

22 cents per sq ft per in. thickness

The ultimate price of an acrylic latex modified cement aggregate-faced panel would depend largely upon the type of backing, the aggregate type and size and the thickness of the cement needed to bond the particular aggregate. The following table, however, is a typical formulation with area coverage and raw material costs for Rhoplex MC-4530 Modified Cement Mortar:

Typical formulation:

<table>
<thead>
<tr>
<th>Thickness of applied mortar</th>
<th>Area coverage</th>
<th>Raw materials cost/sq ft *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in.</td>
<td>40 sq ft</td>
<td>0.22</td>
</tr>
<tr>
<td>1/2 in.</td>
<td>80 sq ft</td>
<td>0.11</td>
</tr>
<tr>
<td>1/4 in.</td>
<td>160 sq ft</td>
<td>0.055</td>
</tr>
</tbody>
</table>

* Basis for RMC calculations:
1. Sand calculated at $2.65/ton in quantities of one to three tons
2. Portland cement calculated at $5.30/four 94 lb bags delivered
3. Rhoplex MC-4530 (45 per cent solids) calculated at $.16/lb in bulk delivered
Silicone rubber roof coating resists weathering—breathes

This roofing allows interior moisture to escape, yet exterior water cannot enter. Tests report high resistance to cold and heat. The material which is roller applied to concrete or plywood decks can be applied in any weather (the material remains liquid to -65 deg) and solidifies to a lightweight, permanently flexible rubber membrane. Two coats give an average thickness of 22 mils. Photo demonstrates roofing’s adaptability to varied roof configurations. *General Electric, Waterford, N.Y.

Floodlight fixtures provide uniform lighting patterns

A total of 84 SW floodlight fixtures provide the smooth uniform beam patterns that illuminate the eight-story Empire Central Building in Dallas, designed by Neuhaus & Taylor. The SW fixtures may be used with high-intensity discharge sources, such as the General Electric 400-watt Lucafox in this installation, as well as with metallic additive lamps and conventional mercury vapor lamps. The fixtures may be mounted vertically or horizontally and offer a choice of reflectors. Here the floodlights, mounted on concrete posts 3 ft high and 1 ft square along all four sides of the building, are aimed almost vertically (85 deg average angle). Wide-Lite Corporation, Houston.

Aluminum windows minimize water and air leakage

In the Series 2900 windows, a pressure-equalization slot (A) allows air pressure to build inside the windows’ chamber. Baffle (B) blocks most water from entering, but any that does get in flows back out through slot (A). Weatherstripping and air seal are located at (C). *The Ceco Corporation, Chicago.
COPPER / Contemporary Copper is a 96-page handbook of sheet copper fundamentals, design, details and specifications. The first section treats the essential properties of the material, the structural criteria applicable to it, and the basic methods of joining it. The second section shows how copper can be used as a design element. A third section includes standard recommended copper details, and a fourth section covers typical applications. Letterhead requests. • Copper Development Association Inc., 405 Lexington Ave., New York City.

SUSPENDED STRUCTURES / H. Seymour Howard, Jr., professor of architecture, Pratt Institute, has prepared a 37-page booklet on hanging steel cable as a structural shape. The special requirements of suspension system design, recent applications of the beam & cable, hammock, inflated membrane and other systems are discussed and illustrated. One section, dealing with proposed projects, studies the development of concepts for a school, a market, and an entertainment tent. • United States Steel, Pittsburgh.

NOISE-CONTROL STRUCTURES / An illustrated manual details the "do-it-yourself" Moduline system of designing and assembling such sound retardant structures as soundproof partitions, gas turbine and cooling tower enclosures, production tunnels, quality control and research rooms and supervisory offices. The 27-page application manual contains over 75 engineering sketches. The pre-engineered noise control panels that are the basis for the structures are 4-in.-thick modular panels of steel with acoustic fill. • Industrial Acoustics Company, Inc., Bronx, N.Y.

STEEL BOLT ASSEMBLIES / A 24-page brochure gives information on the A-325 carbon steel bolt and the A-490 heat treated alloy steel bolt. Properties, working stresses, and other data are listed. • Republic Steel Corporation, Cleveland.

LOCKING HARDWARE / A full line of locks, trim, door closers and exit devices, including fire exit hardware, is illustrated in a 16-page booklet. Included is a chart showing application of locks in specific locations. • Sargent & Company, New Haven, Conn.

GLASS / All patterns for rolled, figured, and wired glass are illustrated in a 20-page catalog. Installations include industrial, commercial, school, church, institutional and residential structures. • Mississippi Glass Company, St. Louis.

DOORS AND WOODWORK / Decorator doors featuring moulded, hand-finished carvings in Milano gold, Granada iron, white and gold are part of a 16-page color catalog. Individual carvings for other decorative purposes include entrance doors, Dutch doors, panel, sash and louver doors as well as traditional and contemporary designs for stairways, mantels, room dividers, cabinets, blinds and shutters. • Morgan Company, Oshkosh, Wisconsin.

DECK AND FORMS / One 8-page booklet provides data on Strongform, the concrete form for structural concrete and lightweight insulating concrete applications. Another 8-page catalog describes five types of roof deck for built-up roofs and conventional reinforced concrete slab construction. • Bowman Building Products Division, Cyclops Corporation, Pittsburgh.
Red Cedar Handsplit Shakes: Richly restrained

A roof of red cedar handsplit shakes has a look all its own. Satisfyingly rich. Reassuringly well-ordered. And underneath the good looks, a catalog of practical advantages ranging from durability to strength to insulative capacity. There is a thickness and style of shake for every demand. Detailed information on Certi-Split handsplit shakes (and Certigrade red cedar shingles) may be found in our Sweet's catalog listing, 21d/Re. For further information give us a call, or write. The specification of Certi-Split for red cedar handsplit shakes and Certigrade for red cedar shingles gives both architect and client the protection of Bureau-enforced product grade supervision.

RED CEDAR SHINGLE & HANDSPLIT SHAKE BUREAU

5510 White Building, Seattle, Washington 98101
(In Canada: 1477 West Pender Street, Vancouver 5, B.C.)
New facts on Gas vs. Electric Heat:
Eight Illinois schools are bid both ways.

Now actual figures from independent sources have cut through the cost confusion about Gas and electric school heating.

In first costs: A study was made of 8 new Illinois schools, each bid two ways. The actual-bid figures at the right tell the story. The consulting engineers who made the study concluded: no basic first-cost difference between Gas and electric systems. (Low Gas operating costs made it the unanimous choice.)

Is there proof of Gas operating economy? Actual-cost data on two identical New York schools (one with Gas heating, the other with electric) showed Gas 50% less to operate. And a 4-year Midwest school system study showed an even bigger margin: Gas 7 to 1 over electricity. (Wherever you are, count on at least 2 or 3 to 1.)

Learn more about these carefully controlled tests. And the great economy of Gas. Your local Gas company has all the details. AMERICAN GAS ASSOCIATION, INC.

For heating and cooling... Gas makes the big difference

For more data, circle 99 on inquiry card
Result:
no basic difference in first costs. Gas heat is chosen for operating economy.

<table>
<thead>
<tr>
<th>Location, Name of School</th>
<th>Square Feet</th>
<th>Gas (Resistance)</th>
<th>Electric (Resistance)</th>
<th>Date of Bid</th>
<th>System Installed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crestwood (Kolmar)</td>
<td>34,000</td>
<td>$418,153</td>
<td>$444,054</td>
<td>Mar. '64</td>
<td>Gas Heat</td>
</tr>
<tr>
<td>Matteson (Matteson)</td>
<td>11,720</td>
<td>154,886</td>
<td>151,900</td>
<td>Mar. '64</td>
<td>Gas Heat</td>
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<tr>
<td>Morton Grove (Golf)</td>
<td>28,653</td>
<td>474,730</td>
<td>466,982</td>
<td>Dec. '60</td>
<td>Gas Heat</td>
</tr>
<tr>
<td>Villa Park (Iowa)</td>
<td>24,130</td>
<td>309,847</td>
<td>304,880</td>
<td>Feb. '62</td>
<td>Gas Heat</td>
</tr>
<tr>
<td>Glen Ellyn (Glen Crest)</td>
<td>34,270</td>
<td>436,838</td>
<td>456,467</td>
<td>Apr. '62</td>
<td>Gas Heat</td>
</tr>
<tr>
<td>Malta (Malta High)</td>
<td>35,470</td>
<td>430,353</td>
<td>424,122</td>
<td>Feb. '64</td>
<td>Gas Heat</td>
</tr>
<tr>
<td>Joliet (Oak Valley)</td>
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<td>336,561</td>
<td>337,684</td>
<td>Mar. '64</td>
<td>Gas Heat</td>
</tr>
<tr>
<td>Plainfield (Eastern Ave.)</td>
<td>20,800</td>
<td>290,348</td>
<td>284,755</td>
<td>Aug. '63</td>
<td>Gas Heat</td>
</tr>
</tbody>
</table>
Madison Square Garden suspended roof to give column-free view to 20,000 fans

The great feature of any cable-roof is its elimination of interior columns to provide unobstructed space. This is what the designers had in mind when they planned a 425-ft diameter cable-suspended roof for New York City’s Madison Square Garden Sports and Entertainment Center.

The unusual placement of the building’s mechanical elements—on top of the cables—frees for other uses the space this equipment (air-conditioning, heating, electrical) would have taken.

The cables, each weighing about 3½ tons, were strung in a pre-determined sequence. The three-phase system involved the erection of diametrically opposite cables to prevent unbalancing of the system.

Besides supplying the 48 strand assemblies (3¾-in.), each approximately 195 ft long, Bethlehem has provided the technical assistance of its wire rope specialists.

If you are planning a cable-roof structure, you may benefit from a chat with a Bethlehem engineer. Just get in touch with our nearest office. Bethlehem Steel Corporation, Bethlehem, Pa.

Measuring 425 ft in extreme diameter, the building has a height of 150 ft. Below its 20,234 seats will be a 5,227-seat amphitheater, a 501-seat Cinema, a Hall of Fame, the National Art Museum of Sport, and a 48-lane bowling center.

| Owner: Madison Square Garden Center, Inc. | Owner's Consultant: Tishman Realty & Construction Co., Inc. |
| Architect: Charles Luckman Associates | Structural engineer: Severud-Perrone-Fischer-Sturm-Conlin-Bandel |
| General contractor: Turner Construction Co.-Del Webb Corp., a joint venture | Steelwork and cables: Bethlehem Steel |

For more data, circle 100 on inquiry card.
Flat or curved. Cantilevered. Concave. Snow loads, wind loads, seismic loads. Spans to 100 ft.

There's nothing this plywood and open-web joist system won't do—at rock-bottom cost.

For example:

This new roof system has two basic components: one, long-span joists with tubular steel webbing and lumber chords. Two, plywood roof decking, which is nailed to the top chord.

There are several lightweight, long-span joist system available (those at left are Trus-joists®). Because plywood is easily fastened to lumber chords, only carpenter lab is needed.

Other key advantages: ready availability of plywood. High strength and stiffness for long spans. Adaptability to dozens of roof profiles. Open webs for duct work, wiring...
umbing. Built-in framing for direct ceiling application—custom fabrication. And quick delivery.

demountable branch bank (left) shows what the system can do for a roof.

building had to be low-cost, yet distinctive. Architects & Ellison, A.I.A., Seattle, specified 43-ft. Trus-joists, girding downward 2 ft. toward center at a constant radius.

wood and Trus-joists were also the most economical in terms of the unique, over-a-river design of the Renton, public library above. Architects Johnston-Campbell & Co. of Renton decided on the 80-ft. river span for aesthetic reasons, and to conserve land for a parking lot.

are only a few ways the system is proving itself, in the country. And not just for roofs. In Chicago, for example, Alschuler, Wolfson & Associates recently designed an apartment house using Trus-joists and plywood for all floors as well as the roof deck.

more facts on roof designs or other plywood construction systems (including floors and walls) send the coupon. Or get in touch with any of our regional offices: Atlanta, Chicago, Dallas, Detroit, Los Angeles, Minneapolis, New York, San Francisco, Washington, D.C.

For more data, circle 101 on inquiry card
Chem 101 to basketball practice
Modine delivers the comfort

In laboratories, classrooms and offices—Modine unit ventilators or fan coils heat, cool, filter and dehumidify year 'round.

In the library—heat with Modine convectors or finned-tube radiation; heat and cool with Modine unit ventilators.

In hallways and doorways—Modine cabinet unit heaters deliver heat on demand; finned-tube radiation blankets large areas with uniform comfort.

In the auditorium and gymnasium—Modine central station units heat, cool, filter and dehumidify wide, open areas.

For more data, circle 102 on inquiry card
The formal generators of masonry structure:

**The linked figure**

In our fifth exploration of masonry structures, architect Stanley Tigerman uses the linked figure as his basis for design. Beginning with the two dimensional figure, he isometrically expands into the third dimension—and then evolves into the complete structure.

Throughout this series we shall continue to show how the basic orthogonal shapes of masonry construction—the square, lozenge, rectangle, pinwheel, cross and linked figure—can be developed and projected. We hope that these drawings will serve as idea stimulators and time-savers.

12" solid brick masonry wall, English bond with extruded stainless steel sash section and rubber gasket fixed glazing.
These formal generators interest us because they broaden architectural expression. At the same time two of our products, roll-type and rod-type Keywall® masonry reinforcement can help improve both the usage and quality of masonry construction. We’d like you to use all of them.

This structure, drawn to 3"=1'0" for easy tracing, is reproduced on 8½ x 11" sheets. To receive entire series, write:

Dept. AR-37
KEYSTONE STEEL & WIRE COMPANY
Peoria, Illinois 61607

For more data, circle 103 on inquiry card
L·O·F announces new larger sizes
new design flexibility
new low prices
on Mirropane
...the "see-thru" mirror

Larger sizes... substantial price reductions... faster
delivery. All are possible due to new production
capacities.

The largest standard size of Mirropane has been in-
creased from 60 x 80 inches to 72 x 120 inches.
Maximum size on special order for ¼" thickness, 120
x 144 inches. These larger Mirropane sizes, in all the
different types of L·O·F glass (see table below), pro-
vide more flexibility in design.

Mirropane is used in schools, hospitals, clinics,
stores, banks—wherever it's important to observe
what's happening without being seen.

For more facts, phone your L·O·F Distributor or
Dealer listed under "Glass" in the Yellow Pages or
write to address below.

Mirropane Selection Table

<table>
<thead>
<tr>
<th>Type</th>
<th>Thickness</th>
<th>Primary Advantage</th>
<th>Maximum Standard Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular Polished Plate</td>
<td>¼&quot;</td>
<td>Lightest weight</td>
<td>72&quot; x 120&quot;</td>
</tr>
<tr>
<td>Plate or Float</td>
<td>¼&quot;</td>
<td>Economical standard type</td>
<td>72&quot; x 120&quot;</td>
</tr>
<tr>
<td>Heavy Duty Plate</td>
<td>½&quot;, ⅜&quot;, ⅝&quot;, ⅞&quot;</td>
<td>Strength, sound reduction</td>
<td>72&quot; x 120&quot;</td>
</tr>
<tr>
<td>Parallel-O-Grey®</td>
<td>½&quot;, ⅜&quot;, ⅝&quot;, ⅞&quot;</td>
<td>Best performance lower light ratio</td>
<td>72&quot; x 120&quot;</td>
</tr>
<tr>
<td>Laminated Safety Glass</td>
<td>⅜&quot;, ⅝&quot;, ⅞&quot;, 1&quot;</td>
<td>Safety and sound reduction</td>
<td>72&quot; x 120&quot;</td>
</tr>
<tr>
<td>Tuf-flex® Tempered</td>
<td>½&quot;, ⅜&quot;, ⅝&quot;, ⅞&quot;, ⅞&quot;, 1&quot;</td>
<td>Thermal shock, impact protec</td>
<td>72&quot; x 120&quot;</td>
</tr>
</tbody>
</table>

† Available up to 120" x 144" on special order.

For more data, circle 104 on inquiry card
One man operates the Honeywell Control Center that starts, stops, adjusts, reveals, alarms, monitors, analyzes, and checks almost everything in a modern shopping center. Shown here: Southdale Center, Edina, Minn. Victor Gruen Associates, Architects.

Now! Honeywell 1-man Control can keep every store comfortable, protect it against fire and theft...

...and save thousands every year.

Savings money is where a Honeywell automated control story begins. Because operating cost savings pay for most installations in 3 years or less, and keep on paying for years to come.

One man at a Honeywell Control Center can read and adjust temperatures...start, stop and check equipment in every store.

He monitors Honeywell detection devices that can protect each store against fire and intrusion.

He can do it all without leaving his control console.

Your client saves on manpower, on heating and cooling costs. Equipment operates more efficiently...often lasts longer, too.

Why Honeywell? Only Honeywell offers five different systems to give your clients exactly what they need.

Only Honeywell offers microelectronic circuitry for infinite life expectancy and reliability.

Only Honeywell can offer so many fire and intrusion detectors your clients are sure to get the kind of protection they need.

Only Honeywell maintains a field staff of Building Automation Systems Engineers to help you give clients full payback.

In short, only Honeywell can design, build, install, guarantee and service the complete temperature control and protection system your client needs.

Make us prove it. Ask for examples of operating economies in building complexes like your project. Send coupon today.

Honeywell automation systems help make people more productive
One square foot of floor space accommodates this Haws HPA-4 water cooler. It's just right for small offices or reception areas—wherever space is limited. Haws has higher capacity models, too, for service up to 22 gph. See Haws complete line of electric water coolers to meet every refreshment need. Write for details.

HAWS DRINKING FAUCET COMPANY, 1441 Fourth Street, Berkeley, California 94710.

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For more data, circle 112 on inquiry card
This Superstrong Moistop® Will Make Sure Moisture Migration Never Damages The Floor

It’s what goes under the floor that counts! Moisture migration through the slab plays havoc with floors as well as the most beautiful floor covering. Not to mention complaints, call backs and repairs.

That’s why before you start thinking about floor covering, think first about a tough enough vapor barrier. Specify and then insist on Moistop.

Moistop . . . the 5-ply vapor barrier that keeps out moisture because job-site abuse won’t rip and tear it like plastic film. Moistop’s strength comes from multiple plies of polyethylene film, glass-fiber reinforcement, asphalt and high-strength kraft, and it has a permanent MVT rating of 0.10 perms.

Be sure . . . send for Moistop sample and Specification Guide. Write: Sisalkraft, 73 Starkey Avenue, Attleboro, Massachusetts.

For more data, circle 113 on inquiry card
**AGITAIR** has the Linear Diffuser to fit your specifications

Specs call for linear diffusers? You’ll find the answer at AGITAIR ... because only AGITAIR has the complete line. Choose STRIPLINE extruded aluminum diffusers ... or AGITAIR track systems ... or DECORAIRE extruded aluminum grilles and registers.

Each line was developed by Agitair engineers with a complete understanding of application requirements. That means whichever you choose, you’re sure of graceful styling and refined finish to blend perfectly with the particular decor ... plus built-in functional features that assure proper handling of conditioned air noiselessly and draftlessly.

STRIPLINE, AGITRAK and DECORAIRE are all available in various styles and sizes to meet requirements of architects, engineers and contractors.

To assist in selecting and sizing the correct linear diffuser to your requirements contact your local Air Devices Inc. representative.

**AIR DEVICES INC.,** 185 Madison Avenue, New York, N. Y. 10016

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Extruded Aluminum Grilles and Registers

**AGITRAK**
Track Systems

For more data, circle 114 on inquiry card
"Imperial House" of Dallas...

Outstanding Architectural Creation

with Ludowici-Celadon Roofing Tile

For a roofing material that can express his every architectural fancy, the perceptive architect looks to Ludowici tile. Varied patterns, colors and surfaces offer an unlimited choice in hard-burned clay that cannot wear out, fade or discolor . . . and that requires minimum maintenance.

Architect George L. Dahl of Dallas selected Ludowici's Designer Tilestones in tones of blue, green and gray for this luxurious modern apartment building.

For additional information write Dept. AR

LUDOWICI-CELADON COMPANY
75 East Wacker Drive • Chicago, Illinois 60601

Manufacturers of quarry tile, the nation's largest producer of roofing tile and NAILON Facing Brick.

For more data, circle 115 on inquiry card
NEW FIRE RATING GUIDE

Gives complete summary of Steel Roof Deck fire ratings and construction details.

Underwriters Laboratories recently assigned a Steel Roof Deck assembly without concrete covering, a two-hour fire resistance rating. This means you can now save as much as ten to twenty percent over conventional fire resistance roof construction.

This new Rating Guide explains how you can make substantial savings and gives complete information on the recent two-hour Underwriters Laboratories test. All other Steel Roof Deck fire ratings along with construction details are also included.

The Guide serves as a quick reference for your next roof design.

STEEL DECK INSTITUTE

Airtherm Manufacturing Co. • Armaco Steel Corp., Steel Division • Bowman Building Products Division, Cyclops Corp. • The Ceco Corp. • The Goldsmith Metal Lath Co. • Granco Steel Products Co. • Inland Steel Products Co. • Maconber, Inc. • The R. C. Mahon Company • Plasteel Products Corp. • Republic Steel Corp., Mfg. Division • H. H. Robertson Co. • Wheeling Corrugating Co.

Fill in coupon and clip to your letterhead for your free copy

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

Also send revised edition of True Cost of Full Fire Resistance Construction, This popular booklet which gives cost comparison examples between "fire-resistance" and "non-combustible" construction has just been revised.

For more data, circle 116 on inquiry card

For more products, circle 308 on inquiry card

SANITARY SYSTEMS / The electrically operated Monomatic recirculating flush toilet may be installed in minutes or may be a portable unit. Its many uses include areas where conventional plumbing is impractical: recreational homes, basements, attics, spare rooms, guest cottages, and poolside dressing rooms. It is being used in hospitals as a portable, bedside flushing toilet. The unit needs no venting, complicated plumbing or holding tank. An initial charge of four gallons of water will accommodate 80 to 100 uses. • Monogram Industries, Inc., Los Angeles.

Circle 310 on inquiry card

For more data, circle 117 on inquiry card

More products on page 244

PRODUCT REPORTS

continued from page 23
Tremco sealants at Expo 67.

Tremco knowledgeability in sealants has led to their use in 75 of the 102 structures at Expo '67 ... like the Ontario Pavilion (above) by Architects Fairfield and Dubois. To see details in print, send for your free copy of "Tremco at Expo '67".

The Tremco Manufacturing Company
Cleveland, Ohio 44104
Toronto 17, Ontario
TRACKS and GUIDES
for 1/8", 3/16", 5/16", 1/2", and 3/4" sliding doors

E-Z Glide tracks and guides offer many advantages to builders, cabinet makers and furniture manufacturers. Neat appearance, smooth and silent operation, nothing to wear, corrode or rust. They mount easily in several ways. Doors lift up and out.

Free 38-page catalog on all EPCO sliding door hardware, magnetic catches, knobs and pulls available on request.

See Sweet’s Catalog under Arch. file 19g-En and Light Const. file 7b-En.

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For more data, circle 144 on inquiry card

For more data, circle 118 on inquiry card

For more data, circle 157 on inquiry card
Ceramic tile lends carefree warmth to an unusual circular home by John Nyberg.

Located in Pasadena, California, this circular home has an atrium as its focal point. All rooms of the masonry and tile structure open off the atrium with its circular pool.

Designed by the firm of Nyberg and Bissner as Mr. Nyberg's home, ceramic tile is used both decoratively and functionally. Quarry tile floors are found in the living room, dining area, kitchen and den. It is also used for kitchen counter tops and back splashes.

Scored glazed tile is used for bathroom counter tops and walls including a unique circular treatment of the walls of the master bath.

In keeping with the contemporary Spanish feeling sought for, extensive use of tile is made throughout other areas of this five bedroom home. Tile contractor for the home was C&D Tile Company of San Gabriel.

If you're looking for a material with limitless possibilities in combined decorative and functional use, look for ceramic tile made in the U.S.A. and Quality Certified by the Tile Council of America. The triangular seal at right is your assurance of glazed wall tile, ceramic mosaic tile and quarry tile that is tested to meet the most rigid government specifications. For more information about Certified Quality Tile, a material that can be used with confidence indoors and out, write: Tile Council of America, Inc., 800 Second Avenue, New York, N.Y. 10017. Or, see the current Sweets Architectural File.

For more data, circle 119 on inquiry card.
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The 20 Houses of the Year

A year in preparation, RECORD HOUSES OF 1967 will present the work of a wide variety of architects ranging from the well-known to talented unknown architects new to the ranks of major innovators. The houses will win for their architects and owners Architectural Record's coveted Annual Award of Excellence for House Design. All 20 award-winning houses are fully detailed with photographs (many in full color), plans and schematics. This highly visual presentation of each house, coupled with a clear statement of the problems and purposes behind its planning, will make RECORD HOUSES OF 1967 an ideal tool for opening your client's eyes to ways in which architecture can serve their individual needs, aspirations and way of life.

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ZERO #155 Adjustable Astragals shown above is only one of 175 full size drawings to be found in the new 1967 catalog. Write for your copy today.

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PATIO DOOR / Insul-Dor is reported to allow 81 per cent less air infiltration than the established standard. Polypropylene pile has been added at points of potential leakage and a vinyl insert for the sill helps prevent "wicking" of water. Wood members are reinforced by recessed metal which promises continued alignment, proper seal and easy operation. • R.O.W. Window Sales Co., Ferndale, Mich.  
Circle 311 on inquiry card

ROLLER-CARRIER / A roller-carrier expressly for heavier patio doors has proved capable of supporting sliding panels weighing up to 1 1/4 tons. Panels are said to be easily moved with a fingertip touch. • Allen-Stevens Corporation, Woodside, N.Y.  
Circle 312 on inquiry card

FLOOR DOORS / Two types, T and K, have concealed hinges, built-in torsion bars, hold-open locking at 90 degrees, and vinyl grip handles and gasketing to prevent metal to metal contact. The type T door is hidden by the floor covering material. The type K has a 1/4 in. aluminum diamond pattern plate. • The Bilco Company, New Haven, Conn.  
Circle 313 on inquiry card

more products on page 254
Prestressed concrete reaches new heights in strength and beauty


Architectural and structural expressions are integrated in a boldly sculpted white concrete frame, further accentuated by the continuous grey window wall enclosing the uninterrupted office area. The dramatic design makes the most of the 27-story building's prominence on the city skyline and takes effective advantage of the Florida sun and sky.

Technological advances continually extend the versatility of concrete and open up new opportunity for imaginative design. Some of the innovations included in the design and construction of the Gulf Life Tower are detailed on the following pages.

Gulf Life Center, Jacksonville, Florida.
Associate architects: Kemp, Bunch and Jackson, Jacksonville, Fla.
Structural engineers: Richard R. Bradshaw, Inc., Van Nuys, Calif.
General contractor: Auchter Co.
Precast concrete: Concrete Materials of Georgia, Inc.
Prestress by Capitol Prestress Co.
Ready Mix by Capitol Concrete Co.
Prestressed concrete structure rises 430 ft. above a broad podium

The 27-story Gulf Life Tower will be the focal point of the 12-acre Gulf Life Center in Jacksonville. Included on the river-front site is a multi-level parking garage for about 1100 automobiles, a small marina, a 300-room hotel and convention facilities. A glass-enclosed lobby at the podium level is set back from a second level bank. Precast concrete bridges will span the drives providing pedestrian access to the garage and rest of the center. A concourse level below the podium includes a 600-seat cafeteria overlooking the river, and an employe lounge. This complex will further enhance the commercial waterfront of Jacksonville’s St. Johns River. The podium level is framed with 7-ft.-wide precast, prestressed concrete single-tees, and is surfaced with terrazzo. The extensive and varied use of concrete provides visual unity to this boldly conceived complex.

Eight exterior columns plus center core support tower

Completely exposed columns provide uninterrupted glass area—set back from the inner column surface. Core contains elevator shafts, stair wells, rest rooms, and mechanical shafts. Gross space totals 512,000 sq. ft. The 360,000 sq. ft. of office space enjoys complete flexibility offered by the long-span prestressed concrete double-tee floor units.

Single spread footing supports 430-ft. core

A massive spread footing supports the tower’s central core; four individual spread footings support each pair of the eight exterior columns. The podium, from which the Gulf Tower emerges, is supported by piles. Hydrostatic pressure from beneath the tower’s basement floor slab is resisted by several walls that cantilever from the central core.
**Posttensioned, precast segments form 133-ft. girder**

The segmental posttensioning techniques used are simple, fast and economical. Although the erection sequence varies depending upon the number of tendons used, the fundamental steps are as follows:

- Precast column shell sections are placed and filled with lightweight concrete.
- Temporary shoring truss is secured in position.
- Precast girder segments are placed and aligned, sealing the periphery of the joint with gummed, foamed plastic tape.
- Rubber pneumatic tubes are threaded into mating prestressing ducts and inflated to 5 psi.
- With tape sealing periphery of joint and tubes sealing duct holes, the 1-in. space between segments is filled with high-early-strength grout. (3,000 psi in 24 hrs.)
- Tubes are deflated and withdrawn. Tendons are inserted, each consisting of twelve ½-in., 270 ksi strands.
- Tendons are stressed and anchored (Freyssinet Method) as columns above girder are placed.
- Ducts are pressure grouted to protect tendons.

**Columns combine precast, cast-in-place techniques**

Each column is composed of a precast shell into which fresh concrete is placed. This provides uniform color and texture . . . and precludes the necessity for the decorative concrete mix throughout the entire column. Columns taper from a width of 6 ft. 9 in. at the third floor to 4 ft. at the penthouse, and are typically 5 ft. 6 in. deep. Mix design data for the column concrete fill are:

<table>
<thead>
<tr>
<th>Component</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portland cement, Type I</td>
<td>800 lbs.</td>
</tr>
<tr>
<td>Fine aggregate (sand)</td>
<td>1245 lbs.</td>
</tr>
<tr>
<td>Coarse aggregate (lightweight expanded shale)</td>
<td>735 lbs.</td>
</tr>
<tr>
<td>Water</td>
<td>43.8 gals.</td>
</tr>
<tr>
<td>Water/cement ratio</td>
<td>5.2 gal. per bag</td>
</tr>
<tr>
<td>Entrained air</td>
<td>4 percent</td>
</tr>
<tr>
<td>Slump</td>
<td>4.25 in.</td>
</tr>
<tr>
<td>Strength at 28 days</td>
<td>5000 psi</td>
</tr>
</tbody>
</table>

For more data, circle 121 on inquiry card
Construction of core walls

Core walls of Gulf Tower progressed simultaneously with the exterior precast concrete framework. Consequently, it was possible for the prestressed concrete double-tee floor slabs to be positioned directly atop the core wall. Wall forms were of 3/4-in. plywood on 2x6-in. horizontal studs, backed up by double 2x8 vertical walers. Heavy-duty, 9,000-lb. ties held forms against concrete pressures. The structural core as designed resists all wind forces acting on the building.

Precast, prestressed concrete double-tee floor slabs span 40 ft.

Metal brackets welded to inserts in the spandrel beams support one end of the 18-in-deep double-tees. The opposite end rests in pockets cast in the core wall or on precast concrete planks which are part of a composite girder extending from the column to the core wall. Tees are placed in north-south, east-west directions on alternate floors to equalize load distribution on the columns. A 41/2-in. lightweight concrete topping is placed over the double-tees providing flexibility in accommodating electrical raceways. Air conditioning units located under the window area have individual temperature controls for office space.

Exposed white concrete sculpture ascends high above Jacksonville skyline

White cement and white quartz sand combine to create a bold sculpture which dramatically defines the individual “work areas” of the office building. Tinted glare-reducing glass contrasts sharply with the white concrete frame. The frame segments were cast in Tedlar-coated steel molds resulting in dimensional accuracy and uniformity of color and texture. The precast concrete exterior surface is permanent and will require little or no maintenance.

FREE helpful literature
Simply fill out the coupon below

Portland Cement Association
Dept. A3-8, 33 West Grand Ave., Chicago, Illinois 60610
Please send me literature relating to the techniques used in construction of the Gulf Life Tower (U.S. and Canada only).

Name __________________________
Firm __________________________
Street __________________________
City ____________________________ State __________ Zip ____________
( ) Architect ( ) Engineer ( ) Other

An organization of cement manufacturers to improve and extend the uses of portland cement and concrete

For more data, circle 121 on inquiry card
Specify something to insulate cavity and block walls.
Even if it's peanut butter.

The so-called "dead" air space in cavity and block walls is very much alive. With problems and pitfalls.

Whenever the temperature differs on the inside and outside of a wall (that's only always) convection currents blow up a storm in the cavities. Therms busily shuttle from the side where you want them to the side where you don't.

The net result: misery of the occupants and misery of the heating and air conditioning bills.

In truth, peanut butter in the cavities of these otherwise perfectly fine walls actually would slow down these convection currents and cut the fuel bills somewhat.

Better than peanut butter:
Zonolite® Masonry Fill Insulation

Zonolite Masonry Fill Insulation was developed specifically for these kinds of walls. It doubles their insulation value. Naturally this keeps inside wall temperatures comfortable and cuts heating and air conditioning bills, which is a blessing.

It pours right into the voids, fills them completely and never settles. It is water repellent; any moisture that gets into the wall drains down through it and out. Cost: as low as 10¢ per sq. ft. of wall, installed. That's a blessing, too. Next time, use Zonolite Masonry Fill Insulation. In your wall, you know it's right.
BLACK EXTRUSIONS / A new alloy reduces the time needed to produce black architectural extrusions and is reported to produce a deeper, more lustrous black color than its predecessor, Type 13. The faster finishing time and improved extrudability of the new Anoclad A13 promise to add up to major savings in production costs. A similar replacement for gold colored products will also be available. • Aluminum Company of America, Pittsburgh.

Circle 314 on inquiry card

MAGNETIC DOOR CLOSER / An electromagnet that normally holds a fire-barrier door open, automatically releases to close the door in case of fire. Since the exact intensity of holding force can be dialed, the Doorman is suitable for hospitals, schools, colleges, factories, dormitories, department stores, hotels, motels municipal buildings—wherever doors should be closed quickly to prevent smoke and fire spread. • Honeywell’s Commercial Division, Minneapolis.

Circle 315 on inquiry card

CONCRETE FINISHING AID / Confilm said to eliminate or minimize the effect of wind, heat, and dryness in finishing concrete surfaces. Confilm is not a curing agent, but a liquid that, when sprayed over concrete immediately after screening, reduces evaporation from the plastic surface up to 80 per cent. Plastic cracking, crusty, stickiness, efflorescence, and uneven surfaces are greatly minimized. • Master Builders, Cleveland

Circle 316 on inquiry card

ENVIRONMENTAL ROOMS / An added 8-in. interior width to the V.I.P. fifty-five controlled environmental rooms provides up to 25 per cent increase in loading area, and up to 36 cubic ft of added chamber space over previous models. The "Lumen-Aire" ceiling plenum serves as a combination air-conditioning and air-flow chamber and permits uniform light transmission throughout the room. • Lab-Line Environers Inc., Melrose Park, Ill.

Circle 317 on inquiry card

FIRE CABINETS / A complete line of fire hose and extinguisher cabinets have been specially designed for building with shallow walls. The cabinets can be completely recessed in a 6-in. wall or semi-recessed in a 4-in. wall. • Potter Roemer, Inc., Los Angeles.

Circle 318 on inquiry card

For more products on page 26

For more data, circle 125 on inquiry card

Fullman Manufacturing Co.
1209-1215 Jefferson Street • Latrobe, Penna., 15650
For more data, circle 122 on inquiry card

Fullman Manufacturing Co.
Tsk, Tsk, is it nice to walk all over the one you love?

(Very nice. When Gulistan Carpet is the one.)

Soft, deep, luxurious Gulistan® Carpet of Acrilan® acrylic is very nice to walk on. To look at. And it also saves a tremendous amount of time and money on care and maintenance. Perhaps that is why Maryland Cup Corp., makers of Sweetheart Cups, have carpeted important areas of their ultra modern plant in Towson, Maryland, with these beautiful carpets. In the offices: Gulistan Charter Oak, with a smart crush-resistant pile. In the Conference Rooms: Gulistan Appointment, glamorous cut and loop texture. Both are Performance rated for Heaviest Traffic. Catalogue in Sweet's Architectural File #13L, AIA File 28E.

Stevens Gulistan Carpet

Gulistan Carpet Division, J. P. Stevens & Co., Inc.
295 Fifth Avenue, New York, N.Y. 10016

Please send me the whole story on how Gulistan Carpet contributes quiet, warmth, comfort and beauty at less cost. Include free samples of Gulistan Carpet.

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Address ____________________________
City______________________State______Zip________

For more data, circle 127 on inquiry card

ARCHITECTURAL RECORD  March 1967  259
Instant success. It's Cel-Way, the in-floor electrification system that makes a success of any building. Cel-Way puts telephone service, electric outlets, even special signal service anywhere you want it today... or anywhere it might be needed in the future.

New, architectural style fittings eliminate floor clutter. They provide outlets for either telephone or electric or signal service—or all three—in a single fitting. Even accommodate up to 5 telephone amphenol jacks in a single fitting. Twelve types available for a variety of service requirements.

Cel-Way is the practical, economical way to electrify floor slabs—a method that's compatible with all types of construction: slabs 2½" thick and up, for slabs on grade or concrete or steel frame construction.

Get complete information. See Sweet's File 1J/GR or write for Cel-Way product manual. Granco Steel Products Company, 6506 North Broadway, St. Louis, Mo. 63147. A subsidiary of Granite City Steel Co.
Perfect Filler

For Concrete Block

Sherwin-Williams Bloc-Tex® is a new type of block filler that produces smoother and superior cement block surfaces.

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101 Prospect Avenue N.W., Cleveland, Ohio 44101
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Address ____________________________
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WALK-IN...
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AND GET A 12'X12'
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When it comes to walk-ins, Norris deals in actual, not nominal dimensions. That means you get the size walk-in you specify to within 6" increments—whether it be a small storage unit or an entire walk-in warehouse.

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Every Raynor door detail is permanently registered on data film for positive identification and quick replacement of damaged parts years from now. Data film registration is exclusive with Raynor, and covers all Raynor overhead-type doors — wood, Raylon (fiberglass), aluminum and steel. If a Raynor door is ever damaged or you want to match existing doors for a building addition, Raynor makes it easy. Any time. Ask your Raynor representative about our exclusive architectural shop drawing service — another way you can depend on Raynor.

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ADDRESS ________________________
LOADING DOCKS / Model TS-582 is a loading-dock installation that has adjustable side pads to accommodate various truck widths. The pads are mounted on steel channels, suspended on ball-bearing sheaves, which in turn run on steel tracks. The self-supporting construction is capable of absorbing the full force of the vehicle as it backs against the foam-filled pads, partially compressing them in order to obtain the required sealing effect. • W. B. McGuire Co., Inc., Plattsburgh, N.Y. Circle 319 on inquiry card

MOSAIC TILE/Marwall, available in pre-assembled panels of split-faced marble mosaic, mounted on mesh, provides the look of marble for wainscoting, walls and decorative trim. Cost is reported to be comparable to that of tile. Marwall is available in over 50 different types and colors and may be polished or rough cut, one hue, a checkerboard pattern or a combination of veined marble with plain. • Walker and Zanger, Inc., New York. Circle 324 on inquiry card

JOINT SEALANT / A one-part acrylic sealant assures a weather-tight seal even between dissimilar building materials. Sonac can be used for joints up to ¼ in, and accommodate a 20 per cent change in joint width. The manufacturer reports that the sealant performs well on both porous and non-porous surfaces with minimal shrinkage and without staining or sagging. • Sonneborn Building Products, Inc., Des Plaines, Ill. Circle 325 on inquiry card

HEATING-COOLING SYSTEMS / An air diffuser continuously monitors the air temperature supplied by a heating-cooling system to automatically regulate the air flow in various draft-free patterns. Each time the fan goes on, the baseboard-mounted Flomatic-400 directs the initial, cooler air in a jet toward the ceiling. As the air temperature increases, the air flow pattern changes until desired blanketing of the wall is achieved. • Hart & Cooley Manufacturing Co., Holland, Mich. Circle 326 on inquiry card

HICKMAN Safeguard expansion joint fascia, and water dam system (pat.)
WRITE FOR EXPANSION JOINT DETAILS AND ADDITIONAL SWEET’S PAGES
W. P. HICKMAN COMPANY, INC. 2520 INDUSTRIAL ROW (313) 549 8484 TROY, MICHIGAN 48084
For more data, circle 131 on inquiry card

See SWEET’S 21G-Hi
Your decision is easy because the potential trouble and damage caused by a roof leak could be very expensive for your client: the installed cost of the Hickman safeguard System, which insures positive control of roof water at eaves and along expansion joints, is comparable to less effective methods . . . Our 8 pages in Sweet’s explain how thermal reaction between roofing felts and metal water dams—the main reason for cracked felts—is neutralized. Make that design decision for Hickman; it is even easier after you see how tar drippings and water stains on walls are eliminated: becomes very easy when you examine the striking fascia profiles which enable you to combine wall beauty with positive roof perimeter protection.

For an easy design decision to stop this roof condition

The cross section from Sweet’s, shows how the free-floating fascia interlocks with, but moves independently of, the galvanized steel water dam. The graceful fascia profiles are available in Kalcolors, porcelain and baked enamel.

In Sweet’s there are engineering drawing and sample specs: the writer of this sales rep: a list of typical installation where Hickman Safeguard System is proving itself (name from 1958).
The building that could not burn.

McCormick Place.
Six years young. Strong as steel. Impervious as concrete.
Certainly a fireproof structure. Only it burned down.
McCormick Place was insured.
But insurance could not put out the fire. Nor could insurance hope to compensate for the staggering costs of being out of business during the long rebuilding months ahead.
Authorities say that an automatic sprinkler system in the main exhibit hall could have controlled the fire and significantly reduced the $150 million-dollar loss.
Please take this hard lesson to heart. The buildings you design to be “fireproof” are not fireproof. Contents—including people—will burn. Your client’s ability to stay in business demands “Automatic” Sprinkler protection.

An “Automatic” Sprinkler system puts out fires almost before they begin. With minimal water damage, since 95% of fires are extinguished with three heads or less.
Sprinklers do not add another cost to your building. You can realize economies in construction which more than offset the cost of “Automatic” Sprinklers—and your client can lease his “Automatic” Sprinkler system without capital outlay. Even make lease payments out of insurance premium savings.
To find out how, write immediately to Mr. E. A. Stroupe, Marketing Manager, “Automatic” Sprinkler Corporation of America, Dept. AR-367, Box 6929, Cleveland, Ohio 44101, for your free copy of our fact-filled book entitled “The High Cost of Burning.”
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For more data, circle 132 on inquiry card
ARCHITECTURAL RECORD March 1967 265
UNIT VENTILATORS

AAF/Herman Nelson introduces a new design for overhead installation.

Now, AAF/Herman Nelson has engineered the "SG" unit ventilator expressly for ceiling installation. Here's what the new line means for you:

First, new unit offers total inlet/outlet flexibility: four outdoor air inlets, four return air inlets, four conditioned air outlets.

Second, choose the air-handling capacity that best suits your requirements. Five models available to handle up to 2,000 cfm at ½" external static pressure. Can be installed for remote operation.

Third, variety of coil options lets you fit unit to any heating/cooling system.

Fourth, SG unit ventilators can be installed in most ceiling configurations.

Fifth, glass-fiber filtering rolls make sure your classroom air stays clean. Filtering media is easily advanced by hand crank—from the floor. And an automatic signal light tells when the job must be done. One roll lasts two years in average installation.

Sixth, positive back-draft protection keeps fuel costs down.

Seventh, maintenance is never a problem. Motor and bearings are permanently lubricated and sealed at the factory. Motor has automatic reset thermal overload protection. Add them all together and wrap them in the famous AAF/Herman Nelson five-year written warranty on parts and labor, and you know why things are looking up in ceiling unit ventilation. See your representative for full information about the new SG line. Or write: Herman Nelson, School Products Division, American Air Filter Company, Inc., 215 Central Avenue, Louisville, Ky. 40208.

For more data, circle 133 on inquiry card
PARTIALLY RECESSED

EXPOSED

SOFITTE

CONCEALED

“SG” ceiling unit ventilators offer total air inlet/outlet flexibility—meet variety of architectural requirements

Regardless of the room requirements, there’s an “SG” unit designed to fit in. Low unit height meets critical soffit dimensions. For partially and fully recessed units, wall guard flanges are standard accessories. Choose from nine baked-enamel colors to accent or harmonize with room decor. Or specify prime coat only for finishing on the job.

For more data, circle 133 on inquiry card

EPOXY TERRAZZO / A new flooring material is said to give a lifetime stable conductivity of 150,000 to 250,000 ohms to floors in hospitals and laboratories. The material can be laid in two days and requires no special bed preparation. It is seamless and remains impervious to germs bacteria, water, grease, oils, solvents, chemicals and most acids. • H. B. Fuller Company, St. Paul, Minn.

Circle 320 on inquiry card

FILES / Companion units that match the Roll Out Conserv-a-file cabinets in size and color are lockable units available with sliding doors, adjustable shelves, or clothes hanger rods. Units measure 36⅝ in. wide by 63½ in. high. Depths may be 17 in. or 20 in. • Supreme Steel Equipment Corp., Brooklyn, N.Y.

Circle 321 on inquiry card

INCINERATOR CLEANER / A compact scrubber removes dust particles from flue gases of apartment house incinerators. The 3000-cfm unit, which may be installed either in the basement or on the roof, requires only 15 gpm of water. The water is recirculated from a reservoir in the base of the unit. • Johnson-March Corp., Philadelphia.

Circle 322 on inquiry card

DIFFUSER / The all anodized aluminum “ASD” Air-Slot continuous line diffuser, in ¾-in. and ⅝-in. wide single or multiple slots, features face-side adjustment of the air pattern, flow rate control, and blank off, with the same vanes. Standard sections are up to 8 ft long, with dual alignment key-strips. • AirGuide Corporation, Hialeah, Fla.

Circle 323 on inquiry card

For more data, circle 134 on inquiry card •

No. 27 (offset hung)—No. 28 (center hung) — No. 327 (independently hung) concealed floor closers . . . the most rugged devices ever developed to control single acting doors. The only floor closers of their kind to permit all normal adjustments without removal of cover plate or threshold.

Choose selective on-off hold-open, automatic or non hold-open. Positive stop: Nos. 27 and 28 at 85°, 90° or 105°. . . No. 327 at 90° or 95°.

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Now you can get thinner-than-ever, complex extruded architectural shapes in all the stainless steel alloys... in lengths to 60 feet... and this free new 28-page technical bulletin tells you all about it.

Thanks to Harper’s breakthrough in extrusion technology and expansion of facilities, extruded stainless steel shapes—standards and specials—are now commercially available at economical prices for a host of architectural applications. Window and door members, door pulls, handrails, curtain wall sections, thresholds and gravel stops are a few examples.

In addition to listing data on physical properties of Harper stainless steel extrusions, the new bulletin illustrates design possibilities and limitations... contains specific design suggestions... and includes data on cutting, welding and various finishing operations.

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ARCHITECTURAL RECORD March 1967 269
What’s the Big Idea in Chicago Faucets?

It’s simple really. The faucet body doesn’t wear out. The parts that do wear are all in one replaceable unit. And today’s unit still fits Chicago Faucets made as much as 50 years ago—completely renews the operating heart almost as easily as you’d change a light bulb.

No other faucet can offer you such assurance of long life expectancy, ease of maintenance, or honest economy. Keep the Chicago Faucet idea in mind for your next job.

You can get this Big Idea in the biggest selection of faucets available—for residential, commercial, institutional and laboratory use. Write for catalogs.

No. 1749-6 Built-in Tub and Shower Fittings.

No. 937 Laboratory Table Fitting, Available for water, steam, gas or air service. Also deck mounted and turret types.

No. HC807 Push Button Lavatory Spout allows about 10 seconds flow, then closes automatically. Smart new answer for public or school washrooms.

No. 886 Exposed Sink Faucet, with integral vacuum breaker. Other types with wall brace, pail hook, integral stops, etc.

CHICAGO FAUCETS

LAST AS LONG AS THE BUILDING

THE CHICAGO FAUCET CO., 2100 S. Nuclear Drive, Des Plaines, Ill. 60018

(A Suburb of Chicago)
STEEL LOCKERS / An 8-page catalog shows steel locker units for schools, plants and offices. Units are suitable for varied uses and space requirements. Included are samples of the 12 decorator finishes available. • Penco Products Inc., Oaks, Pa.

Circle 414 on inquiry card

WALL JAMBS / The Pioneer Frame Selector determines the appropriate jambsizes for all wall types, including poured masonry, concrete block, laminated partitions, wood stud, and steel stud. • Pioneer Industries, Carlstadt, N.J.

Circle 415 on inquiry card

GLASS DOORS / A 12-page booklet features styles and combinations of Tuf-flex glass doors. Specific sections deal with fittings, safety hardware and custom doors. • Libby-Owens-Ford Glass Company, Toledo, Ohio.

Circle 416 on inquiry card

HEATING SYSTEMS / A 20-page illustrated catalog describes unit and air heaters and multi-unit installations for various types of industrial and commercial structures. The catalog includes performance charts for air heaters. • PowRmatic, Inc., Palisades Park, N.J.

Circle 417 on inquiry card

FLOODLIGHTING / The selection, specification and installation of floodlights, brackets, poles and related equipment for indoor and outdoor use are illustrated in a revised guide. Recommended illumination levels for sports and exterior lighting, isocandle curves and other data are included. • Spero Electric Corp., Cleveland, Ohio.

Circle 418 on inquiry card

SOUND CONTROL / A 12-page rated sound control construction system booklet includes sound control definitions, selector guide for both floor and partition systems for sound control, suggestions for added quiet conditioning and a summary of the FHA minimum property standards for multi-family housing. • The Celotex Corporation, Tampa, Fla.

Circle 419 on inquiry card

CONDENSING UNITS / Air-cooled condensers and condensing units of from 7 1/2- to 60-ton capacities available in 19 different space-saving, weight-conserving models are reviewed in a newly revised, 8-page technical information "digest." The units are specially designed for roof-top installation. • Acme Industries, Inc., Jackson, Mich.

Circle 420 on inquiry card

For more data, circle 138 on inquiry card

INDUSTRIAL LUMINAIRES / The 96-model line of Filterglow enclosed and Econoglows open-ventilated luminaires is described in a 24-page bulletin that includes single or twin-mounted designs for mercury-vapor, Lucalox or Multi-vapor lamps, in 400- and 1000-watt ratings. Detailed charts give photometric data. • General Electric Company, Schenectady, N.Y.

Circle 421 on inquiry card

STEEL CABLES / A booklet entitled "Tentative Criteria for Structural Applications of Steel Cables for Buildings" defines common terms used in steel cable construction and makes specific recommendations on a variety of major factors in the design and construction of cable structures. These include preparation of plans and drawings as well as general specifications covering loads, deflection, cable fabrication and protection, end fittings, erection techniques and construction inspection. • American Iron and Steel Institute, New York.

Circle 422 on inquiry card

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Silently at work
in your classrooms, cafetorium, library, conference rooms ... wherever you need space divided
Acoustical class 38 in wood or Formica® clad

* Additional product information in Sweet's Architectural File
Republic Steel Tubing helps make

Detailed truss, left, and typical joist to truss connection, right, show steel trusses and wood joists for church roof, reinforced concrete frame and slab, and concrete block infilling. Republic Structural Tubing is available in round, square, and rectangular shapes in a full range of sizes. Take advantage of this high strength welded steel tubing for your next design and construction project. (Drawings courtesy of Progressive Architecture.)

This STEELMARK of the American Steel Industry on a product assures you it is modern, versatile, economical Steel. Put it on products you sell; look for it on products you buy.
The Unitarian Church of Lexington combines functionalism and
design in a structure that opens
to surrounding nature.

a place of worship a tower of strength.

Architect Herb Greene specified Republic Structural Tubing
for trusses in the new Unitarian Church of Lexington, Ky.

The Unitarians of Lexington wanted their new church to be more than just a meeting
place for Sunday services. It had to accommodate weddings and square dances and
musicales, plus a theater-in-the-round. And it all had to be accomplished with a small
budget.

So, architect Herb Greene set to work. He designed a church of steel, concrete, and
wood.

The finished two-story structure is supported by ten Republic Structural Steel Tubing
trusses. Each truss member is welded onto an I-beam at a point 10 feet from the center
of the compression ring. Truss, beam, and ring form an arch that runs into the ground
and is bolted onto a concrete footing.

Not only do the white-painted steel trusses add a decorative touch inside, they look
like supporting stilts on the outside . . . placed to keep the heavy wooden "umbrella"
from tipping.

The Unitarians now have their church. And it's more than just a building. Utilizing
Republic Structural Steel Tubing, Herb Greene made it an economical tower of strength.
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Architects are Charles Luckman Associates; structural engineer: Stephen Olko; electrical and mechanical engineers: Wald & Zigas; interior design (color and furniture selection): Hans Kriek's Associates; landscape architect: Jack Nazar; and general contractor: George B. H. Macomber Company.
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Engineering library will house 150,000 volumes

The Mart Memorial Library at Lehigh University, Bethlehem, Pennsylvania, designed by Steinmann and Cain, will house 150,000 volumes and will seat 350. The $1.5-million structure will also house a special laboratory area for investigation of ways to help bring the vast stock of recorded knowledge under more adequate control. This library, for books related to science and engineering, will be a three-story building faced in brick and glass with limestone trim. Also provided will be an all-night study room, closed-circuit television system and electronic data processing equipment.

School designed for the mentally retarded

The South Eleventh Street School, Newark, New Jersey, designed by Frank Grad & Sons, architects and engineers, will serve the needs of trainable mentally retarded children. The building will have simple functional spaces connected by corridors which are deliberately kept as short as possible and which are varied by slight differences in shape and color, to enable the students to find their way about easily with a minimum of confusion. The $1,347,000, 41,000-square-foot school will contain 20 classrooms and five workshops on two levels and will surround a large square courtyard. Other facilities provided will include an two-level cafeteria-auditorium, administrative offices, library/conference room, faculty lounge and gymnasium. The school will serve 250 pupils between the ages of five and 20 years.

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Office building will have ground floor arcade
A 12-story office building for the John Hancock Mutual Life Insurance Company on Pennsylvania Avenue, Washington, D.C., designed by Edmund W. Dreyfuss and Associates, will be set back 50 feet from the street to conform with the redevelopment plans of the President's Commission on Pennsylvania Avenue. The $15-million project will be cantilevered at the third floor, creating a second-floor pedestrian walk and a ground-level arcade. The building will contain approximately 400,000 square feet and will have four underground parking levels for more than 300 cars. Basic exterior materials will be high-relief precast concrete panels and tinted glass.

University building will house international conference center
The School of International Affairs at Columbia University, New York City, will have 300,000 square feet in a five-story base structure, partially below grade, and a 10-story tower. The $12.9-million building will house a 600,000-volume library, classrooms, offices, specialized facilities for visiting scholars, television, audio-visual and translation equipment, and an international conference center on the top floor. Architects are Harrison and Abramovitz.
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ARCHITECTURE DESCRIBED BY GENEALOGY, AS LANGUAGE, AS CULTURAL VALUE

This month's book section reviews three entirely different approaches to the history of art and architecture. The first develops a highly selective viewpoint towards recent buildings and ends by exhorting the profession to live up to the pattern that the historians have developed. The second traces the history of an architectural theory and notes its manifestations and influences at the present time. The third attempts to treat the art of a certain period as an integral part of the other events that took place at the same time—an approach that has been attempted but rarely, and might have some useful results if it were tried more often.


It is hard to believe that a book that is so scholarly, so complete, and so well presented as this one might nevertheless be setting forward some very questionable conclusions. It is, however, the very clarity and completeness of this work that make its point of view so difficult to accept. Ostensibly a history of architecture from 1940 through 1965, the book is really a detailed chapter from a historical description whose outlines have been established by historians like Sigfried Giedion and Nikolaus Pevsner. Mr. Jacobus acknowledges this cumulative heritage in an introductory chapter entitled "A Genealogy for Contemporary Architecture." The word "genealogy" seems to be used in all seriousness, although it is precisely around the differences between history and genealogy that all criticisms of this book must center.

The genealogical view of modern architecture that Pevsner and Giedion propagated, and which Mr. Jacobus accepts, sets up a very small number of architects and buildings as the ancestors of almost all the architecture of today. This view, in turn, sets up a false comparison between the order and clarity that seems to have obtained in the days of the carefully selected ancestors, and the variety and comparative confusion that prevail at the present time.

As ideas do not really reproduce the way human beings do, a selective genealogical view of history leads to all kinds of contradictions which the completeness of Mr. Jacobus's study shows up very clearly. For example, Hans Scharoun, who gets fairly cursory treatment as an ancestor (he was apparently only a friend of the family) suddenly receives a full historical biography of his own in the section devoted to present-day architecture in Germany. Mr. Scharoun was blackballed from the "International Style," and he never made the "mainstream" as the art historians have been defining the mainstream; but here he is still inconveniently building important structures like the Berlin Philharmonic, and a conscientious historian knows that he requires some kind of historical explanation.

It is only fair to add that the genealogical view of modern architecture is the prevailing one at the moment. All over the country, art historians are busy imparting it to their students, using precisely the same illustrations that appear in Mr. Jacobus's book. All over the country graduate students are busy researching ever more insignificant aspects of the grand genealogical design; while art-historian-critics lean pantingly over the drafting boards of the great, ready to add each new tracing to the patterns of history. Very few people, however, seem to be giving any thought to the problem that—viewed from the perspective of any other kind of history—this whole top-heavy structure is founded upon a highly debatable assumption.

—Jonathan Barnett

THE CLASSICAL LANGUAGE OF ARCHITECTURE. By John Summerson. The M.I.T. Press, Massachusetts Institute of Technology, Cambridge, Mass. 56 pp., illus. $5.95.

Under the Beaux Arts system, what the British Art Historian Sir John Summerson refers to as the "classical language of architecture" was thoroughly learned and fluently spoken; but this language has passed out of architectural currency in very much the same way that Latin has vanished from the scholarly curriculum.

Summerson considers that the five Greek and Roman Orders were essential ingredients of classicism; but that classicism could also be considered a "demonstrable harmony of parts" of which the Orders were often, but not always, a manifestation. In a series of six radio talks (only the British could be expected to listen to a radio program about the Orders) Summerson undertook to explain the "grammatical workings of this architectural language" to a non-professional audience. The listeners could send in for a pamphlet of illustrations; and now both illustrations and the lectures are available as a book.

The entire work is pervaded by Summerson's charming style and seemingly effortless scholarship. What could have been an exceedingly dry analysis in someone else's hands becomes a means for investigating many of architecture's most subtle aspects. In Summerson's opinion it was Bramante's contemporary, Serlio, rather than Vitruvius or Alberti, who gave the five Orders the symbolic authority which made them a systematic, and international, architectural language. The major part of the book becomes an analysis of the way in which this language developed during the High Renaissance and the Baroque, the effects on it of 18th-century rationalism and archaeology, and its continuing influence both on the form of buildings and as a concept of rational procedure.

For those whose contact with architectural history has been mainly through the propagandistic efforts of the genealogical school, Sir John Summerson on the Orders should be quite a revelation.

continued on page 30
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Early America

THE ARTIST IN AMERICAN SOCIETY. The Formative Years 1790-1860. By Neal Harris. George Braziller, 1 Park Avenue, New York, N.Y. 432 pp., illus. $7.50.

Mr. Harris is a historian who has decided to deal with a subject usually left to the more specialized methodology of art history—American art in the period between 1790 and 1860. Not surprisingly, his primary focus is the artist and his place in society, rather than the works of art themselves. The book's content is consequently refreshingly objective. Instead of the self-conscious analyses of painting and sculpture with which so many art histories abound, there are many citations of contemporary essays, newspapers and biographies—the source material of the cultural historian.

On the other hand, this book's genesis as a Harvard doctoral dissertation is still quite apparent; and the author's desire not to leave anything out has a tendency to make life extremely difficult for the ordinary reader, who would have been delighted to take Mr. Harris's expertise for granted in exchange for a simpler narrative.

Nevertheless, there is clearly a great deal of benefit in considering the problems of art and architecture in the context of other events. Mr. Harris points out that the artist in the early years of the United States was cut off from traditional ecclesiastical and aristocratic patronage and surrounded by a society with a puritanical view of any activity that was not demonstrably useful. Many present-day attitudes seem clearly traceable to this early set of circumstances, although Mr. Harris does not over-stress the parallels. Surely it would be worth while for someone to explore the reasons why so-called "modern" architecture was more acceptable as a European export than the far more subtle work of Wright had been, and how similar the mechanism of eventual acceptance was to the earlier importation of academic classicism. Anyone who is interested in the tendency of Americans to take their new artistic formulations from Europe will find valuable information in Mr. Harris's book. Similarly, the place of the artist in our society (who pays for art and is art worth what it costs?) is clearly traceable right back to the early days of the republic, as is the artist's response: the organization of academies and professional societies.

Mr. Harris's book shows that it would be enormously useful if more professional historians would turn their attention to art, because by doing so, they might induce art historians to devote more attention to historical context.

BOOKS RECEIVED

TExAS HOMES OF THE 19TH CENTURY. By Drury Blakeley Alexander. The University of Texas Press, Austin, Texas 78712. 276 pp., illus. $15.00.

THE SANCTUARY OF HEMITHEA AT KASTABOS. By J. M. Cook and W. H. Plimmer. Cambridge University Press, 32 East 57th St., New York, N.Y. 10022. 300 pp., illus. $15.00.


DESIGN OF THIN SHELLS, Vol. II. By A. M. BINGHAM AND PLANTS. A Checklist for Engineers and Architects. By Mark E. Hanson. The M.I.T. Press, 50 Ames St., Cambridge, Mass. 02142. 262 pp., illus. $7.50.


continued on page 309
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Continued from page 304


BOLAFLI CATALOGUE OF ITALIAN ARCHITECTURE. Edited by Giuliano Luigi Marini. Giulio Bologna edizione, via Eleanora Duse, 2, Turin. 634 pp., illus. $32.00.


OPPORTUNITIES IN AN ARCHITECTURE CAREER. By Robert J. Piper, A.I.A. Vocational Guidance Manuals, 480 Second Ave., New York, N.Y. 10017. 120 pp. Hardbound, $2.65; Paperbound, $1.45.


TRANSPORT TECHNOLOGY FOR DEVELOPING REGIONS. By Richard M. Soberman. The M.I.T. Press, 50 Ames St., Cambridge, Mass. 177 pp., illus. $10.00.

MONASTERY AND CATHEDRAL IN FRANCE: Medieval Architecture, Sculpture, Stained Glass, Manuscripts, the Art of the Church Treasuries. By Whitney S. Stoddard. Wesleyan University Press, Middletown, Conn. 412 pp., illus. $23.50.


N.Y. 10019. 156 pp., illus. Hardbound, $5.95; Paperbound, $3.95.

ILLUSTRATED INTERNATIONAL ARCHITECTURE. Ten Hagen N.V., P.O. Box 34, The Hague, Netherlands. 570 pp., illus. $28.00.


NEW EDITIONS

DIRECT CARVING IN STONE. By Mark Batten. Alec Tiranti Ltd., Transatlantic Arts, Inc., 565 Fifth Avenue, New York, N.Y. 10017. 166 pp., illus. $6.75.

THE MODULAR NUMBER PATTERN. By Ezra Ehrenrants. Alec Tiranti Ltd., Transatlantic Arts, Inc., 565 Fifth Avenue, New York, N.Y. 81 pp., illus. $8.25.


GEOMETRICAL COMPOSITION AND DESIGN. By Matila Ghyka. Alec Tiranti Ltd., Transatlantic Arts, Inc., 565 Fifth Avenue, New York, N.Y. 10017. 48 pp., illus. $3.00.

GEOMETRY IN EGYPTIAN ART. By Else Christie Kieland. Alec Tiranti Ltd., Transatlantic Arts, Inc., 565 Fifth Avenue, New York, N.Y. 10017. 214 pp., illus. $9.00.

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