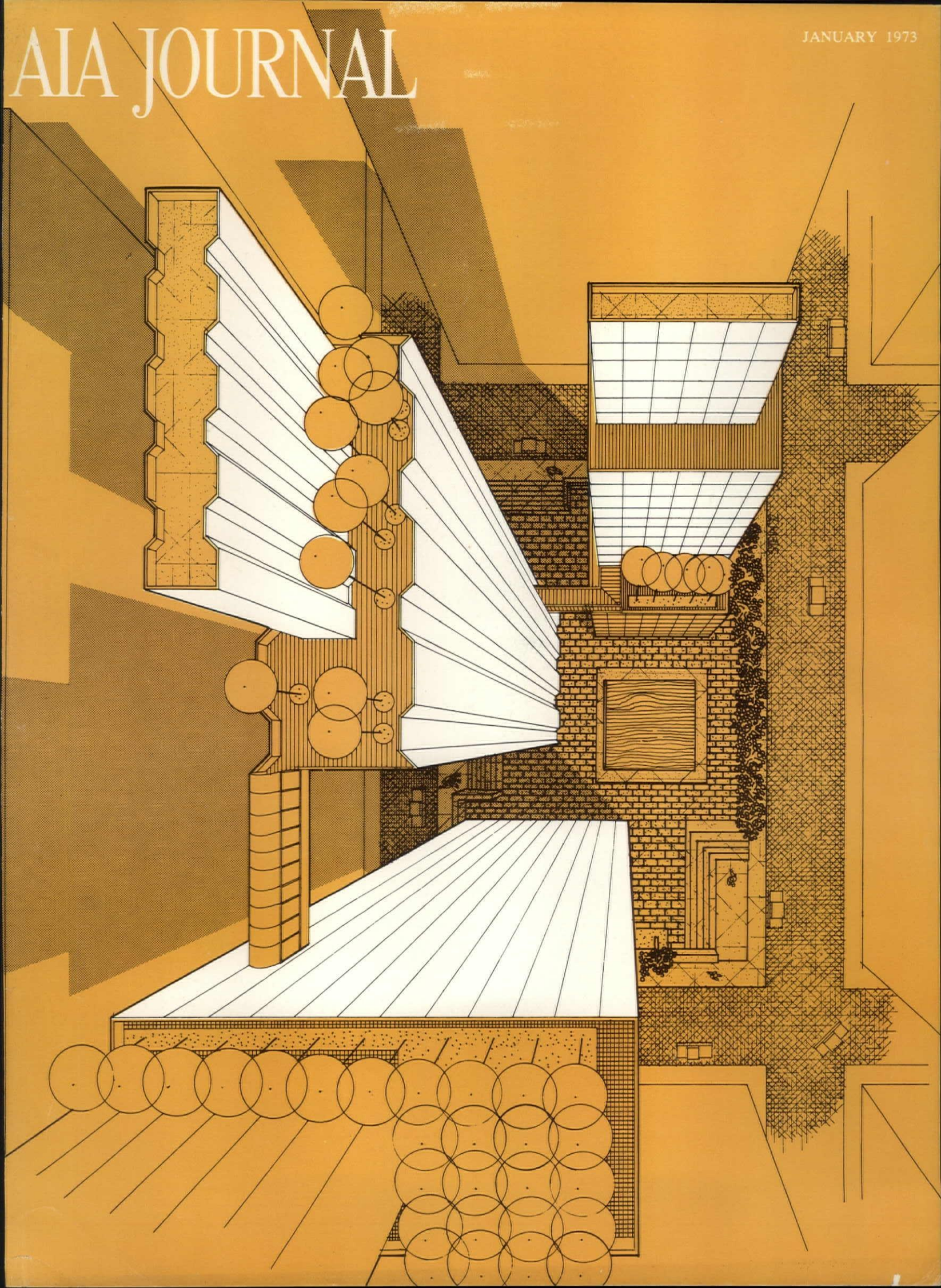
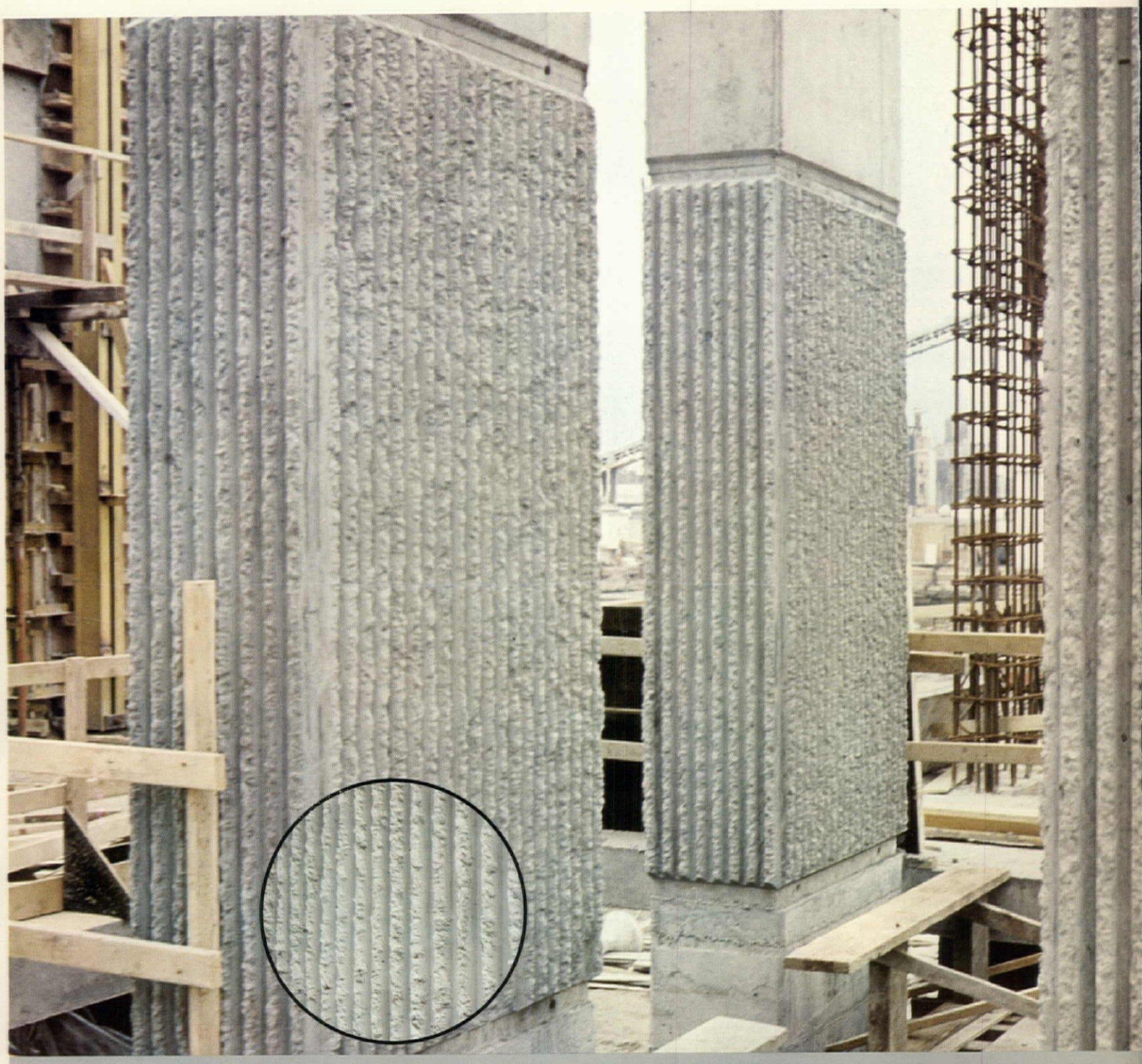
AIA JOURNAL

JANUARY 1973





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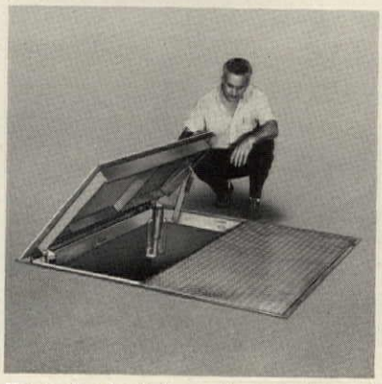

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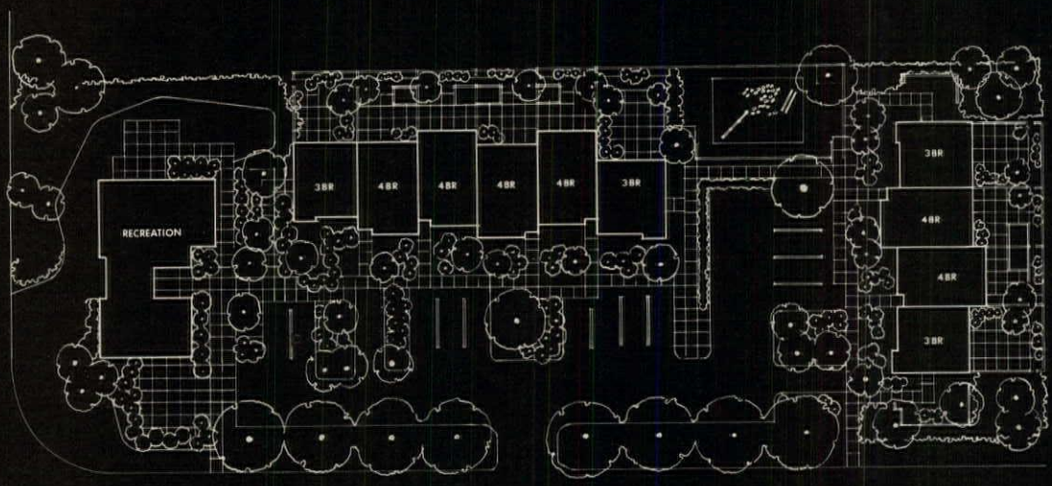

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JANUARY 1973

DEPARTMENTS

COVER: Around tall buildings could be pooled open space, making generous, useful plazas, suggests Herbert McLaughlin, AIA (p. 23). Drawing by Bernard Stein, Kaplan & McLaughlin.

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Comment and Opinion

About This Issue on Tall Buildings: As we were assembling and editing the January AIA JOURNAL, we were made vividly aware that we could not have selected a more topical subject. For, unfortunately, at least two major fires in highrises—one in an 11-story home for the aged in Atlanta where nine lives were lost and the other in a 16-story office/apartment complex in New Orleans which claimed four—were not only making the headlines but also were serving as catalysts for related articles and editorials. Since then, such titles as "Highrise Fire Dangers Stressed," "Safety Actions Different in Fire in a Highrise" and "Highrises Vulnerable to Fire" have become commonplace in the mass media.

All kinds of questions have been raised and likewise all kinds of solutions put forth. For example, one newspaper referred to a fire prevention and control official as stating that the New Orleans disaster could have been controlled if the building had had a sprinkler system, but went on to quote a building managers' association executive as saying that sprinklers have a "cost factor and a problem factor (malfunctioning)." And so it goes.

From a positive point of view, something is being done about fire problems in particular and life safety in general as they pertain to tall buildings. The American Institute of Architects, working with the International Conference of Building Officials, has recommended special provisions for adoption and inclusion in the building codes, as is indicated on page 35. Just as we were going to press, the Chicago Committee on High Rise Buildings summarized its proposals in a news release. (Copies of the proceedings of its national conference are available for $10 a copy by writing the committee at 10 S. Wabash St., Chicago, Ill. 60603). The Council of American Building Officials—three organizations brought together last August so that their members for the first time in history can speak through one voice on matters of national importance—has developed a model standard of suppression systems for life safety. The National Fire Protection Association is now in the process of revising its sprinkler standards. And the General Services Administration has been very much concerned with the matter of fire protection.

The subject of fire, while critical indeed, is only one of a number of considerations associated with tall buildings. That is why we chose to devote the major portion of this JOURNAL to a single topic. After all, every architect, even if he never has or never will design such a project, is affected by highrises: as a place of work and/or shelter and in terms of the part they play in the overall urban—and more and more the suburban and rural—fabric.

The idea for the January issue came about last July when two manuscripts arrived in our office, one on fire in tall buildings and the other on structural/architectural interaction. We conferred with technical staffers at AIA Headquarters who agreed that both were interesting but needed companion pieces. We got a real shot in the arm when the JOURNAL received the announcement of the tall buildings conference to be held at Lehigh University, which was attended by Bess Balchen, managing editor, who already had started the overall planning.

In any event, we want to take this opportunity to let our readers know how both architects and engineers leaned over backward to help us put this issue together. One author gave his copy a final check while packing his suitcase for an overseas trip; another worked on his article in Los Angeles, Honolulu and New York City; still another spent part of the Thanksgiving holiday to comment on various points; and a fourth called long distance from Paris to assure us that his manuscript was underway. If this kind of cooperation is a sign of what we may see happen between architects and engineers in the future, tall buildings will be in much better shape than they are at present.

ROBERT E. KOEHLER

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Outlook

Ferebee Becomes 49th Institute President, Calls upon Architects to Be Leaders

"It seems particularly appropriate that we are gathered in the National Gallery of Art during its magnificent exhibition of the works of Frederick Law Olmsted, city planner and landscape architect, whose visionary genius is revered by all design professionals," said Max O. Urbahn, FAIA, who handed over responsibilities of the presidency of the AIA to S. Scott Ferebee Jr., FAIA, of Charlotte, N.C., on December 8 in Washington, D.C. The exhibition to which Urbahn referred honors Olmsted's sesquicentennial year (AIA JOURNAL, Nov. '72, p. 8).

Saying that the evening belonged to Ferebee, Urbahn continued, "It marks the beginning of a year in an office which is tremendously demanding and rewarding."

In his inaugural address, Ferebee declared: "Architects must not only provide moral leadership to their communities, they must apply design creativity and ingenuity in solving its most serious problems." (*See* Dec. '72, p. 16 and the Institute Page in this issue for statement of his programs.)

Declaring that we are entering a new era "in which concern for human values and individual worth will take precedence over technological advances and material developments," Ferebee called upon architects to approach this new era with "positive thoughts and forward-looking solutions."

Ferebee said that the public "is looking to design professionals to provide leadership in integrating social, economic and physical aspects of our environment" and that the architects' training, professional knowledge and interest and unique relationship to both art and science, as well as their position of respect in the community, make them the logical choice to fulfill this leadership role. He declared that "all of our clout" should be expended on influencing "better housing; prevention and elimination of urban blight and suburban sprawl; creative rejuvenation of our inner cities; community, urban and regional planning; environmental concerns; visual pollution; esthetic values; human scale; and the design of work, home, study and play facilities."

Among the honored guests at the inauguration of the new AIA president were six past presidents, all Institute Fellows: Robert F. Hastings, Detroit; Robert L. Durham, Seattle; Charles M. Nes, Baltimore; Morris Ketchum, New York City; Arthur G. Odell Jr., Charlotte, N.C.; and J. Roy Carroll Jr., Philadelphia.

Archibald C. Rogers, FAIA, Baltimore, president-elect, expressed appreciation for the services to the Institute of the retiring officers and board members. He introduced new officers and board members who will take over the reins of the AIA for 1974 (complete listing on p. 6).

Ferebee receives medal of office from Urbahn; guests at the inaugural view Olmsted exhibit.

Nine Firms Vie in Design Competition For Johns-Manville Headquarters

The Johns-Manville Corporation has invited nine architectural firms to participate in a competition for the design of its world headquarters building to be located on the 10,000 acre Ken-Caryl Ranch near Denver. The building of 400,000 gross square feet has a budget of $25-$45 million, including site development. The total project includes the Johns-Manville headquarters building, three similar office buildings and a management seminar complex on a 400-acre portion of the site. The competition is limited to the design of the Johns-Manville headquarters.

Professional adviser for the competition is John B. Rogers, AIA, of Denver. Jury members are Theodore C. Bernardi, FAIA, San Francisco; Robert L. Geddes, FAIA, Princeton, N.J.; W. R. Goodwin, chief executive officer and director of Johns-Manville; Hubertus J. Mittman, regional landscape architect, Denver; and Harry M. Weese, FAIA, Chicago. The winner of the competition will be announced at the AIA convention in San Francisco in May.

"Most important in the choice of competitors," says the firm, "is Johns-Manville's confidence that each will prepare a design which would be acceptable for construction." There is a $20,000 stipend for each competing firm, and the winner will receive a commission at 6.25 percent fee. The stipend is not part of the total fee.

The invited competitors are: The Architects Collaborative, Inc., Cambridge, Mass.; Welton Becket & Associates, Los Angeles; Caudill Rowlett Scott, Inc., Houston; Vincent G. Kling & Partners, Philadelphia; Neuhaus + Taylor, Houston; I. M. Pei & Partners, New York City; William L. Pereira Associates, Los Angeles; RTKL, Inc., Baltimore; and Sert, Jackson & Associates, Inc., Cambridge, Mass.

Publisher of AIA JOURNAL Is Named

Michael J. Hanley assumed the responsibilities as publisher of the AIA JOURNAL in December. From 1966 until his new appointment, he was the New York and New England advertising manager of *Progressive Architecture*. Previously Hanley was midwestern advertising manager for Whitney Publications where he handled advertising for such magazines as *Interiors* and *Industrial Design*. Earlier he was employed by the Chicago firm of McCutcheon & Cutler which represented numerous publications. He attended the University of Colorado and is a graduate of Arizona State University where he majored in economics.

Panelists Discuss Footcandle Standards As Related to the Energy Crisis

The New York Section of the Illuminating Engineering Society held a seminar in New York City recently on "The Optimization of Lighting Energy." Four panelists addressed their attention to the presentation and challenge of research basis for recommendations of IES footcandle standards.

Moderated by Walter F. Wagner Jr., editor of the *Architectural Record*, the panelists were C. L. Crouch, director of research, Illuminating Engineering Research Institute; Leonard G. Parks, vice president, engineering, Uris Buildings Corp.; John H. K. Shannahan, president, Electric Energy Association; and Richard G. Stein, FAIA, principal in the firm of Richard G. Stein & Associates, New York City.

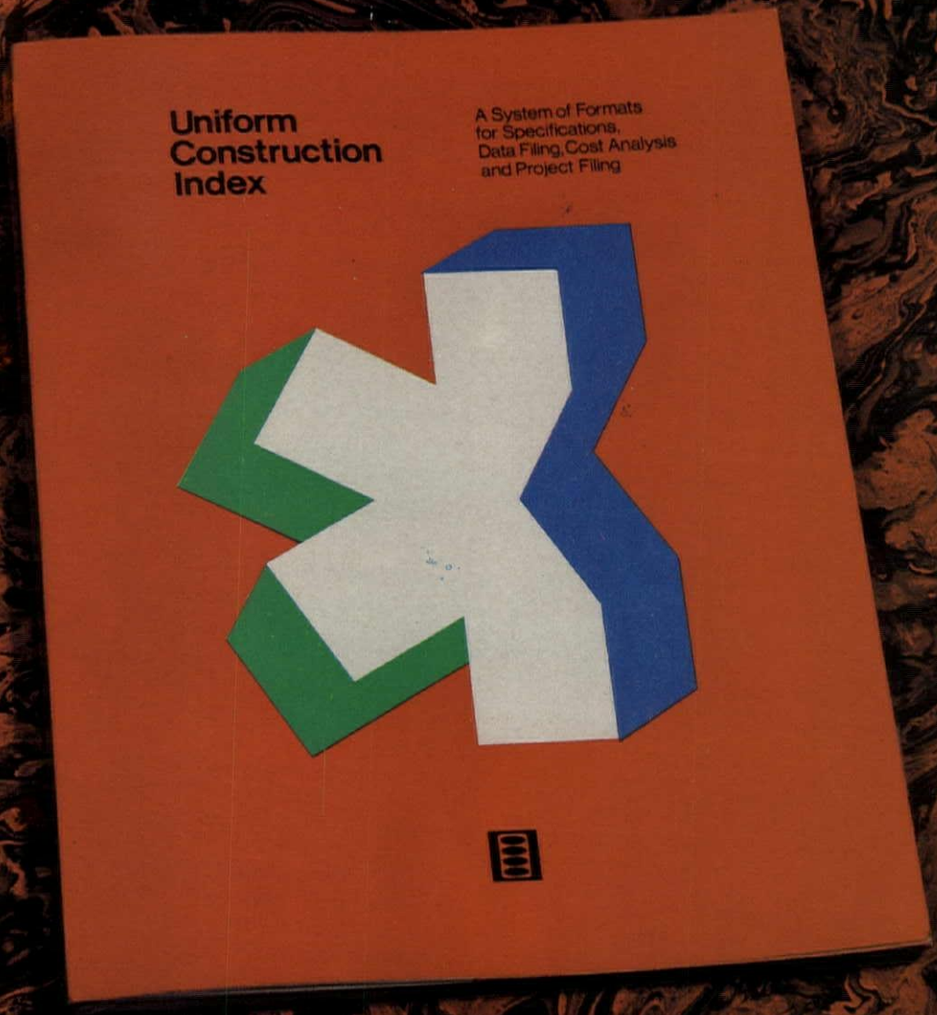
In their discussion of lighting design according to IES standards, three of the four speakers based their statements on the existence of the energy crisis and the state of depletion of nonrenewable resources.

The question period which followed the presentations was a calm one, with no sparks flying. It would appear that the energy crisis is now widely accepted as a factual reality and that a revision of lighting standards is a less explosive issue than it has been.

AIA's Ethical Standards Gets Addition

The following statement has been incorporated into the AIA Standards of Ethical Practice in accordance with requirements of the consent decree entered June 19, 1972 between the Institute and the US Justice Department (*see* July, p. 39): "Under the Standards of Ethical Practice of The American Institute of Architects the submission

continued on page 10



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Mix of Business, Seminars and Tours Planned for AIA Convention in May

The AIA convention will open officially in San Francisco on May 7 with the presidential address by S. Scott Ferebee Jr., FAIA. He will also introduce the keynote speaker, John T. Caldwell, chancellor of North Carolina State University, Raleigh, who will talk on the convention theme, "The Challenges of the Future."

Sam T. Hurst, FAIA, dean of the School of Architecture and the Fine Arts, University of Southern California, will moderate a plenary session on May 8 on the subject of the challenges of growth and change. Panel members are Dudley Kirk Morrison, professor of education, Stanford University; Philip M. Hauser, professor of sociology, University of Chicago; and Glenn T. Seaborg, professor of chemistry, University of California at Berkeley.

Behind Iolani Palace, seat of Hawaii's governments from 1882 until replaced, is the new capitol (John Carl Warnecke & Associates).

Paul N. Ylvisaker, dean of the Graduate School of Education, Harvard University, will moderate a second plenary session on May 10 on "The Challenge to Leadership." Panelists will include Bernard Weissbourd, president of Metropolitan Structures in Chicago, and Representative Jerome R. Waldie (D-Calif.).

The host chapters are planning many tours of the San Francisco area, including a trip on the new Bay Area Rapid Transit system. There will be sightseeing of places of architectural interest in the city, as well as tours of Marin County, the East Bay, the Peninsula and the wine country. For those who can stay an additional day, there will be a trip to the Monterey/Carmel area and Muir Woods.

The Marketplace of New Ideas will be held in Brooks Hall where exhibits, meetings, film showings and other activities will take place. The dates for the Marketplace are May 8, 9 and 10.

A reconvened convention session will be held in Honolulu on May 11-15. After this meeting, those who are interested may go on to the islands of Hawaii. Others may prefer an 11-day trip to the Orient, including Tokyo, Nikko, Kyoto and Hong Kong.

The official coordinator for the Honolulu meeting and the other trips, appointed by the AIA, is Travel Consultants, Inc., 1025 Connecticut Ave., N.W., Washington, D.C. 20036. The agency has prepared a brochure which gives information on travel, hotels, meetings plans, social events and sightseeing tours. It is available upon request from Travel Consultants, Inc.

Architectural Firms Will Be Among Those To Receive '72 Census Questionnaires

The next canvass of the nation's manufacturing and business firms will be conducted by the US Bureau of the Census in early 1973 and will cover the calendar year 1972.

Early this month the bureau will mail questionnaires to firms engaged in architectural, engineering and surveying services to get an overall picture of the economy. The 1972 census of selected services is the latest in a series of business censuses which started in 1929 and is conducted every five years.

Architectural firms which receive questionnaires will be asked the location of their business, dollar volume of receipts, first quarter and annual payroll and the number of employees in 1972. Firms which operate in more than one place will receive a separate form for each location. Completion of these questionnaires is required under federal law. All answers are confidential and will be used to prepare statistical summaries for the various business classifications and for different geographic areas.

"The reports," comments the bureau, "are used by business firms to evaluate their market share and potential, establish sales territories and quotas and generally compare their operations with those for their trade or profession." The information is used as well by officials at all levels of government and by many others "to whom facts about the nation's economy form a vital tool for reaching informed decisions." Publications containing the statistics will be made available in late 1973 or early 1974.

Student Organization Re-elects President

For the first time, the Associated Student Chapters/AIA named a president for a second term. Fay DeAvignon of Wilmington, Mass., was re-elected national president of ASC at its conference in November in Tucson, Ariz. Also elected were Perry Reader of the University of Florida at Gainesville, first vice president; and, as area directors, John Ehrig of the University of Florida at Gainesville, Pat Davis of the University of Texas at Austin and Russ Wright of California State Polytechnic College at San Luis Obispo.

Impact of Environmental Impact Statement Outlined by Urbahn

"The term 'environmental impact' may not yet have attained the household word category, but it is getting there fast," said Max O. Urbahn, FAIA, former AIA president, at the Illinois Council AIA regional conference. "I suggest," he continued, "that you keep an ear cocked for it, and that you look for opportunities to help the public evaluate the environmental impact of developments of all kinds."

Declaring that the environmental impact statement in its influence on the built environment may yet be the most significant innovation of the National Environmental Policy Act of 1970, Urbahn reminded his listeners that the act requires each federal agency to prepare, publish and invite public comment on a statement of environmental impact, in advance of each major action, report or recommendation on legislation that may "significantly affect" the quality of the built environment.

At least seven states and Puerto Rico, said Urbahn, require environmental impact statements on state actions analogous to federal actions. Urbahn urged architects to give such developments close attention. "We must be equipped to advise any of our clients whose projects may be subject to this new process. We must learn to use the potential challenge of the environmental impact statement as an ally in our continuing efforts to achieve the most beneficial environmental relationships in our own work. And we must be concerned with the quality of the environmental impact statement prepared by federal or state agencies . . . and the processes through which they are produced and evaluated."

Urbahn said that a recent publication of the National Environmental Protection Agency notes that "as a direct result of NEPA's review process a number of projects have been suspended and many more have been modified."

Two Major Developments Come Together To Improve Specifications Practice

Production Systems for Architects and Engineers, Inc., and Pacific International Computing Corporation of San Francisco have made an agreement by which PIC will provide automation services for MASTERSPEC users.

The automated version of MASTERSPEC until now has been processed only in PSAE's service centers in St. Louis and Cambridge, Mass. PIC's service centers are located in Los Angeles, San Francisco, Chicago, New York City, Philadelphia and Baltimore/Washington, D.C. PIC will use the computer program that was developed for COMSPEC, a specifications text manipulation system developed by the Construction Sciences Research Foundation under the auspices of the Construction Specifications Institute.

PSAE was established by the AIA for the development of MASTERSPEC, a master specification text system which can be used with either manual or automated techniques.

continued on page 50

Being Heard in 1973

by S. SCOTT FEREBEE JR., FAIA
President

Once an AIA president enters office, his most grueling job is behind him: the preparation of the coming year's program and budget. Working with the Board of Directors, fellow Planning Committee members, commissions, committees and staff, the president-elect selectively puts together a package of activities and projects which will bring the profession another year closer to its goals. With a budget totaling $4,992,650 —of which 62 percent is membership dues —the AIA has developed a program for 1973 that will help the architect in two fundamental areas: professional competency and environmental leadership.

The program offers the means to shape and guide the architect's role of the future. I have been concerned, however, that the response of some members, when confronted with change, has been one of negative rather than positive reaction. Public support for the aims of the profession is at an all-time high. We should be marching into this era of environmental awareness with bands playing and flags flying, while others scramble to climb aboard our bandwagon. Our leadership is needed at three levels: nationally, within our local communities and within the construction industry.

Our national leadership, especially on Capitol Hill, has increased in recent years, and we have taken a major step forward with the report of the AIA National Policy Task Force. In 1973 we will continue to develop and publicize it and to promote projects which demonstrate it. We also hope to increase our influence on legislation and policies of federal agencies which deal with the physical environment.

Although many AIA members are not in a position to provide leadership at the national level, they can make a contribution to the communities in which they live. We will provide the tools to assist them in speaking to the needs for better housing, an improved environment, regional planning, better community design, reduction of constraints and the importance of a national policy for urban growth.

Perhaps the area where the greatest effort is needed is within the construction industry itself. We must develop programs that assist the architect in reasserting his role as leader of the team. We cannot simply claim that leadership; we must demonstrate that we are providing it.

As might be expected, the sum of the proposals to meet these challenges far exceeded the budget, which this year must accommodate the completion and occupancy of the new AIA headquarters building.

I should like to touch on some of the programs which are new or significantly expanded. In the Community Services area, the AIA will seek to bring minorities and the disadvantaged into the profession via the Human Resources Council fund drive for scholarships. Efforts will continue in support of federal funding for the Community Design/Development Centers, and an in-depth evaluation will be made of their status. Money will be provided also for studying and publicizing constraints to building, which has been talked about for two years. This year we hope to get this program off the ground and to produce a meaningful impact on the development of quality housing for those who can't afford it.

In the Department of Education and Research, we are modestly endeavoring to expand our activities in the research field. We will continue to develop our environmental design research survey and will maintain the research information services to members. Of particular interest to me is a program in design and behavioral research to develop understanding of human behavior and its relationship to architecture.

The AIA program of continuing education in this department is now capable of being self-sustaining and as such will be another example of a real and highly visible service to the members at no additional cost to the budget.

The new Environment and Design Department will incorporate much of the activity that is generated by the National Policy Task Force report. Directly related programs to be carried out throughout the AIA total $113,250. The department will develop a national housing policy and model state and federal legislation to assist in the implementation of the task force report. A conference will be held to refine and expand the design concept of the "growth unit."

A study to determine the architect's role in providing design services to large housing developers and tract builders will be instituted, and a book is in the making to give a background in regional planning.

Another major effort will be the study and publication of the implications on design as a result of public policy and administration. Conferences will be held on ecology, transportation and housing.

The Government Affairs Department will continue to give staff and consultant time to the Special Assessment Program which was funded by the membership to promote procurement of architectural and engineering services on the basis of qualifications at all federal government levels. Much of the department's effort will be directed toward promoting legislation which is related to the National Policy Task Force report.

Internal public relations are as important as external ones. We are planning increased emphasis upon the quality of our rapport with components and members. Improved methods of communication are being explored to help every AIA member feel closer to the national headquarters operations.

In the practice area, we are planning to do more for the small office, beginning with a survey to determine what a small office is and what its critical needs are. A detailed survey of the profession is being undertaken. What we learn should help us to structure better and more meaningful programs in the areas of design, continuing education and professional practice in the future.

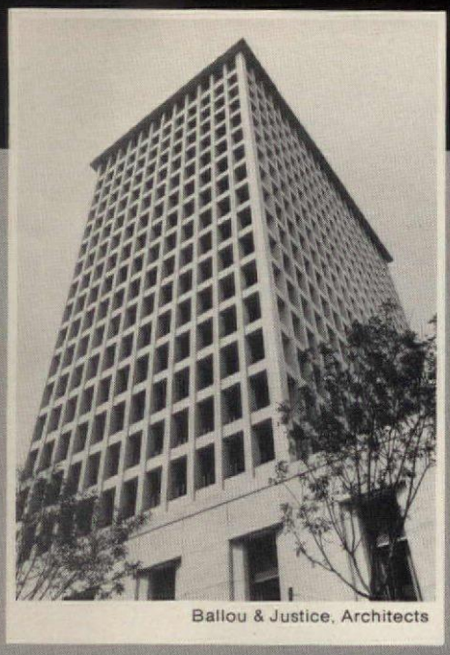
In response to an increased emphasis on personnel practices, we are proposing an analysis of our insurance programs to provide the best possible group benefit support for our members and to determine if methods of portability can be developed. The Documents Board plans to prepare an insurance guidebook for architects.

Emerging Techniques of Architectural Practice, published by the AIA in 1966, will be updated to illustrate the newest methods and procedures in office management and production. A book on real estate financing is being prepared to help architects discuss the financial aspects of projects with realtors and developers. Conferences in the practice area will cover the Occupational Safety and Health Act and the architect as a member of the development team.

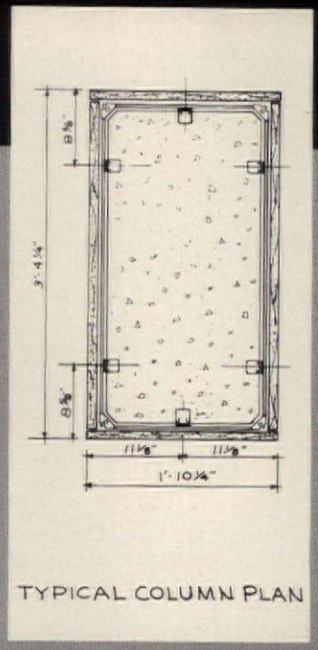
In the Public Relations program, the national advertising campaign will be continued to help establish the architect's competency to provide good design and to coordinate the increasingly complex construction process.

By the end of 1973, some missions will have been accomplished, while others will have just been initiated. The overall aim is to involve the AIA member in both the planning and the execution of Institute programs. In a very real sense, each architect helps the profession simply by becoming and continuing as a member of the Institute. With your support, the AIA plans to vigorously carry out its programs and to be heard in 1973. □

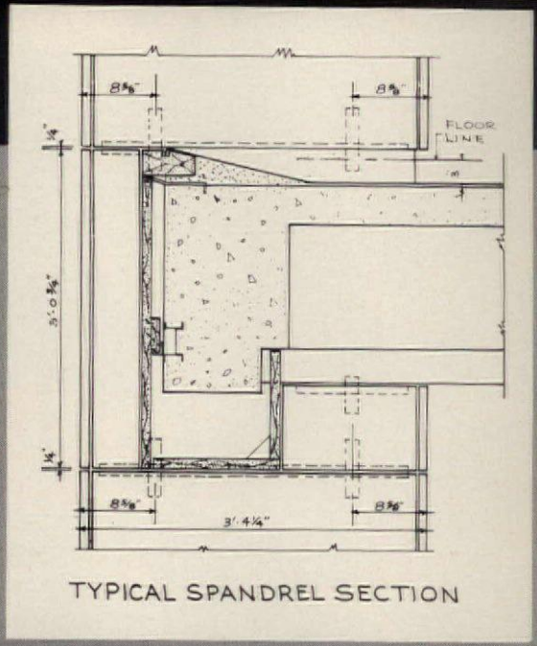
Another beautiful building that cost less to erect and will cost less to maintain



Ballou & Justice, Architects



TYPICAL COLUMN PLAN



TYPICAL SPANDREL SECTION

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THE ISSUE IS TALL BUILDINGS

Say highrise and you have a discussion going. Hardly anyone seems to be indifferent to the subject anymore. Some wouldn't live or work in a skyscraper if their lives depended on it. Others wouldn't be caught dead with a house and garden but vastly prefer the glamour of life on the 60th floor. These people don't object to the height at all but to the sameness, the lack of imagination in tall building design. The emergence of squared-off, homogeneous towers on the skylines of Paris, San Francisco, Santiago, Johannesburg, Bombay, Sydney and other cities on all continents concern and worry most of us. Why? Because, as René Dubos expressed it in his keynote address at the 1972 Houston convention of The American Institute of Architects (AIA JOURNAL, July '72): "The architectural styles all over the world indicate of course that they satisfy some needs of modern life. But it is also likely that international styles express the demands of technology, business or fashion rather than true human needs." We are all affected one way or another by tall buildings: as city dwellers, as tenants, as commuters, as tourists, as students in highrise schools, as taxpayers, etc.; even the jail has gone highrise and may have its as yet unknown effect on the prisoners. The subject of height and locations of buildings has aroused comments from publications such as *Time, Newsweek, U.S. News & World Report,* the *New York Times* and the *Washington Post,* to name just a few. The concern is worldwide, a fact made clear with the recent International Conference on Planning and Design of Tall Buildings held at Lehigh University, Bethlehem, Pennsylvania, by the American Society of Civil Engineers and the International Association for Bridge and Structural Engineering and sponsored by the National Science Foundation and the American Iron and Steel Institute. The meeting — first of its kind and of a series to be held throughout the world— was called, says Lynn S. Beedle, chairman of the Tall Building organization's steering group, so that participants, representing 44 nations, could delve into the problems characteristic of tall buildings and exchange information of mutual benefit. (The AIA is one of several liaison associations which has had representatives working on various committees since the Tall Building organization's initiation in 1968). From an issue so complex that the Lehigh conference report alone will fill several volumes are presented some subjects that may influence their heights as well as their design.

THE EDITORS

FORCES THAT SHAPE THEM

Were togetherness ever needed it is in the planning and design of tall buildings. Now, finally, planners, architects/engineers and developers are facing the issues head-on — and together — to study the problems that loom in highrise shadows and will influence their future designs.

When is a building tall? Though most of us think of it in terms of a Sears Tower or World Trade Center, it doesn't have to reach that high in the sky to qualify. It may be just an ordinary apartment building down the street or in the suburb. One rule of thumb: It is tall when a firehose cannot cover all floors. Lynn S. Beedle, director of Fritz Engineering Laboratory at Lehigh University, sums it up more specifically: "The important matter is whether the planning, design and use are influenced by the concept of tallness."

For the man in the street, tall is when the height of a building does something to him: if it gives him a thrill by its mere improbable height (this still does happen!) or, which is more likely these days, it angers him because it sticks out on the cityscape or horizon like a sore thumb, it makes rush-hour traffic messier, takes away the sunny side of the street, blocks his view or some other such thing.

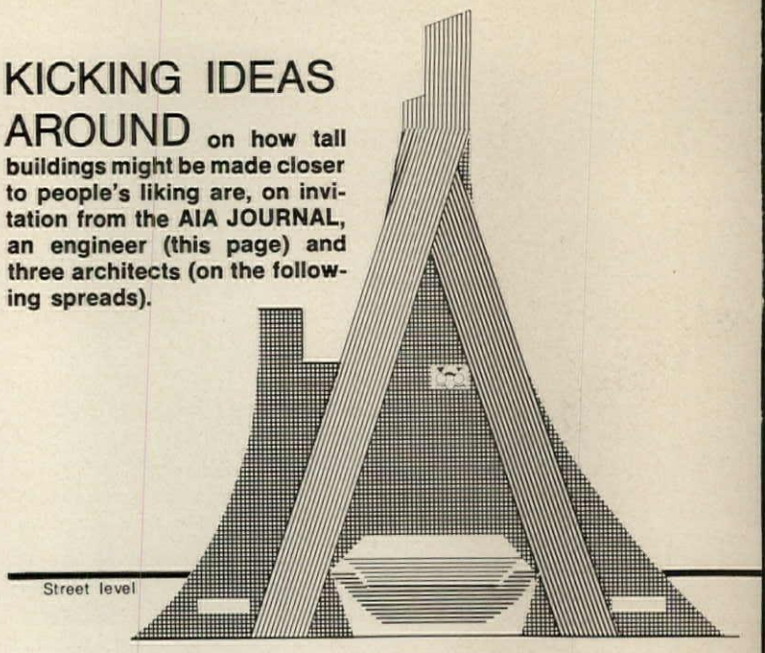
However, ours isn't the first generation that has witnessed ire over tall buildings, and they don't even have to be skyscrapers to provoke it. Lehigh's professor of classics, Douglas D. Feaver, reminds us how Juvenal, in his third satire written at the beginning of the second century AD, refers to five-story buildings as "tall" and relates his meeting with a friend who is quitting the city to move to a smaller town where one can have a garden and raise a few flowers and vegetables. He complains, Feaver reports in quoting Juvenal, " 'that most of the buildings in Rome are only held up with props; huge cracks in the buildings are merely plastered over by the landlords. Fire is still a constant fear. Asleep in the attic under the tiles with the pigeons, he does not hear the commotion at the foot of the stairs that would tell him that the third story is already on fire . . . In these fires the poor lose even the "nothing" that they possess, while the rich are immediately compensated. Sleep is impossible with the traffic, heavy lumbering carts, and shouting slaves. Tall buildings are particularly dangerous as roof tiles fall from lofty heights and even put a dent in the pavement. Vases are knocked out of upper story windows, so that one dares not venture out without having made one's will. You consider it a blessing when only the contents of the chamber pots fall on your head. Not only the streets but the apartments themselves are terrorized by bullying drunks and mugging bandits.'

"Structural failure, fire, noise, sleeplessness and lack of security, together with an exploitation of the poor. . . . Do these complaints sound familiar?" Feaver asks.

Indeed they do. Today the list of complaints against the tall

KICKING IDEAS AROUND

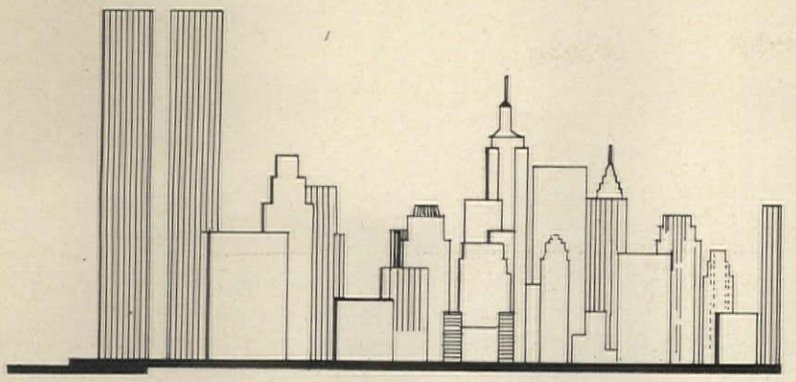
on how tall buildings might be made closer to people's liking are, on invitation from the AIA JOURNAL, an engineer (this page) and three architects (on the following spreads).



Progress in foundation design has lagged behind that of other disciplines due mainly to a lack of interest in anything that is not visibly dazzling in a structure. Architects rarely devote the necessary time to develop a foundation system. This is the result of some basic assumptions: first, the opinion that subgrade development is minor, that it naturally should follow with the above-ground layout; and second, the idea that the engineer can select a system to support the loads.

These assumptions may fulfill the requirements on small buildings, but in the design of very tall buildings the architect must remember that in the foundation, he is dealing with critically high lateral loads, coupled with enormous direct loads. This gives the foundation design precedence over all other aspects of the structure and, because of this priority, the characteristics of the classically beautiful structure must be carried into the subgrade design and not left only for the tall central building.

But the architect cannot assume full responsibility for these shortcomings. Engineers tend to exaggerate Mother Earth's fickleness and feel that mistakes and overdesign can be buried. Even in the case of an ingenious engineering solution, contractors raise their bids to protect themselves in the event of possible unforeseen problems. As a result,



fortunes have been spent on foundations due to little effort being exerted to make them efficient or economical.

A discussion of the problems is only half the battle. Now is the time for discussions of possible solutions. Many years ago Frank Lloyd Wright proposed that foundations could be designed not just as spread footings or on piles, but as rootlike extensions deep into the ground to anchor "mile-high buildings." Although this seems a blatant exaggeration, why not consider a design that spreads the load over the complete subgrade foundation area? A trussed, inclined column system that distributes the enormous direct loads over a larger area and provides a pedestal for the tall central building to resist overturning moments? This would spread the load over a much larger area and also increase the moment arm resisting the overturning effects of wind and earthquake loads. Through this increase in efficiency of the foundation, using all available subsurface strengths, the designer can increase building height and economize on dollars spent on foundations per square foot of rentable space. This increase in space also means greater income to the owner. Combining these with the premium rents for higher floor office space makes this a very attractive offering.

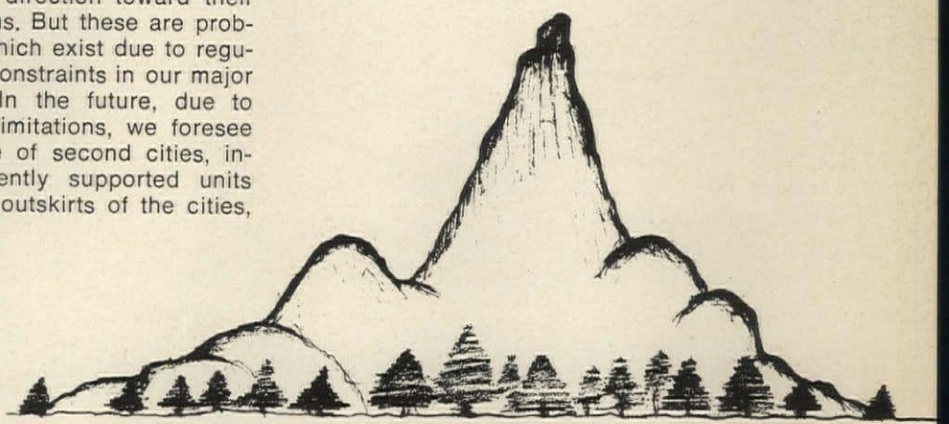
Appreciating the architect's desire for column-free areas at the lobby levels, the truss system could be developed only in the subgrade levels. It could also be devised to allow for traffic flow, since this space is architecturally most convenient as a parking area. This is just a sampling of what can be devised when consideration is given to the foundation. Why not use shells, circular, cylindrical or hyperbolic plates? Or perhaps cable systems or metal skins?

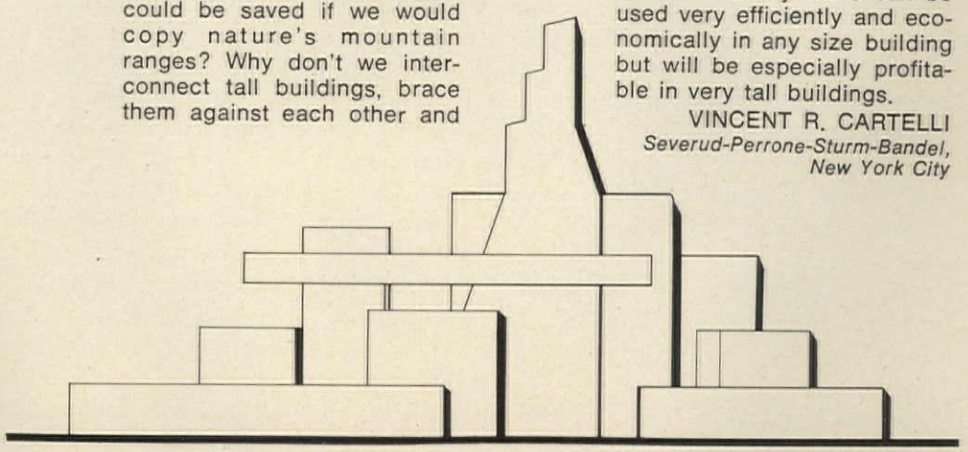
We have tried to state the problems as we see them and offer a direction toward their solutions. But these are problems which exist due to regulatory constraints in our major cities. In the future, due to space limitations, we foresee the rise of second cities, independently supported units on the outskirts of the cities, whose design will encompass completely revamped criteria.

Studying the skyline or profile of our cities we see a multitude of independent, needlelike, cantilevering towers. Using this observation as a motivation into the future, how much material and how much labor could be saved if we would copy nature's mountain ranges? Why don't we interconnect tall buildings, brace them against each other and let real skyways convert their free cantilevers into guided ones, which potentially have a four-fold stiffness, thereby eliminating the tremendous overturning forces due to wind and earthquakes inherent in narrow structures? Or perhaps a tall building that flairs out at its bottom onto a wide base? Such a structure would combine offices, apartments, entertainment centers and business and possibly have its own atomic power source, making it an independent community.

In closing, one thought should be left with the design architect. He must take into account that the concepts of design in his field have advanced meteorically in the last 20 years. He must not now handicap the foundation engineer by requiring outdated systems, while he himself has progressed by experience and fresh thinking. Advances in many foundation design techniques such as driven-in elements which bell out to resist compression or tension in the deeper firmer strata, or the increasing use of bentonite slurry walls can be used very efficiently and economically in any size building but will be especially profitable in very tall buildings.

VINCENT R. CARTELLI
Severud-Perrone-Sturm-Bandel, New York City





buildings alone drags on like a bad year, and the noise of the complainers has risen in proportion with their number and height. Since the appearance of the tall building, says engineering counsel Neal FitzSimons, "its social aspects have been blatantly and subtly argued in the press, in the novel, on the stage and screen, through the courts and in technical journals." Protest marchers have recently joined that chorus, and protests have found their ways into the booths at election time, when local candidates have made an issue of being for or against highrise construction in her or his districts. An ever more disgruntled public claims that tall buildings:

- disturb the scale of most cities
- block out views
- transform streets into canyons
- make anonymities out of people
- are firetraps
- present special problems in earthquake zones
- create havoc with traffic around them
- cost the taxpayers money
- invite more of their kind in the neighborhood
- take away blue collar jobs
- cast too much shadow
- make walking near them dangerous because of the wind effect they create
- cause pollution
- magnify solid waste and sewer problems, especially downtown
- disturb TV reception
- encourage crime
- demand more than a fair share of a city's energy
- are potential dangers to flight operations.

There are other issues, both technical and social, which the public at large hasn't even thought to ask but which professionals are now beginning to study. Among the most important in the social category is: How do tall buildings affect body and soul of inhabitants, adults and children, people who choose to live in them and who like it?

Questions are more numerous than answers. What to do about them all? That tall buildings, although not necessarily the supertall buildings, will continue to rise is quite likely. One-third of the world's population lives in urban areas, and the tide from rural regions is still coming on. "It has been estimated that by the year 2000, 85 percent of Americans will live in the city, an increase from 66 percent in 1970," points out Beedle. The National Policy Task Force of The American Institute of Architects sees it the same way and reports: "Our own guess is that most of America's expected growth from now until the end of the century will occur within existing metropolitan areas — whether all of us would like that to happen or not."

"The pressures on land cost and land use push buildings up," says Beedle. How high up? "We can build the mile-high building this year," says Leslie E. Robertson, partner of Skilling, Helle, Christiansen, Robertson (*see* p. 25), "but do we really want to?" The height limit, then, becomes a social rather than a technical question, and as such more complicated.

One thing seems eminently clear: The public will no longer accept tall buildings which will change the character of their neighborhoods or ruin cherished parts of a town. San Franciscans got that point across when they squelched plans for a 550-foot tower on the Bay. Placard-waving marchers in Chicago, Cleveland, Portland, Oregon, Washington, D.C., and other cities are following suit and rally around their towns to save them from "Manhattanization." The public, in other words, is actively and strongly influencing the silhouettes of their cities.

In San Francisco, Bruce B. Brugmann, Greggar Sletteland, the Bay Guardian staff and 52 other arch skyscraper foes follow up the attack on the tower on the Bay with a broadside directed against tall buildings anywhere in the Golden Gate City. Raising the question of who pays for them, they conclude that the taxpayer does since the monoliths, with their higher density per acre, inevitably up costs in just about every city service.

To probe further into this issue, the US Department of Housing and Urban Development not long ago made $200,000 available to let the San Francisco Planning and Urban Renewal Association make an objective examination of facts and figures. The findings could curb future heights.

Another study, this with both developer and users in mind, has been made by Charles J. Detoy and Sol L. Rabin, whose article "Office Space: Calculating the Demand" appears in the Urban Land Institute's monthly, *Urban Land,* for June 1972. Say the authors: "Anyone contemplating a significant office building project should take a cool, dispassionate glance at the community for which the project is proposed. To achieve a project which has reasonable probability of success, patient, tedious, accurate research and unprejudiced interpretation of the data brought forward by that research is a necessary first step.... Many urban areas of the western United States already have a three to five-year supply of new and unleased office space; yet in spite of this palpable distress signal, large, expensive and purely speculative office projects are continually being sponsored and initiated." Detoy and Rabin, who are both associated with Coldwell, Banker & Company, go on to present a formula for determining the market for office space. The need should play a part in deciding height.

Then enters the consideration how tall to go in order to reach the most economical vantage point, structurally speaking. "Sometimes a building has to be tall (or at least taller) in order for the developer to make money or to suit a planning function," says Beedle. "During a recent debate on building height limits in San Francisco, a preliminary ceiling of 72 feet (or six stories) for a region had to be abandoned because, according to Herb Caen in *San Francisco Chronicle,* 'No builder can make money on a six-story building, given this city's codes. Four, yes, because it can be woodframe, but above five stories steel is required, and the costs become such that only from 10 onward

KICKING IDEAS AROUND

People have lived in multistory dwellings for thousands of years. But until the past 100 years it has always been within walking distances of the ground. Living over the store was a way of life in the preindustrial villages of Europe and Asia. As long as the scale was right this vertical mingling of uses was beneficial in providing diversity and convenience.

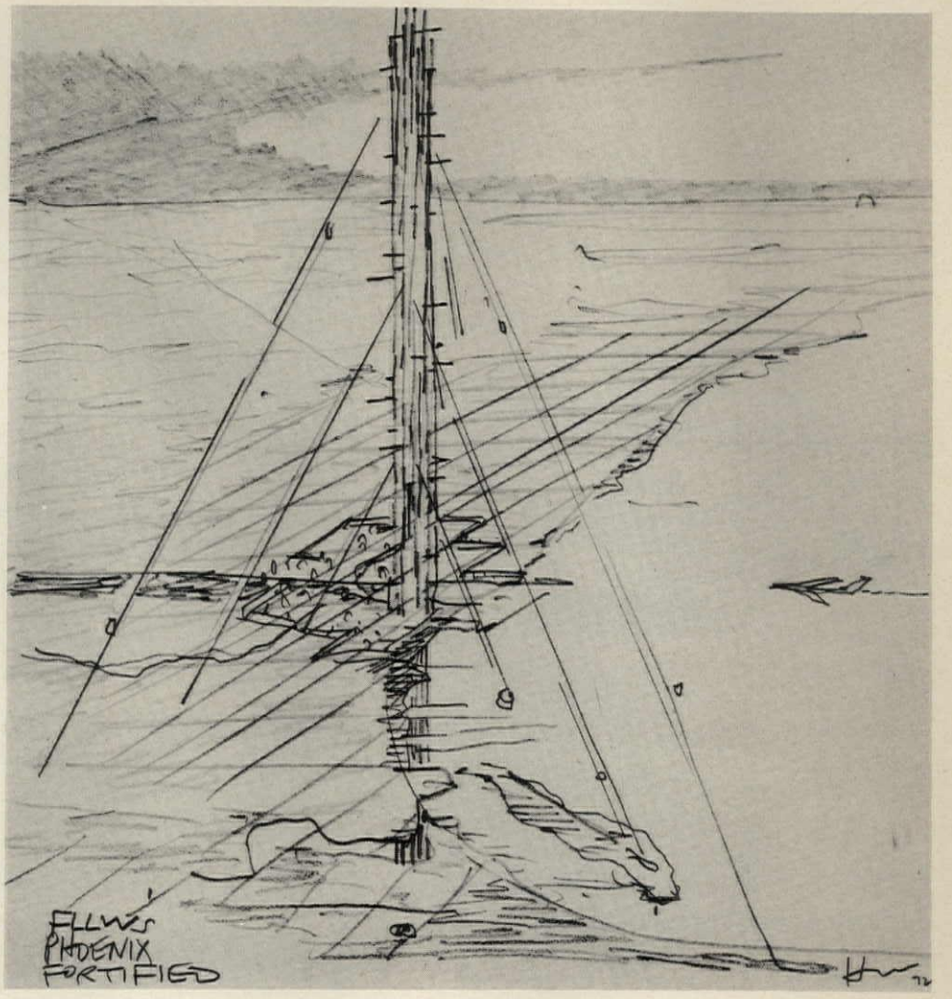
But vertical stratification can have adverse social effects when exaggerated. In the second half of the 20th century we begin to see the limits of high buildings in land and in cost. High buildings are the product of technology and land price. The higher the buildings the greater the expectation of the land holder. So it goes.

Is gargantua USA a necessary way of life? Who benefits beside the land owner? For every new mammoth, five or six smaller buildings will be downgraded. Or the land under them becomes so valuable that they are demolished. And when they are demolished the only cash flow comes from parking, and so the cycle continues: fewer buildings, taller and farther apart with our having little idea what to do in between but park a car. Downtown America is about an equal mix of parking lots and buildings, it seems.

Of course, highrise does have its uses: for offices, for housing the elderly, for swingers or for a jail. In fact, a highrise building is so ideal a jail one wonders if this is not its true essence. Every floor is electronically segregated from the next by the elevator, which can be controlled from the lobby to allow only certain approved movements. Zones without connection can be established by separate elevator banks. Highrises on college campuses isolate faculty from students and separate scientists and humanists alike from beneficial contact with each other. It is well known what it does to families with growing children. Merely because we have the capability of building high and because land cost is inflated, must we continue to accept them as an inevitable proper way to build city cores?

If one believes in determinism, that man should still be able to fashion a viable habitat, that there is actually plenty of land if managed properly, and that efficient movement systems could connect horizontally what the elevator connects vertically, we would not have to accept the tall building as inevitable.

Slice any layered building, say, on the Rue de Rivoli, and one gets a natural mix of arcades on the boulevard, parking under, office and apartments above the store, atriums to the sky. The fifth facade, the roof, has the best view, the sky. But presently we reserve the roofs for tar and gravel and machinery. Better tennis courts, preferably gardens. The rooftops of Rome and Milan are green.



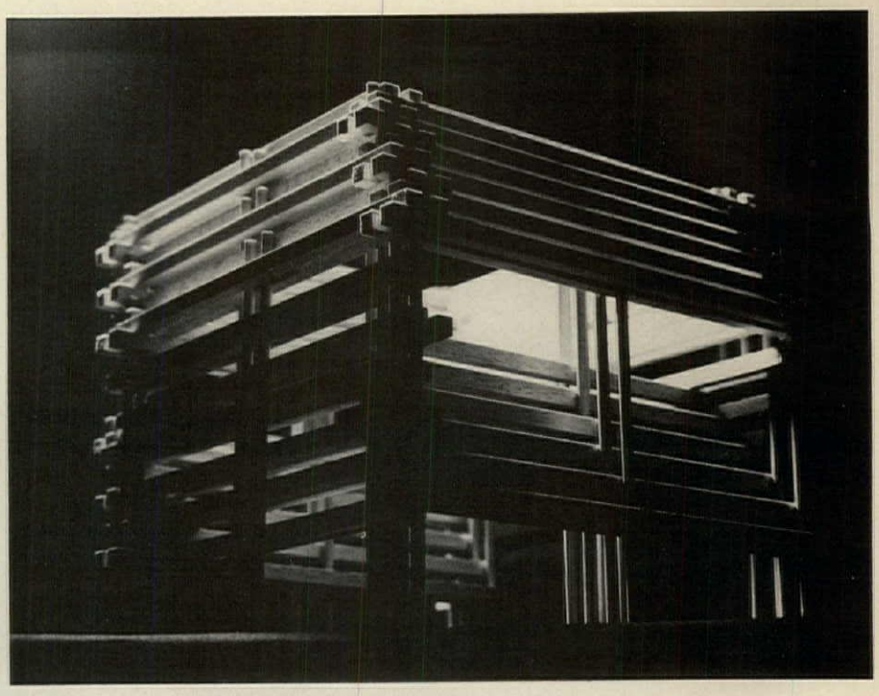
Frank Lloyd Wright's mile-or-more-high fortified building with gondolas to the suburbs connecting the high-rent districts, skipping over the rubble.

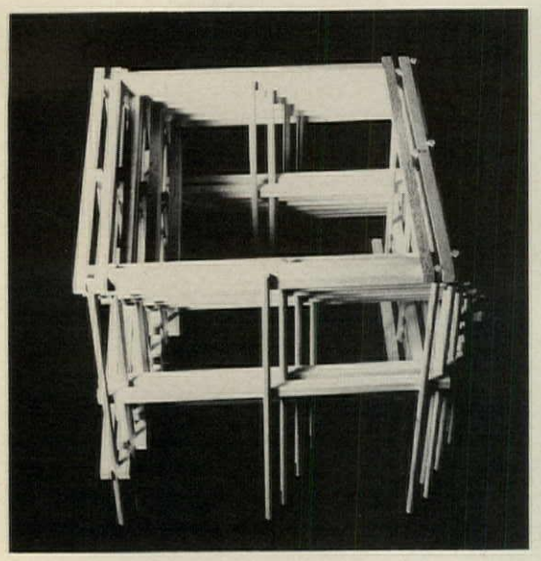
In our fixation with architecture as a sculptural response to an economic equation freestanding on exclusive sites, we have neglected the ground, the sky and, most of all, the user. It is ironic; 3-D is in and facades are out. Yet facades are the essence of an organic city in which all buildings join to each other and have a common skyline. The facade is the essence of continuity and accretion of small elements, blending in nonaggressive unity. Bath, England, is a linear expression of this responsible land use. The facades are the organizing principle.

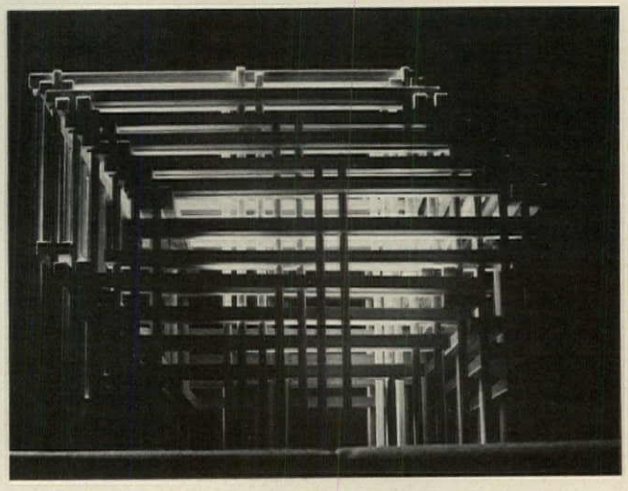
In our bemusement with the heroic skyscraper as the image of this culture, we might ponder the profile of the corporate state lying behind it. Or the rubble from which it rises. HARRY WEESE, FAIA

Harry Weese & Associates, Chicago

KICKING IDEAS AROUND







The human element of a multistory building becomes the relationship of the individual to his immediate surroundings. If this can be solved in a satisfactory way, the tall building becomes a "satellite city," complete with its own surroundings.

The structural system of a tall building is a necessary element to get one up in the air. If this idea of a structural system were expanded to also include the concept of a horizontal structural service system, one could then create the "Hanging Gardens of Babylon" in which to live, work and play. The living units could be oriented within the structural elements to provide a truly 3-D urban grid. Local automobile traffic could be safely brought up along the perimeter to convenience parking at desired levels, then horizontal pedestrian walkways would connect to local traffic to disperse it.

Each stacked studio living unit would have back-door access by automobile, and a public pedestrian way. Along these horizontal concourses would be interspersed shopping facilities and access to office spaces. Small parks, green belts and play areas interrupt this horizontal movement within the structure to form the recreational nodes of the city.

The idea of the 3-D structural matrix is the ability to orient within the grid to take after the sun or turn away from it, as the region dictates. The structure sits on a diagonal with its corners marking the compass points so that it can be stepped to the west to provide maximum protection from the sun, or stepped to allow the sun to penetrate into the structurally defined open space core. The ability to have layers of vertically stepped units separated by horizontal space angled to accept or reject the sun creates a light and airy living environment.

The core of the structure becomes a gigantic park given back to its inhabitants for the enjoyment of living. The human scale has been created within the "Hanging Gardens of Today."

PRESTON M. BOLTON, FAIA,
and A. J. TAMBORELLO
P. M. Bolton Associates, Houston

can a builder come out.' In some cities it has been convenient to establish codes that would result in a similar pressure to increase the height. In Moscow, for example, it is understood that if a building cannot be kept to five stories, the next level is nine because of the elevator economics," Beedle reports.

Concern over money one way or another will always be a shaper of buildings. It becomes a question whose money. Take the matter of that much-criticized 557-foot tower in Paris. President Georges Pompidou, as reported by *Le Monde* and again in the *Washington Post,* commented on it: "If one demanded lower heights, the state would end up by being in deficit, and it would be the taxpayers who would have to pay." Yes, but how high the cost to stay in the black, the public asks; can we afford much longer not to spend money to improve our environmental lots?

However, if the developers ignore the public and seem to care not a damn about humans or esthetics, then it is also true that the public tends to forget the headaches of the developers and the chances they take. No one can deny that without them, we'd be minus some pretty exciting spots. But there must be a meeting of the minds somewhere. The users of a building and the inhabitants of a city have to be adaptable to a certain degree — life is like that — but the creators of tall buildings must be able to better past records. Something's got to be wrong when a goodly number of the brains responsible for placing tall buildings in our midsts admit that they would never live in one but prefer instead to commute to work even if it takes an hour each way.

But there are those who prefer the urban scene and chose to live in tall buildings either because they like it or because it is the only choice; people for whom outlying areas would present an existence in isolation. Our suburbs and even our new towns are to an extensive degree planned and built for car owners: There are few sidewalks for a safe stroll; most stores are too far away for comfort and safety, so are most other facilities where things happen such as school, church, library, movie theater. Public links with the nearby city more often than not leave quite a bit to be desired and usually must be reached by car. Until the suburbs take on people-scale, living or working in the city in a tower has more to offer a lot of people. For many, a tower is a logical alternative to nondescript sprawl. The users, if they aren't already, should be a strong asset in helping architects and planners bring about better tall buildings.

Crime is another factor forcing new considerations on the height and design of buildings. Oscar Newman, author of *Defensible Space* (MacMillan, 1972), challenges the use of highrises for low income public housing, claiming that they neither save taxpayer money nor house more people per acre, and that they encourage crime. During a three-year study of urban environments throughout the country, Newman and a team of New York University researchers have come to the conclusion that our postwar type of highrise developments are "containers for the victimization of their inhabitants." While they suggest solutions in design that might ease the situation, the team suggests that such highrises should be completely avoided for low income families with children.

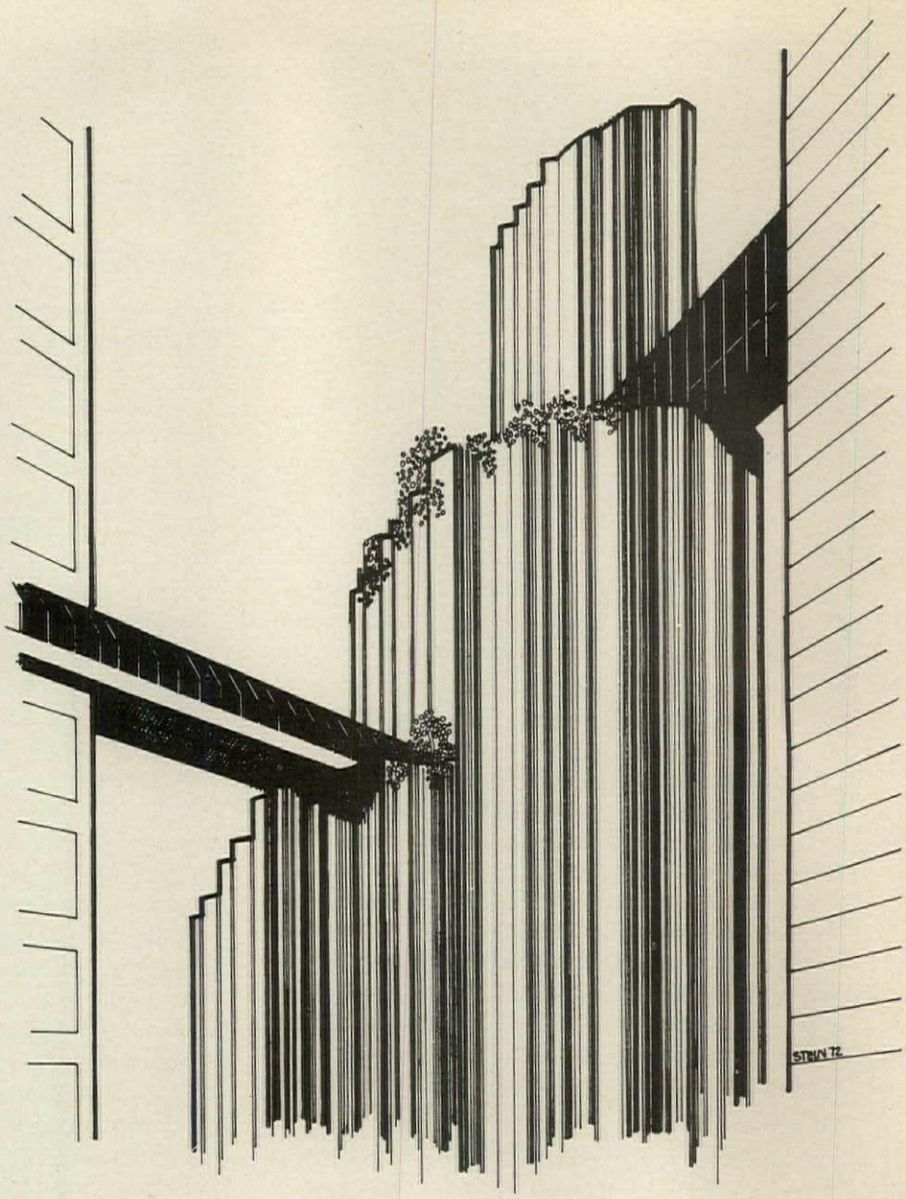
Security measures may well also shape tall buildings for higher income families and other users. Though not for typical tenants but planned for diplomats and others brought to the United Nations headquarters on business, a 38-story tower designed by Kevin Roche, John Dinkeloo & Associates for the United Nations Development Corporation reflects the anxiety over present conditions. It's a minicity with all facilities available within the four walls, making it unnecessary for occupants to venture out. Even crossing First Avenue to the UN will be safe from street life, since it will be on a skywalk. Chicago's John Hancock Center is another all-in-one arrangement but for regular tenants. Such multiple-use buildings could have a mission beyond being safety barriers for the occupants; they could help keep life in a city turned on after five. On the other hand they may have an adverse effect: If they are self-contained they will keep life inside them turned on behind all sorts of security systems, while down in the canyons anything may go.

"Richer people can escape to country homes from the confines of their highrise filing cabinets. There is no such escape route for the poor. The office building represents a different situation: The kind of jobs available in them require education and training that poor people from rural areas very seldom receive," urban planner Jonathan Barnett, AIA, comments. "Unless countries take vigorous measures to bring poor people and appropriate housing and jobs together, there is a real chance that many of the older cities will be, in effect, abandoned to the poor — with the exception, perhaps, of a few carefully defended enclaves of tall buildings. This phenomenon can already be observed to be well advanced in a city like Newark, New Jersey." It is total concern for crime, not just for protection, which must dictate our building.

Notwithstanding persons who would line up behind the authors of *The Ultimate Highrise,* which by the way gives "an arsenal of legal ways for sniffing out, then snuffing out skyscrapers invading our turf," tall buildings are still a way of life for some. Good or bad, they are a sign of civilization in the 20th century. The conviction that they can be made better if we pool our efforts is the reason for the formation of the Joint Committee on the Planning and Design of Tall Buildings. Founded in 1969 by the American Society of Civil Engineers and the International Association for Bridge and Structural Engineering, the international committee has as its objective to coordinate research and exchange information. Close to 1,000 persons from 50 nations are working on 27 technical and 14 advisory committees. They represent 500 organizations in 260 cities throughout the world.

The major opportunities for specific activities in each country, Beedle, who is chairman of the joint committee, points out, include: 1) involvement of owners, developers, managers

KICKING IDEAS AROUND

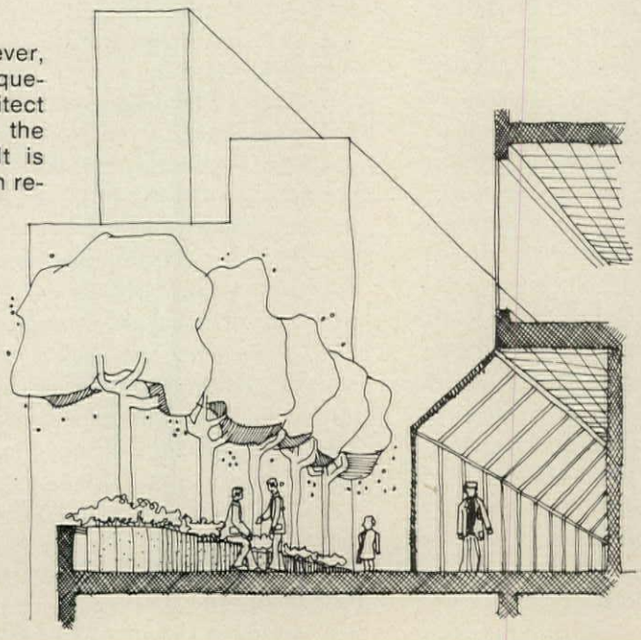


In the '20s the highrise, both residential and office, was seen as the expression of a bold new venture in the spirit of man. Exuberant buildings such as the Chrysler and the Beresford in New York City were typical with the attendant expensive setbacks and ornamentation. Today, with rare exceptions of corporate display, the physical symbolism of the highrise has become one of an inconspicuous, sleek box.

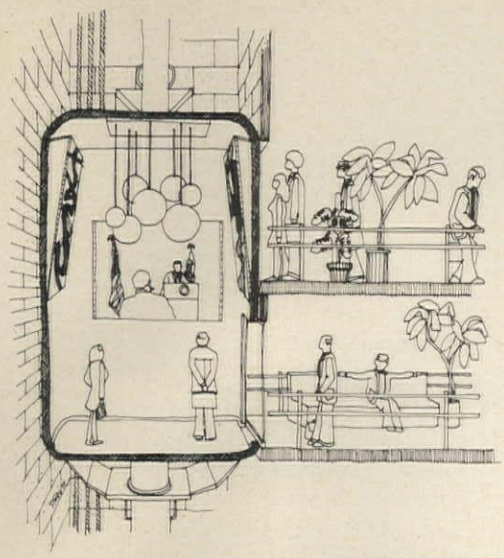
The highrise has joined the crowded ranks of architectural anonymity in the mid-20th century, a time in which few buildings express any particular aspirations on the part of the human spirit except toward technocratic efficiency. Thus the question of the highrise is perhaps at its core spiritual. We are simply not interested in expressing individualism and exuberance in our building forms. They express the anonymity of our work, our lives.

Certainly the money is there to do so. Corporate tenants pay high rents and collect fashionable and expensive paintings. Lavishly detailed plazas abound, providing generally meaningless breaks in the urban scene.

One is bound to feel, however, that aspirations toward uniqueness remain. It is the architect who has failed to excite the ambitions of the client. It is the architect who has been responsible for statements which are either bleak or bland and most often both. Some suggestions as to how this might be remedied:



Bring back the hanging garden: Current fashions in architecture which have now impressed themselves on zoning ordinances call for straight-sided towers. The older architectural standard in which buildings staggered back in profile as they rose upward offers much greater promise in terms of visual diversity and delight. One only has to look at the spec apartment buildings of the '50s in New York City to see how inexpensive buildings took advantage of the opportunities this sort of form implies.



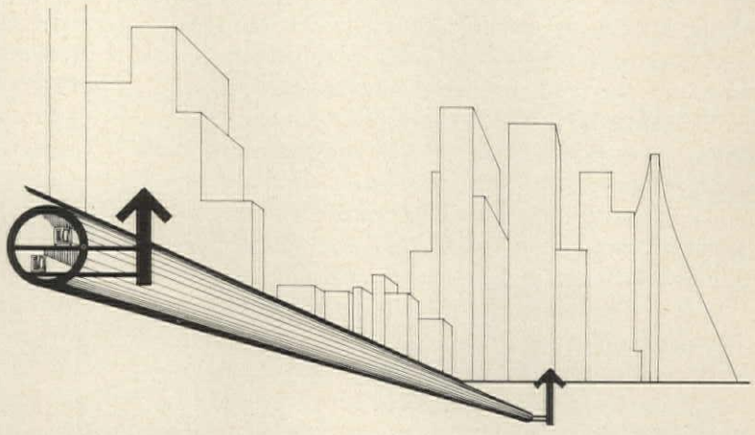
Shape up the elevator: One of the most potentially exciting experiences in highrise building is lost in the current esthetics of the elevator, which presents the rider with what is essentially a nonexperience in a context that could be enormously exciting. The shape of elevators could be changed. Cab heights could be raised. Audiovisual shows could be programmed on the walls and the ceiling, responsive to the speed and movement of the elevator. All of the above assumes the necessity of interior elevators due to efficient floor plans. The advantages of the exterior glass wall elevator in the same context are obvious.

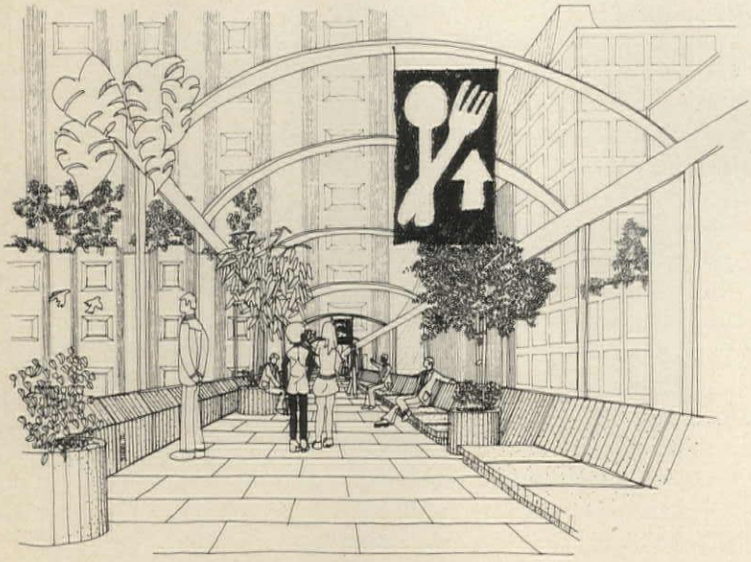
Create streets in the sky: There are advantages to tight groupings of highrise towers. One would be creation of streets in the sky. Taking a lead from the World Trade Center with its essentially unrealized concept of the sky lobby, one would link clusters of highrise developments at sky lobby floors with bridges. This would provide interest, excitement and a useful traffic pattern. Tenants on these floors would include shops as well as offices.

Create varied urban profiles: To use the images of terrain, there are three possible visual topographies: first, the mesa such as in Washington, D.C., with its low height limit to which is uniformly built; second, the shallow hill and valley characteristic of most cities in which the skyscraper profile is not particularly varied; third, the mountain and valley system in which skyscrapers are clustered at a few points, generally around rapid transit stops, and building heights are held down in between. This profile has worked nicely on a small scale on the Near North Side of Chicago, where new residential highrises are generally located on the corners leaving older two and three-story apartment buildings in the middle of the block.

Pool bonuses for meaningful public spaces (*see* cover): At present builders are generally given plaza bonuses relative to their individual pieces of land. This has resulted in generally bleak and useless open spaces such as the ones that occur along the Avenue of the Americas between 50th and 60th Streets. City governments have the power to create useful, generous open space by having a developer pay into a land acquisition fund when he takes out his building permit. This would enable much more appropriate open spaces to be developed around buildings. The precedent exists in many communities which force a developer to pay a fee per unit into a park acquisition fund.

Require developers to subsidize ground floor public activities: As buildings grow taller, rents from ground floors constitute less and less a portion of total income. Yet developers still charge premium rents for this space. Small restaurants, shops and theaters which make a city lively for the average worker are forced out to be replaced by banks, expensive restaurants, etc. Developers should be required to provide low rent space at ground floors for such restaurants and shops. Low cost theaters featuring short nonporno films would also be a welcome sight in downtown (whatever happened to newsreel theaters?)





HERBERT McLAUGHLIN, AIA
Kaplan & McLaughlin, San Francisco

and users; 2) specific contact to the joint committee for each major city; 3) coordination of reports of current research; 4) survey of tall building characteristics; 5) planning of national and regional conferences; 6) further involvement of architects and planners and building officials.

As an outgrowth of the organization's first meeting last August at Lehigh University, where it is headquartered, has come a half-hour documentary film where guests discuss environmental systems, socio-economic aspects, safety factors, etc. It is made available for use over the Public Television Network and also for foreign distribution.

States Beedle: "The rapidity is impressing with which we are all becoming concerned with the appropriateness of tall buildings. Each region faces basic problems that are quite similar, but there is a profound variety due to national culture, heritage, history and to degree of technological development." For instance, it can be a much more delicate problem to place a tall building in a centuries-old European city than in a modern American metropolis.

An international advisory committee may be established by the Tall Building organization which could be called in for consultation on such matters. It would evaluate proposed projects and undertake impartial studies of the need for tall buildings and of the impact they would have on their neighborhoods. Arch skyscraper foes though people may be, the best contributions they could make to their cities would be to work with, not against, planners, through the Tall Building committees, reaching a meeting of the minds without losing perspective of the issues at hand. The now-famous Urban Design Plan for the Comprehensive Plan for San Francisco (AIA JOURNAL, Nov. '71) has been made part of the Lehigh conference report. An international advisory committee, with its objective analysis, could be invaluable in helping to support such guidelines and help a city protect itself against personal greed or corporate vanity in the form of too-tall buildings, though it would in no way intervene in local disputes.

Of more immediate advantage is the sharing of research findings not only on highly technical subjects but also on the human elements involved. With respect to the latter, we have a long way to go but at least there is astute awareness of the importance of those that so far are known.

"To make an all-encompassing study of the human response to tall building environment is almost a hopeless task," says F. K. Chang of the firm of Ammann & Whitney. "There are so many problems to be considered, it is virtually impossible just to list them all, not to mention possible solutions. As time passes, there will be new problems. There will be different kinds of problems at different locations and for people of different ethnic and socio-economic backgrounds."

Results of future interdisciplinary research, then, will shape the architecture of tall buildings, but only if the architect will and can take full advantage of the tools at hand. Some research engineers, for instance, chide designers for not making use of wind tunnel tests, which cost around $20,000, instead of modifying the building after it's up, which quite often will run into six figures. One problem for the architect is that too often he gets the job only when all decisions have been made, thinks Frank L. Codella, AIA, vice president of Charles Luckman Associates of New York City and a member of various Tall Building steering committees from the start. "What effect a tall building will have on the rest of a city is a question city planners should ask themselves before the building goes up," Codella says. "Architects must become more active in the political arena; we must get in on the early decision making. Putting up a tall building is like plugging in a major appliance in your home. It affects everything around it, and it can overload the circuits. We must know the right questions to ask the public and also know how to make the public put the right questions to us.

"Structural engineers may yet become the 'trend makers' in architectural design, inadvertently, that is, or 'through the back door,' unintentionally. The session on structural systems at the recent Lehigh meeting was a real eyeopener for the handful of architects present in the midst of hundreds of structural designers," Codella goes on. "State-of-the-art papers and slides were presented which showed many 'pure' framing systems before cladding was attached. I have heard many architects say that a building looks best at this stage. Framing diagrams and pictures of existing tall buildings were shown, as well as new ideas and probes into dramatic framing concepts.

"One message came through loud and clear: that these structural people were talking architectural design language in its purest form. Column lines, beam spans and shapes were being constructed along stress lines which were mostly curvilinear. We architects certainly should recall the bending and deflection diagrams, the early 'thin shell' vaults, hyperbolic paraboloids, etc., whose lines and forms approached the pure, natural stress systems. We even heard talk about structural design eventually reaching the epitome: nature's way of growing structures.

"Using today's technology, the mile-high building concept presented at Lehigh looked very different from Wright's slender shaft. At the base, the structure covered several city blocks with much high open space in the center with the enclosed space concentrated at the 'four corners,' which really consisted of four separate buildings converging as they went skyward. The new tubular system of structure for tall buildings is another instance of structural design dictating the final architectural design."

Concludes Codella: "Hopefully, simple economics will force architects to let the structure be expressive on the outside without the use of excessive applied skin materials. A promising aspect of tubular shaft design is that architects and structural designers are becoming equal decision makers in the final esthetics of tall buildings. This is the way it should be. Perhaps at long last architects will begin to shed the 'graph paper' look for the exterior appearance of tall buildings." BESS BALCHEN

HEIGHTS WE CAN REACH

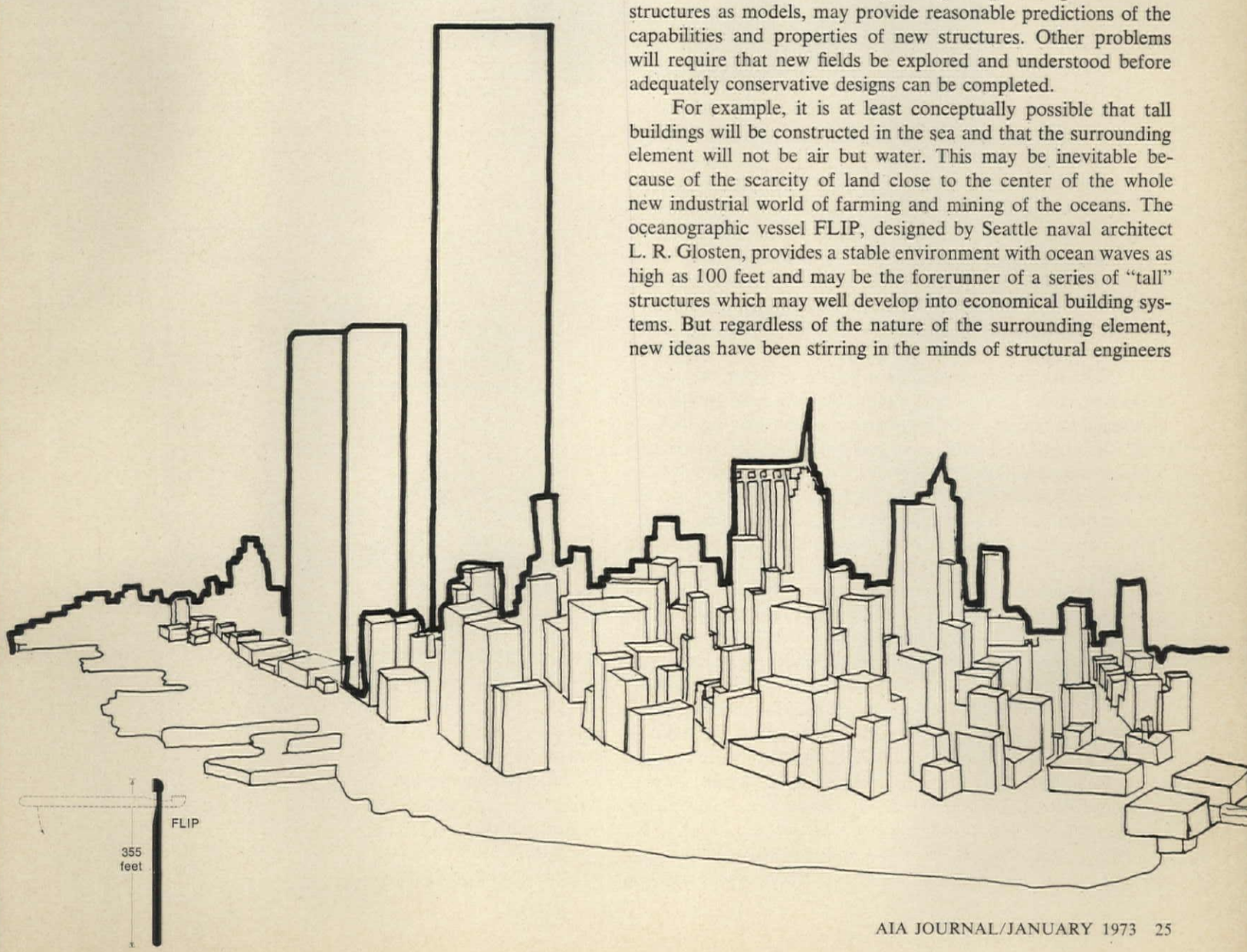
by LESLIE E. ROBERTSON

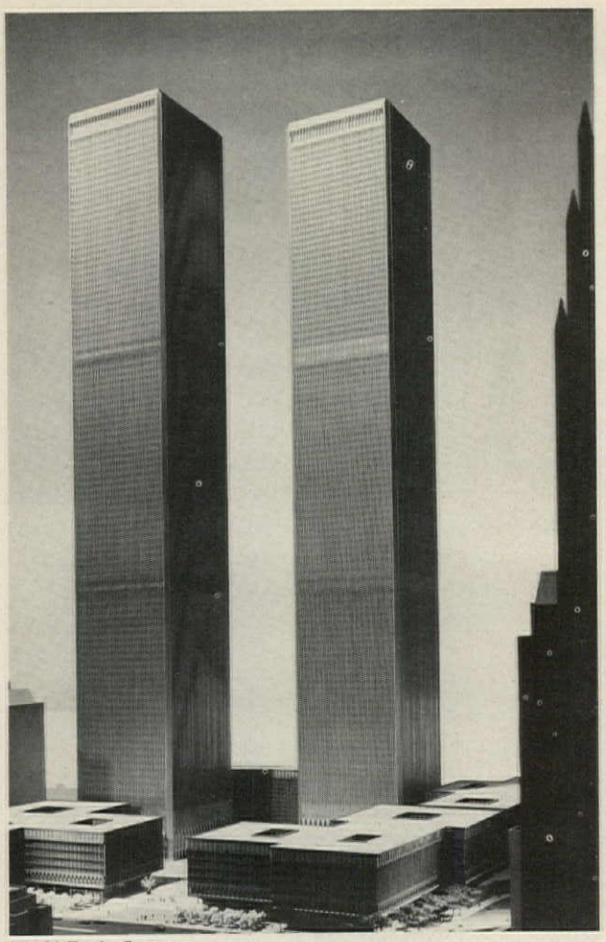
There is no limitation in the technology of structural systems that would restrict building heights to the present levels of about 1,500 feet. We could erect a structure more than twice that height in the near future.

Over the last decade we have seen remarkable improvement in the structural engineer's ability to develop appropriate building systems, to utilize the potentials of construction materials and to analyze and design the structural system. Equally important, he has developed a far more complete understanding of forces of nature such as wind, temperature and earthquake. In the next generation of tall buildings it will be necessary to sharpen these understandings in order to provide structural systems that both accept and dampen these increased forces while providing the needed integration of the entire building system—all at the least possible cost.

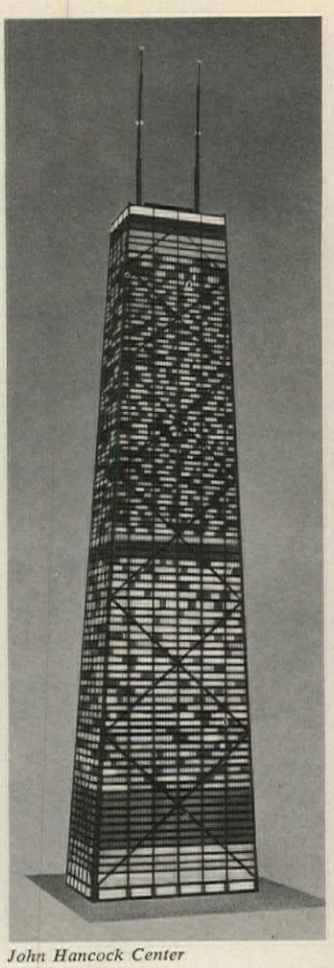
New problems will surely develop to tax the ingenuity of the designers of these tall buildings. Some of them will be mere extensions of those already met and solved in the past; the application of the laws of modeling, using the present generation of structures as models, may provide reasonable predictions of the capabilities and properties of new structures. Other problems will require that new fields be explored and understood before adequately conservative designs can be completed.

For example, it is at least conceptually possible that tall buildings will be constructed in the sea and that the surrounding element will not be air but water. This may be inevitable because of the scarcity of land close to the center of the whole new industrial world of farming and mining of the oceans. The oceanographic vessel FLIP, designed by Seattle naval architect L. R. Glosten, provides a stable environment with ocean waves as high as 100 feet and may be the forerunner of a series of "tall" structures which may well develop into economical building systems. But regardless of the nature of the surrounding element, new ideas have been stirring in the minds of structural engineers

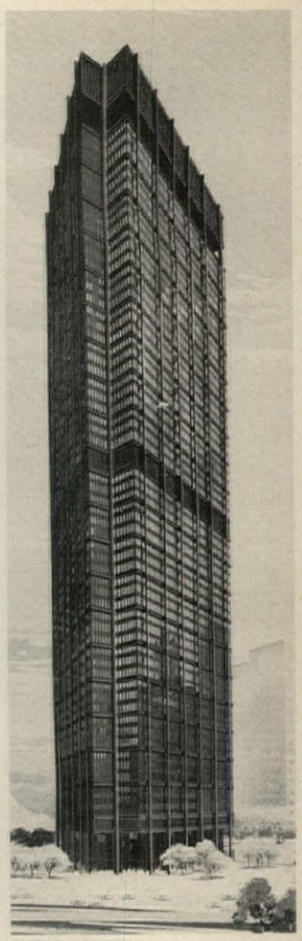




World Trade Center



John Hancock Center



US Steel Building

and new structural systems have erupted into the world of building construction.

The primary frame to be used in the very tall building of the future is most likely the "tube" in any one of its many ramifications. In the tubular concept, a three-dimensional structure cantilevers from the foundation, both to resist all lateral forces and to provide stability to the remainder of the column system. The tubular concept has been used for many years in reinforced concrete construction, for the most part as the surrounding shell of the service core.

The development of structural systems wherein the tube is moved from the service core to the outside wall provides an important step forward in the concept of the bearing wall. In 1962 the Vierendeel truss combined with the tubular concept found expression in the outside walls of the twin 110-story towers of the World Trade Center. Here, perhaps for the first time, the concept of the tube was employed in a highrise building, not for visual effect but because no other logical structural form could be found.

Later, in 1963, a tubular concept in reinforced concrete was developed for the 43-story DeWitt Chestnut Apartments in Chicago and in 1965 the first truly highrise tubular design using diagonal bracing in the outside wall became a practical reality in Chicago's 100-story John Hancock Center.

In 1965, for the 78-level (but only 64-story) United States Steel Building in Pittsburgh (AIA JOURNAL, Dec. '67), the tube was moved from the outside wall back to the core by making use of the X-brace concept but with an added space frame or "hat" at the roof to mobilize the tensile/compressive capability of the outside wall.

Finally, in 1970, the "bundled tube," using the Vierendeel concept, was developed for the 110-story Sears Tower which is

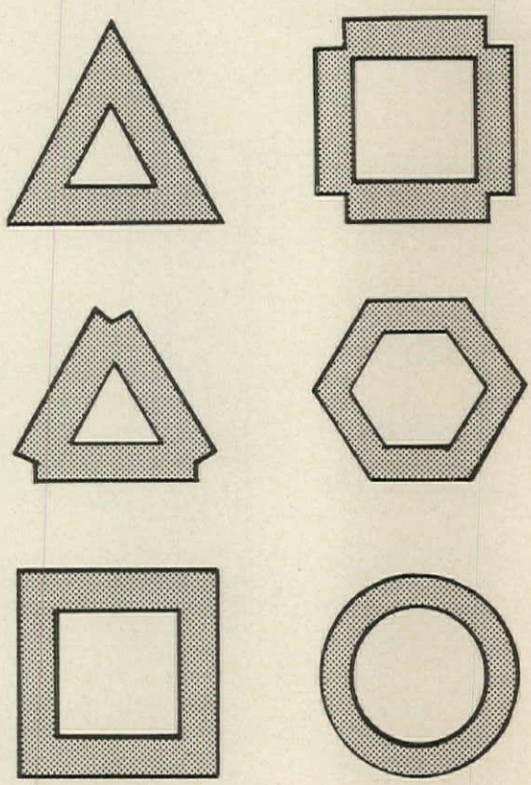
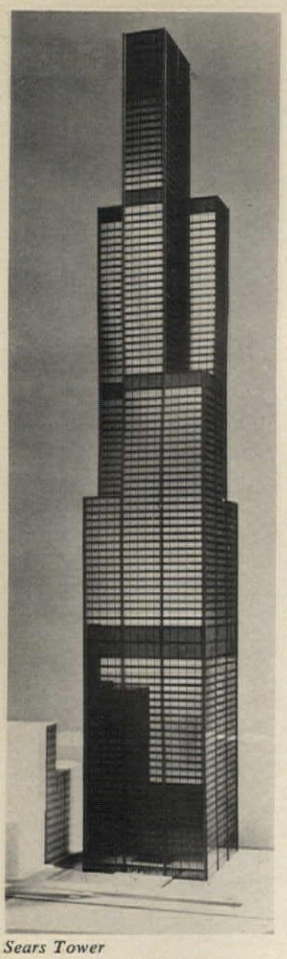


Figure 1



Sears Tower

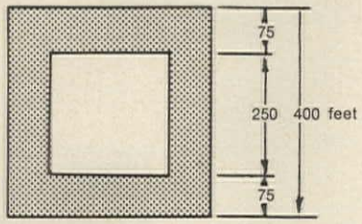


Figure 2

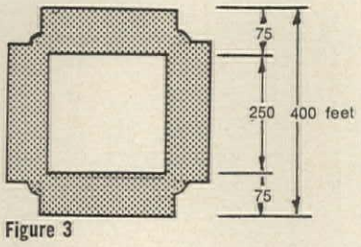


Figure 3

Credits: World Trade Center: architects, Minoru Yamasaki & Associates; associated architects, Emery Roth & Sons; engineers, Skilling, Helle, Christiansen, Robertson. John Hancock Center, Sears Tower: architects/engineers: Skidmore, Owings & Merrill. US Steel Building: architects, Harrison & Abramovitz & Abbe; engineers, Skilling, Helle, Christiansen, Robertson.

now under construction in Chicago. This ingenious application of the tubular concept provides for a reduction in building floor area with height, reduces the shear-lag phenomenon and mobilizes nearly all columns to resist shear-induced bending moments.

Without some dramatic increase in available damping, it seems apparent that wind-induced dynamic excitation is of such importance in the design of very tall buildings that they will not greatly exceed the height-to-width ratio of 1,435/207 feet, or 7:1, achieved in the World Trade Center. For a building to be 3,000 feet high, it follows that the width must be not less than 400 to 500 feet while one of only 300 feet may not be possible.

With a width of as little as 400 feet, a square building would have a ratio of exterior perimeter to building area of (4x400)/(400x400) or 1:100. This could be compared with 1:64 for the Sears Tower (lower 50 stories) or 1:52 for the World Trade Center (full height). In essence, such a building would be limited to a remarkably small percentage of window area. While this might provide important economies in the reduced cost of the exterior wall and in the reduction in capacity requirements for cooling and heating systems, some reassessment of human values would be essential because many occupants would be completely isolated from natural light.

For given plan dimensions it is possible to improve the ratio of window perimeter to floor area only by increasing the window perimeter, by decreasing the floor area or by some combination of the two. Increases in window perimeter can be accomplished by providing a complex shape for the perimeter of the building. Decreases in floor area can be the result of such a complex perimeter, or can be obtained by constructing the building with a hollow center of shapes such as suggested in Figure 1.

For hollow center buildings, wherein the center is not large, it may be desirable to construct the inner surface without the windows. For example, the plan shape given in Figure 2 provides a window perimeter to floor area ratio of 1/61 with windows limited to only the outside surface and a ratio of 1/37.5 with windows on both surfaces. The ratios for the plan shapes in Figure 3 are 1/47 and 1/25 respectively. In both cases the limiting of windows to only the outside surface will provide for a proximity of occupants to natural light similar to that of present highrise buildings.

For such a hypothetical structure, a tubular concept is the natural solution to provide the needed resistance to lateral forces. Following the historical development of tubular design, at least four potential systems are available:

1. Tubular concept utilizing the exterior wall, as in the World Trade Center (Vierendeel) and the John Hancock Center (diagonal) and shown in Figure 4, 1.

2. Tubular concept utilizing the interior wall but coupled to the exterior wall, as in the US Steel Building and shown in Figure 4, 2.

3. Bundled tube concept, as in the Sears Tower but with a hollow center, shown in Figure 4, 3.

4. Tube-within-a-tube system, with or without a floor-by-floor coupling system, but almost surely with several levels of large-scale space-frame coupling, as shown Figure 4, 4.

In their simplest forms, the structural systems of the World Trade Center and the John Hancock Center are not suitable for use in very much taller buildings. There are many reasons for this; mostly they relate to the need for a structural system, perhaps of the type employed in the US Steel Building, linking all columns together to minimize floor level differential elevations (from thermal, lateral and gravity loads) and mobilizing them all in the resistance to overturning forces from wind or earthquake. While such a system was not required for the World Trade Cen-

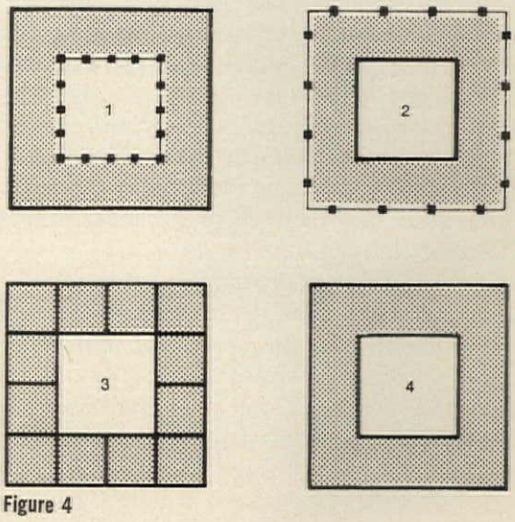


Figure 4

Mr. Robertson is a partner in the firm of Skilling, Helle, Christiansen Roberston with headquarters in New York City.

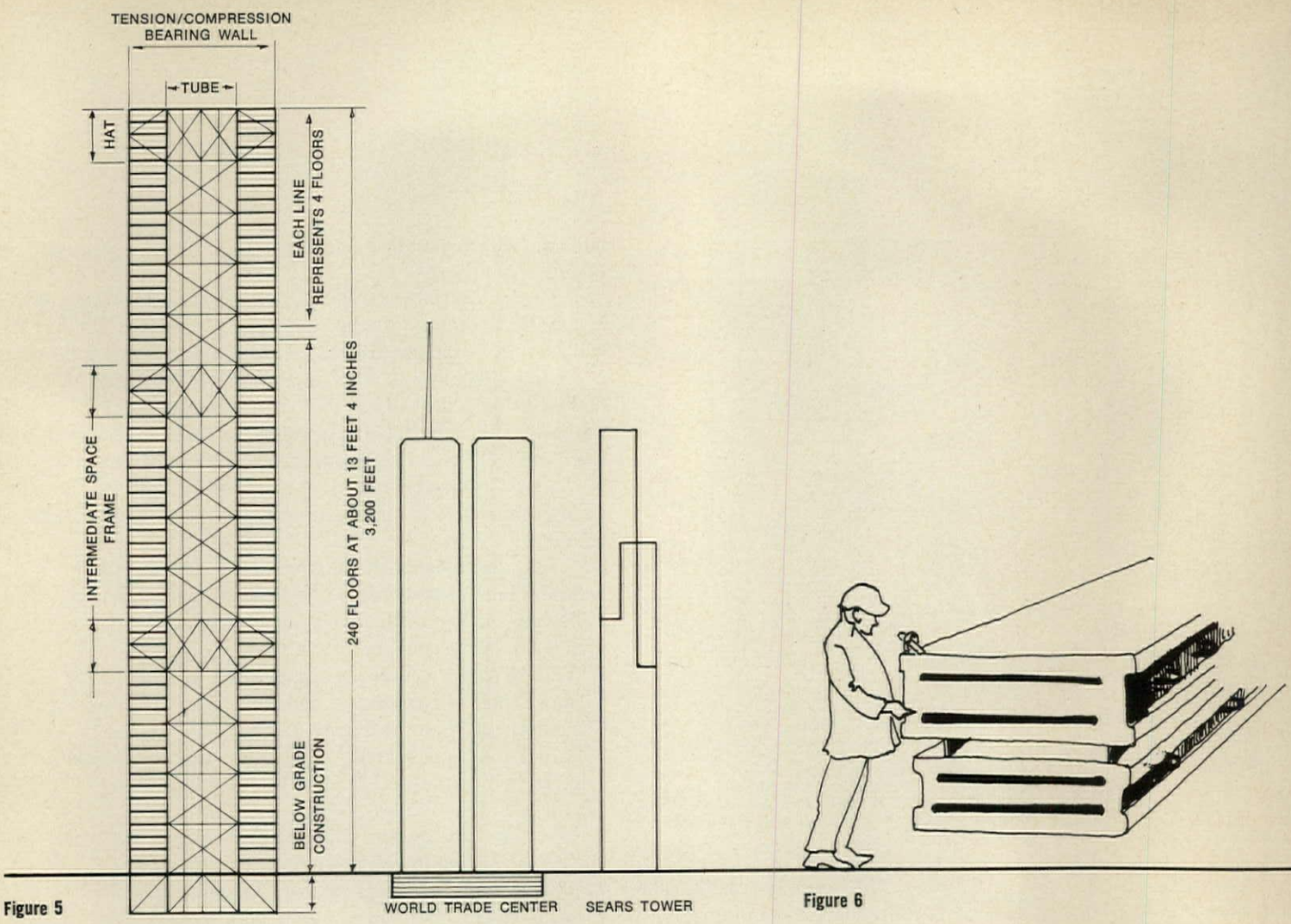


Figure 5

Figure 6

ter, it was later added so as to provide an economical "root" for a 365-foot TV tower to be carried at roof level. The structural system of the US Steel Building also lacks direct suitability for use in a much taller structure as it would need to be augmented by additional space frames so as to enhance the participation of the outside wall. Only the bundled tube system with its augmenting space frame coupling system, as used in the Sears Tower, is directly suitable for use in a "hollow" building of tubular design at a height very much more than 1,500 feet.

For a tubular design of the Vierendeel type, it is possible to locate the Vierendeel on the inside surface, on the outside, or on both surfaces (tube-within-a-tube). In all cases positive structural coupling is required between the two surfaces. Of course, the bundled tube system is quite appropriate. For Vierendeel systems, the tube-within-a-tube and the bundled tube systems carry most promise since they mobilize the bending resistance of all columns to resist shearing forces.

For a tubular design of the trussed type, again the tube can be located on either or both of the surfaces. In making this decision, it should be recalled that there is a need for a coupling system to link all columns together to resist overturning forces. Since both surfaces will participate in the resistance to overturning forces, it follows that there is no primary consideration to force the shear-resisting tube to be on any one of the surfaces. In Figure 5 such a structural system is shown; here, the tube is on the inner surface.

For the proposed building, ducts and elevator shafts, toilet rooms and the like could be placed in the central hollow core or could be within the floor area. Elevator, electrical, duct and piping shafts and other spaces that change in plan dimension or location at various points within the height of the building would most logically be placed in the hollow center to preserve the uniform, modular dimensions of the office area. Toilet rooms, stairways, electrical and communication rooms and other functions that retain their plan dimensions throughout the height of the building could be located as desired.

Columns supporting functions within the hollow center might best be supported on the space frame providing structural coupling between the inner and the outer surfaces. While these loads would be relatively small because the area is mostly shaft space, the "zoning" of the structural system would be compatible with those of other building systems.

The next question of interest is how the mechanical system would relate to such a structure. In order to improve the efficiency of the structural system, it is essential that the floor system should span the clear space between the inner and outer surfaces. Thus, because of the depth of structure needed for such a span, it is inevitable that all ductwork should pass through the beams or trusses of the long-span floor. Indeed, all in-floor mechanical and electrical systems now employed could be used in such a structure.

But what of the location of mechanical equipment—fans, pumps, refrigeration equipment and the like—and of primary transformer rooms? In the past such rooms have occupied entire

floors located at appropriate intervals throughout the height of the building. In only a few instances has mechanical equipment been stacked vertically in a uniform enclosure or shaft.

In the proposed building it should be possible to obtain all fresh air from the roof through the hollow central core, and it may be possible to discharge all used air through the outside wall. At the very least such a system would allow supply air to be as pollution-free as possible. Mechanical equipment rooms could be located within the hollow center by making use of the large-scale space frames providing structural interaction between the inner and outer surfaces. Alternatively, such rooms could be in a continuous vertical shaft or could be through-floor systems as has been the custom in the past.

Fireproofing of the structural work may not differ greatly from that in lower buildings. It may be possible to omit fireproofing considerations from some of the heaviest columns since their vast bulk would provide a much larger heat sink than is found in more conventional columns. Even columns used in the US Steel Building, seen in Figure 6, fall outside the scale of fire testing accomplished to date.

In a hollow core building, life safety systems may well differ from those in conventional buildings. For buildings limited to the heights described, it is likely that the inner surface would be free of windows and could provide an internal fire wall, separating elevators, stairs, duct and plumbing shafts and the like from the occupied areas. It would seem essential to provide access to life safety areas within this hollow core. For even taller buildings, the increased size of the hollow center would encourage the addition of windows on the inner surface, thus diminishing its value as an escape area.

Resistance to dynamic excitation from wind and to a lesser extent from earthquake is an overriding consideration in the development of a structural system for a very tall building. Dynamic response can be reduced only through an increase in structure stiffness, building density or damping ratio. Since stiffness can be increased only through the addition of structural material and since any increase in density must result in a direct increase in structural material (columns), it follows that methods for increasing damping should be explored.

Architectural solutions to improved damping and to obtain reductions in aerodynamic excitation include the use of an appropriate surface texture, the selection of an optimum building shape in plan and in changes in building shape with height. The incorporation of some form of "spoiler" to minimize the generation of vortices may be possible. With such large buildings, the spoiler would need to have a vertical scale of not less than one story but probably two or more. It is likely that the spoiler would take the form of the cantilevering of whole room areas beyond the outer surface of the basic structure. This technique could provide visual interest to the building mass and would improve the ratios of window perimeter to floor area.

Engineering solutions include the addition of tuned-mass dampers or viscoelastic dampers into the structural system; this has been done only once in building systems: The twin towers of the World Trade Center use about 20,000 viscoelastic dampers. One possible damper configuration is illustrated in Figure 7. These dampers, used at the bottom chord ends of the floor members, provide a viscoelastic "hinge" with the columns of the outer walls but perpendicular to the plane of the tube. The column/damper/floor truss system comprises a secondary structural system, independent of the basic tube and not required for the inherent stability of the building itself. Optimization was obtained with the selection of a damper stiffness compatible with the stiffness of the companion floor truss and column. The theoretical work to determine the effectiveness of the dampers is quite straightforward; the system is predictable and reliable.

For buildings with primary and secondary structural systems such as was used in the US Steel Building and for buildings with braced cores, an as yet untried damping concept holds great promise. Under this concept, nearly the entire mass of selected floors is connected to the primary structural system through viscoelastic dampers, thus making their kinetic energy of oscillation available to the dampers for energy dissipation.

As a first example of the concept, consider a building con-

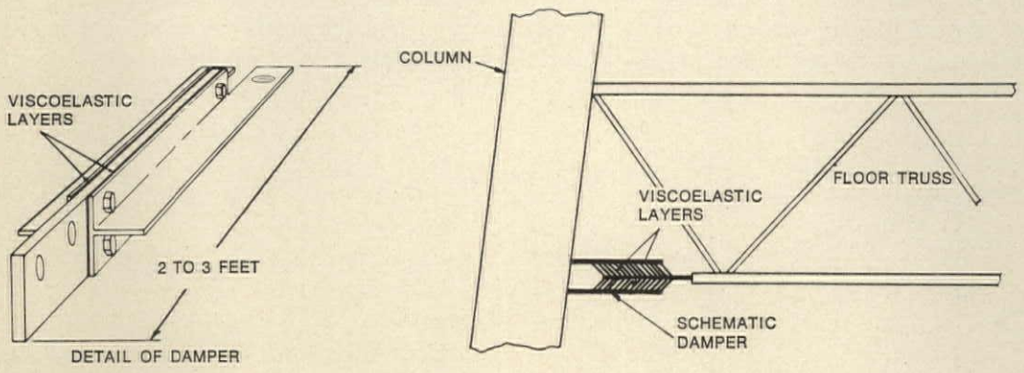


Figure 7

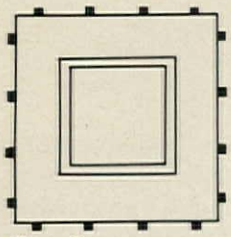


Figure 8

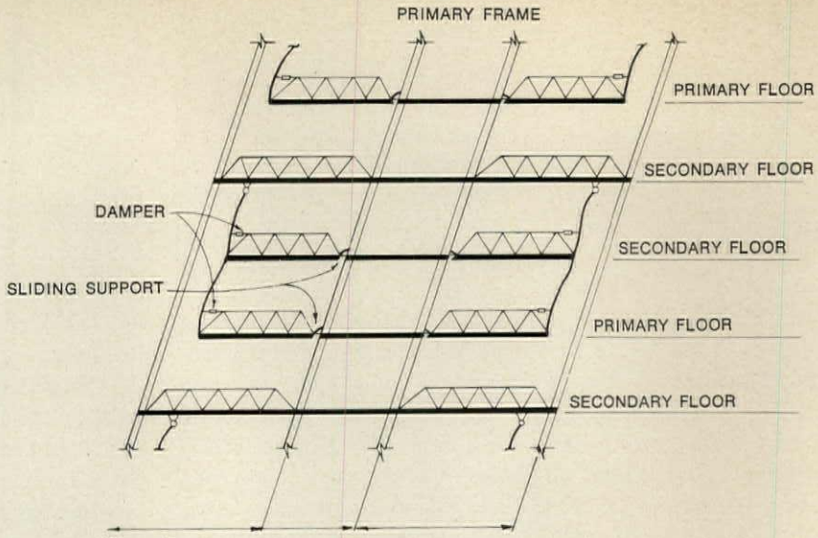


Figure 9

sisting of a slip-form concrete core with sufficient strength and rigidity to provide all resistance to lateral forces and with the floor outside of the core supported on flexible columns at the outside wall and supported at the core by seated and sliding supports. An expansion joint rings the core as shown in Figure 8, but with viscoelastic dampers bridging the expansion joint, providing the structural connection between the core and the surrounding floor. Under building oscillation, strain energy stored in the core structural system and the kinetic energy of the moving masses of the floor system are interchanged through the viscoelastic dampers.

As a second example of the concept, consider a building such as the US Steel Building, consisting of a primary structural frame supporting smaller, secondary structural frames. Under this concept the secondary floors are attached to the primary frame with viscoelastic dampers bridging expansion joints as described above or, alternatively, the secondary structural system is connected with viscoelastic dampers as used in the World Trade Center so as to provide a secondary, plastic frame. The secondary floors, as shown in Figure 9, can be posted or can be hung from the primary frame; hanging systems have a contingent advantage of providing a "centering" system to the secondary frames. The use of a secondary plastic frame has the advantages of magnifying the forces involved, thus providing for easier optimization of the dampers.

These supplementary damping systems provide for positive, determinable and reliable damping for buildings of any height. Through the reduction and absorption of lateral forces induced by wind and earthquake, these dampers provide a largely unexplored but powerful tool in the design of buildings.

The hollow building of tubular concept provides at least one other potential source for the reduction of aerodynamic excitation. This concept, which is seen in Figure 10, still restricted to aircraft structures, involves the discharge of air from the leeward surface of the building into the downstream air flow.

There are three possible sources of discharge air:

- free air from within the hollow center
- discharge of air from the mechanical system
- release of air from the areas of occupancy.

In all of these possibilities it is likely that the natural pressure difference between the leeward surface and the source of supply can provide the required propulsive force to move the air to points of maximum (steady state) negative pressure.

In considering this solution one must discriminate between levels of oscillation providing discomfort to building inhabitants or causing potential fatigue of structural components and violent oscillations leading to permanent damage or collapse. In the first case, massive exterior columns may be organized to provide for the vertical ducting of air to points of discharge. In the latter case it may be possible to organize selected areas of the building facade to become partially porous on the negative pressure side either upon command (prompted by the achievement of a given level of dynamic motion) or upon the attainment of given levels of pressure differential.

As building heights increase, the forces of nature will take on increasing importance in the overall building systems and will dominate the development of nearly every aspect of the building. Methods for obtaining solutions to these problems are available and there exists no limitation in the technology of structural systems that would limit building heights to levels now constructed. Indeed, height limitations, if they do exist, will be found only in considerations of human values, in the systems reliability of service and life safety functions and in other areas associated with the planning of our urban world. □

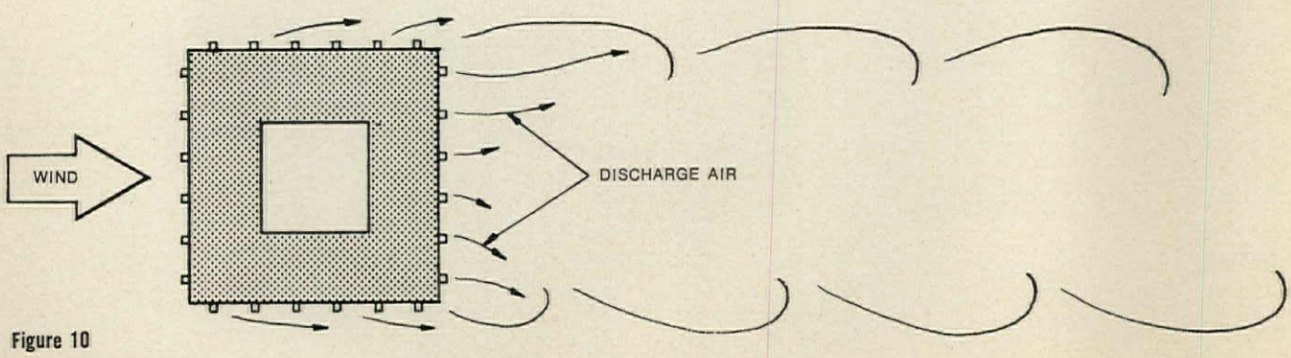


Figure 10

Points to Consider:
Fire

by DIULIU SFINTESCO

While public interest in and worry over fire in tall buildings flare up now and then following incidents covered by the news media, the concern among professionals all over the world is constant, as evidenced by the work that goes on to make highrises safe places in which to live and work.

Some spectacular cases of fire with large numbers of casualties have recently been recorded in tall buildings located in various parts of the world. Smaller but still dramatic accidents to people trapped and harmed or panicstricken in some part of a building on fire occur daily, as reflected by routine reports in the press.

A few more or less famous instances of progressive partial collapse of tall buildings due to domestic gas explosion have also occurred and have been widely described and discussed both in technical and nontechnical papers.

These facts cannot but confirm the seriousness of some risks which under certain circumstances may directly or indirectly derive from the tallness of a building.

Does all this mean that tall buildings are necessarily dangerous in case of fire or blast? Definitely not.

In fact, a careful examination of each major accident invariably shows that their seriousness was due to some weaknesses, imperfections or inadequacies in the design of the building or in the safety provisions. This means not only that the accidents could have been avoided and that tall buildings are by no means necessarily unsafe, but also that careful and rigorously applied provisions for safety are needed.

It is obvious that the probability of a fire or explosion in a building grows with the number of occupants and is therefore significantly greater in a tall than in a small building. In addition, material damage will likely be greater and more people will be involved due to size and population of the building.

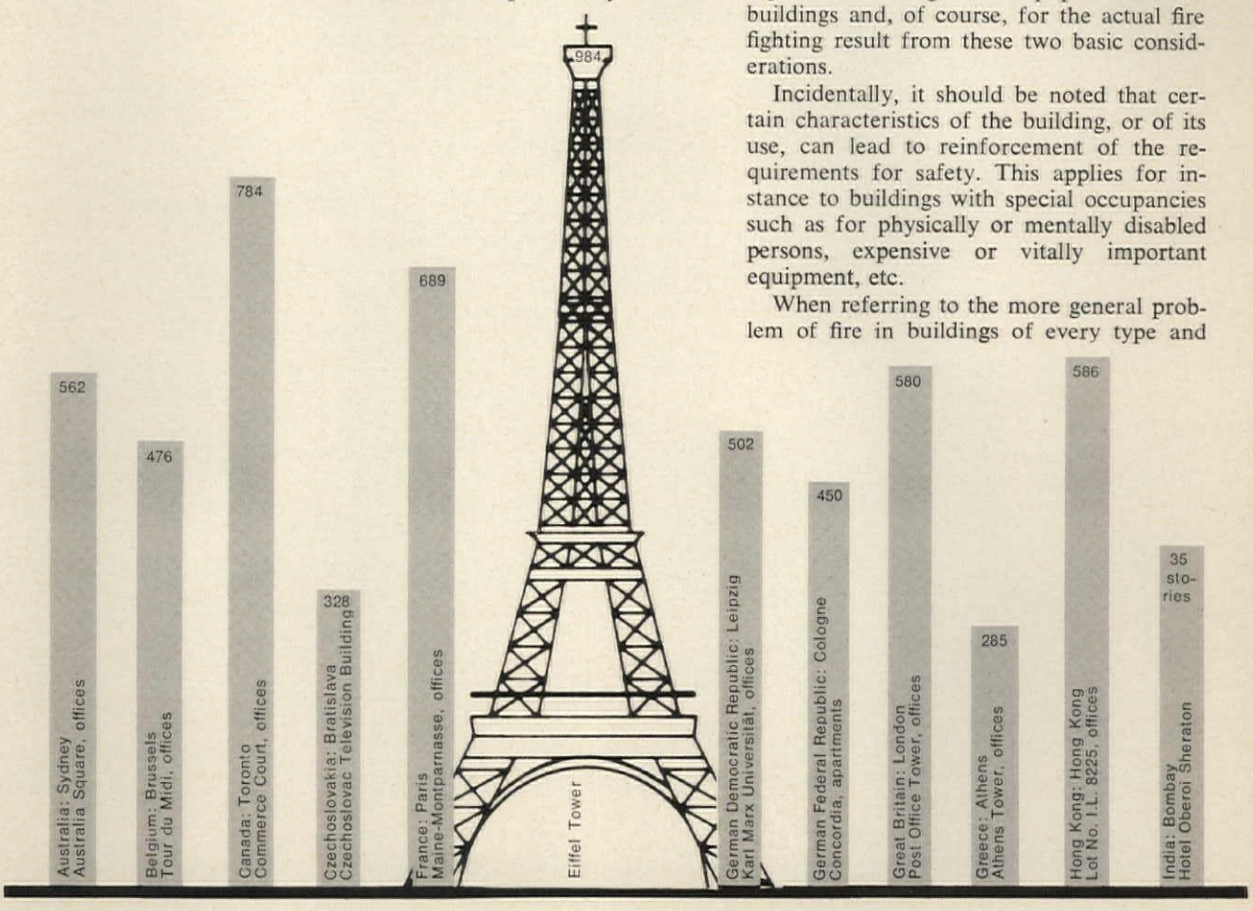
Thus one of the main concerns for safety in tall buildings is to prevent local accidents from extending to larger zones of the building. This applies equally to fire and blast. However, the different nature of these two types of dangers requires separate, specific consideration and leads to different safety provisions.

Fire safety in tall buildings is a different and much more complex problem than in low buildings. This is due to two major, specific facts. First, above a certain height fire fighting and rescue actions can only be undertaken from the inside of the building. This necessarily involves special means and techniques and leads to considerable additional requirements upon the design and technical equipment of the building. Second, total emergency evacuation of a tall building is impracticable within a reasonably short time. This means that the safety of people in areas beyond the immediate vicinity of the incipient fire must also be taken into account.

Arduous tasks for research, for code making, for the design and equipment of tall buildings and, of course, for the actual fire fighting result from these two basic considerations.

Incidentally, it should be noted that certain characteristics of the building, or of its use, can lead to reinforcement of the requirements for safety. This applies for instance to buildings with special occupancies such as for physically or mentally disabled persons, expensive or vitally important equipment, etc.

When referring to the more general problem of fire in buildings of every type and



Shown here are the tallest building in each country which responded to a questionnaire sent out by the Tall Buildings organization, as well as the tallest in some major US cities and a selection of giants in Atlanta, Boston, Chicago and New York City. Use of the buildings is given where known; height is cited in feet or floors. The oldest building on the chart is Detroit's Penobscot Building, which was completed in 1928. Some of the other structures are still in the planning stages or under construction. Steel is the predominant material used in this country, while concrete is more commonly used abroad. Australia has the tallest lightweight concrete and the tallest prefabricated concrete buildings. The information on the chart may not be completely accurate and the Survey Committee of the Tall Buildings organization, Lehigh University, Bethlehem, Pennsylvania, therefore welcomes additions or corrections.

size, the risks involved concern people, property and the building itself. The same applies to tall buildings. These three categories of risks have to be considered differently, according to specific criteria and philosophies. In addition, they are influenced differently by the tallness of the building.

Due to the impracticability of total evacuation there are two main objectives to be attained for the safety of people: evacuation from the compartment on fire to safe areas; and noninvolvement of other compartments of the building. The major aspect to take into account here is the fact that most of the casualties by far in tall building fires are due to the effects of smoke and toxic gases.

No fire can develop and last beyond the limits deriving from the amount of combustible materials present in the affected area. It is thus logical to think of limiting the combustible contents, or fire loads, of a building as the first means of restricting the duration and intensity of a fire. A distinction has to be made between fixed and movable fire loads.

The fixed fire load consists of any exposed combustible material in the structural and nonstructural elements of the building. It is quite easy to achieve and control limitation of the fixed fire load by giving preference to the use of noncombustible material. This falls entirely within the capacity of the architect, who in this way can contribute considerably to improving fire safety.

Such limitation can be fully taken into account in the assessment of the fire risks, thus resulting in significant savings in matters of requirements for fire protection, provided of course that codes are updated to keep pace with the findings of recent studies and research.

The movable fire load represents essentially the furniture and its contents. In most cases it is very difficult or nearly impossible to control the amount of this type of fire load, except for some particular occupancies where all steel furniture can be used.

In general, the assessment of the movable fire load can only be based on statistical surveys for the various types of occupancies, as they have been carried out by the National Bureau of Standards and by organizations in other countries.

The most natural and logical means of keeping the risks at a level comparable to that existing in a small building is compartmentation, which means dividing the tall building into a number of small units in such a way that fire and all its possible consequences remain confined in the compartment in which the fire started, while the occupants of that compartment must find safe refuge in other areas.

Efficient compartmentation is therefore crucial in order both to keep the fire small by preventing its extension and to ensure the safety of people in other parts of the building. Perfect compartmentation is easier to ask for than to achieve, and this is the reason why some accidents have occurred. However, it must remain a major concern in the design of tall buildings; it represents a goal which can and must be attained.

Important research has been carried out in several countries on fire development based on the amount and type of fire load and on the size, shape and ventilation of the compartment on fire. Time/temperature curves have thus been obtained for various situations in real fires. These are in contrast with the internationally adopted standard curve, which has always been used for fire testing of building materials and members in laboratories.

The standard curve does not reflect the progress of any natural fire but is nevertheless most valuable as a common basis for all fire testing in the world. Directly relating the fire resistance measured with the standard fire to the duration of a natural fire is a mistake. However, procedures for correlating the two have been developed, notably in England, Japan, Sweden and at the European Convention for Constructional Steelwork (ECCS) Committee on Fire Protection (of which the author is chairman).

When speaking of buildings in general, the requirements for structural fire resistance can be considered from two different angles depending on the purpose: to ensure safety of people, and to maintain structural integrity or reusability.

The first criterion is in all cases an absolute minimum and must cover the possibility of escape for the occupants and the safety of fire fighting teams.

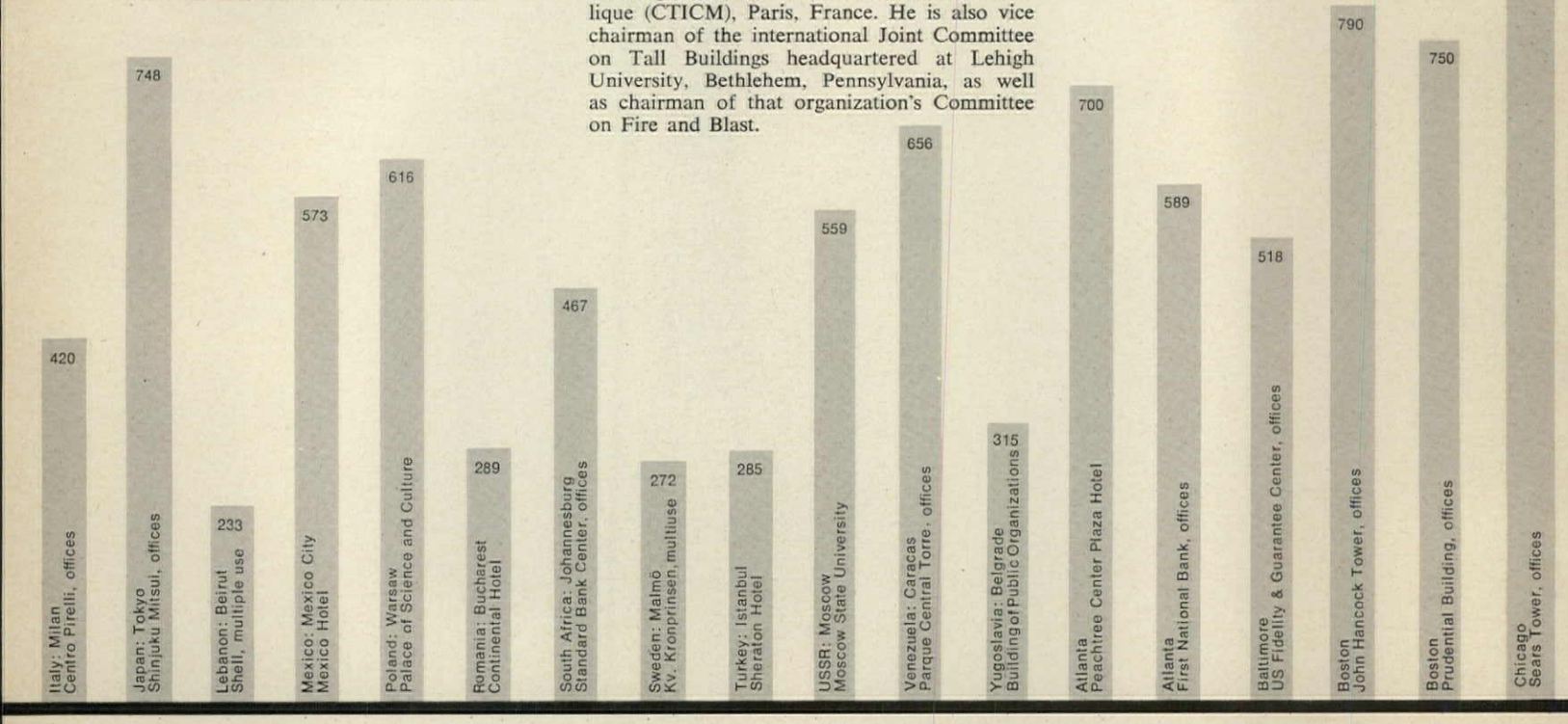
Beyond this minimum requirement, the degree of structural fire resistance of a building in general is a purely economic problem, concerning first of all the insurance companies, except for possible fire spreading to other buildings, which is again an aspect of general concern.

However, for tall buildings the problem is different. The complete loss of or even a major damage to a tall building can be not only economically inadmissible but can also involve many other consequences which make such an event intolerable. It is thus reasonable to establish requirements for structural fire resistance at a higher level than merely for the safety of people.

But the requirements have, naturally, a considerable impact on the building economy. They must therefore be carefully adjusted so they don't become unnecessarily heavy. This is possible only by means of a reasonably accurate evaluation of the structural fire resistance of the building.

Until recently this evaluation was done in a purely empirical way and could only be related to experiments on relatively small, single structural members exposed to unrealistic fire. No attempt could be made to extrapolate the test results to large-size members as they particularly occur in tall buildings, nor to take into account such influences

Mr. Sfintesco is director of research, Centre Technique Industriel de la Construction Métallique (CTICM), Paris, France. He is also vice chairman of the international Joint Committee on Tall Buildings headquartered at Lehigh University, Bethlehem, Pennsylvania, as well as chairman of that organization's Committee on Fire and Blast.



as continuity, end restraint conditions, structural overall stability, etc., which have a considerable influence on the structural fire resistance.

Until recently there was no way to analyze the behavior of the structural system as a whole with regard to the thermal action of a natural fire combined with the existing static loadings. Some remarkable attempts to deal with this problem in a more scientific way have now been made in some countries, but probably the most significant effort in this respect is just being made by the joint action developed by 15 countries within the ECCS.

This international body has erected at Maizières-lès-Metz in France a unique facility for large-size testing allowing a close experimental approach, thus producing the necessary basic data for a realistic theoretical investigation which would have been illusory otherwise.

A systematic scientific treatment of the problem has now started, from the basic philosophy up to the most precise practical aspects of the question. From the results the designer should be able to calculate the resistance of the structure with regard to fire in a similar way as for other types of loadings. This will allow him to determine more accurately the limits of fire resistance depending on the building materials and on the structural system, thus avoiding crude and sometimes discriminating attitudes toward certain materials.

We are therefore now at a turning point in this field, when design for fire resistance is entering into the structural engineering science.

As a first result of studies which have already been performed, tables and charts for the practical prediction of fire resistance for protected and unprotected steel members of various sizes and shapes are now available. Further steps are in preparation. This development is expected to allow better proportioning and distribution of the structural fire protection, thereby improving safety and economy for tall buildings.

In this connection it is interesting to note that there is no record of any structural collapse due to fire in tall buildings, while accidents to occupants occur too often. It is obvious, then, that increased attention and efforts must be devoted to human life protection. On the other hand, structural engineers will say that they have always been conscious of the fact that certain requirements were greatly exaggerated.

It can now be expected that the efforts for fire protection will be better oriented in future.

The extent of tolerable damage to the building, and in particular to its structural elements, must be considered with regard to the probability of fire occurrence and development, and to the use of the building. This is an important part of the study for "survival" of a tall building after a major fire. Therefore, reusability and feasibility of repair must always be considered. This and the techniques to be used have to be thought of as early as possible in conceiving the structural system. The techniques are of course largely material-dependent.

Perhaps too summary—but yet suggestive—a catch phrase has been used for structural steel members: "If it's bent, replace it; if it's straight, repaint it."

When a fire begins, it starts by generating smoke and hot combustible gases. Detectors must therefore be sensitive to these products. It must be recognized that such detectors require delicate adjustment and frequent maintenance inspections. They may sometimes set off false alarms but they offer the best warning by detecting the fire early enough, in contrast to heat sensitive detectors, which may react too late to get life saving operations underway in time.

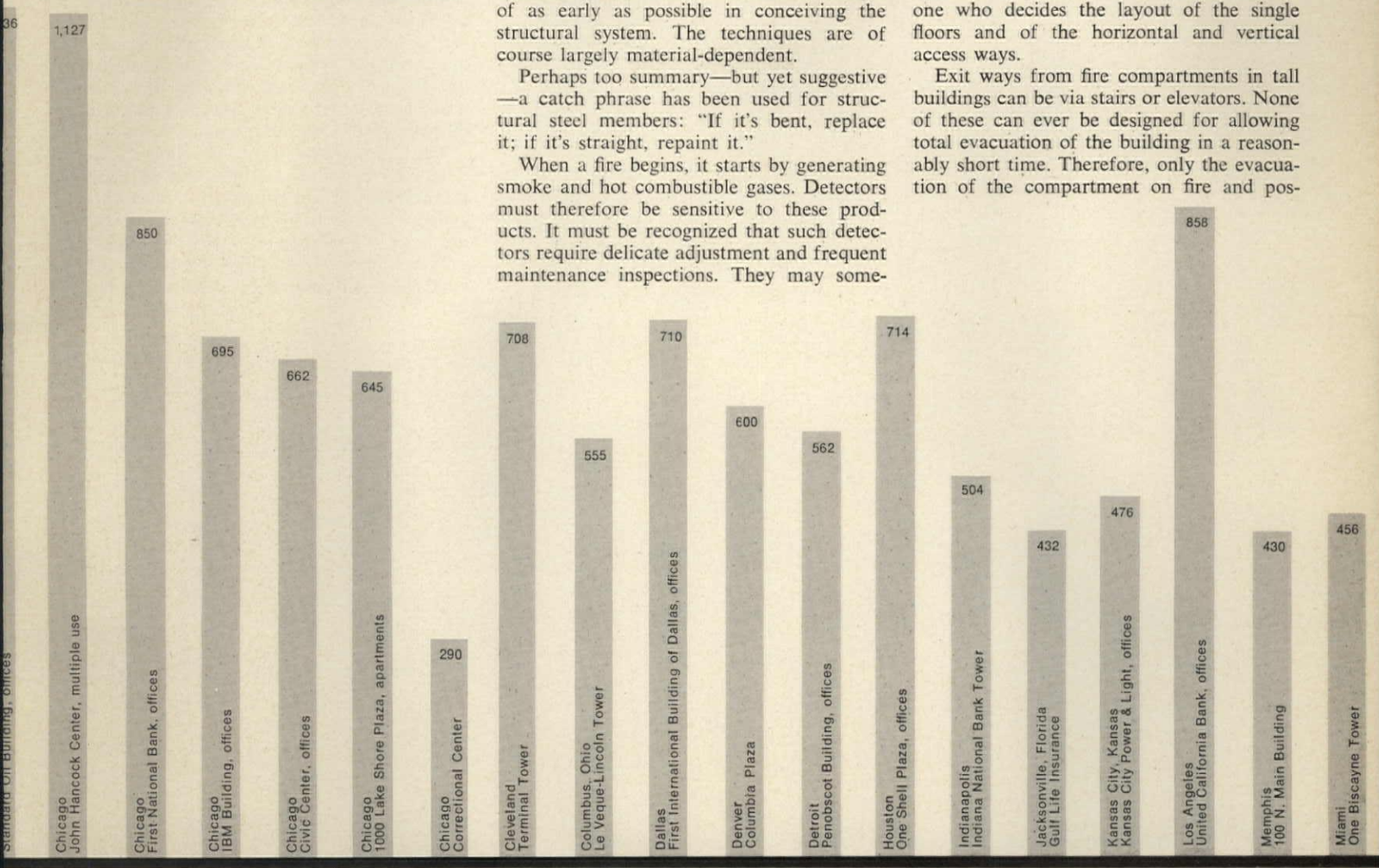
Detection by human means is unreliable and too undependable due to varying conditions caused by unpredictable occupancy.

Early detection must be immediately followed by the alarm transmission to building occupants and to the fire department. Delays in the alarm transmission have been the main cause of several major fires.

Communication and alarm systems in tall buildings must be able to locate the fire and to operate selective alarm so occupants can transfer to smoke-free areas. For this purpose they must be specially treated in accordance with the egress programs and smoke control systems. They should advise people, depending upon the circumstances, what they have to do: either instructing them to remain where they are, or indicate the appropriate egress routes, thereby reducing chances of panic and dangerous blocking up of exits.

The undeserved bad reputation of tall buildings in fire situations has mainly resulted from some instances where they have actually been firetraps for the occupants. It is obvious that safe egress routes must and can be provided for. This is a task to be considered at an early planning stage, by the architect in cooperation with the fire safety engineer. However, the ultimate responsibility belongs to the architect as the one who decides the layout of the single floors and of the horizontal and vertical access ways.

Exit ways from fire compartments in tall buildings can be via stairs or elevators. None of these can ever be designed for allowing total evacuation of the building in a reasonably short time. Therefore, only the evacuation of the compartment on fire and pos-



sibly of the adjacent compartments can be considered.

As confirmed by several fire records, normal elevator systems are not only insufficient in case of emergency but also the least reliable and the most dangerous means of egress due to the possible smoke blockage of the elevator shafts and to the sensitivity of the operating systems during fire.

As a consequence, it is necessary to develop new concepts of exiting ways. Psychological and physical reactions of panic-stricken people to using the familiar means of transportation must also be taken into account. There should be horizontal exiting to smoke-free and fire-protected areas of refuge before the entry to a stair. If elevators have to be used, they must be located in smoke-free towers or shafts and have non-firesensitive controls.

Generation of smoke and toxic gases can be limited to a certain extent, at least in the initial phase of the fire, by an appropriate choice of materials for interior finishes and for furniture. Full control in this respect is extremely difficult to attain since it escapes from the effective authority of the architect. Nevertheless, at least the use of combustible linings which can rapidly spread smoke and flames during the first stage of a fire should definitely be prohibited.

The greatest specific danger to people in tall buildings is due to the spreading of smoke and toxic gas into exiting ways and remote compartments. This may create panic, hinder escape and produce harm to people who otherwise would not be involved.

Compartment tightness may prevent smoke and gas movements at an early stage, but it can hardly withstand pressure differentials developing with the progress of the fire.

HVAC systems may easily offer channels for spreading the hazard, unless they are specially designed for removing smoke and gases from the fire compartment. This means that they can play major positive or negative roles, depending upon the purpose for which they are designed.

The most efficient procedure consists in using automatic detection and operation controls for adjusting fans on HVAC systems in the egress routes. Efficient smoke paths must be provided for in the planning of the building and of its HVAC system.

Access, ventilation, communication and extinguishing facilities are among the main concerns for fire fighting in tall buildings.

Access through staircases is impractical beyond a certain building height, so it is essential to provide elevators specially designed for this function. They must be easily put into the exclusive service of the firemen and be able to take them to a floor near the one on fire.

Smoke exhaust devices must be available on every floor to ventilate the fire compartment so it becomes unnecessary to break windows, which may result in life hazards below.

In order to enable the commanding fire officer to direct the operations for extinguishing and evacuation, communication must be ensured. This is usually done by means of walkie-talkies but these may be inefficient in some tall buildings, in which case a special communication system should be provided for.

Last but not least, when the building height exceeds the capacity of pumping from street level there must be a reliable system of standpipes for the actual extinguishing operations, representing an extension of the city water supply into the building for fire fighting purposes.

For greater building heights, water supply zoning with upper level reservoirs must be adopted. Pumping from inside the building must be operated by means of an emergency power system.

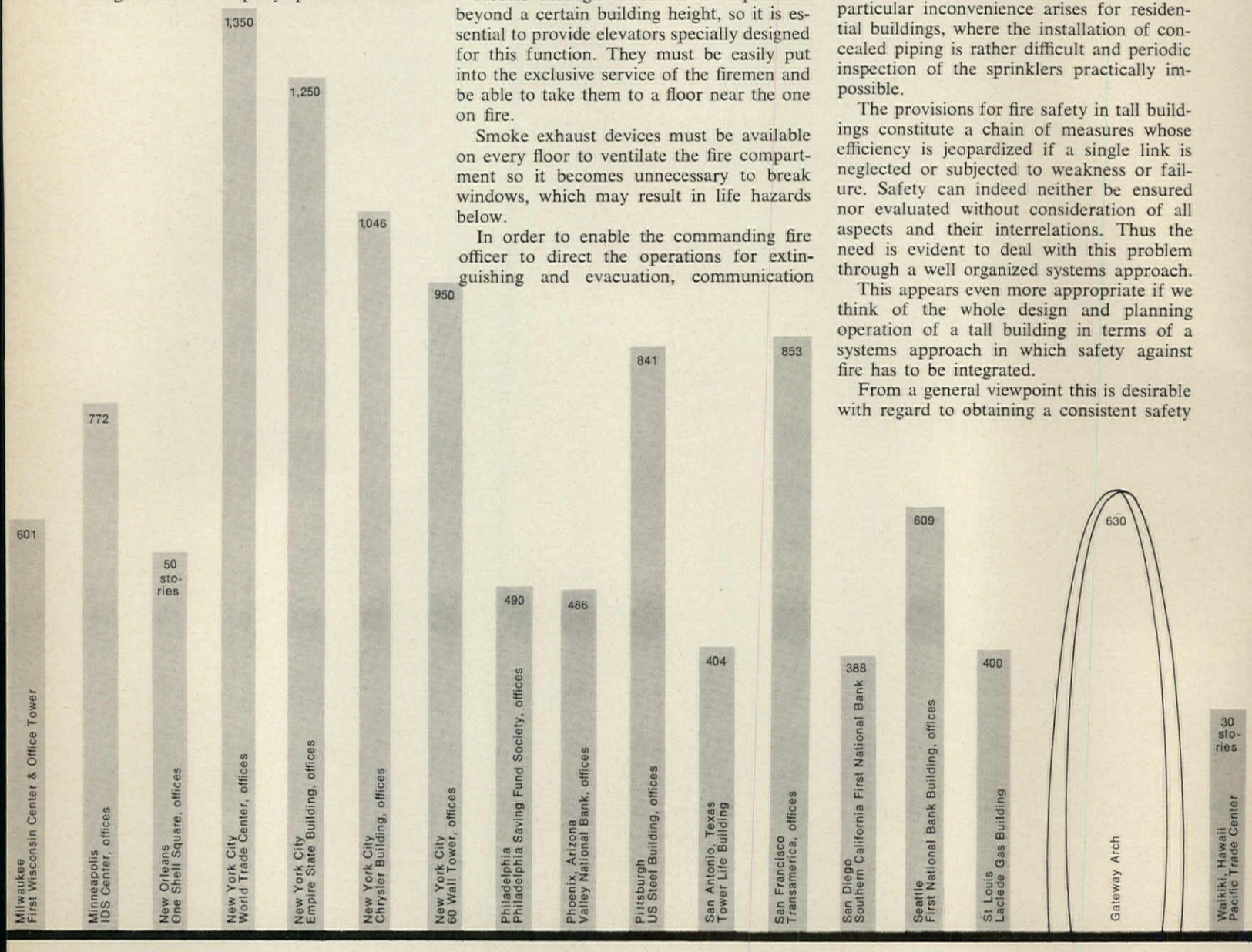
The decision about the use of an automatic fire fighting system depends on the occupancy and, of course, on economic factors. The economic study must include the analysis of the fire hazards to be covered, the resulting design of the sprinkler system and implied savings in the capacity of water supply, piping and pumping installations.

The most obvious advantages of sprinklers are the readiness of intervention, the limitation of the fire size at least up to a certain stage and limiting of smoke spreading. A particular inconvenience arises for residential buildings, where the installation of concealed piping is rather difficult and periodic inspection of the sprinklers practically impossible.

The provisions for fire safety in tall buildings constitute a chain of measures whose efficiency is jeopardized if a single link is neglected or subjected to weakness or failure. Safety can indeed neither be ensured nor evaluated without consideration of all aspects and their interrelations. Thus the need is evident to deal with this problem through a well organized systems approach.

This appears even more appropriate if we think of the whole design and planning operation of a tall building in terms of a systems approach in which safety against fire has to be integrated.

From a general viewpoint this is desirable with regard to obtaining a consistent safety



on all aspects of the problem by weighing the various hazards, because discrepancies in the degree of safety always result in useless efforts and waste of money.

Moreover, various means of protection can fulfill multiple functions in the building, thus leading to improvement both of efficiency and economy of the project, and this can best be attained through such an integrated systems approach.

The planning and design of a tall building today cannot be but the result of team work involving various types of professionals. The fire safety engineer must be one of the team and has to start his contribution at the very first stage of the project.

When it comes to internal blast, probably the most frequent source of damage in buildings is accidental ignition of mixtures of air and flammable gas produced by domestic gas leakages or by evaporation of spilt volatile fluids. This risk is not characteristic of or especially dangerous in tall buildings except for the fact that a larger number of people may be involved.

However, some accidents have revealed that the possibility of progressive collapse of some particular structural systems due to a local damage had been overlooked, while most other systems were basically not subjected to this phenomenon.

This has led to the development of simple structural provisions for making such cases impossible in future. These are now required by most design codes relating to those building systems, in this way reducing the hazards to the level which has always been accepted in low buildings.

Besides various measures for eliminating the possible sources of explosion—for instance, to prohibit domestic gas supply in some tall buildings—the consequences of such an accident can be limited by the use of vents which are opened or blown out by internal pressure, below the level that would cause significant damage to load-bearing components. This is a common task for the architect and structural engineer.

External blast shocks can be due to a variety of causes. One mainly thinks of traditional or atomic bomb explosions whose intensity, duration and impact area depend on type, size and distance.

The main structure of a tall building should be designed (but is usually anyhow strong enough) to resist relatively high pressures. Its safety can be considerably increased by means of appropriate design of the cladding and of the partition walls which would be subject to destruction, thus saving the main structure.

Possible impact shocks produced by a vehicle, such as a truck, or a plane, have to be considered in conceiving and designing a tall building in order to avoid disproportionate damage even from such rare accidents.

More and more people in the world have to live or work in tall buildings. As compared with the pre-tall-buildings state of things, this implies not only many changes of habits and living conditions but also brings about considerable advantages as well as specific inconveniences and risks.

It is the task of architects, planners and builders to ensure a maximum of well being and safety for the users. They actually have this goal well in mind, as confirmed by the remarkable worldwide, multiprofessional response met by the Joint Committee on Tall Buildings. The very thorough and exhaustive analysis of the possible dangers in tall buildings and the resulting systematic study of the appropriate means of reducing all types of risks to a consistent and reasonably low level make modern, well conceived and correctly achieved tall buildings as safe as one may wish. □

Highrise Building Code Requirements Available for Adoption

Early in 1972 The American Institute of Architects' Codes and Regulations Center cooperated with the Fire and Life Safety Committee of the International Conference of Building Officials (ICBO) and other concerned organizations in the development of special provisions recommended for adoption and inclusion in building codes. Drafted in the form of a new section for building codes, it is appropriately entitled "High Rise Buildings."

The provisions were developed to apply to hotels, office and multifamily buildings when these have floors used for human occupancy located more than 75 feet above the lowest level of fire department vehicle access.

The new provisions call for compartmentation of every building to provide areas of refuge for the occupants. This would include the installation of a horizontal exit dividing each story into two areas of approximately the same size not to exceed 30,000 square feet, or subdividing the building into five-story compartments by interrupting the stairshaft with smoke barriers every fifth floor, or through the use of smokeproof enclosures for all stairways. Other approved methods could also be employed to protect against the movement of smoke from one compartment to another.

Openings in exterior walls located vertically above one another would be protected by approved flame barriers either extending beyond the wall in the plane of the floor or by vertical panels not less than 3 feet in height. Horizontal exit areas used for compartmenting the building would not allow any openings which would permit the transfer of smoke from one compartment to the other except for required exits.

A manual fire alarm box would be located adjacent to exits into stairway shafts and in every elevator lobby. The box would be connected to a central control station and to a voice communications system. An approved system for automatic detection of products of combustion other than heat would be installed in every mechanical equipment room and in the return-air portion of all airconditioning and mechanical ventilation systems that serve floors other than the one on which the equipment is located. Detectors would also be located at each opening into vertical shafts. Both the detection and alarm systems would activate a voice alarm system that could be heard by occupants anywhere in the building.

There would actually be two electrically supervised voice communications systems: one between the central control station and elevators, lobbies, corridors, stairways, every office exceeding 1,000 square feet in area and each dwelling unit or hotel guest room; the other for the exclusive use of the fire department.

The purpose of the central control station would be for the use of fire department operations. It would contain all the equipment controls for the voice communication, alarm and detector systems. It would also include status indicators for the control of the elevators, air handling systems, sprinkler valve and water flow detectors and the standby power system. At least one elevator in each bank would be provided for fire department access to any floor. An elevator could be located within a smokeproof enclosure.

A permanent standby power system would be provided. It would be designed for automatic activation upon failure of normal electrical service within 60 seconds, thus providing the necessary power for the immediate transfer and operation of all critical electrical functions. It would include an on-premise fuel supply sufficient to provide full demand power for at least two hours.

The provisions include requirements for the anchorage of mechanical and electrical equipment used for elevator drive, standby power, fire pumps and other equipment in seismic areas.

Fire sprinkler protection could be provided as an alternate for compartmentation and would allow for various tradeoffs. This alternate method of fire protection is detailed and clearly spelled out in the provisions.

The new section will appear in the 1973 edition of the Uniform Building Code published by ICBO.

Code changes based on the same provisions but individually tailored and referenced have also been introduced for adoption by the Southern Building Code Congress and the Building Officials and Code Administrators International, which also publish model building codes. Both are currently under consideration for adoption at the present time.

JAMES R. DOWLING
Director
AIA Codes and Regulations Center

ED. NOTE. The foregoing outlines various points of interest of the original document. However, copies of the complete text is available to any code jurisdiction or AIA chapter code committee for consideration and possible adoption. Requests should be addressed to the author in care of AIA Headquarters.

Points to Consider: Earthquake

by C. MARTIN DUKE

Our earth experiences 500,000 tremors a year; 100,000 of them can be felt or heard; some 1,000 cause damage. One-half to two-thirds of the United States is in potential danger zones. How much should be invested in making buildings earthquake resistive? With more tall buildings going up with consequent denser populations even in tremor-prone areas, it is time that the architectural and other professions take the lead in incorporating economic and sociological factors along with the structural factors.

This country is far advanced in the structural aspects of creating seismic resistant tall buildings. In comparison, we lag significantly behind in the art of incorporating economic and social factors into the design of these structures. In fact, we are still sorting out the relevant elements in this connection and are able only to treat some of them in moderate depth.

The central problem may be stated in two parts: 1) What incremental investment of funds should be applied to what ends in order to co-optimize seismic safety and the variables of function and esthetics in a proposed tall building of antiseismic design? In other words, what proportion of the total cost should go to incorporate seismic resistance? 2) What public policies should be established relative to acceptable seismic risk, land use planning and building ordinances in a municipality planning its future growth with an eye on seismic hazards?

Two public policies affecting highrise buildings vis-à-vis earthquakes are those of land use planning and building regulations. The former may limit construction in fault zones; the latter dictate requirements of strength and flexibility and thus strongly influence the structural materials and hence the building esthetics.

The first problem is the concern of the building owner, the architect, the structural engineer and their professional colleagues; the second involves the community at large and requires initiative from the professional subcommunity. Both problems are solved daily around the world, but usually without much support in the form of factual information, established professional methods or the results of research.

The attitude of the public toward the seismic hazard serve to establish the acceptable levels of risk of death and economic loss. For example, shortly after the San Fernando earthquake, Los Angeles voters defeated a bond proposition to rebuild unsafe schools, thus tacitly accepting the risk extant of one death per year per 400,000 population due to earthquakes. California homeowners generally decline to purchase earthquake insurance, implying that they are willing to accept the associated risk of destruction of their homes. On the other hand, owners and financers of tall buildings usually provide for earthquake insurance.

Public indifference toward protection against economic loss is kept placid by a variety of disaster relief legislation wherein the government pays. The architectural and engineering professions should work hard to sustain a good level of understanding in the public mind of the consequences of its decisions on acceptable risk.

Under national and state laws, federal and state construction in the United States is exempt from local earthquake-resistive design requirements, though some enlightened agencies voluntarily incorporate earthquake factors into their designs. Buildings where people are confined, such as prisons and hospitals, are involved here, as are many bridges, dams, etc.

In the US, California has been uniquely active in adopting realistic design criteria to make buildings earthquake resistant. Other localities where earthquake resistive design should be applied include the states of Washington and Alaska, and to a lesser degree Boston, Charleston, South Carolina, Memphis and New Madrid, Missouri. Quakes in the latter four locations occur much less frequently, but the shocks that may be expected would be comparably severe with those on the West Coast.

In Japan, antiseismic design is generally more conservative than in the US, and local site factors are included in the codes. Chilean professionals are eying the dual bracing system defined by the Structural Engineers Association of California Code, where ductile frames are provided to resist at least 25 percent of the expected lateral forces. A few buildings in Chile comply with this provision but, according to Joaquin Monge E., professor of civil engineering at the University of Chile in Santiago, the Chilean code for earthquake-resistant design presently gives no special encouragement in this direction. Reinforced concrete shear wall buildings are used in structures up to 30 stories.

What we should hope for ultimately are international design criteria with options related to provincial elements. These, of course, cannot be set by one profession alone. Seismologists, architects, engineers and other professionals around the world must cooperate in adopting the criteria in various areas so that these can be developed to reflect the finest of international experience and research results.

Architects should study and understand antiseismic design so that they may provide basic structural concepts that permit sound engineering. Furthermore, in the design of an infinity of nonstructural details the architect must incorporate seismic considerations. For instance, more attention must be given to stairs and elevators in tall buildings. Both are vulnerable to heavy damage during a quake, consequently making it unacceptably difficult for people to escape even though the building structure itself is unharmed.

For perspective on the seismic safety problem, the design criteria for tall buildings may be classified as follows:

1. Protection of human activities
   - Life protection
   - Continuity of work
   - Physical comfort
   - Mental security
2. Continuance of building functions in and after an earthquake
   - Intended function continuity (hospitals)
   - Access and egress
   - Services (communication, energy)
   - Facilities (elevators, airconditioning)
3. Protection of capital investment
   - Tolerable structural damage
   - Tolerable nonstructural damage
   - Tolerable damage to building contents, services, facilities
4. Building's role in disaster response
   - Evacuation and rescue of occupants
   - Emergency services and facilities
   - Panic prevention
   - Role of functional building in regional disaster relief.

Risk analyses should be made for individual building sites; these are routine for nuclear reactors no matter where they are located and this should be so for tall buildings as well, since they involve comparable life hazards. The earthquake hazard is not so much in the tallness of a building as in the earthquake resistance regardless of height.

Dr. J. H. Wiggins Jr. and structural engineer Donald F. Moran have ventured into the new field of making a risk analysis, this for the city of Long Beach, California. In their *Balanced Risk*, (J. H. Wiggins Company, Palos Verdes Estates, California), they present a methodology for relating death risk to building safety on the basis of occupancy factors, soil conditions, earthquake recurrence probabilities and structural factors. The Wiggins/Moran methodology treats the rehabilitation of existing

Mr. Duke is professor of Engineering at the University of California, Los Angeles.

structures as well as the design of new buildings. Their philosophy is valuable and good, but there are still practical problems due to shortage of knowledge of earthquake occurrence and effect.

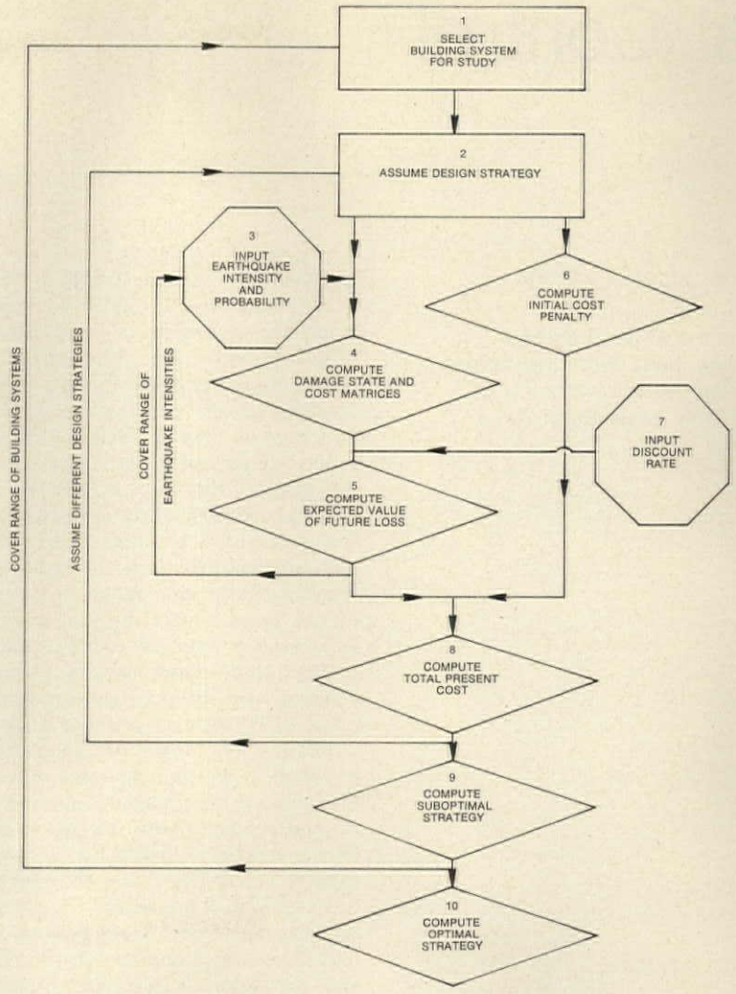
What about the buildings that cannot practically be made to fit the new standards, should they be torn down? For the safety sense, yes, but then again, you cannot tear down Memphis. The Los Angeles metropolitan area has about 40,000 nonearthquake-resistant buildings, mostly unreinforced brick masonry erected before 1933, which present economical and sociological problems. Some amelioration of the hazard can be provided by making the local public service buildings (hospital, police station, etc.) safe against quakes.

The paramount criterion is the avoidance of actual or near calamity of the type experienced by certain buildings in recent earthquakes in Anchorage, Tokachi Oki, Caracas, Mexico City and San Fernando. Between 1960 and 1970, more than 94,000 persons were lost in the nine major earthquakes during that period. Property damage may be tolerated up to a total loss, but life must not be lost. Thus there must be no complete collapses.

Design criteria such as mentioned, when carefully established and faithfully implemented in construction, serve to determine the cost of making a tall building earthquake resistive. Generally, the added cost is on the order of 10 to 15 percent more based on the structural cost; 5 percent based on the total cost. The percentage naturally depends on the level of damage tolerated, such as no damage, superficial damage, structural damage, or extensive damage short of collapse, and on the tolerated level of damage to building equipment and services. There are cost implications in the decision between rigidity and flexibility of the primary seismic force element: nonstructural damage patterns will differ in the two cases; and human sensitivity to building vibrations will be affected. A flexible building may suffer more nonstructural damage than a rigid building and will aggravate occupant vertigo. However, properly designed it can more economically resist collapse than a rigid highrise. A building with interrupted function precipitates costs due to loss of human productivity, loss of wages and loss of rent.

The topic of optimization of the investment in antiseismic design has received but little attention so far. In principle it should be possible to approach this problem as an element of the overall decision making on cost/benefit tradeoffs for a building.

Robert V. Whitman, professor of civil engineering at the Massachusetts Institute of Technology, has made a promising approach at developing a methodology for optimizing seismic protection in the cost of a building. "This methodology can never—and should never—be a substitute for judgment and experience," comments Whitman, "but rather provides a systematic organization of such experience and judgment." (*See* chart.)



Flow diagram for a possible methodology for analyzing the costs and risks associated with designing tall buildings against earthquakes. The methodology is aimed at selecting seismic design requirements for a specific project or for use in a building code. However, the same general method can be used as a basis for insurance considerations or for federal disaster relief laws. A similar methodology has been applied to estimate possible future losses to residential dwellings in California by the US Department of Commerce. Courtesy Robert V. Whitman.

By assembling experience during actual earthquakes plus using results from theoretical studies, continues Whitman, "it is now possible to provide tentative estimates for damage probabilities for various building systems with different levels of earthquake resistance."

Some cost data is available in *San Fernando Earthquake, February 9, 1971* by K. V. Steinbrugge, E. E. Schader, H. C. Bigglestone and C. A. Weers (Pacific Fire Rating Bureau, San Francisco). The report gives this summary of damage and dollar losses to multistory reinforced concrete and steel buildings during that tragedy:

1. Steel frame and reinforced concrete (earthquake-resistive) highrise buildings performed equally well, with some exceptions, when located 15 to 25 miles from the epicenter. Where exceptions occurred, they were usually adverse with regard to reinforced concrete construction.

2. From a percentage loss standpoint, completed steel frame buildings never exceeded about 1 percent of value. A total of five reinforced concrete structures had losses over 1 percent, and two of these had losses over 5 percent.

3. Older nonearthquake resistive highrise buildings performed quite badly when compared to modern highrise construction. A limited selection of older structures in the downtown Los Angeles area all had losses over 5 percent.

This all sums up to a good start in the right direction toward establishing a balance between the risk of future loss and the initial cost of providing a stronger building. However, if we are to elevate to a satisfactory level the state of the art of incorporating economic and sociological factors into the antiseismic design of buildings, we must create a sounder base of knowledge from research and generalized experience and raise the levels of professional competence in the cognizant fields. □

Points to Consider:
Cost Control

by HARRY B. WILSON JR., AIA

The importance of keeping cost figures in line rises with the height of a building. Here's how a large A/E firm goes about it.

Cost control and construction management of tall buildings is one of the prime areas where we, as architects, have found that we must use a different approach to give our clients more for their money. Through the creative design process we must provide buildings of greater flexibility, find ways to reduce construction time, and, in the process, increase the scope of our services.

To accomplish these objectives, we have found the need to place more emphasis on the early contributions that contractors and manufacturers can make to a project. I realize that I am treading on sensitive architectural toes, but in today's practice contractors and manufacturers frequently are of great help, particularly during the design process. To make it possible to get their input earlier, one of the sweeping changes taking place today is reflected in the construction process. In the past, about 90 percent of our projects were bid after completion of the contract documents. However, in a market of rapidly rising construction costs, this traditional procedure of awarding contracts on the basis of competitive lump sum bids based on completed working drawings and specifications is rapidly giving way to other processes, enabling us to reduce significantly the total elapsed time from the start of our design to completion of construction.

In addition, we have found that the traditional lump sum method of bidding offers contractors little opportunity or incentive to contribute to cost reduction since they enter the project after completion of working drawings. This frequently makes the architect the only entity actively involved in construction cost controls.

In an effort to correct this procedure, we are now instituting, where possible, a new method of controlling these construction costs whereby the owner, the architects/engineers and the general contractor participate. To accomplish this we compile a list of five or six general contractors whom we consider competent for a given project. This list is reviewed by and subject to the approval of the owner. Each general contracting firm is called in individually for an orientation briefing. During this meeting each firm is given a set of schematic plans, outline specifications, our standard estimating form and an oral presentation of the scope of the projcet. It is during this meeting, with owner participation, that we describe the intent of the project and establish the quality level that we intend to achieve.

We also submit a list of 7 to 10 questions to be answered by each of these firms. These questions vary, depending upon the type of project, but include the proposed contractor's fee, his best estimate of total elapsed construction time, his method of scheduling, the name and background of the proposed project superintendent, the number of people to be involved in the administration of the work, the best guesstimate of total construction cost, and any early suggestions for probable construction economies without destroying the integrity of the design concept. In most cases we also ask for a list of probable subcontractors that they may wish to use for the project without firm commitment on their part.

Next, a timetable is set up with each firm to make a presentation of the above elements and any other additional qualifications that they may wish to express. Generally these second meetings, again depending upon the size and scope of the project, are limited to an hour and a half.

Following these evaluation meetings, each with owner participation, we recommend our choice of general contractor to the owner. Our judgment is based on a determination of the firm we feel is most competent for this particular project and one which offers the most realistic, not necessarily the lowest, cost estimate.

Once owner approval is given, we assist in negotiating an agreement with the general contractor on the basis of an agreed-upon budget or one which provides, in addition, for establishment of a guaranteed maximum amount at some future stage in the development of working drawings and specifications. For either method we prepare a com-

Mr. Wilson is president of the firm of Charles Luckman Associates headquartered in Los Angeles.

pensation schedule based on reimbursement of costs plus fixed fee which could be a percentage of the total construction cost or a negotiated lump sum. Both methods have merit depending on the nature of the project. However, by using an agreed-upon budget with extremely close monitoring of costs, instead of a maximum figure, we normally can provide better control of completing the project within budget.

We have also found that management contracting retains the advantages of competitive bidding in that all subcontracts are bid in this manner.

Additionally, since costs of materials steadily escalate, the general contractor can purchase his lead items early. Steel for the structural elements is bought in the preliminary phases of the project, and by the time our working drawings are completed, major elements of the building such as the vertical transportation, mechanical and electrical systems, curtain walls, partitions, acoustical elements and others are negotiated and purchased.

All Charles Luckman Associates projects begin with a total budget. We then prepare a set of diagrammatic and schematic plans and run an in-house estimate which is discussed with the client. Reasonable contingencies are introduced in this estimate, varying as to the type of the project. Upon budget approval we carefully monitor and design within the framework.

Keeping cost figures in line throughout the job is one of the critical tasks of our project manager. This is one of the major reasons why we look for project managers with technical backgrounds.

To provide another check, we also run an estimate at the end of preliminary working drawings. Since the general contractor is an integral member of the team, we request a simultaneous estimate from him early in the project and compare notes in terms of quantities, unit prices and time schedule.

These factors emphasize that cost control is really a team effort among the client, architect, general contractor and manufacturer.

In many cases a construction consultant is also part of the team. Although he is relatively new on the scene (and many architects depreciate his importance), we feel that he makes a positive and significant contribution. We welcome the construction consultants' inclusion on large projects because we have frequently learned from their wide experience. They help us keep a project moving rapidly. Our experience shows that a project which moves quickly generally has less dilution of design concept and is better coordinated technically in addition to having a higher profit. From the client's side, every month saved in design and construction is important with today's skyrocketing price increases.

With all of our tall office building projects now on a fast-track construction schedule, we must be equipped to move quickly. Fast, accurate communications and coordination among our firm, the general contractor, client, construction consultant and others are critical. By having frequent project meetings, the team is kept up to date as the project evolves. Meetings are generally held once a week at the jobsite during construction. Monthly meetings between members of top management of the participating team enable us to keep the client fully advised of the progress and budget.

An excellent example of a fast-track construction project where both time and money were saved is the University of Delaware's Student Living Center (AIA JOURNAL, May '72), a development which was completed seven months ahead of schedule at a final cost savings of more than $1 million under the $11.3 million contract construction cost.

For this project the team consisted of Ogden Development Corporation; CLA, which is Ogden's national planning, architectural and engineering affiliate; joint venture partner Frederic Krapf & Son, Inc., general contractor; concrete panel manufacturer; and University of Delaware administrators. Two years of research in modular building technology and student housing preceded implementation of the theories which saved time and money on the university campus. The twin 15- and 17-story Christiana Towers, accommodating 1,300 students, were occupied 21 months from the date the contract was signed.

Our preliminary studies had indicated that a steel and stucco structure would be most economical. As we explored further, we concluded that the use of a completely precast concrete wall and floor/ceiling unit building system, the Bison, with certain proposed changes by our people would offer more building at a lower cost.

While we were studying these methods, we used accelerated scheduling which, as a typical example, allowed the contractor to pour concrete for the foundation before the drawings on the center were completed.

The center is a case in point where the total process—careful integration of planning, design, manufacturing, site operations and management—resulted in the mechanized production of a building and contributed to control of costs.

The fast-track construction process was developed for tall buildings because of the steadily upward spiral of construction costs. With increases averaging from 6½ to 12 percent a year, depending on location, any reduction in the total construction time results in significant savings in money. These savings are so great that if a project is in danger of falling behind schedule, we have found that it costs less to work overtime than to complete the job at a later date than anticipated.

There are certain disadvantages to a fast-track construction schedule, but all are outweighed by the end results. For example, there has to be an allowance for certain omissions in the architectural and engineering drawings because we are moving so quickly. However, by anticipating these problems and programming them into the budget ahead of time, we are able to proceed smoothly and within budget allocations.

The fast-track construction schedule demands full and complete cooperation of our clients because they are making decisions more quickly than in the past. Many tall building projects move so fast that as the steel is being topped out, lower floors are being enclosed. Many times our clients have "beneficial occupancy" of the lower floors before the building is fully completed. Decisions on space planning, programming, in-

terior design and furniture cannot be delayed.

During all tall building projects we are most cognizant of the importance of follow-through during the construction phase. This element preserves the integrity of the design and insures, for the benefit of the client, that plans and specifications are being properly adhered to and interpreted.

Changes requested by the client or proposed by the contractor are examined to guard against possible code violations, structural, mechanical or electrical inadequacies and the use of unsatisfactory or unsuitable materials.

Another continuing process on all our tall building projects is value analysis, starting at the inception of the design process and continuing through completion of construction. We consider value analysis to be an organized system of investigation directed toward identifying and eliminating costs that do not produce optimum life-cycle value in the finished product.

Also contributing to control of costs in tall buildings is our intensive research and development program. By constant evaluation of materials and systems, we are able to select the most feasible structural, mechanical and electrical system for any particular job. However, on many occasions we are faced with outdated local building codes which mandate that we become involved with local governments to initiate changes.

New and better uses for standard construction materials is another important area of research. Solutions evolving from research and development efforts allow us to do an increasing amount of work away from the project. The jobsite becomes a place of application, not experimentation.

As many other of the larger architectural firms, we are fully staffed with construction management personnel. This has proved to be of significant value during the past few years due to the heavy volume of construction we are managing during the construction phase. Construction elements of out-of-town projects are always headed by a member of our construction management group. We believe that this is an important contributing factor to effective cost control.

Another element which is germane to the subject of cost control is the Occupational Safety and Health Act of 1970. The construction industry, of course, was one of five singled out to "stimulate employers and employees to institute new and to perfect existing programs for providing safe and healthful working conditions."

In the design field, OSHA is concerned with the safety of design personnel in their own offices, safety of construction personnel at the job site and safety of the people who occupy a project upon completion. The first area is one that is relatively simple to implement since the office environment is as a rule a safe place to work. The remaining two raise intriguing questions, however.

Can litigation arise between the owner and architect because OSHA believes that the act's standards were not included in the design and construction of a building—standards which brand the building "unsafe" from OSHA's standpoint? The question is so complex that on one hospital facility we have retained a consultant to keep us advised of the complexities of OSHA so we do not inadvertently design elements into the building which could be in violation of the act.

For these reasons OSHA will have a significant future impact regarding cost control and management of tall buildings.

Since our business is built on serving our clients well, over the years we have investigated many plans that could improve our services. Recently we looked into the past for assistance in establishing a program which we believe will be of significant value in providing input to a client. James MacArthur, AIA, executive vice president, and Frank L. Codella, AIA, vice president, of our New York City office, have installed a computerized project information system that enables us to rapidly retrieve project data. In its broadest sense this system is designed to give our clients a quick but thorough cost and time element breakdown relating to the type of building he is contemplating.

For some time we have been involved in an intensive program to collect data for a wide range of projects we have completed throughout the nation. Every type of project is represented in this grouping: office buildings, stores, apartment buildings, hospitals, shopping centers—the complete spectrum.

Eighty-six significant data elements that relate to the completed project, including areas, construction costs and time factors, are part of our input sheets and are fed into our computers. We then are able to retrieve selected data, such as floor areas and costs, for uses of various building types including multiple-use tall buildings. With this information we can project costs for one or more years and offer our clients a realistic time schedule and probable cost for the facility he is planning anywhere in the country.

Also included in this breakdown are unit costs relating to the number of apartments in a building, number of beds in a hospital, number of seats in an arena—in fact, any measure which relates to the building's total end use.

In addition it gives the client complete and accurate information about costs for various quality levels in construction. In the final analysis this information helps him make a more realistic decision regarding his needs before any design planning has begun.

We see no end to the steadily escalating costs of constructing tall buildings. So if we, as architects, want to be the leaders of the building teams, we must lead the way in developing new solutions. Research into building systems and new building techniques must accompany an awareness of the increasing complexities of multiuse projects that are getting larger and more interrelated with the urban fabric. Tomorrow's architect will have to be a creative innovator who can design handsome buildings as well as a businessman who understands the tough demands of completing buildings ahead of time and within the budget. □

Architectural Education

HUMANIZING ARCHITECTS: FEELING VERSUS OBJECT

by Philmore J. Hart, AIA

At the Gestalt Institute in Cleveland, personal development is seen as the roots of a human approach to the art of architecture.

I have been haunted by a recent newspaper article which described the trials of a group of modern research buildings that had been praised by the architects, protested by the neighbors and rejected by potential renters. The architect of the complex was quoted in the article as saying:

"I admit it's strange-looking to people who aren't used to it. The scale is quite large, it's not the scale of other buildings in the area, which is mainly residential. *Our scale is not a human living scale.*" The emphasis is mine.

This is a statement of our times. We are neither living nor building at a human living scale, whether it be for research, education or housing. Our buildings and our fabric of built environments emerge as monumental in scale, untouchable, unwelcoming and nonresponsive.

When I look at this architecture I feel claustrophobic, disoriented, rebuffed, angry, disheartened, discouraged. If that be our architecture, I never want to see or create architecture again.

Many architects, writers and scholars have spent their life energy trying to find the source of a human living scale, trying to humanize architecture. Many, from Leonardo to LeCorbusier, have devised proportional systems based on the human figure. Our design process has been investigated, reviewed and made somewhat explicit. The user has been studied and systems have been developed to fully consider and make known his requirements. Behavioral scientists continue to investigate and bring forth knowledge about man and his relationship to his physical environment. Mathematical and computer-use approaches have been tried. Many books, articles, papers, projects and manuals have been written by a long list of concerned people—all involved in the attempt to humanize architecture. All seemingly have failed.

Our architecture has become progressively more inhuman in both context and form. One possibility is that we have been pursuing the wrong object in trying to find the source of a human living scale. We have been looking at the thing itself or at the process of developing the thing. It may well be more fruitful to deal directly with the person most involved: the architect himself. It may well be that the first step toward humanizing architecture is to *humanize the architect*. Not to study him, or criticize him, or control or program him, but to open him up to his feelings, his creativity, his senses, his relationship with other people, his own space needs, in short, to expose him to his own humanness.

I do not wish to imply that architects are as a species nonhuman but that we are, by and large, *thing*-oriented. We respond by producing large stationary buildings that tend to be monuments and that also tend to be counterproductive to the need for people to contact each other. As behaviorial scientist Edward T. Hall has pointed out, "We seek to heat buildings, somehow forgetting that the intent is really to heat people." Our form determinants are mostly derived from technical or architectural criteria rather than people criteria. We spend much time, energy and creativity on building form and pay little attention to human relationship forms.

I have been working on the problem of humanizing the architect for many years. I began with myself, about 12 years ago, by going through a process of contact with my own self and with my own feelings. While doing so, I discovered many things about myself, and about being an architect. Many of my behavior characteristics appeared to be the direct result of my architectural education and practice. I believe other architects have been affected in the same way and with similar results. Let me mention some specific concepts that I believe I learned as an architectural student and practitioner:

The architect alone must control space, place, environment; the architect must educate the client and tell him how to live; creativity is a singular act; do not share with others your feelings, insights; creativity is competitive; integrity above all; compromise not; perfection—there exists a perfect solution to any given problem; good design can overcome inhumane practices; resist all change of your design, especially from the client; criticize everything and everybody; do not trust your emotions; deal with structure, shape, function—leave the meaning of form to others; design everything, then sell it to the client; architecture ends with the occupation of the building; design toward fixed goals and the proper human behavior; be objective, rational and always right.

The list is almost inexhaustible, and I am sure you can add to the above. The important point is not that I am being critical or that the list is right or wrong but that you recognize the implications of your architectural education and practice.

As for myself, I felt I had become a stereotyped Howard Roark and I wanted to do something about that image. Fortunately for me, my close friend Dr. Erving Polster is a clinical psychologist and was an early leader in the Gestalt therapy movement. He introduced me to the here-and-now existential reality of Gestalt and to such people as Paul Goodman, Dr. Frederick Perls, an early psychoanalyst—and eventually myself.

Gestalt therpay was originally developed by Perls, who became influenced by the Gestalt theories of perception which he integrated into his psychoanalytic background. After a long and eventful experience in the Gestalt process, I became aware that contained therein may be the roots of a hu-

man approach to the art of architecture. Two dramatic change events occurred in the early '60s that caused me to stop, think and try to sense what I was, what I wanted to be as an architect, as an educator and as a human in the continual process of learning.

The first happened while I was listening to a noted historian lecture on the art of architecture. He projected on a large screen the picture of a famous house designed by one of the great masters of modern architecture: "Here," he said, "is the perfect structure . . . but awaiting the perfect people."

I was thunderstruck. Were we, the architects, designing architecture in expectation of the Messiah? Or did we believe that perfect architecture could make perfect people? Either way, the concept of perfect people was in conflict with the real, fallible, yet warm people of my encounter experiences.

The second change event occurred while I was viewing a Museum of Modern Art retrospective show on the great examples of modern architecture in the United States. Here I found all my previously worshipped buildings, designed by the gods of US architecture. The large blowups were of the buildings as originally built or designed, with quite a few displaying a postscript:

"Please do not look at the buildings now, because the owners have done some horrible things to absolutely ruin their perfection."

Whose reality perfection are we architects talking about? How about the users' reality that the architect obviously ruined? How about change? Growth? While the Gestalt model was saying that change, growth and even conflict were healthy life processes, we architects appeared to be worshipping the "do not change, do not touch" model of human behavior.

It became clear that the normal pattern of architecture was at odds with my beliefs. Something had to change, and I chose to begin with teaching. Academic experimentation is simpler, safer and expected.

My role as a teacher in a fifth-year design studio had been that of the traditional design critic. However, since my beliefs were developing in the direction of the open learning process, I began to view my role as an enabler, as a catalyst and as a leader in helping students open themselves up to learning and creativity. I became process-oriented rather than product-oriented and began to see that even the product was always in process.

I introduced a Gestalt encounter group into our architectural education program and asked Dr. Sonia Nevis, a Gestalt therapist, to lead my fifth-year design students in group sessions. Our initial thought was to help them work creatively together in teams, among themselves and with people from other disciplines. What emerged from this experience was their desperate need for help in personal growth and learning and in merging their lives as architects with their own lifestyles. Further, the competitive system of education appeared to be operating at such a high level that even when the students wanted to act cooperatively, they simply did not know how.

After several years we concluded that the group process was actually occurring much too late in the student's academic life, at a time when his architectural personality pattern was surprisingly well developed.

For instance, Dr. Nevis worked with the students on their feelings about their design projects for the studio. They were able to open themselves up to their feelings as long as they were working on the "problem." But when they were actually designing they appeared to lose all contact with their feelings and fell back on patterns of overview, objectivity and of general disconnection between themselves, the human issues involved and what they were doing. The power of the learned design process together with the enjoyment and grand fulfillment of manipulating things was too much to overcome in one quick step. We all are easily seduced into thinking "object."

Feeling is a source of great confusion for most of us. Differentiation between emotions and thoughts is difficult. How I feel about myself, or an object or another person gets all mixed up with intellectual conceptions and assumptions about objects or persons. How this affects architects can be seen in an example of one student in his design of a dental clinic. He was an excellent designer, talented, sensitive, clear thinking, bright and creative. His design of the clinic was dark, foreboding and dungeonlike, no matter how hard he tried to change it.

I became curious and began asking him about his experience with dentists, and discovered his fear and hatred of going to one. His design was an extension of this fear. He did, in fact, feel like a prisoner in the dental chair. After becoming aware of his feelings he was able to design an environment for a dental office that could help both him and others to overcome their fear. It became increasingly clear that there is a need to help students discover their feelings about what they are doing so that they can understand and deal with them.

In another development, I began leading workshops and encounter groups in environmental awareness—a natural combination of some of the principles of Gestalt and my desire to help students and nonprofessionals make a strong and direct contact with their built environment. The workshops also helped them discover feelings about places and spaces. Some of the exercises involved the spatial relationships of people to people and of people to objects, a heightened awareness of seeing and using all of our senses and the power of the environment to affect our behavior.

As it turned out, many of the exercises developed in the workshops are applicable to the design process. One such is "metaphors on things and places," a metaphor here being a transference of terms from one object to another by analogy. As an example, a group of students asked me to redesign their lounge. I, in turn, asked them to construct metaphors, out loud and together, about their lounge through a series of questions:

The existing lounge reminds you of what color? Answer: Gray, janitor green, drab, puke green, dirty laundry gray.

What body of water? Answer: Cuyahoga River, Lake Erie, the Atlantic Ocean in a winter storm.

What season of the year? Answer: Winter, after a snowfall when the snow is melted and dirty.

What President of the US? Answer: Fillmore, Lincoln, Harding, Coolidge.

Days of the week? Answer: Monday.

The students' feelings about their lounge were clear: They did not like it. They were repelled by the sights and the sounds of it. After the metaphors, they had a clearer and deeper understanding of these feelings.

What is most interesting to me is that the metaphors can be used as a design tool to find out what would please a user:

A new lounge should remind you of what color? Answer: Orange, yellow, bright multicolors, red-orange.

What body of water? Answer: A clear bubbling stream, the Pacific Ocean, an underwater grotto, water on the rocks.

What season of the year? Answer: Spring, when the leaves and flowers burst out; fall.

What President of the US? Answer: JFK, Roosevelt, Lincoln.

What day of the week? Answer: Saturday, Tuesday.

Using this metaphor game many times, in both workshops and with clients, I have found both the experience and the product to be exciting and useful. Patterns of images have emerged: Bad places are defined by cool, dull, gray colors, polluted or angry waters, dull and/or hurtful people, passive or static symbols and general hibernation; good places are described by warm colors, pleasant, moving waters, clean sounds and tastes, active, creative people, dynamic symbols and a general outreaching feeling.

It should be noted that people are responding with their own language, symbols and values that need to be understood before any analysis can be made. Conversely, the metaphor can supply insight into symbols and values of those playing the game. Note that Lincoln was used as an image for both the existing and a new lounge. This particular response was due to the fact that black students regarded Lincoln as a bad guy while the white saw him as a good guy.

Another exercise grew out of Hall's proxemics (man's relationship to the spatial dimension) and the encounter group method of direct involvement with the experience. Rather than observing or being told about the various distances, people of the work-

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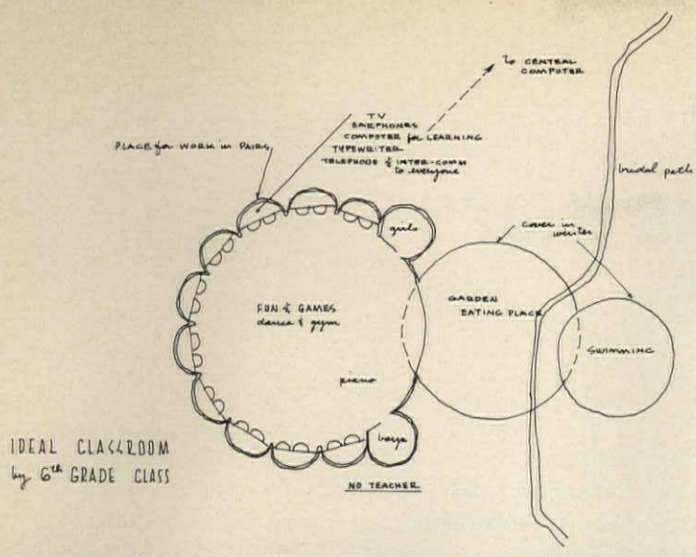
Mr. Hart is a practicing architect and an environmental consultant. He was formerly chairman of the Department of Architecture, Case Western Reserve University, and is presently a member of the Gestalt Institute of Cleveland, where he is also teaching.



shop were asked to pair off and discover for themselves their own social distance, their personal distance and to experience their body language during the process. This has led to the development of the concept of personal bubbles.

Everyone occupies space, not just his physical space but space beyond himself in the form of a bubble. Some bubbles are large, some small, some flexible to each experience, and some are one size and shape at all times. There are also many variables in the formation of personal bubbles beyond national origin, such as personality, state of mental health, size, physique, sex, relationship to the other person, role, etc. Of extreme importance to the architect and the user is the experience of their own personal bubbles: to the architect, so that he can differentiate between his own space needs and that of the users; to the user, so that he can better express and understand his own needs.

There remains much work to be done in this area, but I believe that we can learn much about people-form from this direction, i.e., architecture responding to personal and collective space bubbles as primary form determinants.

There may be ways to uncover groups' collective bubbles and to use this as a form determinant in the design process. It would be possible to find and organize users into environmental awareness groups. By asking them to role play the intended activities of the place, a collective group bubble or bubbles should emerge. Using this information as a base, a flexible space could be generated that would meet the general needs of the user. After the actual space has been built, the inhabitants could be led through yet another environmental awareness process. This time they would learn about their personal and collective spaces and, what is most critical, how they can manipulate their new environment in response to their developing needs and uses. From this it would appear that a new role for the architect is to educate the users about their spatial needs and then to assist them in learning to manipulate the spaces themselves.

Some five years ago I was asked by a sixth-grade teacher to talk to her class about city planning. The students, after learning that I was an architect, wanted to design something, so we agreed on a classroom. I was to serve as the catalyst, as the translator of their words into drawings and as the technical adviser. After a wild, exciting, loud and totally involving session, we had a plan (*see* figure).

Some general concepts emerged from this design encounter that were exceedingly strong and even poignant statements about education and the educational environment:

- One of the normal means of child-to-child communication in every child's life is not available in school life: the telephone.
- Kids at this level want to study in pairs and, in fact, want to be private in pairs.
- The single most resented thing in the classroom is the teacher.
- All children want knowledge and believe it is available if they can be plugged into a computer.
- Students want private seating cubicles around the perimeter and see the large empty space in the middle for fun and games —a desire counter to the typical classroom where the children are roped into the middle and where the teacher owns the perimeter space and surfaces.

During the design process, the students could and did order the priorities and could relate to money problems and could even make reasonable tradeoffs. They were capable of extremely sophisticated decision making. We also discovered that people of all ages can participate in and be creative to both the process and the product.

It was also possible to transpose our theoretical design to the children's classroom. We did this simply by moving the desks and chairs to the perimeter, leaving the center of the room for fun and games. The students had a great time designing their own places for two, some in rows, some in love-seat style, some face to face, etc. And of course, they learned that the environment is a learning agent and that everyone can learn to manipulate it for his own purpose and benefit. I too learned a lesson. If you want to discover what to do in a classroom, go to the source: the students.

While thinking, reading and intellectualizing are necessary and helpful, the richness of life is in the experience. I would like you to try an experiment, right here and now. In your mind, choose two buildings you have designed or with which you were in some way involved, one that you like, one that you dislike, even hate.

Visualize in your mind the building you like. Imagine walking around the exterior. Can you walk around it in your mind? How do you see it in your mind—in color? Do things move? Do you move? Now, walk up to the building, through the entry and into the interior spaces, letting the spaces appear. After you feel somewhat comfortable in taking these visual image trips, visualize the space you like best in the building. This time, try to add sounds and smells; don't be discouraged if these images come slowly or not at all. While the visual images might be rather easy, the addition of the other senses could be more difficult. Nevertheless, try to complete the sense of the whole space.

What we have been working on is our *exterior* senses, those that we as architects have been educated and trained to be aware of and to manipulate. For the next part of our experiment we will work on our *interior* senses, the senses of emotions. In your mind, go back to your favorite space, this time noting how you feel about it. What is pleasant? Unpleasant? Does a surface please you? How do you feel about yourself being the designer of the space?

Now, for the last part of the experiment, try to visualize yourself in the space. What would you like to do in it? Whom would you like to be with? What song would you like to hear in it? Can you see the people for whom it is designed?

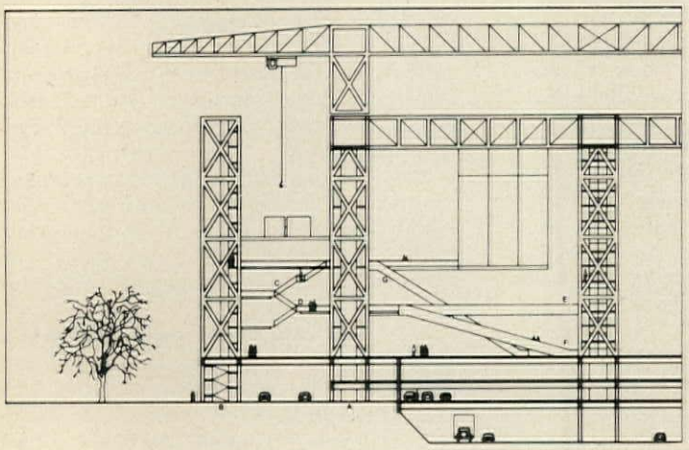
After this experience, repeat the whole thing using the building you dislike, and then compare your experiences. Did you learn anything about yourself or the buildings? Did you develop any counter feelings? Did you discover something about your feelings toward the people for whom you designed the buildings?

What you have just experienced is post-image making. The next step is to discover whether you can pre-image your designs. Visualize them in your mind, walk through the spaces, touch the surfaces, hear the sounds, smell the odors, feel your emotions and finally, extend your senses to be within the space with other people.

This extension of your senses and feelings may well be the process needed to humanize architecture. We, as architects, have been trained to concern ourselves with objects, their shapes and their forms—a rewarding and beautiful education. We have developed our visual senses and refined our tastes. I do not regret my education, but I believe that in the process we have distorted our senses in practice. We need to restore our balance by merging our sense of object with our sense of ourselves and others. Along with finely developed exterior senses we need to heighten our interior senses, our emotions and our feelings toward awareness. What is involved is for us to apply the same amount of energy and devotion to our human qualities as we have done in the past to objects.

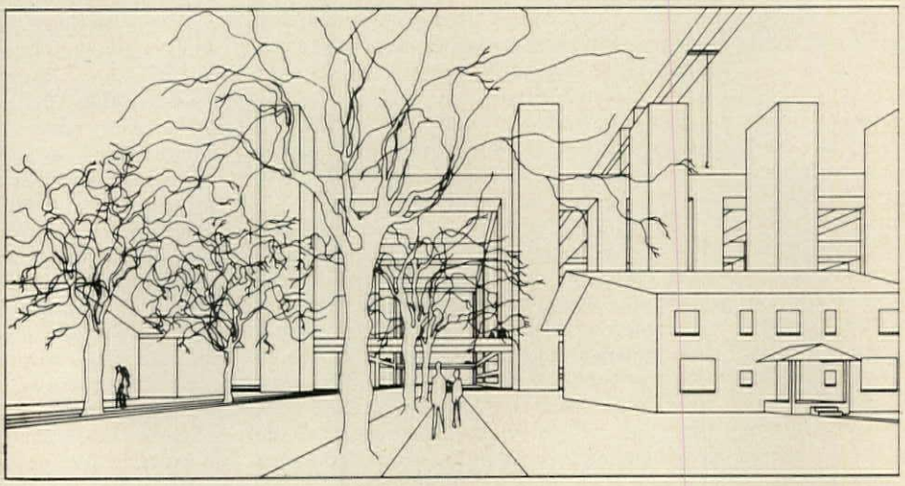
We appear to have all the technical means on hand to allow our buildings to respond to human use and needs. What we need now is to uncover the corresponding flexibility and response in ourselves to create an environment at our "human living scale." □

1972-73 ROME PRIZE FELLOWSHIPS

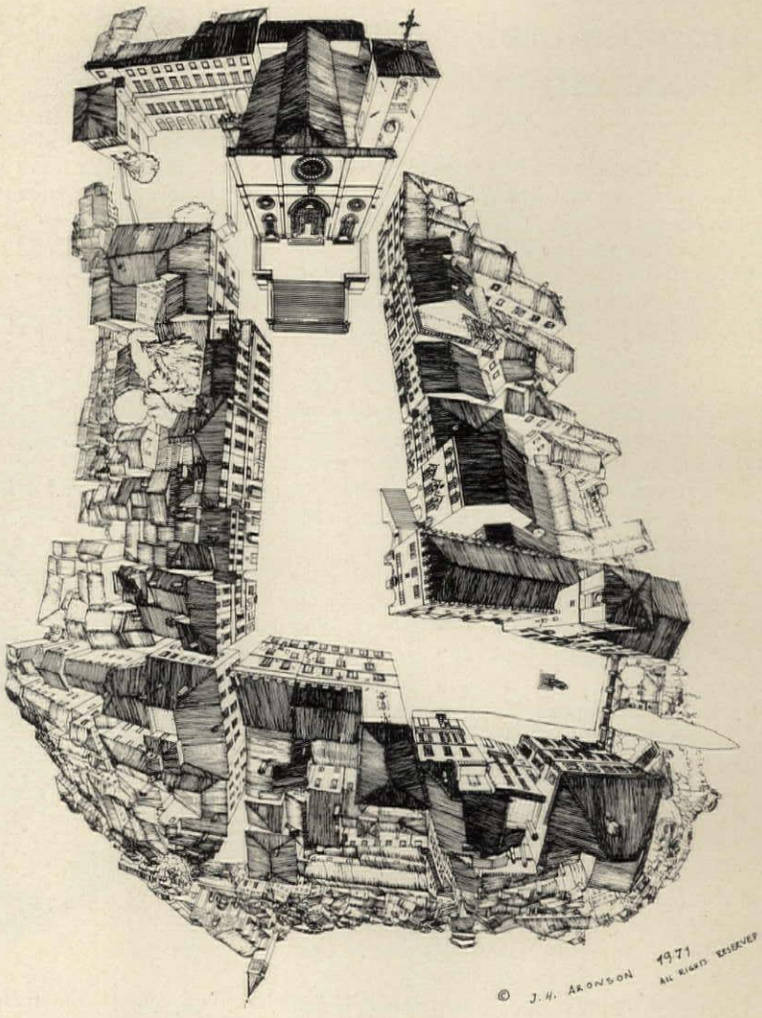


Again this year, the American Academy in Rome presented two fellowships in architecture and one in environmental design. Winners in the first category were Brand Griffin of Medford, Oregon, who received his Master of Architecture degree from Rice University in 1972 and whose work includes, besides the converted Liberty ship shown, the design for an earth-orbiting space station, "Cities in the sky"; and Robert Ward Evans, of Cleveland, who received his Bachelor of Architecture degree, also from Rice, in 1971 and after that worked for a year with Caudill Rowlett Scott of Houston. Joseph H. Aronson of New York City was winner of the environmental design category. He studied architecture at Cornell and Columbia Universities and is now an illustrator, working entirely in etching.

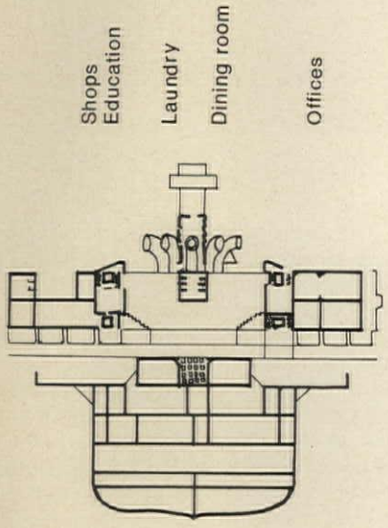
The winners have a year's free residence and studio in Rome, a fee of $4,500 for that year and free use of the Academy's library and other facilities. Jurors were: for architecture, Walker O. Cain, FAIA, chairman; Henry N. Cobb, AIA; James S. Polshek, AIA; T. Merrill Prentice Jr., AIA; Jacquelin T. Robertson, AIA; and for environmental design: Edmund N. Bacon, AIA, chairman; William Platt, FAIA; and Michael Rapuano. □



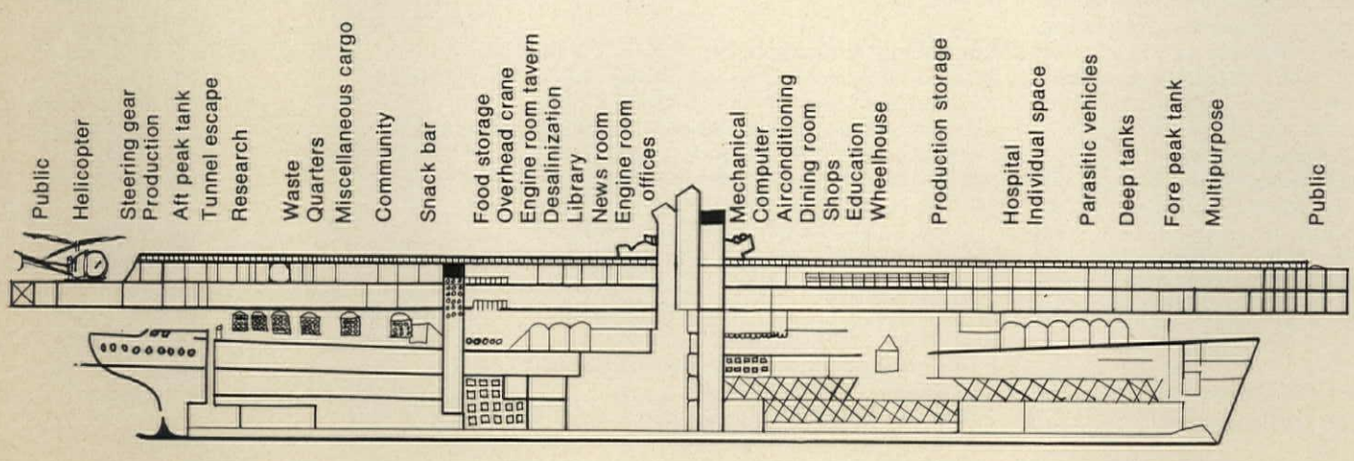
Evans investigates the nature of southeast Minneapolis, which contains both deteriorating housing, small businesses and the campus of the University of Minnesota. Instead of providing an air rights structure over a sunken freeway, which would split the community, he proposes to bridge it with a one-block, square platform upon which the community could meet and "do its thing," which may be mostly nothing at all. Evans' solution is adapted from Cedric Price's Fun Palace project of 1961.



Aronson presents townscapes with an infinity of viewpoints, a mosaic or composite of many individual perspectives. This is much closer to how the eye actually sees a subject of such a scope as an entire urban situation than is a perspective presented through a wide angle lens. The drawings are complete compositions in themselves, without top, bottom or sides, and should be viewed from all angles. Above is the ancient Etruscan hill town of Todi, commissioned for the revised edition of Edmund N. Bacon's *Design of Cities*, Viking Press, 1972.



Griffin provides accommodations for 600 people to live, work and travel in a refurbished and restructured Liberty Ship. The conversion system, designed for physical and functional flexibility, allows the ship to be used by a variety of community types. The above is for a group which would live from refining and marketing resources from the sea. The housing system is made of lightweight four-dimensionally flexible components with pneumatic kits for temporary space expansion.



What's Happening in Architectural Education

Campus Notes: Carl Feiss, FAIA, professor of architecture and urban studies, has been appointed acting director of the Urban and Regional Development Center (formerly the Urban Studies Bureau) at the University of Florida. He is replacing Dr. Elizabeth M. Eddy, director of the center for five years.

Arthur Hacker, assistant professor of architecture at the University of Houston, is the new editor of the *Journal of Architectural Education* for a renewable two-year term. He replaces Philip Dole of the University of Oregon, whose three-year editorship ended with the December issue.

Norbert Schoenauer has taken over the directorship of the School of Architecture at McGill University, Montreal.

Claude E. McKinney, former director of the Urban Life Center at Columbia, Md., is new dean of the School of Design at North Carolina State University, succeeding Henry L. Kamphoefner, FAIA, who is retiring. Kamphoefner has been the school's dean since 1948, the year it was founded.

Lew Litzie, AIA, has been named a distinguished alumnus of California Polytechnic State University, San Luis Obispo, for 1972. He was a member of the university's first graduating class in architectural engineering in 1950.

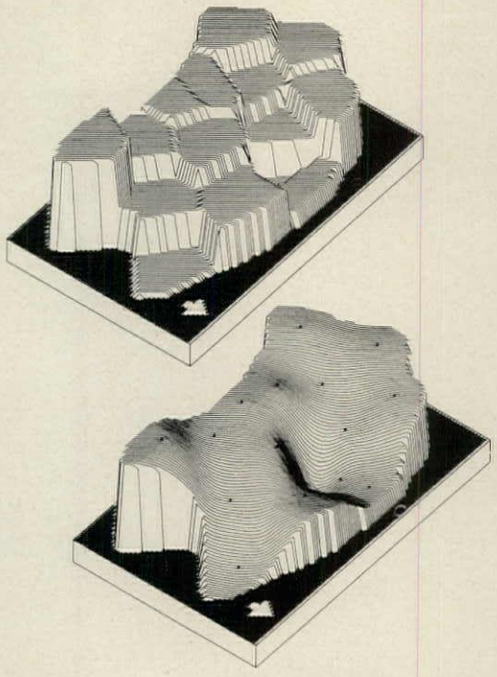
The University of Texas at Austin has started a new on-the-job design/management training program. Students are eligible to participate when they reach the second semester of the fourth year of their studies, and spend one semester during the long term and one summer training in an architectural firm. They go through careful screening to see that they match the participating firms.

The firms contribute scholarships of $1,500 to the university, and that money is returned to the students at the rate of about $200 per month during the training period, which lasts about seven months. The students receive 15 semester hours of credit which count toward their degree requirements. They return to the university for their fifth and final years of studies.

Professor R. Gommel Roessner, FAIA, is originator and director of the project. Five firms so far are participating: Page, Southerland, Page, Austin; Bartlett Cocke & Associates, Inc., and Richard Moore, AIA, both of San Antonio; and Envirodynamics, Inc., and Pratt, Box, Henderson & Partners, both of Dallas.

The Laboratory for Computer Graphics and Spatial Analysis of the Graduate School of Design, Harvard University, has announced the following five computer programs:

SYMAP, which produces maps which graphically depict spatially arrayed quantitative or qualitative information; SYMVU, which generates a three-dimensional perspective view of a statistical "surface" on a line plotter; CALFORM, which produces maps of spatially variable data using a pen or cathode ray tube (CRT) plotter; GRID, which accepts as input a matrix of values and produces as output a graphic representation of these values using a standard line printer; and POLYVRT (polygon convert), which is multipurpose and for use in manipulating and displaying various types of geographic base files. For further information on all programs contact the laboratory's acting director, Allan H. Schmidt, 520 Gund Hall, Harvard University, 48 Quincy St., Cambridge, Mass. 02138.



SYMVU output: conformant map of Mantegna Bay (top) and contour map of the same area.

The Environmental Design Research Association (EDRA) will hold its fourth international conference April 15-18 at the College of Architecture, Virginia Polytechnic Institute and State University, Blacksburg, Va. 24061. For information contact Wolfgang F. E. Preiser, EDRA conference chairman, at VPI.

Continuing Education. A "Critical Path Method Workshop" to provide people with a basic understanding of this method of planning and scheduling projects will be held at the University of Wisconsin-Extension January 10-12; February 14-16; and March 14-16. The fee is $150.

On February 19 and 20 the university will also conduct an institute, "Solid Waste as a Source of Energy," which will deal with the environmental impact, economic feasibility, financing methods and design of plants which burn municipal waste and produce heating and cooling. The fee is $100.

For further information on both seminars contact William C. Fries, program director, University of Wisconsin-Extension, 432 North Lake St., Madison, Wis. 53706.

The Gestalt Institute of Cleveland will conduct a workshop in Applied Gestalt Principles for Architects, Designers and Planners on March 10 and 11 (*see* p. 00). It will center around behavioral and sensory awareness including spatial relationships of people and group forms, extension of self in space and form, behavioral effect of space and enclosure, cooperative group creativity and some of the blocks that occur to inhibit this creativity. Contact the Institute at 12921 Euclid Ave., Cleveland, Ohio 44112.

Texas Tech University is offering a four-day course on Design of Structures for Extreme Winds and Tornadoes February 12-15. For further information and application forms contact Mrs. Helen Goldston, Department of Civil Engineering, Box 4089, Texas Tech University, Lubbock, Tex. 79409.

Fellowships, Awards, Grants. Alberto Bertoli and Guillermo Arizcopreta, fourth-year design students under Abdel-Halim..A at the School of Architecture and Environmental Design, California Polytechnic State University, have won the UNESCO Prize 1972 with their entry "A Space for Collective Recreational Activities." The two winners of the international student competition will share a prize of 5,000 francs and will have free instruction and facilities for studies in France.

The brochure "1973 Scholarship Program/ The American Institute of Architecture" is available free from AIA Headquarters at 1785 Massachusetts Ave. N.W., Washington, D.C. 20036.

The Columbia University School of Architecture is sponsoring an Architecture/Planning/Technology Film Festival at the university during April and seeks professional or amateur 16mm films pertaining to any aspect of these subjects. Films may deal with historic or contemporary architecture; they may be abstract or realistic. They may deal with landscape or environmental issues; the human condition as affected by the built environment, or the built environment as affected by humanity; cities, in whole or in part, their evolution and dissolution; the importance of building technology, etc. There are no constraints. Preferably the films should not be shorter than five minutes nor longer than 30. They may be with or without sound.

A jury consisting of professionals and film makers will review the films and select the best for inclusion in the film festival. First prize is $2,000; second prize $1,000; third and fourth prizes are $500. There is no entry fee. The films selected will be retained by the School of Architecture to be copied at the school's expense (with permission of the entrant) and will become part of a film lending library. For further information, contact Dean James S. Polshek, AIA, Columbia University, New York, N.Y. 10027. □

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How OSHA Adjudicates Job Safety

What happens when an OSHA case is contested? Where are the hearings conducted? Can an employer do anything about a penalty that he thinks is unfair? If a worker won't wear a hard hat, is the employer violating the law? Robert D. Moran, chairman of the Occupational Safety and Health Review Commission which was created by Congress to adjudicate actions under the law, recently answered these and other questions at the National Safety Congress. With some 4 million business establishments that must comply with the OSHA law, and with confusion among employers about it, Moran's remarks are repeated in the hope that they will help dissipate some of the misunderstandings.

There are 10 points about the Occupational Safety and Health Review Commission which may clarify some misconceptions about this federal agency which has been set up to adjudicate federal job safety enforcement actions under the 1970 Williams-Steiger Occupational Safety and Health Act.

Point 1: The review commission is not a part of the US Department of Labor. I am told that I should not get frustrated at the need for making this statement hundreds of times each month. "Just think of the National Labor Relations Board," someone said. "They've been in business for nearly 40 years, and even today many people assume that it's a branch of the Labor Department."

It's different with us. We don't launch investigations of employers or unions, or bring legal actions against them, as the NRLB does. Our business is to render judgment in cases where the Department of Labor is an adversary party—prosecuting an employer for an alleged violation of the law. It can be quite disconcerting when there are so many people who think that the judge is an adjunct of the prosecutor's office. At a time when the people's confidence in their government's ability to dispense justice in a fair and impartial way is under challenge, and when OSHA itself is the recipient of a heavy barrage of criticism, it is important that this point be stressed.

The review commission is one of 40 odd independent agencies in the Executive Branch of the federal government. None of these agencies is part of any of the 11 Cabinet-level departments.

Point 2: The review commission decides contested cases. That's all we do. We employ no inspectors. We do not promulgate standards or authorize variances from them. We issue no regulations. We do not initiate enforcement actions. We are simply a court.

The misunderstandings which are suggested by this and the preceding point would quickly be cured by two simple and logical actions that Congress should take: 1) change our name to the United States Court of Occupational Safety and Health and 2) transfer us from the Executive to the Judicial Branch.

Point 3: The three commission members do not sit as a panel to hear witnesses in each case. In fact, they have never done this in any case and probably never will. When an OSHA case is contested, the evidence is heard by a review commission judge. And it is he, not the commission members, who will decide the case. Each of the three members has the right to require that the commission itself review a judge's decision; and, if he can get one other member to go along with him, they can reverse the judge and replace his ruling with the commission's decision.

How can this be done, you may ask, when the commission members do not hear evidence? Simply by reading the verbatim transcript of the hearing before the judge, studying the briefs and the judge's opinion and applying the law to the fact. Basically this is what appellate courts do.

The principal difference between review by the three-member commission of one of the judge's decisions and the circuit court's review of a district court judge's decision is that the circuit court only sees those decisions appealed to it by one of the parties to the district court action. The members of the review commission see each and every decision rendered by its judges, and each of them has the authority to call the decision for review without an appeal or request from an aggrieved party. The time within which this rather unique authority may be exercised is limited to a 30-day period.

Point 4: The decisions in more than 90 percent of the cases which come to the review commission are not reviewed by the commission itself. Each of the three members will read all of the decisions, but in only about 10 percent of the cases does any member conclude that there is reason for changing the judge's decision.

When no review is ordered within 30 days of the judge's decision, that decision automatically becomes final. When a decision becomes final in this way, it then has the same standing as a decision of the three members of the commission.

Any person aggrieved by any such decision—whether issued by a judge or by the commission itself after review—may appeal it to the appropriate US Circuit Court of Appeals.

Point 5: Review commission judges are impartial and just. In most of their cases, there are only two parties: the Labor Department and the employer. In all cases, each party

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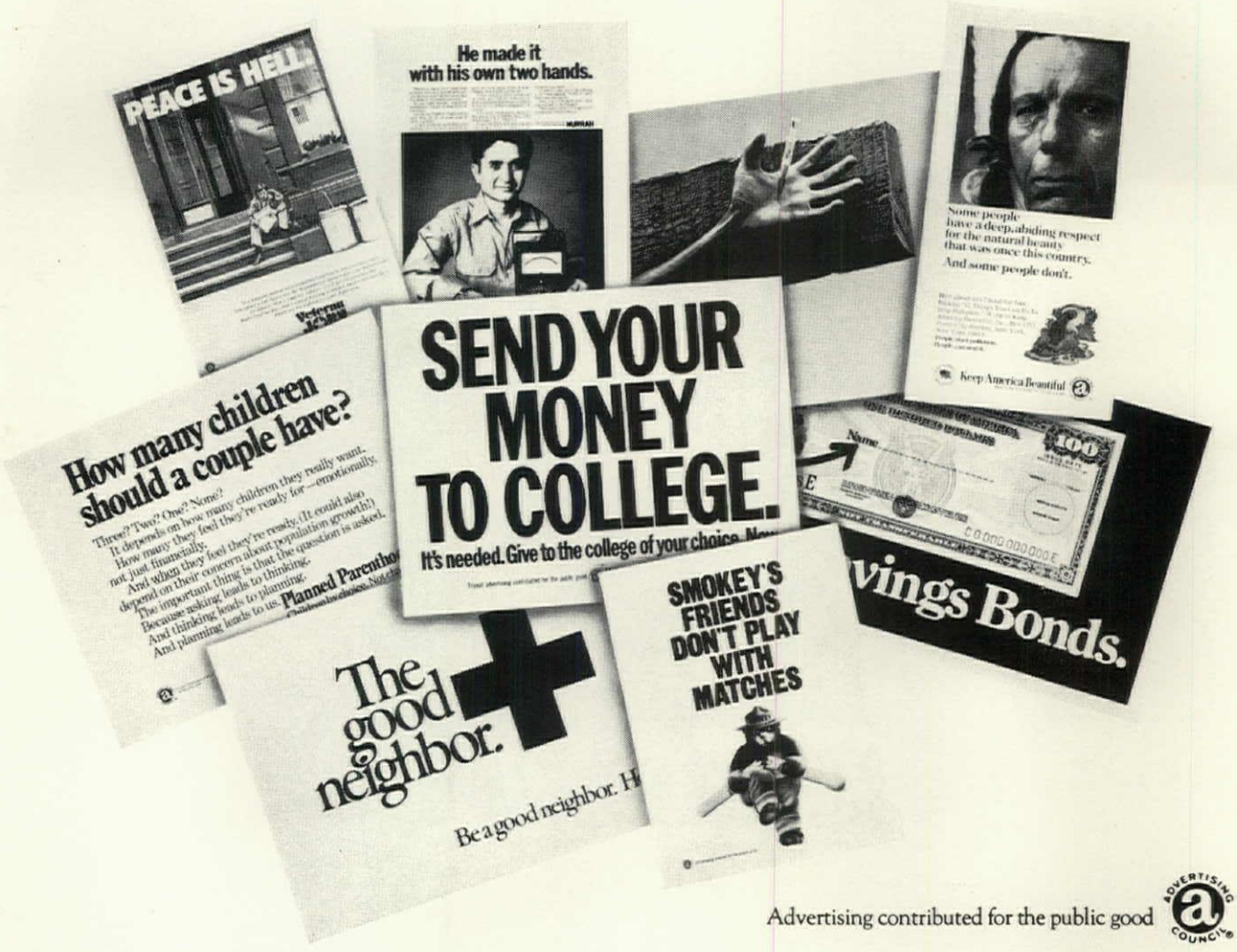

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is treated equally. There is no presumption of regularity in the OSHA inspection or the citation or the proposed penalty. They are simply allegations. The Labor Department has the burden of proving its case in open court. Ordinarily, the OSHA inspector will be a witness. The employer may cross-examine him or any other witness produced. Of course, he can also introduce his own evidence.

The commission has 45 judges at the present time. Each has career tenure. They have no duties except hearing and deciding cases under the Williams-Steiger Act. All are lawyers with many years of experience in trying and adjudicating legal proceedings. Their annual salaries exceed $30,000—more than most state court judges. The commission members do not tell them how to decide cases, nor do they discuss the merits of cases with them. Each judge is his own man. They are employees of the review commission, but they cannot be disciplined by me or receive any pay increase or other favor from me as a result of their actions in a case.

Point 6: All hearings on contested OSHA citations are conducted in the local area where the alleged violation occurred. If a plant in Anchorage or Yonkers is inspected and the citation is contested, we will arrange for a courtroom there, and one of our review commission judges will travel to that place and conduct his hearings there.

All of our hearings are conducted outside of Washington, D.C., except where the nation's capital happens to be the place of the alleged violation. Therefore, we have the distinction of being one of the few federal agencies which conducts nearly all of its program activity outside Washington.

Point 7: Lawyers are not required at review commission hearings. Although the hearings are adversary proceedings that are conducted pursuant to rules of evidence, which are the stock in trade of most trial lawyers, a significant number of employers have handled their own cases or have had their interests represented by a safety professional rather than by a lawyer. There have been cases where nonlawyers have prevailed in OSHA hearings which are prosecuted by experienced Department of Labor attorneys.

We want to see that everyone who desires it gets his day in court under this act. Because there were some who believed that our initial rules of procedure were too legalistic and hard to understand, we did a complete revision on them. We also printed a plainly worded guide to review commission proceedings which anyone can understand. It is automatically mailed to every party to a case before us as soon as the case is received for review.

We will be going one step further to help people understand their rights. Each cited employer will be provided with a brief explanation of what he must do to contest the action against him. A pamphlet containing this information will be given to the employer by OSHA at the time of citation.

Point 8: A review commission was created by Congress to provide a system for the early disposition of contested cases. The system used in the Wage and Hour Law which provides for hearings in the US district courts could have been copied. I suspect that this was not done because Congress did not relish the prospect of occupational safety and health cases growing moldy at the tail end of a court backlog counted in years.

Our first case reached us only 18 months ago. More than 1,600 have been filed since then, and we currently receive about 140 new cases each month. To date, final dispositions have been issued on more than 50 percent of those 1,600 cases. The average length of time from receipt of a case by the commission to its final disposition is only five months. Some might think that five months is a long time if the situation involved might constitute an imminent danger. Bear in mind, however, that the commission does not hear imminent danger cases.

Point 9: We operate in a gold fish bowl. All our case files are available for inspection by the public, and all our hearings are open to anyone who wants to attend. We even provide notices announcing the date and place of our hearings for employers to post so that any interested employees may come and have a say on matters affecting occupational safety and health.

We don't wait for the public to come to us to see what's going on, however. We mail out copies of all our decisions to public reporting services and representatives of many public media. We prepare and issue a news release on each decision of significance and distribute it to many media representatives and other interested persons throughout the country.

If people get to know more about this law and the way in which it is being interpreted, they will be better able to meet its many requirements. This will help reduce work place illnesses and injuries as effectively as a personal visit from an OSHA inspector. Therefore, we do our best to inform people.

Point 10: There are no automatic fines under this law. I have heard or read on many occasions that an employer will get an automatic $50 fine if he fails to display the OSHA poster, or if he does this or fails to do that.

It may be correct that OSHA will propose a penalty for failure to display the poster or for other alleged violations. But if an employer believes that such a proposed penalty is unjust when it is issued, it can be contested. The judge will then decide what penalty, if any, is appropriate.

The review commission does not conduct its judicial responsibilities according to fixed schedules. Every decision is individually tailored to the facts of the specific case at issue.

An employer is not necessarily in violation of the act when one of his employees fails to comply with a standard. Employers often tell me that the law is unfair because they can be penalized because one of their employees won't wear a hard hat, for example. This is not true. We have had a few cases on this very point. One of them involved employees not wearing hard hats in an area where the safety standards required their use. We ruled that the employer could not be held in violation.

Each case has different facts so that one could get trapped by applying only a rule-of-thumb or general rule. With that caution in mind, however, it is my own opinion that a violation of this act can only be established where the employer has done something that he should not have done or failed to do something that he should have done. This act was not written to make the employer the scapegoat for every unsafe act of his employees. The employer has the obligation to keep a safe and healthful workplace and to see that his employees observe the standards. The obligation is a realistic one. If he does everything humanly possible to fulfill this obligation, he cannot be in violation of the act. □

outlook *from page 10*

It now has nearly 700 firms as subscribers. It is anticipated that the added COMSPEC automation capability will promote continued expansion of the MASTERSPEC concept to unify construction specifications.

Battery-Powered Electric Bus Is Tried, Designed for Short-Haul Urban Transit

The Electrobus, publicly demonstrated for the first time in Los Angeles recently, is claimed to be this country's first modern electric bus. Designed to help eliminate air and noise pollution, Model 20 is a short-haul transit vehicle manufactured by the Electrobus Division of Tork-Link Corporation.

The battery-powered vehicle seats 20 passengers and has room for another 20 standees. It operates at a speed of 35 miles per hour. The driver's controls are a forward/reverse lever, an accelerator pedal and a foot brake. There are no gears or transmissions to change, and the bus moves forward or in reverse when the accelerator is depressed. Automatically coupled to a power hydraulic braking system, it utilizes its electric traction motor, while moving, to retard speed with its dynamic braking action.

The bus, under typical conditions, can operate from three to five hours without a battery recharge. Electricity to recharge the batteries costs from 2 to 3 cents per mile. Listed at $28,000, the bus is expected to have a 25-year life due to its simplicity of design. Operating costs are less than for its internal combustion powered counterpart since there's no gasoline or oil to buy nor are tuneups required. Except for recharging and periodically watering the batteries, there is no specific maintenance needed except for inspection of tires, brake linings and lubrication.

Over 70,000 electric-powered vehicles are now in operation in England where they are used for milk and mail delivery and as ambulances.

Scholarship Program Officially Opened; AIA Members Urged to Pledge Support

The AIA Minority Disadvantaged Scholarship Program drive will open officially in mid-January. The goal is to raise $200,000 a year for three years for scholarships for young men and women from minority groups who otherwise could not afford to attend schools of architecture (*see* Oct. '72, p. 10). The program will be operated under the AIA Foundation; gifts are tax deductible.

"The support of the AIA membership is the key to meeting this goal," says Robert J. Nash, AIA, a former Institute vice president who has been active in the scholarship program. Foundations, corporations and firms in the construction industry, as well as large architectural firms, are also being asked to make contributions, but these organizations will want to know that the AIA membership is backing the program, Nash explains.

Perhaps more important, comments Nash, is that the program is a way in which AIA members can demonstrate their commitment to the effort of bringing more members of minority groups into the profession. The reasons for doing so are outlined in a brochure that is being mailed to AIA members.

Passenger comfort is the main consideration of the bus; there's an easy one-step entry.

Minorities are underrepresented in architecture. The scholarship program is a step toward remedying this inequity. In addition, the AIA will help bring into architecture professionals who have special skills for communicating with diverse groups and who also will be able to fill all the roles that architects are increasingly being assigned.

The scholarship program is a continuation of the successful one which was funded through 1972 by the AIA and the Ford Foundation. This program brought 96 students into 37 architectural schools. Deans of their schools confirm the experience of the national scholarship staff that these young people are determined to bring to the profession and to their own communities a high degree of professional competence.

The $600,000 fund will be used for direct scholarships to 60 to 90 students during their first three years of college. After that they will be helped to find other sources of aid, in part from AIA programs. After the 1975-76 school year, it is envisioned that local components will be more active, becoming, in fact, senior partners in running the program. The transition from a national to a local program will be accomplished by means of the national scholarship staff working closely with components to help them develop their own individualized minority scholarship programs.

Ten Persons Named to Research Board, Including Two Members of the AIA

Two members of the AIA are among the 10 new appointees to the Building Research Advisory Board. They are Rudard A. Jones, director and research professor of architecture, Small Homes Council-Building Research Council, University of Illinois, Champaign, and Beverly A. Willis, president of Willis & Associates, San Francisco.

The other new board members are: Brian J. L. Berry, chairman, Urban Studies Training Programs, Center for Urban Studies, Department of Geography, University of Chicago; Patrick J. Cusick Jr., president, Greater Hartford Community Development Corporation, Hartford, Conn.; Charles P. Graves, professor, College of Architecture, University of Kentucky, Lexington; Matt M. Jetton, president, Sunstate Builders, Inc., Tampa, Fla.; Kenneth G. McKay, vice president, American Telephone and Telegraph Company, New York City; Charles E. Schaffner, vice president, Syska & Hennessy, Inc., New York City; John F. C. Turner, Department of Urban Studies and Planning, Massachusetts Institute of Technology, Cambridge; and Joseph H. Zettel, vice president, Johns-Manville Products Corporation, Johns-Manville Research Center, Denver.

BRAB members are appointed on a rotating, overlapping basis for terms of up to three years. Total board membership is 36, plus nonvoting liaison members who represent federal agencies. The 36 regular members serve as individuals and not as representatives of any organization with which they may be associated.

BRAB is the principal unit of the National Research Council that is concerned with building science and technology. It provides advice on research and technical problems, monitors research studies undertaken by others, organizes conferences and symposia, acts to stimulate research and correlate information and explores subjects in the housing, building and related community and environmental design and development fields where objective treatment is required.

International Consultation in Canada Promotes Use of Wood in Construction

Canada played host last summer for nearly two weeks to 313 delegates from 58 countries who studied one of the world's most pressing needs: adequate housing. The World Consultation on the Use of Wood in Housing, held on the campus of the University of British Columbia, was called to explore the potential of wood as one solution to the housing problem. The meeting was co-sponsored by the United Nations Industrial Development Organization, the UN Center for Housing, Building and Planning and the

Food and Agriculture Organization of the UN, with active cooperation from the International Union of Forestry Research Organizations.

The main objective was to improve the availability of housing, particularly for lower income people in all countries, whether highly industrialized or developing. The organizers of the consultation decided upon wood in home construction as the theme because it was believed that this material can be quickly and effectively used to help ease the housing situation, given sufficient supplies and the education to use them properly.

Each working session produced recommendations and resolutions. One recommendation in the recently issued list of resolutions agreed upon at the consultation calls for architects, builders and government agencies concerned with the provision of housing to take all possible steps to insure the technically correct use of wood products in housing in order to help counter any bias against its use.

Another recommendation is for architects and builders in developing countries to employ methods of assembling house components which are as simple as possible but provide strength and stability. The world's universities are urged to modify their curriculums to provide architects and engineers with adequate training in the use of wood in design and construction.

The delegates ask for governments to take the initiative in demonstrating wood's acceptability by specifying wood content in government buildings. Another resolution calls for building codes to be reviewed to be sure that satisfactory and economical techniques are not being excluded by conservative requirements, particularly with respect to fire.

Social and economic studies are suggested which would determine the most suitable design requirements leading to low cost housing types using wood. Forest products research laboratories are asked to undertake more study on the properties of tree species not yet adequately known on timber markets and on their use in house construction. It was pointed out that some tropical woods have been ignored in construction and that there is virtually no research into their potential as a building material.

California, Indiana Claim Two Winners Each in Steel-Framed Building Program

A playground shelter, a naval air station and a boiler plant are among the eight winners in the 13th annual competition for steel-framed buildings sponsored by the American Institute of Steel Construction.

This year's competition, in the opinion of the jurors, "was characterized by a refinement of the architectural concepts and detailing that have developed over the past decade and which is today expressed in strong forms and well-ordered structures that are straightforward and which honestly combine the structure and the system in the architectural expression."

The winners are:

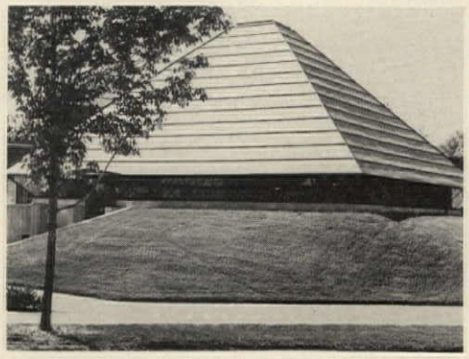
- Naval Air Rework Facility P-108/P-110, Naval Air Station, North Island, San Diego. Architects: Daniel, Mann, Johnson & Mendenhall.
- Boiler Plant Addition, Terre Haute, Ind. Architetcs: Ewing Miller Partnerships.
- McCormick Place On-The-Lake, Chicago. Architects: C. F. Murphy Associates.
- Peoples Trust Company Mini Bank, Fort Wayne, Ind. Architects: George Nelson & Gordon Chadwick.
- Cook Field, Yonkers, N.Y. Architects: Joseph Roth & Associates.
- Calvert County Vocational-Technical Center, Prince Frederick, Md. Architects: RTKL Inc.
- Monguagon School, Trenton, Mich. Architects: Eberle M. Smith Associates, Inc.
- Pardee Substation, Valencia, Calif. Architects: Southern California Edison Company.

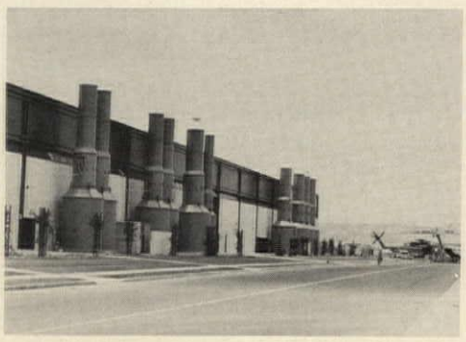
The jury members were S. Scott Ferebee Jr., FAIA, president of the AIA; Vincent G. Kling, FAIA, Philadelphia; John O. Merrill Jr., AIA, San Francisco; Leo Plofker, partner in the Office of James Ruderman, New York City; and Mario G. Salvadori, chairman, Division of Architectural Technology, School of Architecture, Columbia University, New York City.

Elliot Richardson Made Honorary Member; Citations Given HEW Leaders

At an Octagon House reception in Washington, D.C., Elliot Richardson, Secretary of the Department of Health, Education and Welfare, was presented with a certificate of honorary membership in the Institute by the then AIA president, Max O. Urbahn, FAIA. Richardson has since been named by President Nixon as Secretary of the Department of Defense in the new Cabinet being formed for his second term.

Urbahn cited Richardson's career in public service as being "dedicated to fostering design quality" in HEW-supported construction. Urbahn said that the AIA "recognizes and applauds the new impetus for excellence in design, coupled with insistence on good management," which have characterized Richardson's administration.





Two award winners are the Peoples Trust Company Mini Bank, Fort Wayne, Ind. (top) and the Naval Air Rework Facility, San Diego.

At the same time, Gerrit D. Fremouw, director of the Facilities Engineering and Construction Agency of HEW, and Harald M. Graning, head of HEW's Hill-Burton hospital construction program, received special citations from the AIA in recognition of their agencies' support and encouragement of the profession of architecture and their close cooperation with architects in private practice.

Kemper Award Goes to Georgian Noted For His Work with AIA Documents

Bernard B. Rothschild, FAIA, of Atlanta is the 1973 recipient of the Edward C. Kemper Award, given annually in recognition of an "AIA member who has contributed significantly to the Institute and the profession."

Rothschild has been a member of the Documents Board since 1967 and was chairman from 1969 to 1971. He assisted in negotiating the new Veterans Administration owner-architects contract and is currently writing an insurance guide for architects.

This year's winner also is chairman of the AIA Editorial Advisory Committee on Architectural Graphic Standards and is president of the CSI Foundation.

A director of the South Atlantic Region in 1965-68, he headed the Georgia Association, statewide society of architects in 1972.

Nominations Sought by National Society; Honors Distinguished Use of Sculpture

The National Sculpture Society wishes to receive nominations for its Henry Hering Medal which is presented, as the occasion warrants, in recognition of outstanding collaboration among architect, sculptor and owner in the distinguished use of sculpture in an architectural object. The medal is given in several categories of architecture: religious, monumental or memorial and institutional or commercial.

In former years, selections for the meeting were made from nominations received from the society's members. In an effort to widen the base from which the selection is made this year's nominations are sought from qualified individuals.

Nominations should be made in the form of portfolios which describe the nature of the project and include photographs showing the site of the sculpture. Names of architect, sculptor and owner should be included. Nominations must be in the society's office by March 2.

For additional information, contact Mrs. Howard M. Stein, executive director, 250 E. 51st St., New York, N.Y. 10022.

Certificates Presented at AIP Meeting To HUD Design Honor Award Winners

The Department of Housing and Urban Development presented 28 honor awards for "superior design" at the recent annual convention of the American Institute of Plan-

ners in Boston. Winners were selected from nearly 400 entries involved in HUD-assisted planning and construction projects in 41 states, the District of Columbia and Puerto Rico. The "contribution of environmental designs to human values" was stressed in the program.

The winners were in two categories: large area planning and project design. Among the winners in the former class were the urban design plan of San Francisco, undertaken by that city's Department of City Planning with the assistance of consultants, and the Town Center and Area I, Highland Park, Mich., planned by Christopher Wzacny, AIA, & Associates.

The project design category winners included such diverse structures as the Inter-

James Baker, AIA, and Peter Blake, FAIA, are designers of the Bard College modular student housing, a HUD honor award winner.

national House in Philadelphia, designed by Bower & Fradley, and 990 Pacific Center, San Francisco, a housing project for the elderly designed by John S. Bolles Associates.

There were five special mention awards ranging in scope from the historic renewal of Savannah, Ga., planned by Muldawer & Patterson, and an H-plan house in Anchorage, designed by Vetle Jorgensen, AIA. A complete list of awards winners and credits will be sent to any reader upon request to the AIA JOURNAL.

The jury consisted of Van B. Bruner Jr., AIA, vice president of the Institute; Bennie M. Gonzales, AIA, Phoenix; Vincent Kling, FAIA, Philadelphia; Eldridge Lovelace, landscape architect, St. Louis; Jimilu Mason, sculptress, Alexandria, Va.; and Ralph Warburton, AIA, Coral Gables, Fla.

Partner in Large Multidisciplinary Firm, Prominent Leader in Civic Organizations

After serving in the US Navy in World War II, Phillip J. Daniel, AIA, returned to California and started the firm of Daniel, Mann, Johnson & Mendenhall in Los Angeles with fellow architects Arthur E. Mann and S. K. Johnson. They were later joined by civil engineer Irvan F. Mendenhall. Since those early days, the firm has grown to have a staff of 700 persons and 22 offices throughout the country and abroad. The firm credits Daniel's "genius for long-range planning" and his "visionary concept of the role of architecture and engineering in the modern era" as major factors in expanding it into one of the world's major consulting organizations.

Daniel died of a sudden heart attack on November 20 at the age of 60. A senior vice president in his firm, Daniel also directed its Systems Division and led DMJM into new computer applications. He founded and was chairman of the board of the Los Angeles-based computer company, Logicomp, Inc. He was prominent in the firm's involvement in the nation's missile and space programs and its launch and test facilities at Cape Kennedy, Vandenberg and Edwards Air Force Bases.

Daniel served on many boards and committees including the Defense Science Advisory Board of the US Department of Defense and the California Council on Criminal Justice. He was active in Los Angeles civic affairs through his work on the various committees of the Chamber of Commerce, the Rotary Club, the Bay Area Council of Boy Scouts of America and the Central City Association of Los Angeles.

Leader in Architectural Education, Both in This Country and Canada

From 1946 until his retirement in 1962, Milton S. Osborne, AIA, was head of the Department of Architecture at the Pennsylvania State University. Prior to his appointment at Penn State, he was director of the School of Architecture and Fine Arts at the University of Manitoba, Winnipeg, Canada, for 17 years. He died on November 6 at the age of 75.

A graduate in architecture, Ohio State University, Osborne also held a bachelor's and a master's degree from Columbia University. In his early career, he was associated with architectural firms in New York City and in Columbus, Ohio. He also served as acting dean of the School of Architecture, Alabama Polytechnic Institute, and acting director of the School of Architecture, University of Toronto. After his retirement, he was visiting critic for architectural students at the University of Toronto's art summer school.

Dean at New York City's Cooper Union, Participant in AIA, NIAE Affairs

Esmond Shaw, AIA, devoted four decades of his career to Cooper Union, New York City. He joined its faculty in 1932 after having attended McGill University in Montreal and the Art Students' League in New York City. Named assistant dean of the Cooper Union Art School in 1935, he held this position until 1956 when he became assistant dean of the School of Art and Architecture. He became dean in 1963, a position he held until 1968 when he became dean emeritus. He died on November 13 at the age of 70.

From 1939 to 1959, he was a principal in his own architectural firm, acting as designer and consultant to private firms and public agencies. He was the author of a number of articles and books and was co-editor of *Planning and Community Appearance*.

Shaw was active on many committees of the New York Chapter AIA. From 1959 to 1961 he was chairman of the board, National Institute of Architectural Education.

A Leading Consultant on Urban Planning, Professor at the University of Virginia

In 1969 Paul S. Dulaney, AIA, received the Virginia Citizens Planning Association award for his outstanding contributions to planning. Professor of urban planning at the University of Virginia, he served as special consultant in planning for the Virginia cities of Culpeper, South Boston, Covington and Lexington. He was also a special consultant for the Historic Savannah (Ga.) Foundation. Before coming to Virginia, he was planning director for the Knoxville, Tenn., Housing Authority and executive director of the Winston-Salem, N.C., Redevelopment Commission.

Dulaney, who died on November 5 at the age of 58, began work in 1969 under a grant from the National Endowment for the Arts on a project documenting Virginia county courthouse squares, which was nearly complete at his death. He directed the scenic river study for the Virginia Commission of Outdoor Recreation and was a sesquicentennial consultant for the University of Virginia as well.

Active in many organizations, he was also a member of the executive committee of the Washington, D.C., Chapter of the American Institute of Planners and urban design commissioner of the Virginia Chapter AIA. A memorial fund has been established in his name at the School of Architecture, University of Virginia.

Deaths

WALTER ANTRIM
Philadelphia
WILLIAM P. BERGEN
Savannah, Ga.
J. W. COCKE JR.
Waco, Tex.
CHARLES O. DEBARRY
New York City
LEMUEL C. DILLENBACK, FAIA
Syracuse
ELIZABETH M. ELLIS
Atlanta
JAMES B. GODWIN
Atlanta
LEONARD GRIFFIN
Bradenton, Fla.
ROBERT STODDARD LAFAYE
Columbia, S.C.
SAMUEL LAPHAM, FAIA
Charleston, S.C.
CARRINGTON H. LEWIS
San Diego
ARTHUR B. MOORE
Syracuse
RAYMOND A. ORPUT
Rockford, Ill.
MARVIN L. PARLER JR.
Alexandria, Va.
WILLIAM S. SHARY
Islamorada, Fla.
THOMAS L. WHITE
Geneva, N.Y.
JOHN R. ZINNER
Ridgefield Park, N.J.

Newslines

A national new towns policy is urged in the study "Man and His Urban Environment." Sponsored by Laurance S. Rockefeller and compiled by his associate Fred Smith (a contributor to the AIA JOURNAL), the report proposes that land be permanently leased to users rather than being owned by them, that new towns be constructed according to a master plan and that they have a controlled growth pattern. The cost is $2 per copy and may be obtained from Man and His Urban Environment Project, Room 5600, 30 Rockefeller Plaza, New York, N.Y. 10020.

Guidelines for keeping abreast of OSHA and its standards are outlined in "The Consulting Engineer and the Occupational Safety and Health Act." Write the National Society of Professional Engineers/Professional Engineers in Private Practice, 2029 K St., N.W., Washington, D.C. 20006 for a copy. The price is $1 each for PEPP members and $2 for nonmembers.

The Brick Institute of America is the new name of the organization formerly called the Structural Clay Products Institute. BIA will launch new intensified and broadened programs of promotion, marketing research and engineering.

John Hejduk, AIA chairman of the Department of Architecture at Cooper Union in New York City, has been given that institution's highest alumni award for outstanding professional achievement.

The Organization of Architectural Employees in San Francisco has affiliated with Local 2001 of the United Brotherhood of Carpenters. Peter Ekstein, OAE executive secretary, says that the union "now has the expertise, moral support and research staff" of the Carpenters and that it also has "received some assistance at the bargaining table."

MacDonald Becket, AIA, president of Welton Becket & Associates, was honored at a testimonial dinner in Beverly Hills, Calif., in recognition of his continuing interest in research centered about diabetes and other metabolic disorders. Proceeds from the dinner dance went to establish the MacDonald Becket Diabetes Research Fellowship at the City of Hope National Medical Center.

The Damon Woods Memorial Award, given annually by the Industrial Designers Society of America, has been presented to Mrs. Lyndon B. Johnson for her "conspicuous contribution to the betterment of the environment."

The Energy Policy Project, sponsored by the Ford Foundation, has developed a guide consisting of a series of special studies which will be undertaken to buttress its analytical efforts in preparation for EPP national policy recommendations. For additional information, contact EPP, 1776 Masaschusetts Ave. N.W., Washington, D.C. 20036.

Francis J. Sheridan, AIA, a partner in the Albany firm of O'Connor Associates, has been appointed chairman of the National Architectural Workshop for the 97th annual meeting of the American Association on Mental Deficiency to be held in Atlanta in May. The theme of the workshop is "Architecture as a Viable Discipline in the Field of Mental Retardation."

The Alliance of Women in Architecture, in existence for over a year, is expanding its services to women in related design professions: landscape architecture, planning, engineering and interior design. AWA, located at 18 E. 13th St., New York, N.Y. 10003, fosters an awareness of existing legislation to provide women with knowledge of their legal rights to equal employment opportunities, counsels those who wish to enter the design professions and sponsors educational programs for schools, the general public and professionals.

Topics of current interest in business and technology are discussed in a variety of papers available without charge from Arthur D. Little, Inc., 50 Acorn Park, Cambridge, Mass. 02140. A catalog will be sent upon request. □

Books

Bruce Goff: A Portfolio of the Work of Bruce Goff. Designed and compiled by William Murphy and Louis Miller. New York: Architectural League of New York and the American Federation of Arts, 1971. 22 plates of renderings and photographs, 6 sheets of working drawings, listing of 236 buildings and projects, 1918-1968. No price given.

Over the years the great gifts of Bruce Goff have found some recognition and some bewilderment here and abroad, but documentation of his work is still sorely lacking in this country. Some of this neglect was rectified by the one man show at the Architectural League of New York in January/February 1970. The present portfolio is a result of that show.

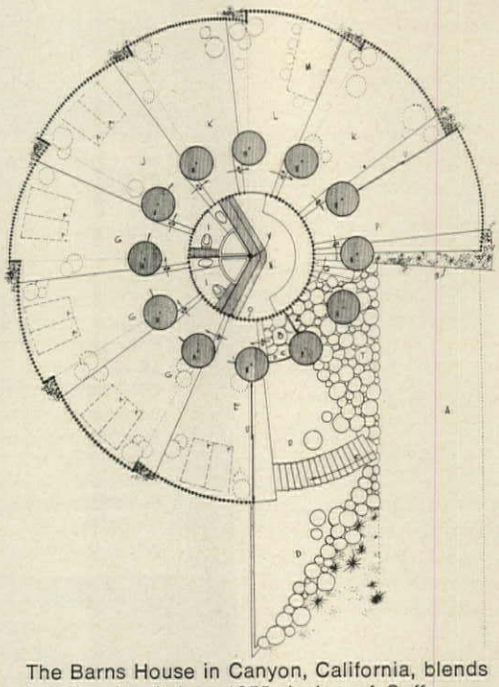
Some critics consider Goff an eccentric designer because they are distracted by some of the more elaborate detail which, however, is mostly a development out of forms of construction or the characteristic of the materials. The overwhelming fact is Goff's tremendous gift of conceiving space, a talent which may be compared with absolute pitch in music. We have to go back to Frank Lloyd Wright to find such high development of spatial art. Yet Goff never creates nor apes a "style." The shaping and interpretation of space to Goff is always an expression of the nature of materials, construction and use of space. Therefore, it is a great delight to see and treasure these reproductions of his designs.

Goff's essay is more than a defense of individualism and the architect's "honest effects." Calling attention to the changes of time, to pointless imitations of the "form-givers" of short-lived periods and to accusations of his nonconformity by those who were of the avant-garde of former days, Goff warns against any kind of "commonism" and admonishes us to "revaluate principles and to discover and invent new ones."

Goff's work certainly shows the ever ready spirit to use human creativeness to advantage, following his brief that architecture "is for people and not only an abstraction."

Herb Greene's introduction to the portfolio has the touch of immediacy when he refers to his personal experience of Goff as a warm, friendly, humorous and tireless worker. I found Goff, as Greene does, filled with respect and reverence for the creative efforts of others. He has a great knowledge of the masters, and he is generous in the way he treats the work of students.

We need not go through the mental exercise of trying to argue the virtues of personal patterns versus conventional order that we may discover the profound functionalism in Goff's work. It is the service to human needs that is at the bottom of all his efforts. I would not think, as Greene does, that Goff's searching reach for new materials is necessarily a shortcoming. Naturally, the search for true solutions of a problem may lead us to be too optimistic and to believe in the characteristics of a new material, but that is done in good faith also by much more conventional architects. It is quite justified and often necessary if there is conscious cooperation of the owner.



The Barns House in Canyon, California, blends into its site; it is a 1955 design of Goff.

The observation by Greene that it is a "loss" that Goff has not been called upon lately to participate in the design of public architecture is borne out by an examination of the long list of buildings and projects, most of which have remained projects.

The plates, particularly the drawings, are fascinating. The design for the Barns house in California shows, for example, Goff's empathy with the natural environment. With a cable tension structure, the soil of a hill site is little disturbed and the landscape penetrates the entire building. The house has some similarity to the famous Bavinger house in Oklahoma (AIA JOURNAL, Dec. '59).

The elevations among the working drawing sheets are particularly characteristic of Goff's personal patterns. The expressionistic shapes are rich and juxtapose such materials as hard glass and coal with gold anodized aluminum, but some of the details such as the projecting aluminum angles at rooftops and the wandering outline of the glass cullets are special extensions of Goff's phantasy.

No matter how we feel about the work of this great architect, the present portfolio is evidence that even in an industrial age a master manages to handle form with old and new materials and yet stay away from artificial form-giving. H. H. WAECHTER, AIA

Arthropods: New Design Futures. Jim Burns. New York: Praeger, 1972. 167 pp. $12.50 hardbound, $5.95 paperbound.

This is not a book on architecture. It is a catalog of the people who, in the author's opinion, have the potential for environmental change. He covers John Johansen and the Halprins, Ann and Lawrence, and such rock-grouplike names as God & Co., and Ant Farm. Their works range from some that seem removed from reality to one completed building (Johansen's Mummers Theater); from a small inflatable tent to an airless, stairless megastructure design; and from simple street happenings and beautiful graphics to an endless grid for all buildings.

Burns admits to no attempt at evaluation; and, generally, there is too little material for evaluation by the reader. Although I found some fun and ideas, the real value of the book is in the display of new attitudes. They are probably best understood from the author's brief text and are not intended to be consistent with all the examples shown.

Briefly, Burns — a former senior editor of *Progressive Architecture* — is anti-form and pro-environments that change in response to the user. He is for socializing efforts in contrast to depersonalizing ones. He is most enlightening when he rather brutally criticizes the present state of the environmental arts.

The examples given show enormous vitality and ability, and are free from economic grubbing. They are almost all aimed at some time in the future. Today's environment could well use these efforts. Some people seem to be producing works with ideas and artistry of execution that are ends within themselves. Most, however, seem to be producing publicity in hopes of being successors to superstars; they have no solid accomplishments.

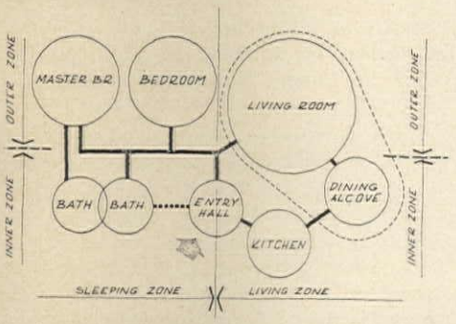
This is not written in contempt, but in sadness. It would be great to see these efforts producing second-rate environments from ordinary third-rate programmatic possibilities. There is ample opportunity for design futures at this level. Instead, we see first-rate publicity material of designs to fulfill future programs that may never materialize as projected. It's so much more prestigious and safe. JOHN BLANTON, AIA

High Rise Apartment Buildings: A Design Primer. John Macsai. Chicago: University of Illinois at Chicago Circle, 1972. 123 pp. $10.

Students at the University of Illinois are benefiting from a design course taught by John Macsai which replaces the traditional philosophy of "anything goes while you are a student" with an actual problem experienced by many practitioners. The author may be accused of taking the freedom of unrestricted design away from his students, but he is leaving them with a better understanding of the problems faced by the profession. His

philosophy does not restrict creativity but places it in the context applicable to a practice situation. I would guess that it also leaves the student with a greater appreciation of what makes a successful building.

The value of the primer goes beyond the student. Highrise apartment buildings are dissected, analyzed and put back together. The various elements of design are broken down



Emphasis is placed upon the functional relationship between rooms and the environment.

to their smallest factors so that the reader can examine and evaluate their application to the design solution.

Macsai has employed co-authors as an architect employs consultants: Eugene P. Holland, a structural engineer; Leonard Korobkin, a mechanical engineer; and Frank O. Zimmerman Sr., elevator consultant. The contributions made by these men provide an easily understood series of choices that are designed to lead the reader into making value judgments throughout the design process.

Macsai, as the architectural design instructor, provides the reader with guidance in evaluating the development in the planning of the rhythm, function and ultimate shape of highrise apartmen' ' ldings. His text is accompanied by excellent illustrations by Alfred J. Hidvegi.

Those responsible for architectural curriculums should find new directions for their programs by employing the techniques expounded in this University of Illinois program. Students probably will learn more about architecture by developing the one problem in this book than in all their other design courses. Great architecture will not likely be achieved in strict interpretation of the text, but the lessons to be learned about the problems faced in practice far outweigh the restrictions on creativity which we all face anyway.

Practicing architects seeking to learn more about improving their design techniques will benefit from using this book as a refresher course. The information is not new, but seeing it so clearly has a cleansing effect.

Macsai has produced an excellent primer which should receive wide use. I only regret that the review copy had a few missing pages.

STEVEN H. ROSENFELD
Director
AIA Professional Programs

Economics of High-Rise Apartment Buildings of Alternate Design Configuration. Richard B. Steyert. New York: Construction Research Council, American Society of Civil Engineers, 1972. 171 pp. No price given.

There is no easy way to develop comparative costs of the various design alternatives requiring evaluation in the development of a highrise apartment building. This report is a modified application of the total cost/total income methodology which requires heavy computer application. The input necessary for an accurate evaluation of the cost alternatives becomes staggering.

The total cost analysis developed by Steyert includes the evaluation of profit and loss at the time of the sale of the property and an "intuitive insight" into the economic consequences of alternate design. Why the cost consultant is more qualified to possess this insight rather than the designer is not stated.

The author recognizes that the developer will build as much as he can within the zoning envelope. What is missed is that the cost analysis system then becomes a means to evaluate how cheaply the project can be built. The use of the word "cheap" may be unfair; rather, let us say, built to produce the greatest return with the least investment. The result may be that of a cheap building, especially if the developer envisions selling the building before the structure begins to deteriorate.

Steyert comments that "the paradox of modern design is that the computer programs are used to save basically pennies, while unquantitative rules-of-thumb on building economy establish overall building form." His concern was to bring precise quantitative analysis into the cost-critical early design

process, being of the opinion that it is here that the real money is lost or gained on a project. The plum in Steyert's system is the development of "parameterization" models that generate construction costs, operating costs and charges associated with highrise construction. The parameters are evidently of such complexity that the cost of computerizing them is prohibitive and are not available unless a consultant is employed who has access to this information.

Every design decision affects another part of the structure and an associated cost. The time and cost evaluation of each design decision on the total cost/total income basis is staggering. Neither the architect nor developer is equipped to make this evaluation nor would the benefit of such close scrutiny be worth the effort. Steyert has developed curves which graphically lead the designer to optimum shapes for the highrise apartment building. The danger lies in all buildings ending up with the same shape, size and unit area.

There is also the danger of stagnation, a stifling effect on the designer by the cost consultant.

In an effort to simplify the judgments to be made, four basic areas of comparisons are provided: building height, floor size, room size and building shape. Within the discussion of these categories, pieces of useful information are available. The effects on the various cost elements are graphically illustrated and include slabs, columns, subcontractors, beams, cranes, wind, foundation, roofs, walls, excavations and an adjustment for building character. The design, developing and land-carrying charges and the cost of the improvement are charted, as are the annual operating costs.

The result of all these charts is that the intermediate solutions are apparently favored. The result suffers from the many pertinent items excluded from the evaluation, such as the local rental market which can throw all the calculations down the proverbial drain.

The room and floor size evaluations are interesting. The feeling that one is designing in a vacuum persists, however. Every building on an unrestrictive site, without an appealing view and designed for moderate rental will be 17 stories high with 10,000 square feet per floor and 210 square feet per room average and rectangular. An unhappy prospect.

The book serves a useful purpose in exposing architects and engineers to the language and goals of developers and cost consultants. The excessive use of formulas, abbreviations and charts makes reading somewhat tedious, as their useful application is limited.

The total cost/total income analysis is the ultimate evaluation made by the developer. No one will knowingly build a highrise apartment building without making as much profit as possible. The developer is the final judge of what is built, and the architect must be able to illustrate the value of good design in a commercial sense.

STEVEN H. ROSENFELD
Director
AIA Professional Practice Programs

The San Fernando Earthquake of February 9, 1971 and Public Policy. Sacramento, Calif.: Special Subcommittee of the Joint Committee on Seismic Safety, California Legislature, 1972. 127 pp. No price given.

There are many lessons to be learned from the San Fernando earthquake of 1971. Once about every four years an earthquake of this magnitude occurs in the southern California region alone. As California Senator Alfred E. Alquist comments, that state has many advantages but it's also a land "where severe earthquakes are a part of the natural physical environment." And Comment and Opinion in the November AIA JOURNAL reminded us all that other states than California must do more planning for better seismic safety.

With a view to lessening the damaging effects of earthquakes, the Senate of California in 1969 created the Joint Committee on Seismic Safety which was directed to develop over a four-year period seismic safety plans and policies and to recommend needed laws which would minimize the threat to people and property from future quakes. The committee is assisted in its deliberations by an advisory group of some 70 experts in such fields as engineering, land use planning, geology, etc.

After the San Fernando quake, the chairman of the committee was requested to conduct an in-depth investigation of the effects of the quake and to learn "what public policies are needed to minimize injury, loss of life, damage to structures and disruption of the economy" from future potentially damaging earthquakes in all parts of California.

The San Fernando earthquake was considered an appropriate one to study in depth since it struck the margin of a large urban area and was large enough to have substantial effects on people, buildings and the economy. This report contains the findings and recommendations of a special subcommittee which was appointed to study the earthquake.

There are chapters on geological and seismological lessons; dams and soils; structural engineering related to buildings; earthquakes and city lifelines; land use planning; governmental organization and performance; and disaster preparedness. There is a concluding statement of a "unifying objective" which has been prepared by structural engineer Karl V. Steinbrugge and geologist George O. Gates. They are of the opinion that a solution of some problems calls for legislative action, that the problems are multidisciplinary and interagency in nature, that earthquake safety costs money and that a unifying influence and authority is needed at the highest state level for hazard reduction.

With highrise buildings on the increase, architects are recommended to read the chapter on structural engineering related to buildings, if nothing else in this significant report. Prepared by consulting structural engineer Carl B. Johnson, it contains pertinent information on earthquake risk as it is related to design and construction. He also details the damage to buildings by the 1971 quake. He emphasizes that there is a need for additional basic and applied research and for a program of education for the public. It's rather chilling to read his comment: "By assuming a time of day with people at work and on the freeways, a death toll of 10,000 could be easily visualized for these large earthquakes." And as the report reminds us, much larger quakes than the San Fernando one "could have a longer duration of strong shaking, could strike at the center of a large urban area and could strike during the busy time of day."

MARY E. OSMAN

Industrialized Building Systems for Housing. Edited by Albert G. H. Dietz and Laurence S. Cutler. Cambridge: MIT Press, 1971. 260 pp. $12.50.

Each summer the Massachusetts Institute of Technology conducts a seminar of one to two weeks' duration on the general topic of industrialized building and building systems — a complicated and often nebulous subject. This particular book is a compendium of the sessions held in 1969 and 1970. The editors have selected a number of the lectures to give a broad comprehensive view of the conferences and, in so doing, have given us as excellent an overall presentation of housing systems and technology as is now available.

Dietz begins by confronting us with the fact that we have an abundance of technical capacity and knowledge, but we have not (nor does it appear that we will) fulfilled the need for adequate housing for all members of our society. In order to examine this failure, we look at and attempt to understand our technology, its status and its ingredients and also its relationship to the social, political and economic constraints of our day. Having done this, we then review and imagine the avenues which hopefully will overcome or eliminate the constraints.

In an excellent review of technology's present status, Dietz defines the concepts and technologies in the world of industrialization and systems. The potential of these definitions in becoming accepted as standards themselves makes the book significant alone. The problem is one of balancing our traditional, proven techniques with the new concepts of industrialization and systems. The new concepts will suffer until experience and performance prove their merit.

John F. Collins, former mayor of Boston, expresses the problem of housing as being one much less of technology than of social process. Included in this process is the area of organization of the building industry, including the lack of significant marketing analysis and feedback and the failure of the design profession to apply performance concepts. Other constraints include governmental, environmental and financial considerations and organized labor. Unfortunately, the presentations are limited to Operation Breakthrough, European experience, a rather thorough study and analysis of the mobile home industry and a generalized statement by organized labor. Perhaps the quantity and quality in this area were limited to emphasize the gap between technology and social process; or it may just emphasize our general lack of sensitivity and desire concerning human needs and patterns.

Solutions again appear limited to the improvement of the organization of the building industry and design profession. Although it is obvious that those involved will propose

solutions therein, somehow this book leaves the impression of an abundance of constraints and only limited efforts to remove them.

One of the presentations by Charles Topping concerns the development of performance codes. He elucidates how readily we can overlook the basic premise upon which architecture is founded: the fulfillment of human needs. Before we develop a performance code, we must recognize that the necessary antecedents to that lofty concept are performance standards, specifications, evaluative techniques and, most important of all, human requirements. It is easy to oversimplify these requirements in order that we may push on with the more distinguished concepts. Once again, the book illustrates our failures by jumping too quickly to conclusions. Defining human requirements is still our basic problem.

As a generalized textbook on the subject of housing systems and as an overview of the topic, the volume is significant. It can only be hoped that future seminar sessions at MIT and elsewhere will produce publications which communicate as readily as *Industrialized Building Systems for Housing.*

JACK ALAN KREMERS, AIA

IF: Industrialization Forum. Colin H. Davidson, executive editor. Montreal, Cambridge and St. Louis: University of Montreal, Massachusetts Institute of Technology and Washington University. 1969-to date. Subscription rates: $10, individuals; $20 (two copies of each issue), institutions, businesses, etc.; $5, students. Donor subscriptions: $100, institutions; $300, industries.

Industrialization is causing tremendous changes in materials, organization and technology for the building industry. Those who are concerned about the future roles of the architect will be interested in the periodical *IF*, whose specific area of concern is industrialization as manifested in systems, construction, analysis and research. The magazine, which started publication in October 1969, is a joint venture of the University of Montreal, the Massachusetts Institute of Technology and Washington University in St. Louis. It is published five times yearly.

The nonprofit enterprise, produced by a team of experts on industrialization and its impact, has received support from a number of United States and Canadian governmental bodies, universities, industries, associations and professionals. Among them are the Association of Collegiate Schools of Architecture; the US Department of Health, Education and Welfare; and the National Research Council of Canada. The magazine's advisory panel is composed of distinguished professionals.

Titles of some recent articles provide an indication of the magazine's range of concern: "Research for Very Low Cost Income Housing," prepared by the editors from notes by Samir Ayad and Witold Rybczinski; "A Method for the Evaluation of Urban Layouts," by Horacio Caminos; "A Reference Guide to Information Services," by Donald Murray; "Transfer of Emerging Materials Technology," by Bryan Noton; and "Computers and Industrialization: References to Current Research," by the editors.

Abstract cards which act as guides for information storage and retrieval and to provide quick information on current publications about industrialization are a valuable part of the magazine. The abstracts, inserted in the front and back of each issue, are printed on 3x5-inch perforated cards that may be easily removed from the magazine for filing. Included are abstracts of documents published by a variety of sources, as well as abstracts of the articles presented in *IF*. Full information is given as to the source and cost of the documents abstracted. Subject cards on which the user may make appropriate entries are also provided. A full explanation about the use of the abstract cards is given in the October 1969 issue of *IF* in an article by Leonard Wert entitled "Information Retrieval and Industrialization Forum." An additional helpful feature of both abstract cards and published articles are the key words that are listed both on the cards and at the head of the articles. Also the magazine publishes a complete alphabetical list of keywords used in each issue. As the executive editor remarks, "The abstract cards, key words, etc., constitute an 'information system' because we want our readers to be able to trace our articles at a later date when they want to refer back to them."

Not only are the abstract cards perforated, but the whole issue is. In this way, individual articles can be removed for systematic filing.

Subscriptions may be entered at either of

the following addresses: Industrialization Forum, School of Architecture, Box 1079, Washington University, St. Louis, Mo. 63130, or Industrialization Forum, Faculté de l'Aménagement, Université de Montréal, Case Postale 6128, Montréal 101, Québec, Canada.

If industrialization is your concern or if you view it as one of those "waves of the future," investment in the price of a subscription will bring in dividends. The magazine is also of interest to anyone who is interested in information systems or in contemporary journals and the way one is put together to yield maximum returns on the subject it covers. MARY E. OSMAN

Construction Materials and Processes. Don A. Watson, AIA. New York: McGraw-Hill, 1972. 418 pp. No price given.

This is a nuts-and-bolts building construction textbook for beginning students. The author, who teaches at Pasadena City College, carefully defines terms as he goes along, taking the mystery out of the language of building technology.

Most chapters open with a brief history and background of the basic building materials covered in that section. Manufacturing processes are frequently described, composition and other characteristics of principal materials are considered and some installation techniques are discussed. The textbook qualities of the volume are emphasized by the sets of questions and references for further study at the end of each chapter.

The site work chapter covers the subject of soils quite well, dwells on piles and asphalt and ignores excavating, finish grading and shoring. The chapter on concrete is an excellent introduction to the subject. Stone, brick, clay tile and concrete block are discussed in the masonry chapter, as are mortars and bonds. While coverage of wood products is well handled, there is no chapter on plastics.

Two chapters are devoted to metals and metal products. The discussion on manufacturing processes of iron and steel is overlong, but this is more than compensated for by comprehensive attention to the properties and uses of many types of ferrous and nonferrous metals and alloys. The important subject of galvanic action and corrosion of dissimilar metals is touched on, but unfortunately some of the information is reversed.

The chapter on plaster and acoustical materials contains an informative section on the elementary principles of acoustics. There are chapters on roofing and insulation, floor and wall coverings, doors and windows, glazing and sealants used for glazing. There is no separate discussion of sealants for general use.

Probably the best chapter in the book discusses paints and finishes. This is worth reviewing by practicing architects to bring them up to date on current technology in this field. Synthetic resins used by the coating industry are given ample detail. As many of the basic resins are used for other products, this chapter can also be useful to attain a little knowledge of some materials used in the manufacture of plastics, but a separate discussion of plastics elsewhere in the book would be a desirable goal for the next edition.

The closing chapters are devoted to elementary mechanical and electrical work. The principal value of these chapters is in stimulation of an awareness that these subjects exist.

The biggest plus for this book is that it is brand new and not a rehash of ancient material. The author knows his subject and has the fortunate ability to express himself clearly and tersely. The book design is well handled and is in a two-column format amply illustrated, sometimes with unusual photographs. After seeing a series of pages of plaster being applied, it's kind of fun to discover a picture of Corbu's chapel at Ronchamp.

There are also a few minuses. There are practically no relative cost comparisons to give the reader a gross idea of costs. Some occasional positive statements are too often misleading in not indicating that other alternatives do exist. The use of the same numbers for both figures and tables sometimes causes a flurry of page-turning. And the author missed a golden opportunity in not electing to use 16 chapters covering the same subjects as the 16-division Uniform System (now the Uniform Construction Index) to help fix this universally accepted format in the reader's mind.

But in sum, the plusses overbalance the minuses. The book is an excellent one for neophytes to study as a text, especially if they expect to be involved in light construction. It may also be useful as an occasional reference work for those who are more experienced in design and construction. Either way, the book is a welcome addition to the architect's library. ROBERT ALLAN CLASS, AIA
Director
AIA Technical Programs

Museums: Their New Audience. Washington, D.C.: American Association of Museums, 1972. 112 pp. Free.

There is a crisis in the world of American museums. It is partly due to omnipresent financial problems, but there are also social changes which call for a reassessment of the museum's traditional task of preservation and the study of objects. The museum is a city institution, but the American city has changed profoundly. The museum's former patrons have moved away and vast numbers of new people have come in who feel alienated from the community and its social institutions. The present "challenge to the museum," states the American Association of Museums in this report, "is for it to relate itself to its new audience in many ways which shall be meaningful for both the institution and its audience." The museum should be a "cultural broker" in the community, using its resources to help meet the city's cultural and educational needs.

This report, made possible by a grant from the Department of Housing and Urban Development, was prepared by the Committee on Urban Museums formed by the AAM to assess the present and potential role of urban museums. The committee recommends a number of changes, including better ex-

change of information among museums; a redirection of resources; a search to stimulate unconcerned and uninitiated audiences; flexibility of programs to make them more relevant to urban needs; etc.

The major portion of the book is devoted to descriptions of programs and community projects already focusing on new audiences.

Guide to Significant Schools in the New York City Area: 1972/Facilities for Higher Education. New York: New York Chapter AIA, School and College Architecture Committee, 1972. Unpaged. $1.

Compiled by the School and Architecture Committee of the New York Chapter AIA, this guide includes 25 facilities for higher education in the New York City area. Three groups of projects, all of which have educational as well as architectural excellence, are represented. The examples include new construction for general or specific purpose; renovation or conversion of "found" space; and innovative technology and construction process.

Parking of Motor Vehicles. 2d ed. John Brierley. London: Applied Science Publishers, Ltd., 1972. 347 pp. No price given.

The first edition of this British book was published in 1962. Since that time, the number of licensed motor vehicles in the United Kingdom has increased by almost 100 percent. Hence, the new edition has been enlarged, rewritten and brought up to date to reflect new legislation, policies, designs and techniques for parking automobiles. One of the 10 new chapters is on security in car parks, thus reflecting societal changes and universal problems, as does the chapter on the disposal of abandoned vehicles.

Comprehensive in scope, the author considers every kind of parking facility and related topics such as parking meters, automatic parking equipment, economics, etc. The book is directed to British problems, but it will help the American architect who is responsible for the design of any facility for parking automobiles.

Kitchen Planning Guide for Builders and Architects. Patrick J. Galvin. Farmington, Mich.: Structures Publishing Company, 1972. 199 pp. $20.

Some people say that a kitchen will sell a house as no other feature of it can. For the most part, the kitchen, like the bathroom, comes furnished and is the one room in a house that is most resistant to change. At the same time, it's probably the one room that is lived in most of all.

"A good kitchen," comments the author, "can bring a family closer during the hours they are home together, but if poorly designed it can be a source of annoyance. It can separate them psychologically as well as physically by a series of minor frustrations."

The kitchens illustrated in this book are handsome and would make any cook long to practice her art in them. There's a great deal of practical advice as well on such matters as basic measurements and minimum property standards, kitchen planning and design (with 60 successful kitchen floor plans) and kitchen trends and concepts. Interspersed are chapters on cabinets; appliances; sinks; lighting; color; floors, walls and ceilings; and noise control.

The six appendices are most helpful. They cover cabinet construction and performance standards; light for living standards; a selected list of cabinet manufacturers; a selected list of countertop manufacturers; a list of Certified Kitchen Designers; and the addresses of all the firms that are mentioned in the book.

The author is editor and publisher of *Kitchen Business* magazine and a member of the board of directors of the American Institute of Kitchen Dealers. This is a book that the architect will want to have in his office library if he does any planning of kitchens at all.

The Japanese Garden: An Approach to Nature. Text by Teiji Ito; photographs by Takeji Iwamiya. New Haven, Conn.: Yale University Press, 1972. 205 pp. $25.

This handsome book is about the gardens in and around Kyoto which is about the same latitude as Memphis in an environment "neither too harsh nor exuberantly lush."

In the text Teiji Ito considers the way in which the Japanese have approached nature, commenting that there are only two attitudes toward it: "One confronts it or one accepts it. The former finds in nature but the rawest of materials to do with as one will—a form is imposed upon chaos. The latter discovers in chaos a new kind of naturalness—and to naturalize nature is to accept it." He goes on to explain that in the Oriental garden it is nature and not the gardener which does the creating. In contrast, Western gardens subdue nature. The Eastern gardener accepts nature, and in his garden man is a part of nature.

Ito describes six kinds of Japanese gardens, showing their derivations and their directions: the island garden, the water garden, the paradise garden, the dry garden, the tea garden and the tour garden. "Together, they indicate the path which gardening took in Japan. At the same time, along this path, as it were, one should be able to glimpse those basic assumptions which remain the Japanese attitude toward nature."

Japanese gardens are far more than esthetically pleasing rearrangements of nature, and it's hard to photograph them. But Takeji Iwamiya's photographs are most successful and beautiful.

The Chamberlain Selection of New England Rooms, 1639-1863. Samuel Chamberlain and Narcissa G. Chamberlain. New York: Hastings House, 1972. 192 pp. $20.

Elegantly simple and simply elegant are the rooms depicted in this volume which is a companion to the previously published *The New England Image*. The houses range in age from the Henry Whitfield House in Guilford, Connecticut, built in 1639, to Victoria Mansion in Portland, Maine, erected between 1859 and 1863. In between are handsome rooms in many New England houses; all give an insight into the lifestyles of the people who lived in them and furnished them.

There are kitchens, dining rooms, parlors,

bedrooms. The photographs detail fireplaces, ceilings, doorways, stairways, moldings, windows and individual pieces of furniture, as well as decorative ornaments, art, draperies, carpets, chandeliers and all the other elements that make a house a home.

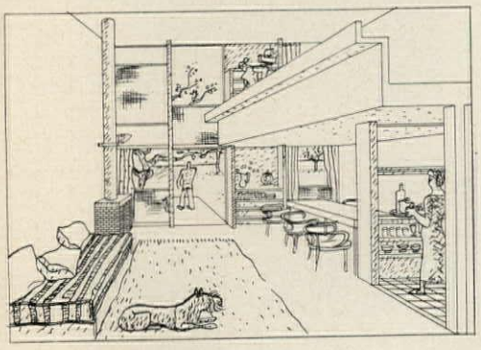
A brief foreword gives the history of the houses; the captions to the photographs are informative and most readable.

Mies van der Rohe. Werner Blaser. New York: Praeger, 1972. 203 pp. $8.50 hardbound, $3.95 paperbound.

A slightly revised edition in a smaller format of a work first published in 1965. It includes a new version of the section on the New National Gallery in West Berlin and a list of the main events in the architect's life.

Le Corbusier. Edited by Willy Boesiger. New York: Praeger, 1972. 264 pp. $8.50 hardbound, $3.95 paperbound.

This pocket edition is based on two previously published works: *The Complete Architectural Works of Le Corbusier* and *Le Corbusier 1910-1965*. Boesiger says in the preface that an inexpensive pocketbook edi-



tion of his life's work was the particular desire of Corbu. He believed that "one must consider the younger generation who does not have the means to buy expensive books."

The three parts of this edition cover sketches, projects and buildings, 1905-1939; projects and buildings, 1940-1964; and the architect's town planning schemes and museum projects. The book is well illustrated.

Georgian Summer: Bath in the Eighteenth Century. David Gadd. Park Ridge, N.J.: Noyes Press, 1972. 195 pp. $12.

The splendid Georgian architecture of Bath, England, brings the 18th century to life, as the author of this most readable book comments. Established first as a Roman spa, the town deteriorated. When Samuel Pepys visited there in 1668, he might have enjoyed the sight of ladies and gentlemen bathing together in the nude, but he could not have found much pleasure in the pickpockets and beggars who roamed the dirty unpaved, unlit streets of the provincial town whose population then was no more than 1,200.

But fashionable crowds began pouring in in the early 18th century, and Bath "stood without knowing it at the parting of the ways." Three men made it into an elegant city: Richard "Beau" Nash, the gambler and man of the world who became the personification of good manners and good living; Ralph Allen, a sober and wealthy businessman; and John Wood, an architect "with an obsessive vision of Bath as the new Rome."

Primarily this is the story of how these three men who had so little in common made an undistinguished watering place into a beautiful city. It's also an account of the architects who came after Wood and continued his ideal, especially his son John Wood the Younger. He created the Royal Crescent which has been called by Walter Ison, authority on Georgian Bath architecture, "the greatest single achievement in the whole field of our urban architecture."

The author, who lives near Bath and spent three years in preparing this study, concludes his book with a discussion of plans to preserve the splendors of the city.

Architecture and Sculpture in Ireland, 1150-1350. R. A. Stalley. New York: Barnes & Noble Books, 1971. 149 pp. $11.

As the author of this book states, anyone who visits Ireland is impressed by its splendid Georgian architecture, but few appreciate the equally fine achievements of the medieval period. His aim is to give recognition to this era of Irish architecture and sculpture.

There are chapters on patrons, craftsmen, castles, cathedrals and abbeys and friaries. The years of decline came with Ireland's invasion by Edward Bruce between 1315 and 1318 when there was a lack of skilled craftsmen but an abundance of wars and plague.

The book has many black and white photographs and architectural plans. Probably the most fascinating are the photographs of the sculpture still in existence, even though pitted with age and neglect. There is a strength to it and an austerity, and yet it possesses an emotional quality for us today.

The Mystic Warriors of the Plains. Thomas E. Mails. Garden City, N.Y.: Doubleday, 1972. 618 pp. $25.

Probably the most colorful of all native Americans, the Indian tribes of the Plains numbered about 200,000 people at the height of a population peak in 1800. Among them were such tribes as the Crow, the Sioux, the Comanche and the Ute. Religious and artistic, they were also daring and courageous.

This book describes their culture and lifestyles at the height of their civilization — a golden age that extended from about 1750 to 1875. There are chapters on such subjects as their personal qualities, their form of government, the practices of medicine and of religion, their arts and crafts and the manner in which they trained youth. Profusely illustrated, it will interest anyone who wants to know more about the proud men who once knew a boundless area.

The Aged, the Family and the Community. Minna Field. New York: Columbia University Press, 1972. 257 pp. No price given.

Dedicated to "all those who aspire to a happy old age," this book would seem to include us all. With our society's cult of youth and its denigration of older people, it can be said that not all of us will achieve that aspiration, however.

The author says that at the end of the 1971 White House Conference on Aging the delegates wanted action. "Act," they demanded. "Do not write about us, do not even talk about us, but act." It is all to the good, however, that someone writes with the sensitivity of Mrs. Field. She explores such topics as the economics of aging, patterns of living accommodations, health and family relationships.

The needs of the elderly can be met most effectively with legislative action, says Mrs. Field. But there must be ways beyond this for his "worth and dignity to be considered as important as the worth and dignity of the younger person." This book is a step in the right direction.

Housing: A Guide to the Literature. Paul Polishuk. Washington, D.C.: Gatekeepers, Inc., 1971. 219 pp. $25.

This is a compilation of references on housing arranged in such categories as "Industralized Housing," "Institutional and Economic Aspects," "Social Aspects and Design," etc. There are annotations for many of the inclusions.

Although the compiler says that periodic updates are anticipated, many of the books and articles included in this first compilation are too old to be useful. For example, an article on the production of new housing was published in 1950; another on tax on urban real property is dated 1943; a book on innovations in building materials was published in 1960 and one on prefabricated houses in 1951. The effort would have been more helpful if the compiler had been more selective. The volume is reproduced from typewritten copy. The AIA JOURNAL is among the magazines indexed.

Tenants and the Urban Housing Crisis. Edited by Stephen Burghardt. Dexter, Mich.: The New Press, 1972. 241 pp. $8.95 hardbound, $3.95 paperbound.

The housing crisis is viewed here from the point of view of tenants. The authors of the assembled articles share a common belief: The acute need for more and better housing will never be solved until tenants effectively organize to force landlords to make new and sometimes radical changes.

The book includes articles on case studies of the "tenant power" movement, causes of the movement and tenant organizations and the organizing process. There is a final section which presents conclusions drawn by the editor. He asks if we must wait "until our cities are hollow shells containing the remnants of a once dynamic urban community before housing policy is adopted that can meet the actual dimensions of our urban housing crisis."

Land Bank Handbook: Advance Acquisition of Sites for Low and Moderate Income Housing. Edited by Carol Van Alstyne. Greensboro, N.C.: Piedmont Triad Council of Governments, 1972. Variously paged. No price given.

Land banking by housing development corporations provides sites for low and moderate income housing, controlling the availability of land for future use. Often

housing projects are delayed while sites in desirable locations at a feasible cost are sought. Land banking is advanced as a way to solve the problem. Although the strategy is not new, land banking by housing development corporations is fairly recent.

This handbook is a summary of practical experience in land banking by three metropolitan housing development corporations. The project was supported by a grant from the Department of Housing and Urban Development to the Piedmont Triad Council of Governments in Greenboro, N.C., and by a Ford Foundation grant to the Low Income Housing Development Corporation of North Carolina. This handbook is intended as "an almanac of useful information" on the organization and operation of a land bank. It tells *how* to land bank — not *why*.

There are sections as well on a network of land bank activities; land bank market analysis and information systems; site selection; appraisal; land and the law; site improvement cost analysis; urban and site design considerations; legal issues of concern to land bankers; government programs relating to land acquisition and development; and recent legislative proposals relating to land banking.

Millions for the Arts: Federal & State Cultural Programs. Washington, D.C.: Washington International Arts Letter, 1972. 58 pp. $10.50.

According to a statement by the publishers, this work is the result of a survey undertaken for the US Senate. It is a compendium of facts and information on sources of money for the arts and art education.

Divided into two major parts, the first covers US government agencies with information supplied about such matters as facilities, programs, special presentations and studies and proposals. Also included are independent agencies and selected boards, committees and commissions. The second part of the book concerns state arts councils. Facts provided for each of the councils include activities, future plans, federal funding and needs.

Nonreinforced Concrete Masonry Design Tables. Henry Toennies. Arlington, Va.: National Concrete Masonry Association, 1971. 401 pp. $9.95.

The designer is given facts and figures in this book on every conceivable nonreinforced load-bearing concrete block wall.

Four different tables are presented to aid the architect and engineer: 1) allowable design loads that can be carried by the wall with different heights, different load applications and different concrete masonry prism strength; 2) allowable vertical load on walls when application of the load is such as to create tensile stresses—tension due to eccentricity governs in these tables; 3) combined loading, vertical and horizontal, on walls of various heights constructed with units of various prism strength and mortar — both compression and tension govern in these tables; and 4) nonstructural data on walls, including thermal and acoustical data, fire resistance ratings and quantities of block, mortar and insulation per 100 square feet of wall area.

Twenty-three wall constructions are covered by the design tables, ranging from 6-inch single wythe to 16-inch composite constructions. Example problems show how to use the tables.

Structural Engineering Syllabus. 8th ed. Edward F. Diekmann. Oakland, Calif.: East Bay Chapter AIA, 1972. Variously paged. $21.60.

Persons preparing for the structural engineering section of architectural examinations will be glad to have this reference work which is sponsored by the East Bay Chapter AIA. It's also useful as a reference in an architect's office. First issued in 1959, this eighth edition has been expanded and updated to the provisions of the 1970 Uniform Building Code. Other additions include sample questions and a section on materials.

Fire Protection Through Modern Building Codes. 4th ed. New York: American Iron and Steel Institute, 1971. 347 pp. $4.75.

Intended for building code officials and building professionals, this fourth edition of a work first published in 1944 has been completely redesigned and rewritten to bring it up to date. Part 1 examines the significant aspect of building fire protection; part 2 suggests fire protection regulations applicable to building construction. □

Letters

'The Trembling Truth About Earthquakes'

Congratulations on Comment and Opinion in the November issue titled "The Trembling Truth About Earthquakes."

Too many people are saying, "They can't happen here!" But they do. The Defense Civil Preparedness Agency agrees wholeheartedly with the statement that "even fewer (than 1,000) lost lives demand still more planning for better seismic safety." We are glad to see someone picking up the banner.

Also of great concern are other environmental hazards—natural and manmade—such as tornadoes, hurricanes, civil disturbances, fallout radiation, noise, etc. Attention by the architect to mitigation of these is what we call "the total-design concept of safety." That's what DCPA is all about. And it's synergic: Designing for protection against one hazard will provide protection against others.

Thanks for making the profession aware.

ROBERT BERNE, AIA
Chief Architect
Defense Civil Preparedness Agency
Washington, D.C.

The JOURNAL has made an excellent brief statement on the seismic risk that exists in California as well as in other states.

All too often, residents and experts alike do not consider areas east of California as seismically hazardous. Yet, as the editorial points out, some of the worst quakes have occurred in more of the eastern states of our country.

We appreciate your concern for obtaining increased seismic safety throughout the United States.

ALFRED E. ALQUIST
Chairman
Joint Committee on Seismic Safety
California Legislature
Sacramento, Calif.

Toward Better Health Care Facilities

I should like to make some comments on the constructive criticism in the review by George J. Mann, AIA, of *An Application of Modular Care Facilities* which was published in the October issue.

This study, initiated by the Health Services Research Branch of the Federal Health Programs Service, set as its goal "research analysis and planning processes to develop guidelines for modular production systems applicable to ambulatory care facilities."

Mann rightly states that "the government together with industry should make more effort toward following through the research projects toward the achievement of construction, operation and evaluation."

Possibilities were discussed and explorations made to continue another phase of the study toward the production of a prototype unit (initiated by government and private sectors of the medical profession and construction industry). However, the confines of any study are limited by the resources and the bounds of responsibility of the participating members, as well as the response from the intended parties involved.

The responses were far from simple and proved to be somewhat disappointing. For example, the offices of two prominent US Senators acknowledged receipt of the study with the return of enclosures of political messages. This would lead one to believe that the study was never read by either man or his staff. Both men are involved in pressing for legislation to provide the very kind of health care facilities that are outlined in the proposal.

Equally disappointing were responses from the private sector of the building industry, whose willingness was prefaced by the necessity of large orders—implying government-sponsored projects—and, conversely, their desire to work within the private sector due to fewer complications and unrestricted policy.

Until the expressed desires of the people clamor for such a concept to provide health care, the ear of the government will remain deaf, and the machinery for the necessary federal muscle in funding any operative programs will never run.

Mann's comments are well taken, and, hopefully, a counterthrust in the right direction could bring the results that he expressed so well.

ROY VOLLMER, AIA
Department of Architecture
Pennsylvania State University
University Park, Pa.

Challenge to Education

In reference to the article "An AIA National School of Architecture," Sanford R. Greenfield, FAIA, is so right: the day of the Renaissance man is *gone!*

In order for an architectural firm to provide the wide range of expertise needed in today's complex society, it must be composed of many specialists. No one man can be expected to learn these skills by the presently favored extended secondary education or through continued education. He cannot absorb the rapidly expanding detailed knowledge that he must have in order to answer society's needs. Competent professional practice today must consist of several "architects" with expertise in varied fields.

The answer to this dilemma is not so unattainable as one is led to believe. To build a curriculum to fill these requirements, a new school is needed, however. Present schools are unable to revolutionize their structure internally. They are hidebound in the traditional concept of the

Renaissance man and in the present educational process.

To provide a lower cost per student for education, one must shrink "educational time." To increase the number of students in architecture, one must offer a wide range of disciplines within this shortened timeframe.

A direct approach would be to provide a two-year basic architectural skills program. This program would run for 102 weeks. This could be a four-semester course with two weeks vacation during each semester. Basic skills and knowledge would be taught: history, drafting, mechanics, art history, architectural structures, etc.

An intensive counseling service would help direct the students into various disciplines. The two remaining years would be divided as follows: six months per year in an office which reflects the specialty that the student intends to follow and six months in school with a curriculum pointed at that specialty, which at the same time increases the student's knowledge of his total professional responsibility. In the fourth and final year, the student would prepare a thesis that would reflect his capabilities and training.

My bet is that upon graduation a productive person would result whom any office would be happy to have at a wage competitive to other fields. The system which now exists produces an unhappy graduate who must hunt for a position and accept a salary lower than most common laborers command. It is baffling that the critical problem of architectural education and subsequent competent service to the community can be so screwed up.

Although I have not gone into detail here, I would be happy to pursue the concept further with anyone—school or individual—who might be interested and capable of helping generate a movement in this direction.

JAMES E. ADAMS, AIA
Birmingham, Ala.

Male Chauvinism?

I have read the letter from David R. Braden, FAIA, in the October issue on "Jane Russell, Girl Architect."

I was mildly upset; incensed may be a better word for my present state of mind because of the attitude Braden took concerning the fact that Ms. Russell designed an apartment complex. It didn't seem to me that he was much concerned about her technical qualifications but rather her measurements. In fact, over half of the letter dealt with his romantic fantasies at a younger (or was it only yesterday?) age.

What have men to fear by accepting women as human beings instead of 36-24-36? Would Braden have been so caustic if the star had been Steve McQueen instead of Jane Russell? I think not.

I am not so blind to my own cause as to think that Braden will change, but a magazine of the renown of the AIA JOURNAL should be more sensitive to a growing number of its younger readers and participants in the field of architecture.

I am a 1972 graduate of Iowa State University, one of the few females to have been graduated from there. I was never proud of that fact, but it is the general apathy of the professional and not the instructors and classmates that has made me question the validity of an architectural career.

We don't want *your* job, Mr. Braden. We just want a job and don't want to be judged on how short our skirts are, etc.

Instead of criticizing Ms. Russell for trying to design an apartment, why not criticize the ones who have tried, failed and keep on littering our landscape with visual pollution?

JILL MORELLI
Tulsa, Okla.

I had always thought of the AIA as a professional association and of the AIA JOURNAL as a serious vehicle of information for the profession. I was disappointed to see the Letters to the Editor column used for the display of the offensive fantasies of a boy architect, or is it a male chauvinist suckling pig?

ANGELA GIRAL
Princeton, N.J.

Construction Documents Requested

The architecturally notable St. Thomas Episcopal Church in Washington, D.C., was destroyed by arson on August 24, 1970 (*see* Oct. '70, p. 10).

I am searching for additional historical data on the life and work of its architect, Theophilus P. Chandler, FAIA, who was born in 1845 and died in 1928.

Chandler was the organizer and first director of the University of Pennsylvania architectural school and the founder and president of the Philadelphia Chapter AIA.

It would be of particular historical significance to locate any of the St. Thomas Church construction documents.

Anyone who knows of historical data or the whereabouts of construction documents will be making a fine tribute to the memory of an outstanding architect and to the friends and parishioners of St. Thomas if they will let us know about them.

HARRY B. ADREON JR., AIA
901 27th St. N.W.
Washington, D.C. 20037

Symbols in Context

The "symbol IQ test" in the October issue intrigued me enough to try it. One point should be taken into consideration: When a symbol is out of context, will it read? Put numbers 17 through 26 in a hospital, and there is less doubt. But alone are they for the same purpose?

Some new symbols are appearing on Delaware highways. They at least create notice, if by nothing else than controversy. The symbols are in the new driver's manual and are an attempt to standardize regulations everywhere.

In all this modernization, we revert to "a picture is worth a 1,000 words." Is it latent respect for our elders? I am pleased with the new simplified graphic communication, even though much of it needs to be in context or a specific situation in order to be legible.

E. JEAN LANYON
Newark, Del.

Events

AIA State and Region

Feb. 8-10: North Carolina Chapter Winter Convention, Downtowner East Motel, Charlotte, N.C.

Mar. 22-23: Virginia Chapter Winter Meeting, Sheraton-Fredericksburg Motor Inn, Fredericksburg, Va.

Mar. 28-30: Michigan Society of Architects Annual Convention, Olds Plaza Hotel, Lansing, Mich.

Apr. 24-26: Wisconsin Chapter Convention, Playboy Club Hotel, Lake Geneva, Wis.

National

Mar. 19-20: AIA/Consulting Engineers Council Public Affairs Conference, Mayflower Hotel, Washington, D.C.

Mar. 21-23: Producers' Council Construction Marketing Seminar, Marriott Hotel, Chicago

Apr. 2-4: American Institute of Kitchen Dealers Annual Convention, Hotel Fontainebleau, Miami

Apr. 11-13: National Conference for the Building Team, Drake Hotel, Chicago

May 5-8: National Architectural Secretaries Association, the Hyatt on Union Square, San Francisco

May 7-10: AIA National Convention and Exposition, Brooks Hall, San Francisco (Hawaiian portion, May 11-15, Honolulu)

International

Feb. 21-24: International Building Exhibition, Exhibition Park, Toronto

Apr. 15-18: Environmental Design Research Association International Conference, Virginia Polytechnic Institute and State University, Blacksburg, Va.

June 25-Aug. 4: Oslo International Summer School in Urban and Regional Planning, University of Oslo, Oslo, Norway. Contact: Ms. Jo Ann Kleber, Administrator, North American Admissions Office, St. Olaf College, Northfield, Minn. 55057.

Awards Programs

Feb. 7: Entries due, Reynolds Aluminum Prize for Architectural Students. Contact: Mrs. Maria Murray, AIA Headquarters, 1785 Massachusetts Ave. N.W., Washington, D.C. 20036.

Mar. 2: Nominations due, Henry Hering Medal for outstanding collaboration in distinguished use of sculpture in an architectural project. Contact: National Sculpture Society, 250 E. 51st St., New York, N.Y. 10022.

Fellowships

Apr. 1: Applications due, Cintas Fellowships to young creative artists of Cuban citizenship or lineage who presently reside outside Cuba. Contact: Institute of International Education, 809 United Nations Plaza, New York, N.Y. 10017. □

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- Trends in the architectural design process
- Practice Aids: How one firm employs fast-track
- Architectural competitions in Scandinavia
- Importance of shadow in architectural photography