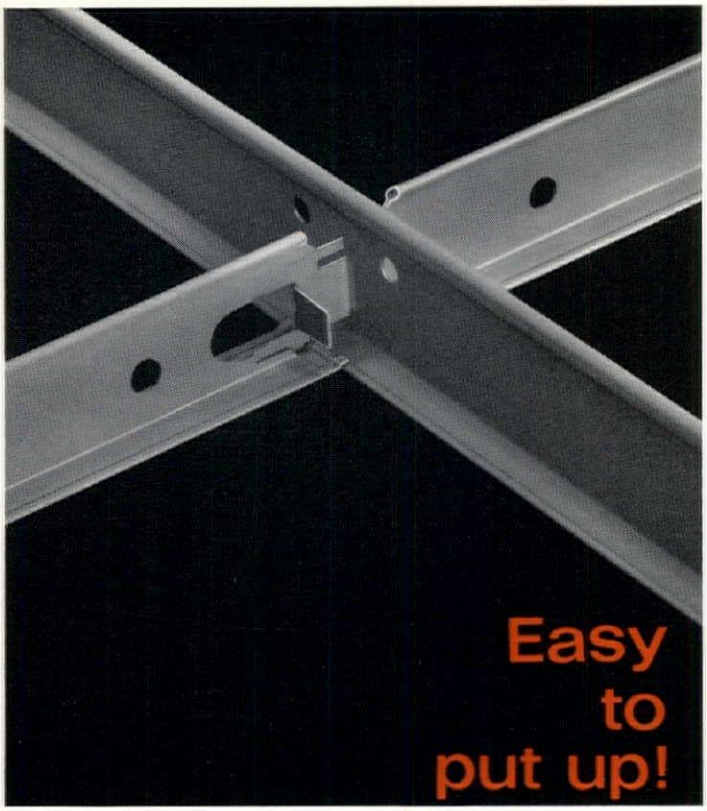
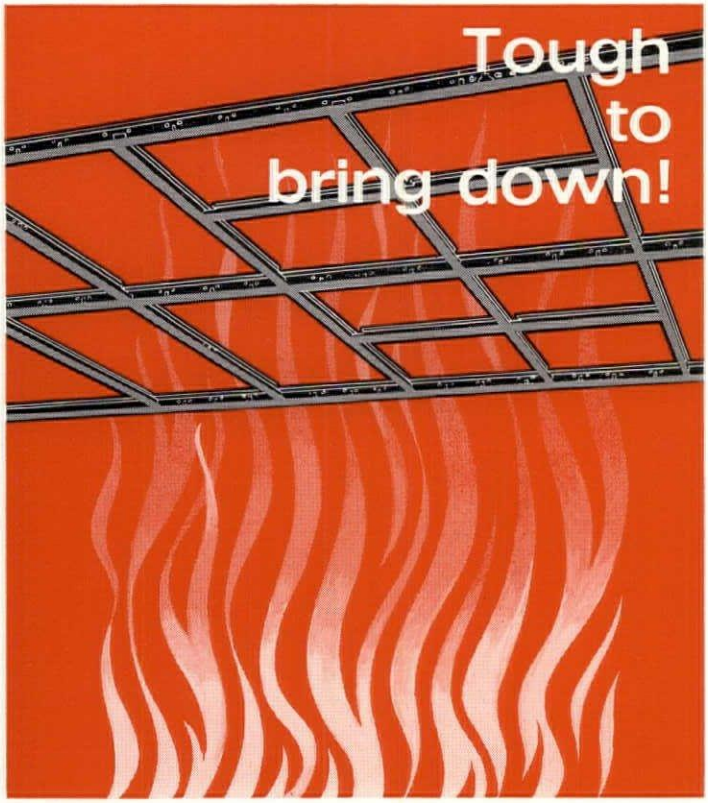
# A·I·A Journal

January 1966

*Design with a Social Conscience*

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A·I·A
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JANUARY 1966

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VOL. XLV. NO. 1



## General Articles



## Heat of Light: An Overview



## News Features



## Departments



**Cover:** From the sketchbook of H. F. P. Goeters (p 29)

# LOOKING AHEAD TO FEBRUARY

**The anarchistic architect:** Louis Sullivan sang his praises, crediting John Edelmann with inspiring his "form follows function" declaration. Sullivan once forecast he would never become the architect into which Edelmann seemed destined to grow. But Edelmann, a man of many talents and interests, addressed much of his ability and energy toward social causes. An active as well as ardent anarchist, he became embroiled in political movements and election campaigns and, in short, appears to have spread himself too thin. At least, such was the view of Sullivan. Nonetheless, this figure about whom so little is known is an important personage in the annals of the modern movement, if not for himself, for his influence on Sullivan. The "discovery" of Edelmann is a piece of fascination in itself.

**Manipulative materials:** Plastics, to be sure, have their shortcomings. To these the reader is asked to close his eyes, to focus instead on a near and highly manipulative future. This positive view of the intriguing possibilities of plastics raises expectations of a highly *plastic* architecture offering a vastly expanded range of design decisions. *Plastics in Building* discusses combinations of plastics with senior structural materials as well as laminated sandwich constructions, inflatable plastics and films, continuous sequence structures, cell-pods.

**"We didn't know it then":** So the author describes his firm's incognizant crossing of the threshold into "what is now called comprehensive services—specifically, in urban design." Setting fees in this new world was bothersome, and indeed now, nine years later, guesstimates are the most common route to fee-setting. You win some, lose some. *Contracts and Office Procedures* tells about different kinds of UD projects and services, office organization, types of contracts and fees and contract provisions.

**Habit-forming spaces:** Spatial patterns become habitual, and habits lag behind technology. Hard as it is for an architect to free himself of preconceived space arrangements, it is even more difficult for him to convince the client that another, albeit novel, set of spaces may be better. *Putting Research to Work* is a result of a study of a key hospital function, radiology.

**Sources of influence:** The wells from which the architect draws inspiration in the search for solution; the resources from which he develops the architecture of his age are discussed in *Ten Sources for Architectural Design*. The article suggests that the expression, "Art for art's sake," be replaced with, "Art as a way of life." ■

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# NEWSLINES

## Institute Issues Policy Statement

The American Institute of Architects, through its secretary, Oswald H. Thorson FAIA, has issued the following statement of policy:

As amended at the June, 1965, Convention, our Standards of Professional Practice provide:

3.1 A member shall support the interests, objectives, and Standards of Professional Practice of The American Institute of Architects.

Components of the Institute have requested us to render an interpretation of this provision of the Standards of Professional Practice. In connection therewith we have asked Counsel for the Institute to analyze the law relating to the right of members and prospective members of professional organizations to freedom of association with other professional and quasi-professional organizations. In view of that analysis, the Institute, superseding all previous statements, has determined to apply 3.1 as follows:

A. The Institute will not terminate any membership, request the resignation of any member, or take disciplinary action against any member, by reason of the fact that he is also a member of another professional or quasi-professional organization.

B. The Institute will not refuse to admit to membership any person by reason of the fact that said person is a member of another professional or quasi-professional organization.

C. No discriminatory action against any member of the Institute or against any non-member may be predicated upon membership in another professional or quasi-professional organization.

D. All members of the Institute and all applicants for membership in the Institute shall be required to support the interests, objectives, and Standards of Professional Practice of the Institute, and membership in another professional or quasi-professional organization which espouses different interests, objectives and standards shall not excuse any member or applicant for membership from compliance with this requirement.

E. The Institute is of the opinion that the best interests of our profession will be served if, as in most professions, there is one national organization, but the Institute will not interfere with the right of freedom of association of its members or prospective members with professional or quasi-professional organizations.

F. The foregoing statement of policy shall not be construed so as to render inoperative any of the other provisions of the Standards of Professional Practice or so as to excuse any member or applicant for membership from compliance therewith.

G. The foregoing statement of policy shall be applicable to all Regions, Chapters, State Organizations, and to all officers, directors, employees and officials of the Institute.

OSWALD H. THORSON FAIA
*Secretary, The American Institute of Architects*

## Convention to Act on Headquarters Site Expansion, Made Necessary by Membership Surge, Nes Says

A proposal to expand the site of the Institute's planned new headquarters—to accommodate a larger building—will go before the AIA membership for decision.

The submission of the question to the June 26-July 1 convention, as Institute bylaws require in such matters, was voted unanimously by the Board of Directors last month.

First Vice President Charles M. Nes Jr. FAIA in a news conference following the Board action attributed the expansion move to accelerated membership growth.

The winning firm in a national competition to design a smaller structure, Mitchell/Giurgola Associates of Philadelphia, will be the architects for the larger building if the Denver vote is affirmative, the president-designate said.

Nes termed the architects' original concept a "brilliant design." He added:

"If we are permitted to purchase additional land the architects will be given complete freedom to develop the best design they can."

**Membership Increase.** Asked whether arguments contending that the competition design "crowded" the Octagon House and its Georgian garden might have influenced the Board's decision, Nes conceded: "I would say that was certainly a part of it."

But the intrusion issue was characterized as minor. Nes said the competition scheme would have been carried out had not the sudden membership bulge occurred.

He noted that the Institute is growing "far more rapidly that we had any idea it would three years ago," when the building program was developed.

The membership has grown by 1300 in 11 months, a period that until recently would be expected to add 500 to 600 members. This made a "considerable difference" in projections, Nes explained.

The original building was to contain 70,000 square feet—32,000 for the Institute, 18,000 for rental and 20,000 for equipment and storage.

**Taking Own Advice.** Executive Director William H. Scheick FAIA, revealing that other Washington sites were given consideration but that none compared with the prestigious Octagon House location, added:

"Our building plans commit us to staying with the Octagon House for the extended future, and 18,000 square feet of expansion space looks very inadequate for a long-term period."

It is a matter, he said, of "our profession giving itself the kind of advice we give to clients—to look ahead to the future."

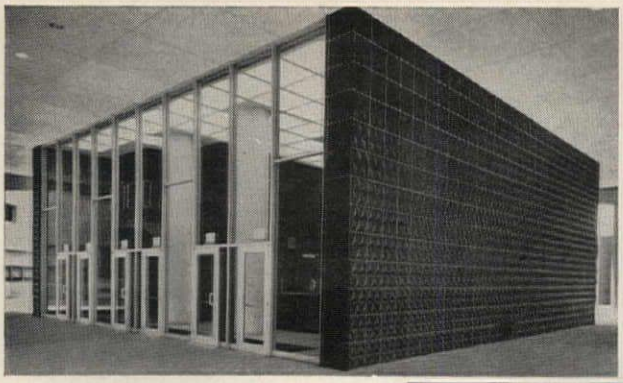
**'We Wanted Costs.'** The referendum calls for acquisition of what is known as the Lemon Building, a late 19th century structure flanking the present headquarters and fronting on New York Avenue.

The Lemon site contains 11,240 square feet which when combined with the original buildable area yields a total of 29,460. Zoning standards would allow 162,030 square feet on such a site.

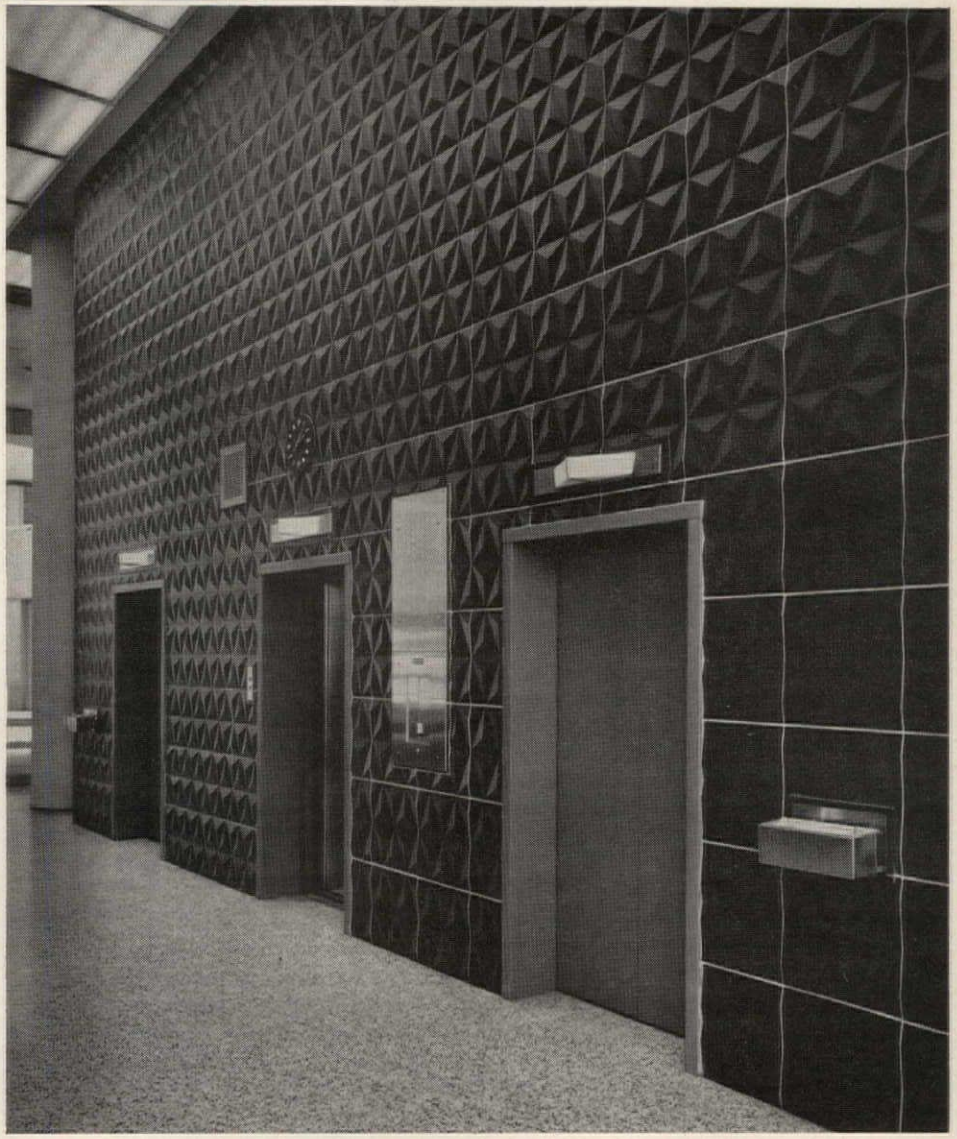
Nes, however, spoke in terms of 130,000 square feet, selecting for discussion purposes the median of several floor areas stemming from recent Mitchell/Giurgola studies.

The studies were not, Nes emphasized, aimed at a new design.

*Continued on page 8*



*Middlesex County Office Building, New Brunswick, N.J. Merchant & Seidel—architects. Gumina Building & Construction Co.—builders. Sculptured Pattern FS-100 in 1½" units 18" x 18" was specified in matte black for exterior facing at promenade and for interior facing in lobby and stairways.*



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**Newslines** *from page 6*

"We wanted costs, not designs."

With membership approval (requiring a two-thirds affirmative vote) the Institute would raze the five-story Lemon Building and proceed with construction.

**More Space, Better Space.** Meantime, no further development of plans will be undertaken by the architects pending convention action, Nes said.

Nes said the expanded site would not only allow for a building with more space but "far better space." It also permits a larger garden.

The size of the building will be determined by the Institute, he said. The rest is up to the architects, and this, he commented in responding to a reporter's question, includes the building's relationship to the garden.

Scheick, commenting on the possible acquisition of the Lemon property, said, "We think we have an understanding with the owners that will reach a mutually satisfactory conclusion."

The property, owned by the Emergency Hospital Association, has figured in AIA plans before. The 1963 convention produced a proposal to buy it through membership contributions, but pledged funds fell short.

The estimated cost of the new headquarters as originally planned was $1,450,000 with another $30,000 allocated for sculpture or other fine arts.

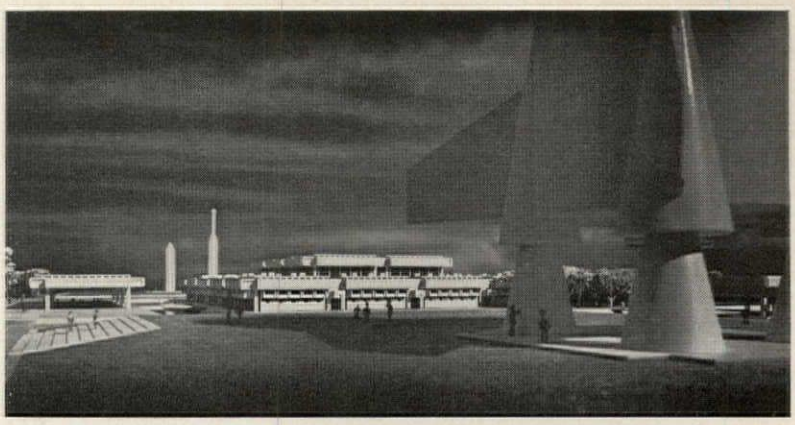
## Writings in Design Field Bring Honors to Three

Three writers are the winners of the 1965 Kaufmann International Design Awards.

They are Christopher Alexander of Great Britain and Ada Louise Huxtable and Lewis Mumford of the United States.

The awards carry no cash prize, but the writings of the three will be published in a special book. Mrs. Huxtable is with the *New York Times;* Mumford's cited writings were published in *Daedalus* and *Technology and Culture;* and Alexander wrote a magazine series, "A City Is Not a Tree," challenging some urban design ideas.

The awards by the Edgar J. Kaufmann Foundation of Pittsburgh honor the writers for "the most effective statements dealing with the field of design, published in periodical or occasional form within the past five years."



**The winning design for information unit at John F. Kennedy Space Center in Florida. At rear of building is bus station for visitors, expected to flood base.**

## Becket Podium Entry Wins Invitation Competition For Information Building at JFK Space Center

Welton Becket & Associates has won the invitational design competition for the Visitor Information Center at John F. Kennedy Space Center.

The Becket office was selected for the National Aeronautics and Space Administration project from among five firms asked to compete.

Submissions were examined by a panel that included Arthur G. Odell Jr. FAIA of Charlotte, N. C., and Hugh A. Stubbins Jr. FAIA of Cambridge, Mass.

Provisions for orderly expansion of the Visitor Information Center without interruption of the visitor program and for maximum flexibility of use were cited by NASA as major reasons for picking the Becket design.

**Set on Island.** The Becket entry is placed on a 400 by 400-foot podium set on an island for the purpose of establishing scale and defining the site and is fronted by a 250 by 500-foot reflecting pool.

Single-story initially, the structure will present reinforced, textured concrete columns and beams with an exposed waffle slab concrete ceiling, all organized into a series of 48 by 48-foot modules.

The initial phase, cost of which will approximate $1 million, will arrange eight modules around a central courtyard, providing a total of 20,000 square feet.

**Bronze Space Age.** Precast concrete window mullions, sunshades and wall panels will form exterior walls and all glazing will be bronze tinted glass in bronze-anodized aluminum frames.

The entry was selected over those of Norman Giller Associates, Miami Beach; Charles Luckman Associates, Los Angeles; Herbert H. Johnson Associates, Miami; and The Architects Collaborative, Cambridge, Mass.

The visitor information center on Merritt Island, adjacent to Cape Kennedy, is expected to draw 3 million visitors yearly by 1970. It includes five major areas for exhibits, an auditorium, canteen, administrative offices and other visitor facilities in addition to providing loading facilities for escorted bus tours of the space center.

## Task Force Appointed To Lead Ugliness War

A task force of four architects on Jan. 1 took over the conduct of the "War on Community Ugliness" which the Institute is waging through its 161 chapters.

Serving on the force, which is relieving Robert L. Durham FAIA of Seattle, are Willis N. Mills FAIA of Stamford, Conn. chairman; George Rockrise FAIA of San Francisco; Kenneth W. Brooks of Spokane, Wash.; and Richard W. Snibbe of New York.

Durham asked to be replaced as "general," a role he filled since the war's start, because of the press of other AIA responsibilities.

He is an Institute vice president and chairman of the AIA Council on Commissions, a new name given to the former Committee on Committees by the Board of Directors last month when the task force was named.

Other personnel changes:

Mills was also named chairman of the Commission on Architectural Design, replacing Durham, and Philip J. Meathe of Grosse Point

*Continued on page 10*

**Newslines** *from page 8*

Park, Mich., was added as a member. Charles Blessing FAIA of Detroit retains his commission seat.

Daniel C. Cowling Jr. of Little Rock, Ark., was named new chairman of the Commission on the Professional Society, succeeding Robert H. Levison of Clearwater, Fla., who will remain a commission member. Bernard B. Rothschild of Atlanta, was appointed the third member.

The Commission on Education and Research will be headed by Walter Scholer Jr. of Lafayette, Ind., replacing James M. Hunter FAIA of Boulder, Colo., who remains on the commission along with Donald Q. Faragher FAIA of Rochester, N.Y.

David N. Yerkes FAIA of Washington, D. C., was named to the Commission on Public Affairs, which is led by Llewellyn W. Pitts FAIA of Beaumont, Tex. Third member is C. Day Woodford FAIA of Los Angeles.

## Suburbs No Longer Sub, Statistically Speaking

Suburbs are no longer subs.

The Urban Land Institute estimates the nation's suburban areas reached a population of 68 million in 1965, compared with 61 million for central cities.

In 1960, central city population stood at 58 million, compared with 55 million for suburban rings. The suburban buildup is expected to continue, according to ULI, a private, nonprofit research organization in the field of urban planning and development.

## Yerkes Heads Panel For Honor Awards

David N. Yerkes FAIA of Washington, D.C., has been named chairman of the AIA's 1966 Honor Awards Jury.

The other four members are O'Neil Ford FAIA of San Antonio, Robert G. Cerny FAIA of Minneapolis, George T. Rockrise FAIA of San Francisco and Benjamin Thompson AIA of Cambridge, Mass.

Willis N. Mills FAIA of Stamford, Conn., will serve as adviser. He was chairman of the 1965 jury.

Judging will be held March 3-5 at AIA Headquarters and awards will be announced at the Institute's 98th annual convention June 26-July 1 in Denver.

## Planned City Underway Near Los Angeles

Another new city is being born. Valencia, Calif., figured to have a population of 250,000 in 25 or 30 years, is 30 miles north of Los Angeles.

Under development at present is a 4,000-acre portion of the 44,000-acre Newhall Ranch.

It will include housing and recreational facilities for 30,000 people, schools, churches, a 600-acre industrial center and the nucleus of a high-rise central city.

Work on the industrial center already has begun. The first houses are scheduled for completion late this year.

The master plan was prepared by Victor Gruen Associates. Supervision of all planning and architecture is under the direction of Thomas L. Sutton Jr. AIA.

## Competition Seeks Design With Fallout Provision

The Department of Defense has authorized a national competition for the design of a community center incorporating a fallout shelter.

The competition, conducted by the AIA at the request of the Office of Civil Defense, is open to architects and engineers registered in the United States and to faculty members and graduates of accredited architectural and engineering schools.

Prizes total $55,000.

Because of the scope of the design problem, architects and engineers were encouraged to work together as design teams in preparing entries.

March 1 is the deadline for obtaining programs and registration forms, available from A. Stanley McGaughan AIA, professional adviser, National Fallout Shelter Design Competition-Community Center, 1341 New Hampshire Ave. N. W., Washington, D. C. 20036.

*Continued on page 14*

## Chapter Improves Its Own Environment

Its handsome new offices will enable the Chicago Chapter AIA "to match the vitality of the city in increased chapter services to the public and to the architectural profession," in the words of President Walter H. Sobel.

Located in the US Gypsum Building, 101 S. Wacker Drive, the quarters were designed by Brooks Buderus, Coder Taylor and Derald West, all AIA members.

The quarters include a conference room, executive office, reception area, clerical work space, library and storage areas.

The Chapter, which numbers more than 700 architects and associates, said the expanded facilities will help to establish improved liaison with government and greater collaboration with other building industry groups.


**Entry, right; conference room, below.**

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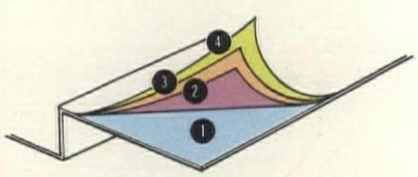


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**Newslines** *from page* 10

## Rapid Transit Conference Set for Pittsburgh

With 42 US cities and urban regions actively engaged in seeking answers to transit problems, the first International Conference on Urban Transportation, to be held in Pittsburgh, Feb. 1-3, will be timely indeed.

While the program for February conference, which will be headquartered in the Pittsburgh Hilton Hotel, apparently will emphasize financing techniques and technology, the design professions have been showing an increased concern for the esthetics of rapid transit systems. One such recent meeting was held in Washington, D.C., which has studies underway for its proposed subway.

Donn Emmons AIA, consulting architect to the San Francisco Bay Area Rapid Transit District, said:

"Basically a new system—to successfully compete with the automobile—must be fast, efficient, convenient, attractive and comfortable. It must enliven the communter's spirit and not be the twice-daily nightmare that most existing transit offers. The stations must be handsomely designed and fitted into the fabric and scale of the community.

These more abstract values must not be pushed aside by the great and pressing engineering problems that are the guts of the system."

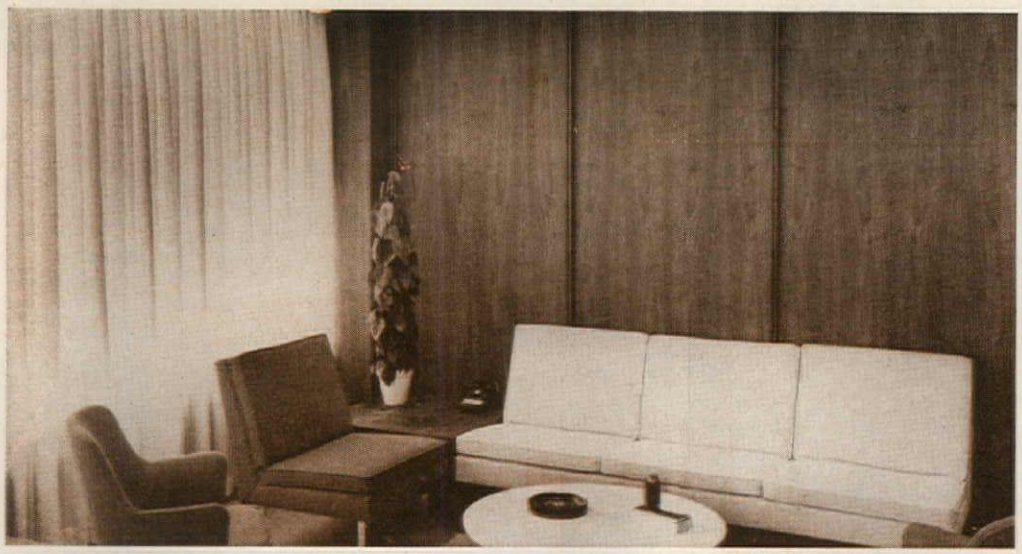
Louis J. Bakanowsky of Cambridge Seven Associates, Inc., consultant to the Massachusetts Bay Transportation Authority, and John I. Williams, the latter's transportation planner, described the planning and design concepts being used in Boston's revamped system as well as in the much heralded Stockholm subway.

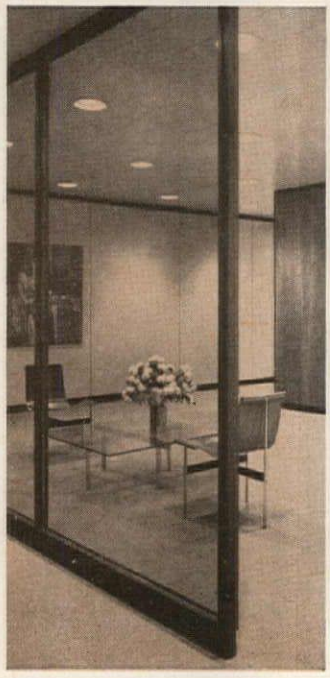
Administrator Walter J. McCarter represented the National Capital Transportation Agency at the symposium, sponsored by the Washington Gallery of Modern Art.

At its conclusion, moderator Robert J. Piper AIA, who heads the Department of Professional Services, reminded his listeners:

"If at some future time we have occasion to look back in anger at disappointments found in the design of our transit system, it ought to be remembered that on a November evening in 1965 we held in our hearts and minds the initiative and resolve to make the design something special."

*Continued on page* 20





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# CALENDAR

**Jan. 19-22:** Second Annual Redevelopment Roundtable, ACTION Council for Better Cities, Hawaiian Village Hotel, Honolulu

**Jan. 27-30:** Society of Architectural Historians Annual Meeting, Americana Hotel, New York

**Jan. 31-Feb. 3:** American Society of Concrete Constructors Convention, Del Webb's Townehouse, Phoenix

**Feb. 2-6:** Cellular Concrete Association Annual Meeting, Alffer Hotel, Mexico City

**Feb. 21:** Mason Contractors Association of America Convention, Washington

**March 21-24:** Industrial, Institutional and Commercial Building Exposition and Conference, Public Auditorium, Cleveland

**April 23-30:** Historic Garden Week in Virginia

**April 26-28:** National Conference on Religious Architecture, San Francisco

**May 8-12:** ASLA Annual Meeting, Yosemite National Park, Calif.

**May 15-21:** Mid-Pacific Conference on Landscape Architecture, Hawaiian Islands

**June 26-July 1:** AIA Annual Convention, Denver Hilton Hotel, Denver

*AIA Committee and Related Meetings*
*(At the Octagon unless otherwise noted)*

**Jan. 10-11:** Architectural Education Conference, Lexington, Ky.

**Jan. 11:** Committee Chairmen

**Jan. 11-13:** "Grassroots" Meeting

**Jan. 24:** Education

**Jan. 30-Feb. 1:** "Grassroots" Meeting, Bel-Air East Motor Hotel, St. Louis

**Feb. 3-5:** "Grassroots" Meeting, Mark Hopkins Hotel, San Francisco

**Feb. 11:** AIA-AGC Liaison Commission, NSPE Headquarters, Washington, D. C.

**March 3-5:** Honor Awards Jury

**March 4:** Interprofessional Commission on Environmental Design

**April 7-19:** Jury of Fellows

*Tours*

**Jan. 22 and March 26:** Architects' Trek to the Treasures of Egypt and the Middle East. January—22 days, led by William W. Eshbach FAIA; March—22 days, leader to be announced. Contact: United States Travel Agency, Inc., 807 15th St. N. W. Washington, D. C. 20005.

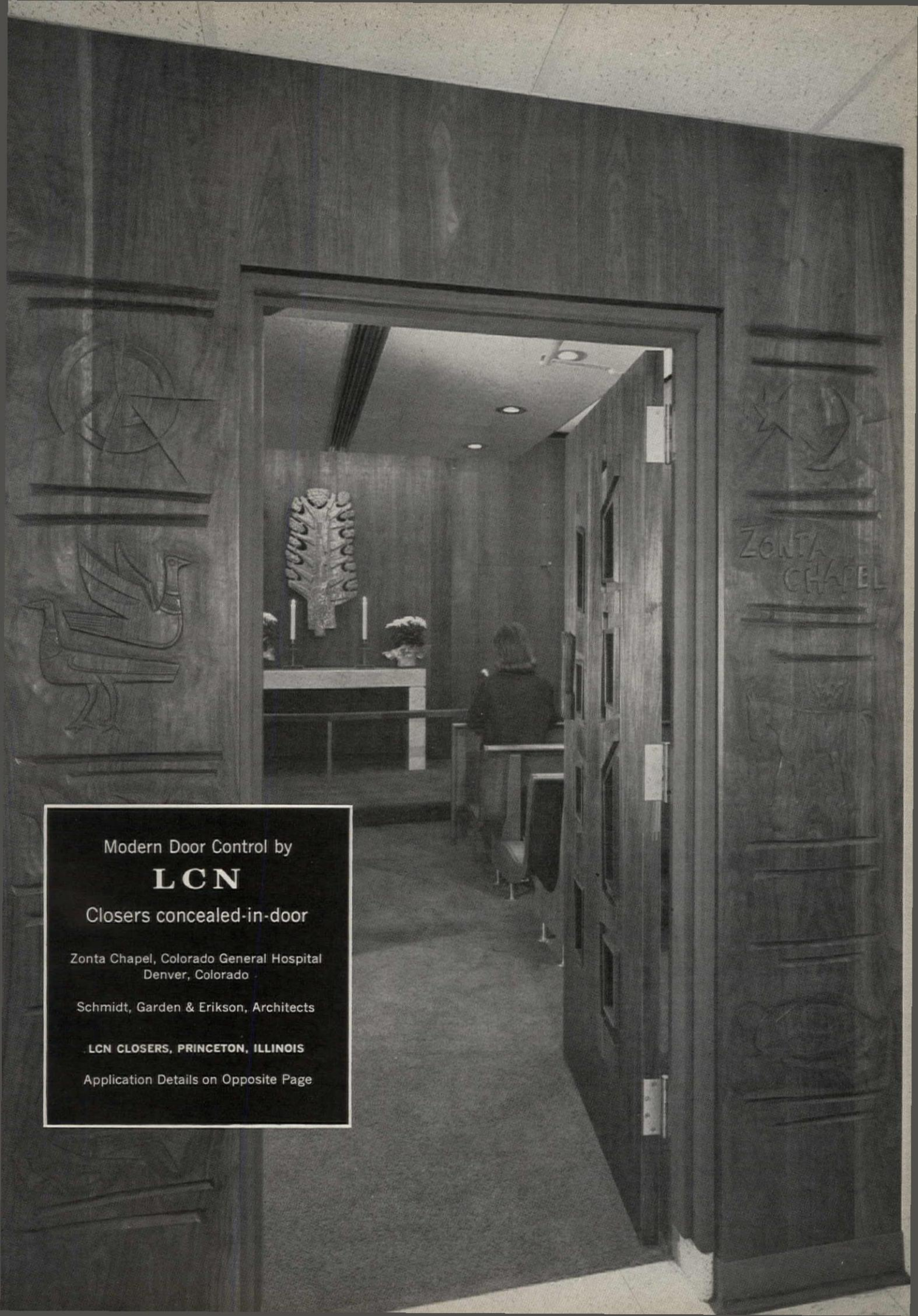
**Feb. 13 and Oct. 9:** Mexican Architecture and Interior Design Seminar-Tours. Two weeks each. Contact: T. H. Hewitt, Apartado Postal 5-251, Mexico City, D. F.

*Competition*

**March 1** (registration): Design of community center incorporating fallout shelter. Contact: A. Stanley McGaughan AIA, Professional Adviser, National Fallout Shelter Design Competition-Community Center, 1341 New Hampshire Ave. N. W., Washington, D. C. 20036.

*Awards Program*

**Jan. 21** (nomination form): R. S. Reynolds Memorial Award. International. Contact: AIA, 1735 New York Ave. N. W., Washington, D. C. 20006. ■

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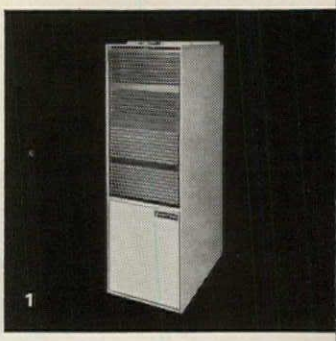
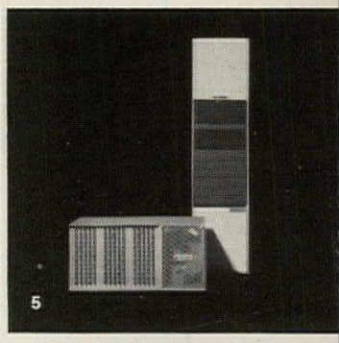
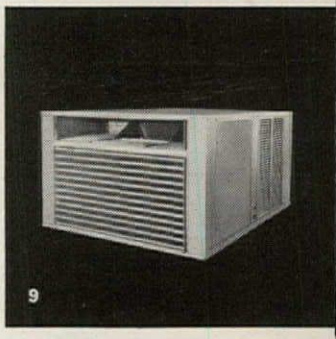
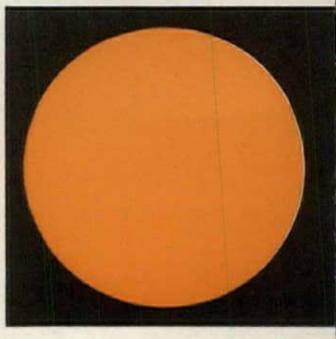
Application Details on Opposite Page



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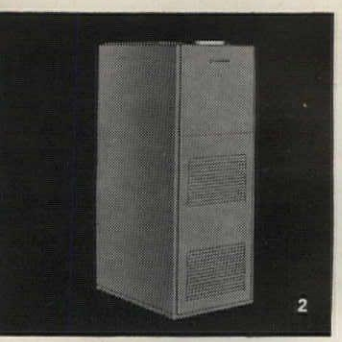



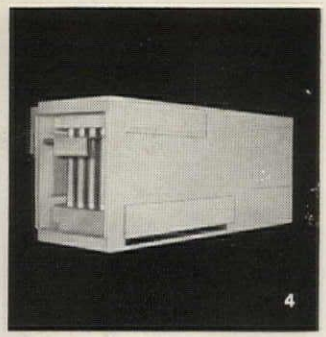


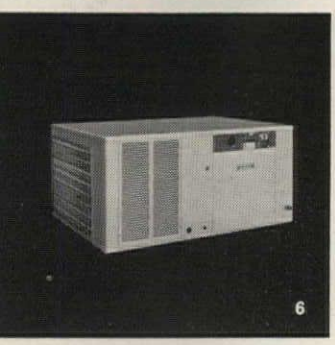


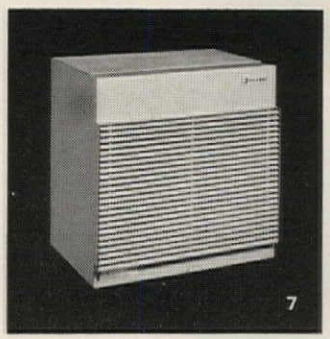


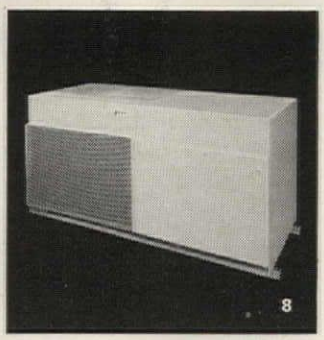





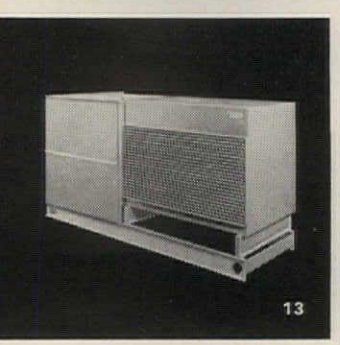


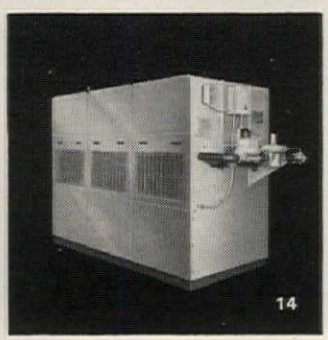


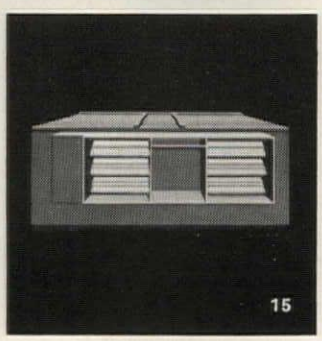


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**Newslines** *from page 14*

## AIA Approves AAA as Building Disputes Ump

Approval of a document making the American Arbitration Association the umpire in construction industry disputes has been registered by the AIA Board of Directors.

The approval, given by the Board at its winter meeting last month, is subject to the final review of legal counsel and the similar approval of other organizations involved.

These groups are the Associated General Contractors of America, the Consulting Engineers Council, the Council of Mechanical Specialty Contracting Industries and the National Society of Professional Engineers.

The Board also approved a collaboration guide aimed at promoting greater understanding among segments of the building industry in the interest of achieving the best environmental design.

An industry task force which prepared the guide said a merging of services through collaboration among design professionals is required to meet advancing environmental standards, to solve the complicated design problems of contemporary projects and to produce unified and harmonious results.

The document was authored by representatives of the AIA, CEC, NSPE, American Institute of Planners, American Society of Civil Engineers and American Society of Landscape Architects.

## Architectural Historians Pass Quarter Century

For the Society of Architectural Historians, 1965 was a silver anniversary year.

The history of the "Historians" started in 1940 when they were organized at Harvard University. The Society distributed its first mimeographed *Journal* in January 1941 to a membership of 25.

Today it boasts some 2500 members, a professionally printed quarterly magazine and a newsletter.

Turpin Bannister FAIA, dean of the College of Architecture and Fine Arts, University of Florida, was the first president of the SAH and served as editor of the *Journal* until 1945-46.

The Society, originally named the American Society of Architectural Historians, dropped the "American" from its title in 1947, partly in response to its having become somewhat international.

The group instituted its August tours in the early 1950's with trips to Nantucket and Martha's Vineyard. Later tours ranged farther afield, recently as far as Ireland, Denmark and Greece.

Annual meetings provide SAH members with a popular winter break. Meetings are generally held in conjunction with those of the College Art Associations. Meeting locations are selected for their architecture and museums.

## Philadelphia Hosts First Urban Design Seminar

The "how" of urban design underwent intensive study in "UD/East," a three-day workshop sponsored by the AIA Committee on Urban Design and the Philadelphia Chapter AIA.

Architects attending appeared to view the workshop as well worth the time and registration fee; several were particularly pleased that discussions went beyond esthetics to the politics and economics of urban design.

The Philadelphia seminar was the first in a series of three-day Urban Design Workshops. Subsequent sessions are being planned for the Midwest and West.

Covered in Philadelphia was the new town of Reston, Va., and the Lenox Square Shopping Center in Atlanta. Boston also figured prominently in discussions. Edward Logue, head of that city's redevelopment authority, told how his staff works with a committee of well-known architects who donate their services toward good planning. He told also of strong feelings:

"We cannot tolerate planners who plan without regard for the political situations, or architects who design without regard for the total economic, social and political fabric of the city."

If the November workshop had a weakness it was—ironically—the panels concerning the host city. Despite polished presentations, the Philadelphia story was just too familiar, and the evolution of Penn Center and Society Hill held few surprises.

But at least one observer saw merit in repeating the account of a renewal effort in which, step by step, the impact on the city as a whole was carefully considered in its various ramifications.

## Mrs. Saarinen Views Arch Unprepared for Impact

Mrs. Eero Saarinen, commenting on the 630-foot stainless steel Gateway Arch, key symbol of the Jefferson National Expansion Memorial in St. Louis, termed it beyond anticipation.

"Nothing can prepare you for its impact," said the widow of the designer. "The structure seems to be springing out of the ground.

"It's like Gothic architecture in this way," Mrs. Saarinen explained. "Both give a sensation of soaring upward—it's the same unity of the structural and the esthetic.

"My husband felt that all our great monuments have had simple geometric shapes—the Washington Monument, a vertical line; the Lincoln Memorial, a cube; and the Jefferson Memorial, a globe."

## 'Operation Grassroots' Gets off the Ground

A feedback program of the Institute called "Operation Grassroots" gets underway this month.

Grassroots will provide a forum in which the AIA can explore its programs, policies and objectives with the presidents and executive directors of state organizations and state-wide chapters.

Three meetings—Eastern, Central and Western—are scheduled with the first, the Eastern, set for Washington, D. C., Jan. 11-13.

The program replaces the separate meetings of the presidents and executive secretaries at the Octagon.

Robert H. Levison, chairman of the Commission on the Professional Society, said the sessions have been arranged to allow ample time for questions and discussion.

The meetings will be conducted by Vice President Robert L. Durham FAIA, the chairman or a member of each of the five commissions, the executive director and other headquarters staff, Levison said.

Following the Washington session, for Michigan, Ohio, New York, Massachusetts, Pennsylvania, Maryland, Georgia and Florida, will be the Central meeting in St. Louis, Jan. 30-Feb. 1, and the Western in San Francisco, Feb. 3-5.

Central is for Alabama, Illinois, Indiana, Kentucky, Minnesota, Tennessee, Louisiana and Texas, and Western is for Arizona, California, Nevada, New Mexico, Oregon and Washington.

*continued on page 22*

A·I·A Journal

# Design with a Social Conscience

FIVE PROFESSIONALS with a common interest in the complexity and excitement of urban living and a desire to work on some of the attendant problems came together as a study group in the fall of 1964. The team consisted of Dr. R. M. Dunham, a psychologist (PSY); Elaine Maas AIA, a graduate student in sociology **(SOC);** Joseph Goeters, a computer systems analyst **(COM);** Keitt C. Barkley, an architectural designer **(DES);** and H. F. P. Goeters AIA, an associate professor of urban design, University of Notre Dame **(ARCH),** who comments:

"Our first aim was to see if we could communicate our particular view of the urban milieu, and then if we could find something worthwhile for architecture in current psychology and sociology. We began by recognizing some of the characteristic social problems that originally helped to inspire urban renewal programs. We thought particularly of the situation people in a blighted area face in meeting society's requirement for social competence and of the questions concerned with social responsibility.

"We knew that conditions such as delinquency have been found to arise where there is not an atmosphere of cohesiveness in which the individual can express his sense of belonging, of identity. We also know that the development of individual competence, whether as social maturity, intelligence or some other form, is enhanced by exposure to a variety of stimuli. Our design, then, would be to encourage the cohesiveness of the neighborhood and to provide a diversity of experience, primarily visual and social, suitable to arouse the participation of the community's youth.

"The Louisville Urban Renewal Competition was chosen as a study model because it was at hand and had sufficient 'reality' as a problem to satisfy our need for a subject. [The submission which materialized did not survive the first stage, and publication of portions of it here is done solely in terms of its interesting approach and in no way is to be construed as an attempt to second-guess the jury.—Ed.]

"The group met four times during a four-week period in sessions of from 1½ to 2 hours each. Then for 10 days beginning with the last meeting, four designers—Kenneth S. Carbajal, James Hagan, Marvin King and C. R. Sundin—joined Barkley and this writer in assembling a specific project.

"We were all instinctively suspicious of group action and consciously tried to function as a creative unit. During the first meeting, the conversation ran at fever pitch, while the shared attitude seemed positive that there was a strong undercurrent of doubt as to what, precisely, we were doing. This was confirmed at the next session, but we agreed we could continue to a total of four meetings and decide in retrospect what we were attempting to accomplish. We did state one overall objective: to formulate social science principles that yield design principles."

The edited transcript of the meetings, illustrated by a number of the resultant sketches, reveals how the group functioned and what it did in fact achieve. As for conclusions relating to the merits of this interprofessional effort, each reader can draw his own.

## MEETING 1

**COM:** In New York, you might have an ultra-high rental property next to a slum area; every other block seems like a different environment. But in Louisville, this might be completely unacceptable.

**ARCH:** Many schools in Houston are designed very much like jails in the sense of making them destruction-proof. My suspicion is that somewhere you cross a line and start defying people to destroy the school *because* you've made it impregnable. Dunham, how would you react to the idea of building a school the way you build a house?

**PSY:** If there is a psychological answer, it would be in the form of a question: Do you have any reason to think that making a *secure* environment will lead to less destructiveness than making a vulnerable one? I don't know of any good reason to think that the cash loss would be less. I have just encountered a related situation. One of my graduate classes is learning to deal with small children and their parents. One pair of students is observing two approaches as regards three-year-olds. In one case, the family has followed what amounts to the school-system policy—keeping everything destructible out of the child's reach, filling the house with old, hard-wearing furniture. This works in a way, but the characteristics of the family become a little bleak. The real problem arises when the child goes elsewhere. The other family puts away only its most fragile possessions, and maintains the point of view that the child needs to learn something about self-restraint and the value of things. So the atmosphere is a bit more comfortable. I don't know for sure whether the total cost in one case is less than that in the other.

**DES:** Could we take the family analogy and relate it to communities, as you have taken a problem in the schools and related it to the home?

**PSY:** What you're saying is consistent with what's been written on maintaining discipline within a community—a sense of what is right, the idea that the family values should pervade throughout.

**SOC:** You mean to take the family as a prototype and work from that?

**PSY:** This isn't the way it's usually expressed, but I think it's as good a way as any other; that is, you want a community as well as a family to be characterized by responsibility and also warmth, security, creativity, etc.

**DES:** You described one family's house as being bleak. Physical things can be quite bleak, and yet the family can be quite warm.

**PSY:** It *can* be, but this hasn't been our experience in going into these homes. It's been as though the walls reflected the family characteristics.

**DES:** In urban renewal projects, we are continually confronted with the idea that these are communities of individuals who want to feel they are responsible for their existence. There is always the problem in a large complex of finding some way for these people to do things that are creative with their environment, rather than just occupy space. After all, a standard apartment is a minimal thing. Take artists as an example; they occupy loft space and make it a great place to be in. How about loft space as a part of our solution?

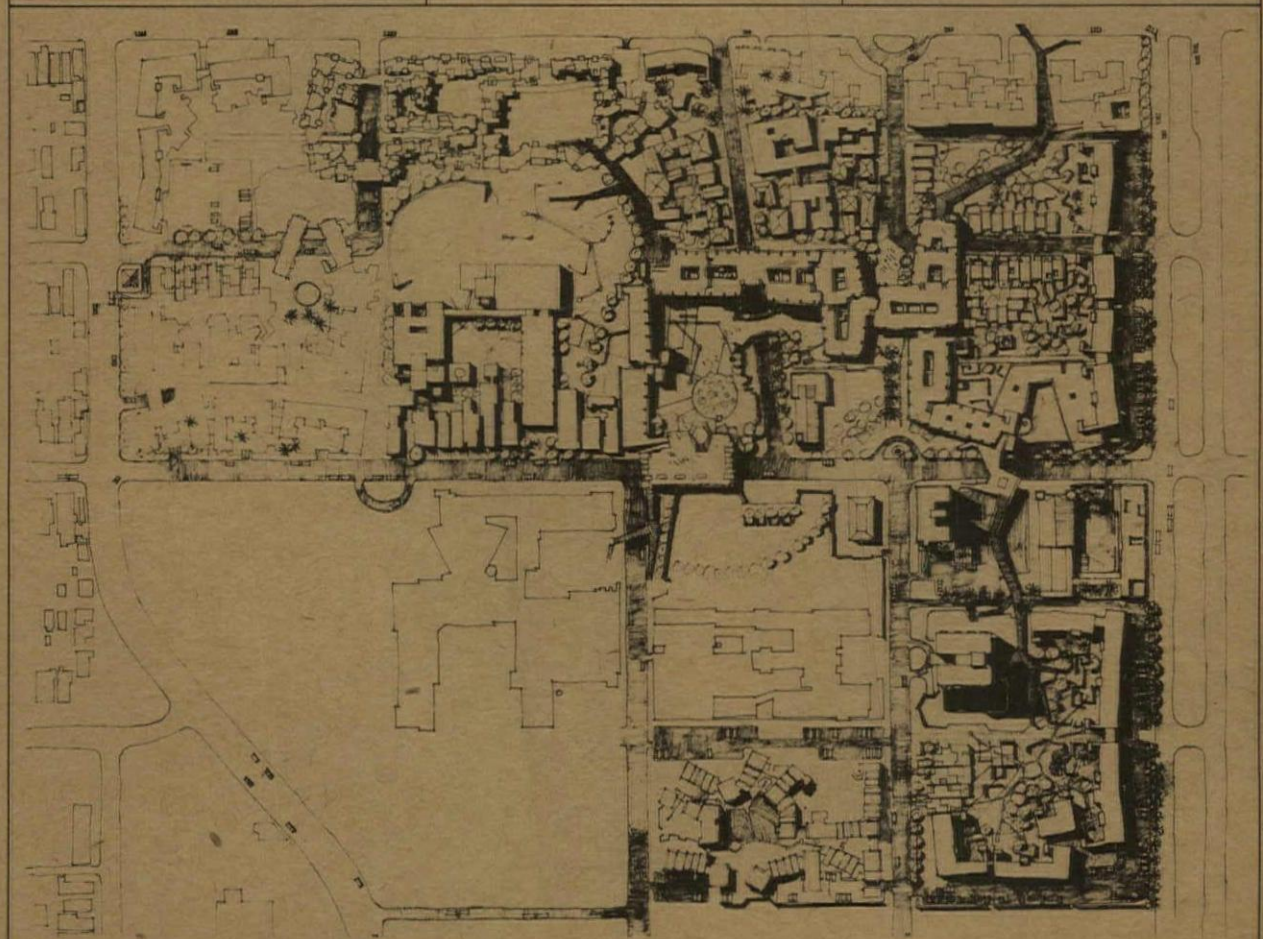
.....What's the difference between making something yourself and going out and buying something you like?

**SOC:** You mean that the more that people participate in a thing, the more they will feel involved.

**PSY:** That's a stimulating idea. You go to the downtown area with the general notion you don't touch anything, you don't move anything; if you buy something, you can take it.

**DES:** What tore me up was that we took out our Farmer's Market. It was a wonderful urban thing, it smelled; you could touch the fruit and vegetables, watch men work. But what did they do? Moved it to the suburbs.

**PSY:** I wonder if you couldn't build something like that back into downtown. Suppose you were to build a concrete structure in the form of a progressively steeper ramp (appropriately cuved on the sides so that small children couldn't fall off). I would like to know what would happen with such a thing.



**SOC:** You mean the people wouldn't touch it?
**PSY:** No! I bet every kid in sight would want to see how high he could climb.
**DES:** A local architect built a school with an arched concrete canopy. Of course, the problem was that the kids would get on their bikes and ride all the way over it.
**PSY:** That's the point: Was it a problem?
**ARCH:** Most of us are now mobile enough so that contrast could be pretty exciting, if the contrast were enjoyable in both extremes; that is, if you didn't flee the downtown to get to the country but would occasionally flee the country to go downtown—because there was excitement there that was nowhere else.
**SOC:** This idea of complexity and diversity seems to be the key to a lot of things. Scientifically, people are always trying to classify phenomena—what is it that all of the things downtown have in common? They all serve a public order rather than an individual one. There are varieties, but they are all phenomena of the same class. For example, there are no single-family residences. So you really don't have diversity of classes—only variety within the class.
**PSY:** I want to mesh two ideas that all of you have come up with thus far: that what characterizes New York is the location of an old house next to a high-rise apartment, and that in the downtown area a special atmosphere can be created. Isn't it possible to incorporate these ideas in a place like this? Suppose one of vour principles is: The first step will be to examine the area and see which structures are viable and which ones have character—even if it's an unpleasant character—worth preserving.
. . . . Another thing I have been thinking about building into the downtown area is sharp contrast. Suppose you were designing a neighborhood branch bank—a drive-in on the bottom floor; a main banking area with no walls on the second, with radiant heating and wind control by some system of louvers; and, by using the new system of lighting and temperature control that is available, create a dining terrace on the third floor that is invisible from the ground.
**PSY:** And one of the old houses could be remodeled into a rathskeller.
**DES:** You know a group had to exist before you could get a place like 10th Street in New York; you don't just provide the spaces for something like that. Down the street on 14th—it's the same street really without the people there.
**ARCH:** But this isn't like the infinite number of monkeys writing the New Testament. What happens is you provide an environment that will accept this; provide it in a hundred places, and one of these becomes 10th Street. You don't have to develop the design so far that you say the rathskeller is going to be here. You should provide an environment that will allow for diversity and you'll get some, though possibly not the diversity that you planned. Without the village you wouldn't have 10th Street—but what happens there couldn't happen on Park Avenue.
**DES:** In other words, you can plan for things that don't have to happen but *might* happen. In group action, though, it seems like an awfully hard thing to plan for. I can see planning for things that create a tactile environment, but I can't understand—except for loft space perhaps.
**ARCH:** I would like to make a point here for the group vs. the individual approach. No matter how much we concentrate on diversity, we will approach the limit of the individual's concept. It will be, as was said earlier, diversity within a class. It will be the diversity within his rational ability to think. Where the individual might take the idea of loft space and make it a

design scheme, for a group it would become part of a thing for which the scheme was never discovered until it was finished. For instance, trying to state the *scheme* for the village amounts to describing the village.

## MEETING 2

**ARCH:** I would like to attempt a statement of our general goal: to uncover social science principles which will yield design principles. And I want to add an aside. I am very wary of this becoming list-making, having fallen victim to such a procedure once before. At least as far as the individual is concerned, all of his ideas of diversity seem to fall, as Elaine would put it, into one class.
**PSY:** Are you saying that somehow completeness destroys the individuality of the project?
**ARCH:** I am saying that by being too rational we could even destroy some of our principles.
**SOC:** Since this is a competition to design a housing area for a city, shouldn't we know whom it is for, what economic and ethnic groups will be living here? Or are we looking for principles that are true for all people all of the time? I think it is important to make something explicit here; that is, that if as a group we are only discussing how *we* would like to see a city or area designed, this is all right. But the idea needs to be made emphatic, for then you realize it is *our*

values we are discussing and not necessarily those of the people who may in fact be occupying the area. We are simply talking about a place *we* would like to live in.
**ARCH:** Can't we give our project a highly special character, just as the village has a special character?
**DES:** But not like the village.
**ARCH:** Right, but just as unique. The normal developer chooses from among given stereotypes. I don't think we should fall into the same trap. What we do here should be unique and to some extent unpredictable.
. . . . . What I'm saying is that if I were building a house for a client I didn't know, I wouldn't make it an anonymous house. I would make it a very strange house and let someone who liked that kind of thing buy it. Let's put forth all of the hopeful ideas we have for a place like this, and let them sort of roll around and see what happens, instead of trying to state first what we will or won't do. Let's think of things we might do, and maybe from this we can develop principles. A principle is an abstraction of choices, and I'm afraid if we state our principle in a certain way, we immediately limit our number of choices more than we actually wish.
**SOC:** I have read that people need an image, need to have something physical that marks the boundaries or the structure of their cities; that people want something they can identify with.
**ARCH:** This is a rationale for the megastructure. Perhaps we could accomplish this the same way be paving all the streets with cobblestones and lining them with street lights and trees so that the minute you step on the

cobblestones, you are home—your neighborhood.

**DES:** This sounds like picking out all the colors for an office building, picking each one in good taste.

**ARCH:** You know how it is when you are driving around town, and one house seems to stand out as being nicer than the rest. When you look carefully, you realize that what distinguishes it is someone's good taste in the selection of materials and colors.

**DES:** On the funny little street where I live, there is a house that is sky blue with red planters. No discriminating person would have selected that color, but I like it.

**ARCH:** I was suggesting a way to establish an identity for an area.

**DES:** To take a negative point of view, there are many areas in New York with a strong physical identity that are unpleasant, and there are some other areas with no apparent physical identity that have a strong social identity.

**COM:** Do you know where Murray Hill is in New York? The only way it can be identified is on a map. In going through or driving by, it is just like any other place.

**SOC:** Getting back to what we were saying earlier, the place ought to allow the individuals to manipulate and change the area.

**DES:** I think we all agreed on the point last time that people should have some effect on the world they live in. It's very healthy.

**ARCH:** But what an enigma! How do you get people to take an interest in their environment?

**DES:** Maybe it takes New York for there to be a village, maybe it takes New Orleans for there to be a French Quarter.

**PSY:** I'm ready to start talking about what we are going to do and how we are going to do it. First, we are close to the Louisville Restoration Area, which I will assume will be handled like Williamsburg, and here is the Civic Center within six blocks of our site. And over here is the central business district and across the way is the Medical Center, which could provide some of the type of cultured people we would hope for in our area.

**ARCH:** More specifically, low-income cultured people such as nurses and interns.

**PSY:** The areas around us already

have an identity which makes it easier to sell the idea that our particular area should have an identity too. I would like to name it Boone Parish. This would imply individuality, initiative, democratic values, and I would also like to imply that there is a cohesiveness about this area that people within it feel for one another. I think we ought to have the edge of this project marked off some way. I would like to put a 6-foot wall around it, but I don't think we can, so I'd like to suggest an overwide sidewalk or lawn area. And then a 4-foot wall, another 25 or 50 feet before the first building —and then close all the streets. Next, in keeping with the idea of diversity, one of the things we would want is a variety of architectural styles. This would involve keeping some of the buildings, especially those relating to the Louisville Restoration Area, and we could use cobblestones on the streets that are closed. We are within easy-seeing distance of the river which suggests a luxury apartment, but it should not have its own services in order to encourage contact with the tenants' neighbors. One of our main principles would be developing a neighborhood that would welcome people from all income levels.

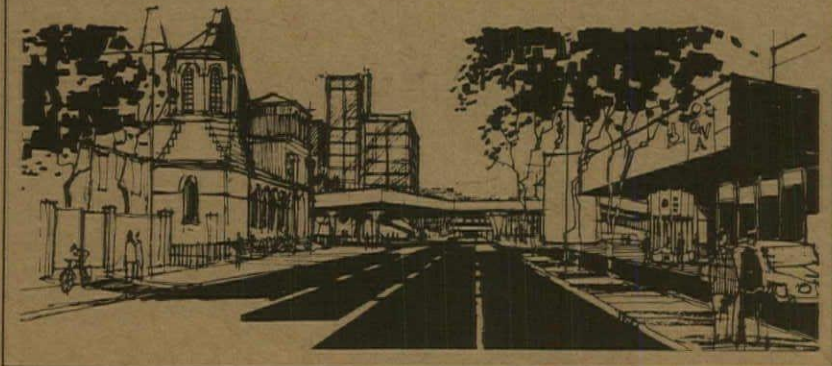
**ARCH:** In view of the controlled rent situation, couldn't we accomplish diversity by concentrating on other characteristics?

**PSY:** No.

**ARCH:** Joe, you stated a problem earlier; now I want you to try to answer it. How do you deal with the iron-headed individual when you are planning?

**DES:** Who is the iron-headed individual?

**ARCH:** He's the guy who does all the things we've talked about. He opens a rathskeller. He's the one who rents a $90 apartment when he can afford a $200 one. He takes loft space and turns it into great studio space.



**COM:** If you could get enough of these people together, you'd get what you want without planning. In Chicago there is an area called Old Town, which used to be rundown, but is now the swingingest part of the city.

**ARCH:** This always seems to occur in an area where you can stamp your personality and usually where there are old, unused buildings.

**COM:** One of the initial drawing cards is that the rent is cheap.

**ARCH:** We have that here because the rent is supposed to be held down.

**COM:** A point you have overlooked is that the residents of the village have the highest per capita income of any area in Manhattan.

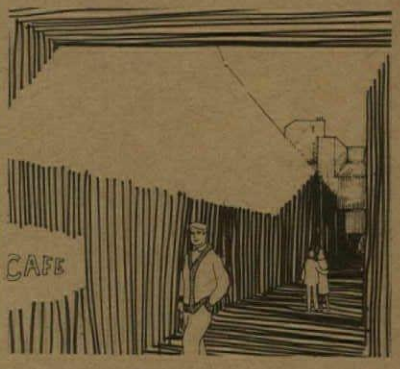
**PSY:** Ten percent of the population because of some special talent could establish the identity of the area.

**COM:** One of the things that concerns me is that we talked about putting in a specific kind of pastrami shop, but I still have the feeling that it's all going to come out the same.

**PSY:** The thing that produces stereotypy is not what we encourage people to do but what we keep them from doing.

**SOC:** This is our answer then—no restrictions.

**ARCH:** It isn't really that simple.




**SOC:** It seems that many of our ideas are contingent on individual ownership or owner-occupied dwelling units; that is, someone who rents has limited liberty to manipulate his environment.

**ARCH:** Joe, how do you write a computer program to get an infinite number of variables?

**COM:** You are really looking for an optimum. Your given expression to solve might be *diversity* = *MAX*. This is not a fixed solution, it is a maximum. You start anywhere and try to approach a best solution.

**ARCH:** One of your parameters could be there won't be 100 percent of anything; no characteristic or element would appear in the entire project.

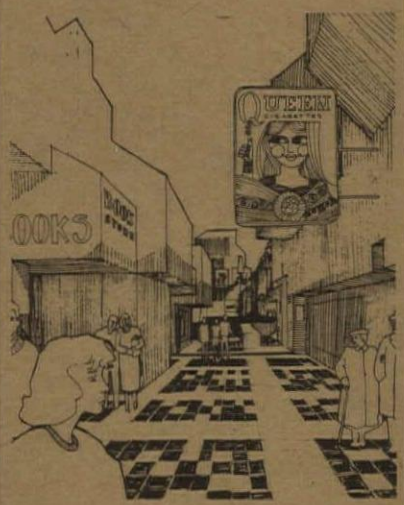
**COM:** Yes. I don't know whether we could ever solve this problem on a computer, but what we are doing is analagous to a linear program. You are given a statement of the problem, a solution you want to arrive at, and any beginning point. You can't possibly examine all of the intermediate steps in arriving at the optimum solution by hand, but on a computer you can examine every possibility.

**ARCH:** How do you set up a program for *variety = MAX* or *Diversity = MAX* without knowing in advance what MAX is? The way we've been going about it, we have decided what MAX is in advance.
**COM:** In suboptimizing, you have to have constraints on the modules of the problem. As Hesiod put it: "A generation of men is as a generation of leaves."

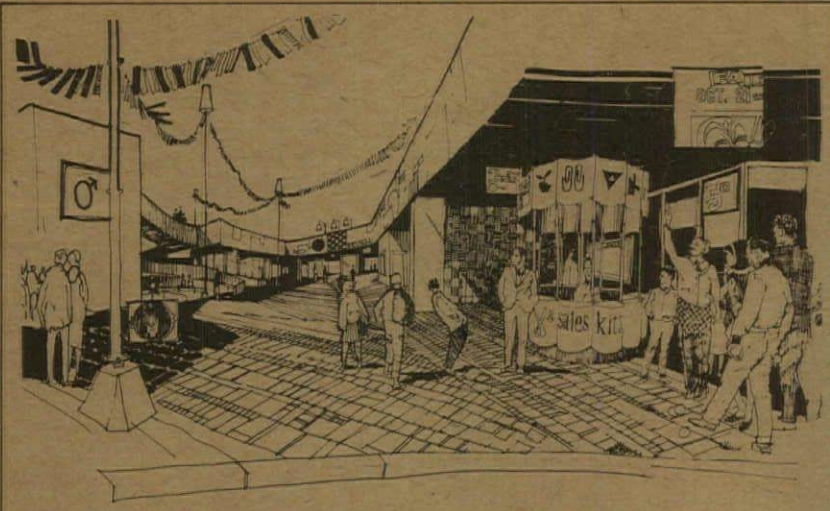
## MEETING 3

**DES:** I think we have established some critera. For instance, we have decided that any stratification either by income or social group is wrong, that we should have a mixture. I feel that this area should be a cross section.
**ARCH:** Would you agree with me if I said that it should be distinctively unlike the rest of the city but diverse?
**DES:** Right, just as a person stands in relation to a race. If the person is whole and healthy, he has a certain broadness of outlook and maturity which makes him similar to all other people. But he has his own personal traits which are unique.
**SOC:** But every community is like that.
**DES:** No, it seems that every city seems to stratify.
**SOC:** Are you going to go along with that?
**DES:** If you leave cities to "natural" forces, areas tend to become specialized to the point at which you can recognize people from different parts of town.
**ARCH:** I'd say this was a good thing.
**DES:** I'm not clear on what I am saying, but somehow we should be able to do a renewal area that doesn't need renewing.
**ARCH:** Haven't we stated several ways of achieving this? By keeping some old buildings, by being able to sell off small parcels of land so that 50 years from now some of the buildings will be 100 years old, some 50, some 5.
**DES:** If you have an area that represents as many kinds of interchanges as possible, this area should continue to be self-renewing because it's never subject to a mass evacuation or status evacuation.
**SOC:** What about the need for privacy? Some place—out-of-doors—where people can fight or argue in private.
**DES:** Some people don't need privacy.
**PSY:** This has not been established either way.
**SOC:** There were some experiments in Topeka which demonstrated that the need for privacy cut across all other characteristics.
**DES:** In the Marseilles project by Le Corbusier, the walls between the apartments are lead blocks, and the tenants found the lack of sound transmission disturbing.
**ARCH:** But isn't this because there is no place for accidental social interchange?
**SOC:** It's sort of like a maximum security prison.
**DES:** There is a need for some sound transmission so you have the feeling, for example, that someone could hear you if you called for help.
**ARCH:** Isn't this just because there are no comfortable areas for social exchange?
**DES:** You mean like the backyard-over-the-fence exchange that goes on between housewives?
**ARCH:** You could put all of the schools and all of the shopping in one giant pedestrian complex and then remove the housing and isolate it in blocks or groups. Suppose we were to consider a 16-hour school with several characteristics (perhaps these are a little oversimplified). Suppose they were activity areas; for example, a science area with lab benches, a library, and they were all covered by one structure—like areas within a park. Try to break down the standard idea of this being a building so you are dealing with places within something. Here the students and the residents of the area could sit in on any of the activities at any time, and the students would have to be somewhere, but it didn't really matter whether a second grader sat in on a chemistry experiment at 12th grade level or second grade reading class. You would be dealing here with community activities that during the day would be child-oriented, but there would be a free range most of the time. This relates to Dick's idea of having a center or forum and the discussion of bringing the school more into community life.
**SOC:** To put this in the form of a principle or general statement, you're saying you want things for people to do in a community-oriented area.

**ARCH:** I'm saying that we want a hub or center for community life. Now what is it? Where is it? What is its nature? We have talked about recognizing our area by its physical boundaries, but we've never talked about a convocation of the people who live here.
**SOC:** If you are going to get a diversity of population, you don't want to exclude people from activities.
**PSY:** Some of the public facilities are already there— schools, churches, etc.
**SOC:** In outline then: Everything is in the interrelation between people and environment. We need a diversity of architecture (that is the environment) and a diversity of people. We have some basic needs that must be met: privacy, security, chances for interaction. The latter has to do both with people *outside* the area, which involves the kind of streets and how you let them come in; and with people *inside* the area, which includes people interacting in parts of the area and also the relation of the parts to the whole area—this is where the center or hub comes in. Then there's an-



other category we'll call miscellaneous. The identity of the area needs to be felt in terms of the architecture, that is physically, and another identity by participation, that's the common center.
**ARCH:** Two points: When you talk about interaction with the environment—an example being a courtyard—you have to be specific because not all courtyards invite interaction. Second, the hub or center can be anywhere.
**SOC:** When I speak of interaction with the environment, I mean tactile or visual interaction.
**ARCH:** In between the individual residents and the center or forum, where is a place for interaction?
**SOC:** It would seem to me places like a little park, a bakery.
**ARCH:** They are usually empty.
**PSY:** No, no. Coffee shops in Vienna are not empty.
**ARCH:** This isn't Vienna.
**PSY:** No, but it can be, though. To get on with the discussion, there are things already existing that constitute logical parts of this center. For example, this area has a boundary which will enhance its identity. It provides for an opportunity for commercial and educational and political varieties of interaction of a public sort, and this raises the question of whether there should be private outdoor areas. Very early we talked about footpaths feeding into the center area. It's only a maximum of two blocks from any point to the center. There would be no thoroughfare except for service roads.

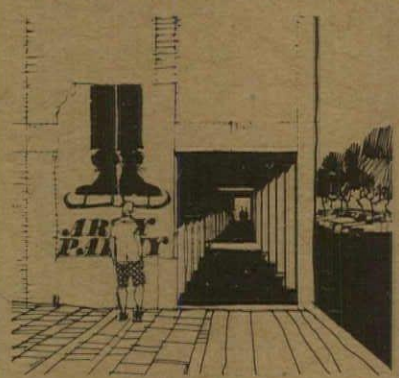



People would be funneled down toward the middle. Could our need for outdoor privacy be met by benches and planting in widened areas along the footpaths? Let's call them parklets so that neighbors could end up watching the sun go down or getting away from the kids for a few minutes. These could be toward the periphery and wouldn't be commercial but something between primary and secondary group functions.

**ARCH:** What are primary and secondary functions?

**PSY:** I mean between the lack of privacy of the family and the lack of privacy of the market. It would be the privacy you would be able to get walking on a country road: that is, you may run into someone or you may not. In any case, you could relax and not be under downtown pressure or home pressure.

**ARCH:** Let me bring up several points here. First, I have found out that the area is predominantly Negro, and this is a Negro high school. There will, of course, be open occupancy, but things being the way they are, it will likely



be a Negro neighborhood. All the things we are tending to do to establish a strong identity in this area would tend to reinforce the characteristics of the all-Negro neighborhood.

**PSY:** A ghetto, in other words. We have a real serious problem with the idea that this is going to be a Negro neighborhood. I think we ought to attack that head on. If both the high school and the elementry school are going to be Negro, then unless we take very direct action, we are sunk; we will not have any of the things we asked for in the beginning. We've got to break that pattern or we've got to design for a Negro lower-class citizen. And we haven't been designing for him.

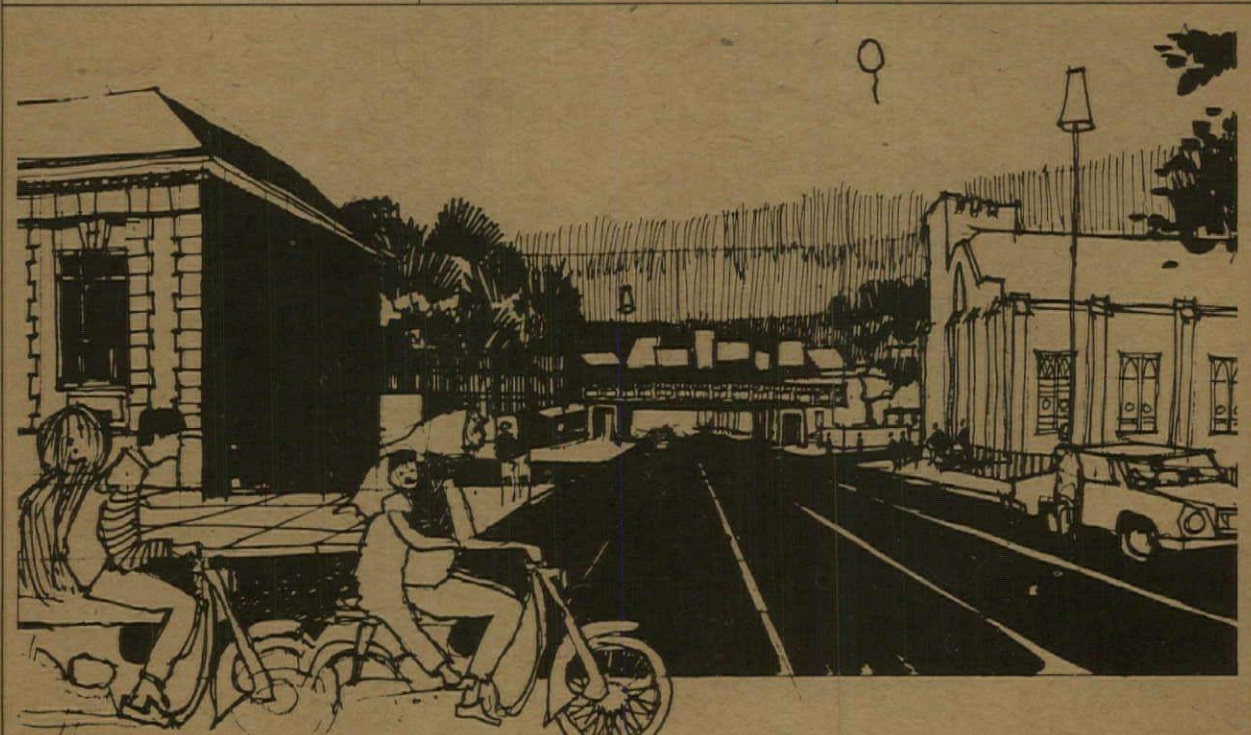
**ARCH:** In addition, this rental scale is close to governmental housing.

**PSY:** One way to do this would be to gain the cooperation of the Medical School or Hospital Complex and the Chamber of Commerce. We could have a higher rent structure as one of our stipulations, and insist that a characteristic of this in a very final way would be to build in institutions that would control the ratio. Coming back to an idea that Keitt proposed, we could try to make sure that the representation in this area approximated that of the community as a whole.

**ARCH:** Like an immigrant quota system?

**PSY:** If it takes a sociological institution to do it, then let's build the institution in with the architecture. Then we can say that one of the unique things we are doing is not artificially separating architectural design from social institutions but recognizing that they have to work together for some acceptable purpose.

**DES:** Getting back to the Negro neighborhood concept, you need to break into a big block, and the fact is that this community might be formed with blocks A, B, C, D, E, F. "A" may be student housing, while "B" may be an enclavish type of



court housing, designed for medium or high rent. We could put these large blocks in, and even though in the scheme they are quite separate, in the community they wouldn't be; they would be components of it.

**ARCH:** You could have hidebound small groups, and this would perhaps help with the institutional aspect but forced so that everybody mingles—then you would be less conscious of it.

**SOC:** Nurses and interns and students are the people who would be the people who would live there, not older couples.

**ARCH:** There already is an old-folks home there.

**SOC:** It might be a Negro old-folks home.

**ARCH:** It's not.

**DES:** An old-folks community could be a real part of this project.

**ARCH:** Nobody loves kids like old people.

**PSY:** This would sell the point that we are really not going to have a ghetto.

**DES:** Your high-rise would be another kind of area.

**ARCH:** No, this is specifically excluded from the plan.

**PSY:** Why?

**ARCH:** Watch that Dunham! They say there is one street you have to leave in the middle of the project, and he says, "Well, let's just take it out."

**PSY:** This is a very good point to discuss because it illustrates a whole category of problems we are running into here. They refer to this as a planned thoroughfare. Now what does that mean? The City Council has passed a law it is going to be that way? A city planner has decided that this looks like a street that people could go through on?

**ARCH:** It means that there is an overall plan for the city that says every fourth street will go through.

**PSY:** I don't mind challenging this.

**ARCH:** I don't either. I do want to keep one aspect of the program in-

tact though. Can't we find at least one innocuous requirement that we won't challenge?

**PSY:** If we are going to draw in people from the Medical Center, then one of the best things we can do is to get them up high enough to see the river—then we have a sure seller.

**DES:** Remember, we discussed earlier the idea of taking houses torn down for freeway construction and moving them lock, stock and barrel some place and jumbling them all in together with footpaths between and renting them as is for 5 cents a square foot.

**PSY:** So, if someone wanted, he could sleep on the floor in a sleeping bag.

**DES:** Or have a studio or a shop.

**PSY:** This idea appeals to me because I can imagine a poor Negro family living next to a family who has developed its space, and then you have exactly the right sort of social tensions.

**DES:** I think we should have a place like that where for very low rent . . .

**ARCH:** So that's another thing we're going to violate, the rental schedule.

**DES:** It might be that we would use their figures for an average rental.

**ARCH:** We'll make it a patchwork quilt.

**DES:** A *big* patchwork quilt. We need big, strong things to drop into this area so they don't get swept away and become a ghetto. One thing would be student housing, another an artist colony, an old-folks community.

**PSY:** Another thing might be a high-rise with an Olympic swimming pool facing the river.

**ARCH:** For the young moderns?

**PSY:** Yes, the young moderns. And just get $10 or $15 above the minimum and rent them to Medical School people. But every Negro school teacher who is within walking distance is going to want to live there, and you get integration automatically. Also, it gets away from the only swimming pool being at the segregated high school.

**ARCH:** We are now left with no community identity unless it is visual. Don't we have a way of having social identity?

**DES:** You can have a social identity.

**ARCH:** How.

**DES:** You simply force people to walk.

**PSY:** I know what would bring people in from all over the town. And if you could reach it only by walking, you are just about integrated on the spot! There is a flying saucer ride in Disneyland—people love it and go through it again and again, and it's cheap.

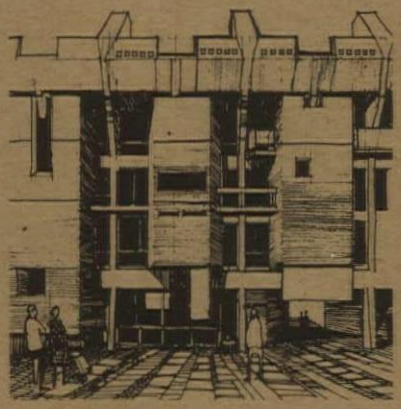
**DES:** You are proposing then an amusement park?

**PSY:** Not exactly. I'm proposing to put one *thing* here that there's nothing like it in that part of Kentucky. Not so colorful as to sound like we are rebuilding Disneyland but low-cost entertainment for all ages of people.

## FOURTH MEETING

**PSY:** I have tried to abstract and reorder the things we talked about. Our ideas seem to be in three categories: cohesiveness and complexity of two kinds. One kind involves ethnic variety, individual initiative and freedom; the other the stimulation of intellectual capacity or sophistication of some sort by environmental complexity. You might say that we are talking about complexity on the one hand and democracy on the other. The point about environmental complexity is easier to defend because there is a great deal of technical literature available on this subject.

**ARCH:** Architects seem to divide themselves into two groups on this score. There are those who favor a simple environment and those who favor a complex one.



**PSY:** This is precisely what has been found in studies on creativity. Artists or architects who are identified by their peers as creative tend to choose complex forms of stimuli.

**ARCH:** Is this the same as the experiment you mentioned earlier by Ivo Kohler?

**PSY:** Not exactly. His point was that for each person there is an optimum complexity which relates to the esthetic experience. Prior to this optimum, things are dull; and after the optimum is passed, the experience becomes unpleasant or chaotic. He didn't care if one person were different from another in terms of his optimum. His point was simply this: To have an esthetic experience was to be con-

fronted with a certain degree of complexity. The sequence, then, is boring-beautiful-chaos.

**SOC:** Referring to an article in *Harper's* about communities that develop a *Gemeinschaft* feeling, the editor says that in this sort of community the people tend to be alike and not very progressive, whereas one of the US characteristics is that we have given up the *Gemeinschaft* or "we-feeling" for mobility and diversity of interest. He says it is a question of whether you want to eliminate conflict or cohesiveness. The editor suggests that conflict is essential.

**ARCH:** This "we-feeling" seems to be a characteristic of rural societies or villages. They tend to be much more cohesive but at the same time they are much more conservative and slow to change.

**COM:** I agree that you don't want to eliminate conflict, but don't you want some sense of camaraderie?

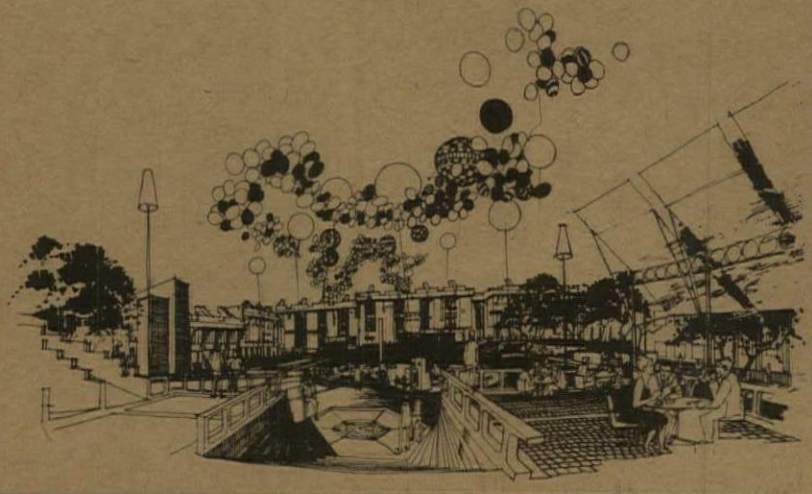
**ARCH:** I have given five people areas within our site to work on within a grand plan. The idea is to let each develop it as though it were a separate architectural project, to bring it up to a point of having some substance before we do our planning. I'm hoping to get here a sort of tension between the pieces and the whole so that neither really dominates and both have a strength of their own. We begin here to get into artistic principles which we have not discussed. This conflict between the project and the unit is one, our idea of the multiplicity of images is another, and our idea of random intervention a third. The latter means that a scheme needs irony, some stubborn characteristics; something irrational, something off the point. The multiplicity of images is a view of the world in which the pictures or images in it have fuzzy edges and overlap. Life is a series of overlaid images which partly obscure each other. This is a vital characteristic which architecture can lose by being too clear.

**PSY:** Here are some things I consider important: *planting variation; water* of various kinds, especially for contact, as in wading pools; *sand; paving; facade textures; form variation; sculpture,* which may include concrete castings (anything that is complex in three dimensions provides the developing individual with the opportunity of learning space relationships); *wall characteristics* imposed by the nature of the materials used or by painting patterns on them; *sound and vision control* in the layout of the relationship between buildings.

**ARCH:** For privacy . . .

**PSY:** Not only for privacy but for the complexity we spoke of. For instance, I found myself trying to figure out ways in and around these buildings you've drawn. In doing that, I'm better able to solve problems involving spatial relationships. To continue my list: *sight variations* particularly the unexpected and isolated experience like the dining garden on the bank building's third floor; *color variations* including multicolor facades; *sunlight control; height variation* in terms of passageways, high-rise buildings; and finally, *a public height,* such as an elevated pavilion or terrace, moderately large somewhere in the central area but high enough to see the entire neighborhood and as far as the river plus a view of downtown Louisville.

**ARCH:** We have a real enigma trying to present the solution without written documentation. Maybe we should show with headlines people running, jumping and standing still so you don't have to read it to see it.



. . . . . Normally the architect isn't trying to unite social institutions with architecture.

**PSY:** The question of social institutions comes later. We are talking in terms of social and psychological principles.

**DES:** I think one of the wonderful things about this concept is that it can be presented as imagery rather than in a diagramatic way. How do you show variety better than just showing variety? How do you show sunlight on the floor other than just showing sunlight on the floor?

**PSY:** Here is an attempt to summarize some of the other ideas that have come up. With relation to our idea of cohesiveness, I thought that we could point out its relationship to personal identity or a sense of belonging. Cohesiveness involves our notion of a parish or neighborhood, parish being a more distinctive term. We spoke of a cynosure, totems, institutional elements, such as the forum or the possibility of a neighborhood patrol or newssheet; the center, providing various services including entertainment—the public pool that would help identify the area and draw people together; the communication issue including transportation, streets, parks and parklets to facilitate public mixing and public privacy; and democracy—there are quite a number of studies of democracy as a social style for a community, much literature that can be cited in support of this.

**ARCH:** I am tremendously concerned about some of our proposed violations of the program, which says: "Any submission which does not adhere to the mandatory requirements of this program may be withdrawn from competition by the jury."

**PSY:** Well, it does say "May be withdrawn"; at least that offers some hope.

**ARCH:** And I guess we really don't have any choice in terms of what we have set forth. I notice also a paragraph in the program's introduction which says: "The architect's responsibility in a program such as urban renewal must extend beyond the tools of his drawing board. The physical environment and social behavior are so closely interrelated that the architect cannot ever forget the social aspects. He should respond creatively to the needs of the total environment."

**DES:** Why, that's what we're doing!

**ARCH:** I hope so. ■

*Searching for a Science of Design*

# PROBLEMS & PUZZLES

BY SIM VAN DER RYN

WHEN WALTER GROPIUS came to the United States in 1937 he wrote: "My intention is not to introduce a cut and dried 'Modern Style' from Europe but rather to introduce a *method* of approach which allows one to tackle a problem according to its peculiar conditions."

This intent has not been realized. Concern for "a method of approach" remains in the realm of personal rather than public knowledge and is not really part of any modern theory of design.

Modern architecture is entering its third generation. Its major concern of the past 50 years has been the technology of building and its resultant form.

The modern theory of architecture is a theory of immediate and material form, its emphasis a natural response to the great 19th century advances in the production and technology of material wealth. But advances in the material product of architecture have been at the expense of understanding the process of design and the extension of design theory.

Despite the intellect and energies of Gropius and other modern-movement leaders, the way in which architects approach problems is often much the same as it was before the advent of the modern movement. Yet the nature of design problems has changed drastically.

There is in this third generation of modern architecture both the need and the opportunity to make profound changes in theory and practice. The new architecture established principles and gave a new conception against which our efforts are still measured. But the configurations of change in society have been so great while the old landmarks guide us along a few well-traveled and familiar paths toward solutions.

In design or any other human activity in which ethics and values play a crucial part, a time-lag is found between the realities of a dynamic society and the perceptions, principles and practices of a particular discipline. The new architecture was a landmark because it settled the score with what was already accomplished fact: the great age of the machine and its triumphs of production—a triumph shared by reasoned, orderly science wedded to a competitive economy bent on the production of material wealth.

In responding to the potentials of the already well-established technology, the pioneers of the modern movement realized that before they could meet the challenge of the future they had to catch up with the past. Even as they formulated concepts and translated them into buildings, profound changes in the images which guide men's actions were occurring.

Nineteenth century science, a world of material order and total explanation, perhaps epitomized by Kelvin's remark that no phenomenon could be understood unless it could be represented by an actual mechanical model, was being superseded by the new conceptions of Einstein, Planck and others. The new scientific conception viewed order as the expression of probability, time and space as not absolutes, and events not always capable of translation into mechanical terms.

Although Gropius and his colleagues were familiar with then emerging views of life and society which since have greatly affected our lives, they were busy rescuing design from a static, anachronistic state. This strategy demanded a practical attitude oriented toward the immediate technical and spatial problems of building. The creation of a visibly new order of form was crucial.

At the Bauhaus, Gropius intended that process, product and use constitute an inseparable entity

in modern design. But the momentum for change in method as well as matter was dispersed and diluted in the trauma of war and its aftermath. A world busy rebuilding, expanding and shaping its environments adopted the products of modern architecture but not its budding methods. The communication of an approach toward design has been distorted in the communication of styles.

Method remains a personally derived resource rather than a known quantity available to the designer. The failure of modern theory to include a theory of method has led to inaction and failure on the problem the makers of the modern movement saw as their greatest challenge: the design of humane urban environments.

The failure of physical designers to deal effectively with large-scale design issues, or to create solutions acceptable to society, is a failure of method and strategy and not of good intentions or interest. We have busied ourselves with studying solutions but seldom problems.

It remains true that architects and designers must continue to expand their technical confidence to build. But the architect does not have a monopoly on the technique of building. The small percentage of professionally designed buildings attests to this.

The special skill the designer must have is to discover problems and their conceptual solutions. The designer is first and last a problem-solver in which physical form is the medium of solution.

The development of problem-solving skills in theory and practice can be approached with the same kind of care that we have lavished on questions of immediate form. We have thought too long of architecture as a fixed and static product about which we can learn only through the photograph, the plan or personal visit, without considering the form of the problem itself, the needs which required solution, the process of discovery, creation, the process of use.

The tide of events inundates and undermines our ability to cope with them. Complexity increases without a corresponding growth in our understanding of how to deal with it.

However, we keep working as we must. Just as a child who stands watching a passing train has the sensation of movement, so do we confuse ongoing inertia of "getting things done" with the illusion of motion. We are again faced with a gap between the realities of our environment and a theory of image of product and process to impart greater purpose and direction to our actions.

A unified theory or approach to design must deal with form at three levels or stages of action. At the first, or preform phase of design, we are concerned with discovering the nature of the design problem, methods to structure it and arrive at a conceptual solution.

The second phase of design theory deals with the technical means of implementing form. This is the immediate form phase of design; it is toward this phase that most of today's usable architectural theory, research and development have been directed.

The third phase of theory is concerned with evaluating solutions and deriving data which may be used to extend theory in all phases. This last phase of design we shall refer to as the post-form stage. Let us now examine some of the ways in which the lack of a unified approach to design is reflected in the present state of design practice and organization.

Design as an activity is guided by two overlapping sets of images and concepts. The first set is made up of those mutually shared life attitudes held by the people in general. In this bundle of images of world and self is an attitude about man's ability to alter environment for his own purposes. It is the latent image of design. The second set of images comprises a more specialized and differentiated bundle of attitudes and data held by a collection of people who, because they share this bundle and engage in similar activities, are known as designers.

Naturally, society's attitudes toward design and the actions it produces interact, modify, and in turn are modified by the mental and physical images of the design community. The individual designer is, of course, a member of both society at large and the community of designers.

Now if the latter is nothing more than a collection of individuals distinguished as a group only because they share some common knowledge and perform similar services, then design can exert only a minimal and nonpositive influence on the community at large. Because the design community lacks an internal structure, the action and the extension of design knowledge will tend to come from outside it.

Design and designers in this situation bob aimlessly on a sea of change. The interaction between society and design is one-sided. Instead of being influenced by the internal collective knowledge of the design community, the individual designer will tend to be influenced more by the attitudes of society. To complete the vicious circle, society's attitudes will mirror what is seen, that is, the absence of design as an entity or integrated activity.

The difference between a loose assemblage of designers and a design community whose activities are connected so as to form an entity or institution is greater than we may suppose.

Perhaps the following analogy may clarify the

issue. All nerve cells are organically similar. The human brain contains such cells, as does each planaria or flatworm. But a community of flatworms cannot duplicate the action or effects of the brain even though organically it is composed of the same units. The difference lies in the fact that while there may be some interaction or low order of communication among the flatworm community for the purpose of food-gathering and the like, there is little organized communication and connection. The community is not an entity. If one removes a portion of the worms, their community will not be essentially changed in its operation.

Contrast this with the brain, in which the cells are tied together by a complex set of relations which lead to purposeful activity. The internal structure of the brain, in fact, illustrates in general all the features that are required for a loose community of designers and design activities to be transformed into an institution of design. The brain includes a mechanism for monitoring and testing the result of the act in such a way that its "knowledge" or inventory of information, structured into images, may be constantly updated and revised. It contains a mechanism for organizing patterns of electrical impulses which permits communication both within and outside of its own system of relations.

Before we carry the analogy too far, let us stop here because the brain is more complex than any machine. But in its structure are included all those activities that should be the proper concern of a unified approach to design. In considering the design community then, it is apparent that theory must encompass design as a temporal entity.

Design is a continuum of processes, an endless but moving chain of development, realization and evaluation, directed toward the purposeful creation of physical form. The present state of design theory, by atomizing the design process and concentrating only on physical realization, can never lead to the extension of design knowledge.

A major difference between our current loosely organized design profession, operating with a minimum of theory and relying on ad hoc method, and that of a design institution based on a comprehensive theory of form is that the latter is capable of purposeful activity directed toward a specified goal.

Required to attain this state is an internal structure designed to systematically extend knowledge.

As we have indicated, this is precisely what each individual human brain does. When the systematic extension of knowledge takes place collectively, that is, where many events and actors are involved over time, the organized process of design constitutes an institutional activity composed of a specified set of relations between images, events and actors. The form or structure of these relationships remains relatively stable or invariant even though the events and actors may change.

Characteristic of such entities or institutions is a stability in the face of transitory or surface change; this is their great strength. An organized body of knowledge in the form of communicable images and abstractions, and the means to create, derive and evaluate new images, are at the core of any institution and provide a common ground for creative action.

Under these conditions the designer may lead, not follow. He need not rely solely on his own intuition in arriving at conceptual solutions but may draw from and add creatively to the design institution. In this way a relatively small group of individuals has been able to exert great influence on the images of the rest of society. The history of science testifies to this.

Science is most successful in the systematic extension of knowledge. While it is suggested that the house of science may in some ways be a model for a house of design, design as an activity is different in purpose and scope from that of science. Design cannot imitate science nor need it mock science since the two are complementary activities.

Science is no more than a way to economically structure collective human experience in order to describe predictable events in the environment. In so doing, science transforms our image of environment and our values. Design uses the predictive knowledge of science in order to solve problems in the real world.

The goal of science is an unceasing search for understanding and prediction of the total environment in order to increase the potential for human survival and development. The goal of design is more than the application of such knowledge in order to solve problems inherent in survival and the growth of human settlement. In each given situation, design aims to extend the potential for experience of environment. Through the physical artifacts of environment, design channels and structures activities and events. Through the interaction of the physical images of design with the images of environment held by its participants, design creates new experience and new understanding for the users of its products.

Environment transforms man; man transforms environment. Design, which transforms human values through the creation of new physical images, can do more than use the product of science, predictable knowledge, as a means to achieve physical form. A unified approach to de-

sign can adapt the method of science, the embodiment of the scientific institution, to systematically extend knowledge and develop theory.

Contrary to popular misconception, the scientific method does not limit the innovation of ideas or the creative solution of problems. The scientific method is no more than a means for assessing the usefulness of creative hypotheses. In science these hypotheses are expressed in symbolic language.

Any physical form is the synthesis of numerous explicit and implicit hypotheses which predict events in the real world. Any physical form is a compound "model" which seeks to predict events in the real world. Any physical form is thus a symbolic as well as a physical entity.

The extent to which a particular physical innovation or design is successful may be measured by the extent to which the hypotheses contained in its conception successfully predict the reality of its use. Any physical form is a container for a host of implicit hypotheses about human behavior: assumptions about how the building will work for a given activity or event structure. Any physical form is also a container for numerous well-validated hypotheses, such as the "laws" of mechanics and the properties of materials, which prove to quite accurately predict the behavior of the physical form and the events which act upon it.

The use by designers of the latter variety of hypotheses is what we refer to as "science" in design. We think of it also in connection with the translation and synthesis of "fact" predicted through such means as the computer. The synthesis of well-tested theory into new physical form will always be a human creative act. The generation of hypotheses which predict relations between physical form and human behavior is creative.

It is these two activities taking place in a situation consciously attempting to validate hypotheses and thus extend knowledge which constitute the core of a science of design. Design as an institution will develop when we consider physical form solutions as bundles of untested hypotheses which need to be confirmed and revised through the systematic investigation of designed environments.

Our knowledge of design is fractured and scattered, largely because we have tended to consider the only aspects of design that might comprise a body of knowledge as those which have to do with techniques of physical realization.

The heart of the design process has remained in the realm of intuition based on personal synthesis of fact and experience. It is probable that great genius is perfectly comfortable with the present arrangement, but for the rest of us what passes for intuition is all too often rooted in ignorance and preconception.

The future development of design as an ongoing institutional process is not intended to produce more genius designers. These are born and not made, although their success might be materially affected by the size and scope of available knowledge. What is intended is to raise the general level of professional competence.

We need to increase the ability to successfully solve physical design problems that society or we ourselves recognize as important to society. It should be pointed out that while the observation and testing of physical solutions is an objective procedure, the ends we choose will always require a value decision. The minute we signify that a particular condition is a problem we have made the essential subjective commitment. What is required of a design theory is not to remove subjective judgment for it is part of any creative act. An important requirement of the preform stage of design, however, is a way of separating fact from value. Without this essential distinction, our subjective intelligence will be misdirected.

If we set about to systematically develop design hypotheses, build them into solutions and then test them in the light of reality, we may in so doing construct a unified theory of design which would permit us to identify and face the design problems of our society in a purposeful and meaningful way. The centrality of design to society is directly proportional to a design discipline's record of proved success, its potential to solve with proved predictability particular kinds of physical problems.

As a collection of discrete and limited design disciplines, the engineering sciences have achieved a high status. Most design innovation in the past century has not come from the traditional design disciplines such as architecture but from the applied science of engineering. The apocryphal story about the moon shot that had to be delayed because the astronaut got caught in a traffic jam on the way to the launching pad is perhaps a comment on the fact that creative technology is ahead of creative environmental design.

Since there is little consensus about the specific objectives of design, stated in such a way that results can be meaningfully measured, the effects of design are seldom really assessed; unlike engineering design, costs of individual and collective failure are seldom measured. A design system must include the means to assess the effects of our work. If we were able to measure the costs of design failure as we do the costs of failure in the space program, the true importance of environmental de-

sign to society would become apparent, and no longer could we afford the waste and duplication of ad hoc design procedures in which problems are discrete and connected with little common method or fact.

We know the costs of design failure each time a missile fizzles on the launching pad. What are the physical and social costs of failures in environmental design: the costs to our mental and physical health, discomforts heaped on us by ill-design, the impairment of enjoyment through thoughtlessness and ignorance?

It is precisely the so-called intangibles of life that we must recognize and try to satisfy in more than a random fashion. The aircraft and air travel industries, for example, are forced to place a value on human life itself in the design and costing of safety devices and procedures. The objective of absolute safety, like the objective of a humane environment, is only meaningful when we can measure our attempts to achieve it.

Our fear of science marching into the traditional realm of design, the satisfaction and expression of deeply seated needs and images which transcend the strictly "functional" through intuitive solutions based on personal knowledge, can only have the opposite effect from what we would wish. If the values which we seek to satisfy remain vague and incapable of definition, then we cannot act on them purposefully, and we will continue to focus on technology as an end in itself.

If we have no predictable theory of design, other than that which applies to the technology of building, then technology will continue to serve as an attractive end to the exclusion of broader design considerations.

If we remain content to be experts only in building rather than in the design of physical environment, and restrict our efforts to systematically gaining knowledge in only the technology of building, then the importance of design will continue its decline. One proposition of a unified approach to design is that physical form and the structure of activities comprise a single entity. Environmental design is the making of places and not things. The design and organization of activities cannot be separated from the physical structures which house them. Ever-increasing skill in the technology of building must proceed hand in hand with the corresponding development of theory which predicts human behavior in designed environments through a process of formulating hypotheses, embodying them in physical solutions or models, obtaining information on the performance of solutions, and evaluating and updating the hypotheses.

Design procedures lacking these steps have too often led architects to become technicians or puzzle-solvers, diverting them from their potential to innovate solutions. All too often the designer is merely a packager who supplies the shell for the client's operations and activities, expressed statically in terms of square-foot space requirements with some simple implied relations between them.

Such a "program," if it may be called this, often becomes no more than a jigsaw puzzle in which the solution is implicit in the nature of the pieces. All the significant decisions about form and organization have been made. What is left to do is to put them together, to make buildings which differ little from one another in basic organization.

Styling instead of solution is frequently the result. Such puzzle-solving requires ingenuity, deductive reasoning and perceptual skill, but it is not truly a creative activity. In a problem, on the other hand, very real constraints exist, but the solution does not rise out of a simple additive manipulation of the pieces.

Only in the case of buildings such as hospitals, airports and exhibit facilities, in which an intuitive design failure may result in an inoperable facility, have there been attempts to extend design knowledge to an understanding of the designed environment as a total entity. In these cases there is a recognition of the fact that the cost of designing and building a physical container may be insignificant compared with savings achieved through affecting efficient operations by means of the physical-design process.

For many large clients "good design" in architecture appears to be justified more by the status value of the visibly apparent form than in terms of better designed operations.

As long as the cost of design is tied to the cost of constructing the physical shell, integrated environmental design will remain unlikely. When we begin testing behavioral theory under various kinds of complex environmental conditions and evolve useful predictive theory, then perhaps clients will begin to observe the leverage effect of design through its ability to implement desired patterns of behavior.

It is surprising that the Federal government, with its increasing commitment to good design, does not include a mandatory provision in its design contracts, with added compensation if necessary, for the recording of design assumptions and their subsequent evaluation in completed projects. Within the last two decades the behavioral sciences, experimental psychology and human engineering have developed techniques of observation and measurement which could be used and

adapted to the observation and evaluation of the "event structure" in designed environments.

In an integrated problem situation such as this the architect would be the physical design member of a larger design team including management specialists, operations researchers, economists and behavioral scientists. Such working arrangements are already appearing in corporate situations.

A unified theory of design would also expect to see a wider scope of specialization. The model of the designer postulated by the modern movement was that of the master builder who combined the qualities of designer, builder and businessman, in a triumvirate of design, construction and economy. In a theory oriented toward immediate form, this formula seemed a natural specification. But the present complexity of design has led to definitions of a model designer few mortal men could fill.

A unified theory of design would allow for greater design specializations and their integration into a total approach. Needed in the preform stage of design are specialists in problem formulation, the conceptual designer and people skilled in the construction of symbolic abstractions at a level different from the usual design drawings but which still translate into physical form. In the post-form phase there would be researchers skilled in the observation of environments and able to make design inferences from them.

The mix between research, technique and design would vary, with each professional competent in at least one of three stages of design. Such specialization would require a far more extensive graphic language than afforded to us today by the traditional means of drawing and verbal statements. Design requires a language, tools for communication and means to store information. Little knowledge is exchanged between designers in any regular fashion. In the loose community of designers, the development and extension of knowledge remains an individual rather than a collective responsibility.

The design community fails to systematically extend its knowledge because it has never agreed or defined what the proper concern of design is, and thus it has never defined a basic framework of information. The process of design remains a very private affair, and so does the success or failure of solutions.

The individual designer tends to work in an isolated world of his own making. What he learns is seldom communicated in a useful way. The mistakes he makes and the potential to learn from them seldom find their way into the community body of knowledge. Such splintered methods are a waste of human effort for which all society eventually must pay. Too often the concern for a monolithic professional image has interfered with free inquiry. Pseudo-institutions, unsure of themselves, behave not unlike their political corollary, the jittery juntas of totalitarian states.

A profession which restricts rather than promotes the extension of knowledge will be a curse rather than a blessing. When activities are outside a well-ordered frame of reference, founded on a body of knowledge, professional rigidity is likely to replace free inquiry.

Any institution of design requires a common method of discourse and means of communication. The whole emphasis on immediate form is a reflection of our inability to find ways of communicating form at levels more essential than that of the orthographic projection or photograph. In fact, one may assume the reason the modern movement so rapidly degenerated to a style is that no means existed to effectively transmit whatever principles were involved in its creation.

Words tend to be insufficient. Through the available graphic medium, principle was easily corrupted. Ville Radieuse was translated into Peter Cooper Village, the Garden City into slurb, Mies into the contractor curtain wall.

It is doubtful that the essentials of form and the process of its creation can be communicated in photograph or plan, since these abstractions communicate visually static properties and metrical organization, and there is more, much more, to design than this. Vague verbal statements of intent are even worse.

To understand form, we must get beyond an orientation to the static object. The extension of theory is dependent upon the development of graphic languages which go beyond our present concepts of either the two-dimensional or the three-dimensional abstraction of form in drawing and model. Useful tools as the latter are, they seldom crystallize for us the nature of the problem.

Perhaps most symptomatic of the absence of an institution of design is the condition of its foundation—the educational system. Unlike every other professional activity, the schools of architecture and design have failed since the Bauhaus to be centers for the production, extension or communication of design knowledge. This failure to extend knowledge, channel information and create significant theory is but a reflection of the aimless state of the design profession today. Gropius recognized that the generation and implementation of professional change could best take place through design education. The challenge for change and the development of the unified theory rests with the profession as a whole and particularly with its educational system. ■

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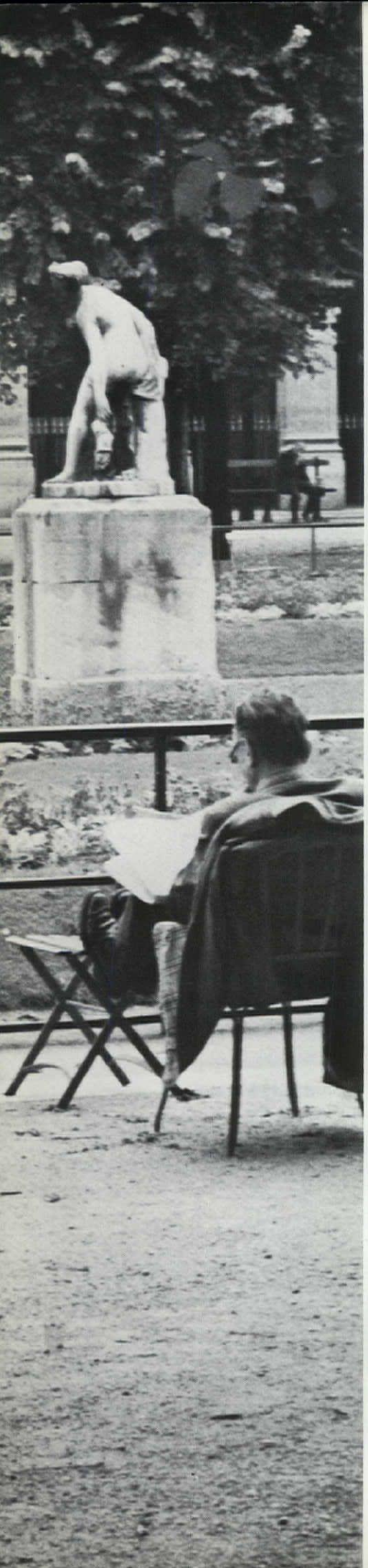
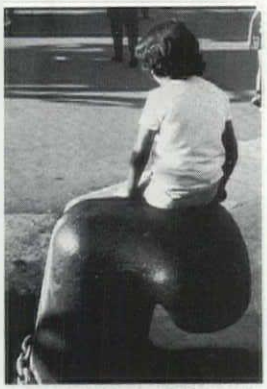
Adapted from an address presented at the College of Environmental Design, University of California at Berkeley, where the author is assistant professor in the Department of Architecture.

# URBAN DESIGN WORKSHEET 5


PREPARED BY PAUL D. SPREIREGEN, AIA, FOR THE COMMITTEE ON URBAN DESIGN

# HAVE A SEAT



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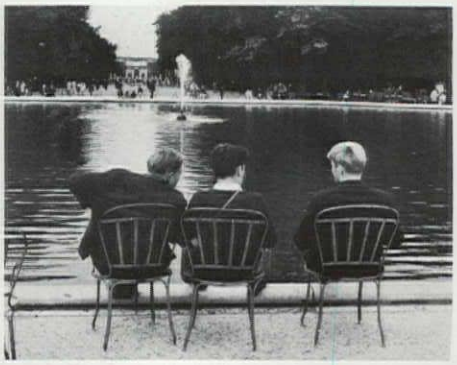
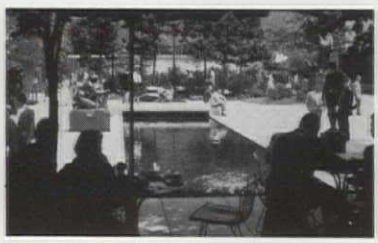




*The State of the Art*

# Professional Liability Insurance

BY GEORGE M. WHITE, AIA

*As the practice of architecture becomes more complex, so likewise do the legal considerations which concern the architect. How he can best face up to these responsibilities is discussed by the author, a member of the Committee on Insurance (Frederic R. von Grossmann* FAIA, *chairman), under the Commission on Professional Practice (Dean F. Hilfinger* AIA, *chairman).*


FEW ARCHITECTS and engineers would deny that of the various legal aspects of the design professions, those involving liability for professional acts, errors or omissions have been of greatest concern. Perhaps because of peculiarities of the construction industry, the architect especially becomes involved in a broad scope of activities. As the practice of architecture changed from the time when esthetic design was predominant to the present when we find mechanical, electrical, structural and other branches of engineering a substantial if, indeed, not a major part of practice, the resultant exposure of the architect to uncharted areas has caused the ghosts of past indifference to rise up.

The entire aspect of the architect's professional status has in fact beclouded the issue. Architecture and engineering are recent entrants into the sanctum of recognized professions, joining medicine, law and the clergy. The latter are somewhat different from other professions in that each encompasses a confidential relationship. Privileged communications between a parishioner and his clergyman, a patient and his doctor, or a client and his attorney are usually legally inviolate. In most jurisdictions disclosure cannot be compelled. This is probably the basic distinguishing characteristic of the common-law professions.

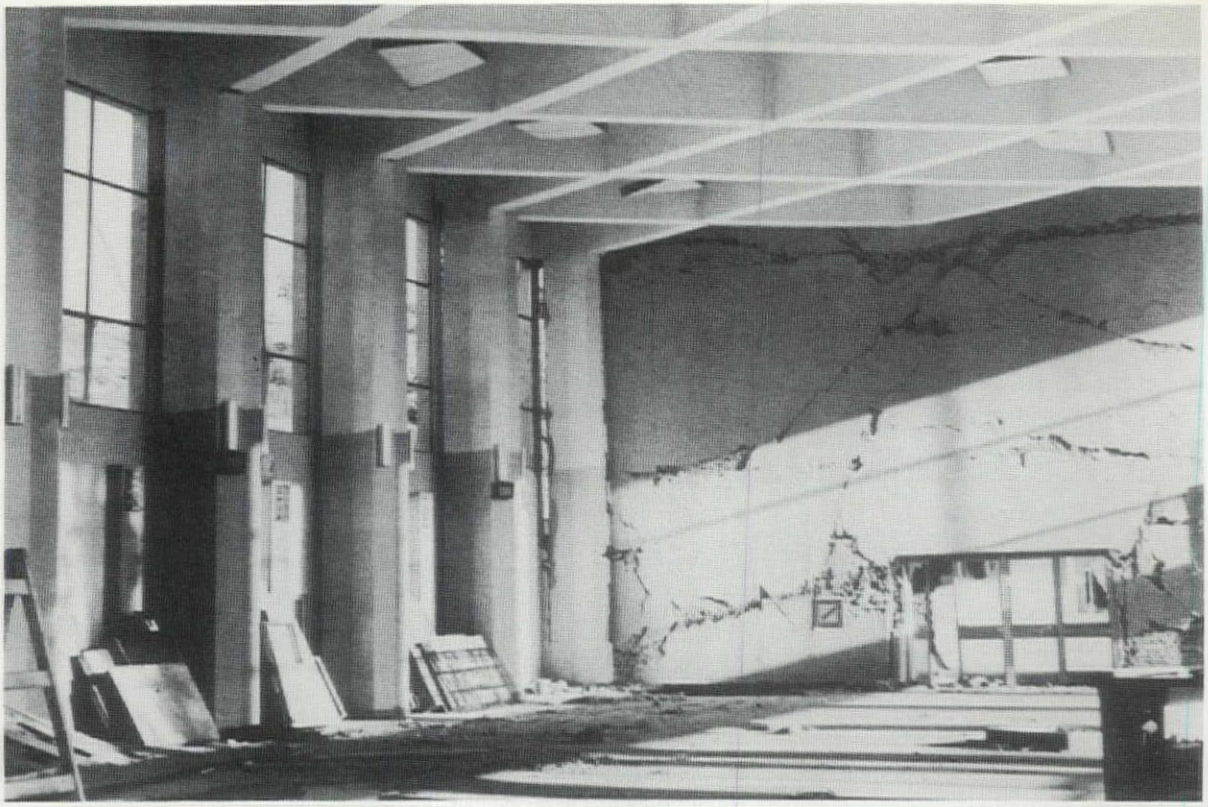
Architecture, a statutory profession, comprises a different relationship; it is a profession because the duties of the practitioner involve the basic consideration of service to the client rather than personal gain to the practitioner. Benefits to the society are a basic motivation and special training and knowledge set the practitioner apart from the rest of society as a specialist. In this lies the foundation for liability.

The architect of 50 or 60 years ago was regarded as were other professionals, viz., as a specialist subject to reasonable and occasional human error; claims against architects for professional negligence were few. As technical information became more widely distributed and available to architects, and incorporated into more complex building forms containing sophisticated mechanical and electrical systems, the general public began to expect from the architect a higher level of technical proficiency and competence.

Architects appeared reluctant to recognize that their profession had become highly technical and that esthetic and visual qualities of the design, while not reduced in absolute value, had nevertheless become diminished in terms of the profession's total activity.

Liability in the United States for negligence in medicine and law was established much earlier than in architecture. Apparently because a mistake by an architect or engineer could mean millions of dollars in damage, the courts felt that if liability were to be found generally against the architect, no one could afford to practice architecture. (For example, in *Curtin* v. *Summerset,* an 1891 Pennsylvania decision, the court said, "If one who erects a house or builds a bridge . . . owes a duty to the whole world in that his work contains no hidden defects, it is difficult to measure the extent of his responsibility, and no prudent man would engage in such occupations upon such conditions.")

In the medical profession, because life is at stake, a small act of negligence would result in a virtual betrayal of personal trust, and so medi-



cine has been far more susceptible to liability. The legal profession is similarly obligated to its clients.

It was not until recent legal history that the architect and engineer have been held liable. Cases arose around the turn of the century as a result of flagrant violation of what would be considered professional competence.

Finally the development of third party liability arose (*see* "Fall of the House of Privity," AIA JOURNAL, Oct. '60). This concerns a breaking down of privity or the need for a contractual relationship to exist in order for one party to be included within the scope of another's liability. Third parties outside of the contract, but who could nevertheless be owed a duty by the architect to design a building safe for occupancy, were brought into the picture.

A further factor affecting the development of liability is a general worldwide social upheaval in which we find ourselves enmeshed in many forms, from increased national interests in newly created countries to the feeling that the government should provide for indigents and furnish socialized insurance for individual citizens. The concept of socialism has helped to influence the courts toward the finding of liability without fault; thus, if someone is injured, he should apparently be provided for, regardless of who or what is at fault.

This concept is seen, for example, in Workmen's Compensation laws, in proposed legislation of a similar nature for persons injured in automobile accidents, and for proposals of socialized medicine. Thus, it is that in our private enterprise economy, attempts are made to find ways to provide compensation to injured persons through insurance and private means, instead of having them look for retribution to a central government. The architect, as well as other professionals, is thus being found liable for errors, omissions and acts formerly considered to be outside his zone of risk.

The trend is toward the legal doctrine of strict liability and the architect is among those caught up in it. Moreover, architects are entering new areas of activity (expanded services), and this broadened scope of practice has opened the door to further liabilities. The team effort of the interlocking design professions has increased liability exposures in that the architect, in his desire to become or remain team captain, accepts liability under the kind of contractual relationship which he feels is appropriate as a practicing professional.

**The Word Gets Around**

As lawsuits became prevalent and architects found themselves enmeshed in an expanding concept of liability, some sought out a form of protection which did not previously exist because of the absence of need. This protection took the private enterprise form called insurance, but no meaningful history of this type of professional liability was available prior to the 1940's.

So the only kind of insurance available was of a very limited nature and required, generally, that

an accident occur before obligating the insurer. In some cases, insurance was obtainable, but the rates were extremely high because of uncertain exposure. It became apparent to architects that a more positive form of protection had to be found and the market was searched in greater detail.

The AIA Committee on Insurance over a number of years explored the problem of liability insurance without finding either a satisfactory policy or a satisfactory carrier. Seeking the most knowing insurance assistance available, the Committee brought in the firm of Victor O. Schinnerer & Company, Inc., of Washington, D.C., as broker to help with the technical aspects of drafting the policy and to search for an underwriter when the final "tailor-made" policy was developed.

The firm conducted extensive studies, surveyed AIA members and drafted a policy form in close cooperation with the Committee. The search for a carrier to underwrite this form was protracted since few of the major insurance companies would venture entering into an entirely new field and issuing a completely new policy on which there was no experience to serve as a guideline.

Finally, Continental Casualty Co. agreed to give the policy a trial underwriting period. At this point the National Society of Professional Engineers joined as co-sponsors of the policy, since those of its members in consulting work had almost identical problems.

As the number of litigable claims mounted, a question that emerged was whether the existence of insurance was generating claims against architects. This is, of course, not a new question; nor is there a new answer. While there is little doubt that the existence of insurance tends to generate lawsuits, legal obligations arise not as a result of the insurance but because of the reverse; namely, that insurance becomes necessary to protect against legal claims conceived as an economic and social obligation.

The inception of insurance generally increases the number of legal claims in any field. After a period of intensive defense and growing understanding on the part of courts, attorneys and people in general, the situation stabilizes and the insurance becomes truly a protection against ordinary losses which occur in the normal course of human affairs.

As more and more lawsuits and claims arose under the insurance policy from 1958 through 1963, the courts began to find a "product liability" key inadvertently included in the policy by virtue of its extreme breadth of coverage. The broad coverage was an attempt to protect the architect and engineer in all possible circumstances.

This product liability key is described as follows: A manufacturer of a product is unable to obtain insurance which will cover him for the replacement of a faulty product. He may buy insurance to protect himself from liability to others who are injured as a result of a faulty product, but not for the replacement of the product itself. Experience under the professional liability policy has shown that the architect, as a result of his job inspection activities, was apparently obligated to determine whether a product used in the course of building construction was faulty.

Thus, if a faulty product were incorporated into the construction, resulting in a detriment to the owner, the architect found himself charged with the responsibility of paying for the replacement of the faulty material or product.

The existence of insurance probably gave rise to some of these types of cases. Aggressive plaintiffs' attorneys, trying to spread the burden of liability to as many areas as possible, found this area available, one in which the architect was never meant to respond and in which he had previously not been liable. It is the sort of situation which can occur when a new legal area arises.

Because of the lack of a statistical history for the setting of insurance rates when the professional liability policy was issued, rates were fixed on the basis of several educated guesses. Claims for the first two or three years after the inception of the commended policy form were minimal; therefore, the insurance company concluded its arbitrarily set premiums were too high.

So, the rates were reduced. Unfortunately, however, a two- or three-year lag was found between the time this class of insurance goes into effect and the appearance of claims. Claims appear upon the inception of construction and remain fairly stable for about two or three years, when a substantial increase occurs.

Thus, at the end of the third year of the program, claims had grown to the point where it was obvious that losses would increase. Losses did occur and it became necessary for rates to be increased, which really meant a return to the original rates that had been in effect. For those who had not been under the original rate schedule, it appeared that increases were being made. This did occur later in order to cover further increasing losses.

Some of these losses occurred four to five years after designs had been completed and after the inception of the policy. Claims made 20 to 25 years after the design was completed were handled by the retroactive policy feature.

Finally, a very substantial net underwriting loss was experienced by the insurance carrier. At this point it was obvious to all concerned that a new

course of action would be necessary. Carriers other than Continental Casualty had entered the market on a limited regional basis. None of these carriers had proper information to indicate the true picture of the pitfalls involved in underwriting architects' and engineers' professional liability insurance. Further, The American Institute of Architects and the National Society of Professional Engineers felt an obligation to their memberships in *all* states and concerned themselves with a program which would be available nationally.

The national program also has the effect of adding the number of dollars available to a single pool to cover insurance losses. Fragmentation of this pool is a rather dangerous concept with a catastrophic type of insurance such as professional liability. In life insurance, statistical analyses are available, and losses take place in small quantities spread out over almost every minute of the day; but in professional liability insurance, a loss might not occur for many months only to suddenly strike with an impact of several million dollars resulting in a possible monetary catastrophe.

**Courts' Decisions and Insurance Claims**

Insurance losses grew to the point where the danger of cancellation or withdrawal by Continental Casualty seemed imminent. To have as much data as possible available to the various groups charged with the responsibility of a solution, it appeared appropriate to have the existing claims data analyzed statistically in various ways. These data would then be available as source information for the rewriting of the insurance contract.

The writer chose to analyze all available data including reported court decisions, and decisions which were unpublished but were in the archives of the insurance company and the insurance counsellor. Also examined were unrecorded decisions obtained from attorneys who forwarded the information voluntarily in the event it would be useful to the program generally. The source of data, whether a reported or unreported court decision, or simply an insurance claim still in process of settlement, has not been indicated or separated out of the data as they are presented.

These data are useful in many ways to the various groups interested in professional liability. Attorneys can find information helpful in the preparation of cases, in the attempt to more appropriately question their clients, and in gaining further expertise in the field of professional liability. Insurance underwriters are enabled to understand more clearly the kinds of claims that are made against architects and in what manner claims may be historically related to premium costs and loss ratios.

From the architect's standpoint the data yields an explanation of existing insurance rates and exposure to liability. He can more easily understand his exposure to risk and formulate a preventive program of office procedure and professional practice to minimize losses and exposures. The assigning of the statistical data into various categories is necessarily an arbitrary one. Those selected for this study are design-phase error, construction-phase error and business error.

The design-phase error stems either directly or indirectly from the actual design of the building. It includes errors in drawings, specifications, incorrect computations for heating systems, incorrect or faulty computations for structural members, etc. Errors or omissions in construction-phase grow out of the actual construction and result in such claims as those for faulty observation or supervision, improper or negligent certification of payments to contractors, etc. Business errors include late delivery of plans, faulty cost estimates, etc.

The so-called business error was separated from the design-phase and construction-phase error because it appeared that certain kinds of errors or omissions do not arise out of the architect's professional capacity or competence, but are a measure of his capability of conducting his own practice economically and with consideration for accepted business principles. If, for example, the late delivery of plans were to have arisen out of an improper estimate of drafting-room load, it seems improper to view any resultant damage to the client as a professional error. A design error which had to be corrected, and therefore caused plans to be late, would be classified as design rather than business error.

Claims were analyzed from four basic sources: 1) those of $25,000 and over, a record of which has been kept by the Schinnerer firm and an analysis made by the writer; 2) the Schinnerer analysis of the same claims; 3) the 197 claims analyzed by the writer, selected at random out of 3,900, a record of which is kept by Continental Casualty; 4) the Continental Casualty general analysis of these claims.

It appeared infeasible to list 50 or 60 cases (each of which could involve several pages of factual data) in addition to the number of pages of claims discussion or evidence as presented in lawsuits resulting in legal decisions, some of which had been appealed, etc. An accumulation of total information would make a burdensome and unwieldy presentation. Although the presentation of the results may not seem to be rigorous, the analysis resulted from careful and detailed appraisal of data as they appeared in the cases (some of which fit into several categories and may thus be more illustrative of a trend in one direc-

tion than in another). This approach is reflected in the summary of the data.

The following conclusions result:

1) A substantial majority of the claims are in the design-phase error category.

2) Approximately 15 percent—a highly significant amount of claims—is in the construction-phase category.

3) Personal injury claims involving injury to either workmen, passersby or parties directly involved in the contract, comprise only 5 or 6 percent of the large monetary claims, but as high as 24 percent of claims of all sizes. About half of the latter arise out of the construction phase, the other half out of the design phase.

4) About 25 percent of the design-phase claims stem from errors made by engineering consultants to the architect.

5) Negligent certification of payment comprises one-fifth of the large construction-phase claims but only about one-twentieth of the construction-phase claims of all sizes.

6) Late delivery of plans and faulty cost estimates comprise only a negligible percentage of all claims.

In the light of these data, it is appropriate to examine the exclusions as they appear in the new AIA-commended professional liability policy issued by Continental Casualty. This analysis was conducted by an AIA representative to ascertain whether the proposed changes to the policy could reasonably be expected to reduce the tremendous losses experienced and at the same time continue basic coverage for the architect. It was felt that if the policy were to be emasculated by an overzealous attempt to insert exclusions which would prevent any losses from occurring, the effect would be no insurance at all.

Negotiations proceeded toward an appropriate agreement which would enable the insurance company to anticipate the possibility of minimizing losses and continue to provide coverage for those kinds of errors and omissions which a responsible and competent architect might experience. It appeared at the inception of the 1957 program that the policy was written to insure the architect for errors and omissions resulting from acts which many architects had embraced as a responsibility without a true understanding of the legal exposures.

There was no attempt during the recent insurance negotiations to reduce coverage by limiting the scope of the practice of architecture as it is known by most architects but rather to define that scope with greater clarity. Interestingly, few architects were in agreement regarding the limitations of their practices.

The difficulty of the prolonged attempt to define the practice of architecture is, in itself, an indication of the confusion that exists in the minds of most architects regarding those elements that should constitute their service to the client. Thus, although the new policy excludes coverage for certain activities which some architects consider a necessary part of their practice, other architects feel no resultant limitation.

Basically, the errors, omissions and negligent act coverage remains as it has been from the inception of the program and, as is seen from this analysis, is coverage which the architect must have. Further, many of the exclusions can be eliminated by endorsement, and others may be covered by insurance which is available under other policies.

**Recommendations**

This analysis indicates several recommendations that would be appropriate as a means of increasing the defense posture of the architect and enable him to engage in a prevention program similar to those followed in preventive medicine. Since it appears the majority of losses are in the design and construction-phase categories, these areas require continued education toward additional competence. This is imperative.

Not only must the education standards of the universities be raised, but it would seem discreet to have formal adult-education seminars conducted on a regular basis in every area of the country. The medical and the legal practitioners engage in such activities regularly. Similar opportunities seem generally not to be available to the architectural profession, apparently because of the aura of uniqueness with which each architect may surround himself, and possibly because of the fear of loss of clientele resulting from an exchange of information with fellow practitioners.

This educational activity would help increase the technical competence of the practicing professional, and a substantial amount of it needs to be carried on especially in view of the constant increase in knowledge, coupled with the progress that has been made technically. More quality control of the drawings and specifications as offices get larger is also a necessary accomplishment. Checking and coordinating drawings and specifications is seldom done thoroughly enough.

Careful use of new methods and materials is imperative. It is a necessity for the architect to require that the manufacturer or producer of a new material or new method stand foursquare behind it. The architect should not be asked to experiment with a new product or a new method and in addition be asked to support the experiment financially in the event it fails.

Another area of great importance disclosed by the data is the need for better control of consultants. It is possible that some alteration of the

present contractual relationship between architects and engineers or other consultants might enable the architect to protect himself from responsibility for errors of the consultant.

Where, however, the architect seeks to maintain control over the activity of the consultant, not wanting the consultant to act as an independent contractor, then the architect must be willing to face the liability in the event of consultant error.

The watchwords of care, caution and competence might well be good slogans for architectural offices to imprint upon their drafting boards. It would further appear appropriate for the practitioner to recognize the limitations of normal professional practice in the field of architecture.

The ordinary acts which constitute the practice of architecture in a particular community make up the standard to which the architect is held. If he extends himself beyond these ordinary architectural practices, he must realize that he is exposing himself to additional risk, and hence liability. This obtains not only with regard to the so-called expanded services but also with the simple extension of exerting too much control over the contractor. It is important for the architect to realize that *he* does not build the building; the contractor does so. The architect designs it; the owner pays for it; the contractor builds it.

The architect must decide where his practice stops and where the responsibility of the contractor in the construction of the building begins. These are not always simple clear-cut positions to determine, but the architect nevertheless should determine the extent to which he wishes to reduce his zone of risk.

As a further result of analysis of these data, it would seem appropriate to make certain that documents the architect uses in his contractual relationship with his client, as well as documents the architect may recommend to his client for use in forming a contractual relationship with the contractor, are the latest edition as published by the AIA.

A continued and frequent review of these documents is conducted and is a necessary part of a program for the prevention of deterioration of the legal rights and responsibilities of the architect.

**What Does the Future Hold?**

In most instances where the law finds a new area of liability, there seems to be a leveling out of the number of lawsuits as well as a reduction in the size of claims. Defense forces gradually yield a resulting predictable average of generally proper and justifiable claims. It is important for architects to be aware that they do not guarantee a perfect building, that they are fallible human beings susceptible to error. Some of these errors are such as to not support a claim but, when they do, the architect should recognize that if his mistakes result in injury or a detriment to another, he must respond in damages either by himself or through insurance. He is further obligated to answer for the errors of his subordinates. He takes the primary responsibility and must be in a financial position to support any losses that should occur due to error.

But cases have arisen in which architects were surprised to find they were liable. These are the areas in which, through proper defense and through re-examination of the services rendered in practice, a reduction in claims can be effected. The education of attorneys on the practice of architecture and methods of the construction industry has begun to take place; it will continue to have beneficial effects on the architect's status in the courtroom.

The availability of insurance is, of course, of primary concern to the architect. Just the same, it is not a panacea. Insurance cannot be expected to protect the architect in all instances in which he may find himself the unfortunate victim of a lawsuit. One of the risks of being in practice is that of having to support one's *business* errors for which no insurance is available.

The claims pattern will ultimately take its place amid other more mature legal areas, claims being made for generally legitimate reasons. Then the architect can return to designing buildings instead of being overly concerned with his legal responsibilities. Ultimately, too, the practice of architecture will be defined by limits that are readily recognized by the practitioner.

This is not meant to indicate that architecture will ever again be simply the designing of buildings. The complexities of the modern construction industry require an amount and scope of knowledge necessary for the practice of architecture that is generally beyond the capabilities of any single individual. The need for several individuals to join together to design a complicated structure immediately exposes each of them to additional risk.

Because of the legalistic society in which we live, it is somewhat less than discreet for the architect to believe that through care, caution and competence he will make no errors and therefore have no lawsuits. He may not err but nevertheless be sued. He may be only peripherally involved in a claim against the owner or against the contractor, but he will be asked to defend himself and to show why *he* is not liable.

He must not only be knowing but prepared to act in his own behalf. If he remains unprepared, he may well find himself destitute of design, by design. ■

# SCSD: A Report from the Field

BY MARILYN E. LUDWIG

SINCE THE AIA JOURNAL'S last report on the School Construction Systems Development project,* SCSD has evolved from a gleam in the eyes of its staff to an actuality. A four-classroom mockup building has been erected on the Stanford campus at Palo Alto; bids are in on several of the California schools originally included in the SCSD project; a plant in Milwaukee is turning out the structural-lighting-ceiling system components in production quantities.

The system has been widely publicized from the start. It has, in fact, gotten somewhat more publicity than its spiritual godfathers on the project staff might have wished, particularly from a few overenthusiastic journalists who hailed it as a magical way of saving money on school construction.

If there is anyone left in the architectural profession who has not heard about SCSD, it was—and still is—a research effort undertaken to encourage and implement the development of a group of compatible components, amenable to mass production, with which architects can design schools having maximum flexibility and amenity, at competitive costs. Ezra Ehrenkrantz AIA, project director, sought and obtained financial support from Educational Facilities Laboratories, Inc., and the project was born. The dozens of empirical decisions which Ehrenkrantz and his staff had to make (Which parts of the structure should be included in the system? Which not? How much flexibility?) are documented in the earlier JOURNAL article.

Successful bidders on the first component group were Inland Steel Products for the structural-lighting-ceiling system; Lennox Industries for heating, ventilating and airconditioning; and the E. F. Hauserman Co. for interior partitions. Hough Manufacturing Co. and Western Sky Industries supply the operable partitions. (An alternative group of components, using a "Space Grid" system devised by Butler Manufacturing Co., was developed later.)

While the evolution of SCSD on the West Coast has been under close and constant scrutiny, a school incorporating the components has been quietly and steadily rising on the prairie, a few miles north of Chicago in Barrington, Ill. The Barrington Middle School—initial enrollment, 900 sixth-, seventh- and eighth-graders—opened without undue fanfare this winter. The educational philosophy of its administration, and the admirable ways in which the school design adapts to that philosophy, are certainly worth noting.

To anyone interested in evaluating SCSD's strong points, and possible weaknesses, Barrington is even more significant. It is not only the first SCSD school built; it is the first constructed outside the 13 districts for which SCSD was developed, and thus represents a step away from the controlled, experimental-laboratory situation.

The evolution of the Barrington school began about the same time the SCSD mockup building was going up at Stanford. The school board was in the process of selecting an architect for the town's new middle school. It picked Spencer B. Cone AIA, a principal in the Chicago firm of Cone & Dornbusch.

The more Cone conferred with Dr. Robert Finley, superintendent of schools, the more firmly the architect became convinced that SCSD would provide the kind of school Barrington wanted. The educational philosophy of Dr. Finley and his associates requires almost infinite flexibility of space, of time and of thinking. Their ideal school would be totally ungraded and contain no fixed interior partitions.

The program at Barrington calls for "modular scheduling," with multiples of a basic half-hour time module being substituted for the traditional 42- or 57-minute class period. As Dr. Finley explains, "Forty-two minutes is probably too long for the home economics

* "SCSD: Better Schools for the Money," Sept. 1964.

*One of a series of papers prepared by members of the AIA Committee on School and College Architecture and by selected specialists to make laymen aware of school building problems and trends and to stimulate discussion. They are not intended to be definitive last words and carry only the authority of their respective authors. New subjects are being developed and contributed articles are welcome. Reprints of these nontechnical articles are widely distributed to educators and interested laymen. One copy of each current issue will be sent free of charge; additional copies, 10¢ each.*

teacher to lecture her class on principles of nutrition—but it isn't long enough for their fudge to harden!" Confronted with the problem of viscous fudge, a teacher in another school might be told to "let it be a challenge." At Barrington, she may elect to divide her two hours' instruction per week into one module of lecture on Tuesday and three of fudge-making on Thursday, or almost any other arrangement that *might* work. (The "might" is important. The administration at Barrington feels strongly about the value of experimentation; a school which cannot provide a built-in capacity for a second guess isn't worth much in its book.)

Pupil/teacher ratios are likewise flexible. The ratio may be 1/1, in certain situations; in others, perhaps 1/90. Classroom dimensions must take into account this changing situation.

What is a middle school for? Experiment, says Dr. Finley, sandwiched between basic education in grades K-5 and the direction-finding of the high-school and college years. Barrington's design had to be, and is, experiment-oriented.

As this was being written, the school was close to completion. Even unfinished, without glazing, built-up roof or landscaping, it was impressive. Once inside the lobby, the visitor will find himself staring through a glass wall into a tiered, interior study court, centered around an ornamental pool and flanked by raised platform stages, one in the cafeteria and the other forming an upper level in the learning center (library—plus).

Three classrooms fan out to the south, east and west. Shop, music, home ec and science classrooms, plus a planetarium, occupy a wing across another court. The gym is a separate 110-foot square, with locker rooms underneath, reached by a ramp from the lobby.

There are no conventional corridors in the classroom wings. Traffic will move along the perimeter of the open-end classrooms; bookshelves can be used as half-height dividers. Since the modular time-schedule means that some, but not all, of the students will move from class to class at half-hour intervals, noise could conceivably be a problem in the open passageways. Dr. Finley does not foresee any difficulty. He points out that the school will be totally carpeted; also that changing classes at Barrington will not mean an entire student body uncaged simultaneously, as under conventional scheduling. One also gets the idea that in the Barrington scheme of things, a little noise is not going to kill anybody.

The 7,000-square-foot learning center will hold a lot of books, periodicals and audio-visual materials but no checkout desk, and no librarian in the usual sense. At last report, Dr. Finley was looking for a librarian "who wouldn't *act* like one." A sort of honor system will prevail, and presumably most of the books will eventually find their way back to the shelves. (Finley tried this in another school system; a year-end inventory turned out more books than the library started with in September.)

The SCSD components get a full workout. Sections of the roof deck are "off the rack," right from the factory, except for the extra-long spans used in the gym, which had to be assembled on the site. The perimeter "corridors" use translucent panels in the lighting troffers to provide a luminous ceiling; classrooms will utilize both the direct and indirect lighting capabilities of the system. (Except in the lobby and around the courts, there is little glass in the school. Strip windows are used in angles of the classroom wings—presumably to let faculty and students see whether it's raining and prevent what astronauts call the "breakoff phenomenon," but there are no window walls in classroom areas.)

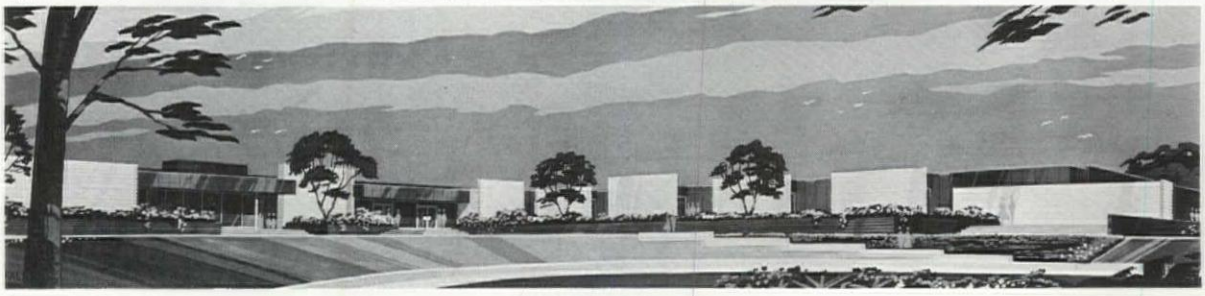
Dr. Finley does not feel that the decision to use SCSD acted in any subtle ways to reshape the administration's thinking about the school. He says, "The educational program is what's important, and that was determined before we had ever heard of the system. People who are interested in SCSD tend to overemphasize the physical plant and to slight the educational philosophy. The main advantage of SCSD is that it allows enough flexibility to protect the community from its educators." Not only should the current administration be able to experiment, he feels; educators who come along later should not be penalized for the whims of their predecessors, immobilized in steel and masonry.

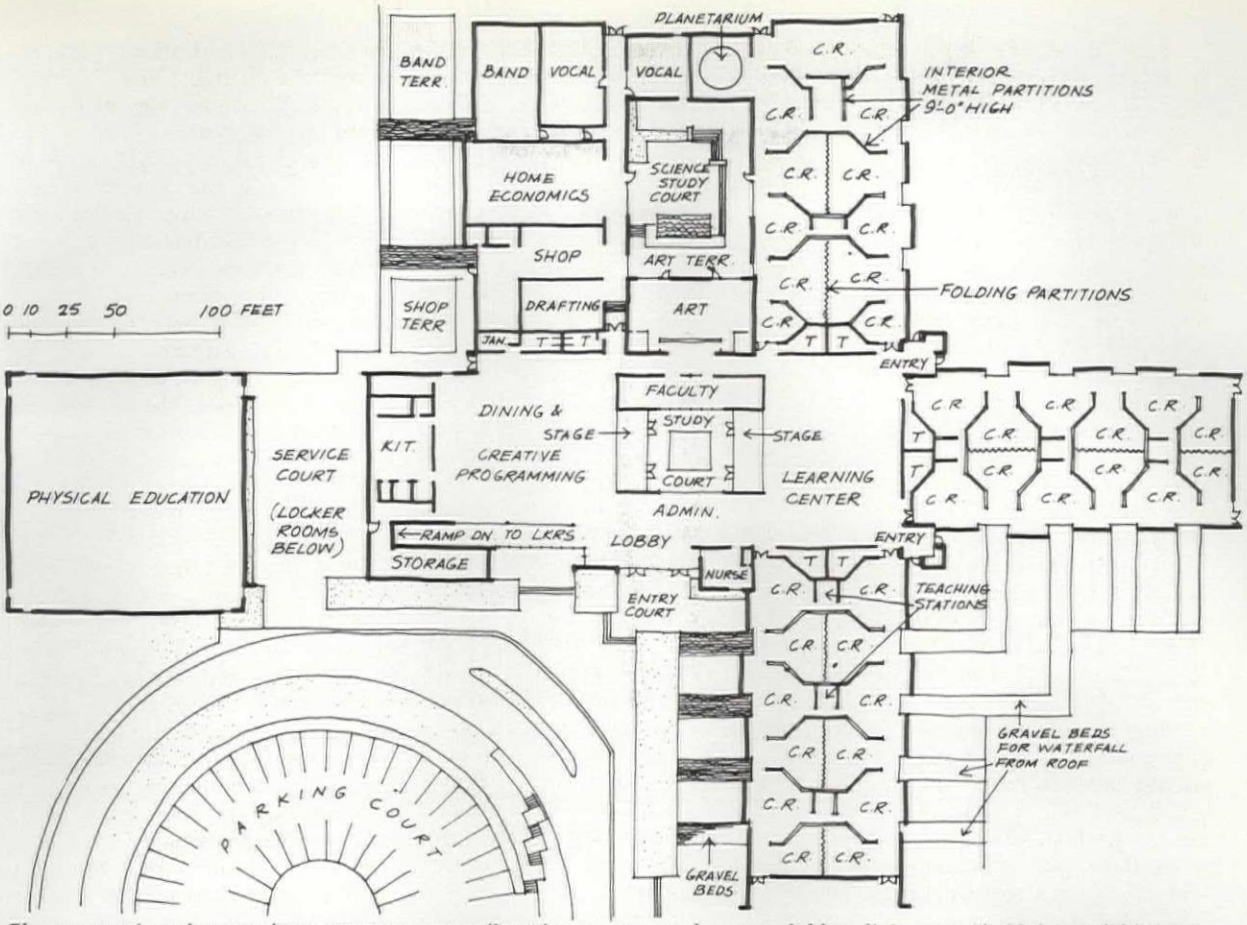
Barrington did, in fact, make at least one concession to SCSD. The original concept called for a round, domed gymnasium; the rectilinear character of the deck components obviously militated against this. Rather than bid the gym separately, outside the system, the board settled for a square. SCSD did give them a bonus, however; since heating and airconditioning equipment is located on the roof, space originally intended as a boiler room now serves as a health classroom.

There is no denying that bidding procedures and contractual relationships during construction were complicated. The board of education had separate contracts with each of the component suppliers, since the price of system components is the installed price. There was also a general contractor, responsible for excavation, grading, masonry walls and plumbing. Inland, as supplier of the structural-lighting-heating system, in turn subcontracted part of the electrical work to a local contractor. (Because the system components incorporate much of the equipment, fixtures, etc., normally supplied under the electrical contract, contractors may be understandably reluctant to bid on jobs where the components are to be used.)

Everyone agrees that the Barrington job required more than the usual amount of coordination and negotiation on the part of the archi-

*Gymnasium, although massive, is at lower grade level than classroom unit, thus does not overpower rest of school.*






*Classroom wings fan out from common areas (learning center, study court, lobby, dining room). Noisy activities are segregated from classroom areas. Ramp off lobby leads to locker rooms, which are located under service court.*

tect. In jurisdictions which require separate contracts on all construction over a specified dollar amount, things could get further complicated. (All component suppliers for the California schools will be coordinated under a general contractor.)

Another possible complication has been pointed out by Alan C. Green, associate professor of architecture at Rensselaer Polytechnic Institute and coordinator of a feasibility study of potential application of SCSD in New York's mid-Hudson region. What about jurisdictions which impose a mandatory "or equal" clause? In Green's words, "If the component is not totally owner-supplied, the law [may require] that its inclusion in the bidding documents invites anyone to bid on it, as long as they can provide an 'or equal' or equivalent to the component as described in the specification. . . . How can the district guarantee the developing manufacturer that he will get to furnish the component? After all, that is the basis on which the components were developed in the first place. The whole question will probably require some legal untangling."

Bidding difficulties are not the only potential problem with SCSD. Architects like Cone, Green and others who have studied the system intensively get frequent calls for advice concerning its advantages and limitations. Frequently the caller wants to know whether SCSD is appropriate for construction in severe climates.

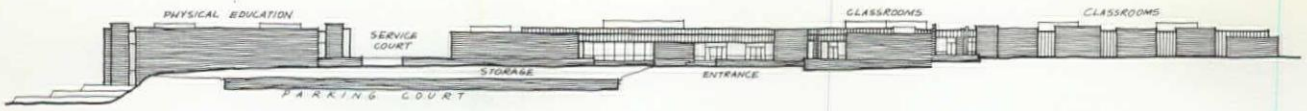
There are also those who wonder about the heating-ventilating-air-conditioning system. Since the air supply uses ceiling diffusers, it is more advantageous when the air supply is cooled; however, students in rigorous climates could conceivably suffer from chilly feet if supplemental heating were not supplied at floor level. A modification has been made at Barrington to provide this.

Despite conscientious disclaimers by the SCSD project staff, rumors still persist that the system will provide a sure-fire way to save money on school buildings. Barrington is not a perfectly controlled test laboratory for this hypothesis. It may enjoy a slight financial edge as a result of proximity to Inland's Milwaukee plant (although Inland is intensively exploring the most economical ways of shipping the deck components). It was the first experience for contractors in working with the components, and Cone feels they tended to be ultra-conservative in the first round of bidding. First bids came in high; after negotiation and familiarization briefings, the job was rebid and came in at a much more realistic figure. Component manufacturers are now developing a set of indoctrination aids, including film and slide presentations, for the edification of prospective bidders.

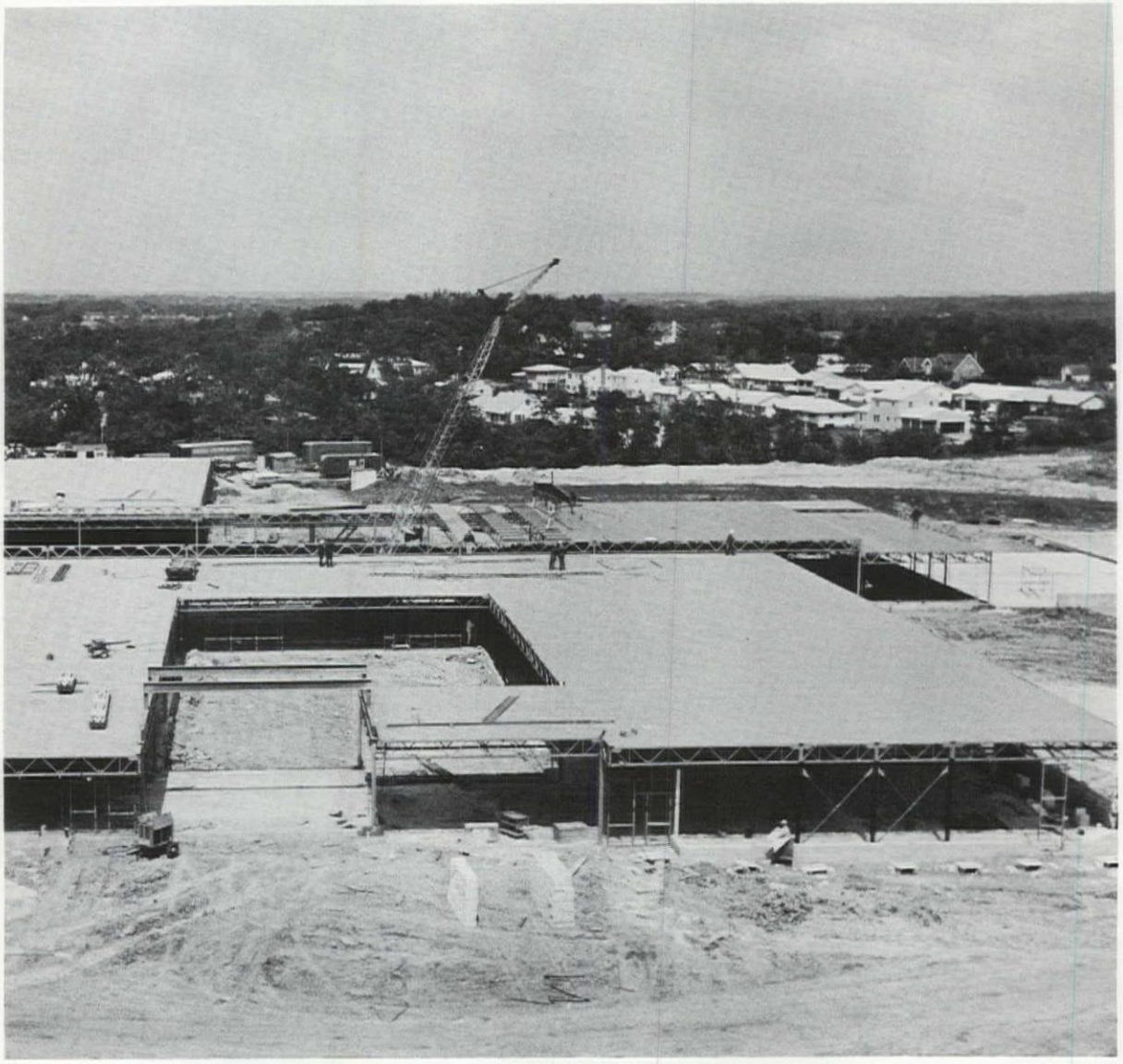
Square foot costs are a perennial goat of architects; they are in disfavor as unrealistic and misleading. Everybody quotes them anyway. For what it is worth, Barrington eventually came in at $12.61 per square foot, including carpet.

When Ehrenkrantz first presented the project before AIA's Committee on School and College Architecture, he was asked, "Won't all the schools using the components tend to look pretty much alike?" His off-the-cuff reply at the time: "They had damn well better not!" One of Dr. Finley's assistants phrased it another way. "No more," he said, "than all people look alike because the human skeleton is a fairly standard component system."

One factor which might tend to-




*Aerial view during construction of school reveals aspects of components system such as off-the-deck roof deck.*



ward look-alike buildings is the height limitation. Although two-story buildings are planned, a spokesman for one of the component suppliers has conceded publicly that the system is probably not suited to high-rise construction.

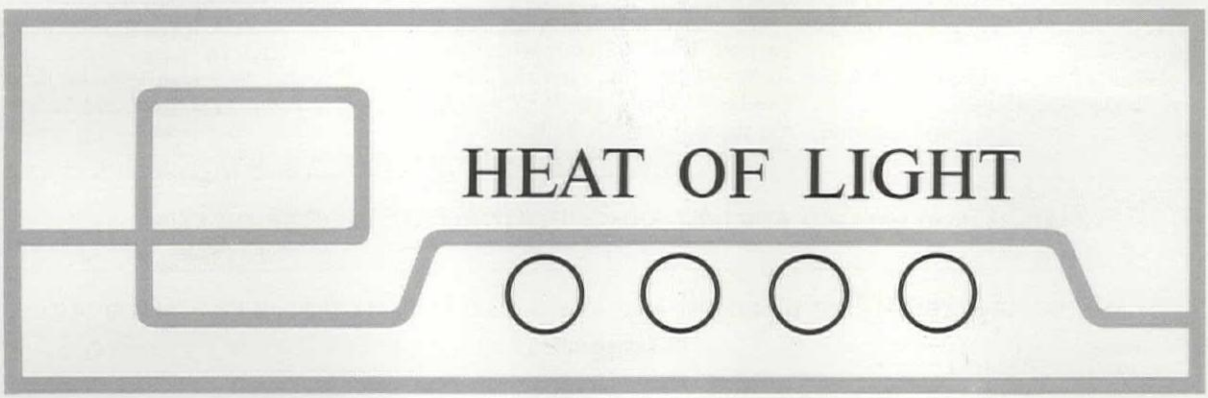
What, then, is there to report from the field? At this writing, the returns are far from all in. Its users are enthusiastic about the school; faculty and students were familiarized with the school beforehand, and a good public relations program produced enthusiasm among the parents. Now that construction dust has settled, Cone feels that a least a few general conclusions can be drawn. The comments which follow are his:

• "All problems with components that caused delay have now been solved. Future projects will benefit from improvements in design, fabrication, quality control and erection procedures as a result of Barrington. . . . The bugs that plagued us have largely been eliminated."

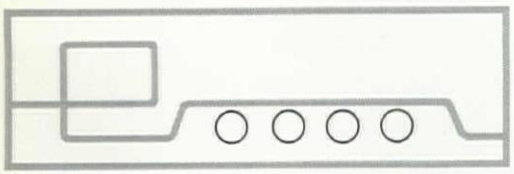
• "Component system buildings will be no better than the design and engineering behind the project. The component system does not minimize the responsibility of the architect, nor reduce the design, engineering, drafting or supervisory requirements normal to any construction system."

• "Possible advantages to the architect may be found in the potential for accurately predetermining approximately 50 percent of construction cost prior to final working drawings and specifications, and in the system's potential for fast erection (not realized in our project)."

• "I am convinced that benefits . . . far overshadow the problems involved. A new and different attitude exists toward this building than for any other we have designed. There is a feeling that it is alive, nonstatic, expected to grow and improve with use as initial space concepts are tested. Occupants have been freed from . . . restrictions imposed by solid and immovable walls. The very idea that areas may be easily altered, excites the mind and encourages new and better programs and uses of space." ■




There is more energy in the electric light bulb than meets the eye. Tests have shown only a sixth of the input energy comes out of fluorescent lamps as light. The rest is heat. ■ Incandescent lamps produce even a greater proportion of heat. Moreover, illumination levels in industrial and commercial buildings are on the rise. ■ The implications are obvious. As illumination increases, so does its incidental heat, and so does the appeal of a concept aimed at recovering this heat for winter deployment. The enchantment mounts when the system involved can be turned toward the expulsion of heat in summer, reducing the load on cooling systems. ■ For all its relative newness and intrigue, the heat-of-light idea is a practical reality in scores of buildings across the nation. ■ Electric heating in general is enjoying a noteworthy increase. Such installations number more than 2 million and this, according to the Electric Heating Association, is eight times the 1956 total. ■ The cost of electric energy compared with the fossil fuels and applied in the conventional resistance method is something to be determined locally. In Washington, one engineer found electricity to be the least costly. In the case of integrated heat-of-light systems, cost advantages appear to warrant the investigation of architects everywhere. ■ In any event, the articles which follow are intended as an overview of developments in electric heating and, more particularly, in the integration of thermal and illuminative systems.



# A Case Study of Comparative Costs

BY NASH M. LOVE

PLANS WERE about 93 percent complete when our firm, Nash M. Love & Associates, consulting engineers, was asked by officials of the Potomac Electric Power Co. to consider an all-electric building concept.

The plans were for a seven-story, 47,500-square-foot addition to the Philip Murray Building, national headquarters of the International Union of Electrical, Radio and Machine Workers AFL-CIO in Washington, D. C.

Although the original structure was heated by gas and cooled by electricity, we—the architectural firm of Clas & Riggs and our consulting engineering firm—analyzed comparative costs of both gas and oil. The possibility of electric heating was considered, but the rate structure seemed to preclude its use.

A recommendation was made to install oil fired boilers for heating and an electrically driven centrifugal compressor for cooling. The hot or cold air would be delivered from ceiling outlets and units under window sills.

Now here was the utility reporting that lower rates had just been approved by the District Public Utilities Commission. Why not electric heating for this building?

A preliminary study showed possible economic advantages in the proposal. A detailed analysis of all-electric vs. fuel oil heating was made and compared (see charts).

Aside from installation savings, we discovered other electric heating advantages in annual costs. Insurance and District taxes would be less, etc. Overall, we found that an all-electric building would end up costing $6990.32 yearly, while fuel oil heating would run $12,842.36.

These "plusses" along with non-economic advantages—fresher office space, no smokestacks and soot, greater reliability and safety —persuaded the client.

**CHART 1: ESTIMATED BUILDING COSTS UTILIZING ALL-ELECTRIC HEATING**

I. ANNUAL ELECTRICAL CONSUMPTION AND COSTS FOR ALL-ELECTRIC OFFICE BUILDING:

| Month | Estimated Billing | | | | | Total Cost |
|---|---|---|---|---|---|---|
| | KW. HRS. | ACTUAL KW. | BILLING KW. | ENERGY CHG. | DEMAND CHG. | |
| Jan. | 228,000 | 671 | 314 | $ 2,040.60 | $ 579.50 | $ 2,620.10 |
| Feb. | 197,000 | 664 | 312 | 1,816.20 | 576.00 | 2,392.20 |
| March | 181,000 | 599 | 312 | 1,701.00 | 576.00 | 2,277.00 |
| April | 140,000 | 516 | 312 | 1,405.80 | 576.00 | 1,981.80 |
| May | 147,000 | 322 | 312 | 1,456.00 | 576.00 | 2,032.20 |
| June | 142,000 | 338 | 338 | 1,435.80 | 621.50 | 2,057.30 |
| July | 146,000 | 356 | 356 | 1,475.40 | 653.00 | 2,128.40 |
| Aug. | 122,000 | 338 | 338 | 1,272.00 | 621.50 | 1,893.50 |
| Sept. | 107,000 | 322 | 391 | 1,141.50 | 714.25 | 1,855.75 |
| Oct. | 124,000 | 481 | 481 | 1,289.40 | 871.75 | 2,161.15 |
| Nov. | 157,000 | 591 | 591 | 1,528.20 | 576.00 | 2,104.20 |
| Dec. | 213,000 | 645 | 645 | 1,931.40 | 576.00 | 2,507.40 |
| **Total** | 1,904,000 | | | $18,493.50 | $ 7,517.50 | $26,011.00 |

**Chart Notes:** 1) average rate 1.366c; 2) based on 47,500 sq. ft. net rentable area; 3) no D.C. sales taxes included; 4) all figures based on normal 8,600 cooling degree hours for electric-driven refrigeration equipment and normal 4,333 degree days for winter heating.

II. SAVINGS IN INITIAL BUILDING INSTALLATION COSTS:

| | |
|---|---|
| A. Omission of heating plant, stack, piping, fuel oil system and tank, wiring, etc. | $48,550.00 |
| B. Omission of bus duct, changeover of existing service and across-the-line starting | $14,300.00 |
| **Total omission** | $62,850.00 |
| C. Additional cost of electric wiring to resistance heaters from secondary side of transformers in 4th floor equipment room | $ 5,400.00 |
| **Net saving** | $57,450.00 |

III. ANNUAL ENERGY COSTS USING ALL-ELECTRIC HEAT:

| | |
|---|---|
| A. Electric energy costs with electric heating | $26,011.00 |
| B. Electric energy costs without electric heating | $18,433.68 |
| **Net difference** | $ 7,577.32 |
| C. Less energy cost of heating equipment | $ 587.00 |
| **Cost of Electric Heating** | $ 6,990.32 |

A three-bank, 780-kilowatt electrical coil unit was selected to preheat the fresh air and reheat hot decks. An 8-foot circulating fan distributes the air throughout the building. Heat is extracted from ceiling fluorescent lights by return air.

The conventional boiler in the original building has been replaced by electric immersion water heaters, permitting continued use of the hot water system in the older building.

Indications are that the system, which went into service in March, is running close to original detailed cost estimates. IUE officials report a performance exceeding their expectations. ■

**CHART 3: HEATING COST COMPARISON**

| Item | Fuel Oil | All-Electric |
|---|---|---|
| 1. ENERGY OR FUEL COST ONLY | $ 1,942.00 | $ 6,990.32 |
| 2. INITIAL COST DIFFERENCE | 57,450.00 | |
| 3. ANNUAL COST DIFFERENCE | | |
| A. Debt service computed at 8% without reserves for amortization | $ 4,596.00 | |
| B. Insurance—80% coverage at $0.60/thousand | 27.60 | |
| C. D.C. Taxes—60% assessment real value at $2.50/$100.00 | 861.76 | |
| **Total** | $ 5,485.36 | |
| 4. ANNUAL OPERATING COST | | |
| A. Operating engineer (58% of year) | $ 4,560.00 | |
| B. Boiler cleaning | 640.00 | |
| C. Feedwater treatment | 215.00 | |
| **Total** | $ 5,415.00 | |
| 5. TOTAL OF ITEMS 1, 3 AND 4 | $12,842.36 | $ 6,990.32 |

**CHART 2: ESTIMATED BUILDING COSTS UTILIZING FUEL OIL FOR HEATING**

I. ANNUAL ELECTRICAL CONSUMPTION AND COSTS

| Month | Estimated Billing | | | | Total Cost |
|---|---|---|---|---|---|
| | KW. HRS. | KW. | ENERGY CHG. | DEMAND CHG. | |
| Jan. | 71,000 | 186 | $ 833.09 | $ 304.25 | $ 1,137.34 |
| Feb. | 71,000 | 186 | 833.09 | 304.25 | 1,137.34 |
| March | 71,000 | 186 | 833.09 | 304.25 | 1,137.34 |
| April | 95,000 | 272 | 1,080.29 | 454.75 | 1,535.04 |
| May | 132,000 | 322 | 1,405.39 | 542.25 | 1,947.64 |
| June | 142,000 | 338 | 1,486.99 | 570.25 | 2,057.24 |
| July | 146,000 | 356 | 1,526.59 | 601.75 | 2,128.34 |
| Aug. | 122,000 | 338 | 1,323.19 | 570.25 | 1,893.44 |
| Sept. | 102,000 | 322 | 1,149.19 | 542.25 | 1,691.44 |
| Oct. | 91,000 | 272 | 1,039.09 | 454.75 | 1,493.84 |
| Nov. | 71,000 | 186 | 833.09 | 304.25 | 1,137.34 |
| Dec. | 71,000 | 186 | 833.09 | 304.25 | 1,137.34 |
| **Total** | 1,185,000 | | $13,176.18 | $5,257.50 | $ 18,433.68 |

**Chart Notes:** 1) average rate 1.555c; 2) based on 47,500 sq. ft. net rentable area; 3) no D.C. sales taxes included; 4) all figures based on normal 8,600 cooling degree hours for electric driven refrigeration equipment but less energy for fuel oil space heating equipment; 5) based on PEPCO's general service schedule "GS."

II. ANNUAL ELECTRIC COSTS FOR HEATING EQUIPMENT

A. Total 27 kw. for 1400 full-load hours.
B. Requires 37,800 kw. hrs. @ 1.555c....Annual costs..... $ 587.00

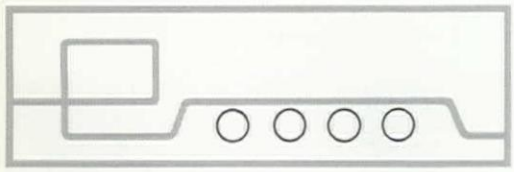
III. INITIAL BUILDING INSTALLATION COSTS

| | |
|---|---|
| A. Heating plant—two (2) 100-hp. boilers, fuel oil system w/storage tank, pumps, etc..... | $28,600.00 |
| B. Boiler stack to roof..... | $ 2,700.00 |
| C. Steam & condensate piping, nonconducting covering..... | $13,200.00 |
| D. Additional caissons for fuel oil tank, code rated enclosure walls, etc..... | $ 2,200.00 |
| E. Electrical wiring controls, etc..... | $ 1,850.00 |
| **Total**..... | $48,550.00 |

IV. ANNUAL FUEL COSTS—NO. 6 OIL

A. Using No. 6 Oil at 7.0c/gal. and with 143,000 Btu./gal. at 72° overall thermal efficiency; cost/1,000 # ST..... $ 0.67
B. Estimated annual fuel oil cost:

$$\frac{2{,}900{,}000}{1{,}000} \times \$0.67 = \$\ 1{,}942.00$$



# The Economics of Various Systems

BY T. L. BALLMAN, R. D. BRADLEY, R. D. SCHMIDT, J. R. WINSTON

IN TODAY'S modern office building, higher levels of illumination and more sophisticated airconditioning systems are coming into usage.

The reason for these changes is to provide higher comfort levels and better environmental conditions, doing all of this at a dollar savings to the building owner. One of the elements of comfort is to supply higher levels of illumination with glare control, both in the direct and reflected glare zone. Providing these higher levels of illumination calls for more wattage.

If less sophisticated engineering were used, it could be said that we could put these higher wattages into the area and increase the airconditioning capacity to remove this added thermal load. This, however, makes poor economics from many respects. Today, lighting and airconditioning systems must be compatible and considered together for numerous reasons.

In most of our present structures where large office spaces are involved, there is probably under 30 footcandles of general illumination, about 1 watt per square foot of lighting energy. Today's recommendations are for 70-100 footcandles, which would entail some 2½ to 3½ watts per square foot.

Buildings on the drafting board today are using 100-200 footcandles, which is indicative of some 3½ to 7 watts per square foot. We have reasons to believe that 200 and more footcandles will not be uncommon within the very near future, running our wattage well up toward 10 watts per square foot. This load alone now becomes a major factor in the thermal loading of this building.

At 150 footcandles there is a thermal barrier which enters the picture, meaning that more sophisticated methods of air handling, air tempering and air distribution must be used in order to maintain comfort in the occupied zone. As there are certain limits regarding the amount of air which can be circulated through an occupied space and maintain comfort, some different approaches must be used in handling these larger loads.

As the illumination level increases from 30 to 150 footcandles, the total cooling load increases 120 percent. The portion of the cooling loads due to lighting increases from 55 percent at 30 footcandles to 80 percent at 150 footcandles.

One should now consider what steps can be taken to isolate a portion of this energy from the occupied space. One of the first things is to mechanically remove the lighting fixture from the occupied space where 100 percent of the energy would necessarily have to be removed by airconditioning.

This equipment can be recessed into the ceiling and under normal conditions 60 percent of the energy would go to the plenum with only 40 percent to the occupied space. Return air can be passed through the lamp chamber in a manner known as heat transfer and this distribution may now be changed to 85 percent to the plenum and 15 percent to the space.

The lighting fixtures are also capable of simultaneously introducing cooled or warm air in supply. In this mode with cooled air, the energy distribution is 50 percent to the plenum and 50 percent to the space. Only such fixtures as are necessary to maintain the design space condition need be connected in supply. All fixtures, including those in supply, are used in heat transfer. This combination results in a reduced space cooling load. When the thermal separation in the fixture is good, as is the case where suitable insulation is employed, the overall energy distribution of the area becomes 35 percent to the space and 65 percent to the plenum.

We now have a much simpler engineering problem from the airconditioning standpoint, as considerably smaller volumes of air are needed to maintain comfort in the occupied space. This, of course, results in reduced duct size, fan size, horsepower, etc.

By using the plenum as the return air system, it can be operated at a slightly elevated temperature of 85 F. This return air being sufficiently warm to be used for tempering of the primary cold air used to condition the space. As it is readily available in the entire plenum, no hot air ducts are necessary, and when their elimination is associated with the necessary reheat coils, piping, etc., it can mean considerable savings. This type of air handling is relatively simple in the interior zones where cooling is necessary 12 months of the year. However, the exterior zones pose an entirely different problem.

The exterior zones exposed to weather and solar load are normally considered to be 10-15 feet in depth. In this particular instance, a 12-foot depth was used. These zones are usually heated and/or cooled by auxiliary equipment such as fan coil units, induction units or baseboard radiation. All of this equipment, with the possible exception of baseboard radiation, has a high maintenance cost. It is also difficult and expensive to obtain simultaneous heating and cooling in different zones.

By the proper arrangements of air and lighting systems, this exterior zone can be narrowed down to approximately 1 foot inside the windows and controlled by means of drapes or blinds. Where this is combined with a perimeter all-air system, we now have what is known as a heat-of-light system. The necessary heat for winter operation can be partially or completely supplied from the plenum without the addition of new energy. Air temperatures from 85 to 100 F can be obtained by the proper arrangement of lighting fixtures and air distribution.

With the electrical loads already provided by the lighting system, it does not take much imagination to visualize a building without boilers or other conventional heating plants.

By the use of these more sophisticated engineering principles using the lighting fixtures for heat extraction, air supply and air return, the

Adapted from a paper presented at the winter power meeting of the Institute of Electrical and Electronics Engineers in New York, 1964. Authors Ballman and Bradley are with the Day-Brite Lighting Division of Emerson Electric Corp.; Schmidt and Winston with Barber-Colman Co.

following advantages could be obtained in addition to the overall economics shown later.

1) Better supply distribution due to more outlets
2) Great flexibility as to placement of supply and/or return outlets
3) No ceiling clutter
4) Modular, without regard to partitions
5) Fewer drafts
6) No ceiling streaking when using proper angle of supply
7) Greater lighting efficiency
8) Fewer lighting fixtures
9) Extended ballast life
10) Fixture heat reused for tempering primary air supply
11) Improved fixture maintenance due to less dirt in fixture
12) Greater use of outside air.

In order to take maximum advantage of these new theories, the lighting fixture itself must be so designed that it not only performs the function of air extraction inlet and outlet but also changes the wave length of infrared energy from approximately 0.5 to 11 micron. This is done quite largely by the absorption of the shorter wave length radiation by a glass or plastic media, allowing more of this energy to be picked up by convection in the air stream radiating less directly into the occupied space.

Obviously, the heat-of-light system enables excess heat to be stored for use during off hours.

The principles outlined here are usually readily applicable both to newly designed and remodeled buildings. In order to determine whether part or all of these principles can be used, a complete engineering study should be made. This is usually known as a feasibility study and should be done by a competent consultant. As a general guide, the accompanying table will point out the relative economics of a 10-story building with various systems of heating, cooling and lighting.

The building, designed to be in Chicago, is 135 feet long and 100 feet wide. Forty percent of each wall area is glass, and the building has the long dimension facing north and south with no external shading. The windows are single pane, standard window glass with draperies inside. The wall is of normal construction of brick and masonry. Each floor has a perimeter or exterior zone 12 feet wide and a ceiling system suspended 9 feet above the floor. The lighting level is 150 footcandles and all fixtures use 4-F40CW lamps. The usage time of the building was assumed to be 3120 hours per year (10 hours per day, 6 days per week, 52 weeks per year), and the power rate was 1.5¢ per kilowatt hour including demand.

In compiling this information, actual mechanical drawings were made showing ducting systems and layouts, and these were priced by a heating and ventilating contractor in the Chicago area. The electrical includes lighting, branch circuit wiring, back to and including panelboards, but not including main feeders or distribution system.

In referring to the table, note the following descriptive headings:

I) Lighting fixtures of the in-room surface-mounted type with plastic enclosure; interior zone supplied from ceiling diffusers through double-duct mixing boxes with return through ceiling registers to plenum; exterior zone with induction units under windows.

II) Lighting fixtures recessed into plenum with plastic enclosure; interior zone supplied from ceiling diffusers through double-duct mixing boxes with return through ceiling registers to plenum; exterior zone with induction units under windows.

III) Lighting fixtures recessed into plenum with plastic enclosure; interior zone supplied by air through the exterior of the lighting fixtures from double-duct mixing boxes with return through side slots of lighting unit to plenum; exterior zone with induction units under windows.

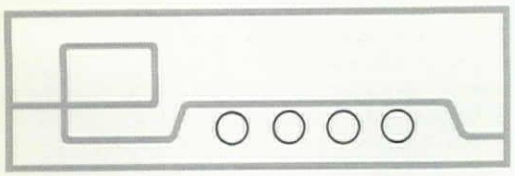
IV) Lighting units recessed into plenum with plastic enclosure; interior zone supplied by air through exterior of lighting fixtures from single duct with reheat; air return through side openings of lighting fixtures to plenum; exterior zone with induction units under windows.

V) Recessed lighting unit with plastic enclosure; interior zone supplied through exterior of lighting fixture through single-inlet mixing box with return to plenum in heat transfer; exterior zone with induction units under windows.

VI) Recessed lighting unit with plastic enclosure; interior zone supplied through exterior of lighting fixture through single-inlet mixing box with return to plenum in heat transfer; exterior zone with fan coil units under windows.

VII) Recessed lighting unit with plastic enclosure; interior zone supplied through exterior of lighting fixture through single-inlet mixing box with return to plenum in heat transfer; exterior zone using heat from light principle, being supplied either heating or cooling between the drapes and the glass; this zone exhausted to the plenum through registers. ■

| | SYSTEM<br>Perimeter All-Air System | | | | | | |
|---|---|---|---|---|---|---|---|
| | I | II | III | IV | V | VI | VII |
| Lighting First Cost | 84.5 | 105.9 | 107.7 | 107.7 | 99.3 | 99.3 | 100 |
| Lighting Operating | 93.2 | 108.5 | 111.2 | 111.2 | 100.5 | 100.5 | 100 |
| Lighting Owning | 89.1 | 105.5 | 112.5 | 112.5 | 99.6 | 99.6 | 100 |
| Mechanical First Cost | 107.8 | 107.8 | 107.8 | 112.2 | 109.9 | 106.1 | 100 |
| Mechanical Operation | 122.8 | 122.8 | 112.8 | 112.9 | 120.2 | 138.0 | 100 |
| Mechanical Owning | 113.7 | 113.7 | 113.7 | 116.5 | 114.8 | 119.8 | 100 |
| System First Cost | 101.9 | 107.0 | 107.5 | 112.1 | 107.2 | 104.2 | 100 |
| System Operation | 107.8 | 115.5 | 116.9 | 117.4 | 110.1 | 119.0 | 100 |
| System Owning | 103.8 | 110.8 | 113.2 | 114.9 | 108.8 | 111.6 | 100 |



# New Concepts in a Remodeling

BY W. S. FISHER, W. R. STEPHENS, E. C. SKERKOSKI

LIGHTING that provides adequately for the visual needs of modern office buildings frequently is capable of supplying a high proportion of the space-heating requirements. Moreover, design coordination of lighting, heating and cooling is essential to improving the comfort, performance and economy of the electrical-mechanical system.

A remodeled office building in Cleveland, in which visual and thermal design are coordinated, incorporates features that may not have been used before in a full-scale installation. It is a two-story masonry structure nearly 50 years old, with 25 percent of its perimeter walls being glazed.

For many years the building housed a financial operation. It was relighted in the early 1940's when fluorescent lamps in recessed troffers and a suspended metal pan ceiling replaced indirect incandescent lighting. It was airconditioned in the early 1950's with a number of "packaged" 5- to 10-ton airconditioning units. Heating requirements from the beginning were handled by hot water piped from a central boiler plant to radiators under each window.

In 1963 the financial operation needed more space and was moved to new quarters.

This provided an opportunity to move administrative and clerical operations into the building. The interior layout needed complete revamping, and, in view of the age of the lighting and airconditioning equipment, a comprehensive remodeling program was approved. This involved removing all the interior partitions and equipment down to the basic structure.

The objective was to provide a pleasant and efficient working environment. To accomplish this required consideration of the employees' physiological and psychological needs, having to do principally with visual, thermal, sonic and esthetic responses.

The architectural firm of Dalton & Dalton Associates, working cooperatively with the owner's plant engineers and application engineers, determined how the needs would be implemented.

Some of the major objectives for the visual environment were:

1) Visual Comfort Index for luminaires, 50 percent minimum

2) Illumination level for offices, 150 footcandles

3) Illumination level for corridors, one-third to one-half that of adjacent offices

4) Room finishes conforming to Illuminating Engineering Society recommended reflectance ranges

5) Accent colors for door frames, chairs and other appointments occupying less than 10 percent of the visual field, certain corridor walls, etc.

The general illumination was established at 150 footcandles to provide 50 percent more than the current minimum recommended level as a hedge against obsolescence. This decision was based entirely on visual, not thermal, considerations.

Some of the thermal-design objectives were to:

1) Create a comfortable thermal environment using electric power as the energy source.

2) Control the mean radiant temperature of room surfaces to minimize uncomfortable radiant effects.

3) Use electric lamps to compensate for building heat losses.

Control of the room air temperature is given, in part, to the occupant to satisfy his individual preference. This is accomplished with a double-duct (hot and cold) air-supply system plus an airmixing box and a wall thermostat.

Mean radiant temperature is a measure of the mean temperature of the surroundings, principally the walls, ceiling and floor. When the temperature of a room surface is sufficiently different from that of a person occupying the space, a heat transfer takes place by means of radiation. This has a significant effect on comfort.

To avoid the cold-wall effect, a system of quartz infrared lamps on variable voltage was designed to maintain the perimeter wall at a comfortable temperature.

And to eliminate the potential discomfort of radiant effects from luminaires and ceiling, heat-transfer recessed troffers or floating-panel luminaires were used with air return arranged to remove lighting heat.

The decision to use mostly troffers was natural in view of the 8-foot ceiling height and its exposed T-bar suspension system. The 2- by 4-foot units are the lay-in type employing four 40-watt cool-white lamps.

Mineral acoustical tiles, three-fourths-inch thick, are laid into all ceiling modules not occupied by luminaires. No effort is made to seal the tiles or the luminaires against air leakage between room and ceiling cavity.

To satisfy the Visual Comfort Index of 50 percent, small-cell aluminum louvers painted white are employed in the troffers. Two rows of slots, four per row, are punched in the luminaire reflector to provide a path for the return air.

To help the uniformity of air return through luminaires, return-air ducts were used in the ceiling cavity. Grills were located in the vertical sides of the duct approximately 20 feet apart. Uniformity of air returned through the luminaires of various offices is satisfactory.

Some reasons for returning air through luminaires are to:

1) Reduce luminaire temperatures and radiant effect

2) Increase light output of fluorescent lamps

3) Reduce air changes and fan horsepower (or if air changes are at minimum values, to reduce temperature differentials between room air and supply air)

4) Reduce ballast temperature.

A number of readings were made to establish the average temperature of the two ceiling cavities. The first-floor cavity becomes relatively stable several hours after the lighting system comes on in the morning and attains a temperature about 6.5 F above that of the average for the first-floor offices. Heat-storage

Adapted from a paper presented at the national technical conference of the Illuminating Engineering Society in New York, 1965. Authors Fisher and Stephens are with General Electric Co.; Skerkoski with Dalton & Dalton Associates.

characteristics of the reinforced concrete ceiling structure and heat transmission through the acoustical ceiling and luminaires back into the occupied space affect the time for stabilization and temperature achieved.

The second-floor cavity is affected significantly by outside temperature due to transmission through the roof. Though approximately 1¾ inches of insulation is employed, the temperature differential between room and ceiling cavity was measured as 3 F on a December day with the outside air temperature at 42 F.

This indicates a substantial heat loss through the roof compared with the first floor. In summer, heat gains can be expected. For single-story buildings an evaluation of heat losses through the roof vs. the cost of insulation is advised.

An assessment of potential radiant effects was made by closing the luminaire slots with tape and measuring several of the significant temperatures. It should be remembered that even with the luminaire slots taped, there is considerable air movement in the ceiling cavity in this building and heat dissipation from the top side of the unit.

Temperature and radiant effects are not as great, therefore, as with static luminaires in a static ceiling cavity. But even in this case, an increase in the radiant energy was noticed by observers in test rooms where luminaire slots were closed.

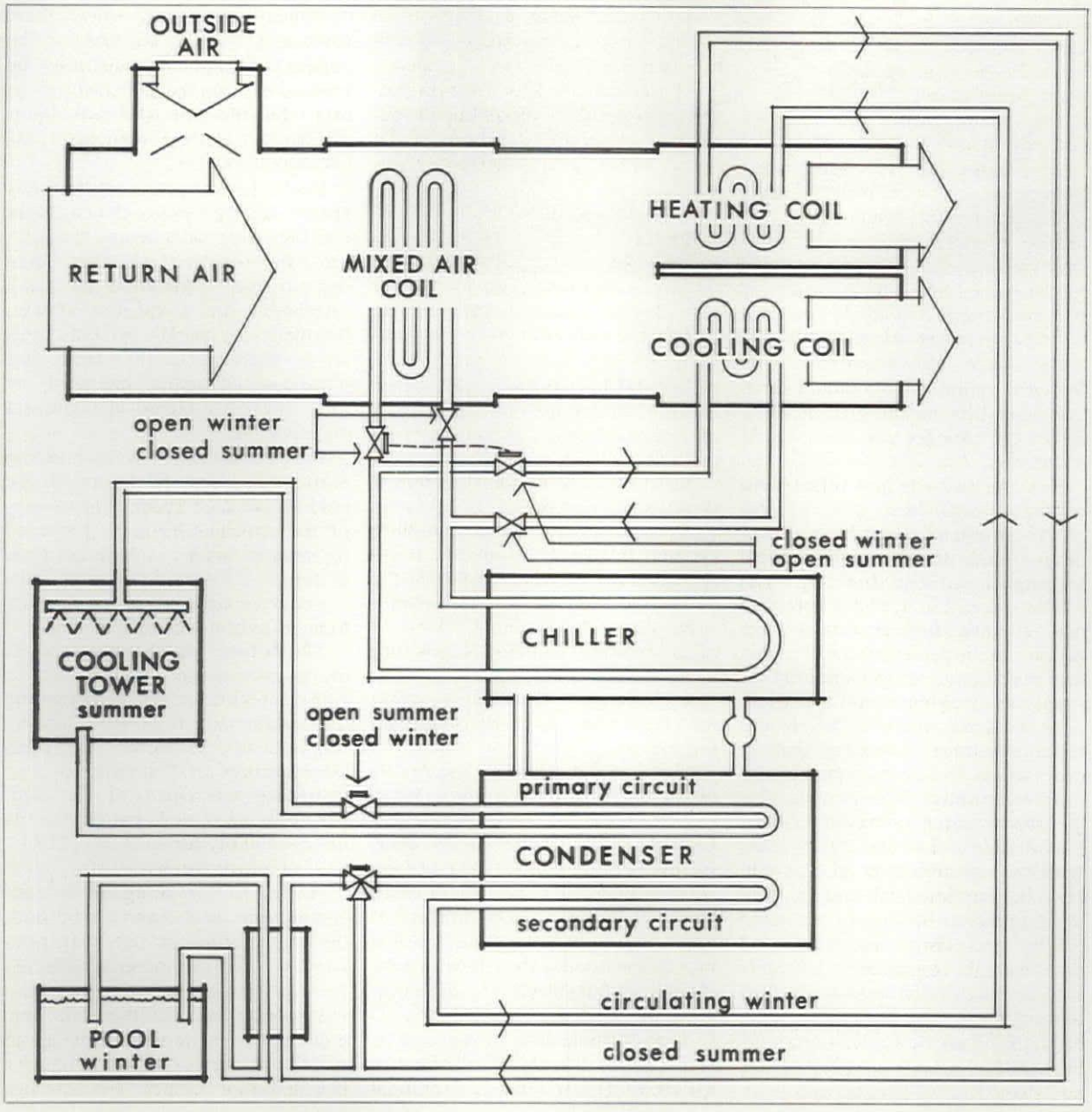
For comparison, corresponding temperatures of a similar luminaire tested in a box simulating a static ceiling cavity were taken. Temperatures indicated substantially greater radiant effects for this condition.

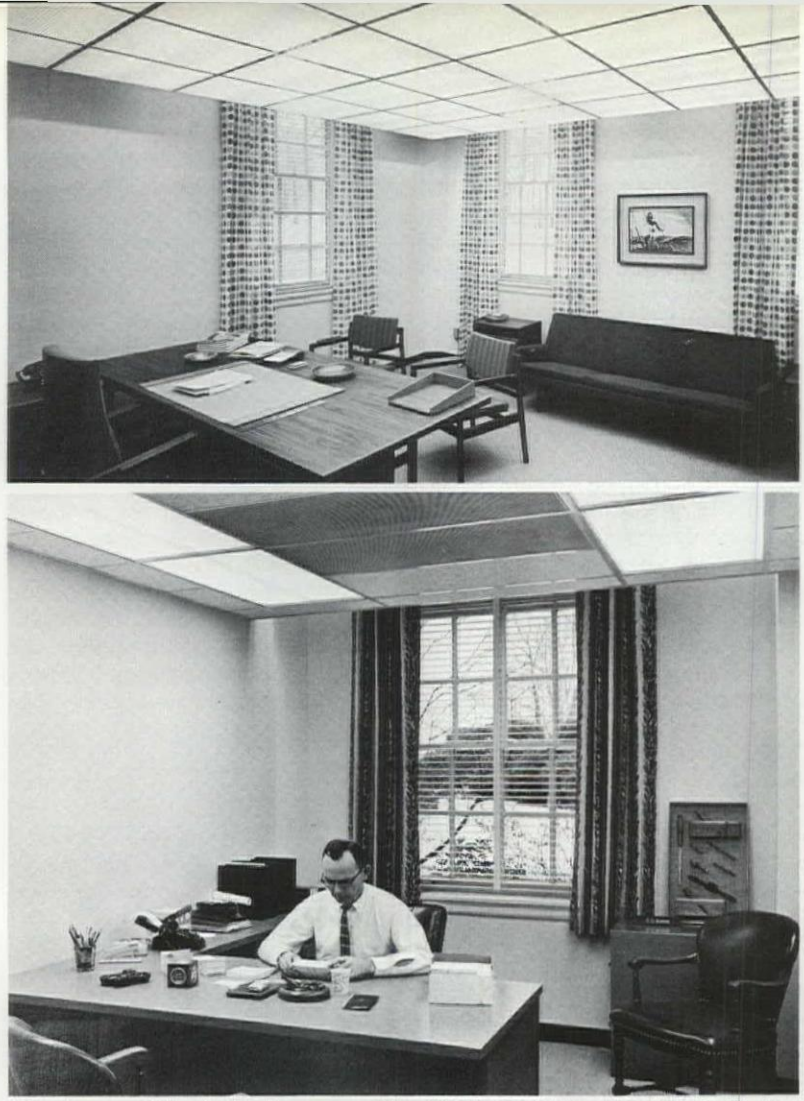
To minimize radiant effects in offices where floating-panel luminaires are employed, grills for return air are located in the suspended ceiling above the units. Several diffusers supply air separately from the lighting at the perimeter.

Four grills above the element allow the return air to pick up lighting heat on the way out and prevent a buildup of temperature and radiant effects at the ceiling.

Heat gain in the room at the time of peak load determines the volume of air that must be supplied to the room. If static luminaires were used, it was found, an additional 74 cubic

*Schematic of heating and cooling design indicates both summer and winter operation in Cleveland building.*





*Floating panel luminaire in corner office (top) uses high-output lamps. Typical two-window office (bottom) has air supplied through central ceiling grid and returned via louvered heat-transfer troffers. Infrared units heat perimeter walls.*

feet per minute of air would have to be supplied, meaning an increase of 3.5 air changes per hour would be needed.

For the two-window office with its higher solar-heat gain, a total of 20 air changes per hour would be required, which is difficult to accomplish without drafts.

For the building as a whole, the use of static troffers would have meant an increase of 8600 cubic feet per minute in the quantity of supply air, making a total of 39,100 cubic feet per minute. This would raise air volume 28 percent, making necessary a 13 horsepower increase in fan size and a corresponding rise in annual energy consumption of 85,000 kilowatt-hours. Duct cross sections and ceiling heights would also be increased, assuming constant supply-air velocity.

The preceding discussion and data have been concerned largely with more efficient ways to control lighting heat. The techniques covered are of greatest advantage during summer when solar-heat gains and glass and wall transmission together with lighting and other energy sources tax the capabilities of conventional airconditioning methods.

The technique of total air return through luminaires is of greatest value as it affects the air-handling system. It has little effect on the refrigeration tonnage required. (A 120-ton compressor is installed.)

In winter the lighting heat and other internal building loads are available for replacing heat losses. The challenge is to devise a system for recovering and redistributing the energy.

Most of the lighting energy is useful for heating purposes. What gets into the room is useful for heating if the room needs heat. Excess lighting energy is picked up by the return air either in the room or the luminaires. In perimeter offices some light energy may be lost by transmission through windows, though shading devices could minimize the amount.

The return air may or may not be at a temperature level satisfactory for recirculating without additional heating. In this building it is not high enough to be recycled directly into the hot duct. Therefore, a heat-recovery scheme is used; it involves passing all the return air across the evaporator side (chiller) of the refrigeration compressor. This creates an artificial cooling load on the machine and drops the return-air temperature to about 52 F, making it suitable for providing whatever volume of air is needed for the cold-supply-air duct.

The lighting energy and other internal building energy is thus extracted from the return air, transferred via water to the compressor's refrigerant, then to water again at the condenser side of the unit after having picked up the heat of compression from the machine.

The condenser water achieves temperatures on the order of 100 F, sufficiently high to heat the air for the hot-supply-air duct. Any excess energy is transferred via a heat exchanger to a pool next to the building. The pool's water must be kept above freezing in winter to avoid damage to fountain and lighting equipment, so the energy is effectively used.

Heat losses are substantially greater during the day than at night for the same outside-air temperature, the reduction at night being due to the elimination of fresh ventilation air from the system. Normally about 10 percent fresh air is supplied (3100 cfm.), but outside-air dampers operated by time clocks are closed at night and on weekends.

A net heat loss from the building during the occupied hours of the coldest weather necessitates supplementary heat. This is provided by infrared lamps in a design that, as far as is known, is a new heating concept being used for the first time in a full-scale installation.

The infrared equipment irradiates the interior surface of the exterior wall in perimeter offices providing the additional Btu/hour heating requirements. However, the principal purpose of the infrared is to neutralize the effect of the cold perimeter wall by increasing its mean radiant temperature (MRT) to a comfortable level.

As far as the occupant is concerned, this is a function of both the temperature of the wall (and window) and the infrared reflected from the wall (and window) into the room. The infrared also provides most of the space heating at night.

The design criteria for the sys-

tem were explored in the winter of 1963. At that time a full-scale mock-up was made and tested in the building before the remodeling.

The resultant data have not yet been simplified to a standard design procedure nor does space permit presenting it here. Indeed, this would be a subject for a lengthy paper in itself. However, some of the points are indicated below:

1) The radiant energy incident on the wall is dissipated by absorption, reflection and transmission. The sum of those values equals the incident radiant watts.

2) For an infrared lamp system and the wall of this building having a reflectance of 50 percent for light and infrared, the incident energy is dissipated as follows:

a) 50 percent is reflected into the room
b) 28 percent of the energy is absorbed and re-enters the space as convection to the inside air
c) 17 percent of the energy is absorbed and re-enters the space as long-wave radiation
d) 5 percent of the energy is absorbed and conducted through the walls to the outside

3) Assuming the reflected energy has a cosine distribution for each watt per square foot of energy incident on the wall, the equivalent mean radiant temperature of the wall can be raised by approximately 2 F.

4) To find the watt density on the wall and its contribution to the MRT at a particular point in the room, a point-by-point calculation of energy density on the wall must be made using radiometric data for the infrared and the space factor for each point on the wall.

5) Following a similar procedure for windows, only 20 to 25 percent of the incident energy remains in the space, largely surface reflection from the glass. Obviously, this method of applying infrared would not be satisfactory if large glass areas were involved.

6) With the experimental installation the net effect of energy from both glass and wall indicates a value of about 34 incident watts per degree F increase in MRT.

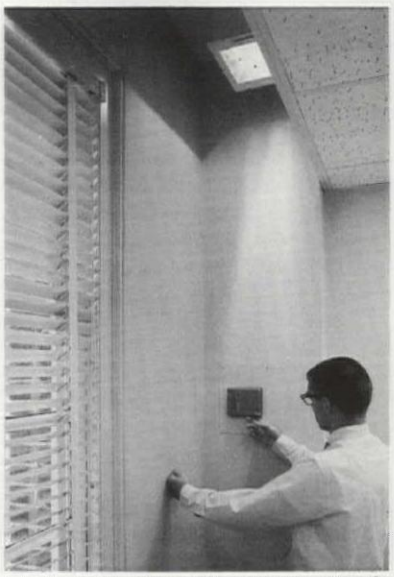
The radiant system, totaling a maximum of 98 kilowatts, consists of 500-, 800- and 1600-watt quartz infrared lamps in specially designed reflectors. The number of luminaires and the wattage of the lamps in each office depend on the number of windows in the room and the total room-heat loss.

For example, the most typical building office is 10 by 16 feet. It may have either two 500-watt luminaires or one 1600-watt unit depending on whether there are one or two windows.

The corner offices are typically 14 by 16 feet and may have three or four windows. Correspondingly, three or four units of 800- and/or 1600-watt size are installed as determined by room requirements.

Total installed infrared wattage would have been somewhat lower if more luminaire sizes had been used. Originally five sizes were considered; but for economic, esthetic and manufacturing reasons the number was reduced to three.

The infrared lamps, and hence the MRT, are controlled by the temperature of the perimeter wall. There are four separate control zones. One controls all the one-window offices on the south side of the building. Another controls all the two-window offices on the south side. A similar arrangement is used on the north side, which compensates for different wind conditions and solar gain.



*Device on sidewall controls supply voltage to infrared lamps in one zone.*

A 40-foot capillary tube operating on the vapor-pressure principle is embedded in the exterior wall about one-eighth inch below the white plaster surface. This length is required to get the average wall temperature.

Then, through a series of mechanical and electrical components, the voltage of the lamps is increased or decreased to match the temperature fluctuations detected by the sensor and maintain a 65 F mean radiant temperature for the outside wall. The actual lamp voltage is applied by an autotransformer with an automatic motorized adjustment.

At night, office occupants are instructed to turn off their room lighting when they leave. The infrared system together with the heat from fans and the refrigeration compressor compensates for the building losses during unoccupied hours. These are lower than during occupied hours since ventilation air is shut off.

If the infrared is unable to maintain the building at 65 F at night, a thermostat in the return-air duct will turn on the general fluorescent lighting. To minimize cycling of the fluorescent system, it remains on for three hours minimum. However, it did not come on during the coldest nights or weekends of the 1964-65 winter.

Other tests are underway in the building, and these will be continued for many months. For example, a one-year lighting maintenance test to determine the dirt collection in both heat-transfer and static troffers was begun.

In March 1965, with the cooperation of the Cleveland Electric Illuminating Company, equipment for recording kilowatt-hours and demand was installed. Data are being obtained on the power consumption of the fluorescent general lighting, the quartz infrared lamp system, the refrigeration compressor, the fans and pumps of the mechanical system and the total for the building.

It is planned to obtain data over a full year's operation in order to appraise the economic performance of the installation.

It can be reported that the coordinated building system works and, apparently, very well. Many unsolicited comments have been received from occupants on the exceptional thermal comfort and pleasant working conditions.

Since the purpose of the infrared control system is to create a comfortable mean radiant temperature and not simply replace heat losses, it undoubtedly uses more energy than a conventional system.

It is felt, however, that the design of this building has resulted in a visual-thermal environment superior to that of most working spaces today. The infrared lamps supply light of warm-color quality for the walls giving a pleasing brightness pattern and a "lift" to the space at a time of year when there are many dreary days. ■

# Coast to Coast, Luminaire to Louver

HEAT-OF-LIGHT systems take a variety of forms, from the direct, though not unsophisticated, to the elaborate. Coast to coast, such systems are more and more in evidence.

One system, the single-unit induction box, resulted in a construction saving of $330,000 for a high-rise building in southern California, according to the architectural firm of Albert C. Martin & Associates.

The box as used in the general office building of the Los Angeles Department of Water and Power is a combination supply and return air device and lighting luminaire.

It is located in the return-air plenum cavity and, receiving only a primary cold air supply, can induce a portion of warm plenum air into itself and thus temper the primary air as required by zone conditions.

An interior space zone thermostat controls the box. On a thermostatic call for full cooling, the induction dampers are closed and the induction box handles only primary cold air.

As the thermostat calls for reduced cooling, the induction dampers proportion toward the full open position, inducing warm air from the ceiling return plenum into the box and tempering the box discharge supply temperature.

When the thermostat calls for additional cooling, the reverse operational sequence takes place.

As induced air is increased or decreased the primary air, controlled by supply fan inlet vanes, varies appropriately to maintain a constant box air discharge.

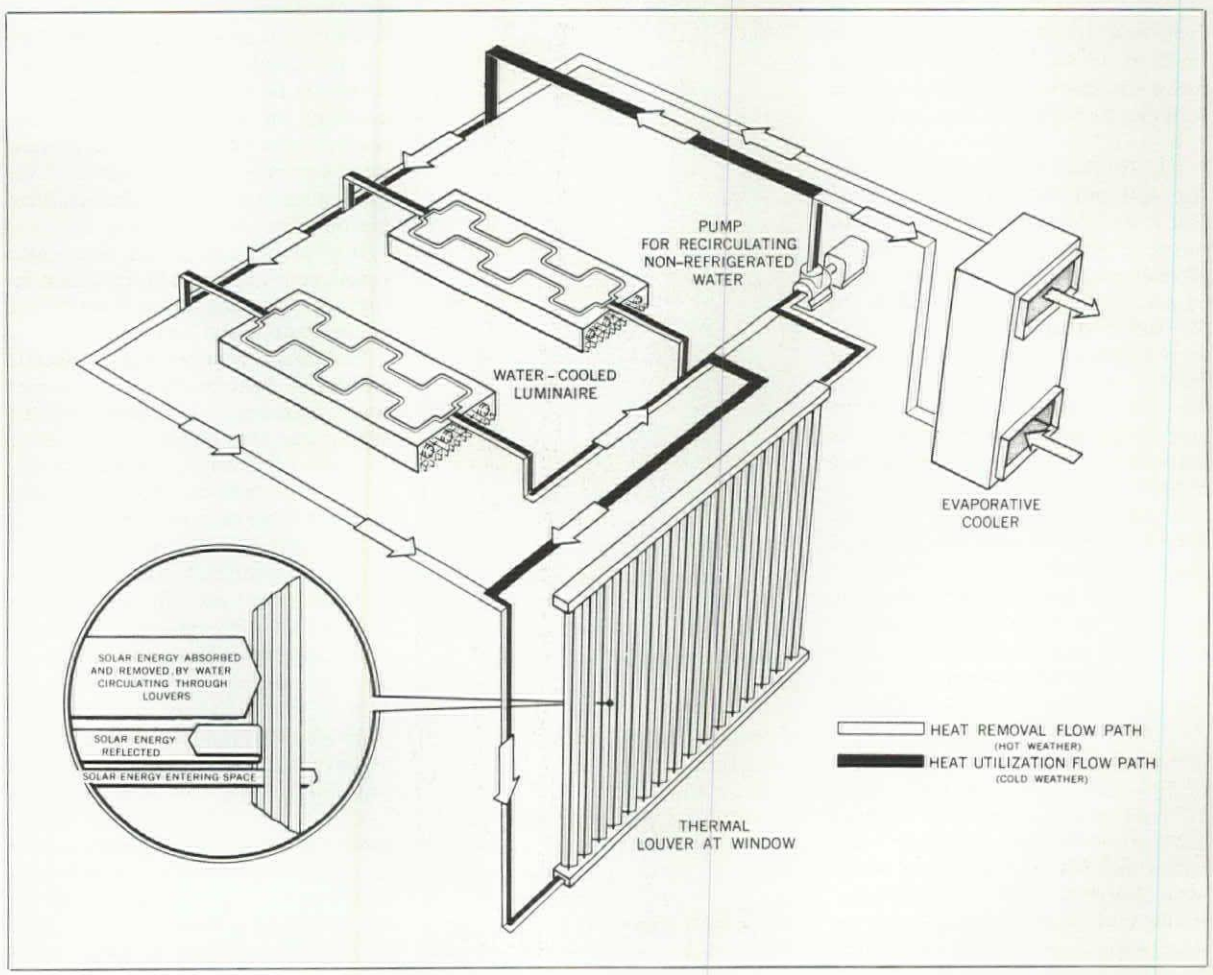
The induction box eliminates the necessity of a hot duct in a conventional high-velocity, double-duct system. Elimination of the hot duct and such attendant system components as sheet metal, hot water heating coils, hot water piping, sheet metal insulation and temperature controls, in addition to the size reduction of building heat-generating and distribution equipment, resulted in the construction cost savings, the firm reports.

Perhaps the ultimate in the exploitation of available heat is the "total energy" approach.

It is an environmental system that involves control not only of lighting heat but of solar heat. It uses circulating water in luminaires and in "thermal louvers" at perimeter windows.

The louvers provide visual shielding plus interception of solar energy. An evaporative cooler is employed with the nonrefrigerated water system.

*"Total energy" system is shown below; across page, new building in Los Angeles utilizes heat-of-light concept.*



Perimeter rooms use both water-cooled luminaires and water-cooled thermal louvers. The latter operate automatically to intercept more solar energy as its intensity increases.

One advantage in the system is the absence of limitation on the amount of glazing in the building's design.

While glass areas can be reduced or eliminated to control heat loss or gain, this alternative approach makes maximum use of the energy generated inside and outside the building.

As much as 80 percent of the solar heat load can be excluded from the perimeter office space. Water at 77 F removes heat generated in the lighting fixtures. The heated water is either cooled in the evaporative cooler in summer or, in winter, supplied to the thermal louvers if there is need for heat at the perimeter.

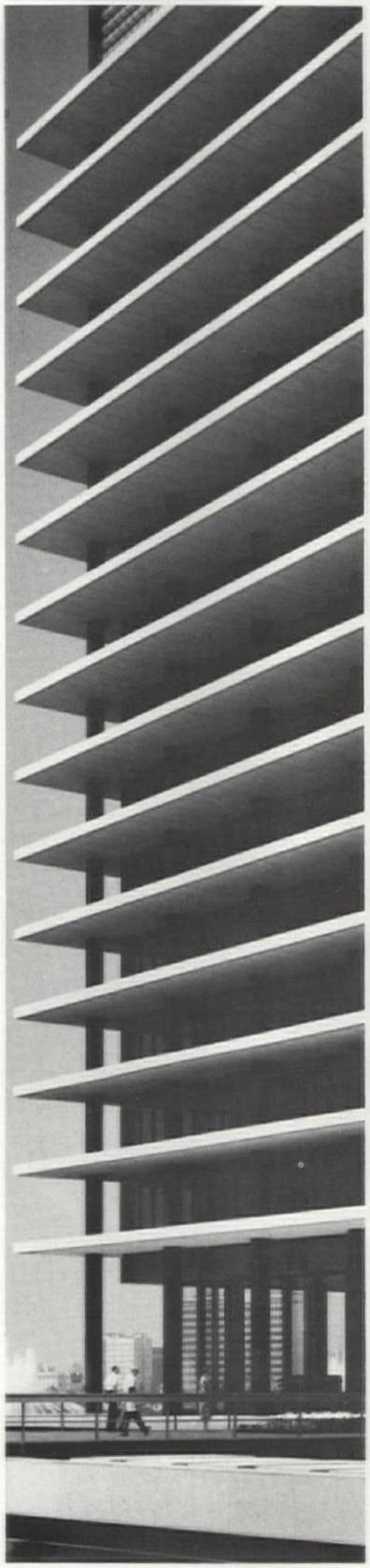
The typical temperature range of the nonrefrigerated water is sufficient to offset heat losses through the glass windows during winter or to remove solar heat in summer.

Though this system uses water for heat transfer and control, it does not eliminate air for cooling, ventilation and humidity control. It also requires a method of cooling that portion of lighting and solar energy (plus other heat gains) which enters the occupied space.

However, the air needed to serve these requirements is less than an all-air system, with corresponding reductions in duct size, building volume and fan horsepower.

In New Jersey, the plant engineer for Electronic Associates Inc. says, "Our electric heat recovery and storage system is a milestone in the conservation of energy." Adds engineer William Hennum: "The system performs beautifully and is highly efficient. We are delighted with the building's remarkably low heating costs."

The 94,500-square-foot office and laboratory building in West Long Branch was designed by the Bernard Kellenyi office. The architect explains that the increased lighting of commercial architecture produces a balance point where



heat from lighting, added to other interior heat gains, equals the heat loss of the building.

Noting that engineering technology can put this heat to work, Kellenyi suggested that architects consider this system in commercial or industrial designs with modern requirements for total environmental control, including high-level lighting, year-round airconditioning and interior spaces with multizoning.

Lighting levels range from 125 to 160 footcandles to provide for critical visual tasks.

The exterior exposure of all occupied spaces of the three-story structure—one story below grade and two above—is metal curtain wall, and 42 percent of the curtain wall surface is single-plate glass. The ratio of glass to total exterior wall is 25 percent.

"The most significant discovery was that all the economies of a fuel-saving system could be attained without extraordinary insulation, insulating glass or minimum glass ratios or other thermal design precautions generally related to some applications of electric heat," Kellenyi explains.

The method of transferring heat is accomplished by using standard refrigeration equipment as a heat recovery system. Summer airconditioning is performed with the same compressor equipment.

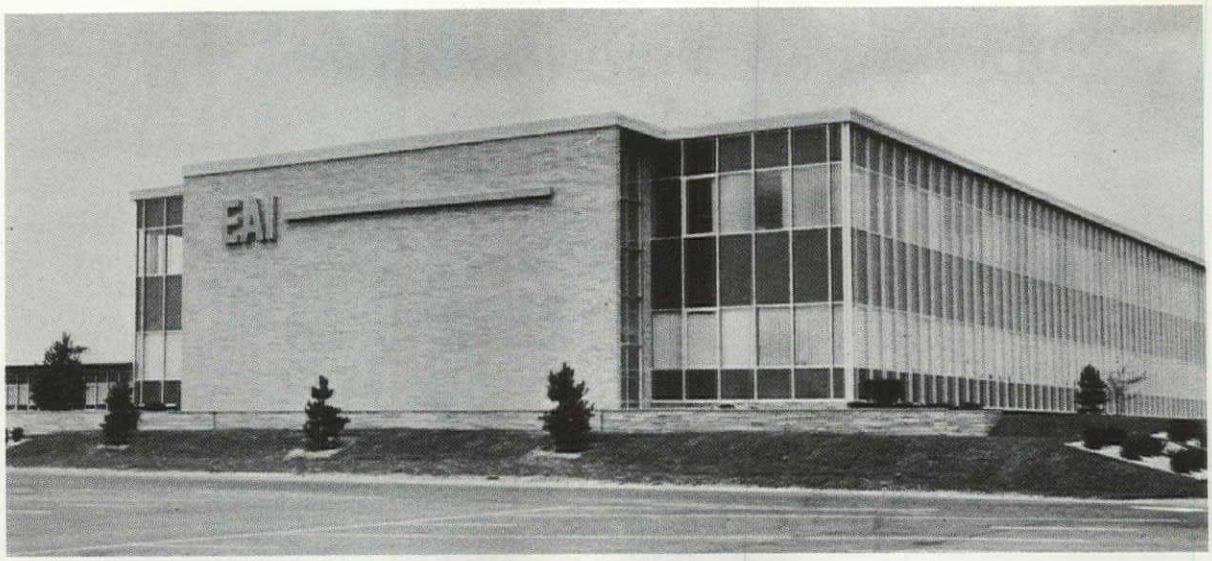
Calculations showed that electric resistance heat would be necessary under extreme conditions, but the operating cost of such heat for a nine-month period beginning last November was only $32.10.

The mainstay is the heat collected from lights, equipment and personnel, a portion of which is used where needed and the remainder stored as hot water.

The entire system, both heating and cooling, costs less to buy and install than a top quality conventional fuel-fired heating plus airconditioning system, Kellenyi says.

Welton Becket & Associates for nearly five years has been using the heat generated by electric lights to provide nearly the entire source of warmth for department stores in southern California.

The use of lights as direct heat




*Two more heat-of-light installations: Electronic Associates building in New Jersey (top) and department store in southern California (bottom). Architects say windowless-wall trend of retail establishments spurs use of system.*

sources is the result of two developments in store design: more light and less glass.

Until recent times, department stores were generally dimly lit, with weak incandescent lights accomplishing an illumination limited by today's standards. But with the advent of fluorescent lights, the stores began to bathe themselves in light, creating increasingly brighter interiors.

The architects' interior design and merchandising departments believed a more sophisticated lighting could be achieved to bring natural colors to merchandise, reduce the harsh brilliance and add to the total atmosphere and decor.

Working with the firm's engineering department, the Becket team developed over the years a lighting capability tailored to each store and varying from a combination of fluorescent and incandescent lights to all incandescent.

Since incandescent lights are only one-third as efficient per watt as fluorescent, total wattage has mounted with their increased use.

And so we find that the lighting load has elevated from the 3½ to 4 watts per square foot of yesterday to the 5 to 15 watts per square foot of today (the amount of wattage varying with the amount of light required in any particular area based on the type of merchandise).

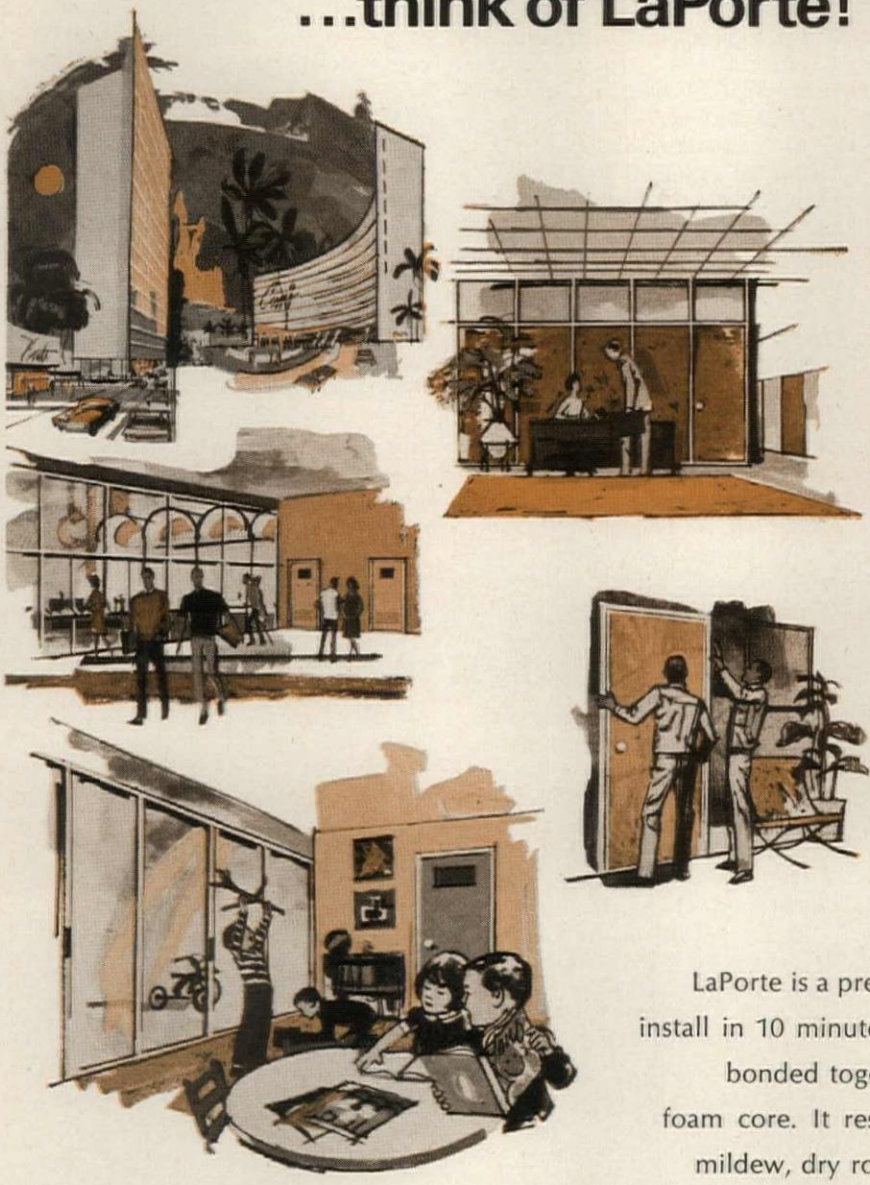
Heat given off by lights amounts to 3.4 Btu. per watt, so that 5 watts provides 17 Btu. It became apparent that this energy could be utilized for stores in temperate southern California, with only a limited addition of resistance heating in entry ways and similar areas, completely omitting a boiler.

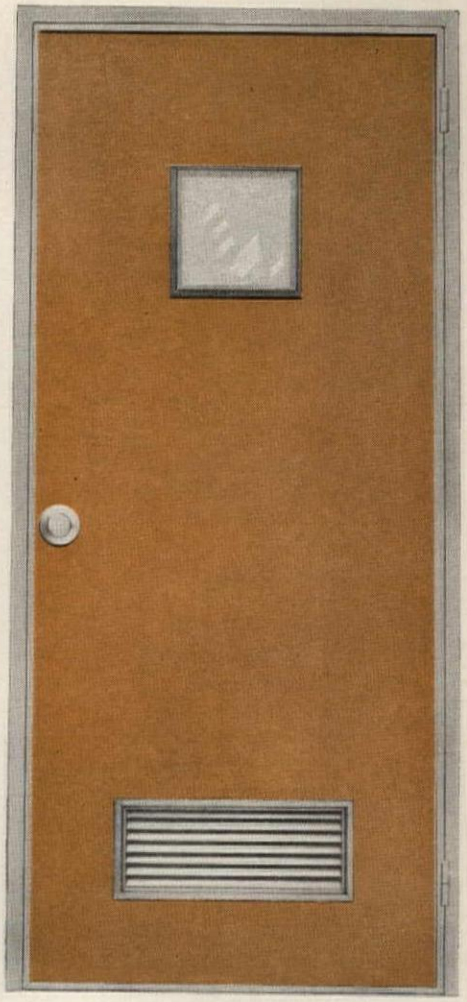
Heat of light has been aided by the trend of department stores toward windowless walls. With a temperature of 50 F outdoors and 75 F indoors, heat loss is 28 Btu. through glass but only 15 Btu. through normal walls.

A department store in southern California, where the average evening temperature is about 50 F, uses its cooling equipment more than half the time. Even during colder weather, opening-hour temperatures can be made comfortable by turning on the lights two hours before the shopping day begins.

Although they have utilized lighting heat in a number of structures for three department store clients, Becket engineers caution that each installation must be evaluated on its own merits, with experienced engineers basing calculations on area, type of usage, lighting and construction as well as climatic conditions. ■

# next time you set your mind to dreaming ...think of LaPorte!*





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# A Critique on Criticism

ARCHITECTURAL criticism should spur the architect toward greater performance and induce in the layman a greater acceptance of good design.

This, in brief, is the twofold objective of criticism as described in a report of the AIA Committee on Esthetics.

"Good architecture cannot be created in a vacuum. The reaction to an architect's work by his fellow practitioners as well as the general public may be considered an integral part of the function of a building as a work of art," says the Committee report prepared by Arthur Q. Davis FAIA.

The report, containing four recomendations, was commended by the Board of Directors. Development of an Institute policy on criticism—the first—is scheduled for the April Board meeting.

The report recommends that:

- Mandatory Rule 3.3, "An architect shall not knowlingly injure or attempt to injure falsely or maliciously the professional reputation, prospects or practice of another architect," be retained intact.
- The Committee on Esthetics should be directed to undertake a series of critical analyses for publication with "a view toward improving the general practice."
- Internal Design Seminars as sponsored by the Committee on Esthetics should be encouraged and expanded in all sections of the nation for they provide criticism within the profession "in its best, most constructive and healthy form."
- Fellowships be given architectural critics in journalism and that constructive criticism be rewarded to "foster the best interests of the profession as well as candid analyses of the best and worst in architecture as practiced today in every community of the country."

The report was prepared after consultation with individual architects, groups of architects, architectural critics, architectural historians, informed civic leaders and politicians.

Also consulted for published comment on the subject were professional and general consumer magazines, newspapers and the AIA JOURNAL.

Thirty-two persons were contacted and 17 of them are quoted.

The objective of criticism, the Committee says, is to help create a better physical environment through the recognition of quality.

As a consensus it appears that "although architects do not particularly thrive on criticism, they are stimulated by it and are sensitive enough to its forces both without and within to demand of themselves greater efforts," the report says.

Criticism must not become enmeshed in defining good taste, the comparison of "styles" or in personalities, explains the report, which on the last score quoted Charles R. Colbert FAIA, former dean of the School of Architecture at Columbia University, as saying:

"We cannot care if they [architects] have one leg and three wives, or whether they are a past president of the AIA, or even a model inmate at Sing-Sing Prison. The criticism of the architect as an individual should never be our concern; but the works which he produces, whether they be good or bad, affect us as architects both in relation to our profession and our standing in the community."

The report divides architectural criticism into three categories:

1) by individual architects, 2) by recognized organizations within the profession and 3) by independent critics directed to the public at large as well as to the architectural profession.

"Architects will always be faced with the problem of objectivity when undertaking the difficult task of appraising and therefore criticizing the works of a fellow practitioner," notes the report. Thus, the critic may be directly or indirectly suspect to criticism himself as to his motives."

Criticism unrestrained by good taste and professional ethics can be dangerous, the report cautions. "We must always respect the feelings of another architect and act in good taste," says one consulted architect, Leon Chatelain Jr. FAIA.

But a colliding view is registered by Gordon Bunshaft FAIA: "I don't care about another architect's feelings. If he is a bad architect, I will say so!"

The Committee agrees the pitfalls surrounding criticism by the architect are considerable. It urges retention of Mandatory Rule No. 3.3 and suggests all criticism be conducted within the framework of this rule.

As for criticism within the profession, the report states:

"There is strong evidence to support the contention that architectural criticism within the profession can be properly administered to protect the interests of its members, but at the same time be in a position to foster good architecture and condemn bad architecture."

Architectural competitions sponsored by the AIA or other reputable organizations permit critiques and establish standards for judging quality in architecture, the Committee points out.

The report says the importance of good critiques at national, regional, state or even local levels "cannot be overemphasized as a method by which architects can present critical analyses to the public" as aids in judging between quality and inferior architecture.

The third and "perhaps most effective means" of presenting criticism to the public is through trained, professional critics who are knowing both in architecture and journalism, the report explains.

The Committee notes the dearth of such persons and says it would behoove the AIA "to undertake the task of being absolutely certain that there are enough people properly trained in the media to give the public fair, unbiased and informed opinions as to the difference between good and bad architecture."

The Committee observes:

"Surely, the theatrical critics of the New York newspapers are a very independent and vocal group who serve a useful purpose in the world of entertainment. There is no reason why architects should not be subjected to the same form of constructive criticism for the public today is more aware than ever before of the architect and his works."

The report also makes suggestions for raising standards of the general public. But it stresses the development of critics, urging the Board to provide funds to initiate a training program, including fellowships, "with a view toward the creation of a more informed press and public and appreciation of good architecture through informed architectural criticism." ■

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# Sharing Business Techniques

BUSINESS PROCEDURES in the practice of architecture are changing radically and will continue to change.

And the creative process, though remaining largely unchanged itself, can be the beneficiary.

This is the thrust of "Emerging Techniques of Architectural Practice," a report of a research team of Pennsylvania State University.

Members of the University's Department of Architectural Engineering, working with an AIA grant and under the direction of the Committee on Research for Architecture, gathered business techniques from architectural firms and consultants across the nation.

The researchers gleaned several hundred *emerging* techniques of significance to both large and small offices. These ranged from innovations in filing methods to the use of electronic data-processing equipment to expedite design decisions.

The research team, headed by C. Herbert Wheeler Jr., associate professor of architectural engineering, screened and grouped their findings to identify nine general techniques or technologies.

While Wheeler and his associates stressed that countless other tools are available, they featured the nine "packages," as the report calls them, as offering a foundation for the management and business aspects of the immediate future's architectural practice.

The packages include such items as network planning, management science and systems development for greater efficiency in project management, cost management and quality and reliability control, and aids to office efficiency including improved communications, reproduction systems, computer technology and automated graphics.

Investigators suggest that architects adopt at least some of the nine general techniques to cope with changes bearing on architecture.

They foresee changes over the next half decade necessitating the upgrading of both business and management efficiency on the part of architects. Architectural clients, becoming steadily more knowing and sophisticated in their demands, will also insist upon it, the report points out.

Increasingly, simple building materials will give way to more complicated technical products and integrated building systems, the assembly of thousands of small parts, to prefabricated larger components, ready to install upon delivery from the factory. Planning, ordering and delivery of these components will be automated and mechanized.

Computers and various electronic aids, the report predicts, will assume a larger role in programming for building and in its business end, with accounting, scheduling and recording. Architects may find themselves concerned with project financing and increased government involvement in building.

Finally, competition will increase, fertilized by new ideas from young architects who have been exposed to the results of today's research, says the report.

Network planning, the first of the report's nine principal recommendations, provides a framework for following the progress of a project from initial planning through action construction by the use of different kinds of charts.

The study next considers the theories and practices of management science which will permit architectural offices to conduct their operations in a much more orderly fashion.

Systems development, the report points out, can stylize the routine aspects of the office and building procedure without hindering creativity, while cost management assures responsible, sound handling of client funds.

Constant checks should also be made to assure quality and reliability control, not only during planning and construction but also after building occupancy.

Four technologies which the study advises firms to investigate are developing so rapidly their applications are limited only by man's imaginative powers. These are communications, reproductive systems, computers, and the automated graphical systems related to them.

Efficiency and organization of both interoffice communications and those between office and client will be regulated by increasingly sophisticated office equipment, forms and checklists, and filing devices, according to the study.

Traditional reproductive systems, such as blueprinting, will be augmented by photographic processes, in black-and-white and color, microfilming and reduced scale prints.

The use of computers, it is suggested, will play an increasingly important role in a number of procedures.

The report assumes that the trend will be toward increased use of such aids. The Penn State researchers devised a framework, consisting of four aspects of architectural practice, and the researchers demonstrate how the emerging techniques may be used.

The aspects considered are single-project management, production management of multiple projects, management of the practice and business management.

Although the report does not represent itself as a textbook or instruction manual in the use of the newer techniques, it is sufficiently detailed to give the uninitiated reader some comprehension of such concepts as critical path and PERT scheduling, electronic data-processing equipment and its associated input and output devices, ways of obtaining computer services etc.

In addition to investigating the use of newer aids to design and scheduling, researchers found a growing concern with such aspects of practice as public relations, governmental relations and business development.

Personnel management is also assuming greater importance, the study reports.

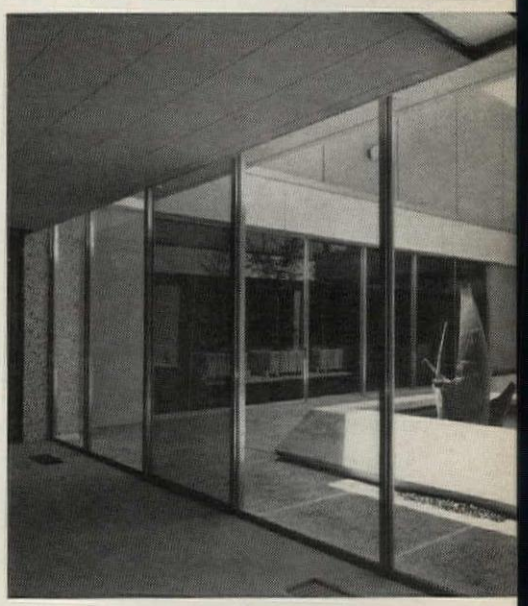
Expanded architectural services and the resulting complexity of operation make it necessary to restudy methods of computing fees.

In contacting architects during the course of the survey, researchers found an almost universal desire to lift the level of business practices so that more time and a greater percentage of fees can be made available for design development.

It is in this context that the report's fundamental salience lies. Not all the techniques sited are appropriate for all offices, but the report can, it is suggested, provide any office with a yardstick by which to measure its own operation.

Also serving as a compendium of business techniques, the report will soon be available at $2 per copy to AIA members and $3 to nonmembers. Orders, now being taken, should be addressed to "Emerging Techniques" AIA Headquarters. ■

# OPEN INVITATION TO ARCHITECTURAL ELEGANCE



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**Books** *from page 25*

**Sonnets for My City: An Essay on the Kinship of Art and Finance.** Arthur Cort Holden. Schulte, 1965. $8.50

"When an architect takes it upon himself to say that his own profession is not performing the services which it is capable of performing because of lack of coordination between his own art and the practices which prevail in the field of finance, it is necessary, on the one hand, for him to give a bill of particulars and, on the other, to frame his suggestions in a way that is unique enough to command attention."

Thus, the author, a Fellow of the Institute, describes his own book of 200 sonnets, related short essays and sketches.

Colleague Robert C. Weinberg AIA, writing in the Greenwich Village weekly, the *Villager,* observes: "This book is a tribute to New York by a true New Yorker which every Villager will enjoy owning, profit by studying and delight to read. It is not only attractive in format, as a piece of book-making, in size, shape, typography and line-cut embellishments, but it is altogether unique in its literary character. For we have here something that has seldom, if ever, been attempted before: the casting in poetic form of observations and opinions on the life, art, politics, economics and administration of our city."

But let these samplings * speak for themselves.

ASPIRING TOWERS

The wealth that down the Hudson River rolled
Started the trade that made my city great.
The ships that carried produce and brought gold
Lifted a village to majestic state.

Afar, from ocean, meadow or the sky,
Manhattan's towers lift their silhouette.
They are my city's welcome to the eye,
A marvel which the mind can not forget.

When nearer viewed, the towers lose their grace.
Chaotic forms are all too evident.
False ornament seems like a double face
Betraying a confusion of intent.

Yet calm above the city's daily strife,
Tower these symbols, man's aspiring life.

*Continued on page 80*

# Ingenious combination { our Quadrille... your Imagination

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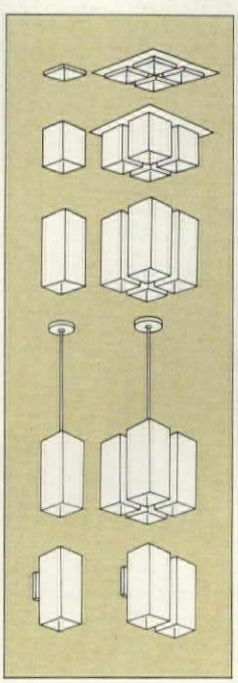

Quadrille, developed in cooperation with architects Javier Carvajal and Kelly & Gruzen, A.I.A. was first installed in the Pavilion of Spain, N.Y. World's Fair.

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# All-electric office building means "higher rentals... better earnings" says leasing expert

**"I believe the all-electric office building has a distinct advantage competitively and can demand and obtain higher rentals resulting in better earnings than the average standard office building can produce," says Murray Randell, Director of Special Leasing for the Chicago firm of Turner, Bailey and Zoll.**

**Mr. Randell made this statement in his speech, "Why I Would Build An All-Electric Office Building," given at the annual convention of the National Association of Building Owners and Managers, of which he is past president.**

**Mr. Randell points out that "the advantages and benefits accruing to the owner, manager and tenants of an all-electric building are numerous and substantial." He discusses some of these benefits: cleanliness, more rentable area, better light, use of light for heating, efficient temperature and humidity control. And he points out how these benefits not only give the building a competitive advantage now but will prolong the economic life of the building. He believes that experience to date indicates that the operating costs of the all-electric building are lower than in a conventional building and cites figures to support his contention.**

**Because Mr. Randell is an acknowledged expert in his field, and has no connection with any phase of the electrical industry, we believe you will want to read his speech in full before you plan your next office building. For a free copy, write: NECA, National Electrical Contractors Association, 610 Ring Building, Washington, D.C. 20036.**

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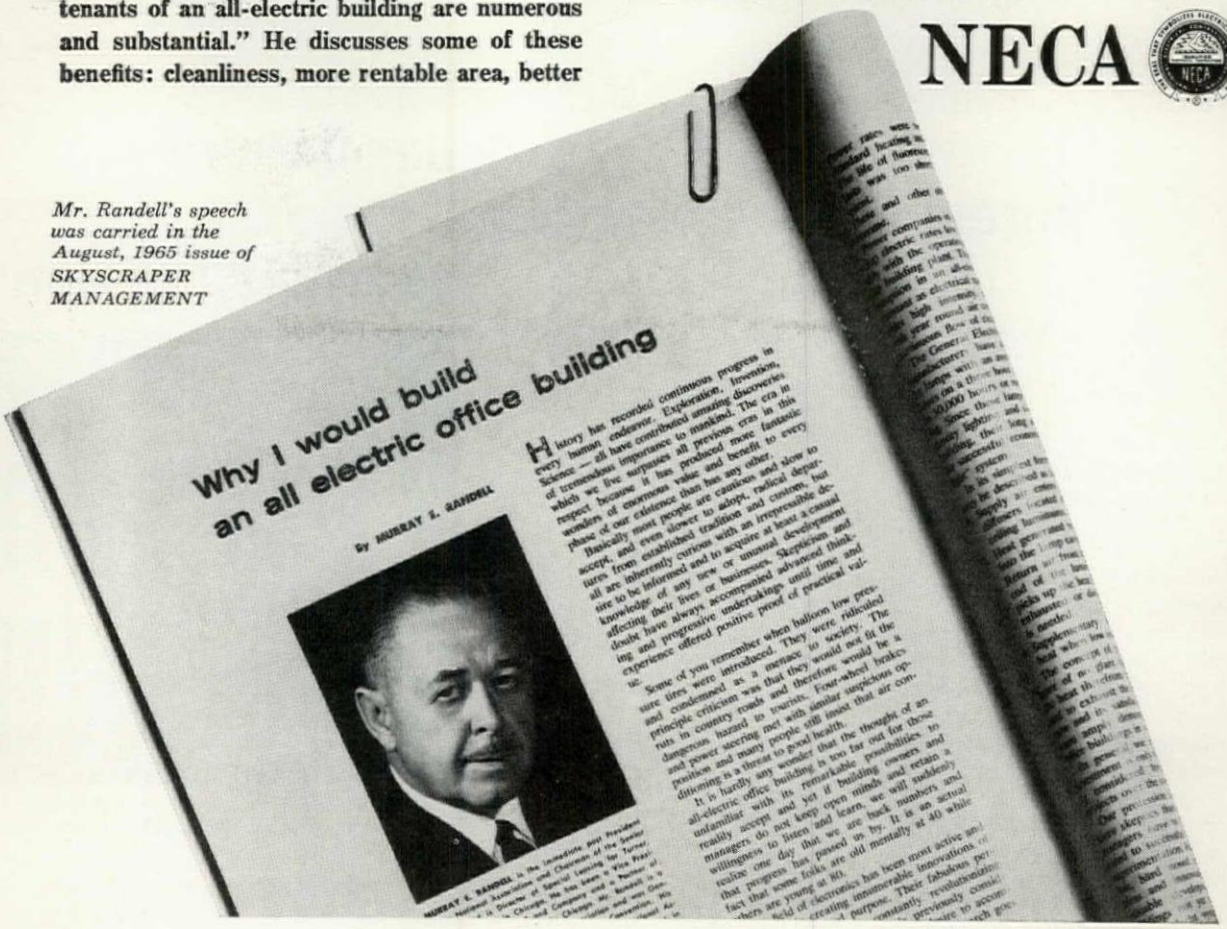
Why I would build an all electric office building

By MURRAY L. RANDELL

*Mr. Randell's speech was carried in the August, 1965 issue of SKYSCRAPER MANAGEMENT*