
AIA JOURNAL

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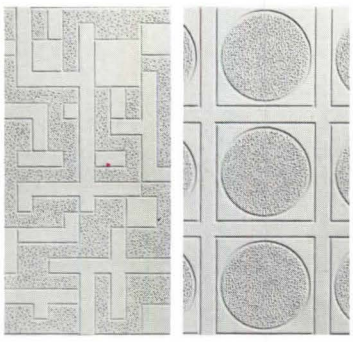

of course, are acoustically efficient. And all are made by a newly developed manufacturing technique that not only carefully registers the embossed design but also conceals the acoustical perforations in the textured surface areas.

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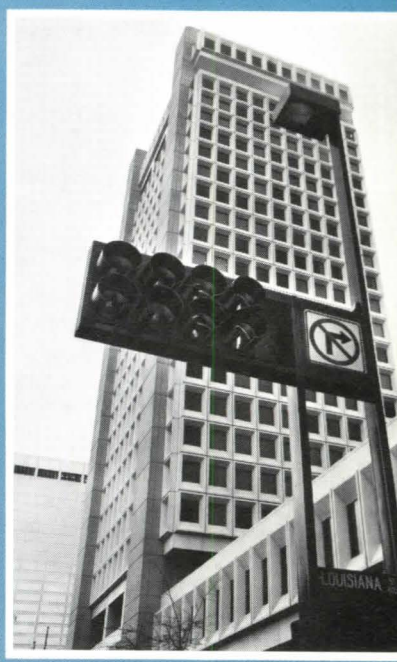

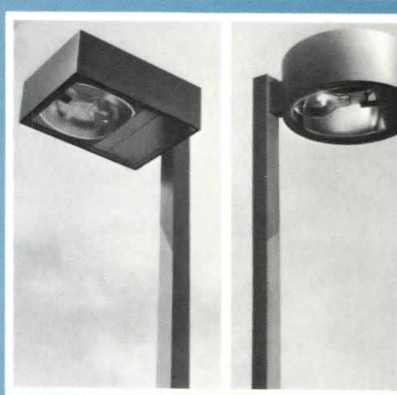

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EVENTS

May 2-3: Institute on design of docks and marinas, University of Wisconsin, Madison.
May 3-4: Energy Management in Buildings Seminar, Washington, D.C., sponsored by New York University, school of continuing education (repeat seminars: June 14-15, Boston; June 20-21, Denver). Contact: New York Conference Management Center, 360 Lexington Ave., New York, N.Y. 10017.
May 5: Technical Standards in Products Liability Litigation Symposium, Toronto. Contact: American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa. 19103.
May 5-6: Hospital Interior Space Design Institute, Chicago. Contact: American Hospital Association, 840 N. Lake Shore Drive, Chicago, Ill. 60611.
May 9-12: American Society of Mechanical Engineers design enginering conference and design engineering show, McCormick Place, Chicago. Contact: Clapp & Poliak, Inc., 245 Park Ave., New York, N.Y. 10017.
May 10-12: Boston Society of Architects, seminar on Building Technologies 1977, Horticultural Hall, Boston.
May 11-13: Annual national engineering conference, sponsored by the American Institute of Steel Construction, Hyatt-Regency Hotel, Washington, D.C. Contact: AISC, 1221 Avenue of the Americas, New York, N.Y. 10020.
May 16-18: Conference on land use, Citizen's Council for Land Use Research and Education, School of Natural Resources, University of Michigan, Ann Arbor.
May 17-18: Institute on deterioration and restoration of concrete, University of Wisconsin, Madison.
May 17-19: International Colloquium on Stability of Structures, Washington, D.C. Contact: Structural Stability Research Council, Fritz Engineering Laboratory #13, Lehigh University, Bethlehem, Pa. 18015.
May 23-25: American Society of Value Engineers international conference, Hyatt Regency Hotel, Dearborn, Mich. Contact: ASVE, 29551 Greenfield Road, Suite 210, Southfield, Mich. 48076.
May 27-29: Aspen Energy Forum, Aspen Institute, Aspen, Colo. Contact: Roaring Fork-Resource Center, P.O. Box 9950, Aspen, Colo. 81611.
May 29-June 3: Joint annual conference of Building Officials and Code Administrators International and Canadian Building Officials Association, Sheraton Centre Hotel, Toronto. Contact: Joan Parker, BOCA International, 1313 E. 60th St., Chicago, Ill. 60637.
May 31: Submissions deadline, awards program for buildings in the U.S. framed with domestically produced and fabricated steel, completed during 1975 and 1976. Contact: American Institute of Steel Construction, 1221 Avenue of the Americas, New York N.Y. 10020.
May 30-June 11: Video Seminar on the Design Science of Buckminster Fuller, Philadelphia. Contact: Fuller Archives, 3500 Market St., Philadelphia, Pa. 19104.
June 5-9: AIA annual convention, San Diego (reconvened convention and study mission to Guatemala and the Yucatan and Cancun, Mexico, June 9-19).
June 5-9: Architectural Secretaries Association annual convention, U.S. Grant Hotel, San Diego. Contact: Marjanne Pearson, Robinson & Mills, 1005 Sansome St., San Francisco, Calif. 94111.
June 12-19: International Design Conference, Aspen, Colo. (Reservations by mail only.) Contact: Mary Apple, IDCA, P.O. Box 664, Aspen, Colo. 81611.
June 15: Entry fee deadline, architectural exhibit at 1977 National Interfaith Conference. Contact: 1977 Interfaith Conference, c/o Guild for Religious Architecture, 1777 Church St. N.W., Washington, D.C. 20036.
June 25-July 3: Seminar on Urbanism and Ecology, Copenhagen, Denmark. Contact: Danish Institute, Kultorvet 2, 1175 Copenhagen K, Denmark.
July 31: Entries deadline, Shinkenchiku Residential Design Competition. Contact: Editorial Section, *Japan Architect,* 31-2, Yushima 2-chome, Bunkyo-ku, Tokyo 113, Japan.

LETTERS

The Gropius House: I thoroughly enjoyed Nevin Summers' analysis of the Gropius house in Lincoln, Mass., in the Feb. issue, not only because the house has so many important lessons for architecture today, but also because it recalled events and discussions that were of deepest importance to me and whose effect has been present in my thinking for these past 40 years.

The description of the reasoning behind the architectural decisions is not the ex post facto rationalization that critics often impose on buildings that may have been designed for quite different reasons. They reflect accurately what actually took place (as recalled by a student and then-employee of Gropius and Breuer during that period).

When Gropius got his land and began thinking of the house he would build, he brought the problem in to his Masters' studio at Harvard as a project for study. Every aspect of residential design was considered as an entirely fresh subject—What is the nature of stud construction? How does one achieve the kinds of openings the new glass technology permitted? What about sun movement (we could draw sun diagrams in our sleep) and prevailing winds? How about trees? And the quality of living? (Suspended on the steel frame beyond the screened porch, Gropius had installed a bird feeder designed as thoughtfully, thoroughly and originally for the birds' needs as the house was for the Gropius'.)

I had the good fortune to work for Gropius and Breuer afterwards, while this and their other early houses were being developed, and I can still recall their constant concern for these problems.

Aside from these reminiscences, however, the house—and the article—have enormous importance in today's architectural reevaluations. First, they begin to correct the widely circulated misinformation that the appearance of the buildings of the '30s resulted from a style with a preconceived esthetic. In fact, the form results from a complex analytical approach that included building performance, satisfaction of user's needs (including physical, psychological and esthetic), careful study of site and environmental demands, and concern for the potentialities and limitations of the building systems and materials used.

Second, they direct us to a way out of the dilemma of the faceless building and the uninformative environment. Life is sufficiently complex not to require a superimposed complication to stimulate visual interest. Gropius' house suggests that if we understand both the unity and diversity within a building problem and design to recognize both, we are dealing with elements that have a wide capability for differentiation.

Third, they demonstrate beautifully that energy considerations in design are not add-ons, but are intimately and essentially tied into the design process.

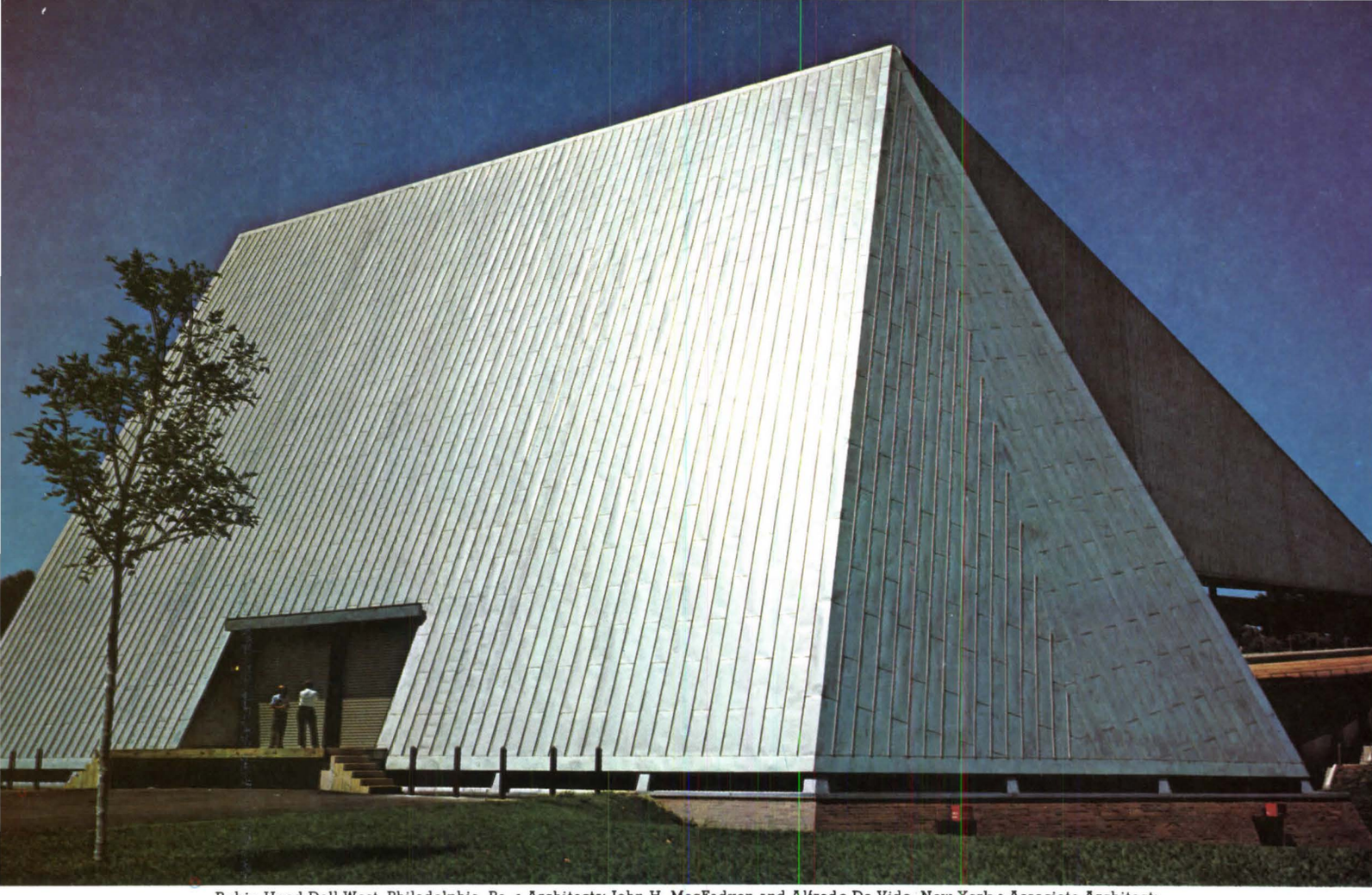
Richard G. Stein, FAIA
New York City

See p. 42 for elaboration on Stein's ideas for energy conservation.—Ed.

Recertification: I would like to challenge two points made in the article entitled "Task Force Report Examines the Issues of Recertification and Professional Development" in the November '76 issue. The first statement is that "it is no longer reasonable to assume that a person once licensed is forever competent" and the second is the unbalanced values placed on the various aspects of continuing education if recertification is inevitable.

Practicing architects and engineers are the only professionals whose work has to pass the rigorous examination, qualification and approval of government regulatory agencies. In California, every commission undertaken by an architect has to

continued on page 85



Robin Hood Dell West, Philadelphia, Pa. • Architects: John H. MacFadyen and Alfredo De Vido, New York • Associate Architect: I. Demchick, Philadelphia, Pa. • Roofing Contractor: Warren-Ehret-Linck, Philadelphia, Pa.

TCS...THE LOGIC OF ITS USE

Rarely if ever has metal roofing been employed with more stunning visual impact than on Robin Hood Dell West, the Philadelphia Orchestra's new summer home, which will also serve as a creative center for other groups in the performing arts.

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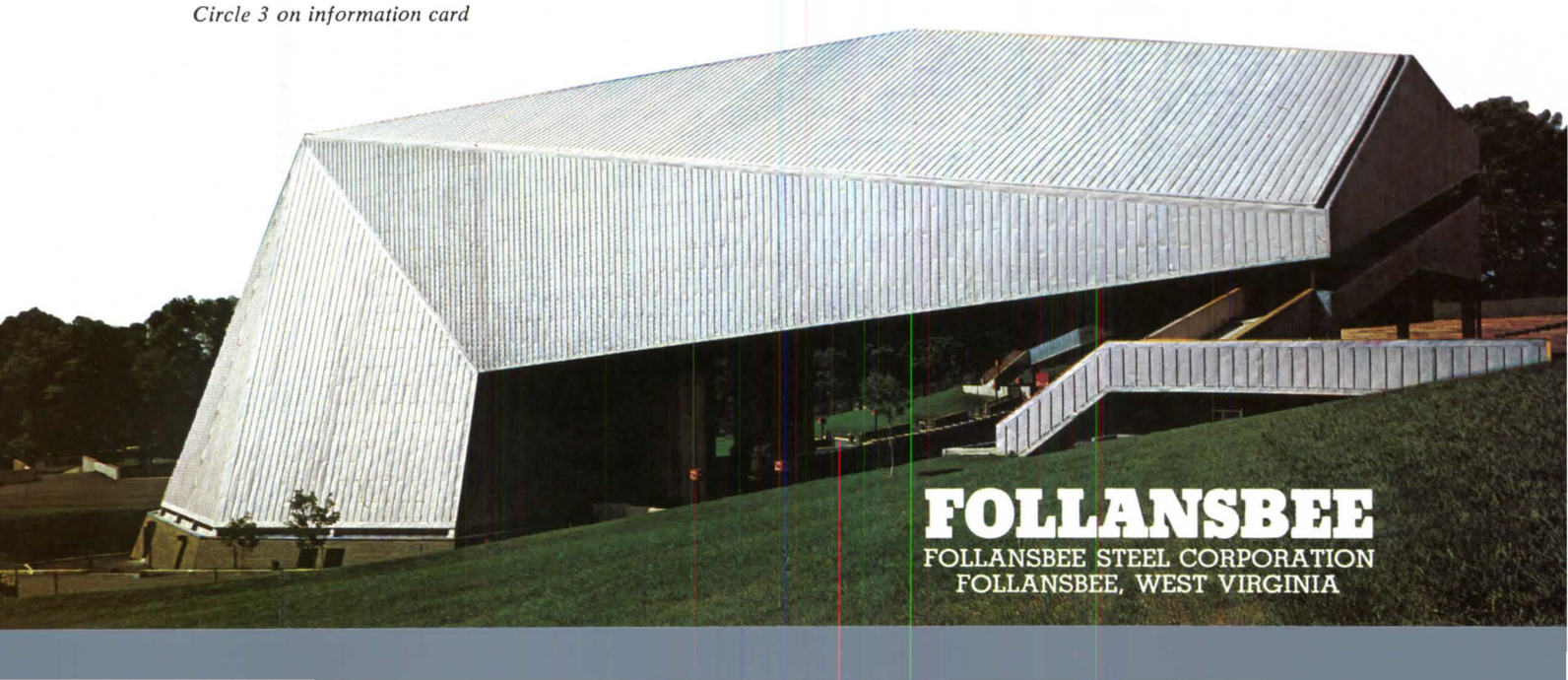

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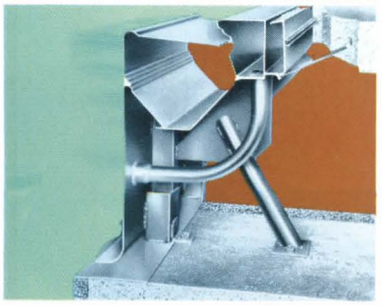

Cross-section of side-wall, circulation system

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VOL. 66 NO. 4.

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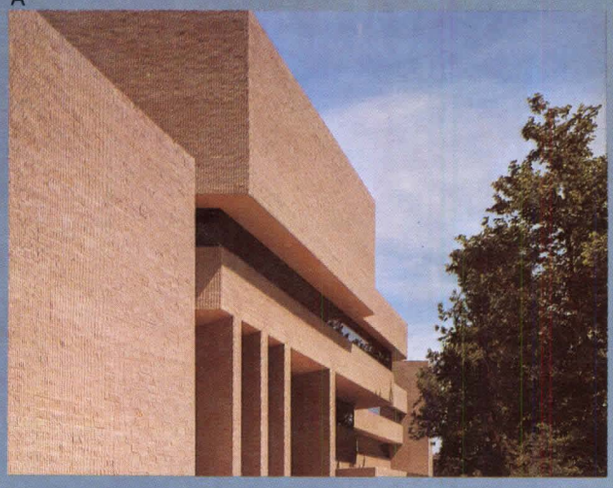

A. Police Headquarters, New Haven, Connecticut, Orr-deCossy-Winder & Associates **B.** Sid W. Richardson Physical Sciences Bldg., Texas Christian University, Paul Rudolf in association with Preston M. Geren **C.** General Studies C/I/R/C, S.U.N.Y. Agricultural/ Technical College, Delhi, NY Wm. A. Hall & Associates, Architecture & Planning **D.** Charles Ennis Residence, Frank Lloyd Wright

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Harris Expands HUD's Budget, Makes Subcabinet Appointments

"Simply unacceptable" was HUD Secretary Patricia Roberts Harris' description of parts of the Ford Administration's housing budget. A revised budget, presented to Congress recently, contains some "drastic" changes that were made "despite severe time limitations and the problem involved in working with a new team." The revised HUD budget not only expands the fiscal 1978 budget, but also the current year's. Such expansions are necessary, says Harris, "in order to meet the pressing and immediate needs of urban America."

Highlights of the revised budget:

- An increase in the community development block grant program by $500 million, with $400 million allocated to the "most distressed cities." The funds would be distributed under an urban development action grant program. "This," Harris said, "will allow HUD to assist in a frontal attack on a myriad of social, economic and development problems in a given city."
- An increase from 164,200 to 400,000 in the number of dwelling units for low- and moderate-income families in 1977. The sum of $508 million would be allocated in Section 8 contract authority for 1977, including assistance to state housing agencies. Harris said HUD would have only the power to create "reservations." In expressing concern about the translation of these reservations into actual housing starts, she said she aims to convert the "unit reservations into construction on the ground, units which families actually can move into."
- Restoration of the Ford Administration's cuts in public housing operating subsidies and modernization funds. Harris also requested funds for public housing authorities to meet rising fuel costs.
- Resumption of the Section 312 rehabilitation loan fund, killed by the previous Administration.
- Restoration of the 701 comprehensive planning grant program to 1977 levels.

The revised budget also extends Section 8 contract terms from 20 to 30 years for privately financed housing in order to attract conventional financing.

Harris eliminated one item from the Ford budget: $200 million supplemental funds for the bicentennial land heritage program which she termed an "overtly political pre-election promise by the prior Administration."

After hearings on the confirmation of Harris as HUD secretary (*see* Feb., p. 18), Sen. William Proxmire (D-Wis.) voted against her confirmation, saying that she lacked experience in housing and urban problems. He gave her high marks, however, for her testimony before the Senate committee on banking, housing and urban affairs, which Proxmire chairs. He agreed almost entirely with her budget. He is quoted in the press as saying that he disagrees only on "minor points," one being that he would like greater emphasis on new rather than existing housing.

In testimony before the House subcommittee on housing and community development, Harris said the urban action grants would be flexible, permitting cities to launch "major new initiatives." Cities receiving such grants, she said, must have a "proven record" on providing equality of opportunity in housing persons of low and moderate income. Other criteria would relate to housing conditions, unemployment, jobs lost, median income, tax base, etc. Through the urban grants program, Harris said, HUD would play a "significant leadership role in urban affairs and in the government's effort to revitalize our cities." The budget increase, she said, would assist not only communities that are losing people, but also "areas with growth lag or on the brink of decline, such as some suburban areas."

Some House subcommittee members said that such urban action grants would be a "retreat" to a categorical program. There "might be a problem downstream" because of lack of structure at the local level, one said.

HUD's staff level will remain the same, except that employment cuts in community planning and development will be restored.

Meanwhile, several appointments have been made at the subcabinet level to assist Secretary Harris, some still to be confirmed. Among them:

- Jay Janis, senior vice president for management and urban affairs, University of Massachusetts, formerly associated with HUD: under secretary.
- Robert Embry, former Baltimore housing commissioner: assistant secretary for community development and planning.
- Lawrence B. Simons, president of the LBS Construction Co., New York City: assistant secretary of housing, and federal housing commissioner.
- William White, executive director of the Massachusetts housing finance agency: head of the new communities development corporation.
- William Medina, office of management and budget: assistant secretary for administration.
- Chester C. McGuire, assistant professor of city and regional planning, University of California, Berkeley: assistant secretary of fair housing and equal opportunity.
- Arch Parsons, director of information, Appalachian Regional Commission: assistant to the secretary for public affairs.
- Harry K. Schwartz, a lawyer who practices in Philadelphia: assistant secretary for legislative affairs.
- Donna E. Shalala, associate professor of politics and education, Columbia University: assistant secretary for policy development and research.
- Msgr. Geno Baroni, a Catholic priest who heads the National Center for Urban Ethnic Affairs: assistant secretary for neighborhood development, consumer affairs and regulatory functions.
- Ruth Prokop, former special assistant to HUD Secretary Robert Wood and now senior counsel of General Telephone & Electronics: general counsel.

Going On continued on page 20

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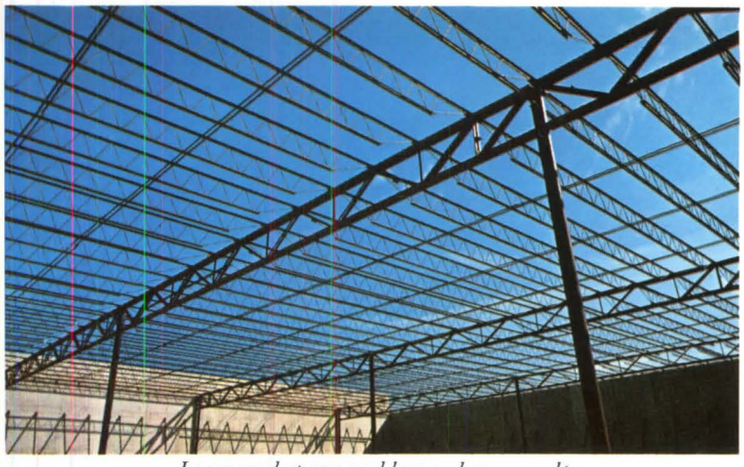

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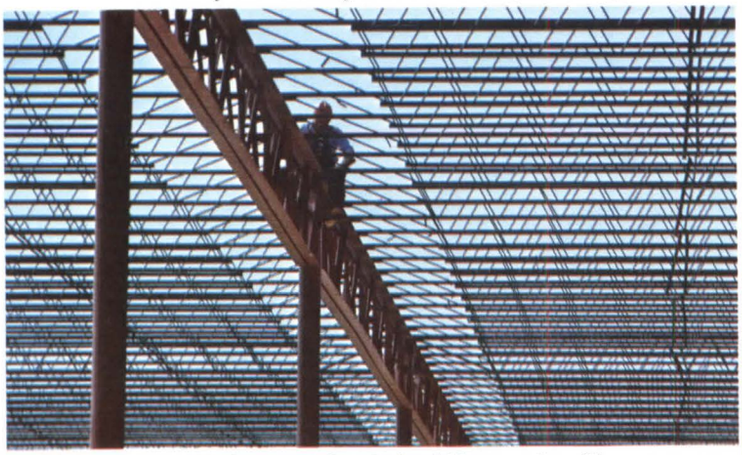

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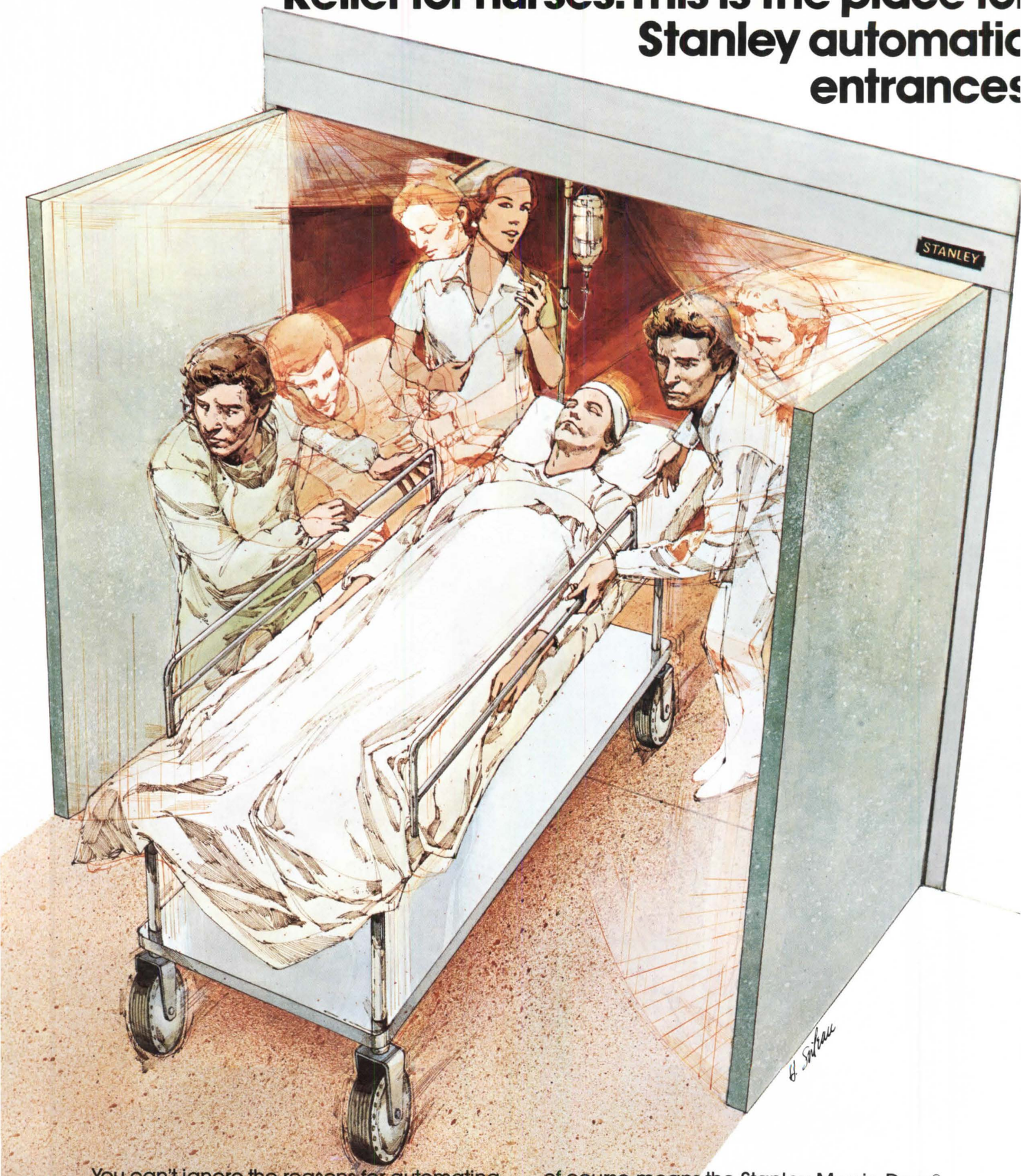

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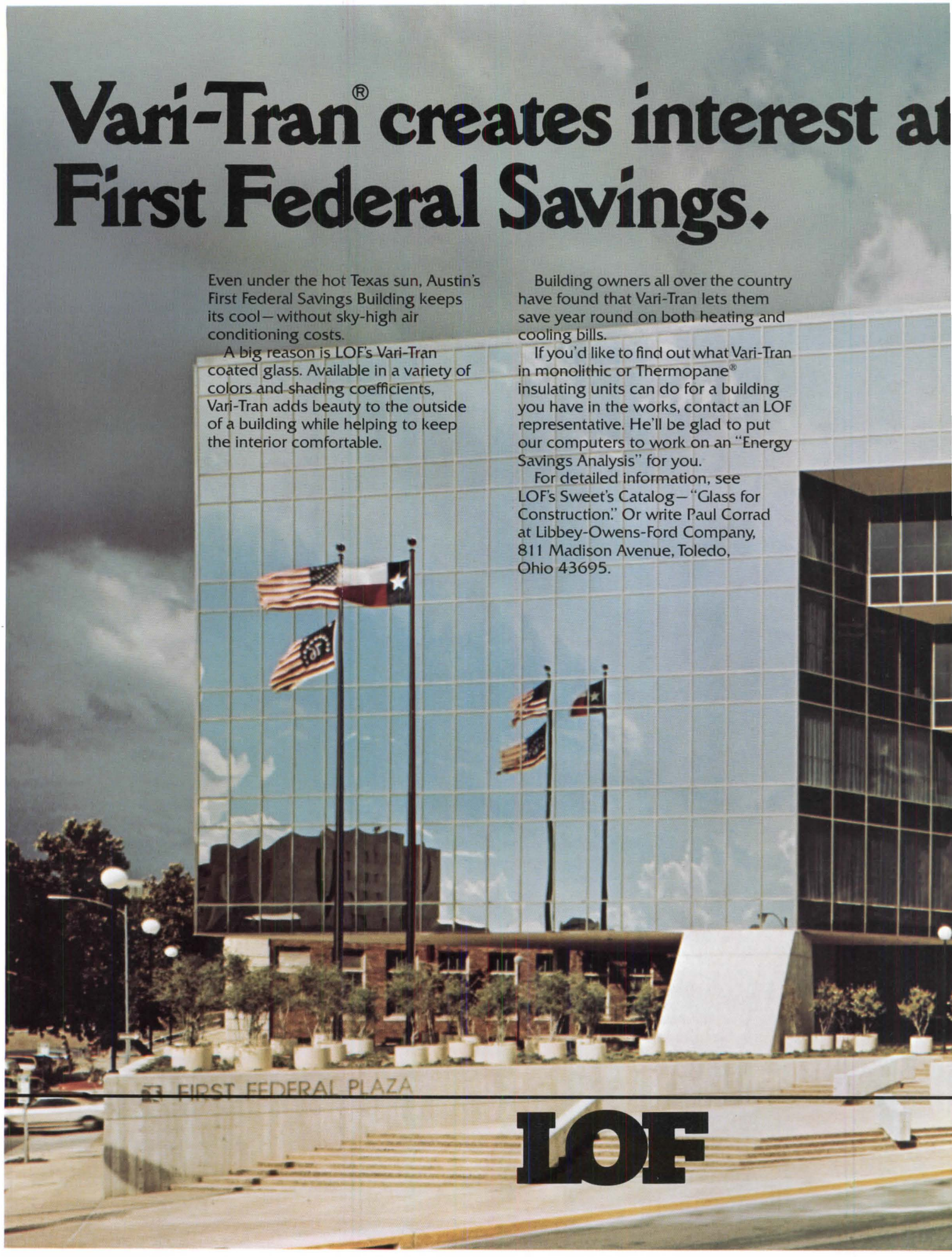

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LOF

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Architects: Brooks, Barr, Graeber & White, Austin, Texas
Wall & Glass Contractor: Binswanger Glass Co., Austin, Texas

Going On from page 8

Cities Receive Pledge By Kreps of Commerce For Better Assistance

Secretary of Commerce Juanita M. Kreps recently pledged the resources of the Department of Commerce in helping solve "what the President has referred to as the nation's number one economic problem: our cities." She told members of the National League of Cities that she was not satisfied with the department's past record. "We need to streamline some programs and to bring more of this department's resources directly to the assistance of cities," she said.

Kreps said that recent amendments to the economic development administration's legislation "strengthened our urban programs, making flexible EDA assistance available to most urban centers." An additional $2 billion in 1977 and $2 billion in 1978 have been requested, she said, to fund EDA's local public works program.

It is clear, she said, that "fiscal transfusions" by the federal government are not enough. "Unless we are simultaneously working to make our declining cities economically well again, there can be no solution." Too little, she said, is being invested in the so-called software side of economic development. "It is not enough that we locate public works wisely or that we arrange for adequate business financing to complete industrial or commercial projects. As important as these are, there is a greater need to build, strengthen and expand the institutional infrastructure of urban economic development to include state as well as private investment," she said.

Kreps said due consideration should be given to the lasting nature of public works. "The projects we are to build ought to serve the public well, to be attractive and well integrated into the social and economic life of each community."

'Deprivation' of Housing Seen for Middle Class

"Extraordinary population and economic pressures" have caused a significant new form of "housing deprivation" in the U.S., says a research report prepared by the Massachusetts Institute of Technology/Harvard University joint center for urban studies. Housing problems, once limited to the poor, now affect average-income families. In 1970, almost half of all U.S. families could afford a median-priced house, but by 1975 only 25 percent (those earning $20,000 or more yearly) could buy the same standard house. Since 1970, the median price of new homes increased by almost 90 percent and ownership costs by more than 100 percent, greatly outpacing growth in income, which was 47 percent in the same period.

The research report, entitled *The Nation's Housing, 1975 to 1985,* was developed under the leadership of Professors Bernard J. Frieden and Arthur P. Solomon. It identifies trends and developments that are the source of U.S. housing problems, including:

- The recession in the housing construction industry, which caused housing starts to drop from a rate of 2.4 million annually in the first quarter of 1972 to 990,000 units per year in the second quarter of 1975. (The highest unemployment rate in any sector of the economy occurred in the construction industry, where unemployment went from 7.5 percent to 21.5 percent.)
- Changes in the national economy and public policy, including "suspension of all major federal low-income housing subsidy programs, sudden and substantial increases in housing costs and periodic withdrawal of funds from mortgage credit institutions."
- Changes in demographic factors shaping housing demand, including migration patterns and number and size of households.

The report estimates that between 1975 and 1985, 20.2 to 22.6 million new housing units will be needed. There will be need for 11.9 to 13.6 million housing units for expected growth in the number of new households, with the remainder required to replace obsolete units and to upgrade existing housing.

The report points to changes in population growth, with nonurban areas outstripping growth in metropolitan areas. As a result, some urban housing may become unneeded, but a housing shortage may occur in small cities and towns. In 1960-70, Pittsburgh was the only city to decline in population, but since 1970, 10 of the 25 largest metropolitan areas declined in population. A major trend, says the report, is rapid population growth in the South and West. "In fact, population growth in the South should be greater than in all other regions combined."

At a press conference, Professor Solomon said: " 'Suburban sprawl' was the word for the '60s; the movement to the Sunbelt for the '70s; now 'back to the country' is the term for the '80s." Except in the South, he commented, growth in nonmetropolitan areas will be larger than in metropolitan areas in the future.

Professor Frieden said that although the number and proportion of families living in inadequate housing units has declined sharply since 1960, those paying an "unreasonably high percentage of their income for rent has increased rapidly." Dwellings without adequate heating or plumbing or in extreme disrepair are "concentrated disproportionately outside metropolitan areas," he said. Conversely, families with high rent burdens and inadequate housing "are located overwhelmingly within the country's metropolitan areas."

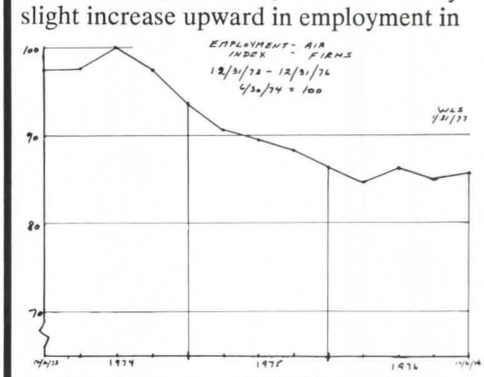
Frieden said that the "decline of slum housing as a problem and its replacement by the cost squeeze as the dominant form of housing deprivation suggests that the nation's housing policies for the disadvantaged need to be accompanied by programs to provide additional income for the poor." Said Solomon, "A strong national housing policy—with a constructive partnership between the public and private sectors is clearly needed to alleviate America's present and future housing problems.

"It should focus on better, more affordable housing for the poor, with secondary emphasis on improving the home-buying climate for the young and for people with average incomes."

Survey Finds Architectural Employment at Standstill

An employment survey of 4,204 architectural firms conducted at the end of Jan. 1977 by William L. Slayton, Hon. AIA, executive vice president of the Institute, shows essentially no change (minus 0.4 percent) in employment from June 30 to Dec. 21, 1976. From Dec. 31, 1973 (the date for which Slayton first asked figures), architectural employment is down 12 percent.

As the graph prepared by Slayton, shown below, indicates, there was a very slight increase upward in employment in



the fourth quarter of 1976 from the low point suffered in the year's third quarter.

Results from the survey show that firms in the south Atlantic states suffered the greatest percentage drop in employment from June 30 through Dec. 31, 1976—a minus 2.7 percent. The greatest increase in employment for the same period occurred in New Jersey, where the percent change was a plus 4.8 percent.

Slayton's first employment survey, compiled in June 1975, revealed that employment in 2,533 architectural firms had declined by 6.8 percent from Dec. 31, 1973,

continued on page 24

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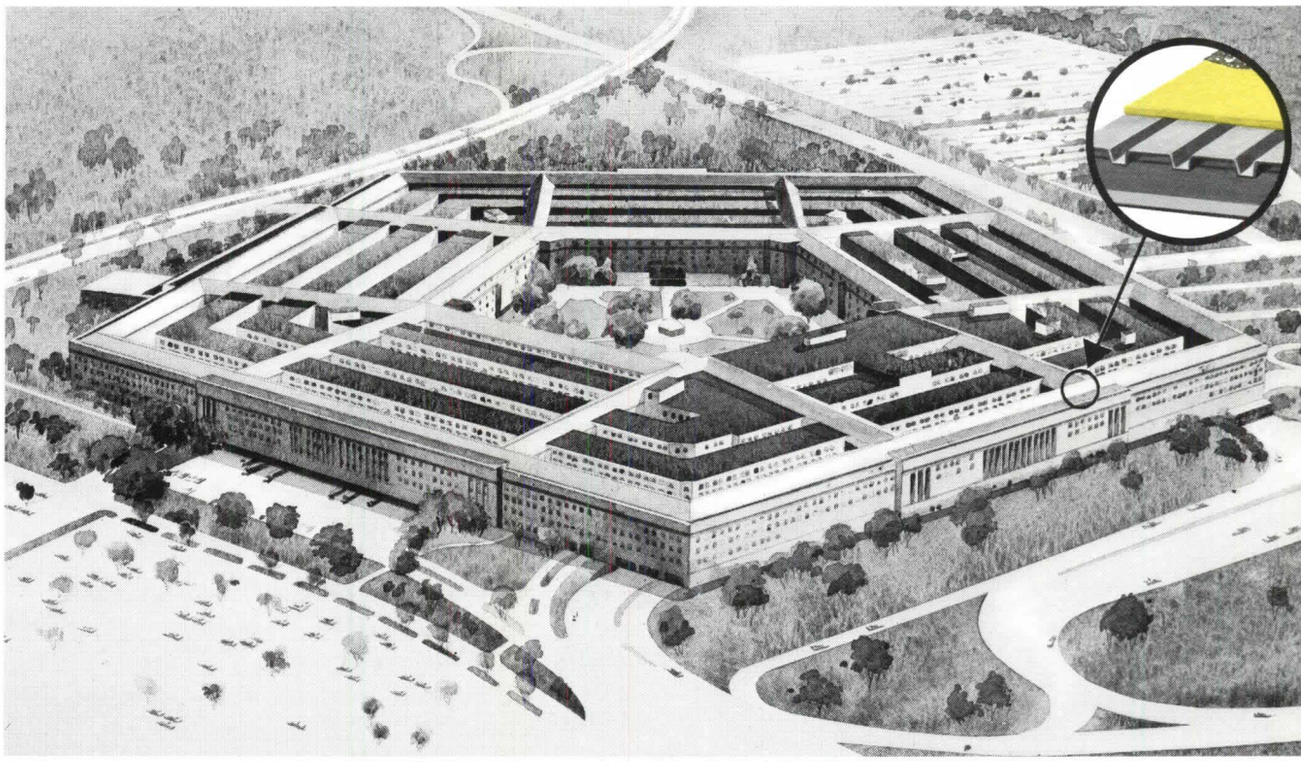

Projected cost to heat and cool the Pentagon
for the next 20 years, if it were built today using only 15/16-inch Fiberglas roof insulation:

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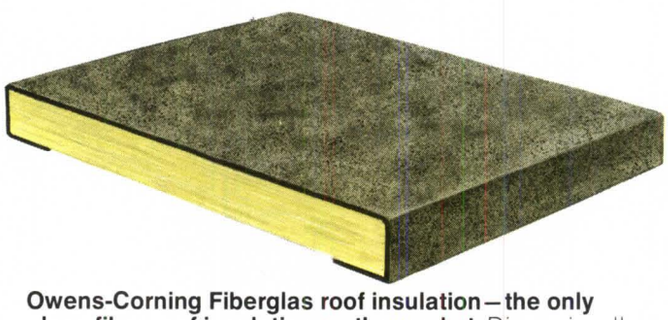

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trust it would have the specific
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20 or 30 years.

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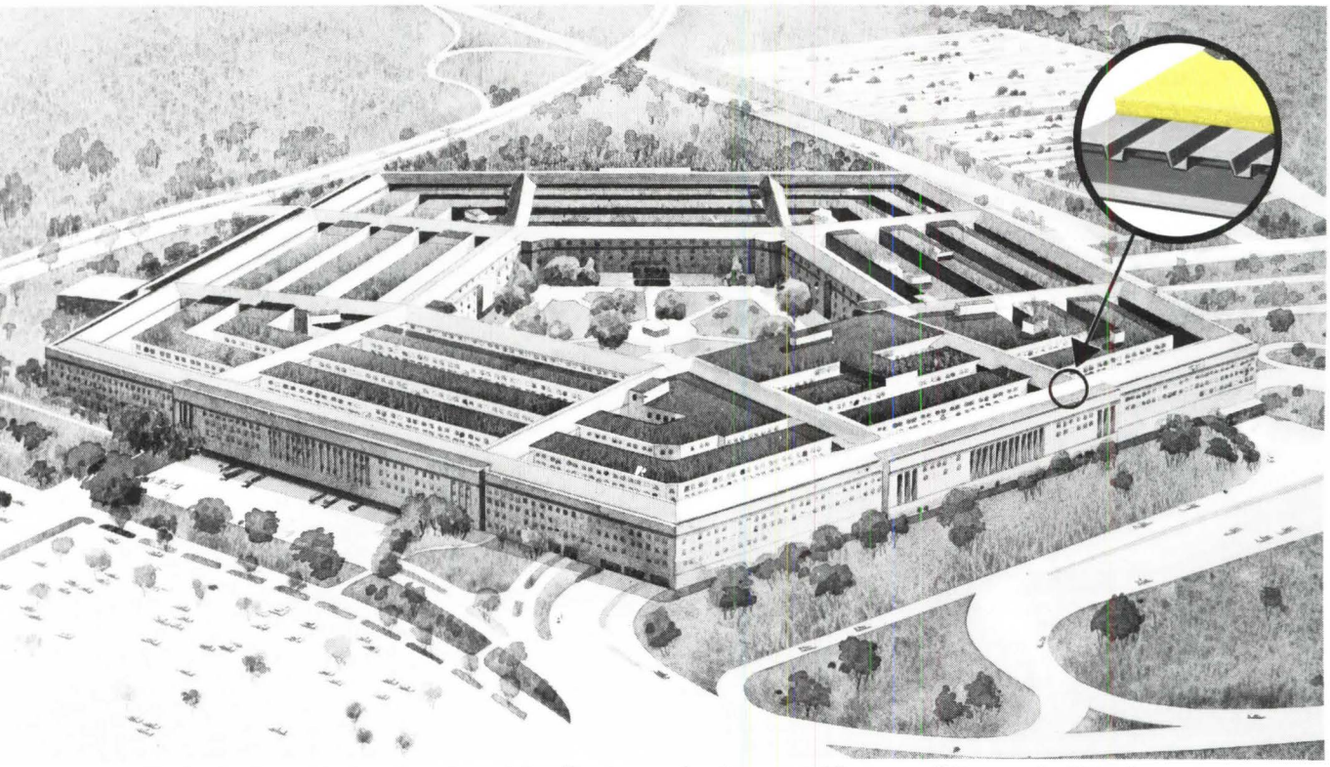

Projected cost to heat and cool the Pentagon for the next 20 years, if it were built today using thicker 2¼-inch Fiberglas roof insulation (*after* allowing for the cost of thicker insulation!):

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oof insulation saves money two fferent ways:

A saving of $1,333,954

1. It saves on energy costs. Esti- ated savings per year, based on as heat and electric cooling in the ashington area, with a projected crease in energy costs at 7% per ear and estimated future savings scounted at 10% per year: $66,697 or $1,333,954 every 20 years.

2. It saves on construction costs. ne estimated first cost of this energy-tight Pentagon would be *lower* than if the less efficient version were built! Reason: the improved thermal performance of the roof would permit use of smaller-capacity, *less costly* heating and cooling equipment. Amazingly, the estimated savings would be large enough to cover the added cost of the thicker roof insulation *twice* over.

Important: Thicker Fiberglas roof insulation also makes sense when it's time to re-roof *existing* buildings. It should pay for itself in a few years, then go on saving thousands in fuel bills for years to come.

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Our EMS II (Energy Management System) computer can give you savings figures on your next roofing job — by phone! You'll get projected energy *and* equipment savings, plus *payback* period. (Actual savings may vary.) For details, call your local O.-C.F. rep, or write: M.F. Meeks, Owens-Corning Fiberglas Corp., Fiberglas Tower, Toledo, Ohio 43659.

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Going On from page 20
through the first quarter of 1975 (*see* Sept. 1975, p. 41). A second survey, conducted in Feb. 1976, measured changes in employment during the last three quarters of 1975. In this survey, tabulations were compiled from responses by 4,003 firms.

Although the figures in the first two surveys are not strictly compatible because of the larger number of firms responding to the second survey, there was a definite indication of a continuing deceleration in architectural employment figures. The percent change in the second survey showed a 4.8 percent drop in employment for the first three quarters in 1975.

"On the basis of this index" says Slayton, "it would appear that employment in architectural firms has bottomed out. One should look for an increase in the next two quarters. We must remember, however, that there is a good deal of employment representing foreign work; so, in effect, domestic employment is down."

Report Appraises HUD's New Communities Program

State and local governments, not private developers, should take the lead in future new town developments, according to a recent report by the new communities administration of HUD.

The federal government's role should be research and dissemination of new technology and simple, prompt and flexible financial assistance for planning and development, the report says. "Most of all," it continues, "this assistance must not be primarily in the form of interest-bearing debt."

The 107-page report, "New Communities: Problems and Potentials," investigates the intent of Congress in setting up the Title VII program, the performance of the program's administration, the physical results and the problems encountered.

To find out what went wrong with Title VII, the consulting firm of Booz-Allen & Hamilton, Inc., was brought in. The consultants identified two major defects inherent in the program.

The first shortcoming was an "infeasible" financing mechanism. Traditional financing simply did not work for new towns, say the consultants, and Title VII direct loans at compound interest to service the original interest-bearing debt both postponed and compounded the problem. Failing to perceive this, developers quickly got in over their heads by making early commitments for substantial land acquisition and by incurring heavy and inflexible front-end debt service and carrying costs. Allied problems included cash equity requirements set too low by HUD and failure by developers to receive federal grants of the types and amounts necessary.

The second major shortcoming named in the report was a failure of government at all levels to use new town development as a "high priority tool" for controlling and channeling growth. HUD administered the program passively, say the consultants, by merely responding to applications of developers instead of identifying areas of rapid growth and promoting growth management in those areas. Consequently, the projects were scattered haphazardly around the country, developers tended to use Title VII as an adjunct to land speculation and HUD understaffed administration of the program.

Regarding the economic recession of the early 1970s, the analysis indicates that most of the new towns would have had severe financial problems even under normal conditions.

In conclusion, the report says that the fundamental problems associated with continuing growth trends remain—e.g. wasteful and inefficient development, destruction of the environment, costly transportation, excessive energy use, segregation by race and income and the decay of central cities. In response, it says, ". . . the evidence to date indicates that well planned, financed, managed and supported new towns are cost and energy efficient, environmentally sound, and offer better housing and community opportunities for minorities—and people seem to enjoy living in them as much or more than in conventional sprawl subdivisions."

Picketing Bill Defeated In 217-205 House Vote

By a vote of 217 to 205, the House defeated the so-called common situs picketing bill (HR3500) on Mar. 23. The press called the vote on the first labor-sponsored legislation of this session a victory for the Republican minority, business, contractors, homebuilders and others "who launched a massive lobbying effort against it." The bill, similar to one vetoed by President Ford in Dec. 1975, would have permitted a union with a grievance against one subcontractor to picket an entire construction site. It was based on the premise that contractors, subcontractors and others on a common worksite are engaged in a joint venture.

A similar bill (S924) has been introduced in the Senate, but Rep. Frank Thompson Jr. (D-N.J.), who sponsored the House bill, said that the chances of site picketing are ended "for a long time. I can't see how the Senate can pass a bill and send it over here in light of this vote."

On the day of the vote, labor made a number of concessions, accepting a weaker version than the legislation that had passed both houses in 1975. For example, the bill finally contained an amendment that would have prevented the union which had a grievance from striking against workers at the site who were not directly involved in construction. Another concession was that construction under way at the time of the bill's passage would be exempted for a year.

AIA has been among those opposing the legislation because of the effects it would have on the cost of construction and the national economy. AIA contended that contractors, subcontractors and others on a construction site are not under a joint venture agreement; rather, each employer is a separate company, bidding against other employers and responsible for its own financing, bonding, labor policies, work force, etc.

Nicole Gara, director of Congressional liaison at AIA, said U.S. architects indicated strong disapproval of the bill in a "flood" of letters to Congress. Her office received over 1,000 copies of such letters in a single week, she said.

John M. McGinty, FAIA, president of the Institute, in opposition to the bill, had written Thompson, stating that AIA is committed to legislation that will serve the public and promote the construction industry. "However," McGinty said, "we have reached the conclusion after long deliberation that HR3500 will not serve these purposes." The bill had provisions intended to reform the construction industry's collective bargaining process, and AIA has not taken a position on this aspect of the legislation.

The Associated General Contractors, long a vocal opponent of the legislation, said that the bill would have resulted in "strikes, project delays and higher and higher costs to the public as the building trades unions slowly and methodically tighten their stranglehold on one project after another."

The *New York Times* commented editorially that labor had stimulated the common situs picketing bill because of the "shrinkage in the share of construction work now done by union labor." The shrinkage, the editorial said, is not due to the lack of such legislation as the common situs picketing bill, "but rather from the great differential between the cost of union and nonunion construction labor."

To raise the cost of union labor still higher, such legislation "would only invite builders to use more nonunion workers." To help labor best, the editorial said, in this case Congress and the President "should ignore" the counsels of labor leadership. The advice, it appears, was accepted by 217 members of the House. *Going On continued on page 26*

ENERGY-SAVING WINDOWS: CASE STUDY

St. Paul Public Library Renovation
Architect: Glenn Erickson, City Architect
Windows: DeVAC dual-glazed Thermo-Barrier
U Value: .52
Air Infiltration: One-fifth of Standards

Window replacement improves aesthetics...more than pays for itself, reducing steam usage 40%

Windows were causing problems in this 60 year old classic downtown St. Paul, Mn. building: frost melting to damage walls and books; drafts and windblown dust coming through; unsightliness of deteriorating paint and putty; excessive cost of potential air conditioning.

New DeVAC windows retained the style of the original with muntins and curved tops custom fabricated. Installation was made during the winter while the library was in full use, with little or no discomfort.

Here are some of the energy-saving results:

- Steam usage cut 40% over comparable heating seasons (resulting in 19% dollar savings despite 35% steam cost increases)
- Needed air conditioning equipment tonnage reduced 37.5% resulting in immediate purchase savings plus sizable annual operational savings. Installation starting May, 1976.
- Humidifiers ran 60% of the time. Probably won't run at all this season.

Other cost-reducing benefits include elimination of painting, easier window washing, reduced interior maintenance and cleaning needs, improved employee comfort and efficiency. All DeVAC windows can be washed automatically.

Required costly maintenance; old windows inefficient. Wide muntins cut visibility.

DeVAC installation has permanent color, clean lines, low .52 U value and low air infiltration.

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Going On from page 24

New Standards Approved To Aid Solar Technology

Two new standards related to solar energy have been approved by the board of directors of the American Society of Heating, Refrigerating and Air-Conditioning Engineers. The new documents are "Methods of Testing Solar Collectors" (Standard 93-77) and "Methods of Testing Thermal Storage Devices" (Standard 94-77). John I. Yellott, chairman of ASHRAE's solar energy applications committee, says the standards are significant because they "will pave the way for mass production of reliable solar equipment, make it easier for builders and homeowners to obtain commercial financing for solar installations and reassure the customer that he is getting what he is paying for."

ASHRAE's board has also approved a first draft of "Energy Conservation in Existing Buildings: Industrial" (Standard 100.4P). Based in part on ASHRAE's "Energy Conservation in New Building Design" (Standard 90-75), the proposed standard "provides a method for an energy audit of industrial buildings and takes into account such features as the envelope of the building, its HVAC systems and equipment, domestic hot water heating and illumination," says Neil R. Patterson, chairman of the 100.4P project committee.

"Most important," says Patterson, "this document recognizes that economics is the driving force behind energy conservation in existing buildings." The standard provides guidelines on cost effectiveness of recommended measures. Annual energy savings, Patterson explains, must be at least 25 percent of the cost of retrofitting in buildings with a life expectancy in excess of eight years. Buildings with less than eight years life "will be in compliance with the standard if the estimated annual energy savings equal or exceed two divided by the life in years, times the retrofit costs." Current practice "is to renovate for energy conservation where savings can be recouped in anywhere from two to five years. We hope to stretch that period a little farther and compromise between our national energy needs and the interests of business."

In other action, ASHRAE has approved Section 12 of the standard for "Energy Conservation in New Building Design." This section helps designers of HVAC systems "to determine the quantities and types of energy resources consumed by buildings. In other words, it evaluates the relative efficiency of oil, gas and coal from their points of origin."

For additional information, write: Nicholas A. LaCourte, Manager of Standards, ASHRAE, 345 E. 47th St., New York, N.Y. 10017.

AIA Scholars' Reports

Three reports on research projects conducted by 1976 AIA scholars have been prepared, revealing that these architectural students not only profitted personally by the experience, but have made a contribution to the profession.

Patricia Holtzclaw, for example, has made a timely report on "Contract Research: A Potential New Business for Architects," prepared with the assistance of Don Conway, AIA, who directed the Institute's research program for several years. The report contains "facts and figures" on federal and state research programs, giving the architect much practical information on how to obtain and carry out research projects. Holtzclaw says that "research is an intellectual tool needed to strengthen the architectural profession."

The subject of Bruce Kenneth Forbes' report is "A Survey of Computer Applications in Architecture," presenting the results of a survey conducted by AIA. The aim was to "provide the architectural community with up-to-date information on who is involved and what is being done in this rapidly growing field of architecture."

The survey found, among other things, that 87 percent of the A/E firms responding to a questionnaire and 92 percent of

the architectural schools "made use of computers in one way or another, some quite extensively and others occasionally." To provide information on "who is involved," the report contains a directory with the names and addresses of more than 175 people who are working, directly or indirectly, in the field of computer applications in architecture. Also there is a compilation of data on 230 computer application programs to give information on "what is being done."

Michelle Morgan, a contributor to the AIA JOURNAL of articles on barrier-free architecture, devoted her time as an Institute scholar to "Notes on Design Criteria for People with Deafness." She points out the absence of literature on the subject, and her report is based primarily on "interviews, on-site investigations and personal observations."

Blindness, Morgan says, "isolates people from things, but deafness isolates people from people." She sets forth the way in which an accommodation can be reached through design, placing emphasis upon the deaf's reliance upon visual stimuli.

The supply of the reports by Morgan and Forbes has been exhausted, but there is a limited number of copies of Holtzclaw's report still available. For further information, contact Ray Charity at Institute headquarters.

Quake Hazard Measures Proposed in House Bill

"All 50 states are vulnerable to the hazards of earthquake occurrence, and at least 39 of them are subject to major or moderate seismic risk," states a bill (S126, known as the Earthquake Hazards Reduction Act) introduced recently by Sen. Alan Cranston (D-Calif.). He considers the bill a "top item" in a list of legislative priorities. The bill states that "an expertly staffed and adequately financed earthquake hazard reduction program, based on federal research and contributions and state, local and private participation" would greatly reduce enormous loss of life and destruction of property. The bill calls for improved construction methods and practices; land use controls and redevelopment; prediction techniques and early warning systems; coordinated emergency preparedness plans, and public education.

The new bill is almost identical to S1174, which passed the Senate in May 1976, but was "derailed on a procedural vote," Cranston says, in the House in the last days of the 94th Congress. The only change, according to Cranston, is an increase of $70 million in annual authorization levels. The new bill authorizes a total of $220 million to be expended over a three-year period: $60 million in fiscal 1978, $75 million in 1979 and $85 million in 1980. The major portion of the funds would be allocated to the National Science Foundation and the U.S. Geological Survey.

Bills have also been introduced in the House. Cranston says that he is "confident that early hearings will occur in both the House and the Senate and that the Earthquake Hazards Reduction Act will be enacted at long last in this calendar year." (House subcommittee hearings began in March.)

Cranston points to growing concern about earthquake hazards. Much of the nation's population and resources are now concentrated "in the very areas most prone to earthquakes and related hazards." An earthquake of the magnitude of the 1906 San Francisco earthquake today would cause losses "measured in the tens of billions of dollars," a burden that would have to be shared by the entire country.

Worldwide earthquakes in the past months have been "extraordinarily destructive," Cranston says. For example, the earthquake of 1975 in the Tangshan-Tientsin region of north China killed an estimated 650,000 people, with injuries to an additional 800,000. There were deaths and substantial damage as well in major earthquakes in Guatemala, Italy,

continued on page 90

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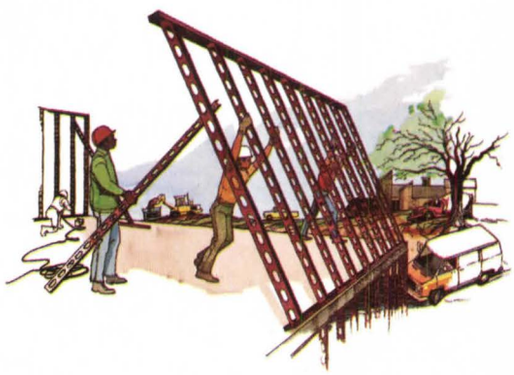

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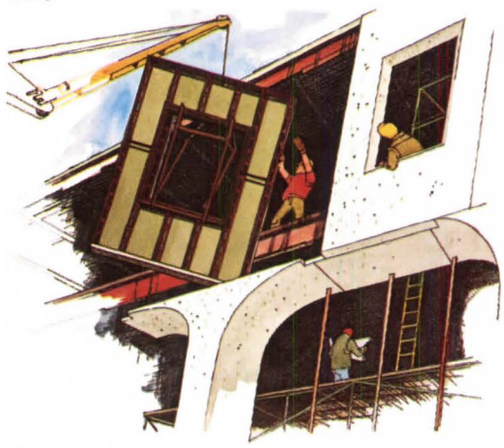

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Our experienced engineering staff furnishes design consultation and assistance on hundreds of projects each year ...reviewing plans, detailing efficient solutions for complicated conditions, calling attention to over-design or under-design of specified systems.

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Through longtime involvement in both construction and manufacturing, Inryco has become the recognized leader in the steel framing field. We've worked closely with steel framing contractors to develop system innovations and improvements in fabrication and erection techniques. We stand ready to assist your contractor in developing proper framing construction techniques to help you achieve the maximum benefits of our systems.

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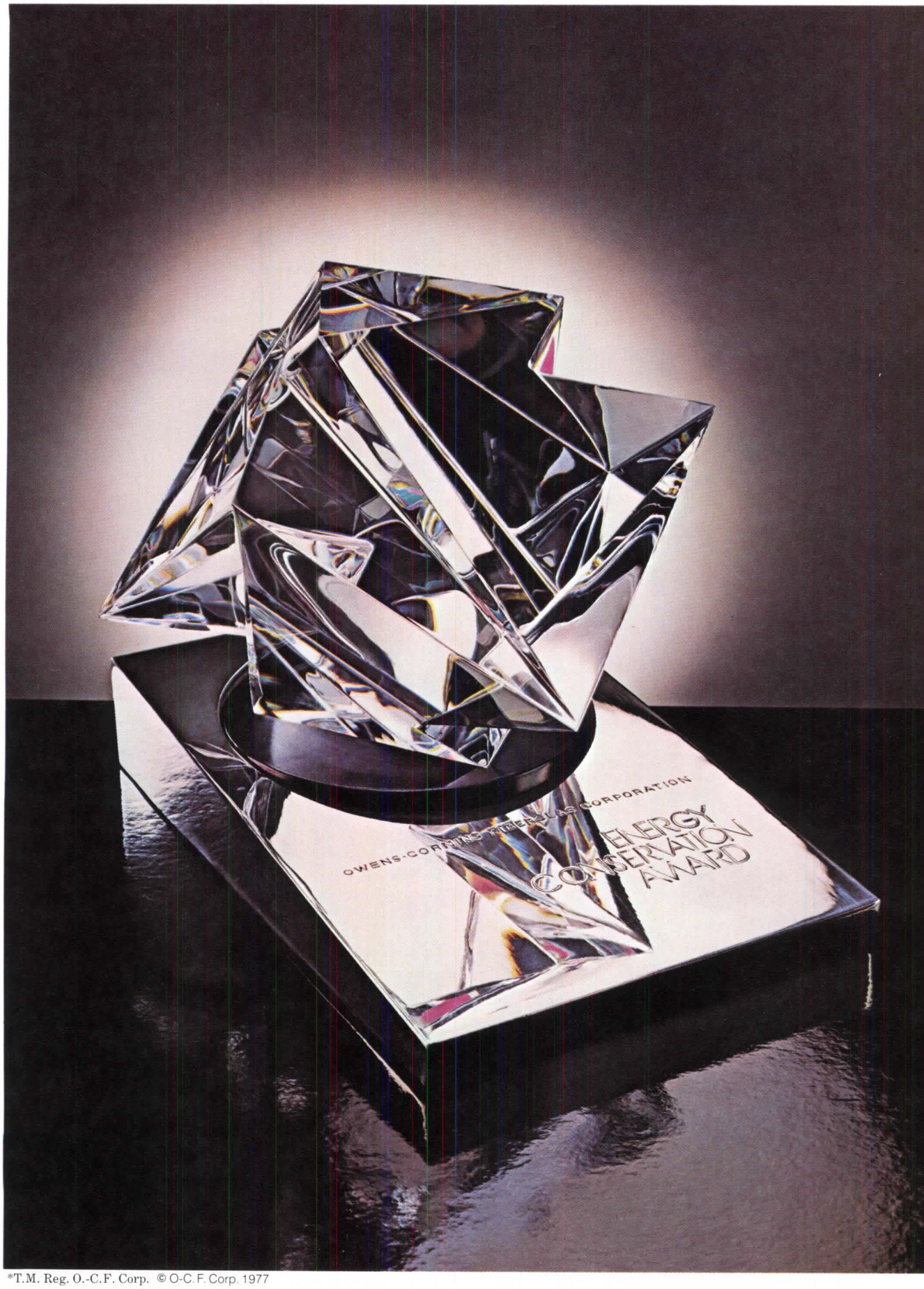

*T.M. Reg. O.-C.F. Corp. © O-C.F. Corp. 1977

Announcing the 1977 Owens-Corning Energy Conservation Awards Program

(because America urgently needs more designs that save energy)

When Owens-Corning announced its first Energy Conservation Awards Program in 1972, architects and engineers responded with dozens of energy-saving designs.

And each year the flow of ideas has continued to pour in.

But this past winter brought a cruel fact to light. Despite all the energy-saving designs that have already been created, and despite all the energy conservation measures that are already in effect, it's nowhere near enough.

Our country still needs more designs that save energy.

Do you have a design that saves energy?

Show our Awards Jury a building design that doesn't waste energy—and you could receive one of the Energy Conservation Awards Owens-Corning will present in 1977.

The Awards Jury will be looking for design excellence and significant energy conservation features and/or systems.

This will be the 6th annual competition in Owens-Corning's Awards Program.

By continuing the Energy Conservation Awards Program, we hope to stimulate even more ideas to conserve energy. It also lets us recognize—and honor—those who do the best job of designing buildings and mechanical systems that help conserve our nation's energy.

Five entry categories

Up to now, there have been four entry categories in the Owens-Corning Energy Conservation Awards Program. This year winners will be selected from *five* design categories:

Institutional—schools and hospitals, for example.

Commercial—office buildings, shopping centers, retail stores, and similar structures.

Industrial—including manufacturing plants, research centers, and warehouses.

Governmental—post offices, administrative buildings, military structures, to name a few.

Special—new or existing buildings, projects, or complexes that are not included in preceding categories.

Who can enter

Any registered architect or professional engineer practicing in the United States is eligible. As an individual. Or in a team.

But to qualify, your entry must be a commissioned building project—in the design process, under construction, or a completed structure.

Although Fiberglas* products are an excellent way to conserve energy, their use is not an entry requirement.

The Awards

Winning architects and/or engineers will receive "Triangles," the handsome Steuben crystal sculpture shown at left. Owners or clients will receive other Steuben crystal awards.

The Awards Jury for 1977

Outstanding professionals in architecture and engineering will serve as the Awards Jury to select the winners.

Send for entry details now

Completed entries must be submitted by July 31, 1977. Winners will be selected and notified in early October.

For a brochure with details on how to enter your energy-saving designs, write: G. N. Meeks, Owens-Corning Fiberglas Corp., Building Products Operating Division, Fiberglas Tower, Toledo, Ohio 43659.

This program has been approved by the American Institute of Architects and is patterned after its Honor Awards Program.

◀ *The Owens-Corning Energy Conservation Award. "Triangles," a Steuben crystal sculpture that captures and reflects light from multiple triangular planes.*

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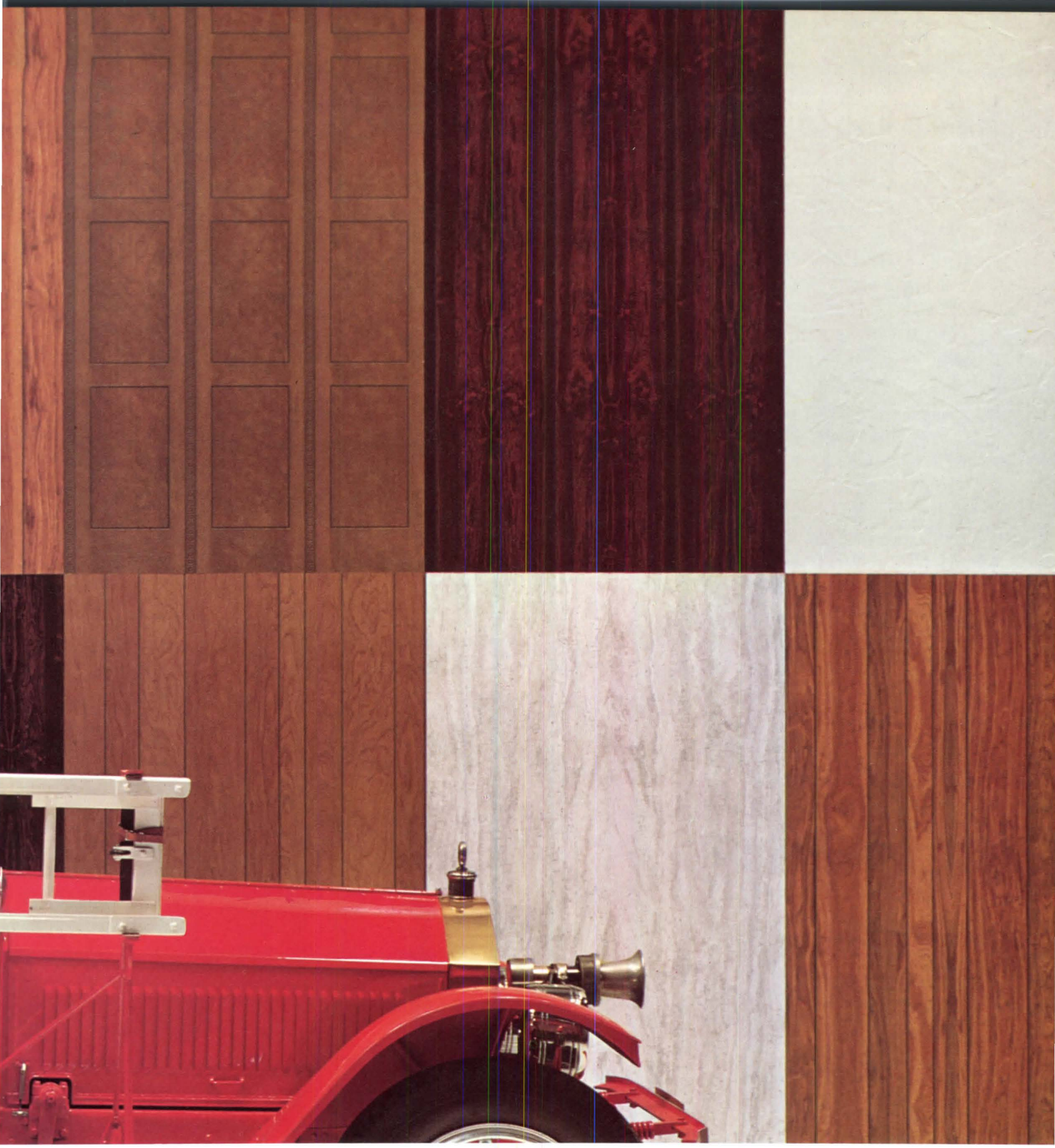

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AIA JOURNAL

Energy, Buildings—and People

A major portion of this issue concerns the saving of energy in the built environment, especially in dwellings. Recently we came across some words of unusual wisdom on this subject, in the form of comments by AIA Research Corporation President John P. Eberhard, AIA, on a set of British residential energy conservation proposals.

Eberhard found them based upon "some questionable assumptions" common to engineers and physical scientists working on energy in this country as well as overseas. The first, he said, was "that dwelling units and their associated mechanical and electrical devices are the users of energy. *People* use energy," Eberhard pointed out, "not buildings. It is the desire for comfort, for the need to see, for food and water, for bathing, that generates the demand. I have never met a house," he said, "that complained of being cold.

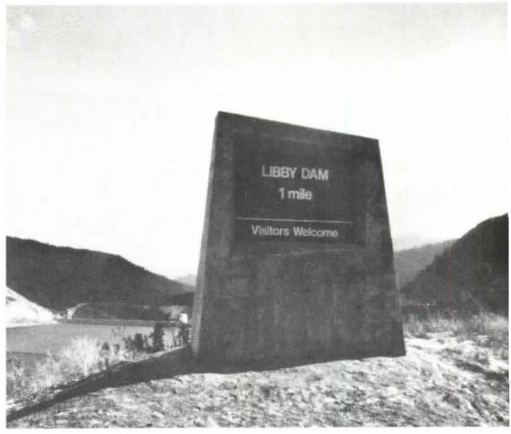
"The second misconception," he continued, "is that insulation is a viable alternative to modified user patterns. If the energy situation is as serious as I believe it to be, we should not be putting a 'fur coat' on the house which is overconsuming and unnecessarily using energy to allow the waste to go on at a lower level."

The third misconception he cited "is that oil, gas, electricity and 'solid fuel' will be the sources of satisfying human requirements for comfort, cooking, light or bathing in the future. There are numerous alternatives (most of them not yet invented) that will change these patterns in the near future."

Eberhard concluded by proposing that architects "use their imaginations rather than their slide rules" in pursuing energy conservation. *D.C.*

A Dam Designed as a Powerful, Respectful Work of Architecture

The involvement of an architect from start to finish paid some unusual dividends. By Andrea O. Dean



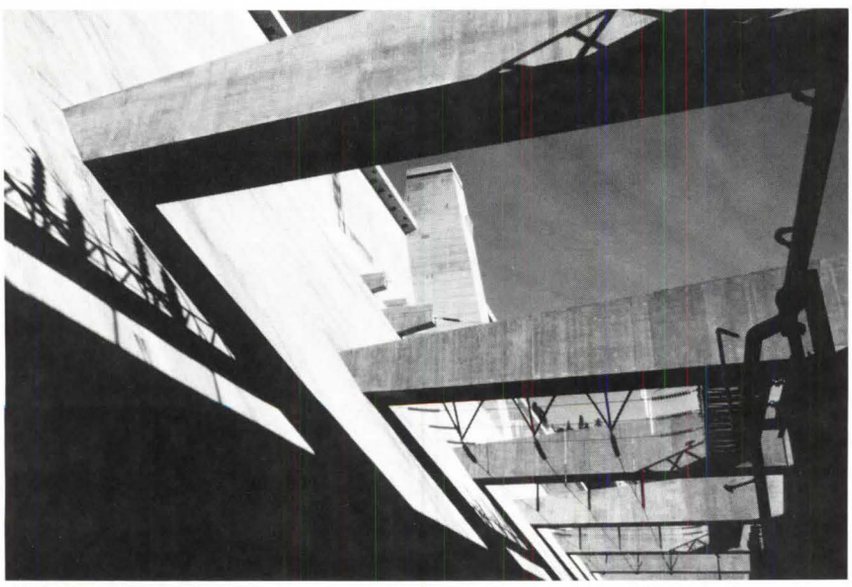
Libby Dam, a project of the Army corps of engineers, is unusual among engineer-designed hydroelectric power projects for having had the broad involvement of an architect, Paul Thiry, FAIA, of Seattle, in all stages of its planning and design. A visually commanding architectural presence, the newly completed installation underscores, instead of competing with, the imposing scenery that surrounds it, and serves as an object lesson for its visitors in the workings of water-generated power.

Located 17 miles upstream from Libby, Mont., the dam spans the Kootenai River (a tributary of the Columbia). It is an enormous installation with a length at the dam crest of 3,000 feet and a height of 420 feet, containing 4 million cubic feet of concrete and costing $216 million.

The dam had its origins in a treaty signed by the U.S. and Canada in 1964 in which both nations agreed to cooperate in water resource development of the Columbia River basin. The treaty called for the U.S. to construct the dam, and shortly after its ratification, the corps of engineers retained architect Thiry to create a master plan for design of the dam, powerhouse, visitors' center and appurtenant structures, including location of roads, highways, recreational grounds, shelters, moorages, bridges, facilities in general, landscaping and restorations of portions of the site damaged during construction. Explains Sydney Steinborn, chief of the engineering division, engineer district, Seattle, "We anticipated the need to do a good job of accommodating visitors tastefully and with finesse." Thiry had previously furnished architectural guidance on the powerhouse for the Seattle district's Chief Joseph Dam, also a part of the Columbia River system of dams and reservoirs.

Before Libby Dam was erected, the area was a wilderness of rocky mountains, woodlands, lush meadows, game and wildlife. Downstream, the Kootenai River is joined by the Fisher River, and in both bodies of water there were islands, rocks and abundant aquatic life.

One of the architect's principal environmental design concerns was to preserve the site. Equally important, he sought to make the finished dam an edu-



Concrete beams (above) tie the powerhouse to the dam. The vast face of the dam is broken only by the spillway's tapered walls, elevator towers and jutting terminals for transmission wires, which usually are strung from metal towers atop the powerhouse.

cational experience, an exhibit of what hydroelectric power generation means with its inexhaustible potential for energy production.

Thiry and the corps of engineers wanted to show taxpayers "what their money was being spent for." The installation itself was to portray the story and make it understandable without undue recourse to explanation. It was to be an impressive experience for the visitor.

Thiry's contract with the corps required that he visit dams throughout the U.S. to familiarize himself with their best features and avoid, where possible, mistakes of the past.

He found that the construction of most of the dams he visited had disfigured natural surroundings and that many contained visually discordant and disconcerting architectural elements.

Returning from his reconnaissance trip, Thiry began to develop sketches and prepare a report for the corps. His work was coordinated with designers in the corps' Seattle district office, which, according to Steinborn, "had the effect of assuring that the architect's concepts could actually be transformed into reasonably economical structures. It also assured that the engineers developed a full sense of the total design concept." The process was at times discomfitting, especially for traditionally oriented engineers to whom environmental design was new, says Steinborn.

One of Thiry's criticisms of existing installations was that the shapes of powerhouses rarely were integrated with the downstream configuration of dams. At Libby, the dam, powerhouse and visitors' center are basically a single architectural unit. All architectural elements are of concrete and are simply contrived. Explains Thiry, "In a large project such as Libby Dam, it is, paradoxically, the

The public areas of the dam are a series of varied learning experiences for visitors.

minutiae which seem to make all the difference; and any carelessness with minor detail detracts from the whole."

Among Libby Dam's more singular features is its trunnion bridge, which provides an exceptional station for viewing the spillway, as well as easy access to the spillway gates for maintenance purposes.

Another key element is the stilling basin bridge, which integrates the lower level of the structure with the overall design and connects the banks of the river. This enables visitors to park their cars and walk across into the powerhouse, or into the dam to take an elevator to the upper level.

The principal observation point at Libby Dam is the Treaty Tower. Located at the center of the dam, it is a symbol of the U.S.-Canadian Columbia River Treaty. To make it easily accessible, room for three lanes of automobile traffic and 110 parking spaces are provided on the top of the dam. All public areas of the dam are accessible to persons in wheelchairs.

Access from the top of the dam to the top of the Treaty Tower is by a 30-passenger, glass-enclosed hydraulic elevator. On the way up to the observation tower, the visitor passes a museum with displays and explanations of the treaty and its history. Throughout the public areas of the dam, there is an audio system for explanations to visitors.

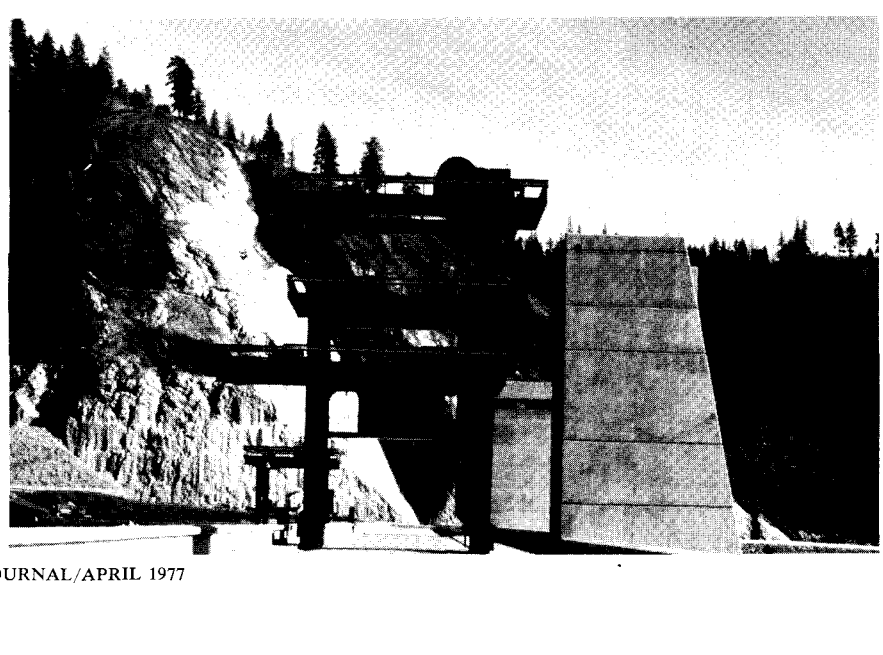
From the Treaty Tower observation deck one can see 15 to 20 miles upstream into Canada or downstream in the direction of the town of Libby.

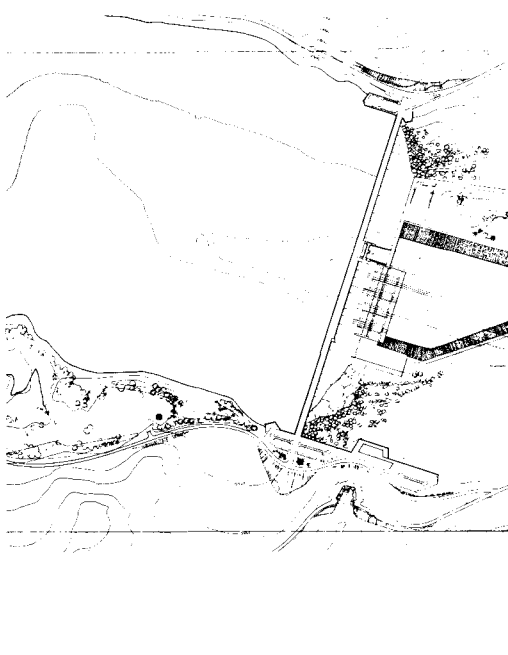
Two other elevators, electric-powered, carry visitors from the top of the dam down to the turbine floor elevations of the powerhouse.

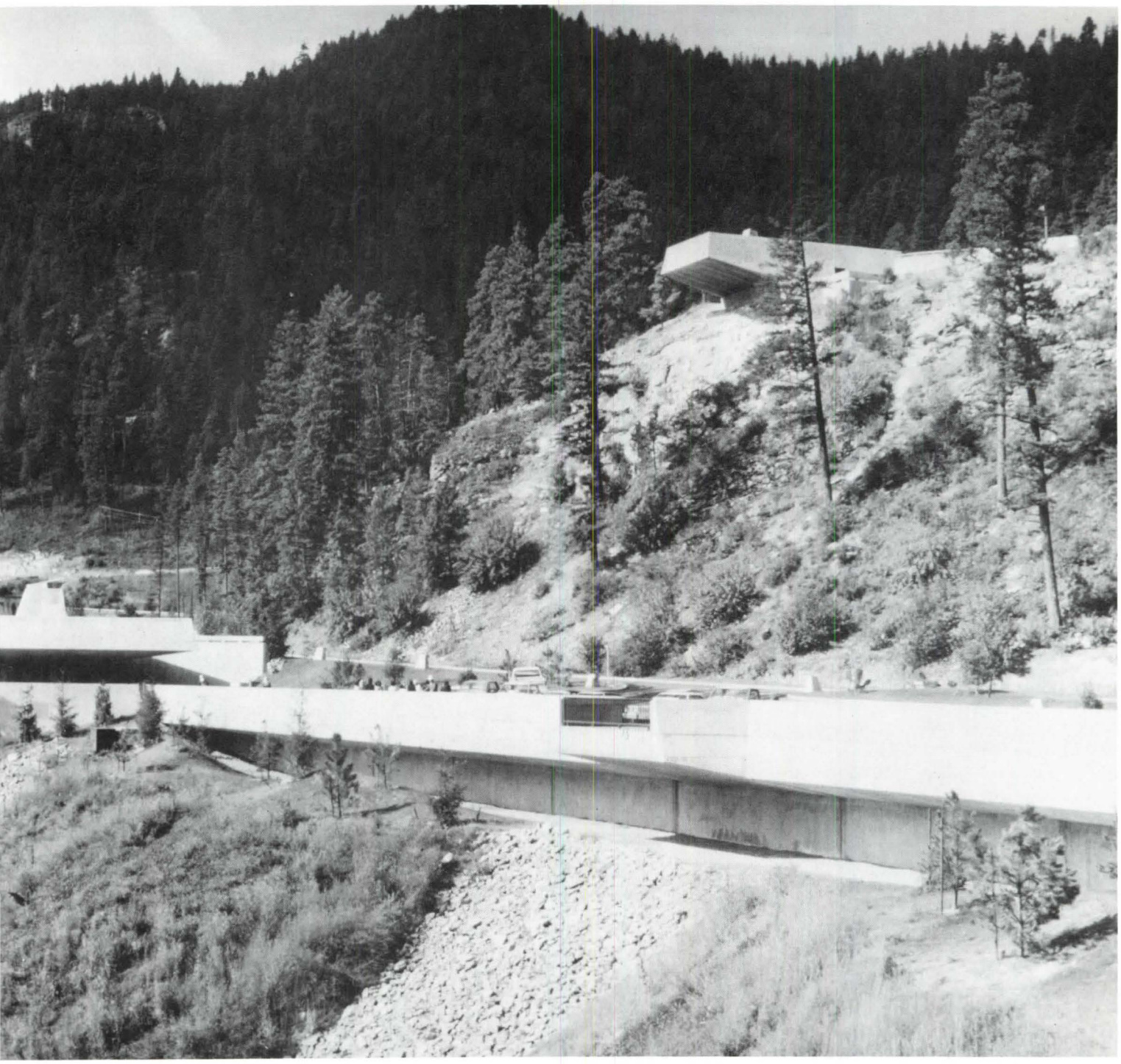
On the descent, the visitor comes first to a great cavelike space, called "the grotto," with bas-relief reproductions of the early petroglyphs and fossil forms of prehistoric mammals that lived in the area. (The trunnion bridge is approached from the grotto.) "My whole attitude about the dam," explains Thiry, "was that because it is concrete, being inside of it is like being entombed in a great cave, like the pyramids. In this project there are no finished floors, no painted walls. It's all just concrete."

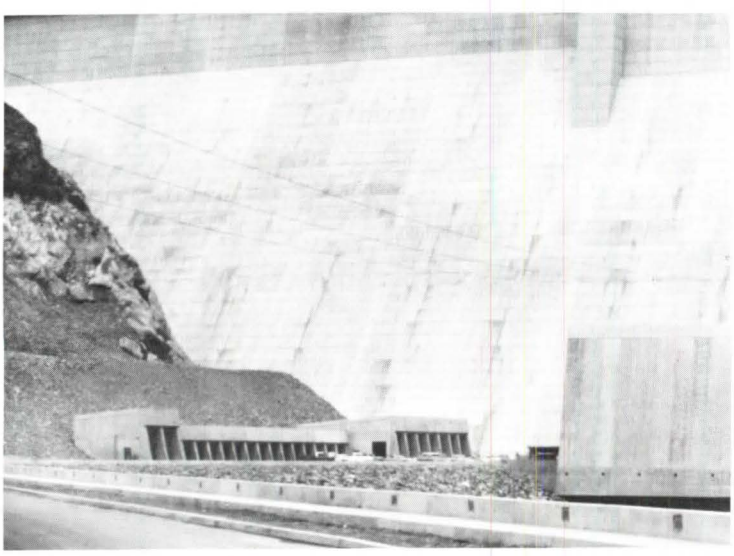
Descending farther by elevator, one finally comes to the powerhouse level and confronts here an aquarium stocked with fish that are native to the river. On leaving the elevator, the visitor can enter the powerhouse through galleries with dramatic low-key lighting.

Lighting was important to Thiry, who was annoyed by the blinding lights—spotlights and floodlights—that he found in many of the installations he visited. "At Libby when you walk through you can see everything in your path, but if you lean over a railing, there's no light in your eyes and you can see the whole dam. The source of light is hidden so that you do

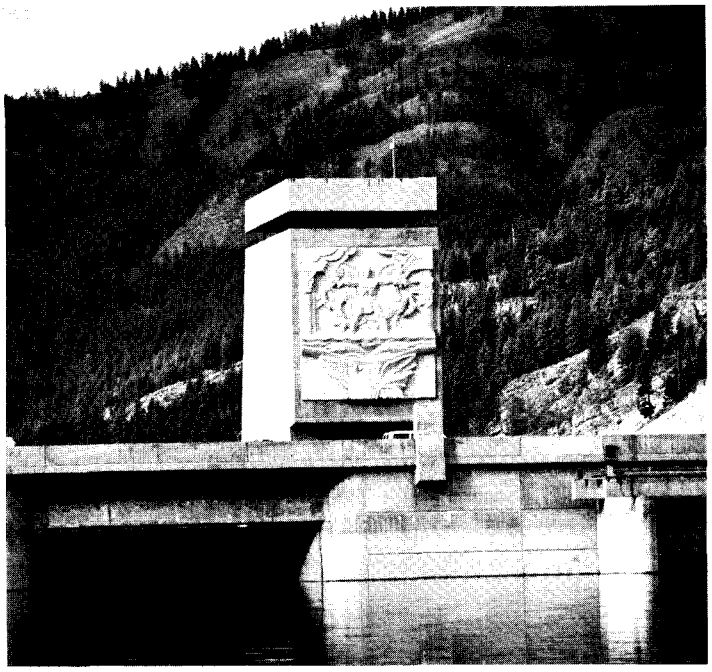








The visitors' center, joined to the dam by a ramp, as well as the outlook above it, are angular concrete shapes as rugged as the surrounding rocky hills. Across page is a view of the service tower and gantry atop the dam; on the western bank are garages, storage areas, workshops (left).



The tower is faced with a huge relief, the powerhouse traversed by a giant floor-mounted gantry.

not lose the sense of night or day," he says.

In most powerhouses Thiry had seen, "everything is visually so dead and static that there is hardly any visitor interest at all." In the various bays of the T-frame structure at Libby, "there are many types of dials, controls, equipment and machinery used in the operation of the dam. I wanted to expose all that," says Thiry, and he did. All parts of the cavelike structure are intended to be open to visitors.

Also in the powerhouse is a museum with exhibits of the project under construction. It contains models of the dam and staging areas, and demonstrates what water impoundage does to retain and control the flow of the river and irrigate the land and what has been done to preserve plant and wildlife.

By using a floor-mounted gantry on the inside of the powerhouse (right), it was possible to build a precast and lighter structure than is usual. The gantry crane serves the generators and turbines as well as tailrace bulkheads. The tailrace deck, located inside the powerhouse, is also accessible to the public.

The visitors' center is located on the west bank of the river, off the mainstream of transcontinental traffic, and is provided with adequate automobile parking space. It contains an auditorium, a museum whose main subject is the historical and environmental features of Montana, a curio sales area and other facilities.

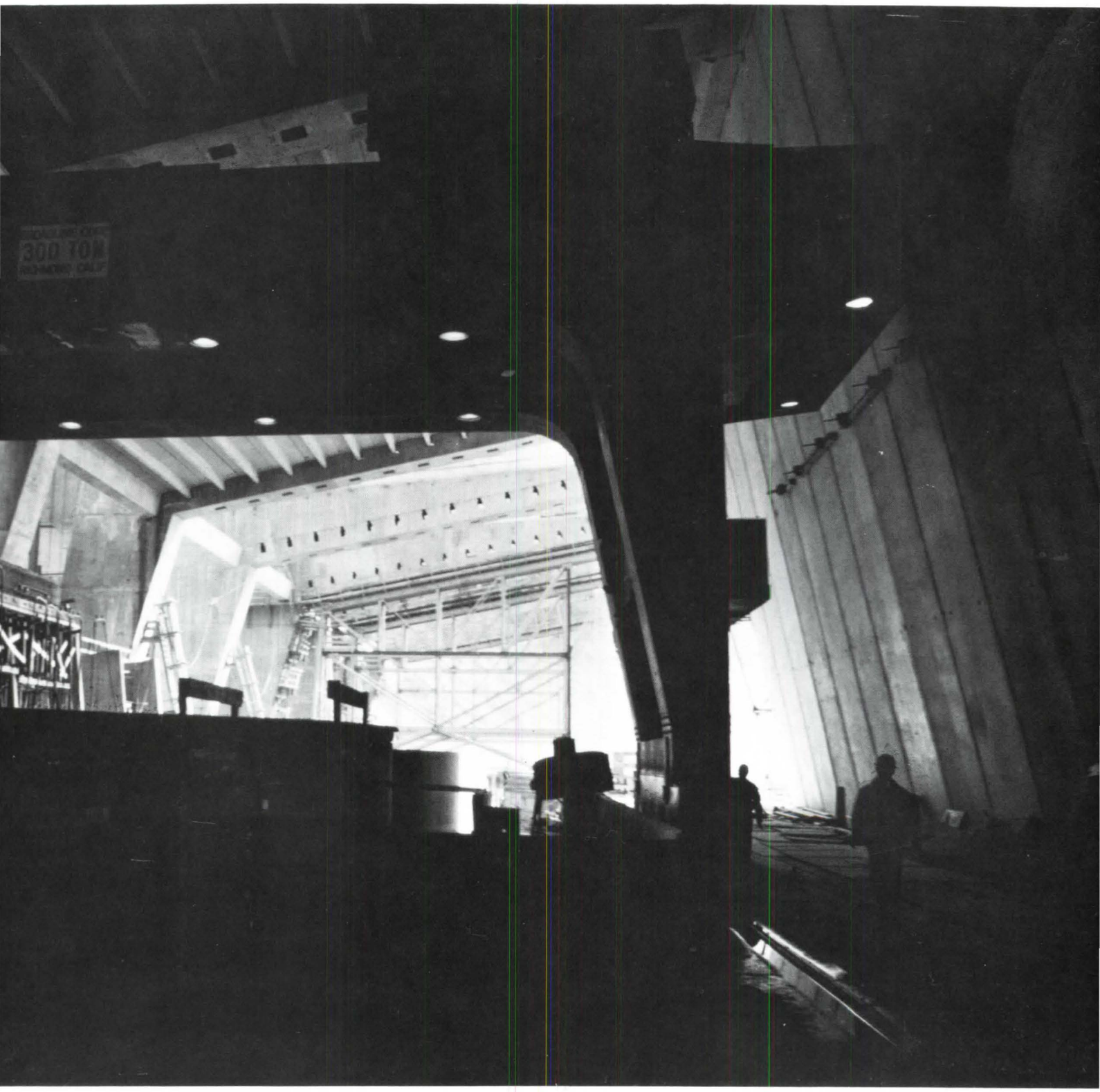
Sprinkled through the lake area are day-use facilities and picnic structures, backed into the mountainside. "The idea is to let nature take over. Grass and mosses should grow on the roofs and in the rock. We made every effort not to disturb anything unless we had to," says Thiry.

To protect natural areas downstream from the dam, the switchyard and transmission lines were routed away from the river level and up into the mountain ravines.

The corps of engineers and the architect also incorporated sculpture into the structure. In addition to the "grotto" with its bas-reliefs of fossils, there is the enormous Treaty Tower relief (above), for which an international competition was held, attracting more than 20 entries. The winning design was by Albert Wein of Encino, Calif.

The completed bas-relief (27x30 feet) was the first major piece of sculpture commissioned for a U.S. dam. With eagle and maple leaf, it symbolizes U.S.-Canadian cooperation in developing the resources of the Columbia River Basin.

In appraising Libby Dam, Philip Cole, corps of engineers' chief for the north Pacific division, says, "In working with an architect, our approach was a departure that produced a utilitarian project that is rational, economical, pleasing to the eye and respectful of the environment." □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Reassessing Architecture as We Enter an Era of Increased Energy Consciousness

'The concept of the building as a static, ideal object in space' will yield in the process. By Richard G. Stein, FAIA

Ultimately, the principal reason for investigating the field of energy use in buildings is to produce a better knowledge of how to design and redesign buildings and to apply this knowledge to our built environment. From the various analyses of building systems, energy-use patterns, governing design principles, applicable codes and standards, changes that have taken place over the years, and other indicators, it is possible to formulate some conclusions and to urge that future building proceed in a particular direction.

In the future, building will have less reverence for and adherence to symmetry and geometric formalism. Buildings will reach out in certain directions and withdraw in others, according to the dictates of site and program. At the same time, building systems will be better understood and more widely used, so that building method and the resulting modularity will serve as a unifying and disciplining control. Wall openings will be introduced according to the requirements of some programmatic design, even though they may not have an immediately discernible order. There will, however, be a series of common dimensions detailing approaches, material usages and relationships between window unit, wall and structure that will all work together to avoid the potential for chaos and the disintegration of rationality in our environment.

It is worth recalling that in previous times the limitations of material choices and of building techniques available in any single locale acted as a tremendous force to produce unified and continuous towns and cities. The prevailing color was connected to the prevailing material. The scale of the buildings was determined by the kinds of spans that could be achieved with a particular building method. In masonry, vaults and domes determined the distances between walls; heights were limited by the number of stairs people were willing to climb day after day. Roofing methods produced a mosaic of small surfaces, all similar in color and material. From some of the upper windows in the larger buildings in Siena, Italy, one can look down over a large and varied landscape of rooftops, all in terra cotta tiles, all slightly different in color through different firings and lichen growths. Yet there is little variation in the size of the roof planes, the size of the tiles or the interval of the undulations. Within these similarities, we find an infinite richness of variations in opening spacings, methods of entering buildings, projections for balconies and special windows, and accommodations of the special requirements of different stores or workshops.

Today, in the U.S., our building decisions are no longer constrained and shaped by such external realities. In every architect's office *Sweet's Catalog,* a compilation of building material manufacturers' literature, occupies three feet of shelf space and summarizes a virtually infinite number of materials, colors, finishes, devices and pieces of equipment in all sizes and scales. At least 90 percent of these products are unnecessary, poorly constructed, differ only in surface treatment or are designed to perform a specialized function that never should have been used in the first place. The catalog's great variety, particularly in finishing materials, results from a desperate effort by manufacturers and building designers to introduce interest in structures that have surrendered their capability of basic differentiation through program sensitive design. Moreover, since there is a greater profitability for proprietary products than for generic ones, the tendency on the part of manufacturers is to press for the sales of the products that they control noncompetitively. Lacking exclusivity, they seek to introduce variations of finishes that would distinguish their products from their competitors'. This leads, inevitably, to an unnecessary plethora of choices.

The market cannot be saddled with the full blame for decisions that have had the cooperative participation of all participants in the building process unless we consider the market in a broader sense—constituting the entire complex that determines what is built and what materials are used. In that context the "market" becomes the summary word for an entire social, cultural and economic apparatus that causes objects to be produced not for their use, but for their salability. Eventually, superior products will persist and survive on the basis of their necessity. It is a long, devious and wasteful process, however, since the fate of many of the items that fall by the wayside could have been predicted by a reasonable person.

Architects are now in a period of major reassessment in which the entire selection of materials and assemblies is being examined to determine whether they can perform to satisfy the new energy conservation demands. Many of the materials that would

Mr. Stein, who heads his own architectural firm in New York City, is the author and subject of numerous articles on energy conservation technology. This article is from his book *Architecture and Energy*.

normally be slowly phased out will now be abruptly rejected. Insulation materials that do not effectively insulate, curtain wall assemblies that become poor heat transmission barriers, and mechanical systems that are incapable of precise control are among them. On the other hand, there are components that have been well developed and widely used outside the U.S. that are being introduced through importers and franchise holders. An example is the "rolladen," the exterior roll-down, slatted blind that has been commonplace in Europe for decades. Further, there are items that have been available in the U.S. for many years, on the fringe of acceptability, that may now have a sudden new interest for builders. Some may have been written up in *Popular Science* and other nonprofessional sources such as *Practical Builder* or the various do-it-yourself publications. More recently, *The Last Whole Earth Catalog* and *Shelter* have publicized some old but neglected building techniques, materials and attitudes that are being reintegrated into the current vocabulary. Even the Franklin stove has been elevated into a philosophy.

These are important changes in the nature of our built environment. They may presage the shape of future building for at least several decades more accurately than will studies of isolated buildings with completely self-contained energy systems. The unconscionable excess use of energy that we have seen in every aspect of building design and operation offers an immediate invitation to continue living within our present urban and regional planning patterns, but with reduced energy dependency that can easily halve our present consumption. The pattern of streets and services—water, sewer, electric service, telephone lines and so forth—represents a major commitment and investment from the past that cannot easily be disregarded or destroyed. Short of a complete change in our political and economic system, the whole structure of land ownership and real estate values that exist today represents an almost insurmountable barrier to a change in the status quo. However, even the probability that in the future the office building with a huge interior space and a minimal perimeter will give way to one where occupants will be closer to natural light and air, will have startling effects on the patterns of real estate ownership and exploitation that prevail today. The building with a square acre of floor space will yield to a narrower building with most occupied space within 30 feet of a perimeter wall.

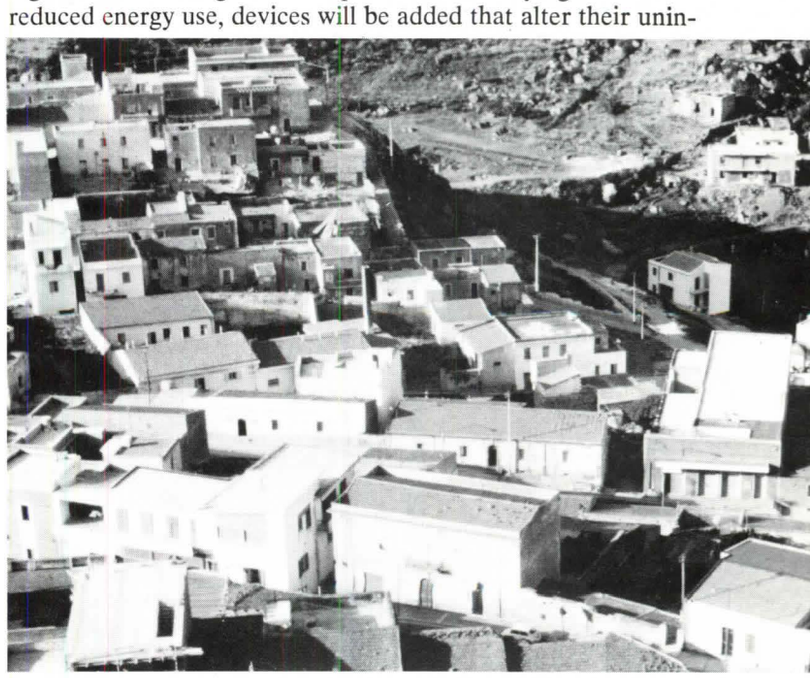
Rather than becoming less important, the city, and with it the grouped dwellings that we see in the closer suburbs, will become more characteristically the shape of future development. It will have less density at its core, and it will be extensively interlaced with greenways—green and porous ground areas to permit photosynthesis, maintain a temperature relationship with the weather pattern of the area and the diurnal night-to-day differences, maintain the water levels in the ground, and avoid the erosion and flooding that result from excessively fast water runoff. These greenways will serve not only as recreational relief in counterpoint to the built areas, but will also offset the heat retention rate of the buildings and streets, serve as utility distribution channels, house decentralized total energy plants serving these smaller communities, and may act to systematize the mass transportation network that will replace more and more individual vehicles.

Power and heat will be provided through a varied combination of sources. The sun will not only heat the transfer device—the solar collectors—but will be used more directly and immediately to heat building walls and interiors when it is desired, and also to bring air movement and light to the spaces that need them. We can expect that the development of solar cells for the direct conversion of sunlight to electricity will have been advanced to the point where this workable but expensive source of energy will be more widely available. The energy of the wind will

Facades will be 'more complex, more varied and quite different in scale,' and will incorporate operable sash and sunshades.

be exploited both in the obvious advantageous response of the building to the air movement resulting from prevailing breezes and from the use of the wind to drive wind-powered generators and pumps. Where geothermal, tidal or hydropower electric generators are possible, these power sources will be employed. There will also be a rapid growth of smaller decentralized generating units close enough to their load centers to make efficient use of what would otherwise be waste heat. These total energy plants will have more refined heat reclamation components, and their proximity to the areas they serve will in itself eliminate a good part of the losses attributable to transmitting power and transforming voltages up and down. Since all energy use, regardless of the source, has a damaging effect on the atmosphere, air quality, heat buildup and the ozone, all energy-producing methods will be kept as small as possible by the new attitudes toward the design of buildings. Fossil fuels will be back-up fuels rather than primary fuels. Goods, people and vehicles will be moving more slowly, but possibly a little less frantically.

The buildings themselves will look very different. They will not be as deep from wall to opposite wall, and their principal facades will be directed to the most desirable orientation in the particular locale. The facades themselves will be more complex, more varied and quite different in scale from present ones. Whereas now the tendency and practice is to duplicate a single fenestration bay ad infinitum over all the exterior walls, the basic unit in the new building will vary to accommodate some special purpose rooms in one part, a public space in another, storage in a third and special mechanical equipment in a fourth. Where a similar function occurred on different facades, in each location it would be designed to be most effectively responsive to the direction it faced. The walls would be capable once again of admitting or excluding outside air; the familiar window would be only one of a range of possibilities for the introduction of light and air. On the bounding planes of the building will be found operable sash, sunshades, rolladen-type sunscreens, horizontal and vertical louvers and greenery on roofs and terraces. Even the older buildings will have changed. In the process of modifying them for reduced energy use, devices will be added that alter their unin-



Wall openings placed according to need at Mesa Verde, Calif., (left), and richness of surface variations, Castelsardo, Sardinia.

formative elevations, similar to the scaffolding that occasionally is draped around existing structures.

The process of building, which has become more complex and therefore more difficult to comprehend and control, will be simpler. Solutions will become more complex, but process will be more direct. Reduction in labor involvement in the design and production of buildings, considered imperative for the last 40 years, will be less important than the adaption of each space to the needs of its occupants. A widely expanded family of components that do quite varied things will be available for insertion in facades. The throwaway emphasis in our culture will give way to elements capable of modification for changing usage.

The concept of the building as a static, ideal object in space will yield to the idea that it is a part of a growing, changing, continuous process. As a result, the architect's relationship to it will also change. He or she will no longer be the producer of isolated sculptural entities, defiantly disconnected from their neighbors. The very characteristics that are singled out for critical commendation will become attributes thought of as inimical to the harmonious development of the community. There will still be certain kinds of buildings that will be more monumental, symbolic or unique in purpose than others, the major buildings and spaces that organize and give meaning to others. Which these are, where they are located and what they are built of will be a reflection of a wider set of attitudes than those of the building. And yet, even here, the ability to consider the unique and idiosyncratic needs of the building and space will produce a greater importance and variety than our present monumental buildings have achieved.

The quality of the spaces within the buildings will also be infinitely more varied than today's. It will no longer be considered necessary or desirable to expect a classroom to be uniform from New York to California or even within a single building. An

An increased emphasis on reuse of older buildings and a need for development of more flexible components and systems for new ones.

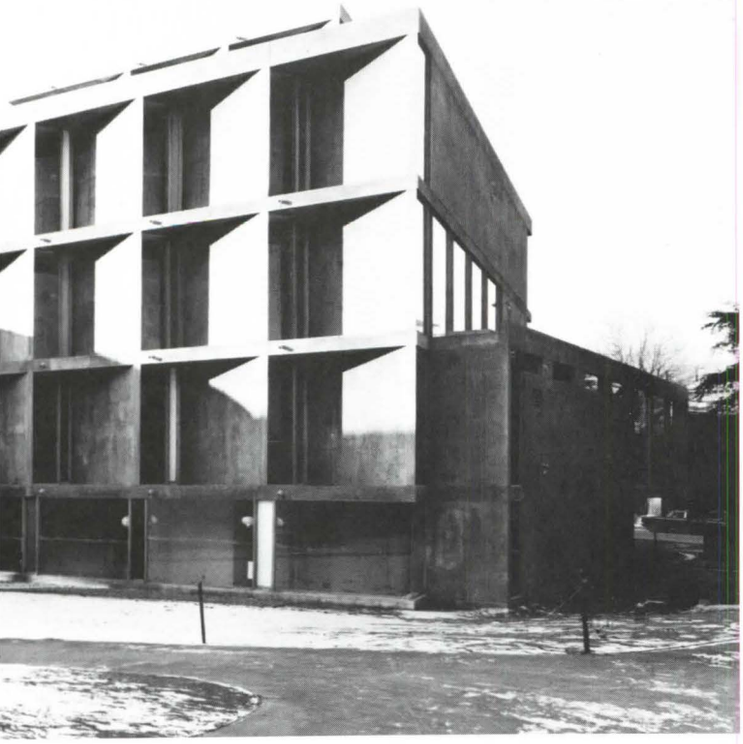
office will be as individual as one person's thought pattern in contrast to another's. We will be able to dispense with the standards attached to room labels and get back to designing spaces for use. A building will be more than a complex, large-scale machine designed to accommodate occupants with as little inconvenience as possible to the building operators.

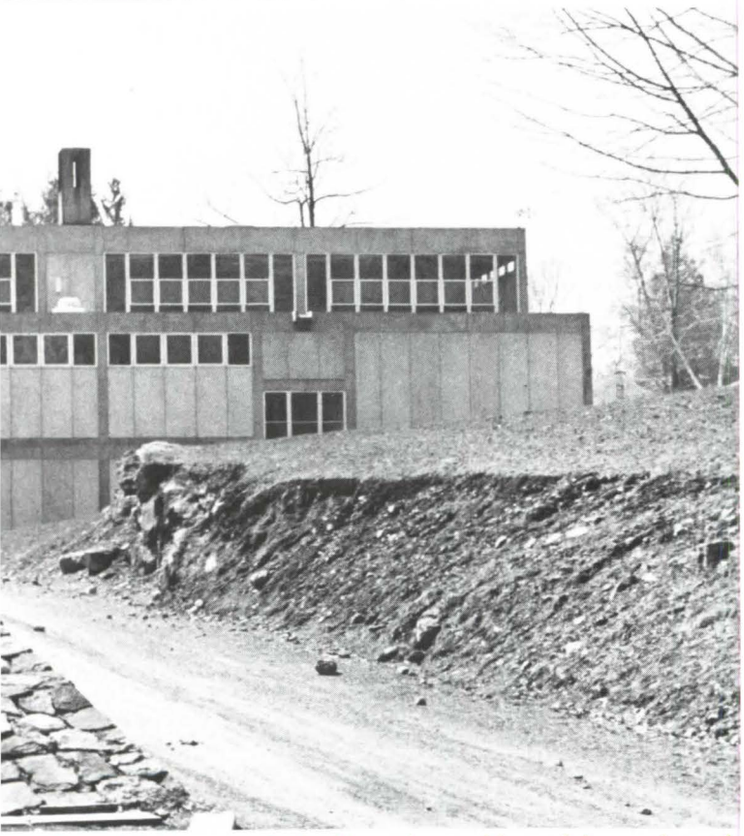
The re-examination of existing buildings for continued usage or conversion to new uses will assume a greater importance. Not only is there a greatly reduced energy requirement in building materials for the alteration of buildings in comparison with building their replacements, but often the older buildings, designed to be comfortable with less dependence on mechanical systems, can function in the future with this same economy of energy consumption. In the recent past, many fine buildings have been lost because of their limited floor area in comparison with higher floor areas permitted by zoning ordinances. The promotional potential for new buildings has been considered easier to handle, but now this may be changing. An owner may be less likely to turn to the newness of a building as its major selling feature. Sharply changing public attitudes favor the reuse of existing buildings for new purposes. While formerly this concern has been based primarily on historic continuity, there have recently been a series of new phrases introduced to justify the retention of these older buildings. We can expect more phrases like "building recycling" to tie modernization closer to reductions in energy use. Does the stress on the reclamation and improved performance of existing buildings mean we are attempting to set back the clock and re-create a bygone day, possibly one

Fenestration designed as responses to performance criteria: Le Corbusier's Carpenter Center for the Visual Arts (top), Harvard University; and a modular precast system at Wiltwyck School, Yorktown, N.Y., by the author's firm.

that never existed? Will we give up all the technological gains we have made? Will rationalized and system-oriented building methods be casualities of this kind of thinking?

Hardly. However, the development of new components and new assemblies will differ sharply from the current ones. As an example, let us consider the building skin, the membrane that allows a difference between the ambient conditions within the building and outside it. Its performance requirements can be listed easily. First, it should be able to maintain temperature





differentials between the inside and out with a minimum dependency on adding cooling or heating. Second, it should allow light to enter in the amount required and in the locations that can benefit from the light introduced. Third, it should be able to allow the outside air to enter when the outside air is at a temperature and of a quality that can be used inside the building. Fourth, it should be able to admit or exclude any energy source that drives against the wall—sun, wind, rain, snow, sleet or whatever. Fifth, where exterior energy forms are excluded from entering, their potential should be converted into heat or electricity to be applied within the building. (Examples of this might be facade-mounted solar collectors, building-mounted wind-driven electric generators, or devices for trapping rain.) Finally, the building must be built for the benefit of its occupants. The height of window sills, the reduction of glare and the nature and velocity of the introduction of outside air will all be measured against the dimensions and attitudes of the occupant. Answering these performance criteria will certainly result in changes in the appearance of our new, undesigned buildings.

Within the building, too, the system may well look entirely different from those that are familiar to us. Let us use lighting as an example. First, the lighting in different parts of the building should be capable of individual control. If light is necessary at one point, it should not be necessary to light up every other point. Second, the light intensity should be variable. Third, the light-delivery components should be movable so that they can be relocated, added or removed according to changing needs. There should be an available group of components capable of answering different illumination requirements, and there should be a framework, grid or matrix that can accept any of these varied components.

Each of the environmental control systems can be similarly described; moreover, we can expect that a new group of building materials will be made available. The initial step is the actual listing of expected performance. We know that several complex programs have been developed to achieve clearly stated objectives. The various outer space programs, atomic accelerators and radio telescopes were achieved because their programs had clearly stated objectives. On the other hand, we also have the experience of operation breakthrough, a program of HUD in the late 1960s, with an interesting basic objective that was unsuccessful because it was undermined and underfinanced. Operation breakthrough was a government attempt to stimulate the development of prefabricated housing techniques and capabilities. Instead of permitting the serious, fundamental evolution of well-conceived prototypes, the program promised instant miracles and depended on public relations instead of allowing time and adequate financing. We cannot assume that the existence of a need will automatically assure the launching and support of a program to solve that need. In our political decision-making process, there must be a sufficiently irresistible combination of facts and pressure to offset the usual tendency toward maintaining the status quo. Nevertheless, it is important that the facts be placed on the table. We are dealing with a compressed time frame, and failure to implement a changeover to energy responsive buildings quickly may have a disastrous impact in the immediate future.

'Failure to implement a changeover to energy-responsive buildings quickly may have a disasterous impact in the immediate future.'

If these changes are undertaken, we will begin to see the shape of the future. It will not be in such sharp contrast with our familiar world of today that we will find ourselves strangers in a strange land. Evolving from the building forms of today will be the more humanized, more climate-responsive, more visually intricate and more nature-oriented world of tomorrow. Our cities will retain their importance, but will no longer pursue the escalated densities that have characterized the last two decades. Since all of this is based on the reduction of energy use to its essential level, we must anticipate sharp opposition from those major economic forces whose profits and growth are tied to the increase rather than the reduction of energy use. However, the opposition may be dampened by the reality of the problem: the disappearance of conventional energy material, the assault on the natural environment to extract more fossil fuel and the geometrically increasing costs to process the materials that can be extracted. Failure to modify our habitual methods of building, a laissez-faire attitude, will result in hardship, damage and dislocations. □

Student Solutions to Solar Heating And Cooling of Single-Family Houses

Ten winners out of 1,800 entries in a competition conducted by the AIA Research Corporation. By Allen Freeman

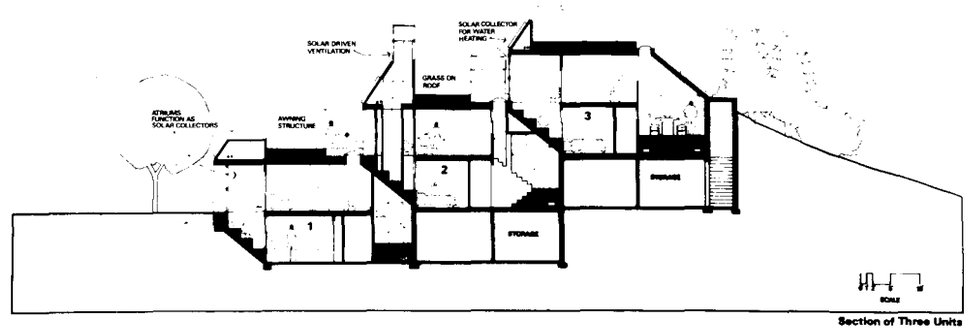
The AIA Research Corporation asked students in U.S. and Canadian architectural schools to demonstrate that solar energy can be integrated into building designs for single-family dwellings to provide primary heating and cooling needs at minimal cost and reduce dependence on depletable fuels.

More than 1,800 students participated in the Exxon-sponsored competition, representing over half of the architectural schools in both countries. Entries were judged against such criteria as:

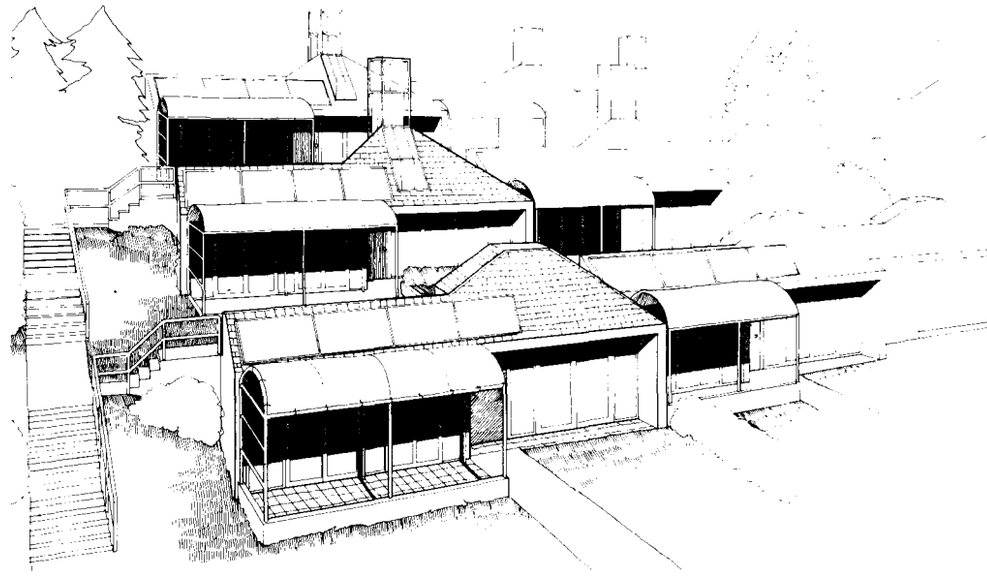
- Quality of design integration and innovation.
- The structure's market value to the customer.
- Suitability of the design for a user group: single adults, growing families, young couples, extended families or the elderly.

The jurors were: engineer Alwin E. Newton, York, Pa.; architect Hal Dean, Albuquerque, N.M.; Prof. Walter Kroner, AIA, Rensselaer Polytechnic Institute; consumer activist Nancy Ignatius, Washington, D.C.; architect Dale Sartor, Point Richmond, Calif.; Prof. John Schade, University of Wisconsin, Milwaukee, and builder Bob Schmitt, Strongsville, Ohio.

The 10 winning entries, described here, will be displayed at the AIA convention in San Diego.



Section of Three Units



Clusters on a Slope

These two- and three-bedroom houses may seem radical to the young, middle-income couples and families for which they were planned, says the designer, but "the pleasant, cozy spaces should win them over."

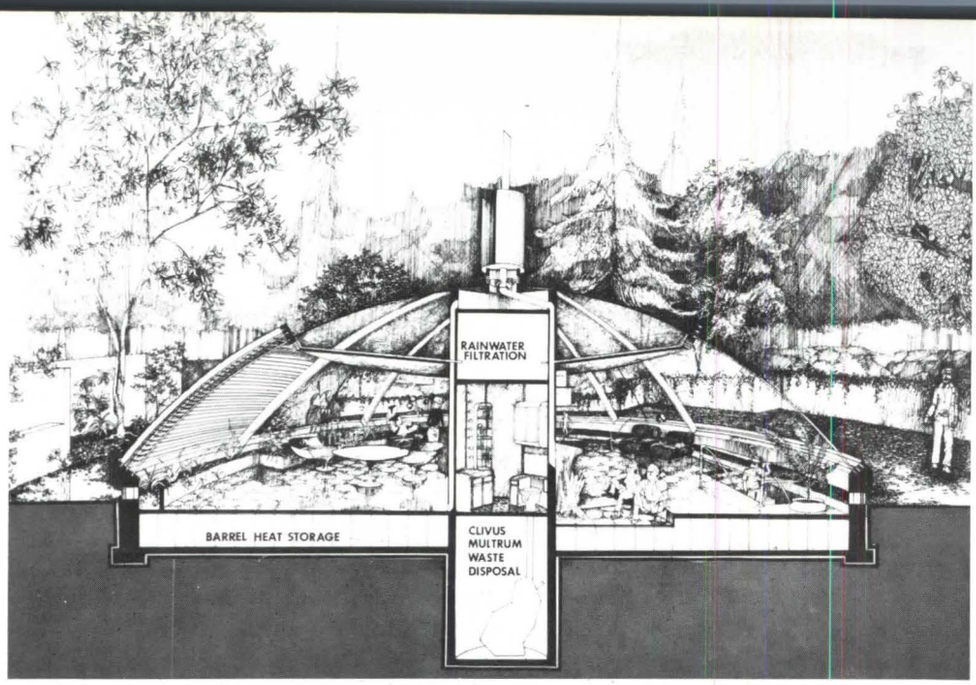
Sited on slightly rolling Wisconsin terrain two miles from Lake Michigan, the houses are clustered to minimize heat loss. Grass and soil on the roofs insulate, make the density less apparent and provide a strip of yard for the house immediately north. Large glass surfaces, protected by overhangs and awnings that retract in winter, face south, and the step-back design protects the glass from winter winds and extends the periods of usefulness of the walks and patios. Rooms on the north side are lighted with skylights, which are closed off with insulating shutters at night to reduce thermal loss.

Over half of the minimized heating load is supplied by the sun. An atrium in each house collects solar heat which is blown into the concrete cavity walls to be radiated later. Shutters between the atrium and the rest of the interior are closed at night, making the atrium a thermal barrier.

Houses are divided into five zones, each with its own thermostat, for selective heating when in use. Movable partitions and interior windows allow the zones to be opened upon each other in warm weather and when entertaining in cold weather.

Up to 80 percent of the hot water requirement, minimized with water conserving faucets and shower foot controls, is provided by commercial solar collectors on the roof.

Designer: Vincent James, University of Wisconsin-Milwaukee.



Shape Cuts Exposure

Here, the dome shape minimizes exposure while maximizing area in a lower-middle income dwelling, part of a suburban Atlanta village to also include lower-income housing.

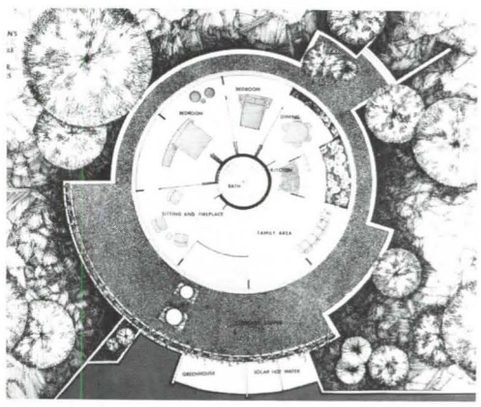
Aluminum louvered panels on the dome regulate solar entry. Heat is stored in barrels in the floor and warm air is recirculated through ducts in the core walls, with the help of a roof-mounted fan.

To cool in summer, the direct-drive fan draws in outside air from vents around the base of the dome. Circulation is abetted by the natural rise of excess hot air from the adjoining greenhouse. This air is channeled through the central core ducts and escapes at the top.

Rainwater is collected and filtered in the top of the central core for use in the Clivus multrum system below.

A two-bedroom house is projected to cost $34,768, including labor.

Designer: Richard A. Standard, Georgia Institute of Technology.



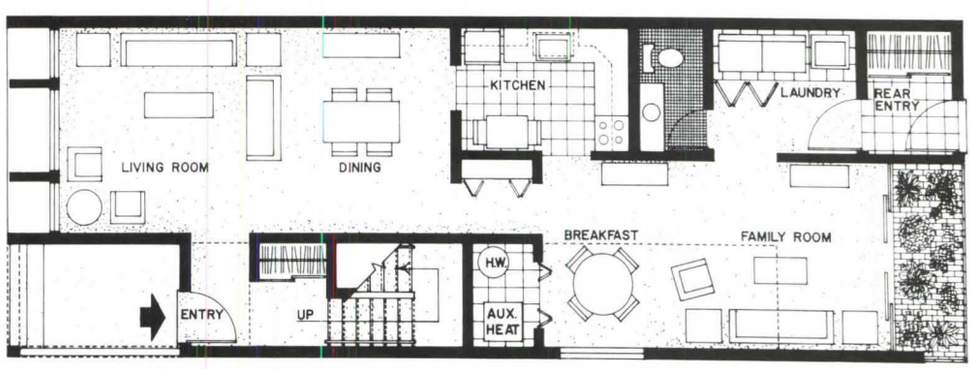
Maximizing the Site

The severe site constraints imposed by a workingman's Chicago neighborhood were accommodated in this three-bedroom, free-standing design for a growing family. In response to a narrow, deep lot which limits southern solar exposure, solar panels, a clerestory and loft extend the entire depth of the house. An active solar collector system provides 50 to 70 percent of the combined water and space heating needs, with the hot water tank located in the system's heat storage rock pile.

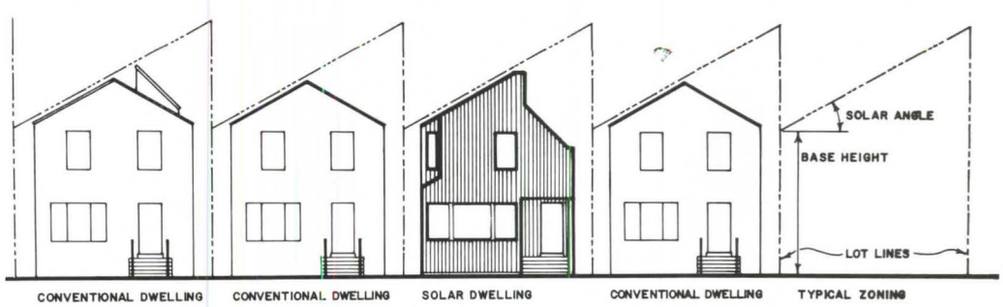
Natural light is provided in all rooms, cross-ventilation is maximized and fans in the clerestory create vertical air flow. Other design aspects: an air lock at the rear entry, a protected front entry, recessed windows, closets on exterior walls for insulation and a greenhouse for solar heat gain.

This project also includes a proposal for urban areas which would protect homeowners' investments in solar collector systems. Taking into consideration year-around maximum and minimum solar angles for the particular locale, zoning regulations would prohibit excessive eve heights which would shade neighboring collectors.

Designer: William Styczynski, University of Illinois at Chicago Circle.



FIRST FLOOR PLAN 1/4"=1'-0"
960 SQ.FT.



Integrated Roof Systems

Attention to amenities and their integration with energy-conservation features highlight the design of these Denver West Side duplex prototypes.

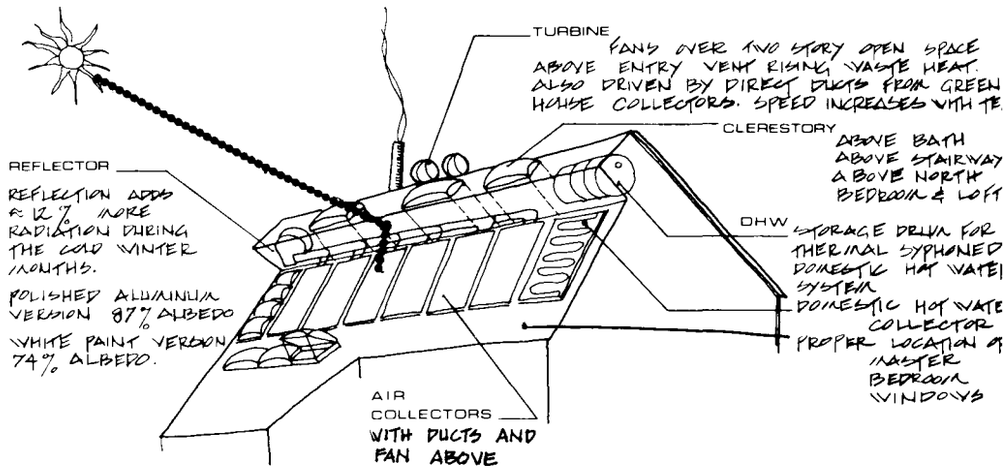
A greenhouse beside the front door, augmented by a wood-burning stove, is designed to heat the living room area. Greenhouse bancos—benches by night which are opened in daytime to absorb solar heat—combine with a multilayered greenhouse roof for maximum winter heat gain. Wood louvers cover the greenhouse roof during warm months.

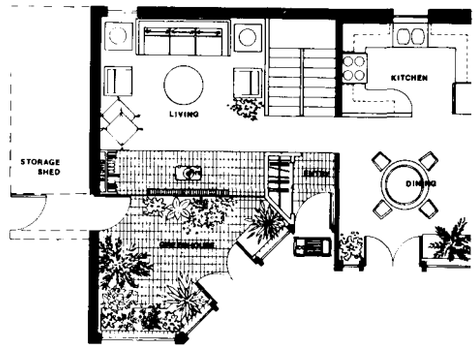
The roof design esthetically unites solar collectors and reflectors, water storage tanks, fans, ducts and clerestories which light the bathroom, stairway, north bedroom and loft.

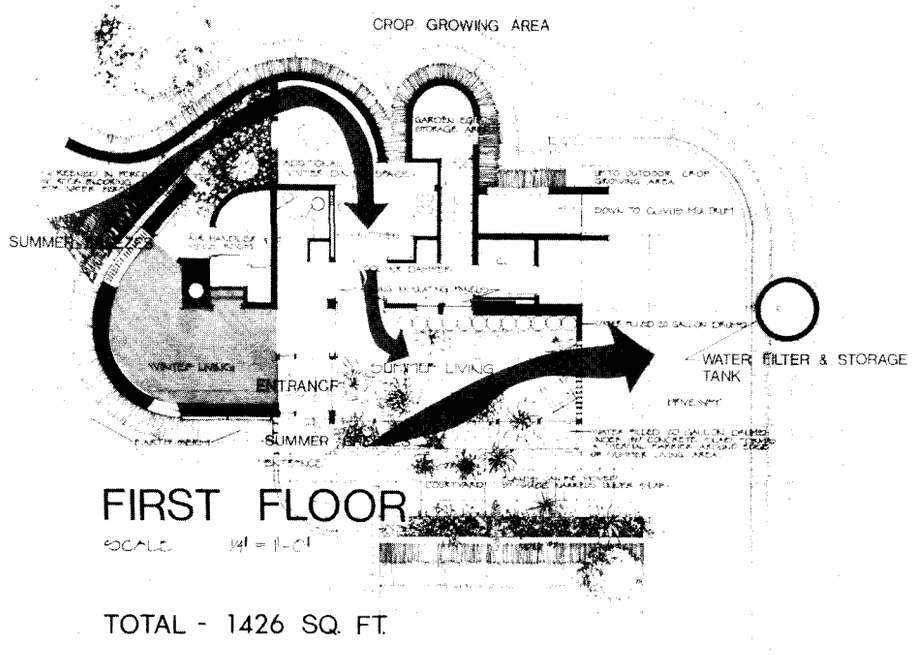
Other features include:

- Side entry through a vestibule to cut down the entrance of cold air.
- A "cold wall" for storage of items on the north side of the house.
- Roll-up "duckwalls" filled with down or fiber to cover windows at night.

Designers: Susan Kerr, Joyce Lichtendahl and Deirdre McCrystal, University of Colorado.





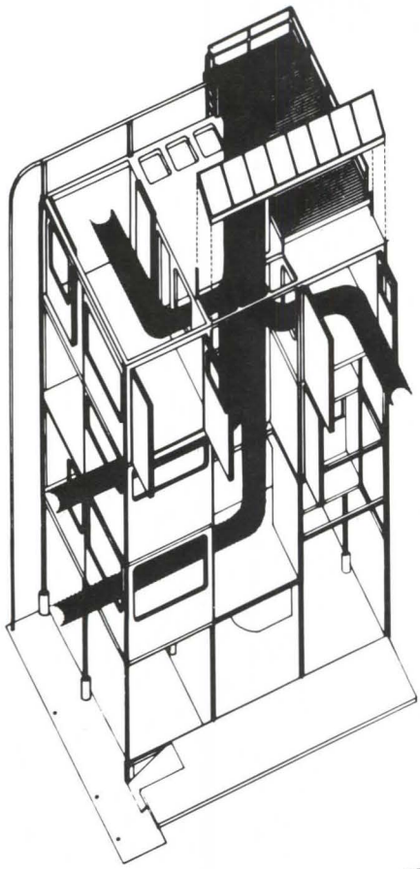


Scoops, Skylights, Shades

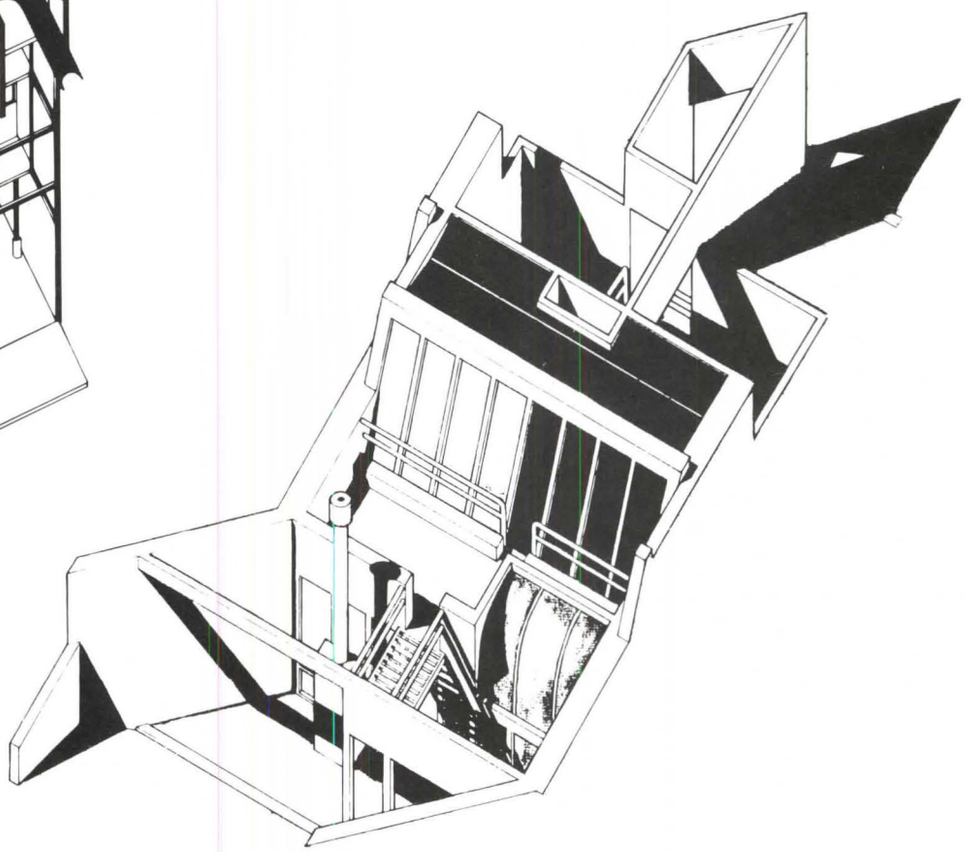
A two-story, shaded air scoop routes summer breezes through a house designed by Jeffrey Sheppard of the Georgia Institute of Technology. The plan (left) differentiates winter and summer living spaces. Space heating is provided directly by a greenhouse supplemented by an active solar collector. Rainwater is collected on the roof, and channeled to an adjoining free-standing tank where it is filtered and then taken to the attic to be heated.

Mark Marsh of the Nova Scotia Technical College contrasted a 2,000-square-foot single-family house in that province with a house of similar size and usage in Jamaica. The cold-climate house is thoroughly sealed and compact to minimize exposure to the elements. The northern wall is buried in a slope and the site is landscaped for wind protection. A central ventilating fireplace and thermal walls are utilized.

In comparison, the Jamaican house is spread out and shaped for best ventilation and shading, especially for protection of the southern exposure. The structure's breezeway bridges a gully to take advan-



ventilation system



tage of prevailing winds, and wooden louvers throughout the house make the most of natural cooling effects. Solar collectors over the breezeway heat water.

Bill Drewek and Don E. Kraft of the University of Wisconsin-Milwaukee analyzed cost factors for retrofitting a Milwaukee bungalow and for building energy-conscious features into new suburban dwellings.

For the bungalow, the goal was a 50 percent reduction in energy with no sacrifice of comfort or security and minimal exterior alterations—all at a cost to be recovered over not more than 10 years. Initial cost for modifications is placed at $6,328. With yearly energy savings estimated at $817, the recovery period is a projected 8.75 years.

Drewek and Kraft's new housing is sited on a tract north of Milwaukee. Suburban development that is typically mindless of energy considerations is contrasted with clustered housing that takes advantage of site features, wind patterns and solar gains. A year's energy bill for a typical family drops from $911 to $411, say the designers, and the initial cost difference is recovered over 10.75 years.

Four students from the Southern California Institute of Architecture designed a single-family house to be as independent as possible from outside energy sources. A south-oriented greenhouse heats a central wall which radiates warmth to the rest of the house. Convection also circulates greenhouse heat.

A central core serves several heating functions: It contains a fireplace with floor-level vents on the second floor; it houses water tanks whose primary heat source is roof solar plate collectors, using fireplace heat passively; it encloses the shower, located directly under the hot water tanks, and it backs on the kitchen stove and refrigerator for added heat input and distribution.

Other features include a Clivus multrum system, water wells, and a windmill to generate power.

Designers: Jon Massaro, Terry Rainey, Debi Strozier and Bob Ginsberg.

A team from the University of Arizona designed solar collectors as a pair of Venetian blinds in solar skylights. The blinds can be pitched according to heating needs, time of day and season. Other energy-conscious aspects of the single-family attached units (above, right) are maximum use of outdoor spaces, earth insulation and siting/configuration to make the most of natural breezes in warm weather. Pam Anderson, Greg Nelson, Russ Onuffer and Ken Stein were the designers.

The walls literally open for summer cross ventilation in a four-story Florida house (above, left) designed by Robert Sanford, Phil Parker and Stephan Porter of the University of Florida. In the summer mode, the living and dining areas expand into exterior screened enclosures on the south and north facades, and a Dacron sail cloth rolls down the west side, supported by a tubular awning structure, for afternoon shade.

On winter days, the lower angle of the sun allows solar penetration through large windows under the porches. On cool nights, insulated doors shut off the glass-enclosed core area. □

'Pumping Sun' for Energy Savings In the Existing Housing Supply

The heat pump may offer a key to large-scale residential retrofitting. By Sumner Myers

Imagine a solar technology for heating houses. The device costs two to three thousand dollars and is easy to install even in older homes. In fact, almost half of the nation's homes could be retrofitted with this device, resulting in enormous savings in oil and gas and sizable reductions in heating bills.

If you're as sun-struck as most energy-conscious Americans, it's likely that you think I'm talking about solar collector panels, somehow developed for mass retrofit. Wrong. I'm talking about a much less conspicuous star in the solar energy system: the heat pump.

Few would argue today against making a major effort to harness the sun's boundless heat. Whatever we do in the way of energy conservation, the inevitable depletion of domestic gas and oil resources means that we must do more than simply use them efficiently. We must consider how to substitute other, less vulnerable energy sources in their stead. And so we look to the sun.

It seems equally clear that one key place to look for substantial payoffs from substituting the sun's warmth for oil and gas is in the American home. It is here that we burn a fifth of all our oil imports and 18 percent of our total domestic consumption of gas.

Solar collector systems are the logical means of substitution in new home construction. In some parts of the country, such systems already are economically competitive with electric resistance heat and promise to be competitive with oil as research improves the breed and mass production lowers costs. Ultimately, collector systems might even compete with gas, if that fuel's price is deregulated.

Yet, the really substantial savings through solar substitution must be sought in existing homes. It is a matter of the simple fact that new construction adds less than 2 percent per year to the existing housing stock.

Mr. Myers is director of technology and transportation at the Institute of Public Administration in Washington, D.C. This article was written with Carolyn Weaver of the institute staff.

Here even much improved solar collectors hold less promise, simply because retrofitting is likely to remain too expensive for mass application. Not long ago, the bureau of standards retrofitted an experimental house with a solar collector system. The major components cost almost $20,000. Even cutting this price in half would be unlikely to inspire enthusiasm in most homeowners.

Existing homes present basic problems that are bound to keep retrofit costs high. Few are likely to be properly sited for effectively capturing the sun's rays, which means building special structures for the collector panels. And few homes have the protective landscaping and high-quality insulation that solar systems require, which means more extra cost. And even if insulation and other energy-conserving features are already in place, old pipes must be torn out and new ones installed.

Which brings us to the heat pump, not often considered a solar heating system. Yet, in a real sense it is: It takes outdoor air warmed by the sun and transfers the heat to the air inside.

It does this as the low-temperature refrigerant in the outdoor coil absorbs heat from higher-temperature air passing over it. (Even at 0 degrees, air still contains 82 percent of the heat it had at 100 degrees.) The compressor pumps refrigerant in hot vapor form to the indoor coils. Circulating indoor air picks up the heat from the warm coil to make the entire house comfortable. As the hot refrigerant vapor cools, it condenses and the resultant liquid refrigerant returns to the outdoor coil where it absorbs more heat. The cycle continues as long as heating is necessary. The heat pump is also used to cool. In this mode, it works much like a conventional airconditioner which, as we shall see, is an important attribute.

Solar collector systems are increasingly feasible for new houses but not for old.

Heat pumps are an "old" technology that got a bad name in the 1950s, when they were widely used in the South. The trouble arose because the early heat pumps were simply remodeled airconditioners, which proved unable to stand the strain of the heating application and failed under the load. The technology was virtually dead until the electric utilities, whose peak loads after 1964 began to shift to the summer, helped to revive the heat pump as a means of generating more business during the winter.

When outdoor temperatures are relatively mild, heat pumps virtually provide something for nothing—or at least for relatively little. Because they extract heat from the solar-warmed outside air, heat pumps can deliver as heat up to three times as much energy as they consume. A well-designed and properly installed heat pump operating at a 35 to 40 degree outside temperature can return up to 10,000 BTUs for every kilowatt-hour of electricity necessary to run it.

There is a catch, however: The heat pump performs at its worst just when it is needed the most. During bitterly cold weather when outdoor air temperatures drop, the heat pump's performance also drops to the point where it can no longer provide all the heat needed for comfort. At this point, a supplemental heat source is necessary. In the conventional electric-powered heat pumps used in new construction, the supplementary heat source is usually an electric resistance furnace. A control system automatically brings the electric furnace on line at around 35 to 40 degrees outside temperature.

Electric resistance heating is, of course, expensive. This is not very serious provided the resistance furnace is not used too often—that is, as long as outside temperatures stay relatively mild most of the time. On the average, there is enough mild winter weather in most of the country to make heat pumps with electric furnaces competitive with oil. However, sometimes the averages don't hold. For example, this winter, which was exceptionally cold, caused heat pumps to shift to resistance heat much more often than usual. The results were exceptionally high heating bills for their owners.

Not all heat pump owners suffered this

problem, however—at least not those who had retrofitted their homes with new "hybrid" heat pumps which did not use an electric resistance furnace for supplemental heat. Instead they used the gas or oil furnace that the existing houses already had. When the temperature outside was mild but some heating was necessary, the control units kept the hybrid heat pumps running at the most efficient point. When temperatures dropped below 35 to 40 degrees, the control unit cut in the oil or gas furnaces and the homes were heated in the conventional manner. Thus, both heat pumps and furnaces were used only in their efficient modes.

Depending on the climate conditions of the region where hybrid heat pumps are installed, these systems (heat pump plus conventional gas or oil furnace) will save up to 60 percent of the oil or gas formerly used. And depending on the relative prices of oil or gas and electricity, the hybrid systems can not only save the nation considerable amounts of oil and gas, but can also save consumers approximately 20 to 25 percent of their heating bills.

Hybrid systems use both heat pumps and existing furnaces in their most efficient modes.

The significance of the hybrid heat pump is that it is particularly well-adapted to be retrofitted into existing homes equipped with adequate hot-air systems. It is estimated that residential hot air furnaces now consume about half of the oil and two-thirds of the gas used annually for residential space heating.

Of course, heat pumps must themselves use energy—electricity—in order to extract the solar heat from the outside air. Ideally, therefore, heat pump retrofits should be encouraged only in areas where electricity is generated from fuels other than the critical ones, oil and gas. To do otherwise actually might be counterproductive.

Even given this limitation, the potential savings are enormous. A whopping 70 percent of the electricity in this country is supplied by coal, nuclear reaction and water, not even considering other noncritical sources. This means that at least the same percentage of the nation's nearly 30 million hot-air furnaces are candidates for retrofit with hybrid heat pumps.

Granted that heat pumps might save the nation a good deal of gas and oil, the question is how to induce people to retrofit their homes with them in order to actually realize the savings. As noted earlier, consumers can save 20 to 25 percent of their average fuel bills by using a hybrid heat pump. For the typical home, this might amount to perhaps $100 to $150 per year. But given the $2,500 to $3,000 cost of installing a heat pump, these savings are simply too small to induce people to retrofit with heat pumps just to cut their heating bills.

Paradoxically, the inducement to use heat pumps lies in their capability to aircondition as well as heat. That is, consumers might buy heat pumps primarily because they want airconditioning. Lower heating bills could be seen as a "bonus," if not the prime reason. Energy shortage or not, over the past years there has been a growing trend toward central airconditioning. Demand for central airconditioning is high; 43 percent of all new homes are equipped with central systems. Demand is also high for central airconditioning in existing homes, and the retrofit market seems large: Only 11 percent of all houses are now airconditioned.

I suggest that the federal government encourage people who are planning to aircondition their homes to do so with add-on heat pumps, rather than conventional airconditioning. At present, heat pumps are more expensive than airconditioning by several hundred dollars. On a life cycle basis, however, the heat pump could be a better buy than conventional airconditioning. The 10-year fuel savings are worth approximately $1,100—more than enough to cover the extra first cost of the heat pump. That is, the consumer should theoretically be willing to borrow that amount of money at, say, 9 percent to spend on the higher cost heat pump. But as a practical matter this won't happen; U.S. consumers are just too accustomed to buying for lowest first cost.

Recognizing this, the government can do a few things to nudge consumers toward heat pumps rather than conventional airconditioners. As an outright push, the government could mandate that *in areas where electric power is generated from sources other than gas and oil,* all future central airconditioning retrofit systems must incorporate heat pumps which can be used as heating units during the winter. This would force the customer to pay for a benefit whether he wanted it or not. If enough homeowners so benefitted, the public at large would also benefit as more oil or gas once burnt for heating was diverted to other uses.

There are precedents for policies that force people to pay for goods they may not want in order to provide the public at large with a benefit. Such a case is the federal regulation respecting the manufacture of television receivers. Several years ago, the government mandated that after a certain date, all TV sets must be equipped with UHF as well as VHF channels. When there were enough UHF equipped receivers in use, it made sense to broadcast in UHF frequencies. And indeed, when UHF stations came on stream, while many TV owners were totally indifferent to UHF channels, the public at large did benefit from the additional broadcast capacity. A softer approach than mandating heat pumps vs. airconditioning would be to have the government *finance* the difference in first cost between the two. That is, the government could lend homeowners the extra $1,000 or so, to be paid back out of fuel savings at, say, $150 a year. The government might sweeten the deal further by providing a small subsidy to favor the economics of the heat pump. The question is, how much is it worth for the government to do so?

In the case of heat pumps which will save oil, the answer is approximately $100 per installation. The government currently plans to stockpile 500 million barrels of oil a year, at a cost of more than $12 per barrel. Because each heat pump installation would release 8 to 10 barrels of oil a year for other purposes, the government would come out even if it encouraged such installations with a subsidy of $100 to $120. Unfortunately, we have no similar figure to represent the value of saving gas. In any event, government subsidies of this order might persuade those who are already planning to aircondition their homes to choose a heat pump instead of conventional airconditioning which is otherwise less expensive—with significant savings of oil and gas.

The next step: heat-actuated heat pumps run by gas with fuel savings of perhaps 50 percent.

And by about 1982 a still more promising heat pump will be on the market: the heat-actuated heat pump, which is powered not by electricity, but by the on-site combustion of small amounts of fossil fuels in a heat engine. At present, the federal energy research and development agency (ERDA) is sponsoring the development of a heat-actuated heat pump that runs on gas. (ERDA predicts that a similar pump will be developed to run on oil.) Its analysis of the gas heat pump indicates that over the heating *and* cooling season, a heat-actuated heat pump would consume only 50 percent of the natural gas that would otherwise be consumed by a gas furnace and electric airconditioner installed to do the same heating and cooling job. That is, unlike today's electrically driven heat pumps, the heat-actuated heat pump will save critical fuels without using extra energy for airconditioning. If these analyses prove correct, we may expect that the heat pump, using the sun's warmth, will contribute immensely to energy independence. □

Evaluation: Housing the Department of Urban Development

An inside view of HUD headquarters by Lawrence O. Houstoun Jr., AIP, who has worked in it through three Administrations.

(This article differs from others in our evaluation series in that rather than resulting from analysis by an outside observer it is the reaction of one who has lived with the building for most of its life. The author has served in a series of policy-making positions at HUD during the last three Administrations. He is now assistant to the Secretary of Commerce and chairman of the federal interagency task force on energy-impacted communities. Ed.*)*

Symbols, President Carter reminds us, are important elements of life and governance. In his choice of dress, transportation and his distaste for pomp and frills, the new chief executive has set a tone which is both republican and democratic in the sense those words were used in early days of the nation.

While it's too early at this writing to identify the President's specific views on public buildings, he could do worse than to turn to the 1974 report of the federal architecture project, sponsored by the National Endowment for the Arts. The authors observed: "Each time we as a people build through our government, we are saying something about ourselves, something about the relationship of government to citizens. Therefore, it is entirely proper that we ask that federal architecture, particularly those strategic buildings used by the general public, reflect the greatness we strive for as a nation —a greatness based not so much on size and splendor as on humaneness, openness and regard for individual dignity. But the message that most federal architecture is giving about us is a distinctly distorted and unflattering one."

With a new mood in Washington, it may be timely to consider how one such architectural statement, conceived in the Kennedy era and born during the Johnson Administration, has served its function as well as making its particular statement about the government and its people. Eight years after the Washington headquarters of HUD opened its doors to workers and the public, it is clearly reflective of the period in which it was designed.

The decision to build predated the creation of the department which was to consolidate and expand America's programs for housing, planning and urban development, most of which were then lodged in the housing and home finance agency. It coincided with the 1962 Report of President Kennedy's ad hoc committee on federal office space. That work's "Guiding Principles for Federal Architecture" called for "an architectural style which is distinguished and which will reflect the dignity, enterprise, vigor and stability of the American national government. Major emphasis should be placed on the choice of designs that embody the finest contemporary American architectural thought."

There is no evidence that these philosophic or nationalistic considerations influenced the HUD design in any conscious fashion. Indeed, the selection of Marcel Breuer, FAIA, and Nolen & Swinburne brought the American capital a building whose basic design was previously twice tested in France.

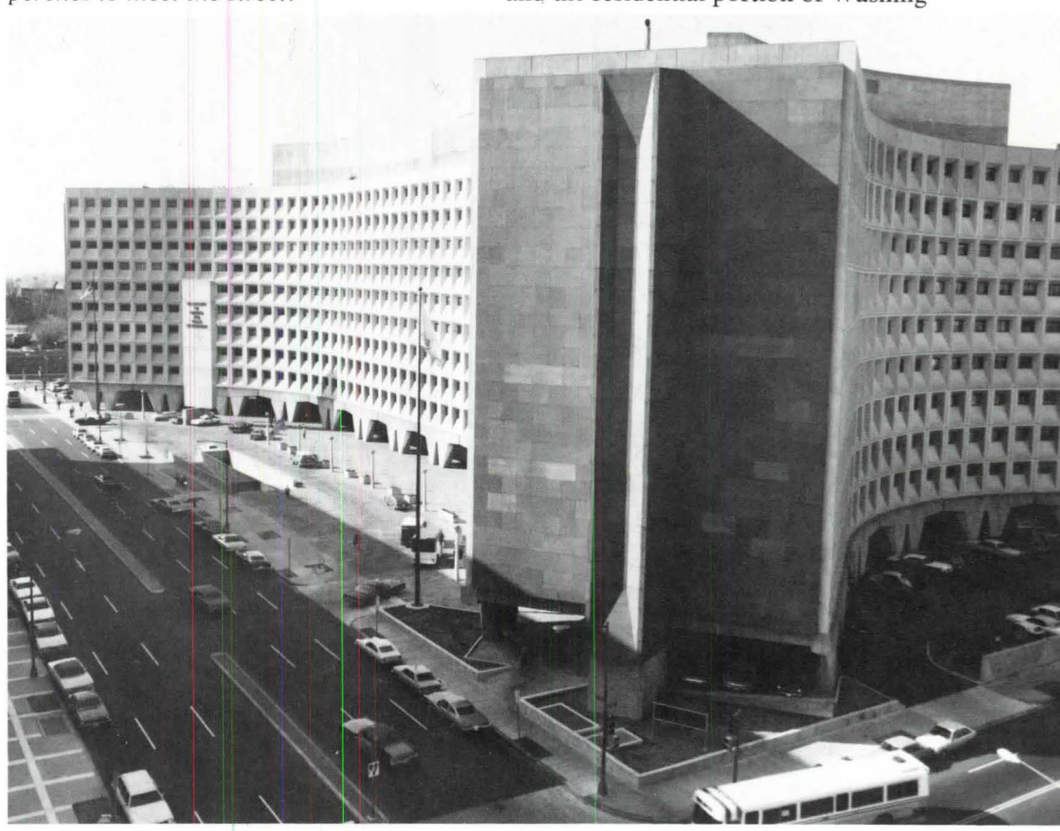
The principles also suggested that fine art should be incorporated in the designs, and that buildings "should be economical to build, operate and maintain. . . ." The construction proved to be economical. In a city renowned for cost overruns of proportions monumentally akin to the structures themselves, the HUD building was completed for $26 million, $6 million less than estimated and $3 million less than appropriated. For this investment, the government received:

- 700,000 square feet of usable office space for use by 4,300 workers from the 20 separate buildings throughout the city.
- A building 588 feet long, 372 feet wide and 10 stories high, shaped in the form of two curved Ys, joined at their bases.
- Three levels of subterranean parking for 550 cars; a cafeteria, library and health service unit; several conference rooms; covered exterior walkways, and future access to Washington's Metro subway.

It was proudly proclaimed to be the first federal precast concrete building. It was formed of 1,584, 12-ton precast window units which bear the load over W-shaped columns spaced on 40-foot centers. It was also the first modular federal building, with a 10-foot basic module. The precast windows contain individual room heating units.

The 5½-acre site selected was one of the last remaining in a strip of old and new federal buildings between the Mall and the residential portion of Washing-

At the front, stone pavement spreads from beneath the massive concrete perches to meet the street.



ton's southwest renewal area. It was in an area that had been subjected to a massive clearance which left only the indomitable St. Benedict's Roman Catholic Church and the railroad as reminders of the 19th century development that preceded it. Immediately to the south would be the inner city segment of I-95 for easy access by suburban commuters. L'Enfant Plaza, a commercial center with subway and bus stations, would be immediately to the west. Several other domestic agencies also chose Washington's southwest for their headquarters, offering the prospect for ease of communication among those responsible for transportation, environmental protection and other urban concerns.

When the building opened in the summer of 1968, the desks and carpets were spanking new, a welcome change of working space for those who were gradually relocated from the string of mostly rented offices along K Street in northwest Washington. Grumbling about the relative paucity of commercial amenities in the southwest was more than offset by the prospect of vastly increased, subsidized and immediately convenient parking space. It seemed as if the years in the wilderness of subcabinet status had finally ended in a gleaming manifestation of bureaucratic legitimacy.

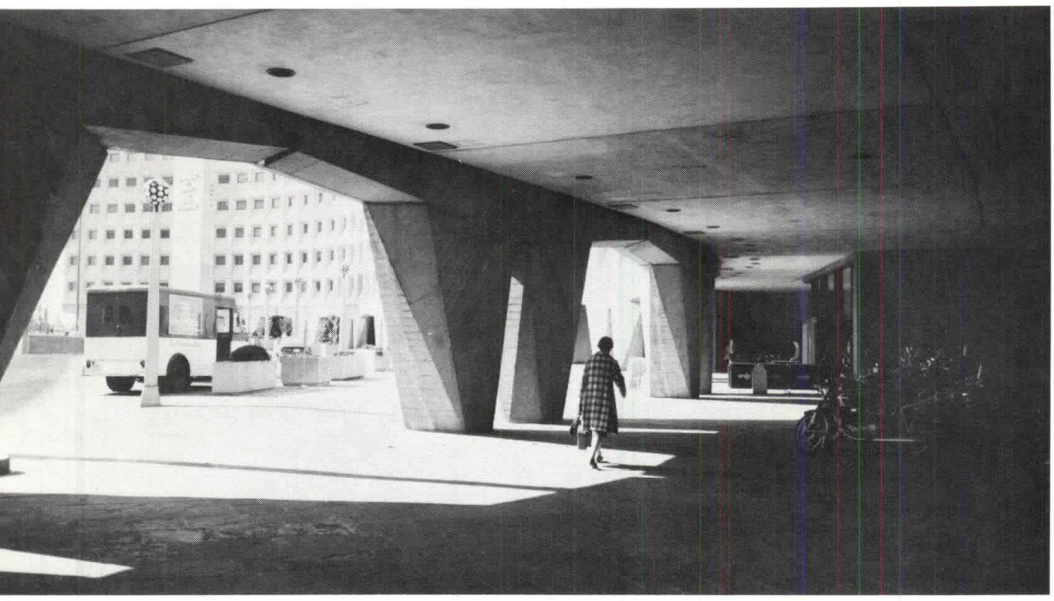
No one was so crass as to remind the planners, architects and patrons of the conclusions reached by Britain's lighthearted social commentator, C. Northcote Parkinson, hardly a decade earlier: ". . . Perfection of planning is a symptom of decay. During a period of existing discovery or progress, there is no time to plan the perfect headquarters. The time for that comes later, when all the important work has been done. . . ."

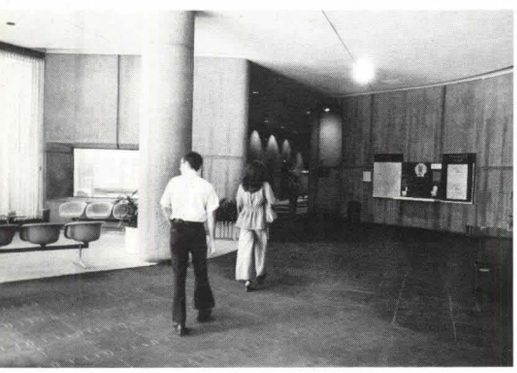
Parkinson observed of Washington that "the most monumental offices are found to house such derelict organizations as the Departments of Commerce and Labor, while the more active agencies occupy half completed quarters. Indeed, much of the more urgent business of government goes forward in 'temporary' structures erected during World War I and shrewdly preserved for their stimulating effect on administration." (By the late 1960s, these had been removed.)

The year 1968 was the peak of a period in which the work of the department was daily considered relevant, positively or negatively, to the riots which ripped through the already deteriorated sections of virtually every American city. If anyone observed that the move in September took the department far from the 14th Street corridor where government workers had observed firsthand the riots after the assassination of Dr. Martin Luther King Jr., it was doubtless with a sense of relief. The Mall, the railroad and the highway helped put comforting distance between what was briefly thought of as "the department of the city" and the festering realities of Washington's ghetto.

The office and apartment buildings of Washington's southwest are restricted to either 8 or 10 stories and tend to be elongated in an attempt to crowd as much use as possible within these restrictions. Moreover, Washington's redevelopment planners were apparently entranced by the notion of severely limiting activities on the first floors. This has produced a street life which emphasizes cars and buses rather than pedestrians, moving among block-like structures with varying setbacks.

The HUD building meets the street with an entrance court that is as bleak in the searing, humid Washington summers as it is in the winters. There are too many precast windows on concrete perches, too





Entry from the street (top) is through one of the two elevator lobbies (center, left). Interior offices (center, right) are windowless; phones sprout from the floor (left) in a typical open landscape office. Halls (right) are long and dim.

Until completion of adjacent L'Enfant Plaza, HUD employees keenly missed being downtown.

many tank-trap concrete barriers to guide the taxis, too much stone pavement. Here and there are a few concrete planters with saucer magnolias, but there is nothing big enough and green enough to soften the overall image of concreteness.

To the rear is a tiny parklet (described as "spacious" in the 1968 press release) which was finally planted during the recent administration of Secretary Carla Hills. It is as overworked as such a recreational island must be when it is all that stands between 4,300 workers and more than five acres of concrete. Beyond is the L'Enfant Plaza hotel whose rectilinear posterior is clutched between the northwest and southwest tips of the concave HUD building. In the six or eight months when the weather permits, however, L'Enfant Plaza offers delightful brown bag lunch spots under the bordering trees and around its large fountain.

The HUD building also has a rooftop lunch area overlooking the Washington channel, the southwest area and Capitol Hill. The view at the 11th floor level is among the best in Washington, although regular use is discouraged because there are no barriers to shield diners from the wind. Nor do the benches have backs, a frequent statement by government decision makers of their real feelings about other people's leisure. One employee-critic has asked why the cafeteria was not placed on the roof to make the vistas available to the rank and file. Before the move to southwest , HUD workers had had superior lunch hour facilities in and around the city's several marvelous downtown parks.

Over time, some of the initial problems have faded and others have become more apparent. Shopping and luncheon opportunities in the area improved as Metro buses, promising a quick trip to and from downtown, filled the stores and eating places of L'Enfant Plaza. Inside, HUD's curved corridors, especially those on the north and south ends behind the elevators, came to be regarded as a relief from the alternative of inordinately long, straight passageways required to serve so many workers within the 10-story height limitation.

It is said that the three-deck underground parking area was designed for Renaults, not Oldsmobiles. The tight turns necessary to navigate the ramps often require time-consuming backing and filling by drivers of larger American cars, compounding the distress of those caught in peak hour traffic. Those who attempt to leave during the half-hour around closing time not infrequently spend 20 minutes or more creeping upwards from the lowest level through mounting fumes. Incoming executives are initially surprised to find that the choicest parking spaces are outdoors, which offers more ready egress. Parking is still subsidized today, and recent regulations, while more democratic because they favor car pools, still help feed the auto commutation habit.

Upon emerging, the typical driving commuter seeks access to I-95, a roaring, congested trough immediately south of the building, to begin an often grinding trip which may last an hour if the destination is the suburbs of northern Virginia or Maryland. A rare few walk to nearby apartments and row houses in the southwest redevelopment area, and even fewer bike to restored homes on Capitol Hill. Much of the secretarial work force is served by buses operating from a poorly sheltered series of ramps on Ninth Street.

The two places where everyone spends some time daily are the lobbies. Access to the building periodically is limited at these points by the seemingly endless number

of guards which the nation's capital supports. Usually this occurs when some group is attempting to express criticism of the department or its officials either through picketing in the front court or storming the executive offices. Government equipment and personal belongings, including locked bicycles, are periodically stolen despite all the uniformed presences, suggesting a challenge to those who hope to arrange office space so as to minimize such risks. The two lobbies are also used by Department of Transportation and other federal employees on their way to the HUD cafeteria or to L'Enfant Plaza beyond. Congestion around the north elevators has become extreme as L'Enfant Plaza attracts more and more noon-hour customers.

The exposed aggregate and other concrete interior finishes remain unpopular. Some see in them an unfinished look. Others object to the lack of color, the "gloominess" exaggerated by the significant reduction in lighting resulting from conservation measures.

The cafeteria has been brightened somewhat in recent years by colored fabric hangings, although newcomers see it as gloomy too. The glass wall to the west looks out on the single well-traveled covered walkway which links the building to L'Enfant Plaza. Nevertheless, most find this prospect insufficient to brighten the room or their spirits. The considerable heat loss from the cafeteria windows in winter makes tables near them less popular than in summer.

The older office buildings in the Federal Triangle typically provided a separate entrance and elevator to speed the departmental secretaries between limousine and office. The HUD building includes an experiment that will probably never be repeated. The elevator closest to the secretary's office can be summoned and controlled by a key issued to the incumbent. George Romney, reminded of this convenience early in his tenure, remarked in a crowded stop-and-start elevator, "If your schedule's so tight that you need to use the key, you'd better change your schedule." It hasn't been used since.

Newcomers tend to be critical of the building as a workplace, oldtimers more accepting.

Individual office doors have been color coded (red, yellow, blue and black) in a vain attempt to orient visitors. This provides the single touch of color in the halls. The offices themselves included an early federal experiment with white, metal walls. All pictures had to be hung with magnetic fasteners. As the original layouts came to be altered with the seemingly continuous reorganizations, however, the replacement sections were standard drywall panels. In a reversal after several years of the white wall rule, all except the paneled executive offices were painted either "putrid pumpkin" (to use a popular employee sobriquet) or the pale blue used in the 1940s for the rooms of infant boys. At the same time, the standard, sound-absorbing dark green carpeting was gradually replaced by basement-style tiles which have the irritating propensity to pop up or inch their way apart. In its eighth year, there is already about the building the beginning of traces of reduced investment, a clue that HUD employees are schooled to recognize elsewhere as the sign of deteriorating neighborhoods and structures.

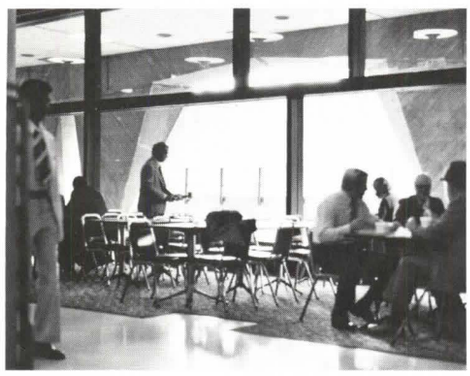
Rare is the secretarial worker who sits by a window. The number of windows or "bays" of an official's office is the surest indicator of status, however fleeting. They are regarded as too high from the floor, however. Even from the cabinet officer's windows the magnificent views of the rivers can't be seen unless one stands.

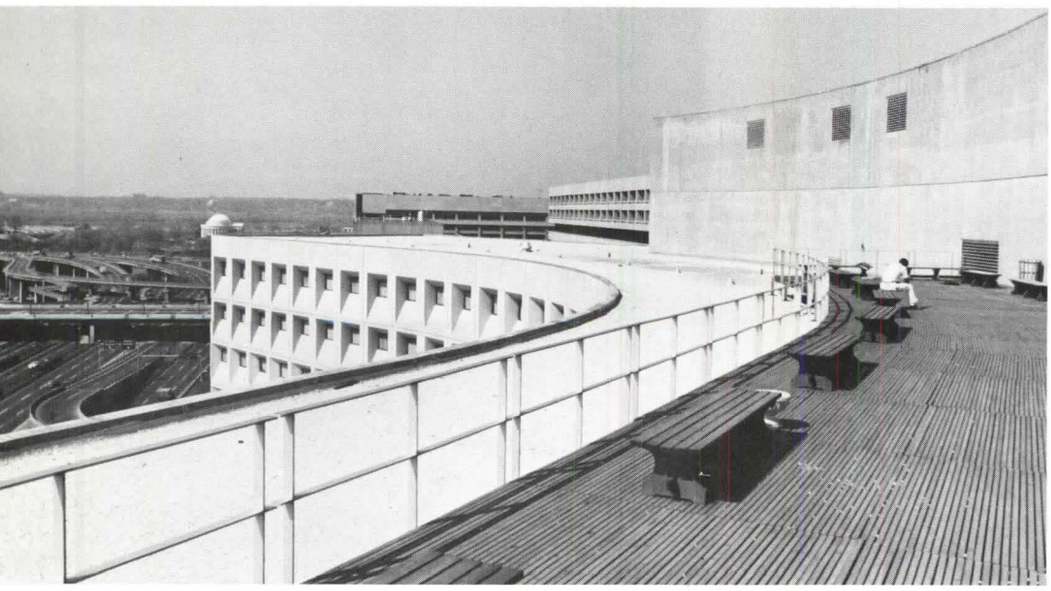
A more striking inadequacy is the absence of a central auditorium; nor is one of adequate size available in nearby federal buildings. The several conference rooms seating 16 to 30 and attached to the assistant secretaries' offices are heavily used. A larger one used for press conferences and meetings of HUD's regional officials and another which occupies the former executive dining room are both awkwardly shaped and acoustically troublesome.

While the opportunities for improving the usefulness and attractiveness of the building may not be many, they should be explored. Are there still possibilities in top floor skylighting or better use of the roof? Would a row of magnolia grandiflora in the forecourt soften the lines and lessen the whiteness? Should color be introduced around the elevators at each floor? Would an auditorium, also serving neighboring DOT, prove a better use of some of HUD's underground parking area when the two Metro lines open? It may yet be timely to raise questions of retrofit design.

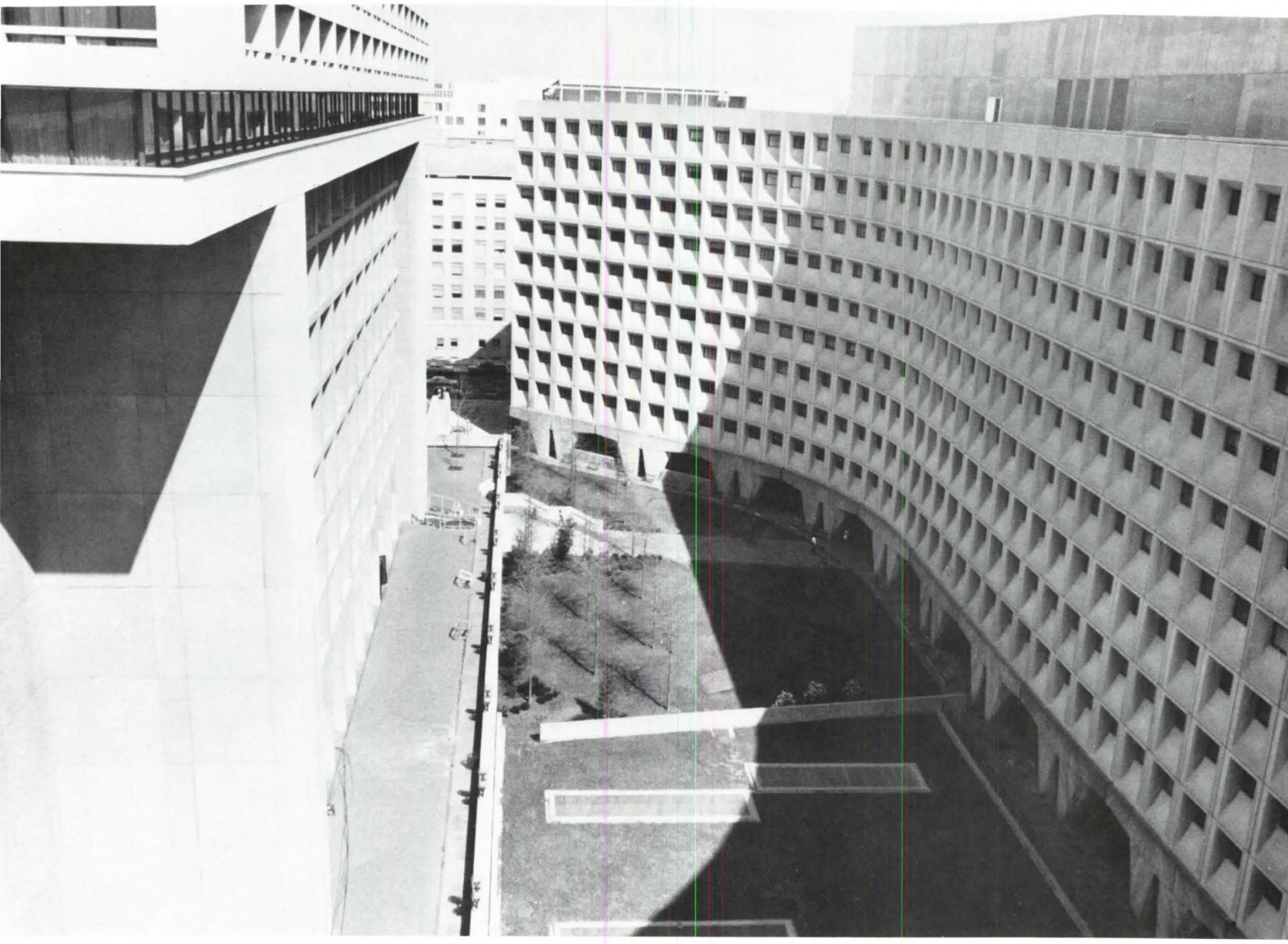
Lest all of this suggest unanimous disaffection among HUD's employees, it should be said that such would be an exaggeration of the probable consensus. The most acrimonious comments directed at the building typically are made by visitors or new employees, not old ones. Incoming Secretary Patricia Harris's assistants, new to the building, used such words as "ridiculous" and "total disaster" in describing their reactions to their new workplace. In contrast, those who have spent perhaps 1,600 workdays in the structure, while critical, are also inclined to agree with one old-timer who conceded, "Mostly, it works."

In 1962, it appeared necessary and convenient to select the new southwest as the site for HUD's headquarters. The choice avoided expensive land and reinforced the then-dominant concept of city regeneration—clearance and new construction. Intentionally or not, the decision was symbolic and particular to the period. What, then, might be the decision were the option to arise in 1977?





Lunch spots: a ground-floor cafeteria or a rooftop perch with a grand view.



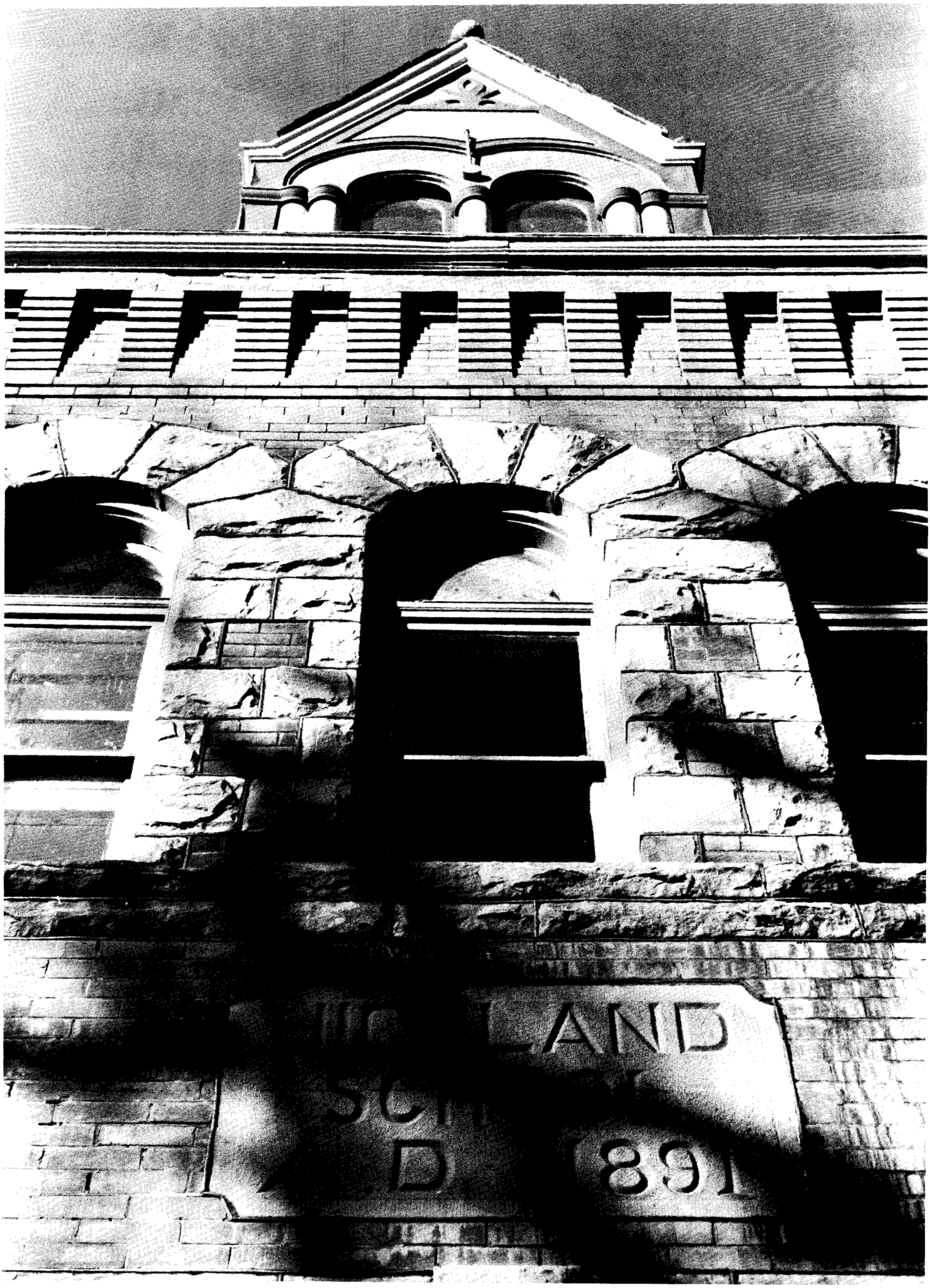
Hotel's rear faces HUD's across a well-traversed courtyard that was only landscaped during Carla Hills' tenure.

Where once the emphasis was on efficiency through consolidation of functions, new values have emerged, representing a more contemporary, but as yet uncollected, set of "guiding principles."

- **Stimulate private revitalization.** For a host of reasons, clearance and "write-down" no longer dominate redevelopment planning. The era of subsidy to induce the construction of new buildings may not have entirely passed, but more attention is being given now to the relocation of public improvements from the standpoint of how they can upgrade marginal urban areas so as to stimulate unsubsidized private investment. Operating under this principle of revitalization, HUD would perhaps select a site near the Judiciary Square Metro station. The symbol in such a choice would be underscored by the environment there that speaks of need and challenge, in contrast to the affluence viewed from the executive windows in HUD today.
- **Recycling.** In the past five years, we have reached a peak of public concern and appreciation for 19th century buildings, which earlier would have been demolished without a second thought. Downtown Washington has two of these —the Old Post Office and the Willard Hotel—whose proximity and scale together might serve a single federal agency or clusters of agencies economically and with remarkable style. Filling these long unused or underused buildings would provide needed stimulus to the city's principal shopping area, as well as provide more central access to other federal agencies and transportation facilities.
- **Conservation.** Those sealed office windows would doubtless be replaced with some means of cooling with outside air. The vacant space around the enormous airconditioning units on the roof would be filled with solar collectors, and skylights would brighten some 10th floor halls and offices. The space allocated for parking would be drastically reduced and more convenient access to buses would be provided. Heat loss through glass also would be reduced. In short, a new (or renovated) HUD building would reflect the neglected realities of scarcity.

Symbolically, the HUD building does say a great deal about the department and government of which it was a part when it was designed. Perhaps anonymity or ambiguity is what it says best. The HUD building might as well have housed the U. S. office of education or the Department of Labor without saying anything particular about their functions either (the former at least has a working playground in its forecourt). In a city which has attracted little architecture of note in the past 50 years, it is in appearance and utility superior to most. This is faint praise.

Inspiration in public service can come from many sources of which leadership is certainly more influential than design. But a nation which hasn't figured out how to build housing for the needy, provide opportunities for poor and minorities in suburbs receiving government subsidies, locate recreational resources so as to be accessible without cars, or improve maintenance of its $1.5 trillion housing stock requires all the inspiration it can get from whatever source. The building may be adequate, but for HUD that isn't good enough. □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Surplus School Buildings: New Opportunities for Adaptive Use

Declining enrollments are leaving many districts with space that they no longer need. A.O.D.

More school buildings have been converted to new uses that benefit communities than any other building type, according to the Educational Facilities Laboratories (EFL).

Steadily falling national birthrates, combined with migration from cities to suburbia and exurbia, have emptied schoolrooms, leaving jurisdictions throughout the country with underutilized but often perfectly sound school buildings.

The cost of operating half empty schools is usually wasteful in the extreme, as illustrated by a drastic example in New York City: In 1975, the borough of Manhattan had more than 250,000 square feet of space in underused schools. At the same time, four city agencies were paying over $1 million annually to rent slightly less than 250,000 square feet of space, more than half of which was used for child care, recreation, counseling and other social services. At least some of these activities could have been housed in surplus school space.

Many basic expenses of operating underutilized schools continue as though the building were fully occupied. Almost as many teachers and custodial workers are required to staff a half empty school as a full one, and neither utility bills nor debt service charges fall with decreased enrollments.

For a number of reasons, closing schools usually fails to result in significant savings. A University of Washington study showed, for example, that of 49 school districts that had closed facilities, only a third had saved money from the closures. By contrast, the conversion of surplus school buildings to new uses can often provide economically and socially declining communities with new vitality. In most cases, the question is not whether to salvage a school building and adapt it to a new use but rather what that new use (or uses) should be.

As EFL President Alan Green, Hon. AIA, points out, school buildings usually have the advantage of central locations, and, unlike industrial buildings, are designed for public occupancy. As a result, most schools fulfill emergency code requirements and have adequate storage, plumbing, electrical and other utilities. And usually, they "present a better face than industrial buildings," as Jim Alexander, AIA, of Anderson Notter Associates puts it.

When selecting new uses for their surplus school buildings, school districts will generally give priority to school-related functions, such as vocational and adult education, before leasing or selling to developers for conversion to housing or commercial use. And although conversions are usually planned on a school by school basis, the far more efficient course is to create districtwide plans, as has been done in Duval County (Jacksonville), Fla.

Faced with 17 empty schools, this school board allocated seven for use by the school district, two for administrative offices, two for storage space, one for a marine center and laboratory, two for curriculum use and one for vocational education. In addition, the district converted two more of its schools for shared use with other community agencies running "compatible programs." Says Don Bulat, associate superintendent, "First we look within our own district; then we seek partners for available space. The next step is to find public agencies that can occupy a total building that we no longer need." Thus, another Jacksonville school is now used as a halfway house by the sheriff's office and still another is a junior college. In these instances, the city pays for the programs and use of the buildings, which adds to the school district's coffers while "mothballing" the building for use again as classroom space should enrollments rise in the future.

In most cases, such conversions require minimal remodeling. The vast majority, in fact, has so far been accomplished with little, if any, help from architects, in part because school boards have been oblivious to the savings and other benefits architects could provide, in part because architects have not recognized and cultivated a promising market. EFL's Green laments that "part of the problem is that because many schools are so easily converted, we've made too little investment to better their environment. Many mean old schools are now mean new spaces."

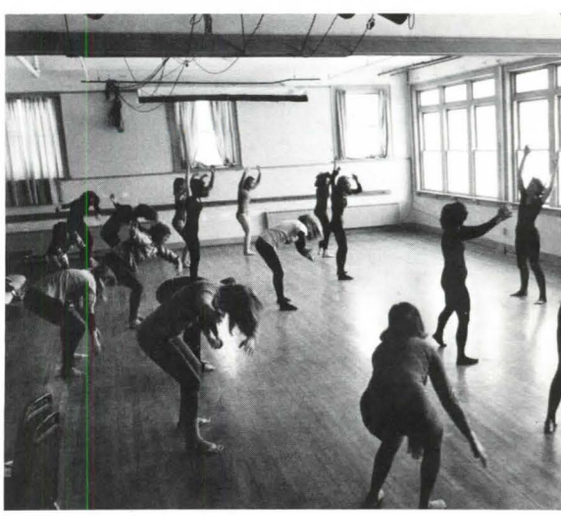
The ease with which school buildings lend themselves to conversion, and the type of conversion for which they are most suitable, depends very largely on their vintage. Most fall into one of three building types: those built before World

The Massachusetts schools presented here were partially drawn from the book Built To Last: A Handbook on Recycling Old Buildings, *prepared by the state's department of community affairs under direction of Gene Bunnell and scheduled for June publication by the National Trust for Historic Preservation.* Ed.

Boulder, Colorado

The process by which the former Highland school in Boulder, Colo., was converted for use by a variety of community organizations is exemplary. The nonprofit Historic Boulder, Inc., wanting to see the abandoned 19th century schoolhouse preserved, undertook a careful feasibility study, found organizations which needed space and matched their requirements to specific areas of the building; obtained commitments from these organizations to lease space, and arranged for financing. Historic Boulder bought the building, retained Gage, Davis & Associates as architects, borrowed the needed money, supervised the remodeling and is now leasing space to various tenants, including the city's head start program, a community free school, a center which provides information on ecological and environmental matters, a day care and crafts cooperative, a school of creative dance and a women's center.

Remodeling was minimal, consisting mainly of meeting code and fire department requirements. The project was accomplished through a bank loan of $140,000. Annual gross income on the 21,132-square-foot building is $37,300. Historic Boulder is now looking for a buyer for the building, and will use the proceeds for future local preservation projects.



War II, those built just after that war and those built in the '50s and '60s.

Ironically perhaps, pre-World War II classroom buildings, which until recently were considered "institutional monsters," in the words of Jonathan King of the University of Michigan's architectural research laboratory, lend themselves most readily to a variety of transformations, and are especially well-suited to conversion into housing. They tend to have large, light classrooms, each of which can be easily adapted to one- or two-bedroom apartments; long (24x28-foot) spans; up to 12-foot-high ceilings, which can be lowered to provide space for mechanical, electrical and other systems, and ready-made cavities for insulation. And in many cases, attic and basement space can be recaptured for use.

Among the problems posed by these older buildings are over-large windows, which many architects have treated with a fixed sash or panel on the inside upper portion. Wide corridors, while adding a touch of graciousness, are often inefficient, and the absence of ramps and other facilities for the handicapped poses a problem, as does size in many cases. It is uneconomical, for instance, to install elevators in buildings with fewer than 15 or 20 housing units.

The most difficult school buildings to convert for any use are those constructed just after World War II. In these so-called finger plan structures, with strings of small classrooms along single or double loaded corridors, rooms are usually too small to be subdivided, ceilings are relatively low and spans are short, with little room for fitting new mechanical systems.

Conversely, the "campus" or "pavilion plan" schools of the '50s and '60s are easily converted to a variety of uses, and have been successfully adapted for use as office space, clinics, day care and senior citizen centers. Being free of bearing walls and relying on trusses and post and beam construction, these buildings can usually be partitioned to fit the needs of the user. An overriding disadvantage of most of these structures is their inefficient use of energy.

Funding for school conversions can often be obtained from state housing finance agencies and HUD community block grants. More help will be on the way if the Surplus School Conservation Act of 1976 (HR 13575) is passed. Introduced into the House of Representatives by Rep. John H. Heinz (R-Pa.), it would provide federal grants for local governments to renovate closed school buildings for "productive" purposes. In addition, Heinz' Surplus School Conversion Act (HR 12628) would give anyone who buys an unused school building an accelerated tax write-off of 15 years, half the usual period.

Ithaca, New York

When the De Witt junior high school in Ithaca, N.Y., was abandoned in 1971, a local bank wanted to buy it, tear it down and pave the site for a parking lot. Architect William Downing, AIA, convinced the school board to sell it to him instead for conversion into an indoor shopping mall, apartments and office space. The advantage of Downing's proposal was that it would yield $40,000 a year in property taxes to the municipality (which included the school district); the parking lot would have produced only $6,000 a year in taxes.

Downing's De Witt mall is today a center of activity in downtown Ithaca, containing three stories of apartments above a ground floor of shops and restaurants. The central core, which was formerly the school auditorium, has been converted into office space.

In refurbishing the old building, the architect/owner retained the turrets, wood-paneled entrances, high ceilings, thick and sound-proof walls and waterdrop fixtures, which impart to the structure its special flavor.

Downing himself runs the mall's art gallery and French cafe. Only one commercial enterprise in the De Witt mall has failed since the complex opened in 1974.

To finance the project, Downing invested $500,000 with help from a local bank which, unlike most lending institutions, was willing to make the loan because it previously had been involved with a successful rehabilitation project in nearby Utica, N.Y.

East Boston, Mass.

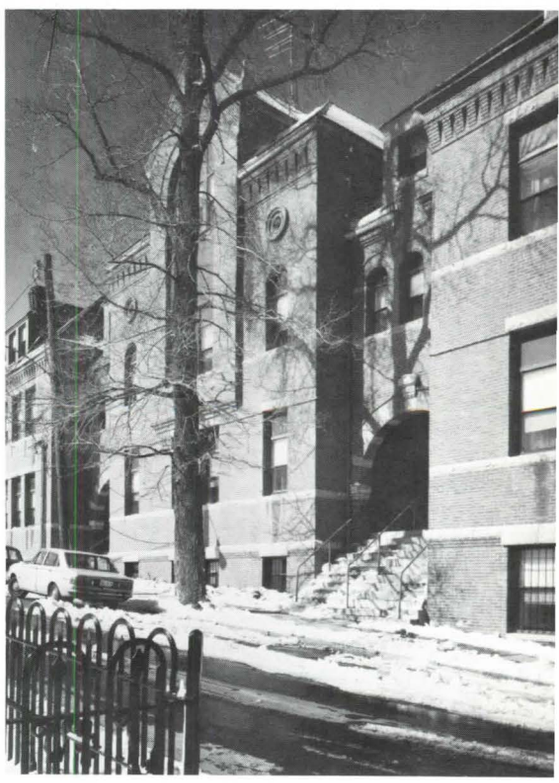
The site and surroundings of this former parochial school made it especially well-suited for conversion into family dwellings. Housing was scarce and very much in demand in the school's East Boston neighborhood. There is an elementary school and social center nearby, the front of the building overlooks an attractive park and there is a small play area on the site itself.

The red-brick structure, with arched entrances and a gable roof, now has 12 living units for low- and medium-income families, including two four-bedroom units, four three-bedrooms, three two-bedrooms and two studio apartments. Large classroom spaces easily accommodated modern residential floor plans and new mechanical systems without extensive demolition of walls.

By adding dormers in the roof and raising the floor level in lower apartments, the architects were able to recapture attic and basement spaces for apartment use.

Portions of overly large window openings have been covered by metal-clad wood panels attached to the exterior of the structure, an appropriate solution since the building already had metal cladding.

The old Assumption school is one of four buildings which have been converted into low- and moderate-income housing by the East Boston Community Development Corp., with financing from the Massachusetts Housing Finance Agency. The cost was $14.50 per square foot.

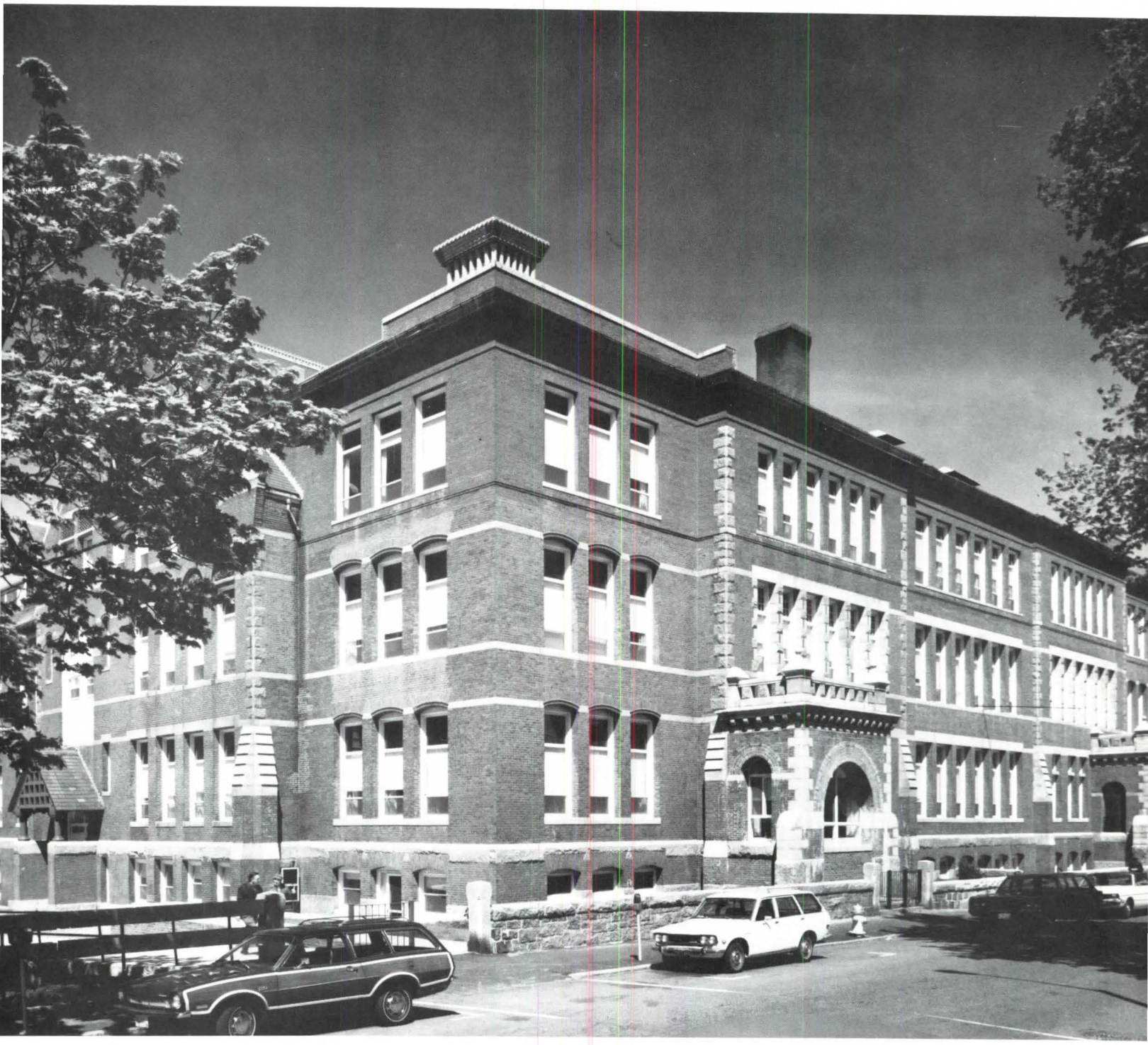


Hapgood, Mass.

The conversion into handsome apartments of this small, wood-frame former country schoolhouse in Hapgood, Mass., (below) shows that often even long-neglected, very modest structures can be put to productive uses.

Constructed in 1888 and abandoned in 1959, the little school in Hapgood stood vacant for 17 years before being transformed into housing by the Boston Architectural Team, Inc., with the Rural Housing Improvement Corp. (Winchendon, Mass.) acting as developers. The architects made five modern apartments out of the building: a one-bedroom with 1,150 square feet of space; two two-bedrooms with 930 square feet each, and two one-bedrooms with 780 square feet. Among the apartments' several assets are hardwood floors, which looked "horrible" until sanded down to reveal their original beauty, say the architects.

The total development cost of the project was $87,000. Financing was obtained from the Farmers Home Administration, a federal funding source for housing construction and rehabilitation in communities of less than 20,000 which are "rural in character."



Gloucester, Mass.

Central grammar school in Gloucester, Mass., received its first pupils in 1889, was enlarged to become the city's high school in the 1920s and by the late '60s had become obsolete. It then stood vacant until a local development team gained approval for its transformation into housing for the elderly and hired Anderson Notter Associates as designers. The former school now houses 84 new apartments.

By grouping new facilities, such as baths and kitchens, in a free-standing core, the Boston architects were able to permit old walls to remain standing, and to use existing classrooms to define most of the converted apartment spaces.

The best of the old remains—9½-foot ceilings, maple flooring, oak wainscoting and trim, paneled closets and large windows. (Two interior spaces are shown across page top, the exterior above.)

The architects opened former attic space to provide duplex units, some with spectacular views of the town and harbor.

On the ground floor they created new entrances for garden apartments and lounge areas, and first floor units have grass patios where once there was an asphalt playground.

One of the greatest advantages of the former schoolhouse for its new occupants is its location right near city hall, with shops, a library and clinic all within walking distance.

Many townspeople were skeptical about the project at first, including the fire department which assumed the building would be a trap. Sprinklers have been installed in hallways, heat detectors in each apartment and an enunciator panel has been wired into the fire department. The chief's mother now lives in the former school.

The *Gloucester Daily Times,* which opposed the conversion at first, wrote about the schoolhouse as follows in a 1975 editorial: "What's been done . . . is fine. In providing housing it meets a serious need. And it does so with style, grace and economy." □

A Boston Firm That Has Made A Specialty of Adaptive Use

Anderson Notter Associates finds a growing market in 'people's new-found concern with roots.' A. O. D.

The work of Anderson Notter Associates of Boston underscores significant changes that have occurred within the American preservation movement in recent years, and has, at least in New England, served as a catalyst for these changes. As founding partner Timothy Anderson, AIA, describes it: "I think the preservation people began to realize it isn't economical to simply take museum-type buildings out of the mainstream and preserve them as they are. They began to look at the stuff we were doing in adaptive reuse as being a good economic engine to support preservation goals."

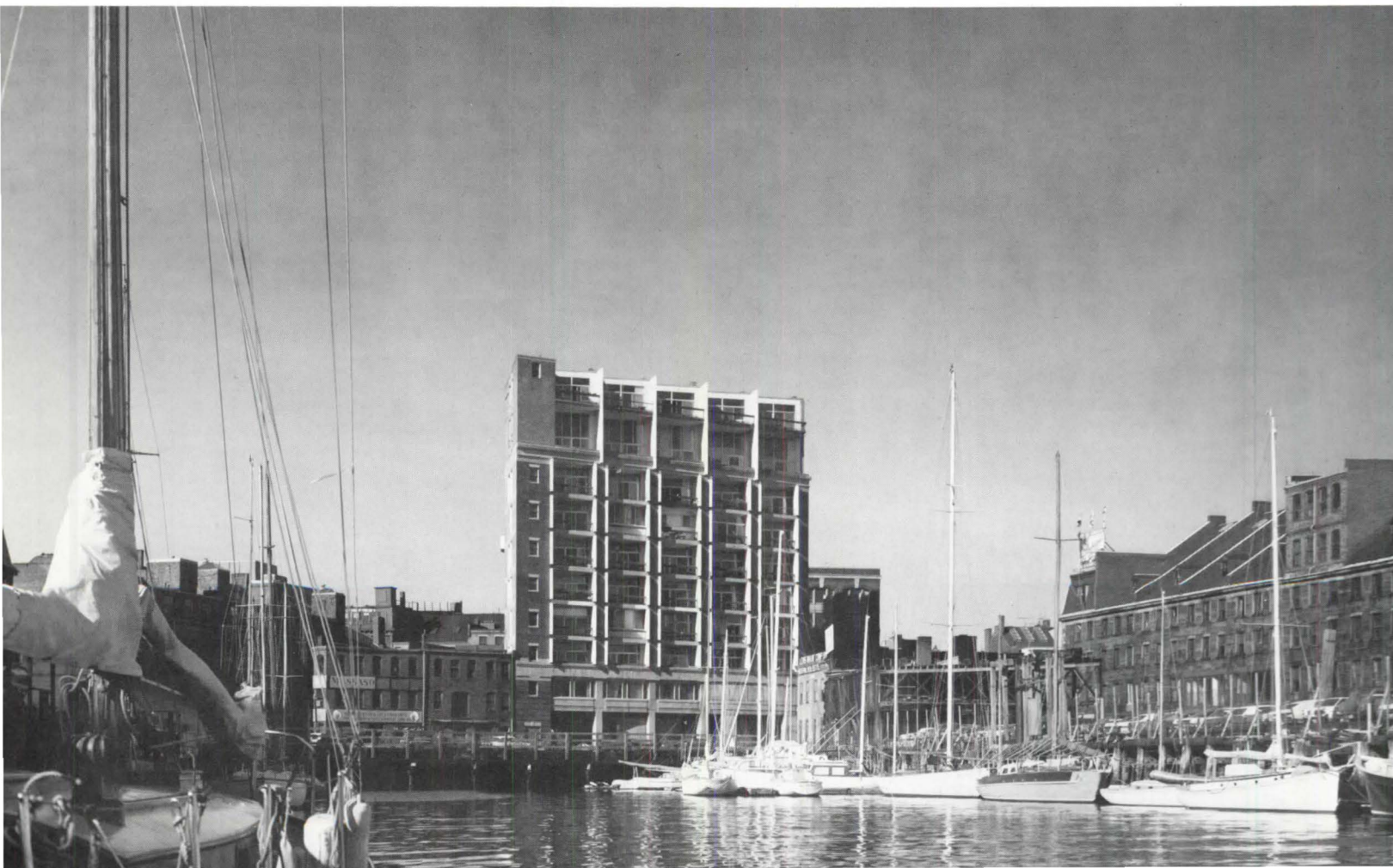
The "stuff" Anderson Notter has been doing consists mainly of converting surplus warehouses, factories, mills and schoolhouses to new commercial and residential uses. Partner George Notter, AIA, describes it as "turning a structural surplus to human service and thereby heightening the identity of places where people live and work."

The 26-person architectural firm has also adapted historic gems for new uses, such as the old city hall in Boston (for which it won an AIA honor award in 1976, the first year awards were given for reuse) and Union Station in New London, Conn.

Although the office also works in new construction, its most salient contribution has been to show that seemingly inconsequential and unloved old buildings can be transformed into respected structures that return a sense of pride and vitality to their usually demoralized and economically declining communities.

Anderson Notter's recycling work began more than a decade ago with the Prince building, a former spaghetti factory on the Boston waterfront. It was the first major building (below) in the city to be recycled and served as a prototype for the rebirth of the historic waterfront as a residential area. Tim Anderson recalls, "Another architect and I were looking for a place to live at the waterfront, and after climbing to the top of Prince, we decided to buy this building and use each floor as a house site." By the time he had negotiated the purchase of the building, the Boston waterfront urban renewal plan had been adopted, calling, among other things, for demolition of the Prince building. It took Anderson another year to convince the Boston Redevelopment Authority to keep the building and let him remodel it. "We succeeded," he recalls, "because nine months had passed since the waterfront plan had been adopted and nothing had happened. The mayor was running for reelection, and we told his people that we could pull all the windows out and begin rehab and it would look like an awful lot had happened in one building in a very short time."

Anderson Notter's solution to the design problems posed by the Prince building contains most of the ingredients that explain the firm's success and influence on the preservation movement. The old spaghetti factory is a five-sided building whose main attraction is its waterfront location. The challenge was to find a way to let most of the apartments have a harbor view. The architects used a skip-stop



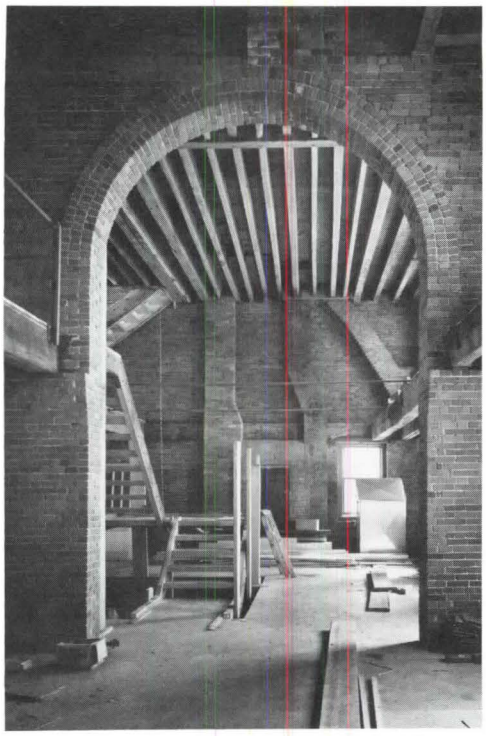
elevator system that permits apartments to extend through entire building floors, with bedrooms on the city side and living rooms and balconies facing the waterfront. "The end product," says Anderson, "is that only three out of 33 apartments don't have a view of the water."

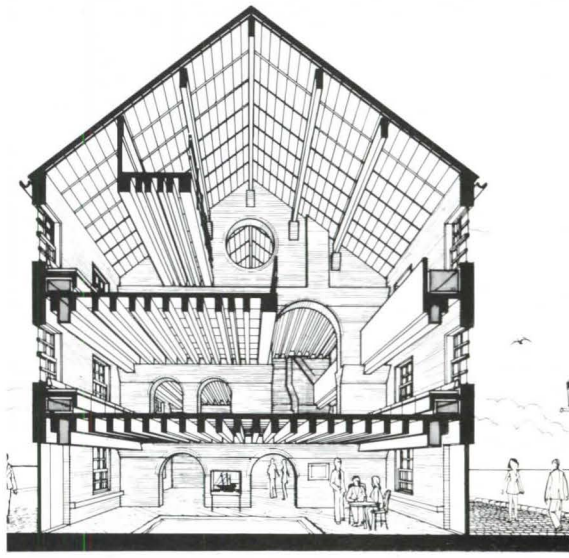
The original industrial structure was substantial enough to add four stories for duplex and penthouse apartments, an unexpected asset. As a result, there are now two levels of tenant parking, a level of office space and seven floors of apartments.

Typical of structures of this type, says Notter, floor-to-floor heights were 12 feet and penetration through the 12-inch concrete slab would have been difficult. The architects, therefore, laid all the mechanical ducts and pipings on top of the floor slabs, punching through only for toilets. They built a raised floor to cover these systems in bedrooms, kitchens and dining areas. Each living room is on a slightly lower level. "This created an inverted apartment scheme that exposes the raw concrete ceilings and mushroom columns—an economical solution that also creates an interesting space," says Notter. "The cost of construction was $12 a square foot in 1967, a good value at the time."

For the Prince building, Anderson Notter functioned both as developer and architect. "We had done a lot of work with developers and were discouraged with the remoteness of the architects' role in terms of decision making," explains Anderson. "We would generate good ideas for the developer and he'd go off and have lunch with his banker and come back and everything would be changed." He says that obtaining partial ownership put the firm in a position to know when decisions were being made and how to affect those decisions. "Architects will have to play the developer role and get into the marketplace if they are going to be effective," he says. Recently Anderson Notter has acted as overall coordinator for complex projects.

Anderson Notter's work on the Boston waterfront continued with the conversion of the customs house block for residential use, and the 18th century Gardner warehouse building into the Chart House restaurant. The firm is now transforming a coal bunker into a home for the waterfront fire station with offices for a variety of municipal, community and professional organizations. The architects are also designing a comprehensive plan for converting 88 waterfront warehouse buildings to residential and commercial uses, as well as a mid-19th century warehouse into townhouses. Anderson points out that restoring the Boston waterfront into one of the city's finest residential neighborhoods has "helped to overcome the initial reluctance some people in more remote communities might have to living in these types of buildings."





The Chart House restaurant *used to be Boston harbor's oldest warehouse. The exterior was left largely untouched, except to add several windows that follow the grid of existing openings. Because building codes required that dining areas be restricted to two stories of the heavy timber structure, the architects removed part of the third floor to create a mezzanine. They also combined three originally separate bays into one large open space, using the brick from the old bays to form structural arches. Planks taken from the third story were recycled into bathroom walls and banquet seating. They routed the air-conditioning system through ceiling ducts, disguised on the second and mezzanine floors as large beams which also serve as baffles for perimeter lighting.*

Recycling requires a careful "psyching out of the elements needed to make a project go," explains planner and associate Paul McGinley. It has to include the right team of people, including realtors, economists and others. "We look at the building as a very raw resource of structure and spaces, and then try to picture what might happen within the spaces. The key is to understand the building as a work of integrity; once you've accomplished that, you have a great deal of freedom." The next step is to confer with economic consultants to determine which potential uses will best suit the community's needs. Then the architect/developer tries to put the physical and economic facts together and analyzes his conclusions with the client.

Anderson explains that a good deal of the firm's efforts are now devoted to "preservation planning" for entire downtowns or neighborhoods. "That doesn't mean" he is quick to add, "that we recycle everything," but rather that the firm surveys the physical assets, economic and social needs of a community, and creates a comprehensive plan that shows what buildings can do and what they might be asked to do in the future.

Preservation as practiced by Anderson Notter thus takes on a much broader role than that usually conceived of by the preservationists of the '60s and early '70s. The firm's principals explain the increased acceptance of recycling in sociological and economic terms. Notter, for example, places great importance on people's newfound concern with roots—where they are and where they came from—and says that his firm has found that the greatest emotional attachment is to old mills, factories, warehouses and schools. He points out, for example, that the same communities that turn down proposals for new construction will often support reuse projects.

The firm finds that recycling 'produces more for less and faster' than new construction.

In Peabody, Mass., for instance, a proposal to build some 200 new subsidized housing units was rejected in zoning hearings. Meanwhile, Anderson Notter's proposed conversion to housing for the elderly of the old tannery building, a town liability that for years had produced noxious smells and noises, was approved without opposition. It was the first successful conversion of a large mill in New England.

"Your first inclination would be to think that many of these old structures would have bad associations for the people who labored in them or went to school and got disciplined in them as youngsters. But there is a latent nostalgia that overcomes the bad feelings, and when a structure like the tannery, which has lain idle and been vandalized but is still a part of the community's heritage, is turned into something productive, it gives a sense of pride."

To further illustrate their point, Anderson Notter's principals point to the town of Windsor, Vt., which until recently was called a "jail town," much to its citizens' dismay. When the state decided to abandon Windsor's maximum security facility, the townspeople, considering it nothing but an embarrassment, wanted the prison torn down. Instead, the architects convinced them to convert it into housing, with the result that Windsor is now known as "the jail town that turned itself around because it used its prison to serve a humane purpose, rather than the jail town that erased its image and became faceless," as Anderson puts it.

The sense of history and pride imparted by imaginatively converted old buildings is especially important in public and subsidized housing, says McGinley, pointing out that it results in less vandalism and better maintenance by residents. He adds that "in today's society where everything is mass produced, including many housing units, a great need is being expressed to break out of the regimented approach, and anything that combines quality and variety is snatched up."

Academy Knoll in Marlboro, Mass., *which contains 109 apartments for the elderly, was until recently St. Ann's Academy. While installing new utility systems throughout, the architects retained stained glass windows and gold leaf vaulted ceilings in the former chapel and auditorium wing. The original classroom and dormitory sections have wainscoted walls, bay windows, built-in wood paneled cabinets and high ceilings.*

Anderson says that at a time of high unemployment, rehab projects have the advantage of being labor intensive, generally employ local workmen "and there's a whole spirit that develops among construction crews that you can't possibly get from working on the 50th floor of 50 State Street."

In the firm's experience, the initial mortgage and land use costs of adaptive use projects are roughly comparable to those of new construction. But recycling generally produces more for less and faster. An example: At the time that Anderson Notter began converting the Gloucester high school to housing for the elderly, the city's department of community affairs began construction of a new highrise housing project just three blocks away. The recycled school received its first occupants just 10 months after construction started; it was 18 months before the highrise opened its doors. The former schoolhouse has 145 apartments, contains 72,500 square feet of space and cost $1,482,350 to rehabilitate. The new housing also contains 72,500 square feet of space, but has only 97 units and cost $2,216,712. The average size of one-room apartments in the conversion is 750 square feet, compared to 450 square feet in the new building. The construction cost per square foot in the reused school was $20.45; for the highrise it was $30.58. In the new building, 64 percent of the total space can be rented, while in the converted schoolhouse 79 percent is rentable (lobbies, halls, stairways, elevators and service and mechanical areas constituting nonrentable space). And the old building provides far wider hallways, higher ceilings and more interesting and varied spaces than does the highrise.

The Tannery in Peabody, Mass., *once a "big, blocky, smelling, empty leather tannery," in the words of one architectural critic, now houses 284 rental units, mostly for the elderly; 75 percent are subsidized. Widely criticized at first, the development now has a waiting list. To make room for parking and open space, the architects cleared several old buildings, reusing the materials for landscaping and plazas. Old wooden vats and tanning wheels now function as planters; two former steam-operated pumps have been transformed into sculpture for plazas. Conversion required gutting, new utility systems, roofing, glass windows, stairs and equipment for elderly and handicapped. Original timber beams and ceilings were retained and sandblasted to give a "natural" feeling.*

Anderson says that state planners are beginning to appreciate the advantages of recycling surplus city structures for housing over constructing new dwellings in suburban areas. "If you start adding into suburban housing the cost of schools, new fire departments, new roads, new utilities, new sewer plants and this and that, the figures are staggering," he says. "We're beginning to see, at least in Massachusetts, a new focus on determining how money can most wisely be spent, and the result is away from suburban building." Notter adds that cities have a vast investment in already existing structures, which is one reason they are giving a boost to conservation.

"One reason new communities and new towns haven't succeeded," explains McGinley, "is that we have tried with all our science and technology to manufacture something *out of nothing* and I think we're learning that it's pretty difficult to man-make something in one leap and have it work." □

BOOKS

Gaudi: His Life, His Theories, His Work. César Martinelli. Edited by George R. Collins, Cambridge, Mass.: MIT Press, 1975. 486 pp. $50.

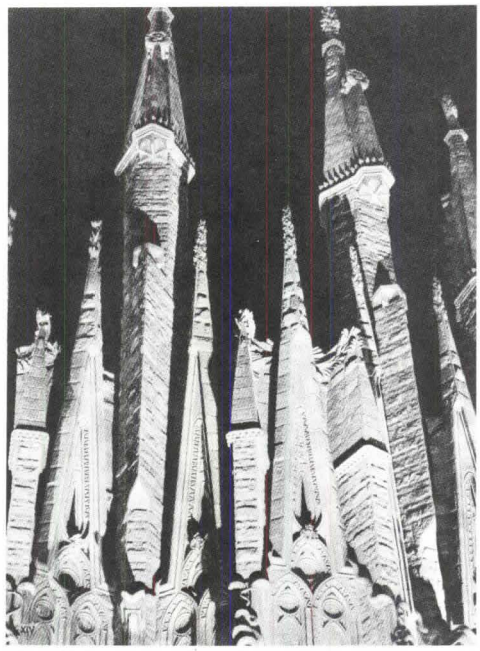
Antonio Gaudi y Cornet worked in Barcelona, Spain, at the turn of the century. Little noticed elsewhere, he is becoming increasingly a legendary figure. The late César Martinelli, who had the advantage of knowing Gaudi intimately during the last 10 years of Gaudi's life, has made an exhaustive study of the architect. As the book's subtitle indicates, the work is divided into three parts. Detailed subdivisions, appendices, sources and indices, as well as many illustrations, make the book a most scholarly documentation. Martinelli reports on and discusses the master's theories and his work, with both affection and critical evaluation.

This insight into Gaudi's work and thought also reveals how we were waylaid by putting credence into the writings of some of the most respected historians and critics of our time. A survey of this literature shows that none of the designers of the time between Victorian architecture and post-World War I modernism was showered by critics with so many invectives as was Gaudi.

Gaudi's architecture was called of "nightmarish quality" with "bold and willful curves" and "just horrible." He was called a "provincial freak" who created "bizarre and frightening" buildings of "wildly heightened orientalism," all adorned with "abscesses." The extent of the misunderstanding is revealed in utterances that judge Gaudi's "fantastic method of construction" as placing "columns out of true" or "creating aberrant parabolic forms."

Without referring to such polemic, Martinelli dispassionately explains that "the solutions of a genius often have perplexed or are simply not to our liking since we are not prepared to understand them." He also points out that Gaudi's work cannot be judged solely from appearance.

However, this leaves old-time historians at a loss regarding proper classification. The easiest way out would be to put



Gaudi into the slot of Art Nouveau or Expressionism. One historian wants to call it an "intransigent brand" of Art Nouveau. This epithet cannot stick, however, because Gaudi was not an antirationalist. In his superb ability to balance all divergent parts of his designs, Gaudi never sacrificed the expression of functional structure to the embellishments which, to him, supported the symbolic content in the use of structure. He saw no conflict between functionalism and the invention of space and form that must correspond to structural forces.

This well-edited book is a great help in correcting a mistaken definition of functionalism from one-sided utilitarianism to the all-inclusive concept of satisfying material and spiritual needs simultaneously. While Gaudi was originally guided by his historical knowledge, he later turned to a design language all his own. Light, color and visibility of details were precisely calculated and became increasingly important to him.

The author also shows how Gaudi produced spatial concepts that are still advanced after half a century. Gaudi's use of semihyperboloid roofs with reinforced concrete vaults, equilibrated arches and curtain walls, with warped surfaces and other structural innovations, foreshadowed most of the achievements by designers today. To find the stresses at work, Gaudi developed funicular models, presaging the use of model analysis.

The illustrated details and the full-page and full-color photographs give us an excellent opportunity to study Gaudi's very personal and advanced architecture. The main emphasis is upon his magnificent cathedral, the Familia Sagrada, to which he was religiously devoted until the end. This book is a much-needed eye-opener, providing for joyful reading. *H. H. Waechter, AIA*

Grand Design: The Earth from Above. Gęorg Gerster. New York: Two Continents Publishing Group, 1976. 312 pp. $50.

This is a stunningly beautiful romance recorded by aerial photography over the earth's active landscapes, old and new. Gerster is in love with this earth. There are 200 air views in all, half of them in unsurpassed color, most in a generous 9¼ by 12 inches on "bleed" pages, some in double-spreads. No artifices, no tricks.

The idea of design runs straight through. That is, Gerster is a poet of an ecologist. This is no random collection of "beautiful views," but seven photo essays showing the earth's surface as shaped and ornamented by (1) dramatic primal forces, (2) living creatures and (3) above all, by the actions of the human race. The medium of aerial photography, in which there are idiosyncracies, the author helpfully explains, adds a whole new dimension to our vision, gives us another world: "the world without tears, as fresh and unsullied as Genesis." Of course, it is not just a type of camera, but the eye of this new Marco Polo among photographers that sees it thus.

The variety among these scientifically based and straightforwardly told modern fairy tales, photographically certified and beautifully so, is a delight. You see how almost miraculously inhabitants of the Sahara Desert fish up water from 130 feet under the sand to feed oases, seen from above as miracles of sculpture made by the wind and actually fertile with produc-

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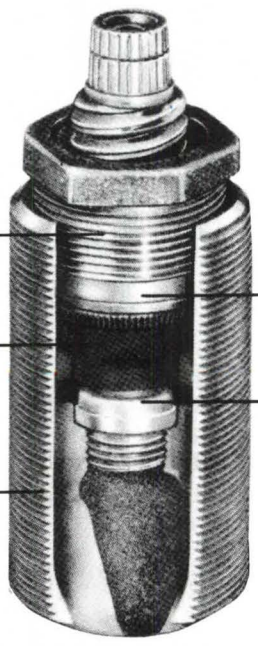
You'd think we just got into the jewelry business.



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Books from page 68

ing trees; you see terraced fields like endless thick cardboard contour maps; salt works as colorful "things of beauty," and earth sculptures as "monumental question marks"; you see early Biblical cities, and why archaeologists "take to the air."

It's because the X-ray eye of aerial photography reveals at a glance where, underneath millennia of accumulated soil growth, lie remains of primordial human history. Unbelievable! So the flight precedes the dig. Since these vignettes include human action in several capacities —as settler, as farmer, as modern industrialist, as inquirer, as communicant, as supplicant to the gods, both in places familiar to us and in places hitherto entirely strange to most, it becomes a whole-family book, a shared golden treasury of songs and lyrics about the earth.

The book's organization of text, captions and picture sections—which follows the tradition set by Roloff Beny in his classic *Thrones of Earth and Heaven,* photographed on the ground—is beautifully easy to follow, as briefly or comprehensively as wished, starting at any point.

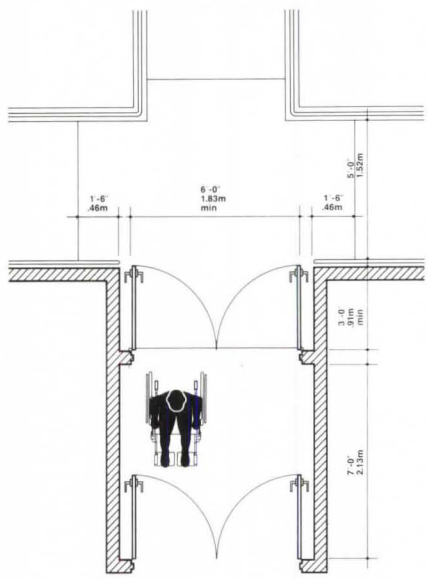
Says Gerster in his ever gracious commentary: "Aerial photography X-rays the environments created by man and reveals the intensity of the ecological give-and-take. . . . The current popular condemnation of man, which sees him as an incurable disease on his own planet, passes judgment without trial. I regard my aerial photographs as the interrogation of the accused, but if they plead at all, it is for one who has built up rather than one who has destroyed."

This reviewer finds Gerster innately sanguine, unable to dwell for more than a moment or two, here and there, with man the ugly as he now does exist. But I want him to convince me; and the quickest way for us to learn of our role and duty—and possible supreme satisfactions —as the earth's co-architects is to learn from Georg Gerster his way to look. *Douglas Haskell, FAIA*

Building Without Barriers for the Disabled. Sarah P. Harkness and James N. Groom Jr. New York: Whitney Library of Design, 1976. 79 pp. $10.95.

This book, unfortunately, begins to explain existing barrier-free standards at a time when comprehensive new standards have just been developed to take their place. Basically, the authors' recommendations are a compilation of those agreed upon in a majority of codes and standards over the years. Yet, the handbook points out the continuing disparity among regulations as to what constitutes appropriate design features. Resolution of these issues is usually left to the reader. Like nearly all "barrier-free" publications to date, a vast majority of copy and illustration is devoted to the needs of wheelchair users, little information is given about people with other disabilities and the focus is on public buildings.

The manual bypasses two crucial issues. The first is that codes and standards contain only minimum requirements, because their recommendations are influenced as much by economic and political factors as by human needs. Therefore, meeting codes does not always assure



Entrance vestibule with ramps
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functional accessibility for the broader range of users. Second, barrier-free design has significant implications in terms of safety and convenience for *all* people in the built environment—disability or no.

On the plus side, the manual provides valuable explanations of some of the rationale behind existing code requirements. It is a handsome and clear presentation and includes an annotated bibliography. Measurements are expressed in both American and metric units.

The book is an attractive supplement to the draftsman's bookshelf, but it should not be considered a primary sourcebook. It would best be used as a complement to more current and comprehensive literature. *Michelle Morgan, partner in the Raleigh, N.C. firm, Interface.*

Contemporary Metropolitan America. Comparative Metropolitan Analysis Project, Association of American Geographers. Cambridge, Mass.: Ballinger, 1976. 4 vols. No price given.

Geographers bring to the study of cities and metropolitan areas a unique objectivity and detachment infrequently found in the literature of cities today. The urge to write about cities seems to be stimulated by personal and emotional responses, primarily about the way things ought to be. Geographers, on the other hand, are somewhat removed from the heat of real urban development decisions and tend to write about cities as they are. This excellent four-volume collection is exemplary of the geographers' approach.

The accurately titled four volumes are: (1) Cities of the Nation's Historic Metropolitan Core, (2) Nineteenth Century Ports, (3) Nineteenth Century Inland Centers and Ports and (4) Twentieth Century Cities.

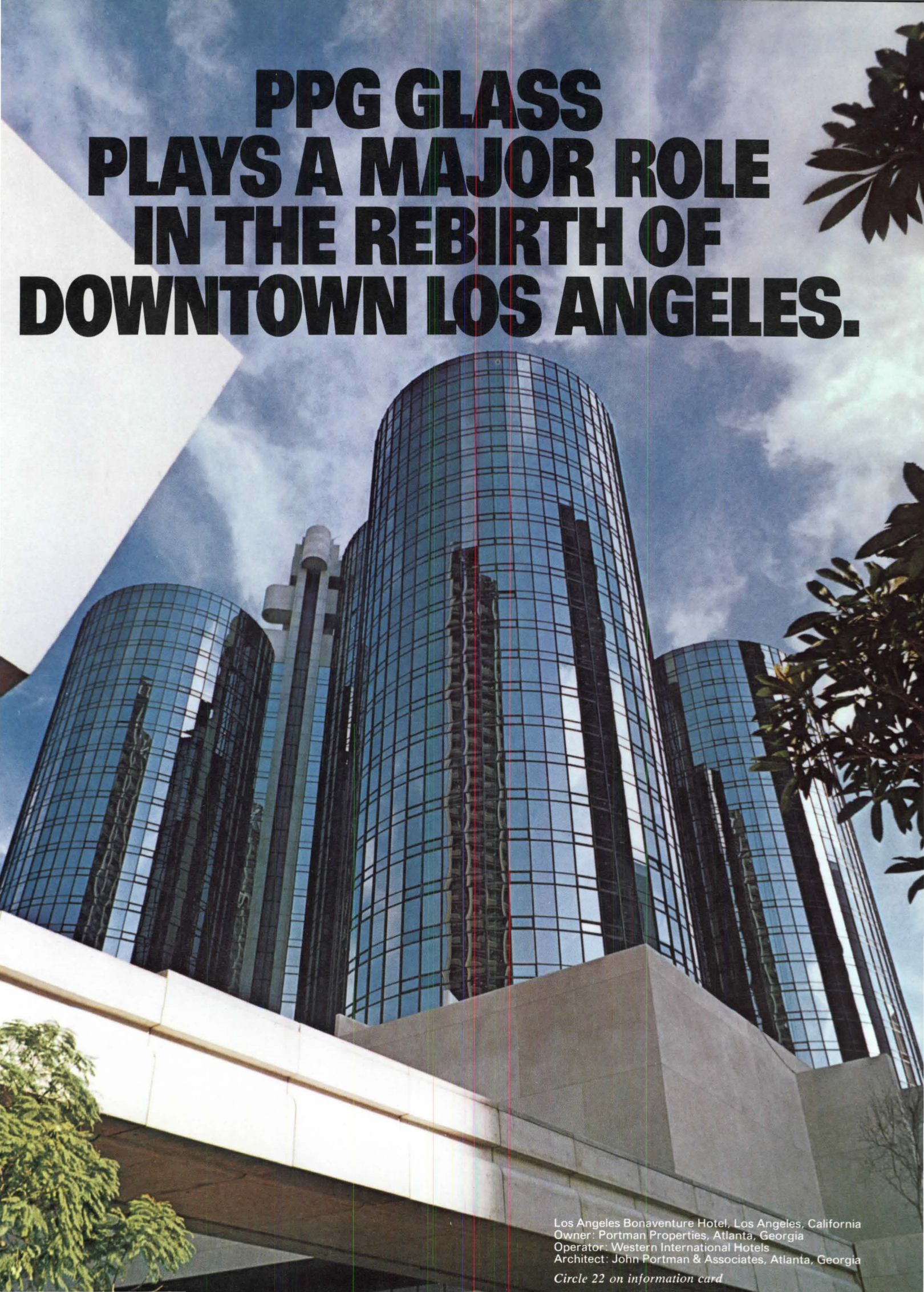
The first volume begins with a very thoughtful essay by James E. Vance Jr. of the department of geography, University of California at Berkeley. It is titled "The American City: Workshop for a National Culture." This 48-page piece attempts "to show the origin and development of a set of interrelated processes that have shaped the morphology and geographical functioning of American cities."

The remainder of the four volumes is made up of case studies of cities and their metropolitan frames. These are classified as the titles of the volumes indicated above. This encyclopedia on major American cities is a reference series *par excellence.* I am one who is interested in cities and by virtue of position required to travel. I have found this series excellent reading before venturing into metropolitan America. It helps one understand what makes a city and region tick.

Although I would not recommend that every architect in the country proceed to the nearest bookstore to buy these volumes, I would urge those who have a particular interest in urban design, city planning or regional development to do so. Also I would suggest that these four volumes would be a tremendous asset to any library serving a clientele interested in urbanized America. *Michael B. Barker, AIP, Administrator, AIA Department of Planning and Design*

Tentative Criteria for Structural Applications of Steel Tubing and Pipe. D. R. Sherman. Washington, D.C.: Committee of Steel Pipe Producers, American Iron and Steel Institute, 1976. 64 pp. $2.

Based on "worldwide research and practical experience," this handbook supplements the American Iron and Steel Institute's *Design Manual for Structural Tubing.* The design rules laid down for the use of steel tubing and pipe are called "tentative criteria" because the rules will be amended with future research and experience. The handbook presents criteria intended for use "in the design of round and rectangular rolled or manufactured steel tubular sections used as tension, compression bending or torsion members of building structures." As the author explains, the criteria "do not apply to pressure piping systems, pressure vessels or to buried structures with nonuniform external pressures." □



Los Angeles Bonaventure Hotel, Los Angeles, California
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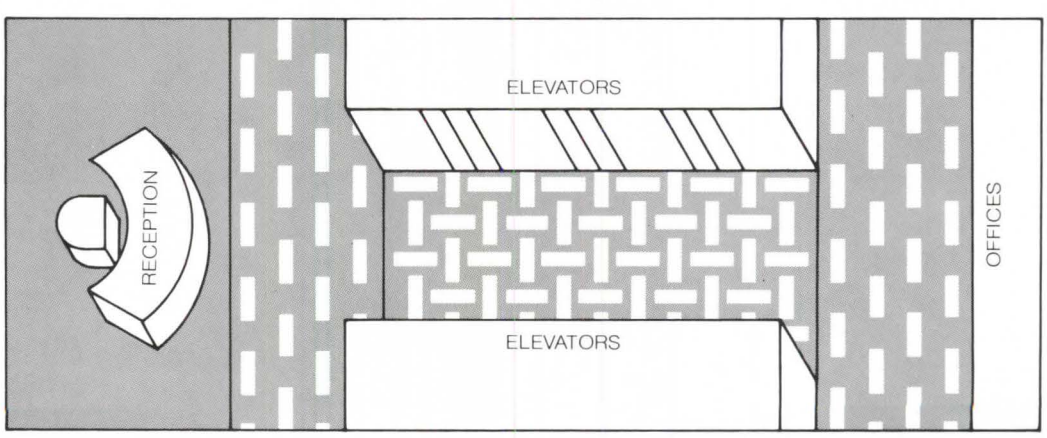

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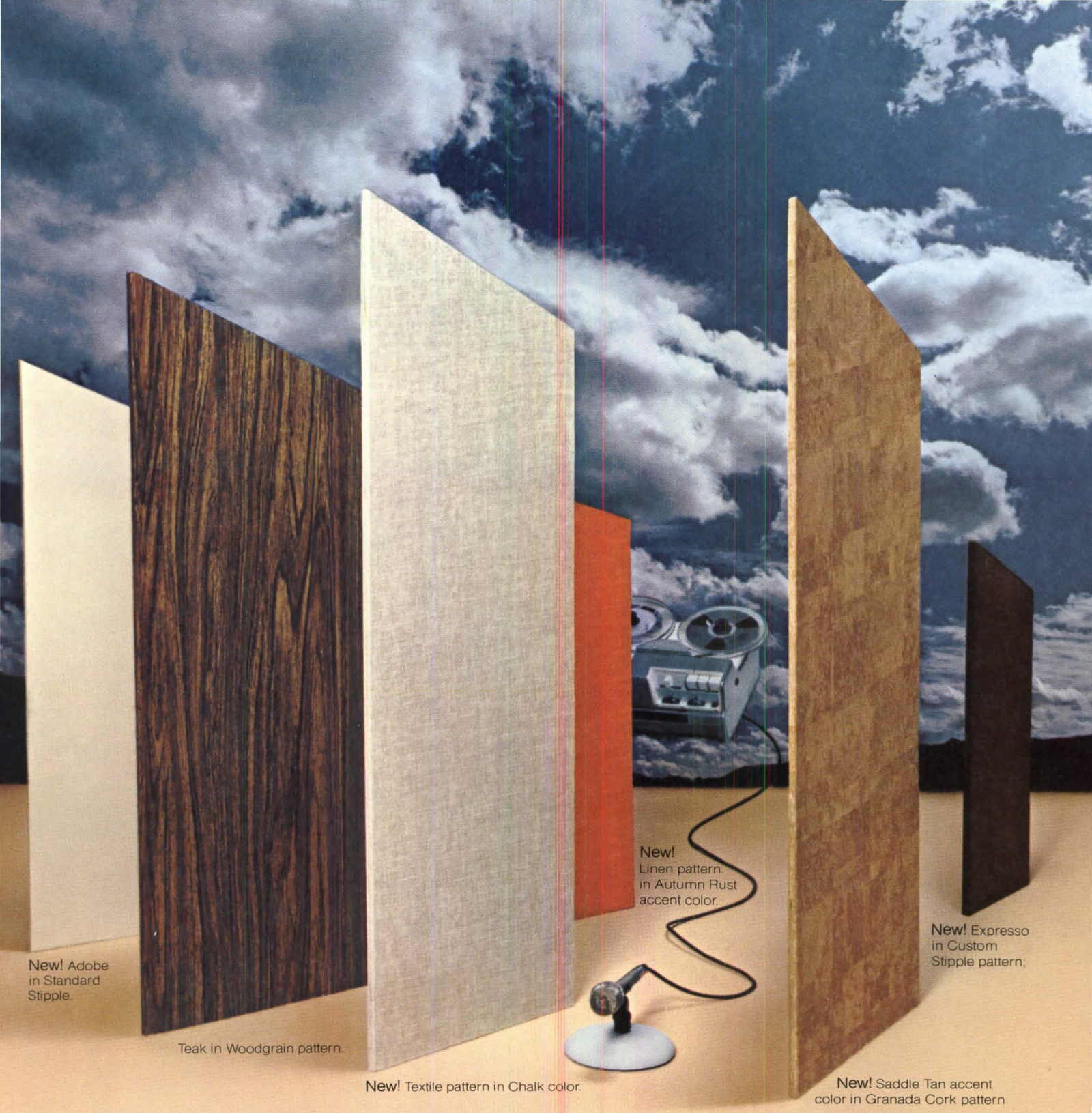

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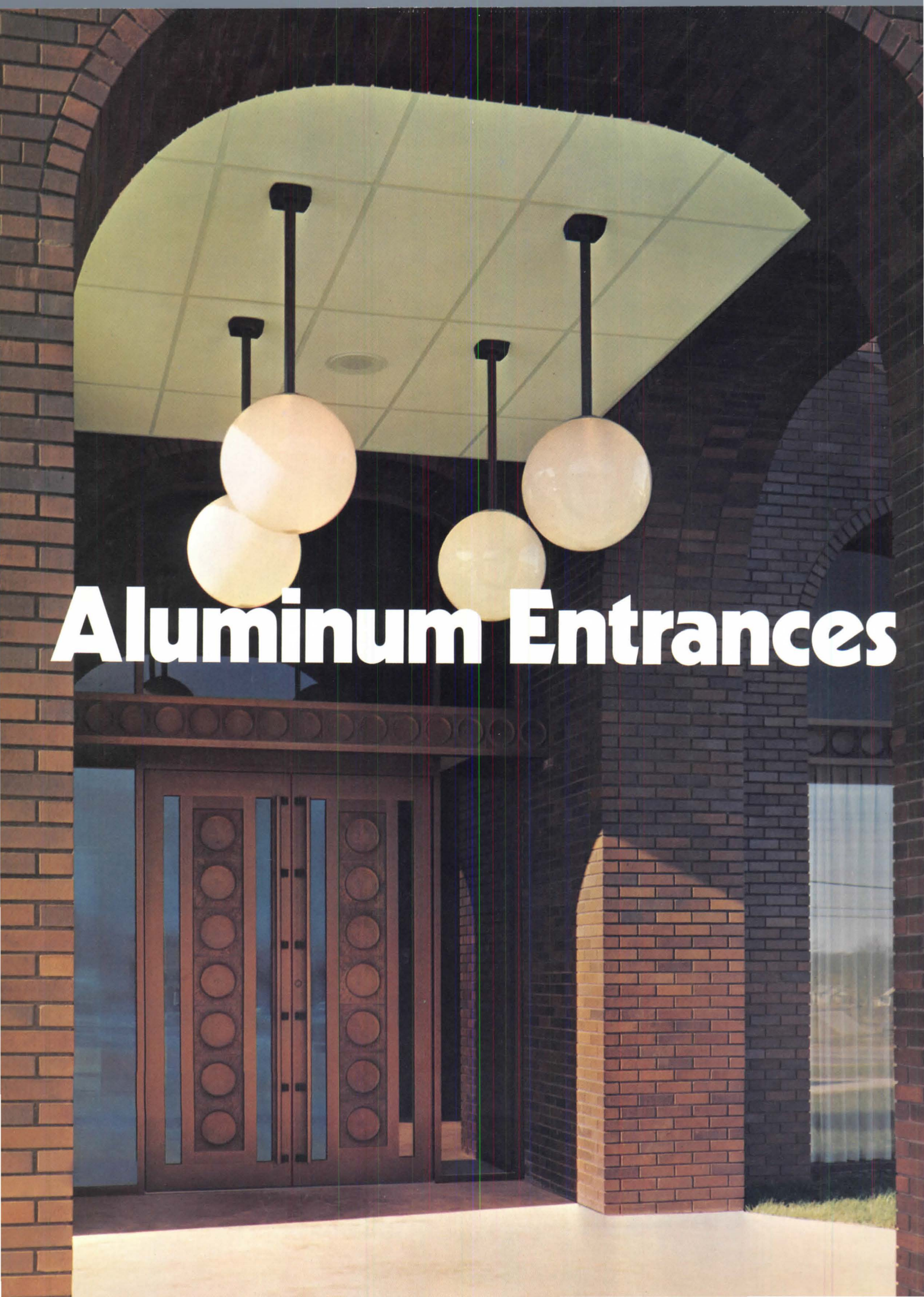

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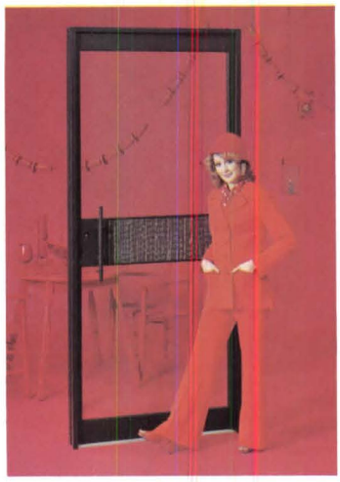
Kawneer means variety. The broadest and most comprehensive selection of entrance systems from any architectural aluminum products manufacturer is available from Kawneer. From stock door "packages" to the exciting spectrum of monumental building entrances like the Entara entrance system, the variety is virtually limitless.

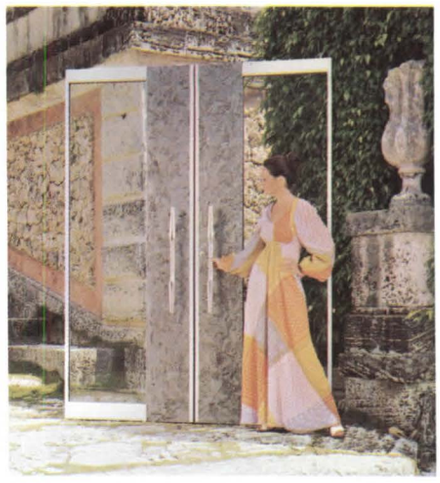
How to turn 12 into thousands,

The variety begins with 12 basic door systems. And then, each can be adapted to meet special design or functional needs. For example, the basic 190 series door can be specified in more than 200 separate and distinct combinations of push/pull hardware, operating hardware options and finishes. Each element is designed and engineered to meet the exact and unique requirements of any entrance situation. And, in a complete system of design coordinates, such as Entara, the exact number of entrance styling and functional combinations is practically unlimited. Kawneer makes more out of entrances so designers can make more of their buildings.



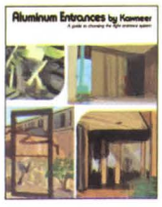
I-Line series 3000 door in Permanodic Black finish with tapered pull and Stria textured panel in Pewter finish.

I-Line 4000 Series entrance in clear anodized aluminum finish, with panels of Quarry texture in Pewter finish and a cast aluminum pull handle.



by Kawneer

And yet, behind this wide variety available in Kawneer entrances is only one standard of engineering and construction: The very best. Each Kawneer Entrance System is a total performance combination of door, frame, and hardware that will stand up to the demands of traffic volume and building usage. The excellence of engineering and rugged construction is backed by a continuing program of testing which assures the user that Kawneer Aluminum Entrance systems will provide efficient performance for years and years. No matter what the variety.



A helpful, 28-page guide to entrance systems is available from Kawneer. Write for your copy of *Aluminum Entrances by Kawneer*. Kawneer Product Information, 1105 North Front Street, Dept. C, Niles, Michigan 49120.

"190" door in Clear anodized aluminum finish with F-2 style hardware.

KAWNEER
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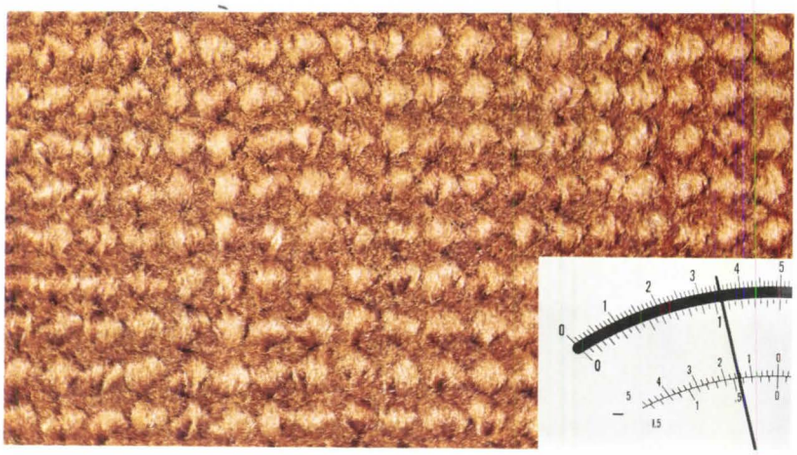
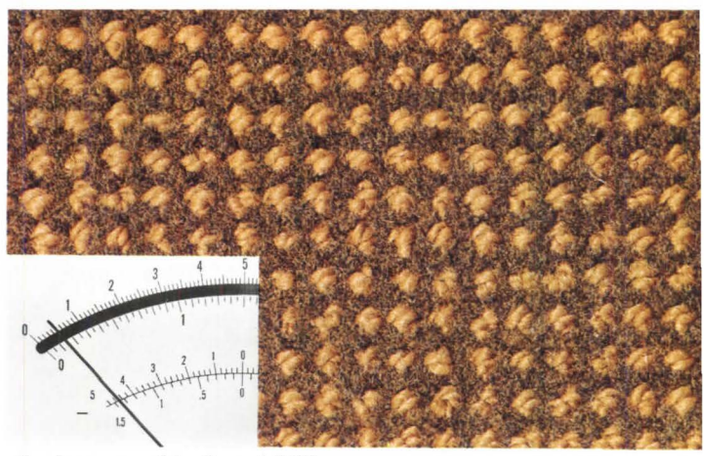
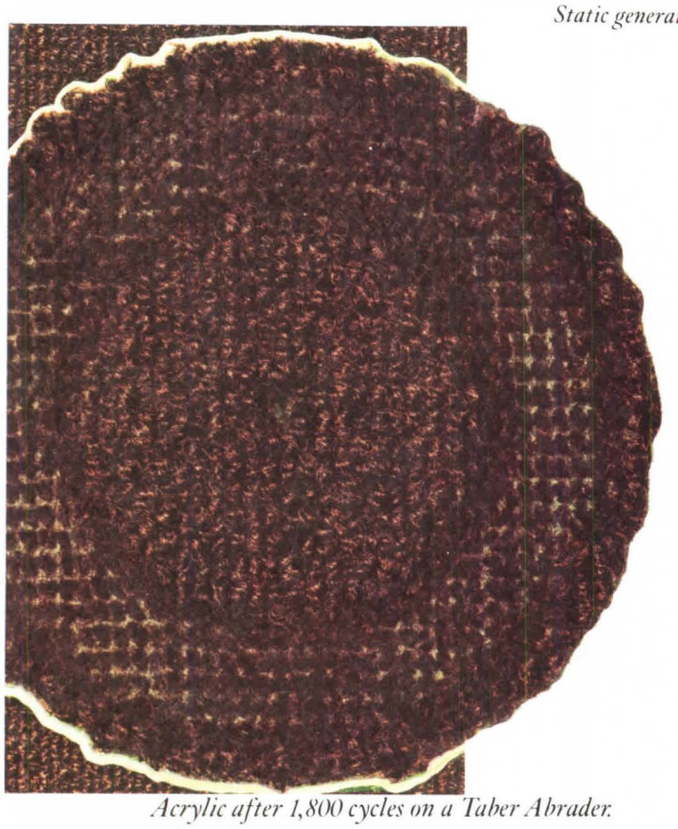


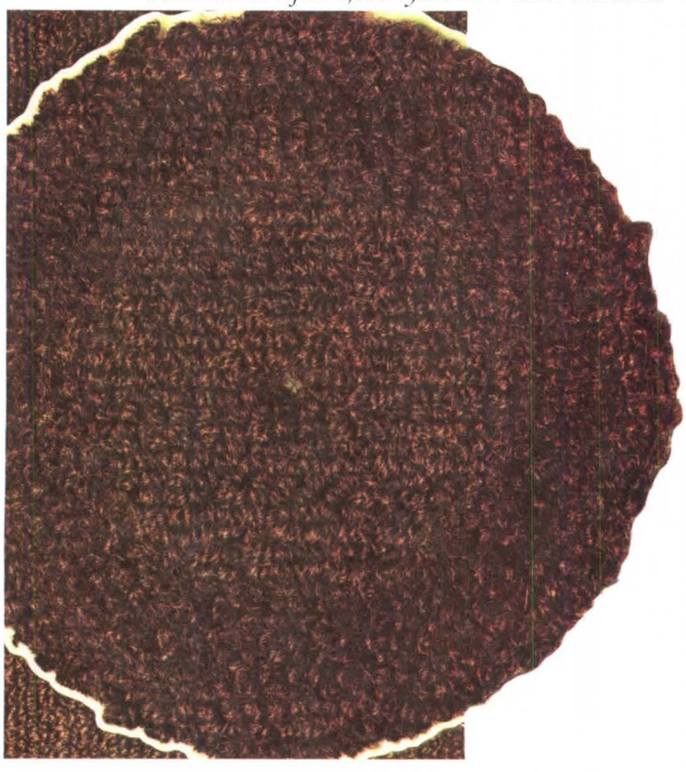
Static generated by nylon.



Static generated by Fortrel PCP.



Acrylic after 1,800 cycles on a Taber Abrader.



Fortrel PCP after 1,800 cycles on a Taber Abrader.

Which carpet

You're looking at photos of the actual results of three tests conducted by Certified Testing Laboratories, Inc. on carpets of Celanese Fortrel PCP producer colored polyester, and commercially available carpets of similar construction in different fibers. Fortrel PCP outperforms them all.

More Durable.

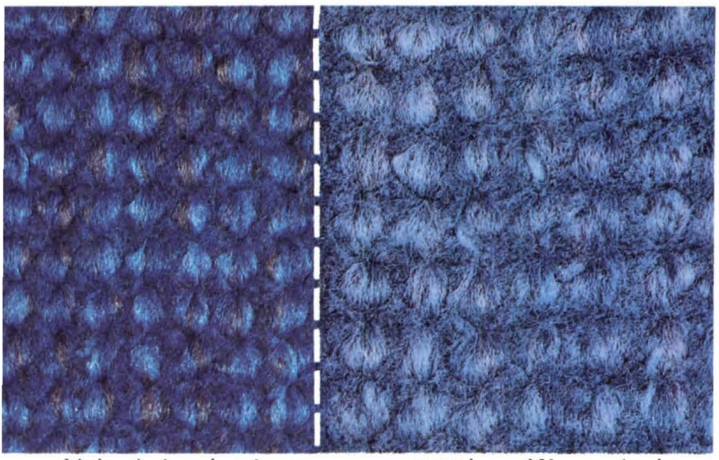
After only 1,800 cycles on a taber abrader (taber abrasion test ASTM D-1175), the carpet of acrylic fiber reached the breaking point (abraded to the backing) and registered a pile weight loss of 11.6%. The carpet of Fortrel PCP polyester didn't reach the breaking point until 22,000 cycles! And didn't lose 11.6% of its pile weight until 29,900 cycles!

Less Static.

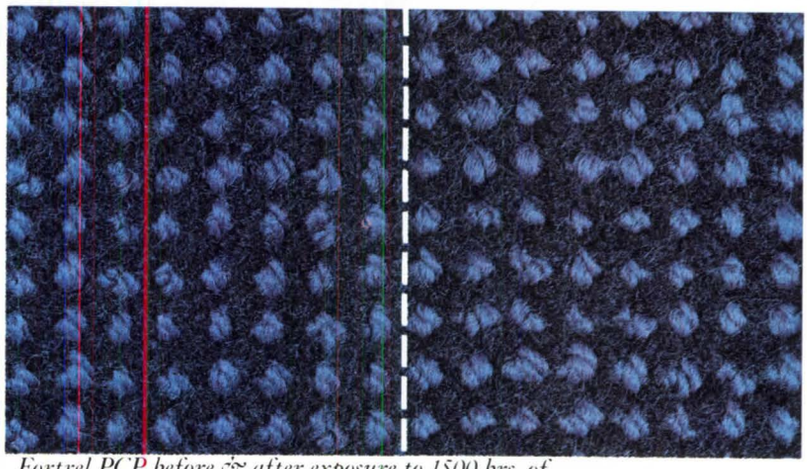
In checking static generation, the AATCC Walk Test with Neolite Soles (134-1969) was conducted. Carpet of Fortrel PCP polyester generated a mere .5 kilovolt, well below the threshold of human sensitivity. (Even below the level necessary for such delicate applications as computer rooms and hospitals.) The carpet of Antron II, even with metallic protection, generated seven times as much static—3.5 kilovolts.

No Fading.

In the AATCC Colorfastness to Light Test (Test Method 16E), the carpet of Fortrel PCP polyester showed no evidence of fading or color change after



Nylon before & after exposure to 1500 hrs. of Xenon-Arc lamps.



Fortrel PCP before & after exposure to 1500 hrs. of Xenon-Arc lamps.

do you want on your floor?

1500 hours of exposure to Xenon-Arc lamps. (That's 18 times the industry standard.) The carpet of nylon had faded substantially well before 1500 hours.

Wear Guaranteed.

These are only three of twelve exacting standards that every carpet of Fortrel PCP polyester must meet before it is awarded our five-year wear guarantee. It's the *only* wear guarantee available anywhere on contract grade polyester carpeting and it guarantees that "if the surface pile of the carpet wears more than 10% within five years from the date of initial installation, Celanese will replace the affected area with equivalent carpeting at absolutely no cost to you."

Now you can be sure which carpet you want on your floor. The one that resists static, fading, wearing, staining, soiling, and mold. And has the only five-year guarantee around.

Fortrel PCP.

The back of most carpeting.

The back of carpeting of Fortrel PCP polyester.

If your new carpeting is made from 100% Fortrel PCP polyester, commercial-grade, and has been properly installed and maintained, Celanese Fibers Marketing Company guarantees it. Here is how.

If the surface pile of the carpet wears more than 10% within five years from date of initial installation, Celanese will replace the affected area with equivalent carpeting at absolutely no cost to you.

Note that the guarantee is non-transferable and applies only to carpeting (stairs excluded) for which wear, if any, is not attributable to negligence or burns, casualties, cuts, pulls, and the use of improper cleaning methods or other causes beyond the control of Celanese.

This guarantee applies only to commercial-grade carpet as defined in Fortrel Polyester Carpet Performance FT-207.

CELANESE

Fortrel PCP is a trademark of Fiber Industries Inc., a subsidiary of Celanese Corporation. Celanese Fibers Marketing Company is a division of Celanese Corporation.

Your next five years are guaranteed with:

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This time do it right.

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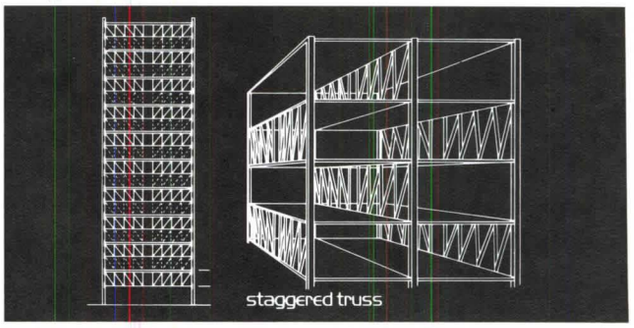
Residential tower $526,300 under budget...

thanks to a staggered truss steel framing system.

Interior view during construction shows large, column-free spaces. Typical bays measure 53 ft 6 in. by 22 ft. Bethlehem supplied 700 tons of structural steel for the project.



In the staggered truss system, story-high steel trusses, arranged in a staggered pattern, span transversely between exterior columns.

Elm Park Tower, Worcester, Mass., is a 16-level, 195-unit residential building for the elderly. The 153,900 sq ft structure is being constructed at $24.84 per sq ft.

In 1973, a plan for a similar building on the same site was $800,000 over budget. For that plan, a conventional concrete framing system was considered.

What key factor made the big difference? Speed of construction: 16 levels erected in 32 days using the staggered truss steel framing system.

Story-high trusses

Developed in 1965, the system consists of story-high steel trusses spanning transversely between exterior columns of the building spaced 22 ft apart and arranged in a staggered pattern.

The big advantage the system offers high-rise apartments or hotel-motel projects is the large clear spaces for complete layout flexibility—in this instance—unobstructed spaces 22 x 54 ft. Clear spaces are defined only by trusses which serve as walls between adjoining living units.

Owners:
Worcester Housing Authority, Worcester, Mass.
Architects:
Masiello & Associates, Architects, Inc., Worcester, Mass.
Structural Engineer:
Theodore/Weaver/Associates, Inc., Boston, Mass.
Fabricator:
Northern Virginia Steel Corporation, Springfield, Va.
General Contractor:
Granger Contracting Co., Inc., Worcester, Mass.

The reinforced concrete floor system, supported on steel open-web joists, acts as a diaphragm, transferring lateral loads in the short direction to the truss chords. Lateral loads are resisted by truss diagonals and are transferred into direct loads to the columns.

Columns, therefore, receive no bending moments in the transverse direction. This allows the designer to orient the columns so that the strong axis is available to help resist bending due to longitudinal wind forces.

The trusses, 54 ft long and 10 ft high, are fabricated in the shop and shipped to the construction site ready for installation.

There's another factor favoring the use of the staggered truss framing system with open-web joist floor-ceiling assemblies: open spaces above the ceilings simplify installation of the mechanical and utilities systems.

Freedom of interior plan

The interior of the first level of the tower is column free and contains no trusses. The entire first floor, therefore, could be one large room, if it did not have to be divided into support areas for the tenants.

The tower office, community room, laundry, and community kitchen, plus an area set aside for a future health clinic, are located on the ground floor. The upper 15 stories house one and two bedroom apartments. Ten percent of each type are designed for the handicapped.

Our Sales Engineering Division offers a variety of technical and advisory services. Our preliminary frame analysis program, for example, is designed to help you select the most favorable steel framing system for your building.

We also have a large library of practical design and engineering aids, slide presentations, product catalogs, and building case history studies. Our Sales Engineers will be happy to provide you with any of these materials or answer any questions you may have regarding steel construction products.

You can get in touch with a Bethlehem Sales Engineer through the Bethlehem Sales Office nearest you. Bethlehem Steel Corporation, Bethlehem, PA 18016.

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Letters from page 2

be checked and approved by many state and county agencies, such as the departments of architecture and construction, health, fire, flood control and environmental impact, to name but a few.

I assert that an architect is essentially applying for recertification each time a building permit is applied for; if he fails to pass these continuing tests, he will soon be out of business in the normal course of events.

I propose, therefore, that AIA fight recertification with tooth and nail rather than cooperating with the politicians who are trying to foist this on us.

As to the values placed on the various aspects of continuing education, my feeling is that this has been developed from an academic rather than a practical point of view, because of the heavy emphasis placed on the value of seminar-type activities (10 hours = 1 PDU) versus activities related to practice (1,500 hours = 1 PDU).

Much more detailed study should be given to practice hour credits. For example, time spent by a principal in a large office in the area of business development versus time spent in a one-man or small office wherein the principal produces or has direct control and responsibility for all phases of the work. Practice hours should be given various values for the type of work performed. A great deal more weight should be given to practice hours. I have attended seminars that are interesting and informative, but often not of use in my practice of architecture. A ratio of 1 to 150 for seminar hours versus practice hours is totally unrealistic.

Credit should be given for longevity of practice. The newly registered architect has some 10 years of education and experience behind him, plus having passed a stiff 36-hour examination. He is qualified to practice architecture. On the other hand, a man who has been practicing for say 25 years has not only qualified by examination but has acquired additional skills, experience and knowledge through practice, seminars, study, research, etc., and should require less continuing education than the newly registered architect. Therefore, some sort of sliding scale should be applied, giving longevity credit.

Several different subheadings are included in the area of independent study. These are all given the same weight of credit, namely 10 hours in this area equals one hour in a seminar. These should be reevaluated. How is travel time counted? Is it the total hours from the time one leaves until returning? At this rate, one travel week would equal 168 hours. If the traveler had stayed in his office and worked for this credit, he would have had to put in 2,520 hours, or about one year of work.

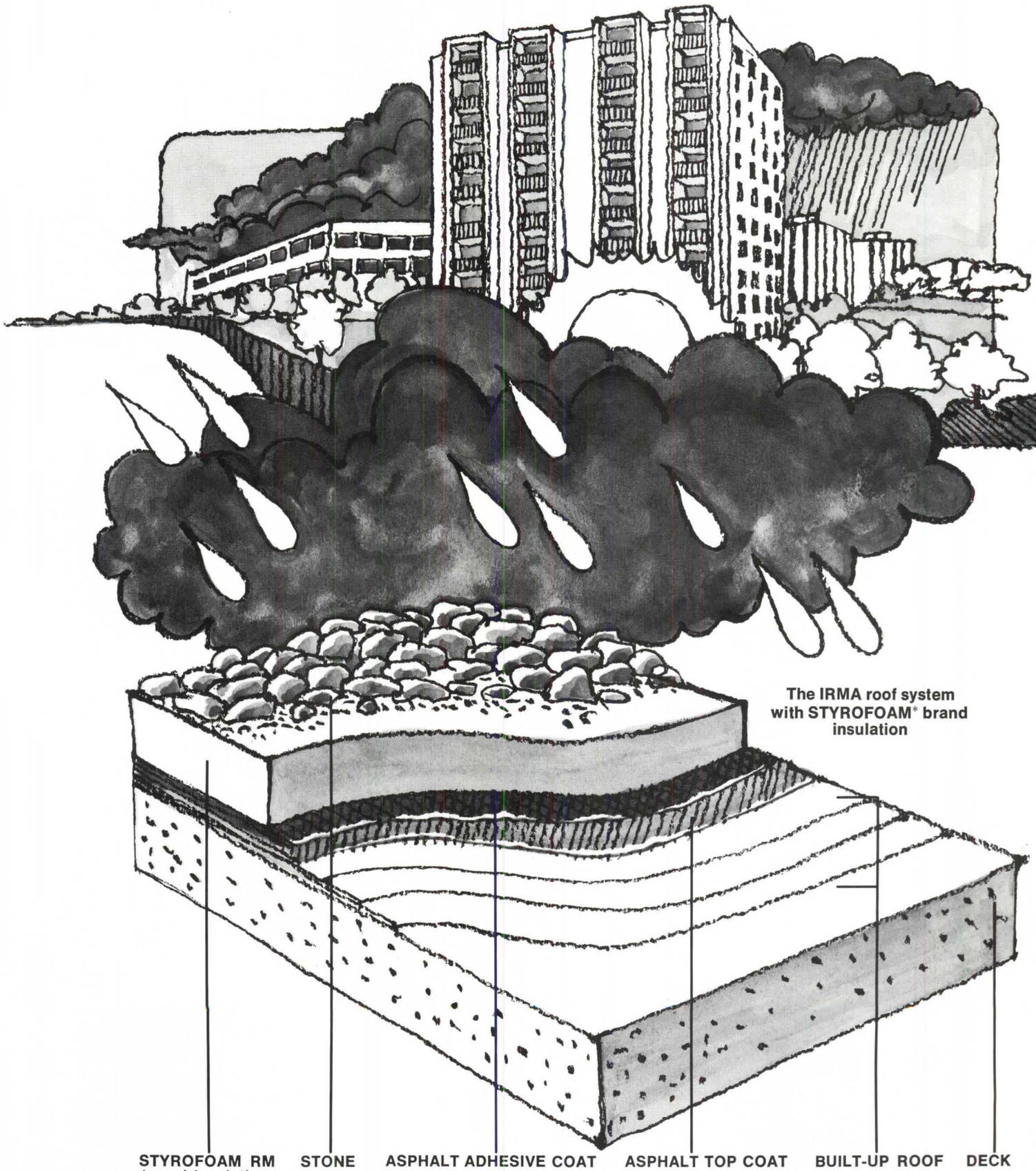
Reading and research should be clarified and not given equal credit. For example, reading could be simply skimming professional periodicals or manufacturers' literature, or it could be an intensive study program. If the latter, there should be equal time credit as used for seminar-type activities.

Laws and regulations affecting the architect are constantly changing, and the architect has to keep abreast to carry forward his professional work. In the past few years, we have had environmental impact, barrier-free architecture, security requirements, energy conservation, etc., thrust upon us. It is up to each architect to qualify himself as these new requirements become law.

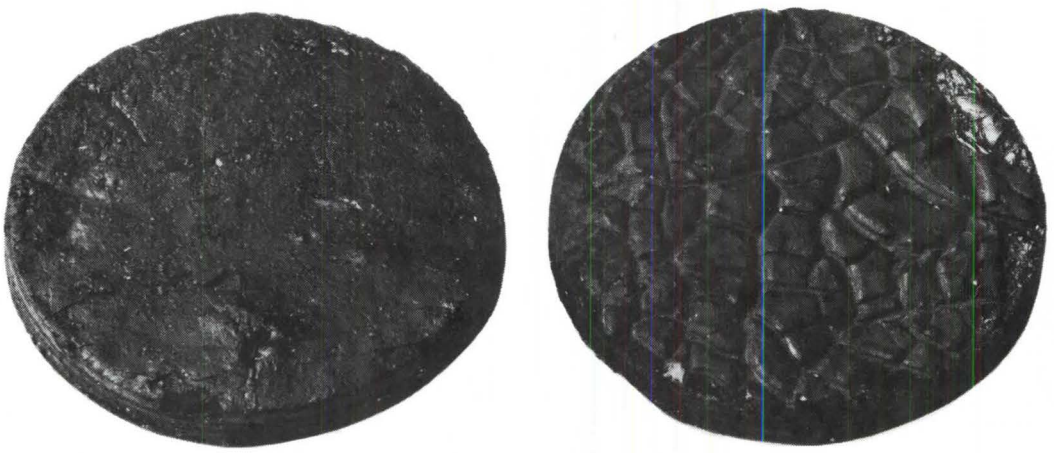
Energy requirements for residential buildings in California went into effect Dec. 23, 1976, and for nonresidential buildings, July 1, 1977. To this end, I am qualifying myself (as I am sure others are) by studying the basic law, known as Title 24, part 6, state nonresidential energy conservation manual, the California design manual for residential buildings, county modifications to the same, the ASHRAE *Handbook of Fundamentals* and various articles I have been collecting from periodicals.

AIA should fight recertification legislation and, if the fight is lost, a realistic recertification program should be developed. *Foster Rhodes Jackson, AIA*
Claremont, Calif.

21 YEARS WITHOU



ROOF LEAK!



Here's proof! STYROFOAM* brand insulation in the IRMA roof system kept the membrane on the left pliable and waterproof, cut energy costs, too.

What you see above are unretouched photos of conventional roof membranes in service side-by-side for 21 years.

The one on the left was protected by STYROFOAM brand insulation *above the membrane* in our patented IRMA roof system. The one on the right was not.

As you can see, the conventionally-installed unprotected membrane became brittle after exposure to heat and cold. It began cracking within two years.

The roof finished with the IRMA system, on the other hand, stayed pliable and waterproof because it was protected from both heat and cold by STYROFOAM brand insulation, which endured decades of weathering including freeze-thaw cycles because it doesn't absorb water as other roof board insulations do.

10-Year Water-Tight Warranty
We think our IRMA roof system is so good that we will warrant it to be water-tight for 10 full years! We will also warrant that STYROFOAM RM brand insulation will retain at least 80 percent of its thermal resistance for 10 years. If it doesn't perform as warranted The Dow Chemical Company will repair or modify the roof at its own expense so it will so perform. A complete copy of the warranty is available on request.

IRMA (the letters stand for Insulated Roof Membrane Assembly) roof systems are now proving their superiority in a variety of climates from the World Trade Center in New York City to the Married Student Housing facility at the University of Alaska and the Fiber Industries plant in Salisbury, N.C.

IRMA roof systems with STYROFOAM brand insulation are installed only by responsible, reliable franchised roofing contractors—so you can be assured of high quality standards.

For the names of contractors in your area, or for more information on this warranted roof, write to The Dow Chemical Company, IRMA roofs, Midland, Michigan 48640.

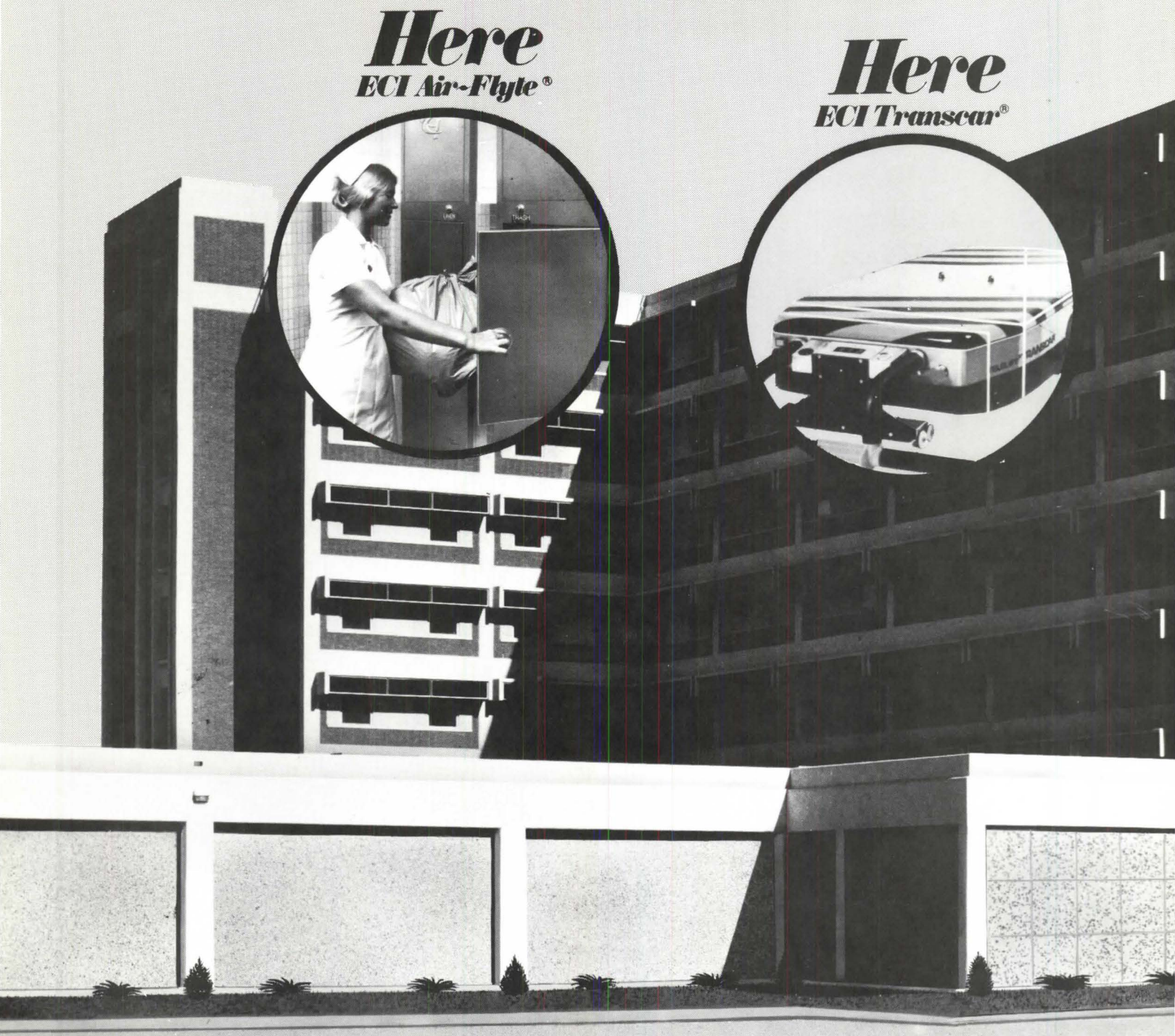
STYROFOAM* BRAND INSULATION

DOW*

*Trademark of The Dow Chemical Company

WARNING: STYROFOAM brand insulation is combustible and may constitute a fire hazard if improperly used or installed. It should not be left exposed or inadequately protected. Use only as directed by the specific instructions accompanying this product. STYROFOAM brand insulation contains a flame retardant additive to inhibit accidental ignition from small fire sources. During shipping, storage, installation and use this material should not be exposed to open flame or other ignition sources.
SPECIFIC INSTRUCTIONS: All roof deck systems over which the IRMA system is installed should provide an adequate fire barrier for the STYROFOAM brand insulation.
Internal sprinklers are required with all wood decks where less than a 15 minute finish rating exists. A 15 minute finish rating is provided by ¾″ thick lumber, ¾″ thick interior plywood or ⅝″ exterior plywood. A 15 minute finish rating may also be supplied by a ceiling constructed of ½″ gypsum board or equivalent.

ECI Fits Perfectly in Today



ECI equipment and systems belong on every floor of the modern hospital. From laboratory to laundry and nearly everywhere in between. We're involved in more than just one facet of a hospital's operations. So we want you to know how we can help all over your building. . .help in jobs like materials handling, pneumatic linen and trash conveying, pneumatic message conveying, laboratory ware washing and drying, and we'll even help you to plan your laundry. You can see we're really diverse. And that lets us get involved in more than just one area where we can increase your efficiency.

Here's how. . .

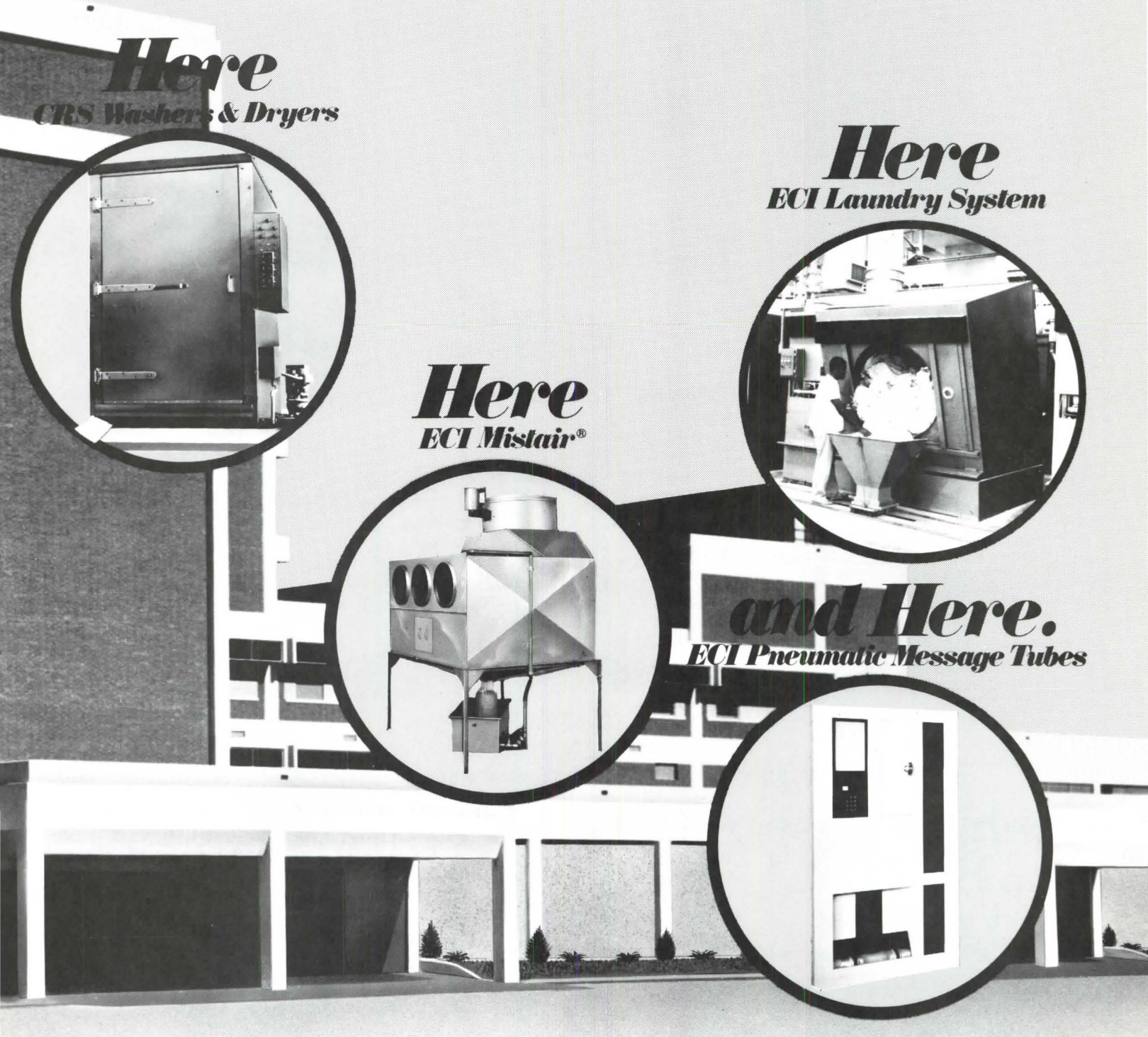
AIR FLYTE®. ..Our pneumatic trash and linen conveying system moves trash and soiled linen from any floor to centralized collection points for pick up or laundering. It's an automatic system that reduces the chance of cross contamination. AIR FLYTE is easy to operate and cuts costs too. Material is placed in conveniently located

where trash and soiled linen is generated. AIR FLYTE may be designed as a fully pneumatic or gravity-pneumatic system.

ECI MISTAIR® . . .Controls the quality of the air leaving your hospital, in your laundry or other processing areas. A very real concern for us all. Lint and lighter-than-dust particles are trapped within the air washer and water-soaked to avoid the danger of fire and provide for easy handling. One more way ECI can help your hospital.

ECI LAUNDRY SYSTEMS. . . Thirty years ago, the first Air-Flyte system was installed in a laundry. Since that time, ECI has steadily improved our design and refined the Air-Flyte system to provide one of the most effective automated methods for moving linen throughout the laundry. Today, the Air-Flyte system, in conjunction with our other products, can give you a completely automated, no hands method of moving your materials throughout your laundry. In addition to the Air-Flyte

lospital. Here, Here, Here...



washer-extractors, and tumblers; our lift aid makes folding tasks easier, and the ECI circulating soap system reduces time and supply costs for washing solution formulation in hospital laundries.

CRS GLASSWARE, CAGE, RACK AND CART WASHERS AND DRYERS. . . Insure "tracer clean" results. CRS's exclusive VIBRA SPRAY produces a pulsating wash solution which scrubs each ware. Our versatile dryers complement our washers' effectiveness. Standard and custom CRS machines are designed for use in hospital's central supply and research laboratories.

ECI TRANSCAR® AUTOMATIC MOTORIZED TRANSFER CARTS. . . Self-propelled battery operated vehicles for transporting goods on carts within the hospital. Quiet and compact. They're guided by safe metal tape on the floor. You select the route to and from anywhere or any floor in the building. An automatic stop insures safety. Transcar utilizes existing elevators and is the only system available capable of traveling both forward and reverse.

ECI PNEUMATIC MESSAGE TUBES. . . Send written messages and small parcels automatically at high speeds. From nurses stations to pharmacy, from emergency to admissions. ECI message tubes save your staff time and energy.

ECI AIR FLYTE CORP. . . We're providing a range of systems all through today's and tomorrow's hospital.

For complete information on ECI Air-Flyte see Sweets File 11:25 EA.

ECI Air-Flyte Corp.

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Telex 13-8787

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Going On from page 27

New Guinea, Bali, the Philippines and more recently in Rumania.

The 10 million people in the Los Angeles area are concerned, he says, about the discovery by geologists of an uplift in the earth's crust along a section of the San Andreas fault. Although it may not cause an earthquake, it "must nevertheless be carefully monitored." There is also concern about whether man-made reservoirs inadvertently trigger earthquakes. "There is currently no accepted procedure for determining in advance of construction whether filling a reservoir will trigger an earthquake, and this seems to be an especially important area for an enhanced research effort," Cranston says.

The bill introduced by Cranston states that a "well-funded seismological research program in earthquake prediction could provide data adequate for the design, within 10 years, of an operational capability that would be able to predict accurately the time, place, magnitude and physical effects of earthquakes in selected areas of the U.S." Priority would be given to the development of standards "for dams, hospitals, schools, public utilities, public safety structures, high-occupancy buildings, and other structures which are especially needed in time of disaster."

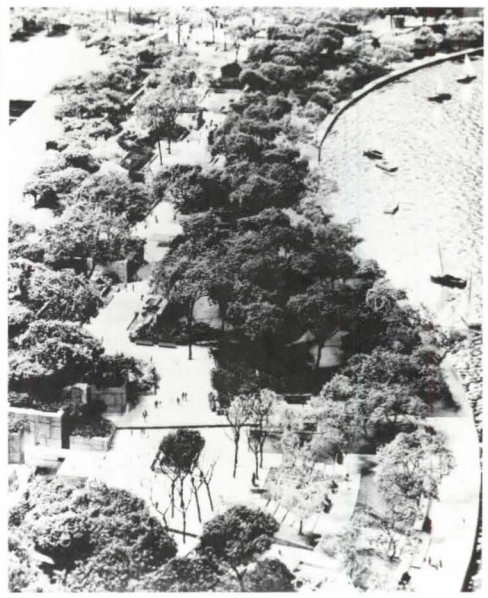
Federal funding would be increased for studies on earthquake-resistant building design. The AIA Research Corporation has already undertaken such studies with funding from the National Science Foundation (*see* Dec. '76, p. 38, and Feb., p. 15). AIA/RC is now embarked on a study of earthquake-resistant fire and police stations.

Testifying before the Senate commerce committee in Feb. 1976, Elmer E. Botsai, FAIA, Institute first vice president, said, "S1174 is an outstanding proposal that offers great potential benefits to the public in both life safety and fiscal soundness." AIA will continue to urge passage of the Cranston bill during the 95th Congress.

Arts Commission Passes F.D.R. Memorial Design

Landscape architect Lawrence Halprin's basic design of a water garden as a memorial to President Franklin Delano Roosevelt has been approved by the U.S. fine arts commission. The memorial, planned for the District of Columbia's West Potomac Park along the western edge of the Tidal Basin, would be about 1,100 feet in length and contain water courses, waterfalls and pools. Roughhewn granite walls would stretch almost the length of the Tidal Basin, with sculptural reliefs commemorating F.D.R.

In June, the National Park Service will



hold public hearings on the environmental impact of the memorial. West Potomac Park was once a marsh, and underground pilings will be required for the memorial garden. None of the playing fields in the area would be eliminated or disturbed.

The history of a memorial to President Roosevelt is a long and controversial one, going back to 1955 when Congress created a memorial commission. A national competition was conducted, and first place was won by architects William F. Pedersen and Bradford S. Tilney (*see*

Going On continued on page 92

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E CUBE 75 can now handle Variable Air Volume (VAV) systems directly. It also offers expanded treatment of Multizone, Dual-Duct, and Reheat air distribution systems. The energy consumption of various air side systems can be predicted—you can compare their performances and costs, and pick the one that's best. Other improvements make E CUBE 75 more complete and easier to use.

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Going On from page 90
Feb. '61, p. 36). The design called for eight steles. The jury praised the winning design's "open character" which incorporated "the natural beauty of the landscape, including altering views of the Potomac River and the Tidal Basin, in which the bright shafts are reflected."

Critics did not agree, however, and the *Washington Post* called the proposed memorial "a cemetery of broken dreams." After plans for the memorial failed to materialize, Marcel Breuer, FAIA, was asked in 1966 to develop a new concept. Accepted unanimously by the memorial commission and the Roosevelt family, Breuer's design was rejected by the fine arts commission.

The commission accepted Halprin's design "in concept" in July 1975. Now the memorial commission, with final approval by the fine arts commission, will go forward with plans for the memorial and is expected to ask Congress for some of the funding. A commission spokesman was quoted in the local press as saying that the cost of the memorial has not yet been determined.

Using HVAC Systems In Fire, Smoke Control

Most deaths that occur in fires are caused by smoke inhalation. It has long been the theory of building codes that when a fire occurs, a building's HVAC systems must be shut down to prevent fanning flames and the spread of smoke throughout the structure. Several speakers at the recent semiannual meeting of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., told how HVAC systems can be put into a "fire mode" and used to control fire and smoke.

Joseph J. Bartoletti, chairman of a symposium on fire and smoke control, said: "People used to have the notion that air would feed the flames and was therefore the enemy. Now we are using air to build an invisible wall around a fire and thus keep its smoke from spreading." He said the concept could be compared with the operation of a fireplace in a home. "If the damper is open, the smoke and toxic gases go up the chimney, but if the damper is closed, they quickly fill your living room."

Fire precautions taken at the Peachtree Center Plaza Hotel in Atlanta (designed by John Portman, FAIA) were described by Britt Alderman Jr., a consulting engineer. The six-story atrium in the hotel and its connections with many adjacent spaces on various levels disturbed building code authorities, he said, because of the problems of smoke control in the event of a fire. The atrium was accepted by the officials, however, because the HVAC system was designed to pump air into the area adjacent to a fire and to exhaust smoke and fumes to the outdoors. This system, he said, was supplemented by fire sprinklers and other safety mechanisms.

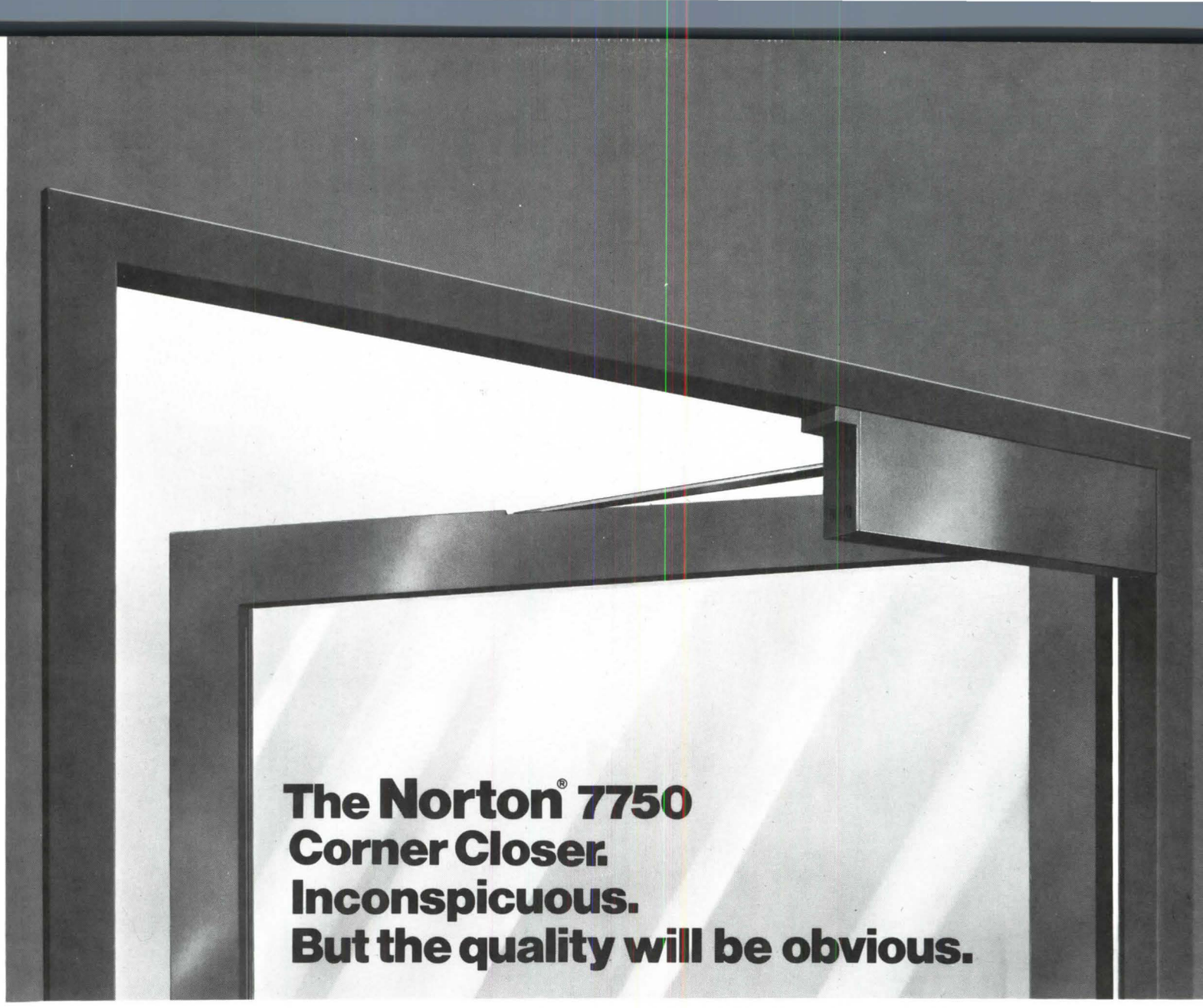
Gerhard Granek, an engineering consultant, told of similar systems in Commerce Court and First Canadian Place in Toronto, where tests with simulated smoke have shown that the smoke can be contained without spreading to occupied areas of the structures. The aim, he said, is to save lives, and the "rapid evacuation of a building with up to 10,000 people in it is a practical impossibility."

Carrol E. Burtner, formerly with the General Services Administration, discussed federal office buildings in Seattle, Atlanta, Chicago and Roanoke, Va., where "smoke control apparatus is activated by any of the installed fire protection systems, or by the occupants of the building using the manual alarm system."

Iran Opens Competition For Design of Library

The government of Iran is conducting an international architectural competition for the design of a 100,000-square-meter national library building to be erected in the new city of Shahesten Pahlavi, Iran. Conducted under the rules of the International Union of Architects, with French

Going On continued on page 96



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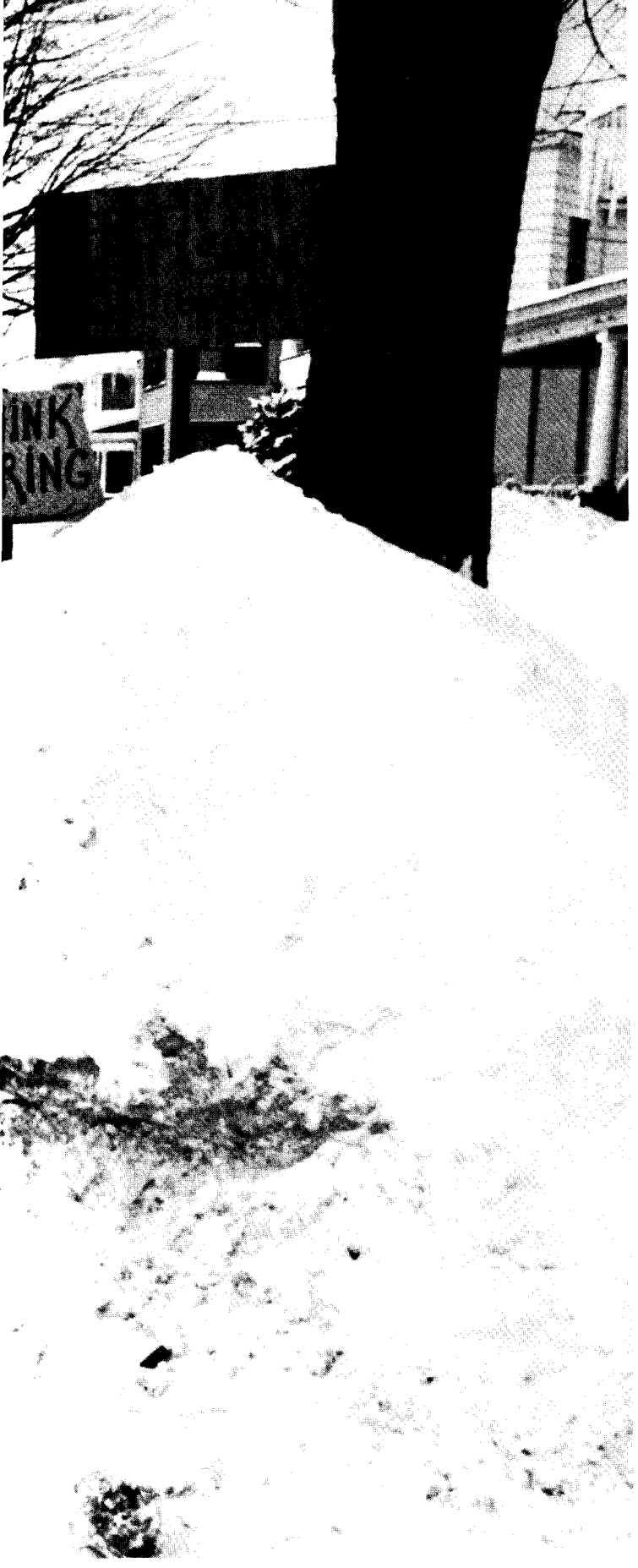
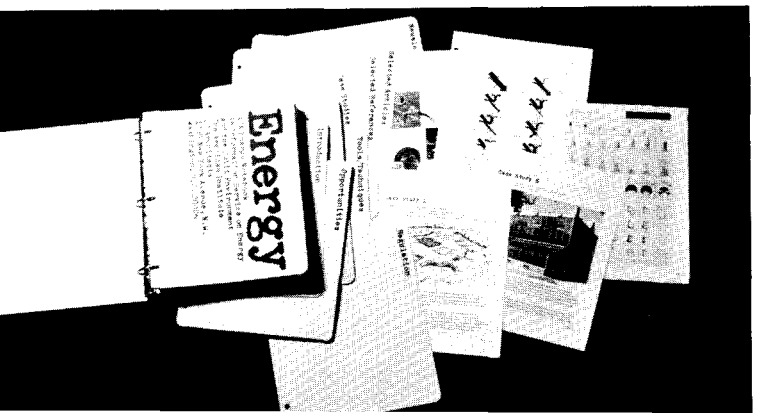
A terrible winter proved the need for energy conscious design.





The winter of 1977 was no joke. It shut down the activities of factories, offices, schools, and other public buildings.

The winter of 1977 proved the energy crisis is real. It dramatically underlined the need for energy-conscious design in new buildings and energy-conscious redesign and retrofit of existing buildings. It proved clearly that design professionals will play a major role in achieving an effective solution to U.S. energy needs.

The Energy Notebook, from the AIA

In the face of an ultimately inevitable energy crisis, the AIA two years ago developed a comprehensive information service on energy in the built environment.

The service is designed to provide useful information on energy as it relates to building design. It also provides a logical framework for assembling and organizing the burgeoning body of energy-related information. To achieve these objectives, the Notebook is updated four times a year.

The basic 400-page volume contains *Case Studies* on energy-conscious buildings with supporting statistical data as well as a reference on existing and emerging *Tools and Techniques* which can assist in the design process.

A *Regulations* section tracks and synthesizes the massive number of energy actions being taken by the Federal government, State governments and model code groups. Names of people in state energy agencies are included.

The *Selected References* section contains a fully annotated and indexed bibliography of significant references.

The Energy Notebook also contains *Selected Articles* which contribute to understanding how energy is applied and utilized in buildings. Some articles are original with the Notebook; others are reprinted from selected sources in their entirety.

An *Opportunities* section provides a listing of stimulating "mind joggers" culled from a range of guidelines for energy-conscious design.

In 1977, the Notebook anticipates the inclusion of additional sections with an emphasis on how design professionals can integrate energy into day-to-day practice.

Over 900 Subscribers to the Energy Notebook

Practicing professionals, future professionals, researchers, policy makers, and educators alike will find the *Energy Notebook* a useful reference. To date, over 900 subscribers have used the service. One subscriber told us the Notebook is ". . . the only sure way I have of being certain I don't miss anything significant in energy design. . . ." A midwest architect said: "Don't you dare let the AIA ever stop the Energy Notebook!"

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Going On from page 92
architect François Lombard as professional adviser, the competition will be in a single stage. First prize winner will be commissioned to design the project. Prizes will be awarded in the amount of $200,000: $50,000 for first place; $25,000 for both second and third place, and $10,000 each for the next 10 selected projects.

Any registered architect, or any team led by such an architect, may enter the competition, which will be conducted in English. Competitors must supply: a presentation report, master plan, isometric perspective, plan for all floors, three main sections, five black and white photographs of a model and tabulations of building areas.

Entries will be judged by a jury made up of 10 architects and librarians, one of whom is I. M. Pei, FAIA, of New York City. If the jury cannot reach a decision on first place, it may select no more than three candidates, abolish anonymity and ask candidates to come to Iran for interviews, after which the jury will rank the candidates. Travel expenses will be provided.

The competition schedule is as follows: registration through Apr. 19; documents available from Apr. 4; deadline to request information, June 21; deadline to submit entries, Jan. 20, 1978.

Competition documents may be requested by forwarding a registration fee of $70 and proof of registration to practice. The registration fee may be paid by check drawn to the account of the Pahlavi National Library Project, International Architectural Competition, or by bank transfer to Account No. 1126, Pahlavi National Library Project, International Architectural Competition, Bank Melli Iran, Aryamehr Square Branch, Tehran, Iran.

The check or a copy of the bank transfer slip must be sent with the registration request to: Pahlavi National Library Project, Committee for the International Competition, Aryamehr Square, 9 Bisotun Ave., Tehran, Iran.

More Job Opportunities Abroad for U.S. A/Es

Here are additional foreign job opportunities for U.S. A/Es (*see* also Nov. '76, p. 19; Dec. '76, p. 64, and Jan., p. 10):

Ecuador: The Ecuadorean directorate general of civil aviation invites offers for design contracts for airports at Quito and Guayaquil. Interested U.S. airport engineering firms should contact Col. Carlos Gudino, Director General of Civil Aviation, Colon y Juan Leon Mera, Edificio Ave Maria (8 Piso), Quito, Ecuador.

United Arab Emirates: Design and construction contracts are sought for the Jabel Ali airport and a construction contract for the joint civil-military airport at Fujairah. Prequalification information should be sent to H. E. Shaikh Mohammed Ben Rashid, U.A.E. Ministry of Defense, P.O. Box 2838, Dubai, U.A.E. To keep applicants informed of further developments, copies of initial correspondence should be sent to William S. Gaines, Department of Commerce, Bureau of International Commerce, Washington, D.C. 20230.

Brazil: Design bids for a $600 million airport near Sao Paulo will be solicited within the next few months. To receive announcement, contact John N. Randolph Jr., Department of Commerce, Major Export Projects Division, Room 3056, Washington, D.C. 20230.

Sind, West Pakistan: This country plans a $45 million tuna fishing and processing complex at Korangi Creek, 15 miles from Karachi. The project includes port facilities and a tuna processing plant. Contact Jay L. Smith, Department of Commerce, Bureau of International Commerce, Washington, D.C. 20230.

Nigeria: Bulk cement handling facilities, including storage silos and bagging plants, are planned. Interested firms should contact Mr. Fowora, Assistant General Manager for Engineering, Niger-

ian Ports Authority, 26/28 Marina, Lagos. Nigeria now requires foreign architects to be registered and have a local partner. The Nigerian government sometimes invites architects to perform specific projects and does not require such architects to be registered, but even in these cases the Nigerian ministry of works requires that there be an association with a Nigerian firm.

For additional information, telephone Patricia Parker, assistant director, federal agency liaison, at AIA headquarters, (202) 785-7384.

New Honorary Fellows

Eleven foreign architects "of esteemed character and distinguished achievement" have been elected to honorary fellowship in AIA. They are: Joao Batista Vilanova Artigas of Brazil, Charles H. Cullum of Canada, Antonio Fuentes Flores of Mexico, Ernest Groosman of the Netherlands, José Maria Gutierrez of Mexico, Ignacio Machorro del Monte of Mexico, George-Henri Pingusson of France, Maria Prus and Victor Prus of Canada, Manuel Rosen Morrison of Mexico and Lennart Uhlin of Sweden.

Deaths

John F. Beuttler, Walnut Creek, Calif.
George F. Diehl, Detroit
David E. Finley, Hon. AIA, Washington, D.C.
James E. Gardner, Bloomington, Ill.
R. C. Hall, St. Louis
Anthony Harrer, Washington, D.C.
J. M. Ingram Sr., Louisville, Ky.
S. Dale Kaufman, Strasburg, Pa.
Edwin J. Kraus, Thiensville, Wis.
Robert H. Lynch, Grand Rapids, Mich.
Clifton C. Miller, Houston
C. W. Mumma, Chicago
S. Alexander Nurmi, Fort Lauderdale, Fla.
Leslie Pelham Pitts, Jackson, Miss.
Hubert D. Simmons, Clarksville, Tenn.
Paul Tilds, Farmington, Mich.
Jonas Vizbaras, New York City

Joseph L. Weinberg, FAIA: The oldest practicing architect in Cleveland, Mr. Weinberg was a partner in the firm of Weinberg, Teare & Herman. He pioneered in large-scale public housing, designing in 1937 the Lakeview Terrace public housing project in Cleveland, one of the first public low-rent housing developments in the U.S.

Mr. Weinberg, who died on Jan. 14 at the age of 86, served terms as president of the Cleveland chapter/AIA and of the Architects Society of Ohio. He was a leader in the founding of the Cleveland School of Architecture, which became one of the colleges of the Western Reserve University in 1929. In 1974, he received the Architects Society of Ohio's gold medal for leadership.

His firm, best known for its work in housing, including private apartment developments, public and nonprofit housing and housing for the elderly and handicapped, won an AIA award of merit in 1955 for its design of the O'Neil-Sheffield shopping center in Sheffield Township, Ohio.

William H. Conrad, AIA: Associated with Mr. Weinberg from 1930 to 1942 as a partner in the Cleveland firm of Weinberg, Conrad & Teare (now Weinberg, Teare & Herman), Mr. Conrad helped design and build the Lakeview Terrace public housing project. He died on Jan. 28 at the age of 75, just two weeks after the death of Mr. Weinberg. Mr. Conrad, who retired in 1970, remained affiliated as corporate vice president of the firm of Richard Fleishman Architects Inc., in Cleveland.

He helped design many Cleveland buildings, including the Newton D. Baker Health Center, the Church of St. Martin of Tours and St. John Lutheran Church. Before studying architecture, Mr. Conrad was a professional violinist. He also was a painter, and his work has been included in traveling shows of the Chicago Art Institute. *Newslines on page 98*

Newslines

The voices of Frank Lloyd Wright and Erich Mendelsohn in lectures given in 1952 and 1953 may be heard on three standard cassette tapes. Listening time for the Wright tape is one hour; the Mendelsohn recording on two cassettes is slightly over two hours. The three cassettes are available for $64 from: VOP Productions, P.O. Box 18251, Oklahoma City, Okla. 73118.

Archibald C. Rogers, FAIA, founder of the Baltimore architectural firm of RTKL Associates, Inc., and president of the Institute in 1974, has retired from architectural practice, but will continue with RTKL on a consultant basis. Since 1971, Rogers has been a spokesman for AIA for the adoption of a national growth policy. He was made chairman in 1976 of the national forum on growth policy, a multidisciplinary coalition of 27 organizations.

Tax-deducted travel for professional purposes is now limited to two conventions or meetings outside the U.S. per calendar year. If more than one-half of the total days of the trip are at business related functions, transportation, not to exceed the cost of economy airfare, may be deducted. "Subsistence expenses" are limited for tax purposes to the fixed per diem allowed government employees, provided at least six hours of business activity are scheduled per day. For further information, consult IRS publications.

The Committee for the Preservation of Architectural Records, headquartered in New York City, recently received a grant from the National Endowment for the Humanities to expand a national catalog of architectural records in American collections. Architects are urged to join in the effort "to locate, identify and make accessible these records of our past." The committee offers help to local and statewide groups. Write: CPAR, 15 Gramercy Park S., New York, N.Y. 10003.

Senator Hubert H. Humphrey (D-Minn.) is the recipient of the National Housing Conference's Nathaniel S. Keith award for his long-time sponsorship of housing and urban development legislation.

"Art in Architecture" is the title of an exhibit recently shown at the art gallery, Oakland University, Rochester, Mich. Louis G. Redstone, FAIA, is given credit for inspiring the exhibit, which was mounted by gallery curator Kiichi Usui. Usui also prepared two slide-tape presentations to accompany the exhibit, featuring photographs and remarks by Redstone, author of the book entitled *Art in Architecture*. An illustrated catalog was published as well. The exhibit is available to other Michigan institutions.

Denver Service Center, National Park Service, has positions open for architects and civil engineers. Contact: Dick Frost, Denver Service Center, (303) 234-4533.

Robert Arquilla, a Chicago builder, has been elected president of the National Association of Home Builders.

"Soviet New Towns: Housing and National Urban Growth Policy" is the title of a 97-page booklet prepared by HUD's office of international affairs. The report examines "free standing" as well as towns that were developed as part of existing Soviet "growth centers," estimating that there are about 1,200 new towns in the USSR. A copy may be obtained for $1.65 from the Government Printing Office, Washington, D.C. 20402. Request stock number 023-000-357-1.

New circulation manager of the AIA JOURNAL is Gladys McIntosh, who served for more than two years as service representative in AIA's publications distribution department. To expedite new subscriptions, changes of address and other matters pertaining to circulation, send the information directly to her. □

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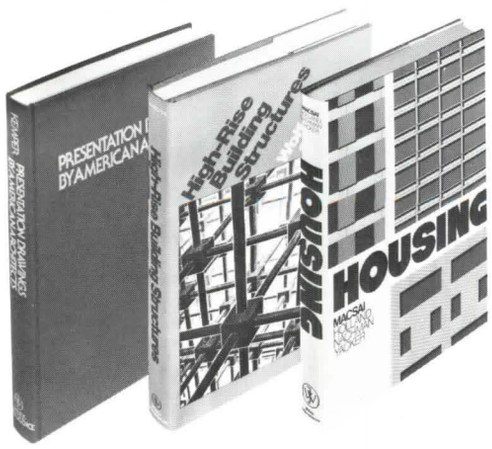

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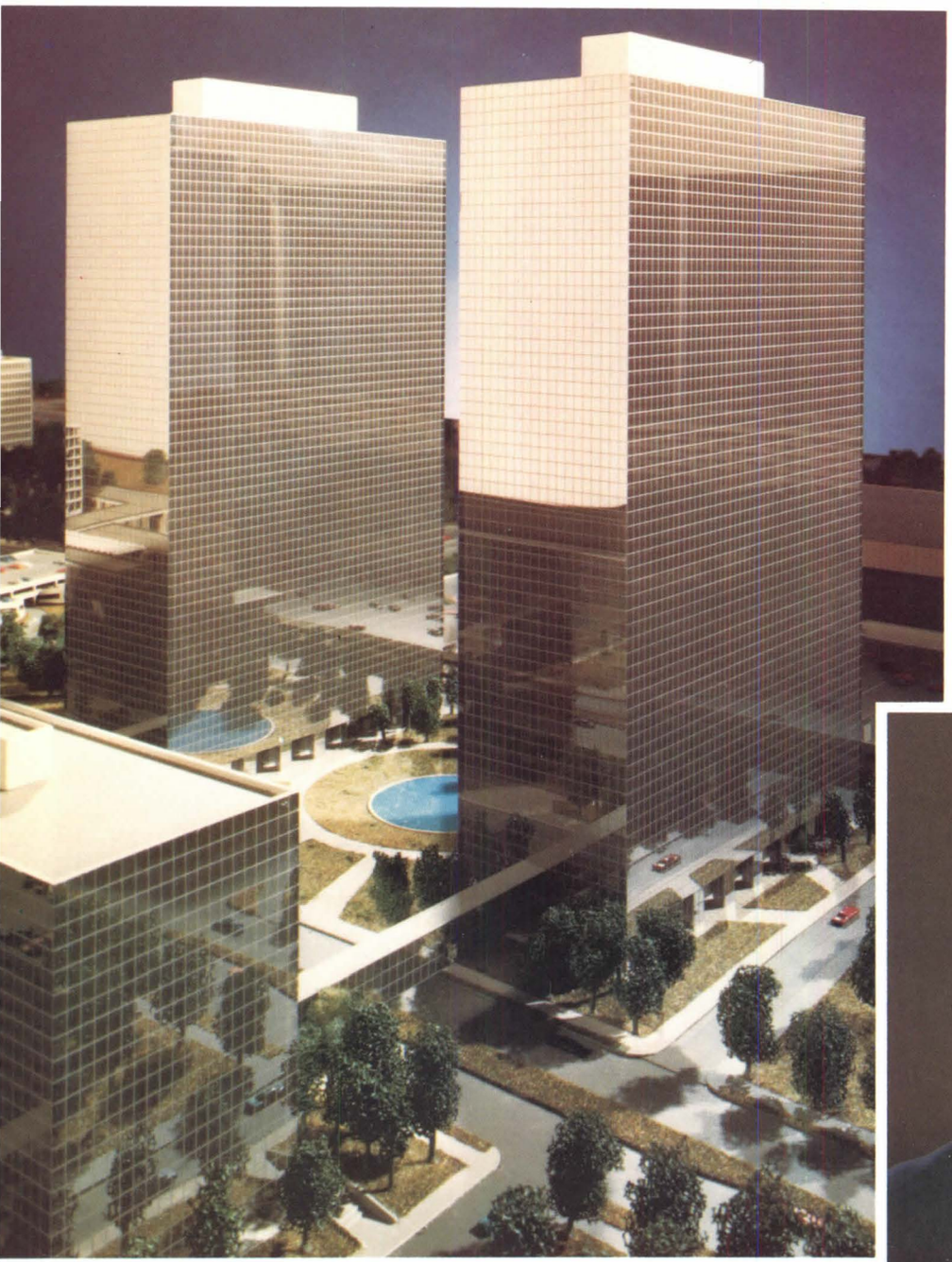

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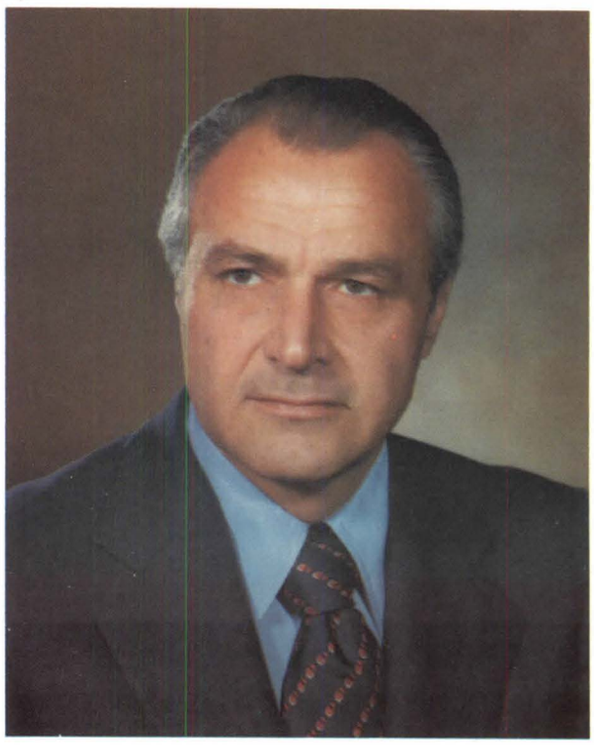

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