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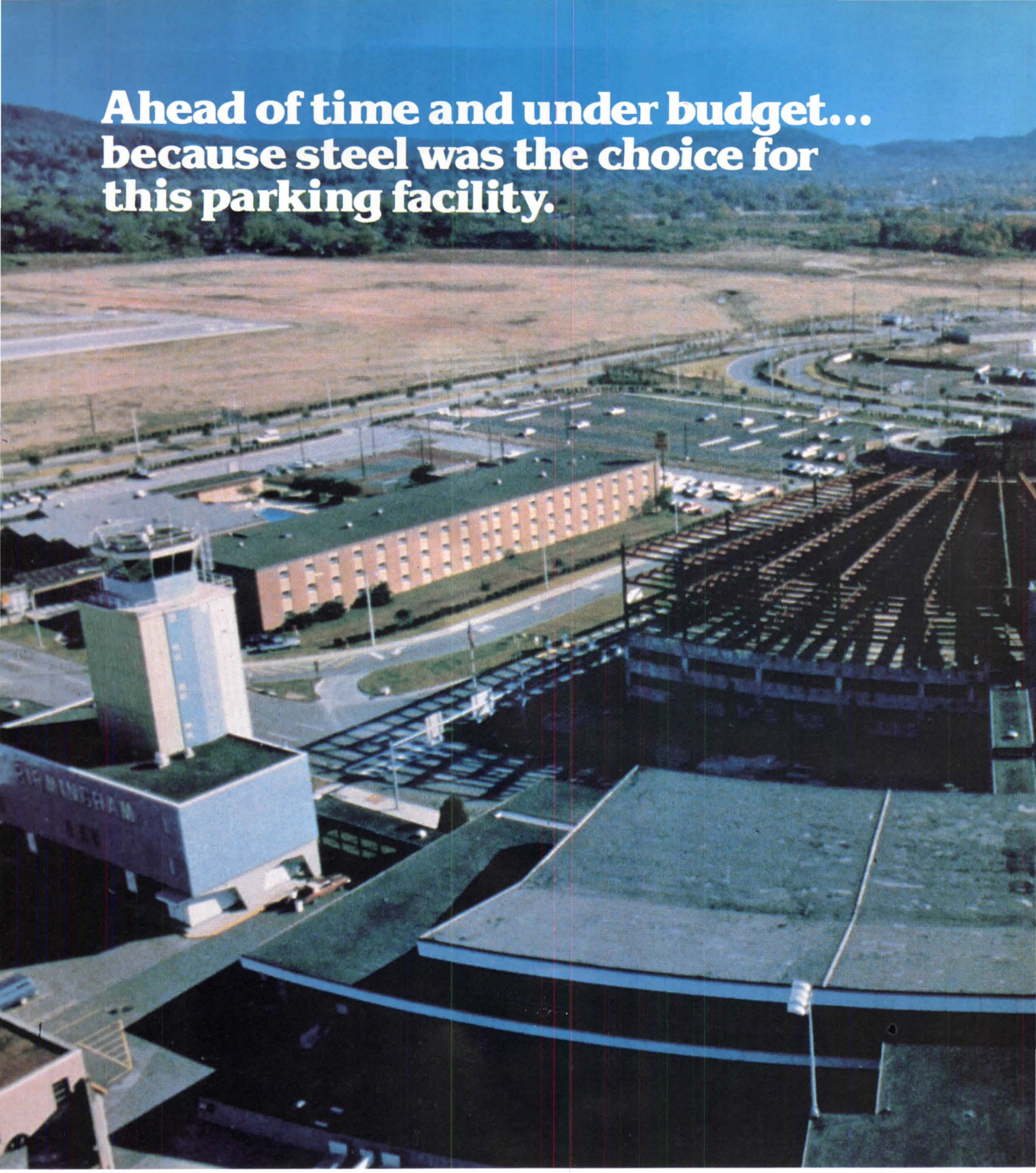
CONTENTS

Cover: A computer-manipulated photograph of an Alexander Calder sculpture (see page 65).

The AIA JOURNAL, publication number: ISSN0001-1479, official magazine of The American Institute of Architects, is published 14 times yearly at 1735 New York Ave. N.W., Washington, D.C. 20006. **Subscriptions:** for architects; students and faculty of architecture schools; libraries; building construction trade associations and building products manufacturers, in the U.S. $24 and in Canada $32. For all others, in the U.S. $30 and in Canada and other foreign nations $40 a year. Single copies, $3 each. Publisher reserves the right to refuse unqualified subscriptions. For subscriptions: write Circulation Department; for change of address: send Circulation Department both old and new addresses; allow eight weeks. Quotations on reprints of articles available. Microfilm copies available from University Microfilm, 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Referenced in *The Architectural Index, Architectural Periodicals Index, Art Index, Avery Index to Architectural Periodicals.* Second class postage paid at Washington, D.C., and additional mailing offices. VOL. 71, NO. 8.

Ahead of time and under budget... because steel was the choice for this parking facility.



The Municipal Airport in Birmingham, Alabama needed to expand its four-level, reinforced concrete structure. Four design concepts were investigated in depth—including both steel and concrete construction, with the option of expanding either horizontally or vertically.

The final choice—to expand vertically with steel—offered compelling advantages.

To begin with, more parking space. The relatively light weight of steel framing meant that three parking levels (rather than two) could be added, while maintaining the existing floor plan and meeting budget and aesthetic requirements.

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Steel beams are placed on radii 6° apart, and span 65 feet between col-

umns, which are placed on 4 circular lines and are 3 stories high, eliminating splices. Filler beams span between the radial beams at approximately 8 feet on centers. The larger radial beams and columns are ASTM A572—Grade 50 steel, and the filler beams are A36. Total weight of the structural steel was 2300 tons. Classified as an open-deck parking structure, no fireproofing for the steel was required.

This imaginative expansion is another example of the design flexibility and economy of structural steel. For more information about the use of steel in this structure, contact a USS Construction Representative through your nearest U.S. Steel sales office. Or write for the USS building Report (ADUSS 27-7969-01) to P.O. Box 86 (C1718), Pittsburgh, PA 15230.

Owner: City of Birmingham
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Architect: Charles H. McCauley Associates, Inc.
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Structural Engineer: Hudson, Ball & Marlin
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General Contractor: Brasfield & Gorrie, Inc.
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Steel Fabricator: AESCO Steel, Inc.
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Steel Erector: Birmingham Steel Erectors, Inc.
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EVENTS

Aug. 5-6: AIA Energy in Design: Techniques Workshop, Monterey, Calif. (Repeat workshops Aug. 12-13, Hyannis, Mass.; Aug. 19-20, Lake Geneva, Wis.; Aug. 27-28, Knoxville, Tenn.) Contact: Brenda Henderson at Institute headquarters, (202) 626-7353.
Aug. 5-6: Workshop on Renovation of Buildings, University of Wisconsin, Madison.
Aug. 6-7: AIA Energy in Design: Process Workshop, Omaha. Contact: Brenda Henderson at Institute headquarters, (202) 626-7353.
Aug. 6-15: 12th International Sculpture Conference, Oakland, Calif. Contact: International Sculpture Center, P.O. Box 19709, Washington, D.C. 20036.
Aug. 9-10: Workshop on Life Cycle Costing for Building Systems, University of Wisconsin, Madison.
Aug. 9-11: Window Energy Show, Las Vegas. Contact: Window Energy Show, 350 Endicott Building, St. Paul, Minn. 55101.
Aug. 10-13: Training Program on Revitalizing Downtown: Understanding Real Estate Development, Austin. Contact: National Main Street Center, National Trust for Historic Preservation, 1785 Massachusetts Ave. N.W., Washington, D.C. 20036.
Aug. 15-19: Second International Computer Engineering Conference & Exhibition, San Diego. Contact: The American Society of Mechanical Engineers, 345 E. 47th Street, New York, N.Y. 10017.
Aug. 16-20: Course on Measurement of Building Firesafety, University of Wisconsin, Madison.
Aug. 17: Seminar on Project Management, Atlanta. (Repeat seminars Aug. 18, Boston; Aug. 19, Chicago; Aug. 20, Los Angeles.) Contact: PSMJ Seminars, 45 Van Brunt Ave., Dedham, Mass. 02026.
Aug. 24-27: Course on Decision Making for Construction Management, University of California, Los Angeles.
Aug. 29-Sept. 1: Seventh National Passive Solar Conference & Exhibition, Knoxville, Tenn. Contact: American Section of the International Solar Energy Society, P.O. Box 1312, Boulder, Colo. 80306.
Sept. 5-11: International Passive and Low Energy Alternatives '82 Seminar, Bermuda. Contact: International PLEA 82, Box 248271, Coral Gables, Fla. 33124.
Sept. 9: International Seminar on Earth Shelter, Bermuda. Contact: International PLEA 82, Box 248271, Coral Gables, Fla. 33124.
Sept. 10-11: International Symposium on Architecture and Energy, Bermuda. Contact: International PLEA 82, Box 248271, Coral Gables, Fla. 33124.
Sept. 13-15: International Passive and Low Energy Alternatives 82 Technical Conference, Bermuda. Contact: International PLEA 82, Box 248271, Coral Gables, Fla. 33124.
Sept. 13-17: International Hospital Design Seminar on Interstitial Space, York, England. Contact: A. J. Fifer Associates Ltd., P.O. Box 9104, Ottawa Terminal, Ottawa, Canada K1G 3T8.
Sept. 16-18: National Renewable Energy Technology Conference, Boston. Contact: Jordan College Energy Programs, 360 W. Pine St., Cedar Springs, Mich. 49319.
Sept. 18: Solar Expo '82, Flint, Mich. Contact: Jordan College Energy Programs, 360 W. Pine St., Cedar Springs, Mich. 49319.
Oct. 14-24: Second Annual Solar Tour of France. Contact: Jordan College Energy Programs, 360 W. Pine St., Cedar Springs, Mich. 49319.

LETTERS

Pennsylvania Avenue Arch: I read with much amusement the blooper in your report of the U.S. Commission of Fine Arts' review of preliminary plans for an arch in Market Square on Pennsylvania Avenue, across from John Russell Pope's National Archives building (see May, page 10).

In the piece you quote me as recommending that the design for the arch be more "clunky." I can only assume that this was a typesetter's slip. The word that the transcript clearly shows I used, and was quoted in the *Washington Post* of Feb. 18, was "chunky." Along with other members of the commission, I was troubled by the aspect ratio of the submitted design, which seemed attenuated and somewhat lacking in conviction. I was hoping for something of the "chunkiness," the marvelous sense of confidence exuded by the Septimus Severus Arch in Rome, or in the Place du Carrousel, or any one of a number of marvelous arches in the tradition.

The commission has not yet had a formal proposal on which to give an opinion. The arch idea is so far the only option that has been presented to us. It struck those members who were there for the presentation (Walter Netsch, FAIA, was unfortunately in the hospital) as an imaginative and vitalizing scheme that would not only help focus the plaza as a place for people, but emphasize the axiality of the important corridor terminated by Robert Mills' National Portrait Gallery facade to the north and Pope's archives building to the south.

The diagonals in L'Enfant's plan, while elegant on paper, often have the effect of disorienting the real-life person proceeding along them. He or she assumes that theirs is the true axis, and the orthogonal grid seems to impinge at inexplicable angles. What will help Pennsylvania Avenue carry off its diagonality will be cues to the orthogonal grid to which it is an exception. The concept of some element helping to do this, and pinioning the rather amorphous place that L'Enfant had hoped would become the market focus for the new capital, presents a real challenge in urban-design terms.

J. Carter Brown, Hon. AIA
Chairman, Fine Arts Commission

The 'Dangers' of Civil Defense: The Reagan Administration's proposal to revive the national civil defense program is not simply a vast boondoggle but a dangerous act of war implying a Pentagon plan for a pre-emptive first strike against the U.S.S.R. Why do I make such an outrageous charge when we are told the plan "could save 80 percent of the U.S. population in an all out nuclear war with the Soviet Union?" Although I am privy to no secrets, I have had experience in early fallout shelter studies.

During the Eisenhower Administration I was working with Hal Wise and others on a central city plan for Tulsa financed by the city, county, and Tulsans Unlimited, a private group. Before we signed the contract, the Office of Civil Defense Mobilization noted that the data we were about to collect could be used for a fallout shelter survey to which they would contribute a modest sum, which was accepted. Some time later Hal Wise and I were informed that the Tulsa survey was one of three pilot studies, and since we had experience in Tulsa we might best handle a survey of Contra Costa County as an example of an evacuation area of the San Francisco Bay Region.

We completed this study in six months and since it was a pilot study, published a report on our findings as well as on the details of our operation. In the process I learned enough about the bombs of that early time, the effects of fallout, and the pitiful inadequacy of potential shelter to dismiss the concept as nothing but an exercise to lull the restless natives into a false sense of security. Nevertheless I agreed to be a consultant on the subject to the Rand Corporation, although they never called on me except to attend a series of lectures.

Eisenhower dropped the program, but shortly after President Kennedy mentioned his interest as part of a speech, and after I had burned about 50 copies of our reports, I was beseiged by requests to participate in a revival of the program, and the Army Corps of Engineers asked me to manage a program covering Nevada, Arizona, and Southern California. I refused simply because I considered it a

continued on page 10

Correction: The photographs of the San Antonio Museum of Art on pages 48 and 49 of the June issue are by Nick Wheeler.

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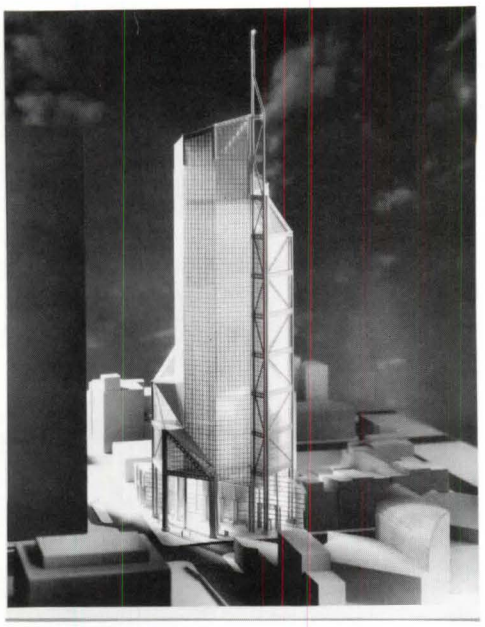

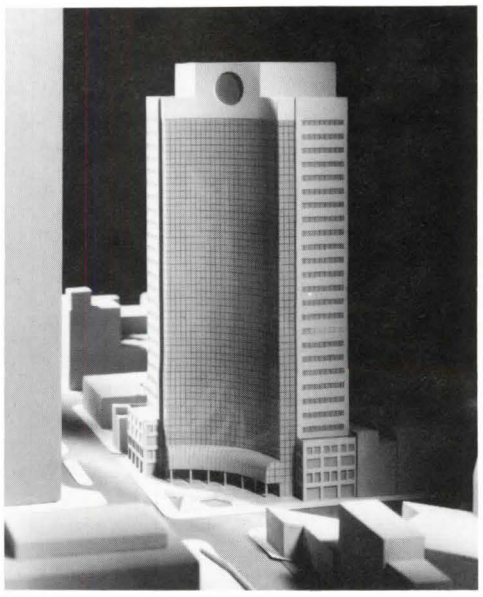

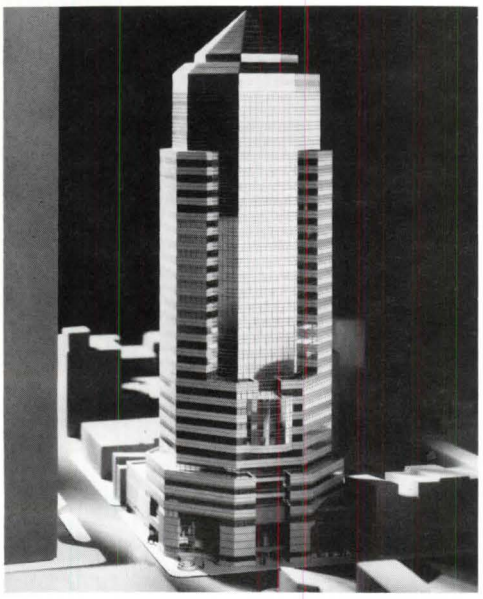

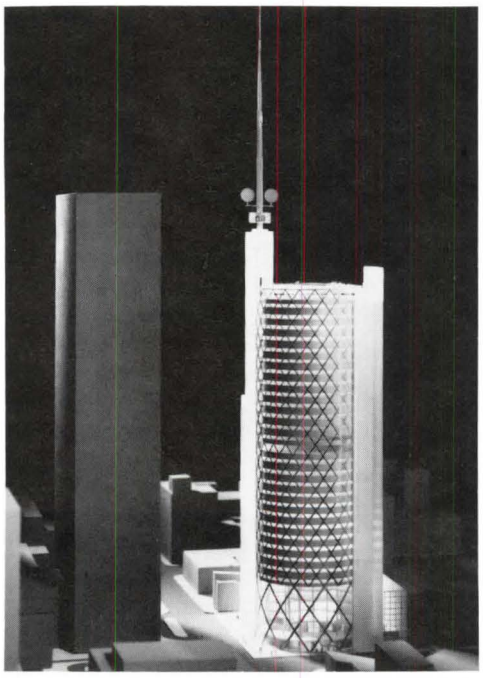

Humana models (clockwise from top left) by Michael Graves, Murphy/Jahn, Cesar Pelli & Associates, Norman Foster Associates, and Franzen/Kroeger & Associates.

Practice *from page 21*

Graves Wins Competition For Louisville Office Tower

Michael Graves & Associates has won an invitational competition for the design of a corporate headquarters building for Humana Inc. in downtown Louisville, Ky. Graves' design is a 27-story rectangular tower covering the entire site. The building's seven-story base, which contains Humana executive offices, is surrounded by a colonnade and open shopping arcade. The tower has a roof garden near the top and is capped with an arched penthouse. Cladding is marble and granite; much of the face is punctuated with 54-inch-square windows.

Graves' firm was one of six finalists. The other five were Ulrich Franzen/K. Kroeger & Associates; Norman Foster Associates; Murphy/Jahn; Cesar Pelli & Associates; and Richard Meier & Associates. The Meier firm dropped out before selection.

The competition was conceived, conducted, and judged in-house by Humana, which owns and operates hospitals in the U.S., England, and Switzerland. James Walters, AIA, Humana vice president for design and construction, acted as professional adviser for the company. Walters says Humana started with a list of some 20 firms, from which 12 were selected for interviews. From these, six were chosen to provide "the best designs from firms we knew would approach it from very different ways," according to Walters. Briefing materials provided to the competitors stated that the building "must, in the end, create excitement and capture the imagination of the public."

Judging was by Walters, a member of his staff, and Humana's president and board chairman. Deliberation lasted six weeks, Walters says. "In the end, we tried to keep in mind that we were after a building of architectural significance, something to contribute to Louisville and to architecture in general."

Asked about Graves' competition winning design for the Public Service Building in Portland, Ore., Walters says it was an influence in selecting Graves only in that "it made us a little more comfortable with our choice."

Humana is to publish in September a catalog of all submission materials from the five finalists. A traveling exhibit to include the five models is also planned.

New York Architects Organize, March Against Nuclear Arms

During the same week in which the AIA convention passed the nuclear disarmament resolution proposed by the California Council, New York area architects were active in Antinuclear Week, a series of events accompanying the United Nations Special Session on Nuclear Disarmament. The week's climax was a World Peace March from the U.N. to Central Park on June 12, but it was preceded by several meetings of those planning continuing support of the disarmament movement following the march and hoping for an eventual national coalition of such groups.

On June 5 about 50 architects, planners, landscape architects, and social scientists met in the context of a conference on nuclear war organized by the City University of New York and Rutgers University. The New York group, called Environmental Designers and Planning Professionals for Nuclear Disarmament, was joined by Sam T. Hurst, FAIA, and others from California and by planner Kevin Lynch and others from Boston. Landscape architect Karl Linn (an organizer of the meeting, along with Richard Hatch, Chester Hartman, and Henry

continued on page 28

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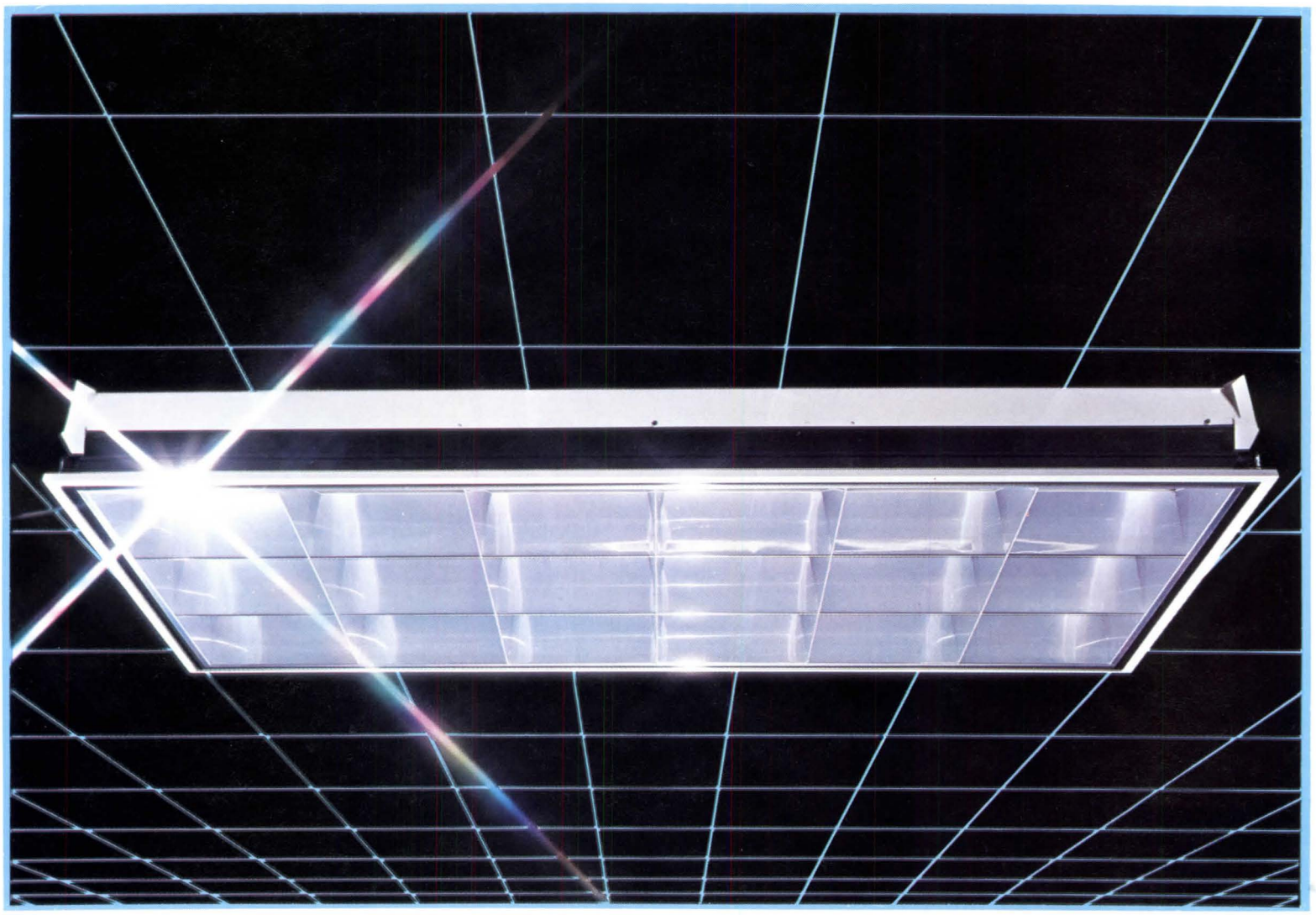

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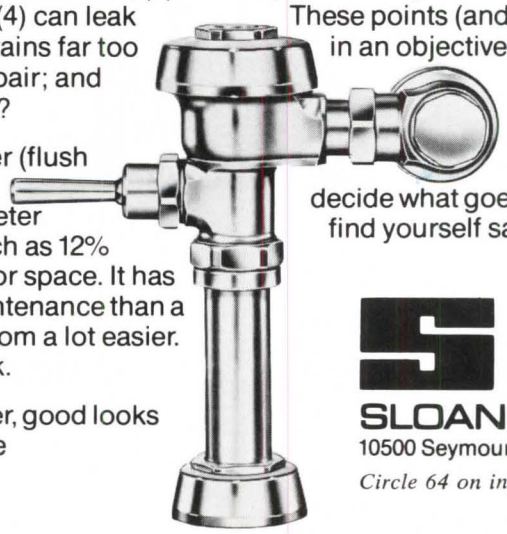

These points (and more) are discussed in detail in an objective report, "Selecting the Proper Flushing System for Your Building." It's yours, without obligation. Write us for a copy.

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Practice *from page 24*

Arnold) spoke of the design professions' "special sense of loss" when contemplating nuclear war, and historian James Marston Fitch said that such war "means the extinction of human history." Psychologist Howard Gruber said that, in protesting, "being militant, being *engagé,* is not enough; we have a duty to be creative." And Hurst warned his fellow architects that they "must not be co-opted by the government to build the civil defense facilities being so naively proposed." Lynch spoke of his own project, now in an early stage, of preparing a brief manual for citizens' use in educating themselves about the effects of nuclear war on their particular communities and in organizing against it.

On June 7 there was a meeting of another (but partly overlapping) group called Architects for Social Responsibility, organized by Dean James Stewart Polshek, FAIA, of the Columbia school of architecture, Joseph Wasserman, AIA, president of the New York Chapter/AIA, architects Sidney Gilbert, Julian Neski, FAIA, Alistair Bevington, Tician Papachristou, FAIA, and others. Again Sam Hurst was present to offer advice and encouragement from the similar group based in Los Angeles. Committees were formed to study matters of membership and financing, publicity, and statements of purpose.

During the week that followed, a coalition of half a dozen art and community organizations, including Artists for Nuclear Disarmament and Hispanics for Survival and Disarmament, and with the participation of architects and landscape architects, held a series of meetings called "Taking It to the Streets" in Chinatown, the South Bronx, and four Harlem locations.

An independent suggestion from architect Sidney Gilbert was for job site signs that would illustrate the relationship between the cost of construction and the cost of weapons for destruction. (For example, a $1.8 million health care center is equal in cost to one Chrysler Corporation tank or to one one-thousandth of a Trident submarine.) In a letter to hundreds of other New York architects, Gilbert pointed out that the world budget for war preparation in 1981 had reached $1 million per minute.

The march itself, on June 12, was a mammoth event. Estimates of attendance varied from half a million people to 750,000, and it was thought to be the largest protest group ever to assemble in the U.S. Included was a group of several hundred architects. To name only a few spotted in the crowd: Ted Liebman, Edward Larrabee Barnes, Mrs. Douglas Haskell, and Mrs. Marcel Breuer.

News continued on page 32

A luxurious hotel in Louisville.
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The 393-room Hyatt Regency Louisville on River City Mall includes the Hyatt hallmark—a soaring atrium-lobby filled with greenery and excitement. The three glass-back, scenic Dover Elevators enable guests to enjoy a breathtaking view while moving smoothly through this 17-story space. Four other Dover Elevators carry passengers and freight between levels of this busy convention-center hotel. For more information on Dover Elevators, write Dover Corporation, Elevator Division, Dept. 673, P.O. Box 2177, Memphis, Tennessee 38101.

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Government

Endowment Design Arts Section To De-Emphasize Grants Activity

In a major emphasis shift, a new charter for the design arts program of the National Endowment for the Arts will make the program more aggressive in educating design clients and future clients, in promoting design selection through competitions, and in upgrading federal design.

The new charter, which arose from a seminar last February, was shaped into policy by design arts program director Michael Pittas and his staff. It has been endorsed by Frank Hodsoll, the NEA chairman appointed by President Reagan and confirmed last November, and has been approved in concept by the National Council on the Arts, the presidentially appointed body that, with the chairman, directs the endowment. Under the new plan, money spent on advocacy will equal that spent on grants. Currently, the emphasis is on grants, which amount to 80 percent of the design arts program budget, with the remaining 20 percent used for leadership and advocacy activities.

Like Nancy Hanks, NEA chairman in the early '70s, Hodsoll sees the design arts program as requiring an approach different from other endowment activities. "Unlike the performing arts," he says, "the production of a play, for instance, design arts is attempting to influence a myriad of economic and political decision makers across the country in how they go about doing things." And, given a relatively small budget in relation to all the money that goes into things that are designed, Hodsoll says he concluded that it was time to "investigate the kinds of things the federal government can stimulate best, and then go try and do at least a few of them." The design arts allocation for fiscal 1982 is $4.59 million, or slightly less than 4 percent of the total endowment program budget.

Concerning client education, the new policy recommends development of a pilot curriculum for professional business schools, to include the senior executive training programs that many schools run in the summer. This, in turn, would serve as a model for schools of public administration, engineering, and law. Hodsoll says the goal is to assure that the "economic benefits of good design are part of the education of the professionals" who make decisions on design. "Lawyers, for instance, write zoning codes. And I would argue that engineers are an important group to educate."

Concerning competitions, the policy brief states that "the process for selecting design innovation through competitions has . . . been a major policy focus," and recommends funding, for $50,000 to $100,000 each, three or four models "comparable in scale and impact to the Boston and Portland competitions." NEA would provide technical assistance and on-site evaluation and documentation, which would be published to influence the conduct of subsequent competitions.

Eight new policies would be directed toward "creating a stronger sensitivity to design issues" by the federal government, the largest builder and purchaser of design services in the U.S. These include a Presidential design awards program to recognize design products and processes, design professionals, and federal employees and agencies; an updated version of *Guiding*

continued on page 34

MACK III Office Building, Paramus, N.J.—Architect Mitchell E. Hersh, A.I.A.

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The 'Exalting' Perceptions Of Photographer Evelyn Hofer

Evelyn Hofer is an architectural photographer of outstanding ability, her photographs of Richard Meier's Atheneum (mid-May, 1980) being one example, but she is a master at many other types of photography as well. From her spare, high-ceilinged studio (in Meier's Westbeth Artists' Housing in New York City) come gems of portraiture and landscape photography as well. As Hilton Kramer wrote in a recent *New York Times Magazine* article about Hofer, "Perhaps one way of distinguishing [her] style—and the special sympathy it brings to its diverse materials—is to point out that for her there are no 'low' subjects. Everything she photographs acquires a high dignity and an exalted character."

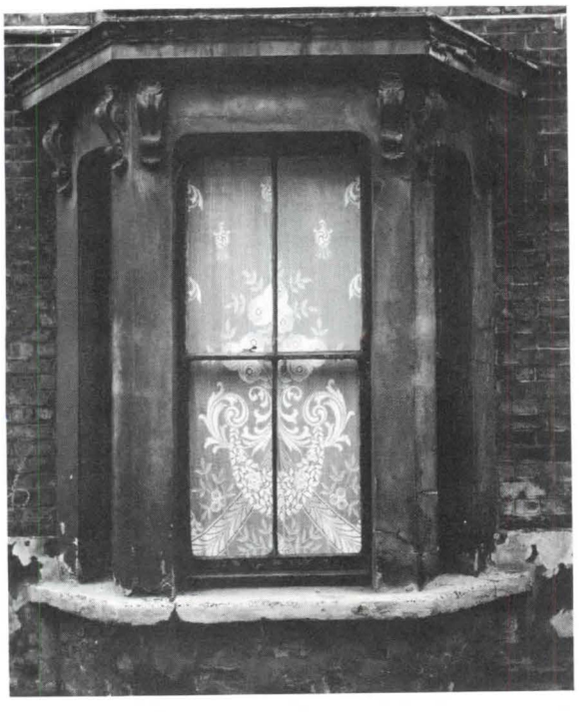
Several of the Hofer photographs we show here are from a show of her work this past February and March at New York's Witkin Gallery ("the photography event of the season," Kramer said). Others are taken from some of the extraordinary books she has done in collaboration with Mary McCarthy *(The Stones of Florence),* James Morris *(The Presence of Spain),* and V. S. Pritchett (books on New York, London, and Dublin). Other Hofer subjects include a recent group from Spain's Basque country, a series of wedding pictures at New York's City Hall, and portraits of Pritchett, Moshe Dayan, John F. Kennedy, and other public figures. At the moment, she is off, taking her 4x5 view camera, 50-pound tripod, and other paraphernalia, to the Castelli Romani area outside Rome.

Whatever her subject, a Hofer picture is distinguished by technical excellence; even more rare, it is distinguished by a perception of the essence behind the appearance.

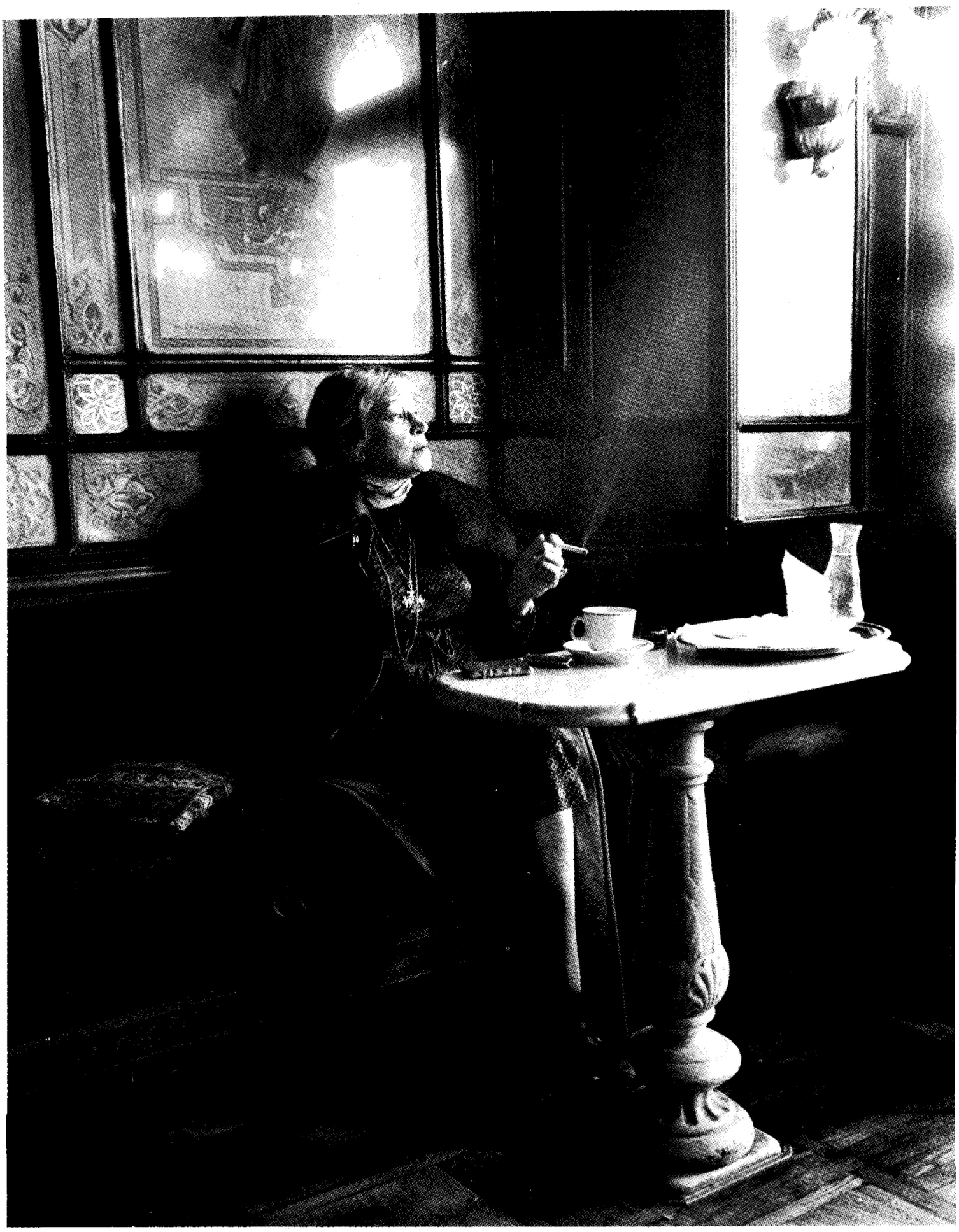
Saul Steinberg, photographed in 1978 with himself, age 6.

Baltard's markets at Les Halles, Paris, 1970, now destroyed.

A London window, 1961.



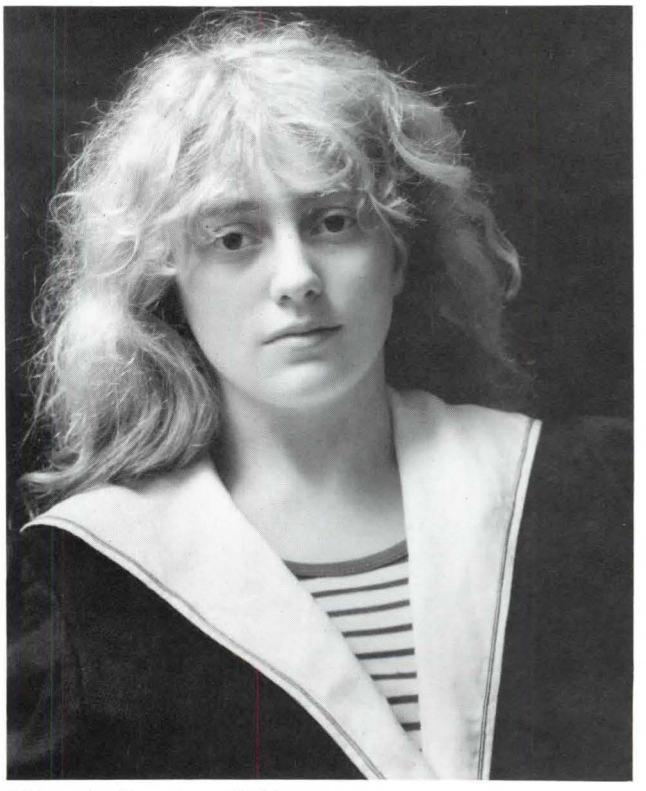
Anna and Emma, Dublin, 1967.



In the Cafe Florian, Venice, 1977.

Central Park, New York, taken by Hofer in 1967.

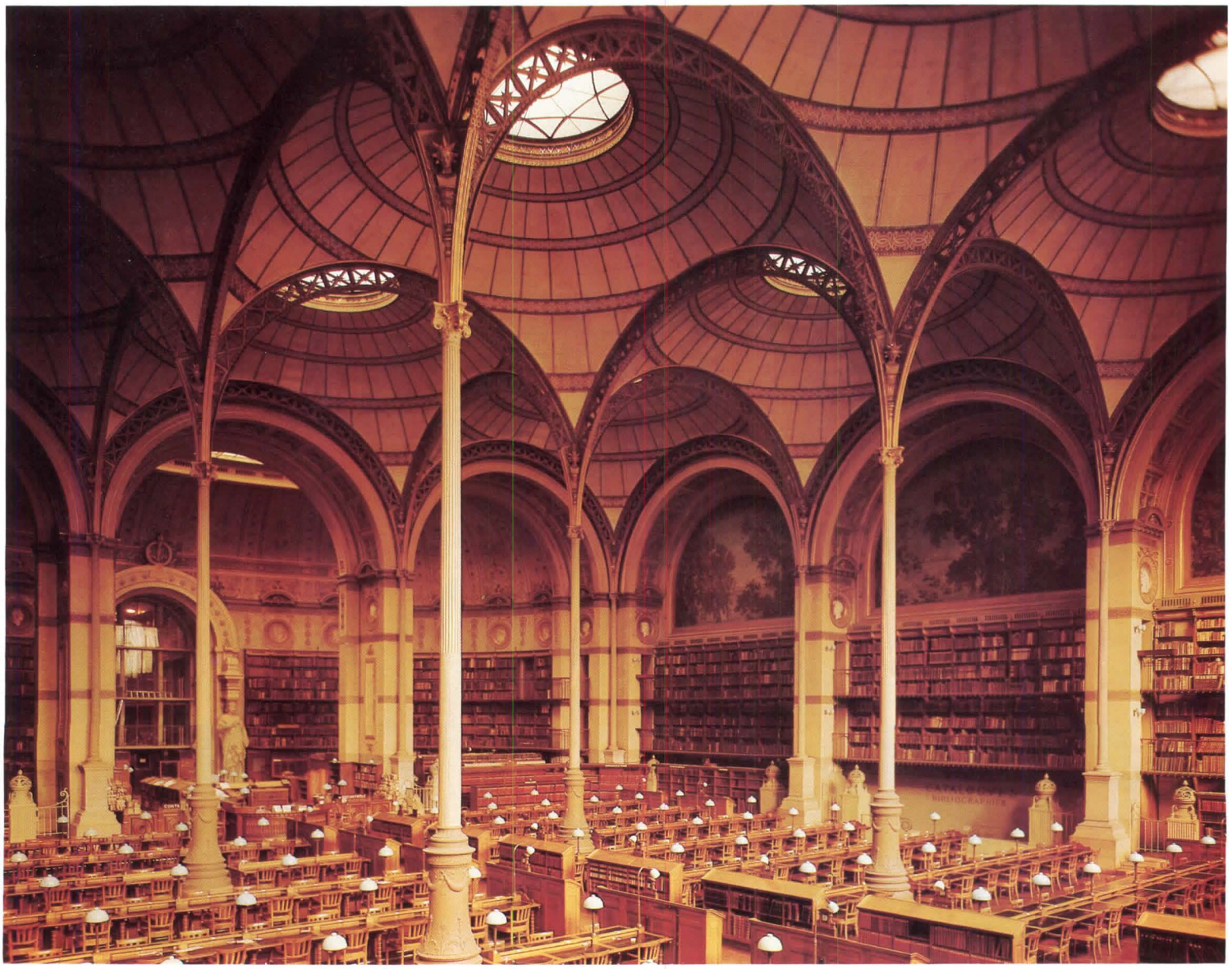
Evian les Bains on the French shore of Lake Geneva, 1980.



Miranda, London, 1980.

York station, 1970.

Labrouste's reading room, Bibliothéque Nationale, Paris, 1970.



Marche aux Puces, Paris, photographed by Hofer in 1968.

The intelligent thinking behind the Gwathmey Siegel desk

Until now, the thinking and talents of Charles Gwathmey and Robert Siegel have been reserved for their individual clients. Now, Gwathmey Siegel have designed a desk and cabinet line for the entire office.

Applying the logic that is characteristic of all their work, the architects have designed a system that, because of its modularity, solves a great many logistical problems for the interior designer.

The Gwathmey Siegel desk and cabinet line offers maximum storage, maximum design continuity and maximum flexibility. And with the Knoll tradition of manufacturing excellence, maximum value.

A variety of sizes and a range of materials assure strong design continuity from the executive suite to the reception desk.

"Opting for the simple thing well done," Gwathmey Siegel, simply stated, have done it very well again.

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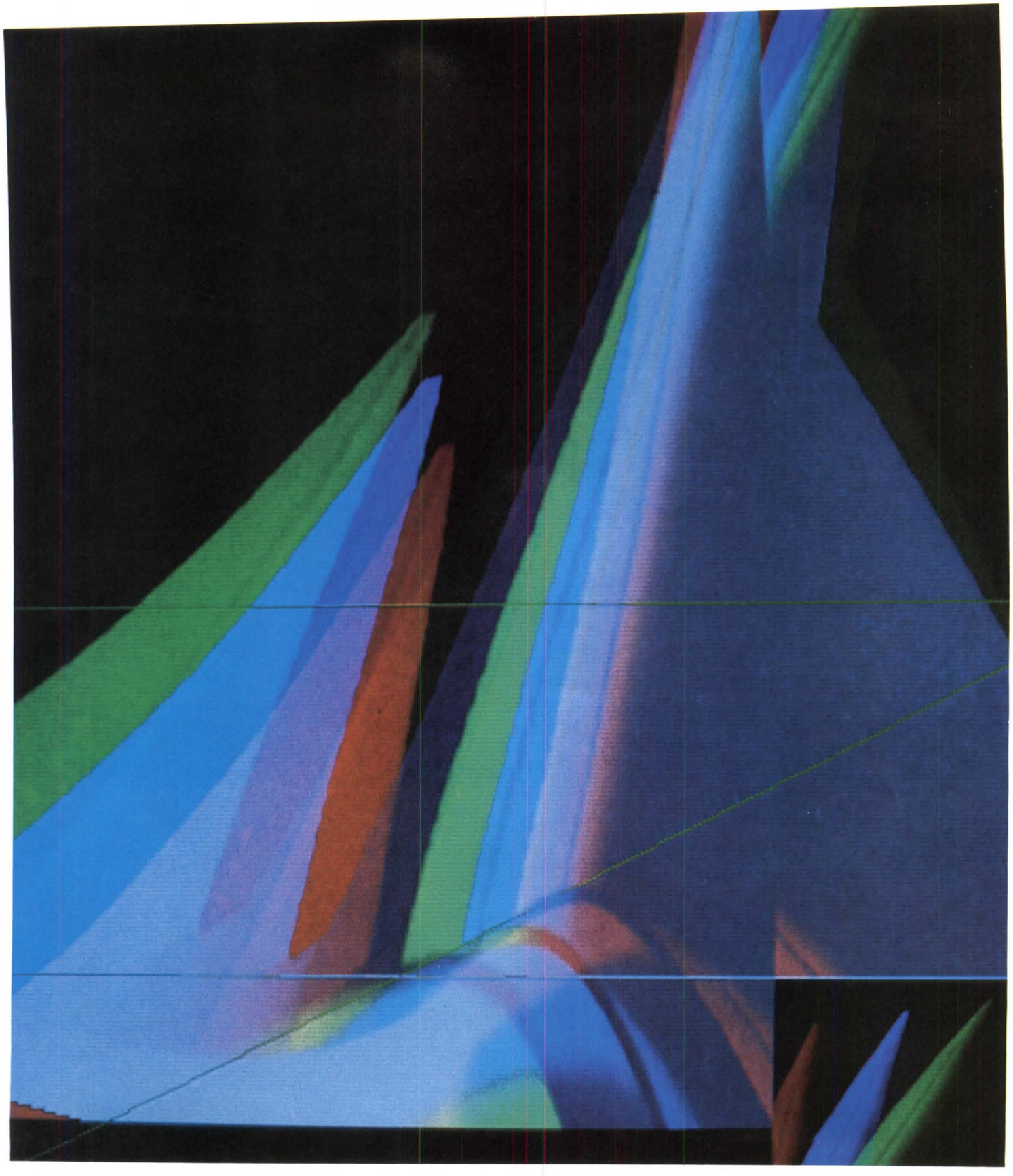
AIA JOURNAL

Our principal focus this month is on interior design. This, which seems to happen every July, reflects the ever increasing involvement of architects in the field. (In a corollary development architects are winning an increasing number and proportion of major interior design awards.)

The issue begins with a searching examination of the revolutionary changes underway in the uses, and design, of that particularly American type, the office building. It continues with a look at a recent building that responds to one possible byproduct of these changes, employee isolation, and fondly looks back at two older office buildings: one a once neglected prototype, and the other a highly individualistic, even idiosyncratic, landmark. These pieces deal with more than the interiors of the buildings, which reflects the fact that a salutary contribution of increased architectural involvement with interiors is a tendency to look at buildings whole.

Then comes an expanded version of our regular Furnishings section, which, in the hands of senior editor Stanley Abercrombie, has grown to be one of our best received features; and a special interiors version of our Books section, which, in our totally nonobjective view and in the hands of senior editor Mary Osman, continues to be one of the magazine's strong points. *D.C.*



Architecture And the Information Revolution

By Porter Driscoll, AIA, Joseph Marzeki, and Forrest Wilson

The computing capabilities of a chip the size of a fingernail connected to telecommunication networks may change the physical form of buildings and our cities. The plethora of exotic office technologies introduced into the work place during the past two decades is shifting the foundation of our traditional man-machine organization. Cybernation changes our way of working from man-machine and man-routine relationships that largely determined the form of our commercial, industrial, and institutional buildings in the past to computer-machine and computer-routine relationships that are now demanding distinct architectural forms to accommodate them.

Architects are involved on two levels: first as professionals licensed to safeguard the health, safety, and welfare of humans in the built environment. The second level of cybernated influence is in the business of architecture itself, which like other businesses can only survive if its tools and methods of operation are as efficient as its competitors.

Can this cybernation be concealed beneath the trappings of historicism, as architects hid the industrialization of building during the latter part of the 19th century? Such questions have immediacy, for it is generally agreed that at this moment our surroundings are being altered as significantly by cybernation as the industrial revolution changed the pastoral village and cottage industry.

The imperative role previously played by the flow of capital is now subservient to the flow of scientific innovation. Can we take the leading institutions of our mature industrial system and convert them, as they stand, to new use by substituting information for capital? This is the first thought that comes to mind and is a tempting idea. But it is not what happened in the past. For example, when the industrial order displaced feudalism, medieval institutions had ceased to be workable. If they did not function for feudal relationships then they were even less appropriate for the new vigorous conditions of monetary exchange and industry. The same appears true of institutions formed by the industrial order when faced by the demands of the information revolution.

The location, size, complexity, and communication systems of organizations have traditionally been determined by the natures, needs, and capacities of the human beings who composed them. What people could do and control depended upon people themselves. The form of the industrial corporation, its architecture, location, and the administrative staff system by which it manages its holdings are determined by the fact that people are the primary components of organization.

But cybernation eliminates the dependency of organizational size and complexity on the nature of humans. The information revolution makes it possible to conceive and exercise a vastly expanded scope of control. Physical continuity between related functions is no longer required in the same way it is as when humans perform functions. The devices of the information revolution make it possible to decentralize functions even as their degree of integration is expanded.

We might be led to visualize the possibility of completely reorganizing the social and physical environment on the basis of optimizing human capabilities rather than allowing life to be determined by the mindless forces of technology and industrialization.

As the information revolution becomes the status quo, the form buildings and our cities will take is at best conjectural. But we can be certain that it will differ from the industrial city we know today just as the industrial city differs from the medieval city it replaced.

At left and on the cover are two stages in the manipulation by computer of a photograph of an Alexander Calder sculpture that wound up as an abstract illustration for a poster for the 1982 National Computer Conference. The designer was Leonard A. Johnson and the computer work was done by Dr. Werner Frei at the University of Southern California institute for physics and imaging science.

The Industrial Revolution Changed Almost Everything About Architecture All at Once

After the Civil War a tremendous acceleration and proliferation of industrial energy transformed American architecture. Woodworking machines of all kinds were invented and adapted to industrial use. The metalurgical industries first supplied cast products, then structural wrought iron, and eventually steel. They rolled steel sections for buildings as they had rolled rails for the railroads. Cement stone was discovered while the Erie Canal was being dug and was later mined and merchandised, greatly adding to the strength of brick and stone masonry. Ceramics and clay products were modeled and cast for building facades and pressed into molds as fireproofing tiles for wrought iron and steel building frames. Glass production was industrialized.

Wood, abundant and cheap, has always been America's favorite building material. As the pioneers moved from New England to Oregon, clearing the land and forests as they went, they supplied wood for the structures designed for all the new functions of an emerging industrial democracy. Wooden buildings lined the streets of frontier towns, dotted the prairies as lonely, isolated farmhouses, and were stuffed together on city streets. In this location they burned quite satisfactorily in the great fires of the period.

The power-driven tools—jigsaw, lathe, and bandsaw—cut, turned, twisted, and shaped wood, the ideal medium, to express the exuberant displays of what Thorstein Veblen aptly termed "conspicuous waste."

It was a period of buoyant optimism for those who commissioned ornate mansions and for those who designed them in the Italianate, Gothic, or Swiss chalet modes. It even permeated the packed slums of major industrial cities. It was a period that historian James Marston Fitch has described as a time in which only the promise and not the problem of the machine was glimpsed.

But even as the machines themselves were becoming more ingenious, wresting dominance and control over production from handicraft, early machines designed to control machines were invented. Among the first of these was the loom of Joseph Marie Jacquard, which directed weaving patterns using punched paper cards. The loom was bought by the French government and declared public property in 1806. By the 1830s Charles Babbage was inventing "analytical engines" that used the result of one set of calculations to determine the calculations to follow. George Boole published his method for solving problems of logic in 1854, and a number of logic machines based on Boole's method were built shortly thereafter. The first one of these to solve a problem faster than it could be solved by human hand was Jevon's "logical piano" of 1869.

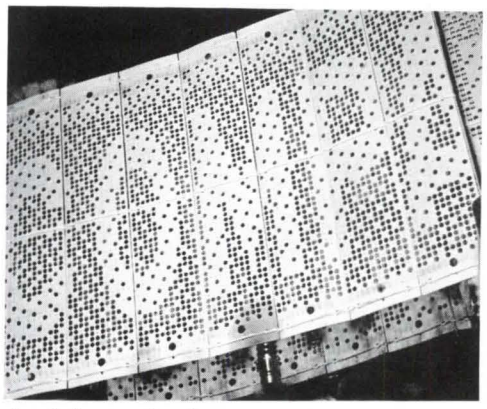
In the great rush of industrialization after the Civil War, building operations were taken from the hands of small independent craftsmen. The ratio of rented to owned dwelling units increased, and those who bought their houses bought them ready-made. Speculative housing became an industry in rapidly expanding cities. The American labor force became mobile, moving to concentrations of industry.

Mills and factories were no longer owned by scattered individual entrepreneurs, but were gathered together as huge plants by the new trusts. The building process underwent a quantitative change. Independent artisans became wage workers and trade mechanics. It was no more possible to build the great factories of the time using independent artisans than it would have been to operate them by employing cottage craftsmen, Fitch notes.

Parts of the building moved from the realm of architecture to that of industry. Stoves took the place of fireplaces, cabinets the place of built-in closets. More and more building parts were manufactured as industrial elements and brought to the building and installed. As industrialization became the mainstream of building that influenced all future changes for the next 100 years, the pattern book of the building carpenter gave way to the builders' catalog.

Accumulations of wealth brought with them an increasing complexity of administrative tasks. Buildings that were designed and built by dilettante gentlemen architects before the Civil War were more and more designed by architectural professionals. The professional became the ideologue of appropriate taste for new wealth. The design and building process passed from the hands of the skilled artisan to the professional architect.

As an advanced industrial, technological society took shape in the U.S., work skills were increasingly specialized. As work tasks were rationalized and standard-



ized the professions as we know them today took shape.

The American Institute of Architects was formed in 1857 but did not become aggressively active until after the Civil War. The first professional school of architecture is said to have been M.I.T., founded in 1886, which was followed quickly by Illinois, Cornell, and Syracuse. The first architectural journal appeared in Philadelphia in 1868.

Before there could be assembly lines and automation, factory work had to be systematized, just as office work was to be stringently organized before business machines could be introduced. Systems of work were vigorously instituted in industry by engineer Frederic W. Taylor, apostle of what came to be known as "scientific management" or "Taylorism," and by the 1890s Taylor was reading papers and publishing the results of his work.

It was during this period that John D. Rockefeller was attempting to establish a "gentlemen's agreement" in the oil industry to limit competition and impose order upon the chaotic conditions of competition. AIA was as anxious as Rockefeller to regulate the conditions of architectural practice. In 1869 A. J. Bloor, secretary and archivist for AIA, pointed out the need for organization: "However else American architects may differ, no one of us surely can blind our eyes to the fact that we cannot, isolated, yield each other the support that we may if we stand all over our common country on a common platform of professional principles. We need our special platform from which to train the public . . . while at the same time, we protect ourselves from the jealousy, the misunderstanding, and ignorance of each other, of our clients and of mechanics." Daniel H. Burnham called for a code of ethics in 1887 that would define, "especially what is professionally damnable" in architects dealing with each other.

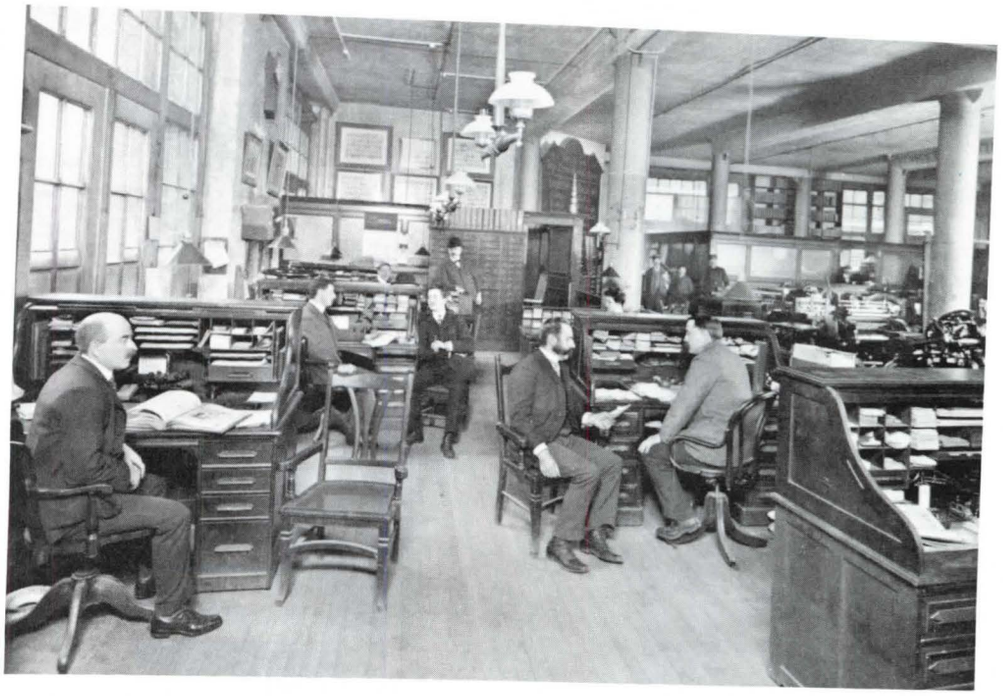
Fitch points out that there was a marked contrast between the relative simplicity

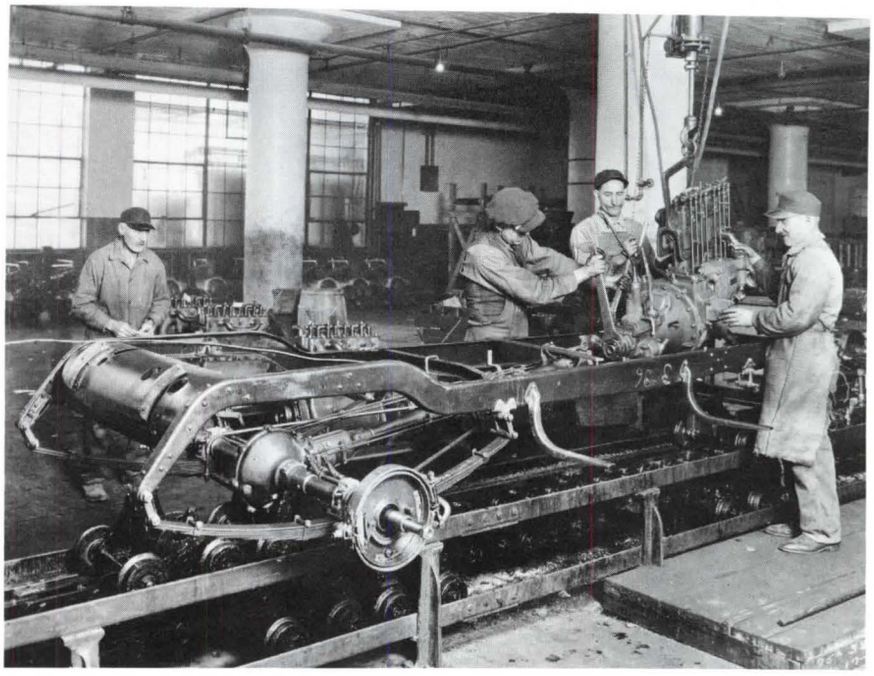
Mr. Driscoll *heads Porter Driscoll Associates, a Washington, D.C., consulting firm, and was formerly in charge of building technology for the U.S. Bureau of Standards.* **Mr. Marzeki** *is a professor of architecture at Catholic University, as is* **Mr. Wilson,** *former editor of* Progressive Architecture.

and homogeneity of the main esthetic current up to 1860 and the turgid flood of the three decades that followed. In esthetic terms this period has been described by one architectural historian as "an appealing decline in public taste" that marked "the lowest point to which American architecture had ever sunk." However, Fitch says, since the attempt is consistently made to explain esthetic phenomena in exclusively esthetic terms, the climactic change of the mid-century is incomprehensible. The forces—economic, industrial, political—that motivated the change had little to do with esthetics at all.

Prior to the Civil War there was little or no conflict between esthetic standards and technological levels of building. The building and its materials—stone, brick, wood, and metal as decoration or hardware—did not conflict with the structural and esthetic theories of post and lintel, load bearing wall, arch, and dome. Buildings until this time, Fitch reminds us, differed in few important respects from the building systems of the Greeks, Romans, and the Renaissance. The types of buildings required by a predominantly agrarian and plantation society were relatively few. They could be readily designed and built in traditional materials and along traditional lines. The society did not generate a wide divergence in ideology. It did not divide esthetic standards along class lines into good, "upper-class," and bad, "lower-class," taste before the surge of industrialization after 1865. Production and consequently design control was not yet concentrated in the hands of small groups of specialists, the professionals.

The flow of people, ideas, things—both inside and outside the building industry during these fateful years—was speeded up and altered to an extraordinary degree. The centuries-old limitations of size, density, and juxtaposition of buildings was shattered. With messages conveyed by pneumatic tube, the scale of department stores could be almost infinitely expanded. When freight and passengers could be moved vertically by elevators, the sixth floor became almost as accessible as the first. If a manager could by telephone, dictaphone, push-button, and loudspeaker direct 500 instead of 50 workmen, then factories could be much larger. If with wires, motors, and current one operator could control the machines that formerly were worked by 10 men, then the building automatically increased in size and complexity. The composition of the city could also change, for the shop no longer had to be at the pithead and the worker no longer had to live in the shadow of the mill.





The prerequisite of the assembly line, standardization, was fully developed by the first decade of the 20th century. Production processes were broken down into controllable repetitive, mechanical, and sequential activities. Systematization of the factory brought with it increasing mechanization.

Beyond supplying factory-made products to the increasing numbers who came to the cities to work in factories, mechanization also profoundly altered the role of the craftsmen engaged in the building trades. The availability and use of standardized building components transformed the previously complicated art of building into an assembly of manufactured parts.

Manufactured components had a strong visual impact upon American cities and an important influence on vernacular building methods and styles. The industrialization of building parts standardized design and changed architecture from a dilettante to a professional activity. Although the versatility of cast iron seemed boundless, only a limited number of styles and sizes could be warehoused economically. The result was harmony of materials and a unity of size and scale in architectural elements.

Industry responded to 19th century

taste by manufacturing and marketing the intricate designs demanded, and the railroads and canals served as vehicles to deliver them. The same building elements appeared simultaneously everywhere, at reasonable prices. They furnished a basic level of design sophistication, from frontier cattle towns to the suburbs of old New England cities.

Catalogs displayed new designs side by side with the conservative "best sellers" that had stood the test of time. Catalogs were both taste makers and taste levelers. Along with the builder and the engineer, the architect was a prime market for manufactured building components. But it appears that the architect seldom supplied the designs for mass production. These came from sheet metal workers and iron die makers and the designers of cast iron and wood model makers. Designs also do not appear to have been proprietary, for different companies in widely separated locations and at different times produced and marketed identical items.

The increasingly mobile population and the corresponding distribution of things and ideas demanded larger and more complex buildings than had hitherto been possible. It also forced a rapid specialization of building types, as labor had been specialized in manufacture. Little by little all of the innovations of the period were introduced into and became organic parts of building, heating, and sanitation systems and light, power, and communication systems. These grew in importance and eventually outstripped in cost the building structure itself.

The development of mechanically controlled interior environmental conditioning facilitated uniformity of building design, undifferentiated facades, and total dependence on the mechanical production of light, conditioned air, internal temperature, and humidity. A century after Mark Twain asked the question, architects finally did something about the weather.

The sealed office building formerly associated with center city areas is now, as we all know, the characteristic building form used for schools, hospitals, private residences, city apartment buildings, museums, motels, hotels, and factories. The simplification of building and the rationalization of architectural design rapidly encompassed the world. The International Style was not invented by Henry-Russell Hitchcock and Philip Johnson but was simply the rational result of industrialization. If Mies Van der Rohe had not been born, Kawneer *would* have had to invent him.

The Evolution and Growth of Machines that Produce Information Instead of Products

There are three mainstreams of innovation that either in concept, theory, or practice interacted and fused to create the workhorse of cybernation, the computer, as it emerged following World War II. These were "logical automata," "statistical machines," and "calculators." These three key concepts—an automated or self-controlled, self regulatory device; the process of sorting information; and the instrument of calculation—appear and reappear throughout the period of industrialization following the Civil War.

But the origin of the need for machines that counted, tabulated, and produced information instead of products began with the adoption of the U.S. Constitution, which states that in the interest of equitable representation a national census must be held every 10 years. The first was held in 1790.

A century later during preparations for the 1890 census it was found that the 1880 census was still being tabulated. The new figures would therefore be obsolete before they could be compiled and analyzed. A competition was held for a workable tabulating device. It was won by Herman Hollerith with an electronic tabulating system. The 1890 census figures were compiled by a force of 46,804, who completed forms gathered from each of 13 million families or households for a population of 62,979,766 using the new Hollerith machines.

The principle of machines controlling machines was widely accepted by 1910. Uses included thermostats for heating units, gyroscopes installed in torpedoes, and ball governors on steam engines. In 1911, James Powers invented an electric punching machine for tabulating and resigned from the census bureau to manufacture and market his invention. He also invented another machine that automatically printed the results of the punching operations. Just prior to World War I, "a great brass brain," a tide-predicting machine, was designed for the U.S. Coast and Geodetic Survey.

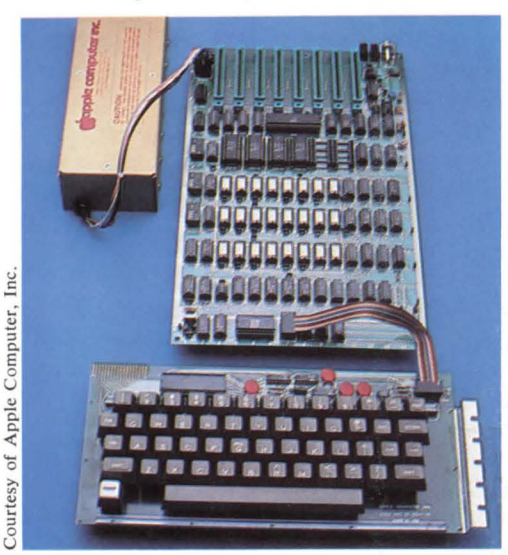
The First World War gave considerable emphasis to the information revolution. The War Industries Board set about regulating the production of all American industries and the control and distribution of their goods. The medical department of the U.S. Army measured 100,000 men and tried to ascertain their fitness for combat. Statistics were gathered to fit men to positions and into uniforms, and in the process it was found, as was expected, that Texans were the tallest, Alaskans the heaviest.

In 1927 the U.S.S.R. embarked on the largest and most comprehensive economic experiment ever undertaken, the first Five-Year Plan designed to assure total economic control of industry, agriculture, transportation, and power. It necessitated a tremendous gathering of data. By 1929 Russia was reported to be the third largest user of tabulating machines in the world after the U.S. and Germany, but this could not have represented a major ma-

chine commitment. For, in the same year, a survey revealed that only 2 percent of accounting in the U.S. was done by machines.

By the 1930s machines were beginning to use machines to control machine processes automatically, and the idea of control as a study in itself aside from the process controlled began to take shape. H. L. Haxan's classic paper, "Theory of Servo-Mechanisms," which studied some of the basic principles of cybernation, appeared in 1934.

A tremendous impetus was given to the gathering of information and its techniques by the Social Security Act. This required gathering and tabulating the employment records of 26 million people. It was termed the "world's biggest bookkeeping job," and was carried out in a brick loft building in Baltimore with 120,000 square feet of floor space that was structurally sound enough to bear the weight of 315 punching and accounting machines. The machines and the operation were said to be able to check and file half a million cards a day.



Courtesy of Apple Computer, Inc.

The first automatic computers were also making their appearance at this time. Vannevar Bush built one in 1930 for solving differential equations associated with power failures. And by 1933 Wallace J. Eckert linked card punching machines to perform complex calculations, and mechanical, reading, writing, and arithmetic was at hand.

Douglas R. Hartree, British physicist, used an automatic calculator to solve problems of atomic theory. Konrad Zuze built a calculator in the living room of his parents' apartment in Berlin. Zuze's machine pioneered the basic ideas of automatic computing, binary arithmetic, floating decimal point, program control, and punched tape. The computer was later destroyed during a bombing raid.

World War II brought many changes. Women were involved as programmers due to the shortage of men and as a newly created field there were few precedents for either sex. It was thought at this time and well into the 1950s that only mathematicians were capable of doing computer work.

Among the more spectacular cybernated machines to make their appearance during WW II was the M-9, which was designed to track German Stukas, compute the information, direct the guns, aim, fire, and hit the Stuka. In the October 1944 Allied defense of Antwerp, 4,883 V-1 rockets were engaged by the M-9, and 4,672 shot down.

The concept of operational research was said to have been born during the war when scientists from different disciplines were called together to advise the military on operational matters such as radar, air attack, and antisubmarine strategies. There was no precedent to guide strategists that combined concepts of new weapons foreign to traditional experience.

After the war, Norbert Wiener published his book, "Cybernetics: or Control and Communication, the Animal and the Machine," and the first general-purpose electronic calculator was formally dedicated at the Moore School of Electrical Engineering at the University of Pennsylvania.

By the 1950s the computer had appeared in essentially all of its present forms, but even those most familiar with it and its spectacular accomplishments were unprepared for its development during the next 30 years. Remington Rand installed the first production line computer, Univac I, at the Bureau of the Census in 1951. By this time, there were 13 companies manufacturing computers; IBM and Remington Rand led the field in 1953 with a combined total of nine installations. It was thought at this time, by those most informed, that at least 50 companies in the country would eventually use "electronic brains." The predominant technologies at this time were the cathode-ray tube, magnetic drums for computer memories, and vacuum tubes for logic and arithmetic. A measure of available computing "power" is the number of additions that all computers installed in the United States could perform in one second. In 1955 this number was estimated at 25,000 per second, which was approximately the operational speed of a single, fairly large computer in 1970.

The development of computer "language" in the 1960s removed some of the tedium from programming and resulted in a significant growth in the number of computer users. A new generation of computers appeared that integrated circuits and established a compatible fam-

Below, a huge and environmentally demanding early 'electronic brain.' Left, the innards of a more contemporary information machine.

ily of computers. Faster circuitry was devised as the number of computer installations increased. Machines were purchased by major corporations, government, and manufacturers. New ways of putting information in and getting information out appeared as the N.Y. Stock Exchange installed a computer that gives voice answers to telephone inquiries in 1965. It is said that the total computer power of all the computers in the U.S. had increased 800-fold by the end of the 1960s.

The computer and systems vendors did not give the architectural professions serious consideration until the 1960s. At first they were not overly successful. Equipment was very expensive, and few programs useful to designers were available. Communication between computer professionals and design professionals was limited at best, although there were some exceptions during these years. A few large architectural and engineering firms hired data processing consultants, established computer departments, and developed proprietary systems.

Automated Procedures for Engineering Consultants (APEC) and the Society for Computer Applications in Architecture, Inc., were established in the early 1960s to provide software exchanges among their members. But computer systems and equipment were still too costly for most design firms.

By the end of the 1960s there were over 6,000 computers in use by the scientific and business communities. There were also at least a million people involved in manufacturing, sales, and services, with another half million involved with occasional computer users. By this time calculating speeds had increased drastically. A reduction in computation costs by a factor of 10 encouraged many new users and uses of the electronic machines. New programming systems had increased programmer productivity, making the computer easier to use. Computers were performing tasks in more than 3,000 different categories.

In the 1970s minicomputers helped destroy the computer mystique. Computers moved from data centers to workplaces as office tools, and a new term, "distribution process," described this move. Information technology today is seeking to devise better ways to make data technology available to nontechnologists. This trend is accelerated by the proliferation of personal computers in the home and office.

A basic change has also occurred in the use of word processing, which differs in kind from data processing. "Data" has been logically defined and follows a set of programmed instructions. But when a machine moves from data to words, sentences, and paragraphs, logical definitions do not apply. A human must interpret text and then decide how it should be manipulated. Word processing demands direct continuing interface between human and machine.

Latest developments combine word processing machines with data processing capabilities acting as computer terminals providing access to a central computer over telecommunication lines. Ultimately every machine in an office that works with information will interconnect with a telecommunications network. Once connected, it will share its capabilities with all other machines tied to the network. For the user, typing into the network will provide access to information stored in the form of data on computers, text on word processors, images on microfilm, and voices on the network itself.

The network is the vehicle. All the powers of modern technology are made available to the entire work force through it. The machines become what the user wants them to be, and the implementing mechanism is the telecommunications network.

By the latter half of the 1970s, computers in design and construction had increased. The semiconductor industry provoked a downward price spiral, with microprocessors and semiconductor memory devices leading to inexpensive minicomputers. In a series of studies made by Sweet's, it was found that by 1976, of the 2,500 most active architectural and engineering firms, 30 percent were involved with computers. This number grew to 35 percent in 1978, leaped to 59 percent in 1979, and then jumped to 65 percent in 1981.

Two recent AIA surveys of member firms showed that the two areas of seemingly greatest interest to designers—computer aided design and automated drawing—constitute a relatively small percentage of use figures. It was 6 percent in 1980 and 9 percent in 1981.

Sophisticated automated drawing equipment remains a luxury in the large architectural offices. These machines remain relatively expensive. They were not influenced by the factors that drastically reduced the costs of other data processing equipment. The largest growth area was found to be in the area of word processing. This registered an increase from 35 percent in 1980 to 55 percent in 1981.

The Architectural Impact Of the Information Revolution Is Just Beginning

The electronic tools currently available are changing the staffing, organization, and operating patterns of many organizations. The ratio of support staff to operating staff is decreasing, and the nature of support is changing. Many of the things an individual's private secretary formerly did are now done by other, remote specialists. For example, typing has moved to group word-processing and filing to group electronic filing with controlled access. Visitor screening, preparation for meetings, travel arrangements, and appointment calendars are now taken care of by a single den leader for a number of executives.

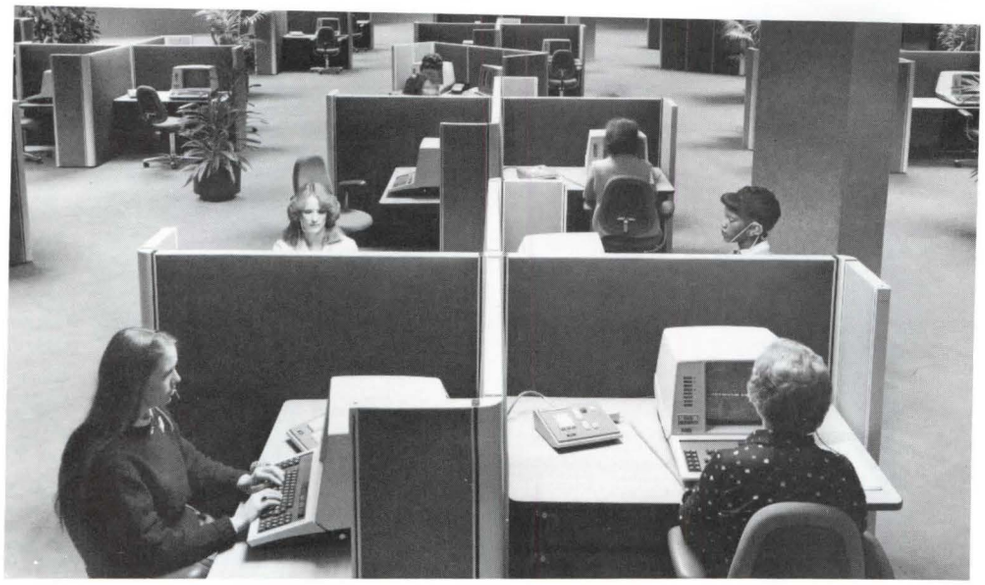
The impact of new operating patterns on clerical workers will be profound. Fewer will be required to produce, store, classify, cross-reference, and retrieve a given volume of information. The big change will be in the substantial clerical skills required to cope in a "technological jungle."

The impact on production and professional staffs will be even more profound. Many of the things once done for them by secretaries and other support staff can now be more rapidly and effectively done face-to-face with a cathode ray tube using a keyboard or a tablet to seek, manage, design, and communicate information.

When people no longer have to spend the time and effort to come together in a central place in order to work cooperatively on a given project, the chances for gains in individual efficiency and quality are tremendous, but the risks of loss of overall organizational effectiveness is even greater.

Few large, complete ideas are the product of a single brain. They are more often the accretion of many smaller ideas —combined, modified, and shuffled to become the great idea that brings about new products, improved products, and new uses of existing products. It has been found that the many small ideas that grow into a complete major concept are those that come not from outside consultants but from communication between fellow workers involved in the same or allied projects.

The adverse effects of electronic isolation of the worker can be compensated for by management policies and by the design of the physical environment. This can be arranged to encourage productive chance meetings of professional staff in the course of the day's work. The architectural setting can encourage easy exchange of ideas, both verbal and graphic (for an example, see page 75).



A sampling of current designs for cybernetic work stations.

The effect of change brought about by the impact of the information revolution has caused much speculation by many concerned groups and individuals. There is a wide divergence of opinion among managers, architects, computer vendors, labor unions, and public officials. Some are pessimistic and others optimistic about change. Yet all agree that change, whatever it is, will be revolutionary and will shape every aspect of the design and operation of the built environment.

There is also general agreement that as computers and the other tools of the information revolution are ever more widely accepted, fewer people are required to do information work. If one senior engineer with a computer can do his work plus that of three junior engineers, then smaller spatial requirements are necessary for the engineering staff. But who is to train junior engineers to become seniors?

Higher skills are required to perform a given job. An engineer, for example, must know how to manipulate computers as well as how to perform engineering duties. In the short term, he will receive higher pay. In the long term, a degree of computer literacy will be demanded of all staff. This knowledge is becoming easier to acquire as information technology is demystified, so that part of the engineers' skills are rendered obsolete.

Flex time and flex place become real possibilities. Electronic tools capable of spanning long distances to transmit and gather information can also process it wherever convenient. They can instantly distribute textual and graphic products anywhere. These capabilities make a central workplace obsolete except for those functions that require personal interaction.

Decentralized staff functions are possible. If managers and professional staff must be in the central city to interact with clients, it does not now necessarily follow that the clerical or administrative staff must also be there. Support personnel occupy costly center city space and usually must arrive at work at considerable cost whether driving their own vehicles or riding public transportation. A decentralization of some office functions is clearly indicated.

Electronic isolation can cripple productivity. People experience different reactions to isolation. Some continue to work productively but fail to achieve the levels of creativity that result from an exchange of ideas with colleagues. Others frankly "goof off" or develop such unproductive

work habits that they produce but a fraction of what they would achieve in more conventional environments. Although the present office organization is the result of and a remnant of the supervised factory system of the industrial revolution, it has engendered a tradition of work and work habits that carry over to the information revolution. They are difficult to readjust.

Perhaps a productive environment for professionals would be one in which there was time for private work that can be done anywhere, and time for joint work that would assume a different form where peer pressure, idea interchange, and reinforcement are made easy and natural.

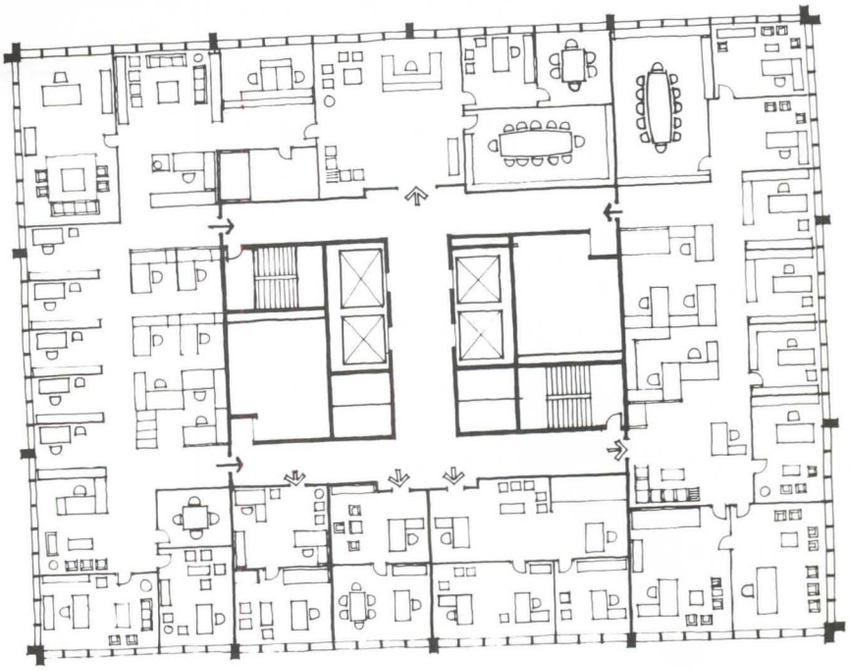
As the impact of cybernation on the office becomes more apparent and the social consequences clearer, the architectural forms that enclose and support office activities must be influenced. Some of the possibilities include more and smaller offices as decentralization becomes possible. Perhaps small offices grouped in a single building, placed nearer the homes of the staff but electronically linked to the central office, will become economically and socially desirable.

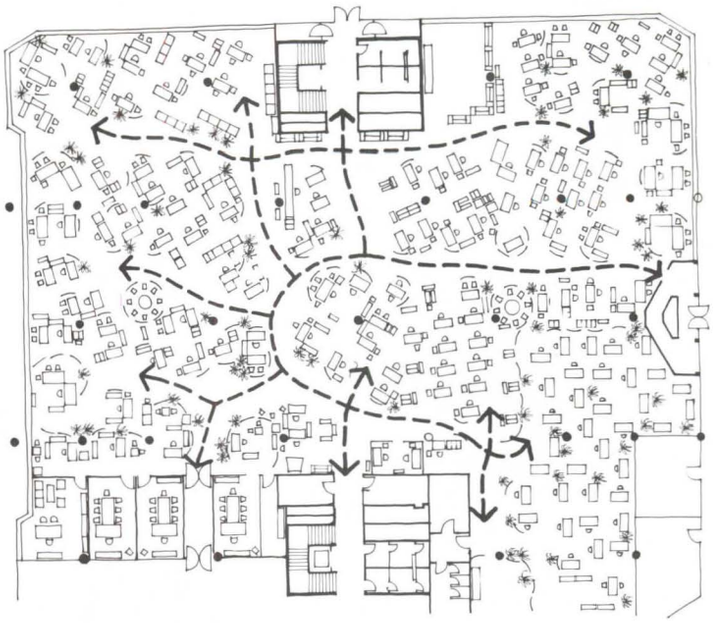
Partial or specialized central offices may develop. Electronic links make it possible to reduce the cost of renting office space, for all activities do not have to be performed at a single expensive central location, as they are now. Sales persons, account executives, some managers, and some professional staff may need to operate from a base close to their customers and clients and may, for this reason, have to be located in central business district office space. Other personnel and functions need not. For example, space-consuming resources such as law libraries no longer need to be placed in the high rent districts if the information in them can be derived electronically from an available source.

If office functions are separated in this manner, the central office would itself undergo distinct changes. It would accommodate as many high-salaried managers and professional staff as it does now, but a limited support staff would be in attendance. This condition would change office layout and the composition of office space.

More money will be invested in electronic tools and less in office design. The tools of the information revolution cost more than the ones they replace. They enable fewer people to perform more work. Both factors tend to reduce the percentage of company assets invested in architecturally designed space.

The demands of early information tools for space and elaborate environmental conditioning demanded by the earlier machines of the information revolution have eased. The machines have become smaller and more adaptable and produce less heat.





Design of the executive work station is a new problem. As executives come to terms with electronic tools and begin to use them directly and not through intermediaries, the executives and the tools will have to be located in closer proximity. The information instruments will have to be adaptable for use either when the executive is alone or in the company of others. They must be conveniently located but should not intrude to a degree that dominates the office and changes its character.

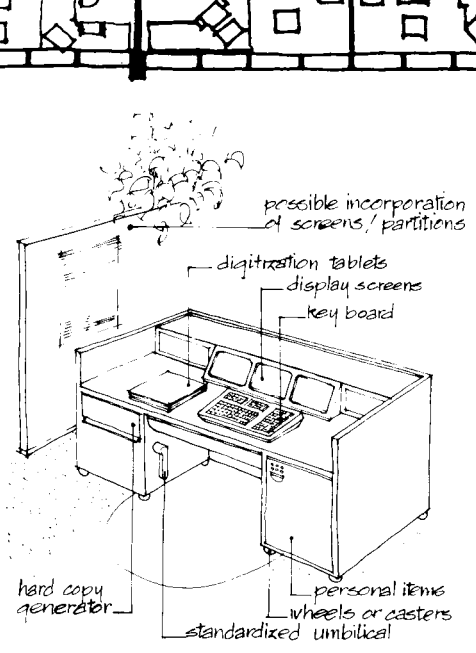
To be much more specific, what can we expect the physical characteristics of the office of the near future to be? Some aspects of current office design are likely to continue to be useful. In the area of general office services, the flexible utility grids that were laboriously worked out during the '50s and '60s, designed to provide power supplies at many points in either ceilings or floors, will still be needed. In the area of environmental atmosphere, all the little amenities—work clusters, plants, lighting, art work—developed to avoid an effect of regimentation and inhumanity, will also be needed, perhaps more than ever.

But other aspects of office design are subject to radical change. Some changes

Top left, the conventional partitioned office of yore. Above left, the office landscape with its layout following the flow of people —and paper. Above, a possible configuration of information age offices, as described in the accompanying text.

will be compelled by a change in the size and nature of the work force in a typical office. Combined with the partial decentralization already mentioned, we can expect, as a result of increased machine capability, a reduction in the percentage of the work force that can be considered low echelon. For other workers, we can expect a concomitant reduction in prestige symbols. Only those in the very top echelon will have a personal secretary or aide. The middle echelon workers will share the services of a den-mother (or den-father) who will have no particular allegiance to any one of them.

Space, of course, will continue to convey prestige, and top executives can be expected to continue to claim the big corner offices for themselves. But, on the whole, because of a greatly reduced requirement for paper storage and printed reference material, offices will shrink in size. The middle echelon worker will lose not only his secretary but also much of his space. His new symbol of prestige will be the equipment he is issued (as at right), its quantity and quality, and a major task of the architect designing his office will be to display that equipment in a way



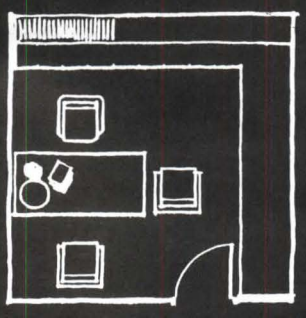
both functional and impressive. The industrial design that shapes the equipment will thus be an increasingly important part of the office interior, and the architect's task will grow increasingly closer to the discipline of the industrial designer.

Intervention of the new machines will reduce the number of conventional face-to-face contacts in office work. Recognizing the continuing value of informal idea exchange, however, good office design will probably, more than ever, emphasize opportunities for such exchange, as at coffee counters and in employee lounges. Conference rooms, too, will continue to be at least as important as in the past, but they will necessarily be equipped, like the private offices, with a proliferation of new equipment, allowing participants continued access to their own offices and information stockpiles while conferring with others.

Offices with 30 or more workers may well have a computer main frame room. Most actual calculations would be done there, with workers outside the room participating through terminals. As mentioned earlier, the size and heat dissipation requirements of such equipment rooms are diminishing, but good ventilation, moisture control, and, of course, power supply are still necessities. Because, at least for the moment, such rooms generate some noise, a degree of isolation is still also needed.

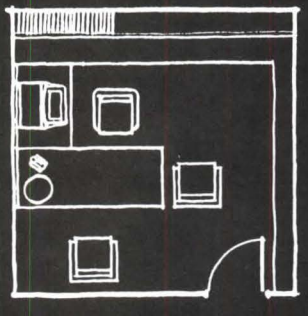
The medium or large office will also probably have a resident computer technician, possibly an electronics engineer with an MBA degree. This technician will be in charge of information storage, disks, and tapes, and will be in touch with hardware and equipment maintenance representatives. He will have his own office, full of displays and equipment for identifying and filing, with a small conference room adjacent to it.

The sales reps who call on this computer technician will present their wares in an appropriately new way, of course. Rather than bringing actual samples or written descriptions of their products, they will bring tapes or some other form of computerized information that can be shown, electronically, in the technician's conference room. Other visitors who come to call at the new office may be admitted or turned away by an electronic screening device. For the most part, however, the reception area will continue to be designed just as it is now, for such design is not so much an expression of function as a tool of corporate public relations. Even if the waiting area magazines disappear and are replaced by Pac-Man games, the reception area will remain the key to that vital first impression. The protocol-hospitality function of the receptionist may even become more clear, for he/she will probably no longer be asked to perform typing chores.



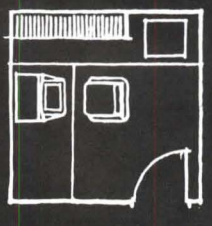
Original State

Face-to-face contact between executive and personnel the primary mode for delegation of work. Written records of work and correspondence maintained and stored in form of paper copies.



Transition

Introduction of personalized electronic data system. Some reduction in space possible. Face-to-face contact reduced by video contact.



Machine-Assisted 1

Considerable investment in personalized electronic data system. Information simultaneously shared at different locations. Need for face-to-face contact further reduced. Significant savings in occupied space.

Machine-Assisted 2

Furniture for the new office is already different, presenting designers with different planning implications. Partly because of the relative expense of the new equipment, there are new provisions for equipment sharing, such as 120-degree work stations that allow three workers to use a single swiveling terminal. Some conventional rectangularity will have to give way to more exotic configurations.

The office chair, as well, has undergone a change. Like the chair in an airplane cockpit, it takes advantage of ergonomic considerations, providing optimum sight lines to equipment and considerable seating comfort and health. The office chair may even be like a cockpit in another way: It may be "hot-seated," scheduled for use by different workers at different times of day on a flex-time schedule. Such chairs must be sophisticated in their adjustability.

In subtle ways, the new office may be more serene than the office of the past. In a reduced-paper operation, noise levels will likely be reduced, and some of the clutter characteristic of paper use will be gone. And sight lines between workers and equipment may generate a new aura of inviolate privacy, much like the space between an intent viewer and a displayed object in a museum environment.

The information revolution has implications at urban scale as well. As some office functions come to be located away from the high-rent central business district, we may well see a return flow of housing and other uses from the suburbs back into the city's former office buildings. The ideal of standardized, universal, multifunctional architecture is an ideal in very poor repute these days, but it is one that might, nevertheless, be redeemed. For the fact that highrise office buildings and highrise residential buildings are quite similar in form and materials has been well established by Mies' Lake Shore Drive apartments and Seagram building, to name the most obvious examples, and the adaptive use of such skeletal building forms could be the basic pattern of work for the architects of the information revolution. If this is so, the fearsome prospect of replacing people with machines may, in the long run, bring us a very pleasant surprise: It may revitalize our cities. □

A Building Designed To Counter The Isolation That Can Be A Byproduct of Cybernation

The W. C. Decker engineering building at the Corning Glass Works houses nearly a thousand people who spend their workdays among sophisticated laboratory equipment and machines, or with such less cybernetic but no less demanding equipment as drafting tables. A central purpose of the design was to provide them with maximum visual and social contact with each other when they look up or rise from their tasks.

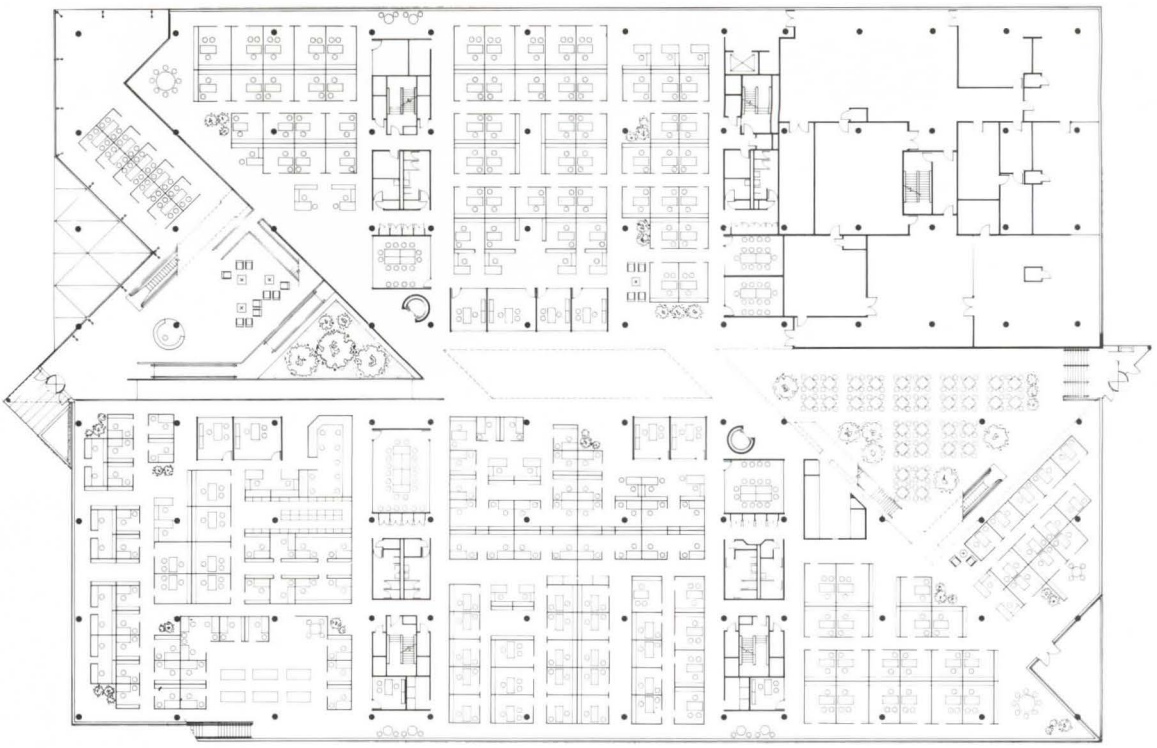
The means that architects Davis, Brody & Associates used to achieve this purpose included making it an open, airy building with glass looking inward and outward and few full-height partitions except at the laboratories. There is a variety of meeting and conference spaces, lounges, and, at projecting bays in the sleek exterior walls, there are small alcoves (below) for chance encounters along the perimeter corridors.

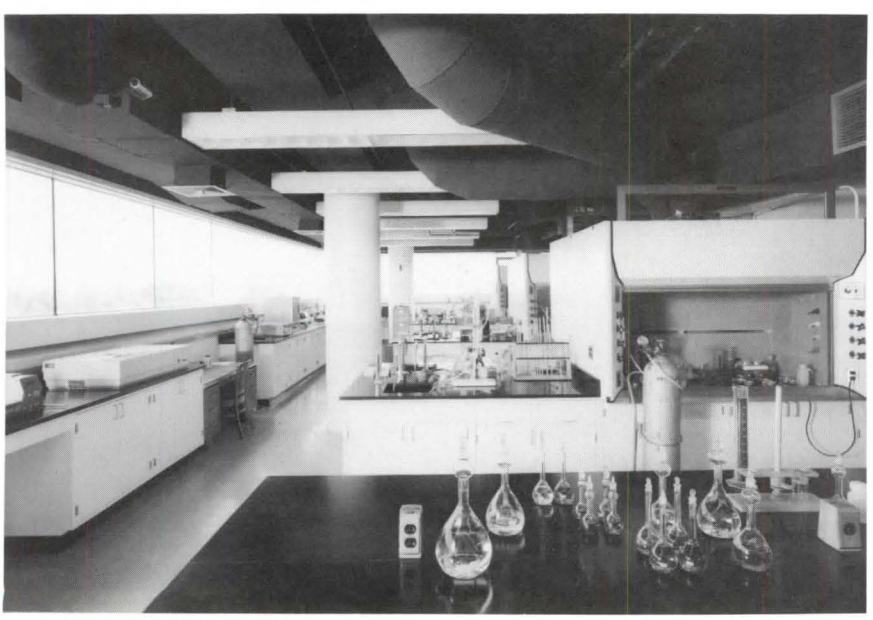
The offices, laboratories, and communal spaces are on three "trays" organized around a skylit, angular atrium. The atrium is criss-crossed by escalators, ramps, and stairs, kept open as yet another device to encourage interaction. The main lobby leads into the atrium, as does a less formal entryway beside a cafeteria, which is the one used most by the building's occupants.

The building consciously echoes the black glass and gleaming metal facades of the earlier glass works buildings, many of them the products of postwar years. The black bands here are clear glass with a ceramic coating, and their horizontality is emphasized by half-round aluminum bands around the vision glass.

Protruding 'bubble' in exterior wall beside perimeter corridor provides a place for impromptu conversations.

Photographs by Robert Gray





Above, the second floor plan. Left, two of the building's workspaces. At right, the atrium that provides the unifying element of the interiors plus a variety of opportunities for casual encounters among the occupants.

Photographs by Robert Gray

A Tower Expressive of Unique Interiors

It embodies Frank Lloyd Wright's ideal of the tall building more than any of his other work. By David De Long

David De Long

During his long career Frank Lloyd Wright designed many towers, ranging from a 60-foot-tall windmill for his Wisconsin aunts (1896) to the mile-high Illinois project (1956). Only two that would qualify as actual skyscrapers have so far been built: the Johnson Wax Research Tower, Racine, Wis. (1944-47), and the Price Tower in Bartlesville, Okla. (1952-56). Of these, it is the latter that more fully embodies Wright's ideal of the tall building, and it is in this sense that it should be judged. More than an individual solution to a particular problem, it affirms Wright's belief in the skyscraper as a viable form and reflects his desire to guide its evolution. Typical for Wright, the essence of its design is a concept of interior space with no exact parallel outside his own work.

Dr. De Long, an architect, teaches architectural history at Columbia University, where he is chairman of the division of historic preservation in the graduate school of architecture and planning. For their help in preparing this article, the author thanks Joe D. Price, Mrs. Harold C. Price Jr., Mr. and Mrs. H. Charles Price III, and Bruce Goff, as well as Ray Steiner, John W. Cameron, and George Keeler of Phillips Petroleum.

Like many of Wright's clients, Harold C. Price was a successful, independent businessman in charge of the company he had founded. Trained as a chemist, he had moved to Bartlesville in 1915 to work in one of the local zinc smelters, and when it closed five years later borrowed money to set up one of the first electric welding shops in the area. Price devised techniques for welding oil pipeline, and his shop, supported by the area's rapidly developing oil industry, became a major pipeline construction company. In seeking an architect to design an office building that might be an appropriate symbol of his company as well as an asset to his community, he consulted his two sons, Harold C. Jr., and Joe D. Price. The latter was then a student at the University of Oklahoma. Guided by a friend who was an architecture student, he, in turn, went for advice to the chairman of Oklahoma's school of architecture, at that time Bruce Goff. Goff confirms that he recommended Frank Lloyd Wright and even helped arrange a meeting between Price and Wright at Taliesin. Joe Price, who accompanied his father on that exploratory trip, remembers it as being in 1951, and further recalls how, at their first meeting, his father was not only convinced to hire Wright, but to abandon his earlier idea of a three-story office building

in favor of the 19-story tower that Wright advocated.

Wright's enthusiasm for a tower is understandable. Then in his mid-80s, he looked back on a career in which some of his most important designs had been for towers that had never been built. These included the National Life Insurance Co. project for Chicago, designed over a period of years between 1920 and 1925, for which Wright proposed cantilevered floors with exterior walls treated as sheer screens of glass and metal. They also included three related apartment towers for St. Marks-in-the-Bouwerie, New York City (1929), with intricately shaped floors also cantilevered from a central service core. As Wright himself has pointed out, the St. Mark's concept was further developed in projects that included the grouped apartment towers, Chicago (1930); the Crystal Heights complex, Washington, D.C. (1940), and the Rogers Lacy Hotel, Dallas (1946). Still further refined, it served as the basis for the Price Tower. The location of the tower within a small town, and the possibility of combining offices and apartments within one building, provided an opportunity to express ideals that had become an essential component of his mature architectural vision.

Built as Wright designed it, the 19-story tower rises 186 feet, its upper profile extended an additional 35 feet by the slim spire of the specially designed television antenna. The building is surprisingly small: only 37,000 gross square feet, counting the two-story wing of offices at the base. The typical floors are barely 1,900 square feet each. It is amazingly complex: No two elevations are alike, each is accented by different sorts of angled projections, and special elements enrich both base and summit. Had these effects been arbitrarily contrived to achieve mere visual complication, it would seem very much of our own time. Yet Wright has made clear in various writings that each complicating element reflects some special condition of plan or interior volume, that each part of the plan derives from a carefully reasoned program, and that the program itself developed not only from the special conditions of the commission but also from underlying principles of a more universal nature.

Concrete floor slabs are cantilevered from four vertical supports, each hollowed near the center of the building to contain service ducts and an elevator and each extended out to form an 18-foot-long fin. At the center, they describe a small elevator lobby. Individual floors are approximately 45 feet on each side, and rotated 30 degrees in plan over the supporting fins, except in the southwest corner where, on alternate floors, the quadrants are not rotated but instead intersect their nearby fins at right angles. These quadrants are the lower floors of duplex apartments, with double-height spaces at the outer corners resulting from the alternating patterns of the floors themselves. Bedrooms on the upper level of each duplex apartment overlook one corner of the living space below, and each bedroom level opens to a small balcony that is formed by the projection of this quadrant beyond the line of the differently aligned floor below. The other three quadrants of each typical floor were designed as offices, and the arrangement of these offices as well as of the apartments was made to follow the modular unit of the floor: a diamond, or parallelogram, with principal dimensions of two feet, six inches. The lines of these modules are scribed in the polished red concrete of the floors, where they show an alignment that is also rotated within each quadrant. Hexagonally planned service elements containing kitchens, toilets, or stairs cantilever beyond the floor at the points where the typical floors intersect the supporting fins.

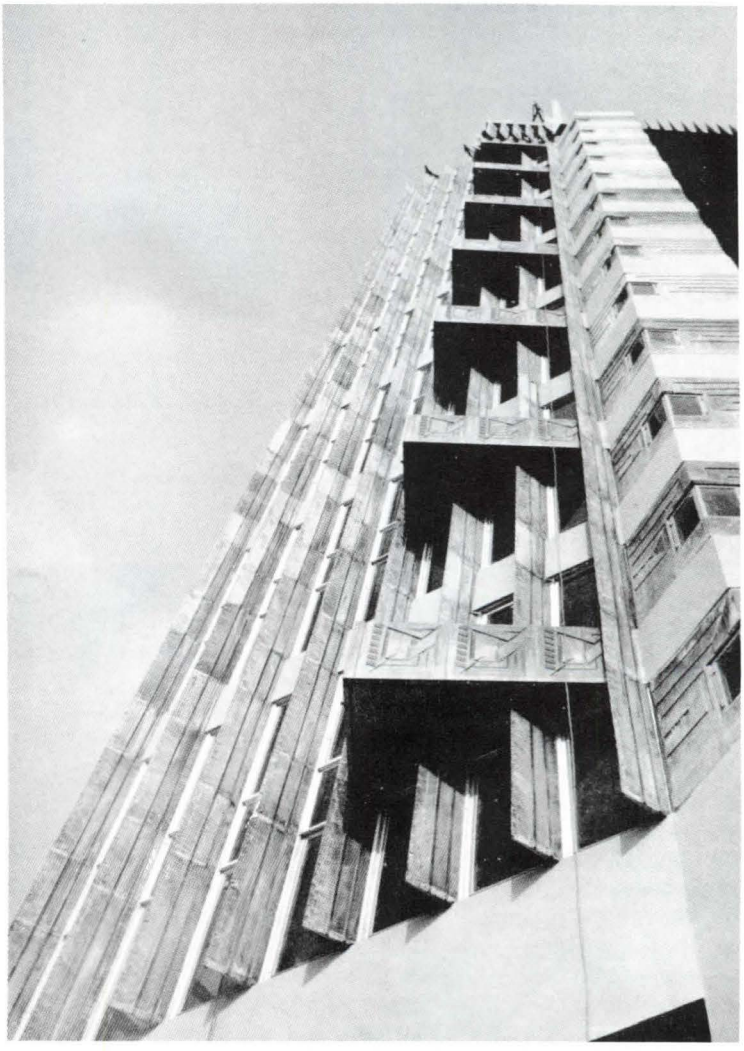
Near the top of the building, selected quadrants are removed to form terraces that relate to special uses within. A richly tapered profile results. A small buffet with terrace is placed on the 16th floor; the top duplex apartment together with separate conference and reception rooms are on the 17th and 18th floors. Alone on the top floor, Harold C. Price's private office, with fireplace and tall glass doors, overlooks private terraces and the Oklahoma plains beyond.

At the base of the building, one- and two-story extensions partly enclose protected entrance courts for automobiles and pedestrians. The simple doorways at ground level are sheltered by the overhanging floors above: There is no raised platform proclaiming special importance. The second floor is treated as a mezzanine level, allowing portions of the small, humanly scaled lobbies to open vertically.

Copper louvers further vary the facade. These were designed to shade the extensive glazing from the relentless Oklahoma sun, and are placed vertically on the southwest, where they shelter the duplex apartments, and horizontally on the other sides, where they protect the offices. Alternate spandrels corresponding to the balcony levels within the apartments are sheathed in copper, their embossed pattern an abstraction of the modular unit of the floors.

The very complexity of the building, and in particular the insistently angled perimeter sheathed lightly in glass and copper,

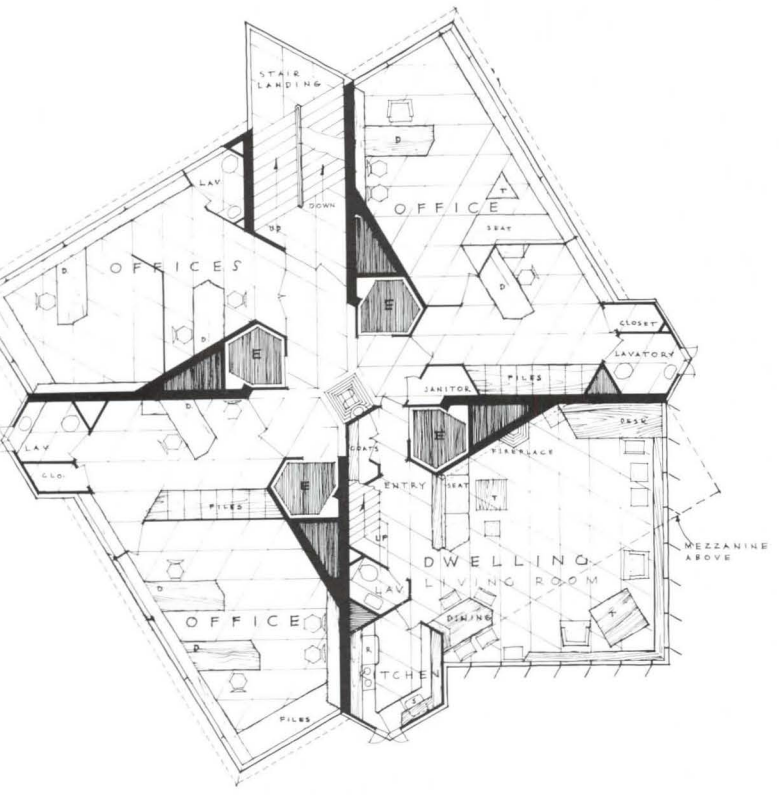
Across page, the tower remains a startling presence in the flat landscape and the modest city around it. Below, the building's bristling edges and richly patterned surfaces.



A quest for individuality everywhere.

gives particular identity to each space within, a feature that, for Wright, counteracted the anonymous character he associated with conventionally designed buildings of the time. Inside, he believed, the varied angles of the plan encouraged a flexible sense of human movement, one far less restrained than would be possible in space enclosed only by right-angled planes. This feature reflects his search for an architecture appropriate to a democratic society. As Edgar Kaufmann, jr., has pointed out, this ideal of freedom was partly achieved in individual dwellings by keeping the perimeter as physically unrestrained as possible. A solid core, generally containing a fireplace as well as related services, provided the stabilizing sense of place within. In the Price Tower, Wright has applied this theme of the individual dwelling to a multistory building, countering the restriction imposed by stacked floors with full glazing at the perimeter. Cantilevered construction allowed such perimetric freedom, and the visible mast of the central support emphasized a tangible reality of anchored place. *Special fireplaces* were included in each apartment, marking the location of the core. Designed as a kind of grand gas log, they also, as Wright suggested, celebrated the area's natural gas and oil resources.

Wright's published writings also reveal a special interest in the relationship between home and office. He believed some people benefited from the joining of both within one building, as a richer, more connected life could result. His own office operated in this manner, a natural result of the arts and crafts movement in which he had once actively participated. The rhythmic continuity that such a relationship provided paralleled the spatial continuity that he sought in his buildings, and the Price Tower became a vehicle for the expression of this principle. The separateness of the outward-looking offices from adjoining units reinforced the independent situations of the various tenants, for Harold C. Price intended the building to be partly a commercial venture, and his company occupied only the top office floors in addition to the penthouse levels. This program contrasts with that of the Larkin Co. (1904) and Johnson Wax Administration Building (1936-39), Wright's other major office structures that were treated as single, interconnected spaces. In the Price Tower,



the building's unity is implied rather than literal, symbolized by Mr. Price's penthouse office that unites the quadrants at the very top.

Finally, the very location of the tower illustrates Wright's broad vision of an ideal society. His various proposals for planned decentralization called for towers to be located within small communities, placed where their height could be visually appealing, within an uncrowded environment and providing views from within out over the countryside. Bartlesville, with its 1950 population of only 19,000 and with only one other tall building at the time—the 14-story Frank Phillips Building (1927)—must have seemed the right place to demonstrate the viability of this concept. Here the tower could be an effective visual symbol of the Price Co., balanced in a picturesque sense by the very horizontality of the area itself.

Construction of the tower began in November 1953, and it was officially completed in February 1956, according to contemporary accounts and Price family records. Joe Price remembers a period of well over one year spent on developing design and working drawings before construction actually began. Disputes between Wright and local building officials regarding such issues as a multistory office building with only one stairway were sometimes resolved only when Harold C. Price met directly with the town's mayor.

The client's top floor apartment and office, with furniture designed by Wright for the building. The black and white photos were taken when it was first built, the color recently.

David De Long

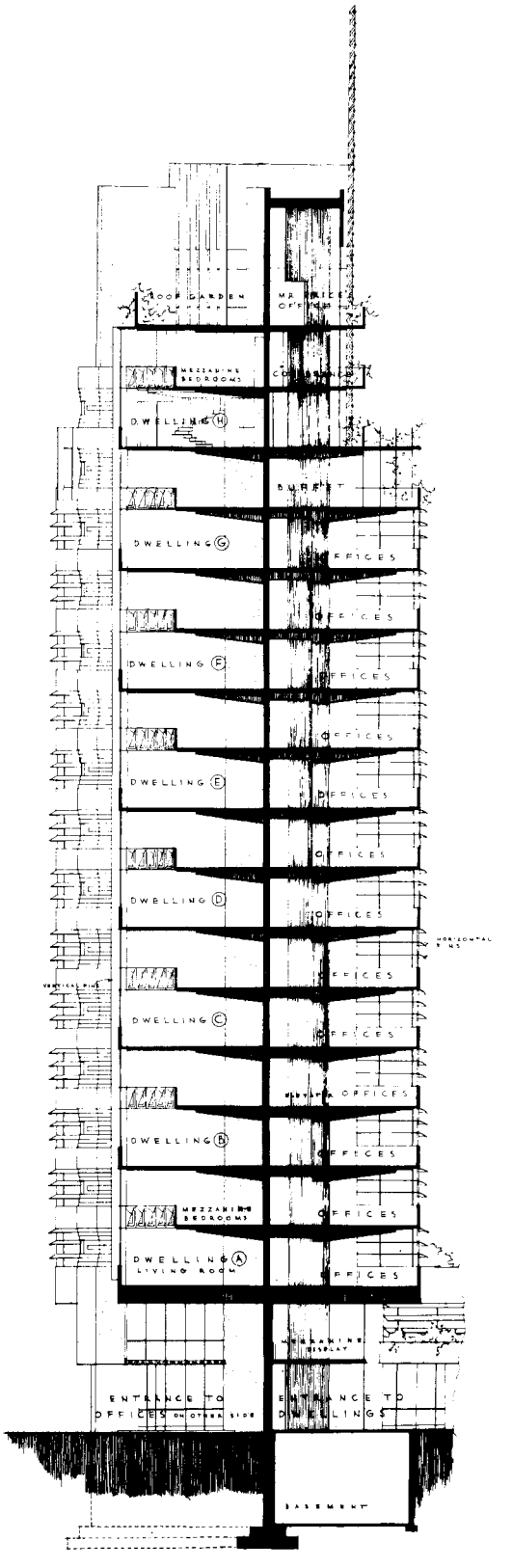
A 'gentle skyscraper' that escaped the city.

The building served well as the Price Co. headquarters, and tenants were readily found for the other offices. Stories do circulate concerning the toilets, which are somewhat too intimately located within each office quadrant, and of a doctor's patient who mistook one of the building's small elevators for the room in which she was to give a urine specimen. The apartments were more problematic. Only two seem to have been used as Wright intended: one by Joe Price while he was working for the company, and one by Bruce Goff who moved into the tower early in 1956 and maintained his apartment and office there until 1964. Goff remembers periods when he was the only resident, though at one time as many as five apartments were let. By Midwestern standards the apartments, though convenient as well as elegant, were considered small. For no more than it cost to rent one, it was possible to buy a house in a small Oklahoma town in the 1950s. Gradually they were converted to additional rental offices, their living spaces divided and balconies closed in; by 1972 only the top unit remained, retained by the Price family.

In 1981, following a reorganization of the Price Co., the building was sold to Phillips Petroleum, Bartlesville's largest company. The Price Co. no longer occupies any space in the tower, but happily some of the extraordinary chairs, desks, tables, and other pieces of furniture that Wright designed for the building have been saved. A few of the pieces are still in their original setting, where they enhance the building's appeal.

Practically no changes have been made to the exterior of the building itself, and it is beautifully maintained. The town has grown to more than 34,000. There are fewer houses and more nonresidential buildings nearby, and several newer structures rival the height of the Price Tower, though at a comfortable distance. Inside the tower, in addition to the conversion of apartments to offices, a ground floor space intended as a shop has been handsomely converted to a reception area, its Wright-designed cabinets and seating retained. Between the tower and attached two-story office wing, a roofed drive that originally linked the office and apartment courts has been enclosed to serve as additional office space, and changes in layout have been made within the two-story wing itself. Upstairs, in the tower, Phillips has located its geophysical branch. The teams of two or three people that work together in this branch are reportedly well served by the flexible areas within each of the relatively small quadrants of the tower. The employees' buffet on the 16th floor is still in use, little changed and still welcoming. The top apartment in which Joe Price lived, later altered by other members of the Price family, now stands empty except for some built-in shelves and tables. Part of Wright's signed mural also remains. Harold C. Price's penthouse office survives largely unchanged, its built-in desk and glass mural intact. These significant records of Wright's quite charming version of American business should be preserved, for they offer clear evidence of the building's meaning and its appreciably human scale.

When the Price Tower opened, Wright wrote in *Architectural Record* (Feb. 1956): "This gentle skyscraper has escaped the big city to live in an American town in the country . . . to stand there in its own park, casting its own shadow upon its own ground." Its special qualities were sympathetically treated in many articles that appeared during and immediately after construction, yet underlying these articles of the early 1950s was an implication that any building so rich in ornamental values must belong to another age. Indeed it did. □



Section show the structure's repeated cantilevers. Spaces marked dwelling have now been converted to office use.

David De Long

Postwar Prototype in Downtown Portland

Belluschi's Equitable Savings and Loan building was an instantly famous, then long forgotten classic. By Jeffrey Cook, AIA

Equitable Savings and Loan building in Portland, Ore., by Pietro Belluschi, FAIA, looks just completed. But this spare, glassy, urbane structure had its grand opening in January 1948. The cost was $4 million. Acclaimed as an esthetic and technical triumph, it became instantly famous in those lean years.

There is something very current about this fragile looking 34-year-old box that just received AIA's 1982 25-year award. The Equitable was and is a progressive piece of architecture.

There are so many firsts to the building that they sound like an entry in the *Guinness Book of World Records*. In spite of the popular importance of Skidmore, Owings & Merrill's Lever House, completed in 1952, it was Belluschi's Equitable building that set the pattern for postwar commercial architecture in the U.S. The Equitable was the first sealed glass building, the first fully airconditioned, and the first with exposed aluminum cladding.

It also was another first. During World War II there had been a moratorium on the construction of commercial buildings so that capital and material could be directed toward the war effort. In the postwar adjustment toward a peacetime economy, a national building permit system was instituted to regulate the transition. In 1946 Ralph H. Cake, the visionary chairman of the board of Equitable Savings and Loan, took plans for the proposed building to Washington, D.C., and obtained the first permit for construction of a large commercial building under the program. Site clearance began in May 1946.

In fact, the building had a much longer gestation. Belluschi credits part of its success to the longstanding association and friendship he had with Cake, a familiarity built through the years that bred both confidence and understanding. Thus the architect was in a position of trust that allowed the most progressive building of that moment in the world to be built in a small city in the Pacific Northwest.

When first published, it was called "an architect's dream" to have such an open client for such a daring program. But building the Equitable was no ideal dream, and no open-ended contract. Nor was Belluschi some out-of-town superstar. He was a Portland architect known for his refined wood houses and churches. He already had more than 20 years of architectural practice and social belonging in Portland. As an architect and as an educator, his national and international recognition would come later. Certainly some of that reputation might be based on the distinctions of the Equitable—his first large urban architectural challenge.

Although the Equitable is typically catalogued as an International Style building, its architect was also inspired by local resources: Both aluminum and electricity were cheap and abundant. He also anticipated their abundance on the worldwide exchange and was challenged by the esthetic frontier of that new building material.

Technical uncertainty arose in the new use of exposed, unfinished aluminum. It had not been applied to large surfaces in polluted urban environments. Its use was inspired by airplane construction, but there were no illusions of stressed skins or wing-shaped streamlining. One application, however, the pop rivet that made the aerodynamic skin structural, became the surface fastener that made the architecture flat and smooth regardless of temperature variation. The charm of these stainless steel mechanical pimples is one of the humanizing subtleties when one sees the building first-hand. Somehow photographs cannot quite capture the delicate tatoo of the skin rivits, even though the often admired flatness of the exterior skin is the basis of the building's characterful complexion.

With the crystalline Equitable, the silvery sheen of the exterior envelope is both fragile and firm. The exterior wall has a maximum reveal of seven-eighths inch. Thus the Equitable is a full-sized building constructed of modern materials but assembled with the precision of a fine cabinet. Belluschi's finesse in revealing the grain and fiber of every surface is highly visible. This esthetic refinement is one that seems seldom to have been attempted with industrialized sheet or planar materials except in the seamless world of extrusions. And most of the commercial style of American building, whether viewed only since midcentury or since Sullivan, has been mullioned.

Properly this is neither a curtain wall nor a window wall. The concrete frame is sheathed with shiny aluminum. Windows extend from column to column and from the 27-inch-high sill to the ceiling. The solid spandrel in front of the continuous windowsill cabinet is exposed cast aluminum—another first. Its deep gray texture contributes a third major color to the elevations, providing much more depth and liveliness than any two-tone facade. Behind the aluminum, a poured concrete spandrel beam with light-weight aggregate stiffens the frame and satisfies the fire marshal.

When built, the Equitable was called a skyscraper, although it is a slab and not a point block. Its 12 stories were a height once considered the optimum balance between vertical service distribution and horizontal usability. Since its proportions are so well studied and its repose so complete the Equitable has been viewed as a kind of apogee: as a classically refined and completely resolved masterwork. Normally, such integrity implies that nothing could be added or subtracted but for the worst. Another view might reveal the Equitable building less as a perfected fait accompli than a systematic resolution pliable to change —a set of extendible if finite fundamentals.

In fact, the Equitable has been subject to a series of dramatic changes, additions, and alterations that might have destroyed the equilibrium of a lesser building. In 1959 a 13th floor was added by Skidmore, Owings & Merrill, which had acquired Belluschi's office when he became dean at M.I.T. And on both

Mr. Cook is professor in the Arizona State University college of architecture and editor in chief of the *Passive Solar Journal*.

The building at left above, is characteristic of Portland's own downtown, into which the Equitable building, center, was a startling insertion in immediate postwar years. Left, Equitable and Portland's lively streetscape.

Photographs by Lawrence Hudetz

Changes proved the design's resilience.

the north and south elevations floors have been added, raising the rear bulk of the building from the original two stories to six stories to match the height of adjacent buildings. Yet the imagery of disciplined slab prevails, and the spirit of reposeful proportion continues.

There have been poetic descriptions about the color of the Equitable building as an ethereal ode to mirror city, sky, and forest. Whatever the effect, the architect is blunt about the esthetic origins of the color. There were only two choices of glass color: clear or sea green. In an attempt to balance interior daylight, green was chosen. It is still manufactured. Although it is the same stock color later used on Lever House, the effect is profoundly different. For Lever House, greenness pervades and relief comes from the stick frames of aluminum extrusions.

On the Equitable, interest comes from a dance between the continuous and the discontinuous. The tripartite windows and the staccato of short mullions in the spandrels produce playful interleaved rhythms at a close esthetic distance. As a whole wall, the shifts of color and texture between green glass and two distinct colors of aluminum provide compounded images of constantly changing contrast in value and interest. Thus the flush wall is a series of understated interlocked visual dialogues: between frame and infill, between reflective and opaque textures, between colors and values, and between rhythms of sets of lines.

In the 1940s, sealed doubleglass was uncommon. Although it was a construction product that had been introduced in the late 1930s when it was an important element in the Keck and Keck development of solar houses, there were many failures because of poor seals, so the product was withdrawn. After World War II sealed double glass units were reintroduced, but it took audacity to base a whole wall system of a large building on such a product.

The glass and shiny aluminum make the wall seem bright and clean in an overcast climate. On a sunny day with wind from the east, it positively glistens. To Belluschi's eye the original combination of green glass with two colors of aluminum was pleasing but conservative and perhaps too cold. He therefore sought ways to make the lobby bright and colorful, even asking Alexander Calder for sketches.

As completed, the design concern for interior detailing was so thorough that the exterior wrapping might be imagined as an afterthought. The concept was of a daylighted office in which free light, space, and air were the refreshing qualities of the new work environment. It is interesting that this first completely sealed building and totally controlled interior environment should be based on daylighting. The fixed windows with tinted glass controlled glare and eliminated the need for drapes or blinds. Being insulated, even though in a mild climate, the windows did not represent cold radiant surfaces. And the air distribution system, with many small diffusers in the ceiling and returns in the cabinet under the window, eliminated drafts and blasts.

The most design care was focused on the ceiling. Cold cathode

Lawrence Hudetz

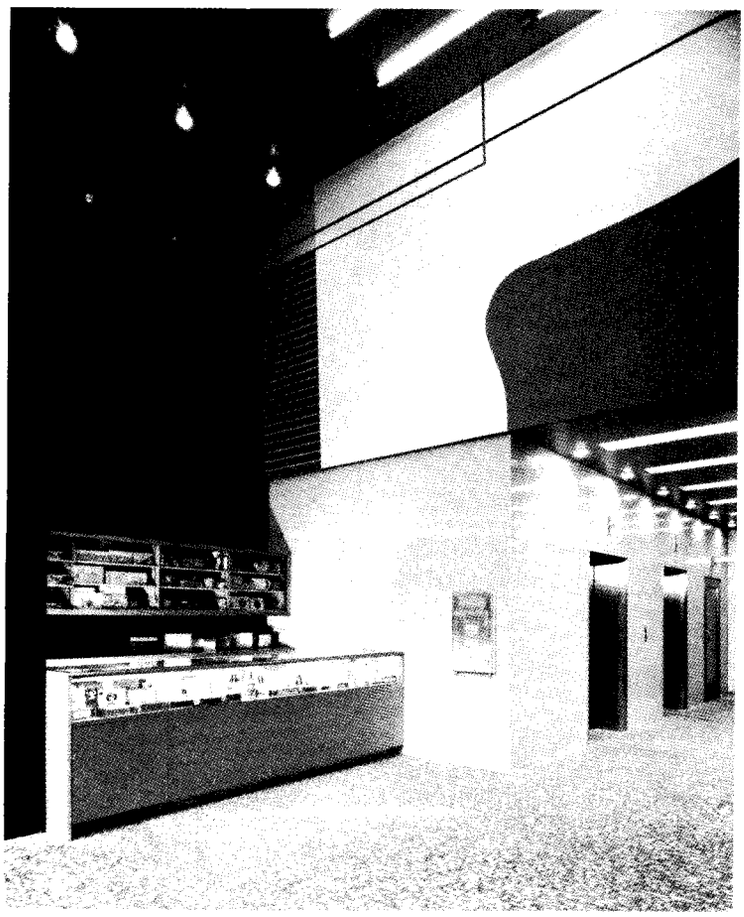
tubes eight feet long were chosen as the most advanced lighting available. It was the first major building to use cold cathode lighting throughout. Their color balance was much closer to daylight than fluorescent, and they had no flutter. The low-voltage tubes were surface mounted on a dropped acoustic ceiling. Because of their low surface intensity, no diffusers were necessary, and the tubes spanned the ceiling between sockets, using the ceiling itself as a reflector.

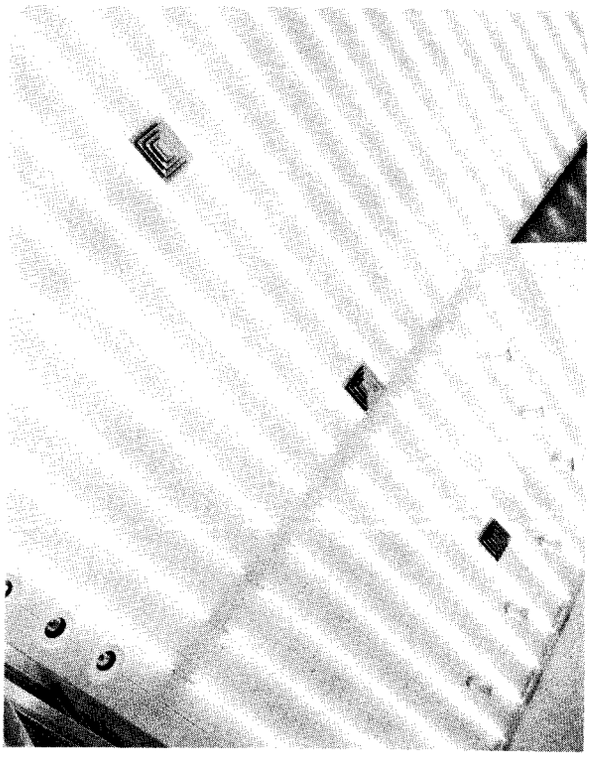
The drop ceiling was fitted with continuous multichannel metal chases at eight-foot centers. With raceways for both electric power and for telephone lines, the ceiling became a much more adaptable and flexible grid than floor chases. Access was made by drilling through the thin floor. Perforated covers allowed return air into the air plenum above the ceiling, thus keeping lighting ballasts cool. The regular and frequent spacing of air supply diffusers allowed lighting fixtures to run both parallel and at right angles. The integrated ceiling design thus became a continuous modular activated service surface with many layout opportunities. It was a unique and thoughtful system that now is covered by a more conventional hung ceiling. Alas, cold cathode tubes for interior lighting have become obsolete.

Other interior innovations included flush doors, veneered with Oregon birch. They had no conventional knobs or latches. Instead, automatic closers and aluminum push plates were the hardware.

Rehabilitation has changed the original building, now known as the Commonwealth building, but it has proved the resilience of the design. Virtually none of the original interiors remain. Lobby, banking room, and private offices have all been reworked, some with unfortunate results, some with handsome transformations.

Among other firsts for the Equitable was the use of heat pumps in a commercial installation, the first in the Western hemisphere. Board Chairman Cake had heard about heat pumps in England. The Equitable is still considered the largest such installation in the U.S., and in 1980 the American Society of





Top, Equitable under construction. Above the original ceiling. Across page, the pleasant but more conventional system that now covers it. Left, the building's original lobby, which also has undergone modification over time.

Left, the delicately detailed wall of the Equitable behind a delicate tracery of leaves and branches. Right, the building in its present context.

Both a technical and esthetic prototype.

Mechanical Engineers honored the building with designation as a National Historic Mechanical Engineering Landmark.

The moderate climate of Portland with an average summer temperature of 64 degrees Fahrenheit is an unlikely site for a heat pump since airconditioning is not normally required. But the sealed glass building required a totally mechanically controlled interior climate even if the green tinted windows would screen out 40 percent of the sun's heat as claimed. The air is completely circulated three times an hour, and part of the building's comfort comes from the large number of control zones (11) on each floor.

The mechanical system was designed by engineer J. Donald Krocker, who has published a number of informative papers on its technical details and its operational experience. The heating/cooling source for the Equitable reverse cycle airconditioning is well water. Two wells 150 feet deep, with water at approximately 63 degrees, provide part of the supply, while a 510-foot well provides a 57-degree supply of water. Both heating and cooling are accomplished as a closed circuit by circulating water from these wells to a return well. Most unusual is the fact that no auxiliary heat is required. Thus only electricity is supplied to the building, aside from district steam for lavatory hot water. And in retrospect there was no need for this connection.

The efficiency of the mechanical system has been examined and admired many times. In 1980 the total annual system energy cost for heating and cooling was about 80 cents per square foot when the total electricity cost in Portland, including demand changes, averaged 4 cents per kilowatt-hour. An interesting energy study showed that the building is clearly more economical to run at a constant interior temperature of 71 degrees rather than at 68 degrees for heating and 76 degrees for cooling as required by federal energy standards. Thus the Equitable was exempt from those standards.

In 1948 the Equitable was first both in technique and esthetic. It both set the benchmarks and became a prototype for the American commercial building. The Equitable was designed for an owner's use with an optimized office work environment and as a symbol of progressive and enlightened business practices. It was the epitome of the postwar vision of design totality. Along the way the building became an object of speculation and, more recently, of investment.

Thirty-four years ago the Equitable anticipated a kind of city building and a quality of urban esthetic that has permeated much of architectural design in the U.S. since. The difference is that this vision of the ideal postwar city can be best experienced not in New York, Chicago, San Francisco, or Los Angeles but rather in such smaller cities as Louisville, Nashville, Kansas City, and Salt Lake City. These each provide a few blocks of urban continuity where design goals are shared beyond the brilliance of individual facades and corporate plazas. It is in these cities that the concept of the modern city is more than a brash commercial collage of the latest architectural magazines and material catalogues lining unkempt streets.

Perhaps the most handsome examples of commercial city-making and thoughtful street-keeping may be found in Portland. The city's commitment to a substantial and designed downtown is immediately visible in the 1978 transit mall loop by Skidmore, Owings & Merrill and Lawrence Halprin, which may be the

most convincing urban streetscape in the country. Its gem is the Equitable. The transit mall is the building's forecourt and corporate plaza—a continuity that embraces downtown.

Architecturally perhaps the more interesting views of the building are from above or from the rear west. Here the rear projecting spine of the elevator and stair shaft provide a vertical mass that rises above the roof. The solids of the adjacent penthouse provide another massive element in juxtaposition with the light, shimmering glass wall. These interlocking opaque blocks underline the delicacy of the aluminum-and-glass clad cage. This dynamic backside has an architectonic vitality absent from the conventional views from Sixth Street. Perhaps these views best reveal a joyful appreciation of the national intricacies of construction and materials that seems to romanticize the logic of commercial buildings.

When built, the press was impressed that no masonry was used above the first story and how this foretold of a new lightness in big building construction. More fundamental is that the Equitable is not topless or bottomless, although it has neither cornice nor plinth. The high ground floor with recessed glass and exposed colonnades provides a visual base even though the details of the shops along the sidewalk have never contributed any particular architectural interest. At the skyline the structural frame becomes free from the building and forms, together with the pipe handrail, a termination with definition and scale. The play of this new architectural order against the heavy neoclassical cornices of adjacent banks has fascinated architectural photographers. But there is an equally poignant contrast with more recent nearby buildings whose exterior wallpaper and curtain walls simply stop at the top.

The Equitable building has neither a glamorous name nor a memorable nickname. It also has no international literary or cultural association. The Equitable has tended to become a forgotten nugget in spite of three separate publications in *Architectural Forum* and coverage in many other journals and surveys. It is a name and a building that has often been missing from reviews of important and critical 20th century architecture. Yet the Equitable was a technical and esthetic masterpiece at the cutting edge of an uncertain transition. It continues to show that when thoughtful design is fundamental it will be lasting. □

Photographs by Lawrence Hudetz

1

Furnishings

From Neocon XIV and farther reaches.
By Stanley Abercrombie, AIA

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Neocon, the annual contract furnishings market at Chicago's Merchandise Mart, has just been held for the 14th time. An outgrowth of the Good Design exhibits once masterminded by Edgar Kaufmann, jr., and cosponsored by the mart and New York's Museum of Modern Art, Neocon substitutes gigantism for Good Design selectivity. But in all that quantity, there is much of quality, and more new products are introduced at Neocon than at any other American market. There are other attractions as well: this year, an Aalto exhibition; talks by Elissa Aalto, Arata Isozaki, and Paolo Portoghesi; an expansion by Michael Graves of his celebrated Sunar showroom; and new showrooms by Isozaki, Robert Stern, the Vignellis, and others.

Furniture introductions this year included: a whole new family of softly rounded but rigorously engineered office seating by Bill Stephens for Knoll (1); the Milan Collection of wallcoverings (2), one of six wallcovering and fabric lines introduced by the Maharam Fabric Corporation; in the Wool Bureau showroom, a variety of pieces upholstered in the bright Borealis color range, including a Vladimir Kagan chair (3) covered in wool fabric from Counterpoint; from the newVignelli-designed Italcenter showroom, the Megalfa executive table desk and chair (4) designed by Umberto Facchini for Faram of Treviso, Italy; and from a.i. (Atelier International), the Unichair (5), a versatile seating group with seven different seat and back combinations, all with or without upholstery, all in a choice of finishes, and accompanied by a series of eight different Unitables.

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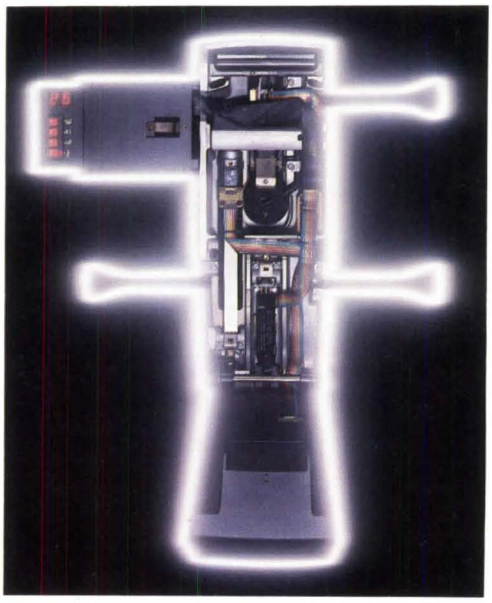

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Further introductions at this year's Neocon : Another Umberto Facchini design for the newly represented Faram firm from Italy is the Projecto 450 storage wall, specifically designed for the storage requirements of the electronic office (1); Rudd International's Cyborg chair (2), shown here in profile and also in a detail view of its control module, not only offers a great range of adjustability in seat height, seat angle, back height, back angle, arm height, and arm width, by means of three pneumatic control cylinders, but also offers a continuous but (unnoticeable) movement that makes slight shifts in the occupant's posture. Such shifts, according to Rudd, "have been medically shown to increase alertness and productivity while reducing fatigue and stress on the body."

Another brightly upholstered chair shown by the Wool Bureau was a Karl Rausch design in sculptured hardwood for Baker Knapp & Tubbs, covered in "Summit" wool fabric from Scalamandre (3). Particularly welcome was the new S/4 series furniture group (4) designed by the space planning and interior design firm of dePolo/Dunbar for the Dunbar Furniture Co. (no relation). Suitable for executive or middle management offices, the S/4 has a distinctive look, organized around a large, semicircular work surface, but, of greater importance, it is served by an ingenious hidden wiring system that allows all elements to accommodate computer terminals and telecommunications equipment. A variety of freestanding storage units, modular seating units, and pull-up chairs has also been designed to accompany the system.

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The recently established Memphis company (2 Corso Europa, Milan 20122, Italy) is so named because of associations with Egypt and the artist-god Ptah as well as with the Tennessee birthplace of W. C. Handy and home of Elvis Presley. Or so they say. It has as its stated goal "to bring into the home a new type of visual information." Michele De Lucchi, one of the two dozen Memphis designers, predicts that the collection "is going to make the floor of design very slippery. Not many will be able to stand up." But architect Ettore Sottsass, a founding partner, is more reassuring: "There is absolutely no need for concern," he says.

All the designs on this spread are in the Memphis collection. The Riviera chair (1) by Michele De Lucchi has a wood frame covered in white plastic laminate; seat and back cushions are covered in pink cotton chintz, and the tubular metal legs are painted blue. The Hilton serving trolley (2) designed by Javier Mariscal of Barcelona has shelves of smoked glass. A design by Sottsass himself is the Carlton sideboard (3), providing space for all those hard-to-store items. Another storage unit is Matteo Thun's Sacher hall closet (4); the body of the closet and the pair of umbrella stands are finished in aluminum, the door in mother-of-pearl with a gold-framed round mirror. Another De Lucchi design, the Kristall side table (5), has a top of yellow painted wood, a supporting box covered in plastic laminate. One of several Sottsass lamp designs is Treetops (6), a floor lamp of chrome plated tubing; it takes a 500 watt halogen bulb. The Sheraton mirror (7), resting on a brass base, is by Luigi Serafini of Rome. Last, not at all least, is the Plaza dressing table by Michael Graves (8); its drawers are finished in painted wood and natural briar, its mirror can be tilted, and its tall back element is brightened by small mirrors and tiny low voltage lamps. □

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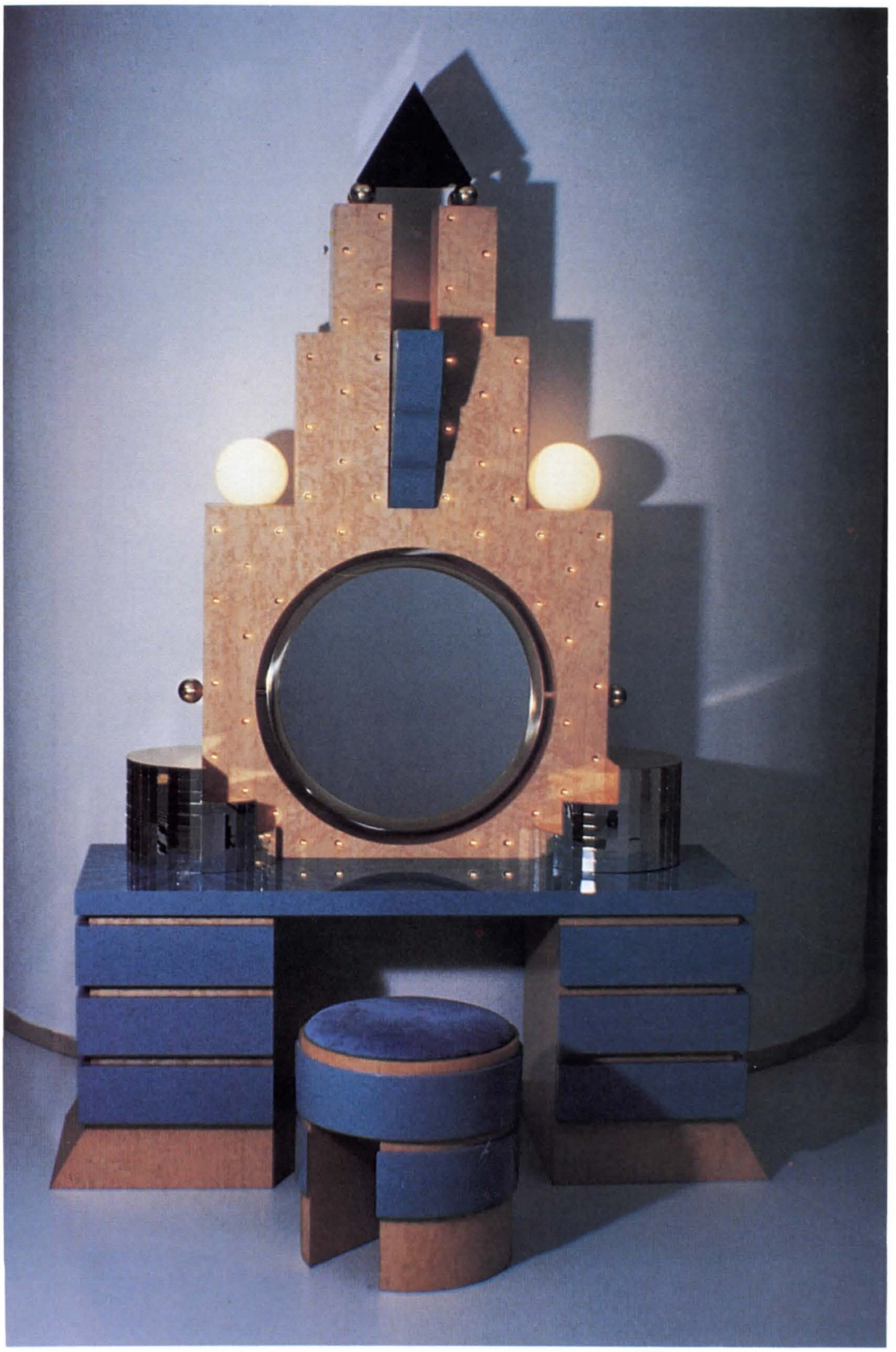

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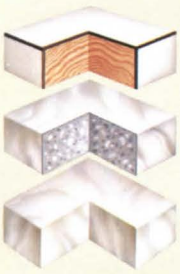
designs apart, show their age.



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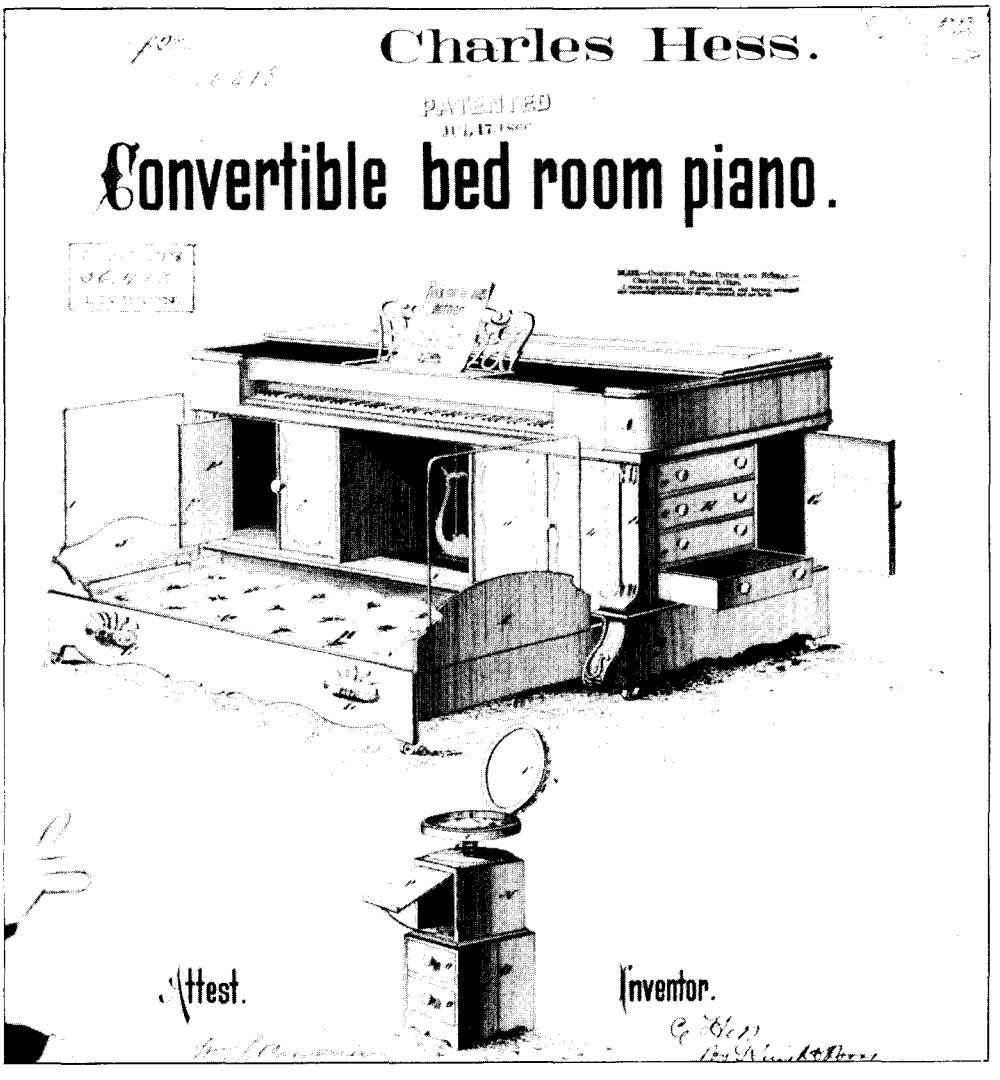
BOOKS

Recent Works on Furnishings, Interiors

Innovative Furniture in America from 1800 to the Present. David A. Hanks. (Horizon Press, $30.)

This is a furniture book with a difference: one that concentrates not just on designs that are handsome but also on designs that have contributed some new idea or construction technique. Hanks' collection is fascinating. There are chapters on designs that make innovative use of materials, on those that contribute to comfort in a novel way, on those that utilize new bending and laminating methods, on those that are portable, and—most interesting of all—those that provide for multiple functions. Among these last are a combined sofa and bathtub from 1883, a convertible bedroom piano from 1866 (right), and (a cartoon ridiculing the multipurpose craze) a combined folding bed and nightshirt. But most items shown are both serious and admirable; the multipurpose section closes, for example, with George Nelson's Storagewall and CSS storage system designs. There is a felicitous introductory essay by Russell Lynes, an illustrated chapter by Rodris Roth on the history of 19th century American patent furniture (simply defined as pieces covered wholly or in part by a patent), and a useful bibliography. The book is based on an exhibition of the same name, for which Hanks was guest curator, organized by the Smithsonian Institution Traveling Exhibition Service. *Stanley Abercrombie, AIA.*



Knoll Design. Eric Larrabee and Massimo Vignelli. (Abrams, $65.)

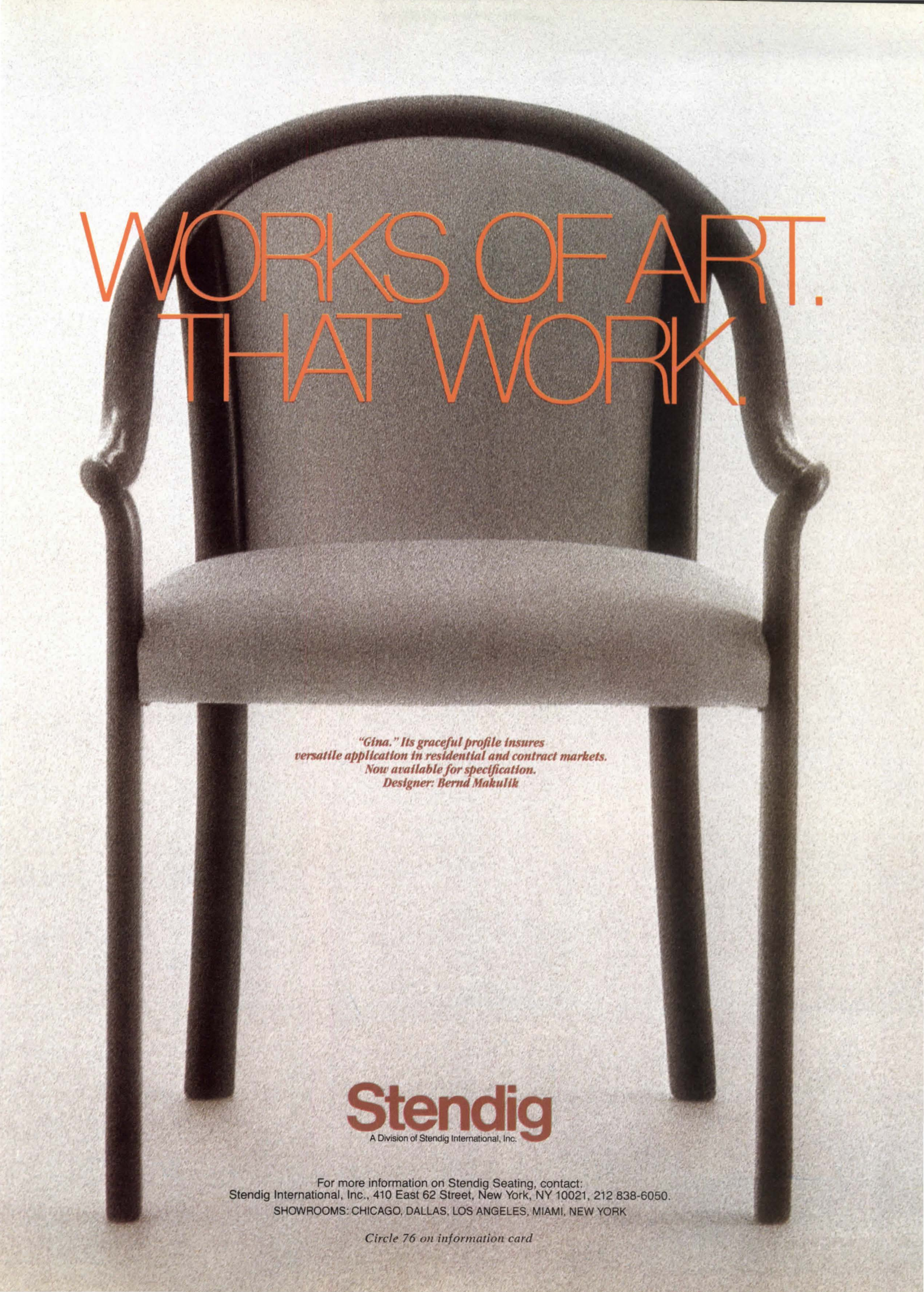
What a big, bountiful, beautiful book this is, a foot square, 300 pages thick, wrapped in the very glossiest stock of the very brightest red-orange, offering spread after glorious spread of color photographs of superb objects. Granted, if some of the photographs had been smaller and if some of the layouts had been less generous, the same information could have been presented more economically, but this is not a book for the budget-minded. It is, appropriately, the Barcelona chair of design books, and, whatever the cost, there is no substitute for the genuine article.

In most cases, book designers remain anonymous; in some cases, they deserve to. In this case, designer Massimo Vignelli is given equal credit with writer Eric Larrabee, and quite rightly, for his talent is a powerful presence on every page. It is a doubly effective presence, serving not only the product at hand but also as a reminder of Vignelli's long association with Knoll, of Knoll's contribution to graphic design, and of the influence of that contribution on other corporate design programs.

But *Knoll Design* is more than a handsome product; there is content, too. For the 44-year-long story of Knoll, with its roots in the Bauhaus and Cranbrook, is—sometimes by analogy, sometimes in actual fact—the story of modern design. The bottom line may be furniture sales, but Knoll, on the way to that bottom line, has created and nurtured some of the most admirable design achievements of our time. It has also helped to shape the furniture industry and to establish present patterns of merchandising and interior design practice. Other than Herman Miller, no firm in the field comes close to Knoll as a leader in both design and business, and this leadership is still the focus of creative experimentation.

Larrabee and Vignelli tell the Knoll story in episodes. There are sections on founders Hans and Florence ("Shu") Knoll, on Breuer, Mies, and Saarinen, on textiles and graphics, on showrooms and exhibitions. From the '50s, there is the story of the Knoll Planning Unit; from the '80s, the work for Knoll by Robert Venturi, Gwathmey Siegel, and Paul Haigh.

Books continued on page 100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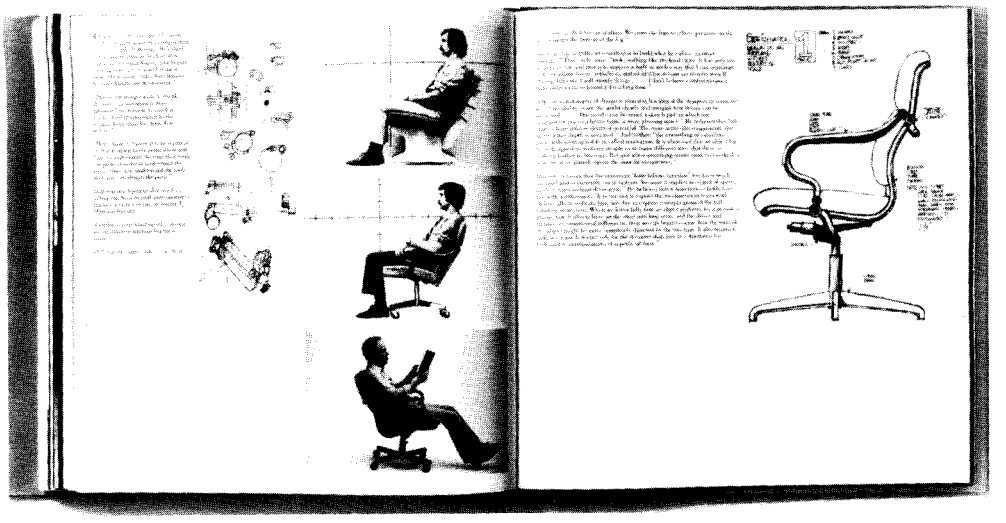

Books *from page 98*
There are ads by Alvin Lustig, by Herbert Matter, and by Vignelli. There are bowls by Charles Pfister, tables by Joe D'Urso, and chairs by Niels Diffrient. There is New York, Boston, and Houston, but also Paris and Milan. There is the work by sculptors Noguchi and Bertoia, and a 1945 line of chairs by architect Ralph Rapson. There is even a picture and paragraph devoted to Cartree, the Knolls' sheepdog and a frequent star of Matter's photographs.

Such episodic organization will not suit all prospective readers. For the serious historian, some interesting details of the firm's history will have disappeared through the cracks between episodes. And, for the unwary, some sections on such greats as Mies and Breuer may imply a more intimate and longlived connection with Knoll than was actually the case. But, for most readers, the treatment is just fine. The Knoll story is big, fascinating, and important, and this book presents it with impressive panache. *S.A.*

Mies van der Rohe: Furniture and Interiors. Werner Blaser. (Barron's, $19.95.)

Barron's continues its production of an exemplary series of small books, well designed, well written, and reasonably priced, about the small-scale work of noted modern architects and designers. So far, the series includes volumes on the furniture of Gaudi and the products of the Thonet company (both reviewed here in July 1981), and others on the furniture of Le Corbusier, Rietveld, and Mackintosh. The Mies volume is the sixth and latest.

Mies' furniture is very familiar, of course, but Blaser, who worked in the Mies office when the master was still active, has provided a few surprises, such as an elegant rosewood dining chair from Mies' Berlin apartment, designed around 1920. And the well-known pieces are shown in unusually fine photographs and, whenever possible, related to specific building designs. A further sense of context is provided by examples of contemporary work by Breuer, Aalto, Le Corbusier, and others, and Blaser has some nice surprises for us in this area as well: unfamiliar chair designs by Jean Prouvé, Theo van Doesburg, Josef Albers, and Hendrik Berlage.

The text is minimal in this fine little book, but the photographs provide much to consider. There is a bibliography and index. *S.A.*

Marcel Breuer: Furniture and Interiors, Christopher Wilk. (Architectural Press, $26.25)

There are two diverse and diametrically opposed tendencies today in architecture and design. On the one hand, it is fashionable for architectural journalism to write about the death of modern architecture, and, on the other, there is a vital movement of rediscovery and intensified re-examination of the forces that brought modern architecture and design into being more than half a century ago.

Christopher Wilk's book on Marcel Breuer's furniture and interiors belongs to the latter. It is symptomatic of the powerful response to the present day confusion in matters of design by some cultural public instrumentalities in Europe and the Museum of Modern Art in New York.

The communist government of East Germany, which throughout its existence labeled anything modern as decadent and degenerately Western, has spared no effort to reconstruct the Bauhaus building down to the minutest authentic detail, including Breuer's theater chairs. France's Ministry of Culture never gave Le Corbusier a job but rebuilt his Villa Savoie and made it a shrine-like museum, just as his 1925 Pavilion Esprit-Nouveau was faithfully reconstructed in a park by the City of Bologna.

The Museum of Modern Art in New York was instrumental in bringing the "Modern Architecture of Europe" to America in the 1930s, and it is not before its time that the large Breuer exhibition last year (just before his death) should be commemorated and recorded in the in-depth monograph that is Christopher Wilk's book.

It establishes Breuer's place as the most influential designer of furniture in the 20th century. He pioneered the use of tubular steel for furniture, a giant step at the time that seemed to synthesize the essence of modern design; it not only looked but was machine-made of a lightweight, strong, austere, and glistening new material, not requiring any traditional handicraft skills. The very dictum of "the most for the least" seems embodied in this vision.

Wilk's fascinating story explains and enmeshes Breuer's background and development in the political, economic, and cultural climate of post World War I Germany.

Aside from analyzing and recording Breuer's prolific output and rapid development to mature mastery, the book relates his work to that of his Bauhaus peers —Gropius, Albers, Kandinsky, Klee, Moholy, Bayer. What an amazing group of creative minds were brought together at this historic school!

One must appreciate the intense competition generated by the economic collapse and desperate inflation at the time to understand that anything, even chair designs, was no sooner thought of than immediately patented. This explains the reason why so many history books credit the Dutchman, Mart Stam, with the first cantilever tubular steel chair; not so, proves Wilk. The now ubiquitous 1928 "Cesca" chair design is indeed by Breuer, even though Stam saw and patented the principle. Thonet, the first manufacturer, knew the truth and paid the royalties to Breuer.

From originals to true and endless banal copies to legal battles—the whole history of this remarkable career is traced meticulously and makes fascinating reading. What emerges is the inconclusiveness of so many directions along which Breuer started. The world took half a century to rediscover only some of his furniture, but much more of it remains to be re-evaluated and put to active use.

Although the book deals with his architure only marginally as it generates his interiors, one is left with the impression that the architecture throughout Breuer's long career warrants an equally incisive historic analysis and appreciation.

I consider Wilk's book an absolute must in any architectural library. *Harry Seidler*

New Shops. Karl and Eva Mang. (Architectural Book Publishing Co., $33.95.)

An excellent international sampling of current shop design, including two attractive bookshops and an accessories store by the authors themselves, architects from Vienna. Some examples are familiar, such

continued on page 104

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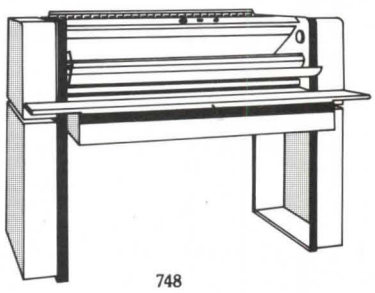
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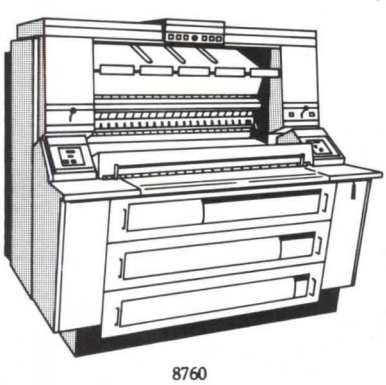
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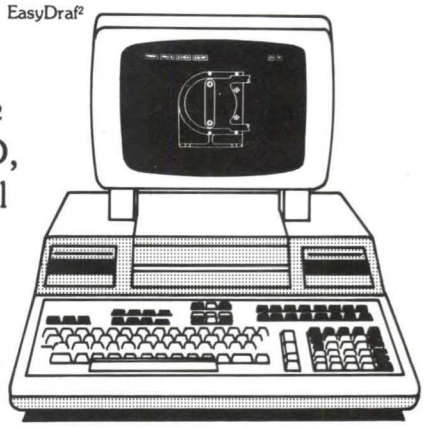

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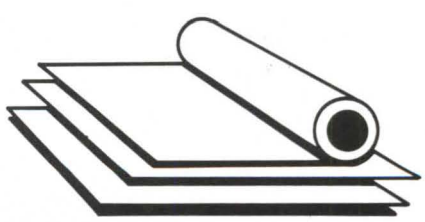

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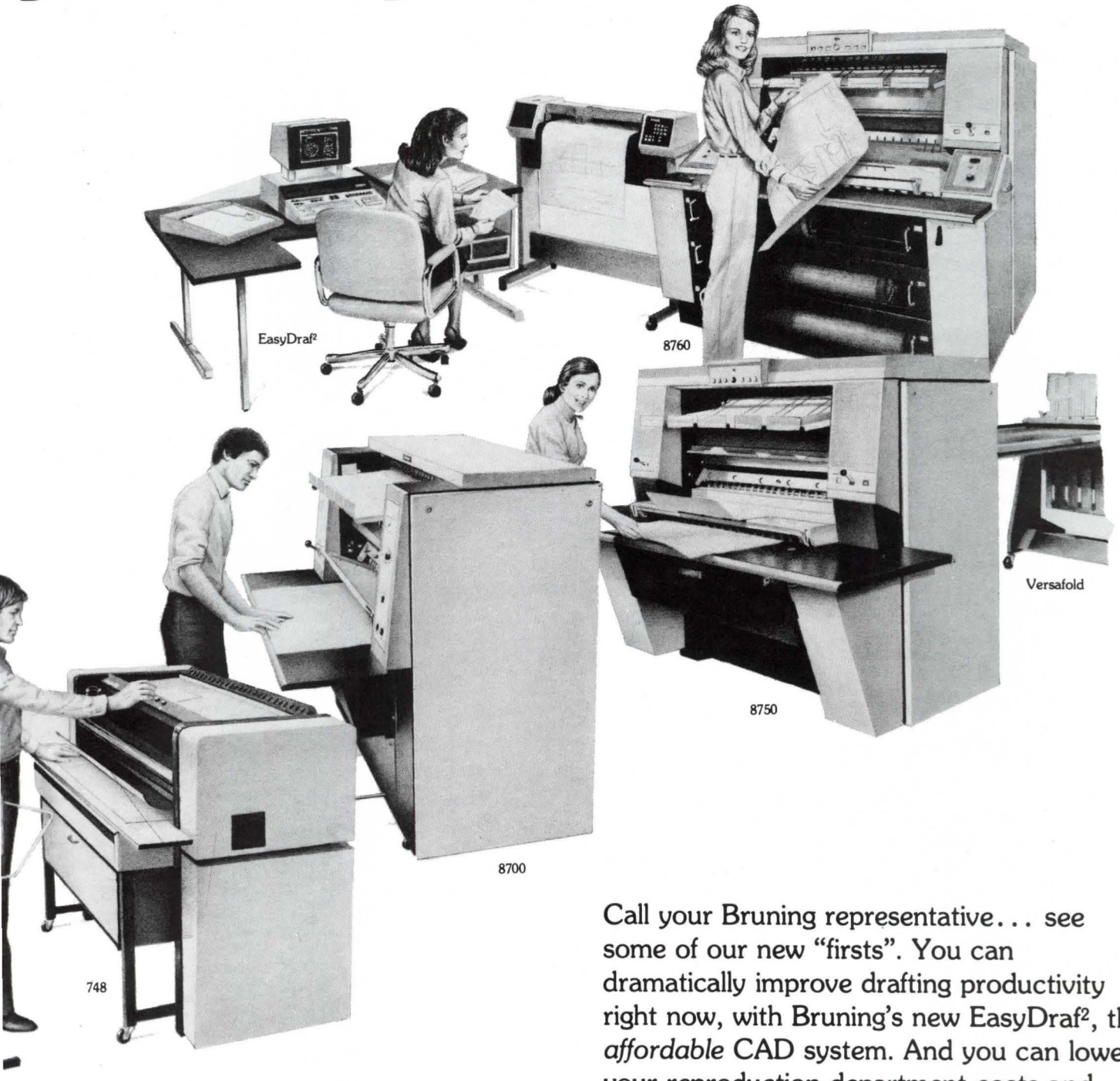

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Books *from page 100*
as Hans Hollein's brilliant little Schullin jewelry shop in Vienna and Aalto's Academic Bookshop in Helsinki, but many are not familiar, and none of the 52 designs shown is without interest. Black and white illustrations are complemented with a generous assortment of plans and sections and, where appropriate, construction details, and there is a sprinkling of color illustrations as well. There is also, as an introduction, a philosophical history of shop design. The text is in English and German.

Contemporary Classics: Furniture of the Masters. Charles D. Gandy and Susan Zimmerman-Stidham. (McGraw-Hill, $21.50.)

Although the need for yet another book about modern furniture is questionable, this one is richer in information than most. It presents approximately three dozen well-known designs by eight well-known designers, most of them architects, but it takes care to consider the designs not in isolation but in the context of the designers' whole careers, general inclinations, and works in other media. There are brief biographies of each designer as well as descriptions of general styles. There is a time chart of "Contemporary Design Movements and their Influences," a glossary, and a bibliography.

The Closet Book. Elin Schoen. (Harmony Books, $10.95 paper.)

Residential storage ideas, all with cute-as-pie captions, and meant more for the layman than for the architect. Still, there is a lot of information here: pictures of 14 different types of coat hangers, for example, and a useful source list with addresses.

Wind in Architectural and Environmental Design. Michele Merlaragno. (Van Nostrand Reinhold, $36.50.)

Did you know that a "chocolatero" is a squally wind in the Gulf of Mexico, or that an "elephanta" is a gale force wind on the southwest coast of India, or that when you call for a "doctor" in Australia, you are calling for a gentle breeze? These unusual names of winds, along with dozens of others listed in the book's first chapter, capture the attention of the reader of this volume at the very outset.

And there is more of this kind of stuff to follow. There is hardly a topic dealing with the wind in its various manifestations that is not mentioned, however briefly. The book comes across like an encyclopedia on the subject, categorized under seven chapter headings: namely, "Winds," "Destructive Winds and Their Effects," "Aerodynamic Wind Forces," "Ventilation," "Wind in the Natural Environ-

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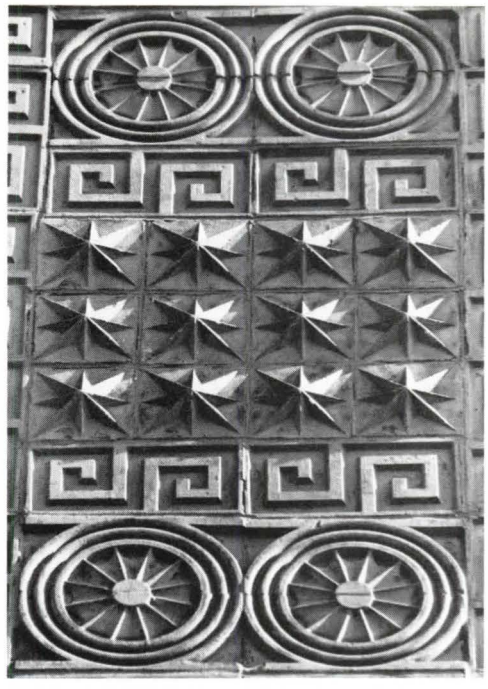

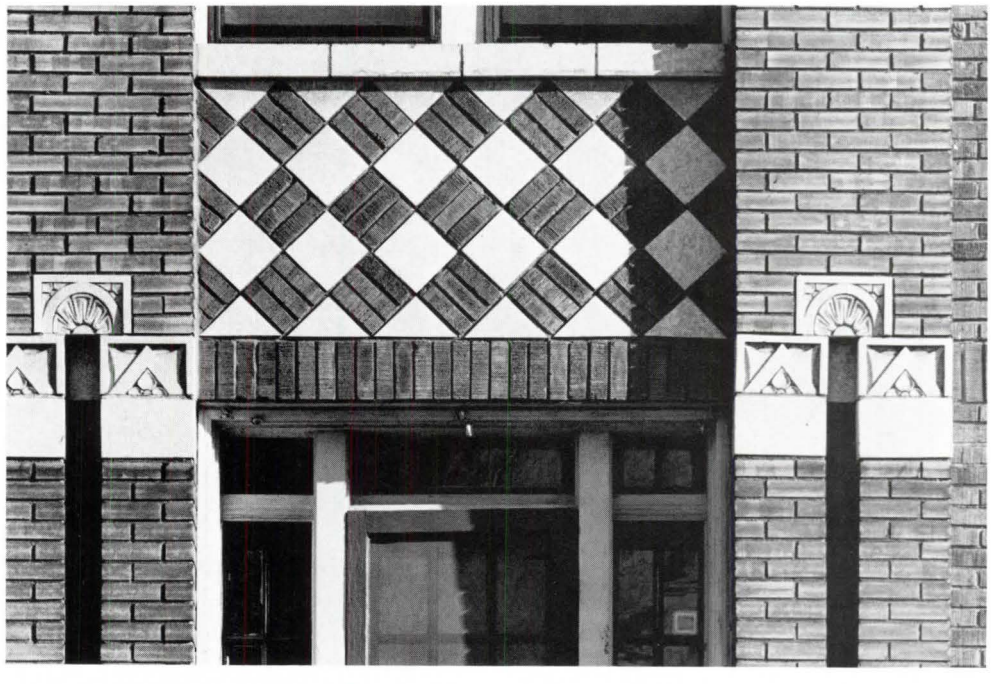

Decorative and Ornamental Brickwork. James Stokoe. (Dover Publications, $6.)

This is a book without pretensions. The subject is modest and so, mercifully, are the price and the author's approach. His volume is as carefully crafted as much of the brickwork it describes. The text, no less so than Stokoe's 162 black and white photographs, is concise, clear, and to the point.

For a long time, while the International Style held sway, we didn't think of brickwork at all, since it was hardly used except in the occasional warehouse or parking garage. With recent renewal of interest in the past and contextualism, brick construction has again become common to the point of cliche. But even with our penchant for making things look old and picturesque, we seldom do much with bricks beyond piling one on another in fairly boring fashion.

This little book shows how our American forebears used brickwork with imagination and verve. Before the Civil War they followed an English tradition that traced its origins to Rome; only after that bloodbath did an American tradition begin, and with time, Stokoe tells us, "brick became a kind of consumer vernacular allowing the layman to express, with the collaboration of the mason, a great deal of creative spirit. This architecture was as exuberant and inventive as any of the many wood vernacular styles." He chronicles briefly the rise and fall and changes in brick decoration from early times to our own. Most of his examples are from St. Louis, which he calls "a city that troweled its way into the 20th century with a hopeful art and vigor." It is where he found the most complete statement of decorative and ornamental brickwork. *Andrea Oppenheimer Dean*

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Books *from page 104*

ment," "Wind in the Urban and Regional Environment," and "Wind Power." For example, in chapter six there is a one page discussion of wind driven kinetic sculpture, on the next an explanation of the Marilyn Monroe phenomenon, on the next a description of row effect, on the next cell effect. A few pages farther, there are brief discussions of building in a windless environment as on the moon, kite flying, and hang gliding. This is not to say that only minor aspects of the wind are included, for the entirety of chapter three is devoted to the specifics of wind forces on buildings, how best to resist them structurally, and how to use the STRUDL computer program to calculate the forces in the members of the structure.

In an apparent attempt to touch all bases, the author mixes together a wide range of topics, treating some in depth quantitatively and passing others off with a few simple sentences. However, almost 100 pages of the book are devoted to references, so that if a question about wind still remains unanswered, a generous amount of source material is cited.

Just as the text material is presented unevenly, so, too, is the quality of the printing and editing. Many of the drawings, photographs, and charts are presented quite clearly, but others are embarrassingly poor. The poor ones are either too small to read easily, smudged, or double printed. A spot check of several equations shows them to be incompletely described, making them virtually useless to the reader. The whole section on STRUDL, mentioned earlier, consisting of 44 pages in chapter three, is not even included in the table of contents. Normally, this amount of computer crunched number information should be tucked away in an appendix anyhow. This reviewer also questions why so much blank white space is left at the top of the pages, suggesting a layout problem.

On the whole, however, this book makes interesting reading for anyone concerned with the wind, either for business or pleasure. By the way, if you are curious about the Monroe phenomenon, it is an updraft on the leeward side of a building at ground level which causes women's skirts to fly up as in Marilyn Monroe's film, "The Seven Year Itch." *William Zuk, Professor of Architecture and Director of Architectural Technology, University of Virginia*

The World of a Market. Mark Tobey. (University of Washington Press, $9.95.)

Although his professional life was spent mainly in New York City, London, and Europe, and he had a strong attachment to the Orient, Mark Tobey remained loyal to Seattle, his home. He died in Switzerland in 1976, an artist of worldwide recognition, represented in major collections, rather uniquely the only American painter to have been presented in a retrospective exhibition of his work in the Louvre.

This collection of sketches of the Pike Place public market in Seattle—now a battle-scarred historic district—exudes the vitality Tobey found in this institution and its human dimensions. The work of a half century ago, they are today of historical value. Like much of Tobey's art, their interest in many repeated design elements composed within a larger frame echoes the calligraphic modes that continued to fascinate him.

Originally published in 1964, the record of an earlier exhibition of this work, the book strongly reminds us of the changed status of public markets in the urban revitalization that has taken place in so many cities. The problem is not simply to preserve the physical fabric of such public markets, but to maintain them as functioning social institutions, to perpetuate the human values Tobey describes in his art and his introductory remarks to this book. By asserting these values, Tobey's sketches should strengthen the efforts that continue to be made by Victor Steinbrueck

continued on page 109

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Books *from page 106*
and others in Seattle, and will inspire those in many cities where the same issues are today of public concern. *Frederick Gutheim, Hon. AIA, Washington, D.C.*

1982 Residential Cost Manual: New Construction, Remodeling and Valuation. Coert Engelsman. (Van Nostrand Reinhold, $29.95.)

As this book points out, a building constructed in 1954 at a cost of $100,000 would have cost $554,000 in 1981. With such staggering escalations, it is wise to know what it will cost in 1982 to construct a single-family house or multiple family units, or to remodel older constructions. Parts one and two of the book give unit prices for construction items and for remodeling, repairs, and additions. The unit prices are for use in the preparation of cost estimates, the prices having been obtained from time studies and job cost records. The third part of the book gives the square foot costs for the appraisal of the replacement value.

Concrete Problems: Causes and Cures. John C. Ropke. (McGraw-Hill, $22.95.)

Concrete consultant John Ropke says that concrete is the most complex and least understood of all materials used in construction. There are so many advantages in its use, he says, that an occasional problem is a small price to pay. Those problems could be eliminated if concrete were better understood, and Ropke devotes this book to "the theory of concrete, its limitations, the factors that cause problems and how to avoid them, and how to correct concrete problems should they occur."

In clear language, Ropke covers concrete materials, admixtures, concrete design mix, and concrete strength. He explains the qualities of fresh concrete—bleeding, setting time, shrinkage; he tells how to handle concrete—footing forms, curing, key joints; he explains hardened concrete —cracks, wear, discoloration, crazing; he discusses pumping concrete—types of pumps, removing line sections, the pumping contractor, the causes of problems. Ropke also covers exposed aggregate concrete—aggregate size, precast panels, floor grinding; he explores concrete repairs—cracks, epoxies, grinding and mud jacking; he gives information on the removal of concrete stains—rust, paint, oils, moss. There are also sections on inspection and testing, the concrete plant, the concrete producer, helpful hints for the concrete producer, and how to handle concrete complaints. In addition, there is a glossary of concrete terms.

Practical in approach and filled with information, this book will help any architect who wants to know more about concrete, how to prevent problems in its use, and how to correct the problems should they occur.

Castles: A History and Guide. Foreword by Sir John Hackett. Various contributors. (Blandford Press, Poole, Dorset, England; distributed in this country by Sterling Publishing Co., 2 Park Ave., New York, N.Y. 10016, $19.95.)

Nearly every child is touched by the romance of castles, with tales of beautiful princesses, noble warriors, and battles won and lost woven into many childhood stories. So this exceedingly handsome book has a basic appeal, evoking the splendors and wonders of our medieval architectural heritage. The book has been prepared by a team of archeologists, historians, and photographers who succeed in providing historical and architectural information in an entertaining way.

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continued on page 112

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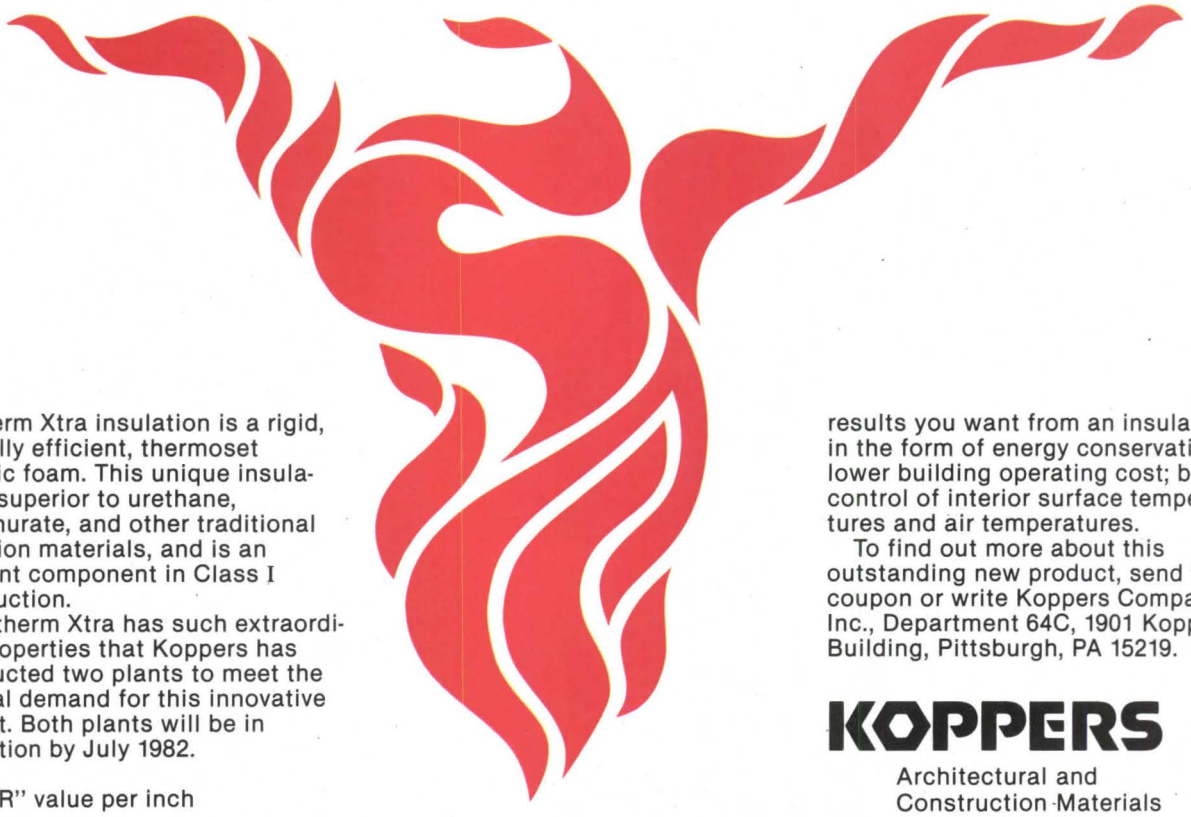

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Books *from page 109*

And for those who want to go to Europe and seek out these architectural marvels there is a 64-page country-by-country gazetteer, with information about location, visiting times, and so on. In addition to the regional maps included in this section, there are some 260 photographs throughout the book, 80 of them in color, and diagrams and drawings. The special consultant on this book's preparation was R. Allen Brown, professor of medieval history at King's College in London, and author of such books as *English Castles* and *The Origins of Modern Europe.*

Hospital Management Engineering: A Guide to the Improvement of Hospital Management Systems. Harold E. Smalley. (Prentice-Hall, $27.95.)

Directed primarily to the hospital administrator, this book will help the architect who wants to know the ins and outs of hospital management. An update of a book first published in 1966 under the title *Hospital Industrial Engineering,* it covers an array of topics, ranging from a history of hospitals to estimating bed needs to the design of an information system. There is a chapter on facility planning that recommends the systems approach to both new construction and to additions. The author, who is director of the school of health systems at the Georgia Institute of Technology, says that the book's general purpose "is to suggest practical methodologies for analyzing, designing and improving the delivery of services in the hospital component of the health care system."

Evaluating Built Environments: A Behavioral Approach. Robert W. Marans and Kent F. Spreckelmeyer. (Published jointly by Survey Research Center, Institute for Social Research, and Architectural Research Laboratory, College of Architecture and Urban Planning, University of Michigan, $20.)

This book, which concerns human response to the built environment, will interest behavioral scientists for its methodology in ascertaining the effects a building can have on its occupants. The researchers provide a conceptual model and put it to use for an in-depth postoccupancy analysis of the Federal Building in Ann Arbor, Mich. The research reported on here was sponsored by the National Bureau of Standards "in an attempt to learn how the building meets the needs of its occupants," with the expectation that the results could be used in the planning and design of other federal buildings.

The award-winning Federal Building, planned and designed under GSA auspices, housed at the time of the research about 270 people employed by 14 different federal agencies. The researchers explain that the evaluation was made from one perspective only—that of the users of the building. The general findings reveal that the Federal Building "has contributed to the attractiveness and economic vitality of the area." It has failed, according to the research, in providing "a high quality work environment for all of its occupants," with many of them considering the building to be "esthetically and functionally deficient."

Advocates of open office planning won't find much to endorse the concept in the research results. Dissatisfaction was most prevalent among workers in open or pool offices. The researchers say, "In open offices, the problem of visual and conversational privacy, space, views, and the location of electrical and communication outlets should be recognized as critical to the workers' environmental satisfaction."

The supplementary tables and figures supplied in the appendices as well as copies of questionnaires submitted to the federal workers are useful, but the lack of an index is deplored.

Newport Preserv'd: Architecture of the 18th Century. Desmond Guinness and Julius Trousdale Sadler Jr. (Viking, $20.)

Touro Synagogue, dedicated in 1763, and probably designed by Peter Harrison, is the oldest surviving synagogue in this country to still be used for its original purpose. It is but one of the many structures described and depicted in this handsome book, which is a celebration of historic preservation in Newport, R.I. There are comments and illustrations as well pertaining to many houses and religious and public buildings that have been preserved either in whole or in part. The book's authors set the stage with a brief "prologue" on Newport's 17th century architecture, but the core of the book is a catalog of 18th century architecture. Both authors, prolific writers on architectural history, admire all those who have worked to preserve Newport's architectural heritage. They call Newport "an active, functioning community rather than a series of lovely shells from which the life has been carefully scrubbed away. To visit there today is to see a living present successfully integrated into a living past." Before such a visit, it would greatly help the visitor to read this book.

Bookstore Planning and Design. Ken White. (McGraw-Hill, $39.50.)

Design consultant Ken White, who has had more than 30 years of experience in bookstore planning, gives practical advice in this book which is directed to both architect and owner. He discusses the nature of bookstore planning; design concepts; the planning program; preliminary planning; walls, floors, and ceilings; fixtures; lighting elements and communication systems; color elements and schemes; and signage and graphic systems.

As he points out, a successful bookstore "requires the coordination of a range of design, architectural, mechanical, and merchandising components to ensure that all elements work together." He explains how to coordinate the elements, discussing in the first 10 chapters such details as site selection, traffic control, interior finish textures, show window lighting, video surveillance, color schedules, and the layout of graphics.

Part two is a portfolio of bookstore plans, photographs, and design sketches of the interiors of 22 bookstores, ranging geographically from New York City to Los Angeles and varying in size from 400 to 60,000 square feet. Only a matter of scale makes the difference between small and large bookstores, White says. The planning principles are the same, with only size, type, and cost varying.

There is a glossary of bookstore planning and design terms. The book contains many photographs and line drawings as well as checklists and charts. The architect who has either the design of a new bookstore or the renovation of an existing one on the drawing board will find here useful guidelines for the planning, design, and construction of almost any conceivable kind of bookstore, whether it be sited in a shopping mall or on a university campus.

Structural and Foundation Failures: A Casebook for Architects, Engineers and Lawyers. Barry B. LePatner and Sidney M. Johnson. (McGraw-Hill, $24.95.)

A lawyer (Barry LePatner) and an engineer (Sidney Johnson) have collaborated on this book, which presents 32 case studies of building projects that ended in litigation due to structural and foundation failures. The case studies are diverse, ranging from a plaza's pavement whose terrazzo topping cracked and heaved to the design of a highrise hotel where there was inadequate reinforcement in concrete slab. In each of the case studies, there is an explanation of the situation, a technical analysis, and a legal analysis. The authors explain how to avoid problems, tell what went wrong, note the measures required to remedy the trouble, tell of claims and litigation, and indicate what settlement was made. Among the problems discussed are excessive settlement in a shopping center, the buckling of columns in an apartment building, the collapse of a grandstand's roof, and injury to a worker during the construction of a university structure. The authors advise the design professional to learn the lessons that such litigations teach in order to avoid a repetition. The lawyer's interest in the book, they say, rests on "the proper handling of such matters and the pragmatics of representing the design professional." □

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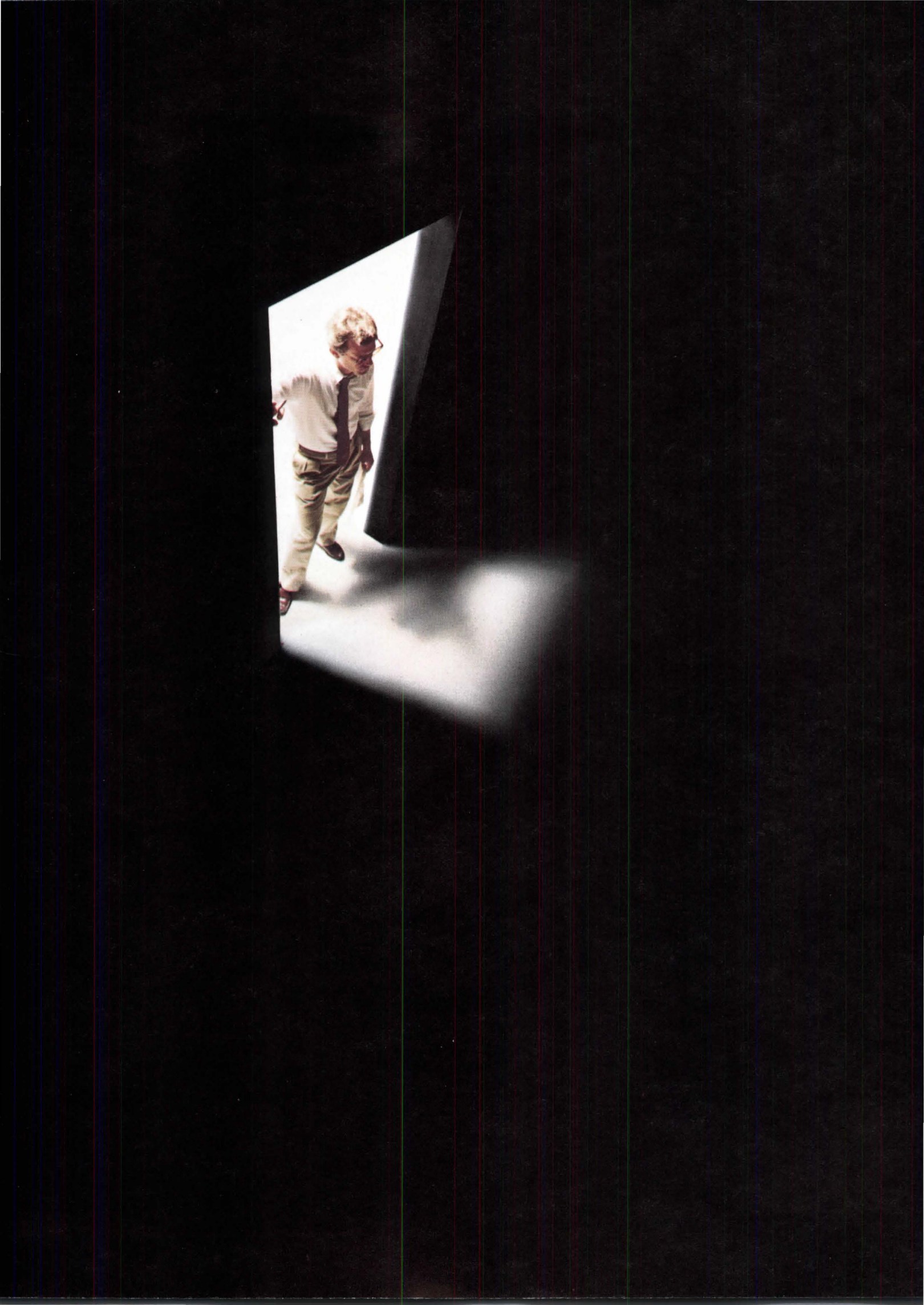

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Irving E. Gershon, New York City
K. E. Justesen, Totowa Boro, N.J.
G. L. Lindeberg, Los Angeles
Sidney H. Morris, Chicago
S. R. Wilkinson, Bradenton, Fla.

BRIEFS

Helmut Jahn Honored.
The Arnold W. Brunner memorial prize in architecture, given by the American Academy and Institute of Arts and Letters, was awarded to Helmut Jahn, FAIA, for his contribution "to architecture as an art."

Brooklyn Bridge Centennial Exhibit.
The American Society of Civil Engineers will donate $25,000 to the National Museum of American History, Smithsonian Institution, toward the creation of an exhibition to commemorate the centennial of the Brooklyn Bridge, completed in 1883.

Call for Entries.
The Chicago Architecture Foundation is sponsoring a design competition for a monument to commemorate the sesquicentennial of the birth of William LeBaron Jenney, pioneer of skyscraper construction. The entry fee is $25 and submissions must be postmarked by Aug. 10. For more information, contact Jethro M. Hurt, Chicago Architecture Foundation, 1800 S. Prairie Ave., Chicago, Ill. 60616.

Mies Exhibition.
The Neuberger Museum, State University of New York at Purchase, will exhibit photographs and drawings of the Barcelona Pavilion and furniture designs by Mies van der Rohe through Aug. 22.

Call for Entries.
Architectural Review is sponsoring an international interior design awards program for completed interiors and interior design schemes. The deadline is Sept. 1. Jurors are Peter Cook, Vico Magistretti, Susanna Torre, and Peter Davey, editor of *AR*. Entry forms are available from the Editor, *Architectural Review,* 9 Queen Anne's Gate, London SW1H 9BY, England.

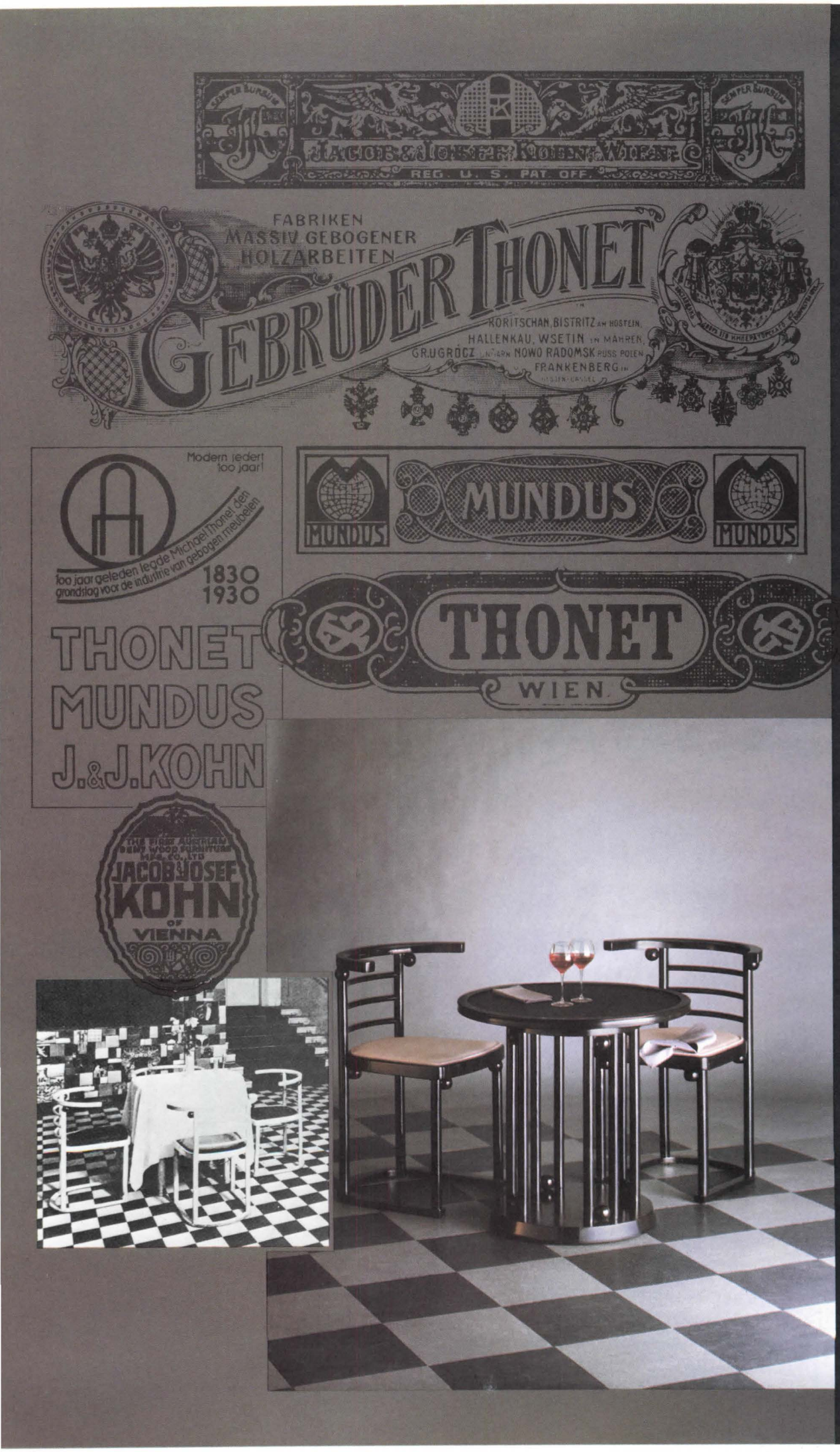
Video and Cable Study.
Vision, Inc., of the nonprofit Center for Environmental Design and Education is conducting a study to explore the current and potential use of video technology and cable television for the design profession. Individuals as well as design organizations interested in participating should contact Joyce Meschan, President of Vision, Inc., 219 Concord Ave., Cambridge, Mass. 02138.

National Preservation Institute Formed.
A nonprofit consortium of preservation experts has been formed to assist organizations concerned with the protection of historic resources. The National Preservation Institute is located at 1719 Q St. N.W., Washington, D.C. 20009.

Architecture and Garden Tour of Japan.
A study tour designed for architects and allied professionals, limited to 23 participants, is scheduled for Oct. 9-30. For more information contact Kenneth M. Nishimoto, AIA, 30 North Raymond Ave., Pasadena, Calif., 91103.

Rome Prize Fellowships Awarded.
The juries of the American Academy in Rome awarded fellowships in architecture and design arts for the '82-'83. One year fellowships were awarded to Celia Ledbetter, of Diedrich Architects and Associates, Atlanta, and James Timberlake, of Venturi, Rauch and Scott Brown, Philadelphia. Four mid-career fellowships of six months were awarded: Stanley Aber-

continued on page 120



Good performance as well as good design deserve an encore. And so Thonet applauds the Fledermaus table and chairs, designed by Josef Hoffmann, which are the second in Thonet's series of classic reintroductions. Taking their name from the Viennese cabaret for which they were designed, the Fledermaus grouping was originally produced in 1905 by the J & J Kohn firm which later merged with Thonet.

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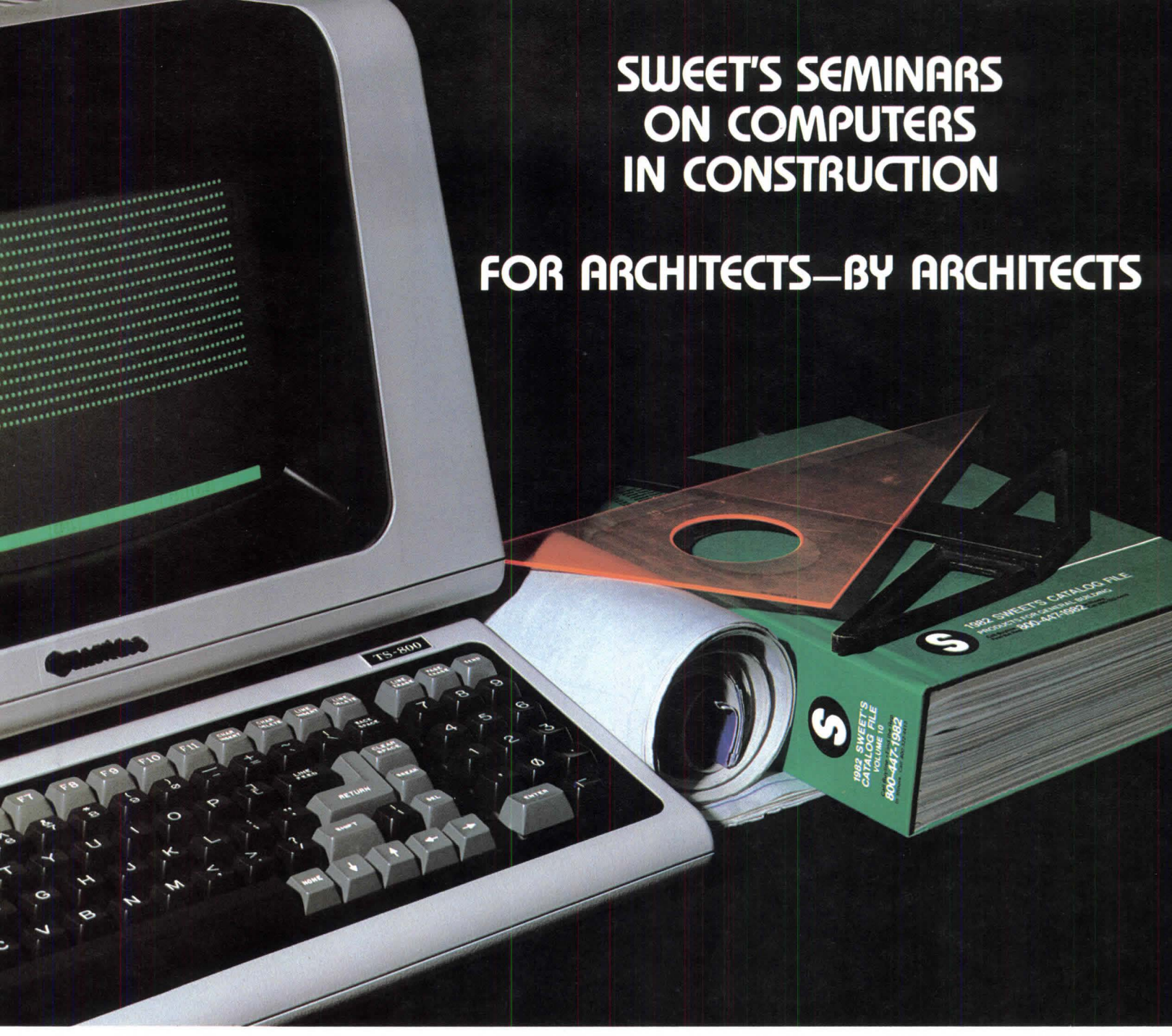

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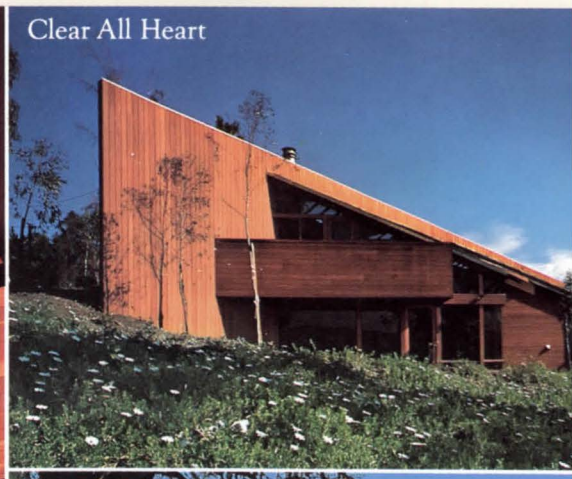

Briefs *from page 116*

crombie, AIA, senior editor, architecture, of the AIA JOURNAL; Eugene Kupper, Associate Professor at University of California at Los Angeles; Tod Williams, principal of Tod Williams and Associates, New York City; and Barbara Stauffacher Solomon, San Francisco. The Steedman/American Academy in Rome Fellowship in architecture was awarded to John McDonald, of Skidmore, Owings and Merrill, San Francisco.

Far East Energy Tour.
Jordan College is sponsoring a Far East energy tour in August 1983 in conjunction with the ISES Congress in Perth, Australia. Cosponsors are the American and Canadian sections of the International Solar Energy Societies, the Michigan Energy Administration, and *Mother Earth News*. For more information, contact Herbert T. Sebree, Jordan College, 360 W. Pine St., Cedar Springs, Mich. 49319.

Third World Architecture.
The New York State Council for the Arts has provided a grant for a major exhibit of contemporary architecture from selected developing and third world countries. The exhibit, to open in New York City in 1983, will be curated by Theo David, AIA, chairman of graduate architecture at Pratt Institute and partner of David & Dikaios Associates in Nicosia, Cyprus.

Raymond Girvigian Honored.
The Irene and Aubrey Neasham award for historic preservation has been awarded to Raymond Girvigian, FAIA, of South Pasadena, Calif., for his "extraordinary contribution to the preservation of California's historic sites and buildings."

Architecture Drawings Competition.
The National Park Service in conjunction with the Athenaeum of Philadelphia is establishing an annual monetary awards program, the Charles E. Peterson Prize Fund, to recognize "excellence in measured drawings" donated to the Historic American Buildings Survey by architectural students. A $15 fee is charged for each entry to cover the cost of instructions, field notebook and drawing materials. For more information, contact John A. Burns, HABS, National Park Service, U.S. Department of the Interior, Washington, D.C. 20240.

Design Competition Winners.
Andy Pressman, an intern architect with the Norman Rosenfeld firm in New York City, and his brother, Peter Pressman, a social science graduate student at Princeton University, have won first prize in a competition sponsored by the Misawa Home and the Building Center of Japan. *Products on page 122*

PRODUCTS

Vinyl Flooring.
Composition floor tiles designed for installation in residential and light traffic commercial areas feature dryback or self-stick backing. The tiles are 12 inches square with an .08 inch gauge and are available in four styles. (Azrock Floor Products, San Antonio, Tex. Circle 189 on information card.)

Ceramic Tiles.
Eight-inch-square tiles designed for interior applications feature smokey or fume glazing in white, gray, tan, and beige. (CeramicUS, Canton, Ohio. Circle 186 on information card.)

Whirlpool Bath.
Self-priming UL approved whirlpool system has six jet nozzles, ¾ horsepower pump, an air adjustment valve, and a timer switch. (Bremen glas, Bremen, Ind. Circle 183 on information card.)

Solar Collector.
Metal solar absorbing collector is a liquid cooled internal manifold system. Suitable for both flush and rack mounting and designed to withstand winds of 120 mph. (Bio-Energy Systems, Inc., Ellenville, N.Y. Circle 190 on information card.)

Carbon Filament Light Bulbs.
Standard-base eight and 16 candle power bulbs are reproductions of the Victorian period. (Kyp-Go, Inc., St. Charles, Ill. Circle 187 on information card.)

Plastic Lighting Globe.
Seamless acrylic plastic globes are thermoformed from a single sheet of Plexiglas with a minimum thickness of .1 inch. The globes are designed for commercial and residential outdoor lighting. (Rohm and Haas Co., Philadelphia. Circle 181 on information card.)

Vinyl Molding.
Prestained cellular vinyl moldings are available in a variety of wood finishes including birch, teak, pine, and hickory. Moldings are washable, do not absorb moisture and bend without splintering. (U.S. Gypsum Co., Chicago. Circle 180 on information card.)

Wall Tiles.
Italian ceramic 3x4-inch tiles featuring botanical prints on beige or white background are designed for kitchens, family rooms, enclosed porches, and foyers. They can be combined with solid color tiles for random patterns, border, or central panels. (Italian Tile Center, New York City. Circle 174 on information card.)

Stairway Floor Covering.
Steptread combines stair nosing, tread and riser for a one piece seamless stair covering and is molded from synthetic rubber in eight standard colors. (Nora Flooring, Madison, Ind. Circle 173 on information card.)

Wall Coverings.
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Marble Veneer Panels.
Reinforced lightweight quarter-inch thick veneer panels constructed of marble are designed for flooring or as wall coverings. (Marble Technics Ltd., New York City. Circle 176 on information card.)

Lighting Control Sensor.
An electronic, passive infrared sensor automatically turns lights on and off by sensing and responding to the presence of a human body. It can be mounted in a suspended ceiling and wired into the existing lighting system. (Tishman Research Co., New York City. Circle 198 on information card.) □

The Institute *from page 16*
of *Trend Report,* chairman of the Naisbitt Group, and the Institute's public director, said that "we now belong to a global community as a consequence of space satellites shuttling information to every corner of the globe." Gentry Lee suggested that computers are already having an effect on society and will ultimately "revolutionize every major profession, including architecture. . . . All buildings, both their development and their operation, will be computer-monitored. The home will become a computer center. The architect will have to rethink the whole structure of the home," he said.

Naisbitt suggested that the new high-tech society will also be one of high touch, in which clients will request buildings that are more sensitive to human qualities to offset the "hardness" of advanced technological products.

As for the development of space colonies, Lee predicted that by 1990 the first manufacturing companies will set up operations in space. "A new discipline will evolve that will combine architecture, engineering, and computer science," he said. This exploration and development in space, Lee said, will not come from government action, but from the process of a "free market economy. First, there will be the traveling in space shuttles. Then, someone will figure out it's cheaper for workers to live up there. Then restaurants will develop."

Concerning the relationship between space exploration and architecture, Donald Hackl, FAIA, moderator of the seminar, said there is a chasm between the two, but that "the peripheral issues generated by the former—communications, the knowledge explosion, and new technology —are very relevant to the profession."

The second session and seminar explored the "Near-Future Impact of Undersea Research." In his discussion, Canadian underwater explorer, physician, and author Dr. Joseph MacInnis noted that we are all dependent on the sea for food, water, weather, oil, and minerals. "Propelled by the population explosion, our need for resources and technological revolutions, we are collectively moving into the sea with the collective ambition of the shark," he said.

MacInnis suggested that in the last two decades "we have penetrated deeper into the ocean space, physically and intellectually, than any other generation before us." And, he warned, not all of the steps have been positive. "We have overfished the great herds of herring, cod, and haddock that used to be thought of as infinite. We have rained into the sea a shower of heavy metals, pesticides, radio-active wastes, oil, and other poisons. In addition, we have sent down into the sea a great arsenal of nuclear weapons. They run silent and deep, buried in the steel bellies of nuclear submarines."

As for the future potentials for the sea and underwater research, MacInnis pointed to the 20 to 30 percent of the world's oil reserves that lie beneath the sea and also the nonpolluting and renewable energy resources of tidal energy, wave power, and ocean currents. He spoke of floating cities as "unquestionably a part of our future," maybe as soon as 25 years away. Sea-farming, which today provides approximately six million metric tons of fish, will expand in the future, according to MacInnis. Ocean mining will first be directed to manganese nodules, potato-shaped nodules rich in oxides of copper, nickel, manganese, and magnesium, he said, and ocean thermal energy conversion, already being researched, will provide energy through a low-temperature boiler and gas turbine system.

In the third session, "Emerging Technologies and Their Impact on the Future," Gerard K. O'Neill, professor of physics at Princeton University and author of *2081*, described the "technological drivers of change" as computers, automation, space colonies, abundant energy, and communications. "By carefully applying these technological drivers," he said, "mankind will be able to serve society better, use energy more efficiently, improve the quality of life, and preserve our environment."

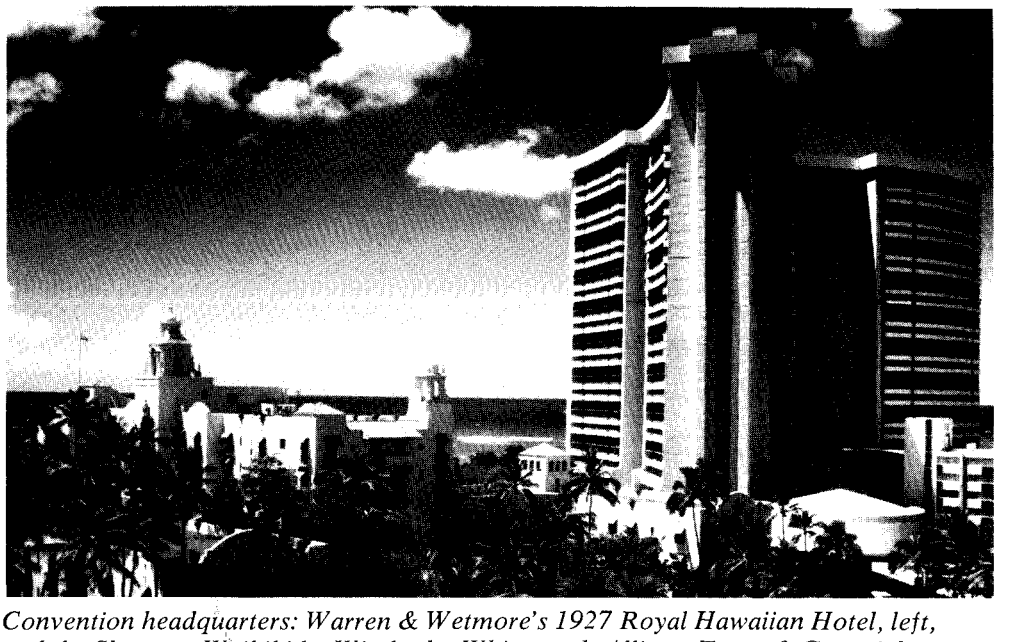
O'Neill predicted that by the year 2081 over 200 million people per year will be traveling to space colonies. That year should witness, he said, routine space travel, solar-powered space colonies, climate controlled cities on earth, land travel in high-speed vacuums, and widespread use of home computers and talking robots.

According to O'Neill, the "peaceful" space colonies will have around 10,000 inhabitants in an environment where weather and the length of days will be controlled by raising and closing curtain blinds. On earth, there will be climate-controlled towns, with glass roofs that can be rolled aside or over the entire community, he said. There will be "personal public transportation" by computer controlled cars and airplanes, and intercity travel will be by floater vehicles that operate on magnetic vacuums in underground pipelines and travel 600 miles per hour. (O'Neill pointed out that the Germans and the Japanese already have developed high-speed magnetic transportation systems that travel at 200 miles per hour.) Energy will be provided by satellite power stations, which will relay energy sources to earth.

In the panel discussion following O'Neill's talk, he said that there is a "widespread misunderstanding . . . especially in this country, that technology is evil." He said humans must set the goals "rather than allowing technology to shape our goals."

Michale J. Antal Jr., professor of renewable energy resources at the University of Hawaii, questioned O'Neill's conception of satellite power stations and argued that we should move toward the decentralization and regionalism offered by renewable energy sources rather than the centralization of such systems as satellite power stations.

On the relationship of future technology and architecture, Elmer Botsai, FAIA, suggested that the construction industry is immune to change and that architecture will be the last holdout against technology. But he said that "architects need to be far more knowledgeable about technology," and that he believes that the more technological the society becomes, the more humanness in buildings will be demanded. □



Convention headquarters: Warren & Wetmore's 1927 Royal Hawaiian Hotel, left, and the Sheraton Waikiki by Wimberly, Whisenand, Allison, Tong, & Goo, right.

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