Some conventional ceiling systems give you high-quality light. Some furniture-mounted systems give you low-energy light. Only Tascon™ task lighting gives you both.
Here's a dramatic improvement in lighting systems that can cut lighting costs by over 65% in either open plan or conventional offices. (See chart below.)

The principle behind Tascon lighting is simple. The lighting fixtures, because they're movable, can be positioned to provide light only in the areas where it's needed. So a properly positioned Tascon fixture provides ESI values of 40 to 60 and up to 90 maintained footcandles on the work surface.

With one fixture for every 100 square feet, Tascon provides this high-quality lighting for less than one watt per square foot. And the 120-volt fixture with optional on/off capability can cut lighting costs another 15%.

Unlike some low-energy systems, Tascon provides comfortable light.

Because the Tascon pendant fixture illuminates from both sides, as well as above and behind, it distributes high-quality light evenly without the glare, shadows, and reflections some furniture-mounted task lights create.

And Tascon directs 20% of its light upwards to create visual interest and ambient illumination.

Armstrong Tascon fixtures fit most types of ceiling grids.

The mobility of Tascon fixtures insures proper lighting angles.

Armstrong Tascon fixtures fit most types of ceiling grids. The tracks that support Tascon fit most ceiling grid systems. And you can relocate them to reposition the fixtures easily. So Tascon gives you the quality of ceiling-mounted lights and the energy savings of furniture-mounted lights along with flexibility that neither can offer.

For more illuminating information about Tascon lighting fixtures, write Armstrong, P.O. Box 3001, Dept. 04NPA, Lancaster, PA 17604.

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ARMSTRONG INTRODUCES REFLECTIONS CEILINGS. THEY MAKE ANY DESIGN LOOK TWICE AS GOOD.

With Reflections Ceilings, what’s overhead looks as interesting as what’s underneath. Because these ceilings actually reflect the room underneath: In Silver, Bronze, Glass Black, Brushed Silver, or Antique Glass*.

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June 1980

109 Specifications clinic: The well-begun project manual

In perspective

The era of swoops and billows

Fabric structures are no longer confined to temporary use. Aided by computer technology, designers are creating permanent buildings. Indication of their coming of age is that fabric structures are being used in all temperatures and weather conditions.

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Cover: Based on Helmut Jahn's entry to the second Chicago Tribune Competition (p. 94). Photo: Jessie Hickman.

Indexed in Art Index, Architectural Index, Engineering Index. Controlled circulation postage paid at Hartford, CT 06118. Volume LXI, No. 5. Printed in U.S.A. Copyright © 1980, 1981. Penton IPC.
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What we've learned from nature. As your vertebrae flex and extend, each is cushioned by an intervertebral disc. At the same time your spine's gliding joints accommodate the movement. Tremco's Dymeric® is a multi-component polyurethane sealant designed for dynamically moving building joints.

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A time to choose

This month, P/A proudly accepted a medal from the American Institute of Architects for the sponsorship of the 28th annual P/A Awards program. The competition was cited on the accompanying certificate as “a catalyst for the best in American design. A lively contest and a platform for testing the ideas of designers young and old.”

Before going to Cincinnati to accept this honor, we prepared the invitation for the 28th annual P/A Awards competition, entries for which must be on their way by Sept. 1. As we do every year, we had to assemble a jury and make some adjustments in the rules, based on our latest experience.

We never take the administration of this awards program lightly, since it belongs in a sense to the whole profession, not just this magazine. This year, however, we approached it with exceptional care and humility.

You are probably aware—as we surely are—that the results of this past year’s program stirred up more than the usual controversy (P/A Editorial, March 1980, p. 7). Many seem to have viewed the outcome as mutual promotion among a small circle of designers. Though neither P/A nor the jury intended anything like that, the indignant reactions were chastening reminders that the awards program could become clubby and isolated from some of the profession’s main concerns. A narrowing range of jury selection could lead to a more limited range of entries, and so on, in a tightening spiral.

In an effort to guard against such a sequence of events, we discussed the matter of jury selection this time with more diverse representatives of the profession than we have usually consulted. Some suggested that we reinforce the authority of the program by inviting a jury composed entirely of elders—long-recognized leaders who were veterans of earlier P/A juries. Others suggested, instead, that we assert our solidarity with avant-garde design positions by, for instance, inviting a jury of this year’s winners. Like most of the people we spoke with, we could accept only a more moderate and—we hope—judicious course. We want neither to reserve next year’s prizes for those who follow the dominant philosophy of this year’s, nor to close out any creative efforts by reconstituting a jury from the past. We simply want to make it clear that the judging process is not in the hands of any faction with predictable preferences.

For the architectural design team of our jury we have invited back one veteran, Romaldo Giuglola, who served on the P/A jury back in 1968. Our juries have often included one previous juror, and it could be argued that they always should. Another design juror, Richard Stein, is widely known for his expertise in the area of energy-conscious design. They will be complemented by two other architects—Robert Frasca and George Hartman—who have been frequently honored for their work and whom we know to be sensitive to today’s varied design issues.

For the crucial tasks of selecting entries in planning and research, we have invited two professionals universally recognized in their fields—Edmund Bacon in planning and Ralph Knowles in design research—each complemented by a respected younger colleague—Galen Cranz in research and Jacques Brownson, whose career in planning at state level follows earlier recognition as project architect for Chicago’s Civic Center, among other landmarks.

What is most important is that all of these people are known to be judicious and articulate in situations comparable to the P/A jury. We can be confident, moreover, that members of all three teams will be able to contribute substantially to the consideration of work in categories other than their own.

In reviewing the rules this year, we added safeguards to ensure that all entries represent real commissions. In a competition among practicing professionals, we cannot tolerate doubts as to the legitimacy of the commissions.

Thus, we at P/A have already made some governing choices—on ground rules and on jurors. And the prospective jurors—who deserve our deepest thanks—have chosen to participate.

In the end, these jurors will choose perhaps a couple of dozen winners out of hundreds of submissions. The odds are formidable, but the stature of the prizes depends ultimately on the quality and diversity of submissions.

It may be worthwhile reminding potential entrants that all submissions will be seen by the P/A editors, as well as the jurors. Though only the jury can give awards, the editors regularly follow up on other work that seems promising for editorial coverage. This year we are looking for energy-conscious building designs, in particular, which might be subject for our series of DOE-sponsored Energy Analyses.

We invite you to review the rules published on pages 15–16 and to consider which of your current work may deserve recognition in the 28th annual P/A Awards program. It’s easy to enter. And that choice is yours.

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Guardian reflective glass

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   Arch.: 3D International Inc.
   Glaz.: Corning Glass Products
   3M Silver Reflective Insulating

   Bingham Farms, Michigan
   Arch.: Lenzini
   Glaz.: C. Levinson
   3/8 Silver Reflective

4. Four Seasons Office Building
   Sherman Oaks, California
   Arch.: Landco Partnership
   Glaz.: C. Levinson
   3/8 Silver Reflective

5. Four Arabi Office Bldg.
   Arabi, Louisiana
   Arch.: Welton
   Glaz.: C. Levinson
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See it in Detroit, Los Angeles, New York, Houston, Calgary, Saudi Arabia and in your next building, too.

As you can see, architects both across and outside the United States are specifying Guardian for high-performing reflective glass. There are good reasons why Guardian is such a fast-growing source. Guardian offers a wide choice of colors and shades. Strong insulating values. And Guardian is a complete manufacturing source—from sand through finished product.

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Gehry's goals

In her lead article on Frank O. Gehry (P/A, March 1980) Barbara Goldstein refers to the debate on the primacy of artistic goals versus social goals in architecture. The key word here, of course, is primacy, which infers that both are goals, but that one or the other (depending on the philosophy of the particular architect) is of prime consideration. Unfortunately, many of those architects who look on their work as "architecture as art" disdain for the most part any social objectives. With them it is not a question of "primacy" but rather, "to the exclusion of" any other consideration. Unfortunately, those proponents of the new movements in architecture that go by many names seem to have forgotten that architecture is not a pure art form to be manipulated as the architect sees fit, but that is is a social craft with a responsibility to the society and to the environment. (Visual pollution is as devastating to the quality of the environment as air and water pollution.) An artist's sole responsibility is to him/herself to reflect the society in his work, whereas an architect's responsibilities are many. He not only must be true to himself, but he must be responsible to the needs of his client and to the two levels of "users," that is, those who will use the building, and those who will experience the building by virtue of its becoming a permanent fixture in the visual environment.

I have known Frank Gehry for 30 years, I have worked with him, and consider him a friend. I have great respect for his talents. I say this because I want it clear that I am not specifically singling him out for criticism, but your profile on Gehry makes it necessary for me to answer Barbara Goldstein and the others who set so-called artistic goals against social goals in architecture.

Frank Gehry says he is an artist, and by my definition he is an artist. Whether what he does is good art or bad art is another question not the subject of this letter. It is art, and that is good enough for me.

But is it architecture, and if it is, is it good architecture? Gehry says he wants to "turn people on to architecture" but I am afraid that his work is having the opposite effect. Architectural design is a process of solving a particular set of problems, and it is from the solution of these problems that the aesthetic is derived. "The Fundamental Principles of Architecture" as set forth by Vitruvius almost 2000 years ago are still valid regardless of the changes in technology and style; and symmetry and proportion and balance are still the elements of good design.

Years ago one of my mentors reminded me that architecture is a series of compromises. An artist must not compromise if he is to maintain his/her artistic integrity, but an architect, by the very nature of the social implications in his/her work must be prepared to compromise in order to closely approximate the ultimate demands of the many forces influencing the solution, such as the client, the public, the government agencies, the environment, the lenders, and on and on. In the final analysis, a work of architecture must be judged by how it solved the problems as well as the aesthetic solution.

Fortunately there are many architects (most of us, in fact) who adhere to the basic principle of good design and problem solving, and who do create some exciting architecture. What is unfortunate is that these architects are not as articulate nor do they get the same media coverage as those whose work is noticed more for its shock value than for its architectural value.

The most serious negative effect of the work of these architectural neo-logomaniacs, who rely on verbiage in place of true creativity, is the confusion they create among the architectural students who now find themselves without the firm base of time-honored principles and are faced with an architecture based on the whimsy of the individual.

Gehry's work in particular reminds me of a similar controversy that occurred in the late 1930s over women's fashions, when the designers were relying on rhetoric to convince the public of the validity of the new design. To illustrate the attitude of the public, a New Yorker cartoon showed a mother trying to get her son to eat spinach by telling him that it was kale, to which the child retorted, "I say it's spinach and the hell with it." Frank, I say it is chain-link fencing, and the hell with it.

Sidney H. Brisker Architect AIA
Los Angeles, Ca

Photo correction

The photographs for Atelier International's Barbajollection and Cole Business Furniture's 500 Series chairs (May 1980, p. 131) were inadvertently transposed.

Multiple awards list amended


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The global effects of acid rain.


Alabama—Average rainfall shifts from a normal pH 5.6 in 1956 to ten times normal acidity in 1972.

Alaska, Greenland, Arctic Circle—Springtime haze, at times as intense as Los Angeles smog, apparently caused by pollution in Japan.

Allegheny National Forest, Pennsylvania—acid storm more acidic than vinegar, pH 2.3.

Eastern U.S.—Average rains as acidic as tomato juice, individual storms as acidic as vinegar.

Minnesota—Boundary Waters Canoe Area lakes reaching critical acidity levels.

New Hampshire—Storm at Hubbard Brook measures pH 2.8, more than 500 times normal, acidic enough to seriously damage vegetation.

Nova Scotia—15 to 20% of lakes reported dead or with decreased fish population.

Ontario—140 lakes reported dead, 48,000 more throughout Canada are threatened over the next 20 years.

People's Republic of China—Dead lakes reported, especially near Manchuria.

San Francisco, California—Dry acid fallout, even more potent than acid rain, able to eat holes in leaves and to corrode plastics.

Scandinavia—Earliest afflicted area, first studies in the 1950s. 5,000 lakes now devoid of fish life, annual liming of lakes to counter the acid problem.

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980 Pritzker Prize awarded to Luis Barragán

The international 1980 Pritzker Architecture Prize has been won by Luis Barragán, Mexico's famed landscape architect. Jay A. Pritzker, president of the Hyatt Foundation which administers and funds the $100,000 prize, announced the jury's choice at a press conference at the Museum of Modern Art in New York on May 1. Barragán gained international renown in the late 1940s for his design of El Pedregal (The Rocky Place), a residential complex set within gardens carved from volcanic terrain. His designs of the 78-year-old, self-taught architect evoke Mexico's past as well as its future in what he terms the "architecture of emotion."

"One does not work on buildings of such importance as Independence Hall and the Second Bank (of the United States) without a sense of awe and respect. The architecture of these buildings is a national resource. . . . The artifacts they contain—paintings, books, furniture—all require that rigid temperature and humidity control be maintained." Because of such restrictions, each building had to be researched separately to determine its original historic fabric, current physical plant, and present energy-consumption characteristics.

The first group of structures analyzed included the Second Bank, the Merchants Exchange, and the Bishop White House, as well as such modern buildings as the Visitor Center and the Franklin Court Museum. Improvements on six building complexes were recommended and categorized by either "immediate implementation" or "requiring further study." Many of the recommended changes involved alterations in the buildings' environmental systems, especially heating, cooling, humidification, ventilation, and lighting. Insulation, specially designed multiple glazing, and other architectural and landscaping improvements compatible with the buildings' appearances and unharmonious to the long-term building life were also suggested. In the case of new buildings, more radical options, such as insulating wall panels, shading devices, and solar heating systems, were advised.

In addition to Ueland and Junker, other members of the design group include D'Ambly, Inc., engineers; Lawrence G. Spielvogel, Inc., consulting engineer and energy specialist; Clio Group, Inc., architectural historians; and Synterra, Ltd., landscape architects.

Energy conservation project, Independence Historical Park

The first stage of a project designed to conserve energy in the buildings and open areas that make up Independence National Historical Park in Philadelphia has been completed by the Philadelphia firm of Ueland & Junker. Original estimates indicate a 26 percent energy saving, with the necessary energy-saving improvements paid back in fuel savings in less than five years. This 26 percent figure is 6 percent higher than the study's original goal.

The 35 building complexes and 10 major outdoor areas that make up the park have historic qualities and also contain historic artifacts. Special considerations, therefore, were taken into account in the energy audit. According to the project director, C. Anthony Junker, "One does not work on buildings of such importance as Independence Hall and the Second Bank (of the United States) without a sense of awe and respect. The architecture of these buildings is a national resource. . . . The artifacts they contain—paintings, books, furniture—all require that rigid temperature and humidity control be maintained." Because of such restrictions, each building had to be researched separately to determine its original historic fabric, current physical plant, and present energy-consumption characteristics.

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Reopening of Kemper Arena

After eight months of reconstruction, the Kemper Arena opened on February 20 with a crowd of nearly 17,000 basketball fans who watched the Kansas City Kings defeat the Seattle SuperSonics, 107-105. The victory marked the first event held in the Kansas City arena since the roof collapsed on June 4, 1979 (P/A, July 1979, p. 26) during a devastating storm. At that time, speculation abounded as to the cause of the destruction, and suggestions included tornados, flat roofs, and drainage problems. City officials approached Helmut Jahn of C.F. Murphy Associates, designer of the project, who recommended a neutral consultant. California engineering con-
The reconstructed Kemper Arena.

Consultant James L. Stratta was then engaged to supervise the reconstruction (PA, Nov. 1979, p. 24).

The major design change was the replacement of the bolt system, used originally to hold the roof to the three massive treistles, with a steel bar unit. The bars were tested for 600,000 lb of stress considered to be "400,000 lb more than would be generated if the roof were covered by several feet of snow," according to Stratta. In addition, the roof was peaked 30 in. to allow better water runoff, and the drainage system was redesigned.

A unique addition is the installation of a $200,000 electronic system which supplies advance warnings of any weaknesses that may develop in the structure during ordinary wear and tear over time. Forty sensors, mounted on the roof structural members, collect data in a method similar to that of a seismograph.

Total cost of repairs and improvements to the arena was nearly $6 million, and city officials estimated that revenue losses over the eight-month period of reconstruction totaled $1.1 million.

The award-winning facility is the Kansas City home of cultural as well as sporting events. Twelve major concerts have already been booked, and local promoters are confident that the city will once again be able to attract top name acts now that the Kemper Arena is back in service.

First annual Monterey Conference

About 400 architects attended the California 101 Design Conference held from March 27 to 30 in Monterey and sponsored by the California Council of the AIA. (The number 101 referred, not to the well-known freeway route, but to the number of participants presenting their work or ideas.) Although this was billed as the first California design conference, there was a similar, smaller scale event last year in Newport Beach that was popular enough to power this one.

In general, it was the kind of mildly chauvinistic affair that California inspires. There are, after all, more architects here than anywhere else, resulting in a lot of energy and curiosity about what is going on. There is also a well-founded suspicion that some design efforts in California are not taken as seriously in the Eastern centers and by the Eastern-based media as they might be.

The conference opened Thursday evening with a brief but exhilarating slide show. But Lumens's rapid-fire order, all the work that would be presented in the two full days of sessions that followed. Next came a panel moderated by Richard Saul Wurman, now at CalPoly/Pomona and composed of Bob Marquis of Marquis Associates in San Francisco, Mildred Schmertz, Architectural Record, and Reynner Banham, now at U.C. Santa Cruz. In expressing their views about the state of the art, panel members mostly touched upon familiar themes. There was a lot of grousing about how architecture had turned into words and pictures, and poor old Modernism was once again trampled. The notion that busy people, who praised Modernism in California for being "pioneering without tears, polemic, or social verbiage," as though the movement had been laundered somewhere along the Great Divide. The evening closed with an opulent multimedia tribute to Herbert Bayer. Friday featured morning and afternoon sessions in which so-called teams were given 7 to 15 minutes—alas, the time limit was not always observed—to present their work. The selection of presenters was done at the level of the component organizations of the CCAIA. The word "team" was misleading because the members were not harnessed to any common point of view nor were they even matched. People just starting out were sometimes followed or preceded by those who had been in practice for years. But, in this reporter's opinion, these inequities or discontinuities of practice made it all real. Any attempt to grade or rank proponents would merely have presented other problems. As it was, this supermarket shopping event was flawed only by the impossibility of seeing and hearing everything, and by the minimal provision for audience feedback. Since the six concurrent sessions were held in rather small rooms and only repeated once, no matter how agile one was, one couldn't attend them all. Even a published, adhered-to schedule would have helped somewhat. Perhaps in the future it might be possible to stage the whole event in a large arena. The performers might have stalls and be obligated to present their work at scheduled times. But what of the human interrelation, presentations might be continuous for all to see as they pleased.

The work itself showed about equal strength in the now-traditional currents of Modernism and the new waves of contemporary, if not Post-Modernist, ideas. There is a healthy and reassuring diversity of practice. Actually, more explanation of the process of practice would have assisted our understanding of the products in many cases, although some of the presenters were quite candid about why they work the way they do.

Saturday's In-Depth—whatever that means—presentations were so disrupted by media problems that it is hard to assess their contribution. Programatically, the four presentations were intended to show the range of practices in the state in a detailed way with John Jerde, Craig Hodgetts, Anthony Lumbden, and Donn Logan presenting for their respective firms. Although these were indeed four different kinds of practice, there was disagreement over how representative or informative the sessions were. The fact that the speakers spent a lot of time fighting the slide projector dissolve units certainly vitiated the program.

The feedback the CCAIA has had about the conference indicated a strong feeling that the speakers should have addressed an issue or theme. A commendable idea, but, as one commentator pointed out, architects are not easily satisfied. The notion that busy people will take time to search their souls and come up with an organized point of view directed to a particular theme is a bit absurd, or at least out of character, especially considering the self-supporting conference structure that required even presenters to pay admission, lodging, and travel costs. More likely they will reach for the current carousel of slides and go from there.

All this is minor carpings. Most everyone agreed that the conference was a success, and a good time was had by all. In all fairness, the Monterey Design Conferences of the future might serve no better purpose than to do for the design what the Monterey Jazz Festival does for jazz: take it seriously but make it enjoyable. [Sally Woodbridge]

Report from London

"We have been slowly destroying our cities," said Richard Rogers this year during a lecture he gave at the Royal Institute of British Architects.

In saying this, he was lamenting not much the destruction of buildings, the replacement of the old by the new, but the gradual loss of the idea of the city. He was not the first to have said this, but coming from one of the leading architectural innovators in this country, it was significant.

It is not only the quality of architecture that draws tourists in the thousand pockets of historical London, the 18th-Century city of Bath, or to the medieval city of York, but their human scale and richness, their secret places.

It is therefore encouraging to find fragment of city newly created in London's central West End near Leiceste Square. Called Hobhouse Court, it is [News report continued on page 32]
Because various grades of lumber were used in the MacArthur Terrace project, the exterior finish had to meet two very important criteria. First, a variety of colors were needed to make the overall apartment complex aesthetically pleasing. At the same time, the finish had to be economical in terms of both initial application and long-term maintenance.

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Hobhouse Court is a secret place and has to be sought out. Its western edge is formed by Suffolk Street with its grand stuccoed houses—last remnants south of Ox ford Circus of John Nash's Via Triumphalis which ran from Carlton House to Regents Park. On the eastern side is Whitcomb Street whose buildings are, in contrast, more domestic in character and fairly typical of London's 19th-Century commercial architecture.

What was once a solid block running between these two streets has been hollowed out to make an interior courtyard reached from Suffolk Street by passing beneath a handsome Nash portico. Paved with York stone and granite sets, and planted with trees, the courtyard has a secluded collegiate quality and is the unifying element that pulls the separate ingredients of the scheme together.

The site is owned by one of London's major landowners, the Commissioners for the Crown Estate. By 1971 many of the houses were in a poor condition. They were leased out then, as they are now, as small shops, offices, and art galleries. The center of the site was filled with a hotchpotch of back extensions, and a long and inconvenient flight of stone stairs led from Suffolk Street to the art galleries of the Royal Society of British Artists at the southern end of Whitcomb Street. Lease renewals were due to begin in 1974, and the commissioners asked Casson Conder to carry out a planning study before preparing a design. The final scheme is therefore the result of careful and lengthy investigation. It includes the renovation of Nos. 6–14 Suffolk Street and four buildings on Whitcomb Street, and the insertion of three new ones.

The Suffolk Street houses were subject to listed building control. They were built between 1820 and 1830 and follow the characteristic form of early 19th-Century London houses having four stories and a basement. While Nash was responsible for the layout and general supervision, other architects also were involved in the design, so that there is a fine mixture of classical detailing.

No. 6 is by Edward Cresy and has a "big arched central window flanked by Ionic columns and a smaller window above flanked by pilasters—a curiously disjointed composition of Italian High Renaissance," notes historian Nikolaus Pevsner in his "Buildings of England: London Volume 1). Next door is the formal entrance to the courtyard marked by Nash's giant portico with four columns and a Roman Doric pediment. Nash also designed Nos. 8–11 while the remaining three were done by Lewis Wyatt.

Only the three Wyatt houses, one with a splendid Regency staircase (now a conference room), were considered important enough to retain completely. The remainder were linked together in pairs so that by breaking through party walls, horizontal sets of four rooms rather than two were provided at each level. This gave better office space with the minimum disturbance of the fabric.

Restoration can prove a delicate business requiring particular architectural skills. In this case, timber battens and ironmongery were placed with masonry. Original plasterwork was restored or duplicated, fireplaces were designed around the old grates, and ironmongery and light fittings faithfully reproduced.

On the Whitcomb Street side, the architects were forced to reconsider their decision to take down the building which, at the time of their preliminary report, they had felt were in too bad a state to repair. To their momentary irritation, a campaign launched by London's Evening Standard succeeded in getting the underground wine vaults "listed," which made building above them virtually impossible. The outcome was that all the buildings except two at the northern end of the street have been renovated to provide space for shops on the lower floors, with offices and galleries above. The current trend towards open loft space, which is flexible and can be let by the square foot and divided by demountable partitions, prevails here.

Ingeniously, a steel cradle replacing internal structural walls was used as scaffolding during construction and then left as the loadbearing framework for new concrete floors.

These modest buildings do conceal delights not uncommon in this part of the world. As well as the warren of wine vaults under the site with their fine brickwork, there is a succession of sky-lit galleries on the top floors. These, simply painted white with a series of graceful cast-iron skylights, are intended to house art collections.

They are reached by a new lift and stair tower built at the southern end of the courtyard and forming a bridge between the two sides of the scheme. Clad in lead, it stands a little uneasily as a punctuation mark, emphasizing rather than softening the joints. Climbing up the stairs behind the galleries affords a view of Reginald Blomfield's evocative Parisian rooftops next door.

The building replacing that demolished on Whitcomb Street is in brick and slate mansard roof and dormer windows. Although somewhat overshadowed by its historic neighbors, it is unobtrusive and maintains the scale, a does the other new building constructed in a similar manner on the site of an old stable block. This, the building of two-stor offices and a caretaker's flat.

The grouping of the buildings creates spaces that are intimate, with long views across the courtyard. The removal of the back extensions and subsequent knitting together of the brickwork with salvaged secondhand bricks has given the court a structure that is rich and pleasing. The stitches, so to speak, are there to be appreciated. [Penny Maguire]
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Hempstead Community Action Program
Solar Energy Center, Long Island, NY.

Two programs are fused in this one building, designed by architects Bentel & Bentel, of Long Island with Dubin-Bloome Associates, of New York as engineers. The energy-conserving structure, estimated to cost between $3.5 and $4 million, acts simultaneously as an energy-conserving educational and training center for the Economic Opportunity Commission, and as a testing laboratory and demonstration project for New York Institute of Technology's Center for Energy Policy and Research. Programs run at Hempstead by the EOC will encourage minority groups to seek jobs in solar-related fields. In addition, students from the local predominantly low-income-population high school will have access to displays of current energy technology. NYIT, in conjunction with Grumman Energy Systems, a division of Grumman Aircraft Corp., manufacturers of solar collectors, and Long Island Lighting Co., the local utility, plan to use the building as a laboratory to evaluate the efficiency and validity of various solar collector systems presently on the market. "The data collected," says Frederick Bentel, "should help lending institutions determine the validity of loans for solar installations." The 25,000-sq-ft building incorporates several solar systems into its design. On the southern façade are mounted flat plate and cylinder collectors; the roof has additional plate collectors and focusing collectors. Passive technologies are used also. The concrete-block building with internal concrete walls and slabs provides a thermal mass sufficient to minimize temperature swing. Four inches of insulation underlie a white stucco skin, a thin, but well-insulated exterior treatment for the internal mass. Light and ventilation come from openings on the southern face; northern exposure is minimal. A greenhouse on the southern façade adds to the passive aspects. More symbolic than efficient, a double Darrieus windmill tower provides a visual focus for the design that is appropriate to the center's purpose.

In progress

Four Leaf Towers, Houston, TX. Architects: Albert C. Martin Associates, Los Angeles and Houston, managing and coordinating; Cesar Pelli & Associates, New Haven, design. These two 40-story condominiums will constitute Houston's largest high-rise residential condominium development and the city's tallest buildings outside the downtown area. The $100-million project will have 400 units with parking for 700 cars on one subterranean level. Landscaping will surround the two towers, four tennis courts, and a swimming pool. Sale of the condominiums will begin in the summer of 1981, and occupancy is scheduled for the spring of 1982.

Bus Maintenance Facility, Houston, TX. Architects: Bernard Johnson, Houston. This $27-million bus maintenance complex features two semicircular buildings connected to a bus parking canopy by elevated pedestrian catwalks. Three concentric activity areas—bus stalls on the perimeter, repair shops at the core, and parts storage in between—make up the facility, which will serve as a major element in the city's move toward a modern, efficient transit system. The 250,000-sq-ft complex is entirely air-conditioned, and window walls, bright colors, and high ceilings add to the structure's spaciousness. The project is being designed and built under a "fast track" schedule, with construction starting on the sitework and utilities while building plans are being concluded. Completion is expected by late 1981.

One Post Office Square, Boston, MA. Architects: Jung/Brannen Associates, Boston, Pietro Belluschi, consultant. This office tower-hot complex in the center of the financial district will include the construction of a 39-stor 750,000-sq-ft office tower and the conversion of the landmark 1922 Federal Reserve Bank building into a 300-room hotel. The exterior of the tower on the first three levels will be predominately glass, with a main lobby three stories high on Pearl and Mil Streets. On the hotel side, the lobby extends for six stories and becomes the top of the hotel atrium, which is the exterior link between the two structures. As a nine-story hotel, the former bank building, an example of early Italian Renaissance architecture, will retain such details as intricately carved ceilings, a marble staircase and fireplaces, an N.C. Wyeth wall mural. The $65-million facility is scheduled to open in mid-1981.

Office Building, Westport, Ct. Architects: Zane Yost & Associates, Bridgeport, Ct. This 30,000-sq-ft office building incorporates passive solar methods for heating and cooling. Offices open onto an atrium, and operable exterior and interior windows permit natural ventilation. Wall construction is masonry for thermal lag. Task/ambient lighting will be used. A mirrored-glass spandrel roof reduces the apparent height of the building on the east façade, which abuts residential district. Completion of the $6 million building is scheduled for the end of the year.

[In progress continued on page 40]
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Architects: Emilio Ambasz and Giancarlo Piretti

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Great Wall of Beijing Hotel, Beijing (Pe-king), China. Architects: Becket International, Santa Monica, Ca. Construction of the first modern hotel in China designed by an American firm is scheduled to begin in October and to be completed in two years. A joint venture between the China International Travel Service and E-S Pacific Development, Construction Co., the $78-million, 1000-room hotel is situated on a four-acre site on Beijing’s main thoroughfare, Dong Haun Road, which leads to the airport. Three guest-room wings, 21 stories high, radiate from a central pyramid-shaped atrium, which also contains a tea garden. All spaces, including guest rooms, are climate-controlled, and the 63 guest rooms on each floor are equipped with color television, radio, and message-light systems. The design is a [In progress continued on page 48]
HOW A FRIGID NEW ENGLAND ENVIRONMENT DEMONSTRATED THE EFFECTIVENESS OF PASSIVE SOLAR ENERGY AND EXOLITE™ SHEET.

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The solarium is separated from the living units by an internal window wall. During the day the winter sun penetrates the room as well as the solarium, providing direct, passive solar heat to the rooms.

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News report continued from page 36

Report from San Francisco

MANHATTANIZATION/Manhattanization

Last fall, San Francisco voters again failed to pass an anti-highrise initiative and thereby stop the Manhattanization process, so christened in 1971 when the first set of height-limiting initiatives was on the ballot. After nearly ten years of unchecked development had confirmed environmentalists' worst fears about Manhattanization, the new initiative received a favorable prognosis. It was assisted by endorsement from the development-minded mayor and by the failure of architect Arthur Gensler's opposition group, San Francisco Forward, to garner strong financial support or reveal a strong consensus.

The proposed height limit would have reduced the present maximum of 700 ft to 260 ft—about 20 stories—and given bonuses for the preservation of registered landmark buildings and the creation of new housing. Although the pro-highrise sector drew a picture of the post-initiative city studded with "short, squat buildings," this was about as far as the discussion of architectural quality got. The initiative itself spoke to environmental issues stating that increasing air, water, and noise pollution, traffic and parking problems, and demand on public services, already weakened by increasing costs and declining city tax revenues, create a "dark, windy and uninviting downtown..."

The question of what developers would do after (as they saw it) downtown was locked up, was answered by Patrick Mahoney who said, "damn little," implying a mass exodus to L.A. and Seattle. The question of what architects would do might be said to have been answered—even for all time—by Philip Johnson after testifying in August before the Planning Commission in favor of his new 48-story contribution to downtown. "We are very high-class whores," he said with a grin, "and we believe in doing what the society of our times tells us to do." In truth, the extent to which San Francisco has become a seller's market makes it more likely that development would have changed form rather than stopped. And as for the involvement of the architectural community, with the exception of the local SOM office, most city architects have been unable to take advantage of the highrise trade. Short, squat buildings might have provided more opportunity for medium-sized firms.

On a different level

Now there is another image of Manhattan that San Francisco has been proud to share. It has to do with urbanity, not scale, and is embedded in a dense concept that provides the off-beat and the unexpected. The contribution of architectural quality to this context is not easy to evaluate. The standard products of developer bonuses—plazas and observation decks—are usually sterile and stereotypical features. Still, the popularity of one blandly familiar place over another that reveals imagination and skill may have more to do with what the people are wearing and doing there than with the setting. Putting this puzzle aside, there are a few projects in Downtown San Francisco that promise to continue the good Manhattanization process.

First, construction has started on the new SOM-designed Crocker Bank headquarters complex that will occupy most of the block touching Market at the intersection of Post and Montgomery. The southwest corner of the site is now cleared for the 38-story office tower, a steel tube structure clad in a nondirectional pattern of alternating polished and flamed carnelian granite. Metallic window-washing buttons, 2 1/4 in. in diameter and projecting 2 in. from the grid serve as a graphic device to enliven the surface and give a subtle indication of the sun path. Overall, the tower has a well-mannered, buttoned-down corporate expression. Upon its completion in spring of 1982, Crocker will vacate the existing tower at Post and Montgomery for the new premises. Then the old tower will be taken down to its base, leaving the opulent, 1920-21 banking hall topped by a half-acre roof garden. Opening up this corner will permit views of the dense cityscape and shot off to maximum advantage the châteauesque office building of 1927 at 11 Sutter, designed by the New York firm of Schultz & Weaver. Lick Place, a private, mid-block alley owned by the bank will be enclosed by a three-story, block-long shopping galleria with a continuous, barrel-vaulted, glazed roof. Though relatively small, this jewel-like corridor will be an urban link between the Union Square retail area and the financial district. The whole project will enrich the historic context of the area in a most responsible way.

About five blocks down Market toward the Bay, the new Federal Reserve Bank, also designed by SOM, will fill the gap in a row of significant Beaux-Art style buildings: the 1916 Souther Pacific Building by Bliss & Faville to the east, and to the west, the 1921 Matson Building, also by Bliss & Faville, and the 1925 PG & E Building by Bakewell & Brown. The SOM team, headed by E.C. Bassett—who also directed the design of the Crocker complex—made every effort to respect the older structures and continuing their cornice height and stepping the 195-ft bank building back in tiers of two stories each so that the ornate and colonnaded Neoclassic could not be hidden. The color scheme established by gray-rose granite, polished on the facade and flamed on the side elevations, and bronze-tinted rail...
on windows harmonizes well with the bank's older neighbors. The self-facing character of the bank contrasts with that of the monumental, freestanding arcade of jointed, chamfered, and aced concrete surfaced in the architect's favorite mix, called Civic Center White. In spirit, the design recalls the work of the French Romantic Classicists such as Ledoux. What the effect will be of an authoritarian presence on this businesslike end of Market is anybody's guess at this point. The bank lobby will house an exhibit on fiscal history designed by Ray Eames that will invite more public participation in this generally aloof institution.

To be continued
Moving back up Market, we pick up the thread of the MANHATTANIZATION story upon reaching the venerable urban renewal wasteland of Yerba Buena Center. Here between Third and Fourth Streets is the still-boarded-up gate through which, if the post-World War II economic powers and plotters had had their way, would have flowed the development needed to enlarge the administrative and service functions of the volving nerve center of the Pacific Basin. The lodestone of this gerry-randered 86-acre redevelopment area north of Market was a three-block, 25-acre parcel called the Central Blocks. In the late 1960s, a design team headed by Kenzo Tange, with local architects Gerald McCue and John Bolles and landscape architect Lawrence Halprin, prepared for these blocks a much-heralded plan for a master developer scheme of interlocking convention facilities with office and hotel structures. Although the plan had the kind of architectural imageability that the agency, under the entrepreneurial hand of the late Justin Herman, put great store by, it sank slowly in the quagmire of endless lawsuits that attended, principally, the struggle of the area's displaced citizens to get good housing. Chester Hartman's invaluable account of this struggle in Yerba Buena, Land Grab and Community Resistance in San Francisco lays bare the redevelopment process in a way that can only be hinted at here by quoting Herman's unvarnished opinion voiced in 1970: "This land is too valuable to permit poor people to park on it." And so absolutely nothing parked on the three precious central blocks for over a decade, and the area north of Market got double Manhattanization.

Last year the design by HOK and T.Y. Lin for the underground convention center, named after murdered Mayor George Moscone, finally got underway. The structuralist interior is the result of the renowned engineer's first opportunity to do something on the scale of Nervi's most famous projects. Ironically, social justice triumphed first, with the completion of about a half-dozen replacement housing projects. The latest and best of these, at Howard and Fourth Streets, is Woolf House, designed by Robert Herman & Associates for the Tenants and Owners Development Corp., the nonprofit housing sponsor created to build housing for the area's displaced elderly residents. Woolf House has 112 apartments of which 104 units are one-bedroom and eight are studios. Apartments are rotated 45 degrees to the street for proper orientation and to make the best use of bay windows and balconies in relation to interiors and a lateral view of the street. Although the creditable design is firmly in the tradition of the city's bay-windowed buildings, it answers the expressed wish of the tenants for a modern, dignified, and secure building devoid of sentimental trappings.

As for the ill-fated Central Blocks, the Redevelopment Agency has just put out a request for proposals for a mix of hotel, retail-entertainment, office, and residential development on the block touching Market and a package of retail-entertainment, amusement, and cultural development on the other two blocks, one of which is the roof of the convention center. The SOM Urban Design team headed by John Kriken, with Tom Aidala and former Planning Director Alan Jacobs as consultants, has worked with the agency to devise appropriate alternatives to the failed 1973 plan. Four strategies were drawn, two of which are dominated by an urban theme park favored by city officials. The other plans incorporate more varied uses including, in Plan C, up to 400 units of market-rate housing. The team favored division of the project area into a flexible, efficient pattern of development parcels organized around an open, landscaped spine of discrete small squares connected by a pedestrian pathway. Two landmark buildings, St. Patrick's Church and Willis Polk's Jessie Street Substation (P/A, Jan. 1978, p. 70), are the historical anchors; their slightly offset spatial relationship has been used to orchestrate a set of intimate vistas along the pedestrian pathway.

The overall strategy of using fixed and variable components in the Central Blocks makes it possible at least to mitigate if not avoid the dreaded possibility of lagging, gap-toothed development that plagues many a redevelopment project. The discordant note in the agency's present offering is the apparent commitment to a theme park when the city's clearest need is for housing. Since the recently completed Pier 39 theme park near Fisherman's Wharf is not doing so well in that well-known tourist area, it is hard to understand the thinking behind a theme park proposed for the city's well-known skid row. One hope is that the present package simply represents political inertia born of previous agreements. If it is unsuccessful, the hallmark of city government is that the SOM team's recommendation that the mix of use emerge through the interaction of public priorities and the market place. Then the city might get more of that enviable kind of Manhattanization it so richly deserves.
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In progress continued from page 40

series of three three-story square elements set at 45-degree angles and connected at diagonally opposite corners. The orientation provides a north-south alignment, with a tinted glass curtain-wall façade on the north side avoiding solar heat gain, and a canopy effect on the south and west sides shading the horizontal windows. All building surfaces will have maximum insulation and double-glazed windows to reduce heat loss. The complex will contain computer HVAC controls and is expected to use 20 percent less energy than a similarly sized older building. One of the major purposes of the structure is to serve as an all-weather corridor for employee traffic between the existing building and the cafeteria. The elevated connecting link forms a passageway independent of working areas and, with its projecting elements, contains special-use facilities including a 200-seat auditorium. Completion is scheduled for mid-1981.

Office Tower, New York, NY. Architects: Eli Attia & Associates, New York. About to rise on the 55,000-sq-ft site of the recently razed Architects' Building at 101 Park Ave., this 50-story office will radically alter an area of Midtown Manhattan that has remained relatively sedate. Located on the second block south of the landmark Grand Central Terminal, the building will break sharply with the medium-rise, street-line façades that characterize this stretch of the avenue. The architect, who was previously associated with Johnson/Burgee, has taken modest steps to reconcile the angular geometry of this structure with the prevailing rectangular pattern, but the prismatic forms of the tower, to be clad in gray heat-absorbing glass, command attention from virtually any vantage point.

Though built as an investment property for H.J. Kalikow & Co., the structure is "designed to the high quality standards more common to institutional or headquarters buildings," according to the owners. The main entrance, from a triangular plaza at Park Avenue and 40th St., will lead to a 90-ft-high lobby; a shopping arcade will lead from there to another major lobby on 41st St. Among the energy-conserving devices employed will be an innovative 350,000-gallon chilled-water reservoir beneath the elevator shafts, which will be cooled at off-peak hours, thus significantly reducing peak-period power demand for the 1.1-million-sq-ft structure.

The Harley Hotel, New York, NY. Architects: Emery Roth & Sons, New York. This 38-story addition to the New York skyline is conveniently located in the United Nations area on East 42nd St. The glass tower containing 790 rooms will have a brick and bronze exterior with bronze glass separated by spandrels of bronze aluminum. Plans include a lobby-level restaurant, a cocktail lounge, and a landscaped, open-air plaza on 41st St. Interior design is by Tom Lee, Ltd., who is also creating the interiors of Helmsley's Palace at 455 Madison Ave. A two-level underground garage will provide parking for 219 cars. The hotel is expected to open in October and will become the flagship hotel for a group of Harley hotels and motels around the country owned and managed by Helmsley.

Baltimore's Inner Harbor, with two pavilions designed by Benjamin Thompson & Associates.

Harborplace, Baltimore, Md. Architects: Benjamin Thompson & Associates, Cambridge, Ma. Consisting of two glass-enclosed pavilions overlooking Baltimore's Inner Harbor, this project is part of a larger one to revitalize this area of the city. The Pratt St. Pavilion and the Light St. Pavilion occupy a site that has a combined land area of 3.12 acres. Total leasable space is 142,000 sq ft, and approximately 120 local and owner-operated businesses, including restaurants, food markets, and specialty shops, are expected to locate in the two pavilions. The $18-million project was developed by The Rouse Co., which is responsible for the successful Faneuil Hall Marketplace in Boston. Construction began in January 1980 and the official opening is scheduled for July 1980.

Morris and Ida Newman Education Center, New York, NY. Architects: Conklin & Rossant Architects, New York. The 460-480 students in the upper grades (7-12) of the Ramaz School—a long-established Jewish day school—will be housed in a seven-story structure on the Upper East Side of Manhattan. Designed to mediate between town houses on one side and an apartment block on the other, the façade of the building will emphasize openings of residential scale. Punctured out of a façade of pewter-colored aluminum panels (above granite base), some

[In progress continued on page 52]
Here at the Guildford Town Centre shopping mall in Vancouver, B.C., a man-made landscape rises to the sky, while natural light floods downward into an equally spectacular interior. It's a remarkable design; almost timeless.

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of these openings will symbolize three-dimensional elements (domes, a bay window, skylighted studios) in two dimensions. The large-volume spaces—gym and auditorium—will be slightly below street level, above them will be five stories of classrooms.

Located on a busy avenue in the Borough of Queens, New York City, this 28,000-sq-ft synagogue and social center will serve an Orthodox Jewish congregation, most members of which trace their roots to Iran. A colonnaded forecourt provides an important gathering place sheltered from the busy street and related to Middle Eastern traditions. In the sanctuary, an inner enclosure of columns, arches, and domes will recall the heritage of the congregation and contribute to the carefully conceived use of light—natural and artificial, direct and indirect. The nonstructural, symbolic nature of these elements is played upon by leaving voids where one would expect solids—recalling the real columns of the forecourt, for instance, in cut-out silhouette. Construction is scheduled to get underway this spring.

Mass Communications Center, Seoul, Korea. Architects: Becket International, Santa Monica, Ca. This $50-million center, which will include newspaper, television, and radio operations, will be constructed for Joongang Daily News and Tong-Yang Broadcasting Corp., a subsidiary of the Samsung Group. It will also provide magazine- and book-publishing facilities, a computer center, a 700-seat theater, an auditorium, and exhibition space. The 65,000-sq-m building, with a 21-story office tower surrounded by a low-rise block base, will be located in a redevelopment area adjoining a business district, and is being designed for maximum integration into the area. Construction is scheduled to start in September 1981, and completion is set for September 1984.

Pershing Square Redevelopment Project, Kansas City, Mo. Architects: Harry Weese & Associates, Chicago. A $500-million project designed to rejuvenate the blighted midtown area adjoining Washington Park and including Union Station is presently underway. Expected to take nearly 25 years to complete, the 56.7-acre area will include new office buildings, retail businesses, high-rise apartments, condominiums, and hotels. The entire project is the multistory Internal Revenue Service regional center to be located on a 12-acre site. The four-building complex, providing 1,366,700 sq ft, will bring more than 6400 IRS employees to the area.

Exhibits


Meetings and expositions

June 11–13. NEOCON XII, Merchandise Mart, Chicago.


June 20–21. National conference on conservation of campus resources. [Calendar continued on page 54]
1980 OWENS-CORNING ENERGY CONSERVATION AWARDS: CALL FOR ENTRIES.

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A panel of proven professionals in architecture and engineering will act as jury. Entries must be submitted by August 29th, 1980. Winners will be notified in early October.

The Call for Entries has full details. For your copy, write today to Mary Reinbolt, Department 127, Owens-Corning Fiberglas Corporation, Fiberglas Tower, Toledo, Ohio 43659. Or call her at this number: (419) 248-7419.

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Calendar continued from page 52

Berkeley, Ca. Contact: Center for Planning and Development Research, University of California, Wurster Hall, Room 373, Berkeley, Ca 94720.


Aug. 7-9. International Disabled Expo, O'Hare Expo Center, Rosemont, Il. Contact: Dennis Quirk, International Disabled Expo, 330 S. Wells St., Chicago 60606.

Aug. 17-21. Viable Energy and Living Alternatives for the New Decade, College of Santa Fe. Contact: Armand G. Winfield, P.O. Box 1296, Santa Fe, NM 87501.


Workshops

July 23-30. Women's School of Planning & Architecture, Hood College, Frederick, Md. Contact: WSPA, 2105 Erdman Ave., Baltimore, Md 21218.

July 28-Aug. 7. Principles of Construction Specifications Writing, University of Wisconsin at Madison. Contact: Philip M. Bennett, Department of Engineering, University of Wisconsin-Extension, 432 No. Lake St., Madison, WI 53706.

Competition deadlines


Sept. 1. Mailing date for P/A Awards entries.

Oct. 15. Helios Tension Products has announced a new architectural competition for design of a tension membrane covering for an outdoor theater. The competition is open to all registered U.S. architects. Write Helios Tension Products, Inc., 1602 Tacoma Way, Redwood City, Ca 94063.

Personalities

David S. Hatcher, 1978-79 professor of the year in the School of Engineering and Applied Science at Washington University, St. Louis, will head the Architectural Engineering Department at California Polytechnic State University, San Luis Obispo, Ca.

Lord Richard Llewelyn-Davies, British architect and planner, becomes the first architect to be invited to take up residence as the Principal's visitor for the 1980 fall semester at the Institute of Advanced Studies in Princeton, NJ.

Calvin G. Rand, president of the Niagara Institute in Canada, has been appointed president of the American Academy in Rome.

Peter Shepheard, University of Pennsylvania professor of architecture and environmental design, was recently knighted by Queen Elizabeth II in recognition of his "services to architecture.

Hugh Stubbins, architect of Cambridge, Massachusetts, has been appointed president of the Jefferson Memorial Foundation Medals in Architecture at the University of Virginia, Charlottesville.

[News report continued on page 59]
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Campus complement

At the heart of the Ohio State University campus in Columbus, notable for its vast collection of background architecture, a recent addition to the Main Library offers a lesson in sensitive response to context. This lesson was recognized by the library for the 22nd annual P/A Awards program, which conferred a citation for architects Lorenz Williams Lively Kirkens & Partners—now called simply Lorenz & Williams, Inc.—of Dayton (P/A, Jan. 1975, p. 65).

The 40,000-sq-ft addition was the most visible part of a commission that included remodeling of 216,000 sq ft in the massive existing structure. The objective was not only to add capacity to the library (increasing it to 1,430,000 volumes) but to convert the facility as a whole to open-stack operation.

Commanding one end of the central green of this vast campus, the existing structure clearly deserved respect, if not quite awe. In its 64 years of existence, the original three-story library, with a richly modeled Beaux-Arts façade toward the green, had been enveloped in additions—including a seven-story bookstack block—in the stripped-down classical style associated with Paul Cret. The resulting structure was distinguished by its compactness, symmetry, and unifying color, and by the fine details of its limestone walls and verdigris copper roofs.

Built in a limited area to the rear of the tall stack block, the addition complements it functionally in various ways, with mixed study and open stack spaces on ground, first, and second floors, and double-decked expansion of the stacks themselves at the top. On the exterior, the addition presents a bold, symmetrical façade delineating the extent of the expanded structure with an expression of finality. Behind this decisive façade, anchored at its ends by windowless stair towers, the building volume is “eaten away” to leave existing windows and exits exposed and to make room, on one
side, for a receiving dock. The visual effect is to clarify the building's organization and its sequential growth. The diagonal walls introduced, while characteristic of the mid-1970s, also help relate this flat-roofed addition to the prominent hipped roofs of earlier construction adjoining it.

The symmetrical, classically proportioned rear wall is a limestone-clad screen, set out from the actual walls, which are glazed in open-stack areas, blank at the upper-floor stacks. The 6-ft gap between screen and building also accommodates main mechanical risers, which show on the façade as solid vertical bands. The screenwall concept is similar to those used by Mitchell/Giurgola, as in the laboratories at Columbia University (P/A, March 1978, p. 54). Like the Mitchell/Giurgola screens, these also serve to some extent as sound baffles, but not in a precise way; here the low west sun can penetrate far inside.

On the interior of the expanded library the symmetrical, additive organization of the existing building has also been respected and reinforced. Axial corridors run through the three main floors, from the original entry to the glazed rear wall of the addition. Continuity was made possible by placing a clear skylight over a courtyard that previously separated the tall stack block from older portions. The resulting atrium has sunlit reading areas at the first floor and freestanding stairs rising bridges at upper floor levels. Portions of exterior detail remaining in the atrium along with views up along the exterior of the stack tower, maintain a sense of the building's architectural identity.

Interiors of the addition itself are no more businesslike, but permit generous lounge and circulation areas to develop in older parts of the building. Completed in 1977, precisely as envisaged in the citation-winning scheme of 1974, the addition and remodel are impressive mainly for their restraint and thoughtful adjustment to the existing fabric. This is not only, as the judge observed, "a good formal solution to a very complex problem," but as they also said, "an improvement on the massing the original." [JMD]
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Once dubbed First City of Architecture, Chicago has spent the past ten years struggling with its famous past and arguing about its future. In the process, a new group of designers has emerged.

For the decade before Mies died in 1969, there was a peaceful bipolar arrangement in Chicago. On one side was Mies himself, who not only controlled the only architectural school, but was beginning to build large, visible downtown towers. His earliest students had taken over top design positions at several big Chicago firms, notably Skidmore, Owings & Merrill and C.F. Murphy Associates.

In successful but wildcat opposition were architects who tended vaguely to call themselves humanists. Most prominent among them were Harry Weese with his Scandinavian-inspired eclecticism; Walter Netsch (at SOM, but heading a firm within a firm) with his field theory; Bertrand Goldberg mixing thin-shell technology with behavioral modification; and Edward Dart blending rustic and medieval romanticism.

Today, nothing is so clear-cut. Mies's influence has declined unexpectedly quickly. Some of the best IIT designers—Jacques Brownson, Eugene Summers—have left town; SOM's Myron Goldsmith has retired. Some practice on their own with little or no work; others occupy less visible positions in the big-firm establishment. The mainstays of corporate design fall less and less within the Miesian umbrella. C.F. Murphy is now dominated by Helmut Jahn, who, at his most conservative, designs with flashy Moderne, High-Tech detailing and has been recently going far afield into historic revival. Skidmore, Owings & Merrill's Chicago office has under construction downtown one high-rise with bay windows and a Portman greenhouse and, in design, a N. Michigan Ave. department store with a Richardsonian arch and perversely missing keystone.

There are many more small firms than Chicago has seen in decades, and the work being produced can legitimately be described as running the gamut of contemporary design. Buttressing the small firms is the addition of another architectural school, the Chicago Circle branch of the University of Illinois.

Fueling the inevitable overturn of generations has been a series of events that have made Chicago one of the liveliest architectural communities in the country.

It began rather by accident in a roundabout manner. A German architect named Oswald Grube, who had spent a year at SOM, wanted to show his colleagues what he had seen. He assembled an exhibit illustrating historian Carl Condit's argument that Mies's work was an outgrowth of the early Chicago School and Frank Lloyd Wright, then went on to show mostly current work of Mies-influenced designers. Eventually the show came to Chicago's Museum of Contemporary Art in May, 1976.

Meanwhile, Stanley Tigerman and Stuart Cohen, Chicago architects whose East Coast connections placed them in the front lines of the battle over Modernism, decided that a response to the Grube lineup was in order. Objecting to the implication that Chicago had an architectural manifest destiny to which only Mies and his followers had complimentary tickets, the two created a rival exhibit. With Laurence Booth and Benjamin Weese, they wrote another history of Chicago's architecture, one that included the opposition in the 1960s, Art Deco and historical modes, and little-known stars of Chicago's pre-Mies International Style. The rival exhibit opened that same May in the lobby of a Harry Weese office tower.

By fall, the insurgence was in full swing. The four hooked up with three others to form the Chicago 7, a name consciously appropriated from Abbie Hoffman and friends. They have held theoretical exhibits in local art galleries, added four new members, and sponsored a competition. Bankrolling much of the intellectual revolution has been the Graham Foundation, a charitable organization linked previously in Chicago minds with the IIT team but in fact with a long record of international support for a wide spectrum of opinion. The architecture schools were also centers. The latest effort of the expanded Chicago 7 has been to expand even further into the Chicago Architectural Club, a 45-member group that meets at the Graham Foundation to present work and hear outside lecturers.

The most recent activity on the Chicago
scene, however, has been the launching of a counteroffensive. Last year, Chicago 7 members won all but one of the local AIA's honor awards. Six were given to Tigerman alone by a jury of Los Angelenes. When Gertrude Kerbis became this year's local AIA president, she created a design committee to run the 1980 awards program and appointed SOM's Bruce Graham as its chairman.

In the March AIA newsletter, the announcement was made as follows:

"If Post-Modern designers have an illusion that architectural design has become a game without rules, easy to play, a game for all ages, impending harsh economic realities will change that to a serious game played 'for keeps.' Chicago's preeminent School of Architecture began in response to the pragmatic needs of its community, its people, and its resources. Our landmark treasures are basically utilitarian, Spartan, and imbued with a puritanical aesthetic. If we are forced to overcome the constraints of dwindling resources, shouldn't we return to our roots in search of a viable, rational, and ultimately economical architectural ethic? The Chicago chapter AIA committee on design...will hold its first open committee..."

This year, only buildings in the Chicago area will be eligible for the awards program. Two of the four jurors will be Chicagoans (though they will share one vote).

It looks like a resumption of the hostilities of 1976, only this time it is the insurgents who hold the Museum of Contemporary Art (the Tribune Tower competition, see p. 94) and the conservatives who are doing the maneuvering. It is a clear indication that the center has shifted. The polarities are also blurred compared to the 1960s standoff. Jerry Horn of Holabird & Root is a member of both AIA committee and Chicago 7, and the AIA tried to get Jahn as well. And, as mentioned above, the work of even Bruce Graham's firm is showing influences from the very sources (historicism, mannerism) that he, as ideological vigilante, opposes.

Having long been a symbol, a straw man to outside polemists, the city today—with its avant-garde, backlash and confused boundaries—is not really very different from the rest of the country. Chicago as a bronzed relic of bygone decades and a more innocent past no longer exists. [Nory Miller]
Cies's ranks are astonishingly diminished in his adopted city. He is finest of the school of Mies ill practicing in Chicago is Ar­ ur Takeuchi. He is also acting chairmain of architecture at lies's school, the Illinois Insti­ tute of Technology, with its con­ tinuing influence over Chicago uth. Foremost in his extremely nited oeuvre is the Wendell mith Elementary School (this age), built in 1974, during wnes Brownson's headship of hicago's Public Building ommission. Glazed paneling, a rfully off-center courtyard ith hairpin ramp and Corbu­ zm swing gate, and industrial rage doors on the interior sec­ ning off the multipurpose om are among its salient aracteristics.
Helmut Jahn, a 40-year-old import from Munich, became the design partner only seven years ago at C.F. Murphy Associates, an established Chicago firm used to big downtown and public commissions. Grid plans, emphatic structure, and sleek skin characterized his work at first. But more recent projects have moved in a variety of directions, often away from "the box." The range has been wide enough to embrace Venturi in one project, Isozaki in another, Kevin Roche Art Deco, and Stanley Tigerman. The scale at which these explorations occur has grown from small libraries to downtown office buildings. At present, in Chicago's Loop alone, one Jahn high-rise is just completed and four more have been commissioned and designed.

The $100-million State of Illinois Center (a joint venture with Lester B. Knight & Associates) will provide 1 million sq ft of state offices and 150,000 sq ft of retail on the lowest floors (top, left and right). The 17-story block holds the corner at the back and presents a stepped-back, arced curve to a small plaza. Inside, a central skylit rotunda rises within the block to a peaked top intended as a symbolic reference to the Capitol. Construction is to begin in September.

One South Wacker (center and bottom) is 40 stories of spec office space with setbacks on the front. At each setback is a three-story skylit "atrium," leaving U-shaped floor areas. At ground retail faces onto the street and into a multilevel galleria. Gray and silver reflective glass are deployed decoratively on the facade which is subdivided into base, three-tiered shaft, and frontal capital. Construction is to begin in July. James Goettsch assisted in the design of both projects.
Donald Krueck and Keith Olsen are among the few recent IIT graduates to have opened a firm of their own. Having graduated in 1970, the year after Mies died but a while after he had virtually left the school, they have both worked at C.F. Murphy and Hammond, Beeby & Babka, forming Krueck & Olsen in 1977. This house on Chicago's near north side is among their first projects. Three pavilions, containing a total of 3000 sq ft, are arranged in a U-shape to provide a private garden court as well as front and back yards. Gridded infill walls, reveals, floating planes, and the use of industrial materials are deployed with a particular eye to texture. Side walls are clad with ribbed metal. The front entry is a screen of steel grating through which is seen another, semicylindrical screen of glass block.
After many years as Booth & Nagle, designing townhouses and housing complexes in both tight urban settings and suburban subdivisions, the firm has recently split. James Nagle continues the firm's practice with ex-Harry Weese capo, John F. Hartray, Jr., who joined the firm several years ago to make it Booth, Nagle & Hartray, and was instrumental in expanding the firm. Laurence Booth is now associated with another ex-Weese officer, Paul Hansen, as Booth/Hansen & Associates. Both Booth and Nagle are MIT graduates whose early apprenticeship was with Tigerman. Booth's Herman Miller Health Science Division office building, under construction in Grandville, Mi, began as a connection between two brick box factory buildings. While still that, it has developed into a formal entrance with extensive office space. Deeply inset red doors, glazed porcelain skin, and jagged enveloping wings make the gateway visible from the road. Windows are skewed to northern directions to reduce heat intake, and the thin porcelain shell is backed with solid insulation. The circular garden in front is echoed by a skylit rotunda within.
Stuart Cohen, Chicago-born but Cornell-educated, under Colin Rowe, has become, in the half-dozen years since he returned from New York, a vocal intellectual influence. He builds generally in association with the young Sisco/Lubotsky Associates, a Booth & Nagle spin-off (P/A Award-winning project, Jan. 1980, p. 122). "Tudor House" is a speculative venture that Cohen designed outside the office for presale in a Chicago suburb.

Nagle's work, which like Booth's, has wandered comfortably in and out of historic allusion for years, influenced at first as much by Chicago eclectic Harry Weese as by East Coast advocates, has become—along with his ex-partner's—far more self-conscious. A house, by Nagle, Hartray & Associates, nearing completion on Chicago's south side, is a structured dichotomy between a "colonial" brick front and stucco "Corbusian" behind. The interior is divided by a curved wall in yellow.
Holabird & Root celebrates its centennial this year. It is a firm whose peaks have included Holabird & Roche's Chicago School landmarks and John Root's Art Deco towers. Among designers in the firm, who have virtual autonomy, the most prominent is Gerald Horn, a self-educated product of California from the days of Arts and Architecture and Craig Ellwood, with whom he worked. Horn has become more and more concerned with sculptural form. The most elaborated is his entry to the Intelsat Headquarters competition which owes a good deal to Jahn's Pahlavi Library entry, which is in turn in debt to Tigerman and Graves. Panel system curtain-walls, exposed stacks, campus arrangements of building blocks, and bridge entries have become Horn trademarks. Michael Pan cost and Jean Bellas were project designers.
A prominent turn-of-the-century firm, Schmidt, Garden & Erikson had settled in as Chicago's hospital specialists until two years ago when it hired Peter Pran to revitalize its design department. Pran came from Norway in the early 1960s to study and then work with Mies, spent eight years with SOM, took a strong Chicago structuralist position in the 1976 battle of exhibits, but is more recently seen to be identifying himself as a Post-Modernist. The work, as in this facilities center for the Methodist Hospital of Indianapolis, under construction, generally attempts Classical allusions with High-Tech sensibilities. Here, distinctions are made between the machine half—identified by exposed boiler stacks—and the office and cafeteria half. The two are divided by the arched limestone-and-glass entry.

Newman/Lustig & Associates is a collaboration of Richard Newman, a 40-year-old Chicago practitioner, and 29-year-old Michael Lustig who joined him four years ago. The work is varied. What this bank, recently completed in Skokie, Ill, has learned from Meier and the Japanese, other projects have learned from Gwathmey, Venturi or Tigerman. Lustig is an example of a phenomenon not really seen since the Fire, and that is an architect from the East Coast (in this case Syracuse) whose attraction to Chicago is economic.

Axonometric indicates future second story.
These townhouses in Chicago's Lincoln Park neighborhood by Bauhs & Dring are built on the site of an 1889 Lutheran church, whose congregation had moved away. The bell tower was retained, and four townhouses were built, closely following the Gothic massing of the old church by means of false fronts. Though a controversial project along preservation lines, the development was approved by a longstanding community organization and Chicago's landmark commission, and granted certain variances by the zoning board. Both William Bauhs and William Dring were designers with Harry Weese Associates before starting their own firm five years ago.

An old warhorse, the American Furniture Mart is scheduled for probably the largest conversion project to date. Its two million square feet will be recycled into 500 condominiums, 500,000 sq ft of office space, and 100,000 sq ft of retail. Above its 16 stories, a new terraced structure will add 85 garden penthouses. Joint venture architects are Fitch/Larocca Associates and Fujikawa Conterato Lohan & Associates (FCL). FCL is the continuation of the Office of Mies van der Rohe. Mies's grandson Dirk Lohan is the partner in charge of design for the project.
Kenneth Schroeder moved his practice a couple of years ago to Printer's Row, a fringe area south of downtown slowly being transformed into Chicago's SoHo. The Mergenthaler is his first conversion there, from linotype to 21 dwelling units with retail at ground. Both one-level and duplex units are provided. Space is left open, loft-style, with core elements—kitchen, bath, dressing area—designed as large pieces of furniture, painted in Gravesian pastels. On the exterior, angled bay windows were added on the south, and the shell of an old sandwich grill is being recycled into a landscaped “urban ruin.”
David Hovey is a 35-year-old IIT graduate who has worked for both Arthur Takeuchi and Helmut Jahn but left standard architectural practice to open his own firm. Called Optima, Inc., it is a vehicle to develop, design, construct, and market housing. In two years, four projects have been started ranging from six to sixteen units each. The six townhouses in Hyde Park (right) were completed in 1979 at a cost of $450,000. Construction is of brick bearing walls. Large, south-facing windows have retractable fabric sunshades for summer (opposite, top).

A community bank by Benjamin Weese for one of Chicago’s worst ghettos consciously takes Louis Sullivan’s Midwestern banks as the point of departure. Massing and symmetry are intended to make the small building look imposing and secure. The firm, Weese Seegers Hickey Weese, began three years ago, when Benjamin left his brother Harry’s firm and created this smaller venture with his architect wife Cynthia and two fellow Harry Weese associates.
Two designers, Charles Davis of Davis Associates as architect and Michael Gelick of Michael Gelick Associates as associate architect, teamed up for this sales office for L.M. Berry & Co. in Brookfield, Wi. The building is 122 ft square, 2 ½ floors, with rounded corners reminiscent of Moderne styling. Also reminiscent are the ribbon windows—limited to eye level for energy conservation except at the entry, canteen, and corners—and metal panel skin, banded for enhanced horizontality and scale. Support elements are enclosed in a cylindrical core, from which the office system is arranged outward diagonally. Building cost was $36 psf (1979).
This firm well represents the changes Chicago is going through now in its design approach, attitudes, values, and background.

Hammond, Beeby & Babka

Chicago is in transition. The oldguard Miesian line based on the nuts-and-bolts pragmatism is being softly and subtly eroded. Recently established firms are pushing the boundaries of Modernism far beyond the excursions of preceding revisionists such as Harry Weese and Bertrand Goldberg. They are doing so with more of a theoretical stance. The ones that do so, however, still maintain a firm grounding in the Chicago tradition.

Hammond, Beeby & Babka is hardly the size of such mainstream Modern biggies as SOM or C.F. Murphy. This small office of 12 or so architects does smallish public and commercial work—like libraries, low-rise banks, medium-rise office buildings.

In the Chicago tradition, all the partners served time with the larger firms. They know a potentially leaky pitch pocket when they see one. The firm also adheres to technically-oriented problem-solving. In their Tech Center nearing completion in Denver, for example, they have taken precast “T’s” and turned them on their sides to create sun-shading devices on the two 11-story buildings.

But Hammond, Beeby & Babka manifest a darker side to their professional personality. One of their number, partner-in-charge-of-design Tom Beeby, draws. He draws and paints lush, evocative images such as the tondo, above, executed as part of an allegorical series on cities for exhibit at the Walker Arts Center. Moreover, he writes articles on subjects like “The Grammar of Ornament/Ornament as Grammar” in Via III, Penn’s Graduate School of Fine Arts publication. Still, Beeby does teach at IIT, where everyone else was schooled under Mies or was schooled under those who were schooled under Mies.

Beeby, Chicago-suburb-raised, lived a few formative years near Philadelphia, and one year in England, before going to Cornell University’s architecture school.

While at Cornell, Beeby came under the influence of Colin Rowe, whose teaching on Le Corbusier (besides Mies) imbued the school with a special intellectual rigor, and John Hejduk, a visiting critic during Beeby's fifth year. Additional pollination occurred through architectural history courses of Vincent Scully and George Hersey at Yale, where Beeby got his M.Arch. in 1965.

Then Beeby returned to Chicago and the design section of C.F. Murphy, headed by Gene Summers. He remained there until 1971, when he was offered a job by James Hammond, whose partner Peter Roesch had left the firm to go into teaching and a separate practice. The firm, then ten years old, was known to Beeby for its high-level Miesian design. Beeby's first building was the First National Bank of Ripon, Wi (P/A, July 1978, p. 54). Within six months of joining the firm, Beeby was made partner.

Beeby had gone back to Chicago determined to prove that one could be interested in drawing and in building. With the C.F. Murphy experience behind him, he knew he need not hesitate to indulge himself with his art. Beeby's art is not only grounded in technique, it has a strong affinity to poetry and a kinship with the German Romantics. There seems to be a desire for his architecture to “spiritually integrate” man with nature and myth with life.

Beeby's drawing and his persistent interest in architectural history and theory have guided his design development in the firm. After his recent trip to Sweden, the work of Gunnar Asplund (P/A, Feb. 1980, p. 88) is starting to take effect on Beeby's design approach. Asplund's way of fusing regional particularities with the Classical norm Beeby finds a particularly appropriate model.

One might think it would be a bit sticky for an architect with James Hammond's background to endorse a design for a new library that recalls Henri Labrouste's Bibliothèque Ste.-Geneviève of 1850. For the Hild Branch Library in Chicago, the architects are designing arches, pilasters, and other Classical details to be executed in metal cladding and concrete. Hammond looks on [Continued on page 93]
The change in materials from gray metal to white porcelain mamel panels to corrugated metal siding calls out the different functions taking place within the library. Similarly, the change from glazing to solid panels, from one-story massing to two-story, from rectilinear form to tree-form differentiates further the various activities within the building.

The reading room, shielded from the main road by an earth berm, is handled with a Miesian purity for which the architects have become known.
Champaign Public Library

With the design of this building completed in 1978, one sees Hammond, Beeby & Babka are quite accomplished with the crisp, taut, planar qualities of the Miesian esthetic. At the same time they attempt to modify the Miesian mold by introducing some Corbusian free-form elements clad in corrugated metal.

Conceptually, the instincts behind the variation in use of material and in the formal elements are quite sound: the shapes and textures indicate a change in function for the spaces within, along with massing, color of exterior wall panels, and use of glazing. However, on a strictly formal level, the amalgam of highly refined parts of different heights, colors, and textures lacks a certain cohesiveness. The vaguely visceral forms of stair and meeting room seem extruded from the grid, rather than contained by or wrapped around it as Corb might have done. Nor do these shapes appear to establish a tension with a dominant wall plane, as in a John Hejduk scheme, for example. At the same time, the porcelain paneling and corrugated metal siding do conjure up too easily institutional or industrial associations. Thus, when the building first started going up, the community complained the library looked like a factory.

The director of the library, Judith Drescher, argues for the new image. Since the library’s role is changing into that of an active, dynamic social and information center, the architecture should eradicate any preconception that a library must be staid, awesome, and hushed. Few who enter the building can keep their preconceptions, she contends. They are also encouraged by the open plan and ample natural light to explore the various areas. While some users complain about the acoustics, Drescher considers the noise natural when people are comfortable.

Interestingly, the jurors for the P/A Design Award who gave the project a citation (Jan. 1976, p. 73) anticipated some of the issues of image as well as contextual questions. Although the surrounding area is commercial and residential, and only the lower, bermed west end is nearest the street, the entire ensemble definitely announces its presence. Despite the (young) planting, Drescher observes the building “is definitely not hidden and doesn’t blend.”

With many architects every new design solution involves implicit criticism of one’s previous work. This is why the projected design for the Hild branch library in Chicago should be interesting to watch and compare with Champaign. Returning to the type-form of libraries of Henri Labrouste’s Bibliothèque Ste. Genevieve of 1850, the projected design detailing definitely harks back to the era when libraries looked like libraries. [SS]
he meeting room and lobby on the north side adjoin the stair (below). The grid allows an openess of plan and introduction of natural light to the interiors (opposite).

**Data**

Project: Champaign Public Library and Information Center, Champaign, Ill.


Site: approximately 87,770 sq ft mid-block area near Down­wn Champaign. Surrounding area is residential and commercial.

Program: provide adult reading area (13,780 sq ft), children’s addy area (4500 sq ft), plus udio-visual facilities, me­ting oms, administration offices for library that has 135,000 book­les, 15,000 records, 8000 cas­tles and serves a town of 50,000. Total building area is 3,200 sq ft.

Structure: concrete slab on grade; steel structure with 21-ft-­ally column bays, steel walls of termingled solid and glazed inels. Modular panels are two-­thick factory finished insu­ted porcelain enamel.

Major materials: porcelain­nameled panels, aluminum fin­ned corrugated siding, gypsum ard, glass, metal.

Mechanical system: roof­mounted, self-contained heating and air-conditioning package units.

Consultants: Interior Design ervice of Champaign, interior sign; Gullaksen & Getty, ructural; Environmental Sys­ems Design, mechanical.

General contractor: Petry & sons.

Client: Board of Library Direc­rs, Champaign Public Library.

Cost: $1,900,000; $42/sq ft.

Photo: Hedrich-Blessing.
Tri-State

A speculative office building north of Chicago spans several distinct modes of architectural design.

The 173,000-sq-ft spec building makes no bones about its $53 per sq ft cost. The ways the precast panels are roughly mortared in the interior is one brutally telltale sign. However Beeby is currently working on a trompe-l'oeil fresco (not shown) that will soften things up.

The most smashing interior spaces are the three floors above the porte-cochere, each with glass block floors. The top two floors are used for a skylit lunchroom; the floor below in the undercroft of the porte-cochere, receives additional light through two bull's-eye windows (section, opposite).
es, after all, was not only Modern. Mies's nascent Classicism shown at IIT's Crown Hall (as pointed out by Colin Rowe), or his use of structure as ornament, as seen in the beam mullions of the Lake Shore Drive apartments, harks back to Neoclassical German heritage. At Tri-State, Hammond, Eby & Babka explore both Classical and modernist sides of Mies: the Classical proportions and a hierarchical arrangement of elements, with semi-detached columns to terminate the long expanses of wall, all distinctly defer to pre-Modern architecture. Even the precast concrete front and rear facades turn out to be load-bearing mass, much like the buildings of yesterday.

And then on the other hand, you turn a corner, and there's the surprise of a highly reflective glass and aluminum curtain wall of the Modernist idiom. A little unsettling, yes, but the message comes across: in any good modern building, the choice of materials corresponds quite legibly to the structural solution. And in a good Modern building, the structure relies on efficient, economical techniques: the load-bearing precast concrete panels mean that the interior is column-free, with hollow-core floor slabs spanning from outside walls to the elevator bank. The 5'-0' windows, which bow to energy codes, are integral, held in place with rubber gaskets. This hybrid building, culling motifs from old and new design approaches, also explores the matter of monumental expression. The large, round columns and three-story-high porte-cochere establish a scale that is played against small-sized detail and articulated elements of the panels. Thus this differentiation shows a reading of the building on two different perceptual levels—at a distance and up close.

The weakest part of the reading, however, in the middle distance—where you cannot see the articulation of the individual panels nor perceive the armature of the ensemble. Here the precast panels blend together into a standardized modern wrapping, grafted, rather than a taut, skin.

Because of the horizontal attenuation and sophisticated handling of the hybrid parts, the building still has the coherence and integrity to carry off the amalgamation of approaches. About the ten-story-high addition built at the rear of Tri-State, however, one is not so sure. The vertical configuration and the sitting off to one side obviously introduce variables into the experiment. This investigation has been a very intriguing and inventive one, but its application in different situations may only dramatize some of the weaknesses. [SS]
Tri-State

Data
Project: Tri-State Center Office Building, Northbrook, IL.
Client: Equity Associates, Chicago, IL.
Site: 8.2 acres adjacent to Tri-State Tollway, northwest of Chicago and near O'Hare Airport.
Program: speculative office space, 171,130 sq ft gross floor area, with 588 parking spaces.
Major materials: precast concrete panels, column shells and floor planks, reflective glass and aluminum curtain wall, poured concrete, gypsum board, terrazzo marble flooring.
Mechanical system: electrical roof-mounted heating and a/c units; distribution in ceiling.
Consultants: Jaros, Baum & Bolles, mechanical, electrical engineers; Cohen, Barretto, Marichertas, structural engineers; Brinkman Associates (with architects), landscape consultants; Consoer, Townsend & Associates, civil engineers.
General contractor and construction manager: Schal Associates.
Costs: $7 million; $42.63/sq ft.
Photos: Howard Kaplan.

CORNER SECTION

FIFTH FLOOR PLAN

FIRST FLOOR PLAN
ammond, Beeby & Babka's design for a small annex to the Adler Planetarium looks to Classical Romanticism's astringent geometrical forms, specifically incised cylinders, for the design solution.

The observatory was needed to serve groups of 30 who would be using the telescope and closed-circuit television for educational but not research uses. Located at the rear of the Adler Planetarium on the eastern tip of the park peninsula, it naturally afforded unobstructed views of the sky. By setting a truncated cylindrical observation room off center to the base, the architects allowed the telescope to have a sweep toward the east, away from the city lights. Circular open stairs, enclosed by the walls of the 40-ft-diameter bush-hammered concrete structure, lead up to the terre-metal-roofed observatory.

One unfortunate aspect was caused by budget limitations. While the proportions of the simple geometric shapes are nicely handled, the bush-hammered concrete and metal doors and storage closets inside hardly match the richness of the pink granite walls of the Adler Planetarium nearby. Planting is planned to cover the concrete walls of the new structure. With nature's "patina" perhaps the structure will age as well as the 80-year-old Adler has.
When this farmhouse in the fabled rolling hills of rural Wisconsin was given a Chicago AI award last year, it caused considerable comment. It wasn't much like the firm's previous work. No, it was a remodeled farmhouse. It was new, and clearly a bettor's step into Regional Romanticism. At close range you discover the white clapboard is metal siding, and the brick foundation is poured concrete with a brick pattern. Those fine old balustrades, columns, leaded glass, and French doors have been culled from houses in Chicago's Hyde Park section and artfully incorporated into the design.

Two living units are inserted into the house, with a duplex for the owners on the top floors and an apartment below for the farmer of the property. The double-height ceiling of the living and dining room, plus the double-height bowed window opening out onto the porch, evoke the interiors of 19th-Century Gothic predecessors.

The change of scale outside and in, with such elements as the oversized pediment, the large circle cut out of the lattice, and the oversized side entrance amplifies the apparent size of the house. Some of the elements border on overstatement: the oculus opening, for example, too large for latticework pediment. Seen on this isolated rolling landscape, however, dotted with strong geometric shapes of silos and farmhouses, these elements read successfully. Up close, the small scale clapboard and roof tracery effectively counterbalance the broad strokes of the other elements.

The 3580-sq-ft house, built for $52,000, occupies a farm of several hundred acres not far from schoolhouse Beeby is renovating for his family.
this scheme, still in the early design stages, with the same kind of enthusiasm he shows for other Beeby explorations, such as the Victorian type farmhouse (p. 92) in Wisconsin.

Clearly Hammond goes against the preconceptions one would have about an architect who was trained at IIT (under Mies, yet!) and who spent 16 years at SOM before opening his own office in 1961. His sense of engagement and connoisseurship subtly modulates his flexible approach. This and a patrician-casual affability explain why other architects refer enviously to Hammond’s ability to deal with clients and run the firm.

In one sense it should not be too difficult to see why a lapsed Miesian would endorse, for example, the ascetic Classical turn of Tri-State (p. 88). Mies, after all, retained traces of his exposure to his Neoclassical predecessors, Schinkel and Klenze, all through his career. But Hammond had his own pre-IIT and pre-Mies influences. Having grown up around Chicago suburbs, he became an expert on the houses of David Adler and Howard van Doren Shaw. Hammond began studying at the University of Michigan, but left to work on Crow Island School in Winnetka, which Eilel and Eero Saarinen were designing with Perkins, Wheeler & Will in 1939. By the time Hammond returned to school, the newly created IIT had emerged visibly on the architectural landscape. Hammond graduated from IIT in 1942. The war years were spent designing hospitals for the armed forces. In 1946, he joined the firm of Skidmore, Owings & Merrill, headed by Nathaniel Owings, rather than go to work for his uncle Eric Hammond’s more traditionally directed firm, Burnham & Hammond. If architectural proclivities cannot be inherited, they still do emerge, given proper nourishment.

Bernard Babka, also from the Chicago suburbs, also went to IIT. After graduation in 1957, Babka worked for Pace Associates, Bertrand Goldberg & Associates, and finally C.F. Murphy, where he met Tom Beeby. In 1975, Babka decided he would take over the responsibility of production and construction at Hammond & Beeby.

Size does make a difference, according to Babka, who enjoys the switch to a small firm. Here, each project receives individual attention. The three partners do share in much of the decision-making about design, although initially Hammond and Beeby spend more time together, and later Babka and Beeby.

Thus one thinks more of the practice Stanford White, Charles McKim, and William Mead conducted than the corporate paradigm developed by SOM several decades later.

Even the offices for Hammond, Beeby & Babka suit the image. They occupy the penthouse boardroom of a 16-story insurance building on North Michigan designed in 1908 by Daniel Burnham. A large, barrel-vaulted white room is edged by French doors opening onto a terrace, with a large Georgian-Palladian arched window terminating the short end of the room.

In their type of work, the firm of Hammond, Beeby & Babka veers around more in the manner of 19th-Century offices trying to find the style for the job, rather than adhering to one kind of building idiom. Sometimes these explorations lead to unresolved schemes. The exploration also has produced good, fresh design. It reflects an investigation that points to a consolidation of directions. The solid base of Chicago-derived Miesian technique and detailing is always there. In combination with a reworking of historicist and vernacular vocabularies, it could yield an enriched but still substantial form of architecture. [Suzanne Stephens]

The Beasley House in Wisconsin had been a kick-off into “regional romanticism.” However, with the house for the Bahamas, Beeby was a little nervous about an appropriate response for a context he knew less well than Wisconsin. But based on climatic considerations and client preferences, the design indeed shows an affinity to older houses seen on the island.

The site, in Harbour Island, the Bahamas, is subject to high winds and some hot and humid weather. Basically a bungalow in plan, the compact house is symmetrically ordered in a manner that promotes natural convection, besides accommodating the needs of a couple with visiting children and grandchildren. In formal terms, the architects are giving the clients a “monumental” house on a smallish budget through the use of the classical imagery.
Chicago Tribune

Late entries

Stuart Cohen

A second Chicago Tribune Tower Competition is held 58 years after the first one, and in some ways makes the same point as that one.

For three years now Chicago's architectural culture has been enlivened or trivialized, depending on your point of view, by yearly exhibitions of the work of the "Chicago Seven." The original seven, since expanded in number, are architects who, like their political namesakes, have been cast in the role of radicals by Chicago's (architectural) establishment. This exhibit is an outgrowth of their activities. Specifically, it comes from a suggestion made by Ben Weese for an exhibition that was to have been held at the Young Hoffman gallery in Chicago, but which was moved to the Museum of Contemporary Art. At Rhona Hoffman's urging, the scope of the exhibit was expanded to include architects outside the city; thus it seemed logical that the enlarged exhibit approximate in its diversity the original Tribune Tower Competition. A list of participants to be invited was compiled using recent American and European publications as reference. Because we hoped each architect's work would represent a point of view or theoretical position, some well-known practitioners were not invited. Also, talented younger architects were no doubt omitted through oversight or ignorance of their work.

Ben Weese's idea, "Hey guys, let's redo the Tribune Tower Competition and give Helmut (Jahn) a chance," seemed ideally suited for an architectural exhibit in Chicago.

Chicago's place in architectural history has long been linked to the development of the skyscraper. Further, architects and historians are beginning to acknowledge that there had been other significant entries to the original competition besides those of Walter Gropius and Adolph Loos, and that these identified a range of formal solutions to the skyscraper that was prophetic of almost 50 years of practice. (Missing only the progeny of Mies's glass tower of 1919, Lopatin's Sears tower alike of 1923 designed for Moscow, and buildings like the First National Bank of Chicago, which seem to have been influenced by Oldenburg's "Late Entry to the 1922 Tribune Tower Competition," a clothes pin.)

Because the competition was held at the beginning of a period of architectural transition, it catalogued a range of architectural thought at an important time. Because it was an open competition, many of the projects submitted were by young architects who had never designed big buildings before. Many of these young architects were relatively unknown. Most of them remained so. Some did not. The total number of entries (258) and the number of prominent architects who entered was astounding, but then the Tribune was offering $100,000 in prize money and the commission to do its building.

Our exhibit is more modest: only a fifth as many drawings and an even greater percentage of young architects. The work is not as substantial architecturally as we had hoped but then there is no competition, no prize and no real building to be built. It would seem that many of the participants did not take the project seriously enough and that others, including some who declined, may have taken it too seriously. Certainly, no one has taken on rethinking the skyscraper as a building type in our society. Whether this is due to a paucity of ideas among this particular sampling of architects or to a prejudice against the tower as a viable building type is impossible to determine. (Rob Krier, who did not make a drawing, wrote, "I must tell you that I have no great sympathies in high-rise building and I would neither design nor build a skyscraper.")
Exhibition entries: Tod Williams & Billie Tsien, facing page; Moore Ruble Yudell, above; Larry Booth, above right; George Ranalli, right.
Chicago Tribune

Still, much that architects now believe architecture can be, or communicate, is represented. From Walter Netsch's sinuous glass tower to Anthony Junker's decorated glass tower, from Bob Stern's classical column to Anders Nereim's classicized use of 1890s Chicago vernacular and contemporary European rationalism, architecture as commentary abounds. To the extent to which architecture has been reinstated as the subject matter of architecture, most of these Tribune Tower designs may be read as commentaries on the current state of architecture, or on the original competition, or the existing Tribune building. Fred Koetter's drawing of Gropius' project (unrecognized as an example of eclecticism when it was done) is shown in a state of decline, a self-explanatory note on Modern Architecture.

Jim Nagle characterizes Chicago's historical place in architecture by a Sullivanesque façade masking rows of grain silos—Sullivan as ornamental making architecture of Le Corbusier's "Cathedrals of the Prairie." Hans Tupker's view from abroad (Amsterdam) concretizes American stereotypes. His skyscraper, entitled "Tommygun Tower," visually transforms the John Hancock building to allude to Chicago's violent past and to America's recent past as libertymonger and warmonger. Tom Beeby's flag-shrouded tower is reminiscent not just of Christo's wrapped buildings but of Claes Oldenburg's proposal of 1968 for a skyscraper on North Michigan Avenue in the form of Lorado Taft's sculpture "Death." Beeby's tower, topped by a flaming (funeral) urn, like Tupker's project, makes a pronouncement about the skyscraper as an architectural symbol of our society. On the other hand, Helmut Jahn has produced an incredibly positive, visually stunning phoenix symbol, in which his "air rights" addition to the existing building rises above the original in a crystalline homage to the Tribune's Gothic forms (on front cover).

Surely one message of these drawings is that architecture is no longer mute—if indeed it ever was. The changes in architecture that the drawings suggest show more than just an interest in history, symbolism, and ornament. One must understand what Modern Architecture was thought to be in order to understand what the contemporary architecture represented in these drawings seems to have rejected. For it is what contemporary architecture has decided it is not and cannot be that characterizes the real changes in our architectural sensibilities.

The essential components of Modernism in architecture were the expression of technology as a force for change and as a symbol of the future, and the rejection of history. Abstraction offered architecture the formal vocabulary to represent the future as a visual rejection of the existing world, and to represent symbolically a rupture in historical continuity between the old and the new. Where architecture had previously dealt with the symbolic elements of building, the International Style of Modern Architecture opted not only for abstract geometry but for the symbolic use of machine imagery to signify the adaptation of "scientific method" to architecture. This faith in technology, progress, and the future made the past irrelevant. History could offer no insights, so architects believed, because the forces shaping the future were totally new. "History is bunk," said Henry Ford.

Cut loose from the history of architecture and proclaimed as "machines for living," Modern buildings were conceived as self-contained entities independent of the rest of the world. By physically and visually articulating their independence of other buildings, Modern Architecture could stand as a literal fragment of the new world it was designed to bring about. But the future that Modern Architecture envisioned has not come about, and it has become all but impossible for archi-
tects to believe in an architecture of idealized or highly generalized forms intending to create a "better world," or symbolically technological forms promising the perfection of architecture and society, or the rejection of history (for even abstraction is now part of our visual history).

The new Tribune drawings suggest an architecture that has come full circle in 60 years. No longer savior, architecture's salvation has become the objective of people like Robert Venturi and Charles Moore who have consistently argued for architecture as communication and, more recently, of people like Colin Rowe and the Krier Brothers who have argued for a return to the space-making of traditional urbanism. Surely it is a major criticism that it is only the former—architecture as communication—that this exhibit addresses. Not one entrant went beyond an obvious concern for the tower as object and symbol to consider it a component of urbanism. And while this was a predictable outcome of the rules of the game and the specifics of the information supplied (only site dimensions), it is also a disappointment. For one assumes that the individual building reinstated as an integral extension of the urban fabric is an important rediscovery, a point of distinction between the ideals of Modern Architecture and contemporary sensibilities.

The Tribune Tower site as it now exists is important to the urbanism of North Michigan Avenue. The Tribune Tower along with the Wrigley building starts to define an urban space, as do the Stone Container building and the 333 North Michigan Avenue building to the south of the Michigan Avenue bridge. The angled shift of Michigan Avenue sets up a visual axis that runs from the old Water Tower to the 333 building, an office slab whose south façade was designed to appear as a tower terminating this view. The Stone Container building, with its curved front, and the angled face of the Wrigley building across the river from it, are fine examples of large, 20th-Century buildings as urbanism. Like McKim, Mead & White's Municipal building in New York (designed by William Kendall), they illustrate the potential of the skyscraper to function as a definer of urban space. While the Tribune Tower could not, because of its site, literally be a gatepost to North Michigan Avenue, as Andrew Rebori had proposed years earlier, the question still remains of how the new Tribune Towers might better have spatially solved this difficult urban juncture.

Finally, the original requirements of the 1922 Competition also indicate the degree to which architecture has changed. Ten years ago architects believed their buildings to be designed by the application of problem-solving methodology to a client's detailed description of needs. Clearly the Tribune's program would not have contained sufficient information for the design of a building. It gave site dimensions, height and area limita-
Height restriction calls for unusual design approach

...steel helps provide most economical solution

How do you build a 136,558-sq-ft building on a 7.5-acre lot that's restricted by a three-story height limitation? The builders of this project, Bannockburn Executive Plaza, Bannockburn, Ill., solved the problem with a steel-framed, "Y"-shaped structure featuring 30-ft-sq bays.

"We considered most of the alphabet before settling on a basic 'Y' configuration," reports Harry Dolan, vice president for the developer, Terracom Development Group. "Ideally, a building with this much area requires about nine stories to insure optimum floor layout and depths. The challenge was to compress this height to only three stories, yet leave the site open with good sight lines!"

Preliminary framing analysis (PFA) requested

Early in the final design stage, the project's structural engineer asked Bethlehem to prepare a PFA based on a 30 ft x 30 ft bay size. Earlier, the designers conducted a similar study on a concrete frame.

After the results of both studies were compared, the steel frame came away the winner. The structural engineer reports, "Structural steel proved to be the best solution because of its economy, light weight, ease in spanning the 30-ft bays, and speed of erection." The frame was erected in about 10 1/2 weeks at a cost of $5.35 per sq ft. The unit weight of the steel frame was 7.5 lb per sq ft.

Construction economies were attributed to the ease by which the utilities and mechanical systems could be installed within the steel frame. Also, structural steel simplified the framing for the cantilevered balconies and the roof skylight in the center atrium.

Composite construction

ASTM A36 beams and girders are designed as simple beams. Lateral wind forces are resisted by beam-column moment connections utilizing Type 2 Construction per A.I.S.C. design specification. Single-piece, ASTM A572 Grade 50 high-strength columns were used throughout. The elimination of column splices contributed to fabrication and erection economies.

The floor system consists of 3-in. composite steel floor deck topped with 3 1/4-in. lightweight concrete. The floor system acts compositely with floor beams spaced 10 ft on centers. The beams, in turn, are supported by composite floor girders.

Sales Engineering Services available

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For more information, get in touch with a Bethlehem Sales Engineer through the nearest Bethlehem sales office, Bethlehem Steel Corporation, Bethlehem, PA 18016.
A 3-story height limitation led to the Y-shaped design of Bannockburn Executive Plaza. Bethlehem furnished all of the structural steel for the project.

Each wing encompasses about 14,000 sq ft per floor. Entrance is gained through the 36-ft-high skylighted atrium. Structural steel simplified the framing of the cantilevered balconies and the skylight.

Floor plan of a typical level demonstrates interior space flexibility made possible by the spacious 30-ft-sq bays.

Developer: Terracom Development Group, Des Plaines, Ill.
Architect: Enviro-Technics Ltd., Skokie, Ill.
Structural Engineer: Joseph L. Heil, P.E., Milwaukee, Wisc.
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The well-begun project manual

Valter Rosenfeld, CSI, is Managing Director for Professional and Technical Services at The Architects Collaborative in Cambridge, Ma.

You have a shelf full of master sections, a library full of manufacturers’ literature, a box full of recent specifications by others, the CSI Manual of Practice is on your desk, and it’s time to prepare the project manual for a new building. When do you start and what do you do first? Is there a logical sequence to this work that actually helps? Yes, there is.

Begin by determining the type of contract you are writing (or are there multiple contracts?). Will the work be done for a fixed lump sum or for construction cost plus a fee? Is there a construction manager? Do the rules of a government agency establish the general conditions? Remember that whoever is paying for the building will have a say about the way the contract is set up and the documents to be used. Last, will the project be bid (under some of these same rules, perhaps) and require bid forms for soliciting prices? To start specifying without these questions answered is to risk redoing technical sections as well as bidding and contract forms, because the entire project manual is affected by them. With the answers known, bidding requirements, contract forms, and general conditions can be prepared with confidence, no matter what the stage of the drawings.

Next, examine the available drawings to determine what trades are involved in this construction. List the materials indicated and make shrewd guesses about others that may be required. Organize the trades according to the CSI MasterFormat and make a rough table of contents. Now you begin to have a notion of the work before you: how many sections need to be written and what information will have to be assembled.

The third step, an important one, is to organize the specifications work of consultants and others contributing to the project manual. Though several professionals are writing this book in collaboration, the ideal is to have it all appear to have come from the same writer (consistency of style) and from the same typewriter (consistency of format). For this purpose, a brief memo to consultants and page format samples are useful. But more is needed if everyone is to be oriented to the same rules.

Not only do the format, numbering system, paragraphing, page identification, and type face have to be established for everyone, but certain technical arrangements have to be worked out as well. How will access panels be handled? Who will provide temporary services? How will testing be paid for? The work must be divided clearly among the trades without duplications or omissions. Does everyone know the rules for bidding alternates, and will they specify the same guarantee period? Will everyone handle shop drawings the same way? Though the work is done in parts, it must eventually fit together as one document.

Now you are ready to begin the architectural sections, but where should you actually start? Since the specifications are a record of decisions about materials and construction methods for each job, it’s best to start where the fewest decisions need to be made or where all the necessary decisions have already been made. Therefore, it’s often not very productive to start technical sections before working drawings are about 50 percent complete unless you have unusually good information about what materials will be used. By that time, a number of sections can usually be started from the information already on paper.

For example, you might start with Section 10160, Toilet Compartments, because comparatively few decisions are required. Do you want metal or plastic-laminate units? Are they floor-mounted or ceiling-hung? Are there urinal screens or special features? With very little more than the answers to these few questions, the entire section can be written; the remainder is relatively standard. For each project there is a group of sections requiring a minimum of decisions, and they are generally the first to be written.

As the drawings progress, you can proceed to other areas. If the door and finish schedules are done early, additional sections can follow. Wall sections and details should be drawn before window and roofing specifications are written. Glass types must be decided before “Glazing” can be done. Toward the end you can tackle sections which need many details, or sections which require extensive consulting with sales representatives or specialists before writing begins.

While working to complete the sections on your list, don’t lose sight of the basic goal: to set down precisely what is wanted, so that bidders know what to price; so that the owner knows what he is getting; and so that the architect can properly control the result: in short, so that the building that is wanted is the one that is actually built.
The era of swoops and billows

For the last decade the momentum of the fabric structure has been building. Now the era of swoops and billows is here. With it comes a computer technology, an awesome capacity for long spans, energy options, and flights of pure form.

Every span of history seems accompanied by its own unique method of attempting the spectacular marriage of the human spirit and the taut rigor of structure. Artists like Gabo, Lippold, and Snelson have succeeded, as have engineers Eiffel, Maillart, Nervi, and Candela. The results can be admired by both the artist and the engineer.

In the recent past, it was the concrete shell and the discipline of compression which held for architecture the greatest opportunity to marry an exciting structure and form in a large-scale, three-dimensional enclosure. The apparent demise of the concrete shell for this purpose has been accompanied and partially caused by the emergence of the fabric structure and its rigor of tension.

Since the August 1970 "Expo" issue, no less than ten feature articles have appeared in P/A discussing various isolated fabric projects and techniques spread out through the decade. In this summer of 1980, there are an equal number of structures to discuss in a single issue. In the pages that follow, several buildings and projects are presented for mild weather zones like Florida and California, as well as low-temperature seasonal climates such as Minneapolis, Syracuse, and Boston. The extreme opposite climates of Alaska and Saudi Arabia also contain built fabric structures. They have been designed, therefore, for all temperatures as well as high winds, earthquakes, and heavy snow, the benchmarks of a mature building technology.

In short, business is booming. The overall fabric structures market consists of rigid-frame tensile structures, air-inflated and air-supported buildings. Industrial, military, and long-span structures are large-scale consumers. According to the Air Structures Institute (ASI), the 1979 sales of fabric for all structural uses grew over 40 percent from 1978 to 1979. A segment of that growth was the standard-design air structure, and tension structures increased in sales by 25 percent. The whopping growth, however, was in the long-span portion of the market—700 percent! A healthy portion of that growth was due to a single building in Saudi Arabia, the Haj Terminal.

For the engineered fabric structure there are two fabric types in predominant use: polyester coated with polyvinyl chloride and fiberglass coated with Teflon fluorocarbon resins. Each has its own domain. The coated polyester represented over 85 percent of the market in 1979, but the fiberglass coated with Teflon market is expected to double in 1980. The fabrics: In vinyl-coated polyester, the fibers provide the strength and the vinyl coating the durability. The material is thin, flexible, and resilient enough to allow for slight errors in patterning. It can stretch as much as 12 percent. It is superior to fiberglass for a demountable structure which needs to be folded and transported or stored. With time and exposure, however, the plasticizers in the vinyl rise to the surface, creating a "sticky" base which holds dust, dirt, and possibly mildew. Such fabrics, therefore, must be either cleaned—a yearly expense—painted with urethane, or laminated to a more durable membrane material. Vinyl-coated polyesters produce a thick, black smoke when attacked by fire and are usually restricted in use to "nonpermanent" structures. Also, with time the stretched membrane continues to yield, causing the material properties to vary and making precise engineering calculations difficult.

The price of the untreated material is about one-fifth that of fiberglass, and therefore a realistic possibility is replacing it in seven to ten years, using the same designs and patterns, for about 40 percent of the original building cost.

Vinyl has also been used to coat fiberglass. Some of the early inflatable structures by fabric pioneer Walter Bitz used this material. John Cook, founder of Chemfab, originally patented the coating of fiberglass with Teflon for use in heat-resistant industrial belting. He worked with Du Pont to generate an architectural fabric. In such a fabric, the strength comes from the glass and the durability from the Teflon. This combination is chemically inert, hydrophobic and noncombustible. It is self-cleaning and needs no regular maintenance. This material is stiffer, stronger, and more predictable structurally than vinyl-coated polyester. (The warp elongation is only 1.6 percent on the fabric being used at the Haj Terminal.) A coated fiberglass roof is expected to last at least 20 years. The long life, strength, and fire characteristics make the material more appropriate for permanent fabric structures.

While the vinyl-coated polyester competes very well with coated fiberglass in the domain of short-term structures, the elevation of fabric to the point of contention with concrete and steel must be credited to fiberglass coated with Teflon.

Why not fabric? The largest single drawback to the fabric structure is the preconceived notion that it is something to fold up and use to go camping: a temporary building, is that fabric structures tend to be spectacular. There are clearly some buildings and clients that do not desire to call attention to themselves. Insurance companies are not delighted with the specter of a building which attracts by its shape, can be entered with a knife, and suffers from the psychological preconception of being temporary. So far, the large percentage of buildings that have used fiberglass coated with Teflon, for example, have
1) New Florida Festival structure. 2) Photoelastic material tensioned in polarized light. 3) Theme park, Nemunosato, Japan. 4) A soap-film model by Frei Otto.
been for government or institutional clients whose clout with insurance companies comes from a very large chunk of business.

Most traditional building codes, moreover, were not written with fabric buildings in mind. Although in recent years great progress has been made, an architect may still have to put up with redundancy of fire protection or an appeal for a code variance. Material manufacturers are very helpful in obtaining code acceptance if problems arise.

Another serious obstacle is ignorance. Very few materials manufacturers are now involved with fabric structures; very few companies have experience cutting the patterns; local contractors are ignorant about fabric construction; few engineers have access to the computer technology necessary for the design; and few architects have ever visited, let alone designed, such structures.

From the viewpoint of an architect, a drawback might be having to work with an engineer from the outset of the building design. As one architect put it: "I don't really know about fabric, and I am not about to turn my building over to an engineer." If the architect does want a fabric structure, he must be willing to accept the curve as the rule for the fabric geometry. Engineer Horst Berger of Geiger-Berger has dealt with many potential fabric architects. For architects, says Berger, "the first obstacle is to learn that everything is curved." The second obstacle, suggests architect Roy Hall of Birdair, is that "drawing is inadequate" to describe the structure. Models are a must.

The shape and three-dimensional geometry of these structures is so complex that the structural and thermal characteristics of them are only now being monitored and modeled with confidence by computer analysts. Yet they are so simple that a novice with a pair of scissors, an old pair of panty-hose, and a hammer and nails can generate very sophisticated buildable forms.

For architect Hall, the problem is to "solve the complexity of making it simple." This duality of personality is part of the form, part of the structure, and part of the fabric.

Fabric structures are for the purist. There is no room in a membrane to hide mechanical or electrical lines. All of the connection details are visible. Construction inaccuracies appear as wrinkles. Every patch in the skin can be seen, and every seam is exposed. As Berger states, it is "a perfectionist job at a very large scale."

Why fabric:

Fabric structures share many intrinsic advantages. The principal values are the light weight (about 1/30 the weight of a conventional roof), and the fact that the structure is completely prefabricated and brought to the site, a giant advantage in remote areas. A high technology structure can be designed and fabricated in a high technology environment and then shipped. The weight alone of fabric represents a saving in support structure. It also allows great freedom in rehabilitation work. The prefabrication allows the on-site construction to proceed quickly, or the design can be fast-tracked. The building can be contained early, speeding up interior finishing. In the case of portable structures, they can be rapidly taken down.

Perhaps the unique quality of a fabric structure is the safety to human beings if structural failure occurs. Disregarding the damage to the structure itself and its material contents, a flexible fabric has the great capacity to accept holes and tears without total collapse or any fragmentation. As a bonus, the structure can be repaired, usually in days, with minimal shut-down time. Tensile structures are designed to a safety factor of eight; air structures to a factor of six.

Structures in tension

The quality which makes tensile structures safe is also what makes them strong—they are flexible. The form and the structure are intimately related to that fact. Horst Berger says it very well: "The aesthetics come from letting go." "Letting go" means paying attention to the form the structure naturally wants to take when it is stressed. It also means not forcing fabric into straight lines or flat surfaces.

A fabric structure can be stable without being rigid. This is so because of the necessity to maintain tension everywhere in the fabric and to make maximum use of the fabric strength by trying to generate forms that stress the fabric equally throughout. The result is a stretched, or "prestressed," condition. When the wind moves the fabric and relieves part of the structure, the fabric does not automatically buckle or undergo compression.

In a tensile structure created by stretching fabric from a mast or frame, the membrane assumes a double curvature, generally a saddle shape. Ideally, every square inch of the material is saddle-shaped.

Wind plays a much more considerable role in the tensile structure than does gravity. A tensile structure that is open around the edges has especially complex behavior under wind loading. The shape of the structure introduces complicated aerodynamic properties.

To optimize the total structure, the compression ring or earth anchors are also considered. Reducing the height of a tensile structure to reduce wind loading increases stresses in the supports and increases the cost of the concrete or reinforcing steel.

An air-supported structure such as the U.S. Pavilion at Osaka or the Pontiac Stadium must assume a low profile (.2 or less rise-to-span ratio) to avoid being blown over. By keeping out of the direct path of the wind, such a fabric roof must deal primarily with uplift, a condition the cables and fabric can sustain well.

Typically, the design of an air-supported structure also eliminates flat planes through use of double curvature, but both curves are "positive" or the same direction. The mechanical system forces air up from within the building, ballooning the fabric outward. The stresses in the fabric are directly related to the load on the skin (5-12 psf) and its radius of curvature. The smaller the [Continued on page 118]
King Abdulaziz University: A new sports complex at Jeddah, Saudi Arabia, is designed by Frei Otto in a joint venture with Ove Arup and Buro Happold, both English firms. The planning for the project began five years ago when Otto was approached in Germany by the Saudis. The early studies involved use of a two-way cable net structure which Otto has made famous. From the early work and soap-film analysis, the new design emerged.

The roof is constructed of two separate layers, a vinyl-coated polyester for the exterior skin and cotton fabric suspended below. The fabric-covered portion of the building is over 600 ft long and 300 ft wide and houses a main arena and a variety of courts, gymnasiaums, swimming facilities, and the athletes' dressing spaces. The photo at left shows the model derived from the soap-film studies shown on the previous pages.
Technics: Fabric structures

Franklin Park Zoo: The zoo pavilion (at right) now under construction in Roxbury, Ma, is a fabric pioneer in disguise. When it was first designed, fiberglass coated with Teflon had been used in only two structures. Architects Huygens & Tappé and engineers Weidlinger & Associates were denied building funds by the state for six years. The one advantage of the wait is that the designers can now profit from the experience others have had in constructing over 30 buildings.

Franklin Park was originally designed by Frederick Olmsted. Replacing the existing zoo on the same site, therefore, had delicate historic connotations. One prime requirement was to place three or four acres of zoo in the park without disrupting the original design. By adopting a low profile and gently curving forms, the fabric roof offered the "least buildinglike" solution. The use of fabric also brought the animals indoors in the winter and extended the zoo season.

From the interior, the fabric and arches allow for the circular animal space and offer a clear span which provides enough natural light to grow plants. Early in the design, a spectrum analysis of the fabric revealed that the light which entered through the fabric could not support certain plants deemed necessary to simulate the natural habitat of the animals. Between the arches, therefore, plastic (Kalwall) sandwich panels were introduced to capture more of the light spectrum. Through careful study of the light patterns in the pavilion, the plants could be placed in the correct light.

The new pavilion will provide approximately one acre of enclosed space (38,000 sq ft of fabric-covered area) and serve as the animals' winter home. Moats will separate the animals and people. The animals will also have underground cages and access to the exterior in summer. The pavilion is due for completion in spring of 1981 and is the first in a projected series of four similar structures.

Florida Festival: The Bullocks management found the fabric skylight so successful that it commissioned a second store with an all-fabric roof. While it pioneered with its skylight, it will follow the precedent of Florida Festival for the full roof.

Many of the fabric benefits so attractive to Bullocks made fiberglass coated with Teflon ideal for the Florida application. Like Bullocks, the basic building plan had been established and another roof planned when the architect Robert Lamb Hart, design consultants Anspach Grossman Portugal, and marketing consultant Ed Ettinger called in Horst Berger of Geiger-Berger. Berger had engineered the Bullocks store design. Since it is part of Orlando's Sea World, the owners wanted to preserve an outdoor "skylike" feeling and use many palms and tropical plants. They sought a column-free open space (over 60,000 sq ft) which would allow the greatest flexibility for juggling over 40 sales booths. Perhaps most important, they got a roof so large (90,000 sq ft) and distinctive that it could be seen from the air and other parts of the park to attract some of the tourist business from the rest of the Orlando area and the Sea World amusements elsewhere in the park.

The two interlocking squares presented an obvious solution in plan, a mast at the center point of each square with fabric stretched in radial patterns to the building edge. Berger and the designers boldly chose a richer solution. One large 106-ft mast was located at the center of one square, and three smaller 62-ft masts centered in quadrants of the other square. The center of the roof was then reversed down into the space and opened to view and weather. The structure got an early test during construction by 70 mph hurricane winds.

Operators attribute much of the financial success of the shops to the roof. Over half the people questioned leaving the building explained the "atmosphere" as the main attraction. During the day, radiating umbrellalike spaces are filled with shadow-free diffused light. The natural environment is so dominant, the wind is noticeably absent.

At sunset, the white exterior of the roof reflects the light in a spectacular array of pastels. On the interior, the night lighting reflects from the interior surface and creates a striking opposite to the uniform diffuse light of the day. The shadows and contrast highlight the sculptural drama of the roof.

The rainwater cascades down the roof and into the building through the hole in the roof's low point. The rain fountain has proved to be such an attraction to shoppers that the management is considering installing hoses on the roof to provide simulated rain throughout the year.

Shown at right are the various design solutions which highlight the building. 1) The edge condition must join curves with straight lines. 2) The building must be unique from the air. 3) The central mast is telescoping and simplifies erection from below. 4) The roof's low point in the central portion of the roof combines as a roof drain and natural fountain.
Bullocks: The giant, 18,000-sq-ft fabric skylight (1 & 2) in the San Jose, Ca, Bullocks department store was conceived late in the building design and replaced a more conventional solution. When the store opened in the fall of 1978, it pioneered the use of the fabric roof in a retail store. Architects EPR (Environmental Planning and Research) of San Francisco along with Geiger-Berger took advantage of the several material properties. The translucence of the fabric created an "outdoorlike" space in which plants could grow. The material's reflectance helped to reflect solar heat gain from without and simplified night lighting from within. The Teflon surface, of course, reduced maintenance.

Fire code officials in the San Jose area called for a double layer of fabric. The interior layer is nonstructural and drapes into the space. The additional layer also absorbs about 75 percent of the sound which reaches it, creates a thermal insulating air space with the outside fabric, and reduces the translucence of the roof. The variation in translucence provides a richer ceiling surface visually and helps to define the space.
The Haj Terminal is shown here under construction. The fabric is unboxed, collared, and draped free (left); tensioned and prepared for hoisting (center); and jacked up (above), all 21 modules simultaneously.
The Haj Terminal: Down the road from King Abdulaziz University is the new Jeddah International Airport. Each year Moslems make a pilgrimage to Jeddah for the religious period called the Haj. During the 70-day arrival and departure period, hundreds of thousands of pilgrims pass through the airport. To handle the onslaught, the Saudi Government is building the largest airport in the world. In addition to a more conventional terminal building, a huge structure is being built as a shelter from the desert heat. Five and one-half million square feet of fiberglass coated with Teflon will be used in constructing this shelter. The entire structure is being prefabricated and erected at the site.

The architect and engineer is Skidmore, Owings & Merrill, Chicago and New York. Early in the design, SOM considered concrete shells. The sun's heat, however, would turn them into radiators. Instead, a modular fabric system was devised consisting of 210 identical roof units 150 feet square. The roof is being raised in ten sections of 21 units each. The raising of the first roof section occurred last March and accounts for the accompanying photographs. The building is scheduled to be completed by 1982 and is already being heralded as the "crystal palace" of this century.

Of course the Saudis will profit most from the structure, and most of us will never visit it. Its benefits, however, are already being felt by members of the fabric structure industry in the United States. The mammoth quantity of material being woven and coated for the job is alone likely to improve the state of the art and provide insights into the ramifications of large-scale manufacturing of identical fabric structures, a possible future direction for the material.

The engineering procedure has consisted of computer analysis, wind-tunnel testing, the construction of two sample units of the structure completely monitored and tested to failure, and the on-site supervision of the ten large roof sections. For the first time the computer analysis commonly used by engineering consultant Horst Berger of Geiger-Berger has been compared to empirical data not only from the wind tunnel but also the mock-up structure. In addition, a vast amount of expertise will be accumulated by the people who will be involved in the design and construction of the project throughout its duration.
Both the structural and thermal properties of the fabric structure are intimately dependent on the fiberglass filament, the yarn, the weave, and the coating process. The yarns are aligned (left) to form the warp. The fabric is being inspected (right) prior to being coated with Teflon.

radius and the smaller the load, the smaller the resulting membrane stress (see P/A, Aug. 1972, “Pneumatic Structures,” p. 76, by David Geiger).

**Fabric, structure, and energy**

The structural principles of such structures have not changed in the last decade. What has been a vast reservoir of empirical knowledge, hands-on savvy, and good structural intuition, however, is now being gradually codified and computerized with great accuracy. Says Berger, “In the old days we were restricted to classical shapes; now we can do anything.”

While Berger has been busy with tensile structures, David Geiger has been meticulously perfecting his skewed geometry air-supported roof principle which began at Osaka. With a care that must rival the shaping of the Doric Order, Geiger has taken detail after detail to perfection. While the Osaka Pavilion was built in vinyl-coated fiberglass, every air-supported structure which has followed has been in fiberglass coated with Teflon (P/A, April 1978, pp. 112, 113).

Although the structural potentials generated the original concept, the energy qualities of such buildings are proving to be very attractive. The energy characteristics, structural nature, design, and construction of the buildings are established mainly by the fabric itself.

**The winding and the weave:** No two coated glass fabrics on any two air structures are exactly the same. The fabric is part of the design. The fiber, Owens-Corning’s BETA glass fiber, is used in every building. The Teflon by Du Pont is also the same. Chemfab has done the majority of the weaving so far. In the weaving and the coating, the specific material characteristics of the fabric are determined.

BETA filament has an elongation or stretch capacity of about one percent. By twisting two or three filaments together, what had been a straight line is reshaped like a spring and stretches about twice as much as the straight filament.

In the weaving process there are two orthogonal sets of these twisted yarns. The warp runs down the loom, and the fill yarns run across, alternating over and under the warp yarns. The undulating filler yarn is therefore shaped like a spring and elongates more than the warp. The weaving generally adds about 2½ percent elongation to the yarns.

The space between the warp and the fill yarns represents a tiny rectangular window. The diagonal of that window is its weakest direction. The first task of the Teflon coating, therefore, is to fill that window and control the stretch on the bias. Tension is applied to the fabric as the wide belt of material passes through a vat of milky Teflon. Increasing the tension will elongate the window and decrease its width. The window is itself filled with a translucent layer of Teflon, and each succeeding layer decreases the translucency of the final material. Opacifiers can be added to the Teflon which will make it more opaque or more reflective. The final layer of coating chemically permits fabric widths to be joined by heat sealing.

The structural characteristics of the fabric are largely determined by the number of filaments used in twisting the yarns and the yarn count per inch. Tension structures commonly use a heavier fabric having three-ply twisting. For air-supported structures, a two-ply twisting is used for the yarns, with a slightly more dense weave.

The patterns used for cutting relate directly to the structural design and eventually back to the fabric design. The object of cutting the patterns for the fabric surface is to maximize repetition, minimize the number of pieces, minimize waste, and simplify erection. These considerations give preference to large, near-rectangular pieces over triangular ones. The difference in directional properties necessitates a very clear distinction between the warp and fill in the pattern cut. The fabric piece cut is designed to elongate more in one direction than the other. Cutting dimensions are ultimately checked with field measurements to prevent fitting errors.

Once the cutting geometry has been coordinated with the structural analysis, the elongation in the warp and the fill can be determined. The initial decision is made as to how much translucence or reflectivity might be desired. The translucence can be decreased in the coating and the reflectance increased.

**Adding to the advantages**

An average coated fiberglass fabric reflects 70 to 75 percent of the solar energy that strikes it; about 6 percent passes through; 20 percent is absorbed by the fabric. Half of the absorbed heat is reradiated outward and half is reradiated inward. Fabrics have been made with translucence as low as 6 percent and as high as 20 percent. Nonstructural liners of the same material can have a translucence somewhat higher. John Effenberger of Chemfab calls the result “a window with very high reflectivity.”

Through using a multiple layer of fabric, several advantages can be gained. When a sealed air space is created, the layers can act as thermal insulation. In colder climates, hot air can be passed through the air space for snow-melting purposes. The liner can also improve the acoustics. The limp, absorbent material itself changes the ceiling geometry from concave to convex and avoids focusing the sound. As a light control, the more layers added, the more opaque the roof.

Doubling the roof fabric must be carefully thought out. The fabric is not cheap. In an air-supported roof, 60 percent of the roof cost can be the fabric itself. In addition to the advantages already mentioned for fabric structures in general, however, the translucence and reflectance have life-cycle cost benefits. The translucence can reduce the cost of lamp lighting and the resulting air-conditioning loads and maintenance. Even night lighting can be reduced by taking advantage of the interior reflecting surface.

[Continued on page 122]
Geiger-Berger's learning curve: From Osaka to Syracuse in one decade has been a long and fruitful trip. Fortunately for the industry, a single engineer has been closely involved in perfecting the necessary structural analysis as well as the appropriate detailing, building on past mistakes. Some of the details are subtle, some obvious. The drain plug, for example, pulls when the roof deflates, keeping the center panels from filling with water, an early problem at Pontiac. The aerial erection clamp system has ramifications on the design, fabrication, and erection procedure. The extensive use of prefabricated double tees is intimately related to the erection speed of the fabric roof itself. More subtle details are the "eccentric eliminator frame," which was evolved to permit the fabric to deflate without tearing at the cable joints. Alternating the direction of the panels (and their seams) eliminates a directional preference in the fabric with aesthetics as a valuable byproduct.

The earliest structures employed earth-barring and resulted in "sunken" solutions. Beginning with Pontiac, the structures "rise" to expose their sides.
When the University of Florida at Gainesville programmed their new center for student activities, they asked for something dramatic. As Gary Koepke of the Division of Planning & Analysis put it: "We didn't want a box." They didn’t get a box; they did get the most successful architectural application of the fabric structure yet to be designed. Some of the success lies in the prior design experience of Caudill Rowlett Scott and their Santa Clara Field House (PLA, May 1976, p. 94). Part lies in the expertise of the architect and local firm of Moore May Graham Brame & Poole Emo/Architects. The engineers for the job are Geiger-Berger. The structure makes use of both the tensile structure for the surrounding "skirt" facilities and an air-supported main arena. The Gainesville location challenged Geiger-Berger to its first air-supported attempt in a hurricane zone.

The photos shown here provide some insight into the kind of engineering, architectural, and construction expertise which is involved in such buildings. 1) A cast-in-place reinforced concrete ring outlines the arena space at an early stage of construction. The precast concrete arches 2) are added to serve as support for the tensile fabric. 3 & 4) The structure is shown deflated and hours later inflated. Even under construction, 5) the swimming facility and 6 & 7) main arena display their fabric quality. The Gainesville building provides one of the few examples where the richness of the architecture matches the richness of the structure.
Energy analysis

This analysis was prepared in the center for Planning and Development Research, College of Environmental Design, Univ. of California, Berkeley; Vladimir Bazjanac, Ph.D., Project Director. The work is funded by the U.S. Department of Energy.

Architectural energy analysis of the Stephen C. O'Connell Center for the University of Florida in Gainesville concentrates on the analysis of effects of variation in transluency of the fabric skin and of different climatic conditions on the energy performance of the building. This report is a summary of the analysis of those building heating and cooling loads which are determined by architectural design. The performance of mechanical systems and energy demands are not included in the results. The reported electrical loads reflect only the demand generated by lighting fixtures (P/A, April 1980, pp. 8-10).

The transluency of the skin, composed of two layers of fabric, is varied from 4 percent (as built in Gainesville) to 16 percent. The energy performance of a hypothetical “conventional” structure is simulated for comparison. The same design as in Gainesville is analyzed but with a concrete shell roof with R-11 insulation and no use of natural lighting. The five other cities in which the building designed for Gainesville is placed are representative of different climates encountered in the United States.

The analysis was prepared using the DOE-2.1 computer program with ASHRAE weighting factors approximating the effect of building mass. TRY weather tape for Jacksonville, Fl., as used to simulate the weather conditions in Gainesville. TRY weather tapes so used for other cities.

Three types of events will take place in the building: 1) intramural sports, 2) NCAA basketball and swimming, and 3) concerts, ceremonies, and speeches. Intramural use is planned throughout the year; other events are concentrated in the period between the middle of February and the middle of June. The building will operate from 7:30 a.m. to midnight. When no major events are scheduled, intramural sports will use the arena; therefore the doubling of major events (from 26 to 52) causes only a minor increase in the yearly energy consumption.

The building contains a large arena with seats for 12,000 spectators. Stratification in such a large space cannot be modeled accurately with DOE-2.1. As an approximation, the arena is divided in the analysis vertically into three freely interacting thermal zones. The curved shape of the fabric skin is approximated by a system of tilted flat surfaces with the same surface area and the same thermal resistance properties as the skin. The self-shading of the bulging surfaces and the changing angles of incidence are ignored.

The water in the swimming pool is maintained at 80 F, which is five degrees above the designed air temperature in the natatorium. Therefore the pool continues to release heat and humidity, adding to the cooling load in the building. Ground temperature in Gainesville during summer months is higher than the temperature of the air inside the building; cooling load could be slightly reduced by insulating the ground slab and underground walls.

Daylighting is the most important factor for the energy performance of this building. The translucent skin eliminates the need for artificial lighting during daylight in all but the subterranean spaces. The demand for energy rises in a “conventional” building because of its necessary reliance on artificial lighting, despite the better thermal properties of its roof and exterior walls.

The low thermal resistance of the fabric skin as designed results in substantial heat loss in cold climates. A fraction of this loss can be offset by increasing the skin transluency to boost solar gain. The greatest reduction of the heating load would be achieved by increasing the thermal resistance of the skin without diminishing its daylighting performance.
The other question is thermal transmission. Professor Willard Oberdick of the architectural research center at the University of Michigan is currently in the process of monitoring four existing Teflon-coated fiberglass buildings to evaluate the thermodynamic performance of the structures. Included are Bullocks Department Store, the dome at the University of Iowa, the Pontiac Silverdome, and Santa Clara College Activities Center. The study is sponsored by Owens-Corning Fiberglas and will last one year. Dr. Steven Selkowitz of the Lawrence Berkeley Laboratory is currently monitoring the thermodynamic behavior of Bullocks Department Store and is planning work on the Florida Festival building. His study is sponsored by Chemfab.

There is nothing static about the fabric market. Product manufacturers are well aware that the fabric roof has great potential for energy savings on a lifecycle cost basis. They are experimenting with multiple layers of fabric, night shading devices, and foil coatings. There already have been applications in Alaska where insulation was inserted in the space between two layers of a fabric roof. The race is on to make a translucent insulation which can be inserted between the layers without sacrificing natural light.

In a project for Inclined Village, Nv, David Geiger of Geiger-Berger is coupling talents with architects Carissimi-Rohrer Associates to produce a "thermally active roof." During the winter months, an air-filled translucent cellular fabric roof will be drawn over cables to protect the swimming space. In the summer, it will be drawn back like a curtain. The flexible material is expected to be vinyl-coated polyester.

Another important direction is the possibility of small-scale pre-engineered structures constructed of coated fiberglass. It is conceivable that products as small as modular skylights or building panels may appear as mini tensile structures. Industry experts estimate that premanufactured products may represent 40 percent of the future market. Horst Berger is convinced that there also will be a bright future market in the housing industry for the fabric structure. In the meantime, fabric people entice us with the thought that there are another dozen or so large fabric structures waiting in the wings to begin within the next 18 months.

Conclusion

The human spirit which cast off gravity and photographed Mars seems quite at home under a lightweight fabric stretched between cables or floating on air. Both the industrial technology and the computer design technology involved provide an equally fruitful setting for the engineering mind. In addition, in these troubled times there is something terribly appealing to an architect about beginning a design by "letting go." [Richard Rush]

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For fabric structure product and literature information see p. 153.

Sun Dome: Look familiar? The Sun Dome Mass Seating Facility for the University of South Florida at Tampa, Fl, is the sister structure for the Gainesville building already discussed. Designed by the same team of architects and engineers, the structure is unique in that the "skirts" have been initially deleted, leaving a set of spidery legs that drain the roof.

Once the concrete superstructure was completed, the fabric roof took only five weeks to erect. Most of this speed was due to teamwork and project manager Larry Harp of Owens-Corning's Fabric Structure Contracting Services. Harp and his team of fabric construction workers travel from building to building and have proven to be a great asset in improving the fledgling construction technology. Explains Harp: 1) "An exterior crane lifts the first rectangular panel—rolled around a metal bar—to the inside of the stadium. 2, 3 & 4) Workers then clamp the innermost side of the panel to the appropriate cable. When the fabric is completely unrolled, workers attach the final clamps at the compression ring." Panels are installed in a precise order from the perimeter to the interior. 5) The result is a soft, billowing roof, complete with lightning arresters and safety devices. The roof was inflated one Saturday night in a thunderstorm.

Carrier Dome: The Carrier Dome for Syracuse University in Syracuse, NY, will follow the Tampa building as the next fabric sports facility to be completed. The $25-million facility will seat 50,000 and serve the entire metropolitan region as an all-weather stadium facility. The name Carrier Dome acknowledges the large financial support which has been provided by Carrier Corporation, a local civic-minded manufacturer. The new structure rests in the "footprint" of the original Syracuse University stadium.

The architectural design effort is a joint venture of Atlanta architects Finch-Heery and Syracuse architects Hueber Hares Glavin. The engineer is Geiger-Berger of New York. The engineers took the opportunity in the Carrier Dome to use a flexible precast concrete compression ring, a concept which had to be abandoned for the Florida buildings. The concept allows the roof to float independently of the seating.

The extreme snowfall in the Syracuse region required special attention in the design of the fabric roof and its liner. The doubled membrane is used as hot-air ductwork and will permit the facility to control snow buildup. The compression ring around the edge will also contain resistance heating elements to eliminate ice. The design concept is pictured at the right along with a current photo of the building under construction. The building is expected to be complete for the fall football season. The owners plan to retrieve $11 million in the first year of use.
A 10-acre roof of TEFLO...and air
An air-supported dome of lightweight Fiberglas® coated with DuPont TEFLON® fluorocarbon resin completely roofs Pontiac Silverdome, home of the Detroit Lions, Detroit Pistons and Detroit Express. The 10-acre area is the largest permanent structure roofed with architectural fabric to date—and the stadium cost far less to build than comparable stadiums using other dome approaches.

Although the roof weighs 200 tons, the spectators inside never notice the slight increase in air pressure that supports it.

In addition to low construction costs, fabric structures coated with TEFLON offer easy and economical maintenance. The coated fabric resists sunlight, dirt and aging, and rain helps keep it clean because of the non-stick surface of TEFLON.

Fabrics coated with TEFLON have high reflectivity, which helps minimize energy expenditures for cooling in summer. They also provide relatively high solar transmission for natural illumination and can be insulated to minimize heat loss in winter.

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There are several special conditions that should be exercised in drafting contracts between owner and architect where fee is contingent upon particular fund or event.

If a contract for architectural services provides that fees are payable upon the occurrence of a particular event or out of a particular fund, the architect may have difficulty in securing compensation, or even forfeit the same, if the event does not occur or if the fund does not become available. When a controversy arises under such a contractual arrangement, the architect will generally contend that the event which must occur, or the fund which must come into being, relates only to the time of payment and not to his right to receive payment, and that under any circumstances, he is entitled to be paid within a reasonable time. The owner, on the other hand, will generally contend that if the event does not occur or if the fund is not established, the architect’s right to compensation is extinguished. The intent of the parties, as reflected in the language utilized in the architectural contract, will in most instances determine which contention is correct.

Architectural contracts are sometimes written to provide that fees will be payable when the owner obtains a mortgage, or such fees will be payable out of the mortgage or building loan fund. Illustrative of the legal problems which may arise under such an agreement is a determination of the Arizona Court of Appeals in Campisano v. Phillips, 547 P.2d 26. In that case, the Court considered a claim of an architect for fees for services rendered in connection with the design of an apartment complex. The architect had not been paid under his original contract with the owner, but when he threatened to institute a lawsuit, he was informed that such an action would impair the owner’s chances of obtaining a construction loan. The architect subsequently entered into a new contract with the owner which provided that the architect would be paid for services already rendered out of the first and last draws by the owner of the construction loan. The new contract provided that the foregoing mode of payment was to be “the only method of payment for the work completed to the date of the agreement.” The owner, however, never received any construction or interim loan draws.

The architect eventually instituted suit, arguing that the contract merely fixed the time when performance was to become due and that the owner’s duty to make payment was not contingent upon the receipt of construction loan draws. The architect, in support of his position, had relied upon several legal authorities which held that where the payment of a debt arising out of a prior contract or arrangement is, by subsequent agreement executed by the debtor, postponed or made payable upon the happening of some specific contingency, the debt becomes payable within a reasonable time after the execution of such subsequent agreement, even though the contingent event has not occurred. The Court, however, concluded that these precedents were not applicable, stating:

“Valid though this statement may be as a general rule of construction, the plain language of the contract must control. We agree that where the language of the contract is reasonably subject to different interpretations, the fact that the underlying debt arose from a prior contract supports the view that the parties intended it to be payable within a reasonable time even if the contingency did not occur. However, where the language of the new contract clearly shows an intent that the debt be paid out of a specific fund and not otherwise, the promise must prove the existence of the fund to recover; and this is true whether or not the debt antedated the new contract. . . . Here . . . the contract expressly provided that appellant was to be paid ‘out of’ construction loan draws. We therefore hold that the contract limits appellant to payment out of a particular fund, and that judgment was properly rendered against him when it was shown that the fund did not exist.”

In reaching this conclusion, the Arizona Court was required to distinguish other decisions which reached a contrary result under somewhat different facts. For example, the Court referred to an Oregon case (Mignot v. Parkhill) which considered a contract which provided that a contractor was not obligated to pay a subcontractor “until such time as the contractor has himself received the money” from the owner. The Oregon Court construed such language as an agreement not to look to a specific fund for payment, but relating only to the time of payment. Thus, the contractor was eventually obligated to pay the subcontractor even though he had not received the funds from the owner. The Arizona Court, although conceding that the Oregon decision was correct, distinguished it on the ground that a contract which did not require payment “until such time” as money is received reflects a different intent than a contract which expressly states that money is to be paid out of a particular fund.

Further, the Arizona Court distinguished an earlier decision in its own jurisdiction (Kirchoff v. Cummard) which construed a contract using the words “out of” as not limiting payment to a particular fund. This conclusion was premised upon the fact that the contract in question did not expressly provide that the payment was to be made “exclusively” or “only” out of the particular fund in question, whereas in the later case, there was a reference to the “only” mode of payment. Such a distinction may seem to be technical and strained, but such differences in result do emphasize the significance and importance of proper draftsmanship in the formulation of the contract between owner and architect.
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Reviewed by John S. Reynolds, Professor of Architecture, University of Oregon; principal, Equinox Design, Inc., Eugene, Or.

This book is a collage of work by architects, engineers, teachers, and researchers; it has something for everyone interested in conservation and building. It is not likely that everyone will find all contributions important, but that is of little consequence and should be expected in works of this type.

Commercial building design is emphasized; this is the book’s great strength and its weakness. The strength becomes evident, chapter by chapter. The weakness rests in the way in which the subject of high internal gains in commercial buildings is somewhat downplayed. Although several contributors include analyses of these gains, only Fred Dubin really goes after electric lighting as the culprit that it is. Too many authors seem to have accepted high internal gains, then pointed out the folly of high insulation levels in an always-overheated building, or to have minimized the role of solar heating in commercial buildings that “don’t need it.”

Dubin makes the point that needs reinforcing throughout the book: we should seek to replace electric lighting with daylight, and when more windows result in an increase in space heating needs, seek an appropriate heat source. Electric lighting is a thermodynamically inappropriate source of space heating, in contrast to waste heat and solar energy. By accepting high internal gains, we come close to missing some of the fundamental changes encouraged by conservation; we wipe the forehead of our feverish child, rather than break the fever.

The articles include the retrospective and the prophetic; in the wide technical range, we go from being tantalized by Stein and Serber’s idea of an energy-estimating handbook to being led, step by step, through Balcolm and friends’ Solar Fraction Method. Such a gathering of information needs more structure in order to get quickly to what will inspire, inform, anger, or surprise you. Some readers will know which authors to...

[Books continued on page 140]
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Books continued from page 136

read, while others will seek out titles. A good third way to begin is to read editor Watson's first and last chapters.

Watson's first chapter sets the tone nicely, reviewing how "fossil fuels became the energy substitute for climate-responsive building design." Detailing the advantages to owners, occupants, and society of energy conservation in buildings, he asks "If energy-conserving building design is ethical, wise, and economical, why then is it not inevitable?" The last chapter provides some answers, along with a concise summary, out of the articles in between. Watson also cautions "Without an architectural design and institutional barriers shows why conservation is not yet inevitable, and he calls for a conservation initiative. Thus challenged, you can then take the chapters in whatever order appeals to your aesthetic, ethical, or technical desires.

For the scholar who seeks precedents and relishes ideas new and old, there is Bruegmann and Prowler's richly illustrated historical perspective; the section on ventilating methods is particularly appropriate to the rest of the book. There are Knowles's observations on solar rights, beginning with "Shouldn't we be concerned with what is moral before we are concerned with what is legal?" Steadman asks us to "think-line" instead of "think-blob," advocating a linear pattern of city growth that allows decentralized energy sources and features urban belts around areas of green, in contrast to the greenbelt approach. Ecll follows with appropriate technology's response to quick-cheap-and-die-young building philosophies.

For the designer who enjoys approaching the sea of the technical (but who prefers to stay on the beach), there is the largest group of chapters. Stein's first article presents a frightening picture of the increase in energy consumed in operating New York's office buildings, from 1950 (128,900 Btu/sq ft) to 1969 (266,400 Btu/sq ft). Then follows a detailed review of energy conservation options in two Albany office buildings, which is expanded in his later article with Serber to include energy saved in construction techniques. It is regrettable that so many of Stein's numbers are not also presented graphically, and that the graphs that are presented are cluttered with extra lines and words jammed in. Would that the graphics were up to the content! Steen and Serber approach the developing subject of energy embodied in building materials and processes, but there is no readily useful table of these values. It is not easy to make a design decision based on energy embodied when, for example, wood shingles are shown as 7315 Btu/sq ft while an aluminum alternative is listed simply as aluminum sheet 95,943 Btu per pound. The authors point out that they are developing a handbook to aid in such energy decisions, which will certainly be welcome.

Milne and Givoni present the beginnings of design approaches to naturally tempered buildings, using the psychrometric chart as a base rather than Olgyay's easier, but technically limited, Bio-climatic chart. (A technical note on the use of the psychrometric chart is thoughtfully included, which would make a nice introduction to the subject for architecture students.) Their approaches to evaporative cooling methods are especially pertinent to the commercial building subject, and, in a later article, Dubin fills in some more technical details and opportunities.

Arumi dazzles with examples of detailed answers available from computer analysis; some tradeoffs between daylighting, heat flow, and electric lighting in window sizing were promising, as was site analysis of the adjacent reflections and shadows from a high-rise reflective-glass building. He presents surprisingly simple rules of thumb (p. 149) that tell a designer how critical is the inclusion of thermal mass for both heating and cooling. Arumi also cautions "Without intelligent questions, even computer-generated answers are not going to be helpful," which I found the case where much effort was spent to track a momentary lapse in a fixed April-August sunshading device: why fix a device to shade in both cool April and hot August?

Getting further into technical details, designers and engineers should enjoy reading Spielvogel's and Dubin's articles.
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Switch to the drafting system that makes it easy to get precise, accurate drawings and pays for itself in savings on everything from labor to refill lead. It's the FaberCastell TK Fine Line Drafting System.

Choose from constant line widths of 0.3mm, 0.5mm, 0.7mm or 0.9mm. The TK Fine Line System features tempered polymer leads in the most popular grades for paper and vellum, plus special Filmar leads for drafting film.

Then pick the pencils that bring out the best in the leads—TK Fine Line Pencils with semi-sliding sleeves that prevent lead breakage.

The leads and pencils work together as a system, delivering precise, uniformly black lines that erase without ghosting. The result is a clean, dust-free drawing that reproduces beautifully in diazo machines, copiers, microfilm and other photographic methods.

Compared to 2mm drawing leads, you'll save up to 75% with TK Fine Line Leads. Save again on man-hours and lead wastage because TK eliminates lead pointing. And save even more on reduced inventories of lead holders, leads and pointers.

See your FaberCastell dealer for the full story, or send today for more information.

Precision that saves you money.
Republic designed its locker line the way you would have

Clean lines. Classic colors. Economically functional. Aesthetically pleasing. And a wide selection for you to choose from.

So the Republic locker installation you specify will look custom-designed for the architectural environment you put it in.

In schools, offices, plants, clubs, recreational facilities, Republic Steel lockers offer a range of types, sizes, accessories and colors to satisfy virtually every clothing storage need. Standard lockers, with over 80 years of Republic Steel locker experience behind them. Expanded metal lockers, combining maximum ventilation and strength. And Republic's MONDRIAN*—the most advanced locker available today. Clean, crisp, innovative design. Recessed handle. Flush front. Bold colors.

Economically, Republic lockers are long-term moneysavers. Easy to install. Long-lasting. Tough enough to require only minimum maintenance.

So, design with Republic lockers in mind. And specify them with confidence—in their performance, aesthetics, economy and client satisfaction.

For full information on Republic's complete locker line, write Republic Steel Corporation, Industrial Products Division, 1038 Belden Avenue N.E., Canton, Ohio 44705. Or call your nearest Republic Distributor. You'll find him in the Yellow Pages.

*MONDRIAN is a trademark of Republic Steel Corporation.
The following items are related to the Technics article about fabric structures. They are grouped here for the convenience of the reader.

### Fabric structures

**Sheerfill® architectural fabric** of fiberglass coated with Teflon® is used in translucent roofing systems. The white, 5 percent reflective exterior surface reduces heat gain from the sun while allowing in enough light to cut daytime lighting needs. The result is a reduction of heat buildup and consequent lowering of air-conditioning load. According to the manufacturer, the material is classified as noncombustible by all model code agencies. Chemical Fabrics Corp., Sirdair Structures Division.

*Circle 200 on reader service card*

**Portomod® and Tension Span® structures** of fabric are lightweight and relocatable, and are available in various configurations, lengths, widths, and designs. The advantages they offer, their components, installation, and typical applications are outlined in a 16-page brochure. Seaman Building Systems.

*Circle 201 on reader service card*

**Permanent fabric structures** and considerations involved in their design are discussed in a 16-page brochure. Various shapes are illustrated, along with photos of typical installations. Properties of the Sheerfill® fabric are shown in table form and described in more detail. Chemical Fabrics Corp., Sirdair Structures Div.

*Circle 202 on reader service card*

**Tensioned membrane structures** brochure describes and illustrates a variety of applications of these products and many of the forms possible. Areas of application are expositions, fairgrounds, shelters for commercial shopping centers or malls, sports arenas, stadiums, amusement parks, and amphitheaters. The eight-page, full-color booklet also includes photos and descriptions of air-supported fabric structures. Helios Tension Products, Inc.

*Circle 203 on reader service card*

**Architectural Fabric Structures'** brochure shows and discusses several buildings that use tensioned, Teflon®-coated fabric. Computer designs indicate the stress patterns of different contours. A list of firms associated with the structures illustrated is included. DuPont Co., Plastic Products & Resins Dept.

*Circle 204 on reader service card*

**Fiberglas® fabric structures** are the subject of an eight-page brochure that covers features, performance, advantages, and installation. A table provides product data about the fabric, such as tensile, tear, static load, flame resistance, and optical properties. Firms involved with the structures shown are listed. Owens-Corning Fiberglas, Fabric Structures Unit.

*Circle 205 on reader service card*

**International Conference on Practical Applications of Air-Supported Structures'** comprises the papers presented at the conference held in October 1974 and transcriptions of panel discussions following their presentation. Several papers trace the history of fabric structures throughout Europe, Japan, and the U.S. Others discuss fire testing and the development of incombustible fabrics; two are concerned with building codes. The proceedings, over 200 pages, are $18 and can be ordered from: Canvas Products Association International, Air Structures Div., 350 Endicott Building, St. Paul, MN 55101.

**Towel warmers** for bathroom or kitchen add heat to the room in addition to keeping towels and clothing warm and dry. There are three hot-water styles in wall- or floor-mounted versions for open or closed systems. Oil-filled electric models, for homes without hot-water systems, simply plug in, requiring no plumbing or pipe work. Myson, Inc.

*Circle 100 on reader service card*

**Pirelli rubber flooring,** available for years in black, now comes in a choice of colors and thicknesses, with raised studs, ribs, and HH patterns. The flooring, for use indoors or outdoors, offers high resistance to wear, good acoustical properties, and easy maintenance. Jason Industrial, Inc., Rubber Flooring Div.

*Circle 101 on reader service card*

**SL low-pressure mercury/fluorescent lamps,** intended to replace 220/240-volt incandescent lamps, provide a 70 percent saving in energy, according to the manufacturer, and last five to ten times longer. Designed to fit standard sockets, 11-, 13-, 18-, and 25-watt lamps to replace 40-, 60-, 75-, and 100-watt ones are now available. A series of lamps in the 120-volt range, predominant in the U.S., will be available early in 1981. North American Philips Lighting Corp.

*Circle 102 on reader service card*

The Alhambra collection of fabrics, inspired by Moorish designs, comes in colors adapted from those of the glazed tiles. Included in the group are large-scale and small-scale patterns to be used as Panelgraphics or for draperies. Colors blend with the firm's upholstery fabrics. Ben Rose, Inc.

*Circle 103 on reader service card*
It’s Not Serious. It’s Not Really Wool.

It’s Marquesa,” Lana, Amoco Fabrics Company’s new carpet face yarn that’s ready to give up the look and feel of wool. It’s soft to the touch, so plain soap and water easily removes almost any stain. Its beauty and durability make Marquesa Lana the smart choice for high-traffic areas and electronic equipment. And its low maintenance make it perfect even around computers.

Marquesa” Lana meets any fashion standard of today. But it costs less than any competitive synthetic carpet yarn.

The name means “royal wool.” Marquesa” Lana means lower cost, lower maintenance, and the latest of fashion, in a variety of colors and styles.

Available from your fine carpet store.

AMOCO
Products continued from page 153

Access control and alarm monitoring system, Model 732, controls up to 32 entrances and 8000 employees, who gain entrance by means of individual cards. The system includes card readers, a central control unit, an operator's terminal, and one or more printers. It monitors up to 32 contact switch points. Schlage Electronics.

Circle 104 on reader service card

Roof, mansard, and sidewall shingles and shakes, preassembled into 8-ft panels, eliminate one-by-one application. Formed of red cedar, Kraft building paper, and exterior grade plywood, here are two mansard and sidewall single panels and one shake roofing panel. Shake & Shingle Panels, Inc. Circle 105 on reader service card

Tailor Made vinyl wallcoverings with the look of textiles are offered in a wide range of coordinated textures and patterns in varying colors and metallics. Choices in the Wall-Tex collection can be made within one color family or from contrasting groups. Columbus Coated Fabrics, Div. of Borden Chemical. Circle 106 on reader service card

Hi-Boy heat pumps can be used for home improvement, new construction, modular facilities, apartments, offices, and schools. There are eight models ranging in heating capacities from 18,000-46,000 Btu and in cooling capacities from 17,000-47,000 Btu. The units are UL listed for installation on exterior walls. The compressor is completely enclosed for quiet operation. Bard Manufacturing Co.

Circle 107 on reader service card

Pumparound factory assembled pump/control center with automatic summer/winter changeover eliminates the need for field fabrication of heat pump systems. It is designed for use in hospitals, office buildings, industrial plants, schools, and other structures requiring large volumes of tempered air to be exhausted to the building's exterior. The system recovers the otherwise wasted heat and recirculates it. Carrier Air Conditioning.

Circle 108 on reader service card

Ground water heat pumps are designed to use well water for economical heating and cooling. The water is circulated through a heat exchanger to help heat or cool air in the house and is distributed by means of a normal system of ducts. Models with cooling capacities from 9500-64,000 Btu and heating capacities from 13,500-94,000 Btu are available. Command-Aire Corp.

Circle 109 on reader service card

The Convectionaire ductless heating/cooling system uses only a small compressor and operates without fans or blowers. For cooling, warm air is passed over cooling coils that extract the heat. By also reducing humidity, the system can be operated comfortably at a higher temperature setting. Excess heat is used for heating water, reducing the need for water heating during the cooling season. Heating is accomplished by extracting heat from the outside air. Balance and baseboard components provide ductless distribution of hot and cold air. Conservation Technologies, Inc.

Circle 110 on reader service card

Executive II Weathertron heat pump has a digital monitoring control that can be programmed to meet almost every home temperature requirement. It provides time/temperature setbacks up to twice a day. Cooling capacity of the WM Series ranges from 35,000-54,000 Btu. The heat pumps are equipped with a high efficiency, two-speed Climatuff® compressor that allows the pump to operate at low speed 90 percent of the time, automatically shifting to high speed during peak demand. General Electric Corp., Major Appliance Group.

Circle 111 on reader service card

Hinged and pivoted windows for hospital, institutional, monumental, and commercial applications, including thermal-break types, are described and illustrated in a 12-page brochure. Detail drawings of components are provided, along with specifications for the different styles. Fenstar Industries, Inc.

Circle 112 on reader service card

Comfort-Aire water-to-air packaged heat pumps for residential use are used with water of relatively constant temp.

[Products continued on page 156]
DELTA DASH. SAME DAY DELIVERY ON SMALL PACKAGES.

Delta is an airline run by professionals. Like Customer Services Agent Terry L. Thies.

Delta DASH (Delta Airlines Special Handling) gives you same day delivery if we receive your small package during normal business hours. If your package arrives after normal business hours, we will deliver it the first thing next morning—generally no later than 10 a.m. And DASH serves over 80 U.S. cities plus San Juan.

Packages (up to 50 lbs.) are accepted at airport ticket counters up to 30 minutes before flight time. Up to 60 minutes at cargo terminals. Size limit is 90 inches: width + length + height.

The airport-to-airport rate between any two of Delta’s domestic cities is $40 ($25 between Dallas/Ft. Worth and Los Angeles or San Francisco). Pick-up and delivery is available at extra charge. Call (800) 638-7333, toll free. (In Baltimore, 269-6393.) You can ship via DASH between Delta cities in the U.S. and Montreal, Nassau, Bermuda, London, England and Frankfurt, Germany. For full details, call your local Delta cargo office.

DELTA IS READY WHEN YOU ARE®

The Whirlpool wedge-shaped heat pump is a design that allows a larger transfer coil surface to be installed in less space than those of conventional shape. The slanting surface also helps to ice to drop off in the defrost cycle. The compressor is hermetically sealed and factory lubricated. It has top-discharge design, preventing hot air from being recirculated through the condenser coil. Heil-Quaker Corp.

Circle 114 on reader service card

WeatherKing® Add-A-Pump complements existing conventional gas, oil, and electric warm-air furnaces. It is engineered to automatically control fuel during the heating cycle and to provide whole-house air conditioning in the summer. The thermostat is set at the specific fuel cost balance point, and the automatic changeover thermostat will operate the furnace to meet heating needs at the lowest local rate. Addison Products Co.

Circle 115 on reader service card

The Heat Re-Cycler heat pump for hot water systems extracts heat from the air and rejects it to the water in the tank to help reduce water-heating cost by as much as 60 percent, according to the company. They are available as auxiliary units to be added to existing systems. Another version will be used by tank manufacturers as an integral part of water heater tank assemblies. Fedders Compressor Co.

Circle 116 on reader service card

The Efficiency II® heat pump water heater can save approximately 50 percent of the cost of heating water electrically, according to the manufacturer. It works like refrigeration in reverse by removing heat from the surrounding water.

Products continued from page 155

Tower Contract Vinyl Wall Covering

Distributor Directory

WALCO INTERNATIONAL HEADQUARTERS
6700 N.W. 77th Court, Miami, Florida 33166
(305) 392-6000
Broward Line: 524-4352 Fla. Wats: 1-800-432-9516
Cable: WALCONB Telex: 853559

Circle 111 on reader service card

The Efficiency II® heat pump water heater can save approximately 50 percent of the cost of heating water electrically, according to the manufacturer. It works like refrigeration in reverse by removing heat from the surrounding water.

Products continued from page 155
Texture and color as subtle as that of an everlasting bouquet can be found in the 37 patterns of 366 color selections of Tower Contract Vinyl Wallcovering. Featuring textures in deep dimension for fabrics, wood, grass, masonry, leather, etc., Tower Contract Vinyl Wallcoverings can be found in buildings of distinction from coast to coast in the United States and Canada. Consult the distributor directory for catalogue and samples. Material is supplied in 30 yard bolts of 54 inch width. Custom colors and emboss effects are also available.
air and transferring it to the water. Electricity is used only to run a compressor rather than as resistance heating. E-Tech, Inc.
Circle 117 on reader service card

Solartron® vacuum tube solar collectors, Series TC-100, are designed with a specially shaped reflector which concentrates sunlight onto the glass solar absorber vacuum tube. In addition to improving efficiency, the design makes the angle of the installation less critical. The collectors can be used for residential and commercial space heating and cooling or to produce hot water for industrial processing applications. General Electric Co.
Circle 118 on reader service card

Sundirector and Sundirector II (for southernmost climates) provide solar water heating. Water is circulated by means of a pump from the water source to the collectors, then into the storage tank for domestic use. When solar heat is unavailable, the system drains down to prevent freezing. A heating element is used for backup heat when solar energy is not available. Rheem Water Heater Div., City Investing Co.
Circle 119 on reader service card

E CUBE III (Energy Conservation Utilizing Better Engineering) is a computer program that estimates the monthly and yearly energy consumption of buildings based upon calculations of thermal load requirements, air-distribution system operation, and primary heating and cooling equipment. Mainline programs are Load Calculation, Energy requirements and systems simulation, Equipment, Economic analysis, and Data edit. Support programs are Response factors and Weather and permanent data. The program was developed by the American Gas Association. Cybernet Services, HQWO5H Control Data Corp.
Circle 120 on reader service card

Other literature

‘Lexan® products for architectural applications’ is a 20-page brochure that illustrates the many uses of Lexan sheet in glazing. Data are provided for several glasses and detail drawings show typical glass systems for interior and exterior installation. General Electric Co.
Circle 206 on reader service card

Sponsored By Helios Tension Products Inc.
In Conjunction With Its Affiliate In Japan
Taiyo Kogyo Co., Ltd.

Colorful, spectacular tensioned membrane structures are meeting today's needs for lighter, cost efficient buildings. To dramatize the potential for soft shell structures, Helios announces a competition for design of a stage and audience covering-outdoor theater.

Call for entries. U.S. licensed architects and professional employees of licensed architects are eligible. The deadline for entries is October 15, 1980.

Ten awards will be made by a professional jury. Professional Adviser for the competition is Elisabeth Kendall Thompson, FAIA.

First $15,000
Second $10,000
Third $7,500
Honorable Mention (7) $2,500

Entry forms, competition rules, specifications and basic information on tensioned membrane structures are available now. When requesting information, please provide the registration number under which an entry submission would be made. Helios Tension Products, Inc., 1602 Tacoma Way, Redwood City, CA 94063. Telephone: (415) 384-1770.
Close Harmony

Graceful Tension Structures by Helios.
The delicacy and beauty of these tensioned membrane structures is strikingly practical. In this economy, a shelter for an outdoor music amphitheater, the natural beauty of the site is preserved, with only minimal disturbance for footings for structural elements. The smaller white tensioned structure at the Aspen Design Conference in Colorado is even simpler, facilitating its erection and demounting each year.

All these structures, including the festive rest area sunshades, are fabricated of vinyl-coated polyester material held in tension on a steel framework. The result is a lightweight, rigid structure engineered to withstand heavy wind. Though a tensioned membrane structure is in a higher price class than a tent, it offers far greater strength and durability. Compared to alternative structures of wood, steel or masonry, it typically results in important cost savings.

When your imagination calls up sweeping curvilinear shapes or great enclosed space, Helios Tension Products are the people to try your ideas on. We specialize in helping architects translate their innovative designs into practical reality. Our expertise includes design, engineering, fabrication and erection—a total, comprehensive service unmatched in the U.S.

For more information, or assistance with a specific project, call or write: Dept. P6, Helios Tension Products, Inc., 1602 Tacoma Way, Redwood City, CA 94063. Telephone: (415) 364-1770, Telex 345590

HELIOS TENSION PRODUCTS, INC.
TAIYO KOGYO CO., LTD.
Soft Shell Structures Division

Circle No. 341 on Reader Service Card
Rich but subtle walls and...Conwed quiet.

The new attendB™ wall system proves that acoustical can be beautiful. Fabric covered acoustical panels create attractive work areas while controlling distracting noise.

Conwed® attendB acoustical wall panels will reduce the noise level within a room (NRC .60) while minimizing noise transmission to adjacent rooms (STC of 35 or 40 depending on wall construction). This performance combination is great for offices as noise is both controlled and confined.

The panels' rich fabric covering adds a soft, designer look to any room. Choose from warm earthtone colors of rust, gold, wheat, or tan. The attendB panels stay rich and colorful, too, because the durable, nonwoven polyester fabric resists fading and scuffing. For new construction or renovation, the attendB acoustical wall system carries a Class 25 Fire Hazard Rating.

New attendB acoustical wall system, see Sweets file 9.1/Co or contact Conwed Corporation, Ceiling Products Division, P.O. Box 43237, St. Paul, MN 55164. Phone (612) 221-1184.

Conwed
innovative products for better interior environments

Circle No. 324 on Reader Service Card
Vertical blind product manual provides detailed descriptions and color photographs of standard, universal, and lexalum verticals. The 20-page manual shows colors and textures of the vanes which are wool, acrylic, aluminum, or PVC. Product specifications are included. Hunter Douglas Window Products Div.

Circle 207 on reader service card

Commercial furniture presented in Catalog 1-80 includes office lounge, reception, and conference furniture. There are gang chairs, stacking tables and chairs, and table bases. A foldout section shows colors available in upholstery fabrics, thermoplastics, and frame finishes. For a copy of Catalog 1-80, write on professional letterhead to: Fixtures Manufacturing Corp., 1645 Crystal, Kansas City, Mo 64126.

Carports, garages, and enclosed parking brochure illustrates these structures for multihousing construction integrated with several building styles. Drawings illustrate components. General specifications are included, along with instructions on how to specify. The structures are engineered to withstand 90 mph winds and heavy snow loads. Installation service is provided. Childers Manufacturing Co., Div. of Overhead Door Corp.

Circle 208 on reader service card

Washroom equipment, described and illustrated in a 56-page catalog, includes over 700 stainless steel items. Colors and woodgrains are featured on many products. New are the Designer Series and the Trimline Series of recessed accessories which come in metric dimensions. Bobrick Washroom Equipment.

Circle 209 on reader service card

Low Level Floodlight (LLF) brochure B40 describes outdoor lighting that doesn't require poles. Drawings illustrate its use in courtyards, plazas, resorts, sports centers, malls, and similar installations. The 32-page brochure includes information about light distribution and installation. There are drawings of suggested designs for concrete pedestals. Kim Lighting, Subs. of Walter Kidde & Co., Inc.

Circle 210 on reader service card

Lascolite® fiberglass-reinforced panels, both opaque and translucent, for industrial, agricultural, institutional, and residential buildings, are described in an eight-page guide for designers. The brochure discusses resistance to weathering, chemicals, and fire, and includes a table illustrating a sample of profiles available as well as data on sizes, weight, and coverage. Lasco Industries, Div. of Philips Industries, Inc.

Circle 211 on reader service card

Ceramic tile sound-rated interior floors. Specifications and drawings are available for four types of sound-rated floors that can be used in installations governed by noise regulations. They include mortar method with either wood or concrete subflooring, and thin-set method with either wood or concrete subflooring. Each specification sheet includes recommended uses, installation requirements, materials, preparation by other trades, and ceiling assembly below. Ceramic Tile Institute.

Circle 212 on reader service card

Architects the world over are covering Problem Walls with FLEXI-WALL®.

Flexi-Wall's Plaster in a Roll™ is the unique one-step solution to covering concrete block, poured masonry, chipped plaster, old tile, drywall, even glass and plastic.

When dollars get tight, it's Flexi-Wall to the rescue. Maximum durability. Goes up like wallpaper, but because it dries as hard as plaster, it covers blemishes and bumps, bridges gaps and voids. Comes in 23 decorator colors. Easy to clean, extremely durable. An optional anti-graffiti covering makes Flexi-Wall perfect for high-traffic areas.

Flexi-Wall...the architectural solution that covers problem walls with a decorator finish.

The cost effective Problem Solver that meets your specs and beautifies your design.

- Hospital Approved
- Class A Flame Spread
- Eliminates Lead Paint Hazard
- O Smoke Generation
- Produces No Toxic Fumes
- GSA Contract GS-00S-64549
- HUD Contract #OPICOM-2878
- City of New York Dept. of Bldgs. #ME 6-79-M
- See Sweet's File 913/FL

FREE SAMPLES. CALL OR WRITE TODAY.

FLEXI-WALL Plaster in a Roll.

FLEXI-WALL®

Plaster in a Roll.

Flexi-Wall Systems
Post Office Box 88
Liberty, South Carolina 29657
(803) 855-0500
attaching glazing. Made of EPDM elastomer, the components will not rust, rot, corrode, chip, crack, or become brittle, says the manufacturer. Temperature range is -60 °F to 375 °F. A six-page folder describes the components and illustrates typical installations. Pro-Energy Systems, Inc.
Circle 213 on reader service card

Solaria is vinyl-strapped aluminum pool and patio furniture for hotels, motels, and resorts. The catalog lists 26 items including sun cots, lounges, loafers, chairs, tables, and umbrellas, which are also shown in color in typical settings. Lloyd/Heywood-Wakefield.
Circle 214 on reader service card

Moduline 100 Escalator Planning Guide contains clear acetate construction overlays of side and end elevations of escalators in ¼-in. scale. Building support and flooring details and construction details are included. Westinghouse Elevator Co.
Circle 215 on reader service card

Industrial/professional sound products are described and illustrated in a four-color, 32-page catalog. A variety of loudspeakers, theater systems, mixers, power amplifiers, microphones, and special purpose electronics and accessories are included. Altec, Sound Products Div.
Circle 216 on reader service card

Area separation walls, Series IV, for use in nonbearing walls between wood frame dwelling units provide a two-hour noncombustible fire-resistance rating with a 3½-in.-thick wall. Drawings show components of the assembly and illustrate the installation procedure on foundation, in intermediate floors, as interior or exterior walls, and at roof. Flintkote Co.
Circle 217 on reader service card

Dryvit System Inc.

The answer to retrofit of concrete walls.

This California retrofit (facing page) had to meet the challenge of poured-in-place concrete walls erected some forty years ago. Dryvit, in a conventional wet application, rose to the occasion beautifully. And energy-saving demands of today were fully realized. Detail of construction below:

1. Dryvit Insulation Board: a rigid panel of expanded polystyrene with optimum insulating characteristics. Board sizes, thicknesses and shapes are available as required by design.
2. Dryvit Reinforcing Fabric: specially woven and treated fiberglass fabric is embedded in the Primus coating to prevent surface cracking.
3. Dryvit Primus/Adhesive: Dryvit's unique plaster material mixed with Type I Portland Cement is used to adhere Dryvit Insulation Board to backup surface. It is also used to embed Dryvit Reinforcing Fabric on the face of the board.
4. Dryvit Quartzputz Finish: one of four finishes available. This synthetic plaster material has high bond strength, permanent integral color and an applied texture that provides a weatherproof jointless exterior surface.
5. 4-inch poured-in-place concrete, circa 1940.
Energy saving can look cool in California.

Massive insulation placed on exterior walls got this railroad’s retrofit off on a fast track.

Architects Albert C. Martin & Associates faced one of the largest and most complex retrofit jobs in Southern California when the Santa Fe R.R. took over 3 buildings as their Western Regional Headquarters.

The challenge was to retrofit with an emphasis on energy saving. And to accomplish the whole project within a year!

Insulation plans for two buildings called for an exterior system to conserve interior space. And the choice was Dryvit Outsulation. Why Dryvit? Because Dryvit not only met California’s Title 24 energy and insulation code, but it offered many additional advantages.

Dryvit went up fast. The lightweight 3" thick insulation boards on the outside were easy to work with and bonded directly to the existing walls. The Quarzputz Finish, unlike stucco, promised to be crack-free under climate changes. At the same time, Dryvit offered massive exterior insulation that sealed thermal bridges, equalized outside temperature thus minimizing thermal stress.

The Santa Fe Railroad was on the right track with the Dryvit System. Objectives of handsome buildings and energy conservation were met. On time and at a competitive cost.

Let us prove how Dryvit can work for you. Call or write, stating application: new construction or retrofit.
Laminated glass to meet various requirements includes Bi-lite safety glass, Quiet-lite for acoustic control, Gard-lite detention glass, Protect-o-lite for burglar resistance, Mul-t-lite for heavy duty, and bullet-resistant Resist-lite. These products are described in an 18-page brochure, which includes photos of typical installations. Product specifications, solar control and sound control data, and glazing recommendations are provided. Buchmim Industries. Circle 218 on reader service card

Surface-mounted lighting for a wide range of indoor and outdoor applications, including some linear fluorescents, is shown in an 84-page catalog. Drawings show dimensions, and descriptions provide information about finishes available. Also included is a section on lighting performance data. Prescolite. Circle 219 on reader service card

1980 Window and gliding door catalog provides detailed descriptions of the types, characteristics, and sizes of all the company’s windows and gliding doors available. Along with other general information, the catalog contains data on insulating values and heat gain, types of triple glazing available, and air infiltration ratings of window and door units. Andersen Corp. Circle 220 on reader service card

Building products catalog for 1980 covers nine products: paneling, siding, gypsum board, lumber, plywood, particleboard, roofing, insulation, and metal products. Information is provided on specifications, assembly, and installation, with application photos and product details in full color. Georgia-Pacific Corp. Circle 221 on reader service card

The Gemini Synchronous Inverter is used with intermittent power sources such as windmills, photovoltaic arrays, and solar collector systems to convert current from DC to AC. The system, how it works, application considerations, specifications, and typical applications are provided in a 12-page brochure. Windworks, Inc. Circle 222 on reader service card

‘Simplified Wind Power Systems for Experimenters,’ written by Jack Park, is an 80-page book of information needed to design and build a complete system for electricity, water pumping, and similar installations. It covers simplified site analysis, load estimation, windmill sizing and design, and systems. The book is $6 and can be ordered from: Helion Inc., Box 445, Brownsville, Ca 95919.

Multi-Vapor Lamp features, performance data, and specifications are provided in a 12-page brochure. The metal halide lamps, which range in size from 175 to 1000 watts, can be used in new or retrofit installations. Lamp selector chart shows criteria to be met in replacing 400-watt or 1000-watt mercury lamps with multi-vapor lamps. General Electric, Lighting Business Group. Circle 223 on reader service card

The Solar Energy Skydome® other skylights, and heat and smoke vents are included in a 16-page, four-color catalog. The acrylic plastic units are available with both single and double domes. Descriptions, specifications, and size charts are included, along with illustrations of various models. Wasco Products, Inc. Circle 224 on reader service card

Insulated store fronts literature includes charts for estimating savings in heating and cooling costs when Insulcast 450® insulated glass framing and insulated glass are used in store fronts and other low-rise windows. Six-page brochure also explains the reduced likelihood of interior damage from condensation. Kawneer Architectural Products. Circle 225 on reader service card

[Literature continued on page 167]
When we founded Atelier International a mere thirteen years ago, we rapidly developed a reputation for carrying modern, innovative design by the world's most renowned architects and designers.

For some of you, however, our fame seems to have stopped at our sofas. At ai, we feel it is time to correct this unfortunate situation.

In our Masters Collection, we have returned to the roots of the modern design movement by carrying the works of some of its foremost practitioners: Le Corbusier, Mackintosh and Rietveld.

Le Corbusier's chaise lounge is just one of the classic pieces of design now available through ai. Our tables and chairs have moved into homes and offices. While many designers choose Mario Bellini's Cab chair and all parts of its base and frame that might otherwise cause damage to their surroundings.

Finally, when we talk, E. F. Hutton isn't the only one who listens. Johns Manville and the Playboy Club in Chicago also have come to us for lighting and accessories. (Pictured here, Taccia and the inimitable ashtray, U 20/20.)

In short, perhaps we've come further than you thought.

Colonnato table for residential dining, a number of corporations (including Polaroid and Arco) have designed their conference rooms and cafeterias around chairs and tables from ai.

Seating systems—both office and contract—have solved problems for such major corporations as Itel Corp., AT&T, Holiday Inn and Pan Am.

And Babar has proved there is room for innovation even in office design. Babar is the first office seating system to utilize self-skin polyurethane on.
Ceramic tile floors and walkways are used in virtually all shopping malls in the U.S. And Gail Unglazed Brickplate has been used far more often for a combination of reasons: **Slip-Resistant** - Gail Unglazed Brickplate has an abrasive surface which helps prevent accidents; **Longer-wearing** - Gail Unglazed Brickplate outlasts others because the vitrified clay body withstands foot-traffic from millions of shoppers; **Economical Maintenance** - non-absorbent body resists acids, oils, chemicals, and other abuses... cleans quickly without heavy scouring or waxing; **Frost-proof** - patterns and colors can be coordinated, indoors and outdoors; **Widest Selection** - a myriad of natural, earthtone colors and sizes (2½ x 5 x 10, 8 x 8). For more than 85 years Gail Brickplate has proven itself the world under the most severe conditions. For additional information the name of your local distributor one of our four regional sales offices.

Gail Ceramics

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Circle No. 337 on Reader Service Card
Surface and wall fluorescent lighting. Thirty-six page catalog/manual provides application and specification data about fluorescent lighting. Surface luminaires can be used where recessed lighting is impractical, to maintain fire-rated ceiling integrity, and for flexibility when layout changes require lighting to be moved. Lightolier.

Circle 226 on reader service card

Decorative fluorescent luminaires, TL series, for interior application can be all or ceiling mounted. They have a baked enamel finish in nine standard colors and the one- or two-lamp fixtures are 2 ft, 3 ft, or 4 ft long. Four-page brochure illustrates the fixtures and colors available and provides photometry data. Columbia Lighting, Inc.

Circle 227 on reader service card

 Scotch tape P-19 is window insulating film which can cut heat loss during the winter and heat gain during the summer. It also reduces glare. A chart in the four-page brochure shows fuel consumption with and without the film for various zones of the U.S. 3M Co.

Circle 228 on reader service card

Arizona rooftop HVAC units, as described in a 24-page brochure, combine solid-state control systems with air-handling control methods to produce 0 to 30 percent savings in power consumption, compared with conventional variable air volume and closed-loop heat pump systems currently available, according to the manufacturer. Each unit provides heating and cooling for two to 17 zones in a commercial building. The thermostat in each zone transmits information to a central analyzer, which determines the most energy-economical way of meeting demands. There are model sizes with cooling capacities of 16–45 tons, heating maximum Btu of 85,000 for gas, 512,000 for electricity, 1,000,000 for hot water, and 1,110,000 for steam. Lennox Industries, Inc.

Circle 229 on reader service card

Packaged heat-pump systems are described in a product bulletin. The systems have heating capacities from 23,000–58,000 Btu and cooling capacities from 23,000–56,000 Btu. Dimensions, performance data, and specifications charts are included. Illustrations show typical installations. Bard Manufacturing Co.

Circle 230 on reader service card

Energy savings by design' is a 16-page booklet that discusses the advantages of Thermopane® insulating glass and Vari-Tran® coated glass products. Charts show savings possible with Thermopane in three office styles and five heating zones when heating fuel is gas, oil, or electricity. Copies at 25¢ each are available from: Libbey-Owens-Ford Co., 811 Madison Avenue, Toledo, Oh 43695.

Circle No. 334 on Reader Service Card

Solar heating brochure describes company capabilities for providing solar heating technical assistance to architects, engineers, and builders for residential, commercial, and light industrial buildings. Included in the six-page brochure is a description of how the warm-air system works, along with a diagram of a house illustrating features and showing air flow. Data table summarizes costs and savings for two homes. Contemporary Systems, Inc.

Circle 231 on reader service card

Solar components catalog, revised edition, is divided into 14 sections: collector covers, seals and fasteners, installation accessories, absorber plates for air and water, coatings, insulation, differential controllers, liquid and air circulation devices, hardware, passive and active collectors and systems, and educational material. The catalog, "Solar Components," is $2 and is available from: Solar Components Div., Kalwall Corp., P.O. Box 937, Manchester, N.H. 03105.

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Circle No. 334 on Reader Service Card

Progressive Architecture 6:80
Solariums and passive solar greenhouses. Sixteen-page brochure describes and illustrates several greenhouse models, some with solar heating equipment. Also described and illustrated is a passive solar house built for the U.S. Dept. of Energy at Brookhaven National Laboratories. Four Seasons Solar Products Corp. Circle 233 on reader service card

Axivane® fans are described in an eight-page brochure. Comparisons are made of centrifugal and vaneaxial fans, with graphs provided to help interpret the information. Several types of fans are illustrated, with size and specification information provided. Joy Manufacturing Co., Air Moving Products. Circle 234 on reader service card

Mark V® solar collector is described in a four-page bulletin. A cross-section diagram illustrates the construction of the collector. Technical specifications and performance data are included. InterTechnology/Solar Corp. Circle 235 on reader service card

The MPC-8901 Microprocessor Controller is described in a four-page brochure. The controller consists of four programs that unite electrical and mechanical systems: Power demand to reduce demand levels; optimum start, which turns equipment on only as needed; on-off control, which operates mechanical equipment only when absolutely necessary; and duty cycle, which bases cycles on interior requirements and occupant comfort. Barber-Colman. Circle 236 on reader service card

Building materials

Major materials suppliers for buildings featured this month, as they were furnished to P/A by the architects.


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Literature continued from page 167
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Edited by Arthur Drexler with essays by Richard Chalae, David Van Zanten, Neil Levine and Arthur Drexler
423 pp., illus. . . . $55.00

Energy Conservation Through Building Design
Edited by Donald Watson, 305 pp., illus. . . . $21.95
This precedent-setting book provides the bridge between architect and engineer, practitioner and researcher, so necessary to the development of a rational approach to energy conservation. Not limited to new building designs, it also includes methods of analyzing existing structures and specific ways to reduce their energy consumption. Circle B602 under Books.

Architectural Rendering: The Techniques of Contemporary Presentation
By Albert O. Halse, 326 pp., illus., 2nd edition, 1972 . . . $37.00
This completely updated revision of the most widely used guide to architectural rendering covers all working phases from pencil strokes to finished product — and shows how to obtain the desired mood, perspective, light and color effects, select proper equipment and work in different media. Circle B603 under Books.

Design Competitions
By Paul D. Spruielgen, 310 pp., illus. . . . $24.95
The first comprehensive guide to design competitions based on American practices. It examines in detail all important aspects of this timely subject, including how competitions work and the ground rules that govern most competitions. Circle B606 under Books.

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Edited by Brian Clouston and Kathleen Steiner, 286 pp., illus. . . . $24.95
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PA in July

Again, as in July 1979, P/A examines several examples that illustrate the design distinction possible in even the smallest, most circumscribed of architectural commissions. The work documented will include a fire station in upstate New York, sewer plant offices in Texas, a church addition in Ohio, and a nature center in a New Jersey park. Notable for its energy provisions, the nature center building will be the subject of an Energy Analysis, one in a series that P/A is publishing. (See page 121, this issue.)

The cultural center in Utrecht, designed by architect Herman Hertzberger (March P/A, pages 86-97) shows how a major civic asset can fit comfortably into an existing urban context. P/A's critical coverage will reveal some of the innovation—and care—behind a large public facility that avoids monumentality.

The new design policies of one of America's most respected furniture producers are discussed, along with examples. Recently opened showrooms in New York and Boston are shown, along with some significant new furniture and some innovative display.

Technical editor Richard Rush has been poring over the print-outs and peering into the green screen, and is ready to give architectural professionals some well-considered information on computers they can use—and how some colleagues are using them.

P/A in August will include a broad view of planning, preservation, and mushrooming new projects in Miami and Miami Beach. Current development prospects and controversies in this unique metropolis carry lessons pertinent to all urban areas.

P/A in September will be another annual special issue on interior design, this time expanding horizons to survey the best of international interiors, with examples from many countries.
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