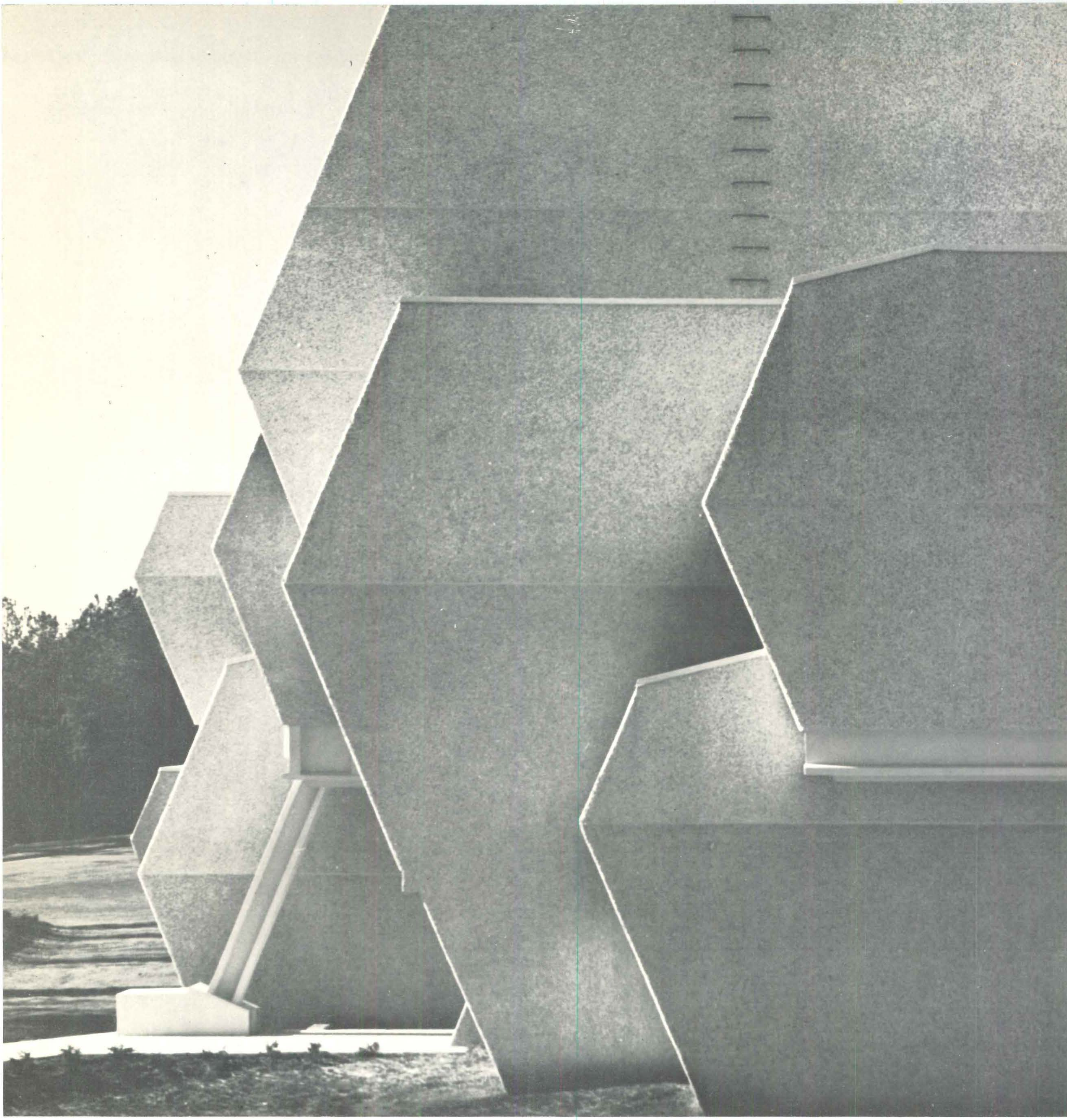


BURROUGHS-WELLCOME BUILDING IN RALEIGH, NORTH CAROLINA BY PAUL RUDOLPH

THREE RENOVATED MANHATTAN APARTMENTS

EXCEPTIONAL TEMPLE FOR AN EXCEPTIONAL SITE

BUILDING TYPES STUDY: HOSPITAL PLANNING RESEARCH

SEMI-ANNUAL INDEX ON PAGES 211-214

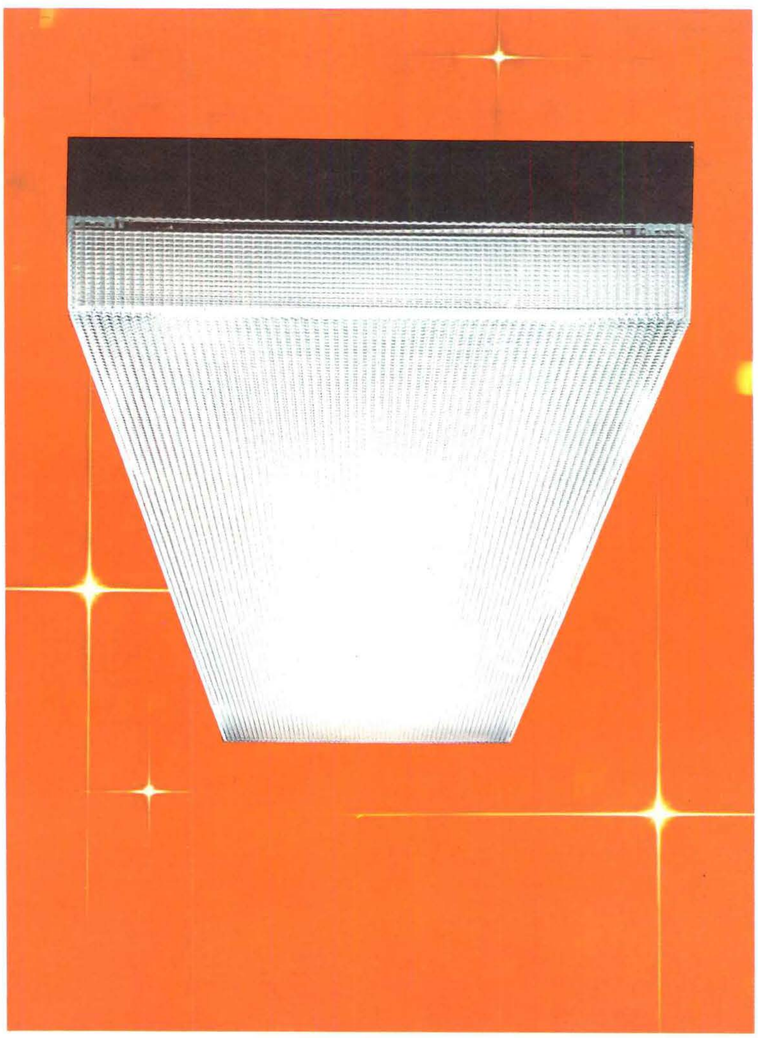
FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD

JUNE 1972 **6** A McGRAW-HILL PUBLICATION THREE DOLLARS PER COPY

Keene didn't become the interiors people just by making building products.

We had to know how to fit them all together.



If Keene was going to serve you as The Interiors People, we realized we'd have to offer you better building products.

We now have three separate lighting divisions that are constantly coming up with new interior fixture designs. Like a ceiling and wall fixture with advanced optical design that diffuses light uniformly, without bright spots or shadows.

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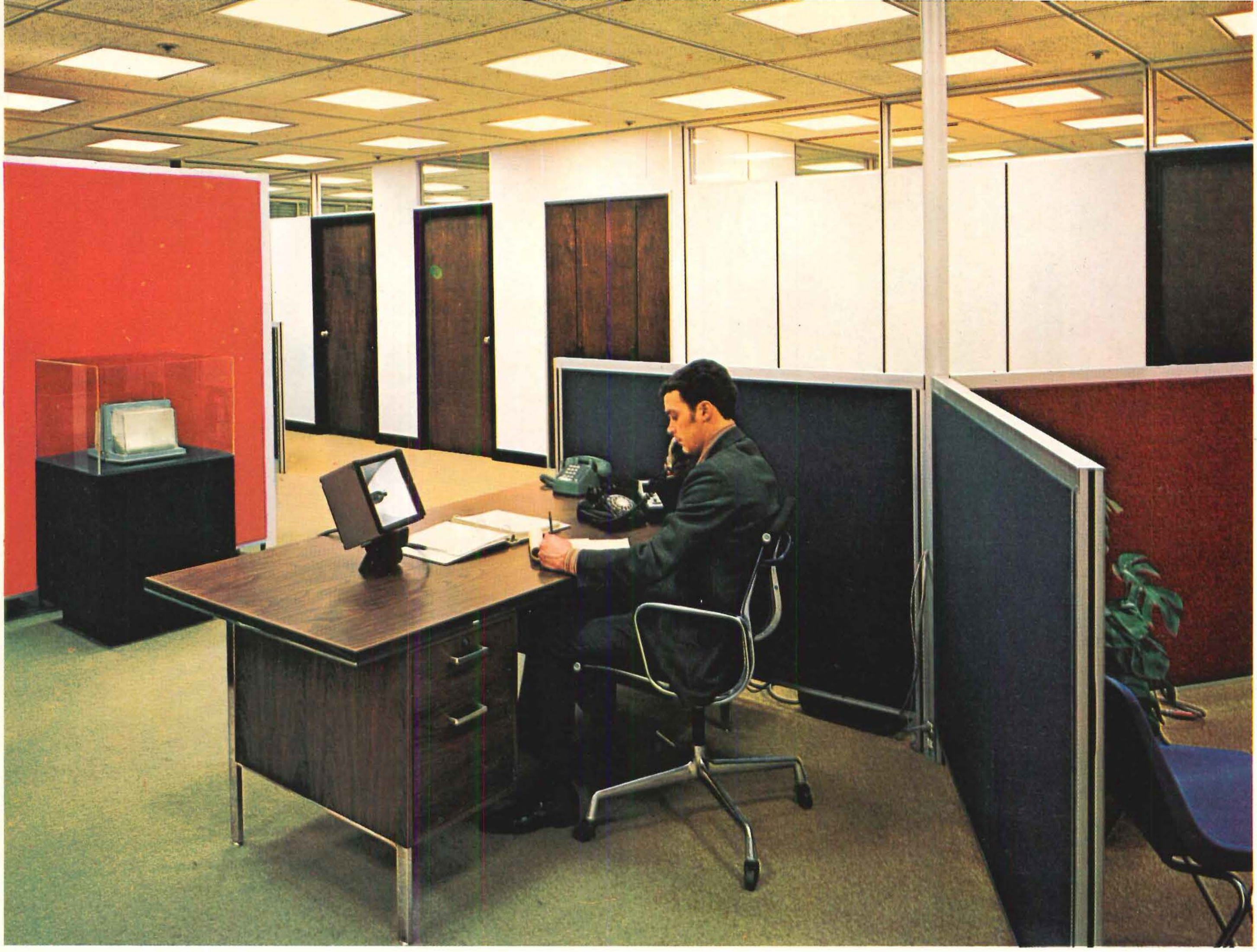
Our Sechrist Lighting Operation's distinctive new Celebrity fixture has a one-piece acrylic lens that eliminates all lamp image, fixture shadow.

Keene movable partitions let you rearrange office space easily—without damaging floors or ceilings.



Over 8,000 combinations of Keene building products can be interdesigned into Keene modular interior systems—and installed rapidly under our single-source responsibility.

available in many materials and styles, all fitting the same sturdy, snap-fit framing system.

We applied our experience in acoustical control, and developed a unique easy-access ceiling system, and a line of distinctive acoustical ceiling tiles (featuring richly fissured Styltone).

But to be sure we were offering you the most useful interior products available, we decided we had to know how they all worked together. Result: the Keene interior systems concept, with all components—lighting, air handling, acoustical control—interdesigned in self-contained modules... and installed under our single-source responsibility for total job performance.

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CORPORATION

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Keene's instant-access Accesso™ ceiling system was chosen for 1,000,000 square feet of ceilings in the new Chemical Bank Building in New York.

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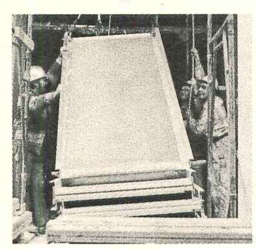
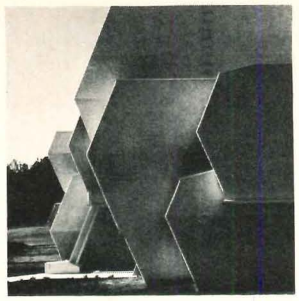

Installing



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Research Triangle Park, Raleigh, North Carolina
Architect: Paul Rudolph
Photographer: Joseph W. Molitor

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ARCHITECTURAL BUSINESS

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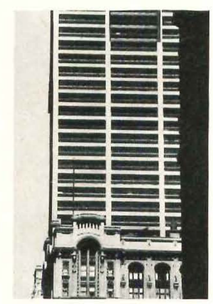
JUNE 1972 ARCHITECTURAL RECORD

FEATURES

John Hill

BUILDING TYPES STUDY 436

ARCHITECTURAL ENGINEERING



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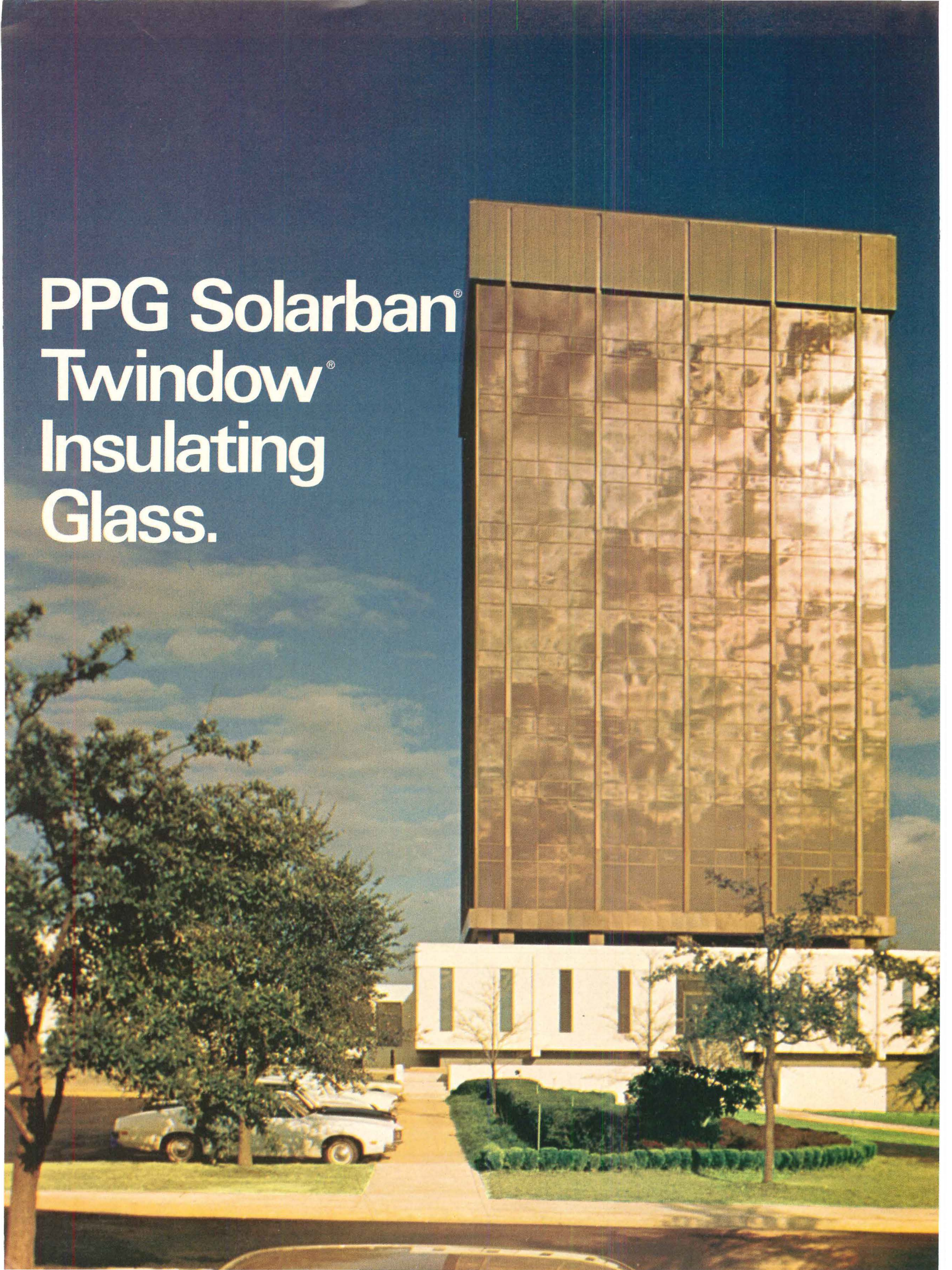
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Afterthoughts from the convention: the consent decree, et cetera

Last month on this page I argued the case, as I saw it, for fighting the consent decree that would require elimination from the AIA's code of ethics of any prohibition against price quotations. The editorial closed with the words: "I certainly don't insist that you agree with the point of view outlined here (especially since I don't pretend to have all the facts and a lot of thoughtful men who do have all the facts voted to accept the decree). But I sure hope you'll try to think out the implications for the profession. . . ."

Well, as doubtless everyone knows by now, the delegates voted 1145-612 to accept the consent decree, and it has now been signed. And no one can argue that all the implications—pro and con—were not properly debated. The debate at the convention, which needless to say got the undivided attention of the delegates for a good many hours, was admirably conducted, with plenty of good arguments on both sides and all the emotion that the issue deserved but not so much as to get the discussion out of hand.

The turning point was president-elect Ferebee's detailed and thoughtful presentation in favor of accepting the decree (for details, see News Reports, page 41); and the remarks of the AIA's special anti-trust attorney, William McGovern, who made it clear that he and his associates saw no real chance of winning a court battle with the Justice Department.

The good news is, it seems to me, the interpretative letter that goes along with the consent decree. It makes clear that the Institute, and individual architects, can continue to fight for passage of the "Brooks bill," for architect selection according to qualification, and for passage of legislation in the various states that would forbid competitive bidding. There are now such laws in a few states, and apparently they override the rulings of the consent decree.

The other good news is the passage of a resolution by the delegates setting up a fund to work for the passage of such laws.

And this seems, under the new circumstances, to be the most practical approach. Let's get started.

—*Walter F. Wagner Jr.*

Next big concern of the profession: the "New Exam"—and the schools

Later this month, in Seattle, the NCARB will discuss the proposed—and now fast-moving—development of a new registration procedure. This seems at least as critical a development for the profession as the Task Force Report and the consent-decree matter, and thus I'd like to start on this page an on-going dialogue on the subject. We invited E. G. Hamilton, head of the NCARB's Examination Development Committee to comment on the new developments as of now. It leaves some questions, which we've asked at the end. And—as they say on those new television editorials—we "recognize our responsibility to air responsible opposing views." At any rate, here is:

AN ASSESSMENT OF THE NEW NCARB EXAM PROCESS BY E. G. HAMILTON

Just short of a year ago, the member boards of the National Council of Architectural Registration Boards in their annual meeting at San Francisco voted almost unanimously to chart a new course that could have historic meaning for the profession. They approved a resolution to revise the registration process through which new vitality is introduced into the practice of architecture. In so doing, NCARB implicitly recognized that the education, the training and the work of the profession must be geared to the changing needs in an increasingly demanding society.

Now, a year later, the delegates are about to convene at Seattle for their 1972 annual meeting. And once again they will consider the registration process, this time in the light of a year's worth of intensive exposure to the profession of the key instrument through which candidates for architectural registration will be tested.

This instrument, as nearly every student and practitioner doubtless knows by now, is "The New Exam." Since last year's vote of confidence by NCARB, the substance of the exam and the philosophy behind it have been widely shared. At latest count, a slide presentation has been shown to 47 AIA chapters, 67 schools of architecture, all six regional meetings of NCARB, and all AIA Grass Roots meetings.

What has been the upshot? The exam's reception has been preponderantly favorable. Yet this does not mean that serious questions have not been voiced; they have been, and in fact they turn out to be essentially the same questions that have conditioned the thinking of the Examination Development Committee as it has pursued its task over the past several years.

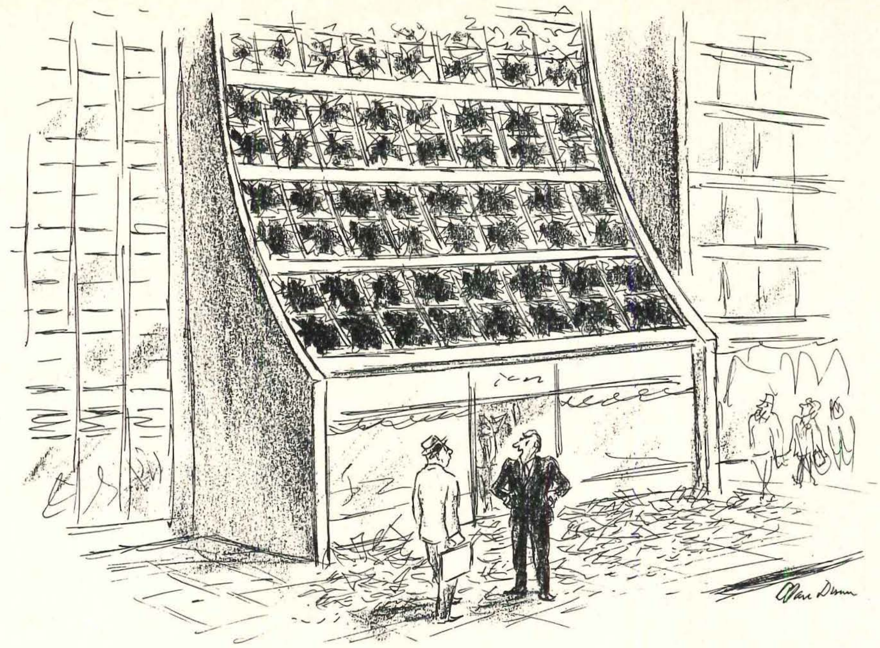
Two basic questions, I believe, transcend all others. They are these:

1) Is the education of architects in this society adequate to fulfill the expectations of the profession to design and build a better environment?

2) What is the yardstick to be used in measuring the length of experience a candidate needs to qualify for taking the professional examination?

Let us be candid and recognize that the education of architects, like that of professionals in other fields, varies in quality from school to school. Some do a better job than others. And while the NCARB feels that most are doing fairly well, the very unevenness of educational quality suggests that the time has come for the process of accreditation, like the process of registration, to undergo careful study and appropriate revision. We believe that a clear need exists, for example, to develop acceptable standards for accrediting undergraduate and graduate schools, *separately*. Strongly indicated as a starting point, then, is the need for agreement on a minimum program of basic professional content for all undergraduate schools.

Accreditation, along with the new examination, should be fully analyzed and vigorously debated at Seattle. So, too, should the other key question raised by the revised registration process—the length of experience required of a candidate before he is considered qualified to take the professional exam. How much experience is enough? If, say, you hold a bachelor's degree from an accredited school? If a master's degree? And how much extra credit should be given



—Drawn for the RECORD by Alan Dunn

*"Yes, a hailstorm!
Got any new ideas, Mr. Architect?"*

to the candidate with both a graduate degree and internship time under his belt?

The implications are clear. Every organizational element of architecture, to paraphrase Barry Commoner on ecology, is connected to every other element. Thus it becomes a source of reassurance that the profession's Five-Power arm (comprised of AIA, NCARB, ACSA, NAAB, and ASC-AIA) is alive and gaining strength. Of special significance at this moment, NCARB believes, is the recent decision of the Five-Power group to form a task force to look into the basic content of curricula at schools of architecture.

Will the new examination process work? Clearly, it will. Both its spirit and substance seek to insure the profession's concern for health, safety and environmental quality, not only through its emphasis on testing a candidate's judgmental ability but also through a test structure that lends itself to constant, ongoing change and adaptation.

Will the new exam be harder or easier? To say it will not be easier is a quick, if insufficient answer. The exam will surely serve as a more meaningful testing process for young candidates to experience. First of all, there will be an NCARB-produced Test Guide which candidates may purchase months ahead of the exam dates. The Test Guide's aim will be just what its title implies: a guide that helps you to understand and take the exam. In addition, a pre-exam "mission statement" and resource materials kit will be issued to candidates from 30-60 days ahead of the testing dates; and during the actual two-day examination, a test information kit will be provided to help the candidate comprehend the context and the objectives of the exam's subject matter.

We believe at NCARB—and we hope the profession agrees—that the evolving registration process will be neither harder nor easier. It will be better.

Now for some questions raised by E. G. Hamilton which still worry some of us: As E. G. has pointed out, the new process puts new and heavy responsibility on the schools to qualify candidates. Will the schools cooperate by establishing some general standards of training in the necessary basic skills and subjects? Can the state boards assume that a degree from an accredited school means the candidate is proficient in the essential basic skills necessary to protect the public health and safety—such as structures, building construction, mechanical equipment, maybe even site planning? And what of the experience requirement? It does look as though the present exam would better sort out those candidates whose experience ahead of the examination was limited to title blocks and borders. Maybe the over-all question—assuming or agreeing as many now seem to that the new exam will much more effectively test a candidates conceptual and tactical skills—is: Who ought to be required to take the qualifying exam?

A lot is at stake inside the profession, for the student, and for the public. And so, again, herewith an offer to act as an honest agent for views—pro, or con, or just questionly in between. —*W. W.*

An invitation to young architects to submit work for a special issue

The entire December issue of RECORD will be devoted to the young architect—including as its major feature "The Best Design of the Young Architects."

A major emphasis—as always in RECORD—will be on building design. But the editors are aware that—while most young architects are designing structures as part of the process of establishing their own firms or working as principals in larger firms—a considerable group is taking new paths into new kinds of work. So the editors are inviting submissions in two categories:

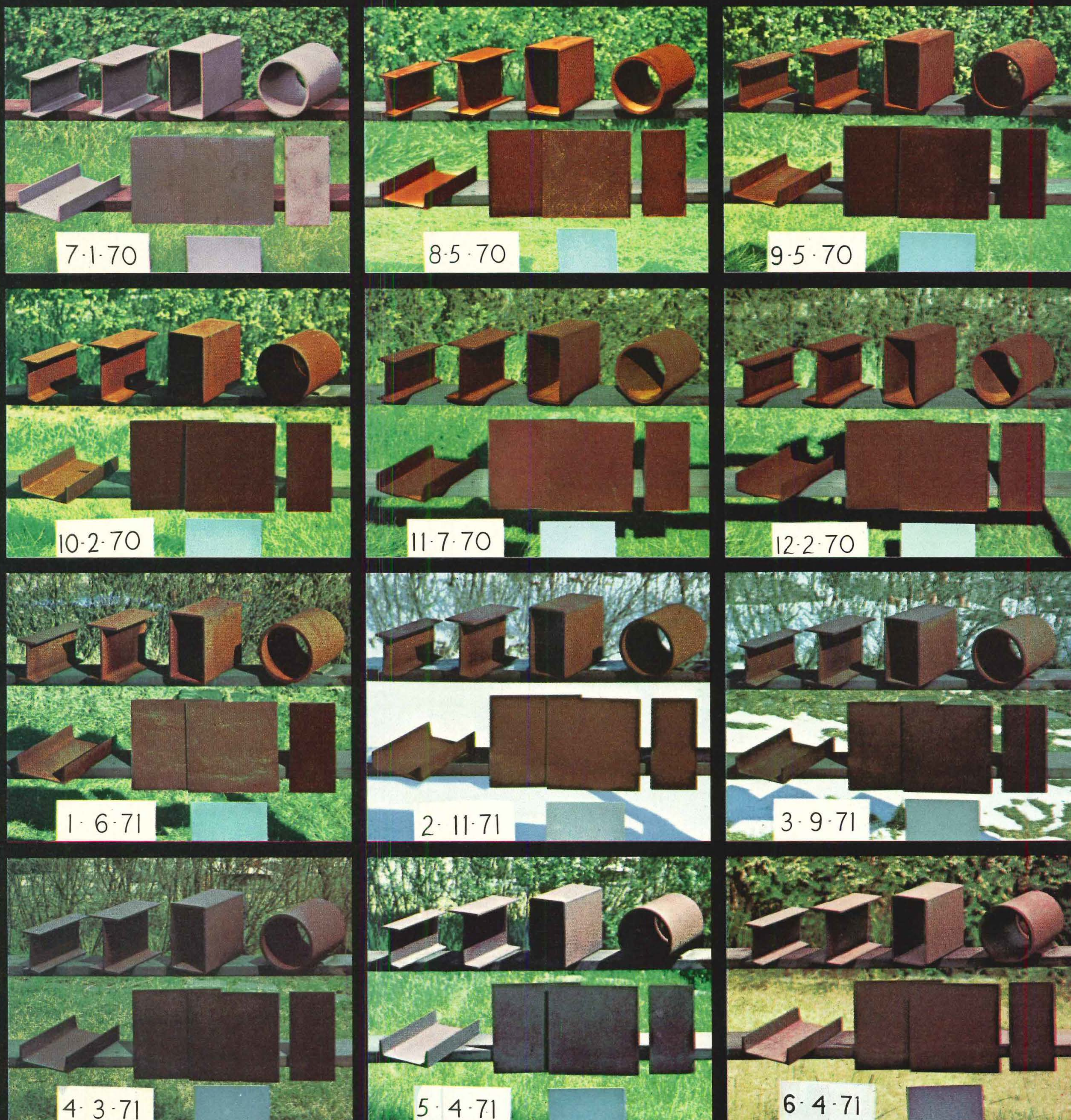
1. All young architects—whether in their own firm or as a recognized member of a large firm, are invited to submit both projects, where working drawings are substantially complete, and completed but unpublished buildings, for consideration for the issue. The material needed is renderings or photos (which need not be of publishable quality) plus plans, and a brief description.

2. We also invite young architects who are involved in non-building work to write us describing their accomplishments in such areas as urban design, advocate work, community development centers, development groups, developing new kinds of expertise in computer use, project management, teaching, Peace Corps or VISTA, government service and so on. We want to know what you are doing, whether or not it fits our established editorial contexts as you perceive them.

Our general intention is to publish the work of those 35 years of age or younger—but we recognize a rigid age requirement may not be possible.

The deadline is September 1st, 1972.

Submissions or questions should be directed to Herbert L. Smith Jr., Managing Editor, Architectural Record, McGraw-Hill Building, 1221 Avenue of the Americas, New York, New York 10020. Phone is 212/997-2593.



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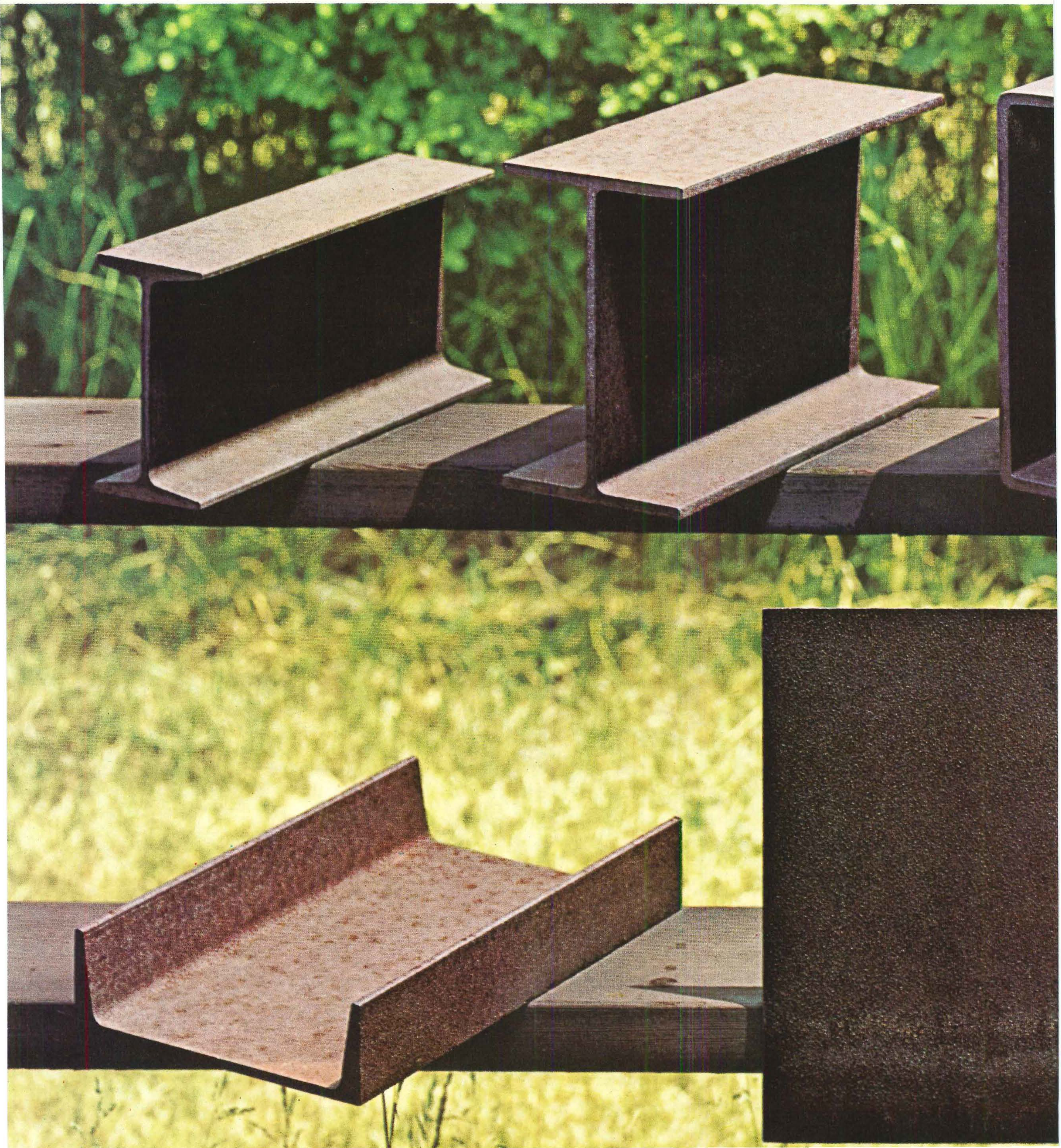

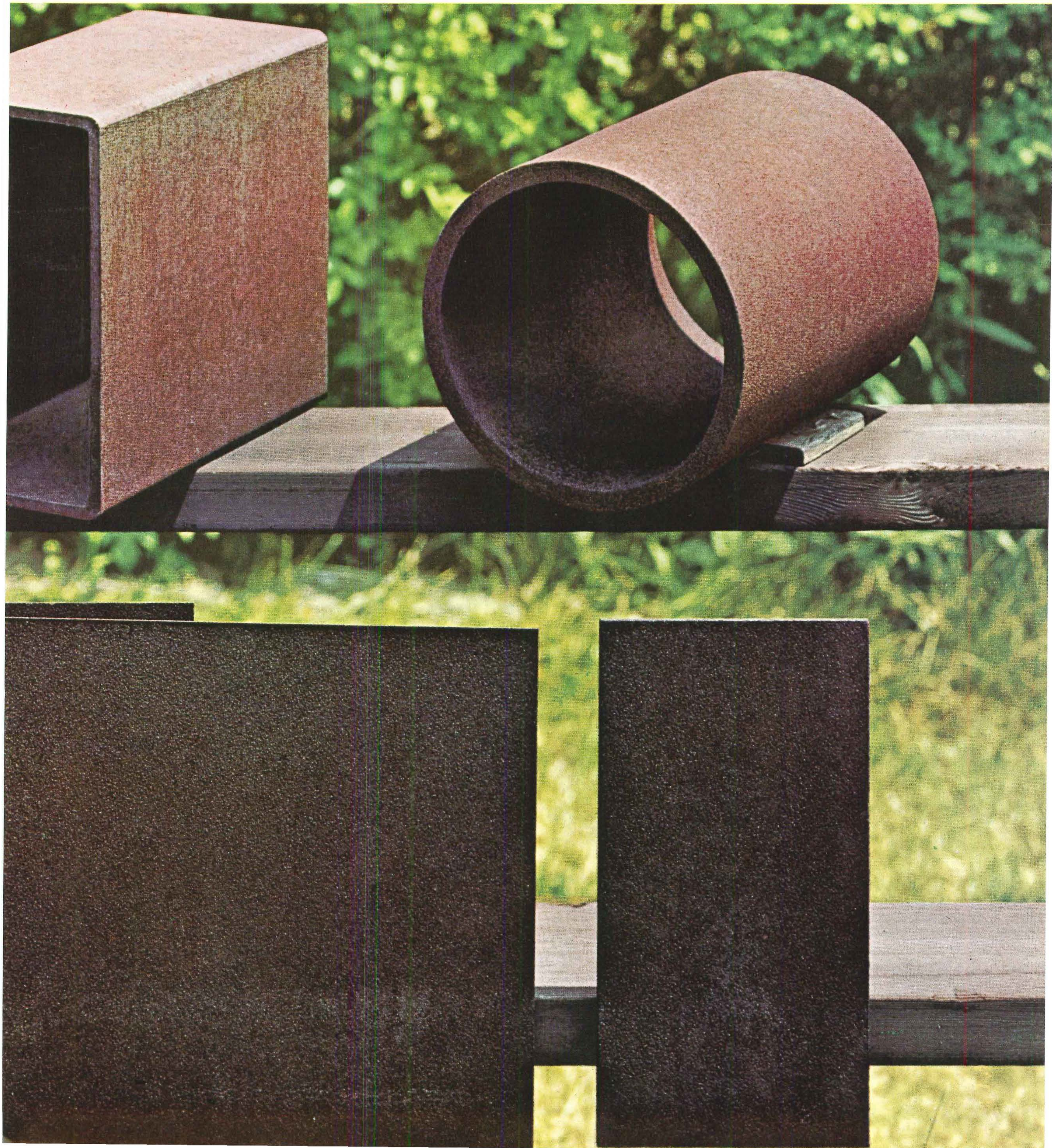

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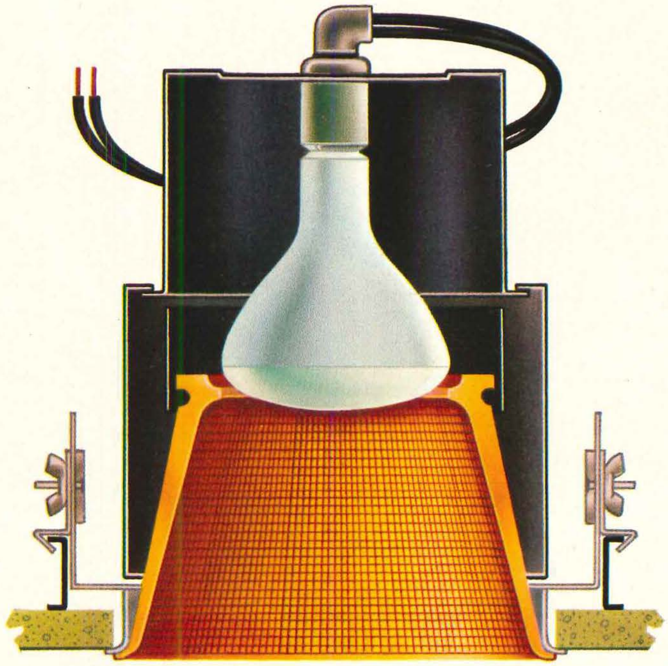

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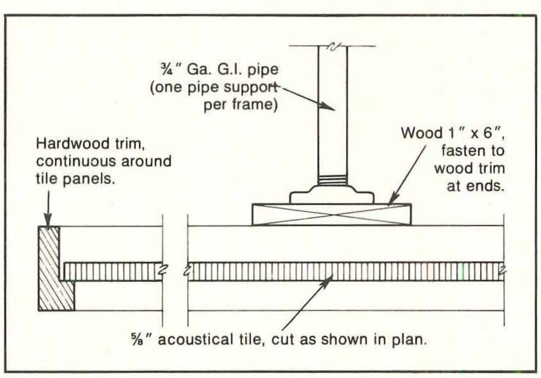
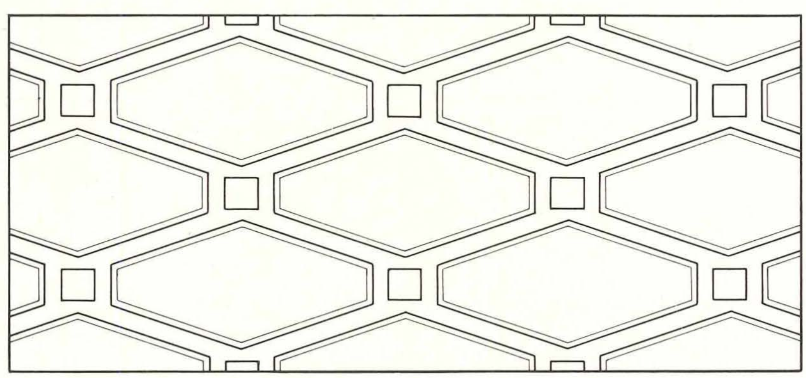


Section of lobby ceiling shows how ⅝" acoustical tiles, cut as shown in plan, were installed in continuous hardwood trim and supported by ¾" pipe.



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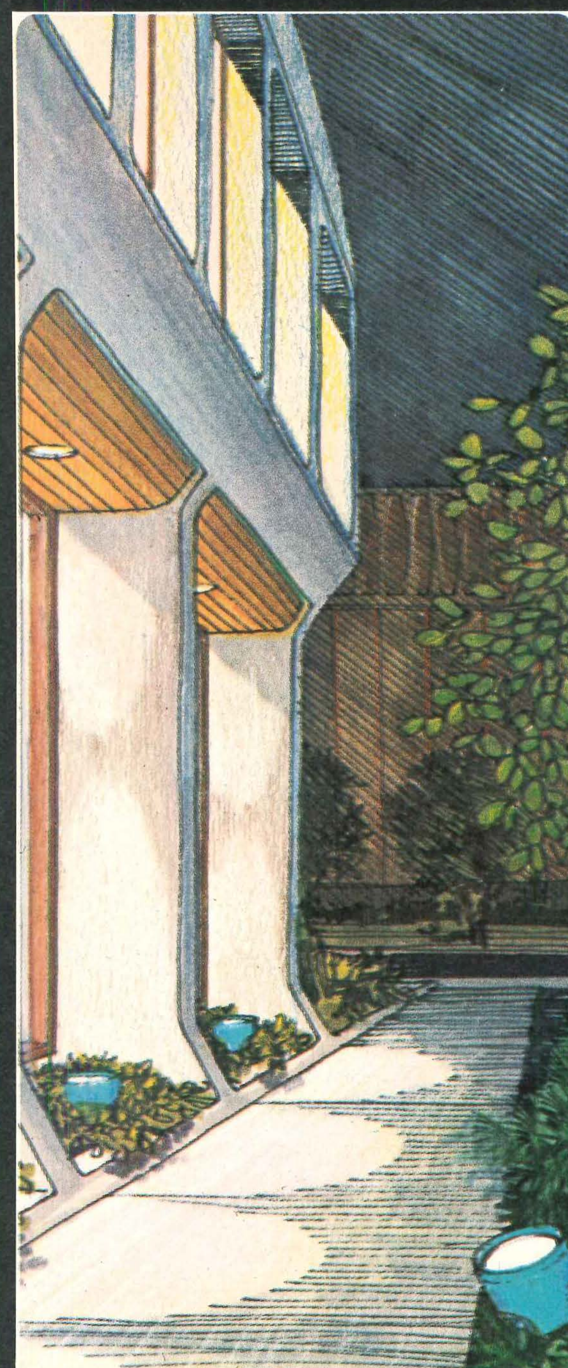

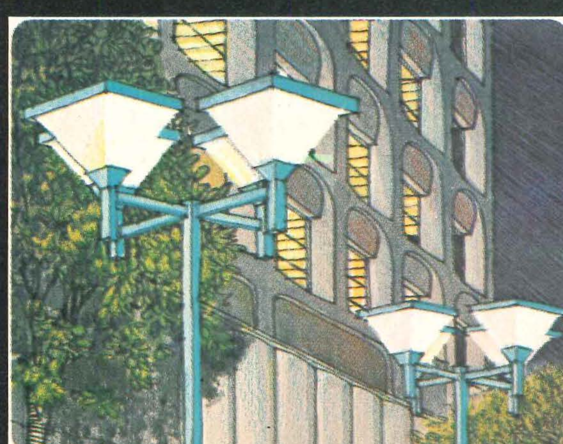

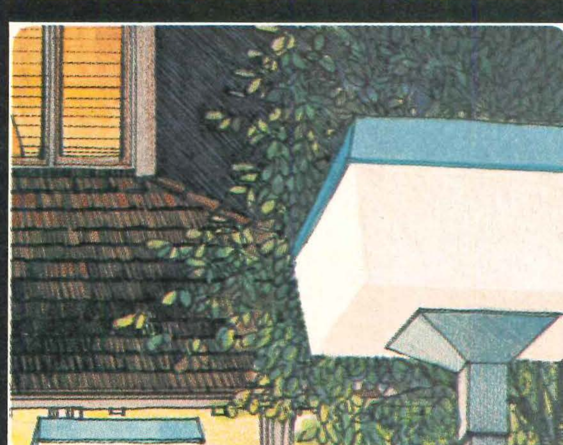

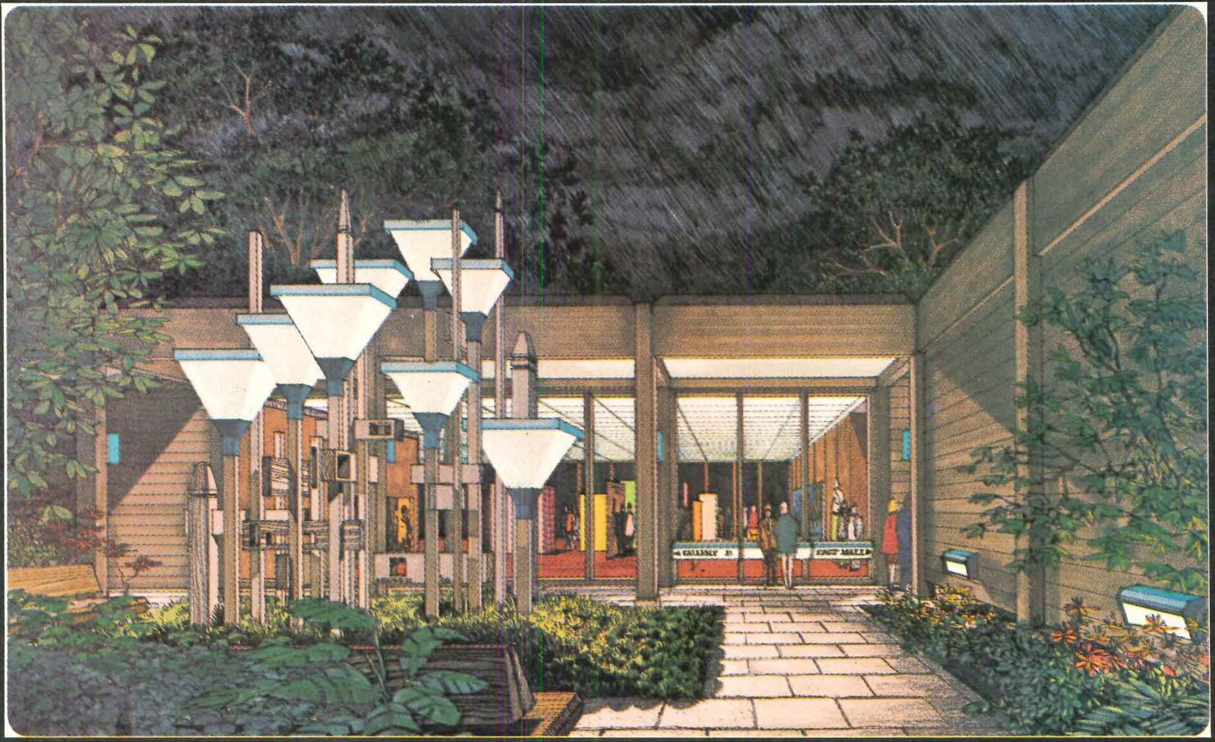

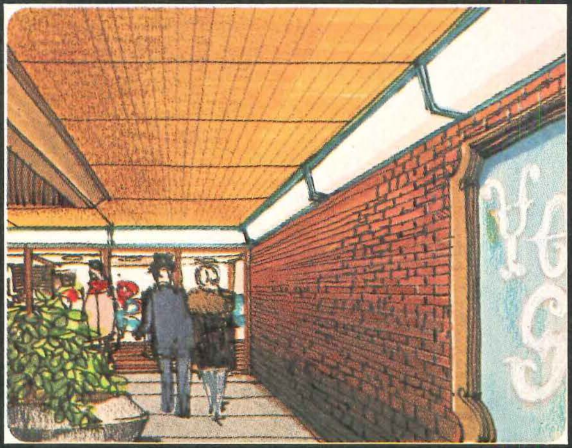

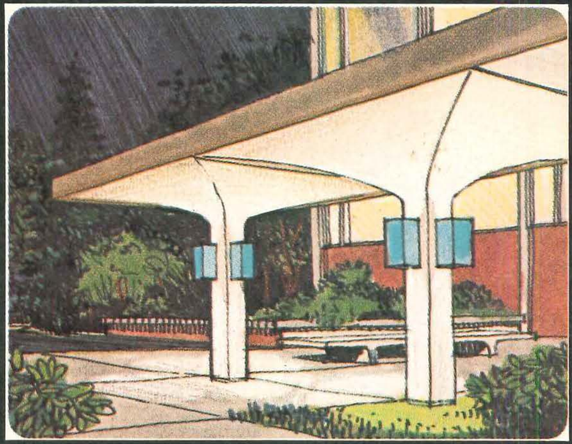

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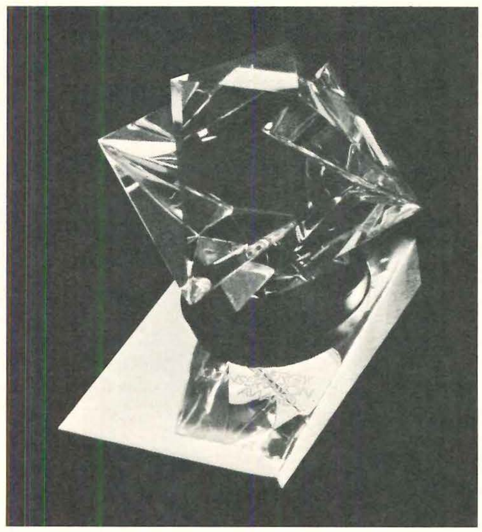

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Send for entry details now. Completed entries must be submitted by August 31, 1972. Winners will be notified in September. We'll make the Awards in October.

For a brochure giving complete details, contact your local Owens-Corning representative. Or write: Owens-Corning Fiberglas Corporation, Energy Conservation Award Program, Architectural Products Division, Fiberglas Tower, Toledo, Ohio 43659.

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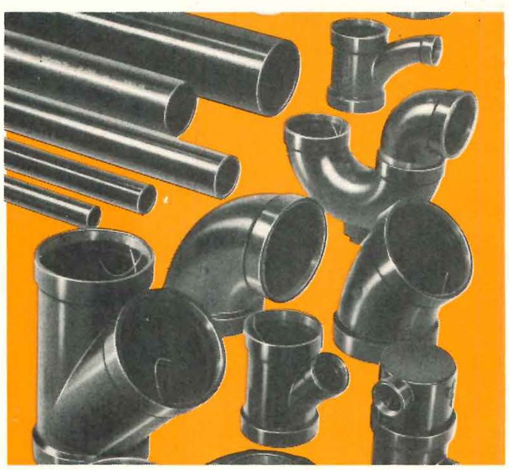
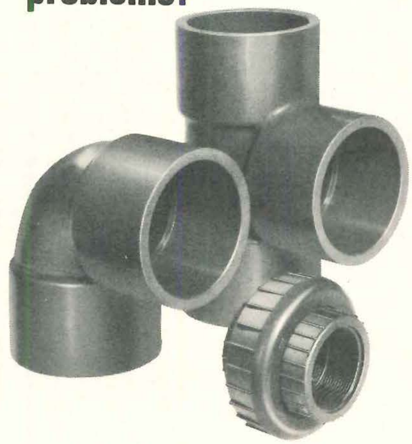


Pressure or temperature problems?



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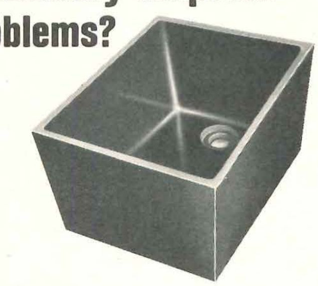

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2004

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Perma Ply-R felts can be installed and left exposed without the final surface treatment for up to 6 months (while other trades are completing construction).

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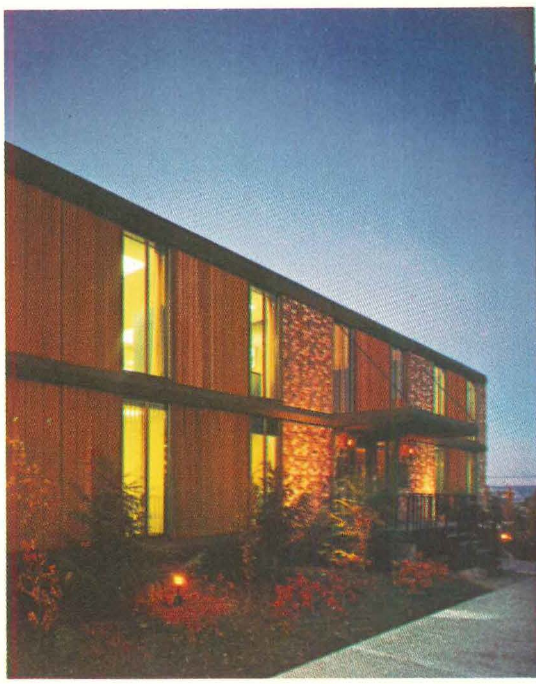
Architectural Consultants: Donald W. McDonald, A.I.A., San Francisco, CA; Harris, Reed and Litzenburger, A.I.A., Tacoma, WA; Person and Person, Inc., Sumner, WA.

Builder: Person and Person, Inc.

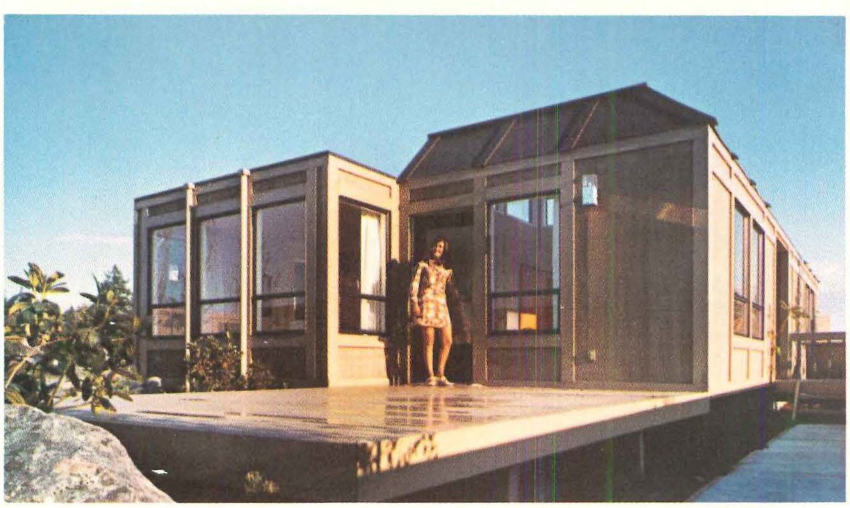
Erected in 7 days, this 2-story law office consists of 14 steel-framed modules, seven on the first floor and seven on top. Each module is 12 ft wide and 40 ft long. A high degree of interior flexibility is indicated by the office's attractive reception room (right).



This savings and loan building employs the same basic module as the 2-story law office. Steel framing permits the structure to be picked up and moved with relative ease to another location.

Steel framing proves advantageous for modular construction

Twelve-inch steel channels, visible from an unfinished portion of an office floor, serve as the unit's primary framing members.



An attractive exterior siding and roofline transform the same basic module into a contemporary home. In this case, three 12-ft-wide by 44- to 48-ft-long units were attached to form the single-story residence.

Design adaptability, high strength, and the ability to maintain close field tolerances are several of the key reasons why the use of steel framing is increasing in commercial and residential modular construction.

The load resisting capacity of structural steel enables the modular units to be stacked atop one another. Design flexibility and versatility are almost unlimited.

Steel speeds erection

The ability to maintain good field tolerances, up to ⅛ in. over a 60-ft span, is one reason why steel is so well suited to the modular concept. Virtually eliminated are erection delays due to misalignment of units.

Investors are able to save almost 10 per cent in construction and interim costs through the economies of factory construction and rapid field erection.

All of the buildings shown here were ready for occupancy within 45 to 60 days after contract signing . . . about a four month lead over conventional construction.

Steel improves portability of units

The strength and rigidity of steel framing enables the individual units to be moved with relative ease, both on the assembly line and in the field. The portability of this type construction is of particular advantage to the owner who wishes to relocate the building at a later date.

Concept adaptable to variety of structures

Steel-frame modular construction is well suited for office buildings, banks, schools, motels, retirement centers, apartment complexes, dormitories, and private residences.

The steel-frame concept in modular construction cuts costs. It also makes possible close tolerance controls not available with other materials. Unit costs range between $12 and $20 per sq ft for the buildings illustrated.

If you would like more information, get in touch with the Bethlehem Sales Engineer at your nearest Bethlehem sales office. Or, if you prefer, write: Bethlehem Steel Corporation, Bethlehem, PA 18016.

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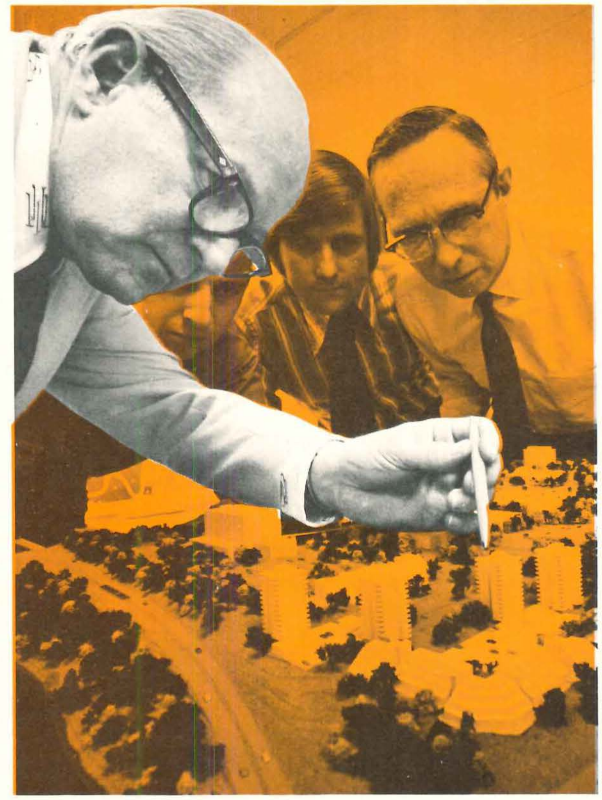

This man can help you avoid a MILLION DOLLAR MISTAKE!

Refuse handling methods vary from city to city. New disposal techniques, restrictions, and laws are on the way.

With all these changes, how can an architect design a refuse system today, that won't become obsolete or impractical tomorrow? (a mistake that could cost thousands of dollars in expensive alterations)

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Latest Information Available

Your nearby Dempster Consultant has at his fingertips the data and know-how that went into solving all of these problems . . . and he's got the equipment to tailor a flexible refuse system—a system that can be expanded to meet increased needs in the future. Most important, Dempster Consultants know the latest and coming word on pollution restrictions that will affect your refuse system now and in the years to come. Finally, by reading your prints and reviewing your information, he can give you specific recommendations, optional courses, or a pat on the back for a job well done.

See Sweets Catalog, Section 10.29 for more information or write today for complete details.

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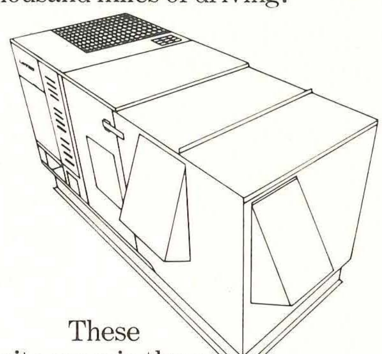
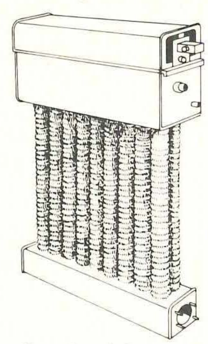
What they do have is the spark of a heavy-duty spark plug.

And this plug lasts. It fires four to six times per start, which in twenty years would be only about as much use as the spark plug in your car gets in several thousand miles of driving.



These units come in three, four, five, seven-and-a-half, and ten ton sizes. This gives you great flexibility for installation where you want gas heating and electric cooling in one compact package.



Of course, our new gas/electrics have lots more going for them than the spark plug ignition system.

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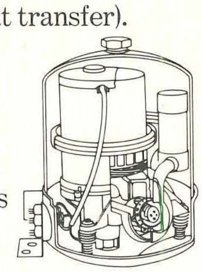

They've got GE's famous Climatuff™ compressor—with a remarkable record of reliability in over 300,000 installations.

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They're approved by the National Roofing Contractors Association.

They can be had with a wide choice of accessories, so they can be used in the widest variety of applications.

And they're approved by the American Gas Association as well as certified by the Air-Conditioning & Refrigeration Institute.

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Look up your GE dealer in the Yellow Pages under "Air Conditioning Equipment and Systems."

Now that you've met the newest thing in gas/electrics, meet the man who'll give you the ones you'll need.

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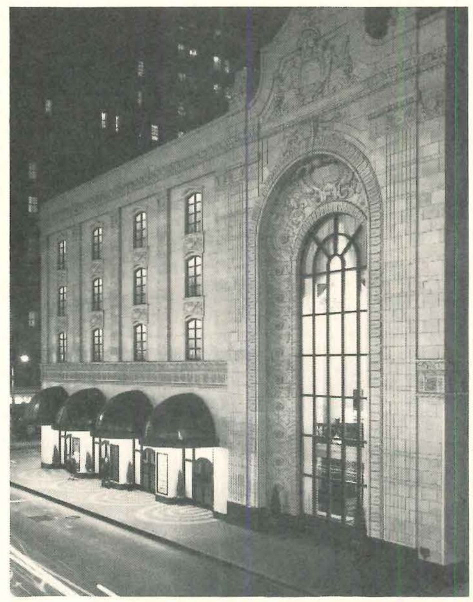
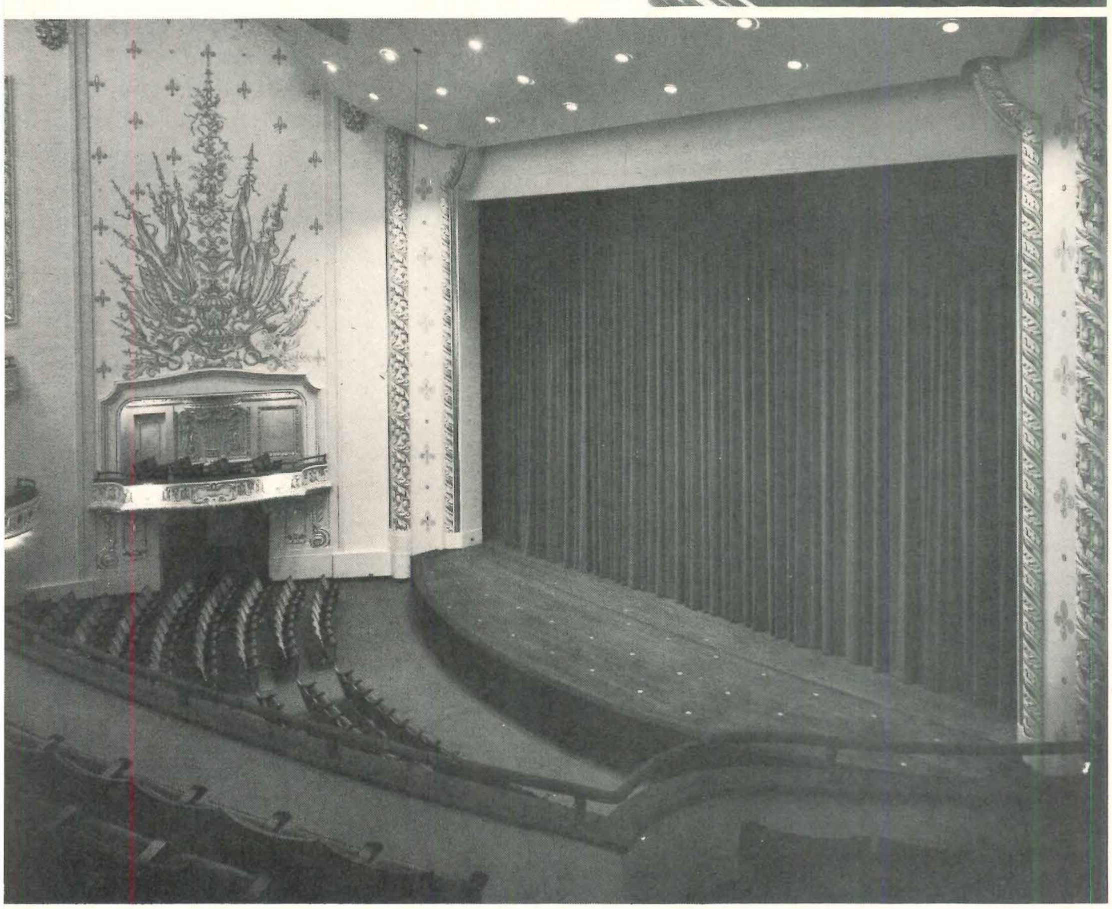




HEINZ HALL FOR THE PERFORMING ARTS, Pittsburgh, Pa. Architects: Stotz, Hess, MacLachlan and Fosner, Pittsburgh. General contractor: Mellon-Stuart Co., Pittsburgh. Acoustical and stage lift consultant: Dr. Heinrich Keilholz. Engineers: George Levinson, Inc. (structural); Meucci Engineering Inc. (mechanical); Hornfeck Engineering, Inc. (electrical). Interior designer: Verner S. Purnell. Dover Stage Lift installed by Marshall Elevator Company, Pittsburgh.

News in brief

The recent AIA Convention in Houston produced few surprises but took up several issues of broad significance to the future of the profession. For a recapitulation in detail, see News Reports, page 41.

National Association of Home Builders has revised its 1972 forecast of housing starts to 2.25 million units from an earlier forecast of 2.1 million units. The revision was made in light of a continuing ample supply of mortgage money for home buyers, a healthy consumer demand for new housing and an unusually high rate of building permits.

The long-anticipated civil antitrust suit against the American Society of Civil Engineers was filed by the Justice Department in New York District Court recently, adding an important new dimension to the continuing controversy between the Federal government and the design professions. The New York suit involves a proposed consent judgment, final in 30 days from filing date, which would enjoin the 64,000-member ASCE from 1) Adopting any plan, program or course of action prohibiting its members from submitting price quotations for engineering services. 2) Adopting or disseminating, in its publications or otherwise, any rule by-law, resolution or policy prohibiting or limiting submission of price quotations for engineering services. The Society could not state or imply that submission of price is unethical, unprofessional, or contrary to its policy.

Eliot Noyes has been awarded the Design Medal for 1971 by the Society of Industrial Artists and Designers. The Medal is presented annually by the Society to a professional designer for outstanding achievement in industrial design.

Architects James Stewart Polshek, William Conklin and James Rossant have been honored by the American Institute of Steel Construction for their award-winning buildings. The buildings selected by the Institute for special awards were: Service group, Old Westbury, New York (Polshek) and the Superbay Maintenance Facility, San Francisco and Los Angeles (Conklin and Rossant).

Recipients of the 1972 Reynolds Aluminum Prize for Architectural Students are Darlene S. Jang and L. Wayne Barcelon, both of the University of California. It marked the second time in the past three years that architectural students from the University of California have captured the national competition. The $5000 prize will be divided evenly between the winning team and the University.

Advanced Management Research has scheduled a series of educational meetings for the building industry. Subjects to be discussed are: Current Techniques in Real Estate and Construction Financing; Land Use: Creating Profitable Real Estate Investment Packages; Construction Management; Managing New Building Projects; Management Strategies for Architects and Engineers. For dates and locations in various cities, please contact: AMR International, Inc., 1370 Avenue of the Americas, N.Y., N.Y. 10019.

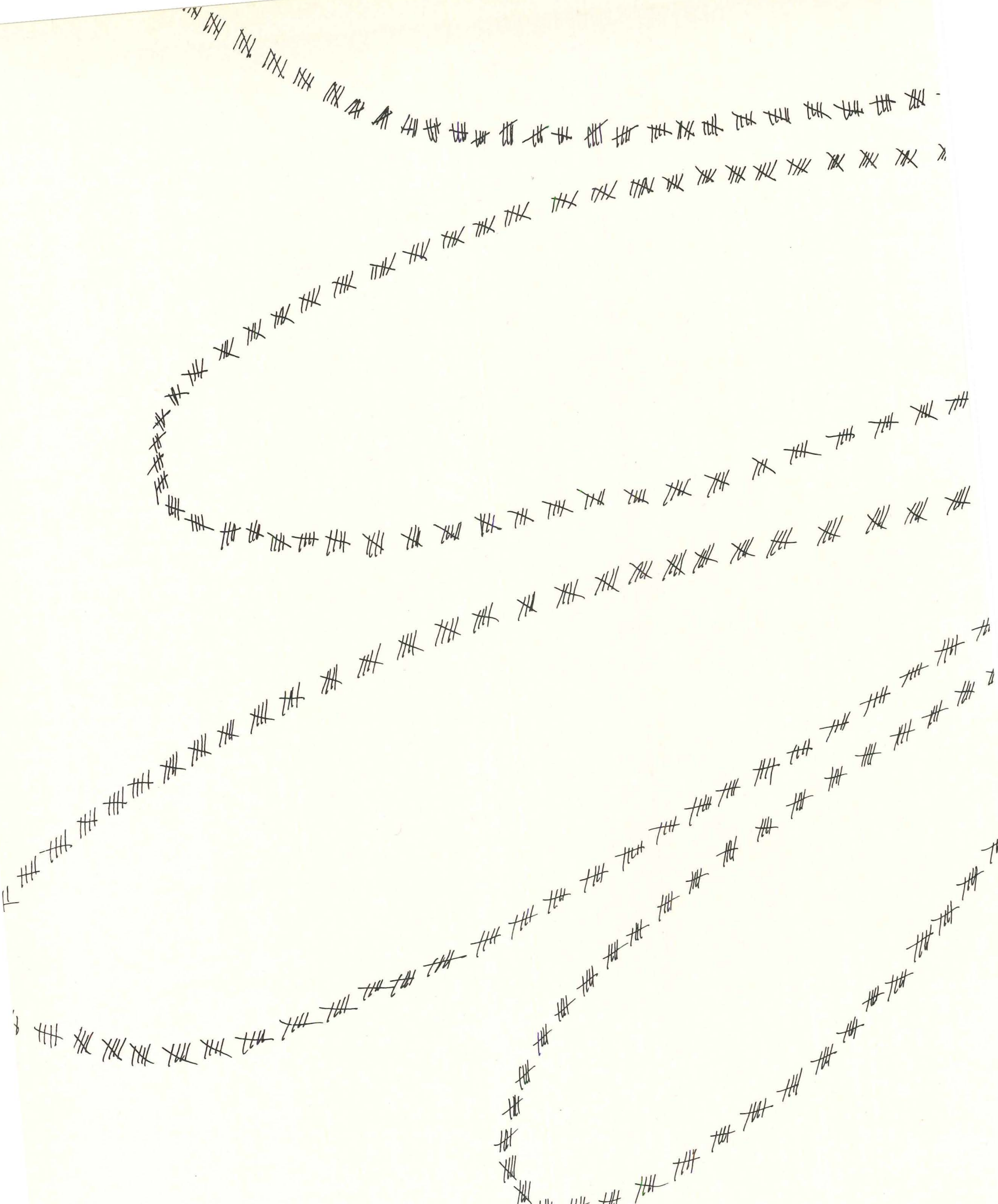
The impact of high rise developments on the economy and quality of life in San Francisco will be the subject of a study by the San Francisco Planning and Urban Renewal Association under a grant of up to $200,000 from HUD. The Association will examine the traditional theory that high rises, both commercial and residential, produce more revenue than they cost in services. Although limited to San Francisco, the study is intended to be helpful to a number of large cities with similar problems.

Upcoming Competitions and Awards:

The Bricklayers, Masons and Plasterers International Union announces the first Louis Sullivan Award for Architecture. The award, to be given biannually, will honor an American or Canadian architect whose "distinguished work in masonry exemplifies the ideals and accomplishments of Louis H. Sullivan." For further information: AIA National Headquarters, 1785 Massachusetts Avenue N.W., Washington, D.C., 20036.

The American Institute of Steel Construction's 1972 Architectural Awards Program: for buildings of excellence located anywhere in the United States and framed in domestically produced and fabricated steel. For information: AISC, 101 Park Avenue, N.Y., N.Y. 10017.

Prestressed Concrete Institute's 1972 Awards Program: for buildings by American or Canadian architects that employ significant amounts of precast and/or prestressed concrete. For information: PCI, 20 North Wacker Drive, Chicago, Illinois 60606.

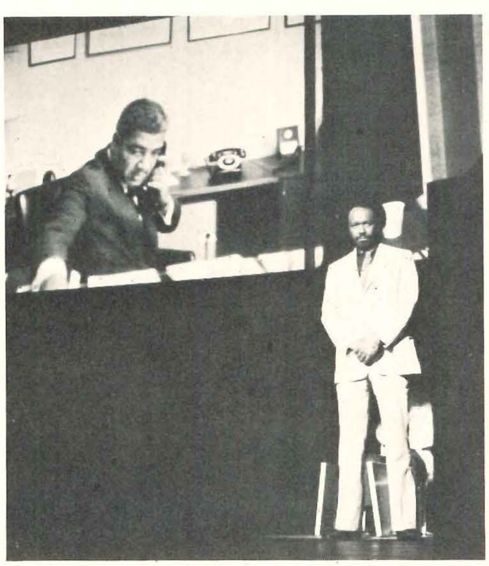


AIA CONVENTION REPORT

Compared to the annual gatherings of the past three years, the 1972 AIA Convention at Houston, May 7-11, was so peaceful as to seem uneventful. But uneventful it was not. As in previous years, there were so many simultaneous meetings and exhibits that the delegates were seldom all in the same place. Although the National Policy Task Force Report and Justice Department Consent Decree meetings were the best-attended (see the accompanying stories), there were many other highlights.

Honor Awards, Fellows, Gold Medal

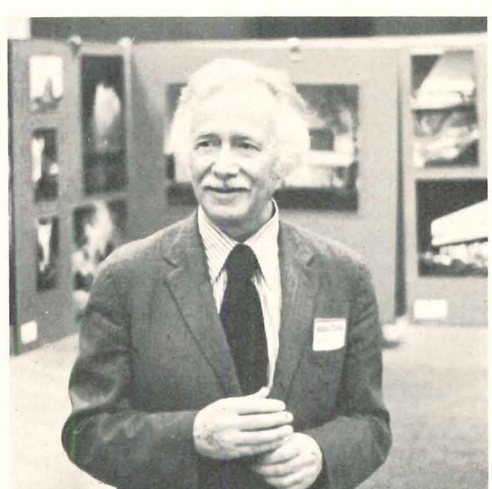
Following Rene Dubos' speech at the opening session on Sunday afternoon, the AIA Awards Presentation was made. President Urbahn was assisted in presenting the Honor Awards (AR, May 1972) and other medals and citations (AR, February 1972) by Walter A. Netsch and Henry N. Cobb. The presentation of the first Whitney M. Young, Jr. Citation to retiring AIA vice-president Robert J. Nash was especially dramatic. The



recorded words of the late Mr. Young in his charge to the 1968 AIA Convention in Portland were heard again by the delegates. In his brief address, Nash indicated that while much had happened in the past four years to redress the neglect cited by Young, he felt that only a strong continuing effort by the AIA could meet the great task remaining.

The Investiture of New Fellows (AR, May 1972) and Convocation of Fellows Dinner took place the next day at the Miller Outdoor Theater and the River Oak Country Club respectively. Addition of the group of 79 brings the College of Fellows to 975.

The Gold Medalist's Ball, in honor of Pietro Belluschi, was the most festive of the award celebrations. The ballroom of the Rice Hotel was filled to capacity as David Braden, architect and Toastmaster Supreme, turned the usually perfunctory introduction of AIA Directors and other guests at the head table into a hilarious hour-long monologue during which none of the gathered officers escaped facetious comment. In his speech after receiving the Gold Medal, Dean Belluschi mused on the process by which he has come to look beyond the rational for the architect's true role.



"I began my career full of youthful optimism, which helped me cast aside all doubts and meet all difficulties, including the language barrier and the use of the non-metric system. That was half a century ago. It took a lifetime to learn how intractable human problems can be, and almost as long to resist despair. At this point in life, I have less fear of exposing my limitations and more freedom to choose inadequate answers within the framework of my limited knowledge; caring less for praise, yet listening with special detachment to other voices.

"Our strength must lie in the growth of our understanding of man, but we cannot embrace more than the length of our arms premit; our compassion must relate to our ability effectively to love. It is the living experience which in the end counts.

"The architect's task, as someone said, is to make the human environment so compellingly attractive that anyone would want to live in it for the inherent values it offers, even if he cannot extract it from the social system which supports it. And this I see as the architect's main role, the role for which he must train himself and which no one else can fill. If he dissipates his energies in trying to be all things to all men, he will fail."

Business sessions

Tuesday was devoted entirely to AIA business. The morning session heard reports from the various officers of the Institute. The now well-advanced progress of construction of the new Headquarters Building was displayed, followed by Robert Nash's statement on the work of the Human Resources Council. Nash pointed out that the Ford Foundation co-sponsorship of the AIA Scholarship program ends next year and that highest priority must be given to finding funds to continue support of the 90 students now in architectural schools.

In order to allow maximum time in the afternoon for discussion of the Justice Department matter, a number of by-law changes, the addition of six more directors to the national AIA board and a provision for termination of membership after six month's delinquency in payment of dues (at present it is a maximum of 13 months) were approved. The morning meeting closed with a romantic visual presentation of the beauties of San Francisco, site of next year's convention. Who needs to be convinced?

Since the results of the Convention's action on the Consent Decree are described at length elsewhere, it will suffice to say that the afternoon meeting was extremely well-attended and that all viewpoints were heard. In addition to that matter, the delegates agreed that assessments of members for special expenses (such as publicizing the AIA's position on competitive bidding for architectural services which was passed the next morning) could be levied by a two-thirds vote of the delegates at a convention. Formerly, assessments were not permitted.

The final business session, Wednesday morning, was devoted to resolutions. Although the principal and last one was that calling for adoption of the National Policy Task Force report, a number of other resolutions were also approved after vigorous discussion and modest amendment. A proposal that the status of the previous year's amendments be published and discussed at the next convention was accepted but a five-year moratorium on similar issues, proposed by the AIA Board of Directors, was deleted. Resolutions pertaining to Conservation of Resources, Involvement of Students with Components, and Broadening Membership Involvement all passed easily. The latter, urging architectural employers to encourage their employees to join the AIA in an appropriate category was the only official response to the concern among members over the emerging specter of collective bargaining in their offices. No doubt that future conventions will see this matter faced as squarely as was the Consent Decree this time. But for now, a timid and euphemistic gesture.

The architectural education resolution, expressing the profession's desire to see schools refocused on training young people to design buildings was amended by a long statement of the ASC/AIA. The effect of the students' statement, which concerned itself with a broadened purview of architectural education, seemed to cancel out the Resolution Committee's intention. But everyone seemed happy as the amended resolution was approved; education continues to be a compelling issue among architects, even if no one understands what it is anymore.

New officers

The final piece of business at the Convention was the election of officers. Balloting took place Wednesday and the results were announced at the Gold Medalist's Banquet. The new First Vice-President and President-Elect is Archibald C. Rogers of RTKL, Inc., Baltimore. The three new Second Vice-Presidents are Van B. Bruner, Jr. of Haddon Township, N.J., Louis de Moll of Philadelphia (beginning a second term) and David A. Pugh of Portland. Hilliard T. Smith, Jr. of Lake Worth, Fla. was elected Secretary.

The Marketplace of New Ideas

In an effort to bolster the spirits of that small but hardy band of manufacturers who exhibit their products each year at the Convention, the Marketplace of New Ideas was added to the proceedings. Two afternoons were set aside for the seminars and exhibits that combined presentation of products and methods with professionally-oriented meetings. Twenty-one rooms accommodated the 88 topics, most of which were offered two or more times. In addition, the strategically-placed exhibitors' booths seemed well-visited, especially around lunchtime when rather good free meals were available, courtesy of the exhibitors. One especially

successful subject, "The Architect and the Development Team", presented by architects Herbert Duncan, Harry A. Goleman and Michael Maas, drew SRO crowds. Many of those attending are already in the development business and the others were eager to learn how. A forth-coming AIA manual on the subject was discussed during the presentation and promises to be very helpful to those interested in this ever-expanding aspect of practice. Whether it is attributable to last year's change in the AIA Code of Ethics or to the fact that so much more development housing is being built now, almost every architect at the Convention seemed to be working with developers for a fee or with an equity interest while a few are even developing projects themselves.

Students and other minorities

As at the Detroit Convention, students and black architects had a more peripheral role than in Chicago and Boston. Yet the increasingly-established nature of their proceedings seems to make them more able to communicate with the Convention as a whole. There is less self-consciousness on each side and, it seems, more productive work together. This is not to say that the problems that were so prominent at recent Conventions no longer exist. But rather that those who really care about them have agreed to collaborate on the hard work and continuing patience needed to make progress on them. The CDCs, basically as impoverished as ever, seem to be hanging on and therefore to be a viable force in community development. In that area, mere existence is often enough to be meaningful. The student party at the University of Houston drew a substantial number of delegates and, as the evening wore on, the initial shyness of older and younger dissolved into good conversation.

The parties

Finally, speaking of parties, this Convention seemed well-blessed with fellowship. "It was clear once again," said RECORD senior editor, Betty Thompson, "that what most people go to conventions for is the social contacts. Next, they want to see the place they are in. And, as a sort of over-all reason for going to the Convention, they hope to bring back something that will give them new insights—into themselves as architects and people, into architecture, into the human beings who are their clients and possible clients, their associates and their employees."

Just as the Gold Medalist's Ball traditionally closes the Convention, the Dodge/Sweet's party opens it. This year the festivities were held at Busch Gardens, a combination zoo and park next to the local Anheuser-Busch brewery. Entitled "Asian Safari," it drew large crowds of gaily-dressed convention-goers. In spite of the dark clouds which threatened all events on Sunday, people eagerly re-established acquaintances. Another excellent party was the Host Chapter party held at the Pin Oaks Stables. Having encouraged western costumes and other informal dress beforehand, the Houston gang threw a lively and varied barbeque that proved a great success. These parties combined with alumni luncheons, chapter and region parties and other informal gatherings gave continuing opportunity to fulfill what is ultimately the principal function of conventions—human interaction.

AIA VOTES YES ON THE NATIONAL POLICY TASK FORCE REPORT

In response to skilled top-level championship by AIA President Max O. Urbahn, and many months of hard selling across the country at the grassroots level by Task Force Chairman Archibald C. Rogers and his team, which culminated in intensive indoctrination sessions at the convention, the AIA voted overwhelmingly in favor of the resolution to support and implement its National Policy Task Force Report (RECORD, Feb. 1972). In so doing the AIA membership has gone on record in favor of social policies which president Urbahn describes as "revolutionary."

Radical Concepts

These key proposals, many of which during the past decade have been advocated by the most enlightened U.S. social planners, are gradually becoming more widely accepted among those in leadership roles. General public acceptance, however, would still appear to be a long way off. The AIA membership by voting to accept the Report has joined this country's vanguard in supporting the following radical measures:

1. The nation must find an orderly way out of its segregated living patterns. Open occupancy should obtain throughout the entire housing market which is affected by governmental subsidies and insurance. For

an example, this means that suburban housing developments financed by FHA mortgage loans must become accessible to blacks wishing to buy homes in these communities.

2. In the words of the report: "Low- and moderate-income families [must be] directly subsidized (through income supplements, housing allowances, "235" and "236" type interest reductions, etc.) at levels equivalent to the housing subsidies now provided higher income homeowners in the form of tax deductions of mortgage interest and local property tax payments (plus what economists call 'imputed rents')". These housing subsidies would be made directly to the people who buy or rent housing for their own use, rather than to public, quasi-public or private agencies for the construction of housing. Thus subsidized, low- and moderate-income people would become part of the private housing market. Such measures would bring to an end all construction of government-owned low-income housing, while greatly broadening the housing options of the poor.

3. Land development must increasingly be brought under public control. The appreciating value of land benefited by public investment in roads, sewers, open space and other amenities should no longer accrue to the landowner, but should be recaptured and recycled into the costs of developing, serving and maintaining it. The report favors that state governments acquire and prepare land in advance of development and proposes that "leasing rather than outright sale would be desirable for land acquired and assembled by public action."

4. State governments should gain control over and augment local building, zoning and health codes in order to plan and regulate the use of land in the following ways: Areas of critical ecological importance such as flood plains and coastal regions should be protected; land in the path of public development should be conserved if necessary for higher public use; where acute housing shortages exist due to lack of available housing sites, land should be pre-empted for housing construction.

If points (3) and (4) should become national policy, the landowner's right—now somewhat inhibited by zoning and other types of regulation—to decide for himself how his land should be used will be even further curtailed. In addition, since he would lose the profits that would accrue from the sale of land whose value had increased through public investment, most incentives for land speculation would vanish.

Moderate proposals

Not all of the recommendations of the Task Force Report can be expected to be as difficult to make part of our national policy as those which have just been summarized. In supporting the Report the AIA permits its voice to be heard on behalf of more moderate measures which include:

1. Development in central and peripheral areas of the metropolis should be linked, because "building new communities and restoring old ones must go together. We think it folly to try urban renewal in the older denser neighborhoods before moving and relocation room is made ready elsewhere. That means we think, a deliberate policy of building new neighborhoods on vacant land before renewal of older neighborhoods is begun."

2. Citizens at the neighborhood level should be invited to participate in the planning process.

3. Metropolitan planning and development agencies should be encouraged, private-public ventures should be encouraged and development corporations should be created by Federal, state and local governments. The Task Force Report asserts that it perceives no conflict between (2) and (3). "We see no contradiction in simultaneous transfer of power upward to broader-based levels of government and downward to the neighborhoods. It is not power which is being subtracted—it is capability which is being added."

4. Public and private capacity to build at the neighborhood scale should be strengthened by easing financial, legal and other constraints; by ensuring a steady flow of mortgage money at low and stable rates; by well phased and coordinated public investment in the so-called infrastructure, i.e.—transit, water, sewage and electricity networks, and by the encouragement of the development of industrialized building processes.

5. Financing patterns should be revised so that less reliance is placed on the local property tax. State and Federal governments should assume a greater share of the costs of the infrastructure as well as health, education and welfare services. Tax and other incentives and disincentives should be revised to encourage high quality urban development.

6. Environmental controls and design standards should be strengthened.

7. Single purpose Federal grant programs such as the Highway Trust Fund must be newly conceived to serve a broader range of community requirements. "If this self-regenerating fund is not refashioned to serve our highest priority needs, the nation will place itself in bondage to the automobile and superhighway."

The Growth Unit

The foregoing Task Force Report recommendations, both radical and moderate are all part of the attempt by the AIA "to change the ground rules," in the words of president Urbahn, "that now shape and distort the shape of American communities; to create a new and useful scale for planning and building in urban areas; and commit the nation to a major land acquisition policy to guide development in and around key urban centers."

The new and useful scale for planning and building is the scale of the neighborhood. Says the Report: "The neighborhood should be America's Growth Unit . . . [thus] national policy can relate to growth and regrowth wherever it may occur—in rural areas, in smaller towns and outlying growth centers, in metropolitan areas and their central cities, in free-standing new communities."

Growth Units would vary in size from 500 to 3,000 residential units and would be large enough to require and benefit from advance planning, broad powers of land assembly, and the coordinated design of open space, public plazas, community facilities and transportation. Larger communities including new towns would be designed as multiples of these Growth Units while their services would enlarge proportionately.

Priorities for the construction of Growth Units

The Task Force Report urges that Growth Units be started in 65 metropolitan areas with a population of 500,000 or more. Citizens of first concern would be those trapped in the slums of these metropolitan areas. A total of one million acres should be publicly acquired in these 65 urban conglomerates. At recommended densities of 25 persons per acre, this program for areas impacted by rapid growth and deterioration should accommodate one-third of the expected growth of the U.S. population between 1970-2000.

Dissatisfaction with the Report

At the grassroots level and at the convention, architects, including black architects, objected that the Report did not focus sufficiently on the problems of poverty and racism. The Task Force replied to this challenge by pointing out that these conditions were precisely those which the Report sets out to alleviate by the crash program to begin the construction of Growth Units within the inner cities of the 65 metropolitan areas.

The issue of community participation and control was frequently raised and the Task Force was repeatedly asked how the AIA's Community Design Centers would function within the Growth Units. The Task Force believes that the CDC's "should evolve into multi-disciplinary design teams serving as interpreters of the community's needs and hopes to the power-holders, and as synthesizers (i.e., architects) for adjusting those needs and hopes to the resources available to the power-holders. To succeed in this sort of 'midwife' role, the CDC is faced with the quite monumental task of correctly interpreting the voice of its lay (and perhaps inarticulate) community client and of arbitrating the competition within its community as to who is the authorized spokesman."

Another frequently voiced criticism of the Report was the fact that it mentions environmental pollution only in passing and makes no reference to the diminishing

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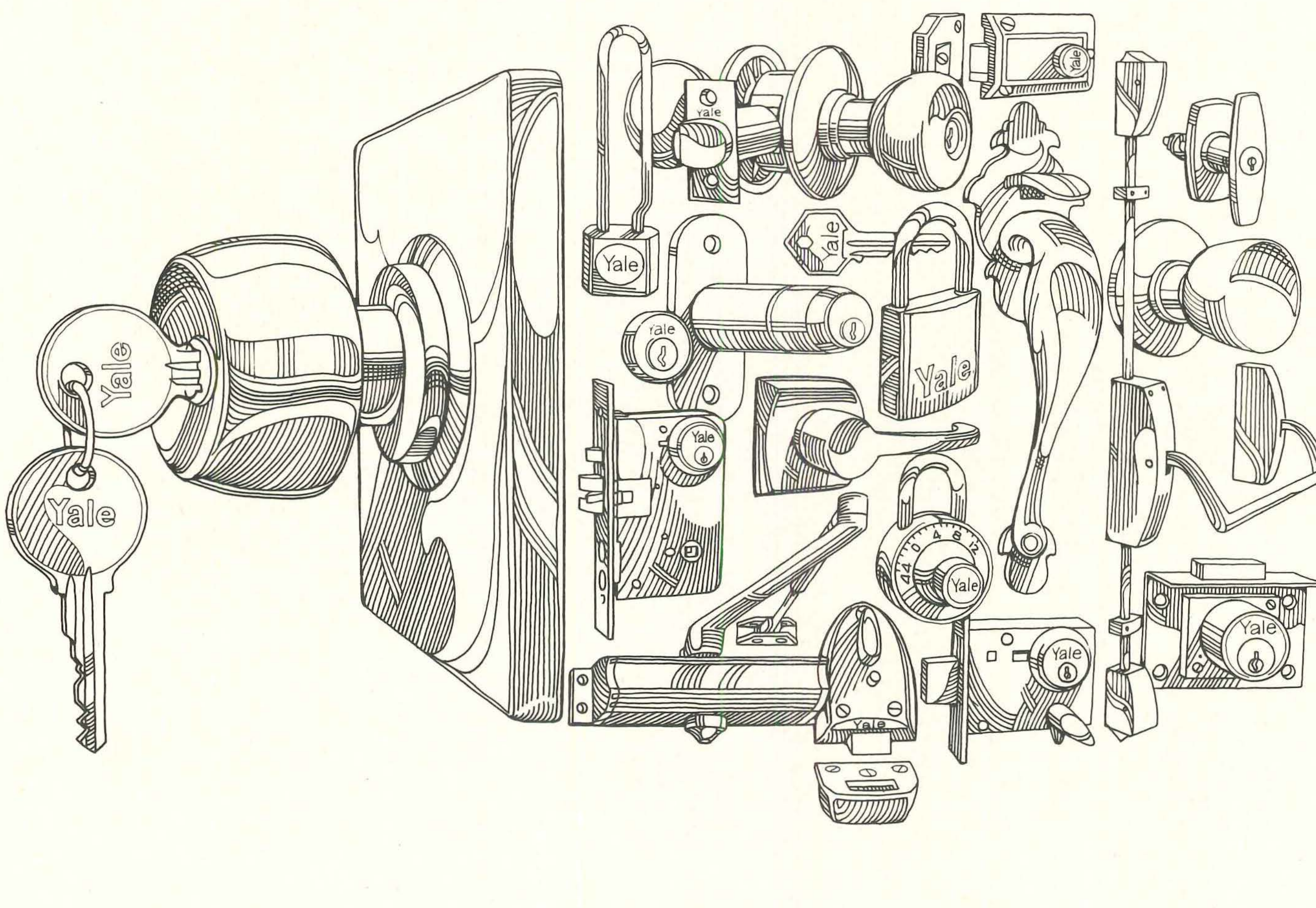

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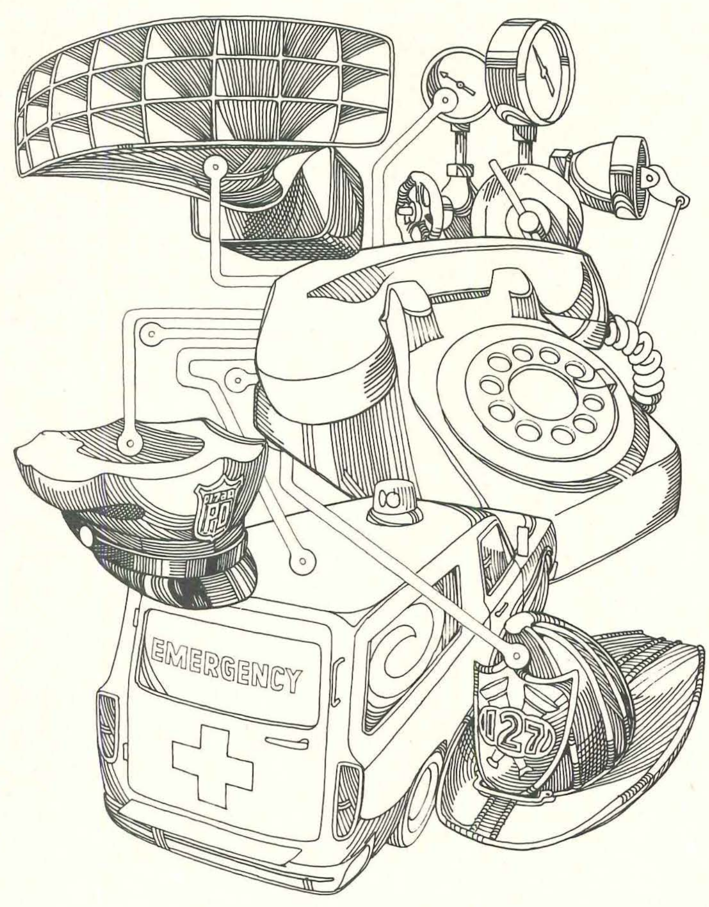

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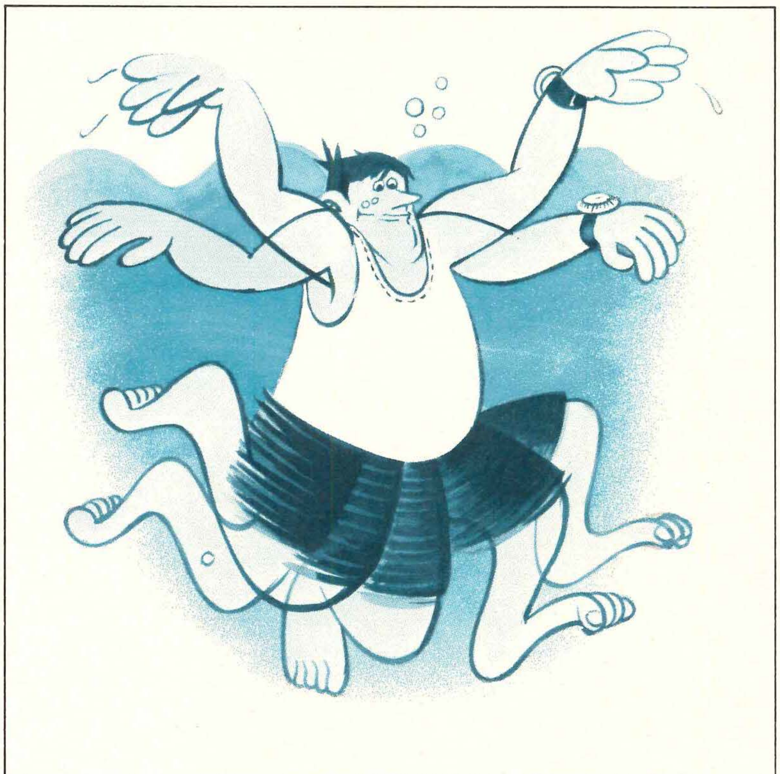

Anything can happen

In Lawford, Essex, England, Peter Strawson treaded water for 17½ hours on July 25-26, 1967, a new world record. Mr. Strawson emerged from the water with wrinkled skin.

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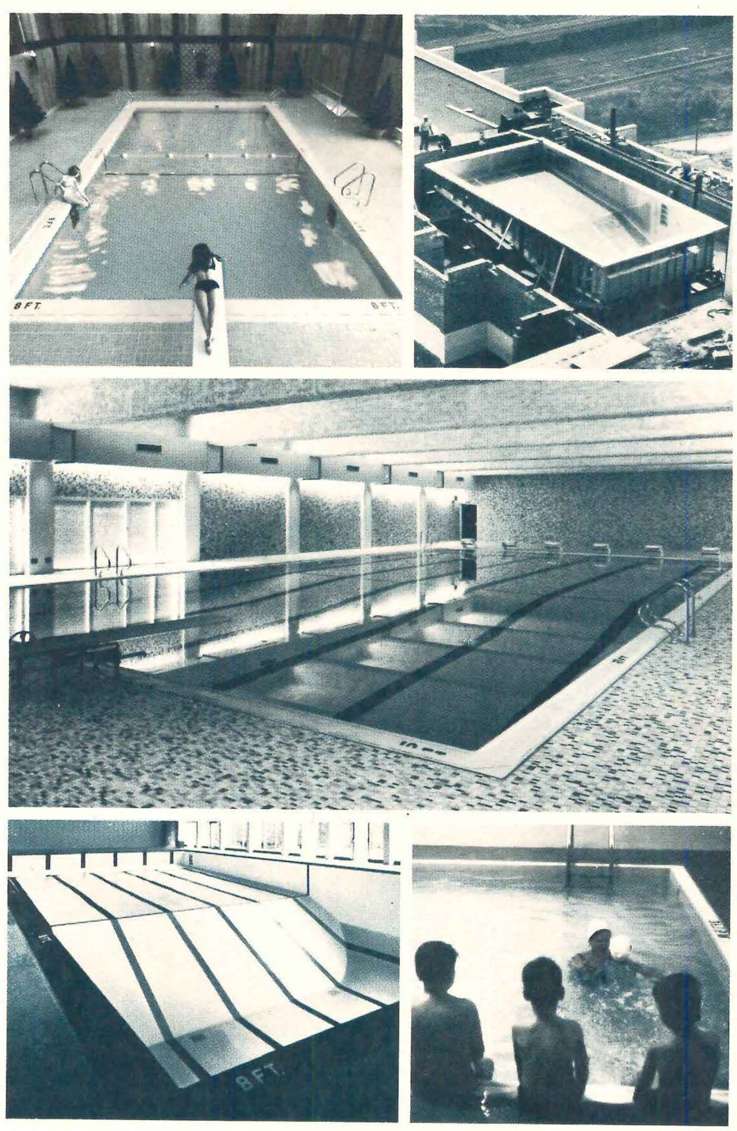

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availability of materials and energy and the need to conserve what we have. To this the Task Force replied that the forthcoming second report which will be concerned with tactics and implementation will address itself to these matters.

The Task Force Report was also criticized for being primarily residential in its emphasis. Task Force member Paul N. Ylvisaker told the convention that "it is time we talk primarily residential as the only way to put the non-residential into the proper perspective."

For the benefit of the AIA members who criticized the Report for its over-reliance and excessive faith in government, the Task Force agreed that the pervasiveness of government is a fact, but one which must be pragmatically dealt with. For this reason, they said, most of the Report's major recommendations are addressed to the government. Essentially the Report calls for a radical reshaping of government institutions which will include transferral of certain powers, including the power to zone, from the localities to the states. The Task Force hopes that its strategies, when implemented, will result in less government involvement "at least in a bureaucratic and programmatic sense."

Many asked:
"Does the AIA favor socialism?"

Of all the Task Force recommendations, the most radical and controversial was the issue of public control of land development. Charged with attempting to undermine the free enterprise system, indeed with proposing socialism, the Task Force countered with the following arguments:

1. The form of "free enterprise" which consists of speculating on the timing and location of public investment as it relates to enhancing the value of land must end. "Our tax laws must be reframed so as to take the incentive out of land speculation."

2. Not only should the unearned increment from public investment be cycled back to the public, but the public should be enabled to control the pace and shape the quality of land development in the process of implementing a well-planned public investment in the infrastructure.

Making it happen

Now that the AIA has approved the Report, the Task Force must fashion the legal and procedural instruments to make its recommendations a reality. The present Report, as was frequently stated at the convention and during the grassroots meeting, is merely a sketch, a "distillation of trends" in the words of Paul Ylvisaker.

The AIA, with technical assistance, will draft proposed Federal and state legislation to create a legal and administrative framework whereby the Growth Unit concept becomes the shaping idea by which our communities will develop. The AIA will testify before Congress on the Task Force Report and lobby in favor of its new legislation as it gradually takes form. As part of the AIA's Minuteman program, individual members of Congress will be approached by individual members of the AIA. The AIA will also work to influence HUD and other Federal agencies involved in urban development. The AIA state organizations will, of course, lobby at the state level as well.

The AIA will become active in the current presidential campaign, urging both the Republican and Democratic platform committees to include the Task Force proposals in their party platforms. In so doing the AIA will seek alliance with other groups who may favor the Growth Unit concept.

The AIA will also develop a national housing program based on the principle of subsidies to the user rather than to the housing unit. It hopes to persuade a local or state government to set up a pilot program of Growth Unit construction whereby the concept can be tested. An extensive public relations program is also envisaged.

Members of the Task Force

The original Task Force consisted of five members who will continue in their present roles. They are:—Archibald C. Rogers, FAIA, chairman; chairman of the board of RTKL, Inc., Baltimore. He developed planning guidelines for a team approach to highway planning, which led to establishment of the Urban Design Concept Team assembled to plan Baltimore's expressway system.—Ieoh Ming Pei, FAIA; principal, I. M. Pei and Partners, New York. His firm was responsible for the planning and design of Philadelphia's Society Hill redevelopment; a renewal plan for Oklahoma City's central business district; Montreal's Place Ville Marie, and a master plan for the redevelopment of downtown Boston.—Jaquelin Robertson, AIA; currently director of the Office of Midtown Planning for New York City; formerly head of the urban design group within the New York City Planning Commission.—William L. Slayton, Hon. AIA; executive vice president of the Institute; formerly Commissioner of the Urban Renewal Administration, Housing and Home Finance Agency; later president of Urban America.—Paul N. Ylvisaker, professional adviser; professor of public affairs and urban planning, Princeton, University; formerly commissioner of community affairs for the state of New Jersey.

After the first Task Force Report was completed a new member was added to the group, Van B. Bruner, Jr. AIA; chairman, Commission on Community Services of the Institute and newly elected second vice-president. *Mildred F. Schmertz*

CONVENTION DELEGATES VOTE 2-1 TO ACCEPT JUSTICE DEPARTMENT CONSENT DECREE

After an almost day-long discussion, marked by strong, effective, and sometimes (but surprisingly little) emotional argument, the convention delegates voted 1145 to 612 to concur in the intention of the board of directors to enter into a consent decree removing from the AIA's code of ethics any prohibition against price quotations for architectural services.

The board, immediately after the convention, did sign the decree, receiving as a condition of signing an interpretive letter which states that "the provisions of the decree do not affect in any way certain rights of the Institute, its officers, its components, and its members."

Those important protected rights were outlined by president-elect Ferebee in an extraordinarily complete, thoughtful, and persuasive "majority report" of the Board. The rights specifically retained are:

"1. The right to influence any branch or agency of any government to take action or refrain from taking action. For example, the Institute or any chapter may request a school board to follow the AIA-preferred method for the selection of architects or may request action by a state architectural board against an architect acting in violation of state rules and regulations. [Some states have laws prohibiting competitive bidding for architectural services, and these state laws apparently take precedence over the consent decree.]

"2. The right to propose, support or oppose legislation, ordinances, rules, regulations and orders by any government or governmental agency. For example, the Institute may continue its campaign to persuade Congress to pass the Brooks bill. [Now the Brooks-McClellan-Percy bill.]

"3. The right to do anything required or to refrain from doing anything prohibited by any law or regulation of any government or government agency. Thus, the Institute may continue to require its members to obey local registration laws, even those which prohibit competitive bidding."

This right was seen by many delegates as an effective tool. After the vote on the consent decree, a resolution assessing each member $10 to establish a fund for the chapters to work, in their own states, for laws prohibiting competitive bidding; and to work in Congress for passage of the Brooks-McClellan-Percy bill.

Mr. Ferebee's report went on:

"4. The right to advocate, express and disseminate, orally or in writing, the Institute's belief that the selection of architects should be based upon other factors in addition to fee. For example, the Institute may continue to state that it believes the preferred method for the selection of architects is that whereby primary consideration is given to the architect's qualifications."

Finally, Mr. Ferebee reported:

"The decree does not apply to actions of Institute members acting on their own and not as officers of the Institute, its chapters or state organizations. Every member remains free to submit or refuse to submit fee quotations on a competitive basis in the exercise of his own personal professional

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judgment, except that if he should choose to submit fee quotations, he must be careful not to violate any law or regulation of any government or government agency. In addition, every member remains free to inform prospective clients of his views as to the appropriate methods of selecting architects and to state his personal views as to the submission of competitive fee quotations."

The major argument against signing the decree was "the principle involved"

It was stated this way in a resolution proposed by the Pennsylvania and California regions (see also RECORD editorial, May, page 9): "A basic principle of our profession is that the worth of architectural services must be measured by many factors other than price. We believe that acquiescence in the consent decree presented to the component officers threatens this principle, is wrong, and should be resisted. This resolution commits the AIA to funding the preservation of this basic principle through support of legal action, and through initiation and support of legislation throughout the United States . . ."

This resolution failed to get the necessary two-thirds vote that would have permitted bringing it to the floor.

But the arguments that carried the day were made in the board's majority report —which made it clear that "the board is no more happy about this situation than are the members . . ."

In addition, attorney William McGovern of the firm of Arnold and Porter, retained by AIA for its knowledge of antitrust work, made three key points: If the board refused to sign the consent decree and the matter went to litigation:

1. "No holds would be barred."
2. There is absolutely no guarantee that the courts—even the Supreme Court —would decide the matter of principle involved.
3. Even if the court does decide the question, there is no assurance that it will decide favorably. The guess of his associates, he reported, was one out of four.

KEYNOTE SPEAKER REFLECTS SOCIETY'S—AND AIA'S—CONCERNS

In his keynote address, "In Praise of Diversity", Dr. Rene DuBos, distinguished microbiologist and Pulitzer Prize-winning author, pleaded for the recreation of small-group units within cities which would "permit development of a social identity and a spirit of place", whether in the structure of a metropolitan city like New York, or in other ways; for the provision of places like malls and plazas where a common experience of great importance and emotional value—like the Apollo 11 moon landing or the death of President Kennedy—can be shared by

C. Herb Paseur, Chairman of Houston Chapter Convention Committee, welcomes delegates.

people anonymously but in unison; and for a multiplicity of settings or "stages"— which all great cities have—"where very different kinds of people can act out lives of their own choosing." Urban settlements are not inhuman because of their size, he said, but because "their present structure is almost incompatible with some of the needs man has developed in the course of his evolution." Hong Kong and Holland, he pointed out, are "places where patterns of behavior have developed during centuries of crowding which minimize social conflict and yet allow persons to retain a large measure of personal freedom." This does not mean, however, he said, that "the density of populations can be indefinitely increased but only that safe limits have not been determined."

Consciously or not, Dr. DuBos echoed two of the convention's most important agenda considerations: The National Task Force report which calls for a "neighborhood growth unit" as the basis for community scale, and the presentation of the Gold Medal to Pietro Belluschi, whose early work developed as a regional expression. Dr. DuBos suggested the former in his plea for recreation of the small villages from which evolved all the world's great cities and the latter in his statement that "The United States, by cultivating regionalism could derive from its rich geographical diversity cultural values—and incidentally also forms of economic wealth far more valuable because more humanly meaningful, than those measured by the artificial criteria of a money economy."

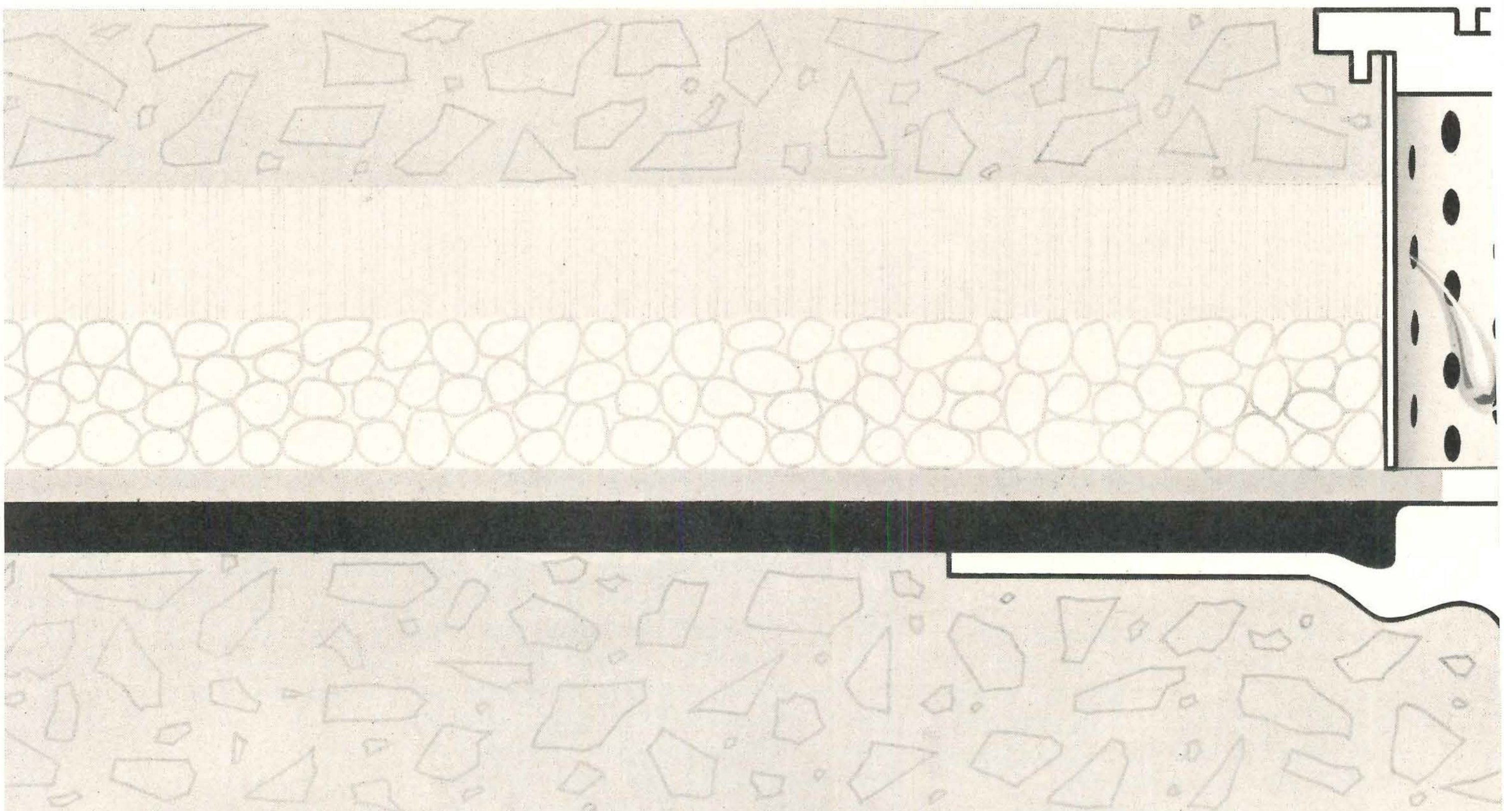
Inside the Maidenform, an air-supported structure erected by students in Convention Center.

BUILDING TEAM CONFERENCE WORKS "TO PUT IT TOGETHER"

About 300 registrants, including nearly 100 architects, attended the Second National Conference on the Building Team, which followed the AIA convention. The subjects: the changing relationships between owner, banker, developer, architect, contractor, and manufacturer; construction management; phased construction; systems; code constraints; life cycle costing; "getting a piece of the action" as a developer; the new legal problems; performance specs; and the role of labor. The busy program offered some able panelists from all disciplines, including some of the nation's biggest builders and lenders, consultants such as David Miller and Gerry McKee, owner and manufacturer representatives, and architects William Caudill, Bill Brubaker, Chuck Thomsen, Phil Meathe, Marshall Erdman, Walter Hough, Richard Miller and, Richard Jacques. Attendees at the sessions were intent and questioned the panelists sharply; mostly, attendees seemed a bit troubled by some of the concepts but wanted to know where they fit in. For example, the session on "Profile of a Construction Manager" brought together architect Thomsen, consultant McKee, and builder Robert Lathlaen—each of whom argued the validity of (respectively) the architect, the full-time consultant, or the general contractor functioning as a construction manager. But there was one interesting consensus: a construction manager is useful on jobs where two or more contractors are involved; but where the traditional lump-sum contract is used, a construction manager is not needed.

Most hopeful sign at the conference was the involvement of organized labor, represented articulately by Robert Georgine, secretary-treasurer of the Building and Construction Trades Department of the AFL-CIO. While firm and unyielding on some points (jurisdiction, for example) he showed and offered negotiation by labor on systems developments, unusual contractual arrangements for multi-building jobs, and regional negotiation of rates.

How to make a waterproof deck that's really waterproof.



Almost any bitumen, elastomer or membrane is waterproof.

Trouble is, it takes more than a waterproofing product to build a leakproof deck or plaza. Since most attempts to waterproof the traffic surface are doomed to failure, we think it's more important to get rid of water from each level of deck construction.

Here's a step-by-step method that does just that.

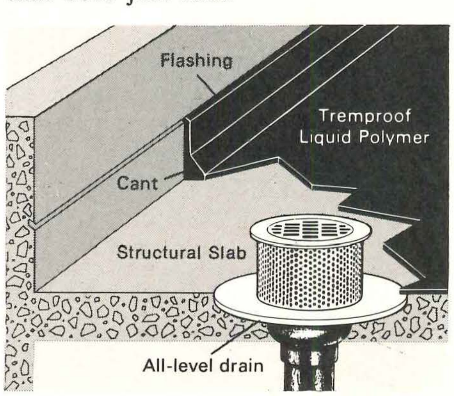
First, use a liquid waterproofing product that can be applied to the best-engineered concrete on the job site – the structural slab. Since the liquid adheres to the slab it will eliminate any lateral migration of water . . . just in case it penetrates the seal.

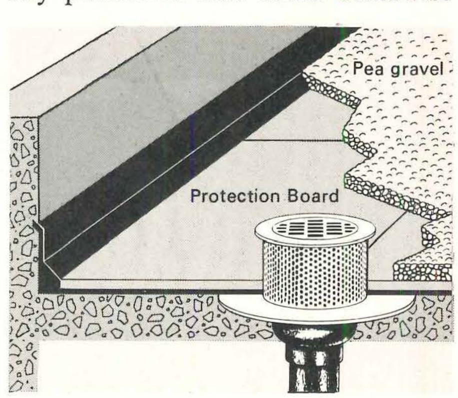
Next, protect the waterproof layer with a ⅛″ thick asphalt-impregnated board. That will prevent any punctures that could otherwise be caused by job-site activity.

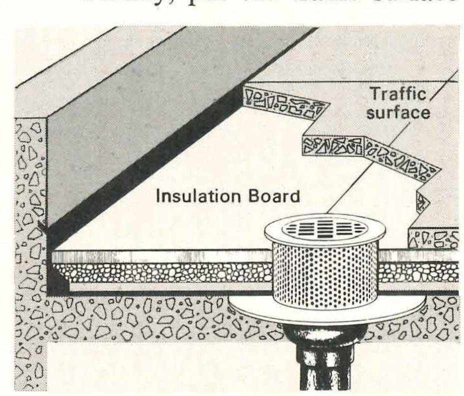
Now add a 1½″ to 3″ layer of washed pea gravel to act as a percolation layer that will collect transient water and carry it to the drain.

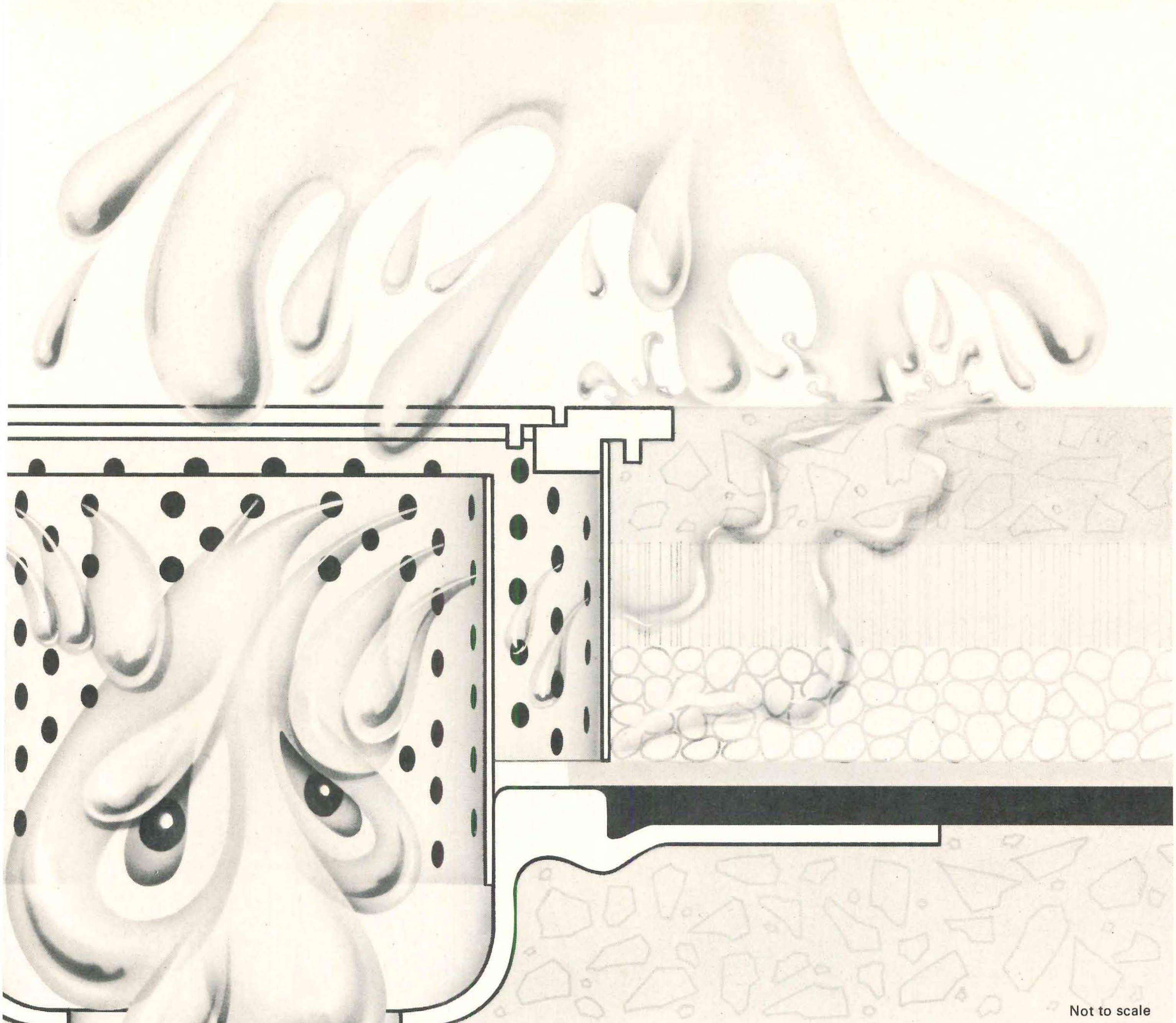
Then, put the insulation on top of the percolation layer. This will protect both the structural slab and the waterproofing system against stress caused by thermal variation.

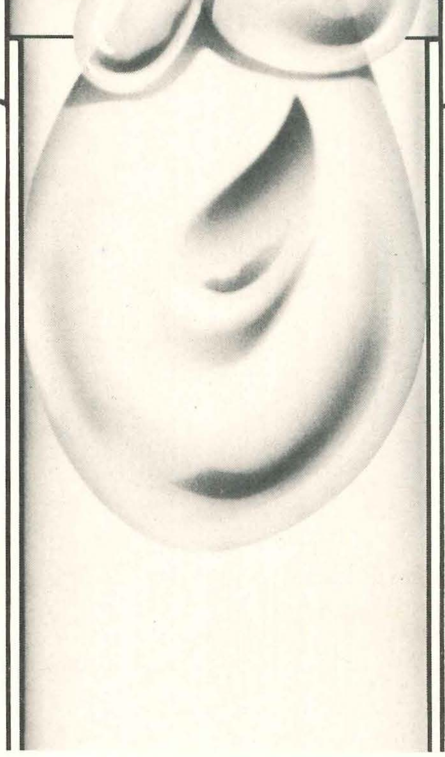
Finally, put the traffic surface











into position on the insulation. To get rid of water from the layers of construction we've just described, you'll need a unique all-level drain. Like the one we've developed with the Josam Manufacturing Company. Where ordinary drains only handle surface run-off, our (patented) drain takes water and moisture vapor from each level in the system.

To meet all these requirements, you'll need a pretty special liquid waterproofing layer. Such as Tremproof Liquid Polymer. It's self-adhering and cold-applied. It has enough body to form a substantial cant strip and carry up vertical surfaces to provide a flashing. It eliminates the use of adhesives and joining tapes plus the time-consuming job of making a positive seal around projections. So you wind up with a flexible, seamless blanket.

One more thing. While your deck is still in the design stage, ask our man for a copy of our "Architectural Guidelines". We've been solving waterproofing problems for over 40 years and we'll give you technical help from the drawing board to project completion. We also give you a choice of some 15 basic caulking and glazing sealants including such familiar names as MONO (our job-proven acrylic terpolymer), DYmeric (the Tremco-developed polymer) and Lasto-Meric (our polysulfide).

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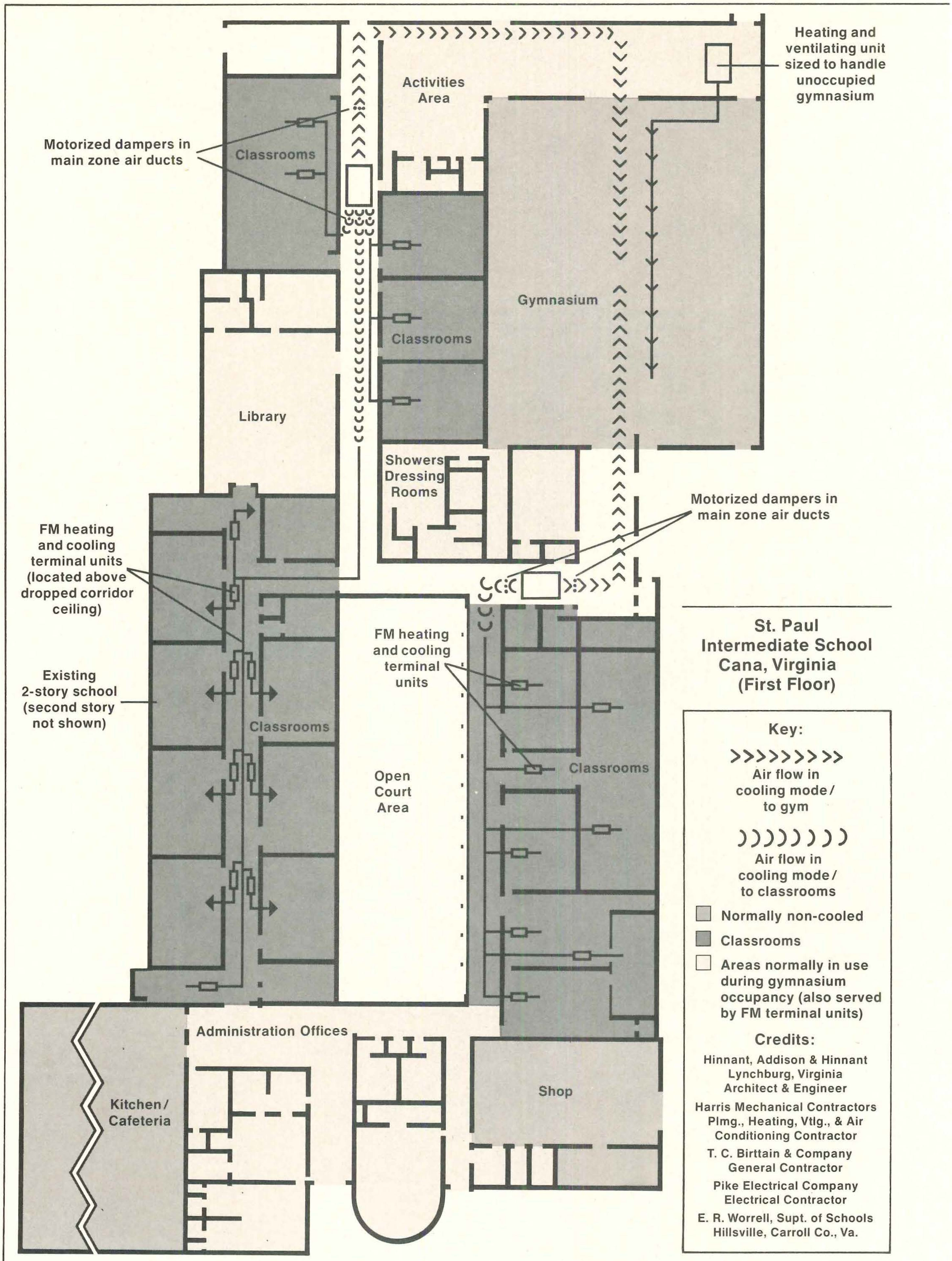
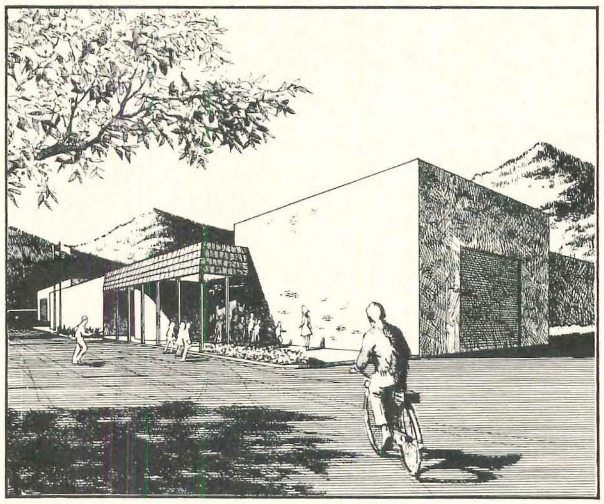

Heating and ventilating unit sized to handle unoccupied gymnasium
Activities Area
Motorized dampers in main zone air ducts
Classrooms
Gymnasium
Classrooms
Library
Showers Dressing Rooms
Motorized dampers in main zone air ducts
FM heating and cooling terminal units (located above dropped corridor ceiling)
FM heating and cooling terminal units
Existing 2-story school (second story not shown)
Classrooms
Classrooms
Open Court Area
Administration Offices
Kitchen/ Cafeteria
Shop
St. Paul Intermediate School Cana, Virginia (First Floor)
Key:
Air flow in cooling mode / to gym
Air flow in cooling mode / to classrooms
Normally non-cooled
Classrooms
Areas normally in use during gymnasium occupancy (also served by FM terminal units)
Credits:
Hinnant, Addison & Hinnant Lynchburg, Virginia Architect & Engineer
Harris Mechanical Contractors Plmg., Heating, Vtlg., & Air Conditioning Contractor
T. C. Birttain & Company General Contractor
Pike Electrical Company Electrical Contractor
E. R. Worrell, Supt. of Schools Hillsville, Carroll Co., Va.

It costs a lot to air condition a gymnasium. But thanks to Mammoth's capabilities it won't cost this Cana, Virginia school an extra dime.

(And the total job is under $2.50 per sq. ft.!)



Take an existing 25,000 sq. ft. school building in rural Virginia. Add 45,000 sq. ft. of new classroom and gymnasium space. Now heat, ventilate *and* air condition the whole thing from scratch for less than $2.50 per sq. ft. (including removal of the existing heating system). Sound far-fetched? Maybe.

But it's situations like this, calling for maximum flexibility to solve a unique HVAC problem and still stay below budget, that Mammoth can deal with better than anyone. Just ask the people of Cana, Virginia.

Common Problems Usually Aren't

The problem facing this Carroll County, Virginia school district—a building expansion program on a restricted budget—isn't unique. But each individual building's environment, use, and the demands placed on that building's HVAC system certainly is. With Cana's St. Paul Intermediate School, the crucial issue boiled down to air conditioning.

Following a national trend toward making a building investment work hard all year long, St. Paul's will be used year 'round for community meetings and events in addition to its regular classroom functions. Traditional multizone cooling was financially out of the question, yet to eliminate cooling from any one area would render that part of the building useless during the summer months. In addition, the existing two-story school had to be air conditioned with minimal disruption or remodeling. In all, a very difficult HVAC situation.

Free Air Conditioning

The architect-engineer looked over the St. Paul dilemma. After careful study, he turned up some interesting facts: Classroom space would not be used when the gymnasium was and vice-versa. So economical use of single and multi-zone units could be used for heating and cooling new and existing areas. With this in mind he proposed an ingenious solution calling for the kind of system flexibility only Mammoth could provide.

He specified five Mammoth rooftop units totaling 155 tons cooling, and three heating and ventilating only units. The Mammoth FM fluidic terminal distribution system was chosen for its ability to warm or cool air, provide individual temperature control, and adapt easily to the existing school.

Then he specified motorized dampers in certain main zone air ducts (see diagram on opposite page). The dampers switch cool air and temperature control from classroom areas to the gym by using a manual timer control panel in the school's main office. Since the two air conditioning units serving the gym can handle all the ventilation air required even with the gym filled to capacity, the heating and ventilating unit fan and the heating equipment could be sized to handle the *unoccupied* gym. This lowered equipment and operating costs.

The beauty of this arrangement is that it allows simple and efficient heating and cooling of the entire building at little more than the cost of heating and cooling the classrooms alone...in effect, the gym could be air conditioned free and for less than the cost of just heating and ventilating it! Combining this imaginative approach with Mammoth's system flexibility, the architect-engineer was able to bring the HVAC cost in at $2.38 per sq. ft., not including electrical work.

Flexibility You Can Fall Back On

The St. Paul project points up Mammoth's ability to solve HVAC problems by examining each individual project on its own merits and then providing the very best solution using Mammoth's flexible array of products... the kind of flexibility you can fall back on for a one-of-a-kind HVAC package.

Mammoth can take this personal approach to your HVAC problems because Mammoth has the people, plant, equipment and system flexibility to do it and still come in at a competitive price.

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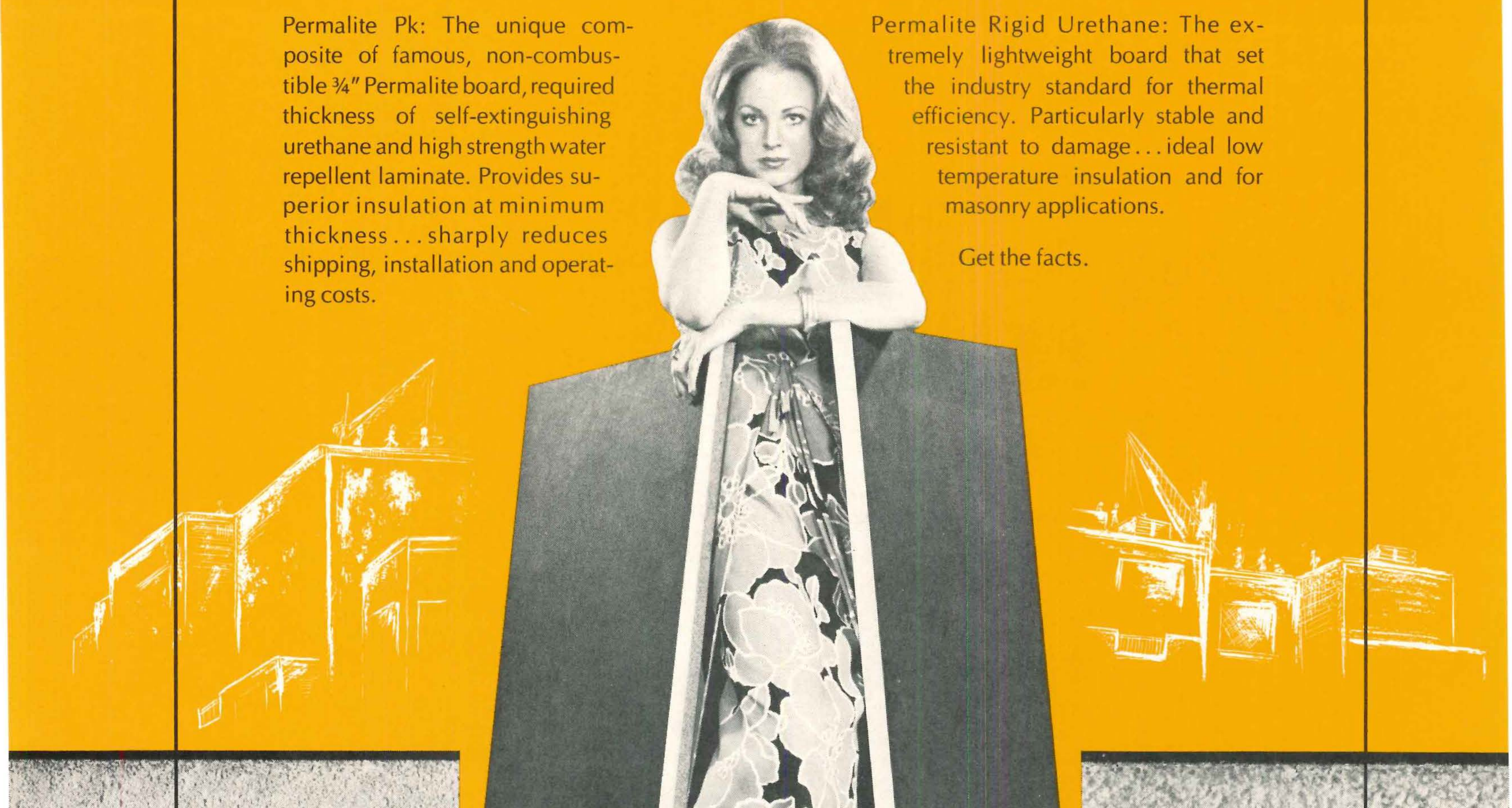

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Organization for Professional Practice

By Bradford Perkins
Vice president, O'Dorsey Hurst and Co., Inc., a division of McKee-Berger-Mansueto, Inc.

It is one of the cliches of management consulting that the management problems of architectural firms would be simple to solve if it were not for the human factor. This article is a discussion of one aspect of the human side of managing an architectural firm—organization.

The typical organizational structures borrowed from other industries often do not apply to professional firms where the major asset is people rather than machinery, assembly lines or cash. The organizational principles which work in businesses where responsibilities and results can be quantified must be modified for firms which depend upon the creativity and difficult-to-measure production capacity of highly-trained professionals. Nevertheless, many established approaches to organizational analysis and structure can be successfully applied in architectural practice.

Successful application of these approaches requires recognition of an appropriate organizational structure. Among the factors are the firm's age, size, number of offices, personality, ownership, financial management approach, typical project type, legal environment, and the personality and goals of the principals and staff.

Each has a profound influence on the firm's organization. Therefore, the architect/manager's role in organizational analysis and structure is to identify the relevant influencing factors and design a structure within the following parameters.

How to think about organizational forms

To organize a firm or not to organize, that is the first question. Some organization is inherent in any group due to the different personalities involved, but many small firms spend years without the visible trappings of an organizational structure. This is possible and even has some advantages for a very limited period in the genesis of a new firm, but age, growth and many other factors soon make it an unacceptable model for any but the smallest offices. Therefore, the second and much more relevant question is how to organize.

Normally the first step toward formal organization is stimulated by the tax and legal requirements of the business environment. Most firms have three choices: proprietorship, partnership or incorporation.

The proprietorship is the simplest. Little or no formal action is required and the organizational structure is clear. One man owns the firm, is legally and financially responsible for all of its actions, and is the converging point of all lines of authority. While there are a number of organizational and legal advantages in this simplicity, there are a number of disadvantages including over dependence upon a single individual, concentrated liability, limited incentive for key staff, and related problems. As a result, the proprietorship is rarely used for firms with staff of more than ten to fifteen staff members.

The partnership is the second and most common form of organization. The liabilities—any partner is liable for the business obligations that he and his colleagues incur—are the major disadvantages of this approach. Moreover, partnerships, unless carefully structured, often result in vague lines of authority and responsibility since the very word partnership implies management by committee. A majority of middle size (10-100 employees) firms have been partnerships, but the trend has been toward the corporation.

The corporate form has some advantages

The corporation is an artificial legal entity created by law for some specific purpose. For years many states made it impossible for professionals to incorporate and, thus, achieve the tax advantages and limited liability of a corporation. These laws are changing but so are the tax regulations on pensions, personal income and other factors which once made corporations attractive tax shelters. The major reasons now for incorporation is often limited liability. As will be noted later, however, corporate structure also encourages a clearer organization, better records, and a more business-like management style which many firms find advantageous. On balance, it is not surprising that an increasing number of firms are turning to the corporate form.

There are, of course, other forms including combinations of the above, but these three are by far the most common. Whichever is chosen—and a firm should always be ready to change when appropriate—it should be done with the advice of experienced legal counsel. William Caudill in his recent book *Architecture by Team* implied that there is little need for carefully detailed, legally-blessed understandings for "partnership is like getting married. All the carefully selected words put on a piece of paper are meaningless unless you trust each other." This is fine for a firm that grew as successfully as CRS, but formal organization agreements and other legal paraphernalia are designed for problems, not success. The financial and organizational impact of the death or retirement of a principal, office reorganization, important management decisions and other problems which inevitably occur during the life of most firms, can be minimized by careful planning.

Whichever organizational form is selected to deal with the external business climate, it will have significant implications for the internal organization. The most closely related issue is the relationship of organization and ownership. It is inevitable that the owner/staff of a firm confuses its ownership rights with its management role, but wherever possible the two should be kept separate. What this means in most firms is that the principals should not necessarily assume that as owners they should be involved in every decision. The fire-plug syndrome, where each makes his contribution, wastes time and rarely leads to better decisions.

Make the assignments and make them stick

Division of the management responsibility is an important organizational concept that seems to be ignored in many firms. This division must reflect both the capabilities of the principals and the basic responsibilities involved in managing an architectural firm. A typical mistake is for architects organizing a new firm to choose men with similar interests and capabilities as partners. If capabilities could be labeled "A, B or C" they choose all "A's" assuming that this encourages internal compatibility. A more appropriate pattern followed by many successful firms, however, is to develop an A (designer), B (salesmen), and C (business manager and D (production manager).

At the very least there should be a man with strong outside capabilities and one who can effectvely direct the inside operations. Each man's different capabilities should be channeled toward the appropriate areas of responsibility.

One man should have final responsibility for each area of the firm's operations and one, in particular should have final responsibility for final resolution of all key management questions. In other words, even if the firm is a partnership it should have some of the organization and clear line of authority and communication of a typical corporation including a president. Management by committee is usually only effective when there are no complex decisions. But this point was most effectively summarized by the well-known architect who threatened to disinherit his son if he ever entered into an equal partnership!

If one man has to be president and/or chief operating officer he should be the one most capable of effective and decisive decision making on the major management issues facing the firm. If his role is primarily policy or direction of the firm's technical side, then he should be supported by a business manager. A definition of this business manager's role is the subject of another article, but in summary the type of man being sought today is not the senior bookkeeper or administrator/architect of the past. Instead, most of our client firms are now asking for 35 year-old men with a master's degree in business administration and some professional firm as well as financial management experience. To make a non-technical senior staff member effective, however, his role, responsibilities and authority have to be clearly defined.

Clear definition of responsibilities and matching needs with capabilities should carry down into staff organization. For example, Robert Townsend, in *Up The Organization* criticizes one typical symptom of firms that ignore this principal, the "assistant-to." As he puts it, "Instead of giving pieces of his job to other line officers, or carving out a whole job and giving it to someone to run with, he hired an 'assistant-to,' and immediately became much less effective than he was when he was just overworked."

Failure to match responsibilities with capabilities has been the subject of a whole book, *The Peter Principle*. Not all people rise to their level of incompetence, but too many professional firms take talented technical staff and try to make managers out of them. A major segment of the art of organizing a design firm is to find the proper balance between business and technical.

The options of organizational concept

Part of this can be done by selecting the proper staff for each role; a second part depends on how this staff is organized. There are several alternatives: by teams, departments, specialties, etc. The proper choice depends on the firm's size, staff capabilities, typical project and many other factors. For example, two 300 man offices of the same age, in the same city found it necessary to have very different structures, for one handled large office buildings and the other small schools. As a result, the former could depend on key designers who turned their conceptual design over to a large production department while the latter organized around small teams. As rules of thumb:

1. The design, production, engineering, etc. departmental approach is most appropriate for firms with more than fifty staff members and who primarily handle large and/or relatively simple (office building, industrial, multi-family housing, etc.) projects.
2. An alternative departmental approach —organized by project specialties such as hospitals. University facilities, etc.—is most appropriate in firms with steady volume in two or more relatively complex building types.
3. The generalist team approach is most effective for designer-oriented firms with fewer than fifty employees and with a non-specialized practice.
4. The project manager (a single individual, whether principal or employee, that is responsible for all phases of the project) approach is appropriate in all firms—whether organized by department or by team. Just as in the case of the firm itself effective coordination, management and even good design depend upon some one individual taking ultimate responsibility.

Clear lines of communication and authority are desirable in all firms and mandatory in large and/or mature firms. This does not mean published organization charts, which are primarily useful for planning and only occasionally helpful in clarifying the organization to the firm. Carefully and clearly defined assignments and top management monitoring are far more effective as management devices.

As has been already noted above and in the first article of this series, all of these concepts are modified by such factors as the firm's size, number of offices, age, sophistication, financial control philosophy, and many other factors.

1. Size, for example, has several stages. At eight to twelve (the size which some relate to the biological principles which have made this the typical team size in everything from business and the military to religion and sports) an informal organization has to become a firm. At thirty to fifty a middle management level must be introduced for the principals can no longer maintain direct control of every aspect of the office. Above fifty the firm usually becomes specialized enough to have departments. And at six hundred to one thousand (also considered to be the most manageable school size, battalion strength, etc. by many theorists) the firm reaches a peak size that few if any firms can exceed as a single unit. Beyond this point the firm should consider semi-autonomous subsidiary units.

2. Most firms have multiple officers or subsidiaries long before they reach the peak limit. Management of the multi-office firm could also be the subject of another entire article, but typically the most effective management of branch offices or subsidiaries occurs when they are operated as self-sufficient teams with their own technical, business development and business management leadership. CRS, for example, formalized this in the troika concept they installed in their branches.

3. Branch office, departmental or project organization also depends on the firm's financial control philosophy. If a segment of a firm is expected to make a profit, it must be responsible for both income and expenses. If it is a cost center it can only be expected to concentrate on meeting an expense budget. In all cases, a person can only be held responsible for those areas over which he has control.

4. Sophistication also plays a role, for older, more experienced firms can experiment with more complex organizations. Organizational specialists usually prefer to see an individual's responsibilities or "span of control" limited to four to six subordinates, major tasks or other concerns. Managers that have sophisticated management controls that permit management by exception and are experienced in their role can control more.

5. Age also changes a firm's organization as top management changes from the entrepreneurs that founded the firm and see it as an extension of themselves to the second generation of managers who see the firm as an institution.

This change from founder-enterpreneur to second-generation managers is all part of what Peter Drucker, a leading management theorist, has called the management revolution. This quiet revolution, which has been a latecomer to the design profession, is having a profound effect on the organization of architectural firms. Its effect, however, will be very different from that experienced in other industries, for the complex human side of managing an architectural practice will always remain. And as long as it remains, architect/managers must respond with flexible but clear organizations that are unique to the special requirements of their firms and their profession.

REINFORCED CONCRETE: COMPELLING IT IS.

American National Bank Building, Amarillo, Texas
Architects: Kelly/Marshall & Associates, Inc., Tulsa
Structural Engineers: The Engineers Collaborative Ltd., Chicago
Contractor: WRG Construction, Tulsa

CURRENT TRENDS IN CONSTRUCTION

George A. Christie
Vice President and Chief Economist
McGraw-Hill Information Systems Company

Concern for the environment: its impact on construction

The emergence of "The Environment" as a burning social issue has placed the construction industry in the incongruous position of both "bad-guy" and benefactor. Newspaper headlines like, "Ecology suit stops urban highway extension," or "Pollution hazard delays utility plans," are followed the next day by stories about Congress appropriating "Millions for environmental control," or business allocating a larger proportion of its capital expenditures for anti-pollution facilities. The facts behind these headlines have had significant impact on some facets of the industry in recent years, and promise to continue as an even larger force in the future.

It's no secret that the highway builders have been in trouble with the environmentalists for some time. Those dotted lines running across the roadmaps of most major cities represent dead or dying extensions of the Interstate highway system; plans on paper that will probably never bear the weight of crosstown express traffic, or high-balling tandem trailers. Also, because critical reevaluations of the Highway program have been pursued by various groups both inside of government and on the outside, it has become an easy mark for those fighting the good fight against inflation. Both Johnson and Nixon froze Trust Fund monies for varying periods in the past to ease inflationary pressure.

It's because of work deleted or postponed, and these adjustments to the financing faucet that the Highway Trust Fund is now sporting a $3.8 billion balance. But, more importantly, anticipating the realities of future encounters, the Federal budget for fiscal year 1973 projects a balance in the Fund of more than $5 billion. At current Federal-share ratios, that amount of money could finance almost a full year's worth of highway construction. Put another way, by mid-1973 (when fiscal year 1973 ends) the Highway Trust Fund, through its levies on highway users, will be nearly a year *ahead* of the highway construction program, in terms of its ability to pay. That's an extremely unique situation in this current period of huge Federal deficits—a situation that is fully appreciated by environmentalists in their current efforts to divert some Trust Fund money into other areas, like urban mass transportation.

Similarly, the alleged environmental hazards posed by electrical generating plants have fostered a "go slow" attitude in the expansion plans of many utility companies. Dodge data show that more than $10 billion worth of electrical utility projects are currently in various states of design. But, the progression from design to the contract award stage has slowed down somewhat in recent months, and the environmental question figures heavily as a possible cause.

The other side of the environmental issue, of course, is the clean-up effort. And, it's here where the construction industry is looked to as a source of help. (The cost of cleaning up the nation's streams and waterways by providing adequate waste water treatment facilities has been estimated at between $50 and $100 billion, depending on who's doing the estimating.) In this area the government's purse strings have been a lot looser. Federal outlays for sewer and water treatment facilities are anticipated to be in the $3 billion range during the 1973 fiscal year. That's double the $1.5 billion actually spent in 1971, and 25 per cent more than the outlays for the current fiscal year.

And, unlike the area of highway construction, where contractors are paring their bids to the bare minimum in the face of keen competition for the available jobs, people in the sewer and water facilities business have more work than they can handle. There is some $7 billion in waste treatment facilities for which Federal assistance has been committed that is as of yet incomplete. In some cases committed projects are not even under contract yet. This backlog is *in addition* to the $3 billion in funds coming available for new projects in fiscal year 1973.

Other areas containing significant amounts of potential construction money are recreational facilities, parks and historical sites. Federal outlays in these areas will amount to some $900 million in the next fiscal year, one-third higher than the amount spent during 1971. In addition, outlays for environmental research and development are expected to hit $2 billion in 1973, one-third greater than the fiscal year 1971 amount.

Also related to the environmental effort, funding for flood control works, and irrigation and navigational facilities is expected to exceed $1 billion in the next fiscal year, a 50 per cent gain over 1971.

Government isn't the only source of clean-up money, however. A recent McGraw-Hill survey shows that American business plans to spend nearly $5 billion for air and water pollution controls during the current year, 50 per cent more than in 1971. Close to $3 billion will be for air pollution control, with $2 billion alloted to the water pollution area. Of the two areas, water pollution monies can be expected to contain a larger proportion of direct construction work. And breaking it down a little further, three industries—chemicals, petroleum, and paper products—will account for nearly 40 per cent of the private water pollution expenditures total.

But, manufacturing is just one area in the private sector where clean-up pressure exists. The environmental problem includes a lot more than just industrial pollution.

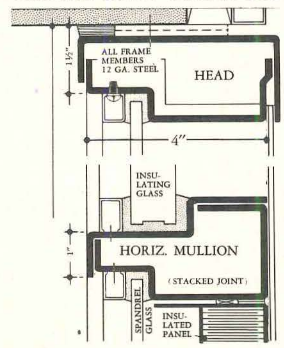
Unlike so many "hot" issues that appear on the scene, evoke considerable concern for a time, and then disappear as interest wanes, the current concern for the environment is too vital to just fade away. In fact, interest is more apt to accelerate as fresh examples of deterioration in our habitat are uncovered. As this is true, not only will the "mix" of construction types continue to be affected as is presently the case, but style and design changes will become more prominent as well. Not only will there be relatively greater growth in areas like sewer and water treatment facilities, but, increasingly, new structures will be weighed on the basis of what they, themselves, add to or detract from the environment. And, the concept of the self-contained unit, the structure that puts back into the environment what it takes away, will become more commonplace. The factory that leaves the water downstream from it as clean as the water upstream is but one example. The office structure that provides transportation facilities—in terms of parking space or other accommodations—to *all* the employees that work in it will also be more common. So will the apartment structure that provides recreational facilities for its residents, and educational facilities for the children of its residents.

In addition to needing an economic and a social rationale, then, more and more, new construction in the years ahead will also be evaluated on its environmental attributes. The question, "does it carry its own weight in terms of the environment, or does it impose too much of a burden on existing community facilities?" will not be an uncommon one.

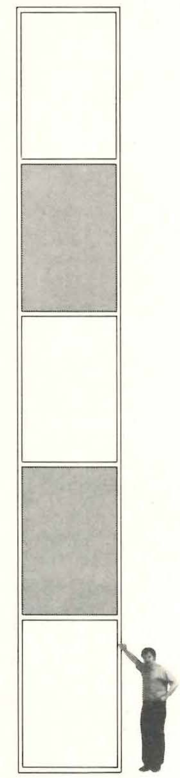
HOPE'S

How Hope's Serves the Creative Architect

This three-section building for Standard Oil Company (Indiana) typifies the large scale, highly specialized project on which Hope's reputation for quality custom work has been built. Wigton-Abbott Corporation, designers and constructors, specified installation of more than 180 monumental size steel custom windows by Hope's. Constructed of 12-gauge pressed steel members, the fixed windows are 30 to 35 feet high and over five feet wide. The installation provides an intriguing example of pressed metal's broad adaptability; steel was chosen for its strength, durability, rigidity, and economy. Note that the detail of the horizontal mullion is designed to accommodate two different thicknesses of glass in the same member, while keeping the outside glass surfaces in the same plane. The attractive apppearance is enhanced by finishing frames, beads and panels each in a different color, with Hope's unusually durable Ultra-Coat finish.



The Hope's pressed steel subframes used in the Standard Oil research center were installed in five sections to accommodate three sections of clear glass, interspersed with two of opaque spandrel glass. The vertical unit, with spandrel surface covering structural framing as well as ceiling and floor construction, functions as both window and window wall. The frames, formed in a tubular shape, provide the glass with a third-dimensional framing effect. The installation typifies the individual choices available to the architect using Hope's pressed steel subframes. They are custom made to suit the requirements of each installation, offering the designer broad versatility. Frames can be designed to accommodate: ventilated or fixed windows, panels, doors, grilles, louvers and all types of glass. Ask Hope's engineers to work with you on your forthcoming construction plans. Your creative ideas provide a challenge they welcome. Hope's Windows, Jamestown, New York 14701.



HOPE'S WINDOWS
A DIVISION OF ROBLIN HOPE'S INDUSTRIES, INC.

WIGTON-ABBOTT CORPORATION DESIGNERS and CONSTRUCTORS PLAINFIELD, NEW JERSEY
RAGNAR-BENSON GENERAL CONTRACTOR PHOTO BY HEDRICH-BLESSING

LETTERS

Child care centers: a thoughtful criticism

For many years community groups, professionals, and others interested and involved in children have been fighting against the sterility and the static quality of the concept of "child day care." Acceptance has finally come to the concept of early childhood education rather than a child tending service for young children. Services and experiences that were formerly available only to middle- and upper-class children are now recognized as being critical for all children and are being made available, with variations relevant to each specific group, to all children. The value of providing this background of experience and self awareness lies behind much of the recent expansion of child care facilities. These facilities offer more to the child than conceived by Mr. Hale in his opening paragraphs in your recent article (April 1972) on Child Care Centers, with his statement "Child care centers are, by definition, resources available to working mothers." What medieval dictionary was Mr. Hale using? This concept pervades the entire article which, unfortunately, has gross factual inaccuracies as well.

Day care centers are heavily government funded in New York State. The State contributes 87½ per cent of which 75 per cent are Federal funds. The local municipality contributes the other 12½ per cent. These funds have not been cut back.

The slowdown in construction is due to the New York City stopping of all lease program construction until the abuses of the previous program have been eliminated. The State has slowed down its capital funding program under the Youth Facilities Act, less from budget cutbacks than from other unknown reasons. Funds for the Youth Facilities Act come from the sale of bonds.

Private profit making child care centers are not springing up in large numbers but are closing in large numbers. [More and more private centers] have all found that even providing the minimum of services is an unprofitable venture.

As far as the role of the architect with the community, the [five lead] centers that Mr. Hale uses as his example are types of centers where the architect invariably had the least possible communication with the community. His client, since these centers were part of the New York City direct lease program, was the owner or contractor for the center. One of the major criticisms of this program was the lack of community input into the center's design. The resulting center under this program is one devoid of any solid relevancy to the community's special needs and goals.

The potential for relevancy was one of the exciting parts of the funding program of the Youth Facilities Act where the community group selected its own architect, making him responsible to them, and then participated in every phase of planning and design. Mr. Hale, except for one small sketch, chooses to ignore these infinitely more exciting and relevant centers. He also chooses to ignore the years of work that these groups—such as "West Side Community Alliance" with its functioning West 80th Street Day Care Center, "A Group of Friends for Day Care" whose center is under construction, the "Committee for Community Controlled Day Care" that coordinates the efforts of over 150 community day care groups, and other groups and individuals—have put in, in order to effect changes in the rigid system.

I am including a list of several early childhood education facilities that are more satisfactory than your five lead examples in their response to the needs of children: Millersville School, Pennsylvania; Acorn Montessori School, New York City; Community Learning Center, Washington, D.C.; West 80th Street Day Care Center, New York City; Casady School, Oklahoma; Sea Pines Montessori School, South Carolina; Phoebe Hearst Pre-School Center, California; Child Minders School, Connecticut; Lamplighter School, Texas; Bing Nursery School, California; Eveline Lowe Primary School (under five Wing), London; Hilltop Center, Massachusetts.

Wallace Kaminsky
Kaminsky & Shiffer Architects PC, New York City

continued on page 88

INDEXES AND INDICATORS

Percival Pereira
Dodge Building Cost Services
McGraw-Hill Information Systems Company

CURRENT COSTS AND FUTURE HOPES

A slower rise in building construction cost will take place for the remainder of this year, which will make the over-all percentage increase substantially lower than 1971.

Tighter pay board reviews and trimming of overhead are some of the factors that will have a braking effect on the crippling 12 to 15 per cent yearly increase that has prevailed recently. Also, the construction industry stabilization committee is hoping to pare down construction wage levels to allowable limits within guidelines established under phase two.

Some educational building costs bid in 1971

Elementary schools	*SF Area*	*Total Cost/SF*	*Struct.*	*Mech.*	*Elec.*
Topsham, Vt.	20,250	22.62	15.35	4.88	2.39
Flint, Mich.	36,512	19.42	12.36	4.72	2.34
Fort Wayne, Ind.	40,712	22.63	14.79	5.23	2.61
Whitesburg, Ky.	47,460	19.31	12.94	4.23	2.14
Des Moines, Ia.	42,750	20.88	14.05	4.09	2.74
Hamilton Co., O.	53,000	27.51	17.94	6.20	3.37
Cambria Co., Pa.	61,009	30.64	21.69	5.78	3.17
Vocational schools					
Ocean Co., N.J.	23,100	28.20	16.38	7.58	4.24
Bowling Green, O.	54,950	31.69	17.16	8.70	5.83
Fayette Co., Pa.	65,900	29.61	18.18	7.88	3.55
Onondaga Co., N.Y.	150,000	43.26	27.54	9.88	5.84
Marlboro, Mass.	336,190	25.58	18.42	4.36	2.80
Pitman, N.J.	78,000	21.65	13.96	5.12	2.57
Lexington, Ma.	119,000	28.82	21.06	3.77	3.99
York Co., Va.	154,368	19.47	11.50	6.24	1.73
Tucson, Az.	156,881	26.75	17.70	6.39	2.66
Phila., Pa.	187,000	30.40	21.58	5.93	2.89

1941 average for each city = 100.00

JUNE 1972

Metropolitan area	Cost differential	Current Indexes non-res.	residential	masonry	steel	% change last 12 months
U.S. Average	8.3	376.8	353.8	369.0	359.7	+ 7.70
Atlanta	7.8	479.4	452.0	466.5	456.3	+ 6.34
Baltimore	7.9	395.9	372.2	384.9	374.7	+ 7.88
Birmingham	7.3	346.0	321.8	333.8	329.1	+ 8.46
Boston	9.0	383.4	362.2	379.8	368.7	+ 11.57
Buffalo	9.1	420.2	394.6	415.1	401.3	+ 9.76
Chicago	8.4	429.9	408.8	415.7	408.6	+ 8.34
Cincinnati	8.7	406.3	382.3	395.3	385.5	+ 7.63
Cleveland	9.3	422.2	397.3	412.5	402.7	+ 6.37
Columbus, Ohio	8.3	401.5	377.0	389.6	382.3	+ 6.46
Dallas	7.6	369.3	357.7	362.2	355.3	+ 7.12
Denver	8.1	403.9	380.0	399.2	385.4	+ 5.83
Detroit	9.5	422.7	402.7	422.2	406.4	+ 8.61
Houston	7.6	359.6	337.7	351.2	344.4	+ 5.38
Indianapolis	8.0	355.2	333.6	346.4	338.7	+ 7.46
Kansas City	8.1	354.4	334.9	344.7	337.5	+ 6.07
Los Angeles	8.2	418.0	382.1	406.3	398.1	+ 9.19
Louisville	7.7	375.0	352.2	367.4	358.9	+ 8.64
Memphis	7.7	359.2	337.3	347.3	341.4	+ 7.21
Miami	8.0	397.4	378.6	387.8	379.3	+ 6.95
Milwaukee	8.5	429.8	403.6	424.5	410.9	+ 6.33
Minneapolis	8.9	407.3	383.2	401.1	389.2	+ 9.97
Newark	8.9	375.3	352.5	370.0	360.9	+ 7.19
New Orleans	7.3	356.6	336.6	351.0	343.2	+ 7.26
New York	10.0	417.1	387.8	404.2	394.1	+ 7.50
Philadelphia	8.7	399.7	380.8	392.7	383.4	+ 10.83
Phoenix	7.9	215.0	201.9	207.5	204.1	+ 10.19
Pittsburgh	8.8	369.7	347.8	362.9	352.4	+ 8.04
St. Louis	8.7	391.7	369.7	386.7	374.7	+ 7.31
San Antonio	7.6	145.5	136.7	142.1	138.7	+ 2.14
San Diego	8.0	150.3	141.2	147.3	143.9	+ 7.63
San Francisco	9.3	548.4	501.3	544.8	526.7	+ 11.52
Seattle	8.6	373.6	334.4	370.1	356.0	+ 4.90
Washington, D.C.	7.8	355.7	334.1	345.1	337.6	+ 8.01

Cost differentials compare current local costs, not indexes.

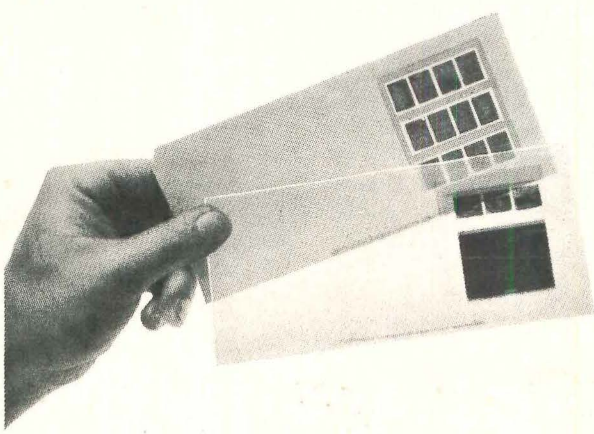
HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL NON-RESIDENTIAL BUILDING TYPES, 21 CITIES

1941 average for each city = 100.00

Metropolitan area	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971 (Quarterly) 1st	2nd	3rd	4th	1972 (Quarterly) 1st	2nd	3rd	4th
Atlanta	298.2	305.7	313.7	321.5	329.8	335.7	353.1	384.0	422.4	424.0	445.1	447.2	459.2	472.5			
Baltimore	271.8	275.5	280.6	285.7	280.9	295.8	308.7	322.8	348.8	350.3	360.5	362.5	381.7	388.1			
Birmingham	250.0	256.3	260.9	265.6	270.7	274.7	284.3	303.4	309.3	310.6	314.6	316.4	331.6	340.4			
Boston	239.8	244.1	252.1	257.8	262.0	265.7	277.1	295.0	328.6	330.0	338.9	341.0	362.0	377.3			
Chicago	292.0	301.0	306.6	311.7	320.4	328.4	339.5	356.1	386.1	387.7	391.0	393.2	418.8	422.8			
Cincinnati	258.8	263.9	269.5	274.0	278.3	288.2	302.6	325.8	348.5	350.0	372.3	374.3	386.1	399.9			
Cleveland	268.5	275.8	283.0	292.3	300.7	303.7	331.5	358.3	380.1	381.6	391.1	393.5	415.6	415.2			
Dallas	246.9	253.0	256.4	260.8	266.9	270.4	281.7	308.6	327.1	328.6	341.4	343.4	357.9	364.9			
Denver	274.9	282.5	287.3	294.0	297.5	305.1	312.5	339.0	368.1	369.7	377.1	379.1	392.9	398.3			
Detroit	265.9	272.2	277.7	284.7	296.9	301.2	316.4	352.9	377.4	379.0	384.6	386.8	409.7	416.9			
Kansas City	240.1	247.8	250.5	256.4	261.0	264.3	278.0	295.5	315.3	316.6	329.5	331.5	344.7	348.7			
Los Angeles	276.3	282.5	288.2	297.1	302.7	310.1	320.1	344.1	361.9	363.4	374.2	376.4	400.9	407.8			
Miami	260.3	269.3	274.4	277.5	284.0	286.1	305.3	392.3	353.2	354.7	366.8	368.9	384.7	391.5			
Minneapolis	269.0	275.3	282.4	285.0	289.4	300.2	309.4	331.2	361.1	362.7	366.0	368.0	417.1	401.7			
New Orleans	245.1	284.3	240.9	256.3	259.8	267.6	274.2	297.5	318.9	320.4	327.9	329.8	341.8	350.9			
New York	276.0	282.3	289.4	297.1	304.0	313.6	321.4	344.5	366.0	367.7	378.9	381.0	395.6	406.5			
Philadelphia	265.2	271.2	275.2	280.8	286.6	293.7	301.7	321.0	346.5	348.0	356.4	358.4	374.9	394.2			
Pittsburgh	251.8	258.2	263.8	267.0	271.1	275.0	293.8	311.0	327.2	328.7	338.1	340.1	362.1	364.5			
St. Louis	255.4	263.4	272.1	280.9	288.3	293.2	304.4	324.7	344.4	345.9	360.0	361.9	375.5	385.5			
San Francisco	343.3	352.4	365.4	368.6	386.0	390.8	402.9	441.1	465.1	466.8	480.7	482.6	512.3	535.3			
Seattle	252.5	260.6	266.6	268.9	275.0	283.5	292.2	317.8	341.8	343.3	347.1	349.0	358.4	363.0			

Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other; if the index for a city for one period (200.0) divided by the index for a second period (150.0) equals 133%, the costs in the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0 ÷ 200.0 = 75%) or they are 25% lower in the second period.

"WHERE ARE THE SPEC SHEETS FOR THIS DRAWING?"



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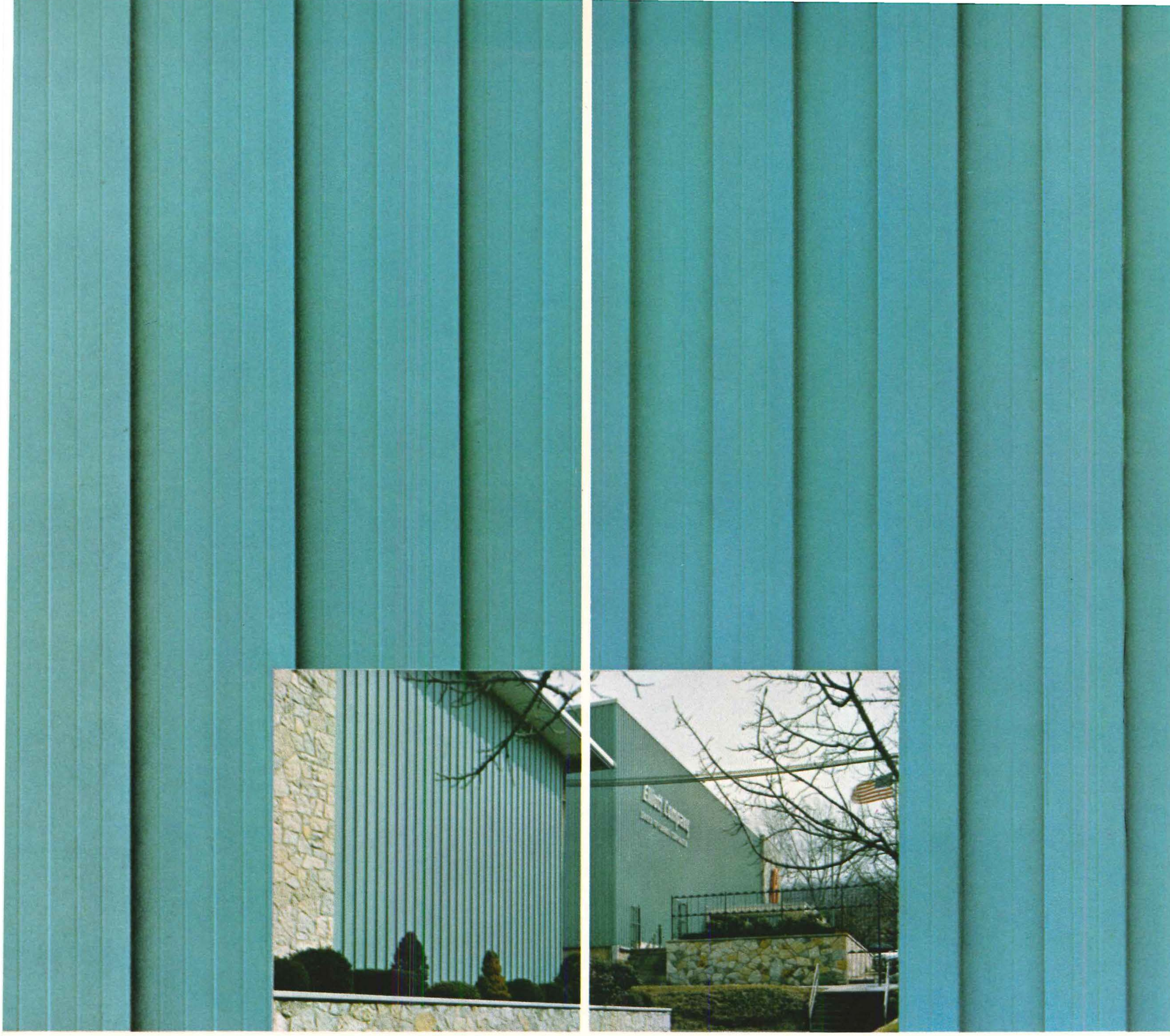
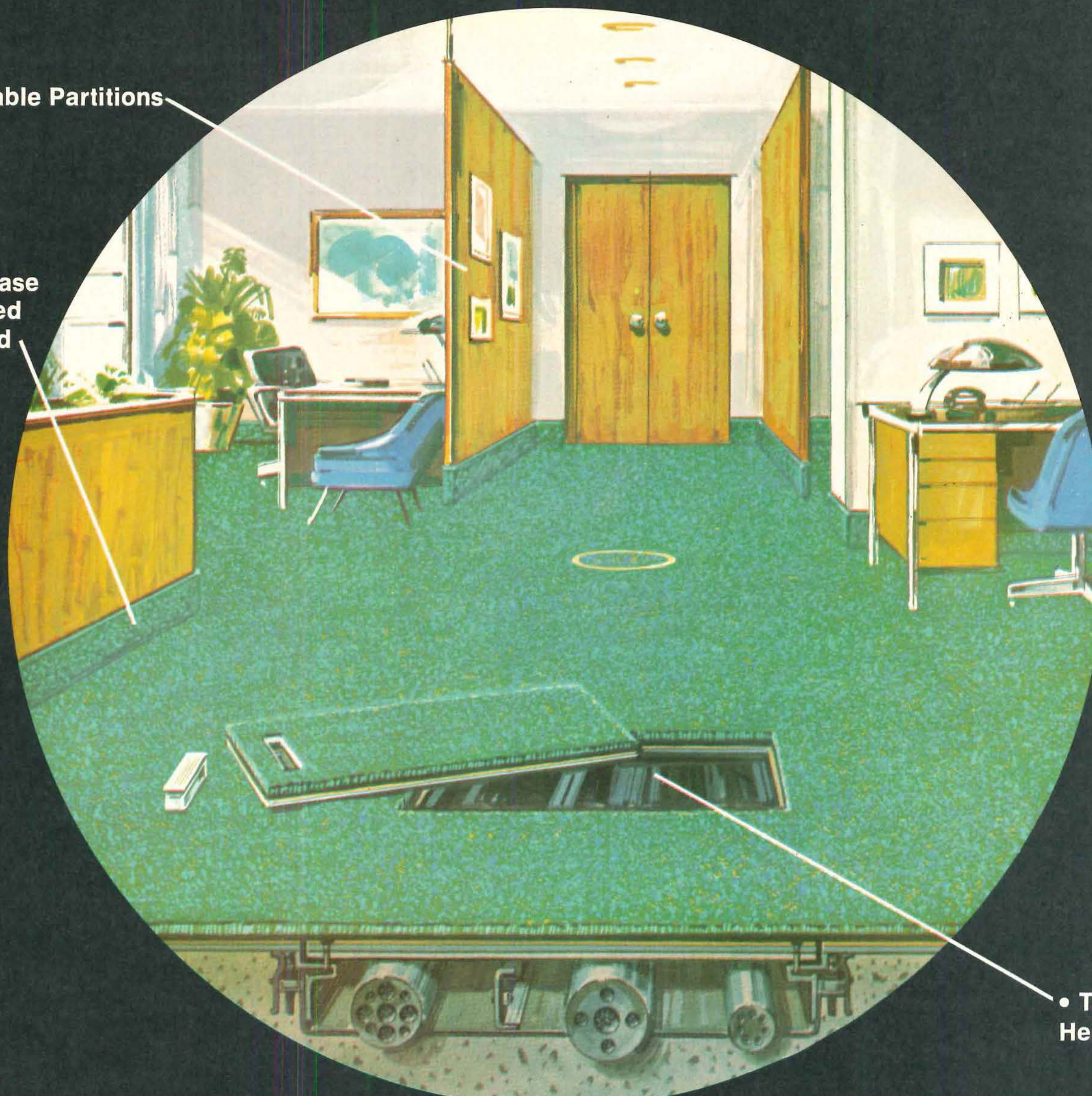


All systems are go

Carpet Systems from CCC with Acrylic 73... engineered to integrate with all architectural systems.



Carpeting is no longer a simple matter of beautiful floors. The challenge today is to integrate carpet with the total architectural environment.

CCC has this very complex problem down to a precise system—the unique Acrylic 73 Carpet System. We analyze every element involved—right from the blueprints. Recommendations are based on design, function and maintenance factors.

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Acrylic 73 is a total performance carpet. CCC's exclusive blend of 70% long-staple Creslan® acrylic and 30% long-staple commercial nylon combines unequalled stamina with design versatility and appearance retention.

CCC is the world's largest manufacturer of commercial and institutional carpet systems. We would like to tell you more about what we can do for you. Why not send in the coupon today.

CYANAMID Creslan® LUXURY ACRYLIC FIBER

Creslan is a product of American Cyanamid Company, Wayne, N.J.

CCC

Commercial Carpet Corporation
Dept. AR-6
10 W. 33rd St., N.Y., N.Y. 10001
Attention: Walter Brooks

☐ Please send Acrylic 73 brochure and the booklet, "Installation Details for Carpeted Mechanical Access Systems."

☐ Please have a CCC man contact me.

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Pliolite: One-coat

surfacing for concrete

Texture paint made with Pliolite resin from Goodyear protects against water penetration and alkali attack.

Painting masonry surfaces doesn't have to be a costly multi-step process involving priming and finish coats. Today a single application over a bagged wall can do the job when you use texture paint made with PLIOLITE® resin. What's more, you get a completely waterproof coating. One that resists penetration by a wind-driven water spray at 98 mph for 8 hours. Paints made with PLIOLITE are the only coatings that meet this test in Federal Specification #TTP-00555A.

PLIOLITE-based paints cover easily—by spray, brush or roller—and have excellent adhesion on wet or dry surfaces. They come ready-mixed, so there's no time-consuming mixing on site. And there's a wide range of particle sizes to provide the exact dimensional effect you want.

PLIOLITE resin-based texture paints dry rapidly. Form tough, chip-resistant coatings that last and last. They have excellent resistance to chemicals, weathering and ultraviolet light. In fact, they surpass other commercial latex, alkyd and powder-water systems tested. Indoors and out.

For pre-cast and pre-stressed concrete components in manufactured housing as well as poured-in-place concrete panels, PLIOLITE-based texture paints offer easy application and years of functional beauty and protection. Your first step: get complete information about PLIOLITE. Call (216) 794-4867. Or write to Goodyear Chemicals Data Center, Dept. R-84, Box 9115, Akron, Ohio 44305.

PLIOLITE—T.M. The Goodyear Tire & Rubber Company, Akron, Ohio

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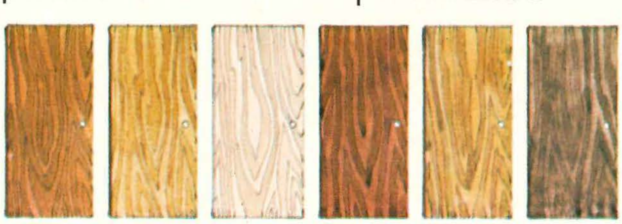
We make doors the way they should be made.

To begin with, G-P Curtis® Doors are made to order. And we make them like fine furniture. We start with real hardwood cores. Then, we hand select the veneers you want and make sure colors and finish are matched to your exact specification.



Finally, we pre-machine and pre-finish them to fit any size opening.

If you want slats or louvers, we'll make them too. And we'll pre-cut and pre-finish them to your specifications.

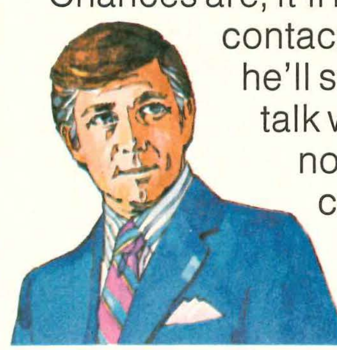
Just recently we expanded our line so you can now get fire doors with ¾ hour, 1 hour and 1½ hour fire ratings. Slats and louvers for fire doors meet U.L. codes. We also added plastic laminate doors into our line which you can order in practically any color or texture.

We even individually carton the plastic laminate and prefinished doors to prevent them from damage before installation.

We guarantee our doors, too. And all guarantees meet industry recognized standards. For details, please look in your Sweets Catalog, Section 8.

Now, you probably think we charge more. The fact is Curtis doors cost a lot less than you'd expect to pay for a really good door.

As for service, we have 110 distribution centers all over the United States. This means you can get custom made doors by just calling your G-P representative. Chances are, it'll be a local call. So contact him today. And he'll send out a man to talk with you. There's no charge for consultation.

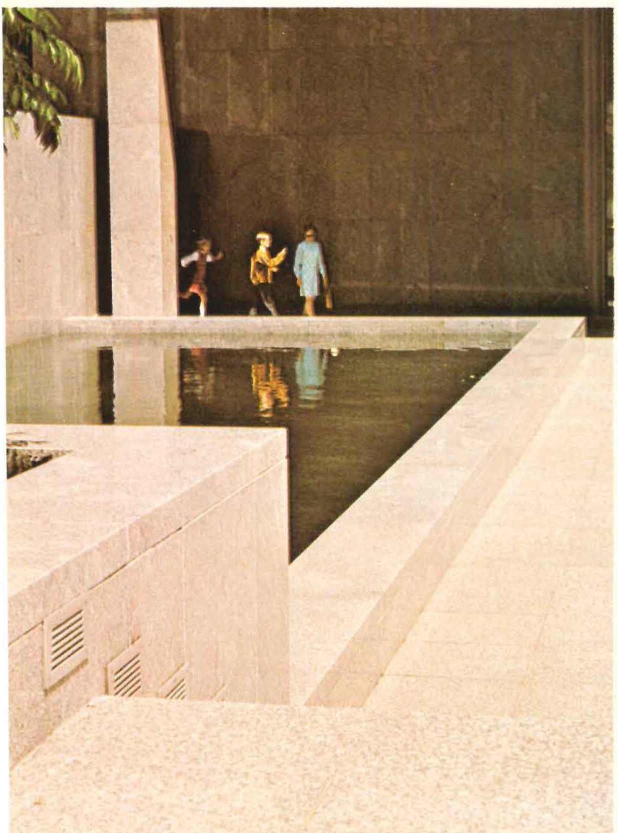


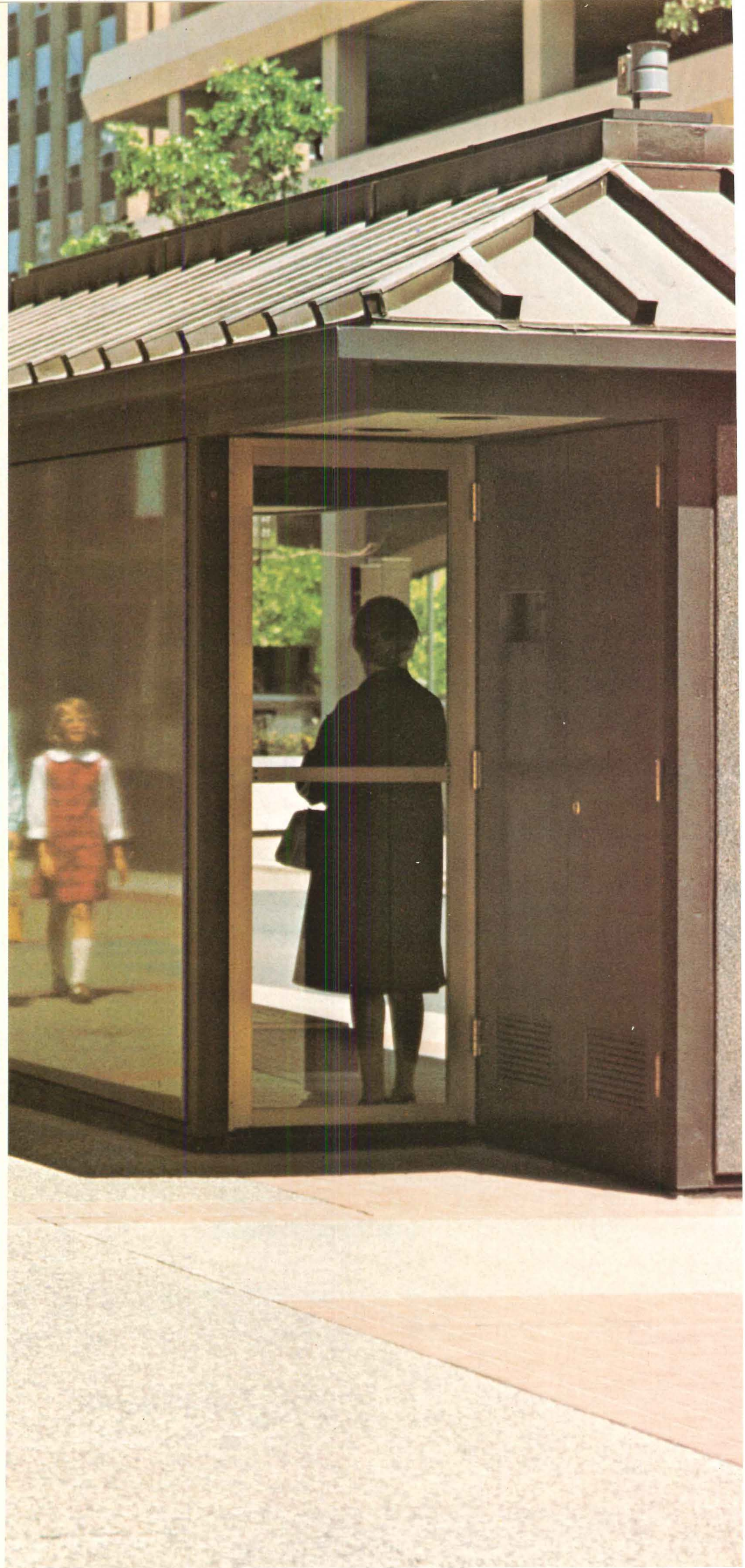
That's our story. And we think it's a pretty good story. After all, we make doors the way they should be made.

G-P CURTIS® DOORS

Georgia-Pacific
Portland, Oregon 97204

For more data, circle 45 on inquiry card

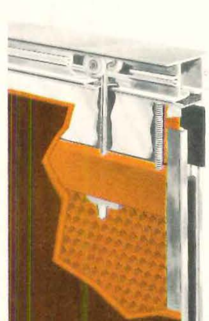





Movable Kwik-Wall
creates a beautiful look of permanency

Add flexibility and usability to your room space with Kwik-Wall, the movable wall partitions featuring qualities of a permanent wall . . . attractiveness, durability, sound control. The solid construction of Kwik-Wall makes each area it divides a separate room in the strictest sense of the word. Impressively designed, Kwik-Wall adapts to blend with any design motif, beautifully.

Portable Kwik-Wall (left) requires no tracks on ceilings or floors. Free-standing panels can be stored anywhere, easily rolled into position on optional retractable wheels. Select 1-3/4" standard or 2-1/4" deluxe Kwik-Wall.



Track-Mounted Kwik-Wall glides with ease on inconspicuous ceiling tracks; needs no floor guides or rollers. Pocket doors provide complete, coordinated concealment of panel storage. 2-1/4" deluxe or 3" master thickness.

Over 1500 Decorator Facings to select from to give your decor the look of permanence. Chalkboard, chalk trays, corkboard finishes available, in addition to pass-doors with cylinder locks.

One-Hand Locking Operation, insert crank and give a half-turn; spring-loaded top rail expands firmly against ceiling, forming effective sound seals around each panel perimeter.

the permanent look in movable walls

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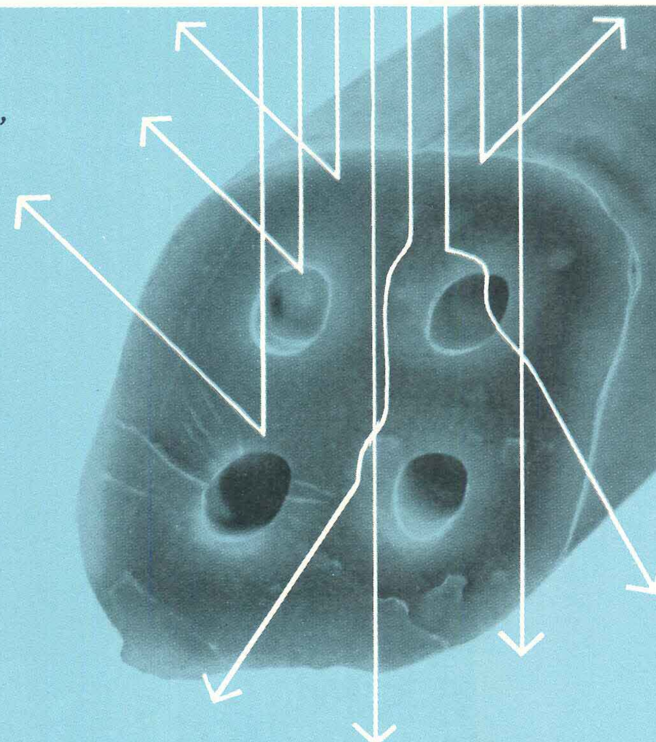
Carpet of Antron® stays new-
through heavy, round-the-

looking
clock hospital traffic.

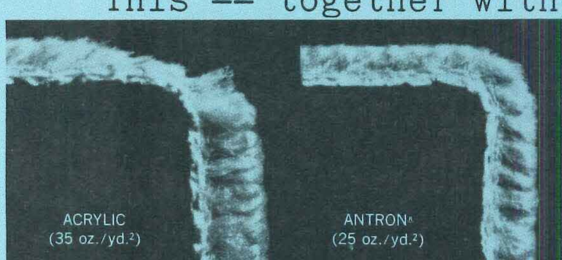


A single filament of "Antron" at 1200x magnification. Illustrates scattering of light to minimize appearance of soil.

Montgomery General Hospital, Olney, Md., like most hospitals, must cope with heavy wheeled vehicle traffic, tracked-in dirt and spills on its carpet. Yet the carpet must retain its attractive appearance while keeping maintenance costs at a minimum. To meet these and other requirements, carpet with pile of Antron* nylon was installed in the project for which William H. Metcalf, Jr., was the Architect and Emily Malino, the Interior Designer.

The magnified cross-section (right) shows how four precisely placed hollow chambers traverse the length of each "Antron" filament. This unique fiber structure refracts and scatters light to minimize the appearance of soil without significant sacrifice of color clarity or luster.

This -- together with the fiber's abrasion and matting resistance -- means carpet of "Antron" retains its original fresh appearance longer than carpet of other fibers. Concentrations of spots and soil tend to even out and blend into the overall color and texture of the carpet. Maintenance costs are minimized by the need for fewer wet cleanings than with carpet of other fibers. And even after repeated shampooings the carpet returns remarkably close to its original appearance.



Simulated stair-edge abrasion test showing carpet pile fiber wear in level-loop carpets.

What's more, "Antron" is tough because it's nylon, the abrasion-resistant, long-wearing carpet fiber. So the carpet will have a long life. Compare the performance of carpets in this stair-edge test (above).

Specify "Antron" for high-traffic commercial carpet. It has no equivalent in long-term appearance retention.

For more facts and a mill resource list, write to Du Pont, Contract Specialist, Room 5638/103, Eden Park, Wilmington, Del. 19898.

DU PONT
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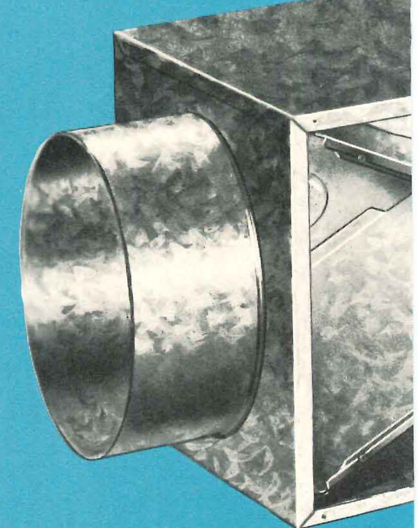
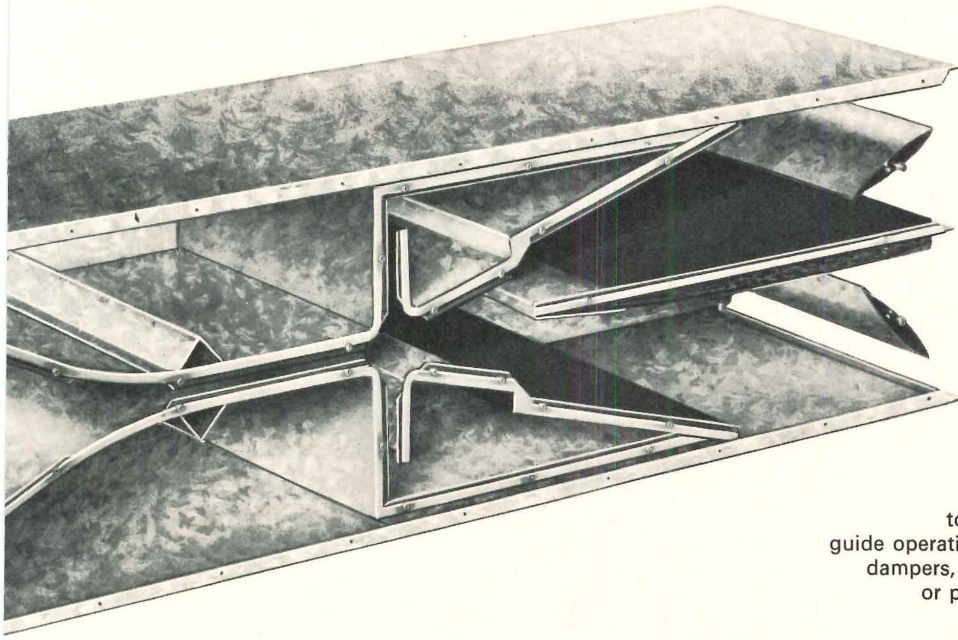
*Du Pont registered trademark. Du Pont makes fibers, not carpets.

For more data, circle 49 on inquiry card





The only moving part in fluidic terminal unit is on the wall

Simple bi-metal thermostat reacts to temperature changes immediately to guide operation of system. There are no automatic dampers, bellows operators, linkages, electrical or pneumatic connections to make noise, require maintenance, or wear out.

A variable air volume terminal with no moving parts • No limitations on ceiling construction or type of outlet • Close temperature control ± 3/4°F • Quiet • Lower cost

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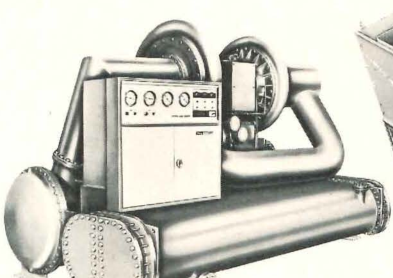
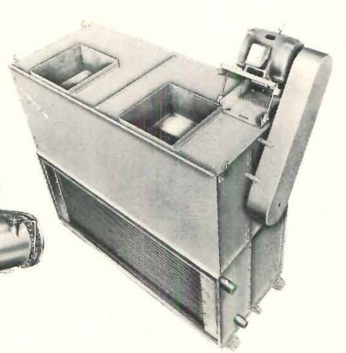
F.A.C.T.S. delivers air to room at full velocity and attains its design throw under all load conditions. No throttling or dumping of air. No need for delicately counterbalanced discharge grilles or special ceiling diffusers. And the constant fan volume eliminates the problems involved with varying volumes and varying duct pressures.

Patented fluidic terminal units are manufactured in sizes from 120-2400 cfm. Several outlets can easily be ducted from a single unit. System-matched chillers and air handling units customize F.A.C.T.S. to wide variety of applications. Ideal for office buildings, schools, institutions. Mail coupon today for full details.

System-Matched Line of Chillers and Air Handling Units





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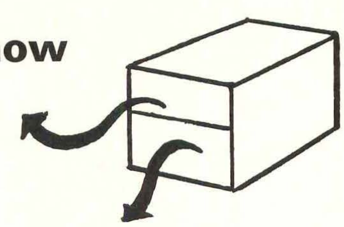

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Gentlemen:

☐ Have your representative call for F.A.C.T.S. demonstration.

☐ Rush new Data Booklet containing complete details on new F.A.C.T.S. System.

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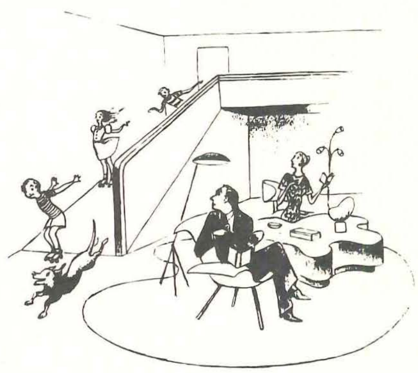
continued from page 63

"Machine for Sliding"?

In regard to your April 1972 article covering Richard Meier's house for a family of eight and the ramps ". . . which are alive with running, shouting youngsters," I am reminded of an illustration by Mary Petty in T. H. Robsjohn-Gibbings' *Homes of the Brave* (Alfred A. Knopf, 1954).

This may not be a "machine for living" but it appears to be a machine for sliding and slipping.

Brent M. Porter
Department of Architecture
The Pennsylvania State University



OFFICE NOTES

NEW FIRMS, FIRM CHANGES

We are pleased to announce the formation of a new Architectural firm in Chicago, Illinois. The firm is **dac inc—Design-Architecture Consultants,** 718 W. Hubbard Street, Chicago, Illinois 60610. The firm is headed by Robert G. Lyon.

Don Forst & Roy McCutcheon Architects announce the opening of their offices at 181 West Old Country Road, Hicksville, L.I., New York.

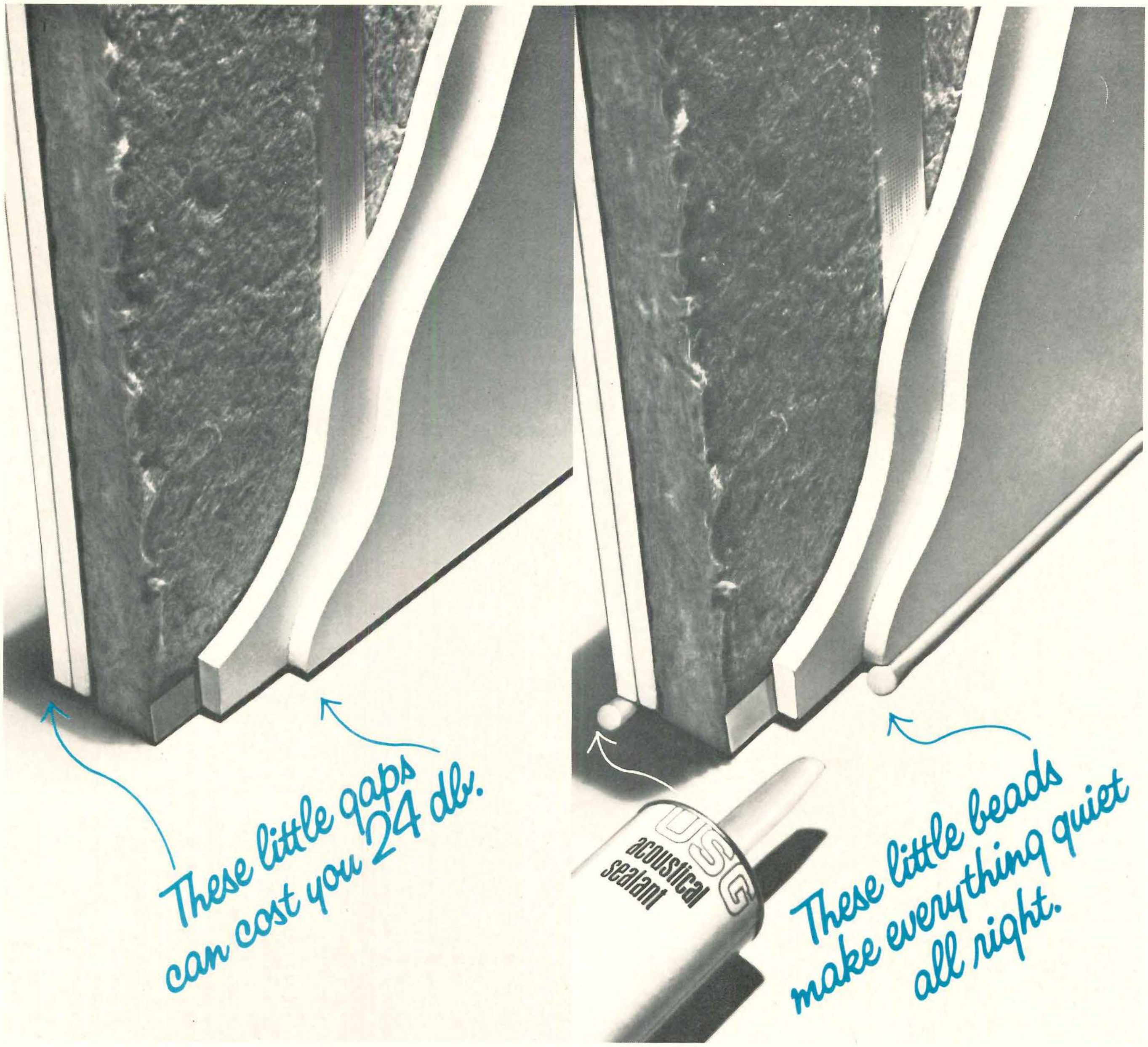
Harvey B. Gantt, AIA, and Jeffrey A. Huberman, AIA, have formed the firm **Gantt/Huberman Associates, Architects and Planners,** 212 South Tryon Street, Suite 717, Johnston Building, Charlotte, North Carolina 28202.

We announce the association of Hushang Seihoun, Architect Tehran, Iran and Khalili of Moser, Architects, AIA, Los Angeles, California in the firm of **Seihoun-Khalili Architects, AIA.**

Stanley Pomeranz and Robert Hogrefe have formed **Intradesign Group Inc.,** an architectural design firm. Intradesign, located at 170 Fifth Avenue, N.Y.C., was founded by two partners of Pomeranz, Jacob, Merriweather & Hogrefe, Inc., and will specialize in architectural and interior design and corporate facilities planning.

Albert H. Jost, architect announces the formation of a new partnership **Jost/Becker/Jost—Architects.** They will be located at Suite No. 4, 324 South Fourth Street, Pekin, Illinois 61554.

M. Paul Friedberg & Associates, Landscape Architecture and Urban Design are pleased to announce the appointment of William B. Kuhl and Allen C. Pearson as associates in the firm.



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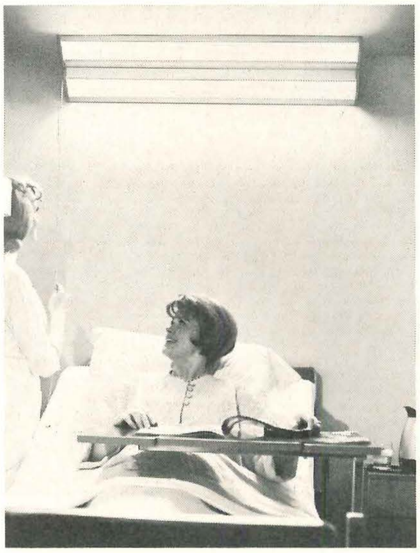
LPI designs for specific applications



LPI Serenity Luminaire

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A reading light for patients . . . an examination light for doctors.

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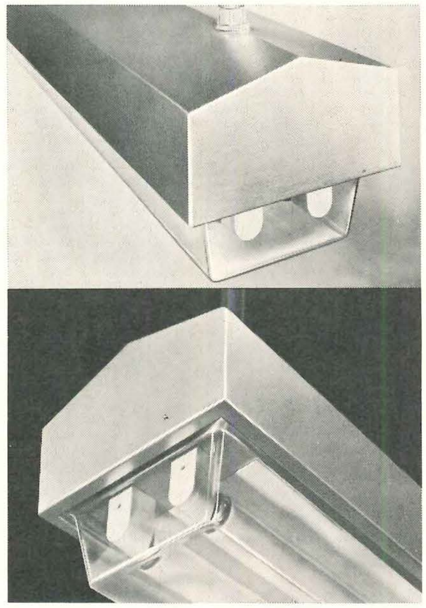

LPI Ellis Luminaire

For hospital kitchens, laundries, service areas.

Watertight. Easy to clean. No refuge for bacteria.

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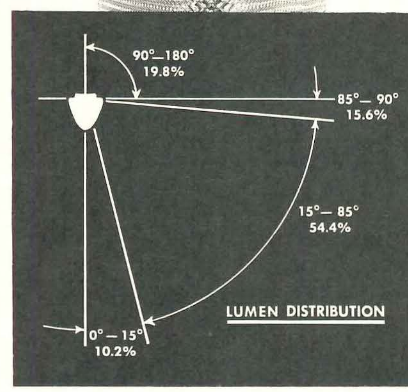

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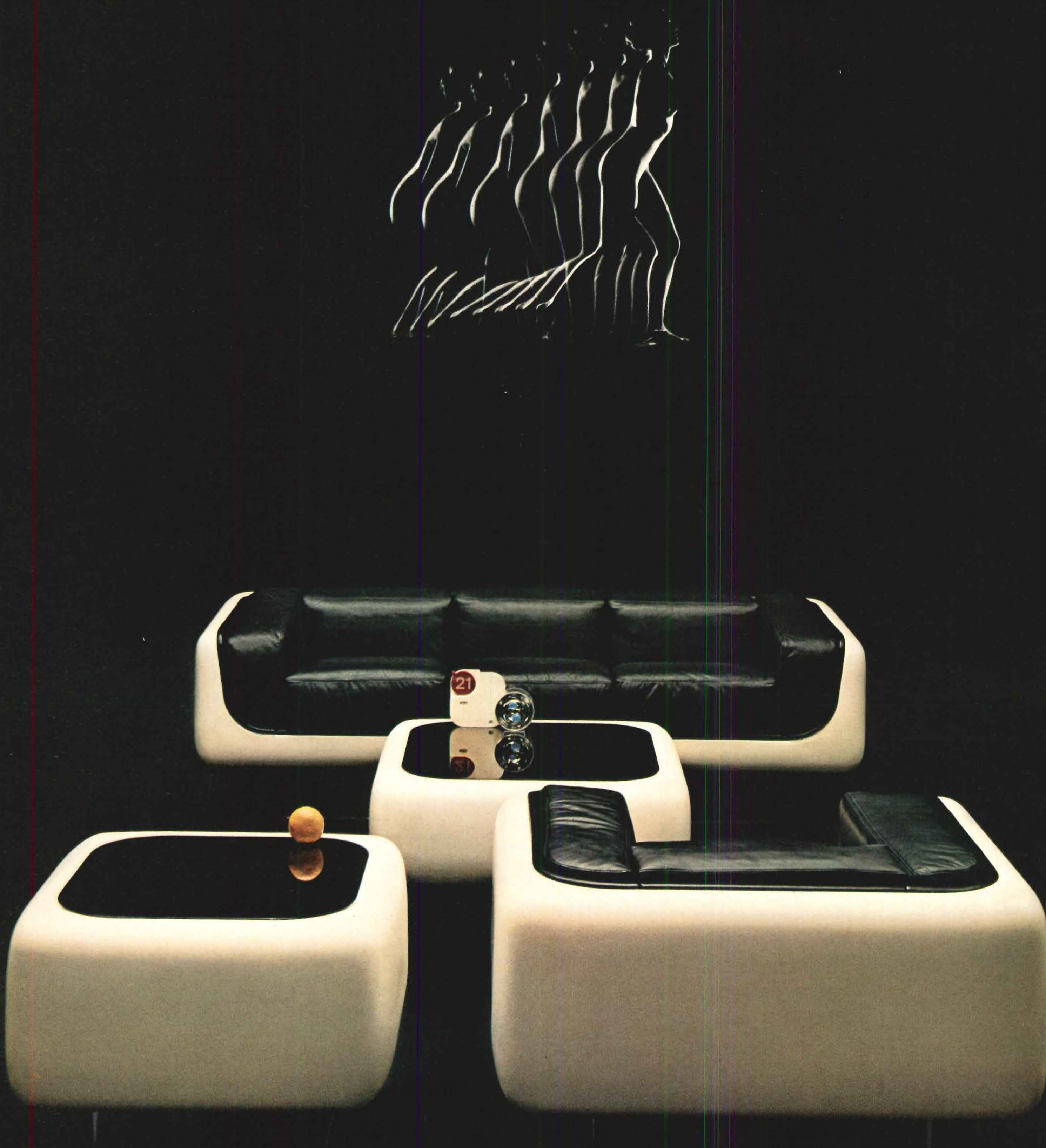

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Joseph W. Molitor photos

SCULPTURAL FORMS FOR PHARMACEUTICAL RESEARCH

Springing in inclined forms from the summit of a long ridge in North Carolina's Research Triangle Park, the laboratory and corporate headquarters of the Burroughs-Wellcome Co. is marked by the sculptural invention that has long made Paul Rudolph's work so arresting. It is also filled with the characteristic complexities that make his work, in some quarters, controversial.

The client wanted a building that was shaped to his needs but remained architecturally distinctive—a building that would leave a forceful after-image in the minds of all who see it. Rudolph wanted the building to be a man-made extension of the ridge. He also wanted an opportunity to explore the variety of spatial relationships that diagonal framing could produce.

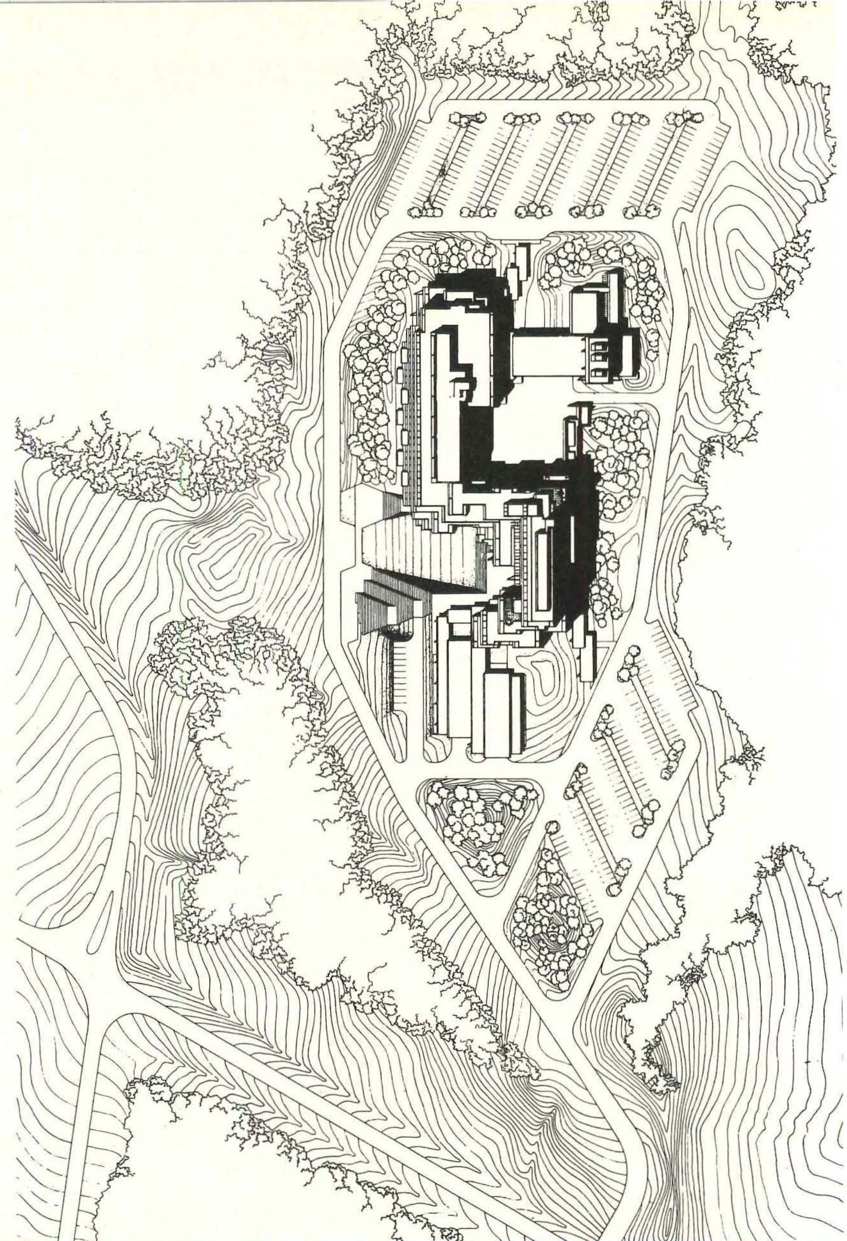
With only minor reservations, both owner and architect are well pleased with the final product.

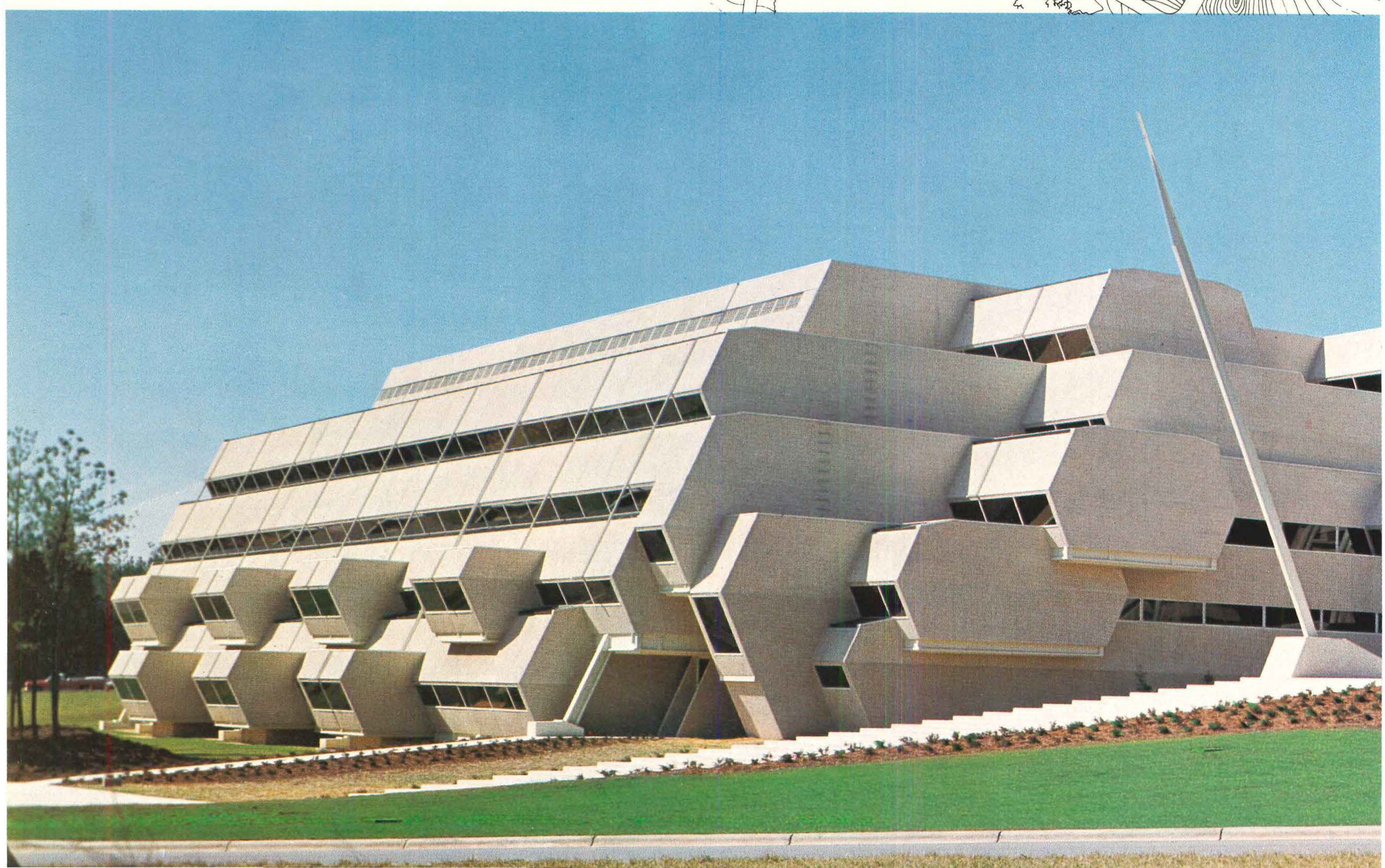
Viewed from almost any vantage point, Burroughs-Wellcome is a large and complex structure. It encloses some 300,000 square feet of laboratory and administrative space distributed unevenly over five stories. In plan, the building forms a giant "S" with opposing arms that embrace a main entry court and a large service yard. Reception, cafeteria, library, auditorium and administrative offices flank the entry court. Laboratories, research offices and quarters for test animals surround the service yard.

The handsomely textured exteriors are finished in a limestone aggregate which is sprayed in place to a plastic binder. The same finish is used selectively inside.

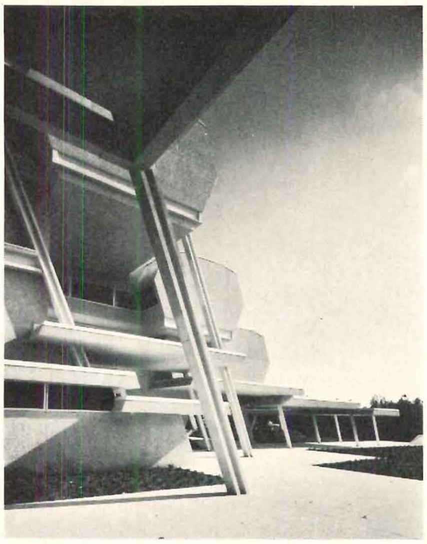
Flexibility was a primary programmatic goal. Each major area in Rudolph's plan—laboratories, administration and support services—can be expanded by simple, linear addition. To prepare for this eventuality, the architect left the expansible ends of the building expressed in a somewhat random pattern of flattened hexagons (photos right). Any of the elements can be extended horizontally without disturbing the building's visual order. This device, combined with an elaborate articulation of parts, complicates the elevations considerably but gives the building an agreeable scale and plunges it squarely into the realm of dynamic architectural sculpture. The complications of the exterior assert themselves inside with no less force. The three-story lobby space (photo page 99) closes dramatically overhead in a turbulent and visually compelling spatial composition. The administrative offices are shaped at the exterior wall to receive skylights that admit daylight from an unseen

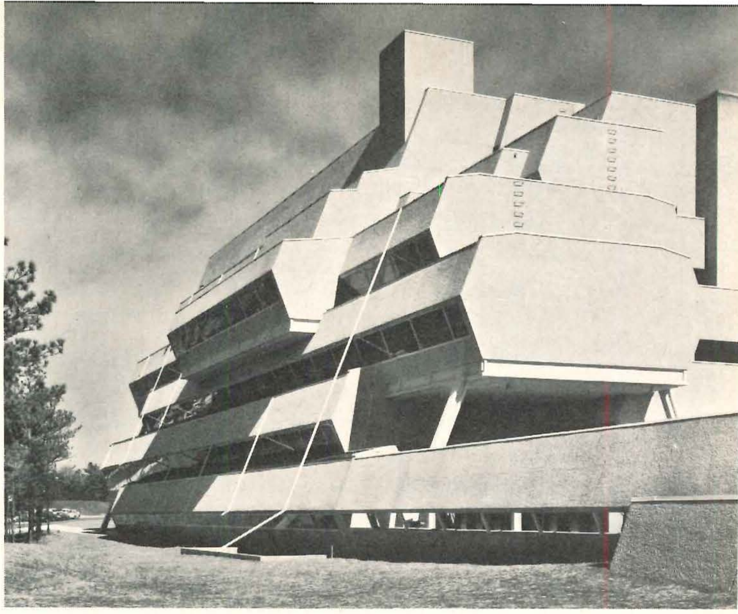
(text continued on page 98)

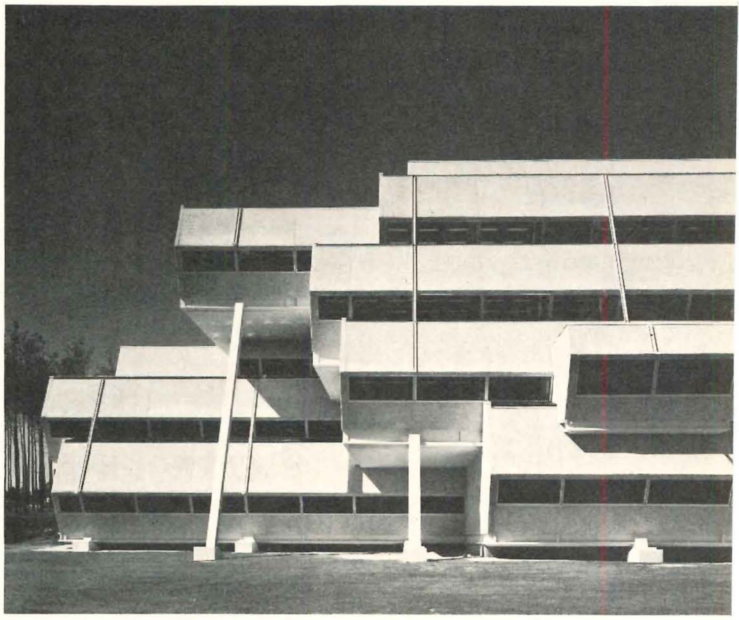




The site is 66 acres of rolling woodland approximately equidistant between Raleigh, Durham and Chapel Hill. Because Burroughs-Wellcome is research oriented, its ties to the three surrounding universities are immediate and vital. Much of the rolling woodland has been left intact and new planting around the building and in the parking areas will gradually heighten the site's natural qualities.





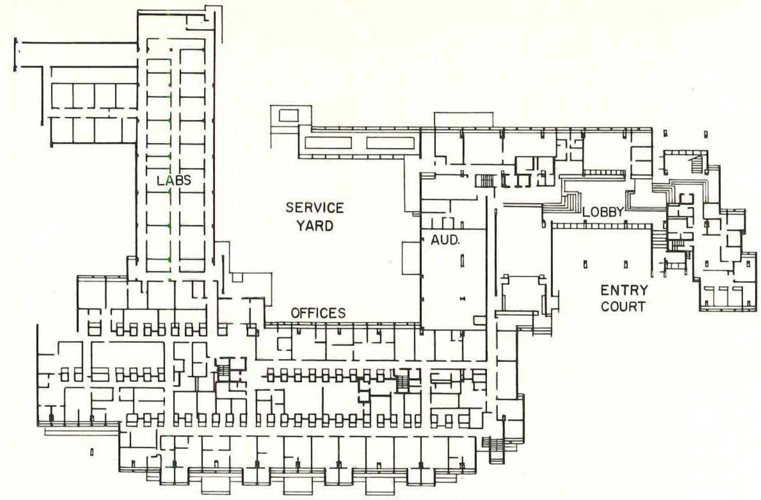


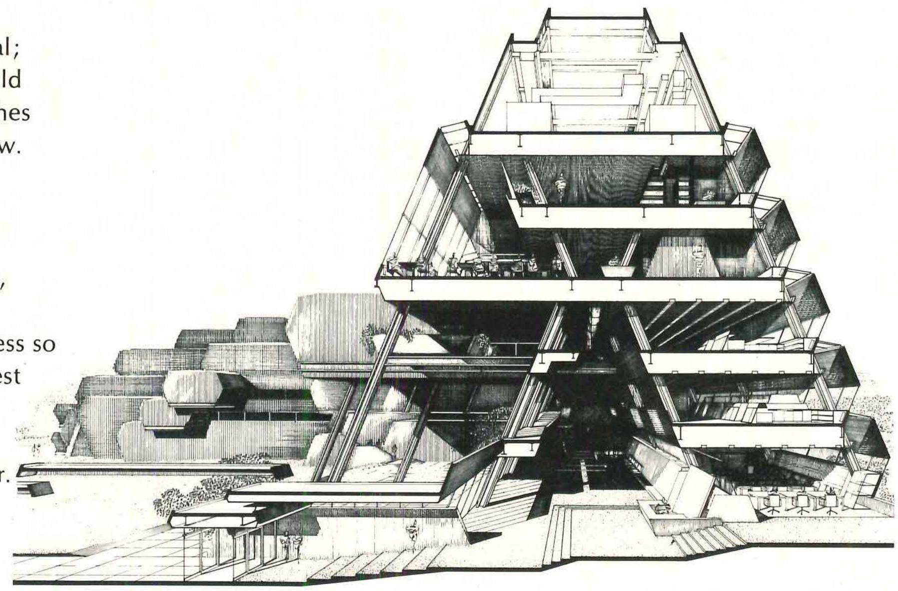
and unexpected source. The board room, over the cafeteria, opens out through a canted window wall to one of the fairest scenes in North Carolina: a timbered Piedmont plain with the spires of Chapel Hill in the distance.

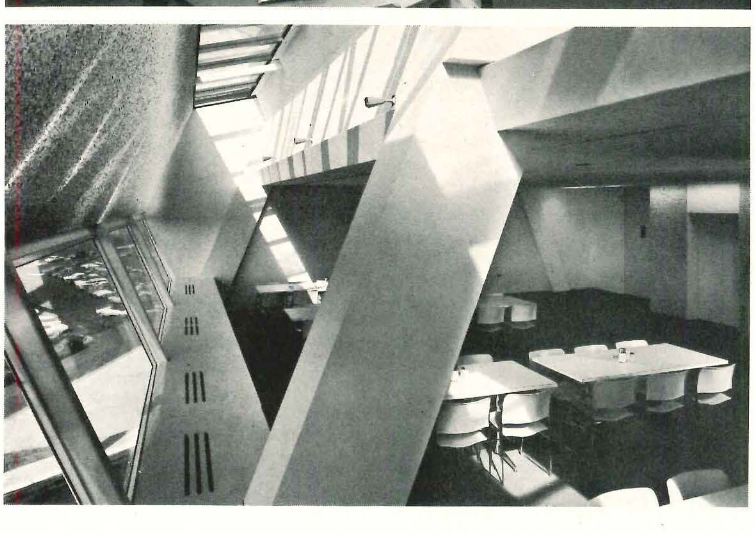
The structure is an eccentrically loaded, trapezoidal steel frame with columns inclined at 22½ degrees (see section at right). To absorb the substantial bending moments, floor beams and columns are linked in the transverse direction by rigid moment connectors. Tie beams, below grade, take up the horizontal component of all gravity loads.

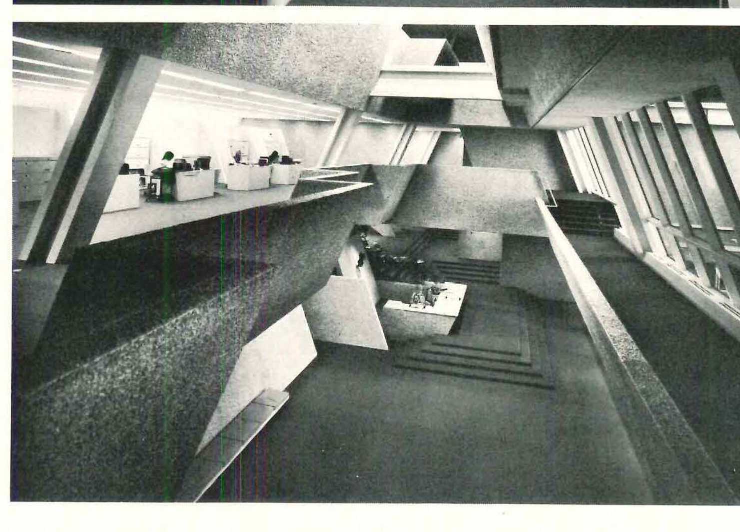
Throughout the building, the inclined columns seem to emerge, disappear and re-emerge freely. When they lie in the plane of a wall, they are simply integrated without fussy detail. When they stand independently, the space flows around them with only the merest hint of obstruction. Diagonal relationships are present everywhere and right-angled elements, when they appear, do so almost apologetically. The spaces are particularized and personal; as much the opposite of universal space as Rudolph could make them. A simple and consistent vocabulary of finishes gives the administrative areas an easy continuity and flow.

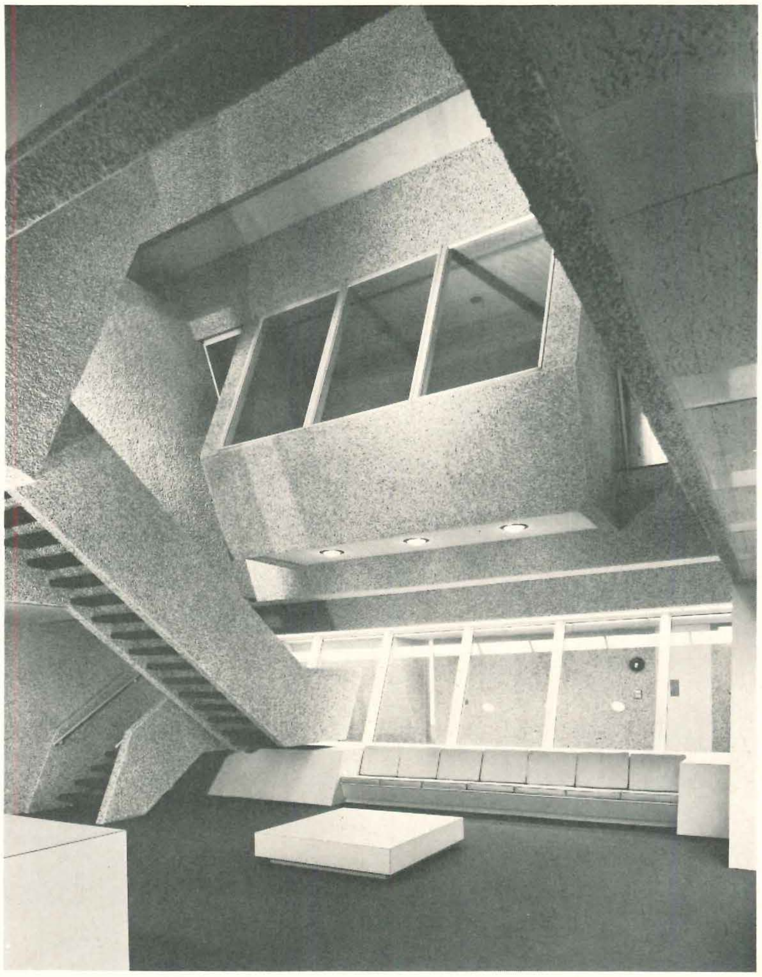
The Burroughs-Wellcome building is not for those who are disturbed by departures from the norm. The sharp-eyed visitor may find details that are not completely resolved. But if there is bravura here, it is more than balanced by solid accomplishment. The building is functional—probably no more and no less so than similar facilities of more routine design. What is best about Burroughs-Wellcome is the sense of exhilaration and spatial excitement it awakens. That it achieves so much of each is a tribute to both architect and owner.







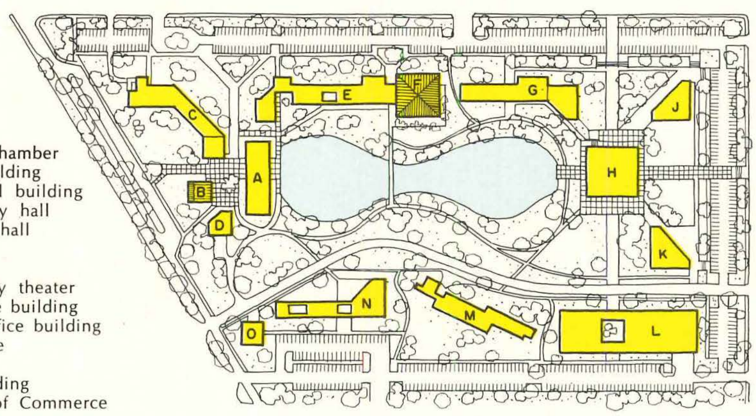




Diagonal lines of force make themselves felt throughout. The sloping shafts that line the corridors are used for storage and for housing the heavy mechanical service requirements of the laboratory and research spaces.

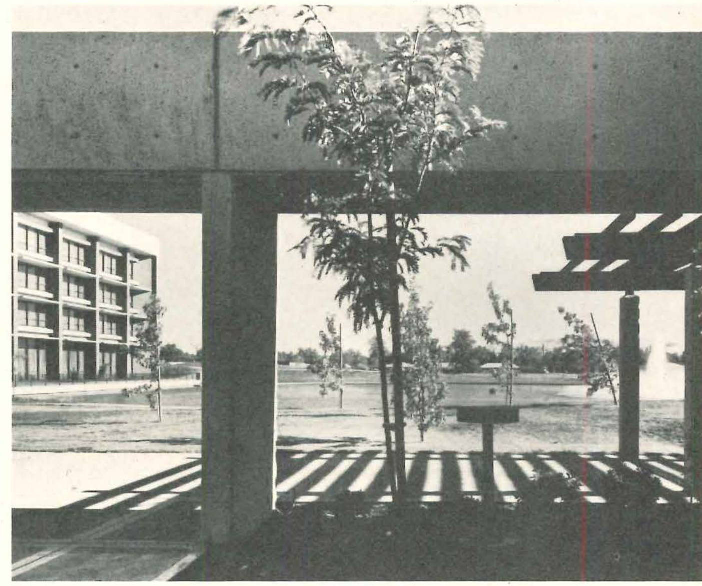
BURROUGHS-WELLCOME CO., Research Triangle Park, North Carolina. Architect: *Paul Rudolph*; engineers: *Lockwood-Greene Engineers*, Inc.; contractor: *Daniel Construction Co.*

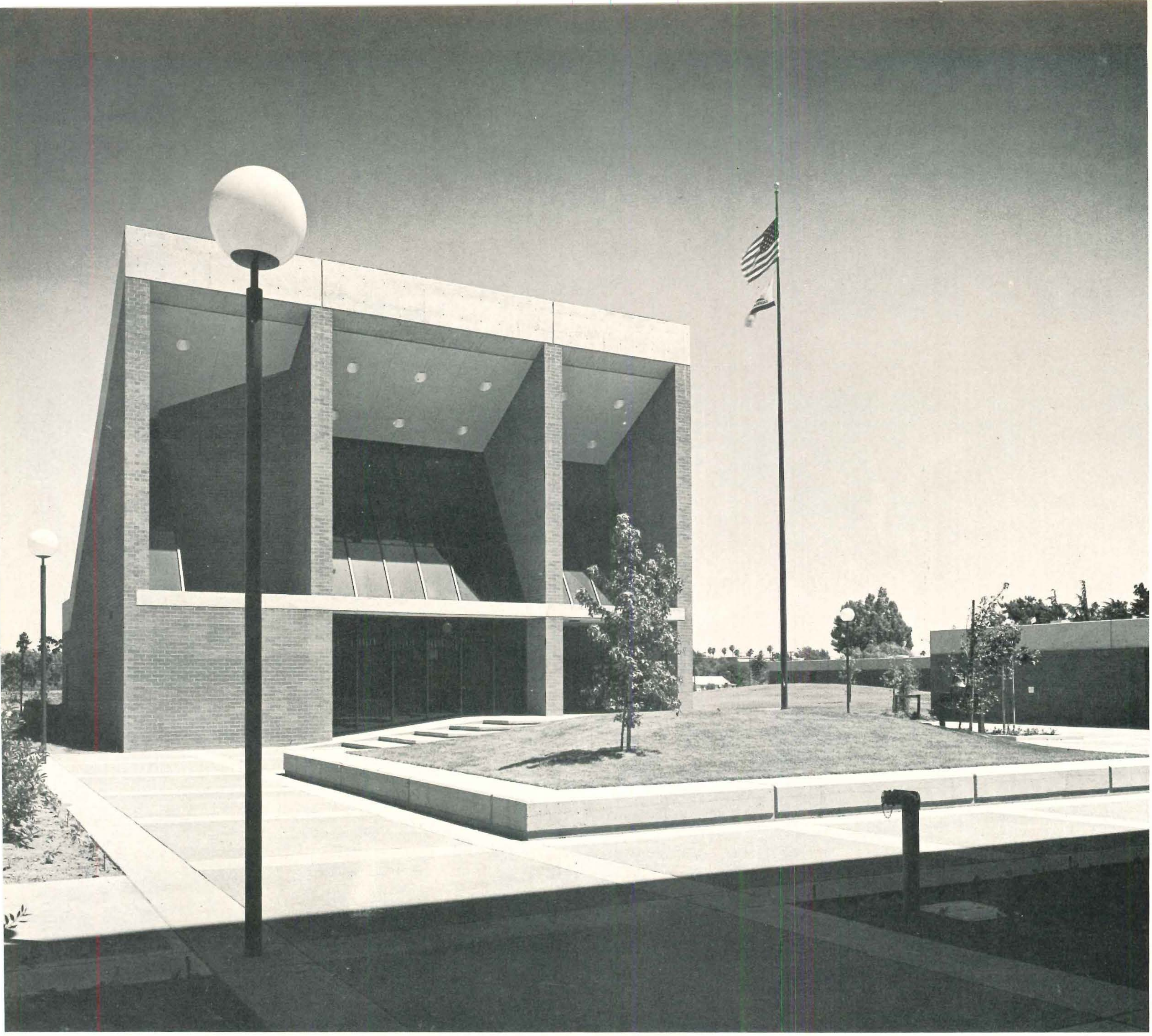
GOOD DECISIONS AND GOOD DESIGN PROVIDE A SMALL TOWN WITH A DISTINGUISHED CIVIC CENTER

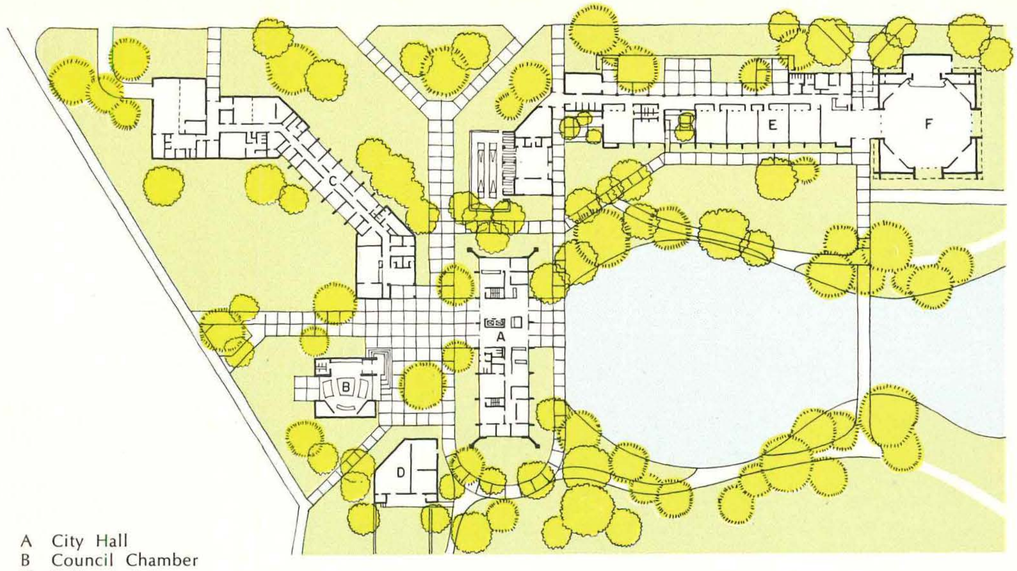


A City Hall
B Council Chamber
C Police building
D Mechanical building
E Community hall
F Assembly hall
Future:
G Library
H Community theater
J State office building
K Federal office building
L Post Office
M School
N Civic building
O Chamber of Commerce

Joshua Freiwald photos



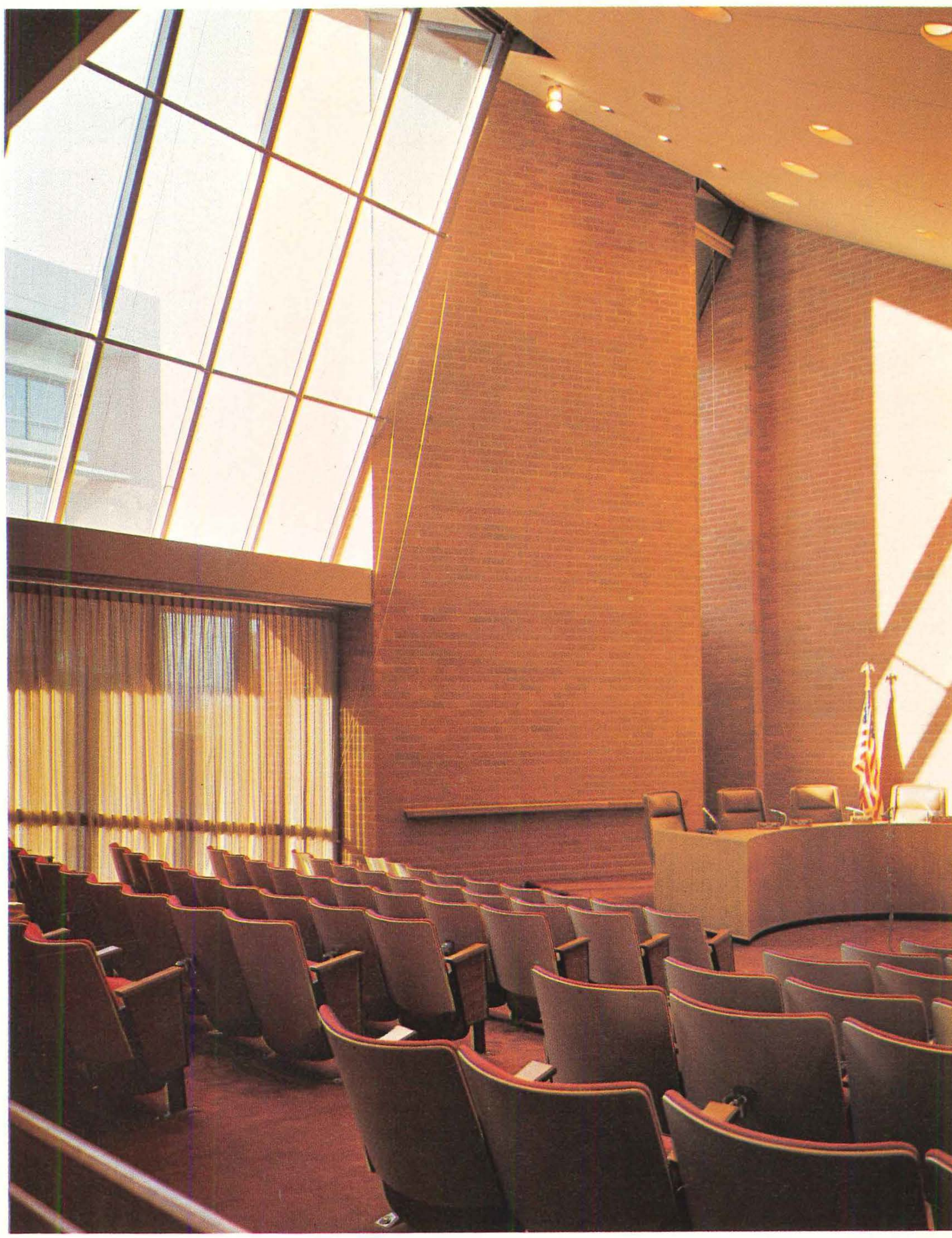


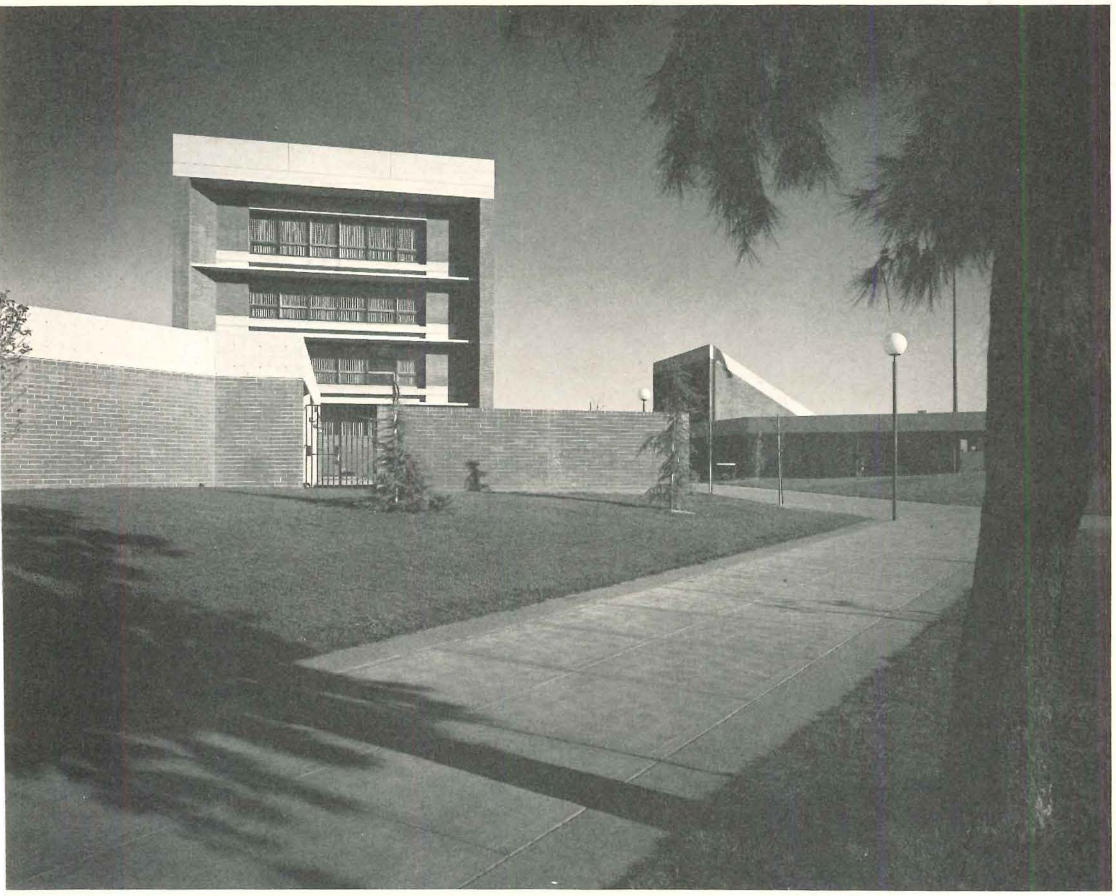


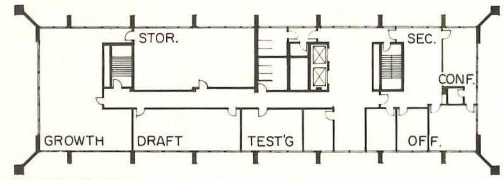
A City Hall
B Council Chamber
C Police building
D Mechanical building
E Community hall
F Assembly hall

Few small towns have the good fortune to have so handsome a civic center as the little northern California town of Fairfield near Travis Air Force Base—or the good sense to make the far-sighted decisions that lead to such a result. It was good fortune, in 1953, that made available to Fairfield a 33-acre tract of land just north of its business section, used during World War II for temporary housing. But it was good sense that the City Council decided to buy it and to keep it intact for eventual use as a civic center. For 15 years the city worked toward this goal. In 1967, emulating three nearby communities whose fine new civic centers had resulted from competitions, Fairfield decided to hold an architectural competition, invited all registered architects in northern and central California to participate, and appointed Louis DeMonte, architect for the Berkeley campus of the University of California, professional advisor. A jury of five professionals chose the design of Robert Wayne Hawley of San Francisco as the winner. His master plan grouped the proposed buildings around a man-made lake (whose jet fountains very practically serve the cooling system) in a parklike setting. The first-phase buildings are now completed: four-story city hall, separate council chamber (a strong statement that the people make the decisions), police administration building (with no jail), community activities building, and 750-seat assembly hall. The same materials—warm red brick and concrete—are used throughout (except for the copper roof on the assembly hall), a limited palette handled with rare versatility and grace to produce an overall design of great distinction.

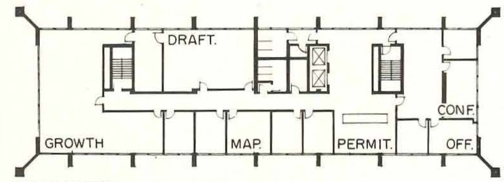
FAIRFIELD CIVIC CENTER, Fairfield, California. Architects: *Robert Wayne Hawley & Associates.* Engineers: *GFDS Engineers,* structural; *Harding, Miller, Lawson & Associates,* foundation; *Yanow and Bauer,* mechanical/electrical. Consultants: *Wilson, Ihrig & Associates,* acoustical; *Len Koch Co.,* cost. Landscape architects: *Ribera & Sue.* Contractor: *Stolte Inc.*



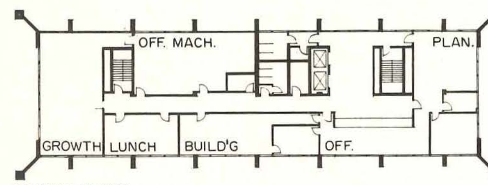




FOURTH FLOOR



THIRD FLOOR



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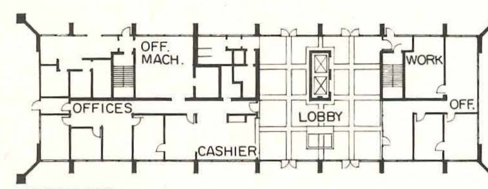
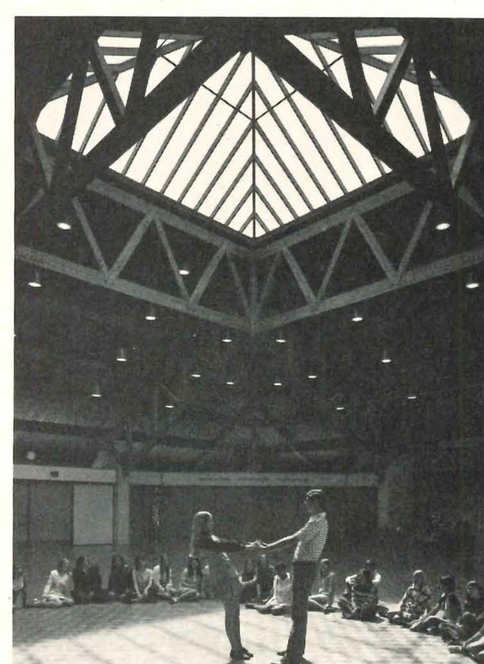


FIRST FLOOR



A lively variety among building exteriors gives each its own expression but clearly states that it is one part of a whole design. The city allocated $20,000 for art works to be used in the buildings. The architect advised on selection of 35 prints and 40 commissioned photographs of the area by Ernest Braun. The city bought 40 paintings as prizes in a city-sponsored exhibition.

THREE RENOVATED MANHATTAN RESIDENCES

1 A remodeled townhouse for the City's Commissioner of Parks and Cultural Affairs

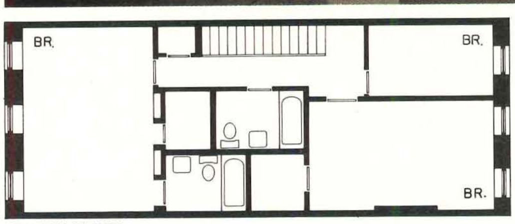
When their sons had grown and gone off to college, the August Heckschers decided the time had come to physically reorganize their townhouse on East 94th Street. With architects Joseph and Mary Merz, they decided to relocate the second story living room to the first floor and convert the existing living room to a master bedroom. The third floor, previously bedrooms, was redivided to provide an intimate, informal living area (photo right) and a press shop for the owner whose hobbies include fine printwork. The fourth floor guest sleeping quarters were left almost untouched, but the winding stair, linking all the levels, was partially rebuilt.

A large built-in seating unit defines the formal living room (photo page 106) which looks through a glass wall into a landscaped garden. As the owners are art collectors, wall surfaces throughout the house have been designed to receive paintings and sculptures.

The final result is a series of living, working and sleeping spaces that are exceptionally comfortable and appealing because they have been well planned, well proportioned, and invested with more than the ordinary architectural concern.

HECKSCHER TOWNHOUSE New York City. Architects: *Joseph and Mary Merz*. Mechanical engineers: *Dalton & Dunne*; landscape architect: *A. E. Bye*. Contractors: *Gulli Construction*.

John T. Hill photos



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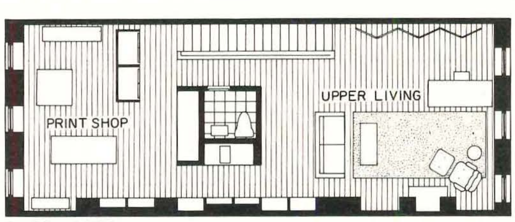

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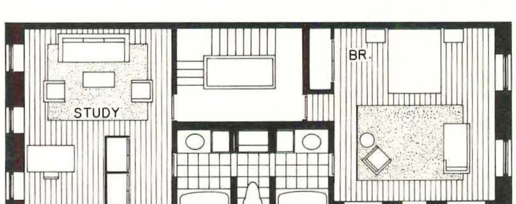

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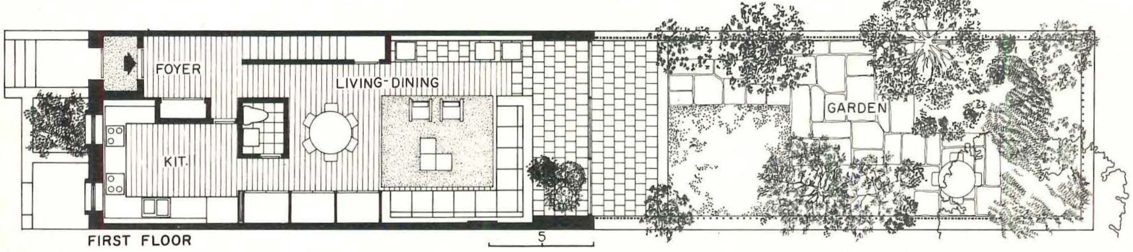


FIRST FLOOR

Combined living and dining space (photo above) is the ceremonial heart of the house. Built-in seating and cabinets are designed by the architects to complement the other furnishings, many of which are modern classics. Lighting is used with drama to highlight paintings.

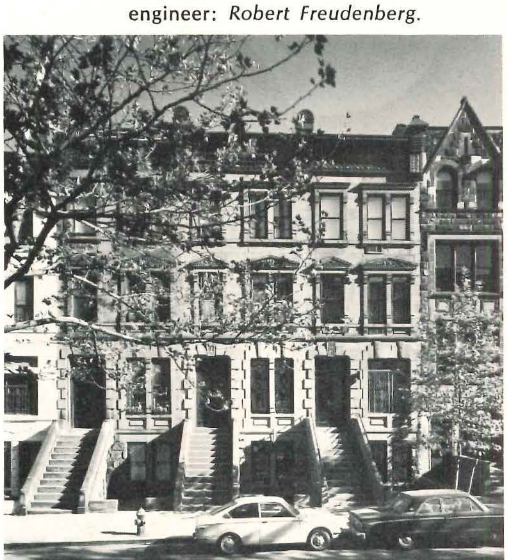
2 A light and cheerful house in the city for an architect and his family

The usual deficiencies of New York brownstones—narrow width and dark interiors—were present when owner-architect Peter Samton and his wife began renovating. They had a tight budget but wanted openness, daylight and as much flexibility in spatial and furniture arrangements as possible.

The width was fixed at 16'-2" by the enclosing party walls. The street elevation was established at the building line. But by demolishing a small existing extension of the building at the rear, and by substituting a generous window wall, natural light could reach deep into the waist of the building. Living spaces are therefore defined by furniture groupings rather than transverse walls.

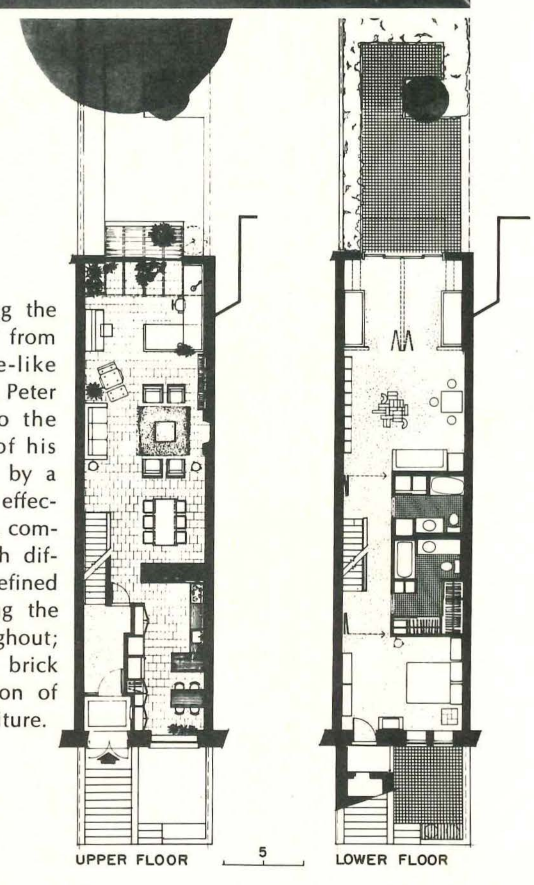
Living room, kitchen, dining and work spaces occupy the parlor floor; sleeping quarters and playroom are below. A small, intimate court, at rear, extends the play space and furnishes a pleasant taste of outdoors. Completing this handsome renovation are two rental apartments above.

Renovated Town House, New York City. Architect: *Peter Samton* (partner, *Gruzen & Partners*). Mechanical engineer: *Robert Freudenberg*.



David Hirsch photos

In addition to flooding the main floor with light from the new green-house-like window wall, architect Peter Samton has added to the bright spaciousness of his renovated brownstone by a number of simple, but effective devices: creating a completely open plan with different "room" areas defined by low cabinets; using the same flooring throughout; exposing the original brick walls; and the selection of light, well-scaled furniture.



3 A duplex apartment that overlooks Central Park and provides a rich selection of spaces for people and art

Architects Robert Stern and John Hagmann have completely remodeled this duplex apartment on Manhattan's West Side. When they began, the apartment had a narrow, confined kitchen and no double height space. The architects opened up the space vertically to provide a view to Central Park for both living room and bedroom balcony above. They also combined the existing kitchen and pantry to create a comfortable, eat-in kitchen (see overleaf).

"The use of curved walls," says Robert Stern, "derives from an orderly functional flow from the relocated entrance to living and dining spaces" and from a desire "to have the dramatic view unfold slowly to the visitor."

The owners are art collectors and asked the architects to provide suitable spaces for the display of various sized paintings and sculptures. The architects have done this using cabinets and cases and recessed shelving with special skill to give the individual pieces sympathetic scale and background.

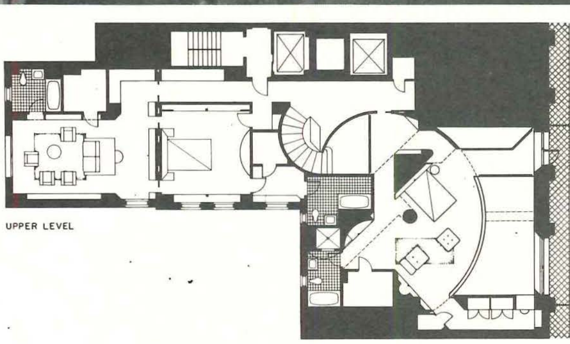
The apartment's spaces are orderly but flow into each other easily around curving wall planes. The high degree of detailing is consistent and intelligent throughout.

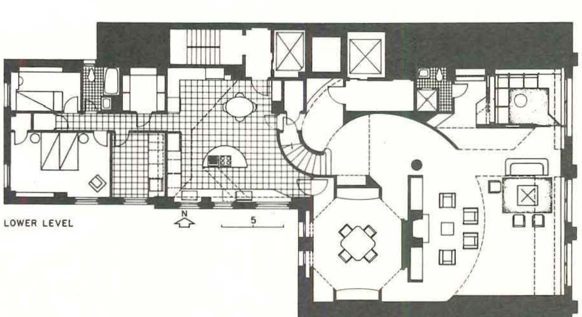
Duplex apartment, New York City. Architects: *Robert A. M. Stern* and *John S. Hagmann*. Engineers: *Robert Silman* (structural); *George Langer* (mechanical). Contractor: *Garson-Bergman, Inc.*

Maris-Semel photos

Architects Stern and Hagmann retained the existing staircase but modified it by new construction to link the living room and master bedroom above. A bridge connects the bedroom balcony with a narrow terrace that overlooks the park. In the kitchen, the existing beam structure was left largely untouched.

All photographs courtesy of *House Beautiful*. Copyright the Hearst Corporation, 1972



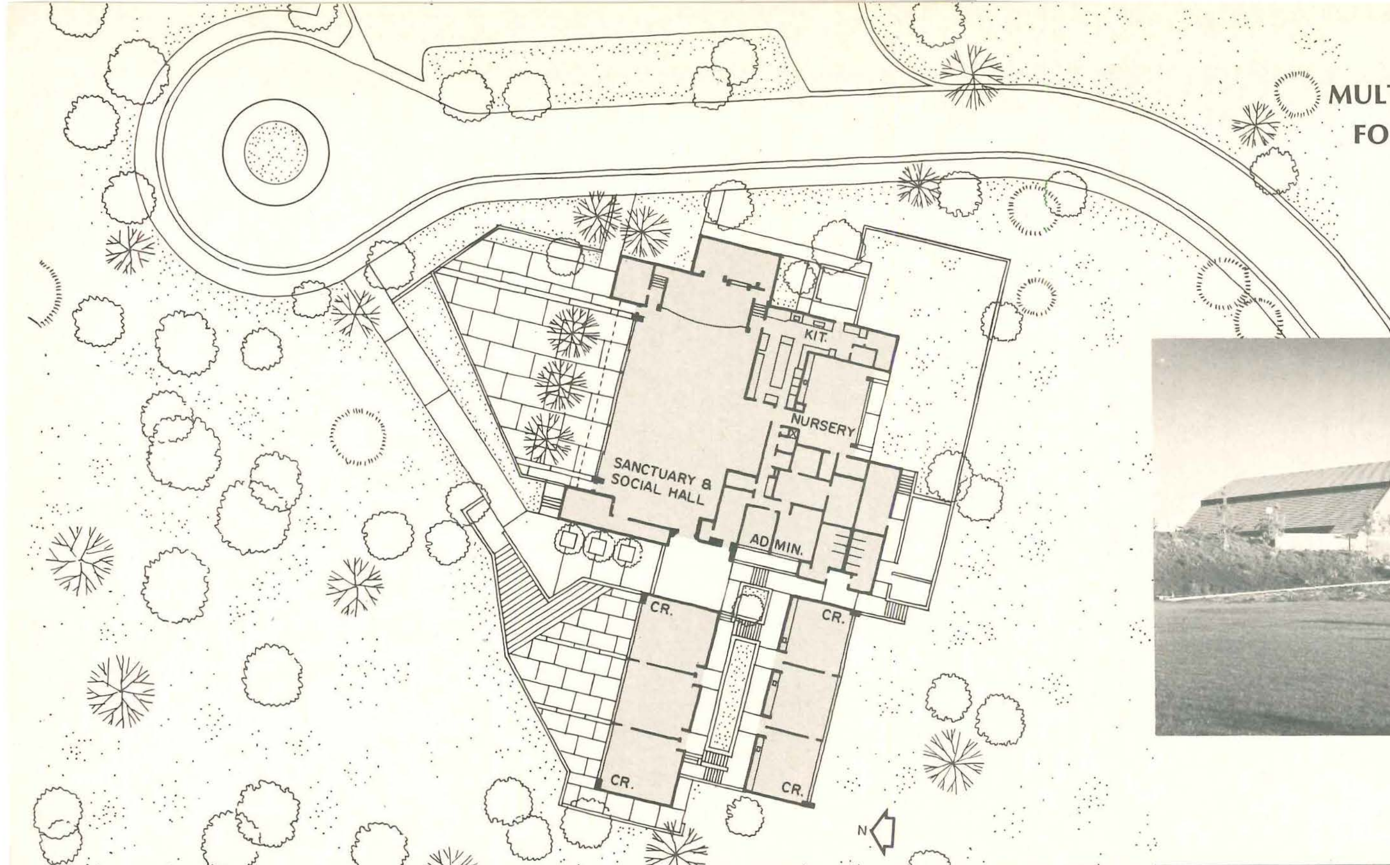


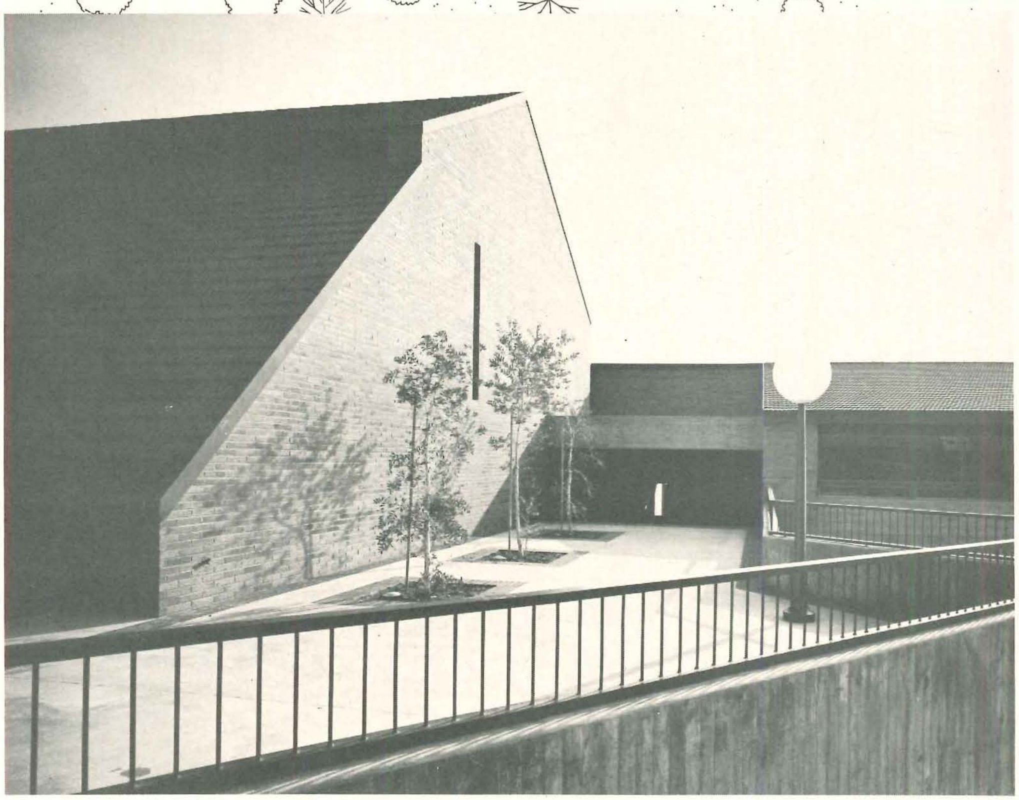
EXCEPTIONAL SITE FOR AN EXCEPTIONAL TEMPLE

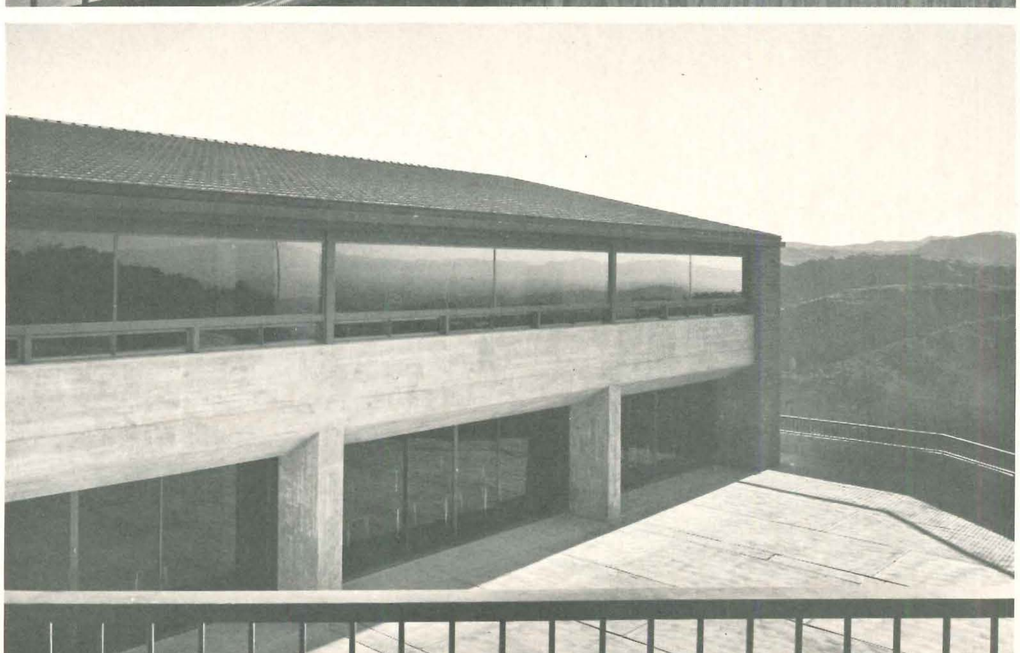
The Stephen S. Wise Temple in the Santa Monica Mountains above Bel Air, Los Angeles, houses a variety of facilities for congregational activities but the organization of its plan and its elegant design give it an air of essential simplicity, strong and positive in its own right.

Jordan Lagman photos

MULTI-LEVEL BUILDING FOR TEMPLE-SCHOOL COMPLEX





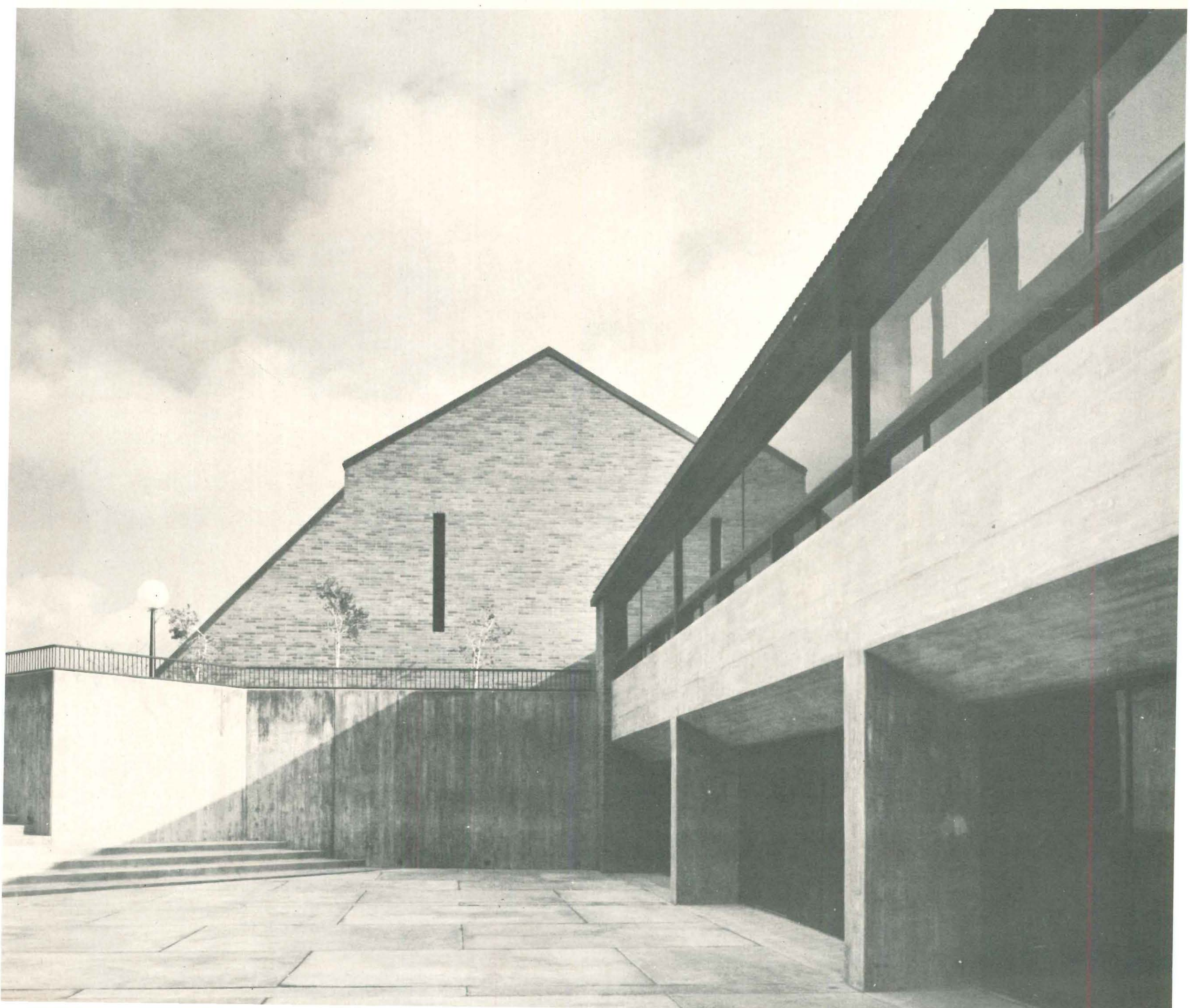


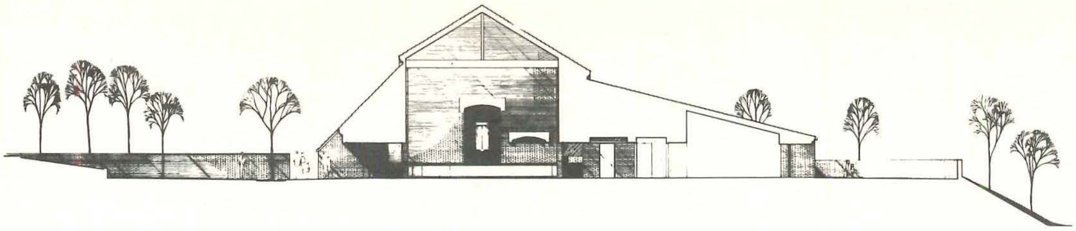
This tranquil temple complex, with its variety of facilities in the tradition of Jewish religious buildings, is located on a site in the Santa Monica mountains with a superb view which gives no clue to the proximity of the site to the Bel Air section of Los Angeles. Careful grading provided locations for the several elements of the complex without changing the natural variation in levels. The building—it is actually one building, disposed so that each of its parts has, in effect, an identity of its own—is on four levels: sanctuary level and the three levels of the religious school. The various elements are tied together by the handsome brown concrete tile roofs whose elegant profiles are a strong aspect of the character of the complex.

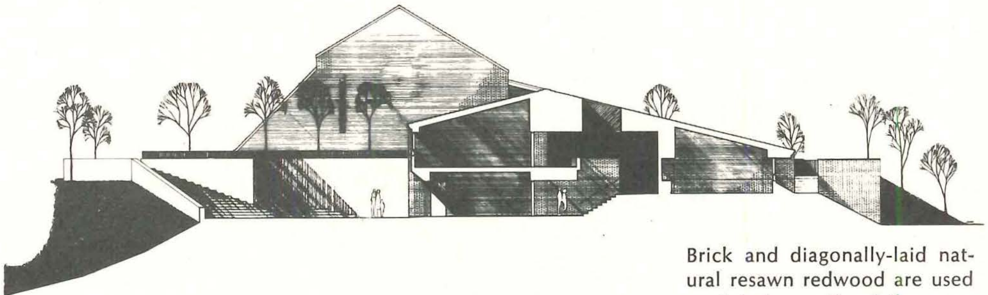
The complex presently consists of the sanctuary, offices, school, nursery and two playing fields, but this is just part of a master plan which eventually will provide a permanent sanctuary northeast of the driveway circle, a chapel, and outdoor amphitheater and additional space for offices and classrooms. The present sanctuary will then become the social hall and multi-purpose room. A small university is to be built on the adjacent site, forming an unusual center for religious and intellectual study. The entrance to the present complex is level with the parking areas, and overlooks a great court of irregular shape with spectacular views to the mountains. The monumental steps leading down to the court and its outlook make it an exceptional gathering place for outdoor events. At one side of this court is one of the two two-story classroom wings; it is separated from the other wing by a semi-enclosed court. Seven rectangular wells, whose size and depth vary with the mass of the roof structure, admit daylight to the court which serves as entry for both the offices and the classrooms, and connects by stairway with the sanctuary.

The character and quality of this building derive from its architect's sure sense of form and knowing use of materials. In essence it is a simple building, though its functions are multiple, but it is never stark. The choice of materials, and their handling, and the limited palette of colors and textures, contribute to this quality. Materials are natural and warm in color: red-brown face brick, natural resawn redwood siding, board-formed concrete left natural, laminated wood beams, brown concrete tile, dark-brown painted wood and metal trim.

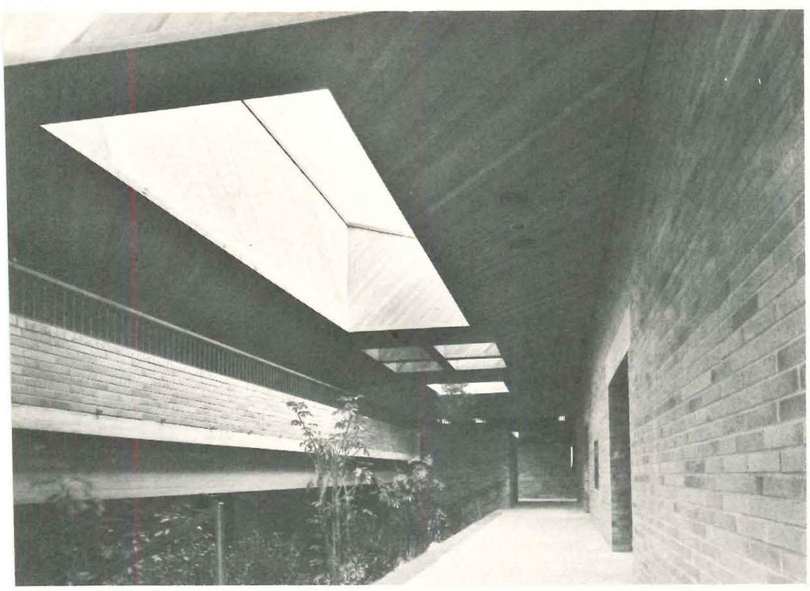
STEPHEN S. WISE TEMPLE, Los Angeles, California. Architects: *Daniel L. Dworsky & Associates.* Engineers: *Erkel, Greenfield & Associates,* structural; *Takahashi, Tobian & Horiuchi,* mechanical; *Saul Goldin & Associates,* electrical. Landscape architect: *Emmet Wemple.* Contractor: *Conant & Lieberman.*

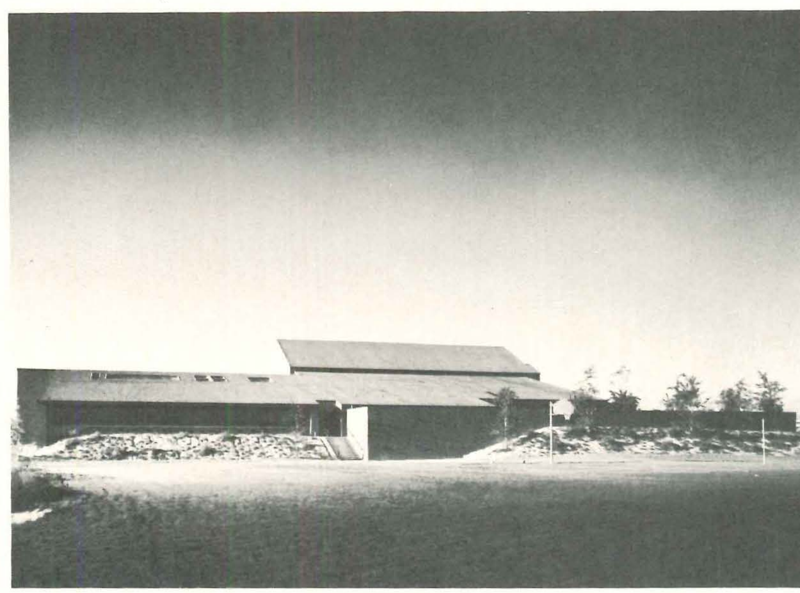






Brick and diagonally-laid natural resawn redwood are used on interior walls of the present sanctuary, and are the principal materials in the semi-enclosed court between classroom wings. Classroom structures are framed in natural concrete. The tile-covered roofs (below) slope to the playing fields on the south side of the complex.





HOSPITAL PLANNING RESEARCH

BUILDING TYPES STUDY 436

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Three important and fundamental new approaches to hospital planning and design are reported in this study. Each one represents substantial research in specific areas of health care facilities design.

The article by George Agron beginning on this page represents several years of research in systems building approaches to hospital design. While the client, the Veterans Administration, is a military one, applications for the research are already being made in the civilian sector. One such, the Saddleback Community Hospital in Laguna, California, is illustrated.

The second report also covers research for a military client, the Department of Defense, and also has broad civilian applications. Its approach is from a demographic data base translated into hospital space requirements. The work was done in two phases by a joint venture of RTKL Inc. and the Health Services Department of Westinghouse Electric Corporation.

The third report covers the work of Clibbon and Sachs at the Architectural Research Unit in Philadelphia. This report on industrial techniques spaces in hospitals is sequel to the report on clinical spaces which appeared in RECORD, February, 1971.

Building systems research for VA applied in both public and private hospitals

By George Agron
senior vice president
and James Borthwick
senior designer
Stone, Marraccini & Patterson

1

If one measures American hospitals by the profusion of their activities, equipment and physical components, there is little question that their complexity has increased more in the past thirty years than in the previous 200. This enormous increase in complexity has not only given rise to great increases in construction, operation and maintenance cost, but also has reduced in relative, if not absolute terms, their adaptability to respond to continuing changes in health service, medical education and research.

With rare exception, hospital design and construction techniques have given ground grudgingly to the problems which increasing complexity proliferates. As new mechanical, electrical, communication and transport systems have been injected into the already congested ceiling sandwich of the typical hospital to meet new health service needs, the depth of that sandwich has been increased by that minimum required to "get it in," without recognition of the fact that there is a point of no return in this approach to hospital development. Beyond that point, operation, maintenance and adaptability are critically impeded, at the very time when these functions are most critical to effective hospital life.

Figs. 1 through 5 (next page) show a family of maintenance and mechanical problems typical of contemporary hospital design and construction. While each of these problems is no doubt individually soluble through more prudent design and construction, the fact that the problems are extensive and pervasive indicates that no casual approach to solution will be of any significant value. The cost effects of such design, construction, operational and maintenance problems cannot be wholly quantified, but they are sufficiently visible and forceful to lead one to look at new approaches to hospital development from a completely fresh point of view.

While serious efforts have been made to attack such problems, these efforts have been in the main limited to single-hospital solutions, having no broader application. That such efforts are not more general is, at least in part, due to the consideration that there are few owners or agencies responsible for large scale multiple hospital development programs, and fewer among these who have committed themselves to generic research in hospital development.

The Veterans Administration (VA) of the United States Government owns and operates the largest hospital system in the nation. There are currently 167 hospitals under its jurisdiction, and those eligible for care in VA hospitals number in the millions. VA hospitals differ enormously in age, size, functional programs, physical settings and in design. VA hospitals exist in every climatic and seismic zone in the country. Over the years, the responsibility of the VA for health service has increased to the extent that the agency now operates the largest health system in the United States, and it has increasingly important responsibilities in medical education and research.

It is in this environment that the Veterans Administration has undertaken the most comprehensive research effort to date to reduce the complexity of hospitals to manageable terms on a basis applicable to large hospitals and to successive projects. Their approach is to develop a nationally applicable hospital building system that will permit a wide range of hospital programs to be met, and will provide better order, discipline and integration to hospital design and construction procedures. It is the intent thereby to improve hospital performance and adaptability, to reduce hospital development time, and to gain cost benefit from these improvements.

The research task itself, under direction of the Research Staff, Office of Construction of the Veterans Administration, has been conducted by a joint venture of San Francisco architectural firms, Stone, Marraccini and Patterson, and Building Systems Development, Inc.

The work has been done in three phases. The first, published by VA in 1968, established the feasibility of integrating structural, mechanical and electrical systems for VA hospitals, and explored two optional systems development programs. The first, somewhat parallel to the SCSD school systems program in California which has been widely reported elsewhere, is dependent on a guaranteed market as an inducement for manufacturer's development of new compatible subsystems, whose integration would achieve certain cost and performance objectives. The second alternative for development was based on the rationalization of existing practices, using currently available products on the existing market, without the necessity of market guarantee or industrial innovation. The latter option was considered the more appropriate to VA needs, and became the basis for succeeding developments.

Phase II undertook the development of a prototypical building system for that portion of hospital buildings housing nursing care and related functions. This was published by VA in 1971. Phase III has been completed, and its publication is expected in mid-1972. It extends the prototypical building system to the whole hospital, and is the basis for the discussion which follows.

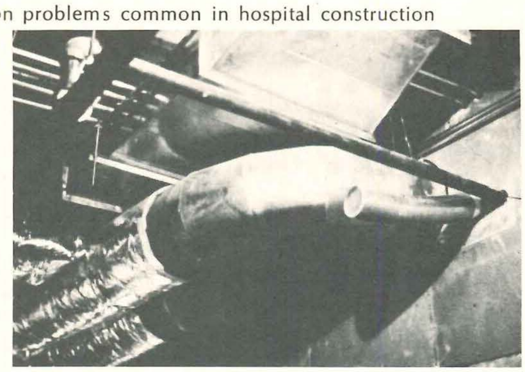
VA systems approach: from the general to the particular

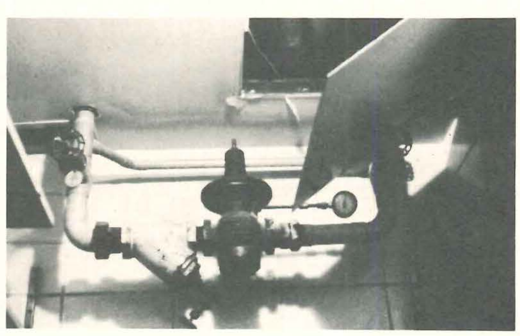
The VA building system tends to general solutions of what are, in essence, general problems. The systems approach, therefore, is one of strategies for planning and construction which establish a basic compatibility, while at the same time allowing wide latitude for different project requirements, different siting conditions and different materials most suitable to the specific problem. In the long run, the generic nature of the VA building system provides a useful basis for continued effectiveness and development. The system can absorb new building products and improved design and construction methods as they become available so as to keep pace with the advances of industry, as well as with new needs in service, teaching and research functions of the VA.

In basic overview, the systems approach is concerned with modular planning systems, with selected physical subsystems (structure, ceilings, partitions, HVC, plumbing and electrical), and with their integration in hospital design.

In terms of planning, the hospital is considered as an assembly of large scale service modules (10,000 sq. ft.), having variable content and organization. These modules have certain common characteristics which permit their assembly into hospitals of widely different size, program, siting and esthetic treatment. The common characteristics of these service modules include their essential mechanical, and electrical independence, the commonality of interstitial space which separates functional and service activities, and common subsystem characteristics and disciplines.

Figs. 1 to 5. Maintenance and congestion problems common in hospital construction





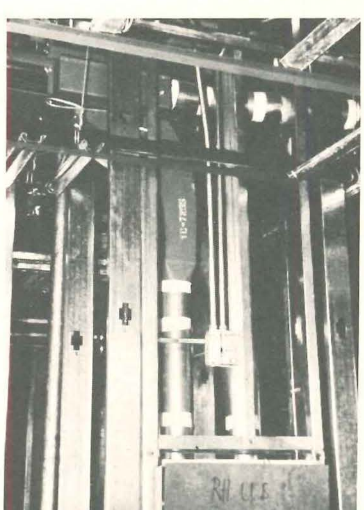
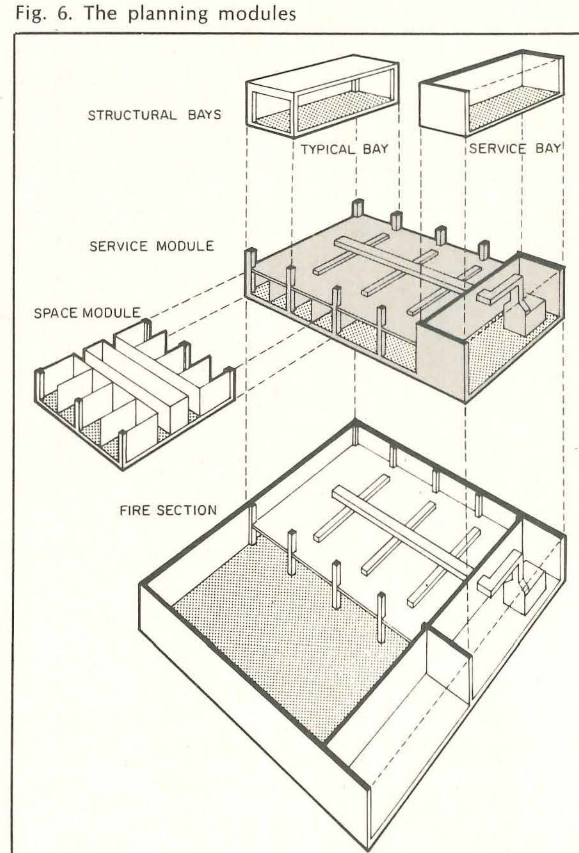


Fig. 6. The planning modules



The discussion which follows details the main aspects of the prototypical building system and design methodology, and provides examples of their application to VA hospital design and to the design of Saddleback Community Hospital in California, which is discussed toward the end of this article.

The VA building system is essentially composed of a data base of user needs and performance requirements, and a design manual of planning modules and selected building subsystems.

The data base expresses the functional, environmental, psychological and esthetic needs of the user. These needs are subsequently interpreted as functional and performance requirements which determine space allocation, arrangement and environmental characteristics.

The design manual is derived from and responds to user needs and functional performance requirements.

The planning modules (Fig. 6) are ranges of space with an assured capacity to accommodate a wide variety of hospital activities. They represent, in essence, large scale assemblies of the building subsystems which, simultaneously, take into account functional space, service space and life safety requirements. The integration of these interrelated aspects within a basic geometrical and dimensional discipline provides a useful and versatile design tool that can help to expedite preliminary planning. Alternative plan configurations can be quickly generated and evaluated relative to the particular program, budget and site requirements. Thus, all the relevant factors of the building organization can be brought together and reconciled at a very early stage in the design process.

There are two families of subsystems

The prototypical building system currently encompasses two families of subsystems, shell and services, which together constitute about two-thirds of the cost of contemporary American hospitals. The shell family (Fig. 7) includes the structure, ceiling and partition subsystems. The service family (Fig. 8) includes the heating-ventilating-cooling, plumbing and electrical subsystems.

The VA building system deals with the design of subsystems on a generic basis; that is, it provides a range of options for appropriate selection for particular project development. Each of the generic design options has different space, performance, or cost characteristics. The VA building system integrates these different options for the selected subsystems within a basic design format which permits compatibility between all subsystems of a given project, regardless of the selected option.

The selected subsystems have categories of "permanent" and "adaptable" components. Permanent components are those whose introduction, modification or removal would require major building reconstruction. Accordingly, such components are designed for sufficient capacity to meet projected increases in demand. Permanent components include the basic structure, the ceiling assembly, two-hour fire-separations, primary piping, main HVC duct, and wireway mains. Adaptable components can be relocated, altered, added, or deleted without major building reconstruction. They include air handling equipment, local service distribution and terminal components, par-

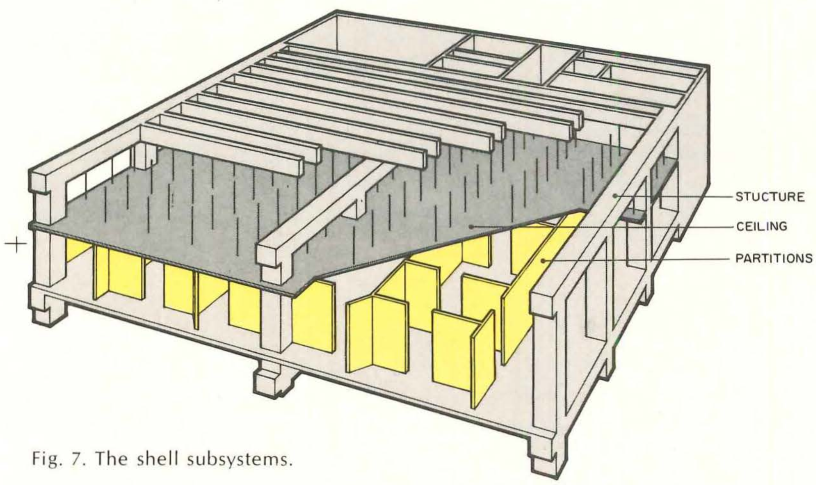


Fig. 7. The shell subsystems.

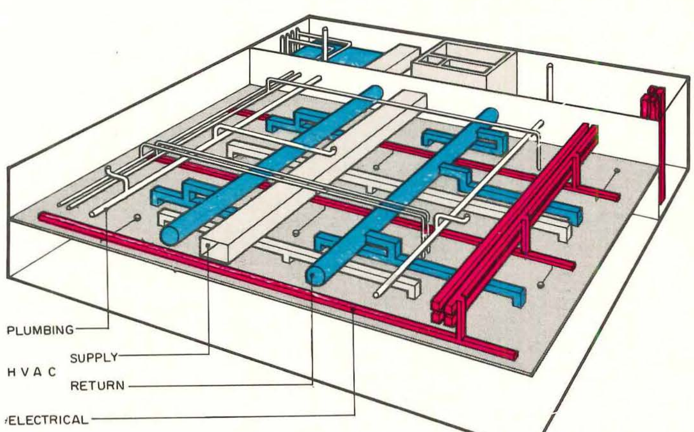


Fig. 8. The service subsystems.

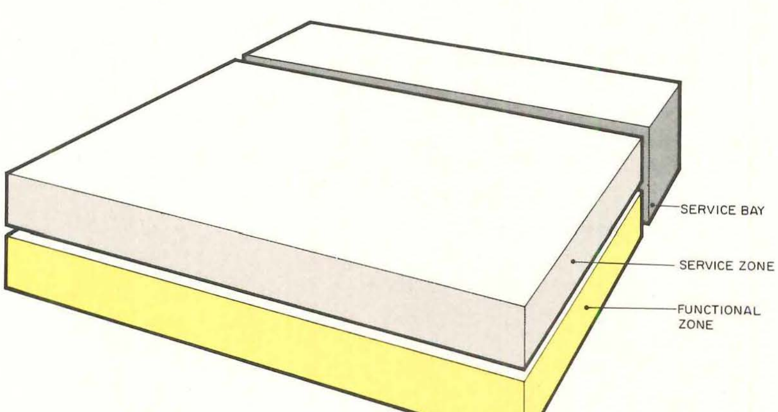
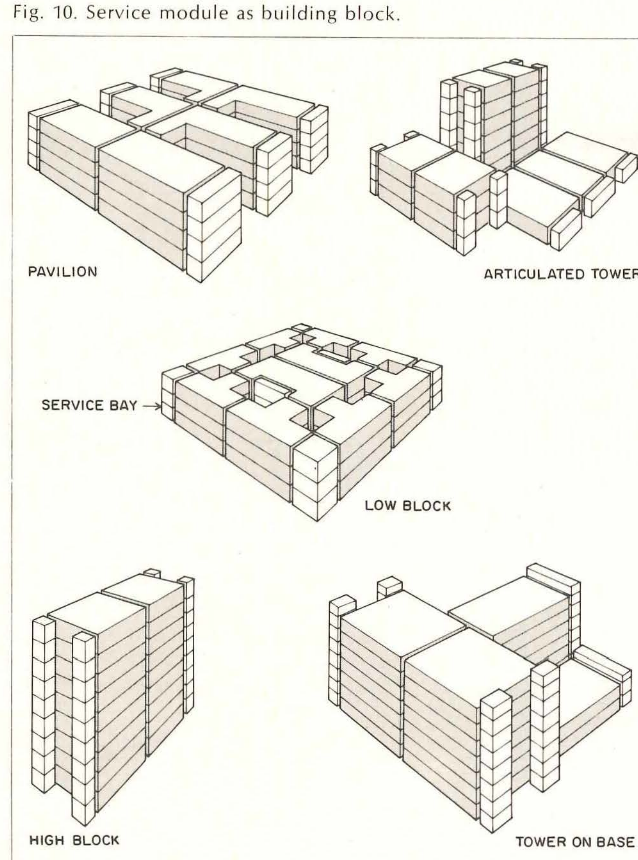


Fig. 9. The service module.

Fig. 10. Service module as building block.



titions, and future service systems for which initial space and load provision is made. In general, adaptable components are sized only for current needs. This concept of permanent and adaptable provides the framework for improved hospital adaptability, which is essential to the long-term needs of the Veterans Administration program.

Flexible characteristics of planning modules

There are four types of planning modules: structural bays, service modules, space modules and fire sections.

The structural bay is the basic unit of which all other modules are composed. The range of structural bay sizes is based on a constant bay width of 22.5 ft and a variable bay depth ranging from 40.5 ft to 58.5 ft in 4.5-ft increments plus, where required, an 18-ft cantilever.

These dimensions are derived from the organizational requirements of the nursing unit, which analysis indicates to be the most repetitive and most stable functional unit in the hospital. These dimensions have been tested and confirmed as suitable also for the functional space requirements of the non-bed care portions of the hospital. If in time these requirements lose validity, or change in emphasis, new dimensions can be established as required.

The over-all planning module of the hospital is **the service module**, which combines and integrates functional space and service space. The service module consists of a service bay, a functional zone and a service zone (Fig. 9). The decentralization of the HVC subsystem into mechanically independent units of space provides the opportunity to conceptualize a building as an assembly of building blocks, and provides a means of manipulating the assembly to achieve a suitable plan configuration with the assurance that the subsystem capability remains (Fig. 10). Operationally, the mechanical independence of the service module permits one unit to undergo alterations without affecting other areas of the hospital while they are in use.

Dimensional characteristics of service modules are determined by the number of structural bays and the service content and organization necessary to support the activities housed. Service modules range from 5,000 sq ft to 15,000 sq ft. These represent a scale of space and performance sufficiently generalized to be compatible with a wide range of departmental sizes and environments.

In the patient care areas, the service module is more precisely scaled to the functional requirements of the nursing unit by means of **the space module.** The space module is a sub-unit of service modules designed to take into account the special requirements of these areas, such as exterior exposure at the building perimeter. Currently, a vocabulary of 11 space modules (Fig. 11) provides the area, perimeter, content, and organization to conform to the user needs and performance requirements of the Veterans Administration.

In turn, the service module is a subunit of **the fire section** which subdivides buildings for life safety requirements. Fire sections must be bounded by two-hour fire separations, and any penetration must be fire-protected. The coincidence of service module and fire section boundaries greatly minimizes the number and complexity of service penetrations.

There are three divisions in the hospital module

The service bay is the service control point for the module, and houses all the basic equipment for the three service subsystems and all vertical service distribution to and from the module. The concentration of all vertical services within the service bay area leaves the functional zone free for planning and later change without the traditional impediment of service stacks and shafts, and simplifies the organization of the service zone where access and space for equipment would be more complex and cause problems of industrial safety.

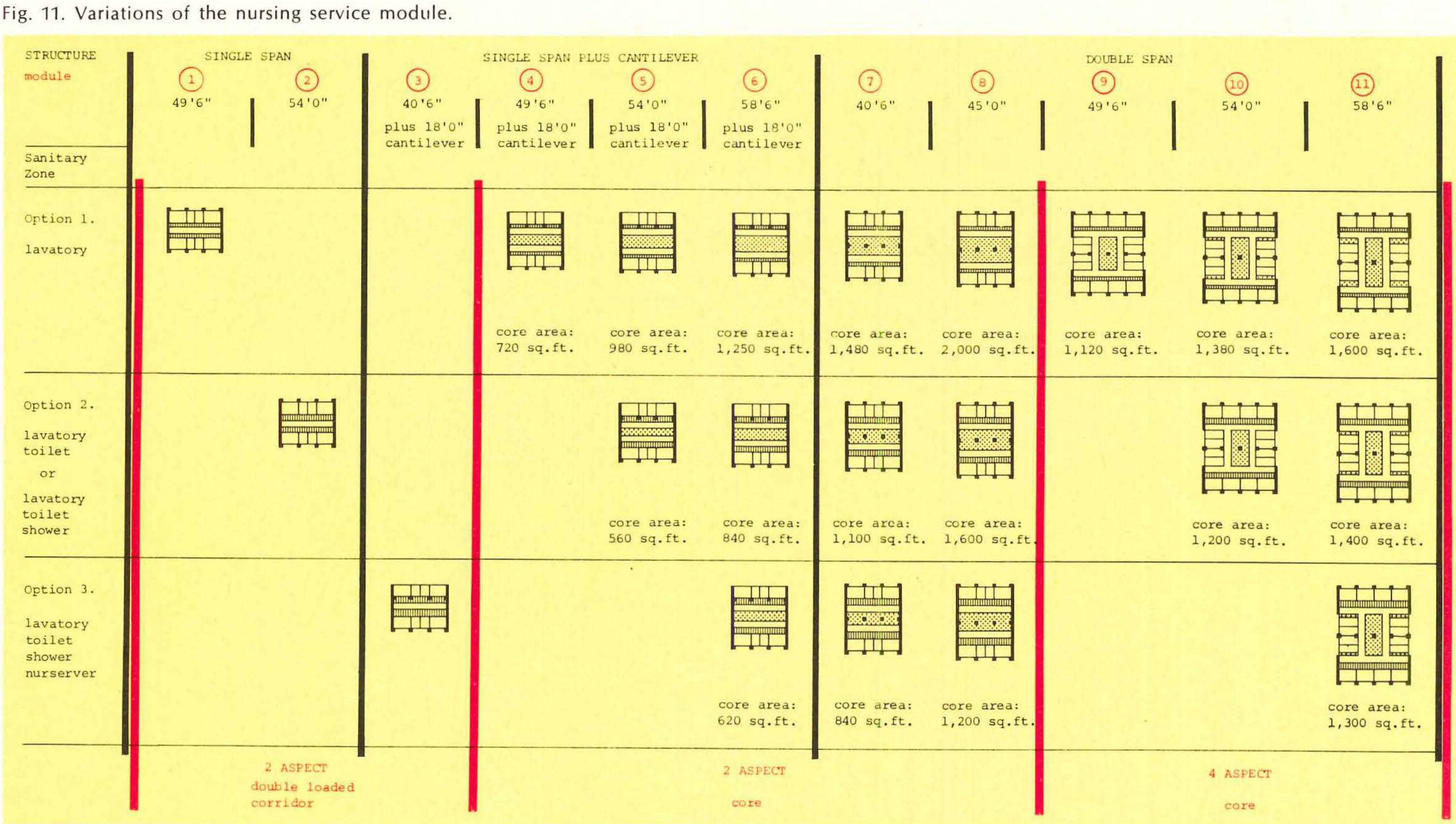
The service bay is a special variation of the structural bay and provides some of the shear walls for the over-all lateral resistance of the structural frame.

The functional zone is that portion of the service module which houses the hospital activities, and which can be internally organized in various ways to accommodate the different functions. Generally, the only permanent vertical components which occur within the functional zone are the structural columns. Shafts, shear components and two-hour fire partitions are located at the perimeter so as not to interfere with planning freedom or with horizontal service distribution in the service zone above.

The service zone carries the horizontal service distribution of the service module. All services are downfed to the functional zone with the exception of the gravity drains from the service module above.

Cost studies have indicated that increased building height to provide more service space is justifiable if that additional height simplifies the design and construction process and improves performance.

Fig. 11. Variations of the nursing service module.



To obtain these objectives, accessibility of services for construction, maintenance, repair and change is essential. Hence, the service zone has an over-all working platform, which, within this system, is the ceiling subsystem. It also has a highly defined organization of service distribution with specific permanent accessibility to components requiring personnel attendance.

It has been found that changes in direction of service mains in interstitial space create cross-over problems that disrupt service organization, increase interference and reduce accessibility. Hence, within the service zone, all service runs are organized on the basis of reserved subzones to simplify design and installation, minimize cross-over problems, and to preserve rights-of-way for future service runs.

Primary subzones (Fig. 12) are horizontal layers of the service zone that define the direction of travel of the services. The main service distribution lines enter from the service bay immediately below the beams and run parallel to the main girder to the end of the service zone. Branches run at right angles to the mains and are located on the layers immediately above and below. Plumbing and drains occupy the upper layer between the beams. HVC and electrical occupy the lower layer. Laterals run at right angles to the branches and parallel to the ceiling system strongbacks immediately above the ceiling.

The direction and depth of beams, girders and ceiling strongbacks visually locate the respective layers and provide physical references in the service zone both for the initial location of services and for later revisions to the layout.

Secondary subzones are vertical divisions of the main distribution primary zone for particular services and are defined by the ceiling hanger spacing.

With this organization it is obvious that no shortcut or point-to-point routing of services can be permitted without jeopardizing the predictability of initial or future installations.

A full size mock-up of the service zone over a portion of a radiology suite was constructed and is shown in Fig. 13. It shows not only the nature and organization of subsystems but also accessibility as an inherent system characteristic.

Although the ceiling is intended for over-all accessibility for construction purposes, accessibility becomes constrained by subsystem installation. It is a system guideline that components requiring regular maintenance be organized along established access lanes. An example occurs in Fig. 13, where a reheat coil is shown at the left center of the photograph. This is one of a series of reheat coils aligned along an access lane perpendicular to the beams.

Accessibility, even along dedicated lanes, will be somewhat constrained by branch and lateral distribution systems in Zones S4 and S5 shown in Fig. 12. Since the use of interstitial space is not yet widespread, industrial safety consideration of such constraints will for the time remain a matter of individual project determination. The accessibility can be increased selectively by offsetting branch and lateral distribution subsystem components, at the risk of increased interference. Accessibility can also be increased by limitation of size or frequency of Zone S4 and S5 elements crossing primary access paths, at the cost of changing duct size or other local modifications. Trade-off judgments are involved in such design and construction decisions.

Organization of the shell subsystems

The basic structural system is a post, girder and beam assembly, with shear walls or braced frames assuming all lateral loads. The generic structural options are steel, precast or poured-in-place concrete. Regardless of which material is employed, the organization of structural components remains the same. Perimeter girders are always flush with the top of the beam system. Interior girders are always below the beams

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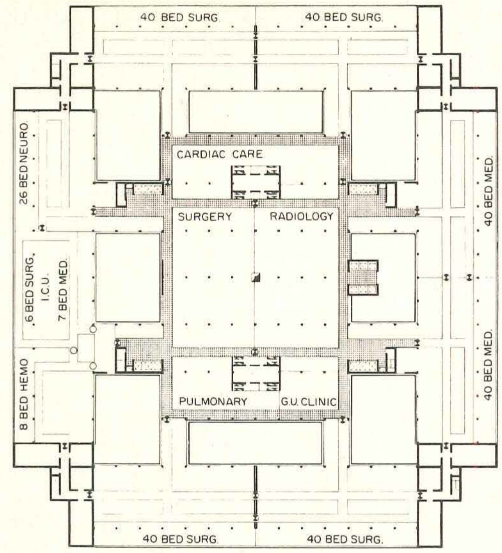
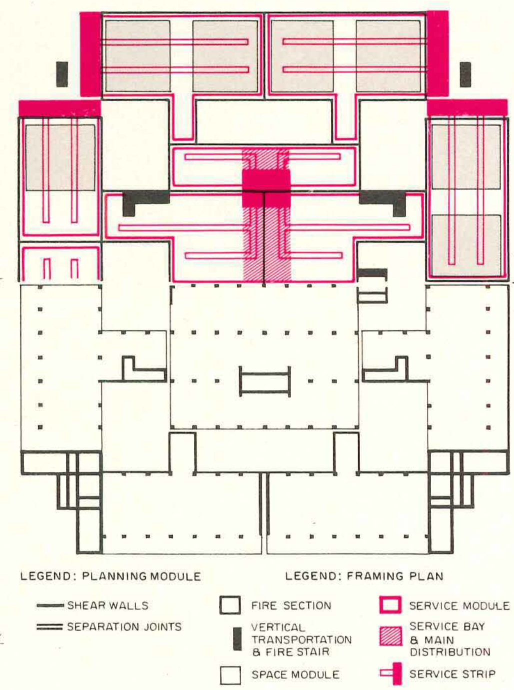


Fig. 14. (above) and 15 (below). Schematic design example.



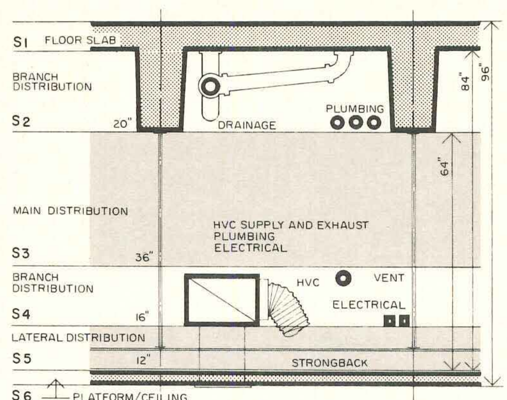
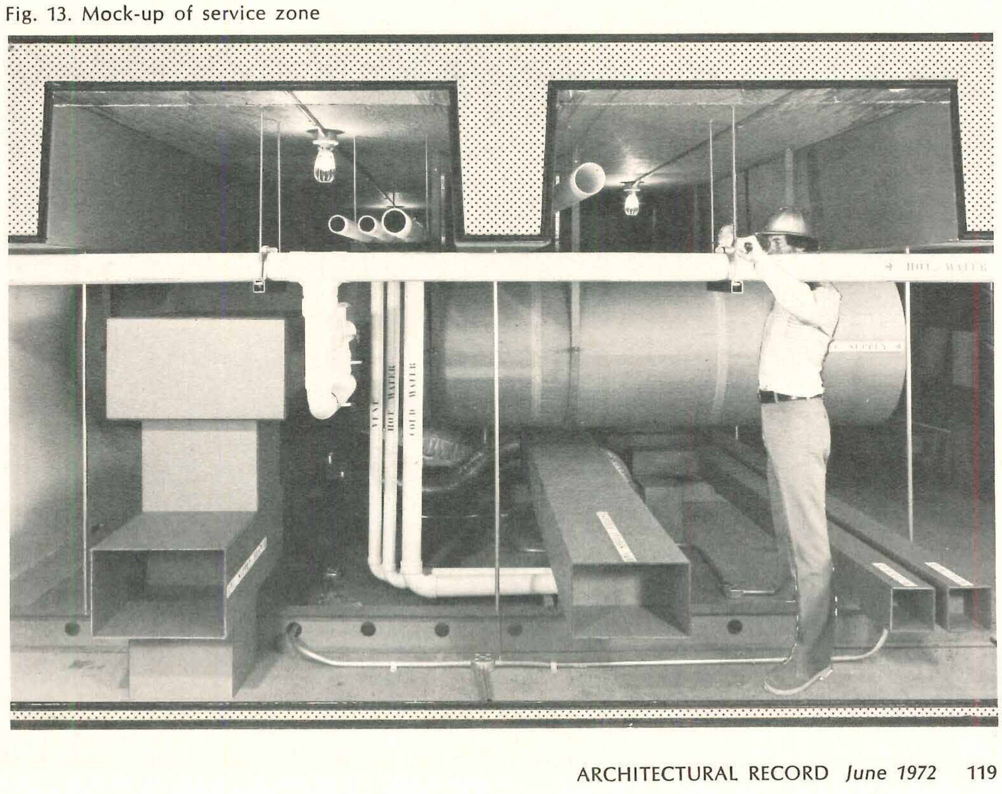
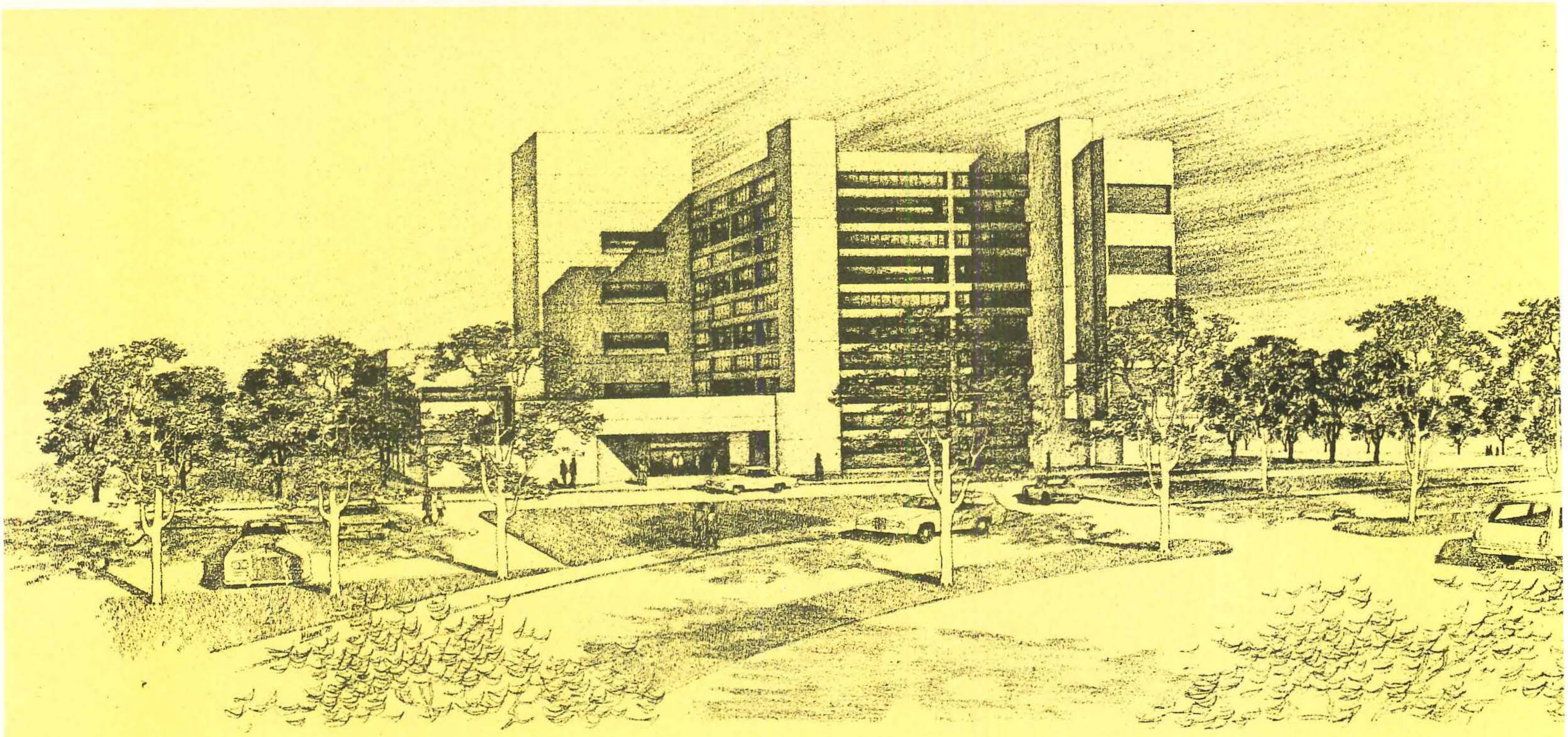
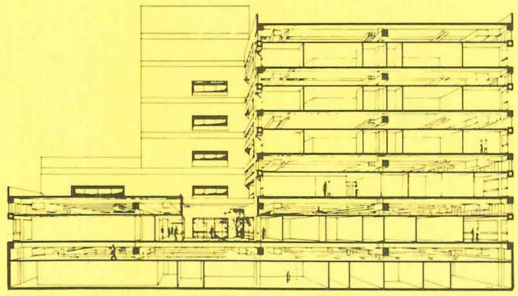


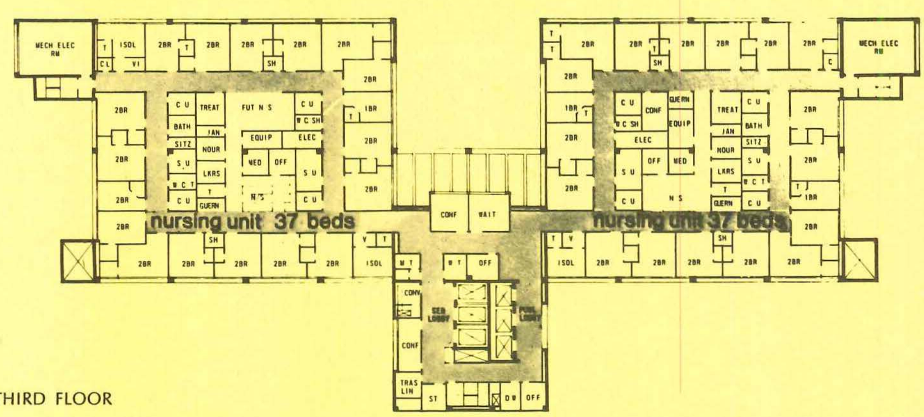
Fig. 12. Primary subzones of the service zone.

Fig. 13. Mock-up of service zone

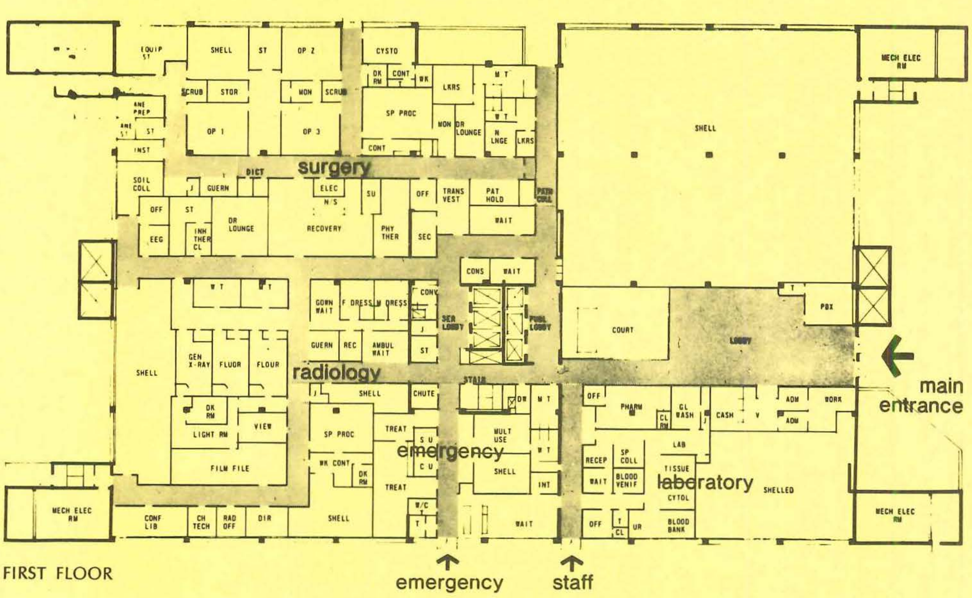








THIRD FLOOR



FIRST FLOOR

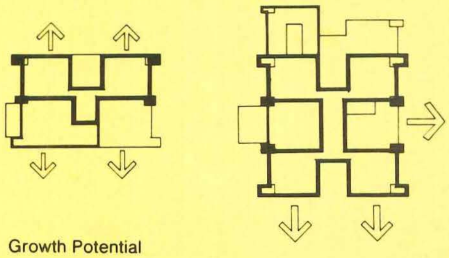
The first application of the VA system was in a private hospital

The first application of the VA Hospital Building System was to the design of the Saddleback Community Hospital in California. When the Lutheran Hospital Society of Southern California undertook the development of that hospital in mid-1970, a program was established which set forth an urgent schedule, which demanded both hospital quality and adaptability, and which established prudent budgetary limits which recognized the cost implications inherent in the program.

The architect, Stone, Marraccini and Patterson, was then involved in development of the VA Hospital Building System as part of the joint venture research team. Although the system development research project was then only at the mid-point of Phase II, it was felt by the architect and the Society that this system approach was sufficiently far advanced for application, and that it was the best available means of meeting the owner's requirements.

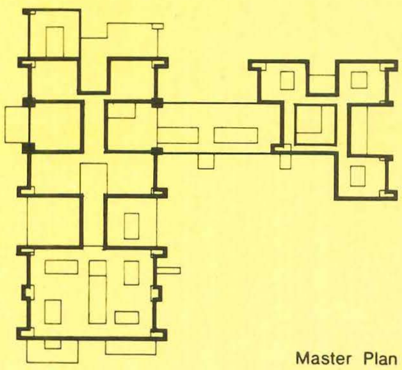
Using the basic systems concept with slight modification to respond to the owner's specific user requirements, planning was begun in July 1970. When module selection and building form were established, cost estimates indicated project feasibility. Authorization was given for selection of a construction management firm, with appointment of Swinerton & Walburg to that role. This firm has since worked closely with the owner and architect in component system selection and in organization of the construction program along the lines described.

The construction management firm established a guaranteed maximum price for the hospital on the basis of comprehensive



Growth Potential

Phase I (256 beds) Phase II (500 beds)



Master Plan

preliminary drawings in May, 1971. Workings were already sufficiently advanced so that construction was begun in June, 1971. Construction and design proceeded simultaneously, and final design documents were completed in November, 1971. Bids were taken on segments of the work in accordance with a critical path schedule. By January, 1972, all bids had been received for the work, which came within the guaranteed maximum price.

The hospital will be completed in July, 1973. It will open with 150 beds. The initial expansion program will increase its capacity to 256 beds, and the ultimate program is for 500 beds. Expansion will be both vertical and horizontal.

The guaranteed maximum price for the initial phase is $9,198,000, which includes a significant cost allocation for future expansion requirements. The total development time from inception to occupancy, will be three years. This is the shortest development time for any major hospital designed by its architects.

Saddleback Community Hospital is partially funded by a Federal grant. It is considered a pilot study for systems application and for simultaneous design and construction by the Department of Health, Education and Welfare.

It is of significance that the research studies for the Veterans Administration and the systems development of the Saddleback Hospital have occurred simultaneously. There has been opportunity to explore and test procedures, component organization, cost data and scheduling within the research format on the one hand, and practical project circumstances on the other. It is the judgment of the architect that this situation has been of benefit both to the Saddleback project and to the VA research effort in hospital building systems development.

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to allow the passage of certain services above the girders and between the beams. Beam spacing is always modular, but varies with the generic option employed for the specific project.

The ceiling system serves as the working platform of the service zone, as an acoustic, thermal and aseptic barrier, as the terminus and support for partitions, and as a contributor to fire safety. It also provides capacity for cutting and patching and support for certain hospital equipment.

Penetration of the platform for flush electrical fixture installation, or for esthetic reasons, is precluded, though provision is made for suspended ceilings to accommodate those conditions.

This ceiling assembly can be constructed of a number of available products. There are, at this moment, no fire ratings on such assemblies. However, the potential of the VA Systems program, generally, and its first application for a private client in California, specifically, has induced one manufacturer to submit such an assembly for fire test. Two-hour test requirements were exceeded, and the tested ceiling was accepted for installation in Saddleback Community Hospital in California. The over-all building system is not dependent on a fire rating for the ceiling assembly, so long as it is incombustible. However, the fire rating will benefit the system as a whole and reduce some fire protection costs.

Hospitals require a wide range of partition types, and the building system brings them to more appropriate uniformity. The partition system attempts to eliminate many of the significant partition problems. It establishes a uniform partition height for a service module, and a very limited number of partition heights for the hospital as a whole. It establishes uniform methods of attachment and lateral support, as well as for acoustical seals. It provides for installation of partitions prior to, or in combination with, the installation of local services. It removes from partition requirements many load-bearing demands, and transfers them to the ceiling, as for patient television sets and some service consoles. The system greatly standardizes door height and mountings. At the same time, it permits wide variation in finish for functional or esthetic reasons, as well as for cost considerations. It provides for partitions of a great range of performance characteristics within contemporary industrial practice.

Organization of the service subsystems

The basic design of the HVC subsystem is all-air within which the generic options have been limited to the low-or medium pressure terminal reheat system and the dual-duct mixing-box system. The subsystem is capable of handling from 25 to 100 per cent outside air with return and general exhaust extracted through the service zone by either duct or plenum.

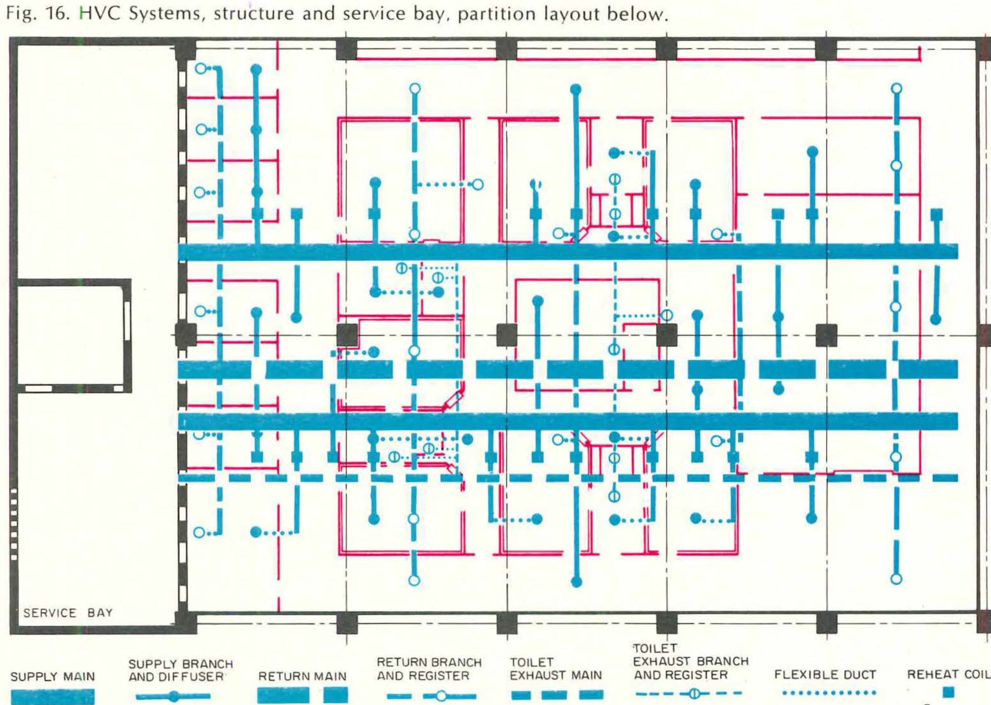
The plumbing and electrical subsystems are conventional in their materials and their assembly, but unconventional in organization. The organization of service mains and local laterals will demand more materials, whose cost will be offset by more rational installation, zoning, and by substantial reduction or elimination of interference with other work. With the exception of gravity drains, all services downfeed through the ceiling. Services to rooms can be console mounted, or installed within partitions.

Hospital design employing the VA building system

As part of the research study, a schematic design of a hospital based on a specific VA hospital program was developed to test design procedures and results.

Nursing unit requirements were translated to appropriate space modules, and

Fig. 16. HVC Systems, structure and service bay, partition layout below.



organized into service modules. General configuration was developed around desirable interdepartmental relationships, and with regard for transportation requirements for people and goods. The general environment created was also considered. Configuration studies were simultaneously evaluated by structural and mechanical engineers, who determined service distribution organization appropriate to internal and external service modules, and structural characteristics.

Functional, service module, fire section and structural planning appropriate to the schematic phase of design development are illustrated in Figures 14 and 15. These are shown only for a single floor of the building, although the research study includes planning of the whole hospital.

Cost studies indicated conformance of the building design to established cost limits, which are in the general range of contemporary VA hospital costs.

Preliminary design was carried through for a portion of the radiology department of the hospital, in accordance with the VA hospital program.

Schematic design for a systems design building goes beyond conventional design development for this stage of planning in its simultaneous consideration of functional requirements, structural, mechanical, electrical and fire safety organization. Preliminary design, as illustrated, also goes beyond conventional design procedures in the information presented. Working drawings and specifications are not likely to be reduced for systems hospitals, but many major conventional problems can be eliminated or substantially reduced through the systems approach.

The hospital designer has, in a sense, been given a new palette and new guidelines for planning. He must still command the whole spectrum of conventional design services, to the smallest final detail. But if he has been given new design instruments, he has also been assured of the ability to coordinate and integrate design to a higher level and earlier than is the case with conventional design.

Systems hospitals developed according to this program will be somewhat larger in area than conventional hospitals due to the significantly increased area allocated to mechanical and electrical subsystems. Cubage will be higher because of interstitial space. On the other hand, a trade-off in cost is expected because of the reduction in subsystem conflicts, in the continuity of the work of certain trades which are discontinuous in conventional construction, and because of a much higher level of overall building coordination.

There is no automatic assurance of this building cost expectation. It will require that design be subject to effective cost control on one hand, and that the documentation establish to bidders the economic value of the pre-coordination of work inherent in the system.

This prototypical building system is intended as a practical working tool within the framework of current practice. It is of interest that the first project employing the system is for a private hospital client, the Saddleback Community Hospital in California which is further described below. The system will be the basis of design for the Loma Linda Veterans Administration Hospital, in Loma Linda, California. Experience and feedback will determine where and how system improvement should and can be achieved. Since VA hospitals are comparable to American hospitals of comparable age, size and content, this research has application to the American hospital system generally.

Fig. 17. Plumbing system, partition layout below.

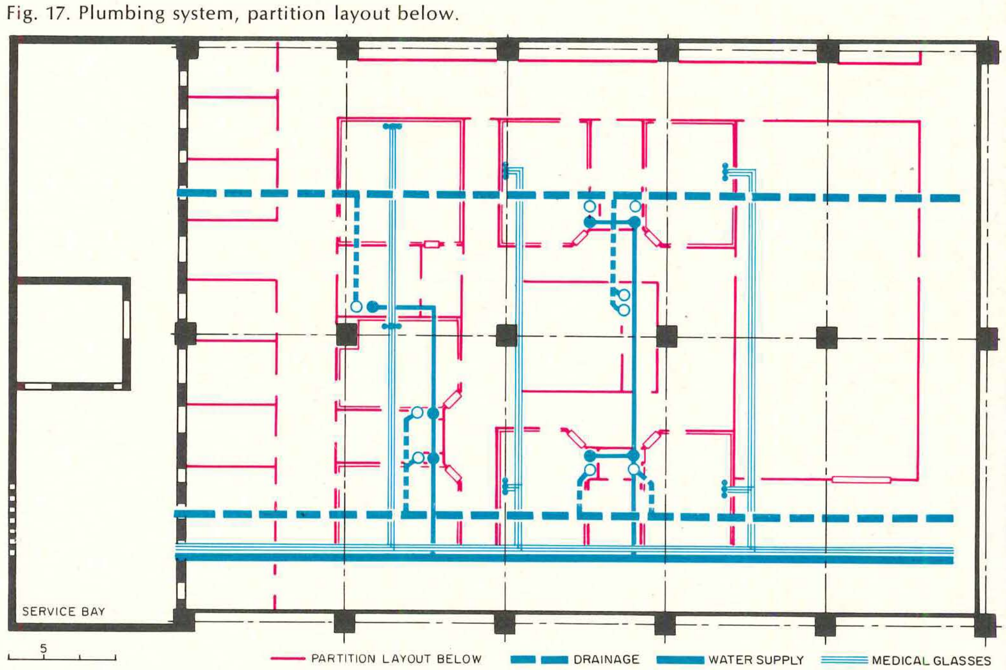
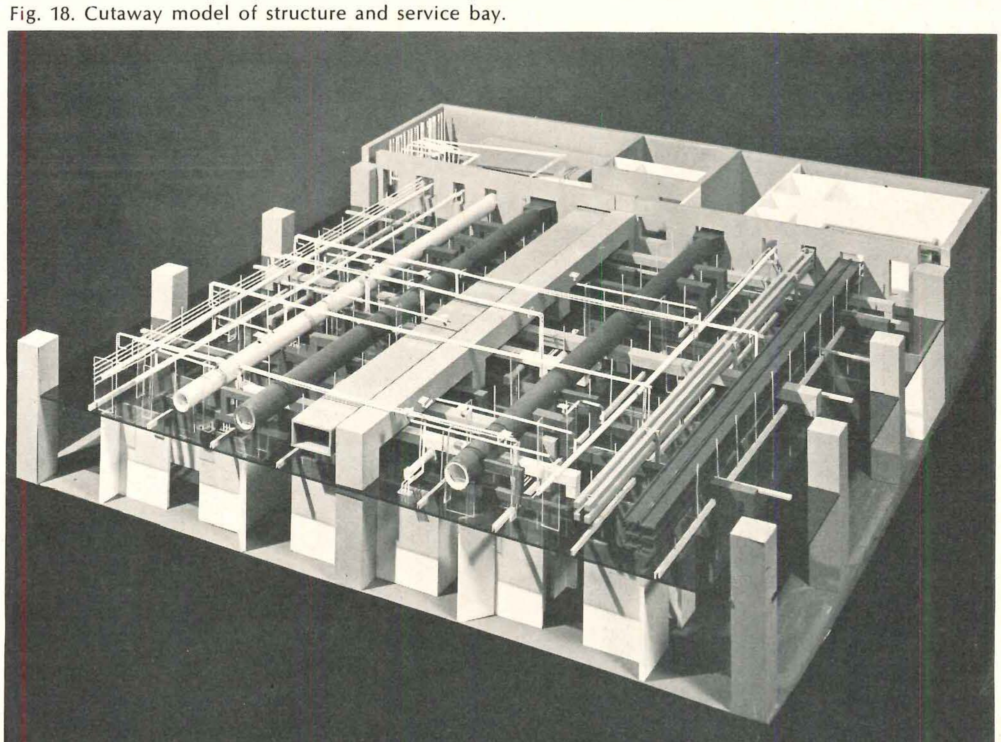


Fig. 18. Cutaway model of structure and service bay.



References and Credits

Each of the three phases of the VA study reported here has been reported in 3-volume sets published by the Research Staff, Office of Construction, Veterans Administration, Washington, D.C. 20420.

Phase I: Integration of Mechanical, Electrical, Structural and Architectural Systems in VA Hospital Facilities, October, 1968.

Phase II: Application of the Principles of Systems Integration to the Design of the Nursing Tower Portion of VA Hospital Facilities, February, 1971.

Phase III: Application of the Principles of Systems Integration to the Design of a VA Hospital Facility, under review for publication mid-1972.

All studies were prepared for the Research Staff, Office of Construction, Veterans Administration, by the joint venture of: *Stone, Marraccini and Patterson*, and *Building Systems Development, Inc.*; *George A. Agron (SMP)*, and *Christopher Arnold (BSD)* co-principals for the joint venture; consultants to the joint venture: Phase I: *Professor Arnold Rosner*, structural consultant, Ayres & Hayakawa, mechanical consultant; Phase II and Phase III: *Rutherford and Chekene*, structural consultant; *Ayres, Cohen and Hayakawa*, mechanical.

Joint venture studies for DOD by architects and industry probe systems analysis for a new generation of military and civilian health care facilities

National Naval Medical Center is first proving ground of computerized method for design approach

2

Credits

Phase I, systems analysis: Health Systems Department, Westinghouse Electric Corporation/RTKL Inc.: program, C. A. Sadlow, engineering, W. D. Finlay (*W.*); design, S. B. Csobaji (RTKL); costs, L. B. Jaquith (MBM).

Phase II, NNMC project: RTKL Inc./Westinghouse HSD: F. T. Taliaferro, RTKL principal in charge, S. B. Csobaji, project director (RTKL); W. D. Finlay (*W*); Metcalf and Associates, consultants; T. A. Hussey, Johns Hopkins University; J. W. Love, Santa Barbara Medical Clinic.

The U.S. Department of Defense has received separate reports on two major phases of one of the largest feasibility-design studies of health care requirements and facilities design ever awarded. The award was in the form of two separate commissions to an unusual consortium in what is actually an architectural/industrial joint venture. Phase I, the demographic analytical phase, went to the Health Systems Department of Westinghouse Electric Corporation as prime contractor with RTKL Inc. as principal consultant for design. In Phase II, a design development phase including application of Phase I principles to updating the National Naval Medical Center at Bethesda, the roles of the joint venture principals were reversed, with RTKL as prime and Westinghouse as consultant.

The combined phases provide a prototype of both the analysis method and the design approach for a nationwide program of attention to military hospitals (called Base Level Health Care Components) of all sizes from 250 to 750 beds. At the same time, there was the secondary goal of accommodating data and techniques useful to the whole field of health care provision.

The first phase of the "new generation study" was an approach to statistical and demographic analysis of both the current patient population and the projected population of the regions involved. These data, analyzed by computer, provide what is called the "demand model." The programing required for rational handling of immense technical data in the demand model called for an array of specialized input from civilian companies and professionals in research, engineering, architecture, medicine, hospital administration, health, law and other fields.

The "New Generation Military Hospitals" (NGMH) program is an on-going 10-year research and development effort in the office of the assistant secretary of defense (Health and Environment). The Department of Defense operates a comprehensive health care system for 10 million active duty members, their eligible dependents, retired members and their eligible dependents. The system includes 230 hospitals and 450 dispensaries, ranging from 8,000 to 700,000 outpatient visits per year, and from 10 to 2,300 beds with 160 to 36,000 inpatient admissions.

The focus of the NGMH program is the Base Level Health Care (BLHC) component, analogous to a comprehensive community health care system in the civilian sector. The base level system also contains certain elements of advanced specialty care and teaching.

The overall program objectives are to improve the operating efficiency and reduce the cost of the individual BLHC System, while maintaining or improving the quality of patient care.

The specific objectives of Phase I, The Systems Analysis, is to develop alternative systems designs which are applicable to the range of Base Level Health Care Systems under consideration. Phase II objective is to design and construct a single prototype model incorporating the improvements of Phase I, with construction commencing in 1972. The objective of additional long range research and development efforts is to focus on potential systems improvements, applicable for 1975 to 1980.

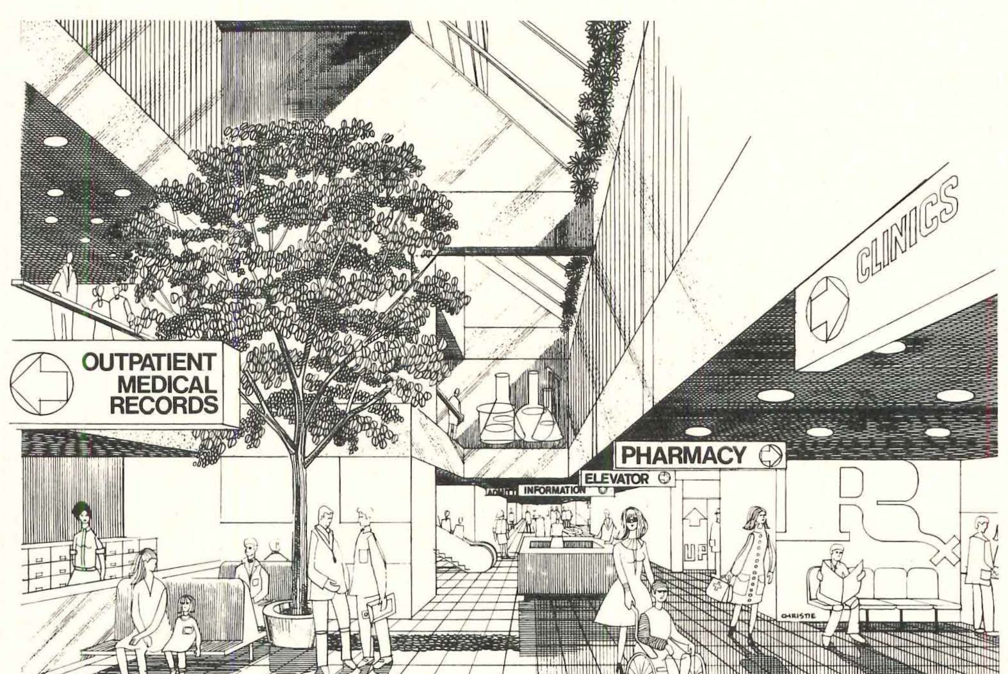
The major requirements of Phase I included:

Operations analysis—A characterization of the existing system in terms of operation and costs. This characterization serves as a base line for the evaluation of all improvement alternatives.

Improvements analysis—Potential improvements are evaluated in terms of costs and benefits.

Recommended alternatives—The improvements which offer the greatest benefit in

Landmark tower at NNMC



Future medical shopping center at Bethesda terms of life-cycle cost savings have been aggregated in a total systems configuration, defining the operational objectives, the performance requirements and general systems plans for the New Generation Military Hospital.

In view of the Phase II objective, the design and construction of a prototypical facility, all Phase I efforts were focused on applicable results. The following steps were inherent in the analysis: 1) Health care demand characterizations for any base level system; 2) major resource definitions in terms of facilities staff and life cycle performance; 3) Detailed resources definitions of configurations incorporating appropriate technological improvements, new guidelines and criteria for the 1972 prototypical design.

Each analysis step is supported by an extensive data gathering activity and a comprehensive "state of the art" search. Within the systems analysis framework, the specific role of systems design was to: 1) generate a framework for illustrating and testing all systems alternatives; 2) generate a design logic which was responsive to the life cycle performance requirements of the system; 3) generate a design configuration.

Real problems of the system were uncovered during the course of the project. The results are not only recommendations for specific hardware and procedures, but are also reflected in the development of tools and concepts for the planning, design and operation of health care system resources. Since these are universal problems in the health care industry, the results are not only applicable to the new generation of military hospitals, but also to other organized health care systems in both public and private sectors.

Summary of results

In focusing on the base level health care system, it became evident that improvements were required in four major areas. These were: 1) a more predictive method of defining the health care demand; 2) a configuration concept more responsive to the changing and growing health care demand; 3) improved resource management techniques which recognize the scarcity of professional health care resources and are capable of increasing the utilization and capacity of the system; 4) a method for integrating the cost elements (acquisition, operations, modifications) of the system into a decision-making framework.

The major results of the study produced tools and concepts which are responsive to these improvement needs. These are: 1) *The demand model*—a computer-based tool which takes basic demographic data and defines the health care requirements of the beneficiary population; 2) *a design concept*—a system of organizing the health care elements into facilities; 3) *sub-system cost benefit analysis*—computer-based tool for evaluating support system alternatives; 4) *dynamic optimization*—a concept of using dynamic programing techniques in the life-cycle planning of health care systems considering simultaneously the nature of the health care demand, the levels of uncertainty associated with the changes in the demand, and trade-offs of acquisition, operating and modification costs to determine the least cost of the system.

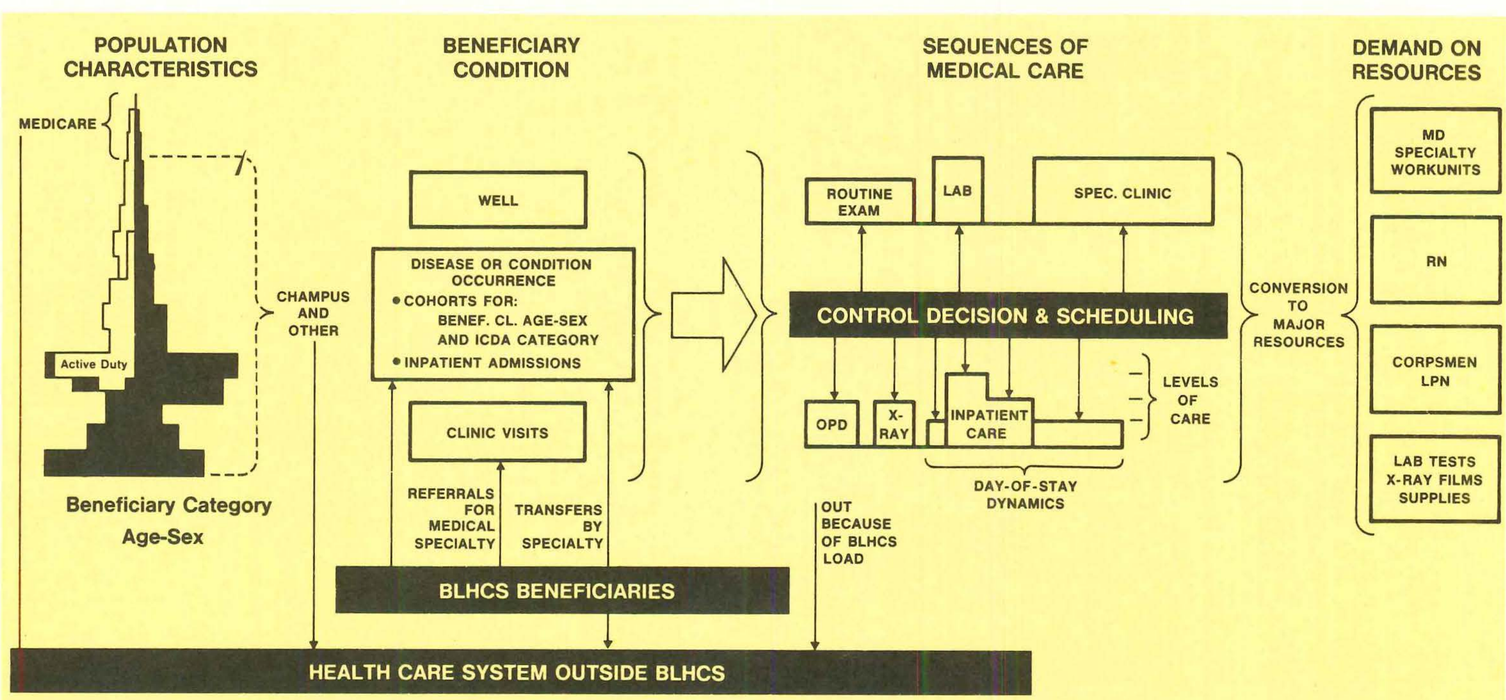
All of these results are supported by: The massive data base (33,000 sheets of computer printout) which permitted the characterization of the base level health care system as it exists and operates rather than as an abstract system. The comprehensive state of art survey covering 16 major functional elements of a health care system. These elements were selected on the criteria of high cost, labor intensity and known problem areas. Direct improvements in any of these functional areas consistent with the cost/benefit objectives and patient acceptance criteria, will result in direct quantifiable cost savings in the system. The continuous professional review of all results and data by an expert group of health care professionals (physicians, nurses, dentists, administrators) called the Medical Health Care Review Team was to ensure that all recommendations and results are compatible with medical practices and consistent with the stated objective of maintaining or improving the quality of patient care.

All of these tools and concepts were evaluated in an applied example called Base "X". In this example, the initial mission and population of a military base were postulated. During a 25-year life cycle period, hypothetical mission and policy changes were assumed to simulate the conditions to which the new generation military hospital may have to respond.

The demand model is an effective tool in predicting the demand on the system at any given period in time, and also in predicting the day-to-day operational variations of this demand.

The design concept has been determined to be capable of effective interface with the demand model, and of simulating all the changing physical configurations which were required during the life cycle of Base "X". The configuration was also found to be economically competitive with any conventionally designed facility.

The cost benefits analysis of the opera-



The demand model starts from a base mission and demographic study which determines the number of active duty personnel, their ages and activities, characteristics of the region as to population and other health care systems. The data are processed through the sequence shown above and ultimately translated into organization and design of health care facilities specific for their region and its probable future.

tional sub-systems defined the appropriate combination of functional support. The aggregation of all improvements yielded a 10 per cent savings in inpatient/day cost and 5 per cent savings in the cost of an outpatient visit.

The dynamic optimization tool correlated the savings identified by aggregating the benefits of the sub-systems improvements. The term optimization was found to be a misnomer in that the optimal (or least cost) condition was found to be the precise match of the health care demand with the appropriate level of resources, (staff and facilities). Therefore, the most appropriate application of this tool is to determine the best planning strategy under conditions of constraints, such as budgetary ceilings on capital expenditures, non-availability of health care services, etc.

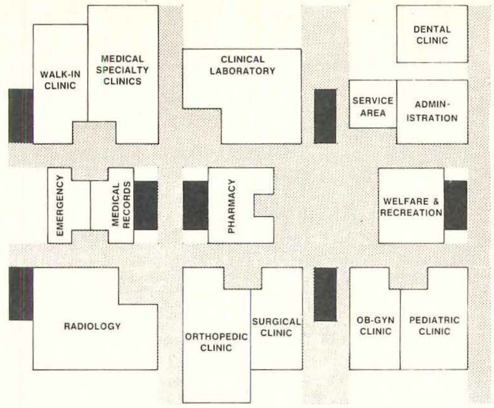
The National Naval Medical Center at Bethesda

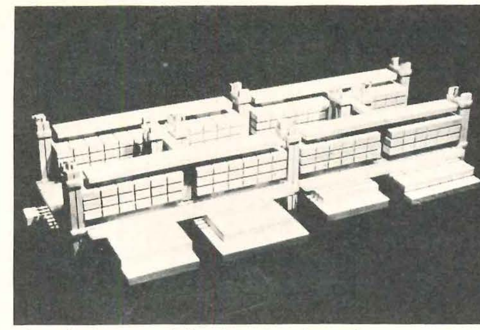
The demand model for Bethesda was unique in that it had special peaks for returned veterans from the Vietnam War, and also in that the beneficiary population was considerably larger and atypical in mix. Part of the exceptional circumstances at Bethesda lay in the fact that the project is a phased replacement of existing structures that range in age from 10 to almost 100 years. The capability of handling exceptions to the normal profile is built into the DOD system.

The design translation of any demand model, including Bethesda, assembles the population data in terms of the resulting demands on space allocations. Since the data base is assembled with the built-in profile of expected change over a long-range period, the space allocations then are similarly evaluated on the basis of future as well as present requirements.

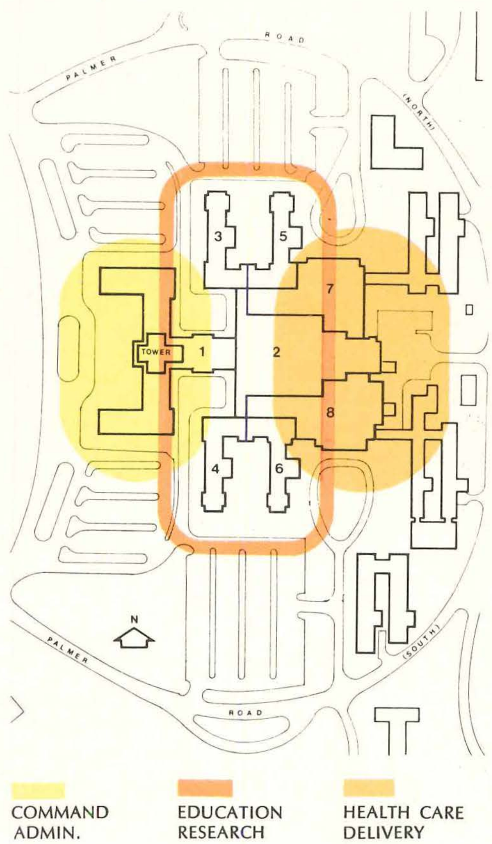
As the details of space arrangement come on stream in the design problem, studies of the main enclaves of administrative emphasis (i.e. medical, educational, or research) are further refined through computerized adjacency studies. Within the medical and surgical section, for example, the allocations of staff to degrees of required care are studied with relation to their effects on both space allocations and traffic patterns.

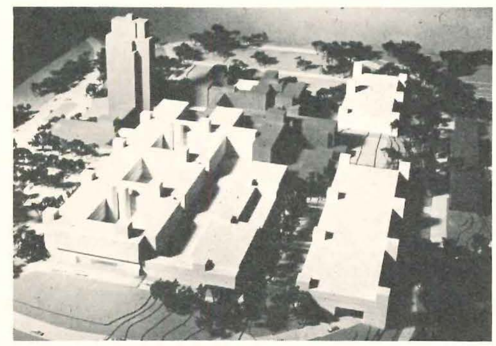
The overall design at Bethesda is shown in the model photos of the basic module in two of the phases of construction.

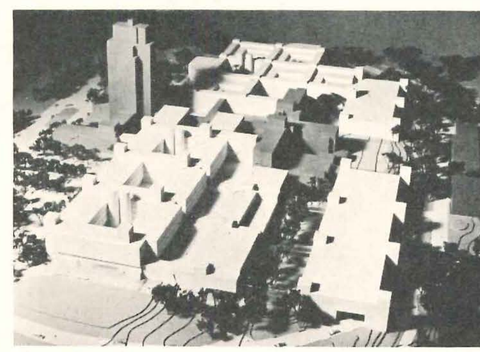




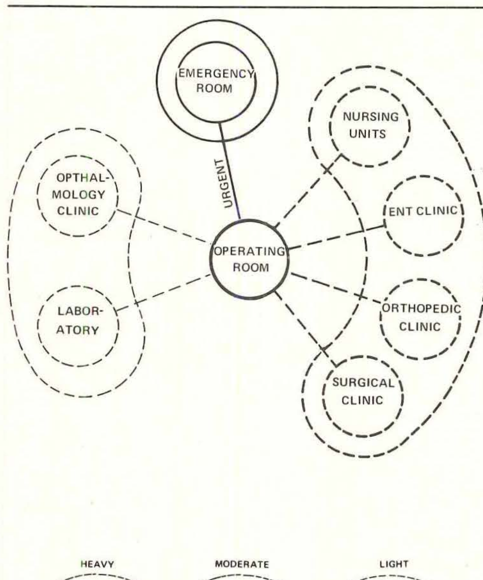
The design model (above) takes shape as major adjacencies are determined (left) by computerized data. These are progressively refined in later detail.





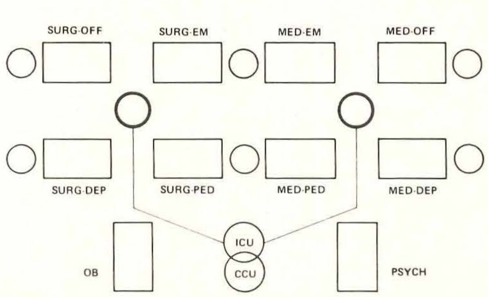


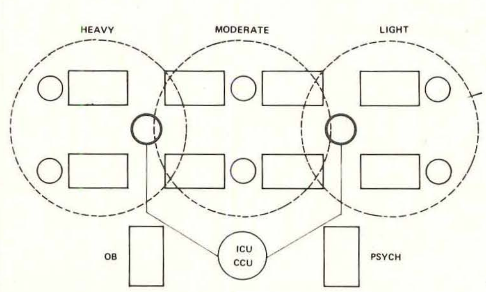
The phased replacement of older buildings at NNMC is shown in photos above. Master plan of the campus (left) coordinates major areas of activity as administration, health care and research. Buildings 1 through 8 are 10 to 25 years old. Smaller buildings at the right of the plan are currently obsolete.

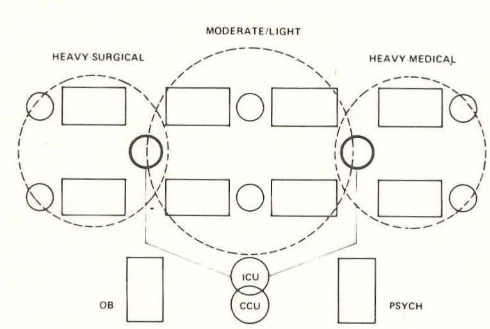


A series of adjacency and urgency studies was plotted similarly to the sketch at left to determine details of space location, size and traffic pattern.

Inpatient care management considerations were also sketched out as in the three diagrams below. At left is coordination by beneficiary category and medical specialty. Next is management by levels of care. The third diagram combines consideration of management by both levels of care and medical specialty. Similar analysis of outpatient and other services contributed to the ultimate configuration.







Industrial techniques spaces make clinical spaces, and patient fostering spaces work in health care facilities

By Sheila Clibbon, A.R.I.B.A.
and Marvin L. Sachs, M.D.

3

From the Architectural Research Unit of the University City Science Center, Philadelphia, and the Department of Community Medicine and the Department of Medicine of the University of Pennsylvania. Supported in part by grants from the Sears-Roebuck Foundation and the U.S. Public Health Service (HM 00210), by funds of the Department of Community Medicine of the University of Pennsylvania, by aid from the University City Science Center and by private contributions.
This article, sequel to the one describing Clinical Techniques Spaces published in the RECORD for February, 1971, extends the periodical summaries of the work at the Architectural Research Unit of which Miss Clibbon is director. Reprints of the series from this and other journals can be obtained from Miss Clibbon at the Unit, UCSC, 340 Market Street, Philadelphia, Pennsylvania 19104.

The product of the synthesis section of our research on the organization of health care facilities is a set of interrelated systems which we call "constructs." Some of these are static, as in systems of like spaces; the others are dynamic, inter-penetrating the spaces with what we call "purveying systems." Some of these concern human, animal and vehicular movement. The others are for distributing substances and power, for handling commodities, and for communicating information.

In two earlier papers we dealt with two of the three systems of like spaces which together form the essential core of a major health care facility. They are the *Patient Fostering Spaces* (PFS) (1), which occupy the top floor, a position in which the benefits of top lighting as well as side lighting including that from courtyards may be obtained, and the *Consolidated Clinical Techniques Spaces* (CCTS) (2), situated at or near ground level. The PFS are the nursing units collectively, where patients reside and where dispersed clinical techniques are brought to them. The CCTS are those spaces to which patients go to be the subject of one or more clinical techniques.

The third space system, the *Industrial Techniques Spaces,* lies between the other two and makes them work (Fig. 1).

By the term, *technique,* we mean a unique collection of resources, people, space, and equipment, assembled to meet one or more of the purposes of the institution. The *industrial techniques* are those which support the purposes of getting the right commodity (or substances or power or information) to the right place in the right condition at the right time.

There are three general categories of ITS: 1) Those concerned with commodity processing include receiving, sorting, food preparation, washing and drying, sterilizing, drug dispensing, specimen processing, document processing, experimental processing, radioactive materials handling and waste disposal. 2) Those concerned with the generation of substances and power may be classified as water, air, gas, heat and power processing. 3) For information there is data processing. Each of these three categories has its processing or storage element. These techniques comprise the static elements of the ITS. The dynamic elements are the purveying systems which deal with inanimate subjects, information, commodities, substances and power.

The development of two approaches to the organization of health care facilities has been traced (2)(3). One is oriented to the consolidation of like spaces, with maximum horizontal contiguity. The principal hospital design solution in the United States in the last decade, the tower and podium, is an example of this approach. The PFS spaces in the tower, however, lack the horizontal contiguity which is an important goal of *like-spaces design.*

The other kind of hospital design solution is oriented to what we call *baliwick design.* In this approach, medical administrative divisions, usually referred to as departments, are expressed in built form either as discrete buildings, as floors of buildings, or as contiguous parcels of space. It is characteristic that the PFS and CTS of each division are mixed on one floor, often together with ITS needed for the research interests of the group. A contemporary version of the separate building solution to bailiwick planning is the street system. The floor solution to the bailwick approach was the T-shaped hospital of the fifties. It has been superseded by what we call perimeter plans in which a collection of CCTS spaces on each floor is wrapped around by a ribbon of PFS spaces. This is one of the ways of arranging bailiwicks in "Universal Space," the currently popular product of bailiwick thinking.

Location of spaces for industrial processing techniques in hospitals

Hitherto, spaces for the generating and processing of substances and power, commodities and information (industrial processing techniques) have usually been very clearly separated from the spaces required to circulate them (industrial circulation spaces). The spaces required for circulation were, with rare exceptions, not clearly distinguished from other spaces until the last two decades. Those for commodities still are seldom separated from those for the circulation of human beings.

Whereas a century ago stores, kitchen, laundry and mortuary were each a well separated building, they have been located in the basements of most hospital complexes for several decades. In tower and podium hospitals it has been convenient to tie basement supply and process centers in with vertical circulation elements as in the systems of Gordon Friesen (4). There are rare exceptions to the basement location for industrial processing techniques, and even Le Corbusier did not deviate from the conventional stratification for his Venice hospital (5), though the canal site might have suggested that it could be otherwise.

Special (interstitial? associated?) spaces for industrial circulation techniques

Special spaces for accommodating circulation for what we have described as purveying systems are increasingly common. During the late fifties, suspended ceilings of five foot depth were not unusual, and it was obvious that if they were made just a little bit higher, and if a floor were put in, men carrying out maintenance and alteration work would be able to move around more comfortably and with far less inconvenience to all concerned. Further, the deep structural trusses which accommodate such working spaces also make possible wide column spacing. While these truss-like spaces became known as interstitial floors, we might better think of them not as merely filling in the interstices of the structure but as associated spaces.

One of the early examples built was the Salk Institute Laboratories, designed by Louis Kahn and completed in 1966. The horizontal associated spaces at the Salk Labs alternate with the floors they serve. In an earlier work finished in 1960, the Richards Medical Research Building, Kahn gave monumental expression to vertical associated spaces, but the principle was not extended to cover the horizontal runs of what they contained (7). Kahn's terminology for the two kinds of space are "served" and "servant" spaces and it may well prove the best, even if it has an unegalitarian ring.

Other variants of associated and/or interstitial spaces are described in References 6 through 16. In general, the contents of these spaces are the same as would occupy a suspended ceiling void, but in the San Diego VA Hospital (6, 11) the generation as well as the circulation of air handling systems is installed in the associated floors as relatively small decentralized packages. In the McMaster University building (6, 12), the location of these packages is in associated vertical shafts.

To the authors' knowledge, the first horizontal associated space to be actually constructed in a hospital is that installed between the two principal floors at the Dominican Santa Cruz Hospital in California designed by Rex Allen (13 and RECORD October, 1968). Somewhat similar, but more clearly organized with the top courtyarded floor comprising the entire PFS is his hospital at Madera, California (14). In partnership with Hugh Stubbins, he is responsible for the master planning of the phased replacement of Boston City Hospital, a complex which contains a high-rise building with "systems floors" each serving one floor above and one below (15).

The clear height of horizontal associated spaces published so far range from about five to nine feet. A sectional perspective of the San Diego VA Hospital shows a central boarded and handrailed walkway in the associated floor (which has a 6 ft-10 in. height), the rest of the floor being gridded with a suspended ceiling having a slight change in levels beneath. If the drawing is to be believed (and it may have been beefed up for the purposes of presentation), there is such a plethora of ducts and tubes filling up the rest of the space that it is difficult to imagine how any man, unless he were transformed into a caterpillar, could writhe his way over these contents.

It is one thing to work in confined places and to be able to straighten up whenever desired; it is another to have to find one's way over a distance of perhaps 100 feet through a maze of ducts, pipes and Vierendeel trusses to a staircase, before being able to do so. The additional foot or so required for a comfortable ceiling height would allow conduit and small pipes to be suspended from it leaving personnel free to concentrate on negotiating the principal ducts and structural members in the space.

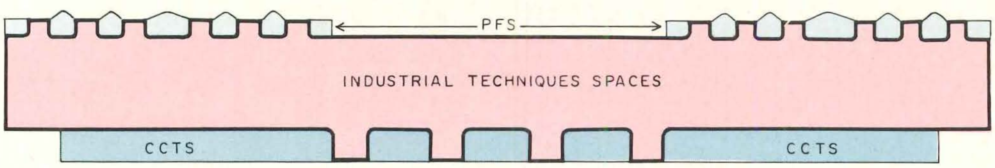
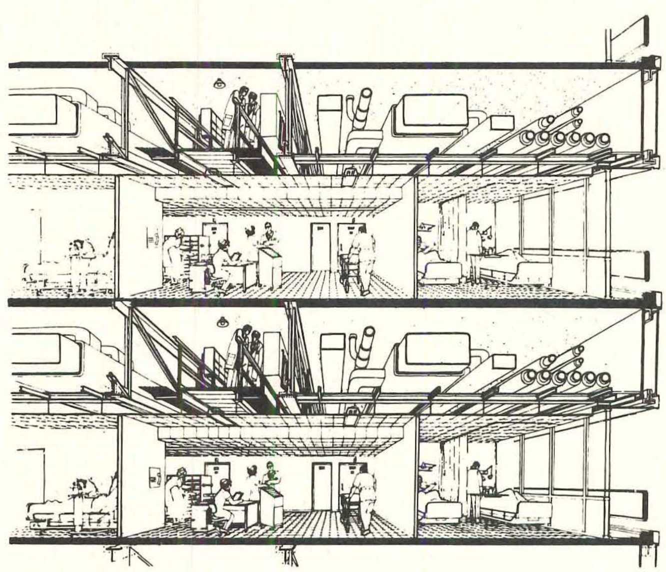
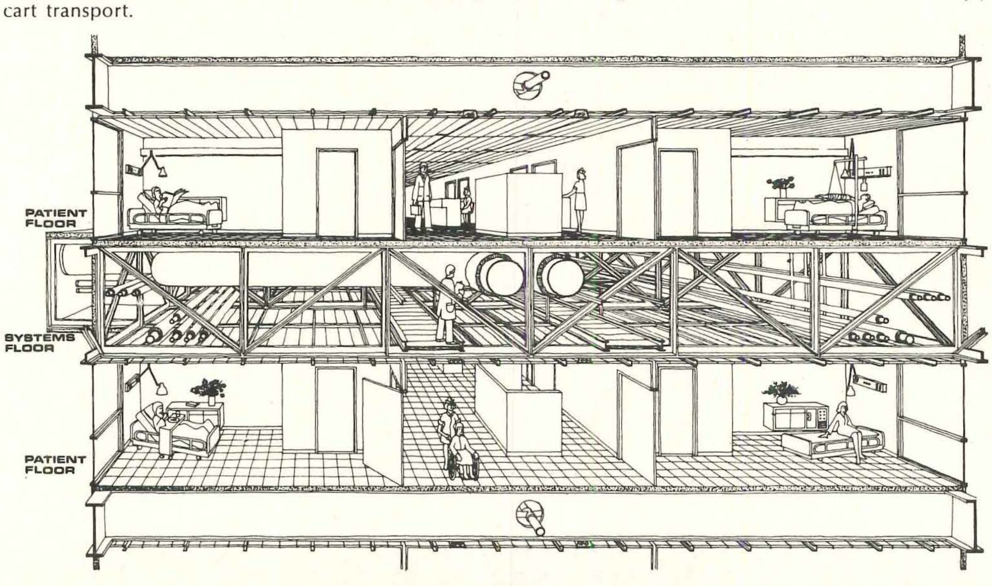


Fig. 1. (above) The sandwich of three major space systems which form the core of the hospital has at the top the courtyarded Patient Fostering Spaces (PFS) and at the bottom the Consolidated Clinical Techniques Spaces (CCTS). The central layer, which is the ITS, reaches into the spaces it serves by means of the terminals, forming a horizontally and vertically contiguous whole.



The interstitial spaces at the VA hospital in San Diego (right) by Charles Luckman Associates.

Boston City Hospital (below) by the Hugh Stubbins/Rex Allen Partnership has space for cart transport.



Critical height of spaces served by associated floors

A very important issue regarding associated floors is the kind of spaces they serve. Blumenkranz (10) thought of these spaces as "undifferentiated", meaning space which could accommodate any activity one might expect to find in a health care facility, presumably with certain exceptions. The section through the McMaster building shows the interruption of what Blumenkranz calls the "sandwich" by an auditorium. If such exceptions are accepted, why should all the rest of the space be the same? In order to have adequate space to operate x-ray units over the patient in surgery, even if partly housed in the associated floor, or for TV cameras to relay pictures of the operating procedures, we may need twelve feet. Yet for patients' rooms, a less lofty scale is preferable.

If part of the ceiling is dropped, what does this do to the servicing and adaptability of the associated floor? If it has an overall grid floor, how are the maintenance men going to get at a panel several feet below the grid? If we alter the levels of the grid and provide steps up and down for the maintenance men, the flexibility of the whole concept will have been seriously compromised. Raising and lowering the plane is not really feasible on a temporary basis where the grid is bracing the structure. Trusses are another snag.

At Greenwich, "a constant finished floor to finished ceiling height of 9 ft (2.7m) is maintained, but in some places, e.g. in theaters and x-ray rooms, the height will be increased" (16). But it is precisely over these spaces that the use of the horizontal associated spaces for the most complex installations and their maintenance will be the greatest.

The spatial constraints of a building with associated (interstitial) floors are far greater than those with suspended ceilings, and much greater care is required in their planning. If we organize the building in such a way as to avoid such conflicts, the bailiwick principle must be jettisoned.

Vertical connections to associated floors

Once over the brief euphoria of conceiving an associated floor, one is faced with the nasty problem of how to get out of it what one has bottled up inside it. The solution to these problems has not been made very clear in much of the literature we have covered.

In one project (9) two solid reinforced concrete slabs are shown sandwiching the associated floor. The placing of anemostats and other mechanical outlets would therefore be extremely constricted and permanent, and the very adaptability which was the point of the whole design nullified.

In a suspended ceiling, panels containing lights and air inlets and outlets may be moved, or each panel in a building designed on a sizable modular grid may be evenly supplied with quantities of air and lighting, sprinklers and so on, so that it does not matter where partitions are placed, provided they conform to the module.

Throughout a concrete slab, it is possible to cast a regular pattern of orifices at the center of each module and to introduce supplies through such sleeves, but to make them large enough to accommodate what is needed for changes in space occupancy (which might require much higher volumes of air or more varieties of supplies), does not leave much of the concrete slab intact. A structural grid with removable fireproof panels seems a better idea. Santa Cruz, Madera and Boston City Hospital have, in effect, super suspended ceilings which can be serviced from inside. The fragility of the lower horizontal surface presents problems with water leaks, and there are fire-spread and acoustical problems. Presumably, the supply up occurs at preselected vertical positions.

We have been thinking so far only in terms of air handling and lighting. But what about water and gas supplies? Power? Communications leads? Pneumatic tubes? All of these are, of course, easily accommodated in horizontal associated spaces. At Boston City Hospital a proposed overhead monorail cart system is to be accommodated also. But what about the vertical connections for all these major systems?

If we organize them into an overall pattern of neat vertical ducts, why are we going to so much trouble to create columnless spaces, involving Vierendeel trusses, which largely justified the "interstitial" floors in the first place? Stalactites and stalagmites which are partial vertical ducts would leave us with the justification intact, but they can limit our floor arrangements just as much as columns, if they are as permanent. Though nonstructural, ducts require awkward holes in the floor. If ducts are to be movable they are best arranged as part of a removable floor panel system which will allow a variety of duct sizes almost anywhere we want within reason.

Perspective on investment in requirements of future ITS

If the most sophisticated commodity handling devices were to be installed throughout an entire hospital, it is likely that a great deal of them would hardly be used. But because of the need to adapt to changes, it would be advantageous to design the building so that the needed capacities can be achieved. The maintenance and repair work on some automated systems, especially in the early stages of their development, is so great as to more than offset the benefits. A great deal of time must be consumed because of the difficulty of access to such equipment and in going from one point of access to another. If we arrange to have all vertical and horizontal runs of the various purveying systems in completely accessible spaces with their own internal circulation so that engineering personnel do not have to use a common circulation system, it will facilitate the engineering work and curtail the disturbance to those in the spaces served by these systems. Furthermore, if such spaces are generous enough, the work of replacing an old system with a new one, whether in part or as a whole, can be simplified. It is obvious that if such a system of associated spaces were designed, the circulation of these purveying systems could not be divorced from their generation, storage and processing components.

If the capacity for automated commodity handling were made available in a far more decentralized way, not only would time be saved in operating the building, but we would be able to focus on designing it much more for the real human traffic, having eliminated that part of it which is concerned with transporting things. Still, a rational balance of designing for both people and things is essential in buildings so technically organized.

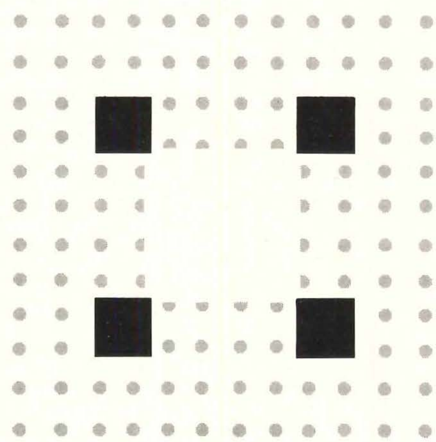


Fig. 2. One of the many possible patternings of terminals, shown in gray, for the PFS level. These are octagonal in shape within an octagon and square module. Like the four solid squares representing the vertical circulation cores, they are permanent. The overall space shown is of city block size with a large central courtyard.

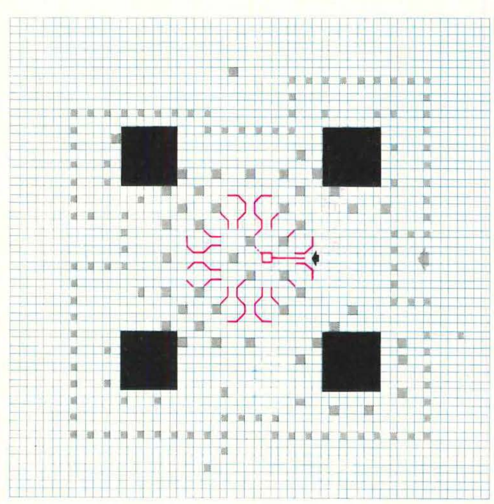


Fig. 3. A transitory patterning of terminals, shown in gray, for the CCTS level. The same vertical circulation cores can be seen as on the PFS floor. The edge of the building above is indicated by the dotted line. The edge of the space itself coincides with it only when expansion of the CCTS is almost complete. The x and y dimensions we used for the CCTS grid shown are very approximately 5 feet and 7 feet respectively. Thus, terminals can be made of 5 foot and 7 foot squares and 5 foot by 7 foot rectangles, by removing the panels above them. The areas inside the fireproof duct enclosures, assembled from standard panels, are such that the 5 foot square is about half the area of the 7 foot square with the rectangular one of intermediate size. A patterning of terminals for a CCTS of average extent is shown, large ones in the center, a line of closely spaced small ones at the edge, a mixture between, and an occasional one beyond.

Volume of space required for industrial techniques in hospitals

In a typical tower and podium hospital of the sixties at least one third of the area, usually occupying half the podium, is devoted to industrial techniques. In 1963 (17), Clibbon rearranged cost data published by Blumberg in 1961 (18), to show that at that time industrial techniques were responsible for 53.5 per cent of all expenses in the short term hospitals studied. It is here that we can automate, not only to reduce the number of personnel, but also to provide a much higher quality of service to save the time of those who work directly with patients. The ITS take up about one-third of the floor area of a conventional hospital. If we think in terms of volume, the depth of false ceilings which must be taken into account converts this to at least half of the building volume for normal depth false ceilings. If horizontal associated spaces are used throughout at, say 45 per cent of the volume then the total of ITS is 63 per cent of the total building volume without counting vertical ducts, dumbwaiters, or conveyors, which make it even more.

Once we recognize that so much of a health care facility is not required directly for the fundamental purposes of the institution which involve the presence of patients, but that instead most of it is devoted to techniques which make these fundamental purposes possible, then we can approach the design in an entirely different way as a health care delivery problem.

A new proposal for industrial techniques spaces

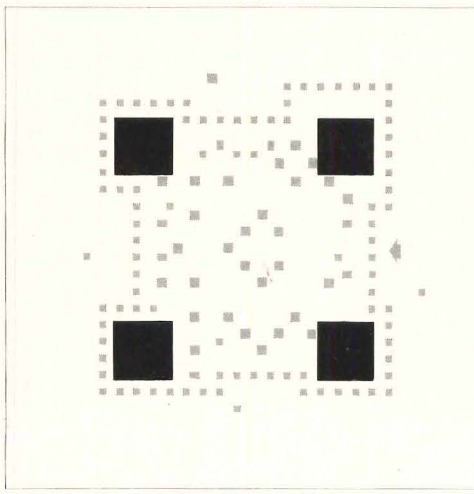
In accordance with our like-spaces approach, we arrived at three space systems for the core of a comprehensive health care facility, each of which is entirely different, but they are to some extent interdependent. The upper and lower space systems, the PFS and CCTS respectively, are locked together by the ITS at the center of the sandwich (Fig. 1).

In the uppermost space system, the PFS (1), there is a series of like cells, the patients' rooms, which will not change in size though the commodities, the substances and power, and the information we need to purvey to them may change or increase in scope. These particular cells are occupied continuously by patients throughout the day and night. They are residential. Light and a domestic scale are needed. In Fig. 2, the "terminals" through which commodities, substances and power, and information are purveyed, and which impinge on each cell, are located in a permanent pattern and incorporate the structure. They also incorporate the bathrooms of molded form; the access to their plumbing connections is from the space beneath, since there is no intermediate floor to obstruct it.

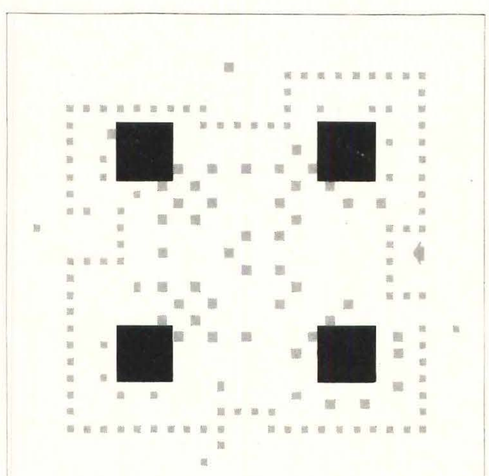
On a lower floor with side lighting for the outer waiting and reception spaces which are most in need of it, the other space system, the CCTS (2), is an answer to the need to accommodate a shifting pattern of different sets of cells, each set of different size and supply characteristics. It is a more elaborate system (Fig. 3). The structural grid which hold small standard removable fireproof and sound-insulated panels is of alternating *x* and *y* dimensions in both directions. It can be thought of as a very wide tartan. As the lowest plane of a space frame, no vertical supports other than the cores and columns at the edge of the building are necessary. It provides coverage for the entire floor area, with terminals of a reasonable range of size which have access from above for maintenance. These terminals, like those in the PFS spaces, also accommodate the purveying systems. The geometric relationship of the *x* and *y* dimensions of the grid is such that *x* is the side of a right angled isosceles triangle of which *y* is the hypotenuse. In the center of the inner sterile zone where the surgery and delivery facilities are (2), this allows the formation of the octagon and square layout.

In the central sterile zone, there is a need for many large terminals; and in the diaphragm of consulting rooms there is need for a regular pattern of what looks like a necklace of small terminals. The intermediate size of terminal is convenient for the toilets. Techniques in the intermediate zone between the sterile zone and the diaphragm have their own special needs for one or more of the three sizes of terminals. Even in the surrounding waiting area an odd terminal is needed occasionally to service one or more special facilities such as the snack bar. Fig. 4 *a*, *b* and *c*, showing three phases of expansion, illustrates how the terminals form patterns of kind and density, each characteristic of groups of techniques as institutional needs change, terminals are shifted and patterns can change or expand, and replace those in neighboring spaces.

Figure 5 (height exaggerated) illustrates the inside of our Industrial Techniques Spaces (ITS), a multi-level factory with tentacles (the terminals), reaching into the spaces where the fundamental techniques involving patients are carried out (the PFS above and the CCTS below). There one is always within a short distance of a suitable terminal, through which the commodities, substances and power and information processed within the ITS are dispensed.



4a



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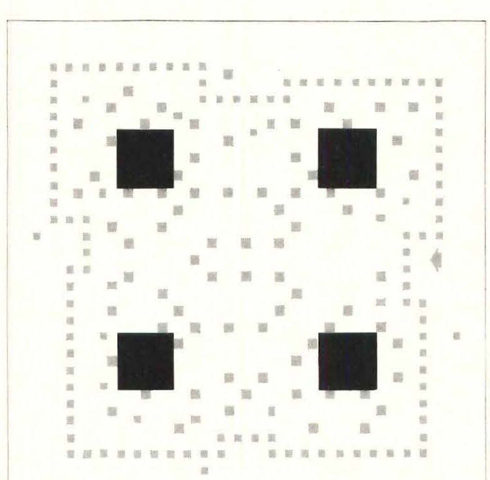

4c

Fig. 4. In (a), (b) and (c) the patterns of terminals reflect three phases of growth of the CCTS.

A completely contiguous system with its own internal circulation independent of the rest of the building, the ITS is an engineer's workshop, and in it there are many specialties of engineering logically patterned and identified for contiguity: electronic engineers for the data processing and physiological monitoring equipment, or for building surveillance equipment; others for the control of various processes, mechanical and electrical engineers whose responsibilities are the substances and power and commodity handling systems, and the sanitary engineers who keep the whole place clean. For in it there are no dusty ducts, no hidden unlit spaces, nowhere for insects and vermin to make a home undisturbed. The entire working innards are exposed and easily accessible by personnel for maintenance, cleaning and replacement, both vertically and horizontally. All "interface" equipment such as plumbing fixtures are arranged so that access to traps is directly from this area. Interface equipment such as oscilloscopes are built into panels so that they can be easily removed and replaced from this area when faulty.

While the distance between the PFS and CCTS floors in the ITS example shown in Fig. 5 could be about 54 feet (this ITS being about 42 feet over-all) they would be only one stop apart on the elevators plying between the two. Since each core would contain batteries of elevators and since new hospitals are now normally supplied with 100 per cent standby power, elevators could be relied upon and used more creatively in the design of the building, rather than serving merely as floor-to-floor substitutes for stairs. There is, of course, a vertical correspondence between surgical beds and the surgical suite and between obstetrical beds and the delivery suite. Once having got rid of the idea that these floors must be vertically adjacent (and in a tower of nursing units only the lowest can be, in any case) then one can free the intervening space from height restriction for ITS.

Although there must be many ways of organizing this ITS, the proposal shown in Fig. 5 will be discussed in more detail. Within the space we show three levels, the lowest (Fig. 6f) called "user down" is for servicing the CCTS. Above it is the processing floor (Fig. 6d) and, at the top, the level referred to as "user up" (Fig. 6a) which is for servicing the PFS. The last two floors do not extend to the edges of the space, resulting in a slot of at least five or six feet all around.

In the center of the whole space, suspended above the processing level, is the giant vending machine which is for commodity storage (Fig. 6b and c). The colored rectangles between the vertical circulation cores represent racks of commodities which are sloped down to the inner edge. Those colored in light red are small enough for the pneumatic tube system. The various divisions of the upper rectangle are for items requiring storage under special environmental conditions. Two grades of refrigeration are shown intersecting with two levels of humidity and an explosion-proof section. There is also a light-excluded section. The rest is unconstrained.

When a commodity is retrieved from the system, the item of this kind which has been in storage longest will be the closest to the inner edge. It will be carried on the inner or exit conveyor around to the exit point and under the racks to either the up or down conveyor, depending on whether its destination is a PFS or a CCTS terminal. Items for emergency use are stored closest to the end of the line. The lower coded line below the inner conveyor is for pneumatic tube items. When an item is returned, it travels via the upper conveyor and enters the racks from the outer edge. As there is no emergency in returning items, there is no separate pneumatic tube entry. Because items are returned to the upper edge a proper chronological sequence of use is maintained. Arrows are used to delineate the path of a commodity exit and return.

Fig. 6*d* and e shows the main processing floor. A horizontal ring conveyor connects all processes arranged each side of it and links them with the vertical conveyors. Just below the vertical conveyors to the left is the receiving and breakout of supplies and on the outer and inner edges are shown—in pink—sorting, food preparation, fodder preparation, washing and drying, ironing and folding, sterilizing, drug dispensing, specimen processing, and document processing. These are the broad divisions; and there are many subsidiary ones.

In the center is shown a space called "consolidated animal experimenting." This is in many respects the equivalent of the CCTS for patients. In the same way, "animal tending," as we call it, shown on the outer edge, is the equivalent of the PFS. Where there is extensive use of animals, an entire parallel facility could be created with upper and lower levels, equivalent to PFS and CCTS respectively for humans, with the ITS continuing between, as an alternative to integration with industrial techniques. In orange is shown radioactive materials handling, waste disposal, water, air, gas and power processing.

The circulation of a reprocessed item is shown as bypass on the perspective. A piece of linen, say, descends from the PFS level through the down vertical conveyor, travels on the horizontal conveyor to the fabric washing, drying, and ironing section, is returned to the horizontal conveyor for storage in the vending machine by means of the up conveyor.

The slot between the edge of the floor and the outer wall accommodates the ducts, pipes and conduits of the substances and power system the processing elements of which just mentioned, are on the outer edge. There is plenty of room for these runs to cross each other horizontally, vertically, and diagonally. In front of them there is a suspended cradle system, like that used for cleaning the face of the building, so that the whole is readily accessible for repair and alteration. Those areas in plan surrounded by walls with extensions that cross the slot do so in order to satisfy atmospheric constraints which dictate isolation from the other techniques because they are either dangerous or unpleasant, and where adjacency to an outside wall is necessary, they only interrupt the slot for one story.

The user-down level shown in Fig. 6f is the level above CCTS and below the processing floor. It accommodates the horizontal elements of commodity handling, substances and power purveying, and information handling systems. Because the CCTS must be column free, this floor also accommodates its structure (not shown here). The vertical structural supports are arranged over a regular pattern of large terminal panels regardless of whether the space beneath is open or being used as a terminal. The user-up level shown in Fig. 6a is suspended from the PFS floor which, with its fixed terminals, is designed as a space frame (or the two floors could be considered a double layer space frame). Ducts, pipes and conduits rise from the slot and cross the floor leading up to the terminals above in the floor of the PFS, which is the ceiling of the ITS, extending the width of the building. Alternate aisles for equipment and for access can be arranged so that an alternative to automatic monorail or conveyor delivery systems for commodities could be a powered (fork or platform lift) vehicle delivery system on both "user" levels, or a combination of these systems to be used for both routine and emergency supply.

Each patient station would be coded, depending on its current occupancy, for a routine inventory of supplies according to category. (The selection for an obstetrical patient will obviously be different from that for a pediatric or psychiatric patient). An exchange cabinet system (or restocked cabinet system somewhat similar to the Nurserver) might be used such that replacements are made daily or when a change of occupancy occurs. The cabinet may also have a section for routine supplies required for the patient as an individual and it may be lowered at any time for the insertion of a new pack into this section. One of the advantages of stocking from a separate space below is that the routine work does not have to take place at night when the noise may disturb patients.

Cabinets may also be used for delivery of emergency items. Small items will travel by pneumatic tube, with a separate drop into a locked receptacle for items such as narcotics which must only be administered by authorized personnel. Reusable and

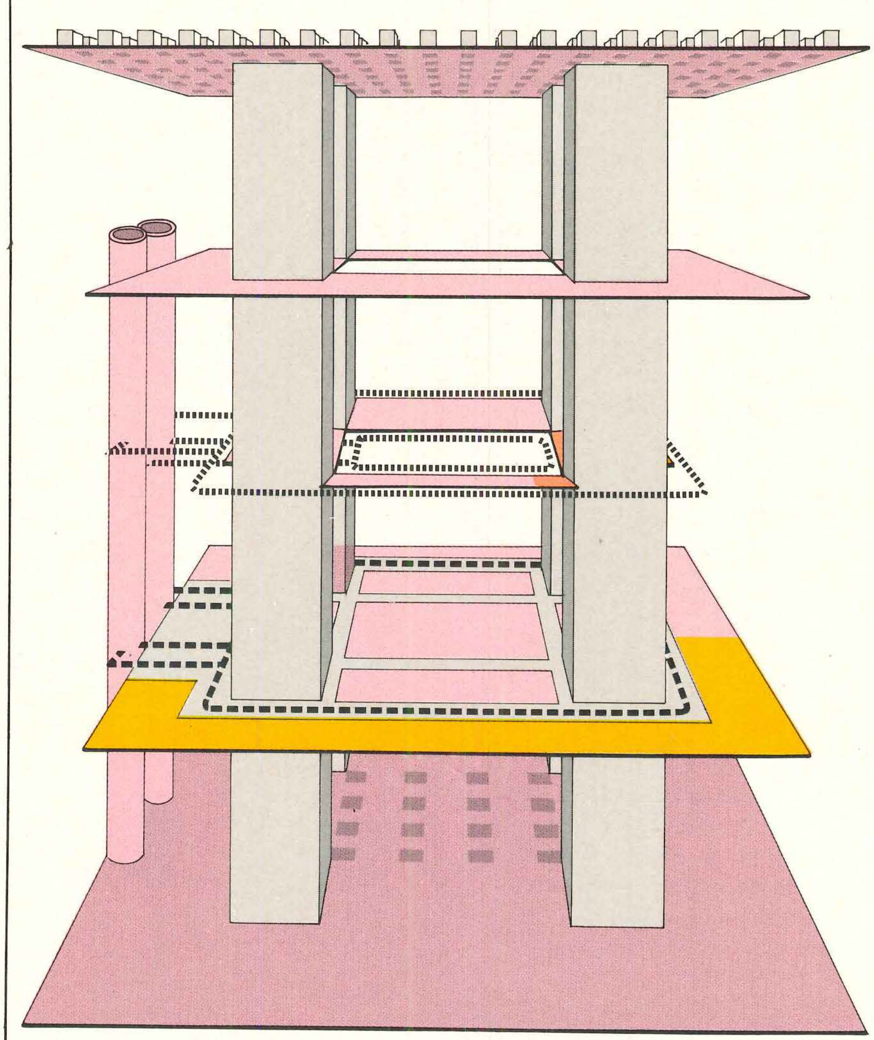

Fig. 5. Exploded perspective. See caption top opposite.

processible items and garbage may be handled by means of a hatch which, when open, spreads a plastic bag from a continuous roll. After the contents are inserted and the hatch closed, the bag is automatically sealed and is impressed by push button with an identification indicating whether it is reusable or garbage and whether it is radiation-contaminated. Awkward commodities the accommodation of which would unnecessarily complicate the design of the commodity handling system, such as extra large items or ones that are unsafe (like radioactive materials) can be personally delivered to the nursing centers.

A section of what has been described is shown in Fig. 7a and b. The purple space in the center below the courtyard of the PFS contains the data processing techniques, including monitoring systems. It is symbolically the brain of the facility and the center of the information handling system. Terminals rising from the user-down level conveniently supply the experimental processing and consolidated animal experimenting techniques spaces in the center of the processing floor which are rather remote from the ring conveyor.

Some of these spaces such as animal operating rooms may be duplicates of those below and require the same kinds of supplies. The ceiling of those spaces provides a floor for servicing the underside of the data processing floor one story higher up.

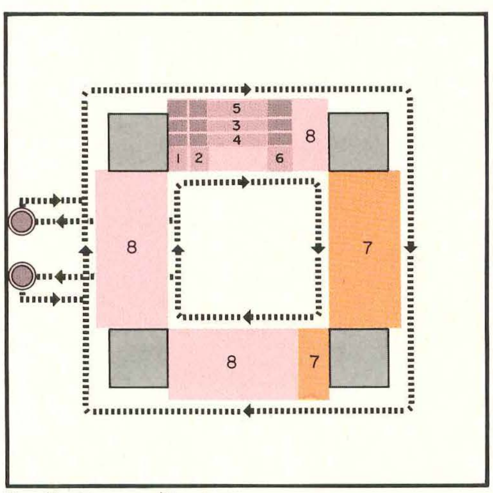

Fig. 6b. Commodity store.

1. Temp., controlled area below 32 degrees F
2. Temp. controlled area 32 degrees F—60 degrees F
3. Humidity controlled area 80 per cent—85 per cent
4. Humidity controlled area 85 per cent—90 per cent
5. Explosion proof area
6. Light excluded area
7. Pnuematic tube commodity storage
8. Unconstrained storage

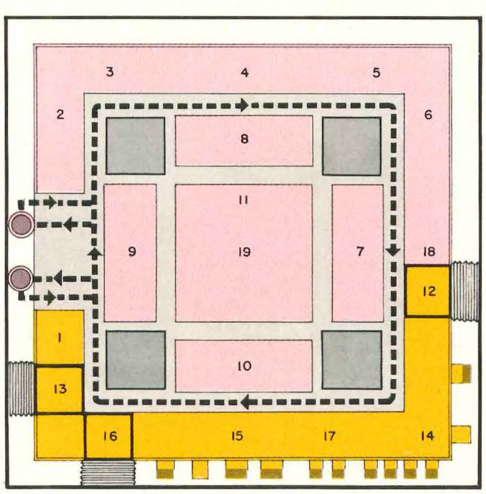

Fig. 6d. Processing level.

1. Receiving & Breakdown
2. Sorting
3. Food preparation
4. Fodder preparation
5. Washing & drying
6. Ironing & folding
7. Sterilizing
8. Drug dispensing
9. Specimen processing
10. Document processing
11. Experimental processes
12. Radioactive materials
13. Waste disposal
14. Liquid processing
15. Air processing
16. Gas processing
17. Power processing
18. Animal tending
19. Animal experimenting

Fig. 5. (opposite below). In this vertically expanded perspective of the ITS space, the exterior walls have been omitted. The terminals for the PFS level are shown to scale; they are identical, and for simplicity are shown on a simple grid and of square section. The openings for those at the CCTS level are shown for simplicity as several large black squares on a regular grid in the central area. The vertical elements joining these two floors, i.e. the circulation cores shown in gray and the vertical conveyors to the left shown in pink have been grossly exaggerated for the purposes of seeing the floors simultaneously.

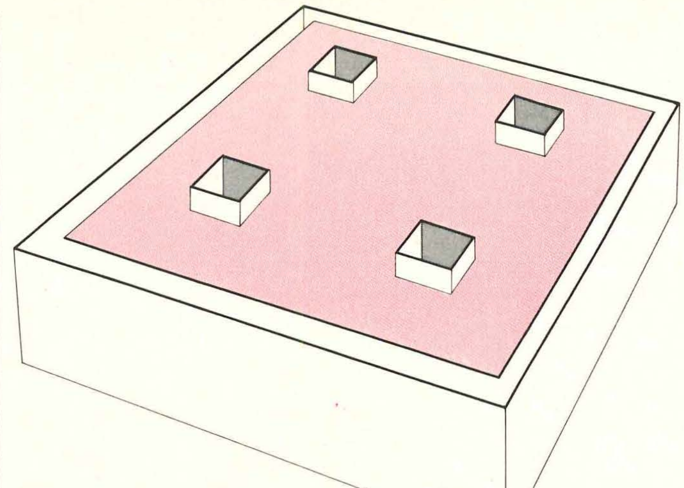

Fig. 6a. User up level.

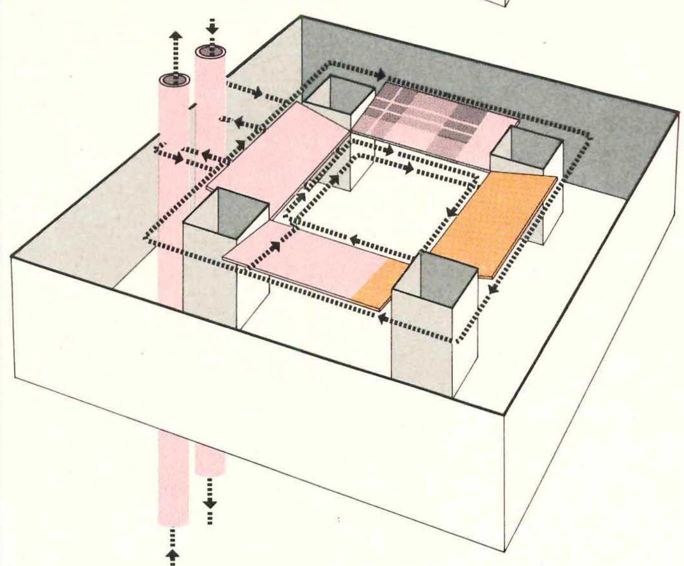

Fig. 6c. Commodity store.

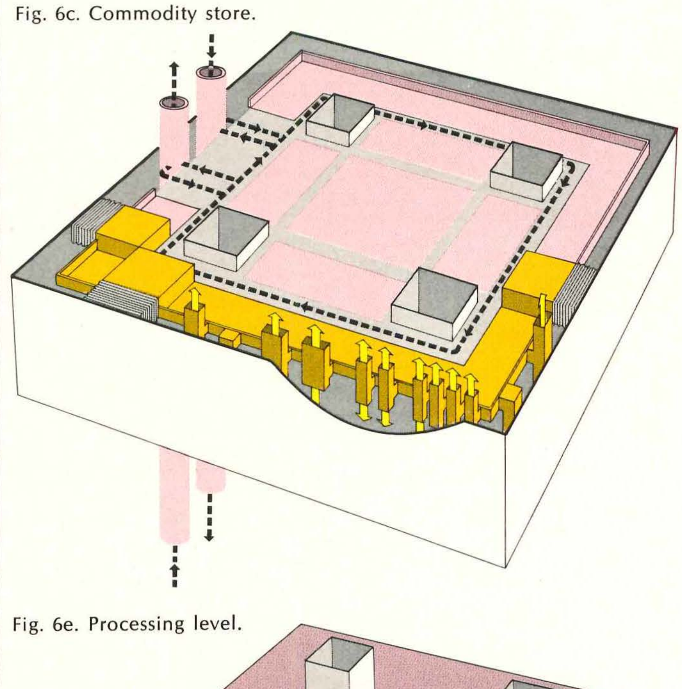

Fig. 6e. Processing level.

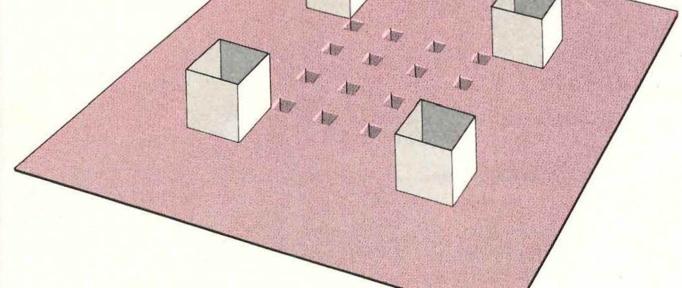

Fig. 6f. User down level.

The enlarged drawing of half the space shows in coded linear form the circulation of substances and power, commodities, and information.

An alternative section is shown in Fig. 8. The commodity storage rack is shown sloping in the reverse direction with its outer edge synchronized with the processing supply conveyor. Horizontal relationships may be developed between storage and processing of kinds of commodities. For a community hospital the outer rim beyond the processing conveyor would be adequate in area for all processing and the commodity storage rack area would be sufficient. In eliminating one level as this scheme does, the central experimental processes and consolidated animal experimenting techniques spaces in substantial form are forfeited, but they are only needed for more elaborate medical center institutions where research requiring these techniques is more important. For ease of maintenance, the underside of the vending rack would be immediately accessible from the user-down level. In both these schemes the runs of ducts, pipes and conduits will be shorter than would be where there are three main floors, one each for PFS, CCTS and ITS in conventional descending sequence, each provided with an associated floor, one of which would be on top. In the denser, more compact ITS space we propose, there would be only two sets of horizontal runs instead of three.

There must be many different ways of developing the ITS space. Designers will be able to approach this problem without the constraints on spaces and systems associated with conventional hospital design. They can give full rein to their inventiveness in developing the most efficient plant for the job—and then adapt it as new commodity handling equipment becomes available. Hopefully, substantial reductions in the number of personnel required to operate the facility would result, and the time of personnel who deal directly with patients would be made more efficiently available.

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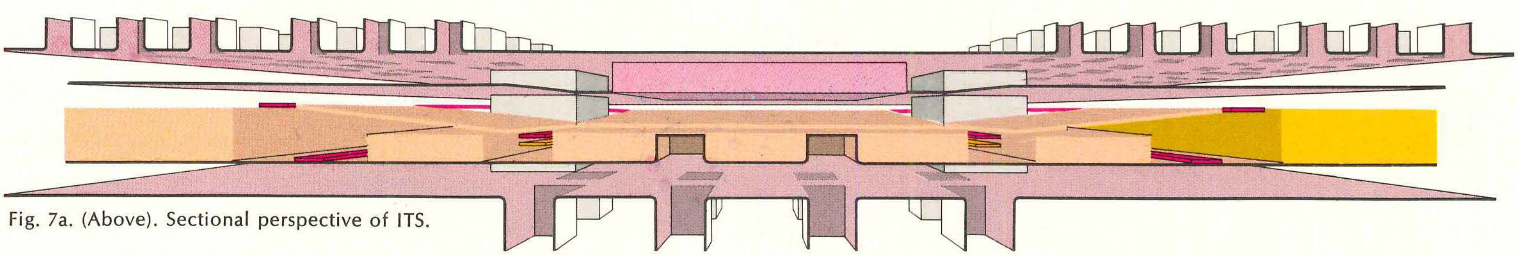


Fig. 7a. (Above). Sectional perspective of ITS.

Fig. 7b. (Below). Enlargement of half of Fig. 7a showing distribution systems.

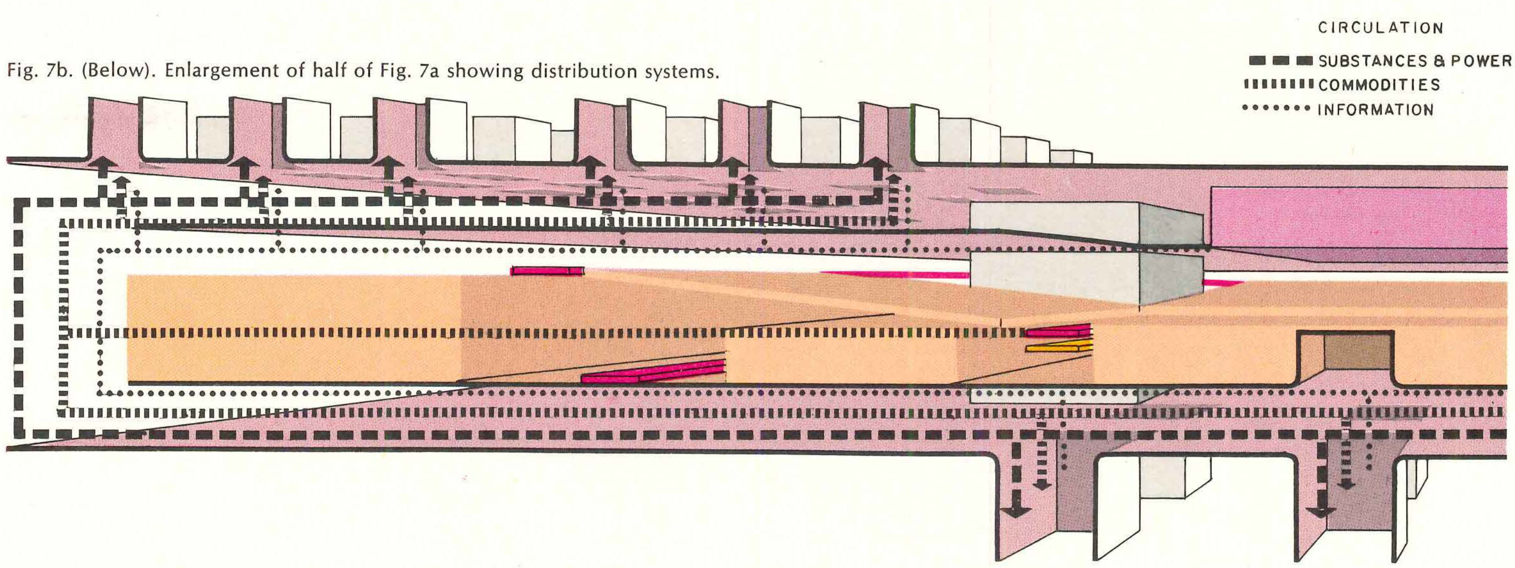
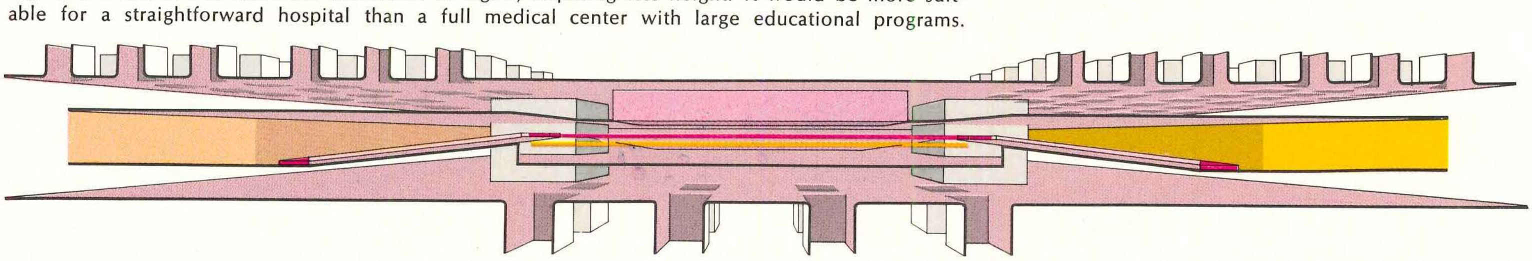


Fig. 8. (Below). A less elaborate alternative to Fig. 7, requiring less height. It would be more suitable for a straightforward hospital than a full medical center with large educational programs.



PART 2 OF 2

There are more problems today with curtain walls than there ought to be. Rain gets through, occasionally glass is broken, and, more rarely, curtain wall panels are torn off by wind.

Because the modern curtain wall has existed for 20 years or more, one might presume that all the problems have been solved. Not so! Granted that much knowledge has been acquired, and that new materials have proliferated. But cost pressures have forced manufacturers to fabricate products that are closer and closer to minimum safety factors, with little margin for contingencies — such as if service conditions turn out to be more severe than those stipulated in the criteria.

The answer lies in architects being able to pin down performance requirements more precisely and more thoroughly. And, they must have available to them the technical expertise for evaluating manufacturers' designs, proposals and costs. Because of this need, independent curtain wall consultants have begun to emerge. Some architects who do a lot of custom curtain wall work may find it advisable to develop in-house expertise in some areas of curtain wall design and technical evaluation.

What the architect should recognize is that owners are becoming more and more aware of curtain wall problems, and they will find means to prevent them, if no one else does. It will be better for everyone if the architect understands why curtain wall problems exist and takes steps to prevent them through carefully prepared specifications, competent evaluation of proposals, and knowledgeable inspection of work in the field.

Solving today's curtain wall problems

Curtain wall specifications often are poorly written today. One of the reasons for this is that many architects derive much of their specification content from industry standards and manufacturers' information without understanding as much as they should about the basis for this material and its limits. This becomes even more important as performance specifications are used more frequently.

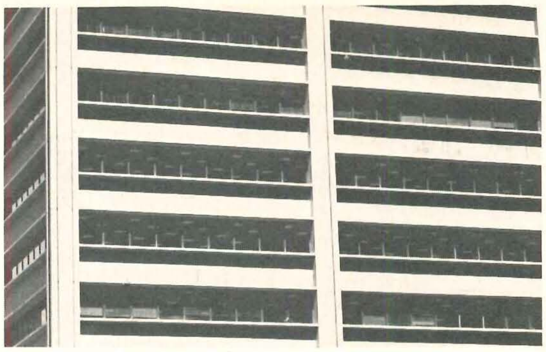
In using performance specifications, the architect needs to be very specific about performance criteria in both qualitative and quantitative terms. It is no substitute to rely, instead, heavily on manufacturers' guarantees—for example, including in the general conditions section a broad statement such as, "This building shall remain watertight for five years, and the manufacturer shall make all repairs that are necessary." While such a statement may seem to provide protection by fixing responsibility, all is for nought if the building leaks—the owner is unhappy, the architect is in trouble, the manufacturer is in trouble, and the occupant is in trouble. A guarantee doesn't help if the architect has not tied down performance criteria carefully, and the manufacturer does not understand fully the environmental conditions to which the wall will be subjected. And if performance requirements are not pinned down, what one manufacturer feels is acceptable may not be the same as another manufacturer's concept. Obviously, responsible manufacturers want to avoid a malfunctioning system because repair costs can be tremendous—at times almost prohibitive.

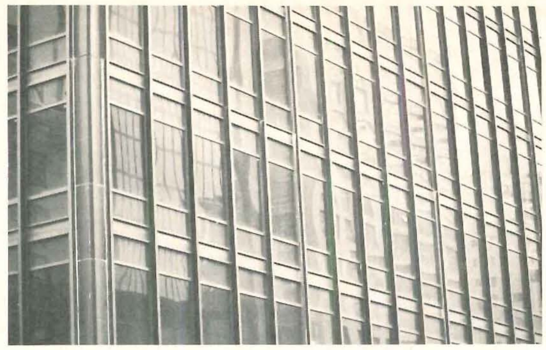
Once a tight set of performance criteria has been developed, every effort should be bent toward defining the system in mechanical terms, with a system that meets those criteria being described in as complete and clear detail as possible. For example, in a good performance specification, allowable wall erection tolerance, expansion tolerances, and deflections will be pinned down. Deflection will not be given merely as, say, 1/175 of the span, but as the maximum allowable in inches; the maximum operating temperature range will be given, etc. In other words, the specification relates a specific curtain wall to a specific structure. Further, erection procedures need to be spelled out. A properly written performance specification provides an equitable basis for bidding for manufacturers of similar quality levels. In the past some specifications have restricted bidding by being too proprietary. If, for example, the joinery is defined too specifically, this could favor one manufacturer to the exclusion of others, even though it might not matter whether a window is screwed together, welded, or mortised and tenoned, if it performs structurally and weatherwise, and meets appearance requirements.

Quality varies depending upon the type of client and the architect's approach

Obviously, the building owner has the responsibility in establishing the level of quality he wants in a building—speculative building vs. owner-built building. Some owners, particularly developers of speculative buildings may want to accept a certain amount of maintenance on a curtain wall rather than paying more money for a better one. It is possible that the owner might want the flexibility of having alternate glazing systems for bidding. If this be the case, the architect should represent the entire range from top to bottom that is acceptable, and these alternates should be developed by the architect, not the manufacturer. The architect should define minimum level of performance in mechanical terms. Then the situation wouldn't arise in which the architect designs a "Cadillac" and the owner goes out and buys a "Ford." The owner thought he was buying a "Cadillac," because all the systems looked the same.

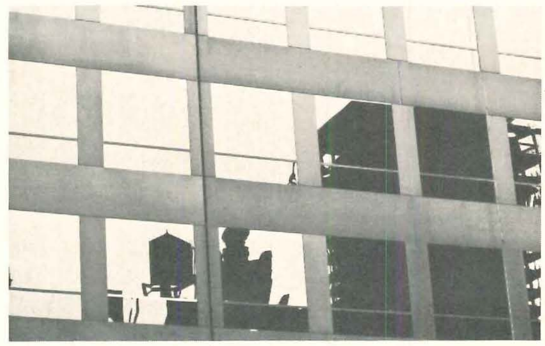
With prestigious buildings, an architect may prefer to fully detail the custom curtain wall and glazing systems, provided that he has had the experience and has knowledgeable personnel available to him to carry through. He needs to be certain of his performance criteria and needs to be sure how they can be answered. While this approach limits the options available to the supplier, it means that most likely the architect should have no "surprises" with respect to performance.





The functional integrity of a curtain wall is as important as its architectural expression

The first step toward getting a curtain wall that works is the preparation of a set of highly developed performance criteria. Then the system needs to be described in mechanical terms (i.e., type of anchorages, weep system, thickness of glass, etc.) in as complete and clear detail as is possible.



The architect's in-house costs are high the first time he uses a new approach—butted glass for example. It may not always involve new technology, but development of criteria can take time.

The office of I. M. Pei & Partners, with Michael Flynn heading up the curtain-wall group, spent 18 months in the research and production of the curtain-wall design for the John Hancock Building in Boston. For field inspection, the office utilizes personnel from the staff that has been involved with the design drawings and working drawings. Because they have been involved with the development of the curtain wall, they are knowledgeable about what to look for in the field; and, of course, they have the best interests of the job at heart. Further, to help ensure good field performance, the Pei office investigates what the building practices are in the locale of the building—e.g., what types of glazing systems the contractors do well.

Prequalification of bidders makes it more likely that proposals are comparable

There are advantages to all parties in prequalifying manufacturers who have equivalent capabilities for a certain type of building in a certain location. These manufacturers might be asked to submit proposal drawings along with detailed information and calculations. The architect, then, will know not only the price, but what the manufacturer plans to produce. The advantage to manufacturers is they are competing with their peers. Obviously prequalification will only work if all the manufacturers really do have equivalent competence and capability. If this is not adhered to and other companies are let in, brand "X" may fall far below others; then manufacturers "A," "B," and "C" may put in only token bids because they know they cannot meet brand "X's" price. The architect should keep in mind that some manufacturers are not able to provide the same quality in different locations of the country, but, say one quality in New York, another in Chicago, and still another on the West Coast because of different manufacturing facilities, different staffs, etc.

Standards are not a bench-mark of quality because they are based on minimum levels

Because a great many of the standards in the curtain-wall field are developed by manufacturers' trade organizations, they are, perforce, minimum standards. While they say that most products should try to achieve higher levels, cost pressures force maximum quality down to minimum standards. Example: manufacturer "A" has a window that falls within a given classification of a standard, and is at the top end of the spectrum. Manufacturer "B's" window has lesser capabilities, but still falls within the same classification; obviously manufacturer "A" is not competitive.

Some standards are deficient because the tests that are used are geared to laboratory application, rather than being equated to field use, and correlation is not made between the two.

Architects should realize also that some standards cover test methods only and do not indicate quality levels. For example, if performance levels are alluded to in an ASTM specification, these are given to indicate application of the standard and are not performance parameters; the user must specify whatever performance level he feels is necessary for the building he is designing.

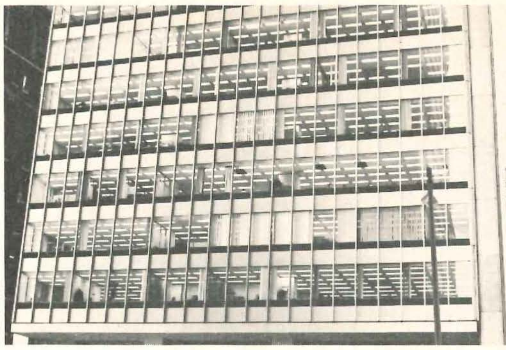
Architects and engineers need to have standards clarified so that they understand their basis and intent of use. That such clarification is needed is obvious in that often specifications are found to be comprised largely of excerpts pulled out from various standards; they may even have been paraphrased and interchanged in such a manner that they make no sense at all. They are used, despite lack of understanding, undoubtedly because the person who prepares the specification feels this offers a certain degree of protection.

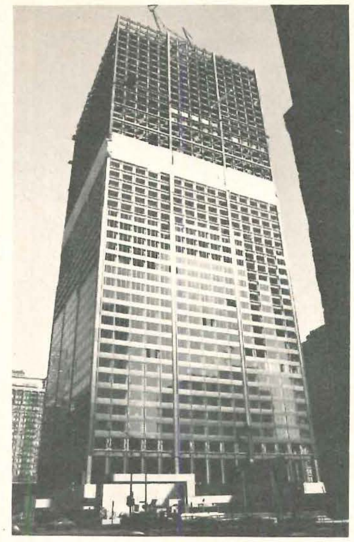
Further, some standards are used in curtain wall specifications that were never intended to be applied to large, high-rise buildings that experience the more severe weather conditions. Independent consultants such as L. J. Heitmann of St. Louis state that, in general, all standards need to be upgraded. It is entirely possible today for, say, half a dozen manufacturers to comply with a given test, but the performance levels of their products may be totally different, while in theory they are all equal. Heitmann says the architect should realize that for many of his designs, he cannot accept the minimum levels called for today. Undoubtedly, too, manufacturers would like to see better standards, particularly if they helped everybody to compete on the same basis.

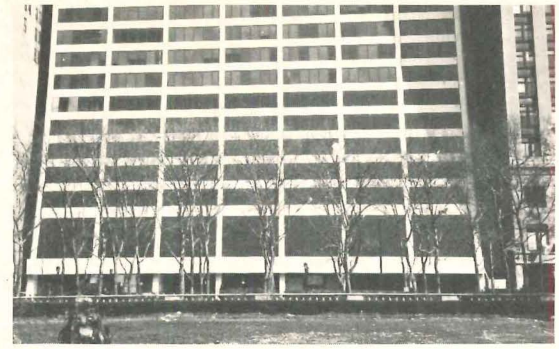
Some existing standards, on the other hand, serve their purpose satisfactorily; standards on finishes are an example. But in this category there is not the chance for ambiguity that there is with techniques of joining, fabrication and assembly—all of which affect performance levels as well as costs.

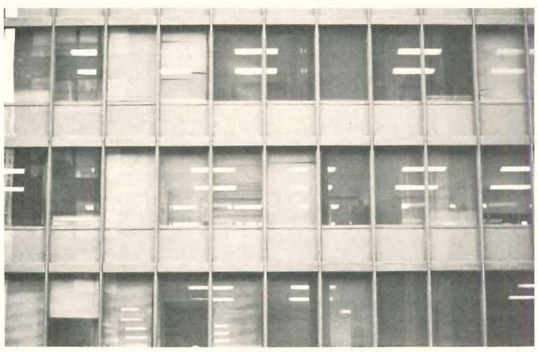
The technical expertise for design and costing exists; question is how to get it

When an architectural firm is large enough, and they do enough of the same kinds of buildings, they can develop in-house expertise, but they have to be able to move their expert from job to job in order to









The level of performance that the curtain wall should achieve must be established by the architect

Obviously, there will be a range of quality levels for curtain walls in a variety of buildings. The desired level must be decided between owner and architect. In control of quality via the specification, the architect should understand the intent, implications and applicability of standards.

afford him. A specialist can get involved in the preliminaries—setting standards, the pace of the job, etc. Doubtless there is very little that the office of Emery Roth & Sons doesn't know about making a curtain wall effective. Irving Gershon of that office starts out assuming that the curtain wall may leak someplace, and that means are necessary for trapping water and redirecting it to the outside: gutters, weep holes, baffles to keep wind from blowing in.

Smaller offices, obviously have to depend more upon outside sources for technical expertise.

The 25-man office of Bower & Fradley, architects in Philadelphia, has found it advantageous to bring in an outside curtain wall consultant. First of all, their experience is that in the last five years or so, manufacturers have not been able to spend as much time as formerly in working out curtain wall problems. Further, they find that an outside consultant can save in-office time and help make sure the specification is more precise. For example, architects find it difficult to keep up with sealant technology; specifying color range has to be precise to get the results the architect and his client want.

What kinds of services can a curtain wall consultant provide? L. Russell Buczkowski of Peter Corsell Associates, Inc. of New York reports that their involvement with the architect often begins with design conception, and is followed by development of performance critieria; definition of the mechanical systems involved (anchorage, glazing system, etc.); developing methods of analyzing and testing wall systems; reviewing proposed systems and advising on the acceptability and cost value of the proposed system. Once the contract is awarded and a system is defined, the firm reviews it with regard to structural and mechanical aspects and water-leakage control. Periodically they inspect fabrication at the manufacturer's plant, spot-checking for color control, fabrication tolerances, shop fabricating techniques such as welding and sealing. One of the functions of the consultant is to protect the owner on costs—to see that he gets what he pays for and within the scope of what the architect has defined.

The way curtain wall contracts are negotiated these days, Buczkowksi says, it is critical that those doing the negotiating for the owner and evaluating proposals by suppliers be completely aware of the technical aspects of the systems so that lines can be drawn beyond which no compromises will be made, so as to ensure the proper level of quality. Further, some means of evaluating pricing should be available to the owner so that he gets an equitable price. An example might be when a supplier wants to, for example, substitute lighter extrusions for the wall, but provide additional anchorages—obviously such change needs to be evaluated both tecnically and cost-wise.

Another curtain-wall consultant L. Jack Heitmann Jr. of the St. Louis consulting engineering firm of L. H. Antoine & Associates offers many years of experience as head of technical services for a major curtain wall manufacturer. His firm's services include: 1) selection of suppliers; 2) preparation of specifications and general scope drawings (asking for proposals drawings with bids that show evidence of meeting specifications); 3) critiquing bids and awarding contracts; 4) supervision of mock-up testing, 5) field inspection and testing (e.g., testing for leakage with a hose).

Testing for the structural integrity of glass and curtain wall assemblies is one of the functions provided by another consulting engineering firm—Wiss, Janney & Elstner of Chicago (North Plains, Illinois). They have, for example, tested large, reflective double-glazed units for solar load followed by sudden chilling.

Building Materials Research Institute of New York gained a lot of early experience in sealants with curtain wall and glazing applications. Early on, much of their work dealt with investigating failures, but now more is new work involving, in part, field quality control aspects.

Full-scale mock-up tests, including the simulation of wind-driven rain, are performed by Construction Research Laboratory in Miami, headed by A. A. Sakhnovsky.

Mock-up testing has its place, but the similitude to reality must be considered

How well does the mock-up test relate to actual conditions? That is the big question. Are you testing what you are going to see erected in the field; and are you testing in a manner indicative of the exposure you are going to have? In many cases the tests are limited in terms of the size of the mock-up and the exposure criteria that determine the tests. For example, consultants say, differential wind load tests about the center line of the spandrel are very seldom run to determine whether there is any rotation about the anchors or undue deflection of members caused by unsymmetrical loading. Further, there are high negative loadings on some areas of buildings—as a result, some spandrel panels and column covers have been lost.

Further, testing may be curtailed on a mock-up if, for example, a light of glass breaks due to damage in installation, and only the positive wind loading has been completed, but not the negative. In such a case, the anchorages have not been tested for negative loading.

Not too much emphasis can be put on the point that what is shown in shop drawing and what is erected in the building may or may not be the same. A fabricator may change an extrusion or an anchorage—not grossly, but perhaps in some important details. Granted that the manufacturer accepts the responsibility for the structural integrity of the curtain wall if he is guaranteeing it according to performance specifications, but the architect is not free of difficulties, particularly if there is a failure.

So what needs to be done to upgrade the end product—buildings?
First of all there needs to be more comprehensive and careful definition of the technical areas involved in the design and fabrication of curtain walls—by owner, architect, manufacturer. The field needs to be more clearly understood in an over-all sense by the people who buy the product. The true basis for negotiating a curtain wall contract needs to be understood from a technical aspect. And finally, the architect needs to have a thorough enough acquaintance with the technical aspects of curtain wall design and construction, and to have the right kind of technical support, so that a properly working curtain wall system can be designed and constructed that is within the owner's budget.

Procedure that a large architectural firm uses to control strength of glass
Fazlur R. Kahn, partner and chief structural engineer of Skidmore, Owings & Merrill, Chicago lists three steps the firm takes in designing and checking the glass installation:

Step I:

1. Check the local code. Is it realistic in terms of statistical analysis of winds according to weather records (50-100 year recurrence velocity; profile up to 1000 ft)?

2. If the building is an average, rectangular one, use judgment for assigning pressure coefficients for corner zones and the interior zones of building faces. Zone the building for every 100 ft of height.

3. Use a safety factor of 2 and 100-yr recurrence wind. Pressure equals velocity^2 $\times$ 0.00256 $\times$ shape factor $\times$ gust factor^2. (PPG literature says the minimum shape factor for a building is 1.25, but that in some cases, values as high as 5 may be appropriate for certain areas of a building.) If code values are higher, then they supersede.

4. If the building shape is unusual, or if over 50 stories, or if the site situation is unusual (e.g., tunnel effect), the engineers recommend that a wind tunnel test be employed. Pressures are checked every 5 degrees for all 360 degrees.

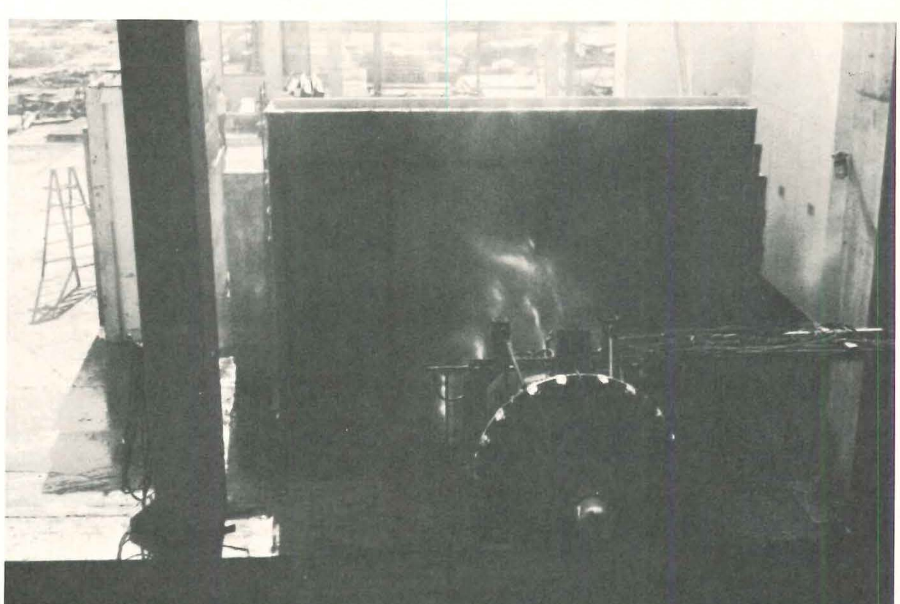
Step II:

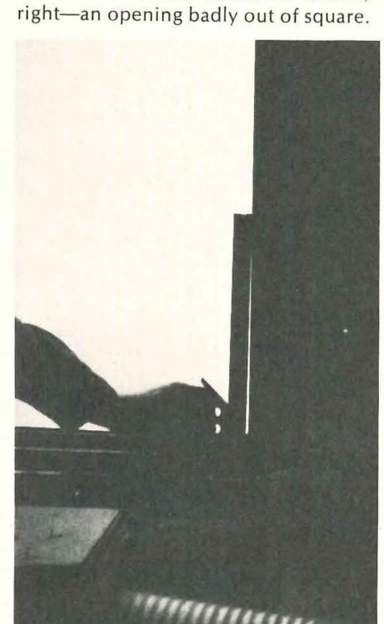
Run a full-scale mock-up test of an assembly with mullions and glass simulating actual building details and glazing details. Glass is selected on the basis of a safety factor of 2. The assembly is said to pass if it withstands 1.5 times design load (obviously, the frame cannot be infinitely stiff). Gaskets, if used, are checked for possible roll-off: bite, neoprene hardness, width of gasket (are any of these insufficient?). How is the bite with metal stops? Stiffness of mullions is important. Deflection equal to 1/175, per se, is meaningless; amount permissible will be dependent upon size and shape of glass light, proportions and exact details of stops.

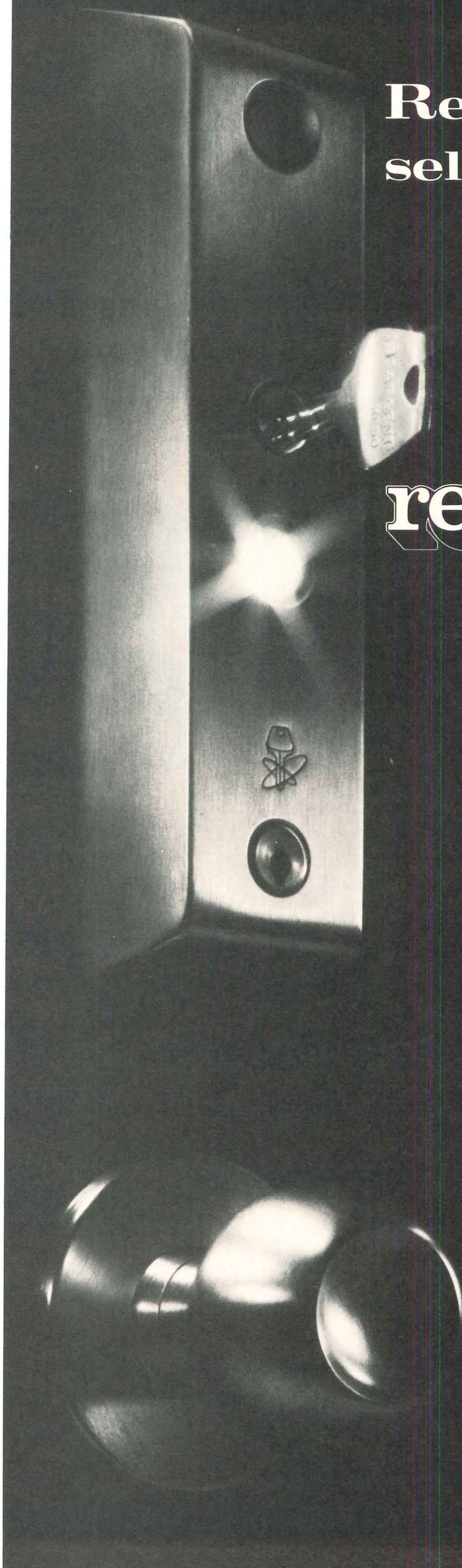
Step III:

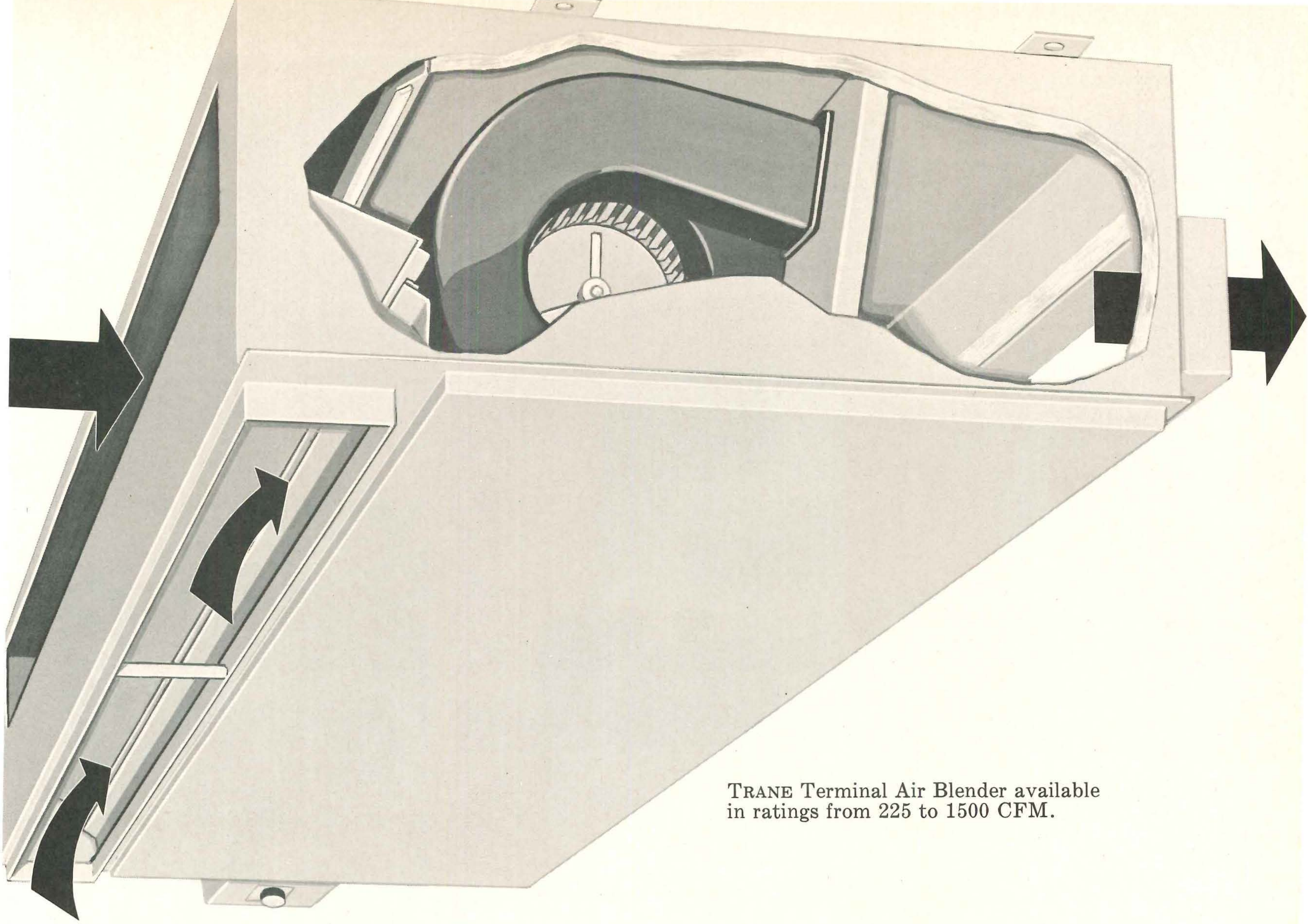
Review shop drawings. Make field measurements and reports—tolerances, opening sizes, squareness of frames. Make visual observations of glass. (For example on the Sears building in Chicago, glass is to be checked as follows: 1st typical floor, 50 per cent; 3rd typical floor, 50 per cent; remaining typical floors, 5 per cent.)

The provision of quality-control measures—or the lack of them—can greatly affect performance of curtain-wall systems. Testing at an independent laboratory to the effectiveness of a curtain wall against wind-driven rain is shown below, left. When erection quality is not specified, or is not checked adequately in the field, conditions can result as shown below, right—an opening badly out of square.









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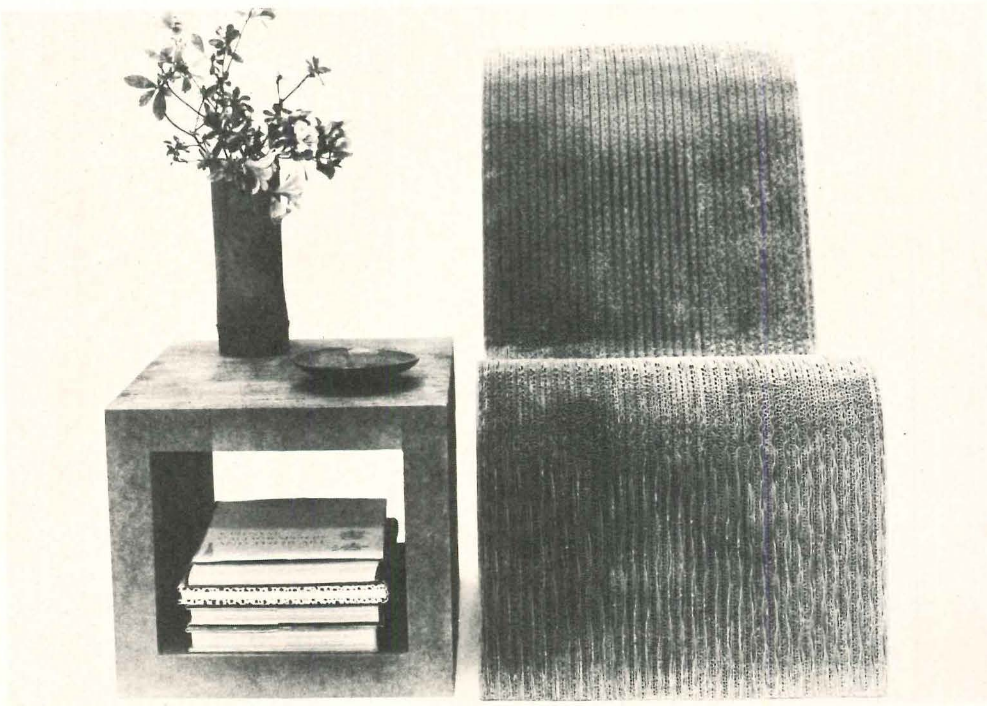

CORRUGATED FIBERBOARD FURNITURE / Color and over-all strength are similar to that of wood. The material is easy to work with, lightweight, and less expensive than wood. The structure of the material lends itself to a variety of bent and curved furniture shapes which rock, contract, or spring back. Other advantages include high sound absorbency, durability and easy maintenance. Designer is Los Angeles architect Frank Gehry. ■ Kairalla Agency, New York City.

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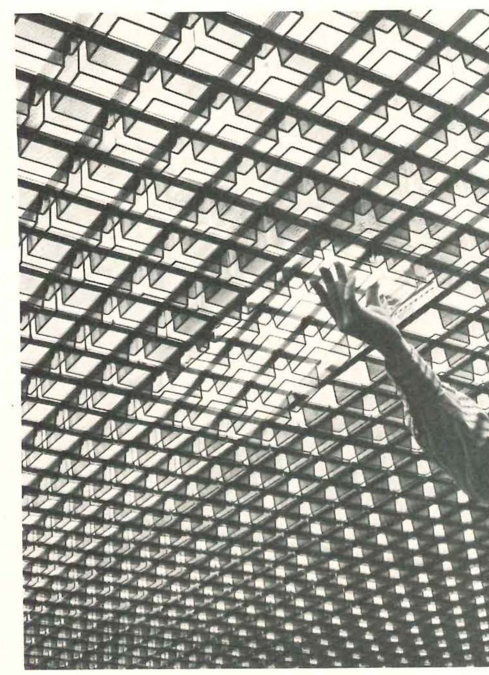

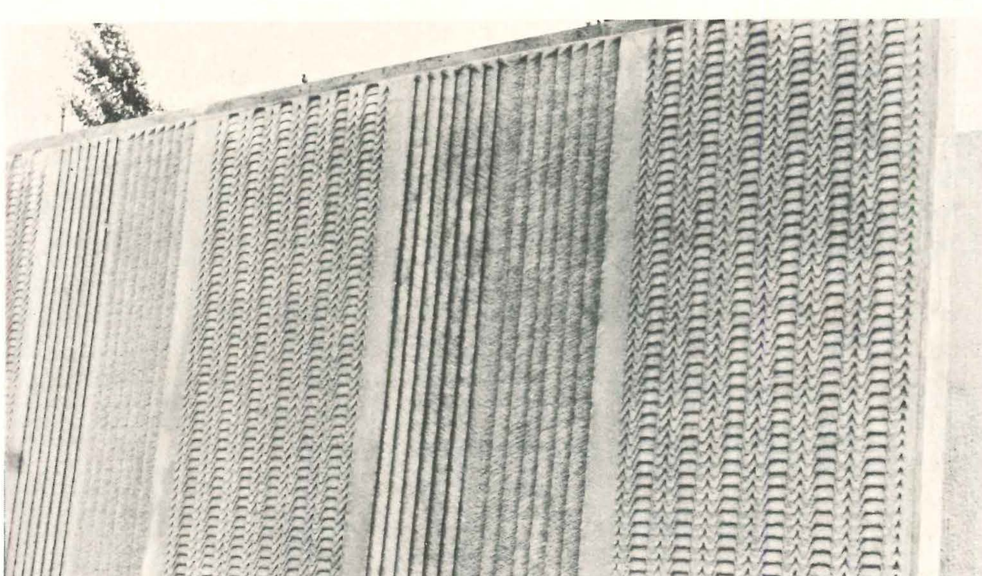

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Other advantages include freedom from bleeding and an unusually high resistance to atmospheric staining. ■ Laing Construction Services Inc., Greenwich, Conn.

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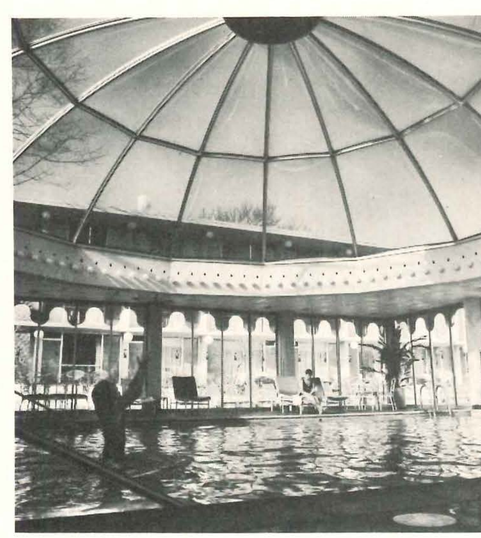

ACRYLIC DOMES / Transparent *Plexiglas* acrylic plastic domes are available in a variety of transparent gray or bronze tints which control heat transmittance and glare. Formed panels, most of which are dome shapes, provide rigidity and are capable of resisting wind and snow loads in large spans. Domes are lightweight and offer high impact resistance. ■ Rohm and Haas Co., Philadelphia.

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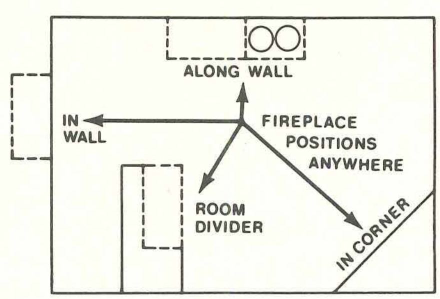

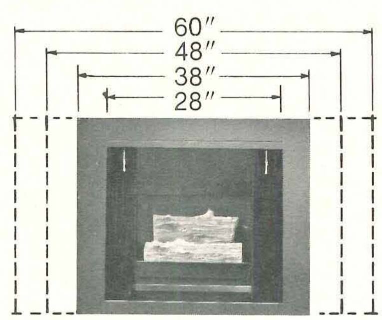

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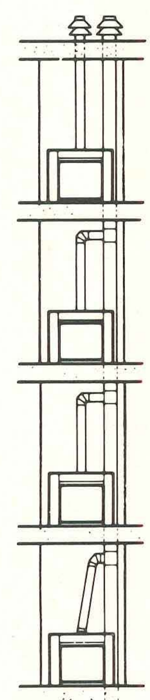

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continued from page 140

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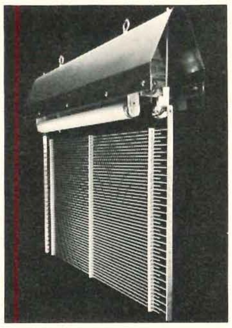

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SUB-FLOOR SYSTEM / The company's floor-decking panels for commercial and residential applications are said to provide a rugged subfloor, acoustically-rated noise control, a resilient carpeting underlayment and weatherproof insulation with termite, rot and fungi protection. ■ Homasote Co., West Trenton, N.J.

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PASSENGER SHELTER / Prefabricated unit is assembled on site. Shatterproof panels give a clear view of all sides of the shelter. The framework comes in a wide range of colors, and the roof is available in any design. Shelters need no foundations and are easily relocated. Units may be ordered with bulletproof windows and built-in seats. ■ Melrose Displays, Inc., Passaic, N.J.

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WORK STATION / Semi-enclosures are composed of free-standing, acoustically controlled panels, hanging shelves with dividers, flipper door storage cabinets and work surfaces with file drawers that can be easily arranged for efficient usage, and free-standing tables. Panels, hanging components, and work surfaces are available in a wide variety of sizes, colors and finishes. ■ Modern Partitions, Inc., Holland, Mich.

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INSULATED WALL SYSTEM / Construction consists of an exterior steel panel, gypsum soundboard, and a layer of fiberglass. Interior surface can be any material specified. Panel dimensions are said to be extremely flexible to accommodate all types of plans. An adjustable joint speeds construction by allowing for reasonable tolerances in joining the panels, while assuring a flush fit with the interior finish. ■ Pascoe Steel Corp., Pomona, Calif.

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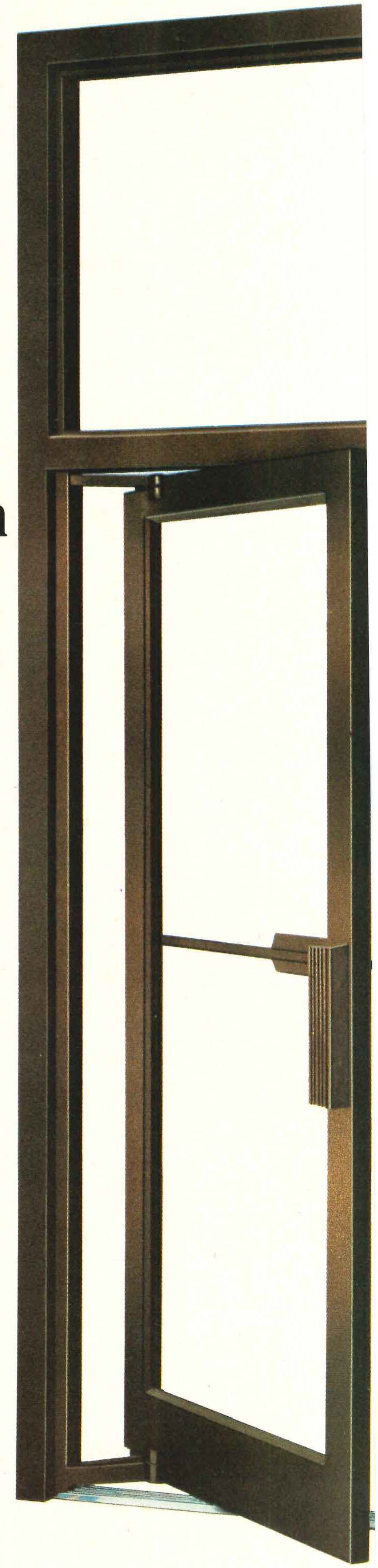


Design options featuring exclusive 4½″ frame depth

Kawneer's Manual Balanced Aluminum Entrances provide design versatility for those jobs which require maximum door control without sacrificing ease of operation. Narrow, medium and wide door styles can be installed in a narrow 4½″ as well as a standard 5½″ depth framing system. Now you can specify a manual balanced door and still maintain consistent mullion depth throughout your design . . . whether the desired look is an extremely slim or monumental profile.

Engineered performance

Each entrance is engineered for maximum strength and durability. Doors feature rugged dual-moment corner construction, self-aligning pivots with spring-cushion backstop, and adjustable pile weathering on all four sides. Frame joinery is specially engineered to withstand abusive traffic and heavy winds. Pivot nearer door center nearly equalizes wind and stack pressures on either side—so the door requires less force to be opened, less pressure to stay closed.

Economical installation

Factory fabrication and assembly of the total entrance unit insures precise alignment of moving parts and quality workmanship throughout. Elimination of time-consuming and costly jobsite fabrication and assembly holds installation costs to a minimum.

Is "reliability" just a tired old word?

Not when applied to our multizone rooftop units. We use the word "reliability" with a great deal of pride and an above average degree of confidence because we have worked hard to build that important quality into our multizone HVAC rooftop systems. The result is that the owner gets dependable comfort, low fuel and power consumption, and absolute minimum maintenance. The architect and engineer keep satisfied clients. And the installer has fewer call-backs.

Here are some of the tangible ways in which you can measure the reliability you get when you specify Modine rooftop units.

Dual heating, dual cooling assure steady performance
Our larger, most popular units have two independent heating systems and two independent cooling systems.

Under normal weather conditions one system handles the heating or cooling requirements. When extremes occur, the second heating or cooling system also goes to work—automatically.

In either case, the second system acts as an emergency back-up should the first system become inoperative.

During mild weather, the occupants normally notice no difference in comfort. In extremely cold weather, the dual heating system guards against building freeze up. During very hot weather, the dual cooling system provides protection against total loss of occupant comfort.

Designed to last the useful life of the building.
Leaks in rooftop units can cause extensive water damage to the building and its contents as well as to the unit itself. So our unit has a one-piece, leak-proof, seamless, fiberglass cover. It's rust-proof, too. Side panels are aluminum pre-finished with baked enamel for double protection. Panels snug up tightly to aluminum posts and are secured by special fasteners for easy removal and replacement. No screw holes to leak or rust.

The base of the unit contains gasket seals for further weather protection. From your roof to our roof, no steel is exposed to weather. So, regardless of your kind of climate, our rooftop units keep on performing at their peak, year after year.

Actually, there's a lot more to the Modine multizone rooftop story. Like for instance a big saving up to 50% in cooling costs, a 25% reduction in power cost, and "free heat" when the weather is mild. Send us the coupon and we'll send detailed information about any of the types of units listed.

Or we'll send our representative to explain the reliable facts that will help you make a "best-buy" heating/cooling decision.

MODINE®

☐ Send detailed information on reliable Modine rooftop units made for: RT-11153

____electric heating
____gas heating
____hot water heating
____electric cooling
____gas heating/ electric cooling
____electric heating/cooling
____hot water heating/ electric cooling

☐ Have your representative arrange an appointment.

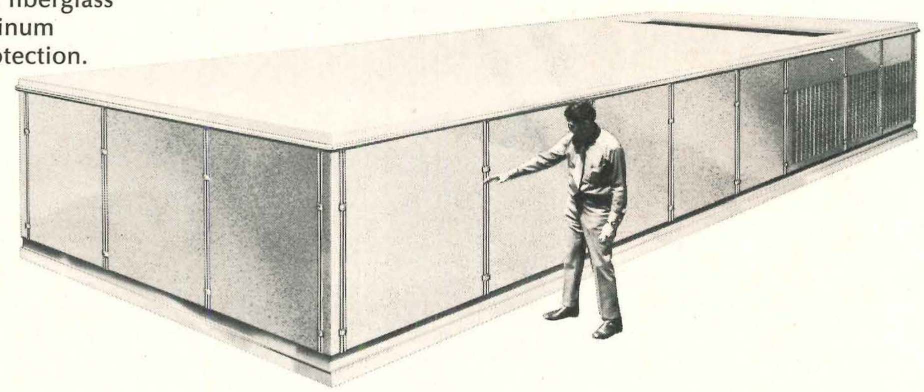
Name____________________

Title__________ Firm__________

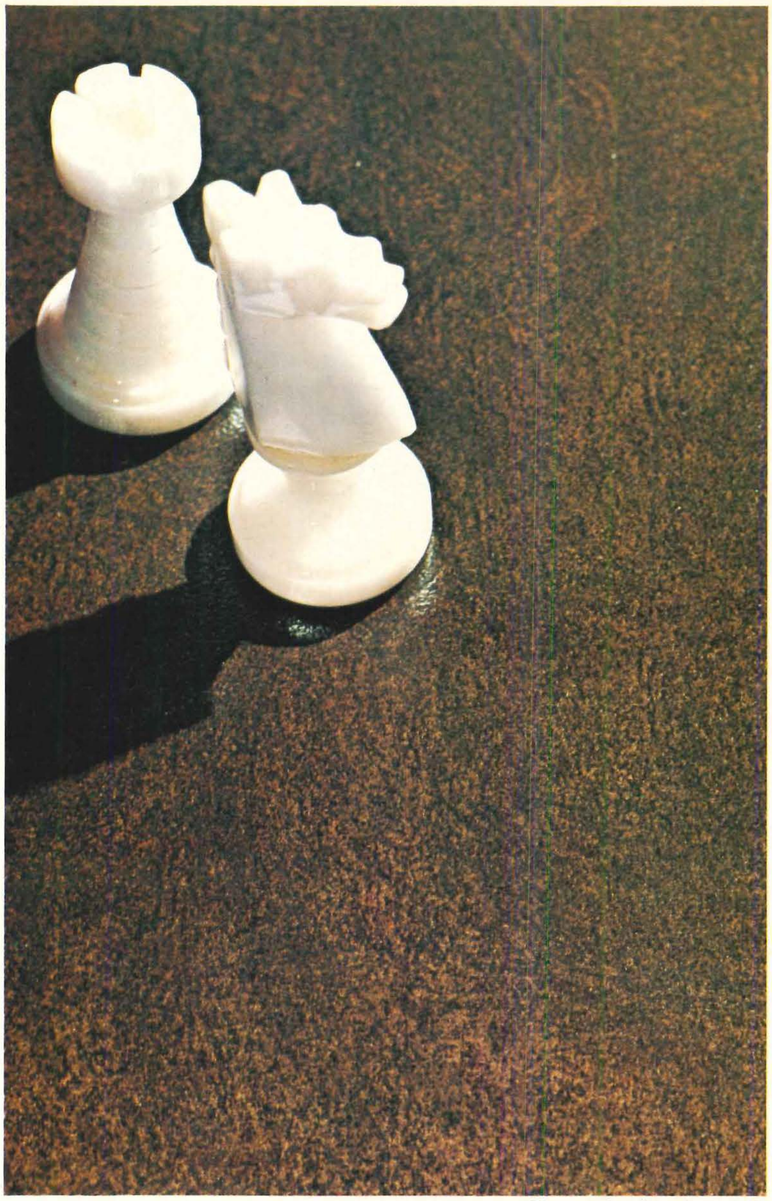
Street__________ City__________

State__________ Zip__________

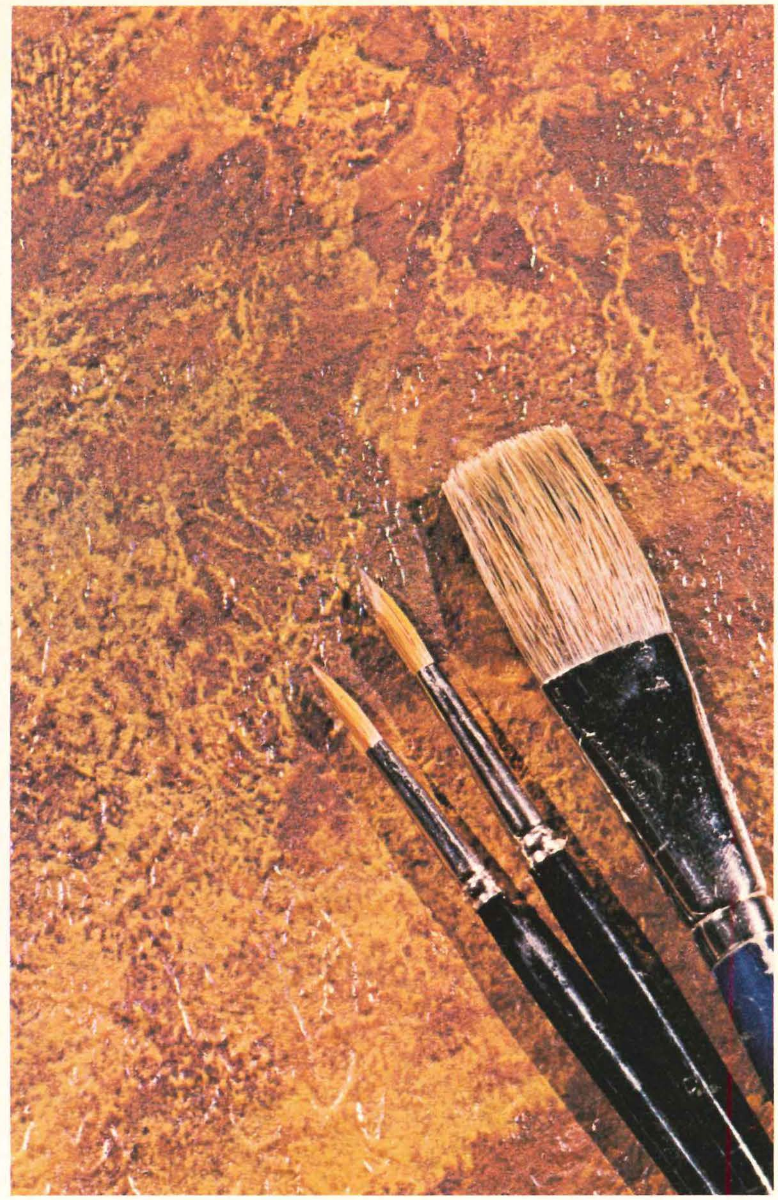
Mail to: Modine, 1510 DeKoven Avenue, Racine, Wisconsin 53401



For more data, circle 63 on inquiry card



Cimmerian Leather, 773



Bronze Tableau, 797

Dimensionals !

Formica does them with feeling.

This is Formica '72 — a vintage year. And these are two of the exciting new dimensionals that help make it so. Run your fingers over Bronze Tableau. Feel the ripples and peaks of the rough-troweled texture. Observe how the highlights and shadows of the raised surface enhance the rich, varigated colorings. And Cimmerian Leather. Its dimensional "grain" gives off a soft, warm feeling that appeals to your sense of touch. Gives it a natural texture that enlivens the colors.

And the real beauty of it all is — when you specify one of our 13 exciting dimensionals — you're specifying a FORMICA® brand laminate that never needs refinishing — stays bright and new looking for years. Select from more than 130 Standard and Designer Collection colors, patterns and woodgrains.

Let it be a vintage year for you, too. Consult your Sweets Architectural File 6.14/Fo, or write us today for more information, Dept. AR-6.

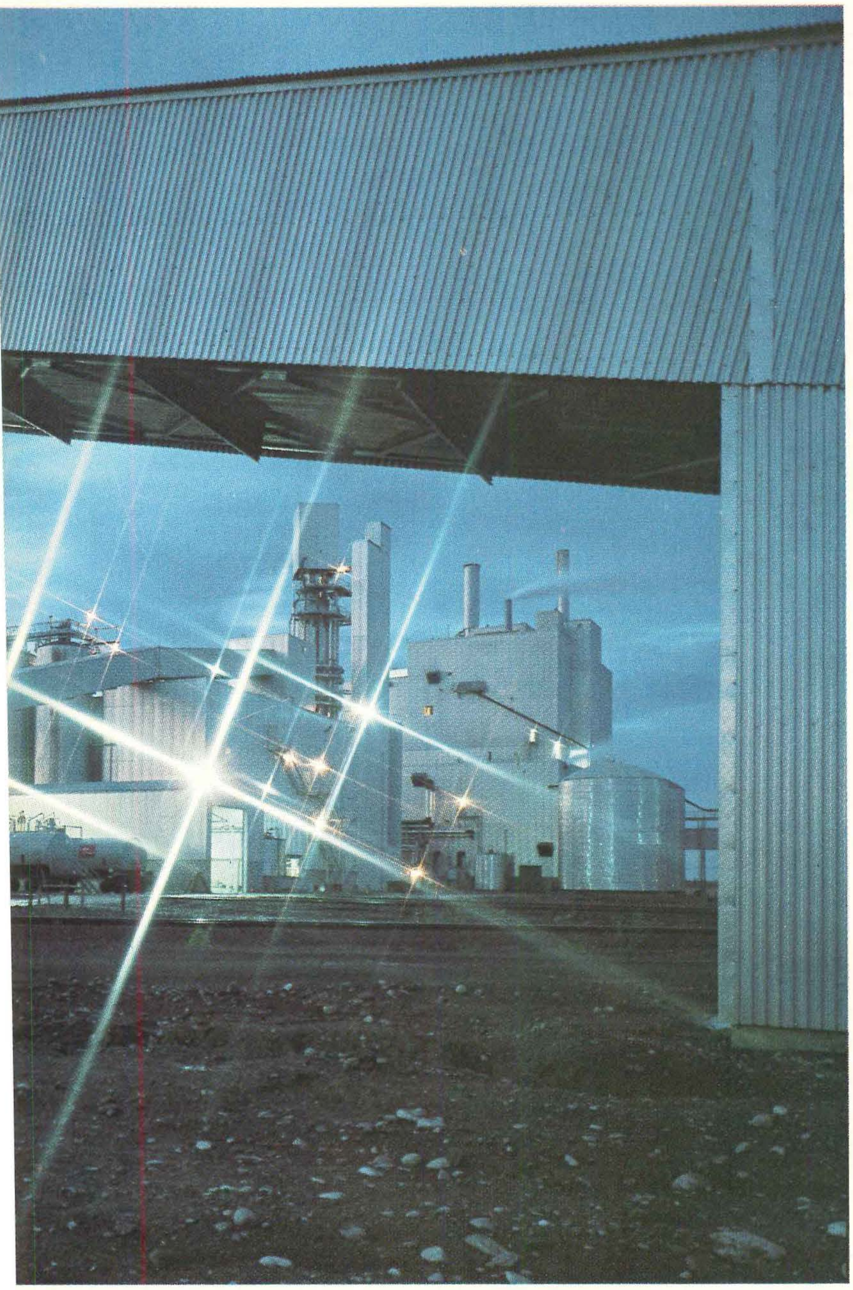
Leadership by design

FORMICA® BRAND

laminated plastic

For more data, circle 64 on inquiry card

From power plants



1.

New Reynolds Aluminum Building Products Plant near Columbus, Ohio is built with 60,000 sq. ft. of Reynolds 4″-Rib Siding. This 270,000 sq. ft. plant is the world's most modern aluminum building products facility, producing a complete line of Commercial and Residential Products.

2.

American business builds big with Reynolds Aluminum Commercial Building Products.

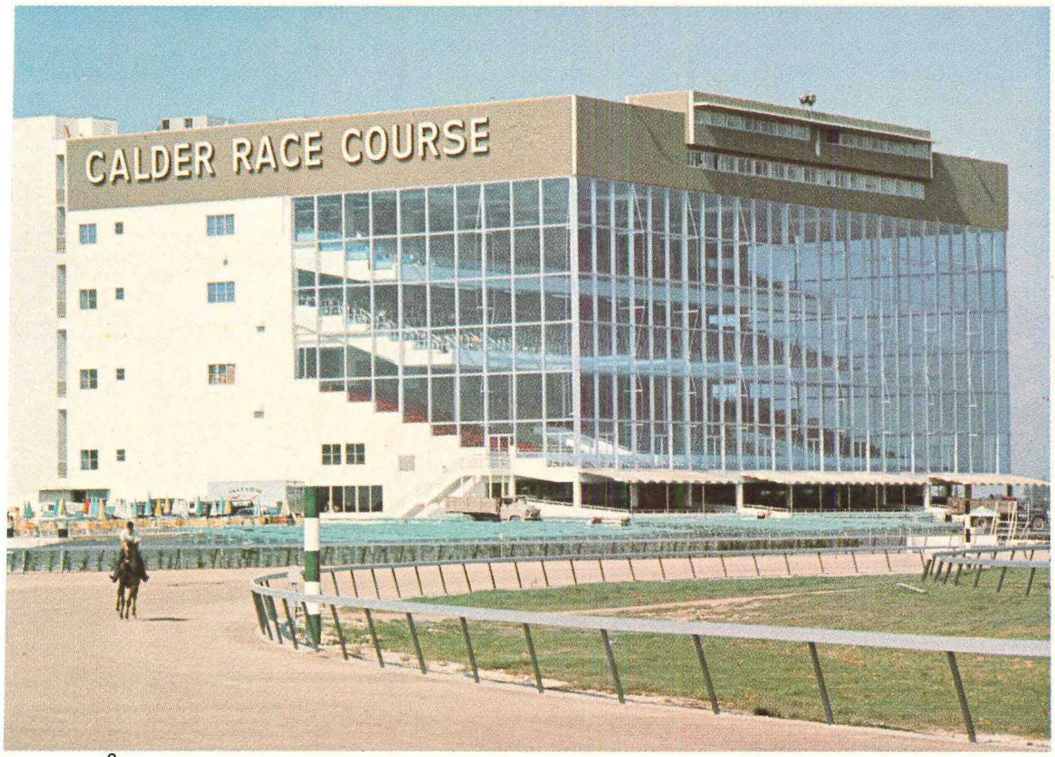
And for good reason.

Construction costs are going up. Low-maintenance and economy have become more important than ever. Today is fast becoming the aluminum age, as more and more designers and builders turn to aluminum to answer their problems. And more specifically to Reynolds Aluminum Building Products. Aluminum products that are rugged, easy to handle and install. Products that cut maintenance costs. Stay beautiful for years with Reynolds Colorweld® finishes.

Reynolds Aluminum Building Products resist corrosion—without a trace of red rust. And they provide efficient thermal and light reflectivity.

Reynolds has a big line of Commercial Building Products. Big enough to handle big business from manufacturing plants to fast food outlets . . . race tracks

to service stations...



3.

5.

6.

4.

7.

to power plants . . . paper mills to service stations and shopping centers. If it can be done with aluminum, we're doing it at Reynolds. And we're doing more and more of it every day.

Shown here are just a few of the thousands of buildings using Reynolds Aluminum Commercial Building Products. For the full story, write or call today for Reynolds "Products in Action" portfolio. Reynolds Metals Company, Architectural and Building Products Division, 325 West Touhy Avenue, Park Ridge, Illinois 60068 (312) 825-8811.

1. International Paper Company, Ticonderoga, N. Y.—400,000 sq. ft. Reynolds 4"-Rib Siding. 2. Kansas City Power & Light Co., Kansas City, Mo. 40,000 sq. ft. Reynolds 4"-Rib siding. 3. Calder Race Course, Miami, Florida—750,000 lbs. of Reynolds Aluminum Roofing, Siding, Track Rail & ReynoRail II. 4. General Electric Company, Wilmington, N.C.—600,000 sq. ft. of Reynolds Aluminum "V"-Beam Siding with white fluoropolymer finish. 5. Texaco, Inc.—Reynolds Aluminum Shingle-Shakes™ in Texaco Green Colorweld. 6. Kentucky Fried Chicken—Reynolds Aluminum Rustic Rib™, Shingle-Shakes™, Soffit & Fascia. 7. Shopping Center—Chicago, Illinois—Reynolds Aluminum Rustic Rib™, Soffit & Fascia.

REYNOLDS
for better building products in
ALUMINUM

They told us robots would be riding one of our seven elevators at the new Franciscan Hospital . . .

No problem. Montgomery handles the unusual just as well as the usual. So besides the 6 Montgomery elevators that will be serving patients and personnel at the new Franciscan Hospital in Rock Island, Illinois a specialized Montgomery elevator is being installed for the exclusive use of a fleet of automatic delivery vehicles.

They're called AMSCARs. With built-in electronic guidance systems they can make their deliveries anywhere in the hospital . . . without human assistance.

They even take the elevator. Because of Montgomery's special engineering, AMSCAR will be able to call its own elevator, get into (and out-of) it easily, and signal it to the proper floor.

AMSCARs don't need expensive decor, but precision elevator operation they must have. Accurate stopping is essential . . . a misleveling of 1/4" could prevent AMSCAR from getting on or off the elevator. And the last thing hospital personnel have time for is searching out AMSCARs abandoned on wrong floors.

A close partnership was called for and that's what we came up with. The architect, Montgomery and Amsco combined forces to help this new hospital cut personnel costs . . . and we can do the same for you.

montgomery®

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POWER WALKS & RAMPS

Montgomery Elevator Company, Moline, Illinois 61265
Montgomery Elevator Co. Limited, Toronto, Ontario
Offices in Principal cities of North America

For more data, circle 65 on inquiry card

Chapel's importance emphasized with precast white concrete panels.

Instructions to the architect were to design the Saint Catherine of Siena Convent with the chapel as the dominant element. And at a moderate cost.

To meet both directives, precast white concrete was selected. Precast chapel windows clearly proclaim the chapel's importance to the brick structure.

The Trinity White cement accentuates the quartz aggregate used in the panels. The quartz was easily and economically exposed by use of a chemical retarder.

Precast flat panels accent the brick living areas, while unifying them with the chapel. The bell tower, in addition to its prominent screen panels, features a distinctive sculpture mounted on a flat precast panel.

Precast white concrete panels can make the architect's art a practical reality. Consider precast for your design . . . and your client's budget.

For new ideas in architectural concrete using Trinity White and new Trinity Warmtone, write:

Trinity White

Creativity in Concrete

P.O. Box 324, Dallas, Texas 75221.

General Portland Cement Company

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Owner: State of New Jersey
Architects: Mahony & Zvosec, Princeton, N. J.,
Kenneth De May of Sasaki, Dawson, De May & Assocs. Inc., Watertown, Mass.
Gen. Contractor: Glenwall Construction Co., Hawthorne, N. J.
Curtain Wall by Cupples Products, St. Louis, Mo.; glazing by American Paterson Glass Co., Paterson, N. J.

We help Ramapo College change

As the wooded countryside around Ramapo College changes colors, so does Ramapo College. With Vari-Tran® reflective glass, the building shown here presents an ever-changing mural that depicts the varied hues of the four seasons. The mural changes each day, often each hour.

Ramapo College is located on a spacious, wooded tract in Mahwah, New Jersey, and it was the intention of the school officials and their architects to preserve and even complement this environment as much as possible. To accomplish this end, Vari-Tran was selected.

By using Vari-Tran coated glass fabricated into Thermopane® insulating units, they achieved other ends. Since Vari-Tran reflects the sun's light and heat, less air conditioning equipment is needed to cool the building. And less energy is needed to run the air conditioning. In winter, Thermopane reduces heating bills because of its insulating properties.

school colors every semester.

Now that Vari-Tran is available in 52 varieties of glass for buildings, it's even easier for architects to select a shade that can best reflect the environment they're designing for. Vari-Tran comes in gold, silver, grey, blue and bronze tones—plus new degrees of reflectivity, and shading coefficients. For the whole story, send for our new brochure, "Reach for a Rainbow." Libbey-Owens-Ford Company, Dept. R-672, Toledo, Ohio 43695.

LOF GLASS

L-O-F Hi-Performance Glass

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J. J. LAVALLEY
J. J. La Valley Co.
Painting Contractor
Glenshaw, Pennsylvania

"Two of my men painted 8 two-bedroom apartments in one day with *Hide-A-Spray*"

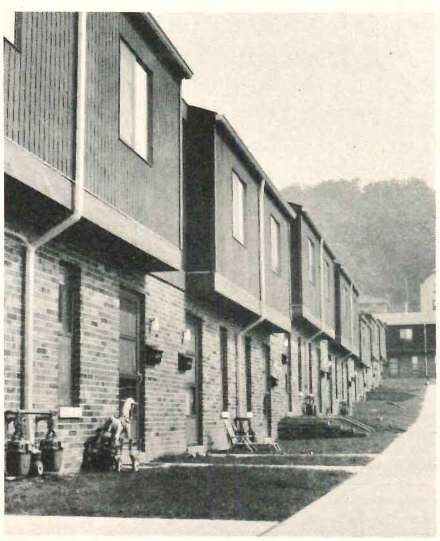
Mr. LaValley had other good things to say about *Hide-A-Spray*™ High Build Interior Flat Latex Paint. Not only were his men able to do this job fast but *Hide-A-Spray* gave complete one coat coverage without priming, without ghosting. Taped, spackled and sanded drywall joints were invisible to the naked eye. On this particular job a Perlite aggregate was added to the *Hide-A-Spray* paint resulting in a finish that "looked like plaster."

Another big plus for *Hide-A-Spray* is its competitive price. This, combined with its other outstanding features, provides a top quality airless spray paint system that saves time, money . . . and returns a handsome profit. In fact, Mr. LaValley was so pleased with the results that his future plans include *Hide-A-Spray* Interior Flat Latex on similar projects.

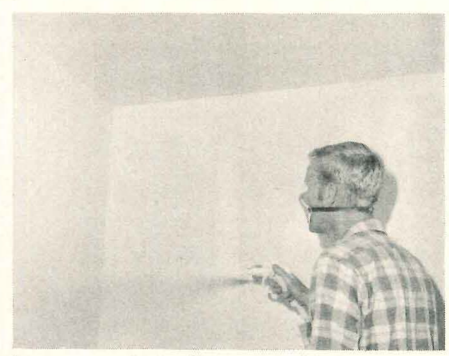
For additional information on *Hide-A-Spray,* write PPG Industries, One Gateway Center, 3W, Pittsburgh, Penna. 15222.

PPG: *a Concern for the Future*

PITTSBURGH® PAINTS



The Project:
Westgate Village, 230 Units, Crafton-Ingram Section, Pittsburgh, Penna. Contractor/Builder: Mellon Stuart Company, Pittsburgh, Penna.



Taped and spackled joints and nail holes in this corner quickly disappear with one pass of airless sprayed *Hide-A-Spray* Interior Flat Latex Paint.

Mud and other construction grime wash off easily with a damp cloth.

After a touch up of *Hide-A-Spray,* accidental scrapes and scuffing from furniture or equipment movement quickly disappear.

PPG INDUSTRIES

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Smucker's® went name-dropping on Stevens Gulistan® Carpet of Herculon®...

...but couldn't make it stick.

Stevens Gulistan "Mainstay" carpet with pile of HERCULON* met a mainstay from Smucker's. A big helping of their U.S. Grade "A" fancy grape jelly. But it was a very quick snack. Stevens carpet of HERCULON olefin fiber cleaned up quickly and easily. The stain resistance of HERCULON, coupled with uncommon resistance to abrasion and fading, gives you the perfect carpet for any commercial installation. Even a name like Smucker's couldn't make an impression on Stevens Gulistan "Mainstay" carpet of HERCULON. But a name like "Mainstay" will make a beautiful impression on your clients.

For detailed information on HERCULON olefin fiber see Sweet's Ⓢ Light Construction, Architectural and Interior Design files. Or, write Fibers Merchandising, Dept. 211. Hercules Incorporated, Wilmington, Delaware 19899 for free 24 page booklet.

Specify carpet of Herculon® by Stevens Gulistan

HERCULES

Smucker's is a registered brand of the J. M. Smucker Company.

*Hercules registered trademark.

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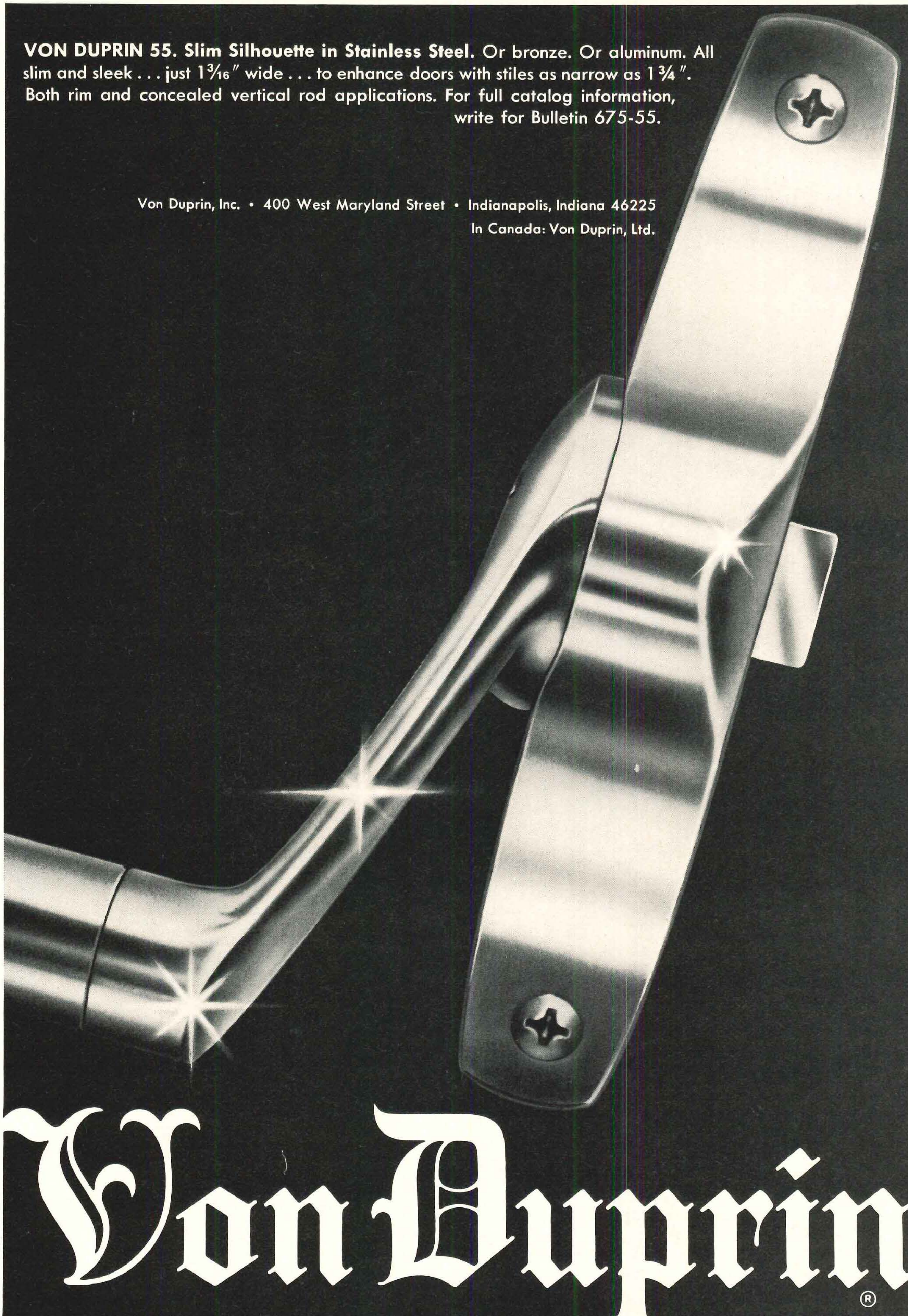

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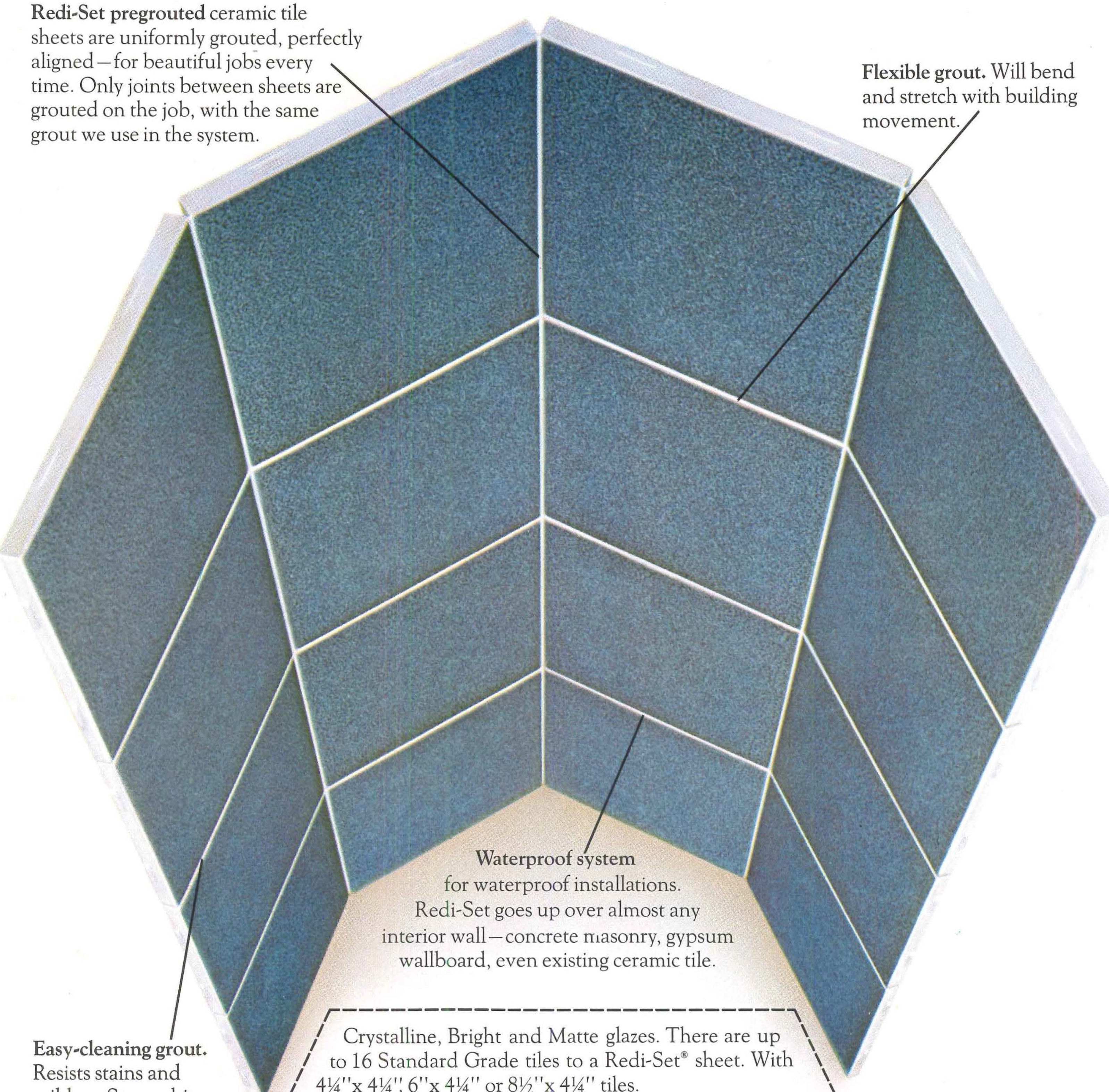

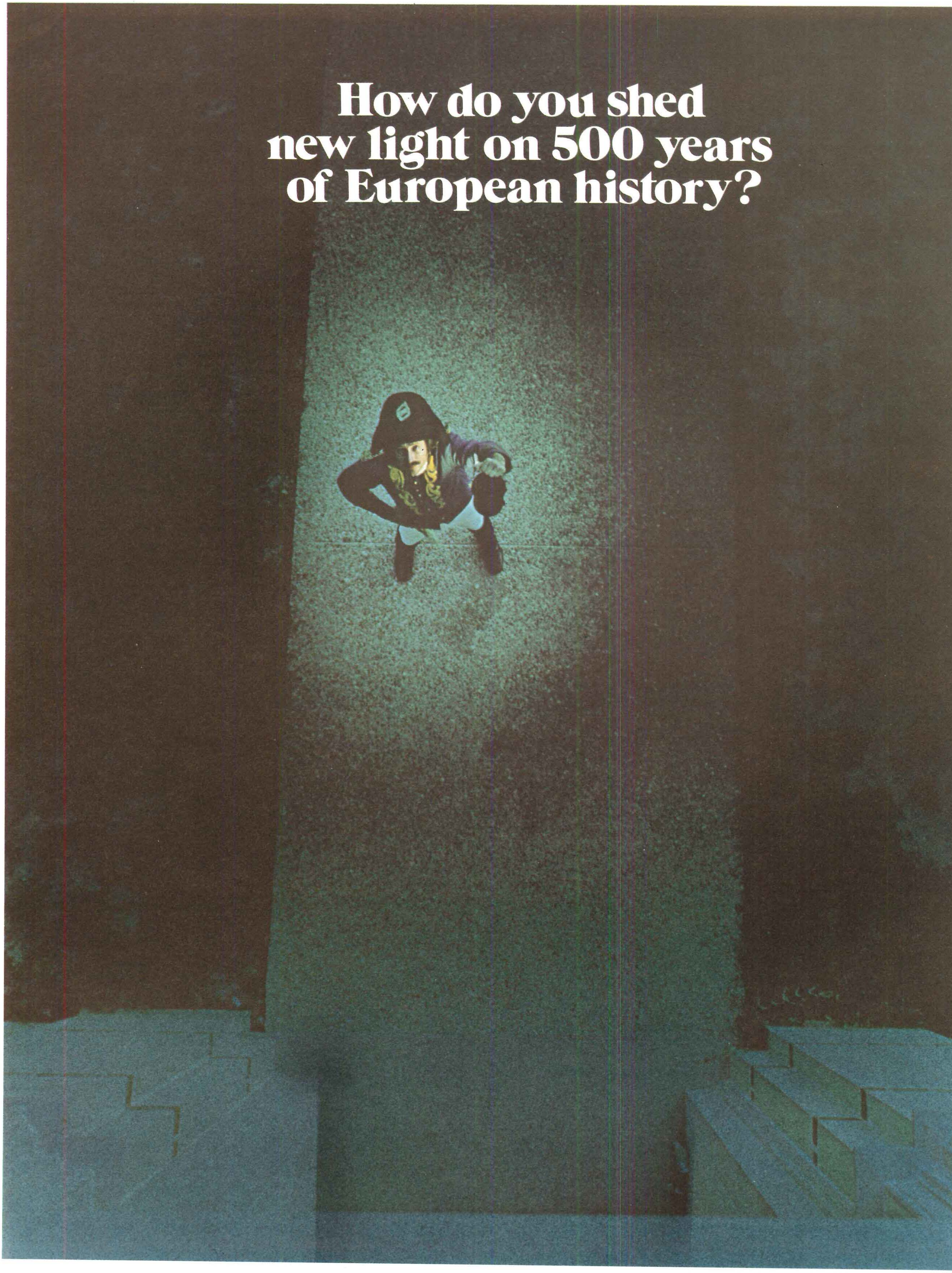
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new light on 500 years
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"If you can stain it, we'll replace it." *

That's quite a claim. And we'll back it up. In writing. Because our Knight Guard® Collection of wallcoverings is coated with DuPont Tedlar,® the invisible barrier that resists all stains. Not even silver nitrate, crayon, or lipstick can get through. Neither can iodine, ballpoint ink, or grease.
Knight Guard. For hospitals, schools, apartments. Offices, hotels, motels. Restrooms, restaurants . . . any high traffic area. For new buildings or improving old ones. It even covers imperfections in walls. And Knight Guard is beautiful, too—no need to go drab and dreary. Select from a brilliant to subtle spectrum of colors in textures, woodgrains, leather lookalikes, and more.
Knight Guard. Type I, Type II, Type III. From Columbus Coated Fabrics—the largest producer of wallcoverings in the industry—with the delivery, service, quality, selection, and local professional support only the leader can give. Write for more information. We'll get you some Knight Guard to test.

KNIGHT GUARD®

BORDEN

COLUMBUS COATED FABRICS
Division of Borden Chemical, Borden Inc.
Columbus, Ohio 43216

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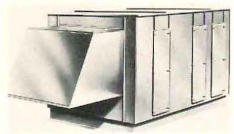
continued from page 146

PENTHOUSE CLIMATE CHANGER / Product is designed to meet the demand for a completely weathertight central station air handler that can be roof-mounted and used for cooling and/or heating, ventilating and filtering. ■ The Trane Co., LaCrosse, Wis.



Circle 311 on inquiry card

AIR-SUPPORTED FABRIC ROOFING / Structure is held up entirely by air with only the sides of the roof secured to end walls for anchoring. Air used to inflate and sustain the fabric roofing is provided by conventional air blowers. ■ Industrial Covers, Redwood City, Calif.

Circle 312 on inquiry card

LOW-PROFILE DOMES / Measuring 200 ft in diameter, domes are constructed of latex modified concrete using Styrofoam brand polystyrene foam as a structural form. Units shown enclose a water waste treatment plant's trickling filters. ■ The Dow Chemical Co., Midland, Mich.

Circle 313 on inquiry card

SLIDING TACK BOARDS AND CHALKBOARDS / Panels operate smoothly on nylon carriers. Panel materials include vinyl-covered cork in 23 colors, cork in eight colors, magnetic chalkboards in 10 colors, and composition chalkboard in five colors. Both horizontal and vertical sliding boards are available. ■ A-1 School Equipment, Inc., Santa Fe Springs, Calif.

Circle 314 on inquiry card

ROUND TABLE / Tops and seats are solid-core fiberglass with heavy-wall steel tube bases. A wide range of colors is available. A choice of free standing or floor-mounted installation is offered. ■ Freight Container Corp., Temple City, Calif.

Circle 315 on inquiry card

LIGHTING FIXTURE / The recessed unit shown here is one of three models now available. The shape of the ballast cover and the design of the white reflector panels provide a more uniform distribution of light, resulting in a softer, more diffused illumination. Clear or translucent lenses are available as accessory items. ■ The Celotex Corp., Tampa.

Circle 316 on inquiry card

ENVIRONMENTAL CONTROL AIR FILTRATION SYSTEM / Filters are said to circulate air that is up to 97 per cent pollution free, and to trap the gaseous ingredients of air pollution as well as eliminating particulates. The system operates in three stages and costs 10 cents per sq ft more per year than conventional air filtration, according to the company. ■ Farr Co., Los Angeles.

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Convenience. Capacity. Care.

What more do you want in a Whiteprinter?

See this brand new Bruning 875 in action—learn its attractive price — and you may well wonder how anyone could ever build a better value.

It cares for your drawings, tracings, and prints with the same tender touch it gives your employees. And it has true high-volume capacity.

Naturally, the 875 has the safeguards and conveniences your operators deserve: the automatic reverse when a finger gets in the way; the concentrated control cluster that slides out for easy reach. Pushbutton controls for every operation. And coded lights to confirm desired operating mode.

But Bruning cares for paper as well as people. Only the 875 has a soft-feed roller to protect tracings from tearing and wrinkling. Only the 875 has a slow forward speed for extra accuracy in lining up sheets when feeding. Vacuum ports on the feedboard help hold print paper in position. And our unique tracking device keeps long prints from sliding sideways.

Add it up and you'll find the new Bruning 875 is the finest whiteprinter you can buy regardless of price. It's a 42″ automatic machine with a dual 100/150 watt-per-inch mercury vapor lamp, with variable speed—1½ feet to 80 feet per minute—a huge, 400-yard paper capacity, reverse switch, automatic blower turn-off delay, and much more.

Call your local Bruning man now to see the exciting Bruning 875. Or contact us at 1555 Times Drive, Des Plaines, Ill. 60018.

BRUNING DIVISION

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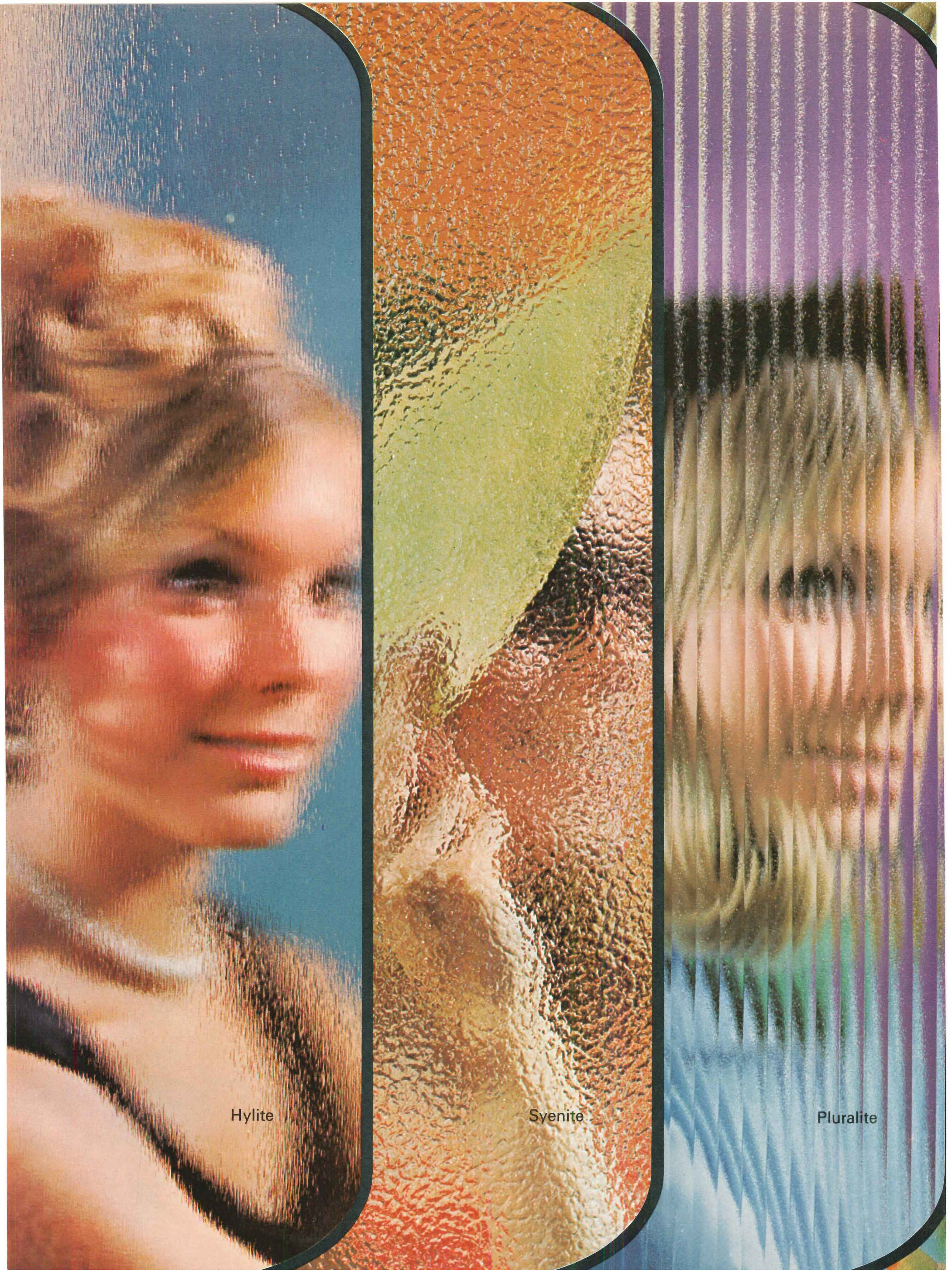
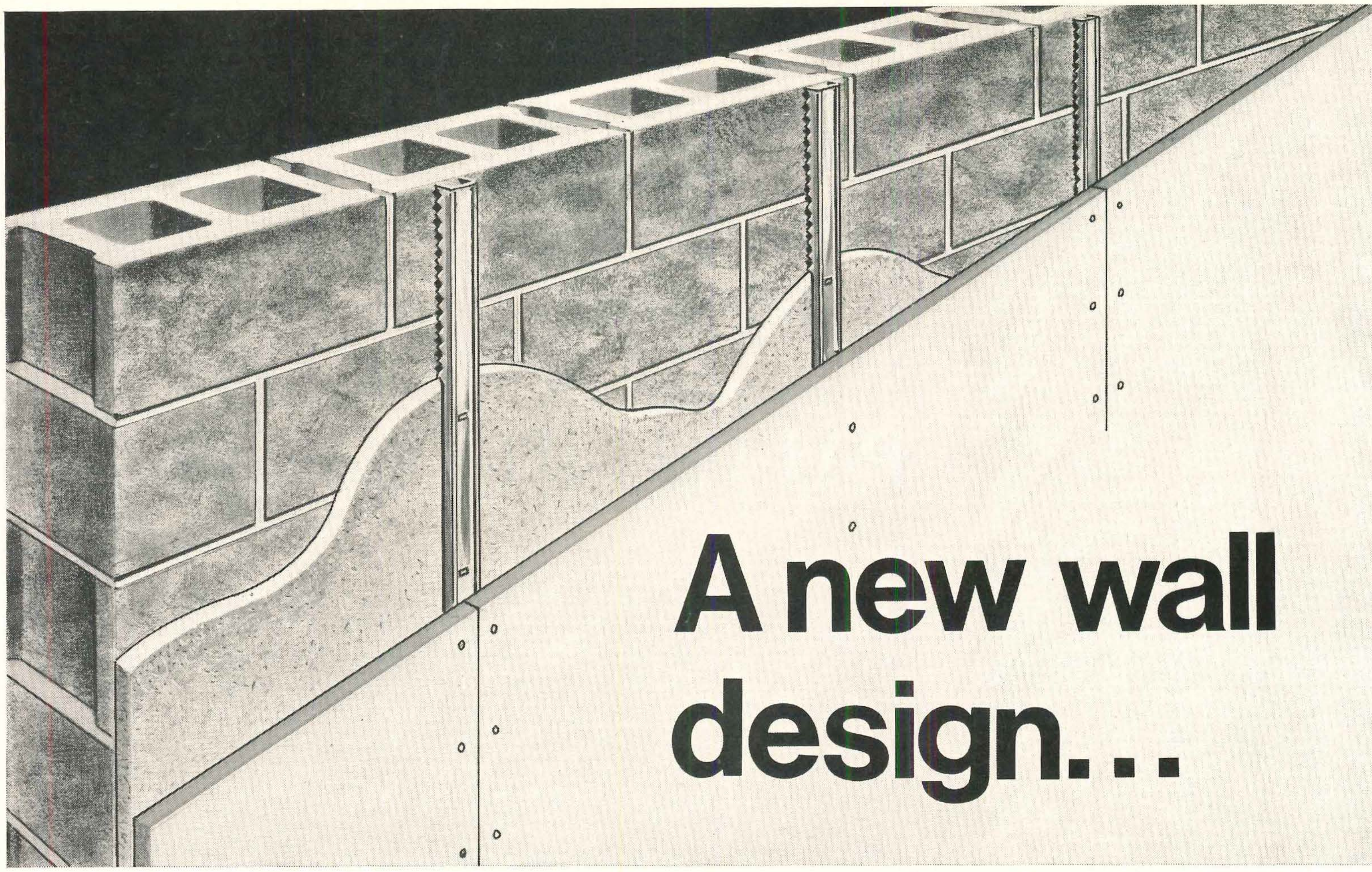

Hylite
Syenite
Pluralite


A new wall
design...

33 stories of long-life white: a dramatic first for DURACRON® coatings

ORIENT OVERSEAS ASSOCIATES BUILDING, New York
Architect: I. M. Pei & Partners
Curtainwall and window fabricator: Lupton Manufacturing Co., Aluminum Group, Olin Corporation
DURACRON Coating applicator: Aluminum Company of America

"88 Pine Street" offers more of special interest to architects and builders than distinctive beauty alone. This striking new addition to Manhattan's skyline is the first building constructed of aluminum curtain wall in a column-and-beam style. And to accentuate its face dramatically, it is also the first high-rise finished exclusively in a white organic coating. The result is a gleaming study in light and shadows—a clean, carefree appearance that will endure for years to come.

All spandrel panels and column covers were fabricated from aluminum extrusions, then factory finished with baked-on DURACRON Super 800 coating. This silicone-fortified acrylic finish from PPG offers outstanding durability and color integrity. In addition to excellent performance characteristics, this DURACRON coating provides the savings of a moderately priced extrusion finish. For data on PPG color coatings, check Sweet's Architectural or Industrial Construction Files 9.10/PPG. Complete product information is available from Product Manager, Extrusion Coatings, PPG INDUSTRIES, Inc., Dept. 16W, One Gateway Center, Pittsburgh, Pa. 15222.

PPG: a Concern for the Future

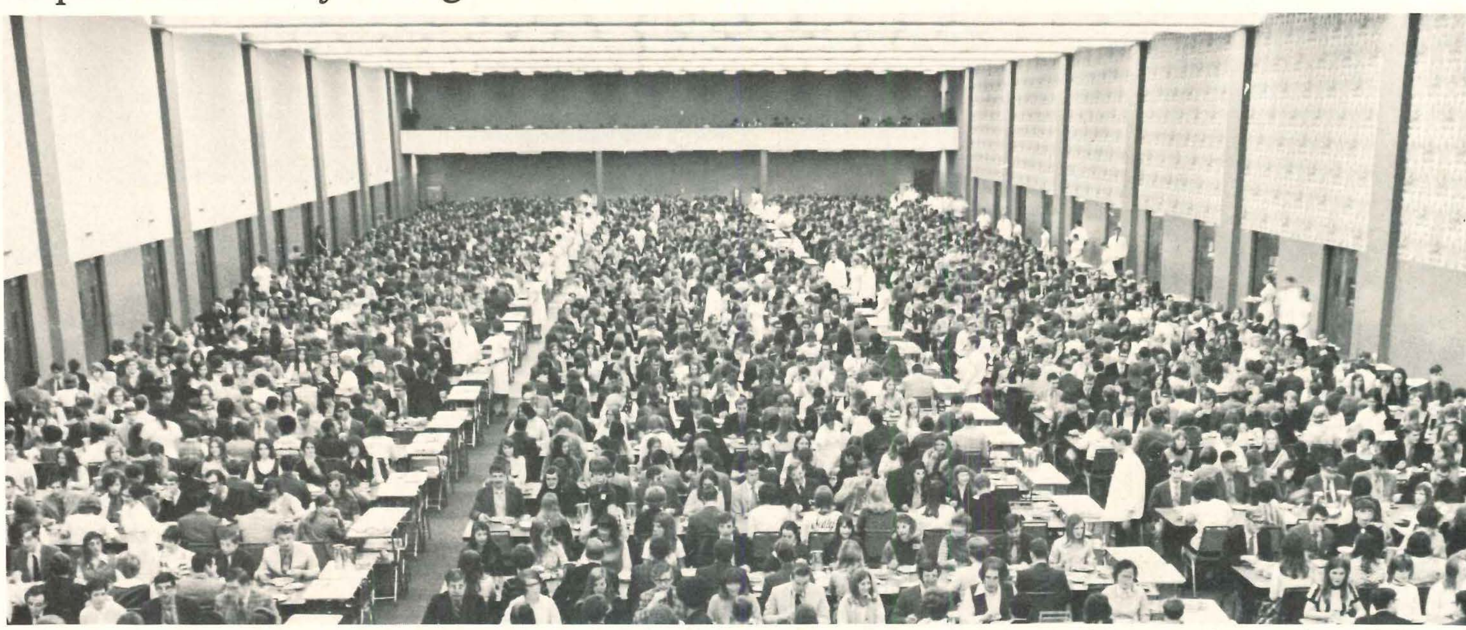
Extrusion Coatings
PPG INDUSTRIES

For more data, circle 84 on inquiry card

Loktuft® survives on three meals a day.

Three times a day, seven days a week, 2,500 students of Bob Jones University, Greenville, South Carolina, torture a carpet backed with Loktuft® Duon secondary backing.

The carpet is a 42 oz. level loop by Wunda Weve Carpets, Division of Dan River Inc. The 85′ x 300′ tackless installation, over dense rubber padding, is the largest carpeted university dining room in America.



Loktuft Duon secondary backing was used because it lays flat without bubbling or rippling. It also saves time and labor since it does not require extensive power stretching to achieve a good, flat installation. Loktuft cuts cleanly without fraying. And seams join almost invisibly.

Now they've discovered how well it performs.

After two years, Jim McAbee of Certified Carpet Service, Greenville, reports not a single call-back on the installation. No stretching. No delamination problems.

Loktuft Duon secondary backing withstands the rigors of intense traffic, movement of thousands of chairs and repeated cleanings.

Even massive water spills common to large dining hall facilities create no puckering problems and that's because Loktuft is made with Marvess® olefin, a Phillips 66 fiber which resists damage from rot, mildew and insects.

Loktuft Duon. If it can handle three meals a day at Bob Jones University, it can handle anything you might serve up.

Loktuft®

A PHILLIPS 66 CARPET BACKING

PHILLIPS FIBERS CORPORATION, GREENVILLE, S.C., A SUBSIDIARY OF PHILLIPS PETROLEUM COMPANY. PRODUCERS OF: MARVESS® OLEFIN, QUINTESS® POLYESTER, PHILLIPS 66® NYLON AND LOKTUFT® CARPET BACKING. MARKETING OFFICES: P.O. BOX 66, GREENVILLE, SOUTH CAROLINA 29602. TELEPHONE (803) 242-6600; 1120 AVENUE OF THE AMERICAS NEW YORK, NEW YORK 10036. TELEPHONE (212) 697-5050.

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For more data, circle 86 on inquiry card ▶

more
Security with a touch of beauty!

As these installations illustrate, the Kinnear Rolling Grille is more than a beautiful veil for entrance-ways after hours. It provides dependable security without the sacrifice of air, light, or vison. At the same time, 'round-the-clock climate control and better merchandise displays are provided for those late mall shoppers. And, the Kinnear design is so inherently efficient! The strong counterbalanced metal grille coils like a window blind . . . completely concealed above the opening, out of the way. Operates either manually or with a Kinnear power operator. In addition, with Kinnear's "Registered" life-extension plan and nationwide service organization, you're assured of the best store-front closure money can buy. Write today to get the full story.

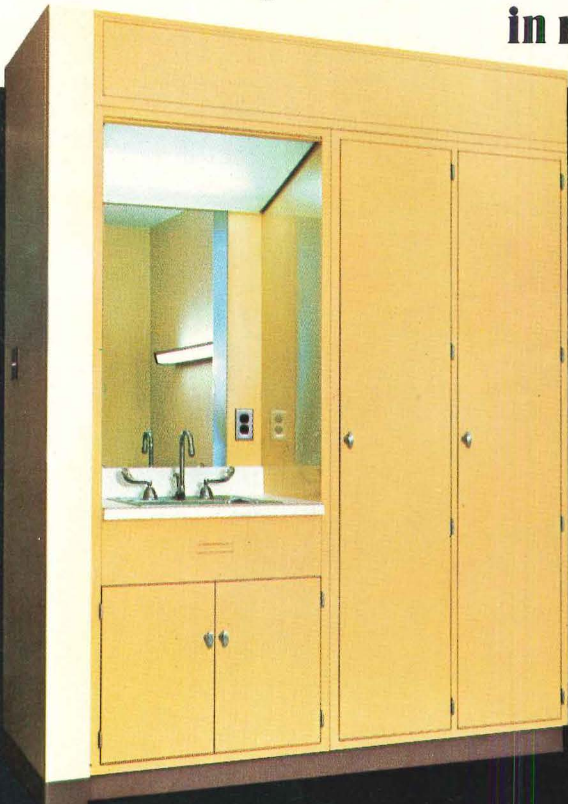
Kinnear Corporation, 1860 Fields Avenue, Columbus, Ohio 43216.

KINNEAR®
ROLLING DOORS
Saving Ways in Doorways Since 1895

Kinnear Rolling Grilles

The Indestructibles!

Hospital and institutional casework in steel... beautifully finished in rich, enameled colors or in gleaming stainless.



Wadsworth Rittman Hospital, Wadsworth, Ohio

Northside Hospital, Atlanta, Georgia

Northside Hospital, Atlanta, Georgia

Every piece of Jamestown Products metal casework is custom-made to meet actual field conditions. As you know, this is an uncommon specialty today.

Every piece is of the finest quality and equipped with lasting, maintenance-free components . . . not added as extra features, but as integral parts. Cabinet sides, bottoms, and backs are constructed of first quality furniture steel, 18 gage minimum.

Performance characteristics under all (damp or dry) hospital conditions are outstanding.

Brooks Memorial Hospital Dunkirk, N.Y.

Our metal and plastic laminated products represent the optimum for every institution you will ever design and build.

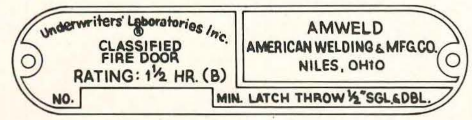
AVM CORPORATION

Jamestown Products Division

JAMESTOWN, NEW YORK 14701 716/665-5313

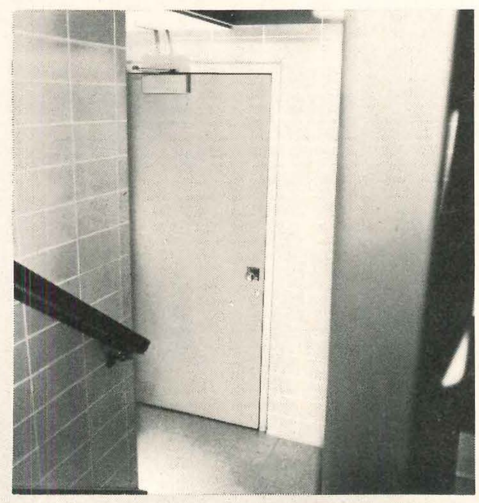
For more data, circle 90 on inquiry card

Amweld puts the heat on fire door costs



We've added Underwriters' "B" label to our polystyrene core door to give you an economical fire door. It's our Super Core, available in either 1⅜″ or 1¾″ thickness.

Super Core fire door offers fire protection, plus excellent sound retardation, moisture resistance, and cold weather insulation characteristics at an economical price.



Super Core is the reason.

A rigid, pre-cured, preformed polystyrene core is permanently bonded to cold-rolled steel panels with structural thermosetting adhesive. This combination gives our door its inner strength, assures dimensional stability, and results in a smooth, attractive exterior. There is no sacrifice in quality or materials. You get the same kind of precisely engineered, hard-working product that you've come to expect from Amweld.

Specify Amweld Super Core. It's the perfect door for stairwells or other areas requiring fire protection. And, it's available in 18- or 20-gauge, full-flush or seamless, in a wide range of widths and heights.

Want to know more? Contact your Amweld distributor or call us. Amweld Building Products, 370 Plant St., Niles, Ohio 44446. Phone (216) 652-9971.

For more data, circle 91 on inquiry card

AMWELD® METAL DOORS AND FRAMES

A division of The American Welding & Manufacturing Company, Warren, Ohio

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2. CONTROLLER — Solid-state and electro-mechanical relays combined for the most advanced dispatching and car control.

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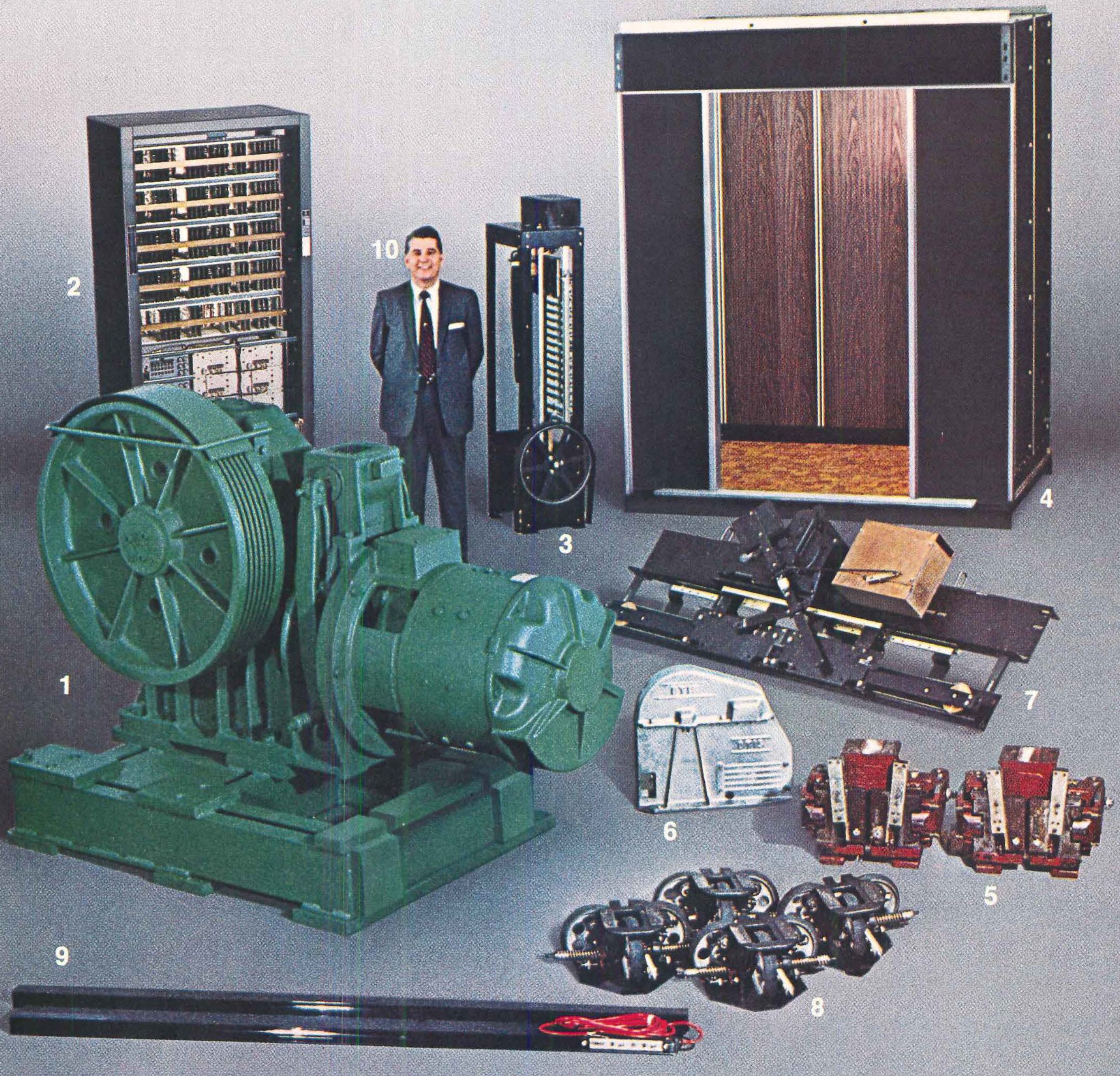

CG&E building owes much of its striking beauty to White Polished Mount Airy Granite!

The Cincinnati Gas & Electric Company's Northern Division offices, Middletown, Ohio exemplify today's functional design concepts. White Mount Airy Polished Granite was used for the four corner columns, the apparent lintels at the third floor and top of the building, the facia of the second floor deck, and the deck seats and planters. The white granite blends with the stainless steel mullions and areas of polished black granite for a beautiful, mirror-like finish that reflects light with ever-changing contrasts.

More and more architects recognize the limitless design possibilities, durability, and timeless beauty of Mount Airy Granite. For details, write today.

North Carolina Granite Corp.

Mount Airy, North Carolina 27030

The Cincinnati Gas and Electric Company's Northern Division Offices, Middletown, Ohio. Architects: Gartner, Burdick, Bauer-Nilsen, Cincinnati, Ohio. Contractor: Frank Messer and Sons Construction Co., Cincinnati, Ohio.

For more data, circle 92 on inquiry card

Specify the complete commercial dishwashing system.

Jackson provides the only packaged dishwashing systems which include **built-in power rinse** and **booster heater** which eliminate low or fluctuating water pressure and assure you of 180° temperature for final rinse.

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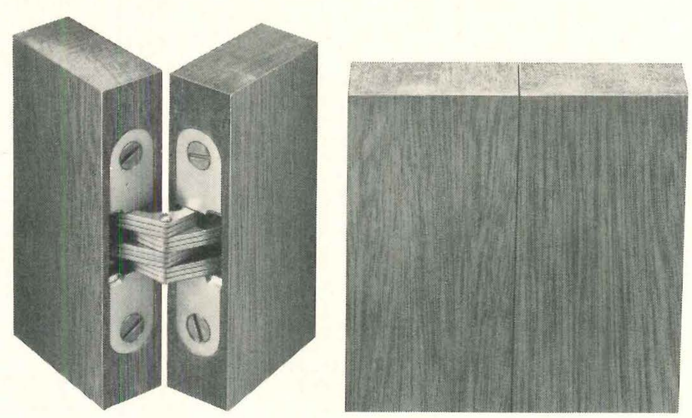
JACKSON FASPRAY DISHWASHERS

The hinge that hides



NOW YOU SEE IT **NOW YOU DON'T**

The Soss Invisibles—for a custom look for any room! These amazing hinges hide when closed, eliminating unsightly gaps, hinges, and door jambs. They're the perfect hidden touch for doors, doorwalls, storage cabinets, built-in bars, stereos, and TV's. Specify the Soss Invisibles wherever looks matter. See listing in Sweet's or write for catalog: Soss Manufacturing Co., Division of SOS Consolidated, Inc., P.O. Box 8200, Detroit, Mich. 48213.

the SOSS Invisibles

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Until now you had a choice of pretty carpets that weren't very tough. Or tough carpets that weren't very pretty.

But in many contract installations you need both. So we conceived carpets that are pretty and tough.

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But these carpets are a lot more than pretty. They're made from 100% ANSO nylon so they hide dirt better. And they're tough enough to stand up to your heaviest traffic areas.

In fact, Allied Chemical guarantees carpets of ANSO nylon against excessive wear for 5 years (We've got more guaranteed carpet fiber installed than anybody—over 40 million square yards.)

If you need pretty-tough carpet, ask for ANSO. Or contact Allied Chemical Corporation, Fibers Division, Contract Department, One Times Square, New York, N.Y. 10036. Phone: (212) 736-7000.

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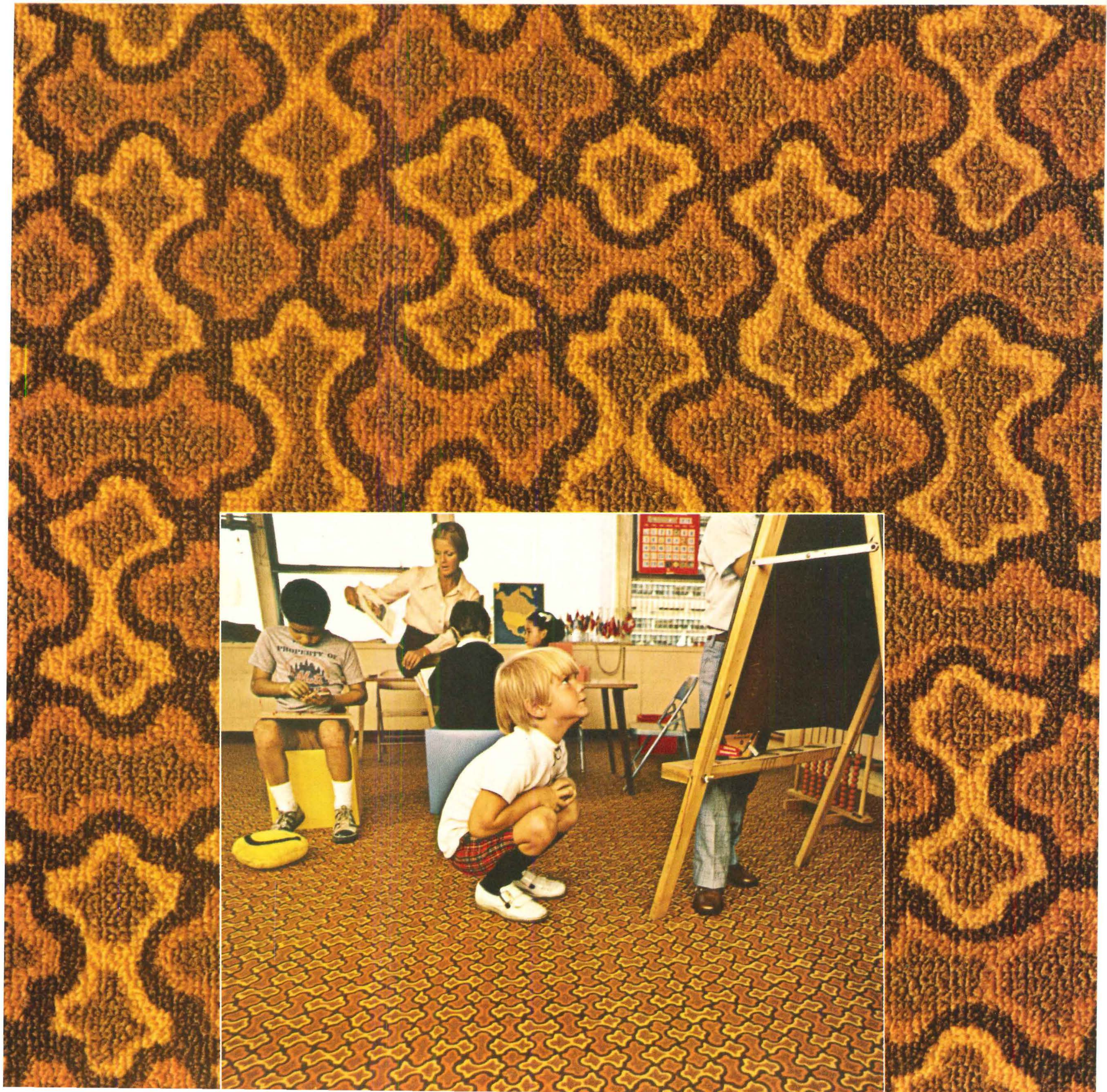
CARPET—BAROQUE BY MAJESTIC



OFFICE LITERATURE

For more information circle selected item numbers on Reader Service Inquiry Card, pages 219-220

CENTRAL STATION AIR HANDLERS / A complete line for heating/cooling and heating/ventilating is described in a 40-page catalog. A wide range of capacities is available. Optional equipment is also discussed. ■ Mueller Climatrol Corp., Milwaukee.
Circle 400 on inquiry card

TRANSLUCENT FIBERGLASS PANELS GUIDE / Recommended spans for every configuration in every panel weight are given in an 8-page guide. The manufacturer's line of panels is featured. ■ Filon Division, Vistron Corp., Hawthorne, Calif.
Circle 401 on inquiry card

WATER SAVING TOILET / A water closet whose tank uses ⅓ less water compared with conventional types is described in literature. According to the company, the closet is of particular interest to owners who maintain private water systems because the design significantly reduces demand on system pumps. ■ Crane Co., New York City.
Circle 402 on inquiry card

WASHROOM ACCESSORIES / Over 300 soap dispensers, waste receptacles, shelves and mirrors are presented in a 36-page catalog. ■ American Dispenser Co., Carlstadt, N.J.*
Circle 403 on inquiry card

INDUSTRIAL WOOL AS FIREBREAK / Two types of insulation made from the company's wool product are said to provide resistance to flame passage in excess of three hours between floors at exterior walls. Literature describes installation procedures and applications. ■ United States Gypsum Co., Chicago.*
Circle 404 on inquiry card

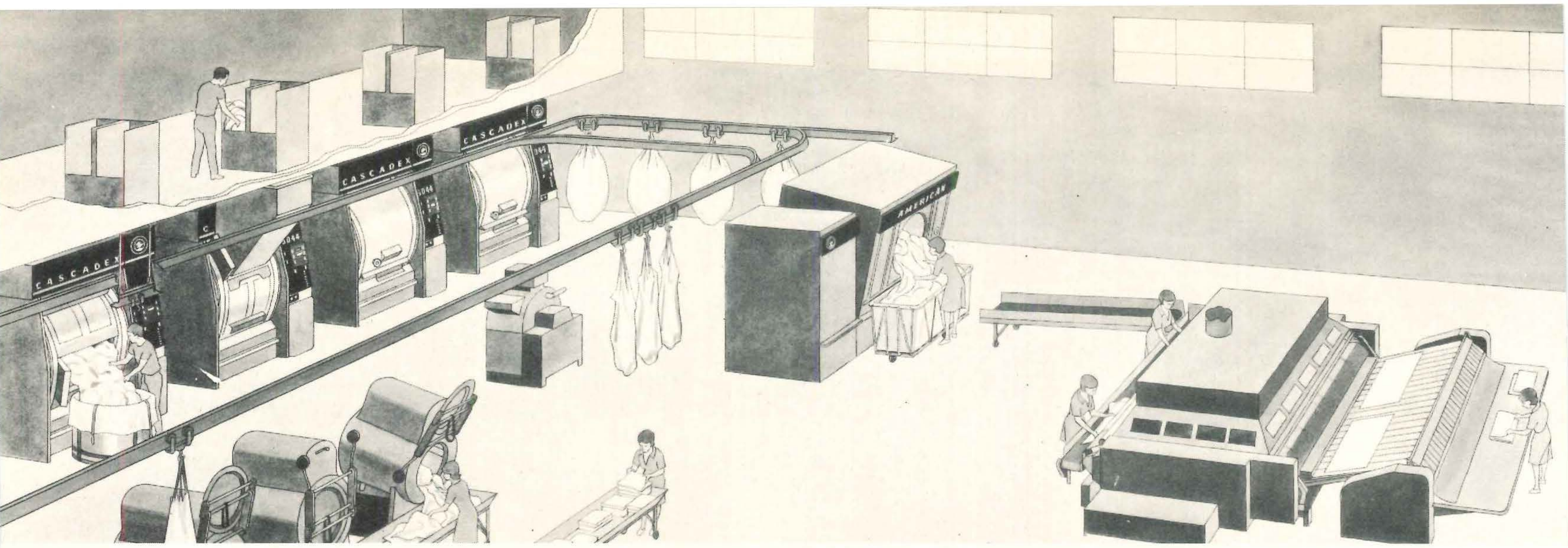
LIBRARY SHELVING / An extensive line including open and closed base bookstacks, multi-tier bookstacks, wood shelving, and specialized shelving is presented in a 12-page catalog. Specifications are included. Library accessories are described. ■ Estey Corp., Red Bank, N.J.*
Circle 405 on inquiry card

VINYL WALL COVERING COLLECTION / A 44-pattern group imported from England is illustrated in an 8-page brochure. ■ ICI America Inc., Stamford, Conn.
Circle 406 on inquiry card

VINYL ASBESTOS AND ASPHALT TILE GUIDE / The 1972 edition of color comparison charts lists commercial equivalents of color lines and patterns for most tile made in this country. Over 500 different patterns and colors are included. ■ Asphalt and Vinyl Asbestos Tile Institute, New York City.
Circle 407 on inquiry card

MUSEUM EXHIBIT AND STORAGE FURNITURE / Items illustrated and described in a catalog include exhibit cases, art pedestals, tray storage cases, history storage cases, archives equipment, art storage racks and fumigating chambers. ■ Kewaunee Scientific Engineering, Adrian, Mich.
Circle 408 on inquiry card

**Additional product information in Sweet's Architectural File*

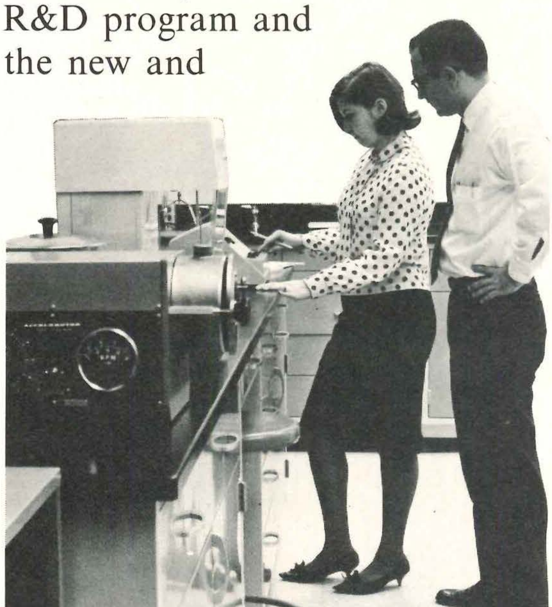


How to plan an up-to-date laundry that stays up-to-date.

Laundry needs—in terms of type of equipment and provision for flexibility—have changed dramatically. New synthetic fabrics and rising labor costs have called for new kinds of equipment, greater degrees of automation—and the adaptability of both to changes in the size and sort of work loads.

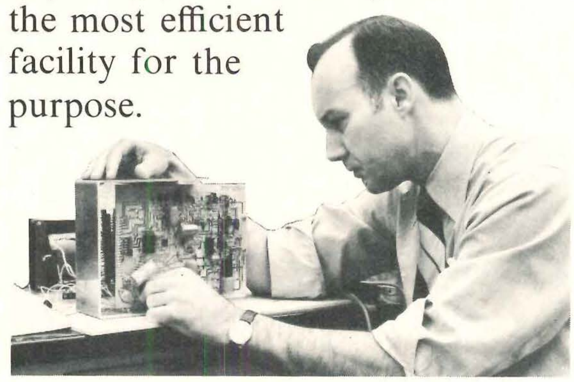
In planning laundries to meet these conditions, you can count on uniquely qualified help from American.

Our credentials—over and above our long experience—include the industry's most extensive R&D program and the new and



improved process machinery that it has produced—machinery that is now proving itself in the "new" laundry operations of today.

For dependable help in planning up-to-date laundries—that stay up-to-date—call on American. We can help you with complete floor plans, equipment recommendations, flow diagrams, capacity and personnel data—anything you need to provide the most efficient facility for the purpose.



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American Laundry Machinery Industries
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You'll be doing your client (and your reputation) a big favor by specifying a Hillyard floor care system for his resilient floors. From the original seal to daily maintenance products and procedures, he'll appreciate Hillyard quality for years to come as his floors stay new-looking and his maintenance costs stay low.

There's a system of Hillyard floor care products that's right for your client's floors and for his projected maintenance needs. If he plans a regular buffing program, specify the wax system based on Super Hil-Brite,® the floor wax with 100% #1 prime Carnauba wax content. If his floors must undergo frequent scrubbing with heavy-duty disinfectants or detergents, specify Hillyard LokGard,® the advanced metal-interlocked acrylic copolymer polish.

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If you would like help in specifying a floor care program for your clients, just say the word. We'll have a Hillyard Architectural Consultant get in touch with you. In the meantime, look us up in Sweet's or ask for our Uniform Numbered Files, containing complete maintenance information for all types of floors.

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Multi-purpose room, Tomahawk Elementary School, Johnson County, Kansas. Marshall & Brown, Architects-Engineers-Planners.

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Weyerhaeuser® Lighting Standards are an environmental system with hundreds of combinations for residential areas, schools, shopping centers, parks and urban renewal projects.

The laminated wood standards come in two shapes: straight and curved, from 8 to 30 feet, plus one- and two-way crossarms. The design flexibility is fascinating.

And now, thanks to the special adaptor brackets, almost any luminaire with an integral ballast can be used in the system.

Weyerhaeuser Lighting Standards are treated for long life with penta in light solvent. You can stain the standards or leave them natural.

For more information on this environmental lighting system, refer to your Sweet's Architectural File or send us the coupon.

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To: Weyerhaeuser Company, Box B-9137
Tacoma, Washington 98401

☐ Please send me data on Weyerhaeuser Lighting Standards.

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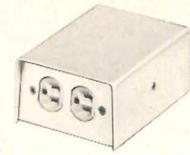

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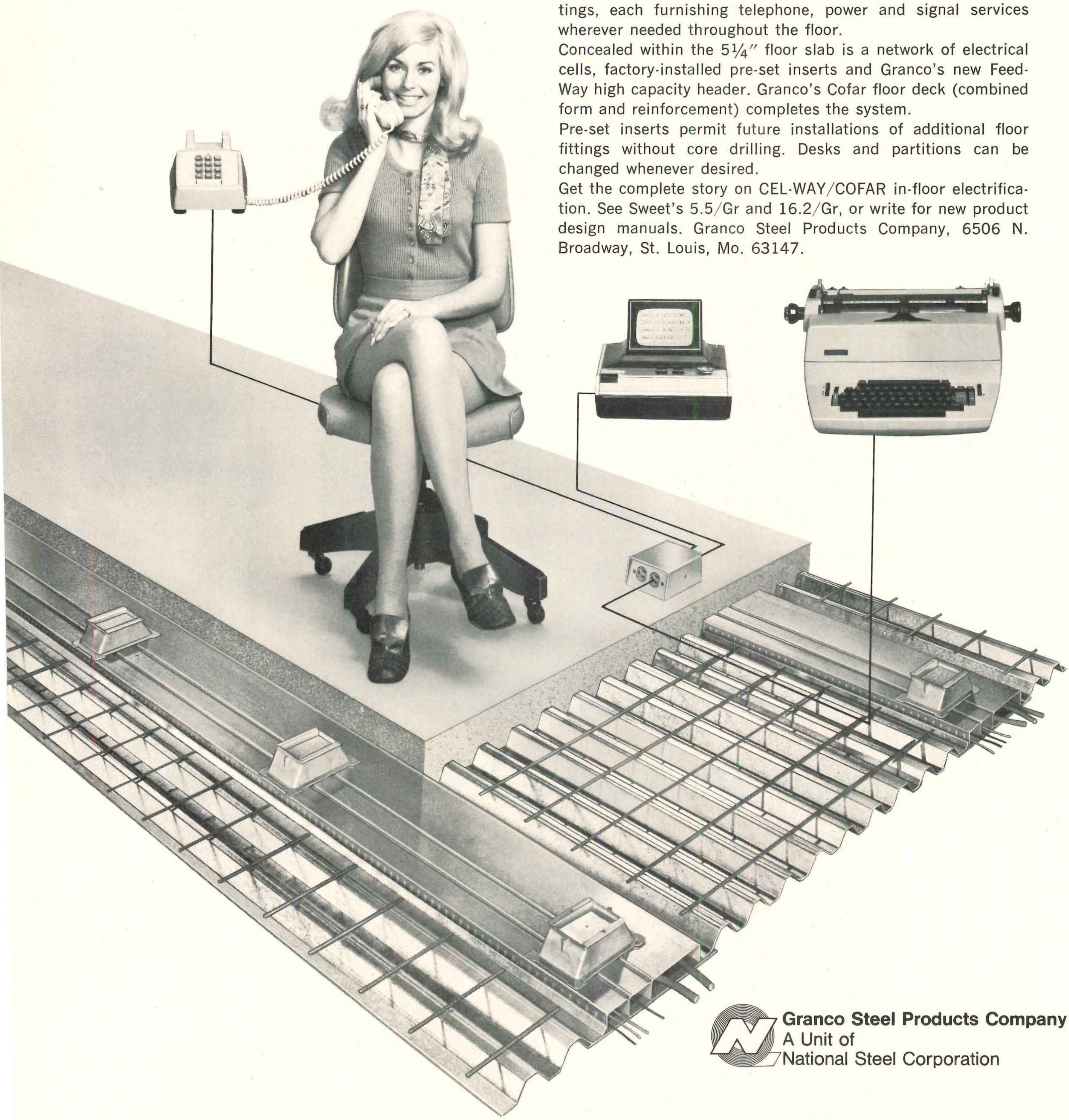
Only visible evidence of the system is the handsome floor fittings, each furnishing telephone, power and signal services wherever needed throughout the floor.

Concealed within the 5¼″ floor slab is a network of electrical cells, factory-installed pre-set inserts and Granco's new Feed-Way high capacity header. Granco's Cofar floor deck (combined form and reinforcement) completes the system.

Pre-set inserts permit future installations of additional floor fittings without core drilling. Desks and partitions can be changed whenever desired.

Get the complete story on CEL-WAY/COFAR in-floor electrification. See Sweet's 5.5/Gr and 16.2/Gr, or write for new product design manuals. Granco Steel Products Company, 6506 N. Broadway, St. Louis, Mo. 63147.



Granco Steel Products Company
A Unit of
National Steel Corporation

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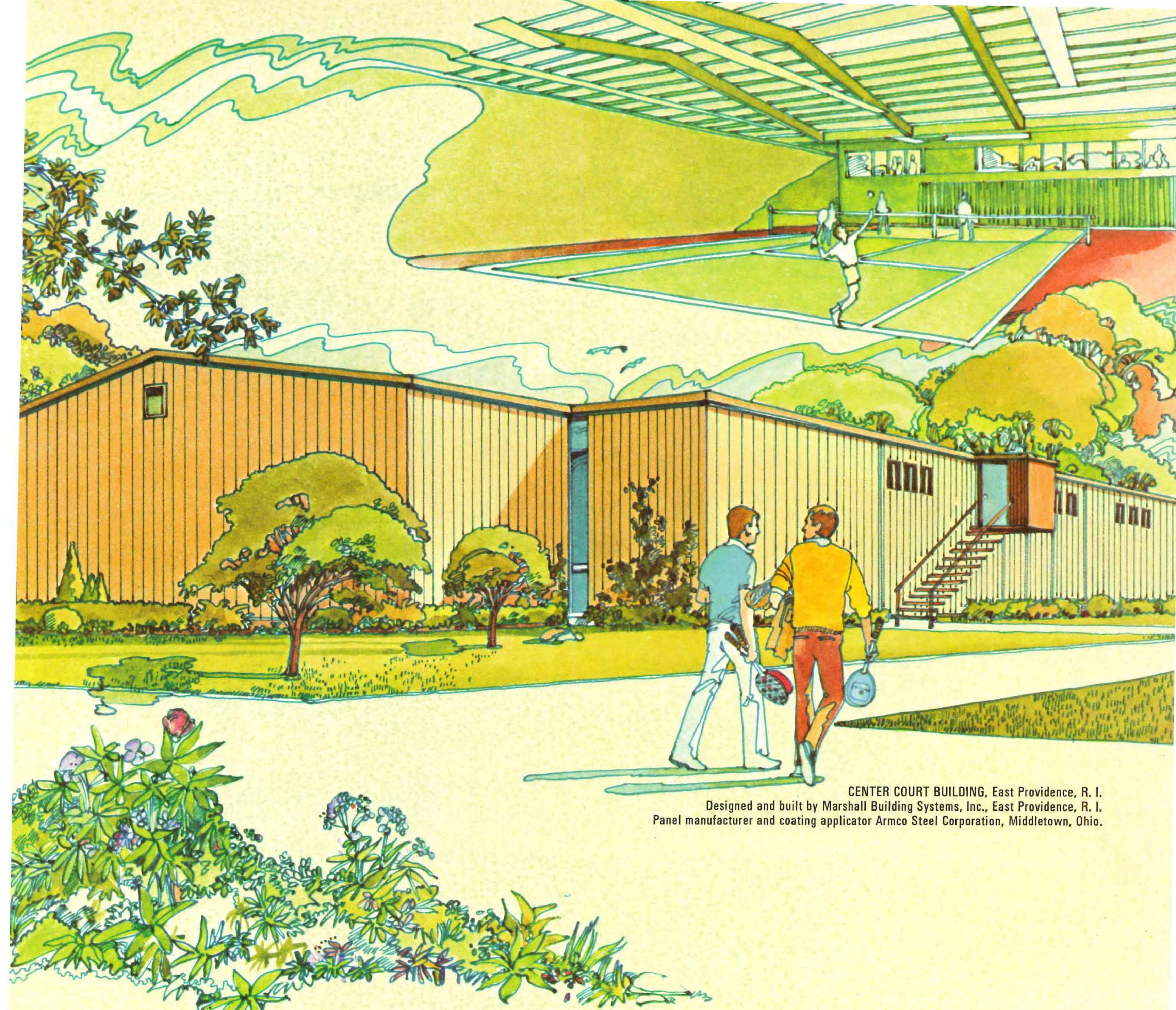

CENTER COURT BUILDING, East Providence, R. I.
Designed and built by Marshall Building Systems, Inc., East Providence, R. I.
Panel manufacturer and coating applicator Armco Steel Corporation, Middletown, Ohio.

Building for fun

with colorful, low-maintenance DURANAR® 200 color coatings

Here's a growing use for metal buildings. Recreational structures for tennis, hockey, ice and roller skating. Like all quality metal buildings, they should be protected by DURANAR 200 fluoropolymer coatings.

They're beautiful. The rich color of factory-applied DURANAR 200 color coatings can make your metal building stand out, or blend in with the environment to add esthetic value to your building's functional value.

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PPG: a Concern for the Future

Coil Coatings PPG INDUSTRIES

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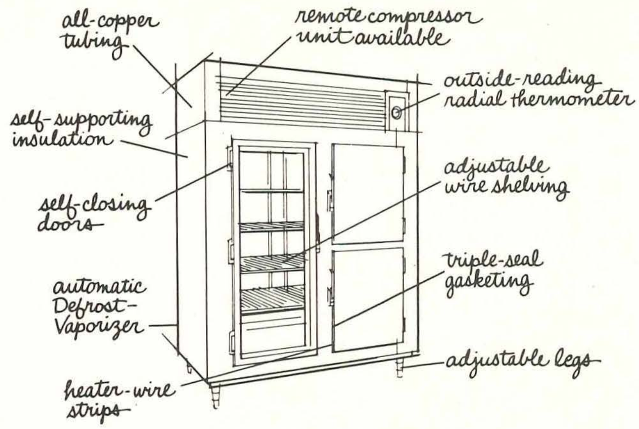
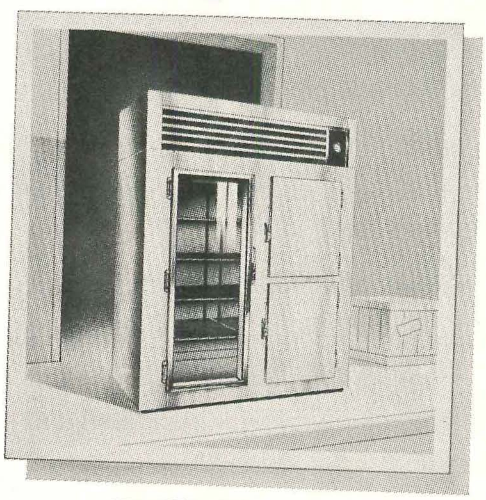


from your specs to shipment



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Second and Elm, Hudson, WI 54016
Phone: 715-386-2323 Dept. 3171

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*Kynar is Pennwalt's registered trademark for its vinylidene fluoride resin.

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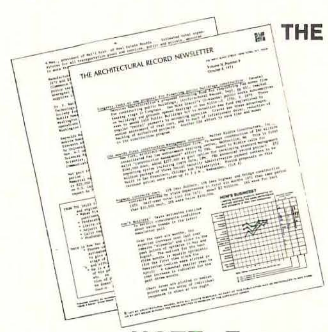

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"Stylable" means you pick the light and louver treatments you want. Modification is done by your local Republic distributor right in his warehouse. At standard prices and without delivery delay.

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So, if they look great in a home, they'll look great in an institution, too.

Want to know more? Check the Yellow Pages under "Doors — Metal," and call your nearest distributor. Or write Republic Steel Corporation, Manufacturing Division, Youngstown OH 44505.

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For more data, circle 112 on inquiry card

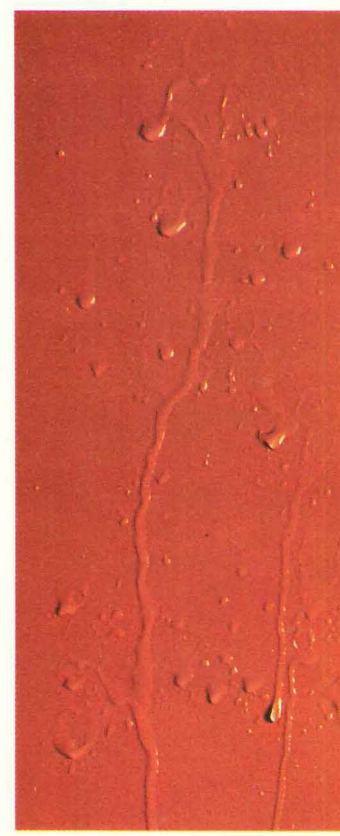
What's going on outside?

All kinds of exterior excitement from U.S. Plywood. For all kinds of exteriors.

Our Facad,® for instance, is pure sculpture. Lightweight, sturdy, easy to handle and install, Facad panels have a depth of relief you usually expect of heavy, precast units. But Facad weighs just two pounds per square foot. Facad is completely incombustible. And comes in a gallery of handsome standard surfaces. (You're looking at Composition 1 on the left.)

Sculpture

Color



Our Glasweld® is a panel of a different color. Twenty-six different colors, both smooth and slightly textured. (Like Guard Red shown here.) Inorganic colors that keep their integrity for years and years – in all kinds of weather. Waterproof, incombustible Glasweld can be cut, drilled and installed with ordinary power tools. Easily cleaned. Used anywhere there's a call for color.

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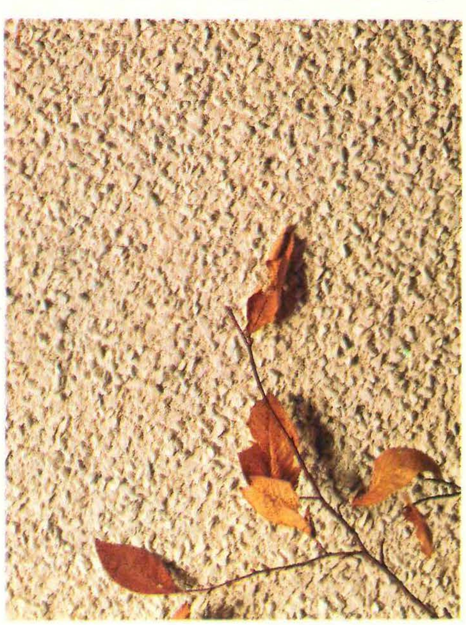

Our Sanspray® is beautiful, durable, stone aggregate. Bonded to economical, easy-to-install plywood. It's far lighter and far less expensive than most stone and masonry claddings. It can be sawed, drilled, glued or nailed, and is virtually maintenance-free in all climates. Sanspray's remarkable texture comes in large (pictured here) or regular aggregates. And appropriately distinctive colors.

For further information on the outside excitement going on at U.S. Plywood, call your local U.S. Plywood Branch Office, or write directly to our New York office.

U.S. Plywood

777 Third Avenue, New York, N.Y. 10017

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For more data, circle 114 on inquiry card

Because all the 'bumps' on our floor deck go in the right place, your building gains strength and costs less, too.

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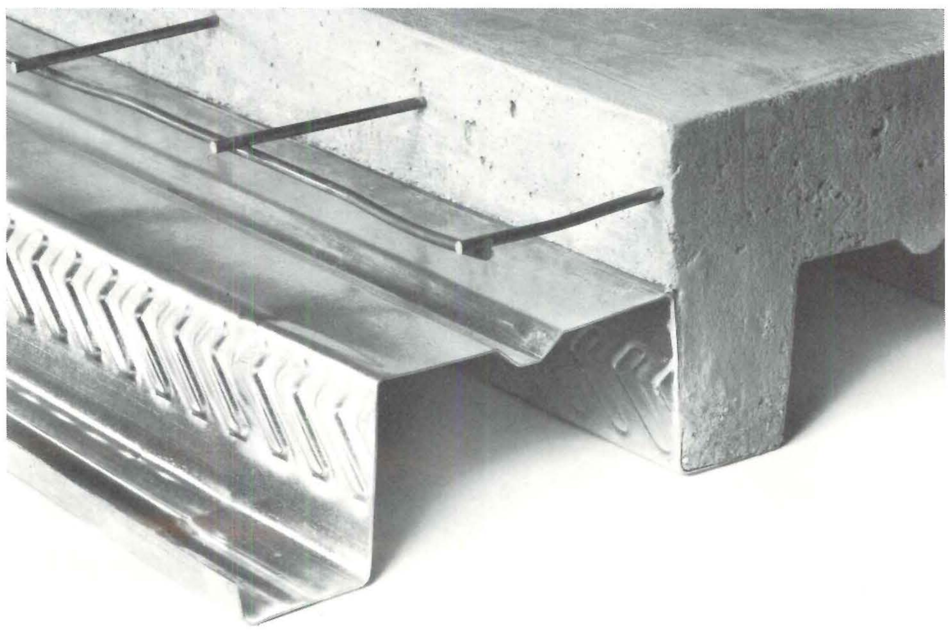

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The way some people talk, all you have to do with floor deck is keep adding 'bumps' and it keeps getting stronger. That's wrong. It's not how many, it's where they are. The 'bumps' or embossments serve two purposes. 1) to hold the concrete down to the deck to resist natural lift, 2) to provide resistance against horizontal shear. Steel decks with 'bumps' in either the top or bottom flange are defeating the purpose. Here, the leading edge of the 'bumps' promotes a wedging and lifting action between the concrete fill and the deck. Not good. But with Bowman V-grip floor deck, the 'bumps' are only in the vertical webs. Here, the wedging action is advantageous since the concrete within the rib is acted upon from two opposing sides . . . creating a gripping action that actually increases with increased horizontal shear. Very good. That's what makes our composite deck stronger. And in most cases requires less concrete. Give us a call. 412/923-2300. Make a comparison and see for yourself . . . just why we're called The Simplifiers.

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The beast in our drain is the ductile iron grate.

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Which means you can use Wade floor drains in places where others just can't take it.

In areas subject to unusually high impact loads.

In maximum traffic areas.

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Next time you specify floor drains, remember the beauty in our beast and specify Wade with the Golden Ductile Iron Grates.

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A classified advertising section devoted to helping architects and engineers keep up to date on building product manufacturers.

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M & H ZINC COMPANY ANNOUNCES THE PUBLICATION of their new "General Specifications" covering installation details of Titanaloy "A"—(zinc-copper-titanium alloy). Specifications include detail drawings showing their new vented roof system for batten and standing seam roofs. Also included are detail drawings for other Titanaloy "A" architectural end uses such as: fascia, gravel stops, flashings, etc. For a complete set of these specifications, write today. Matthiessen & Hegeler Zinc Company, La Salle, Illinois 61301.

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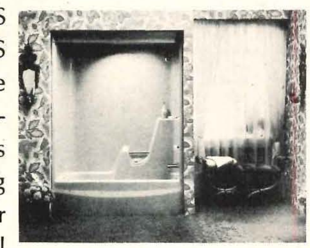

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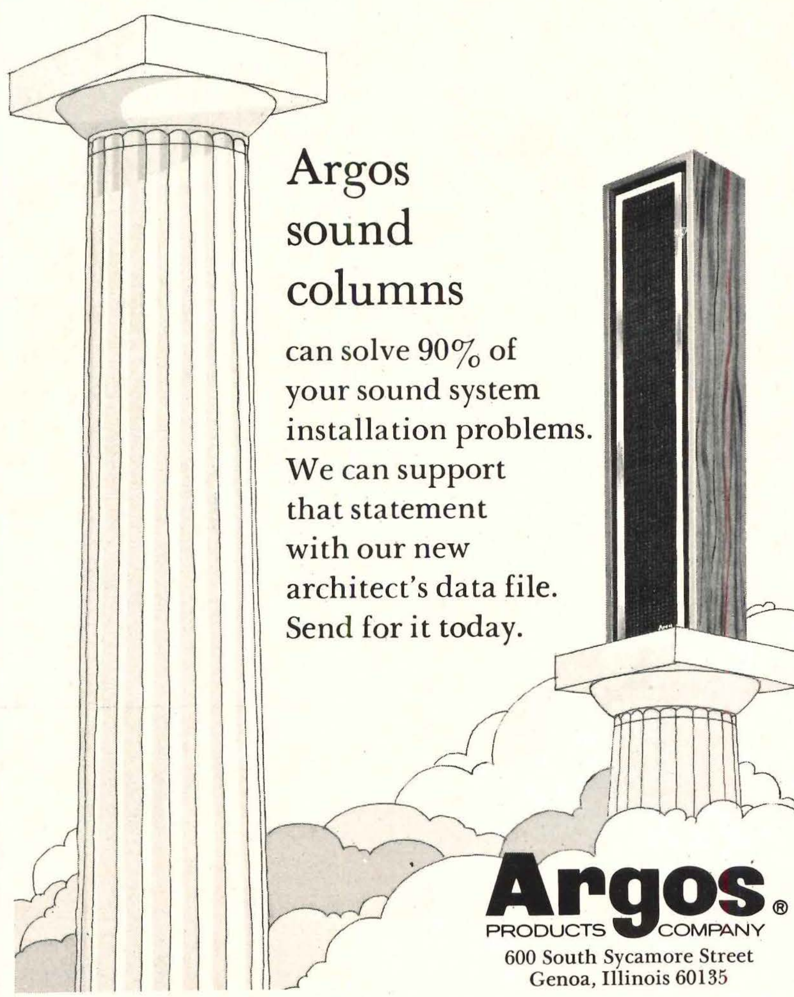

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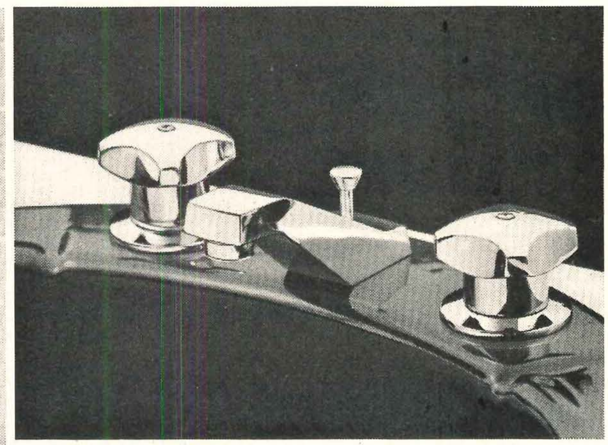

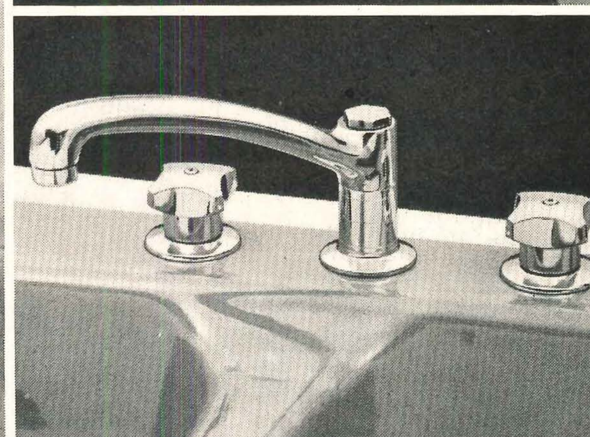

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An exclusive patented feature on Kohler fittings, the flow control unit is durable—quickly installed and easily accessible. On new plumbing installations, the flow control can be supplied as an integral part of the Kohler fitting—adding nothing to the installation costs. If you already have a Kohler fitting with a Valvet cartridge, simply replace it with the flow control cartridge.

Want to know more about automatic flow controls, now optional in fittings at nominal cost? See your Kohler distributor or write Kohler Co., Kohler, Wisconsin 53044.

THE BOLD LOOK OF KOHLER

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Who shot Santa Claus?

Santa Claus is dead!

He died last year, when price and wage controls were imposed, the dollar was devalued and the whole trend of American economic policy and thought was abruptly reversed.

He died when the dreams died. The dream of something for nothing. The illusion that everything—prices, wages, profits, benefits, everything—could go forever up, without ever coming down. The fantasy of an endless and effortless expansion of output, with no increase in input. The vision of permanent, ordained U.S. domination of world markets.

What happened? Who killed Santa Claus?

A lot of things happened, all at once. But what principally happened was that the most productive economy in the history of the world became steadily less productive, and less competitive.

U.S. productivity in terms of total output declined. For over two decades, the gross national product increased at an average rate of about 4% per year. For 1970 and 1971, the rate dropped by almost three fourths—to 1.0%. The loss in output for the two years was $60 billion.

Productivity in terms of output per man-hour declined.

From an average annual increase of 3.1%, 1950-1968, to an average 1.7%, 1968-1971.

Productivity in terms of cost efficiency declined. While output per man-hour was increasing less than 2% a year, compensation per man-hour was increasing 7.4% a year.

Meanwhile, other changes were occurring.

The structure of the U.S. economy was changing. Services accounted for 30% of the GNP in 1950—37% in 1960—42% in 1970.

Demands on the shrinking producing base were increasing. The military burden, the burden of public needs, the tax burden, all grew heavier.

Competition in the world marketplace was increasing. Our major competitors became more productive.

West Germany continued to increase GNP and output per man-hour both at an average annual rate of 6%—and to increase exports 7% a year.

Japan increased GNP by an amazing 9% a year—output per man-hour 12%—exports 15%.

The U.S., in contrast, increased exports a bare 2% in 1971, and for the first time in this century imported more than it exported, by about $2 billion.

What, or who, caused the decline in U.S. productivity?

What, and who, did not?

The measurements of output, of output per man-hour, or of cost efficiency do not measure the effectiveness of labor alone, or of management alone, or of government alone. They measure and reflect on the efficiency of labor *and* of management *and* of government—and of the system that links all three in a functioning whole.

The decline in productivity is a result of the attitudes and actions of labor, and of management, and of government, and of the American people. It is the final result of a national attitude, and of the sum total of 200 million actions and inactions.

Because the decline is, above all, the result of waste. Waste of time, waste of money, waste of materials, waste of effort, and waste of spirit. And the truth is, this is an extravagantly, almost proudly, wasteful society.

So who is to blame? Nobody. And everybody. In the immortal words of Pogo: "We have met the enemy, and he is us." Who shot Santa Claus? We did.

And it doesn't matter. What matters is that, for whatever reason, we are all in the same boat. Neither labor nor management nor government can prosper, and most assuredly the American public cannot prosper in an unproductive and noncompetitive America.

It is time to stop fixing the blame and start fixing the boat. And the place to start is with the waste.

One way or another, we have got to reduce the waste of time—on or off the job. Due to the attitudes or actions of labor, or of management, or of government.

The waste of money—squandered, misspent or lost down a multitude of ratholes by careless labor, careless management and magnificently careless government.

The waste of materials—due to heedless consumption and needless neglect—by labor, management, government and the public.

The waste of effort—in meaningless, misdirected, mismanaged work. The fault of management, and of labor, and of government.

And the waste of spirit, energy and goodwill—in endless confrontation between labor, management, government and the myriad other groupings in a contentious society.

Quite an order! To make America productive again, all we have to do is reform the attitudes and redirect the actions of a nation.

But all great endeavors begin with a single idea. And in this case the idea is simple, stark and direct—we can no longer *afford* the waste. The richest nation on earth is no longer so rich or so abundantly wealthy as to be able to ignore reality.

Santa Claus is dead!

We had best learn to live without him. Starting now.

We at McGraw-Hill believe in the interdependence of American society. We believe that, particularly among the major groups—business, professions, labor and government—there is too little recognition of our mutual dependence, and of our respective contributions. And we believe that it is the responsibility of the media to improve this recognition.

This is the second of a series of editorial messages on a variety of significant subjects that we hope will contribute to a broader understanding.

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John R Emery

John R. Emery, President
McGraw-Hill Publications Co.

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ARCHITECTURAL RECORD

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SEMI-ANNUAL INDEX

VOLUME 151
JAN.-JUNE 1972

Readers using the index will find buildings entered in three ways: by architect's name, by building or owner's name, and by building type (apartments, hospitals, schools, etc.). Other categories cover subjects in the engineering section (concrete, lighting, prefabrication, etc.). ABBREVIATIONS: AB-Architectural Business; AE-Architectural Engineering; BC-Building Components; BTS-Building Types Study; IA-Issues in Architecture; RI-RECORD Interiors.

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ADVERTISING INDEX

Pre-filed catalogs of the manufacturers listed below are available in the 1972 Sweet's Catalog File as follows.

A Architectural File (green)
I Industrial Construction File (blue)
L Light Construction File (yellow)
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