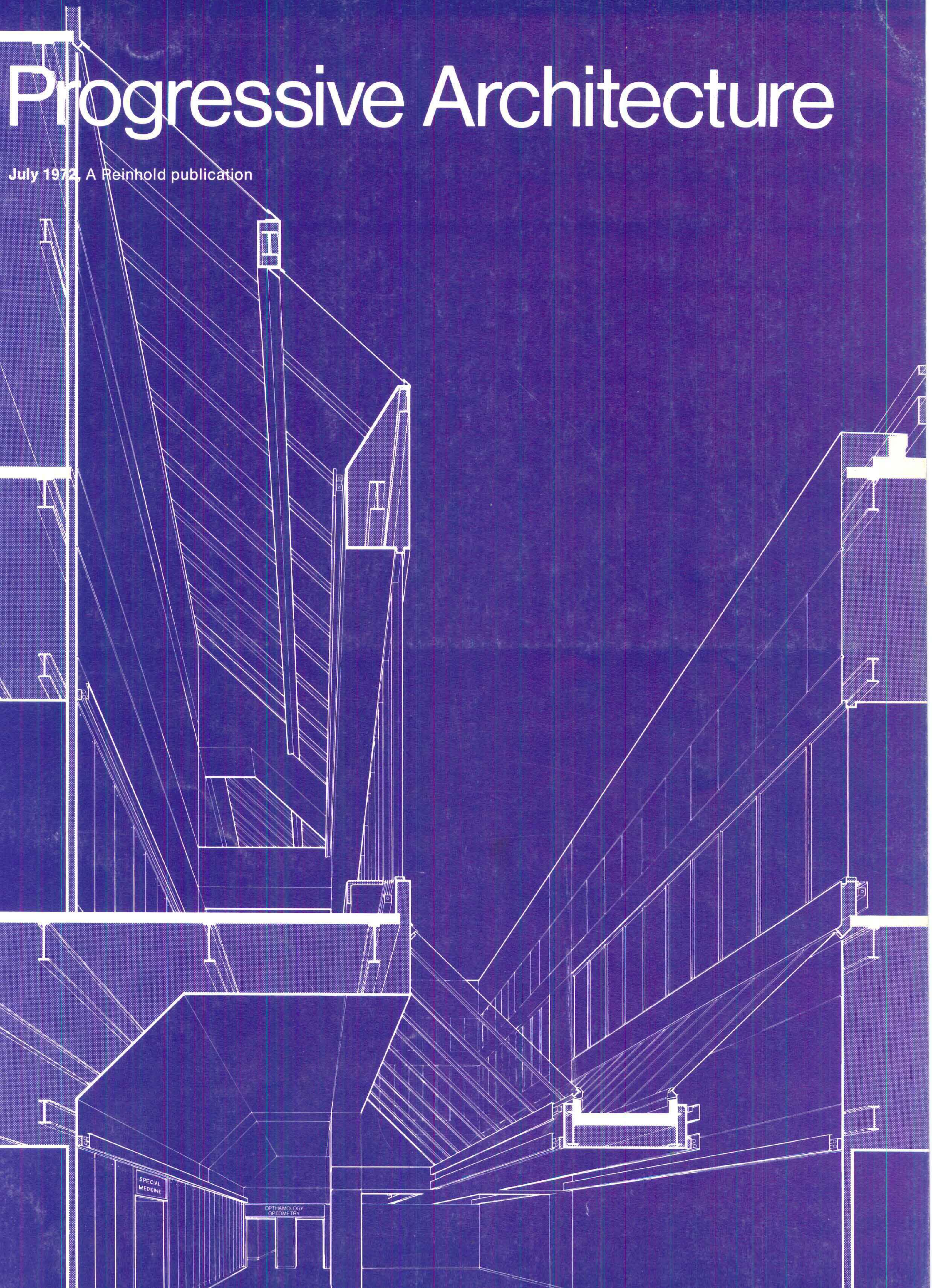
Progressive Architecture

July 1972, A Reinhold publication



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July 1972

Progressive Architecture

Hospitals

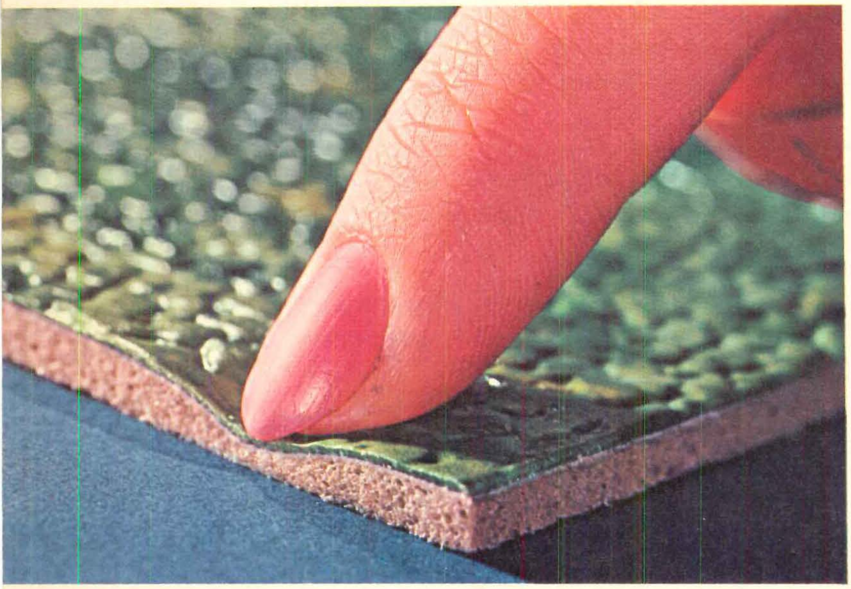
Departments

Cover: Detail from the Woodhull Medical and Mental Health Center, Brooklyn, designed by Kallman & McKinnell and Russo & Sonder (page 54).

Introducing

A soft step forwar

COMFORT



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P/A annual design awards program for projects not yet built

tull Erickson Hardy Johansen LeM
Logue Okamoto Rogers Stull Eric
ardy Johansen LeMessurier Logu

Progressive Architecture announces its twentieth annual Design Awards Program. Awards will be made to **U.S.** and **Canadian** architects, urban planners and their clients for projects now in the design stage to be built in 1973 in the United States and Canada. Any building, group of buildings or urban planning project illustrating definite building proposals will be eligible.

Purpose of the Design Awards Program is to give recognition to good design in the period of design development, rather than after completion, in order to encourage the designers and owners of the projects so honored.

First design award, awards and citations may be given by the jury listed below to the best projects chosen on the basis of site use and development, choice of structural system and materials and methods of construction, solution of the client's program, and overall design excellence. **Jury** will be composed of the following architects, planners and engineers: **Arthur C. Erickson,** Architect, Partner, Erickson/Massey, Vancouver, British Columbia; **Hugh Hardy,** Architect, Partner, Hardy Holzman Pfeiffer & Associates, New York; **John M. Johansen,** Architect, Principal, John M. Johansen, New York; **William J. LeMessurier,** Structural Engineer, President, LeMessurier Associates, Cambridge, Mass.; **Edward J. Logue,** President and Chief Executive Officer, New York State Urban Development Corp., New York, Visiting Lecturer, Yale Law School; **Rai Y. Okamoto,** Architect and Planner, The Okamoto Associates, San Francisco; **Archibald C. Rogers,** Architect and Planner, Founder and Chairman, RTKL, Inc., Baltimore; **Don Stull,** Architect, Principal, Stull Associates, Inc., Boston.

Judgment will take place in Stamford, Conn., during September 1972. Winners of Awards and Citations will be notified (confidentially) immediately after the judgment.

Announcement of the winning projects will be made at a presentation in a city to be selected. Winning projects will be featured in January 1973 P/A. As in the past, P/A will arrange coverage of winning projects in news media, particularly in those localities of the Award and Citation winners.

Submissions do not require filling an application blank. For each project submitted, simply send:

1 On a 5″ x 8″ card, type the client's name, location, and proper name of project; name and address of the architect; and identify all items included in the submission. As **anonymity is required,** mask architect's name on all other items submitted.
2 Brief explanation of the program and your solution.
3 Description of materials and construction methods used, and the reasons for their use.
4 Site plans; basic building plans; pertinent sections and details.
5 Perspective or model photographs.
6 A statement that: (a) the project is not yet completed and that construction will be under way before December 31, 1973; and (b) that submission of a project for judgment gives **Progressive Architecture** first rights in the architectural field to publish both the project and the finished building if it receives an Award or Citation.

It is preferred that you submit 8″ x 10″ prints, photostats or photographs. All submissions must be firmly bound. Original drawings, actual models, or mounted exhibit panels will not be accepted and no material is to exceed 11″ x 17″ in size. Each project is to be submitted under separate cover.

P/A will guard and return all submitted material.

Deadline for mailing is August 31, 1972. Address entries to Awards Editor,

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Views

On reading architecture

Dear Editor: From the response we have had to our article, "On Reading Architecture" in the March issue of P/A, the hard work that went into the final product was certainly worthwhile. To have triggered such debate can only be a sign that somewhere a healthy architectural community lies waiting to be tapped.

We are naturally quite pleased that such discussion is one of the positive results of this effort, and want to thank you for, in this sense, going with us.

However, there are three points in your editorial which remain to be clarified. First, the article as written with respect to our work was totally conceived of and its intellectual character given by the particular point of view of Mario Gandelsonas. Second, we did not provide a "handy book list" as you suggest. The books mentioned were in fact merely working references presented as footnotes by Gandelsonas, to some publications which very few of us would have taken the time to explore. Indeed a working bibliography for architects interested in pursuing the subject would be a useful contribution which your magazine could make.

Lastly, with reference to your concluding remark, we would suggest that it is through no lack of good clients that we have in this country a climate which sustains very little in the way of architectural virtue. Let us hope that P/A will continue to confront architects with the challenge that this paradox represents.

Peter D. Eisenman,
Michael Graves

Unflattering

Dear Editor: In your article on the Dixwell Community House/Neighborhood Facilities Buildings in New Haven (Apr. 1972, p. 108) there are a number of points with which we would like to express our dissatisfaction.

The consulting structural and mechanical engineers were not mentioned.

The Plaza is shown in its unfinished state and the reader is given to believe that the present asphalt sub-base is the finished surface. "A token number of trees" are actually over 50 to be planted this spring, not "eventually."

The city located the building for us. The architect did not choose the site. The building has four interior courts which provide large glassed areas for the users of the building while not exposing glass for privacy and security on this exposed site.

The massing and disposition of the forms on the Plaza are intended as abstract sculpture and as an image of solidity and strength to the black neighborhood. The scale and massings of the building and the stairway attempt to play a public role on Dixwell Avenue while the courtyards provide quiet private amenities.

Most importantly, the article has used very unflattering photographs to reinforce what we regard as distinctly uninformed and negative feelings about the project and the neighborhood. We do not question your right and responsibility to say what you think, however we do think it unfair not to use photographs which will let the reader decide for himself.

Edward E. Cherry, AIA
Herbert S. Newman, AIA
New Haven, Conn.

[*We were depending on the photographs that we had selected to illustrate the forms and textures of this building. In this case, unfortunately, the printed reproductions fell far short of the photographs themselves in quality. Our text did indica that the city chose the building site, our plans showed the interior courts and the 50 trees—though only about 20 of them long to the Plaza itself. Credit due: the structural engineers were Spiegel & Zamecnik, Inc; mechanical engineers, Tar guay Associates. Ed.*]

Substance and/or style?

Dear Editor: Your current housing issue (May 1972) follows a familiar and disturb ing pattern. In giving the major attentior the Moore project you seemed to have missed the substance of the low-modera income housing issue; i.e., with such m imum levels of money to spend, the cru concern must be the program and the p orities which guide its development. Instead of concentrating on how these ma ters were resolved, you commented extensively on the visual "nifties" and his ical analogies characterizing Moore's w

In the Sauer project you alluded to sc research into user needs but didn't real say much about the priorities which led the design choices. I believe that you m led readers by not giving attention to th basic problems of privacy (interior and terior), security (control of visitors), ser and auto access (waste removal, storag moving in problems, emergency access provisions for different age groups (chi dren vs. elderly), recreational activity (court games, tot lots, field games).

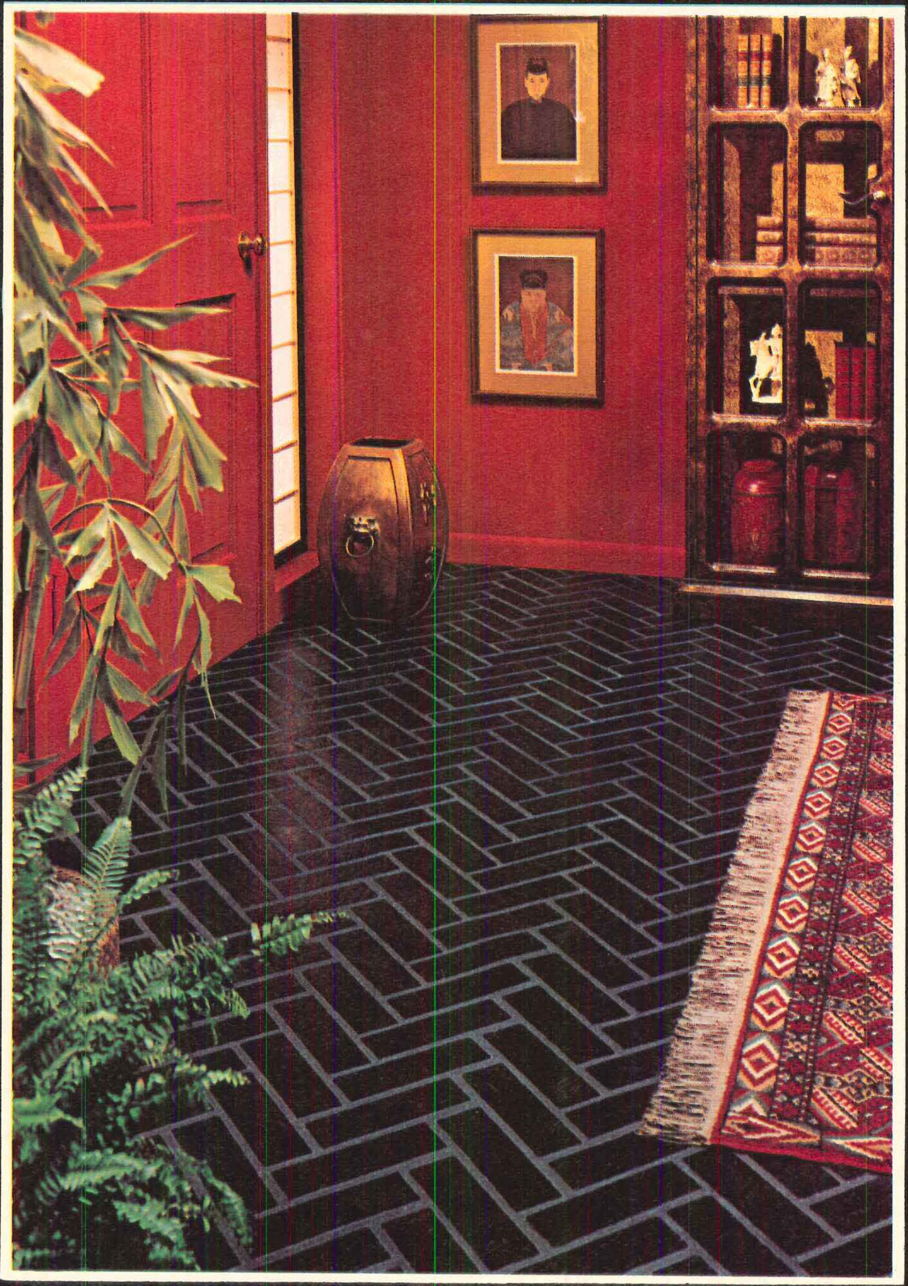
Large scale projects like Church Stre South suggest a careful study of the en concept of a common—shared resourc creating facilities which no individual c afford alone. As I read the site plan, the only commons are euphemisms like forums, greens and courts or parking lots Couldn't this project be characterized style without substance?

William R. Gustafson, Associate
Dayton, Ohio

[*We don't claim that either project atta any of the crucial economic shortcomi of our housing problems—only that ser tive design, including effective visual " ties," can go far toward compensating them. Ed.*]

Dear Editor: I have just read in detail th May issue of the magazine, and I think and your staff are to be congratulated. was most impressive to see such divers work as the Rogers' and Charles Moor presented objectively and informatively

Robert A.M. Stern
New York, N.Y.



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LOF helps National Airlin

There's a lot to see at Kennedy International. And the architects who designed the National Airlines terminal make sure visitors see it all—through suspended clear plate glass.

To support this hanging glass curtain—more glass. Vertical glass mullions that keep the facade of the building light and transparent. Which is in keeping with architects I. M. Pei & Partners concept of the terminal: one of classic simplicity, an antidote to the visual hodge-podge of unrela
structures at the airport.

Suspended glass braced by more
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against 140-mph winds. It passed with
flying colors.

◀ Phipp's Plaza Theatre, Atlanta, Ga.
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Six Associates, Inc., Asheville, N.C.

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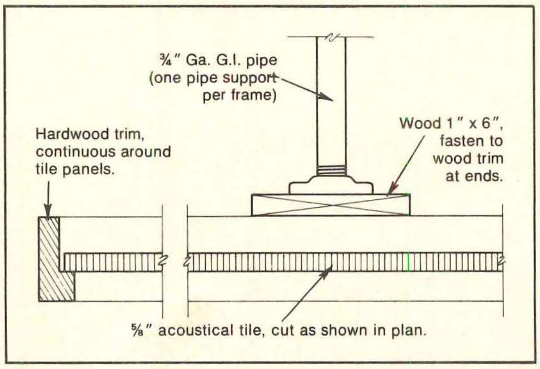
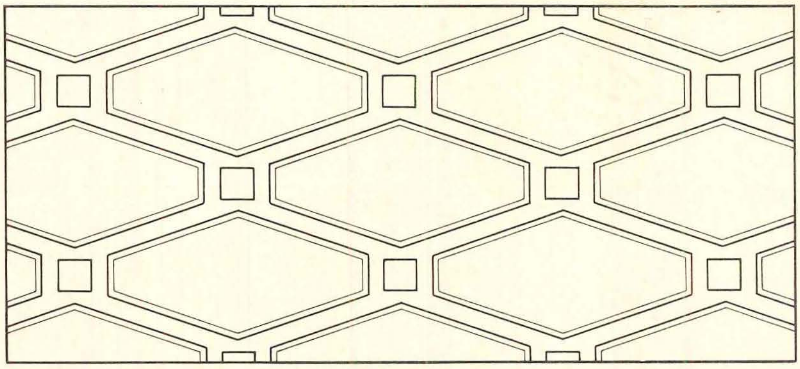


Section of lobby ceiling shows how ⅝" acoustical tiles, cut as shown in plan, were installed in continuous hardwood trim and supported by ¾" pipe.



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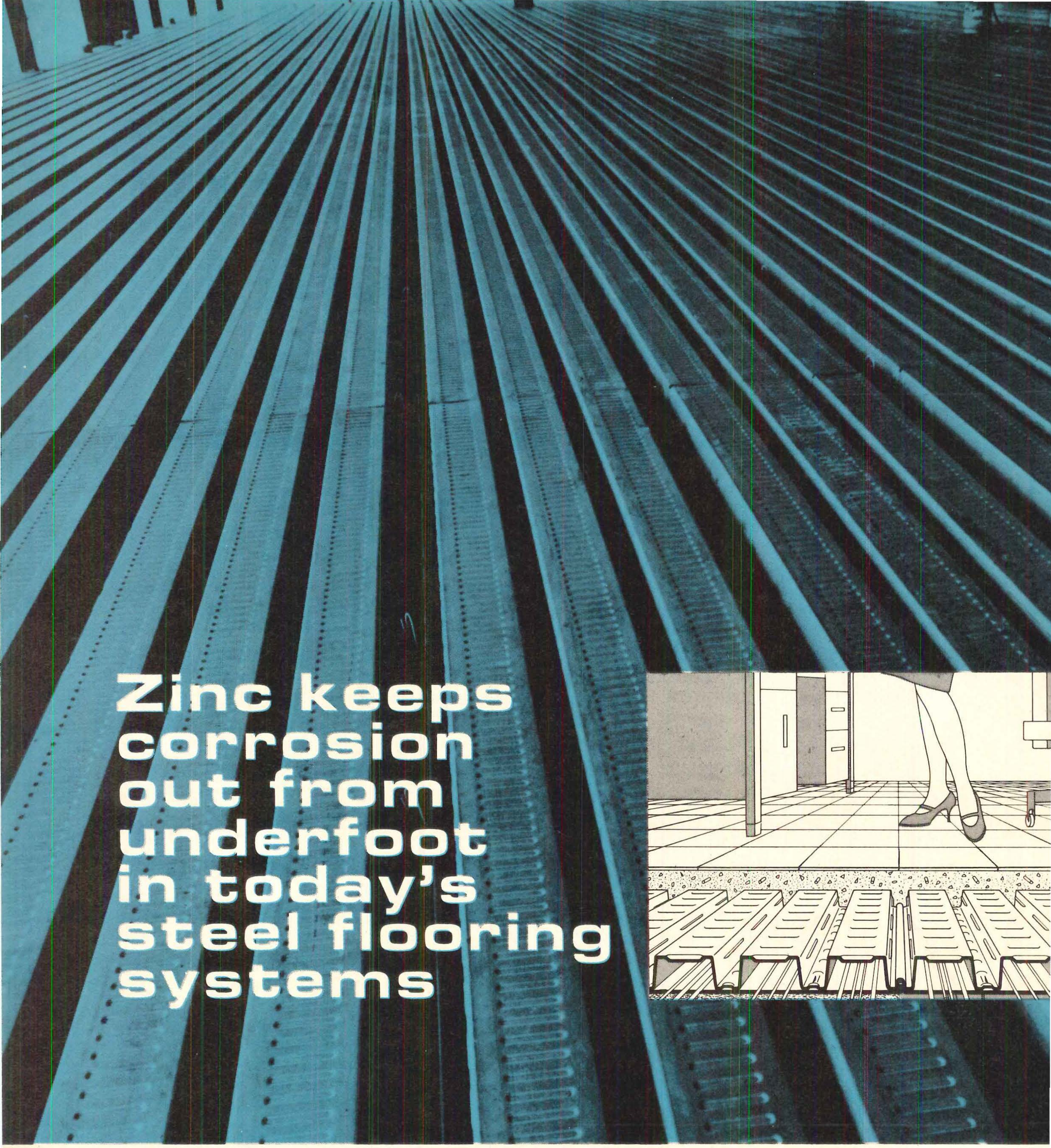

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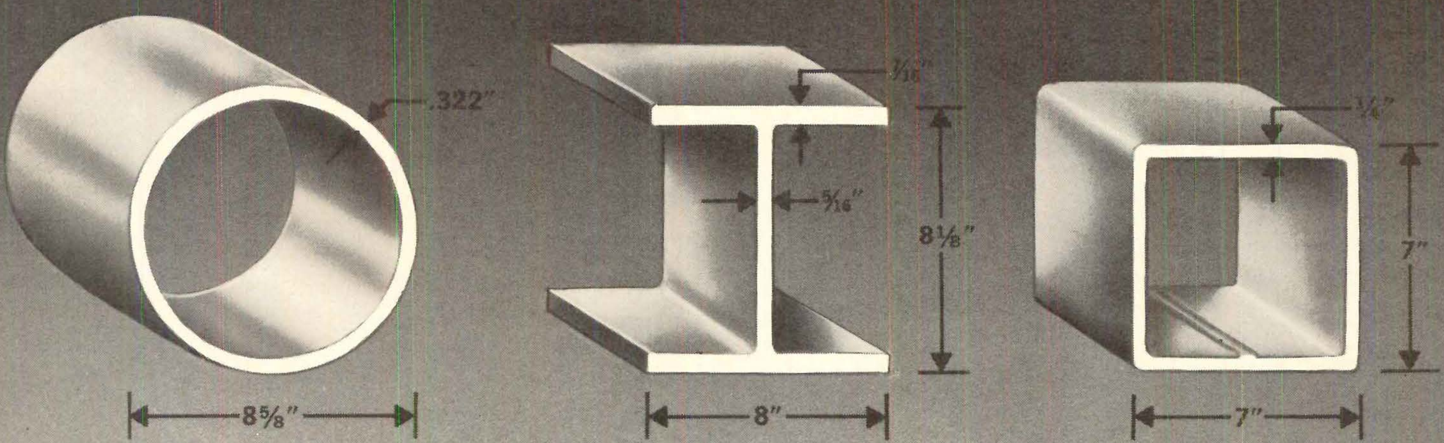

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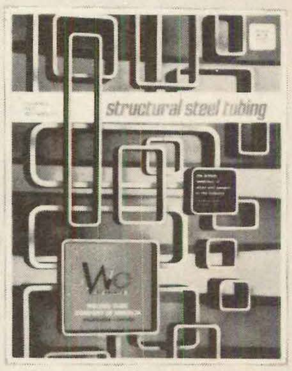

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Contents

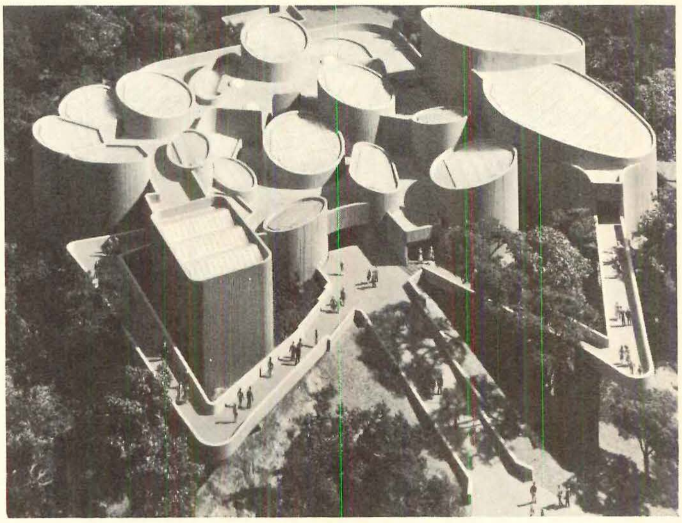
News report

For the birds

The old expression of derision may take on a new meaning with the opening of a new exhibit building at New York City's Bronx Zoo. There some 550 birds, representing more than 200 species and subspecies, are housed in a $4 million structure designed by Morris Ketchum, Jr. The building, called the World of Birds was donated by Mrs. Lila Acheson Wallace who, with her husband, publishes the Reader's Digest.

The building is a series of large interconnected cylinders with skylight roofs; heights and angles of the skylights are arranged to let in the most possible sunlight. Most of the 25 separate living exhibit areas are either glass fronted or open, but visitors can enter directly into two two-story exhibits and view the birds from an angled walkway. The building also includes a small theater, an art gallery and a lounge. Two concrete ramps are part of the building's circulation pattern, one leading from ground level to the second floor and the other an exit ramp.

As part of the building's program of living exhibits in simulated habitats, the exhibit areas present a variety of climates. The largest display, in an elliptical chamber 70 ft long and 50 ft high, recreates a tropical rainforest complete with rain, lightning and thunder provided by shower nozzles, loudspeakers and strobe lights. Other simulated habitats include the African Jungle, an eroded stream bank, swamps, deserts and the Australian outback.



Bronx Zoo bird palace, rain forest

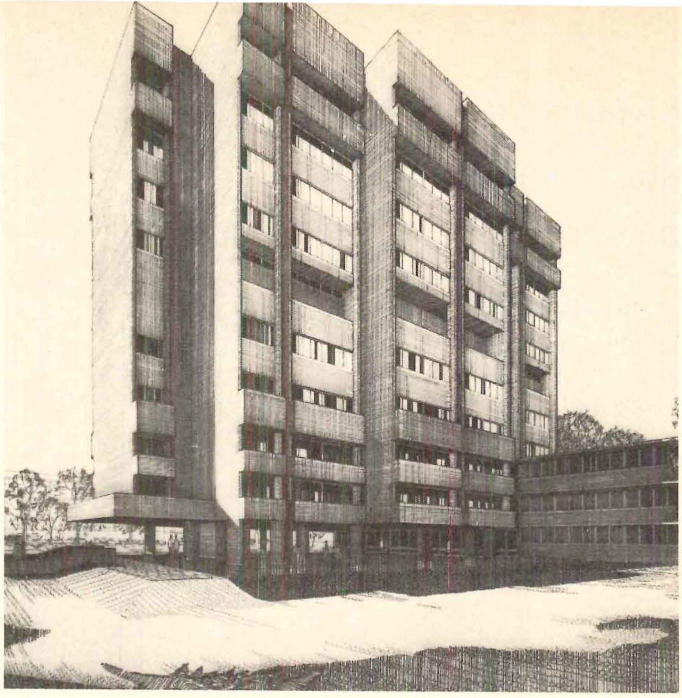
AIA settles down to serious business

The year's AIA convention has to go down as one of the more earnest ones in recent years. What set the tone, however, was not the National Policy Task Force report, but the AIA's brush with the Department of Justice.

It started a few months back when the Justice Department filed an antitrust action against AIA, claiming that its prohibition of competitive bidding was in restraint of trade; Justice at the same time filed a proposed consent decree, leaving AIA with two alternatives—sign the decree or fight the action. By convention time, the AIA Board of Directors had voted 22–4 to sign the consent decree; while the board could have acted independently, it had asked for, and gotten, an extension of the Justice Department deadline in order to bring the issue before the convention.

[continued on page 26]

Buildings on the way up



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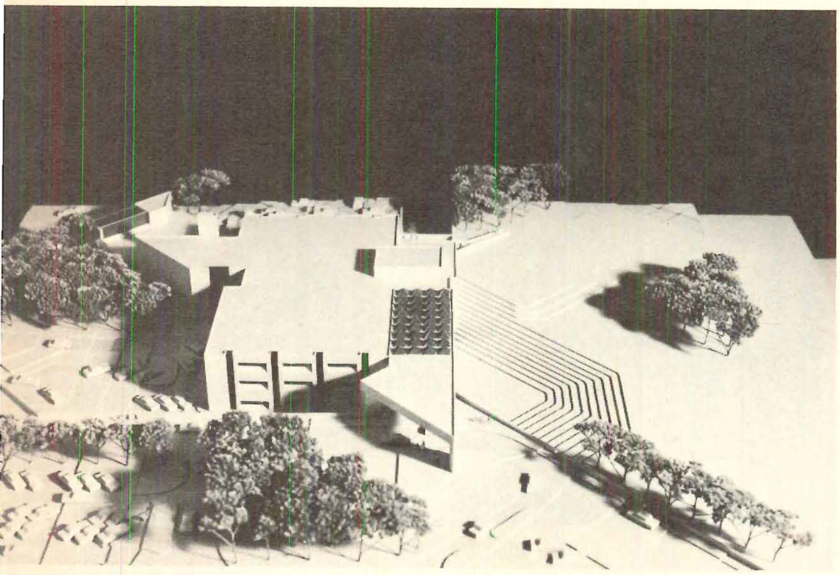

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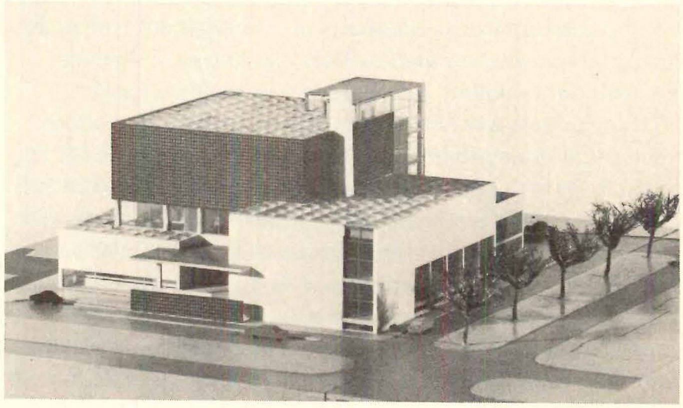

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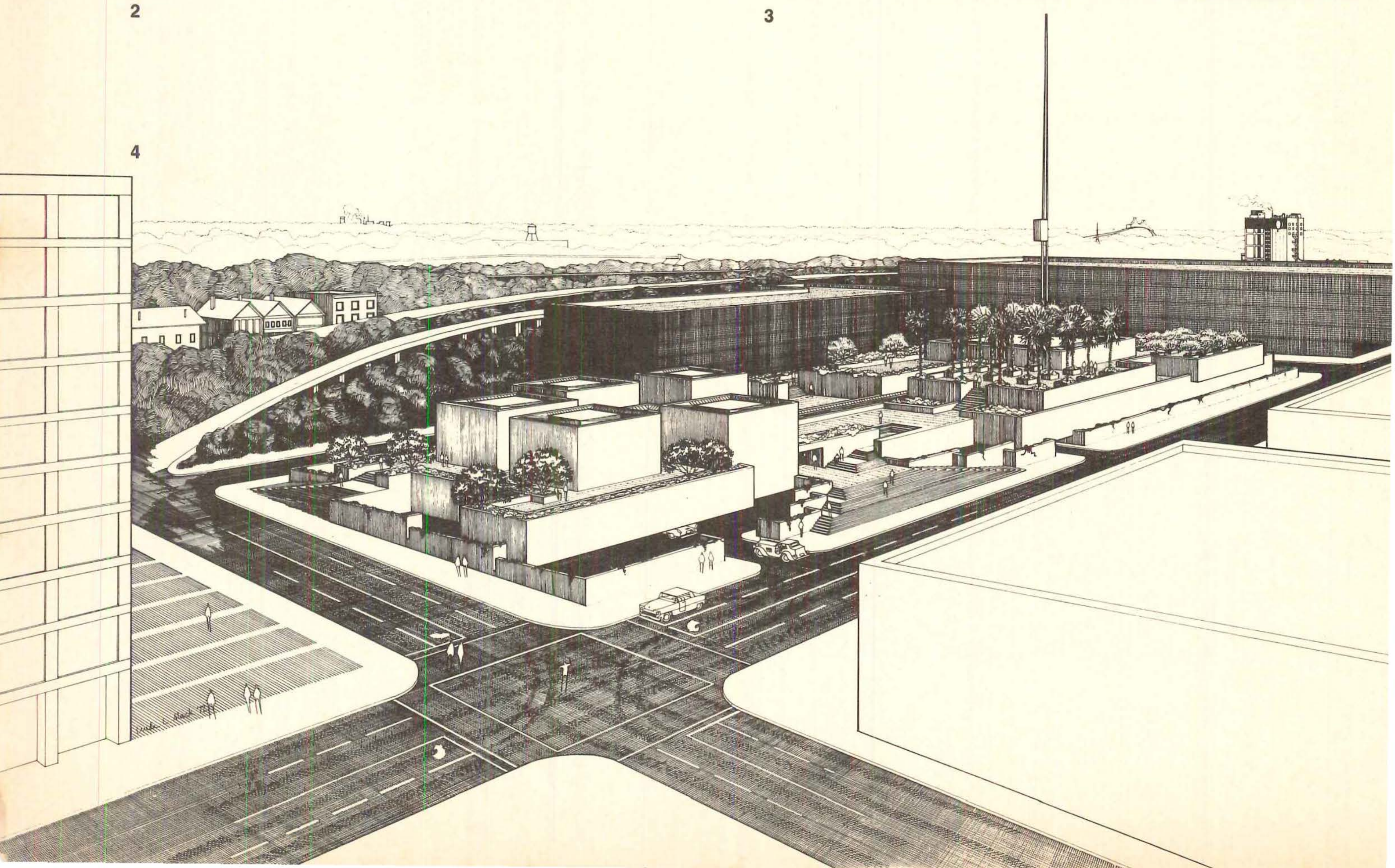


1 Patient and laboratory spaces are intermingled in clinical research building for Denver National Jewish Hospital; special facilities include rooms in which allergy-asthma responses can be observed under varying conditions of temperature, pressure, humidity and family relations. The 10-story structure will be built in two stages, at a cost of approximately $7 million. Structure is cast-in-place reinforced concrete, veneered with face brick; some bricks are to be laid in place, some to be in prelaid panels. Glazing is to be bronze glass in anodized aluminum frames. Ground floor will be open for outdoor activities; 2nd and 3rd floors are patient floors and related labs; 4th and 5th floors are research labs. The same pattern is repeated on the 7th to 10th floors. The 6th floor is devoted to mechanical equipment and animal quarters. Eugene D. Sternberg & Associates are architects.

2 A three-level 40-doctor medical clinic is the first stage of a combination facility for a private group of doctors in Chicago Heights, Ill. Laboratory, pharmacy, radiology and administration facilities will be shared. Second stage will add a two-level 100-bed care center; eventually the clinic will total seven levels and have room for 60 more doctors. Two more levels of 100 beds each will also be added later, and dental offices, nurses' housing and other facilities may follow. The clinic is a reinforced concrete structure with a brick exterior. Setter, Leach & Lindstrom, Inc. are architects.

3 Central lighting shaft brings daylight to all levels of a new national museum being built in Amsterdam, Holland. Intended to house the collections of the Vincent Van Gogh Foundation, the four-story building will be of concrete with a white glazed brick and dark enameled steel tile exterior. A glass enclosed staircase will dominate one side of the structure. Rietveld, Van Dillen & Van Tricht are architects.

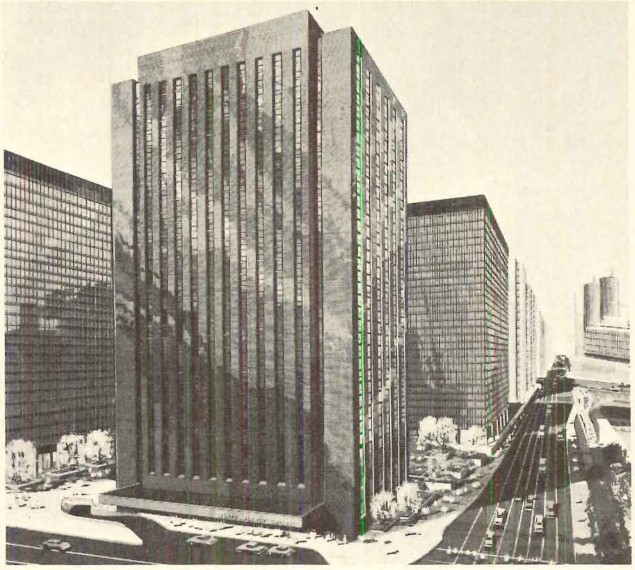
4 Replacing a 50-year-old police headquarters building, the new Jacksonville, Fla. police administration complex designed by William Morgan Architects will be windowless, for security reasons, yet not oppressive, according to the jury for the architectural competition that selected the architect. The roof of the three-level, $9.5-million building, will become a public park; skylights will bring light to the interior of the building. Cast-in-place concrete is the principal structural and finish material. Building will total 235,780 sq. ft.

5 Glass-enclosed lobby, three stories high, extends from the plaza side of Hyatt Regency Chicago Hotel, designed by A. Epstein & Sons, Inc. The 1000-room brick-clad hotel is the first major new downtown hotel in Chicago in more than 20 years; cost is put at $40 million for the 36-story structure. Landscaped plaza, complete with pools, fountains, sculptures and greenery surrounds the hotel and is shared by other buildings in Illinois Center development.

6 Residents and workers in a $21 million complex planned for a bluff overlooking the Minnesota River in Bloomington, Minn. will enjoy a 15-mile vista, according to Landmark Development Corp., a subsidiary of Ellerbe Architects-Engineers-Planners. Only 30 percent of the 37-acre site will be devoted to buildings; the rest will be left open, with natural surroundings left as intact as possible. Plans call for two 15-story office buildings, a 200-unit motel, two apartment buildings, 72 condominiums, plus shops and stores and parking for 3500 cars. Population will be 750 people when project is completed in 1977.

7 Student center at Framingham (Mass.) State College includes lounges and recreation facilities, formal dining rooms and snack bars along with ballroom, auditorium, post office, student offices and college radio station. Steel-framed building will be enclosed with brick and dark gray anodized aluminum panels, glazed with gray glass. Cost of 93,000-sq-ft building is estimated at $3.7 million. Architects are Campbell, Aldrich & Nulty; engineers, Nichols, Norton & Zaldastani (s), Shooshanian Engineering (m,e).

8 First phase of long range plan for Broadway Methodist Hospital, Merrillville, Ind. will provide a 157-bed general acute hospital with all private rooms. Long range development includes a 600-bed hospital with four 6-story wings attached to a vertical circulation tower. All elevators, ejector cart lifts, and materials handling equipment will either be installed as part of first phase or shafts and doors will be provided for future use. Architects are Schmidt, Garden & Erikson.



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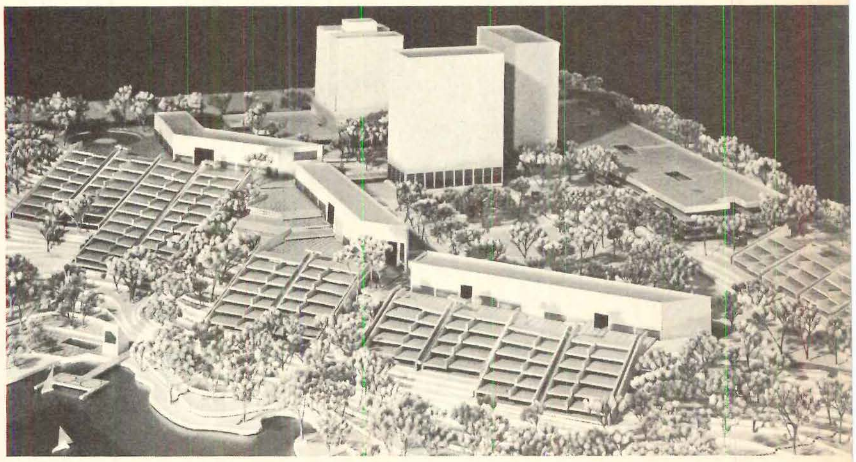

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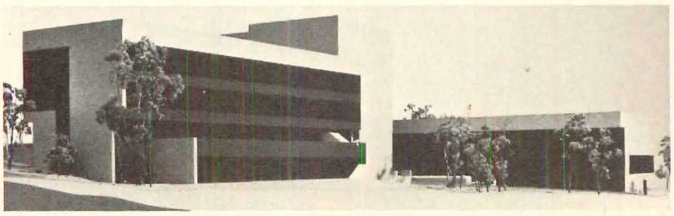
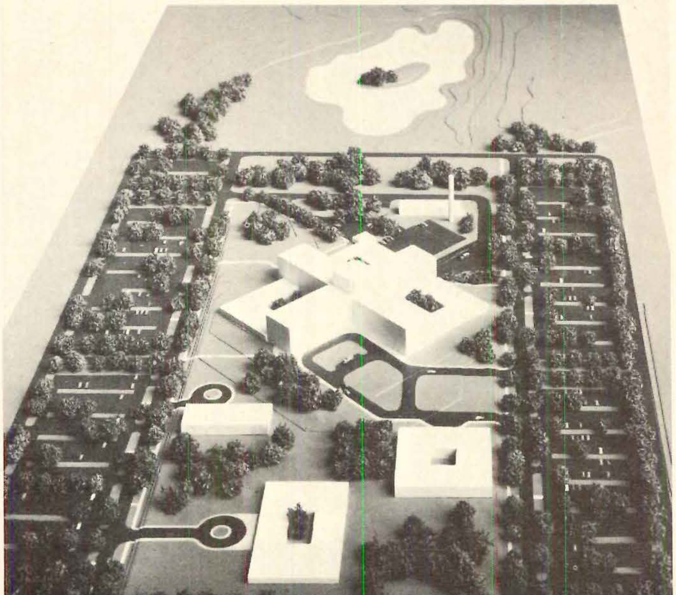




8

News report continued from page 23

The issue was one that could possibly have split the Institute. There was strong and eloquent pressure to fight the Justice Department, pressure growing out of principle, pride and the righteous feeling that signing the consent decree would imply some wrongdoing. Strongest opposition to the consent decree came from California and New York, with Max Urbahn noting that he "was not impressed with attorneys." If the decree was signed, Urbahn said, "we have surrendered professionalism." The persuasive arguments, however, were on the side of signing the decree, and were clearly outlined by attorney Bill McGovern of the law firm of Arnold & Porter, retained by AIA for its antitrust experience.

McGovern, who said he was "agonized" by having to make such a choice, but found no alternative, explained why he felt the consent decree would be in the best interest of the institute. If the convention chose to fight, he said, the members should be aware that antitrust litigation is "notoriously protracted" and expensive (the cost of fighting was estimated at $500,000 to $750,000). To begin with, AIA could not just contend that bidding was bad, but would have to assemble evidence proving it bad. Beyond that, McGovern said, the court fight would produce unpleasant publicity; "the government already has information on fee schedules that won't make choice reading for clients." It would be a rough fight—no holds barred—with no guarantee of winning. And with no guarantee, he pointed out, that the Supreme Court, if it went that far, would do anything more than decide between the two litigants before it; what AIA might see as a great issue of principle might not interest the court at all. And if it all went against AIA, the results, after the lower courts made their final judgment, would be a judgment the "likes of which wouldn't be seen in the consent decree." And that decision would be used as evidence in individual litigation, leaving all architects open to damage suits.

The consent decree, on the other hand, simply requires the AIA to stop prohibiting competitive bidding, no great loss since the ethical bans against it haven't been enforced for several years. AIA would still be free to work for legislation against competitive bidding for architectural and engineering services, and individual members could or could not, as they see fit, submit bids for work.

A related resolution, to assess each AIA member $10 for one year, passed with a 3–1 vote. The money would be used to convince Congress and the public that competitive bidding is not the way to get the best professional services.

The other big issue at this year's convention was the much talked-about National Growth Policy, which was adopted almost unanimously and with little negative discussion by members. Since release of the Task Force report earlier in the year, most differences of opinion and clarifications had been thrashed out in state and local meetings and a series of grass roots conferences. The little opposition that did crop up at the convention concerned private property rights—an amendment to remove a section dealing with the public's right to recover increases in value of private property that result from public investment on adjacent land was defeated—and there was a small amount of regionalism in evidence, as the lack of western or southwestern representatives on the Task Force was criticized.

awyer McGovern (foreground) explains consent decree

The most serious objection, however, came from a caucus of black architects concerned that blacks or other minorities night not have a hand in making the policy work. Randolph Clark, from Fort Worth, noted that while they applauded the ask Force report, they felt they must reject it unless "provi-ions on eminent domain, land banking notions, and the rowth module itself, are influenced and totally controlled by hose communities and by the people who are affected by uch actions" and unless "the concerns and expertise of ualified black and minority professionals, the 'Alumni of the Ghetto,' are included in the generation and the implementa-ion of this policy." Task Force Chairman Archibald Rogers noted that Van B. Bruner, Jr., a black architect and chairman of the AIA Commission on Community Services had been dded to the Task Force.

Other major business included passing by-law changes to estructure the Institute; these were the same by-law changes hat were discussed and defeated last year. Their effect will e to make the board of directors more representative.

The number of resolutions had been cut considerably this ear; the resolutions committee reported six, and all six assed. One called for written reports of action on passed esolutions; another put the AIA on record as committed to conservation of natural energy and resources (it was mended to require that energy consumption rates be made a art of the National Policy Task Force's second report); oth-rs called for greater student involvement with components, ncouraging more memberships for employees of archi-ectural firms, evaluation of architectural education. The sixth esolution called for the adoption of the Task Force report.

Archibald Rogers, who sports a Max Urbahn-style flower in is lapel, was elected first-vice president and president elect; e will succeed as president following the term of S. Scott Fe-ebee. Other newly elected officers include three vice presi-lents—Van B. Bruner, Jr., Louis De Moll and David A. Pugh—nd a secretary, Hilliard T. Smith, Jr.

Business was not the only reason some 5000 people came o humid Houston. There was inspiration, in the form of a key-note speech (the only invited speaker) by microbiologist and continued on page 28]

News report continued from page 27

author Dr. Rene Dubos, who urged the profession to design for man's psychological needs. "Deficiencies in man's psycho-social environment," he said, "are probably more dangerous than chemical pollution, and even less well understood." Small personal spaces should be as important as large communal ones, he said. "American cities would benefit from the creation, within their grotesque and obese structures, of neighborhoods small enough to be capable of achieving identity and local pride."

There was also information to be had, of all sorts, at what the AIA convention planners labeled "The Marketplace of New Ideas." Names aren't everything, and the idea succeeded even if the name didn't. The large and varied program of miniprograms, presentations, films and seminars added an extra dimension to the usual products-show side of the convention, and whoever decided to serve a real lunch instead of sandwiches probably made the single biggest gain in keeping people in the convention hall at lunch time.

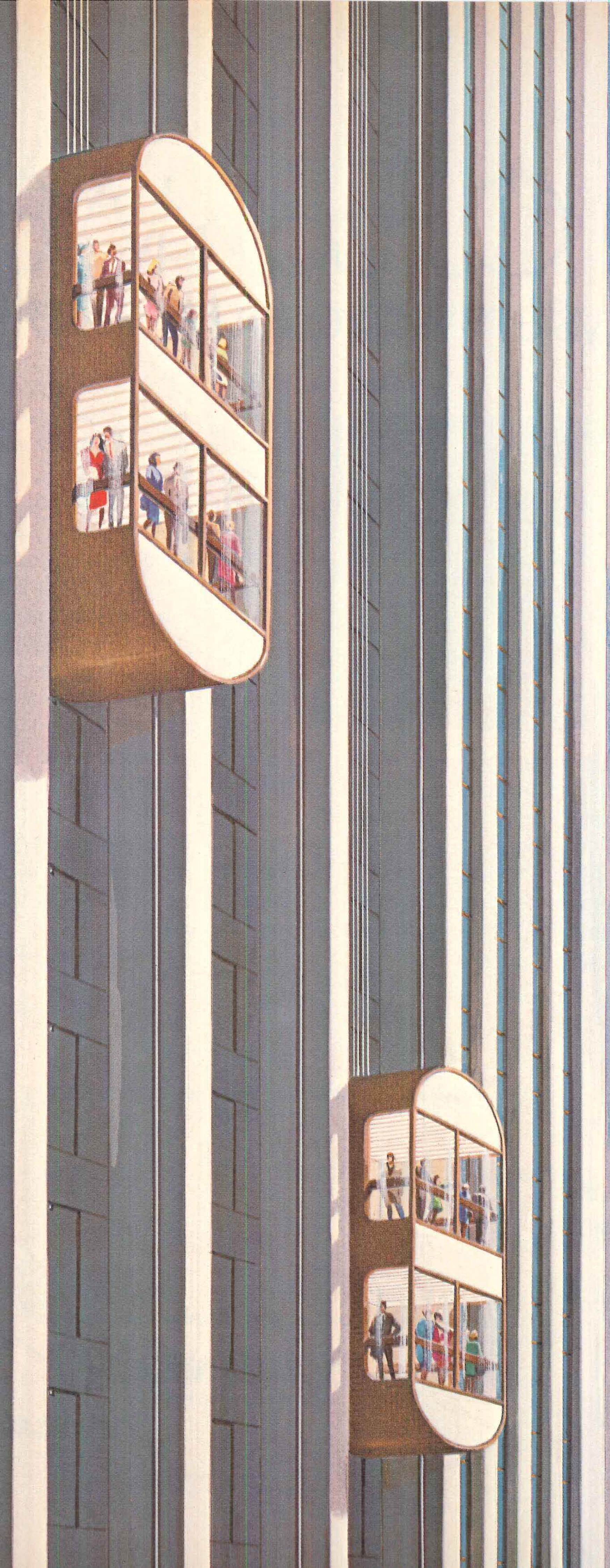
Fun, too, is an important part of any convention, and the Houston chapter made sure there was plenty, capped by a host chapter party that was several parties rolled up in one. Music and food, for those patient enough to wait for it, of the major cultures in the Houston area—western, Cajun, Greek, Mexican and Indian—was laid on for an open air fiesta. There were, of course, the usual other social events—receptions and dinners for the president, the new Fellows; a theater party at the Alley Theater (a 1972 Honor Award winner for Ulrich Franzen) and the convention-ending ball.

Houston proved to be an interesting convention site. The halls in which the convention was held—Jesse Jones Center for the Performing Arts and the Convention Center itself—were real places, not the barns that convention halls can easily be. The weather was typical for Houston, and the city an example of some of the best and worst things about cities and zoning (or the lack of it). Houston is like the legendary oil men that made it rich—sprawling, ready to spend, unwilling to do anything in a small way, and reluctant to be restricted by arbitrary rules. Thus there is a booming downtown building spree, pockets of poverty, pockets of elegance, freeways, spectacular suburban shopping centers—all of it separated by considerable distances and expensive taxi rides. And it's convenient to Mexico, where the convention reconvened.

Continent's largest laminated wood project goes up

Canada's north country can boast the largest laminated wood project in North America, built as part of a $60 million mining project. The three buildings are storage warehouses for Asbestos Corporation of Canada Ltd.; they are located 1200 miles north of Montreal on a strait between the Ungava and Hudson bays.

The largest of the three structures is a 760-ft-long, 305-ft-wide clear span building that stands 144 ft high at the peak of [continued on page 32]



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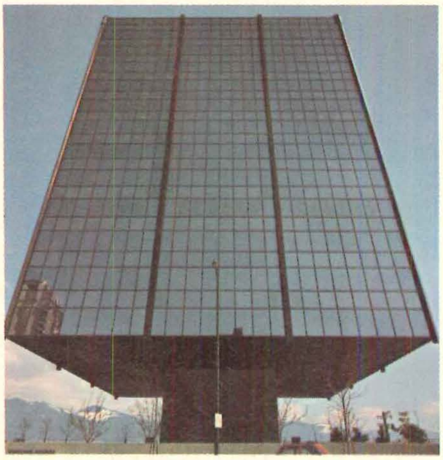

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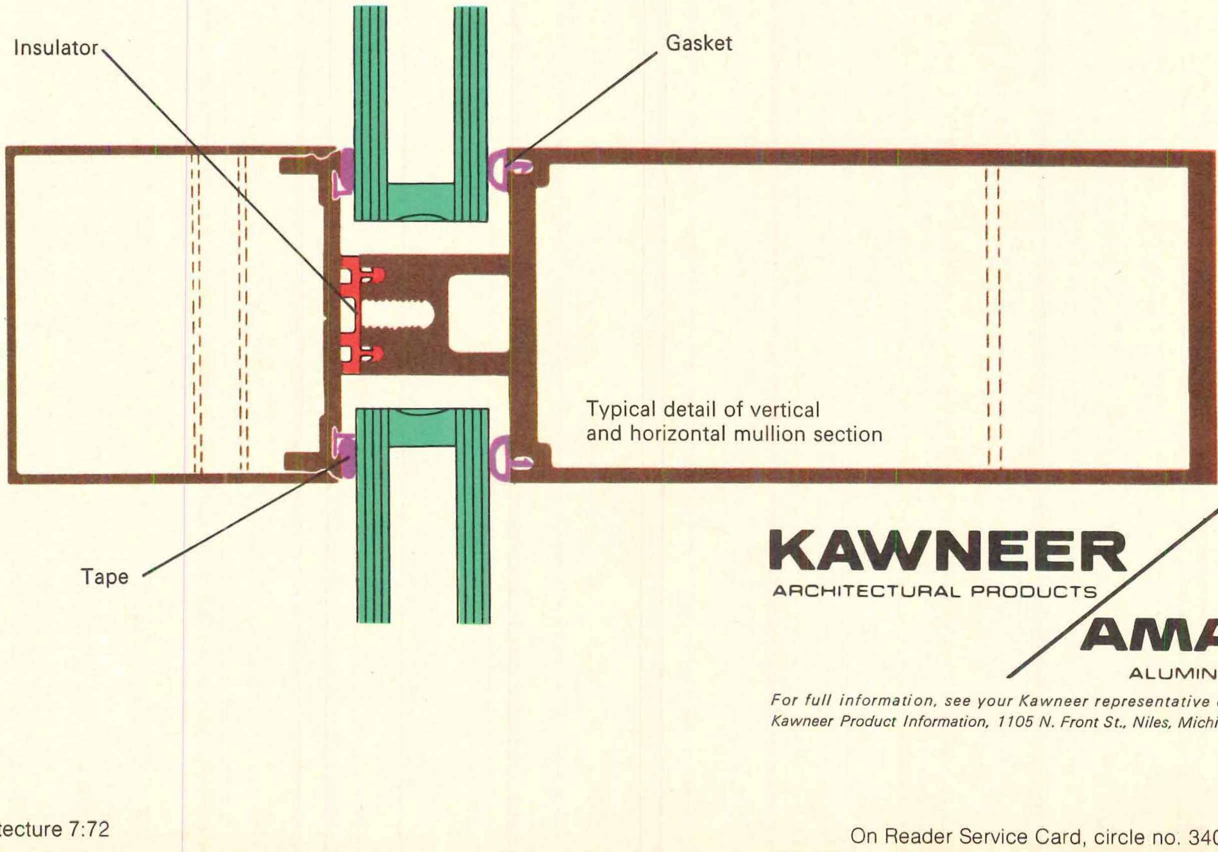
Architects: Rhone & Iredale, Vancouver, British Co



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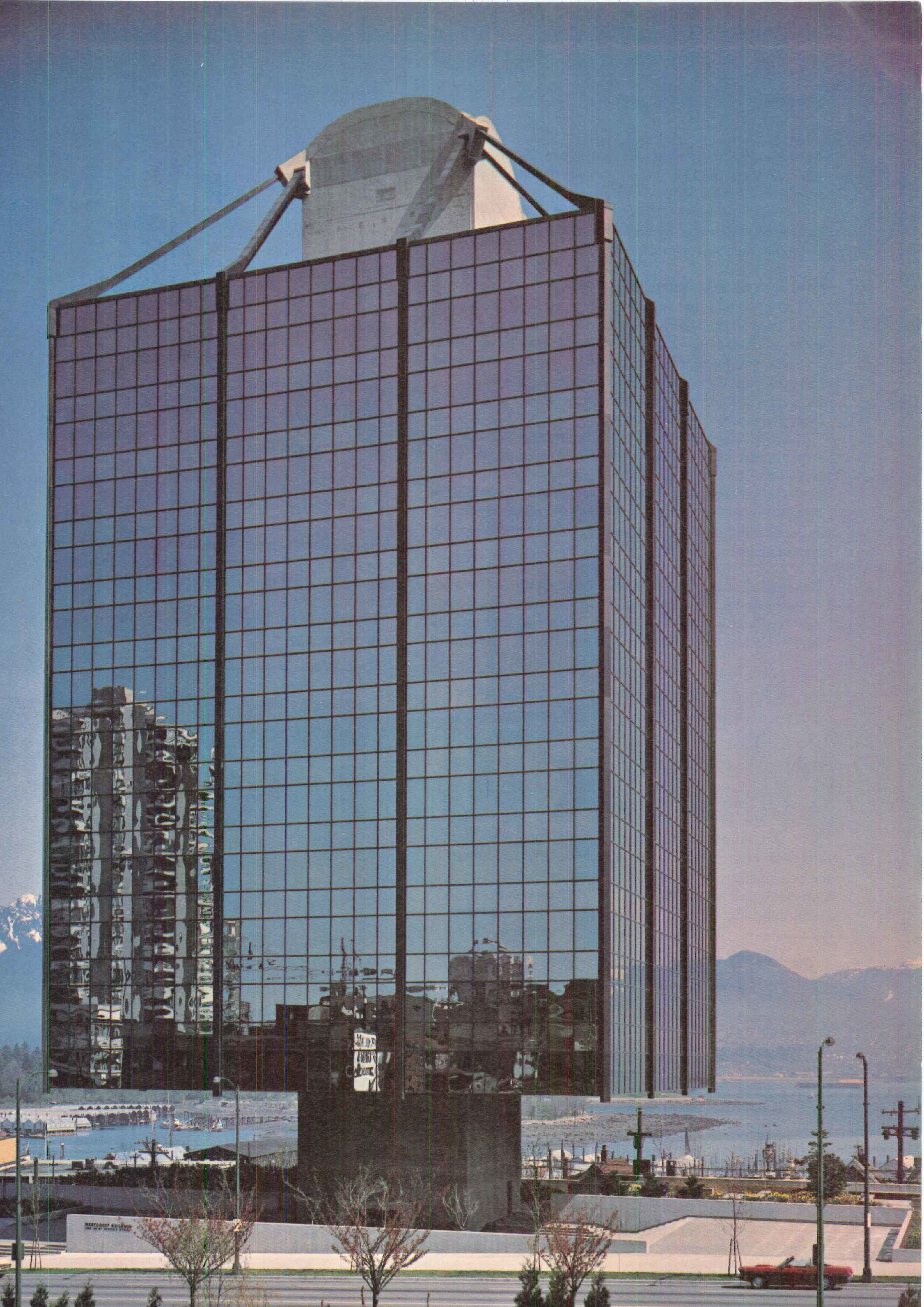

WESTCOAST BUILDING

News report continued from page 28

the arches. Some 1.8 million bd ft of glue laminated wood went into the 36 arches. Two smaller warehouses are 90 ft high at the center and 190 ft in diameter.

The structural members were laminated at TPL Industries Ltd. plants in Burnaby, Edmonton and Louiseville and carried by freighter to the site from Montreal.

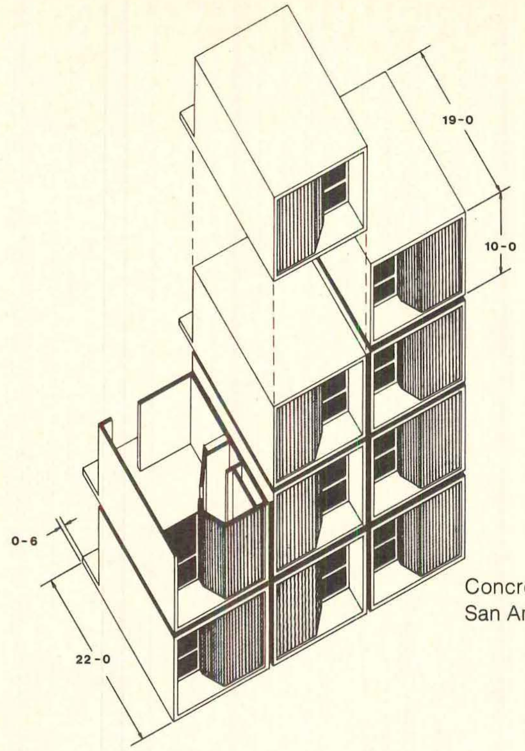
NTIS adds building technology category

The National Technical Information Service (NTIS), an arm of the Commerce Department, has long been the place to go for research documents and technical reports. For architects, however, the pickings have been slim, partly because material has been classified under categories such as chemistry, physics, etc.; that problem has now been solved by a new category—building technology.

The new category is fairly broad, reports Don Conway, director of research programs at the AIA. It includes the "soft" side of architecture—user needs, design methods and related subjects—as well as the hardware side. Subheadings include architectural design and program analysis, construction, construction analysis, building standards, construction materials and equipment.

Concrete building blocks stacked for San Antonio hospital

The same modular construction system—stacked precast concrete boxes—that was used in building the Hilton Palacio del Rio Hotel is being used again in San Antonio, Tex., this time in a hospital project. The system, developed by the H. B. Zachry Co., is said to reduce construction time by one-third to one-half and cut construction costs by about the same amount.



Concrete boxes for San Antonio hospital

Each room of the seven-story nursing tower of Doctor's [continued on page 34]

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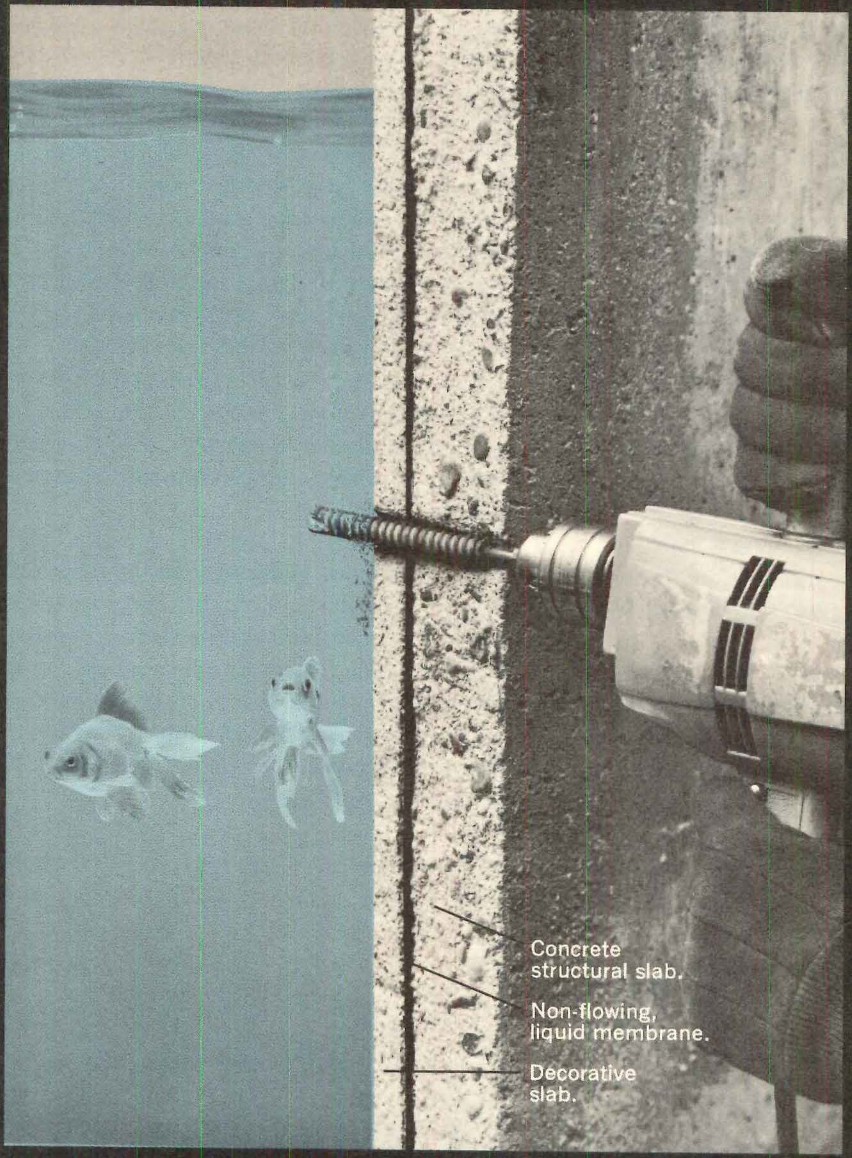

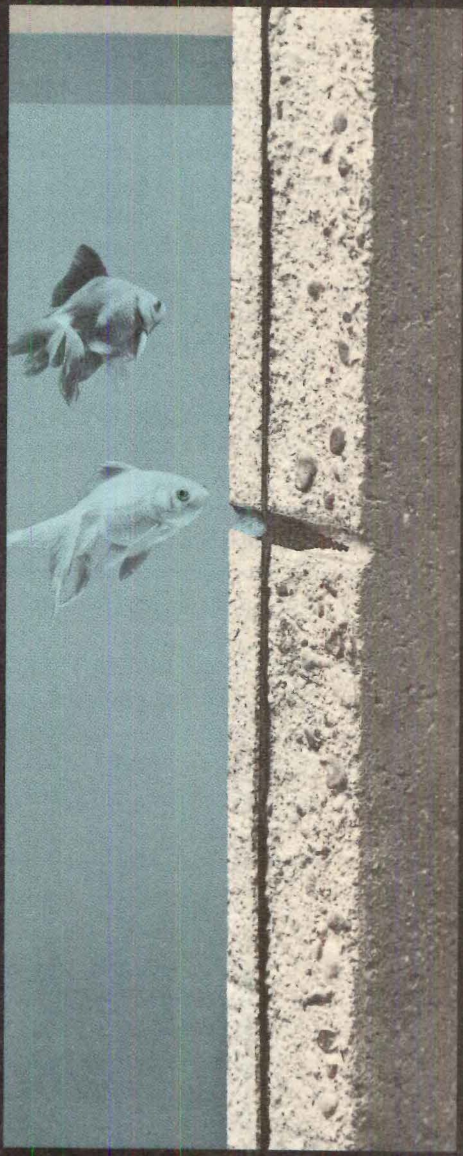

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News report continued from page 32

Hospital will be precast and trucked to the site, fully furnished, with communications and heating and cooling ducts and plumbing already installed. The boxes will be stacked and connected to adjacent boxes and to the horizontal and vertical building systems.

The hospital, designed by Caudill Rowlett Scott and Cerna, Garza & Raba, will consist of two buildings—the nursing tower and a three level clinical services building which will use conventional construction techniques to gain flexible loft space. This building will include complete materials handling below grade, covered parking for 200 cars on the ground level and diagnostic and treatment facilities on the top level. Bridges at the lower and upper levels will connect the two buildings. End walls of both buildings will be precast striated concrete; other exterior materials will be stucco, bronze glazing and anodized aluminum.

Other consultants on the 250-bed, $8.7-million hospital include Feigenspan & Pinell, structural engineers; Burges, Latimer & Miller, mechanical and electrical engineering; Robert F. White, landscaping; and Charles Dunn, hospital consultant.

Work starts on Spokane's Expo '74

With the pulling of a railroad spike and the planting of a western hemlock, work has started on Expo '74, the Spokane World Exposition. The $60 million fair will be built on a 100-acre site next to downtown Spokane, including two islands and the banks, falls and rapids of the Spokane River. Theme: "How Man Can Live, Work and Play in Harmony with His Environment."

The first step in the project will be the removal of railroad tracks and bridges that now criss-cross the site. A U.S. Pavilion is in the planning stage, and a Washington State Pavilion that will include a theater for the performing arts is being designed. Also planned for the site are an outdoor waterfront theater, an amusement park, aerial tramways, theme structures, restaurants and landscaping.

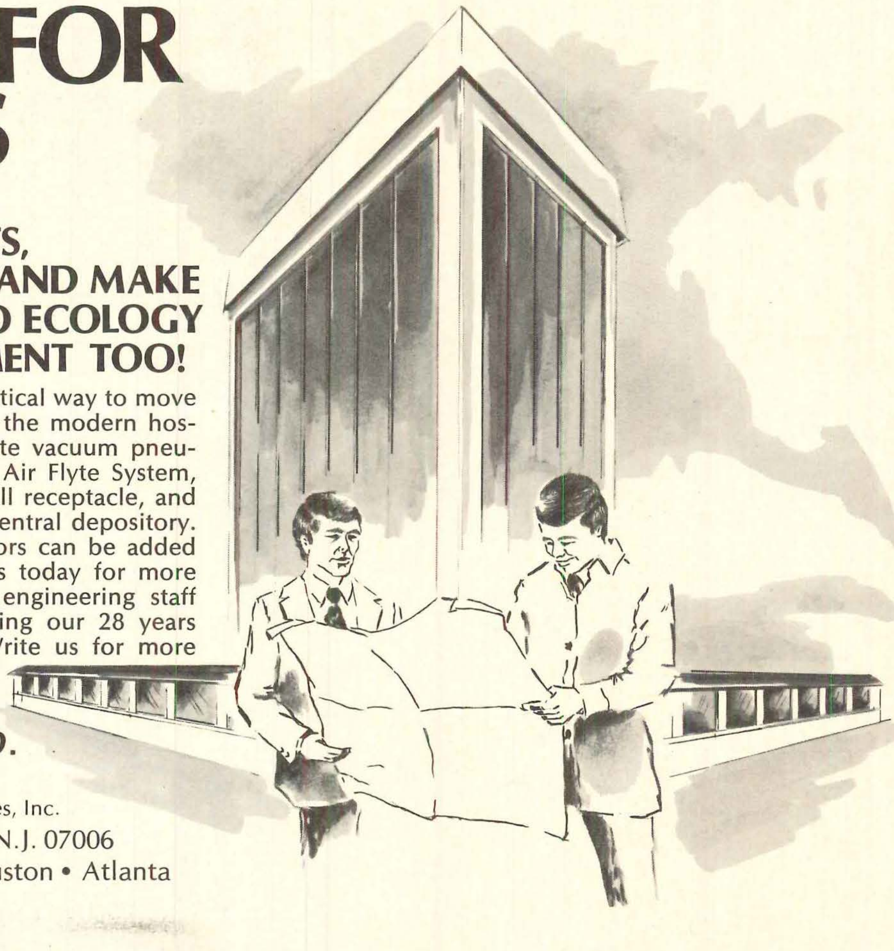
The fair is expected to create some 4000 new jobs in the city and surrounding region; its economic impact is put at $125 million, according to Economic Research Associates. During the six-month run of the fair, May 1, 1974 through October 1974, 4.5 million visitors are expected.

For the long run, the fair is expected to revitalize Spokane's central riverbank area. It will leave behind it a downtown riverfront park and cultural complex, and the theme structure will remain as a permanent environmental study and information center.

Six NYC institutions plan major air rights complex

Six New York City hospitals and schools, grouped together on York Avenue and collectively calling themselves the York Avenue Institutions have announced plans for a major complex of hospitals, medical schools and research operations to be built over Manhattan's FDR Drive. The $300 million development would involve the New York Hospital, Cornell Univer-

[continued on page 38]



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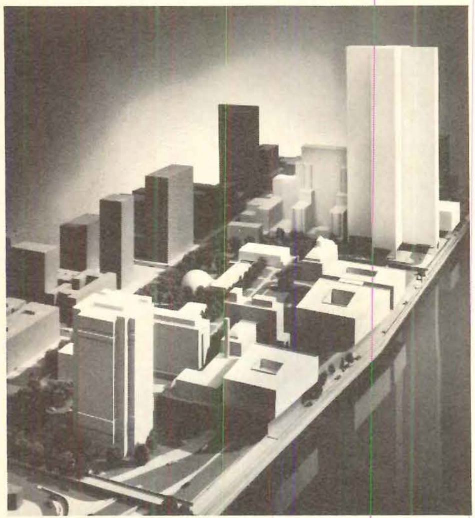
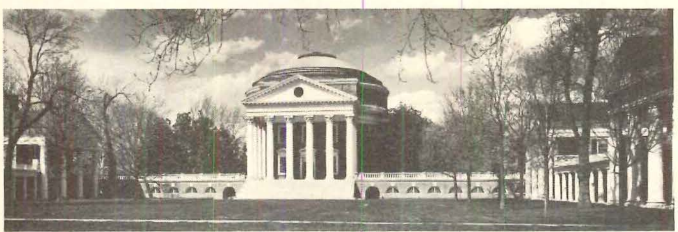


Air rights plan for six NYC hospitals, schools

sity Medical College, Cornell University–New York Hospital School of Nursing, Rockefeller University and the Hospital for Special Surgery; it would provide more than 2.6 million sq ft of space.

Plans for the development by Skidmore, Owings & Merrill call for a new in-patient tower for the New York Hospital–Cornell Medical Center. This building would be some 40 stories high, contain 1,530,000 sq ft and replace the existing 1088-bed hospital building. At the north end of the site (air rights over the highway) would be a 286,000-sq-ft structure for ophthalmology, psychiatry, rehabilitation and other services. An underground garage would give the medical center 450 parking spaces for visitors and staff.

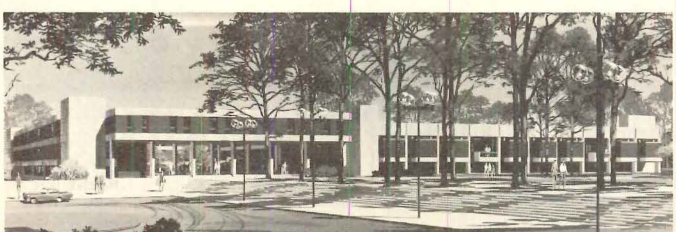
For Rockefeller University, the plan would provide a library, more biomedical research space, an animal care facility, a computer center and an auditorium–conference center. The plan also includes an elevated esplanade along the East River between 63 and 72 Sts. Once final approval is gained, completion of the project is expected to take 8 to 10 years.



University of Virginia's rotunda . . .

law school building . . .

Judge Advocate Generals' School . . .



graduate school of business administration

U. Va. to restore rotunda, build new quad

Designed by Thomas Jefferson as a half-scale adaptation of the Pantheon, the Rotunda at the University of Virginia is about to be restored. A federal grant will make it possible to carry out restoration that has been talked about since before World War II.

The central hall will be a visitors' reception and information center; the dome room above, a museum and galley and meeting room. Other rooms will be used for offices and seminars. The dome will be illuminated by an aluminum skylight.

Jefferson designed the building as a library and meeting place, but the original structure changed considerably over the years. An annex was added in 1853, and in 1895 a major fire brought about the rebuilding of the Rotunda to plans drawn by Stanford White; White's redesign, which changed many of the original design features, drew much criticism. In 1938, the university moved its library to a new building, leaving the Rotunda three-fourths unused; an exterior renovation was done about the same time. Work will start this year on the current restoration, which is to be completed by 1976 at a cost of $2,176,500.

On another part of the Charlottesville campus, work has started on a new graduate school quadrangle with the start of construction on a new law school building. The three-level structure will provide 136,000 sq ft of space; the first level will house lecture rooms, the second, a major part of the 225,000-volume law library; and the third, the rest of the library, offices and a student activities area. Skylights and wells will bring light to an interior concourse.

The second building of the quad, to house the Judge Advocate Generals' School, was recently released for bids. To be built by the University and leased to the government, this building will serve as a training facility for lawyers in military justice. A third building, a graduate school of business administration, is now being designed. Between it and the law school will be a mall reminiscent of the Lawn at the main campus. Hugh Stubbins & Associates are architects for the graduate school quadrangle; Stainback & Scribner are associated architects on the law school and the graduate school of business administration, and Rawlings, Wilson & Fraher are associated architects on the Judge Advocate Generals' School.
[continued on page 40]

News report continued from page 38

Awards

Romando Giurgola and **Mario Salvadori** have been award
the title of Commendatore dell'Ondine al Merito della Repub
Italiana by the Italian government for their contributions to It
American cultural relations. Both are at the Columbia Unive
School of Architecture.

The department of architecture at the University of Illinois
bana-Champaign has been awarded the Great Silver Medal
the French Societe des Architectes Diplomes par le Gouver
ment in honor of the department's program in Versailles.

The 1972 Utilization of Energy Award, given by Southern Ca
nia Edison and the Department of Water and Power went to
ton Becket & Associates for Avco Financial Center.

First Honor Awards for Excellence in Architecture and Urba
sign were given to **I.M. Pei & Partners** (National Airlines Te
nal, Kennedy International Airport) and **Abraham W. Geller**
(Henry Ittleson Center for Child Research) in the 1972 Barc
Awards program of the City Club of New York.

Calendar

July 1–3. National conference of the National Society of Int
Designers, Fairmont Hotel, Dallas, Tex.

July 3–20. Athens Ekistics Month, Athens Technological Or
zation, Athens, Greece.

July 11–15. Annual meeting of the National Society of Profe
sional Engineers, Brown Palace Hotel, Denver, Colo.

July 17–21. Institute on hospital design, sponsored by the d
sion of design and construction of the American Hospital As
ation, AHA headquarters, Chicago, Ill.

July 25–27. Compressor Technology Conference, Purdue U
versity, West Lafayette, Ind.

July 31–Aug. 1. Managing new building projects sponsored
Advanced Management Research International, Inc., the St
ford Court, San Francisco.

Aug. 6–9. Seventh annual conference of the Society for Co
and University Planning, Sheraton-Biltmore Hotel, Atlanta, G

Aug. 7–10. American Health Congress, Chicago-McCormic
Place, Chicago, Ill.

Aug. 9–10. Outdoor lighting conference for landscape plan
sponsored by General Electric Lighting Institute, Nela Park,
Cleveland, Ohio.

Aug. 10–11. Architectonics '72 Exposition, Oakland Audito
Oakland, Calif., preview for building design and constructio
team professionals and officials. (Aug. 12 the exposition is
to the general public.)

Aug. 21–26. International Conference on Tall Buildings, Le
University, Bethlehem, Pa.

Aug. 26–28. Northwest regional conference and meeting c
dent council of the American Institute of Interior Designers,
Seattle, Wash.

Aug. 29–Sept. 1. Twenty-first annual northwest regional co
ence, Alaska Chapter AIA, Anchorage Westward Hotel.

Aug. 31. Deadline for mailing P/A Design Award entries.

Aug. 31. Deadline for entries to Energy Conservation Awar
gram sponsored by Owens-Corning Fiberglas Corporation
ledo, Ohio.

Sept. 14–16. Annual meeting of Architects Society of Ohio
Sheraton Columbus Motor Hotel, Columbus.

Sept. 20–23. Western Mountain Region, AIA, twenty-first c

[continued on page 42]

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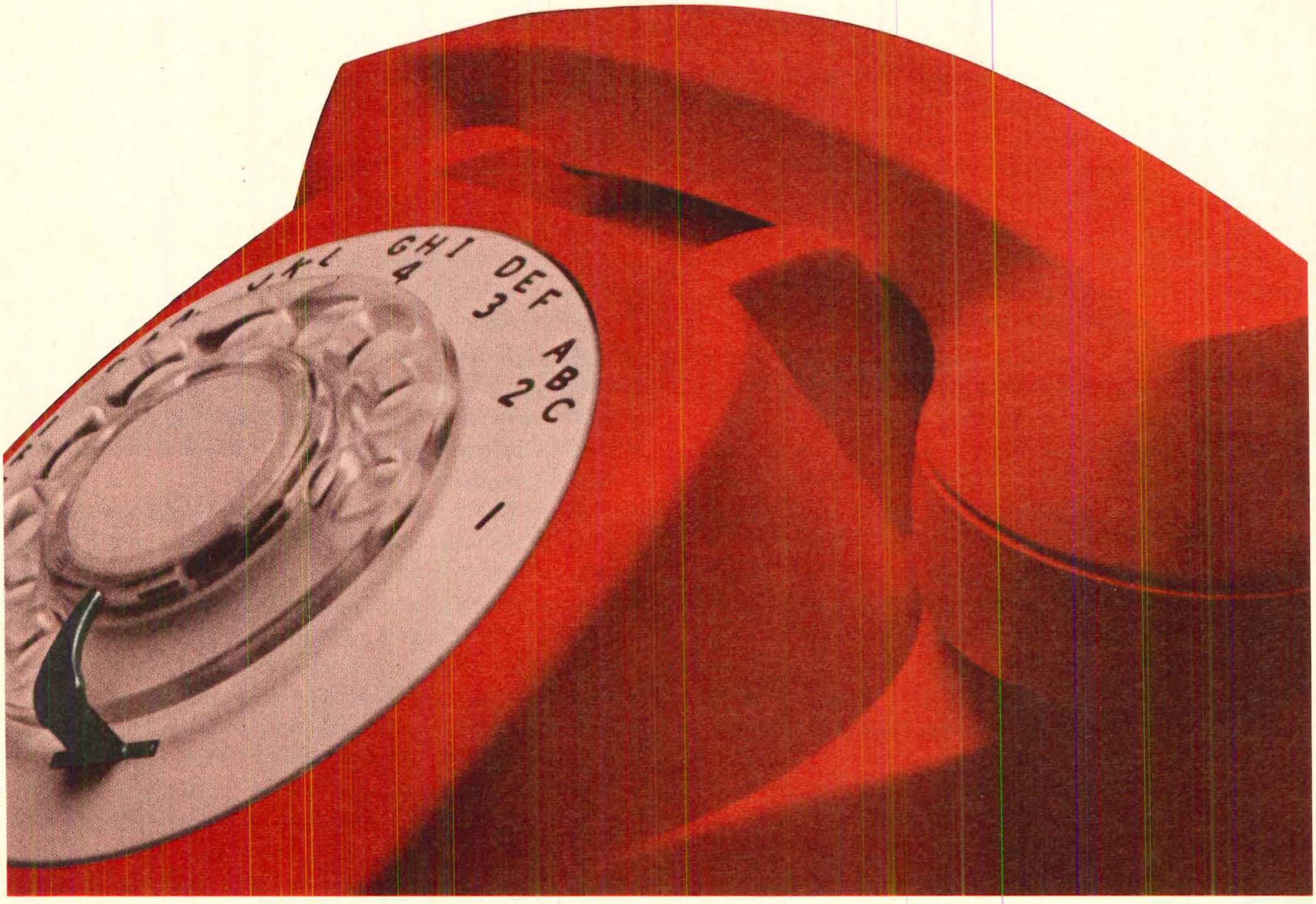

News report continued from page 40

vention, the Four Seasons Hotel, Albuquerque, N.M.
Sept. 24-27. Annual apartment conference of the National Association of Home Builders, Las Vegas, Nev.
Sept. 25-30. Eleventh World Congress of the International Union of Architects, Varna, Bulgaria.
Sept. 27-30. North Carolina Chapter, AIA, South Atlantic Regional Convention, Carolina Hotel, Pinehurst, N.C.
Sept. 28-30. New Jersey Society of Architects annual convention, the Playboy Club, Great Gorge, N.J.

Washington report

Bidding: Justice Department wins first skirmishes

Construction professionals obviously won't concede loss of their war against bidding requirements, although they have been forced into retreat on the first couple of skirmishes with the Justice Department. Both ASCE and AIA, the two biggest and most prestigious of the professional societies, have now signed "consent decrees" in response to antitrust suits, under which both agreed to end specific ethical restrictions on their members against submitting bids for their services.

But, as part of its action, AIA got some "interpretations" from Justice Department attorneys that appear to soften the effect of the decree. (ASCE got no such specific comments.) Specifically, Justice said that the Institute may continue its efforts to influence any branch or agency of government "to take action or refrain from taking action" on the bidding matter; to "propose, support or oppose" legislation or orders by any government agency; to "advocate the Institute's belief that the selection of architects should be based on other factors in addition to fee. . . ."

Some real support for the professional position began to appear from a number of areas. For instance, it began to appear that the National Society of Professional Engineers might be the only major professional group that would stand and fight Justice Department actions, with no concessions or "consent decrees." NSPE must await a final decision, scheduled for its annual meeting in mid-July, but its officials and some members seem determined to battle the matter in the courts. Their viewpoint: unlike the other groups, NSPE is founded on the idea of professionalism alone (not on technical work, or on lobbying activities) hence it must fight the attempt to deprofessionalize engineering through putting a price tag on services.

The Consulting Engineers Council also seemed prepared to fight, but its grounds were a little more vague. At its own annual meeting in San Francisco in late May, CEC approved a resolution to leave the current Code of Ethics intact, and authorized the organization to pledge $200,000 to join other groups in combatting the bidding idea. However, it should be noted that CEC changed its code of ethics last October—eliminating the word "only" from its outline of how consultants should be selected (the leadership said the word made the direction too exclusive).

In Congress, one of the two bills on the subject (HR 12807) cleared a subcommittee chaired by the author of the bill, and hopeful nose-counts taken before AIA's consent decree announcement, indicated the bill would clear the full Government Operations Committee, despite the opposition of Chairman Chet Holifield (D. Calif.). The Senate version of the bill (S.3156) hadn't gotten as far as committee action as June began. Most observers still believe neither bill will get through Congress this session, partly because of lack of understanding of the problem, partly because of political preoccupations.

Meanwhile, some federal agencies were obviously trying to straddle the issue. The Environmental Protection Agency, for example, announced that it will seek "requests for proposals" from professionals in two parts: a "technical proposal" which will contain no reference to costs, and a "business proposal" which would cover costs. The procedure is reminiscent of an attempt by the Defense Department more than a year ago to get similar divisions in proposals—an attempt that failed dismally when architectural-engineering firms simply sent back polite refusals.

The Department of Transportation also published revised A–E selection regulations, which became effective early in June. Under these regulations, an A–E selection board will prepare a preselection list of at least three qualified firms; following interviews, the board will then enter negotiations with the firm given first preference on the basis of qualifications. If agreement is reached on the scope of work, the selected A–E will then submit a proposed fee along with a supporting detailed cost breakdown. Fee negotiations are then to be based upon the cost or pricing data submitted. The "curve" method of fee determination is to be used (if at all) only as a secondary method to test "reasonableness" of the negotiated fee.

(Incidentally, DOT's regulations define the 6 percent fee limitation in a way long advocated by professionals: it excludes such items as field investigations and surveys, soil surveys, travel and per diem, inspection, master planning, technical studies and "similar services not involving the production of designs, plans, drawings and specifications.")

Even so, the general opinion remains that there will be no change in legislation and little in procedures this year.

But many observers think the overall effect of the continuing battle may be all to the good. "For the first time in memory," said one society official, "all of the design professionals are finding themselves in the same corner on an issue, though some may feel more strongly about it than others, depending in large part on their personal employment.

"Not only that, but the design professionals are now being joined by others—accountants, attorneys (whose fee schedules may also be in line for attack by the Justice Department, if it continues its actions in a logical fashion), surveyors and others. Even the medical profession may find itself embroiled in this, before something is concluded.

"That kind of unanimity may, in the end, succeed in bringing the whole matter properly to the attention of the general public—and might make the point that we have long been trying to make individually: That one shouldn't buy professional services and advice on a price basis alone."

There's one powerful group outside the ranks of private professionals very much on their side—though keeping publicly quiet: the old-line government construction agencies at federal, state and local levels. Almost unanimously, they are opposed to any change in the traditional methods of selecting architect-engineers—which would mean re-gearing their own operations, and heavier burdens on them in the form of added supervision and inspection. [E.E. Halmos]

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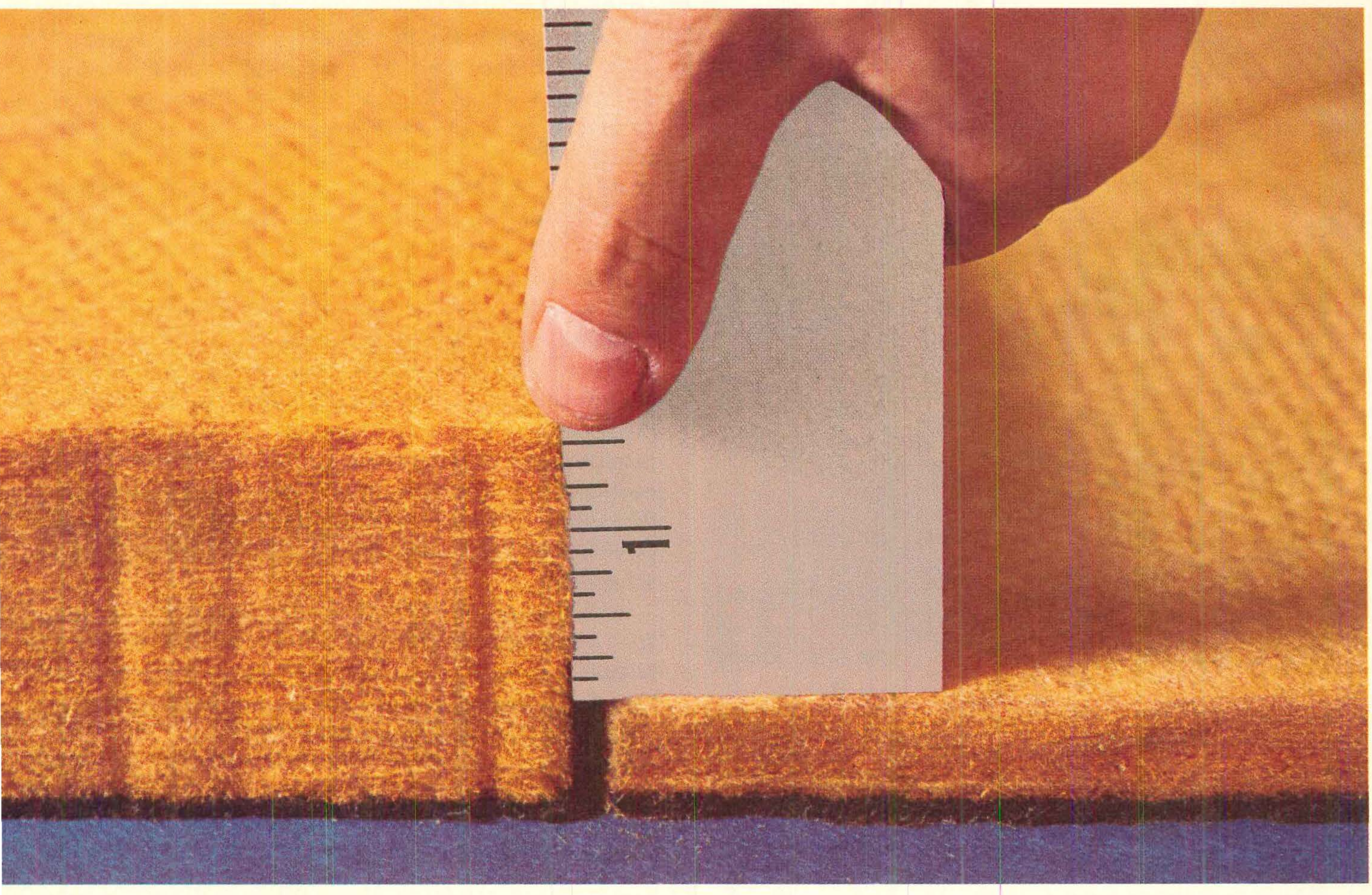

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News report

Architecture west

Venice, a three-square-mile enclave of Los Angeles, is the West Coast's most studied community. The mix of Chicanos, blacks and Caucasians and of age groups in the town's 40,000 people is unique. There is a teeming youth culture, and L.A.'s highest concentration of aged poor and of artists. The aging live mainly in pre-1940 dwellings, and the 1000 or so established or striving artists in commercial and manufacturing buildings.

Drug addiction, crime and hard-core unemployment are high, the education level is low. Less than 50 percent of the young attend high school. One-fourth of the community is on public assistance or social security.

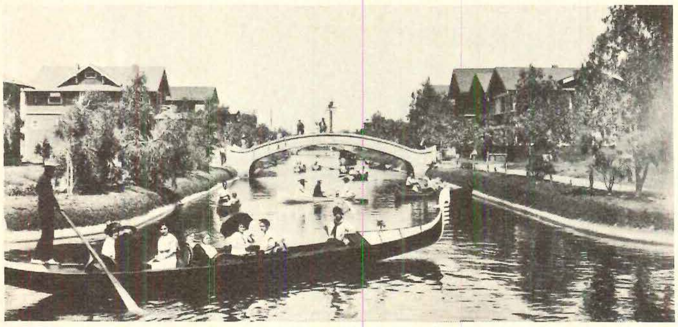
The narrow streets are lined with cottages whose real living room is the ocean front—alive with people walking or sitting on benches. Ocean Front is a celebration of mixed use. Playa del Rey, to the south, has been swallowed by a marina so successful that office buildings go up around it and land costs have increased tenfold. Ocean Park, to the north (part of Santa Monica), was half denuded by a redevelopment project which left two 16-story towers, proving false the theory that something that's big and that's up attracts its kind. The most recent Venice plan was based on the Marina del Rey waterways scheme. It got as far as bids being taken for widening and deepening existing canals; high-masted craft would be allowed in as far as a proposed bridge, and motor launches to the doorstep. This 1969 plan stalled, and today the City Planning Department would rather forget it. Objections came from people on low fixed incomes who would be assessed out of their homes and also from police and fire departments which would not guarantee service in an area cut into islands with limited access.

Since the erosion of the waterways plan, interest groups such as Project Action and Free Venice arose to combat Los Angeles' consistent 45-year policy of neglect. Their shared aims are to clean up and provide low-cost housing while preserving the cultural heritage and unique mix.

The Venice Conference Committee, headed by Rick Davidson, was host to a Summer Festival in June at which planning alternatives were explored with Venice residents. Davidson, an architect living in Venice, hopes that a solution for their 15,000 poor can be a model for other communities.

Another project, funded by UCLA's Department of Urban Affairs and directed by architect-planner Kenneth Norwood, is a classic example of advocacy planning. Starting out as an ad hoc committee in May, it became a community design center. At a housing workshop, Venice residents, aided by outside people, met to explore housing needs and solutions.

Venice has survived many indignities since it was planned in 1904; 16 miles of canals were dug, and gondolas and singing gondoliers were imported from Venice East. Venetian Gothic was what the builders had in mind, but the studs and plaster arcades at the town center (mostly gone) were freely conceived. By 1925 when Los Angeles annexed Venice it had taken on the coloration of its amusement pier. Half the canals were filled in, oil drilling was permitted and derricks sprang up among the beach cottages. Hippies arrived in the 1950s, and the campaign to root them out fell most heavily on the aging poor. Crews of inspectors condemned whole blocks; property owners had 90 days to start bringing their buildings up to code. As banks would not lend, a third of the structures were razed. The question now: will the developers finish the job? [Esther McCoy]



Venice, 1908. 1910 L.A. County Museum of Natural History photo

Arcades, 1972. Tim Rudnick photo

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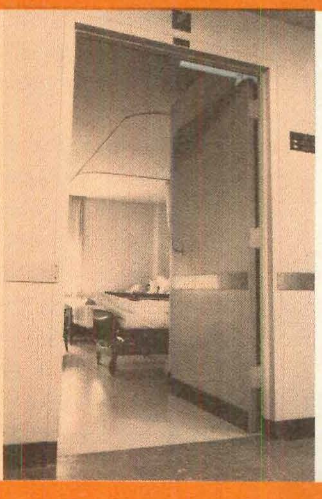

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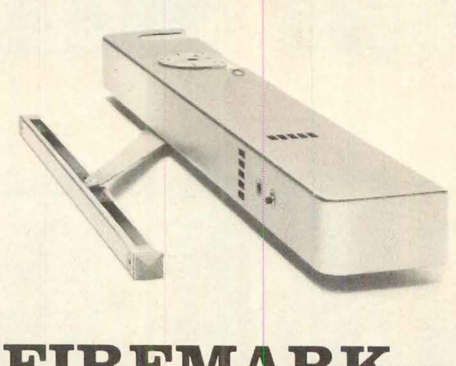

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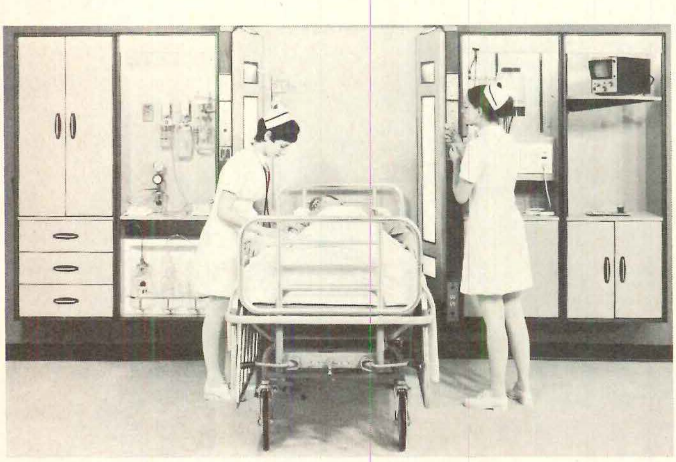
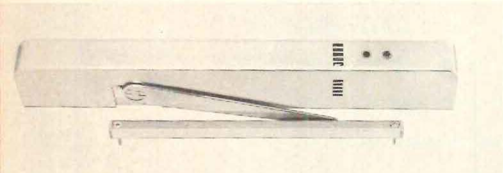
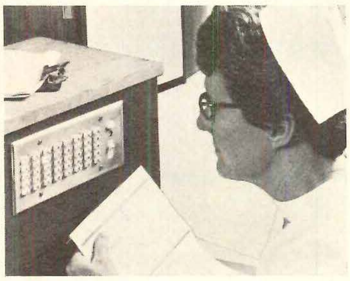


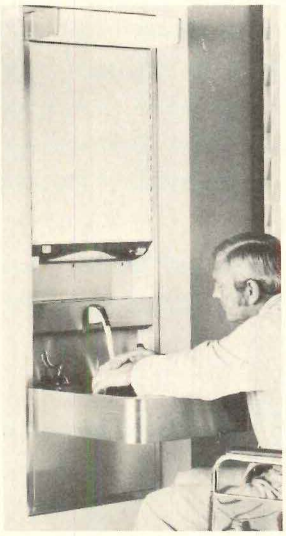
Enviro-care



Fire/life safety



Sentinel



Wash center

Ready rooms

Enviro-care. Designed to simplify the installation of central power, communication, grounding and gas distribution systems into the patient's room, this system offers a prefabricated core module. Wall hung, it contains nurse and patient lighting, individually fused electrical outlets, strategically placed medical gases to handle specific needs and a control-panel for patient-nurse communication. It also provides bedside treatment centers and a visitor convenience bench. Acute care core module available. Hill-Rom Co., Inc.
Circle 101 on reader service card

Fire/life safety door controls. Patient room door release with integral closing power and two-point hold-open has been designed to meet new building code performance standards. It provides hold-open points at 85, 90 or 100 degrees and at 35 degrees. The fail-safe electromagnetic device provides door holding, automatic release and closing in one unit; it is in keeping with the NFPA No. 101 Life Safety Code, calling for automatic products of combustion detection in all hospitals and custodial care facilities (1973 edition). The unit permits doors to remain open until actuated by detectors. Designed for surface mounting on a standard 2-in. frame, the device is self-contained, is available for new or existing buildings. Firemark; Rixson Inc.
Circle 102 on reader service card

Sentinel. To provide protection for patients who may endanger themselves by wandering while confused by sedation or illness, and primarily for situations where monitoring is needed, this system offers visual and audible indications if a patient leaves a protected area. Doors to each exit in a protected area are equipped with contacts normally open in stand-by state. System is actuated when a guarded door is opened. A "call placed" lamp and reset button in or near each protected area enables an attendant to cancel the alarm and reset the system. The master station is equipped with an annunciator with a lamp and audible signal for each room. Plug-in design, powered by 24v UL listed power supply. S.H. Couch Division, ESB Inc.
Circle 103 on reader service card

Wash center for wheelchair users. Stainless steel wash center is specifically designed to provide clearance for wheelchairs. Equipped with wrist-blade operated valves mounted on a horizontal surface of the bowl deck, the satin-finish rectangular steel bowl has coved corners, underside is coated to absorb sound. Includes fluorescent light fixture and grounded electrical outlet; storage cabinet with mirrored door. Bradley Washfountain Co.
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Ready rooms. Beds—both motorized and hand operated—mattresses, bedside cabinets, chests, overbed tables, chairs and carpeting are coordinated to furnish patient rooms. Styles include traditional, Mediterranean, provincial and contemporary; cabinetry is made of roll-formed sheet steel over welded A-frames. Drawer fronts and bed ends are die-formed thermoplastic; tops are of high pressure melamine laminate. Accessories such as side rails and exercise bars also available. The Simmons Co.
Circle 105 on reader service card
[continued on page 48]

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Products continued from page 46

Furniture for health care. Called Health Care Invironments, furniture includes patient lounge chairs, available with removable head rest and matching ottoman; matching side and arm chairs fully upholstered or with wood back. Constructed of solid oak with polyurethane foam, seats and backs are separately fastened to chair frame for maintenance ease. Hardwood House.
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Air curtain. Particulate air filter is designed to remove bacteria, mold, pollen and dust down to 0.3 microns from the room in which it is installed. Mounted over a door opening or converted to a movable bench model, it disperses a vertical flow curtain of dust-free sterile air 18 in. in depth to the floor. Offers filtering action and prevents such contaminants as insects, dust, dirt and fumes from passing through doorway openings. Fire retardant and corrosion proof. Mars Co.
Circle 107 on reader service card

Nurserver. A double-door, pass-through cabinet, built into the wall between the patient's room and the corridor makes it possible to distribute linens, medication and food from the corridor without disturbing the patient. Nurses have access to clean supplies and medication within the patient's room. Separate section for soiled items in disposal section; medication compartment door comes with lock. National Industries Division, AVM of Maryland, Inc.
Circle 108 on reader service card

Radiant ceilings in hospitals. Water circulating through this ceiling system via pipes or through channels in the panels provides the source for radiant energy transfer. Hot water is circulated when heating is required, the panels then emit infrared energy downward; when cold water is circulated, it uniformly cools the panels, creating a room-wide heat-absorbing surface drawing infrared energy from warmed objects below. The system does not depend on the movement of air to heat or cool; air is used for ventilation and humidity control, eliminating recirculation of contaminated air. Panels provide acoustical control, with noise reduction coefficients up to .90. Airtex Corp.
Circle 109 on reader service card

Nurse/patient communications. Vis-o-matic, a patient-to-nurse signal system provides simultaneous audible and visible annunciation of all calls, both routine and emergency, from a patient, emergency or duty station. System consists of a central control master station, central control assembly with power supply, patient, emergency, staff, and duty station, corridor and zone lights and all system cabling. Solid state, modular construction with plug-in signal control components. Can be converted to intercom at any time. DuKane Corp.
Circle 110 on reader service card

Shower. Made of one-piece fiberglass, shower enclosure is of seamless construction with soap dish, grab bar, seat, chrome plated outlet drain. Fiberglass by PPG Industries; shower by Universal Rundle Corp.
Circle 111 on reader service card

Corner and bumper guards. Designed to absorb the impact of push carts, hot trucks or other mobile vehicles at corners, walls and doors of hospitals, these guards are made of Acrovyn, a vinyl alloy. Can be flush or surface mounted on a continuous aluminum retainer, installed on any existing surface and are available in six colors. Construction Specialties, Inc.
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Literature

Mylar-surfaced fire guard ceilings. Folder describes the advantages of Mylar-surfaced ceiling in tile and lay-in panels that are said to meet high standards of cleanliness. Mylar is a durable polyester film facing that provides good acoustical control by diaphragmatic action. UL time design ratings are 1-, 2-, 3- and 4-hours; rated Class 25 (noncombustible) under Flame Spread Index section of Federal Specification SS-S-118a Ceilings by Armstrong Cork Co; Mylar by Du Pont.
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Electro hydraulic compaction. Designed to meet tough anti-pollution legislation, this equipment can be manually loaded or chute fed. As the collection hopper fills to a predetermined level, an electronic beam triggers the compaction cycle by moving the hydraulic ram into position for compaction. In forcing the refuse into the receptacle, the volume is reduced at a ratio of 8 to 1 at ram pressures of 12,000 lbs or more. All models are equipped with automatic disinfectant spray units and nonspill packaging. Pressure Systems Engineering.
Circle 114 on reader service card

Hospital planning guide. A checklist of recessed and surface-mounted stainless steel washroom accessories recommended for use in each area of a general hospital is offered in this booklet that includes suggestions for patient examining, treatment and recovery rooms. Also available is a four-page brochure describing 20 different lavatory console units, with details of rough-wall preparation and plumbing rough-in. Bobrick Washroom Equipment, Inc.
Circle 115 on reader service card

Planning the laboratory. An 84-page reference handbook for the design or modernization of laboratory facilities presents three sections of furniture; service fixtures, fume hoods and antipollution fume scrubbers. All units are illustrated and architectural drawings are given. Lab Fabricators Co.
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Record holders. Space control for hospital storage is the theme of a series of bulletins describing filing and storage equipment for hospitals. The Swedish-designed wood shelving offers many possible combinations of length, width and depth. Lundia, Myers Industries, Inc.
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Stainless steel equipment. Over 200 items are described in this catalog of stainless steel hospital equipment for operating, emergency, examining and out-patient areas. All welded construction; fully conductive and noncorrosive. Affiliated Hospital Products, Inc., Wilson Division.
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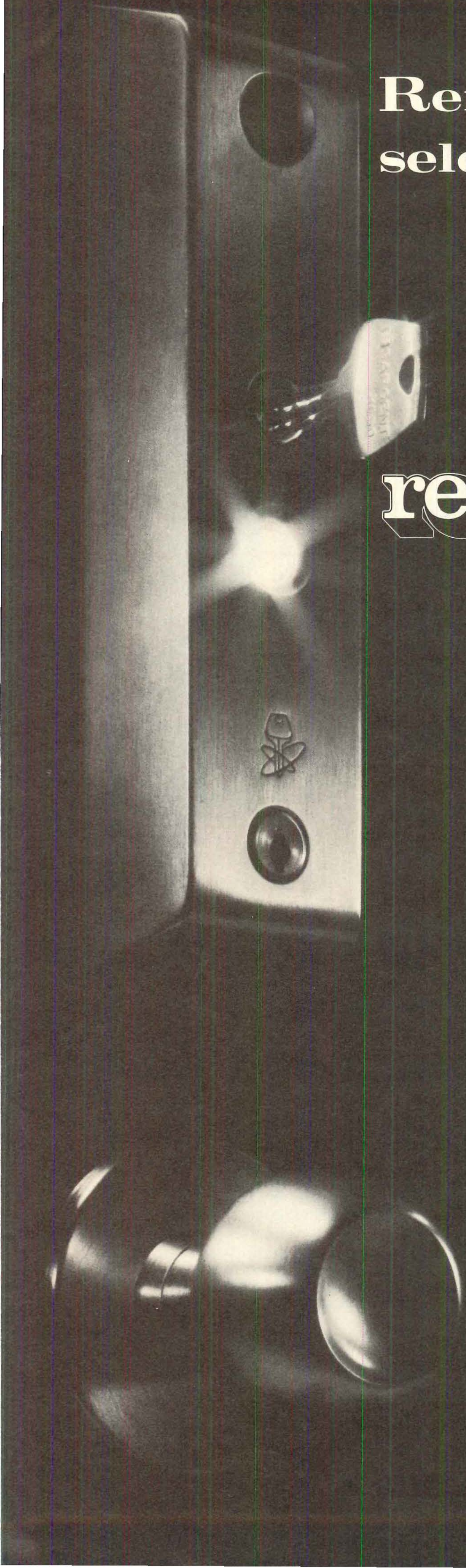


Editorial

Progressive Architecture

July 1972

In addition to writing the introductory article for this special issue on hospitals, author H. Robert Douglass sent along some views on the ongoing process of hospital planning that begins long before architects and consultants are brought in, presented here as a guest editorial

Complex social, architectural and technical problems compound the difficulties of hospital design. The field is full of contradictions. Skyrocketing construction and operating costs vs. increasingly sophisticated technical requirements. Rigidity of physical structure and its neighborhood environment vs. continuous self-renewal. The scale and impersonality of large institutions must be humanized while obsolescent hospital organization and operating systems must acquire some of the efficiency of business and industrial methods.

Yet, knowing all this, an architect can easily make the mistake of assuming that the hospital project starts at the point where he steps in. It has, in fact, been underway for a long time. To be a successful player in this game, the architect should view his role as one member of a team which may have worked together for years and which will continue working together after his limited involvement in the work is finished. Management and administration, capital and financial planning, community and inter-institutional relations are ongoing concerns which determine the form of the architect's episodic intervention.

His best initial approach is that of method actor, viewing the situation through the eyes of the administrator, the board member, the nurse, physician and patient. He should understand how design decisions that affect operating or construction costs find their way into the hospital's books and onto patients' billings. In health facility planning, the administrator is the real "project manager" while the "designer" who sets the earliest and strongest direction for the project is the comptroller or financial consultant. From the hospital family and outside sources, the administrator must assemble a team that can lead the institution through the critical process of getting ready for planning, and then work elbow to elbow with the professional planning team members as they become involved. This in-house planning team not only considers physical resources, but operational and social systems within the institution as well as its relations with the community.

Premature obsolescence is a prime concern. Its prevention requires a wide and continuing search of trends in medical, social, behavioral, economic, technological and physical change. The architect must learn to accept a greater degree of uncertainty in program and scope than on other types of projects to avoid imposing a strait-jacket on the institution.

On-going maintenance and remodeling must become part of the overall plan, both in terms of physical facilities and capital expenditure. An institution will, on occasion, spend up to $1 million annually on patchwork maintenance and renovation, at the same time bemoaning the fact that it has no means of funding new construction. On the other hand, if remodeling must be done while long-range planning is underway, as is usually the case, it provides an opportunity to test and evaluate experimental settings or new equipment. How much better it would be to evaluate a new patient room by several months of use and documentation rather than by herding professional personnel through a basement mockup.

Finally, design cannot be left to happenstance. It still tends to be treated by clients—and even architects—as something additive, a decorative frosting which no one can afford and which ends up pretty low on the totem pole after technical problems have been solved. Hospitals are often considered more machine than architecture. Erroneously so, as human environment is always of primary importance, be it for the sick or the healthy, the poor or the more fortunate. Moreover, if given its true meaning and importance, design should offer the solution to the technical, physical and economic problems of health facilities.

Are we giving our clients their money's worth in health facilities design? I don't think so. While all of us are trying hard, there are such glaring disparities in time, cost and quality of the facilities being produced that someone is surely dropping the ball. The reason may be that we are all preoccupied with the *ideal,* forgetting the infinitely more important question, "What is appropriate?" The answer lies in the concept of *value,* and value is always a product of its environment. What is appropriate will vary significantly in specific situations. As we accumulate experience and knowledge, we transfer it to each succeeding project, and along the way some of our clients might have to pay for solutions that were appropriate for someone else.

Health care: the fastest growing industry

H. Robert Douglass

Although emphasis is changing from cure or prevention, the hospital will continue to be the core of the nation's fastest growing industry. The author surveys the field, from opportunities this growth offers architects to emerging design concepts and the need for research to develop them

A look at health care in America today discloses paradoxes, inequities and disparities between capacity and achievement which raise serious questions. Why, in the shadow of many illustrious medical teaching centers, is the infant mortality rate five times the national average? Why is the hospital which treats the community's sick not involved as a leader in the fight for community health? Why are great metropolitan centers continuing to overbuild patient beds and medical services when even the most rudimentary of medical care is not available in many parts of the South, Southwest and Midwest?

The answers are all the same. While we have achieved great sophistication in medical sciences and technology, we have failed to develop and maintain an effective health care system that matches medical capacity with consumer need. The need to provide universal health maintenance rather than sickness intervention has been recognized for years, but during these years, the mechanisms for achieving such a goal have hardly changed at all. However, the pressure for change is growing, and we can expect to see significant strides toward a more comprehensive health maintenance/health care system within this decade.

On the basis of an ever-widening public interest in health care services, it is predictable that an increasingly interrelated network of private and public agencies, home settings, schools, work places, clinics, ambulances, doctors' offices, out-patient and in-patient facilities will emerge in the immediate future. The hospital will assume a greater role in coordination and brokerage of services, while its role in direct patient care will not change significantly. This statement may seem at variance with the concept of health maintenance which seeks to diminish hospitalization by heading off the need for crisis care by dealing with problems at a less acute level. It appears likely, however, as the health care system broadens its base, it will reach a greater number of people to the extent that hospitals will retain a pivotal function in the total system, especially as the primary source of skill and knowledge of the specialist and researcher.

For the architect willing to make the necessary commitment in depth to health facilities design, the opportunities have never been greater. It has been forecast that health facilities nationally will constitute one of the most active of major design and construction markets for the immediate future.

The health industry is growing at a fantastic rate. It has been projected that by 1975, health care expenditures (now around $70 billion annually) will top the $100 billion mark and hospitals alone will employ over five million people, making health the largest industry in the U.S. It is estimated that it will soon reach 10 percent of the gross national product. The need for appropriate facilities to support this growing industry becomes ever more acute. A U.S. Public Health Service study published in the late 1960s marked 35 percent of all hospital facilities in the country as seriously obsolescent. A recent HEW publication stated that 43 percent of the nation's health care facilities need modernization. We are not keeping up with the simple maintenance of our existing system—yet we face a growing need for new facilities. As reported by HEW, some 2799 hospitals having a total of 227,682 beds are obsolete. All states reported obsolete facilities in terms of number of beds, ranging from 11.7 percent in Mississippi to 60.3 percent in Delaware. On the basis of total obsolete beds, New York leads with 27,200, followed by Pennsylvania's 21,500.

More than 75,000 additional beds are needed to overcome current deficiencies, eliminate maldistribution and respond to population growth. Simple projections reflect a requirement for a net addition of some $23 billion capital funds in this decade; this means nearly doubling investments in hospitals and related facilities in a single 10-year period. Just to maintain the present system of facilities will require a capital expenditure in one decade nearly equalling the total capital outlay for all years prior to 1960. Translated into dollars, a reasonable estimate of the value of the needed replacements at current construction costs is $16 billion. In addition, $500 million in new construction will be required each year just to keep pace with population growth.

Author: H. Robert Douglass is Vice President and Director of the Architectural Division, C.E. Maguire Inc. He was assisted in this article by Maria Rupp, who is also with the firm.

Group practice facilities are a large potential market. A recent survey by the AMA Center for Health Services Research and Development (of some 8000 groups involving 42,000 physicians) indicated that 60 percent of all clinic groups rent rather than own their premises and that the trend to ownership increases with the size of the group. The 16–50-physician, multispecialty group, is particularly ownership oriented. Continuing expansion trends indicate that many more will soon plan on erecting a new clinic building or satellite facility.

As the need for design services in the health field grows, the market place grows more competitive. Many of the larger architectural and engineering firms are reinforcing their market position by establishing specialty groups to focus exclusively on health facilities design. While this move toward specialization is, in many cases, producing a higher level of function and technology in design, it is making it ever more difficult for small and local firms to compete for major health facility commissions. Perhaps the healthiest aspect of this trend is the growing recognition that designing health facilities is a team effort in which both specialist and generalist can play a meaningful role on a given project.

What is going to be built?

Despite the continuing state of transition in the health care system, it appears that the design and construction of health facilities in the immediate future will not be radically different from that of the recent past. Hospitals will continue to generate the largest fee and contract volume for architects and builders. They will continue to be the most demanding single component of the health facilities system in terms of complexity and design commitment. The field of activity will be rounded out by a mix of physicians' offices, clinics, medical school facilities, mental health centers, nursing homes, extended care facilities, etc.

The trends in construction of health facilities are more apparent in terms of what is *not* being built. For example, we are no longer building the vast custodial mental institutions which have been shown in the past to be little more than storage bins for mentally deficient or simply unwanted people. The Community Mental Health Center program, among others, has succeeded in bringing the focus of mental health care back into the communities.

In hospitals the emphasis has shifted from beds to services. There seems to be a new level of commitment among administrators to avoid duplication and unnecessary construction of facilities and services by a sharing of resources among institutions. In health education, where the dollar squeeze in recent years has been the tightest (a dozen of the country's most prestigious private medical and dental schools currently verge on bankruptcy) program innovations to minimize capital expense have flourished. They involve use of academic campuses for basic science and social science instruction, consolidation of for-profit and nonprofit facilities, and use of community hospitals for clinical training.

Who is going to be building? Development of health facilities continues to be influenced by the availability or lack of federal funds. Nudged by the promise of federal money, evolution in the health care delivery system is triggering significant changes in the health facilities picture. As it becomes more widely recognized that social and educational dimensions are inherent in the total problem of health care for the nation, additional levels and branches of government will become involved. This will mean a more complex spectrum of clients—and a blurring of the lines of demarcation between various components of the education/health/social/economic system. This trend will be reinforced by any development which extends the concept of the health care system, such as community and neighborhood health centers.

There are reports that new neighborhood health centers bring on an initial upsurge in hospital days due to a backlog of previously unidentified or untreated illnesses. There is, however, a gradual long-term reduction in the required number of hospital beds. These centers are springing up all over the country, one advantage being that they do not require a large capital expenditure. A store front or existing community facility can be adapted without exorbitant cost. Such centers not only offer a natural entry point for persons seeking health care services, but they also provide career opportunities or slots for voluntary participation by nearby residents, enhancing the working relationship between the professional and the consumer.

HMOs now and for the future

To highlight the distinction between medical care (preventive medicine) and medical cure (intervention after the on-

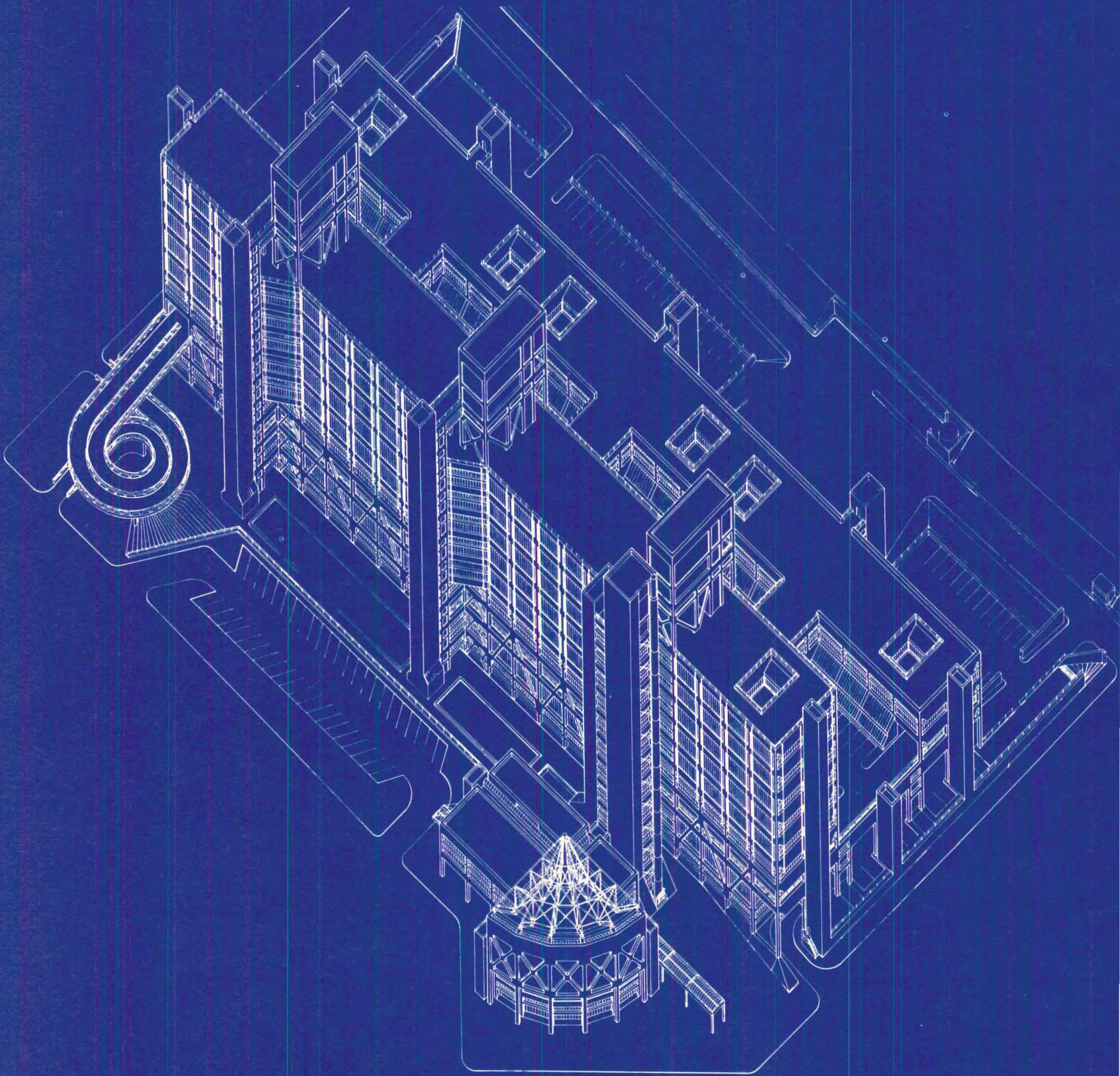
[continued on page 90]

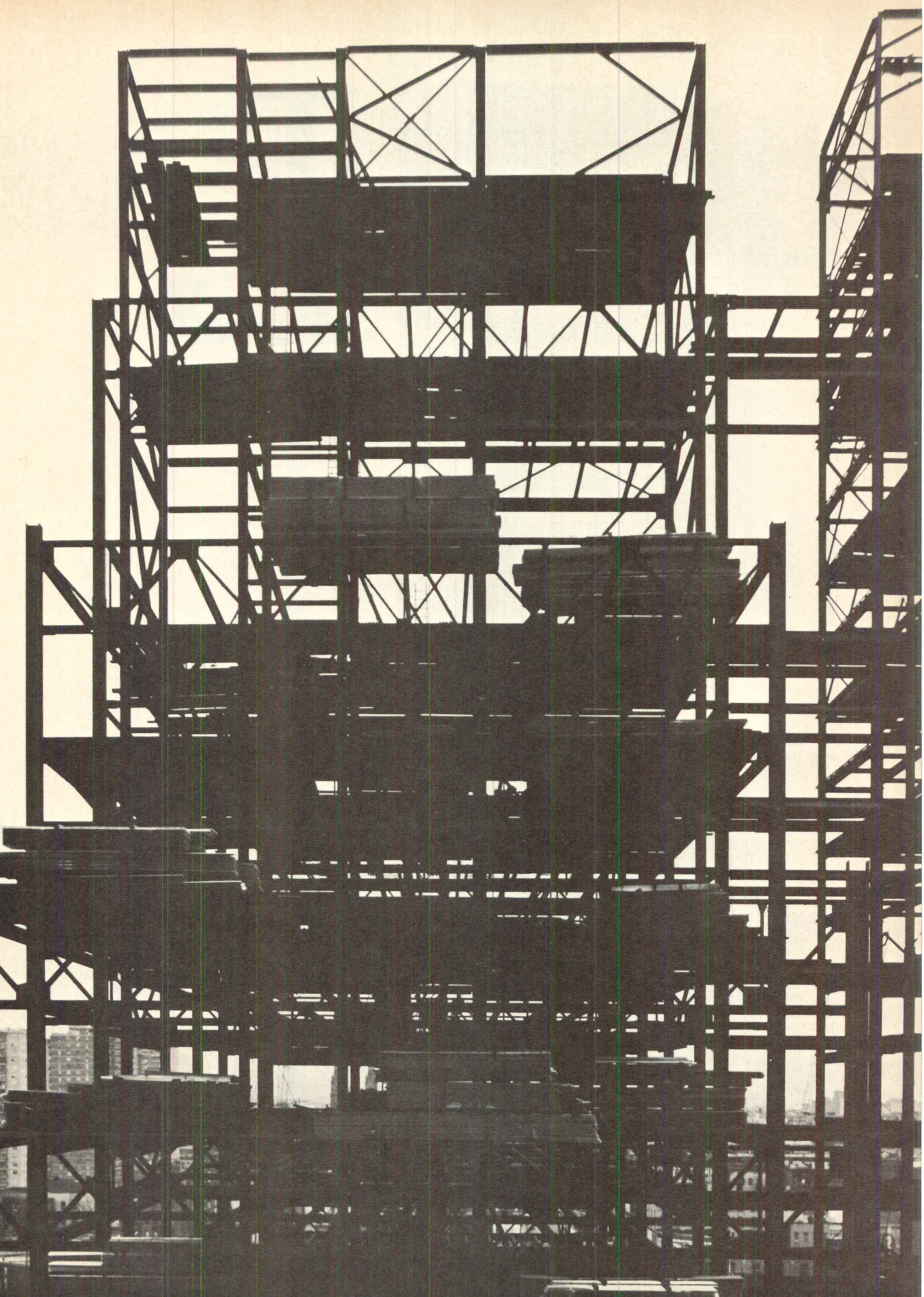
Woodhull Medical and Mental Health Center

Toward the minimal shell

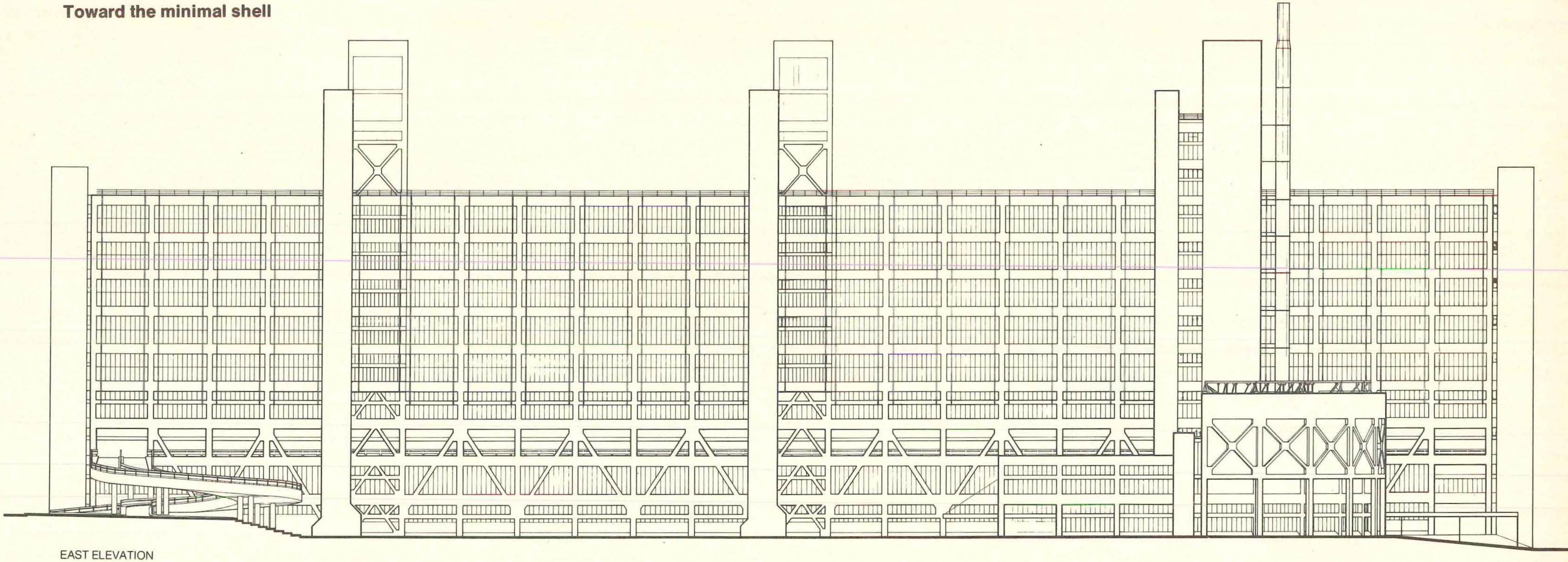
Size (1 million square feet) and scope (medical and mental health care for a large population) plus the need for flexibility and early occupancy called for innovative design and construction processes at a Brooklyn hospital

Kallman & McKinnell of Boston and Russo & Sonder of New York are designing a huge 610-bed, 1-million-sq-ft hospital—almost 2 million counting interstitial spaces—that will be ready for occupancy early in 1974. Are designing? One would think that any building of that size, which will be ready to open that soon, would already be completely designed. But that is just the point. Woodhull Medical and Mental Health Center in Brooklyn probably will not be in a finished design stage for some time. The reason for this is that it is not being designed or constructed in the usual way. If it were, it is estimated that it would not be ready for occupancy until about three or four years after its scheduled opening date. And with labor and

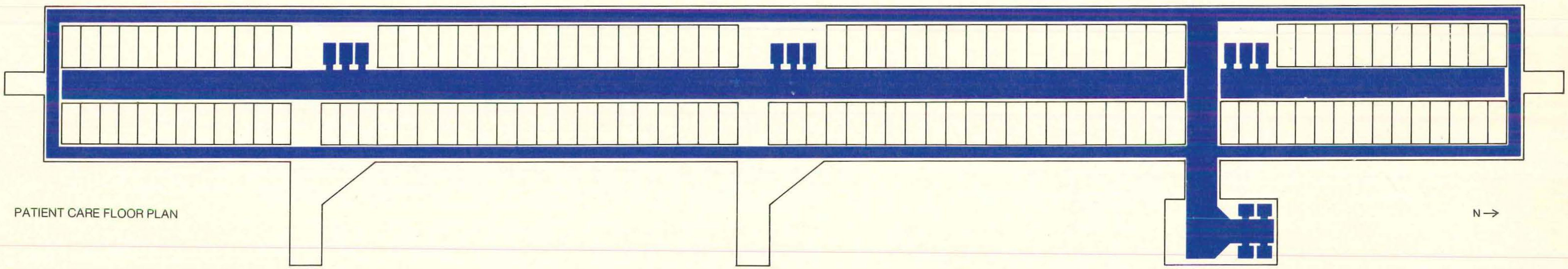




Toward the minimal shell

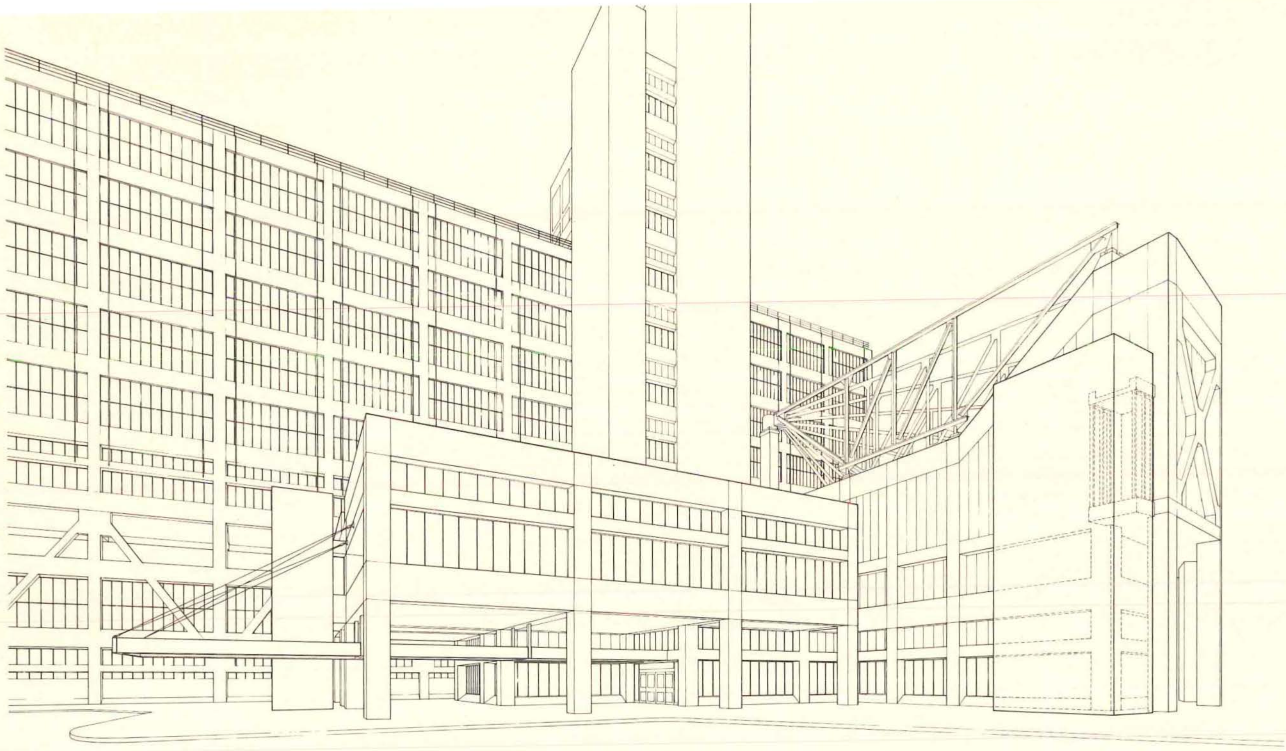


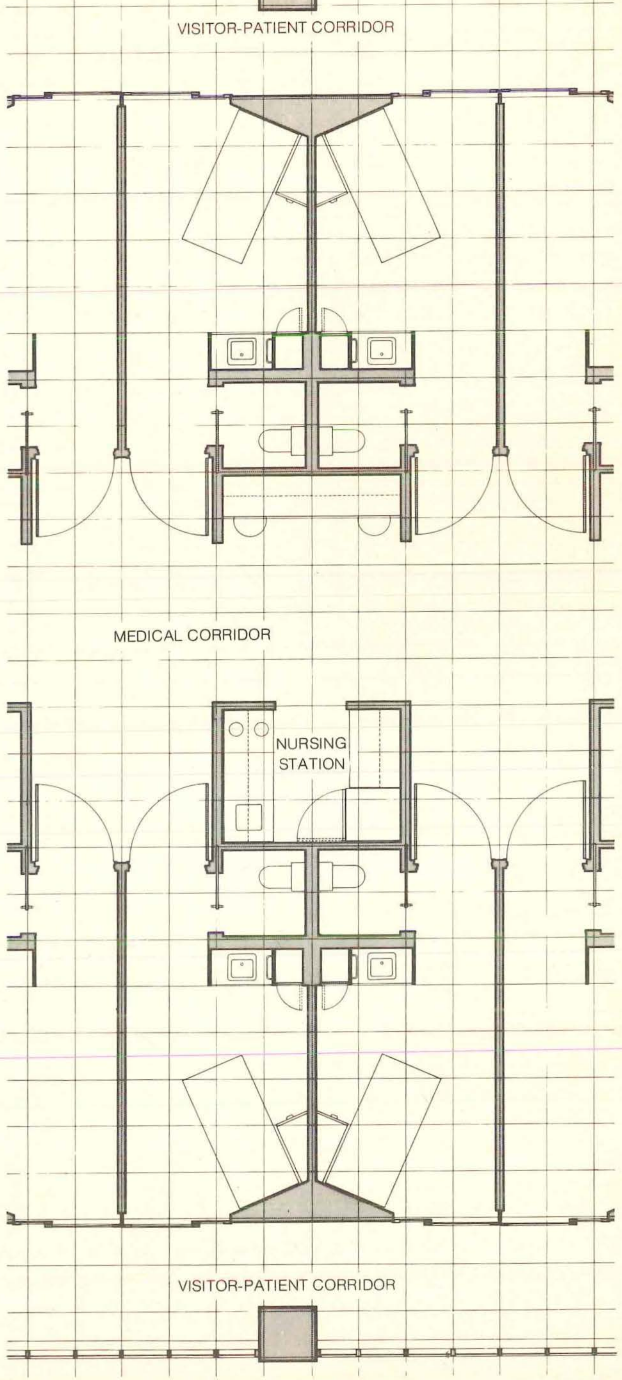
EAST ELEVATION



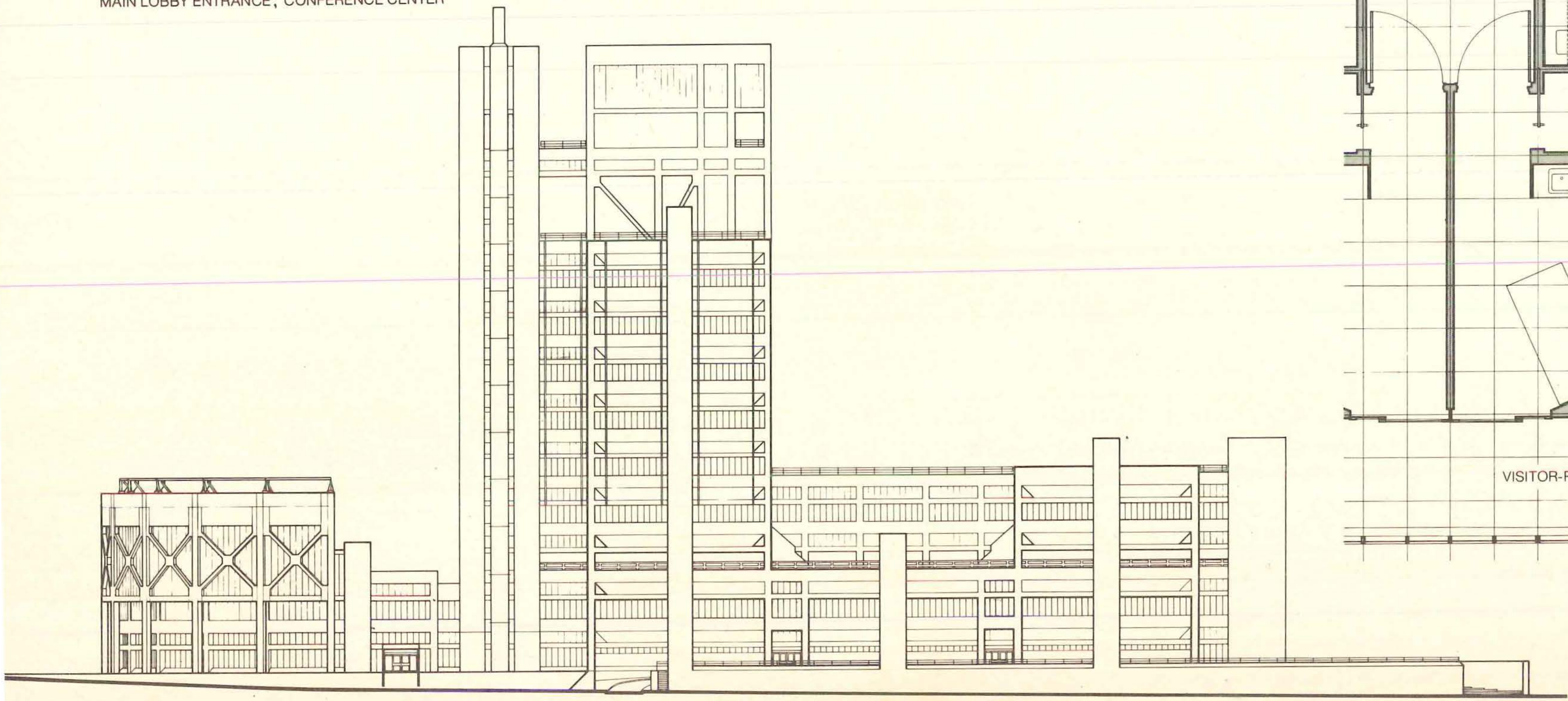
PATIENT CARE FLOOR PLAN

On Woodhull's 700-ft-long floors, patients are grouped in single rooms according to degree of illness; intense-care patients are toward the north close to elevators serving emergency and surgical units, while extended-care patients are at the south close to rehabilitation facilities. Each floor is served with pedestrian-visitor corridors on the perimeter and a medical corridor down the center. Linear arrangement of rooms allows maximum flexibility of subdivision into nursing units; north-south orientation allows natural light to enter all patient rooms through the glazed corridors.


MAIN LOBBY ENTRANCE, CONFERENCE CENTER



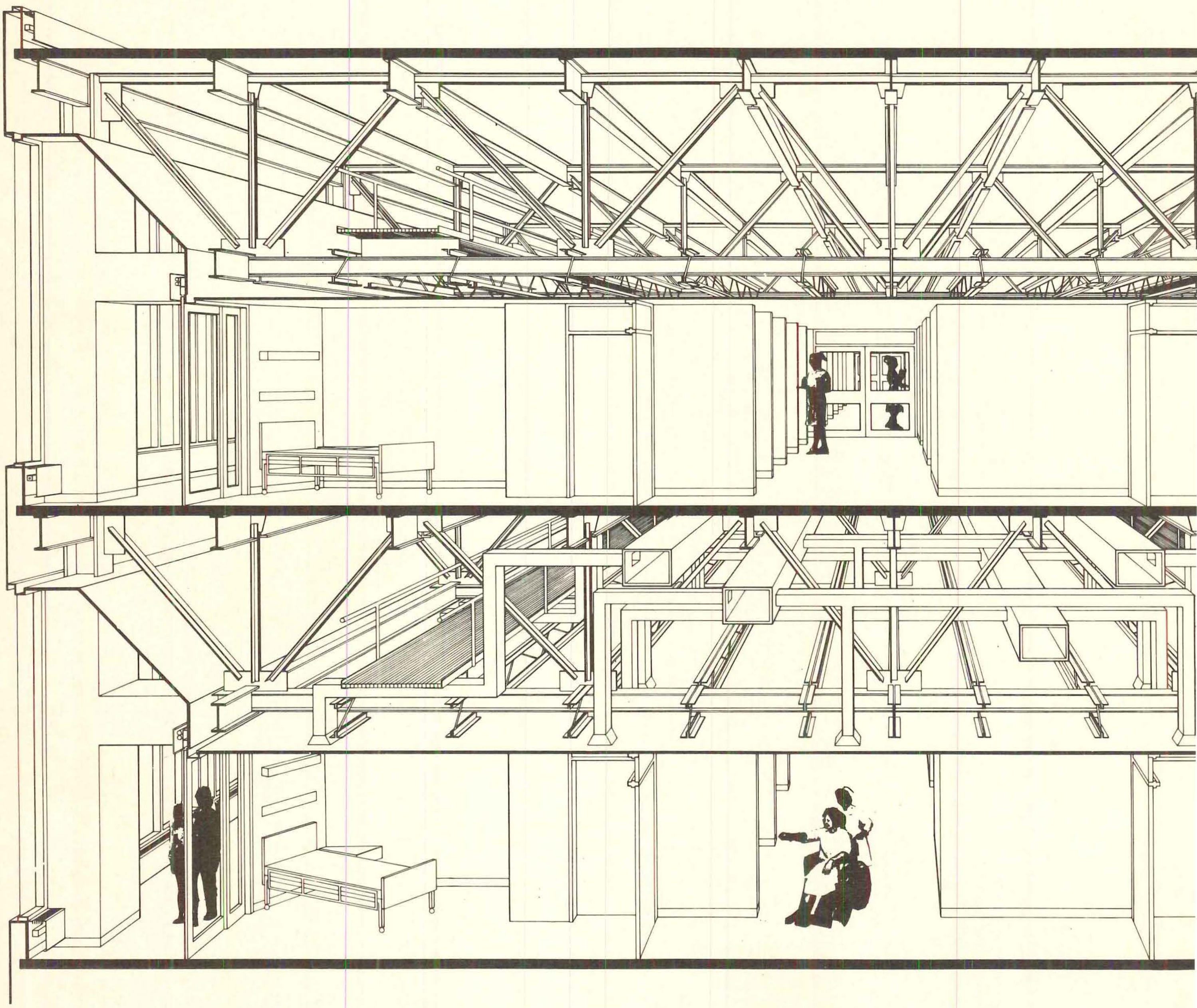
TYPICAL PATIENT FLOOR PLAN


NORTH ELEVATION

materials costs escalating about 10 to 12 percent a year, the cost of this facility might be closer to $115 million than to its present budget of $86 million.

How is this possible? The answer is "construction management." Briefly, construction management is the consequence of a particular design method in which the structure and envelope of a building have been predetermined in such a fashion that the building can accommodate any manner of interior layout, if the building is served by a flexible mechanical system. Consequently, it is not necessary to wait for one "finished" package to be bid on completion of design; construction can begin long before all documents are completed, and the construction manager can organize construction and bidding as parts of the design are completed.

Construction management is not new; it has been used for some time in building standardized types of buildings, such as schools and tall office and residential structures. But because hospitals are generally not thought of as standardized, easily defined building types, the principle of construction management has rarely been applied to them. Until recently, hospitals have been thought of as extremely specialized facilities requiring a lengthy and complex program analysis and definition, which then forms the basis for designing every detail of the building before construction can begin. All of this can take years, which not only means the building increases considerably in costs, but it often means that a hospital is ob-



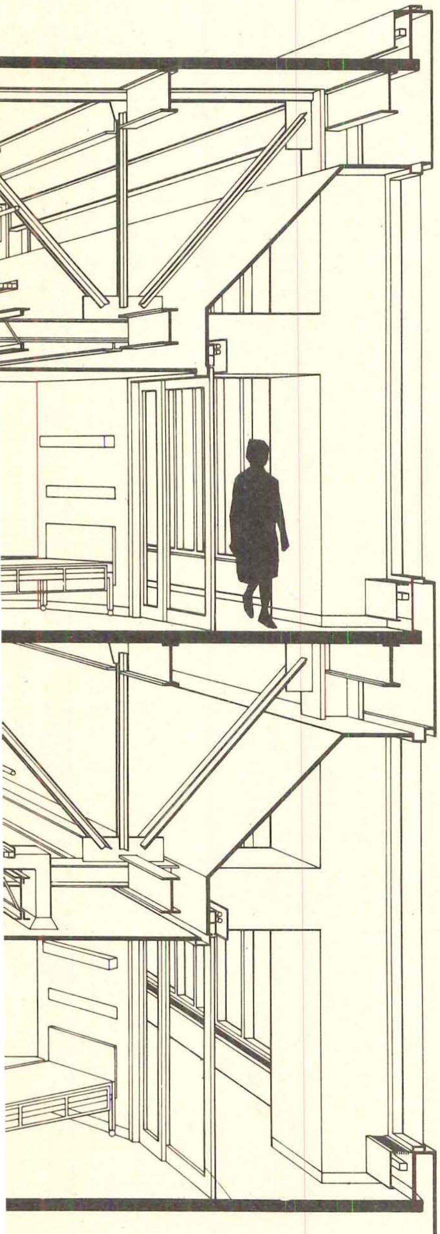
The space created in section by the truss is used to accommodate all mechanical equipment, with ample height for servicing and maintenance. The basic structural element is a steel truss 8′ deep spanning 68′-10½″; trusses are placed at 28′-6″ on center. Floor beams at 7′-1½″ on center span between truss panel points supporting composite steel deck and 4½″ concrete slab. Bar joists between bottom chords of trusses support ceiling system and system of catwalks.

solete before it even opens its doors to patients.

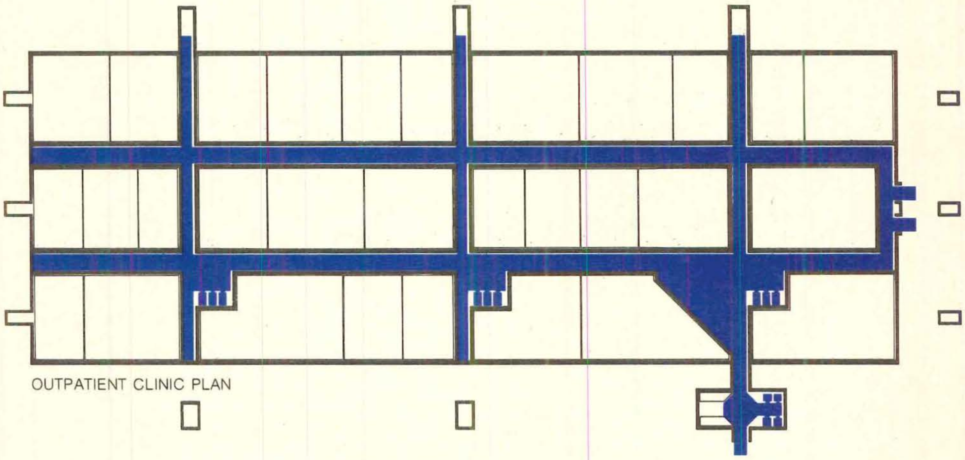
It is impossible to give a clear-cut definition of construction management because it takes on different aspects according to different situations. But basically it is a process whereby one highly specialized office, which may be part of the architect's office, part of a general contractor's office or a separate firm altogether, is charged with the responsibility of coordinating design and construction of a project, whether or not that office or firm is directly involved in its actual design and construction. As the architects say, "the construction manager is like a stage manager—he sees that everything gets done efficiently and on time."

With the telescoping of time possible through this coordination, design and construction go on at the same time instead of in sequence. With construction beginning early in the design process, bids are taken and sections of the building—the foundation, the superstructure, for example—are begun as soon as they are designed, even though the rest of the building—the plumbing, heating and other interior work—has not reached the drawing boards. One great advantage the process affords a building as large and complicated as Woodhull is that it allows as many as 30 to 40, or even 50 prime contracts to be let, and the numerous contracts can be bid and awarded as the appropriate part of the design sequence is completed.

There is, however, an additional cost advantage possible

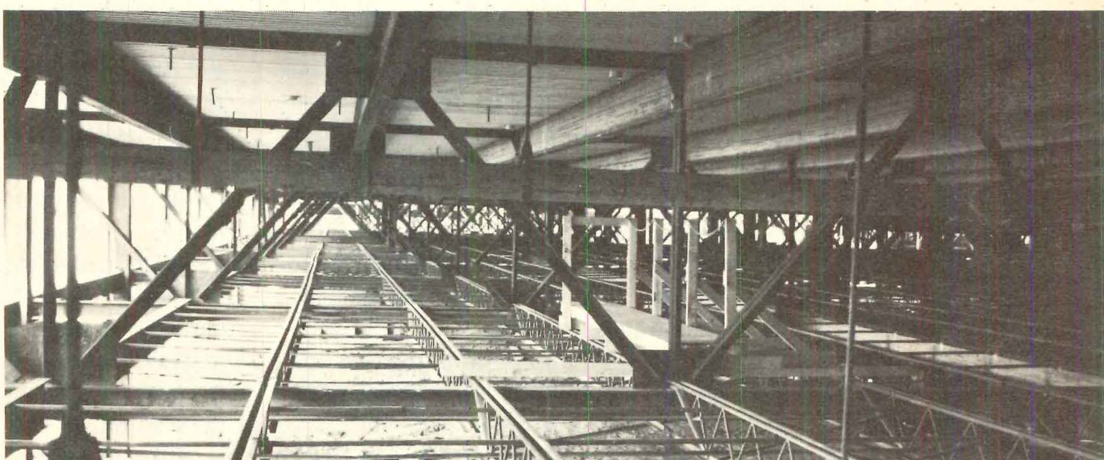


TYPICAL PATIENT-CARE FLOORS



OUTPATIENT CLINIC PLAN

Schematic drawing of outpatient clinics plan (above) shows linear disposition of clinics which allows variation in the size of each clinic and easy re-arrangement of clinics within each track. Contiguity of the tracks with the circulatory network assures that unpredictable arrangements of clinics within tracks will always be accessible from circulatory system.



through construction management, which works in somewhat a reverse manner. This is what the architects call Quantity Scope Bidding. Because the building is built out of sequence, not all of the materials from a particular supplier are needed at the same time. But to build in this manner, with the building not completely designed, the architect must have in mind a generic concept of the building. With simpler buildings this is not difficult, but the architects of Woodhull do not see why the same concept cannot be applied to more complicated structures if, that is, one has a generic idea of what the building will be. At Woodhull, after refining the preliminary program requirements into a general physical configuration of a particular amount and kind of flexible floor area separated by interstitial spaces at each level, the architects had a generic concept of the building. At this very early stage they could then estimate many of the types and quantities of materials that would be needed during different stages of construction, and they could then make purchase agreements based on current unit prices that would be lower than if purchased after design completion.

With most of its steel superstructure now in place, the new hospital is well underway long before all of its design is completed. Located on a 12-acre superblock on the confluence of Brooklyn's Bedford Stuyvesant and Williamsburg districts, the 1-million-sq-ft hospital will replace the obsolete and increasingly inefficient 59-year-old Greenpoint Hospital, which ultimately will be torn down. Woodhull is planned to handle each year an estimated 300,000 ambulatory care visits, 150,000 emergency visits and about 4000 home-care cases. In addition, the hospital will have a complete community mental health service incorporating 100 beds on its own floor with private entrances, coupled with facilities and staff for psychiatric day care and emergency care.

Woodhull will be the first New York City hospital to be built in accordance with the three-corridor plan. Visitors and ambulatory patients use two corridors that run along the perimeter of each floor. A medical corridor down the center of each nursing unit gives physicians, nurses and service personnel easy access to patient rooms. Proponents of this layout believe that it increases medical and nursing efficiency by providing quicker access to patients, that it saves space in locating service functions, and that it improves security because visitors are kept away from such medical supplies as drugs and hypodermic needles. It also adds to the patients' comfort and well being. Patients will be moved through the medical corridor to special medical elevators, away from curious visitors in the public halls. The separate visitor/patient corridors have the further advantage of creating a lively "street" effect within the hospital, which the architects feel would be important to patients who would otherwise be isolated in a room removed from activity.

All of the patient rooms will be single units that can be easily reorganized into varying configurations as needs change. Each room will have a lockable door that opens onto one of the public corridors and another door to the medical corridor. The pedestrian corridor will have an all glass wall so that patients can look through the corridor to the outside; curtains can be closed for privacy.

The architects believe the private-room hospital will actually realize a greater use of its space because any room can be used by almost any kind of patient. With semi-private rooms and wards, needed beds often go unused because a patient does not fit into a larger group: he might be either too sick, have an incompatible or communicable disease or illness, or he (or she) may simply be the wrong gender. In some hospitals, these and similar problems can leave as many as 20 percent of the available beds vacant. Along the 700-ft-long corridors at Woodhull, patients will be grouped according to degree of illness, with sections for intense, acute and extended care. Patients requiring intensive care are toward the north end of the building close to elevators serving emergency and surgical units, while extended care patients are similarly close to vertical transportation facilities linking them to rehabilitation facilities. Each flexible floor space, however, can be rearranged easily to accommodate changing patient populations.

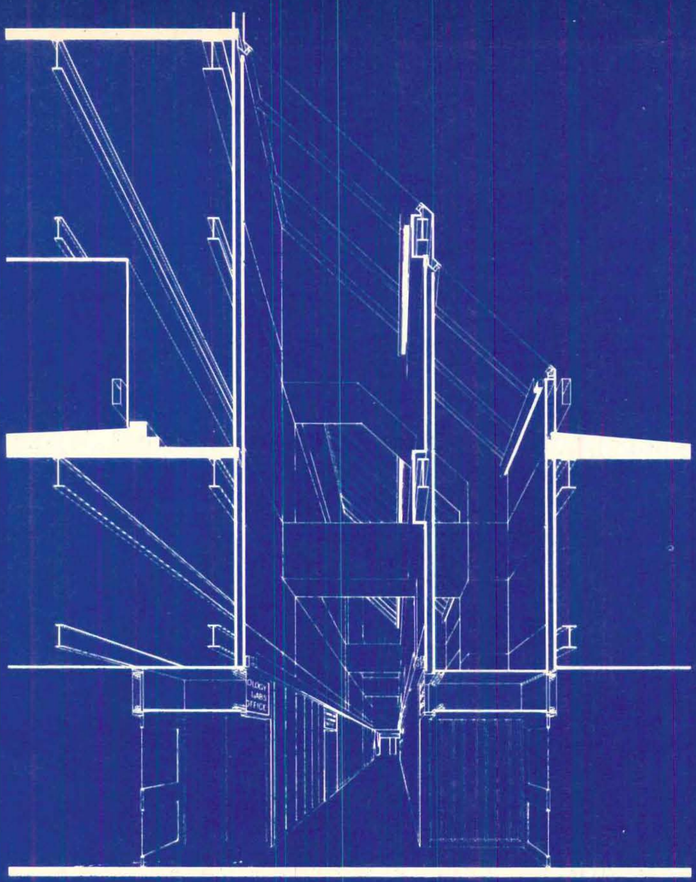
The hospital will be a six-level tower rising from a three-level base with each 19-ft floor-to-floor space divided horizontally into patient care and interstitial levels. The 69-ft length of the interstitial trusses will permit widespread columns which, combined with movable partitions, will allow floor plan flexibility for future hospital requirements. In addition, the 8-ft depth of the trusses will provide sufficient headroom for walk-through mechanical/utility areas, which will allow mechanical maintenance and alterations to be completed without disturbing either patients or staff.

The interstitial spaces will contain all of the services such as air handling equipment, ducts, transformer rooms, distribution systems, and plumbing and service piping, including complete sanitary, storm, acid waste, fire standpipe, vacuum cleaning, domestic cold and hot water, hospital vacuum, high and low pressure compressed air, oxygen, nitrous oxide, nitrogen and natural gas systems serving all areas that require them. They will also contain pneumatic chutes through which sealed bags of soiled laundry and trash will be moved to disposal areas. Other materials will be handled by a system of self-propelled electric cars on tracks that will be programmed to travel up vertical shafts and inside the mechanical floors to preset destinations (p. 74).

On the exterior, the hospital's walls will be of gray tinted glass with panels and columns of weathering steel. The fire towers, which have been placed outside the main building to accommodate changes in the future as interior layouts are reordered, will be clad with an iron-spot brick. The ramp leading to 438 parking spaces on the roof of the podium building and a somewhat pie-shaped conference center attached to the hospital at one corner of the site will be constructed and detailed with similar materials.

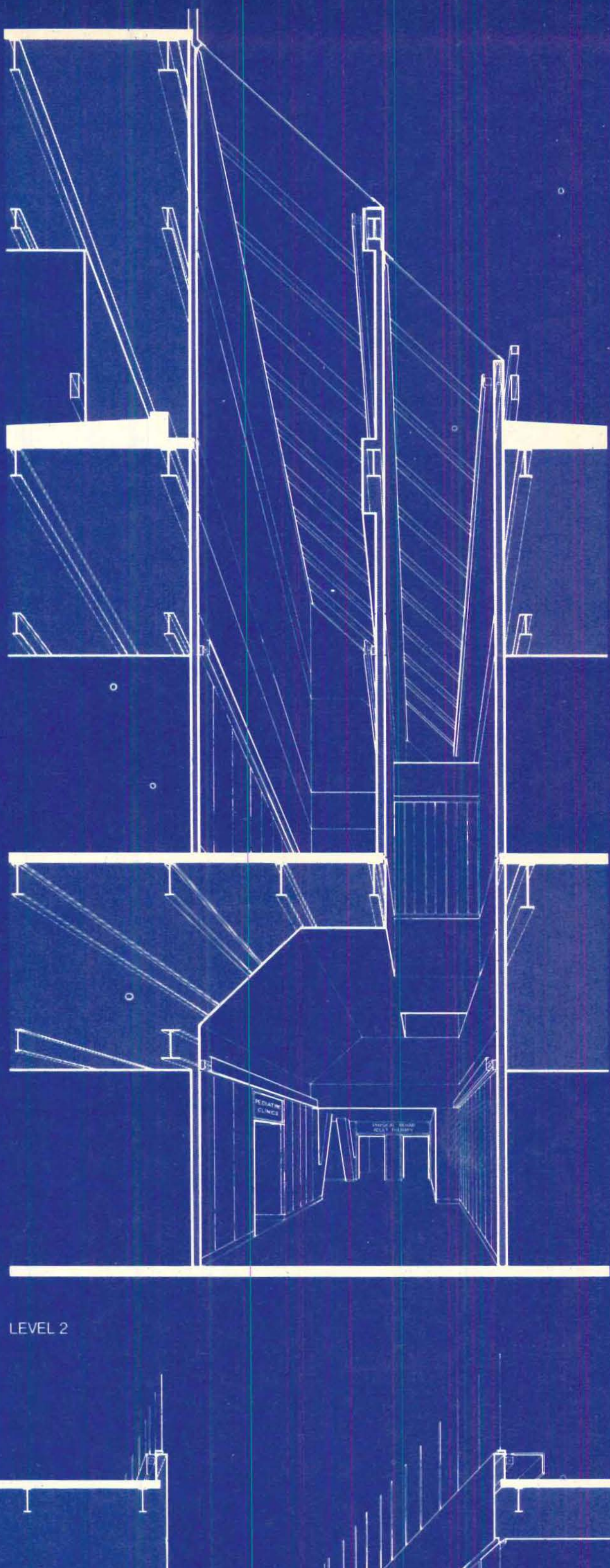
One of the main problems with a building of this size, according to the architects, was getting light down into the building. It is essential in large buildings to bring a sense of the outside to people to avoid a Kafkaesque feeling of disorientation, they say. At Woodhull, through a series of well-placed, deep light wells, natural light penetrates all the way down to the lowest basement level. It was this same concern for light that led to the all-glass patient-room walls and the extensive glazing of the hospital's exterior walls.

A large hospital is unquestionably one of the most difficult

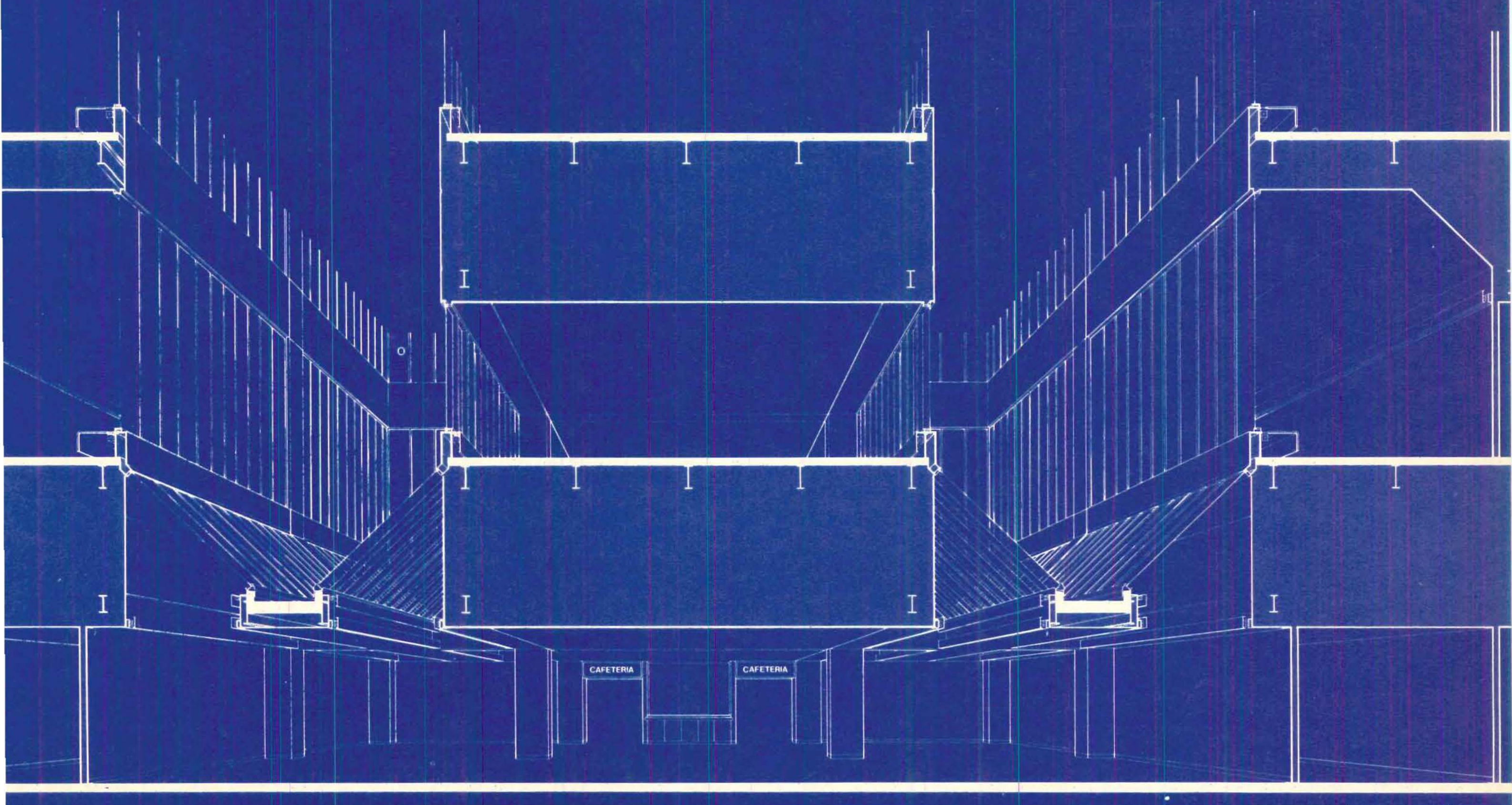


LEVEL 3

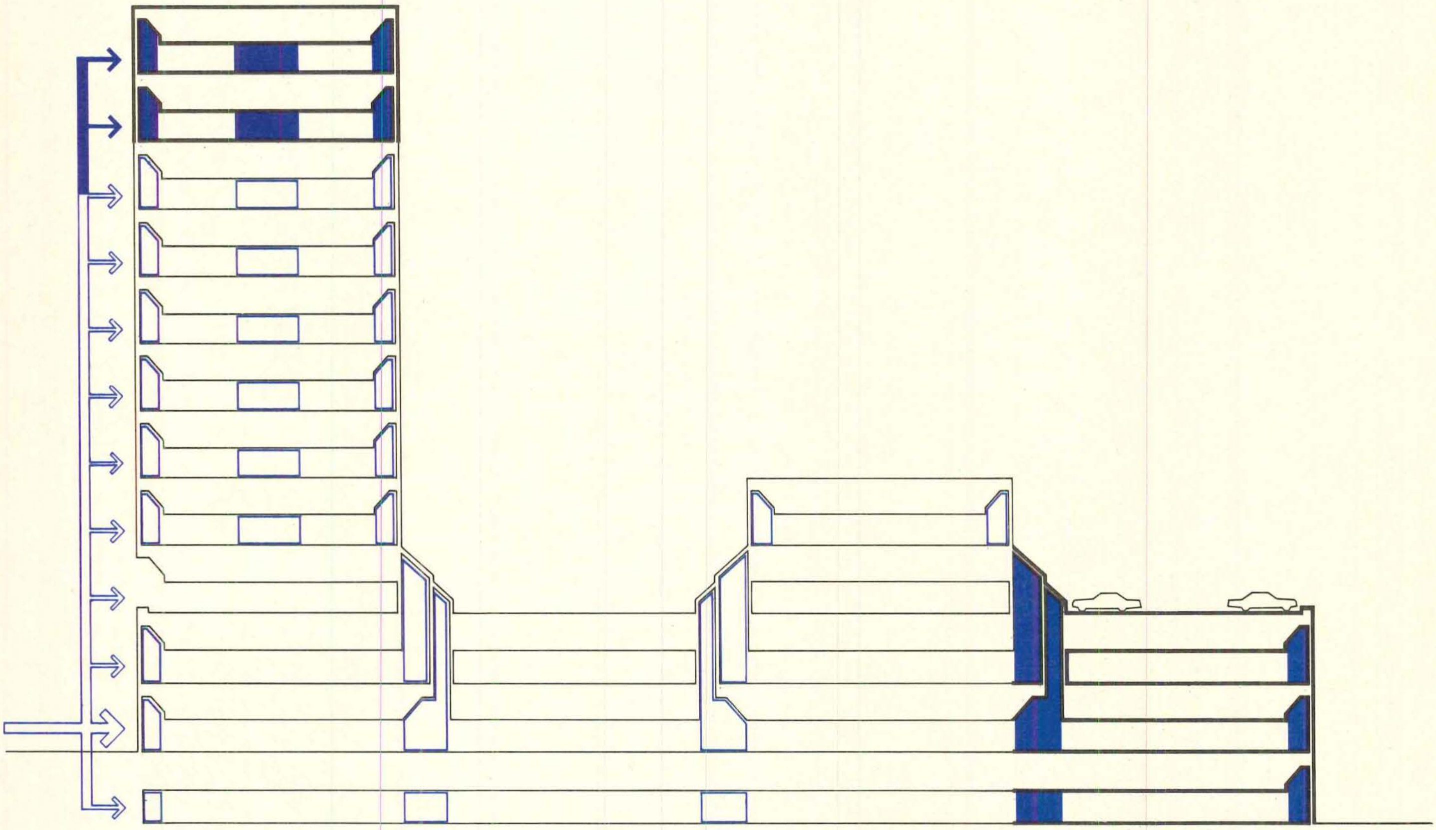
Light is brought to the three lower levels through a number of different light-well treatments, some of which are shown here.



LEVEL 2



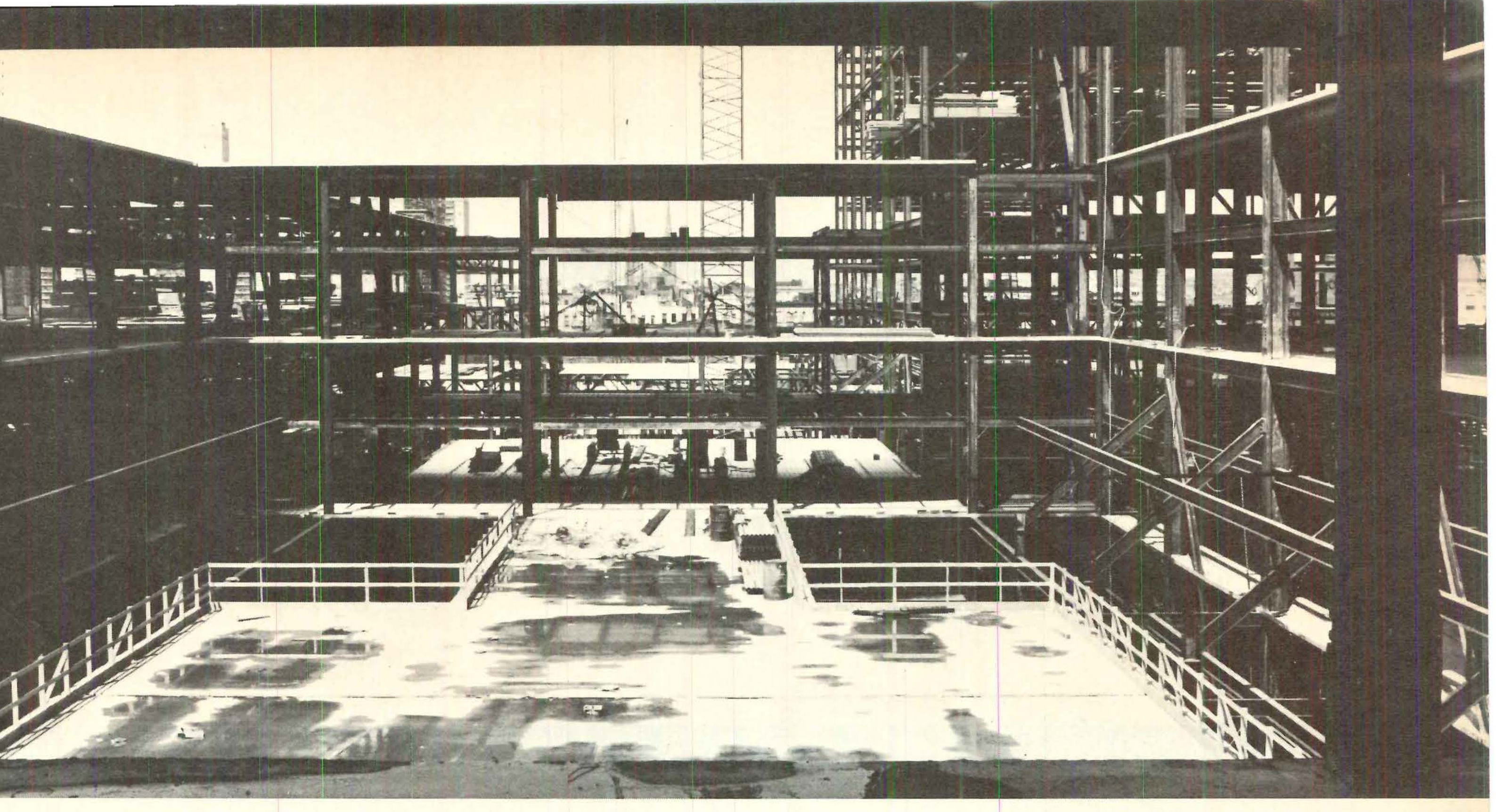
and complicated of all building types to design and construct. In designing Woodhull, the associated architects have formed a very close alliance in their work; together the architects have thought very long and very hard about what a hospital is, and although the brilliant result of their thinking is not revolutionary, they are among the first to be able to incorporate their ideas into the design and construction of a major hospital facility. But part of the credit is also due to some particularly sophisticated clients who not only went along with their ideas, but who took an active part in encouraging the architects' innovative thinking. This is all the more unusual when one considers that the client is actually composed of three separate governmental organizations; the New York State Health and Mental Hygiene Facilities Improvement Corporation is the builder-owner to whom the architects are contracted, the New York City Health Services Administration wrote the program, and the New York City Health and Hospitals Corporation will operate the hospital. On a lease-back arrangement with the state, New York City will lease Woodhull, and in 40 years will own it. [DM]

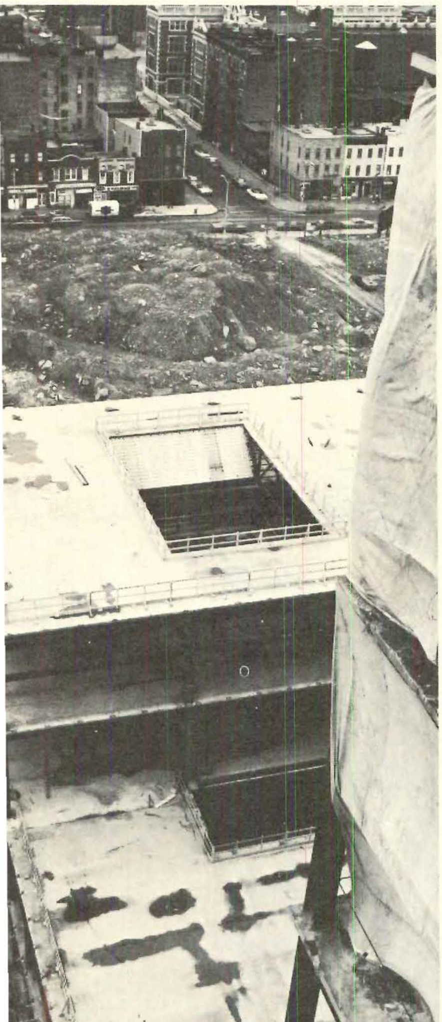


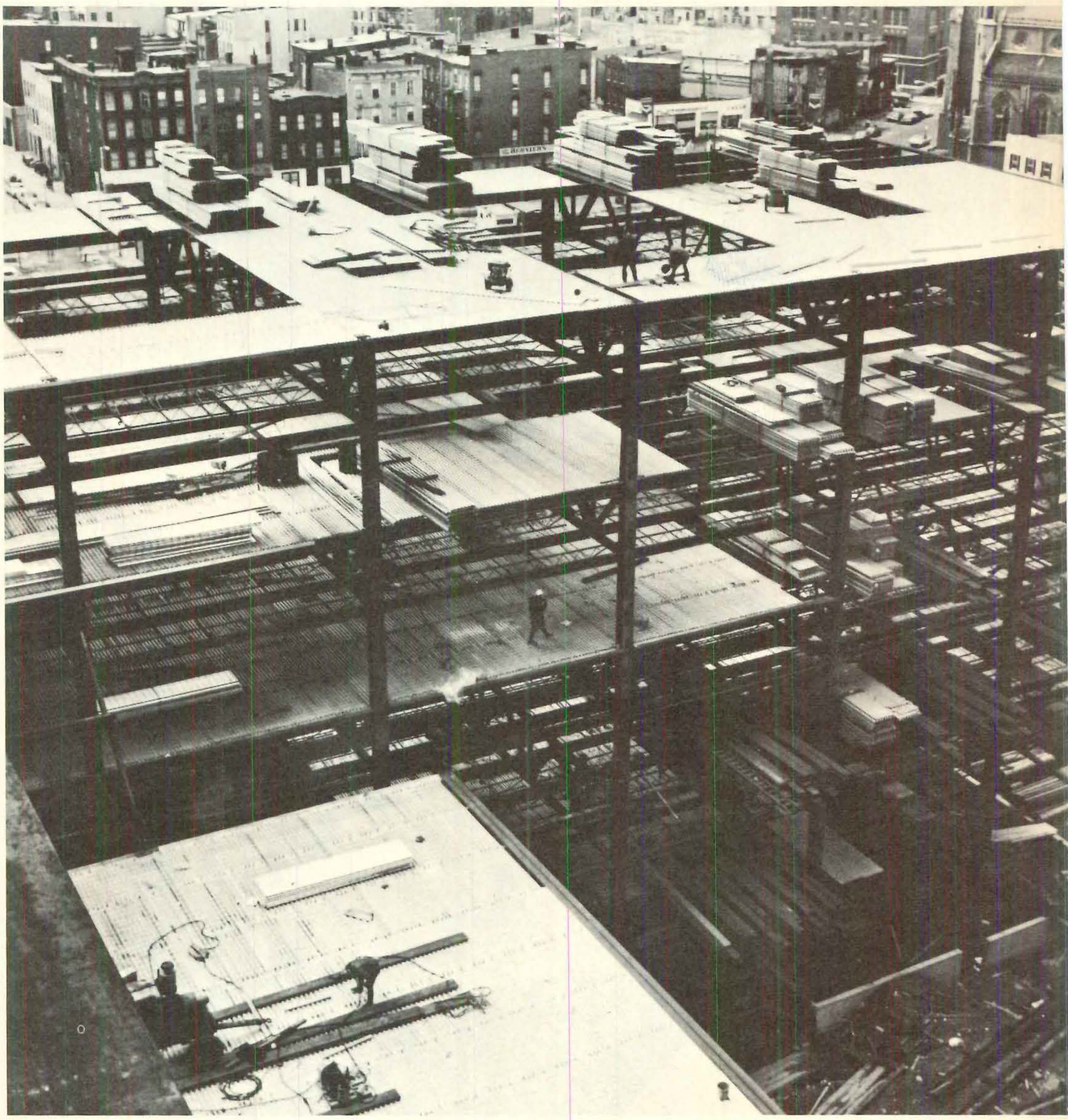
Six floors of patient care are stacked above three floors of service outpatient and treatment facilities, with one floor of car parking on the 4th level. Future expansion (shown in blue) calls for two additional patient-care floors on the tower, while additional service, outpatient, treatment and car parking facilities will expand hospital horizontally.

Data

Project: Woodhull Medical and Mental Health Center, Brooklyn, N. Y.
Architects: Kallmann & McKinnell, Russo & Sonder, associated architects.
Program: 1-million-sq-ft medical and mental health center with 610 beds and extensive out-patient facilties.
Site: flat, 12-acre urban lot in mixed residential/business section.
Structural system: steel frame superstructure with composite floors.
Mechanical system: three medium pressure steam boilers heat building through a system of fintube radiation and ceiling mounted four-pipe fan coil. Air handling and conditioned air system consists of air handling units for each 15,000 sq ft of floor area, located within interstitial space; cooling towers located above roof at each of three elevator and service shafts. Air distribution system is run at interstitial level and feeds down to hospital use level. Emergency power supplied by two 1500kw diesel generators.
Major materials: steel frame, corrugated metal and concrete composite floors, gray tinted exterior glazing, iron-spot brick, dry-wall partitions.
Costs: $86 million budgeted, about $90/sq ft.
Consultants: Cosentini Associates, mechanical; Paul Weidlinger, consulting engineer; Edwin Associates, medical equipment; Romano & Associates, food service equipment; Walsh Construction Company, construction manager.
Client: New York State Health and Mental Hygiene Facilities Improvement Corporation.

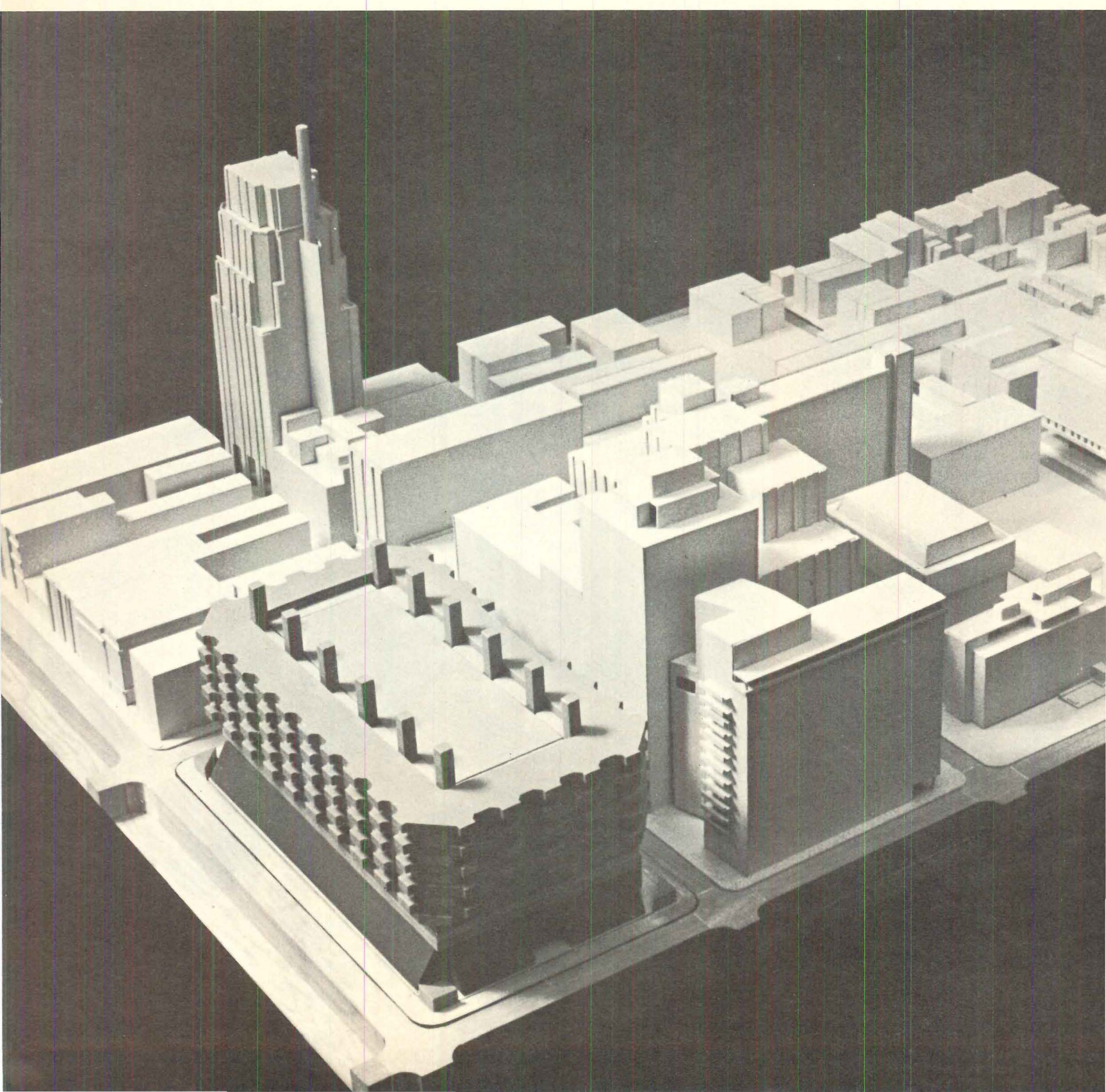


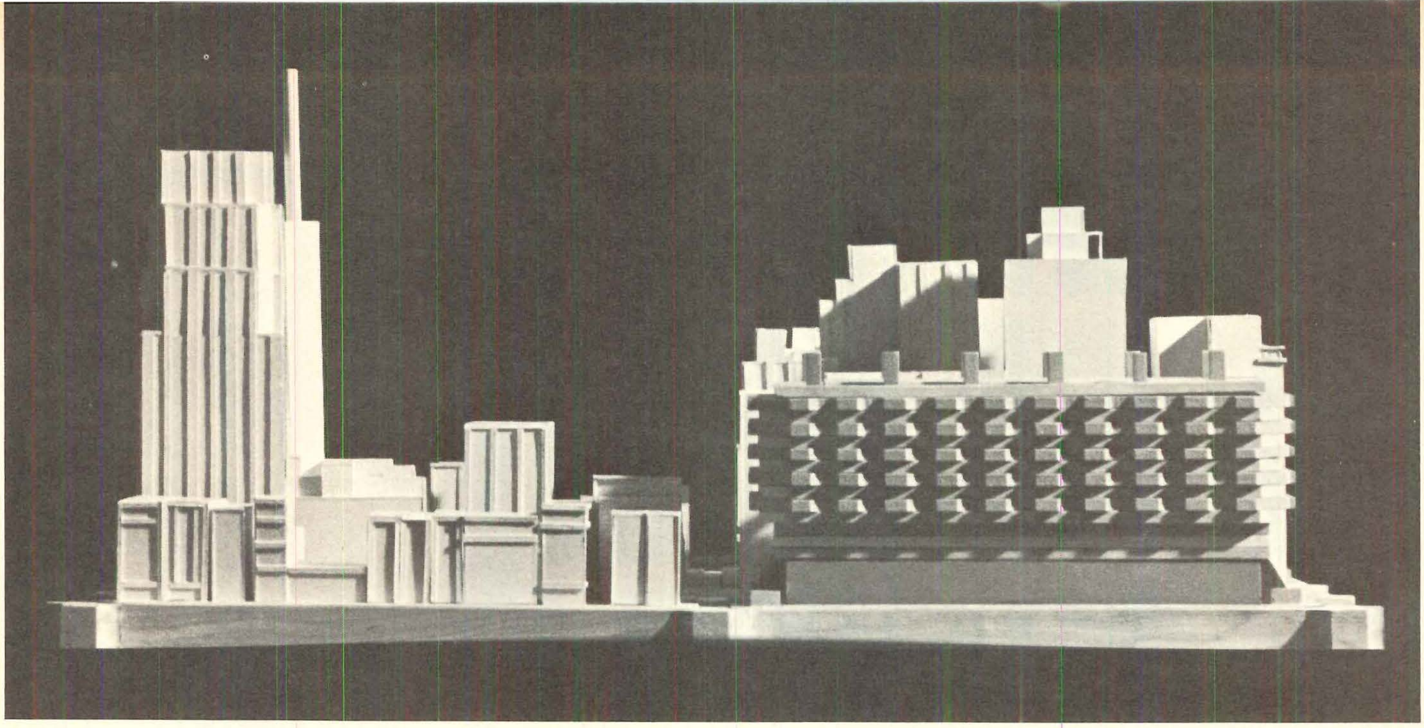


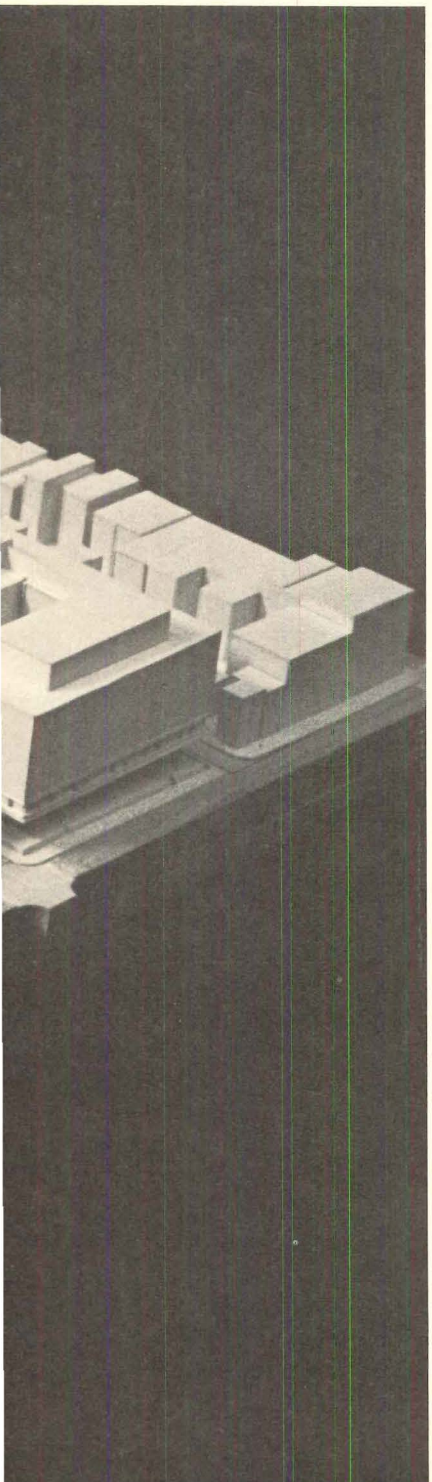


Because Woodhull was designed to be built by construction management, most of the steel superstructure is already in place as a result of the telescoping of time permitted by this build-as-you-design method.

Variations on an interstitial theme

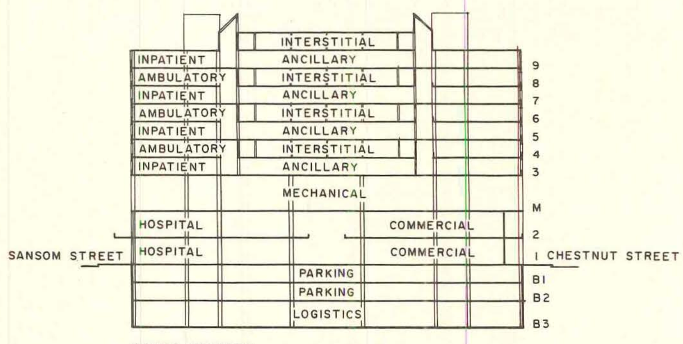




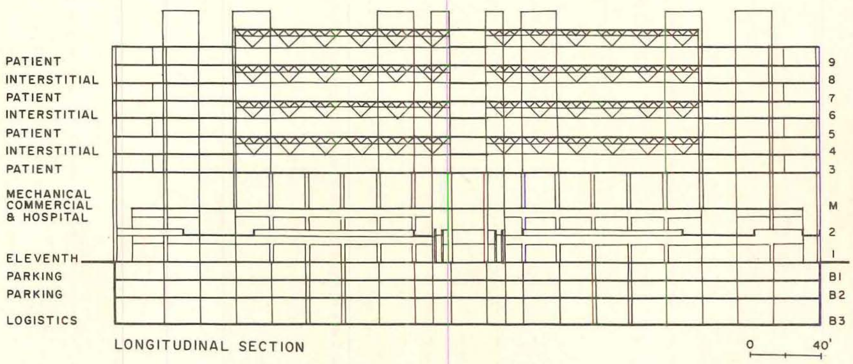


A proposed clinical teaching facility on a tight urban site not only adds offices and labs to interstitial floors but puts shops at street level as a link to the community

It's one thing to reserve every other floor of a hospital for distribution of mechanical services, but quite another to extend this concept of layering to solve other programming requirements. A proposed design for a Philadelphia teaching hospital confines the interstitial spaces to the center of a megastructure, using its perimeters for physicians' offices. Patient rooms are also at the perimeter above and below, with the large unobstructed central areas on these patient floors given over to ancillary services: diagnostic, treatment and operating rooms, laboratories and other spaces required by both pa-



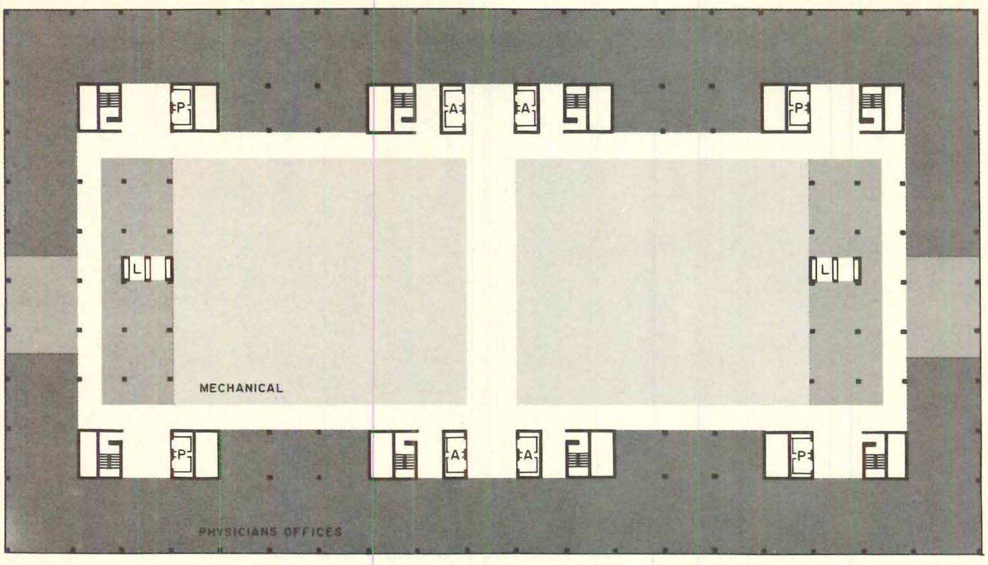
CROSS SECTION



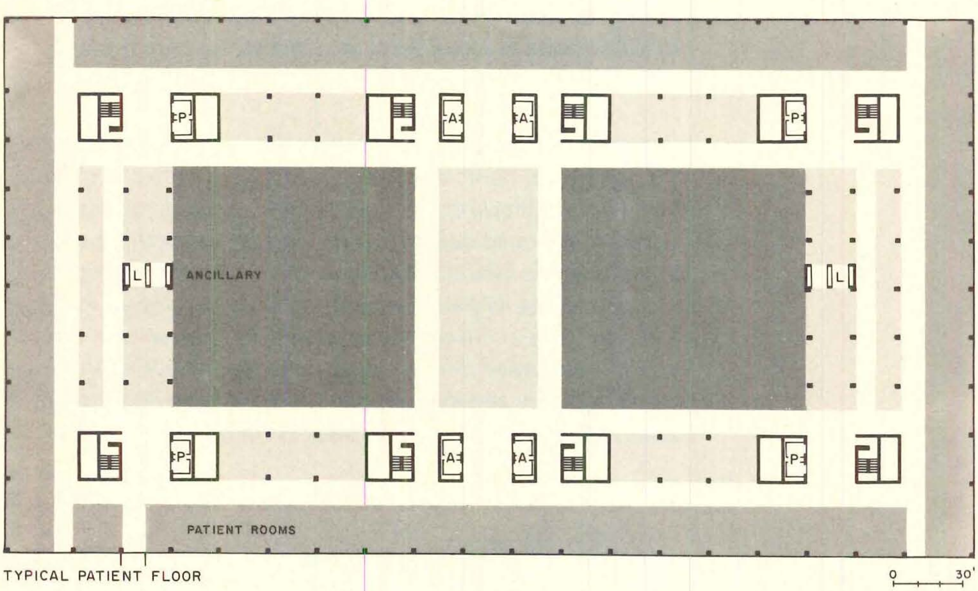
LONGITUDINAL SECTION

Early study model points up full-block size of teaching hospital.
Elevator and service shafts surround large interstitial/ancillary area.

Variations on the interstitial theme



TYPICAL INTERSTITIAL FLOOR



TYPICAL PATIENT FLOOR

Alternate tower floors have ancillary areas with patient rooms at perimeter, interstitial spaces with doctors' offices at perimeter. Floor plans on opposite page show how public areas at ground level maintain the shopping character of Philadelphia's Chestnut St. Parking occupies two basements; logistics and nuclear medicine are at lowest level. Legend for elevator cores: **P** in-patients; **A** ambulatory patients; **L** logistics; **S** freight from loading dock to logistics.

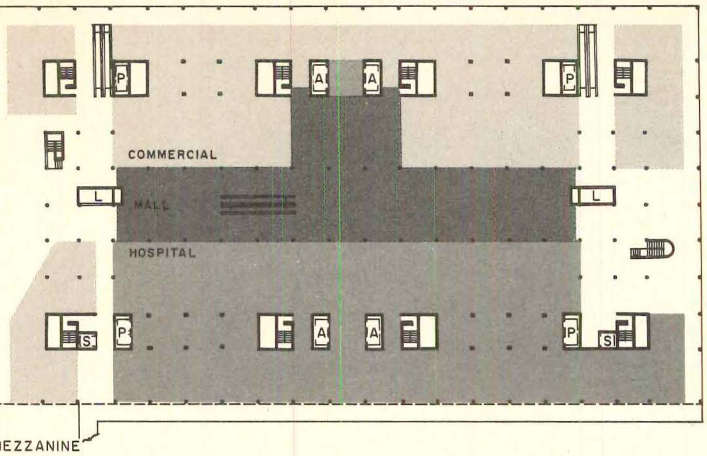
tients and staff. Because these facilities are used for both inpatients and outpatients, there is no duplication such as is found in hospitals with separate clinic outpatient wings.

Keeping the physicians close to their work areas was a basic programming criteria for Jefferson University's clinical teaching facility. Most do triple duty, handling inpatients and outpatients (both private and clinic), as well as teaching. The traditional departments of medicine, surgery, obstetrics, gynecology, pediatrics, radiology, pathology, etc. will be maintained for administrative purposes; departmental diagnostic and therapeutic areas, however, will be distributed throughout the hospital rather than being concentrated, as is common, in one or two floors at the base of a nursing tower. This, with the added factor of having conference, class, study and consultation rooms also distributed throughout the hospital, will limit the distance any one doctor must travel during the day. His patients, students, surgery and clinical research facilities will all be located in one compact area.

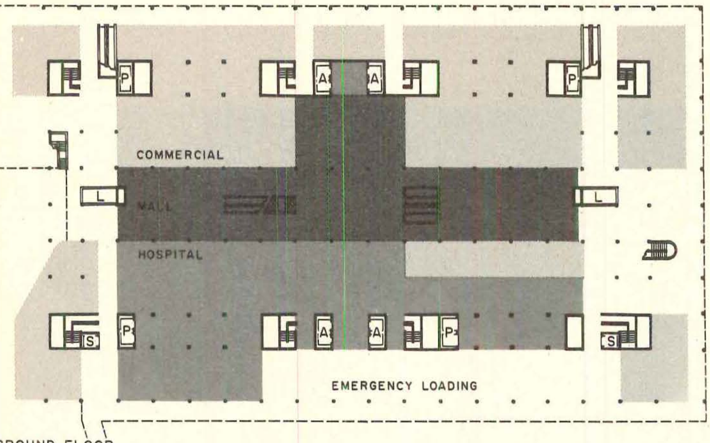
Architects Harbison, Hough, Livingston & Larson originally proposed that the hospital be designed as a megastructure frame into which would be slipped complete prefabricated rooms. Prefabrication techniques may not be advanced enough or economically feasible by the time construction is expected to start in 1973, but in any case partitions will be movable and spaces can be adapted to any program changes over the next several decades. Elevator and service cores, located at the perimeter of the interstitial and ancillary cores, are the only fixed elements.

Another departure from normal hospital design is the inclusion of commercial spaces on the ground and mezzanine levels. This, according to Harry Kurki, partner in charge, is a response to Philadelphia's concern over expansion of its universities with subsequent loss of ratables. The site is a full block in center city, and having shops built into the Chestnut Street side preserves a major commercial area. It keeps ratables for the city and brings in a little revenue for the University, but most importantly, helps integrate the community with the life of the hospital.

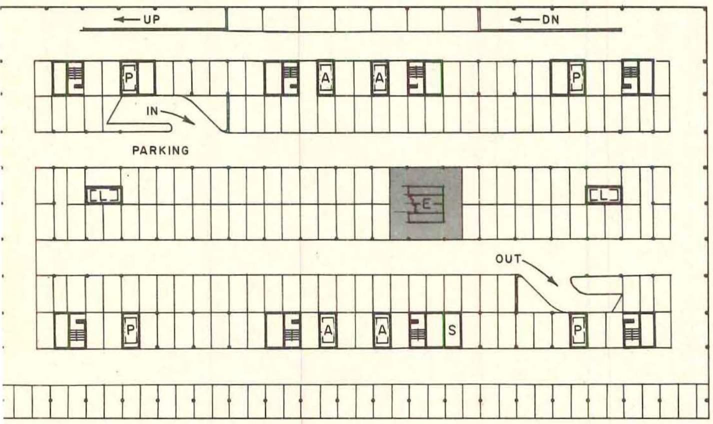
Commercial spaces are separated from the hospital by a two-story public mall. The first two levels below grade will provide parking for 425 cars. The third basement will house the central supply and kitchen for the entire hospital plus the University's 400-bed Foederer Pavilion across the street. Two of the elevator cores are reserved for the logistics department



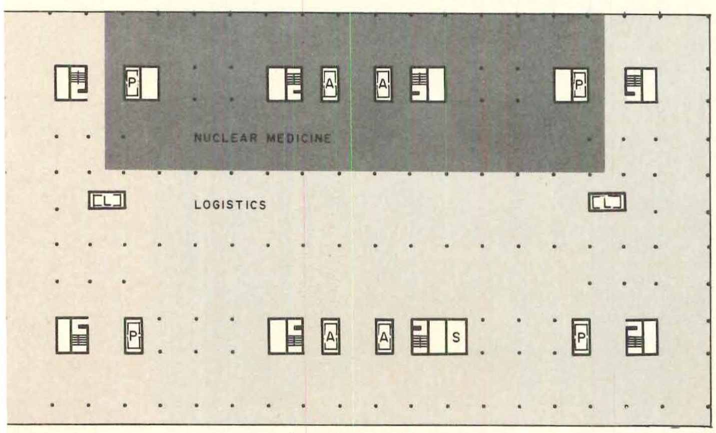
EZZANINE



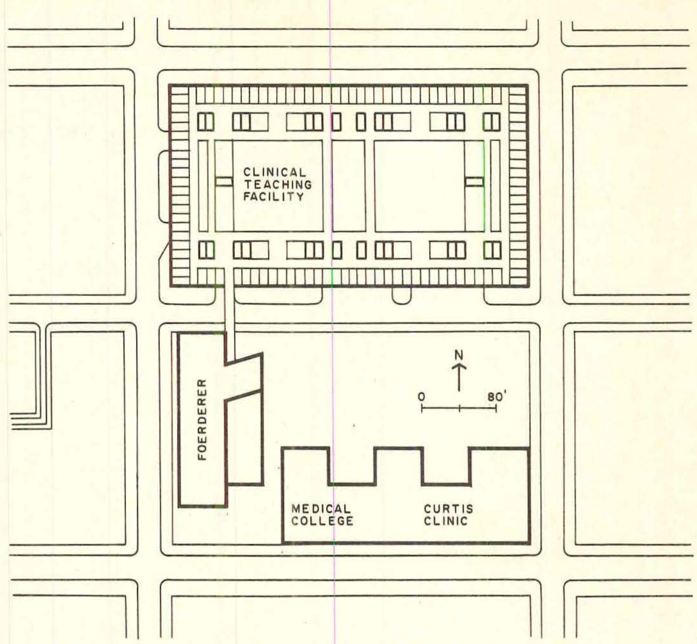
ROUND FLOOR



ARKING



OGISTICS, NUCLEAR MEDICINE



SITE PLAN

and one core (there are two elevators in each core) links this area with the loading dock. A single staff will handle all purchasing, storing, processing, distributing and maintaining of supplies at points of use. Under this premise that all supply, equipment and communications support required by patients and staff should be delivered to them, each patient floor (100–125 beds) is treated as a separate clinical unit with its own service staff. An automated distribution system is planned but not yet specified.

There will be no main admittance desk. Patients will be admitted and discharged at their floors. The goal is to handle them like patrons of a small, fully staffed hotel; they will not be forced to travel long distances, queue or wait for attention.

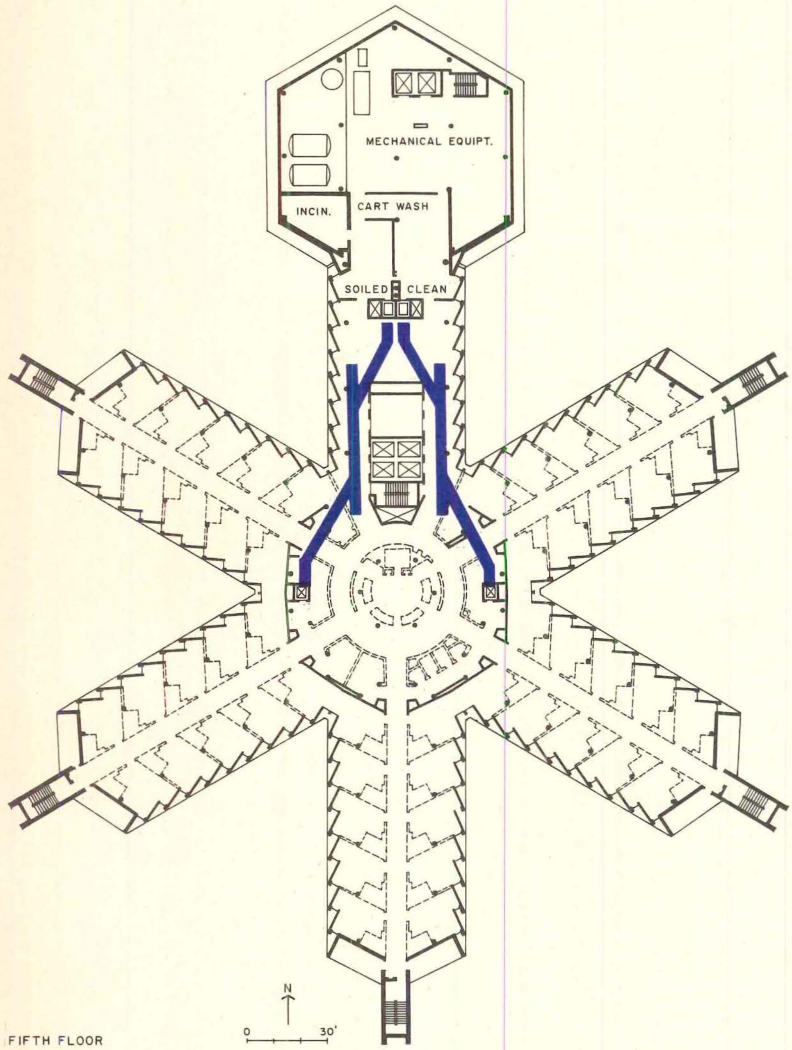
Almost all rooms are single, allowing for their most intensive use. Exceptions are certain intensive care units and rooms for those patients, such as maternity, who are better off in a more social atmosphere. A nursing care unit is made up of 14 to 18 rooms, and each floor will contain a management center for supervision and administration, medical records, unit-dose pharmacy services, diet and supply services. Relieved of non-nursing duties, the nursing team is kept at the patient's bedside.

Patients not arriving by prior arrangement will go either to the emergency department or to a screening center at the main entrance. There they may choose appointments at organized clinics or in physicians' offices, both of which have access to diagnostic and treatment services.

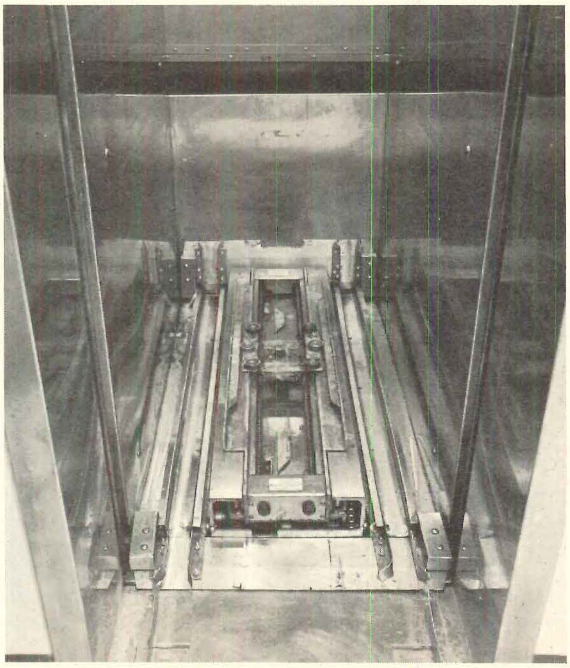
The architects plan a systems approach to final design and construction. They expect to establish a modular system that will permit off-site prefabrication of walls, floors, ceilings, electro-mechanical and structural subsystems. This prefabrication could continue over the life of the megastructure as replacements and changes are required.

While a traditional teaching hospital may have been feasible for the same site, says Kurki, such a building would never have been able to respond to the continuing need for change and flexibility. [RR]

From the inside out



Photos: Wollin Studios



At Beloit General Hospital, Beloit, Wis., special carts carry supplies and food vertically through four floors, horizontally on the fifth. An automatic conveyor mechanism pulls the cart into the lift, ejects it at its designated floor. Architects: John J. Flad & Associates. Cart system: Cargomaster; The Guilbert Co.

Automatic materials handling systems have become so much a part of hospital function, they must be chosen in the very early planning and design stages

Materials distribution—the supply and return of the thousands of urgently needed materials without which the hospital cannot function—has developed from simple manual transportation to automated systems so sophisticated that some even operate without benefit of human hands. No longer a dream of the future is such equipment as a sonar-equipped vehicle that can stop when something gets in its way and start again automatically; a miniature railroad that runs inside the hospital walls delivering pills, prescriptions and almost everything but the patients themselves.

Designed to deliver a high degree of operating efficiency and to look beyond immediate needs, these systems are more and more frequently a vital consideration in the early stages of planning new hospitals and related facilities. They have influenced hospital design dramatically, so much so that "from the inside out" is becoming an increasingly popular hospital design approach.

Despite the abuse of the terms "system and systems approach," there is a valid systems approach—the proper definition being "a regularly interacting or interdependent group of items forming a unified whole" that is geared toward improving the operation of the facility. The forces that go into effect when a patient is admitted or discharged from a hospital offer an example: the flow from the admissions office, nursing stations, laboratories, pharmacies, dieticians, housekeepers and records departments. How this is handled, how many miles of nurses' footsteps it takes, how it can be organized most efficiently and economically, are major considerations in hospital planning.

From the inside out

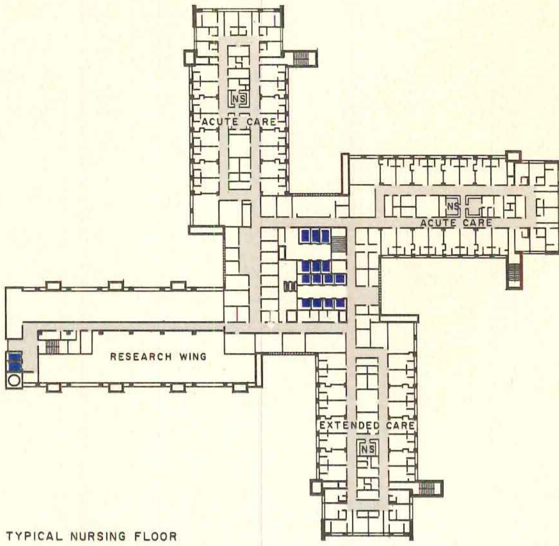
Although materials handling equipment is costly to buy and install, suppliers claim that initial costs are justified by subsequent manpower savings, since the largest cost that a hospital faces over its lifetime is salaries. And, they claim, not only the rising cost of manpower but the difficulty of obtaining workers in many areas make such systems increasingly important. Robert Green, design consultant at The Hospital Bureau, a buying service to which over 800 nonprofit hospitals belong, points out that the Bureau, formerly only in the business of buying bulk quantities of standard products, is now aiding in design problems and advocating materials handling systems for new and remodeling applications. According to a study by Arthur D. Little, Inc. for Lincoln Medical and Mental Health Center under construction in the Bronx, N.Y., materials handling requirements based on 400,000 outpatient visits per year, 200,000 emergency visits per year, and an 85 percent occupancy rate of 760, plus an additional 115 beds for mental health now being planned, beds will approximate 5000 hours per week. This hourly requirement is accomplished by all personnel; nurses, interns, doctors and others. The cost of materials handling services in a hospital, therefore, is an appreciable portion of its salary budget; these costs would range from a minimum of $550,000 per year to as much as $675,000. The report concludes that systems which eliminate the need for human attention or guidance for transporting supplies throughout the hospital can have an appreciable effect on the operating expenses of that facility.

Costs aside, and there are systems equipment manufacturers who candidly admit that cost is not the primary issue, the focus of hospital administrators and hospital consultants is to promote the health of the patient population by saving the time and energies of the trained hospital staff for patient care. "Nurses for nursing" is the theme—not for flower delivery and messenger services.

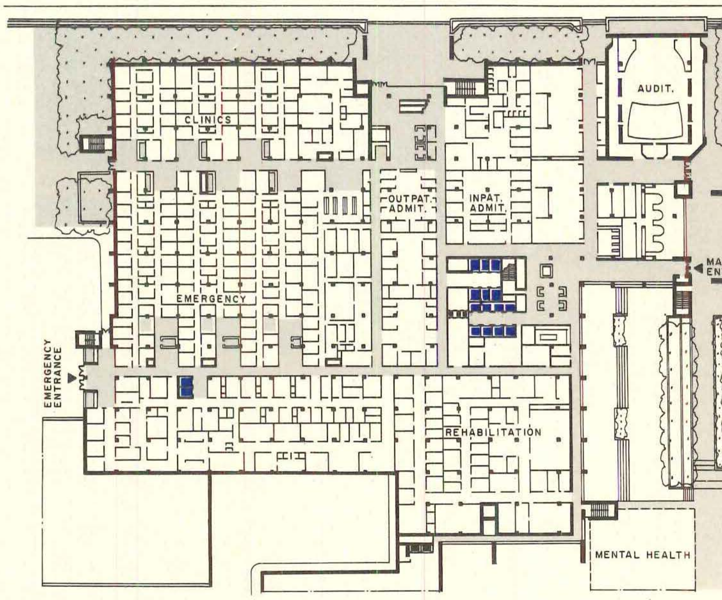
What does all of this mean to hospital designers? Beloit Memorial Hospital in Beloit, Wis., shown on these pages, is one case in point. Without some of the materials handling systems that have been specified, the design might well have been different. Five of the six separate wings include patient accommodations; the sixth wing is connected to a service tower containing mechanical equipment, cart wash facilities and the incinerator. Medical supplies, food, laundry and other materials are conveyed through the building by a combined vertical and horizontal automated cart system (Cargomaster, p. 75). Four dumbwaiters are used for vertical travel; on the fifth floor, a chain conveyor is used for horizontal travel. Carts roll down two corridors of the fifth floor delivering food, clean linen, laundry and medicines on one lane; scurry back on the other with used and soiled items, only to return again reloaded with new materials after having sanitized themselves.

According to the hospital administration, this automated cart system functions well. Early mechanical problems, largely related to poor hardware, have been corrected and the system is reported to contribute to the efficiency and organization of this hospital.

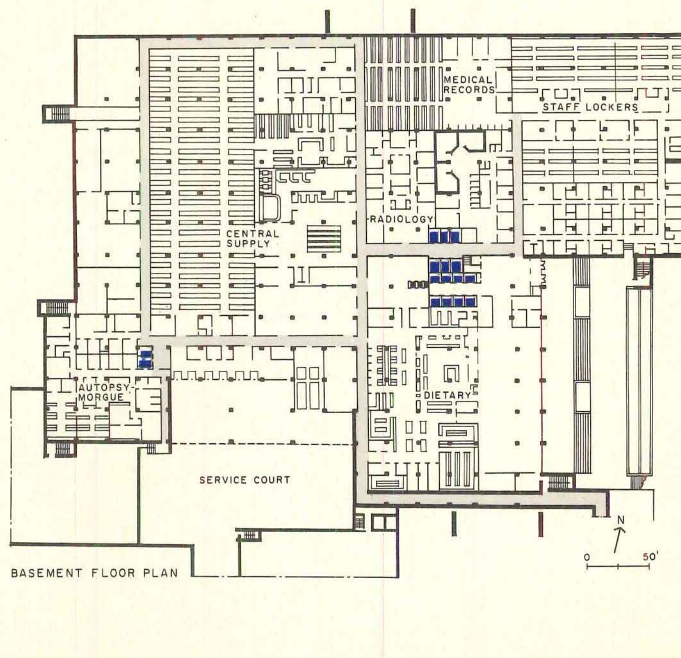
When Lincoln Medical and Mental Health Center, rapidly rising on its Bronx site at 149 St. is completed in 1974, it will boast three materials handling systems, based on the conviction that no one system best fulfills all of a hospital's needs



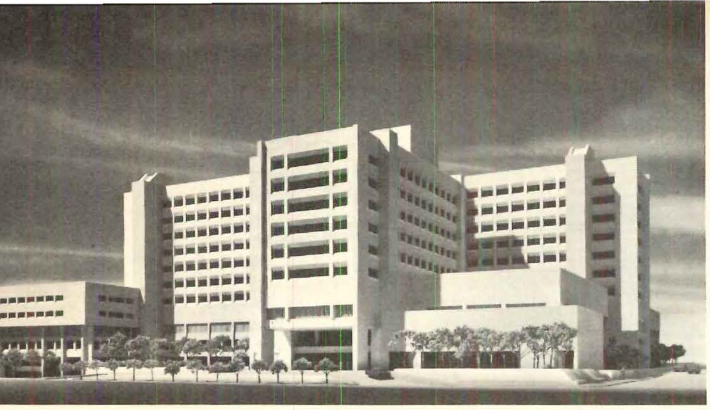
TYPICAL NURSING FLOOR



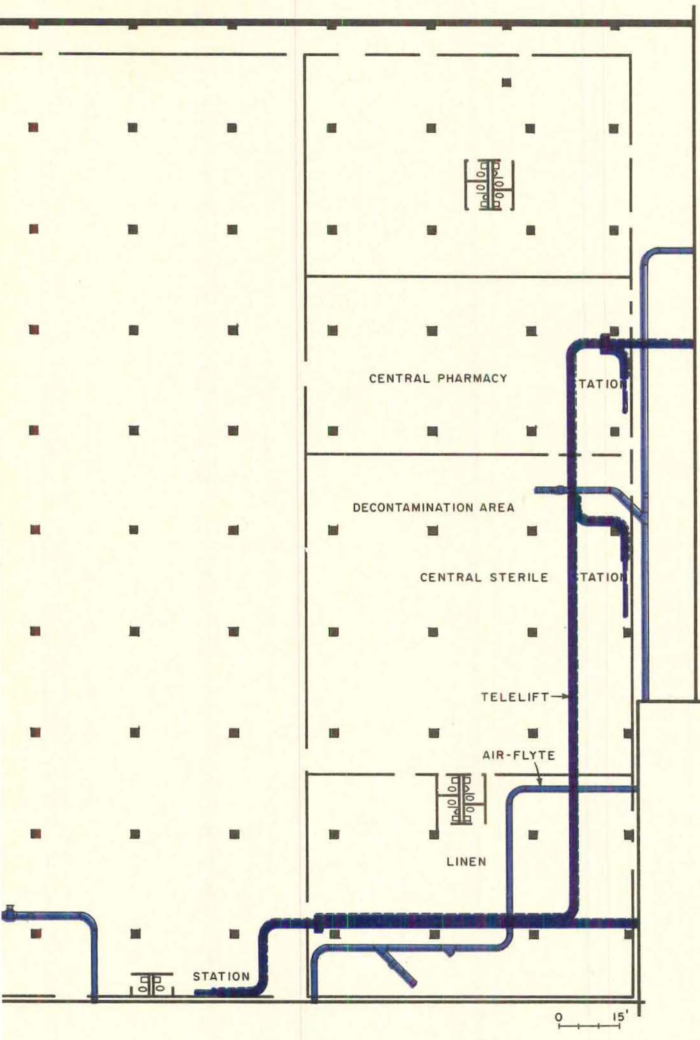
FIRST FLOOR PLAN



BASEMENT FLOOR PLAN



At Lincoln Medical and Mental Health Center now under construction in the Bronx, N.Y., materials handling is a division in the table of organization of the hospital. Three systems—carts, tote box and pneumatic waste and trash disposal—are specified.



Partial floor plan shows Telelift and Air-Flyte systems in supply area.

and that several combinations of systems could be designed to fully service a hospital. Every aspect of materials transportation in this complex hospital is covered; in fact, materials handling is a regular division in the table of organization of the hospital.

Using the fast track construction method—the largest hospital to date to be built under this system—and one which makes the architects confident the building will be finished as scheduled, the 760-bed hospital will expand to 950 beds when complete. It is designed to accommodate an automatic cart transport system, with 23 cart indexing conveyors—when this equipment was specified only 18 such conveyors were in use in the entire country; a tote box system (Telelift, p. 76) to handle intermediate and small items; and a pneumatic tube trash disposal and linen collection system (Air-Flyte, p. 77).

The lower floors of the 10-story building—a future 11th story is ready for expansion—contains all ancillary facilities; upper floors are patient areas; the third floor is a 24-ft-high mechanical floor. Since the site presented a soil problem with water just below soil level, the building goes only one level below grade. The processing of all systems is organized on this floor, with the path of supplies similar to an industrial plant.

The cart make-up takes place inside each of four major facilities. All foods—only convenience food is used—are loaded onto the carts frozen; at the scheduled floor the whole cart goes into a special refrigerator until just before feeding time, when trays are heated in microwave ovens. Three different sized carts are used for different supplies: 48 in. for housekeeping; 34 in. for dietary; 39 in. for central sterile supply.

Carts are moved to the inject conveyor, automatically enter and leave their special lifts, are met at the eject stations by special personnel and led to their destination. Should any problems occur with the mechanical equipment of the cart lifts, they back up to the service elevators which can easily accommodate the carts.

Since security factors were a major concern, systems that could offer protection against theft were chosen: carts are ejected into a locked security area to which only special personnel have keys; the Telelift containers cannot be removed from their tracks except at their basement shop and containers can be locked; keys are needed to open the trash stations of the Air-Flyte trash collection system.

Since existing fire codes had to be observed, it was necessary to design special dampers for the Telelift and Air-Flyte systems wherever they passed through fire walls or would violate fire safety precautions.

The single-tube trash disposal system is designed to handle 22,000 lbs of trash a day, exclusive of linens, with double compactor waste disposal equipment specified. Although incinerators had been considered, the city, responsible for trash removal, preferred to incinerate the residue itself or use it for land fill.

Costs for the systems run as follows: Telelift, $1,646,000; Eastern Cyclone Air-Flyte System, $429,000; costs for ejection lifts are buried in the cost of the elevators but were budgeted around $450,000.

According to Richard Banks of Max O. Urbahn Associates, Inc., design architect for the medical center, the systems contribute to the design process by their flexibility—they open areas of choice in planning that must result in greater efficiency and improved patient care.

Credits

Architect: Max O. Urbahn Assoc., Inc.
Consultant architect: Joseph M. Neufeld
Structural engineers: Fraioli, Blum, Yesselman
Consulting engineers: Joseph R. Loring Assoc., Inc.
Client: New York City Health and Hospitals Corp.
Photo: Louis Checkman

Non-automated modules

In the year since Co-Struc, Herman Miller's Hospital equipment and transportation system, was introduced, it has been specified for a number of hospitals in a variety of departments. Based on 10 years of research, Co-Struc—short for "coherent structures"—was designed to improve hospital transportation and services, to make use of spaces frequently ignored in hospital planning and to improve the sanitation and appearance of hospital furnishings.

Unlike automated systems for materials handling, Co-Struc eliminates the need for special arteries for transportation, and costly special mechanical systems. In existing buildings, it can eliminate the need for extensive remodeling.

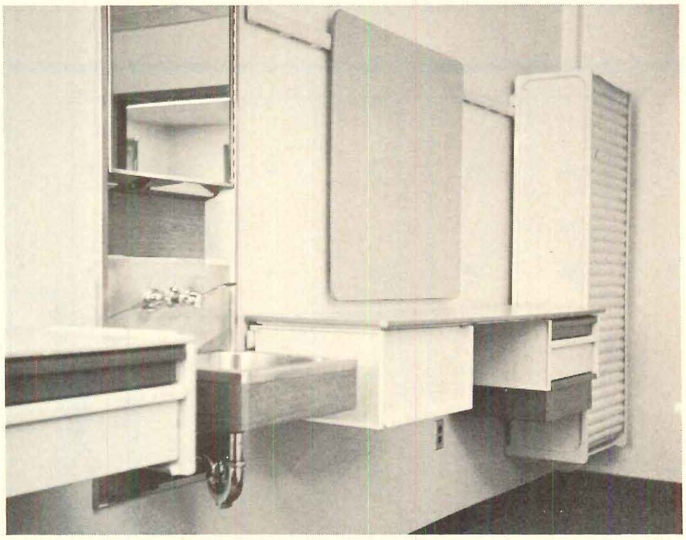
The system comprises about 20 modular containers, frames, carts and rails. Each container is a single-piece, seamless, plastic module which may serve a variety of purposes. Basic components can be hand-carried from place to place; stacked on carts that can be linked together to form cart-trains, they make it possible to transport large quantities of materials with ease. The physical size of the structural module permits use of normal corridors and doorways without modification for access.

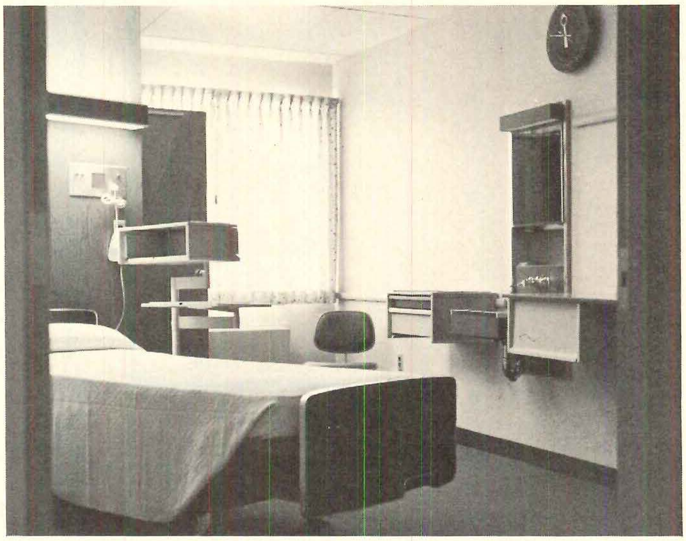
Most units literally hang from the walls; rails are mounted along hospital walls to hold locker units and components that become the varied facilities in patient rooms, nurses stations, laboratories, laundry and kitchen units. Basically, components come in three sizes; a cabinet of closet size, a transportable waste disposal or laundry container and a bedside table to which drawers of various depths are easily attached and removed. Units are quickly stacked, cleaned, detached, repaired or replaced.

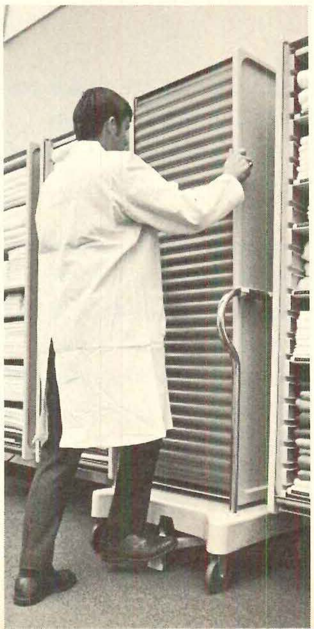
Users of the Co-Struc system can arrange the units as needed and simply alter the configuration as work loads and needs change. The system is being specified for laboratory use, so that this area of the hospital can achieve clean room standards not possible with traditional laboratory furnishings. in addition, most fixed walls and extensive cabinet work can be eliminated.

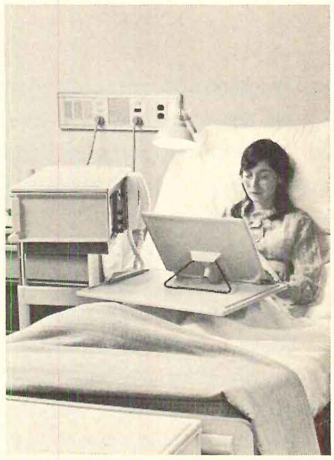
In a prototype installation at Community Memorial Hospital in Monmouth, Ill., it was found that Co-Struc saved housekeeping time, simplified cleaning, storage and distribution; improved the overall appearance of patient rooms. Savings in operational costs were considerable—a projection of $18,000 per year per 100 beds on floor labor alone.

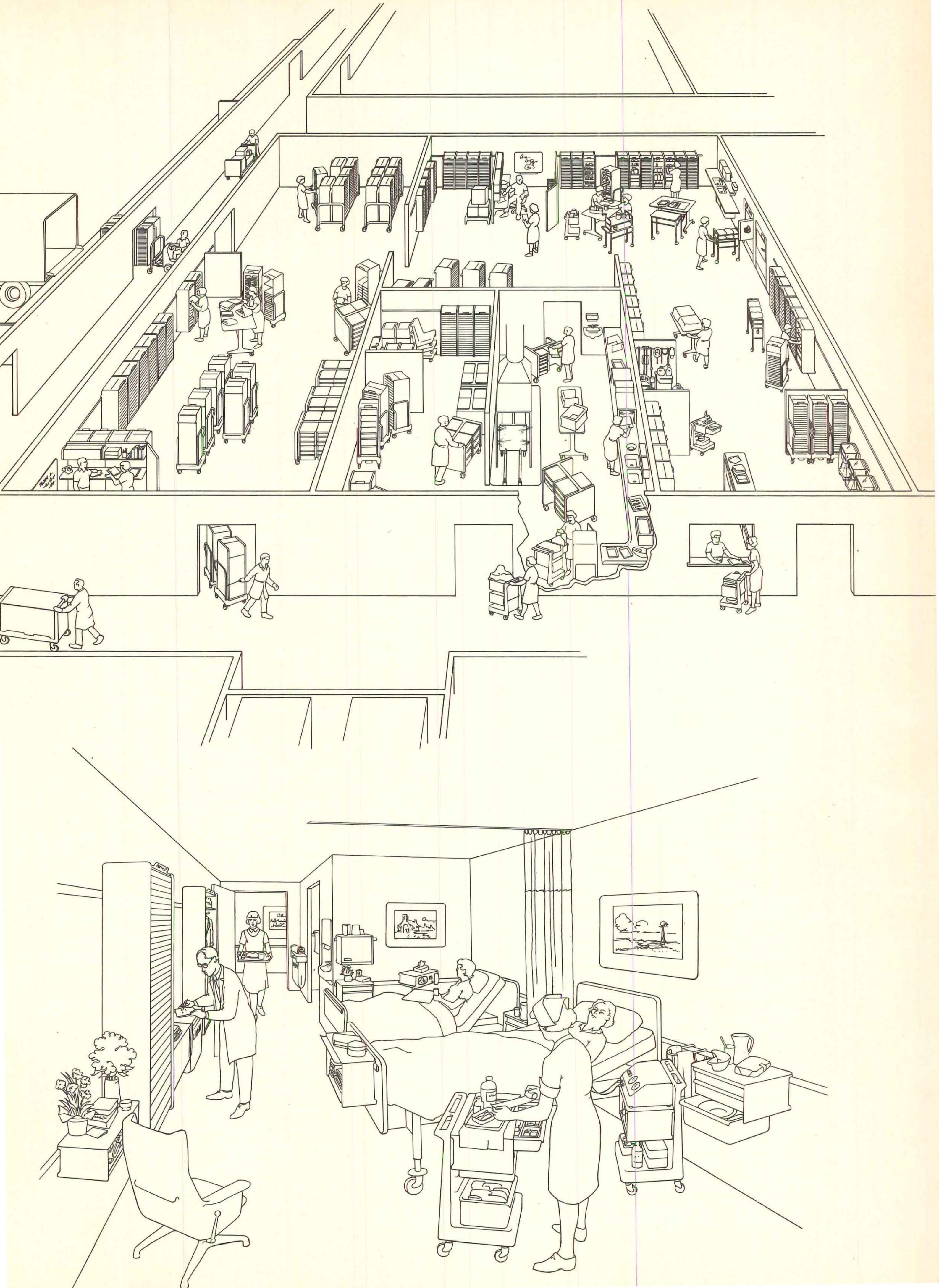
Installations currently functioning successfully include the burn and cardiac units at University Hospital in Ann Arbor, Mich.; an intensive care unit at Bronson Memorial Hospital, Kalamazoo, Mich.; and the cardiac and intensive care units of the Veterans Administration Hospital in Memphis, Tenn.



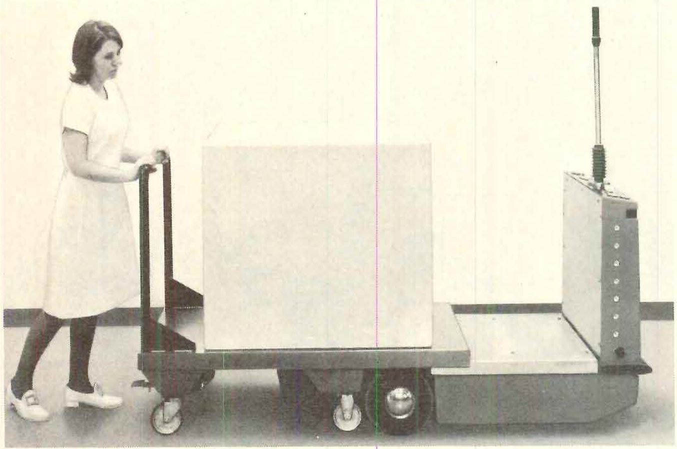


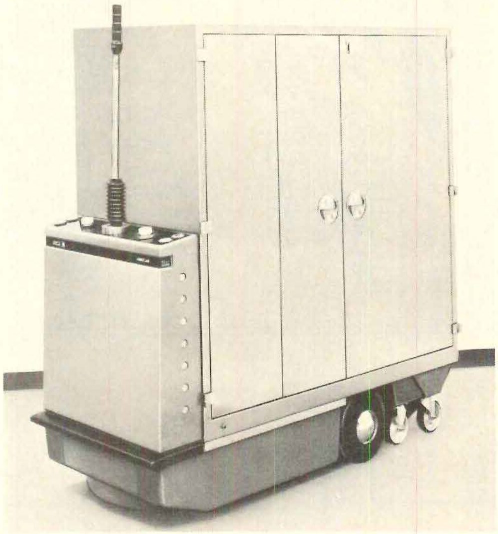






Run car run





An electronically guided, battery powered vehicle that uses its own lift system to automatically deliver medicines, instruments, linens, food or almost any other item is moving up and down hospital corridors doing its thing quietly and efficiently. Called "Amscar," it propels itself throughout the hospital by following a series of electronic guidewires imbedded in the floor. It can carry almost a half ton of equipment, has its own battery charger, can be directed to one or more destinations.

If Amscar is sent to multiple destinations, it can be programmed to restart automaticaly after pauses of various predetermined lengths, or for pushbutton restart by persons at the receiving end. It automatically calls, enters and exits from special system elevators.

Here is how it works in the distribution of meals, for example. When patients' food trays are prepared, an employee loads them in the Amscar, dials the destination and pushes a button. The vehicle automatically follows its preselected course along its guidewires. It calls, waits for and automatically enters the special lift. At the desired patient floor, it exits and proceeds to its assigned destination where an attendant switches the car to manual operation to distribute the food trays to the patients. In this way meals are warm and attractive, passenger elevators are not bogged down at mealtime, nurses and paramedical personnel are free to perform more important tasks of patient care.

After mealtime, the vehicle automatically returns soiled dishes for dishwashing, moves to trash disposal and laundry areas and is unloaded at each stop. It then propels itself through an automatic two-minute wash, from which it emerges dry, clean and ready once again for use.

When the Amscar reaches its destination and is led manually from its guidepath, the way is cleared for following vehicles speeding delivery of supplies. Amscar provides its own motive power; a single lever allows the operator to control speed and direction. The lever must be pulled down to a horizontal position before the car will move. Released either intentionally or inadvertently, the lever springs upright shutting off power and setting the car's brakes. After manual operation, the car is led back to the guidepath and submits to electronic control again at the push of a button.

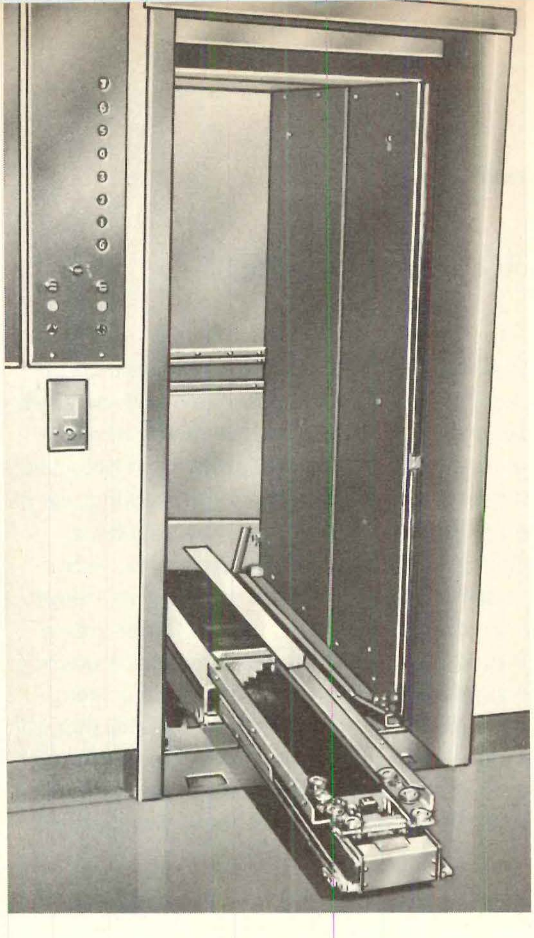
The car's speed is 1 mph during automatic operation. Manual operation allows speeds of 1, 2 or 3 mph forward; 1 mph in reverse. The vehicle is 62"x26"x73" high with operating lever in vertical position.

The system elevator is a high-speed, Class A type, usually the same make as others specified by the hospital. Its cab has doors at either end—one for the car's entry, the other for exit. It is fitted with a control package that enables the vehicle to operate the elevator. A radio-controlled electronic blocking device holds the vehicle at the entry door until the elevator arrives and the door opens. The opening door releases the blocking device and the vehicle enters the cab where another electronic block halts it again. The car signals the floor it wants with a series of electronic beams; at that floor the exit door opens, releasing the electronic block. The car exits, tripping a floor switch with its magnet to close the door and free the elevator. A system elevator can accommodate one or two Amscars, as required by traffic volume. And, because all cargo is completely enclosed within Amscar modules as a safeguard against cross-contamination, the same elevator is used to distribute clean supplies and return soiled items.

All Amscars are dispatched from a central control station manned by a single operator. This dispatch area serves as the hub for distributing all clean supplies. Monitoring devices, including closed-circuit TV if desired, allow the dispatcher to keep track of the cars and elevators. To start a car on the distribution cycle, the dispatcher leads it into position above the guidewire, dials the desired destination, presses the start button, and lets automation take over.

Seems there's little this little car can't do. Its newest trick, it delivers the patient too.

Mechanical arm



Vertical or horizontal transportation—nothing fazes the automated cart. Here is a system that began with the Cargomaster (a unit similar to a mechanical arm) that rests in a groove in the floor of an elevator or dumbwaiter and loads and unloads on any floor specified.

The Cargomaster machine, functioning as an electronic robot, is installed by the elevator company that supplies all elevators in the building. The cart is wheeled by hand to the elevator doorway and its front wheels placed in the doorway's wheelpockets. When the doors of the elevator open, the Cargomaster machine emerges on a drawbridge and engages the cart. Elevators are designed to accommodate the cart and the coupler device. The system usually functions automatically although some recently developed systems require a dispatcher. Average time for a round trip is 1½ minutes. For smaller items, containers rather than carts are used to reach their floors and emerge from dumbwaiters automatically.

This system has also been developed for horizontal transportation. The floor destination can be selected on the cart by means of a simple sliding cam. The dispatcher places the cart or a multiple of carts on a Cartveyor, permitting automatic and unattended dispatch of these carts to their individual destination. Hospitals designed with bridges or tunnels—one tower concentrating on patient service facilities, the other on patient care—use the carts to travel from tower to tower.

At the present time over 90 Cargomaster systems have been specified for hospitals in the United States, Canada, Puerto Rico, New Zealand and South Africa. These systems range from the simplest to the most sophisticated and are obviously an influence in the design of today's hospital buildings. (The hospitals shown on pages 68 and 70 are two of the most recent applications.)

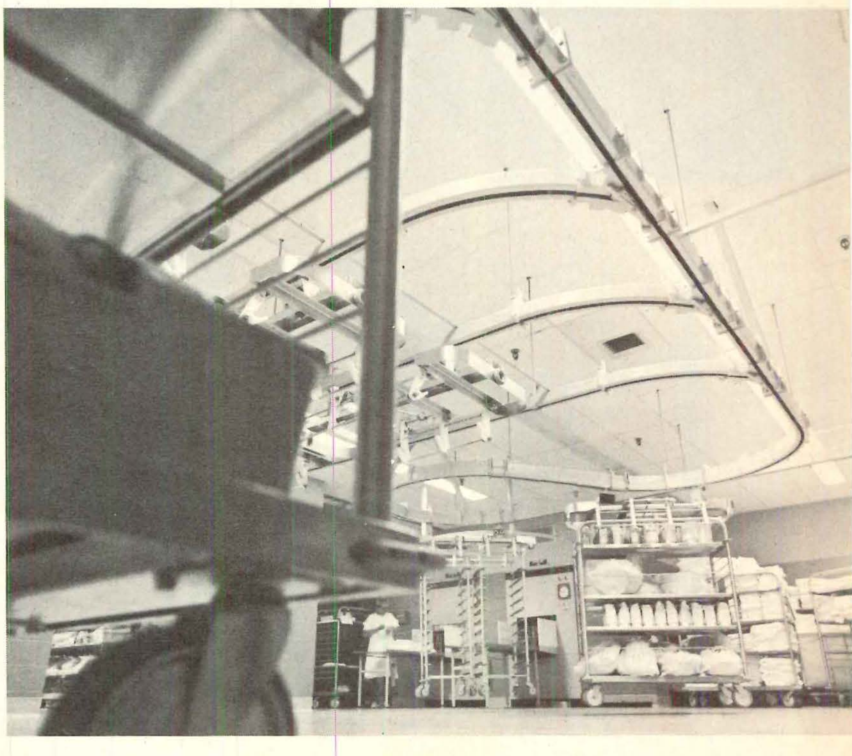
Monorail system

A system that started out helping industry function more efficiently is now proving to be a practical mechanical handling system in hospitals. Called ACT, the system is a powered, chain conveyor enclosed in a monorail.

Suspended from the rail are transporters and frames with hooks that grab the carts. While in motion, the carts ride several inches off the floor—touching down only when they reach a particular location to which they have been directed by the selector dial-setting on the transporter's trolley. Load capacity is 600 lbs, including the carrier, which weighs 100 lbs.

Refined and quieted for hospital use, ACT centralizes the operation and control of supply services to all hospital areas, is instantly available 24 hours a day, can be scheduled for preplanned supply or for fast emergency delivery. It operates horizontally, vertically, services all floors and areas, connects separate buildings.

Already installed in a number of hospitals and scheduled for operation in others, ACT is specified for new and remodeling construction for small, medium and large buildings: St. Joseph's Hospital, Bryan, Tex., 100 beds; Cedars-Sinai Medical Center, Los Angeles, 752 beds; The University of Alberta Hospital, Edmonton, Alberta, 2200 beds; the University Medical Center, Cologne, Germany, 2100 beds.



From the inside out

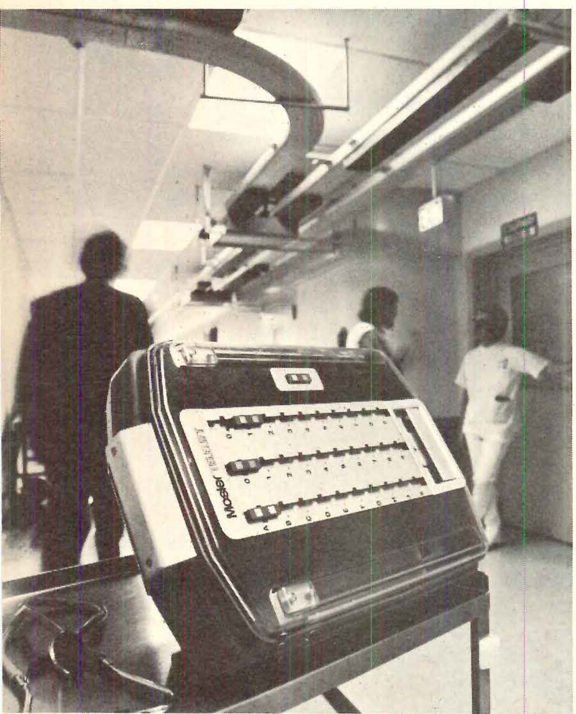
The way to run a railroad

Can a miniature railroad running around inside the ceiling and walls of a hospital cut costs and improve health care? Advocates of this system think so. Although a variety of pneumatic tube systems have whisked supplies through hospitals from one department to another for years, the growing use of Telelift, a railroad system running through the hospital's walls, is adding a new dimension to delivery service. Essentially a single car railroad train complete with engine, freight car and switchman all in one compact unit no larger than a small suitcase, it runs on a U-shaped aluminum track quickly, safely and, most significantly, silently. Prescriptions, files, fluid samples, mail, books, X-rays, records—anything that will fit into one of its cars—is carried automatically from any one station to any other station in the system. Each self-propelled car moves at about 100 fpm without disturbing occupants of the building in which it is installed.

Cars are programmed by positioning indicators on the car cover to the code number of the receiving station. Propelled by 24v DC motors, the cars enter the system on command and travel horizontally and vertically to their destination via the shortest route. There is no need for a central switching or transfer point.

Systems are designed to meet the requirements of individual applications, can grow with building expansion and increased demand. They can be installed in new or existing buildings, enclosed within walls and ceilings or exposed where the design of track and cars can blend with functional interiors.

The cars are available in two models; one with interior dimensions of 4″x12″x15″ carries a maximum load of 11 lbs; a larger car, 8″x12″x18″, can carry up to 20 lbs. Power for the system is obtained from low-voltage conductor rails in the track. A friction wheel drive propels the car on horizontal track sections; for vertical travel, a drive gear automatically engages a gear rack in the vertical tract. Four guide wheels stabilize the car in the track and prevent its removal except at

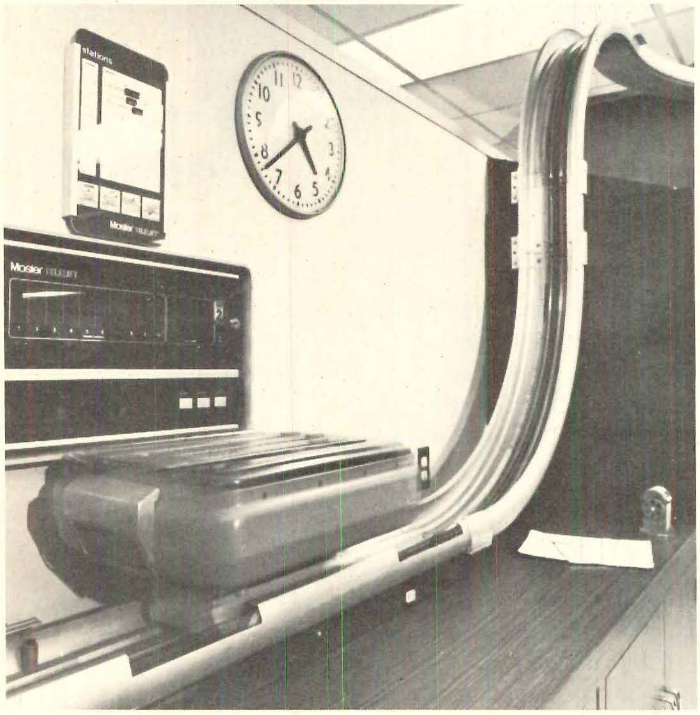


specified stations. Switching units in the system "read" the position of the magnetic indicators as the car passes and direct it to its destination. At the receiving station the car is unloaded and dispatched to its home station. Cars can be programmed to travel automatically to as many as 1000 stations in the system.

Four modular track section types permit flexibility in the system design. If other than 90 degree curves and bends are required, curved track sections may be modified.

Optional equipment includes fire doors and draft control dampers; the dampers close automatically after cars have passed through, preventing excessive air flow from one area to another. Supervisory panels monitor the system.

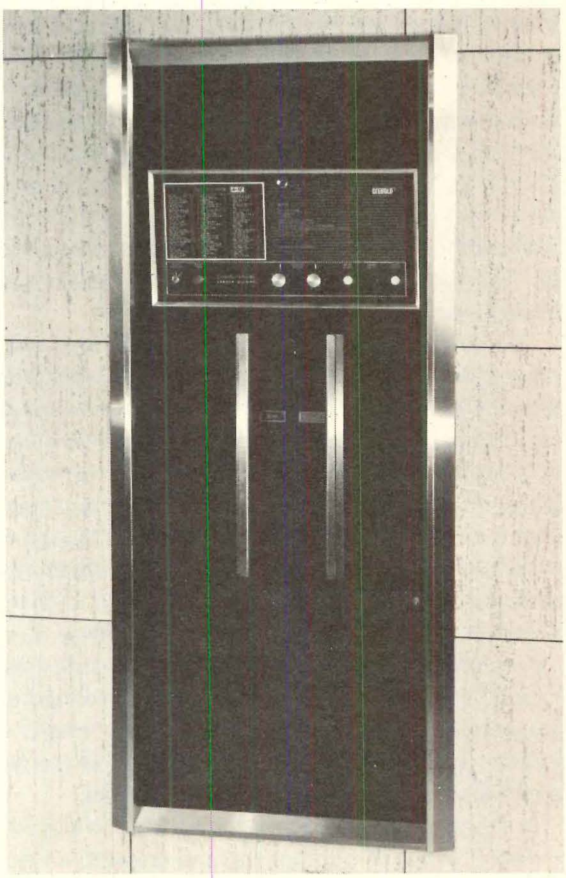
Telelift systems range from two stations with as few as three cars to a projected 33 stations on four levels with 65 cars specified for McMaster University Health Sciences Center in Hamilton, Ontario. The largest Telelift system on order, with over one mile of track and 110 cars is being installed in the Lincoln Medical and Mental Health Center, Bronx, N.Y. Another system will be in the Woodhull Medical and Mental Health Center (p. 54).



Computers program moving materials

New twist to an older system—a recognized pneumatic airtube system that has been a standby in commercial institutions for over 100 years—has been updated to meet hospitals' needs for speed and efficiency. Asking and getting directions from a computer, the Lamson airtube system minimizes human guesswork and chance of error. The computer monitors all operative conditions within the system; when the controls at the sending station are activated, a fast sequence of questions and answers is initiated within the computer, determining whether all channels are clear for carrier passage.

Built on solid state circuitry, the system schedules traffic and handles traffic surges efficiently and easily. There is no need for a reject station where carriers wait until someone decides what to do with them. Carriers that cannot be delivered to the selected destination will not be accepted into the system. A larger improved carrier that provides over 30 percent more capacity than similarly sized carriers has also been engineered. It opens at either end, and will not be accepted by the system until it is properly closed. Once closed, it will not open.



The automated waste basket

I.V. tubing and bottles, plastics, disposable gowns, linens, syringes, needles, bandages and many other materials end up as part of a hospital's waste load. Special items present special waste disposal problems; I.V. tubing may stretch into spaghetti-like strands and refuse to succumb to normal pulping procedures; needles refuse to be digested and jam waste disposal machines.

As a result of special problems and also to keep pace with air and water pollution restrictions, solid waste disposal systems have been given considerable redesign attention and are improved over earlier versions and better able to handle stubborn items. In addition, the handling of soiled linen and trash is receiving increased attention in hospital planning, considering the time and monies involved in collecting, transporting, processing and removing the growing quantities of these items the hospital must deal with. Many hospital planners are moving more and more to automated systems that may have a high initial cost but offer long-term savings and improved sanitary conditions.

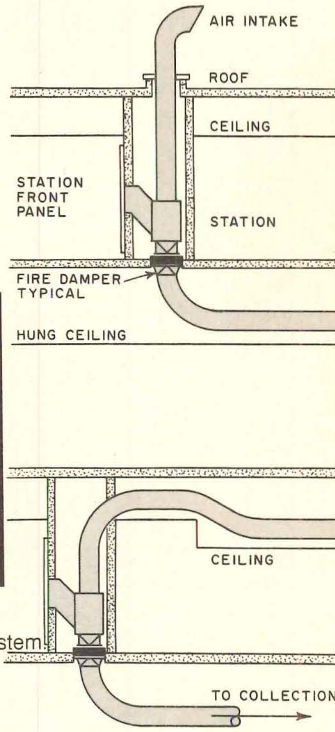
There are several automated systems available today—air transport systems for the handling of trash and linens; pulping, compacting, shredding, incinerating and combinations of these for solid waste disposal. Incinerators must be equipped with emission cleaning equipment to satisfy air pollution codes.

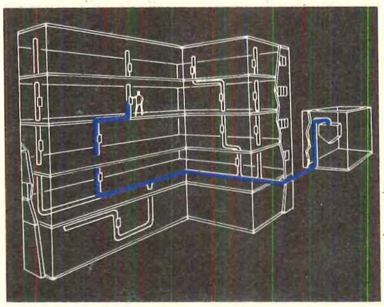
Herewith, an overview of a few systems currently making waste disposal a part of the approach to total building automation. Suction pneumatic systems transport waste and linens—the waste directly to disposal machines, the linen directly to the laundry or to carts for transport. The Nassau County Medical Center is planning to install a $1 million Air-Flyte pneumatic system with which they hope to "hold down housekeeping costs." It will move waste materials on a 60-mph airstream from 83 depository stations to central disposal points. Said to be the largest installation of its kind in a hospital in the world, it has 54 linen depository stations and 29 waste depositories strategically located throughout the hospital. There is no storing of soiled linens, trash or garbage in storage rooms, corridors or patient rooms.

This system reportedly prevents the escape and spread of staphylococci and other pathogens within hospital corridors and also prevents the escape of offensive odors. Conduits are of galvanized steel pipe, measuring about 16 in. in diameter and can be installed on or behind walls, overhead, in shaftways, on roofs or undergound. The airstream maintains its mile-a-minute speed regardless of load direction—up, down, diagonally, around corners. Negative air pressure within the system is developed by a generator and provides sufficient suction to carry 50-lb bags or heavier in these directions.

A safety time cycle control permits only one load to enter a moving line at any given time, avoiding overloading. The employee deposits the material, presses the "trash" or "linens" button, and the control automatically stores the signal sequentially until the turn for that load arrives.

In Trans-Vac's system, air transport for trash and linen is interfaced with a shredding machine creating an almost total





Pneumatic tube system moves material on a 60-mph airstream. ECI Air-Flyte system.

disposal system—the air transport can also be used with other waste disposal equipment. Gravity-vacuum and full-vacuum air transport is offered, with the gravity chute used for vertical movement and a vacuum tube, under negative pressure, for horizontal movement at a high velocity.

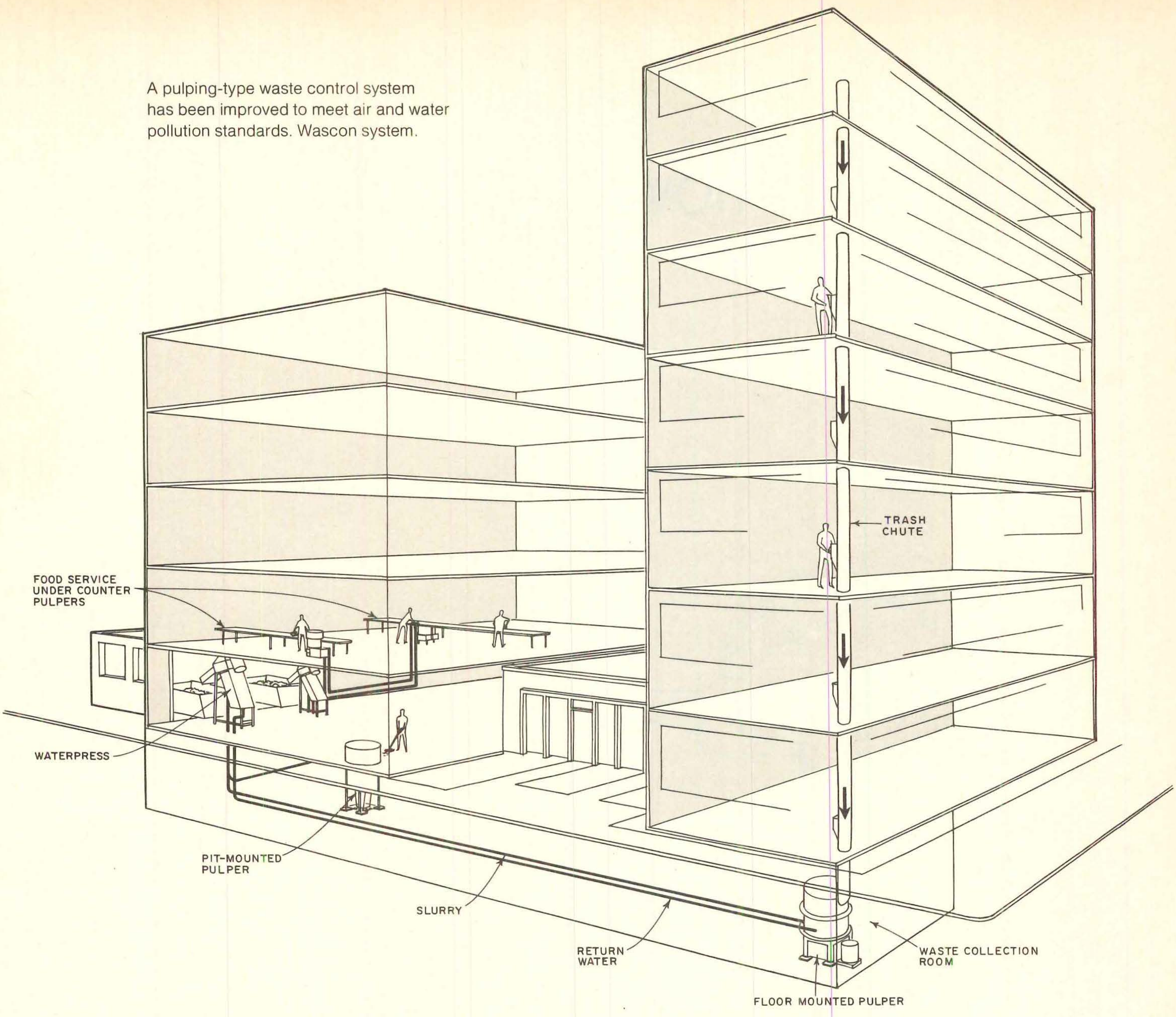
The shredding system utilizes a heavy duty compact machine with a punch and die cutting action for breaking down bulky refuse and reducing it to particle size suitable for conveying to a truck, compactor or incinerator. A shredder can chop or shred almost anything and can be fed automatically by the pneumatic system.

Some of the hospitals using the Trans-Vac system include San Antonio VA Hospital, using a combination trash and linen, full-vacuum system of 36 stations on 11 separate risers; Imperial Point Hospital, Ft. Lauderdale, Fla. uses a gravity-vacuum system including a shredder with an integral fan to provide pneumatic conveying.

The pulping machine, a process that squeezes refuse to one-fifth its normal volume, has been improved to handle some of the most stubborn and resistant hospital waste materials. The Wascon pulping process, for instance, has been upgraded to meet clean air and water standards and is equipped, especially for hospital use, with a glass cyclone separator and deltas for improved disposal of plastics.

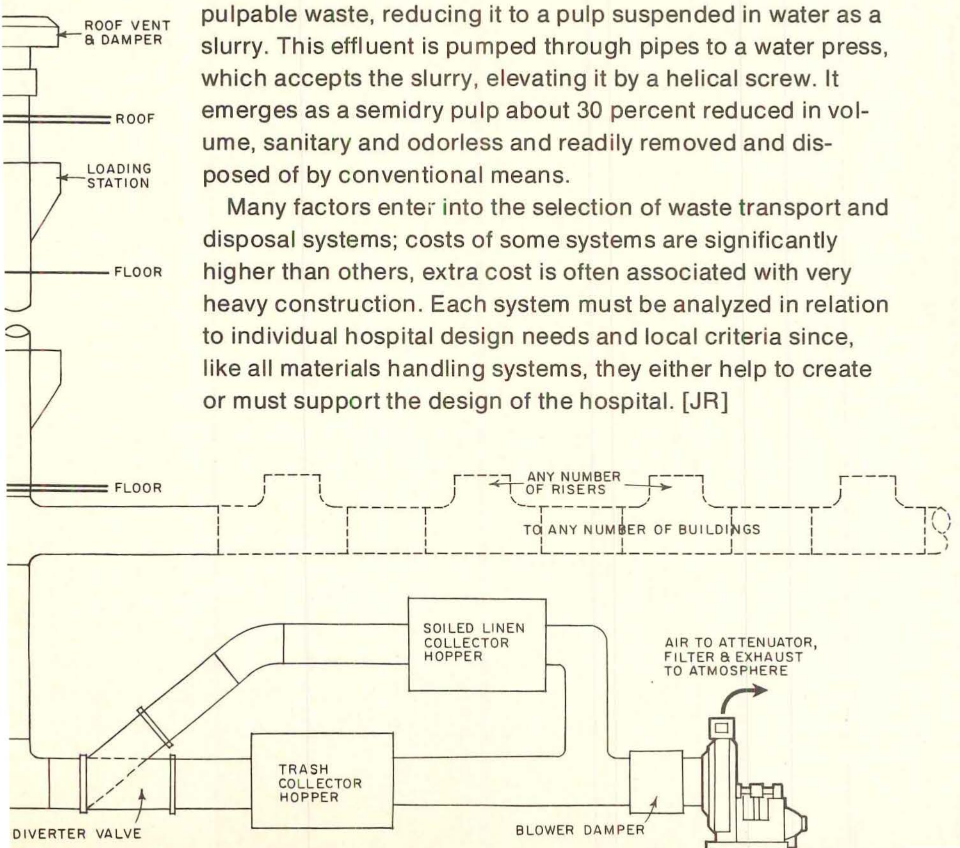
In this system, pulpable waste which enters the pulping tank from a collection chute is automatically reduced to a mere fraction of its former volume. Air fouling and water pollution are completely eliminated. In the first stage, waste is introduced into a stainless steel pulping tank housing a rotating impeller plate studded with randomly mounted tungsten car-

A pulping-type waste control system has been improved to meet air and water pollution standards. Wascon system.



bide teeth and filled with water. The violent action of the impeller, rotating at high speed, continuously tears and abrades pulpable waste, reducing it to a pulp suspended in water as a slurry. This effluent is pumped through pipes to a water press, which accepts the slurry, elevating it by a helical screw. It emerges as a semidry pulp about 30 percent reduced in volume, sanitary and odorless and readily removed and disposed of by conventional means.

Many factors enter into the selection of waste transport and disposal systems; costs of some systems are significantly higher than others, extra cost is often associated with very heavy construction. Each system must be analyzed in relation to individual hospital design needs and local criteria since, like all materials handling systems, they either help to create or must support the design of the hospital. [JR]



Vacuum system is recommended where there will be offset in vertical risers. Risers are extended through the roof and roof dampers are used to provide an air source. Trans-Vac system.

Laminar air flow for ORs

Boyd Agnew

1 A river of clean air moves in parallel lines from filter modules across operating field at 140 fpm. Because room air is filtered 200 times per hour, shed particles are kept suspended no longer than 20 seconds.

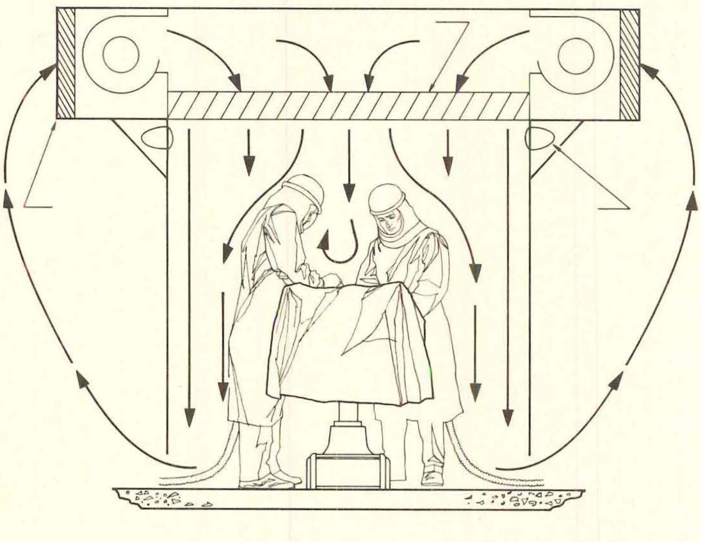
Clean air systems for hospital operating rooms require specific design considerations. A review of those conditions is presented in this article

Before the middle of 1970, laminar flow clean air systems were a rarity in U.S. hospitals. Since that time, however, nearly 200 laminar flow systems have been installed and many more are in the planning stage. This discussion will define laminar flow as a method of air purification, outline means of applying the principle to the requirements of hospital operating rooms and define the areas of concern for the architect who is planning laminar flow installations.[1]

What is laminar flow?

Laminar flow is a descriptive term given to a method of air purification wherein a body of air is made to move through a work chamber along parallel flow lines in a constant direction and at uniform velocity. The laminar flow principle, developed in 1961 to meet the needs of the aerospace program, produces working atmospheres that are cleaner than previous types by roughly three orders of magnitude. It accomplishes this because it does three things previous systems did not:

1 *High efficiency filters are placed directly in the work chamber.* Previous systems had similar filters but put them in ducts remote from the work site. During the journey from the filters to the work site, the air became contaminated with particles that soon coated the interior of the ducts or were drawn into them through fissures.



2 "Greenhouse" laminar flow system enclosed within operating room has vertical air flow which requires lamps at sides. Bulky suits and helmets are worn to keep particles from being washed into airstream.

2 *Clean air is delivered to the work site in a quantity sufficient to overcome the rate at which particles are being generated in the work site.* Thus instead of 6 to 12 changes of air per hour provided by conventional ventilation systems, laminar flow puts 200 to 500 "changes" of air per hour through the work site. These "changes" are actually the same air being recycled through the high efficiency filters, with the 6 to 12 changes through the air conditioner going on as before in a by-pass cycle.

3 *The clean air is delivered through the work site in a constant direction* (figure 1) making it possible to plan the work to take advantage of the cleanest air. Particle-generating activity is put off to one side or downstream of the critical work site.

Rules of thumb for laminar flow

1 *Don't use ducts.* Erect a bank of High Efficiency Particle Air (HEPA) filters. Work in the lee of this bank. If the work process is a pharmaceutical transfer, for example, a 2-ft-high by 4-ft-wide bank at the back of a table is sufficient. If the work being done is a surgical operation, the bank of filters should be wider than the operative field and reach substantially from floor to ceiling.

2 *Place the bank of filters so that the work site*—in the case of the operating room, the operating table and the instrument table—*can be put in first air,* that is, air that has just issued from the HEPA filters. This rules out the downflow direction because the inverted bowl of the surgical lamp is in the way. Attempts to use downflow have been made but at the sacrifice of good lighting. John Charnley of England, who originated the downflow or "greenhouse" concept, has since stated that good sight comes first and has gone back to the conventional lighting system.[2]

3 *Have enough clean air to do the job.* This means also not having too much air to do the job. The Air Force manual on clean rooms states this rule: "Don't clean up any more air than necessary to get the job done."[3] Moving too much air means spending too much money in initial installation and operating costs.

Laminar flow applied to operating rooms

Four methods of applying laminar flow have been used up to the present time.

1 *Downflow.* This is the original greenhouse concept (figure 2) which was a result of coming through the roof of an older hospital with an entirely new air conditioning and filtering system. Four walls were needed to contain the air flow until it had passed the operating team and this made operating space limited and posed problems of safety. Installation costs are high with this method because in many cases modification of the existing ceiling is necessary. An alternate downflow system to the one with walls made use of air curtains in a rectangular shape within which a central core of air was ducted downward through the ceiling. This made use of remote HEPA filters which violated rules 1 and 2, and air quantities were not sufficient to achieve the requirements of rule 3. Also, installation required a complete rebuilding of the ceiling of the operating room with a cost three to four times higher than the systems described below. Note: All systems of downflow require that the surgeons wear "space suits" complete with helmets and visors to prevent particles shed from the head area from being blown downward toward the wound.

2 *The tunnel concept.* The tunnel (figure 3) directs clean air horizontally at the operative field. The horizontal flow of clean air does not compete for position with the surgical lamp. Helmets are probably not necessary because particles shed from the head area are rinsed away sideways. Versions of the tunnel are available which do not require attachment to the walls or ceiling of the operating room. Tunnel walls are retractable to permit movement of equipment into the operative field.

3 *The wall-less horizontal laminar flow clean air system.* A system now in use by approximately 100 U.S. hospitals is the wall-less horizontal laminar flow projector (figure 4). The sidewalls of the tunnel are replaced by projector vanes.[4] These vanes accelerate the vertical edges of the flow of air as it is-

Author: Boyd Agnew is President, Agnew-Higgins, Inc., Garden Grove, Calif.

sues from the HEPA filter bank. As these boundaries are accelerated, the balance of the air is caused to flow across the room where it divides and returns for refiltering and another cycle through the room along the sides of the room (figure 5). The wall-less system has been evaluated by a medical and engineering team from the Indiana University-Purdue University Medical Center in Indianapolis.[5]

4 *The full-wall approach.* The full-wall approach (figure 6) is an adaptation to the operating room of the horizontal laminar flow clean room widely used in industry. However, it violates the third rule of thumb—not having more air cleaned than necessary to do the job. The full wall of filters makes a nice appearance, but requires that additional space be provided behind it for service, and the ceiling in most cases must be double to provide for an air return.

Guidelines for design.

The following are minimum requirements for space, etc., for rooms in which the tunnel or wall-less laminar flow system is to be installed.

1 The room should be made longer to compensate for the thickness of the HEPA filter wall. In the case of the wall-less system, this is 2 ft 9 in.

2 The wall chosen for the HEPA filter wall should be left essentially blank at least in its central portion. (The wall-less system permits a doorway on either or both sides.)

3 Conditioned air should not be blown into the operating field. Air conditioning diffusers should be situated one on each side of the room to direct conditioned air into the return airstreams. (This applies to either the tunnel or the wall-less system.)

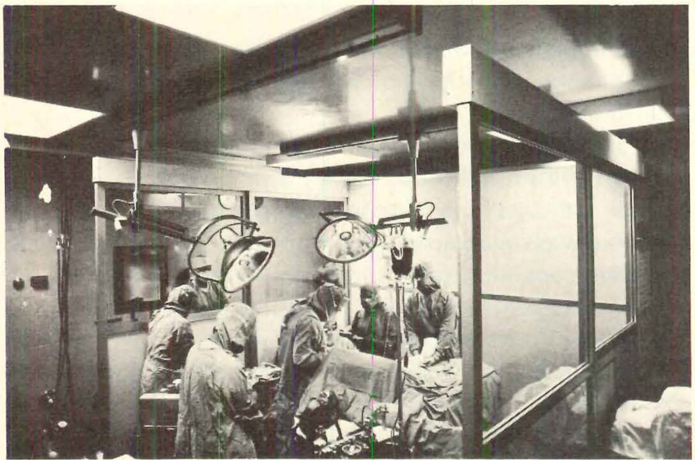
4 Add approximately one ton to the air conditioning designed for the room to compensate for the heat load added to the room by the laminar flow equipment. This ranges from 2 to 6 hp depending upon which system is to be used. In this respect the wall-less system has a provision for capturing motor heat and ducting it out of the room along with the normal exhaust of conditioned air.

5 The ceiling of the operating room should be made of some sound-absorptive material. Noise levels should be kept low in the operating rooms so that the operating team can converse in a normal tone of voice. Speech interference levels begin at 80 db (scale A). The wall-less system with which the writer is familiar operates at levels below 65 db depending on the material of construction of the operating room.

Laminar flow myths

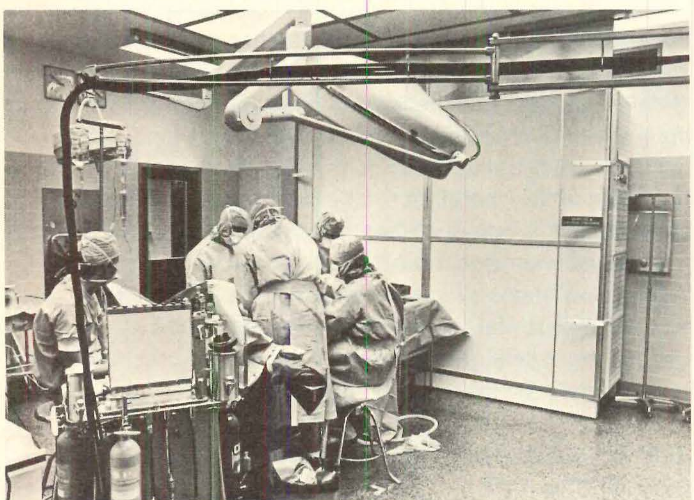
There are a few misconceptions about laminar flow that keep cropping up:

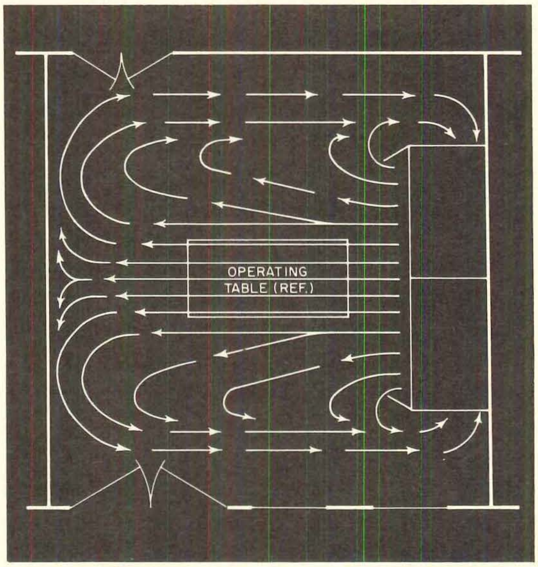
1 "Laminarity is essential to the effectiveness of laminar flow." This seeks to dismiss the laminar flow principle on specious grounds. It is axiomatic that if we're going to do



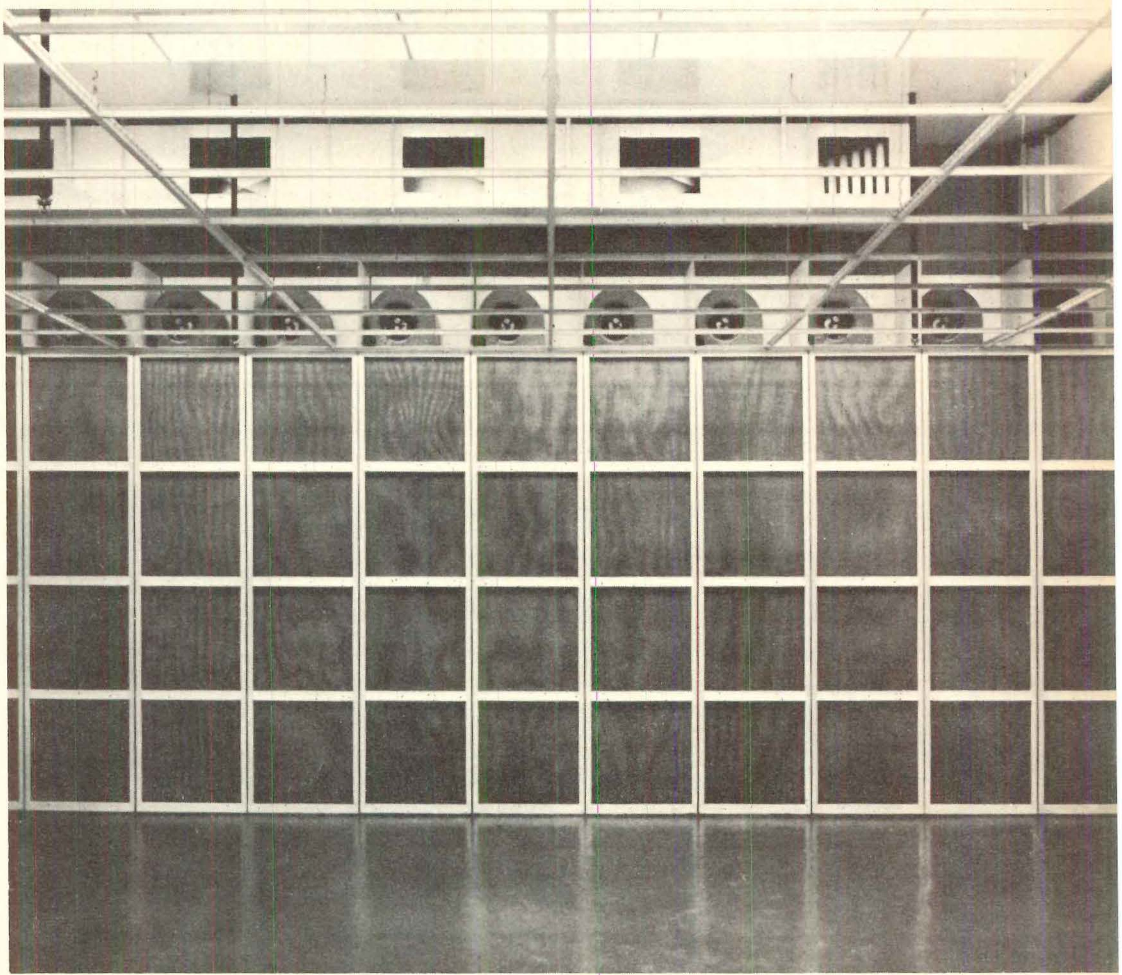
3 "Tunnel" systems require 10-ft retractable side walls to be effective. Horizontal air flow from filter modules purges the tunnel area but if side wall is retracted to make room for more equipment or people in an emergency, the air flow will abort around the shortened end.

4 Wall-less horizontal laminar flow clean air system at Indiana University Medical Center, where an engineering evaluation confirmed that 14-in. projector vanes on either side of the filter bank are as effective as side walls in providing direction and velocity to flow.





5 Schematic of the wall-less laminar system shows how clean air flows from modules at right, across operating table to the opposite wall, where it divides and then returns along the sides of the room for refiltering and recycling through the operating room.



6 Laminar flow clean room with ceiling panels removed to expose blowers and HEPA filter modules. Conditioned air is distributed across the blower intakes in such a way that assures an even temperature gradient in room.

work, i.e., put objects and people in the path of the laminar flow, the flow is going to be disturbed. However, at the work site, which is positioned to be as near as possible in "first air," we are 99.9 percent better off than we were before on a particle count basis, and in the balance of the room we are 99 percent better off than we were before because of the high dilution rate. Turbulence downstream of objects or people is merely a disturbance or eddy which is caused by clean air from upstream constantly penetrating the disturbed area. Particles are still rinsed away and it is possible to program the work so that these areas are downstream or to one side of the critical site.

2 "Laminar flow produces a tornado" that will blow dust up from the floor. This is false for two reasons. Flow rates are seldom more than 1, 2 or 3 mph. People walk faster than that. This is hardly a "tornado" as anyone knows. As far as blowing dust up from the floor, the general direction of the air is parallel to the floor and any dust that is stirred up will be rinsed away at floor level. Furthermore, dust tends to remain attached to a surface upon which it has settled and even to form a crust upon that surface. You can't blow dust off your car even when driving many times faster than the slow rates at which laminar flow is projected.

3 The laminar flow "breeze" will dry the wound. Surgeons report that if there were a drying effect, it would be a welcome one because one of the surgeon's tasks is keeping the wound dry enough to work with.

References

1 Federal Standard 209a (Aug. 10, 1966) "Clean Room and Work Station Requirements, Controlled Environment."

2 "Operating-Theatre Ventilation," John Charnley, *Lancet* (May 16, 1970) p. 1053.

3 U.S. Air Force Technical Order pp. 25-203.

4 Agnew Clean Air System, manufactured by Agnew-Higgins, Inc., Garden Grove, Calif. 92641.

5 "Evaluation of Wall-less Horizontal Laminar Flow Clean Air System for Hospital Operating Rooms," Merrill Ritter, M.D. and Jack Hart, M.Sc., Ph.D., presented at the symposium, "The Bio-Clean Room and Its Application to Surgical Suites," Nov. 12–13, 1971, sponsored by the National Aeronautical and Space Administration and the San Francisco Orthopaedic Training Program.

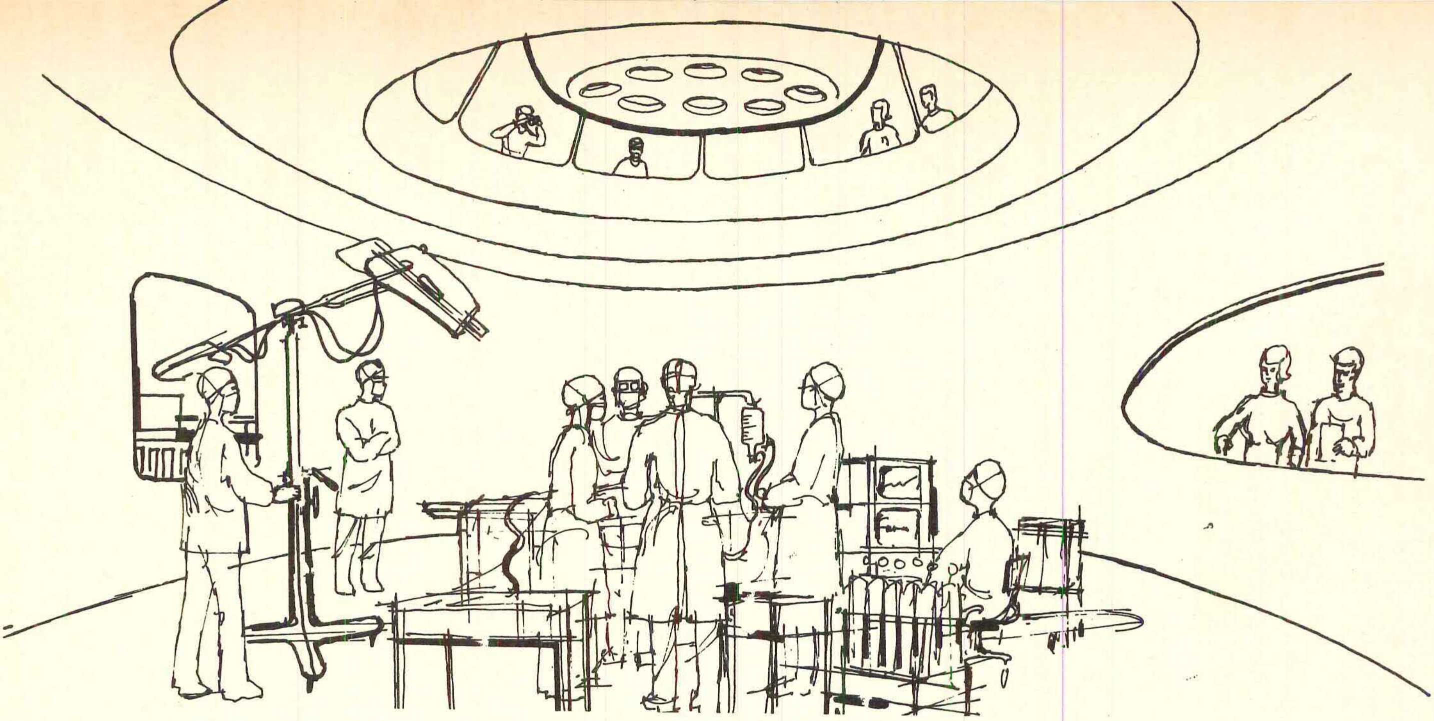
New rules for the game

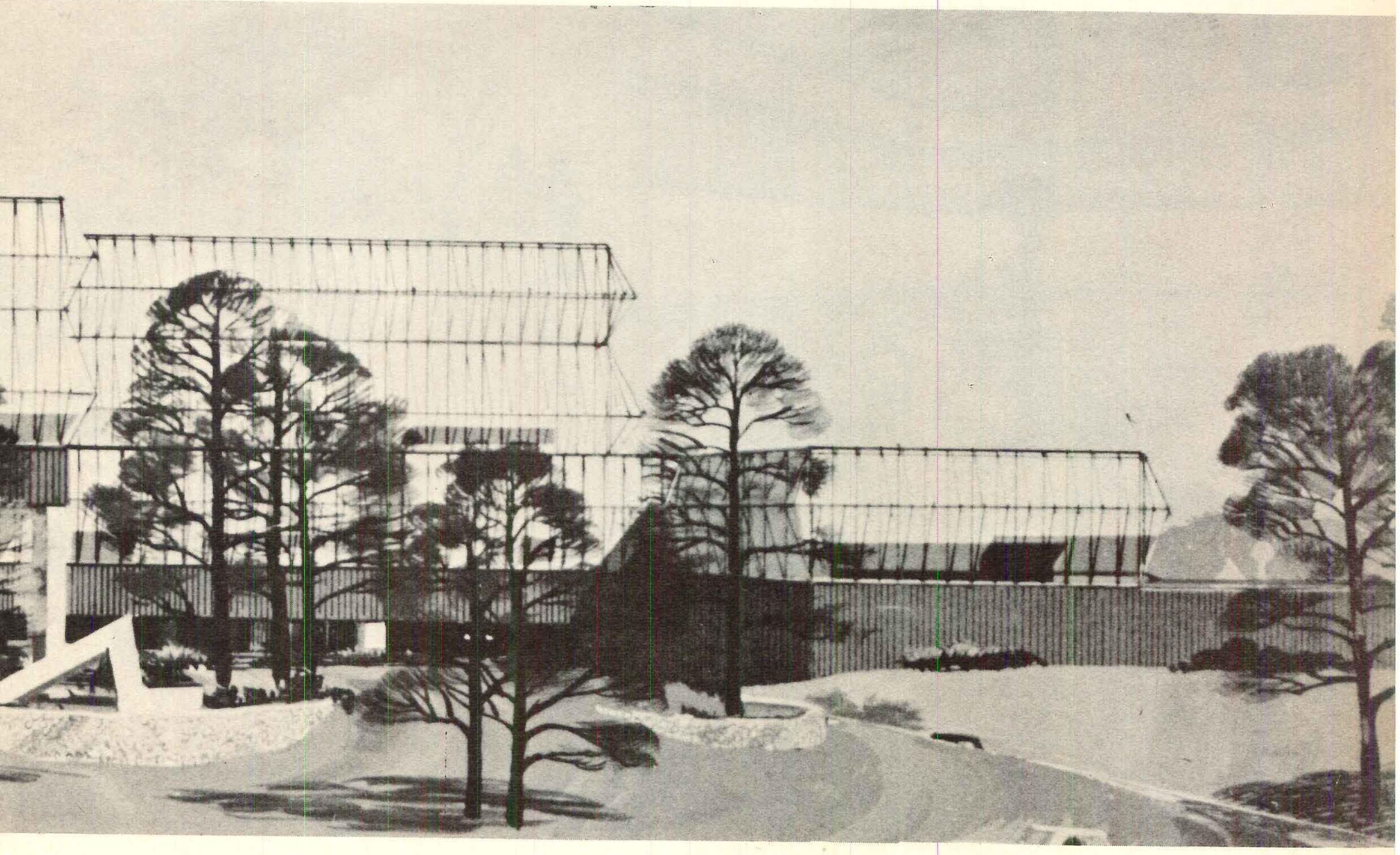
Innovations at the Washington Children's Hospital, now under construction, range from involving the staff in the planning game to new fire safety provisions that seek to protect bedridden children rather than steel

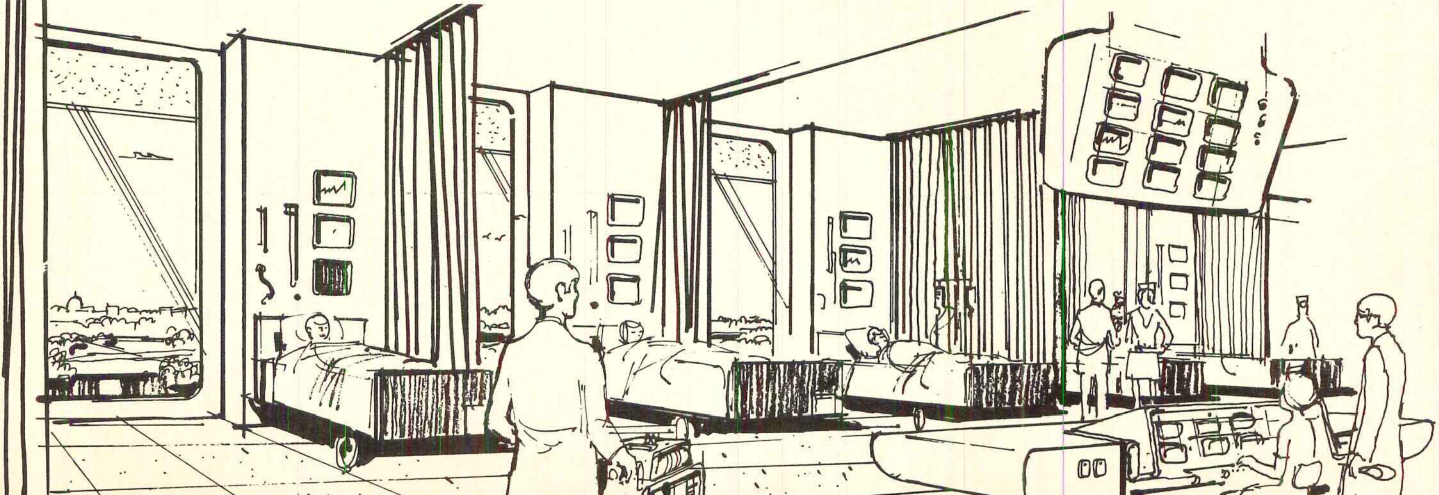
What they wanted to do, says Robert Graham of the Leo A. Daly Company, was to give the client a kit of parts and let him arrange his hospital to suit himself. Failing this, the architects are providing the Washington, D.C. Children's Hospital with a glass walled shell over a four-level (three below ground) base that includes parking for 1000 cars. Other permanent installations include a skylit central court, four or five fire walls on each floor and a ceiling grid on a 5-ft module.

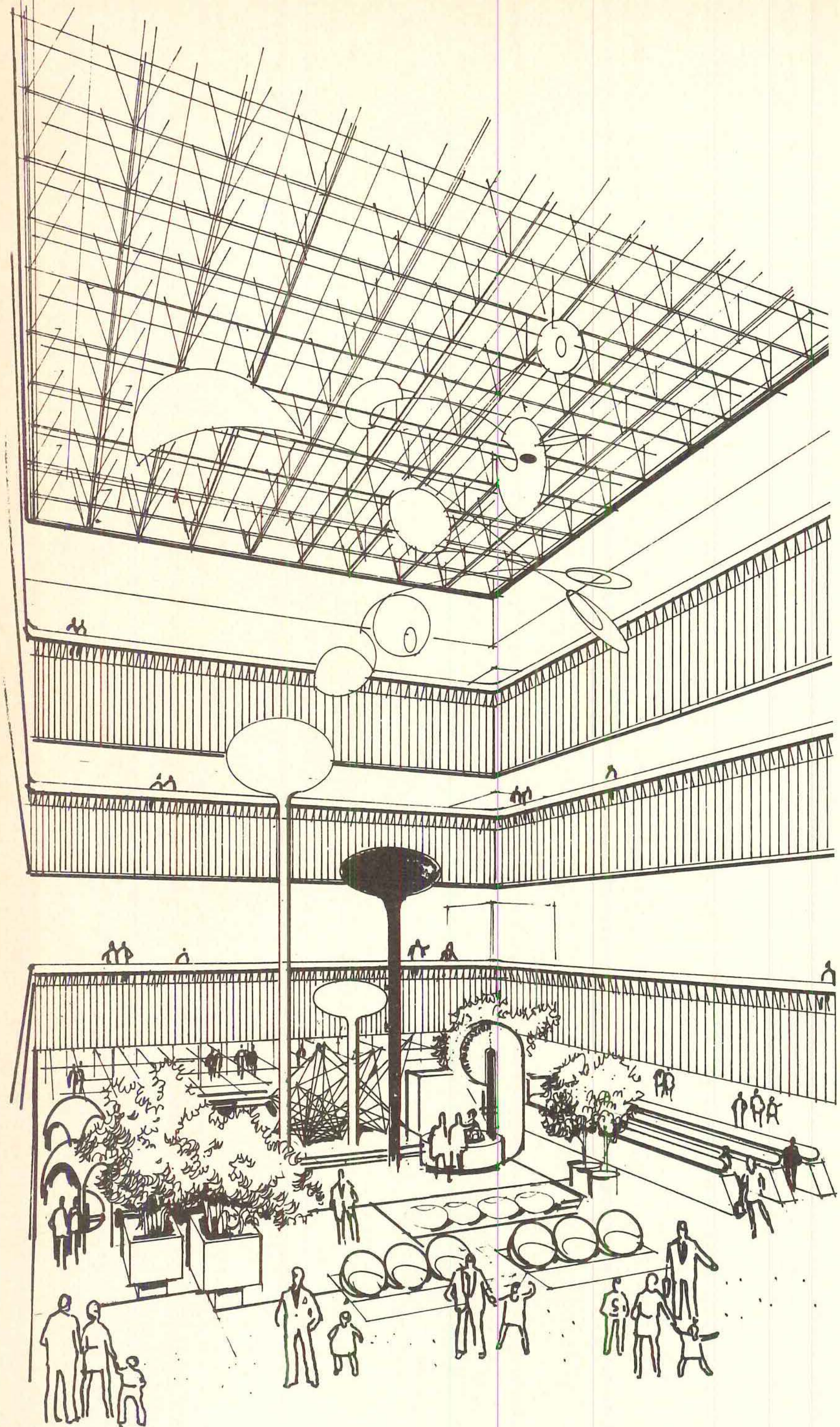
Everything else is movable: services are dropped from interstitial spaces: snap-on, 2½-ft-wide partition panels—both solid and glass—can be moved anywhere on the grid; prefab plastic bathrooms and laboratories can be moved at will (drains are the only things that penetrate the concrete floors). Public toilets are also movable. Rather than install large restrooms for men and women, the same single modules used for patient rooms will be placed where needed for the public with an occupied/unoccupied system copied from the airlines.

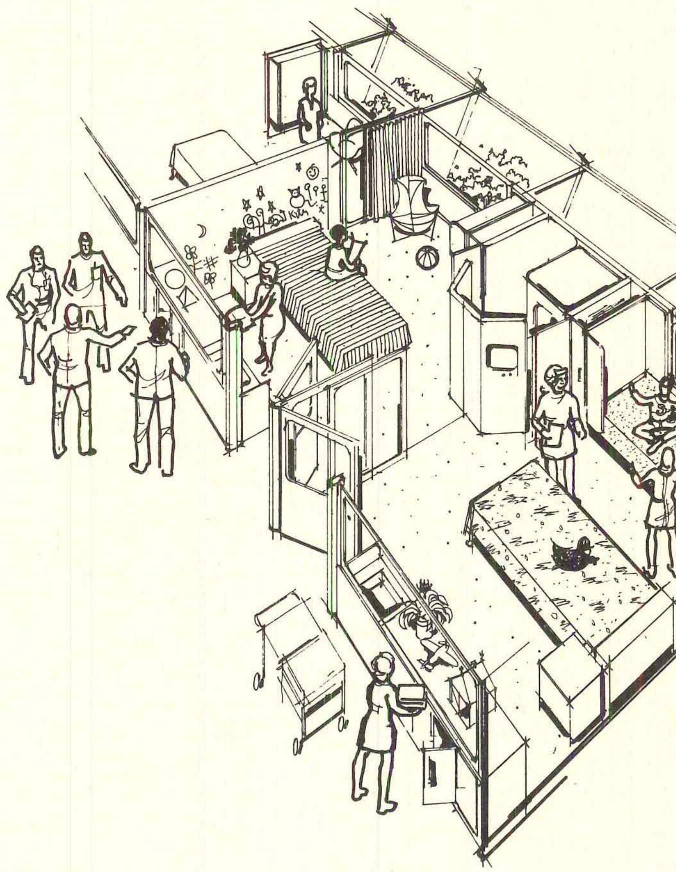
Although the building envelope is a dual wall, inner and

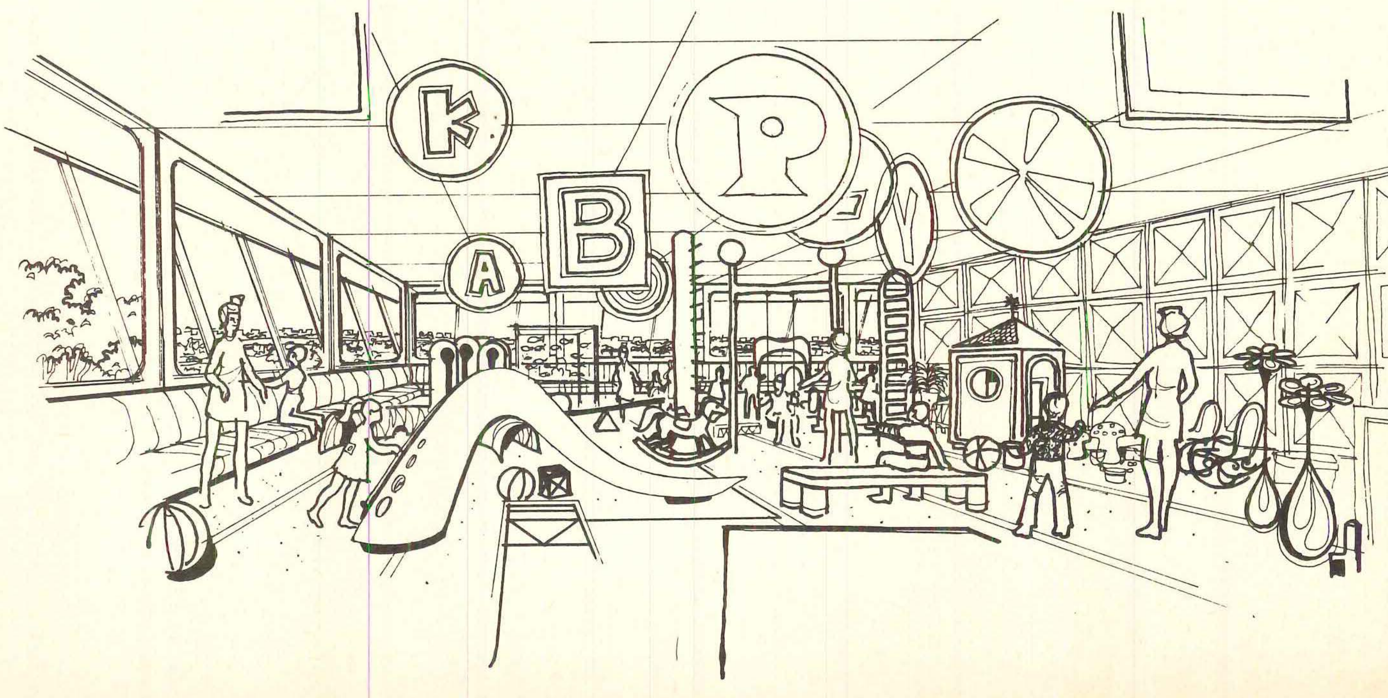








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outer glass do not meet and were, in fact, designed and bid in separate stages. Specifications and bid requests for the outer wall called only for optimum glass and mullion spacing, and in the winning bid the outer glass is sloped to reflect heat and glare. The inner glass is part of the partition system, and spaces between the panes will be air conditioned to eliminate temperature problems. The space, 5 ft wide to conform to the module, is large enough to give rear access to plumbing.

To speed construction and allow simultaneous planning, designing, bidding and building, the architects separated the project into three stages, or "packages." The foundation package, already under construction, includes the 1000-car garage within its reinforced concrete structure. The envelope package has been bid—the bid for the outer skin actually came in under budget—and the steel is going up.

No one yet knows exactly how the interior will look, as the completion package of layout, equipment and furnishings is still being determined. The architects, however, are determined to design for children rather than for typical adult versions of what children would like. There are to be no bunnies, no pink or blue lambs, no Mickey Mouse walls. Bright colors and "real art" are to be provided; despite the fact that the glass walls provide superb views of grass, trees and a lake, the design direction is inward. Children are much more attracted to their immediate surroundings than to views, are both reassured and distracted by people and things moving by. In some places glazing will permit glimpses of the automatic Telelift carts as they run around the interstitial space.

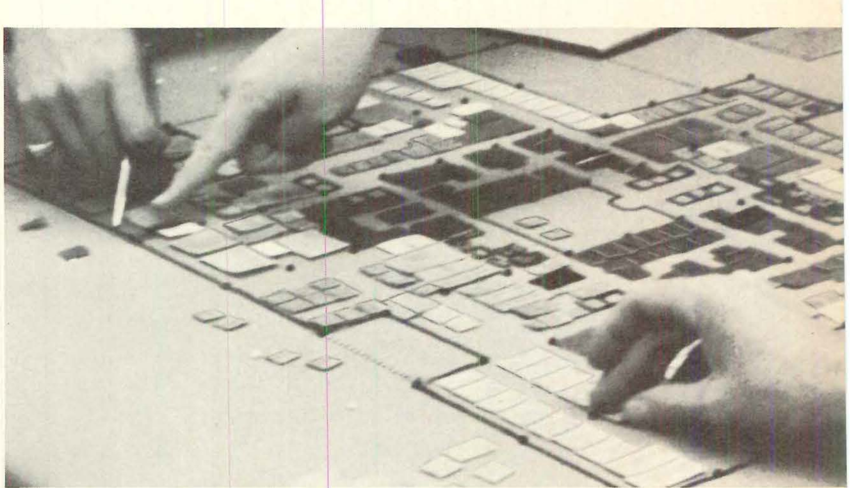
The architects were brought in during early stages of planning, when goals, objectives and program development were still being thought out by the Board of Directors, the staff and E.D. Rosenfeld Associates, hospital consultants. Design time was compressed by working on a forecast basis. The architects, without knowing or even wanting to know the number and kinds of special facilities required, took the original Rosenfeld forecast and assumed it to be 90 percent accurate. From this they developed the foundation and envelope, retaining the G. Fuller Company to do cost estimates. The most economical structure turned out to be a 30′ x 60′ bay with 9-ft-deep steel trusses for interstitial spaces.

The planning game

Children's Hospital celebrated its 100th anniversary in 1970, and the staff input in planning sessions, based on years of working in overcrowded and outmoded conditions, was readily accepted by the executive architect, Lee S. Windheim, and the project director, Robert Graham. In general, the staff wanted flexibility first; second, light and airy spaces with large play areas, wide corridors, movement and color visible through large glass areas, facilities for parents to stay—anything to make the youngsters feel at home and promote their quick recovery. Third were requirements for ample departmental facilities, from emergency and a large outpatient clinic to teaching and research.

Interior planning, begun on the forecast basis, was continued at gaming sessions. These were more serious than the name implies; the buildable area was outlined on large boards and the hospital staff laid out its own areas with colored chips representing room sizes from the forecast list. Boards were filled in and tradeoffs made as the hospital consultant brought in more specific data. Graham says this requires "an ability to work with a high degree of uncertainty and, unfortunately for some people, that turns out to be a high degree of panic." Every session was videotaped and all board layouts photographed for reference.

There will be no "front door." Cars and public transportation will bring people to one of the lower levels, where they proceed by moving ramps or elevators to the main court. The emergency department, which has a separate entrance, a large outpatient clinic, physical therapy and rehabilitation areas, is located at this Level A. Level B houses diagnostic, therapeutic and professional services, an auditorium, administrative offices and a cafeteria. The initial 250 beds are on

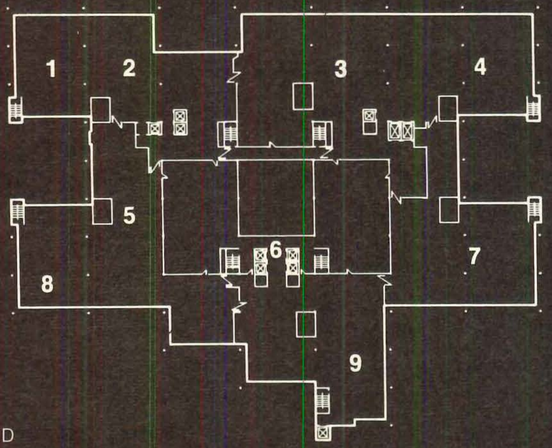


Hospital personnel and architects play the serious game of planning, using chips to represent rooms on design board.

Levels C and D, with patients grouped not only by age (newborns, toddlers, intermediates and adolescents) but also by similar illnesses. Beds will be clustered around special doctors, therapeutic teams and equipment.

Because it is designed especially for change and expansion, the hospital will be able to grow to accommodate another 200 or 250 beds.

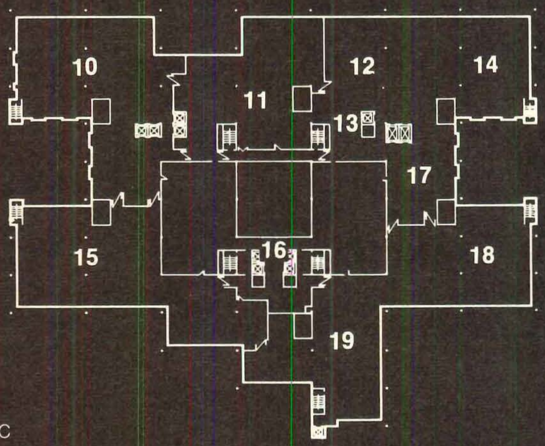
The open, airy plan caused consternation, if not panic, with respect to the fire and life safety codes. Fire safety consultant Richard M. Patton, however, applied his theories to the performance spirit and not the letter of D.C. and federal codes, emphasizing life safety rather than "fireproofing." Traditional life safety recommendations—"fireproof" corridors, quick exit, closing doors to contain the fire, prompt use of hand-held extinguishers and notification of the fire department—are simply inadequate in hospitals and totally useless where children and infants are involved, according to Patton. He recommends instead horizontal exit through a fire wall (and fire-doors) into another area of the same floor. This, coupled with a full sprinkler system, automatic notification of the fire department, smoke detection devices, small hoses (garden size) that personnel can actually operate, and isolation of key areas would more than meet code requirements, says Patton. Thus, with each floor divided into four or five fire areas, only a small number of persons would have to be moved (and none



LEVEL D

Level D

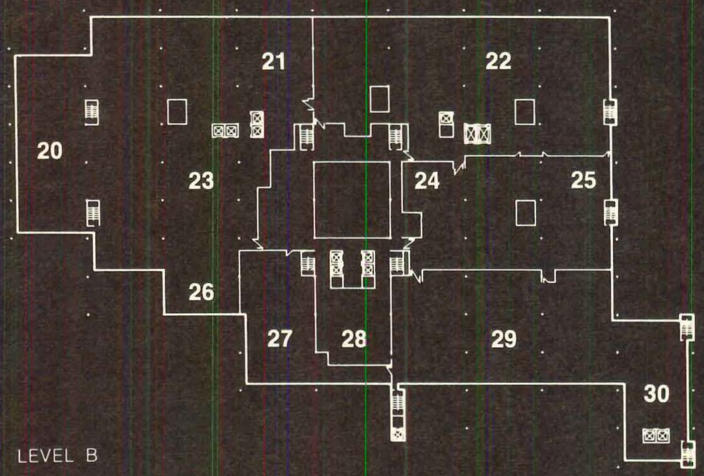
1 Hematology–oncology
2 General pediatrics intermediate
3 Child development
4 Short stay
5 Psychosomatic
6 Ambulatory
7 General surgery intermediates
8 Adolescent
9 Orthopedics



LEVEL C

Level C

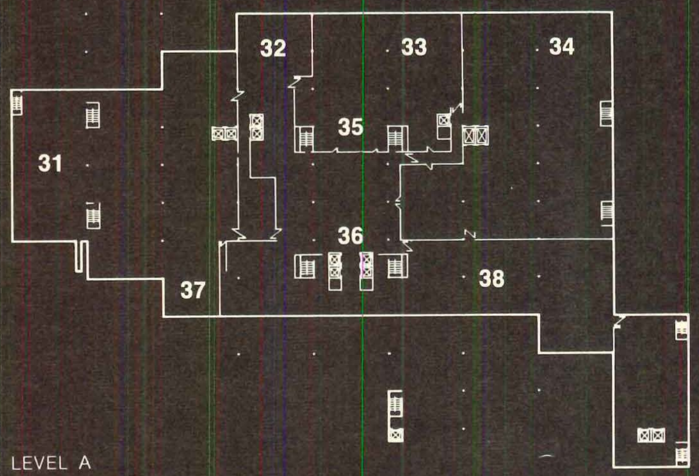
10 Infectious diseases
11 Inhalation therapy
12 Newborns
13 Renal dialysis
14 Intensive care
15 General pediatrics toddlers
16 Ambulatory
17 Burns
18 General surgery toddlers
19 Cardiology



LEVEL B

Level B

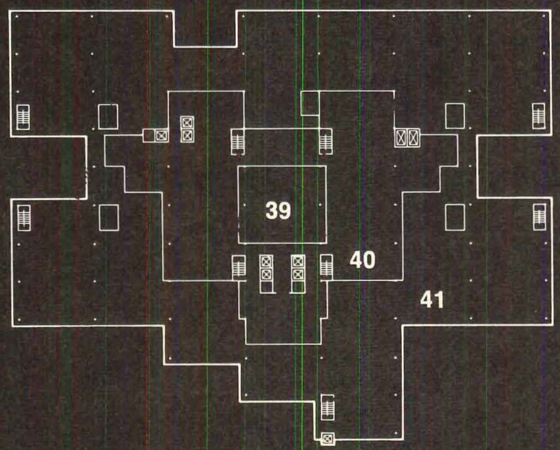
20 Administration
21 Medical records
22 Surgery
23 Dietary
24 Nuclear medicine
25 Radiology
26 Public dining
27 Medical library
28 Auditorium
29 Clinical laboratories
30 Speech



LEVEL A

Level A

31 Materials management
32 Maintenance
33 Pathology–histo laboratory
34 Ambulatory
35 Admitting
36 Lobby
37 Personnel
38 Physical medicine



Service level between C and D

39 Open to court below
40 Research labs
41 Interstitial space

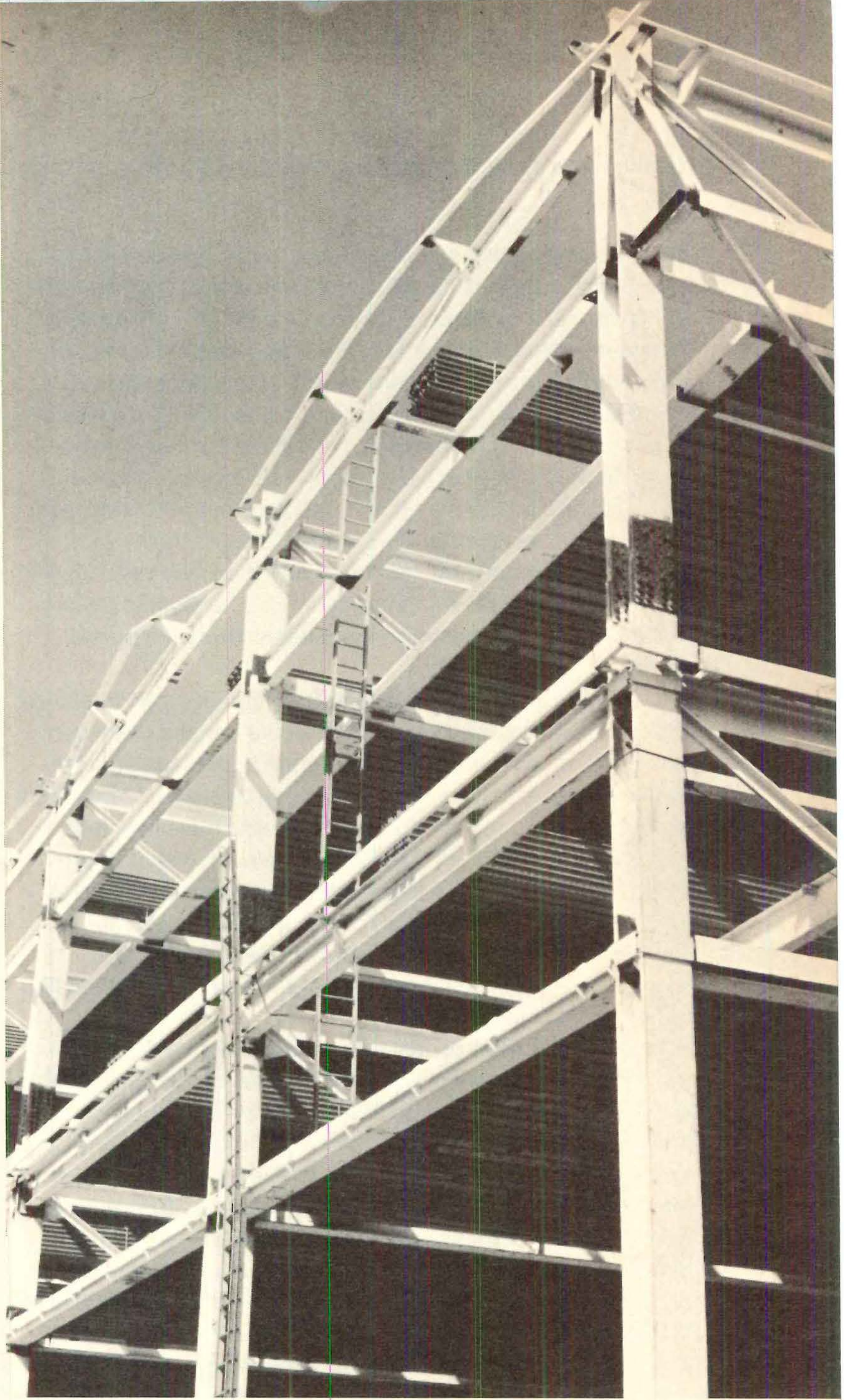
to the outside) even in the unlikely event that the sprinkler system did not promptly put out any fire. Patients could be moved, still in their beds or cribs, if necessary, to the safe zones on the same floor.

"If, rather *when,* this plan goes through, we will have destroyed every existing concept about life safety regulations," says Graham. "D.C. has accepted it—in fact, the Department of Licenses and Inspection deserves the highest praise, first for allowing us to design and build in pieces and second, in trusting the concepts. At this writing, however, Graham was still battling "traditionalists" at HEW over the life safety provisions. "One point: they say to use wired glass, but we have proved that wired glass will kill kids; the standards for it allow the glass to crack, letting smoke and gasses through." He proposes to use tempered glass instead. Another deviation is that the steel will not be fireproofed. Exposed only in the interstitial spaces, it will, however, be painted white. "We're having everything white," explains Graham. "It's a good, clean color you expect in a hospital, and carries the message, even in service and storage areas, to keep it clean."

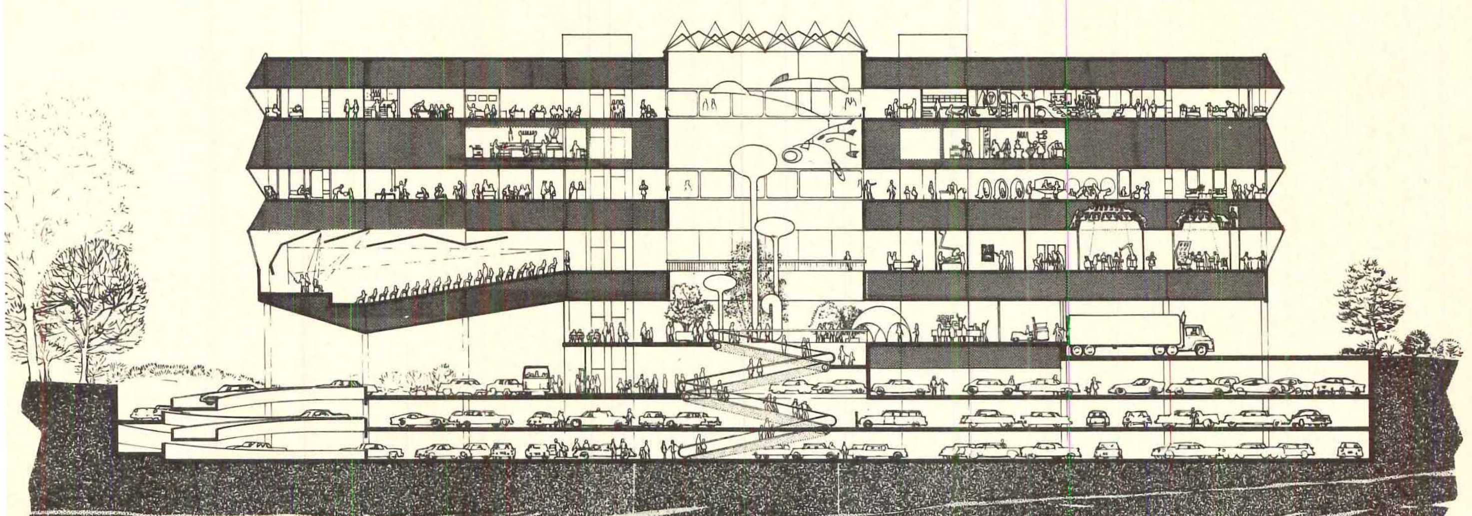
Construction cost for the first phase is $38 million, with a total project cost of $50 million. Funding sources includes a federal grant, low-interest loan and private voluntary contributions. [RR]

Data

Project: Children's Hospital National Medical Center, Washington, D.C.
Architects, engineers, planners: Leo A. Daly Company.
Site: Washington Hospital Center; building overlooks McMillan Reservoir and the city.
Program: 250-bed hospital with parking for 1000 cars and facilities for extensive outpatient service, education and research.
Consultants: E.D. Rosenfeld Associates, Inc., hospital and health services; Richard M. Patton, fire and life safety; Department of Civil Engineering, Colorado State University, wind pressure and air pollutants control; R.C. Coffeen & Associates, acoustics; Hyman/Bateson Joint Venture, construction manager.
Costs: $38 million for first phase construction, including parking garage; total project cost, $50 million.



Steel frame rises while design goes on. Section shows how research laboratories are fitted into one interstitial floor.



set of illness) a new term has been introduced into the health care vocabulary—HMOs (Health Maintenance Organizations). In his message of March 2, 1972 on the health care system, President Nixon described the HMO as a method for financing and providing health care which "brings together in a single organization the physician, the hospital, the laboratory and the clinic, so that patients can get the right care at the right moment. The HMO is no longer a drawing-board concept—more than seven million Americans are now HMO subscribers and the number is growing." It could, for the first time, create from the current fragmented organization for the delivery of health care a true system, i.e., "a regularly interacting or interdependent group of items forming a unified whole."

The HMO is an evolving idea and its impact on architecture for health is the subject of much speculation and uncertainty. One thing is certain—if the HMO concept can revolutionize the health care delivery system, it will have a significant effect on facilities requirements. Private interests have also proposed national networks of HMOs. One such plan was presented in 1970 by the American Hospital Association's proposal for the delivery and financing of health services in the United States—*Ameriplan.* A parallel development, also spurred by the availability of federal support, is the expansion of hospital out-patient facilities.

Traditionally, the hospital with its in-patient beds has been the core of a vast spectrum of facilities devoted to the healing arts. In 1969, HEW estimated that there were as many as 31,308 in-patient health facilities in the United States with a total of more than three million beds. These include 7845 hospitals, 19,646 nursing and related homes, and 3817 other facilities such as homes or resident schools for the blind and deaf, dependent children, unwed mothers, physically handicapped, mentally retarded, emotionally disturbed and others. These statistics indicate the size of the health care industry within the exclusive context of bedded and boarded patients.

What then of the ambulatory patients who ever more frequently are finding their way to the emergency rooms of large medical institutions or are looking to the small neighborhood health care center for preventive medical care? Ambulatory services are increasing at a prodigious rate, creating vast problems of response in terms of facilities and a tie-in to the overall health care system.

So far little interest has been shown in evaluation and research into new types of facilities for ambulatory services, community health centers and group practice. They are often summarily described as standard physicians' offices in triplicate, miniature clinics or glorified emergency departments, yet they present a unique design problem. These facilities focus on health, not sickness, on comprehensive family care, not on categorical diseases. Here the nurse practitioner, social worker or paramedic functions as the principal link to the patient while group education, counseling and preventive care provides the focus for services.

These emerging and expanding activities require multipurpose, flexible space geared to advances in communications, audiovisual systems and diagnosis. This concept of health care already has been implemented and is expected to grow. A regional system of satellite community health centers operated by nurse practitioners is functioning with success in Colorado. In New York the Family Medicare System, operated by nurse practitioners and social workers, has gained widespread public acceptance.

The profit makers

While the argument of profit versus nonprofit facilities rages on, the for-profit hospital corporation has become a rapidly growing force. These corporations now control 5 percent of the nation's 1.6 million hospital beds, and predictions for the next two years indicate a rise to 10 percent. In changing its mortgage insurance program for hospitals, the federal government has given recognition to for-profit facilities. Proprietary or profit-making sponsors can now apply for mortgage insurance if they can prove a need for new or improved hospital facilities and can operate them properly.

Because of their nationwide involvement both as a purchaser and as a seller of services, the for-profit corporations have a unique opportunity to make new breakthroughs in management as well as facility construction. To the architect they represent a potential for innovation in health facility design. Availability of more complete operating data and more advanced data processing techniques will be reflected in the programming of space requirements and cost effectiveness studies. Fast-track scheduling, negotiated contracts, building systems and components using new methods and materials not always acceptable to public or government agencies can have their initial application in for-profit hospital construction.

As in any private industry, hospital corporations are capable of more careful scrutiny of overall facility operation including purchasing, introduction of automation and the selection, use and retention of personnel. Scheduling work, bulk buying of materials, provision of centralized support services such as warehousing, laundry, preparation of food, etc., permit additional savings. With 10 years of experience behind them, hospital corporations are now entering a new field—that of selling their management expertise to nonprofit institutions and actively seeking ways to enter the HMO field with management techniques and services.

Where the money is coming from

The golden years of the Hill-Burton program have made us fat and lazy, and the habit of looking first to the government for potential financing is firmly established. Today, although the well is not dry, it is running low, and the administration would like to entirely eliminate the traditional program of grants in favor of a system of loan guarantees and subsidies. While a subsidized-guaranteed loan is still far from cash on the barrelhead, it does force the hospital to make some hard distinctions between those activities which generate surplus income and which therefore can retire debt, and those expensive activities which hospitals have traditionally carried at a loss as public service. The generally small proportion of project financing available through federal grants, combined with the red tape restrictions and long waits involved in securing federally guaranteed construction loans, have created an expanded market for private money lenders.

Many hospitals have found that by getting financing through private sources they could be under construction sooner and proceed more freely; despite the higher interest rate paid to the private lender, they came out money ahead through savings in cost escalation and by speedier capital accumulation. The rule of thumb for capital financing among hospital administrators used to be: one-third borrowing, one-third accumulated capital and one-third private subscription. Today, the rule of thumb seems to be, two-thirds borrowing, one-sixth accumulated capital and one-sixth private subscription.

As voluntary hospitals secure more of their dollars from the private money market, they are forced to compete on a more strictly business basis with for-profit institutions. This equalization of sources of financial support between the traditionally subsidized voluntary institution and the tax-paying for-profit hospital will continue as communities begin to charge hospitals for services in lieu of taxes and as the unionization of hospital personnel continues. The need for more rational planning and more sensitivity by planners to values for money spent grows more urgent—and the impact of an economically irresponsible decision finds its way back to the consumer.

Architects as members of the team should be aware of where the money comes from and should appreciate the herculean effort that the board and administration must make to obtain it. Planning and development of physical facilities must go hand in hand with the fund raising effort and both should be adjusted in the light of the other realities.

New financing methods have recently been established by HEW for the Hill-Burton program making available direct loans and loan guarantees with a 3 percent interest subsidy. The HEW position is, "Heretofore, Hill-Burton has been primarily a formula grant-in-aid program and this will continue, but far greater assistance will be made available through the direct loan and loan guarantee setup. Under the new regulations, high priority will be given to out-patient facilities including neighborhood health centers which will serve rural or urban poverty areas. Out-patient projects in these areas may receive federal assistance of up to 90 percent of total cost. The emphasis is being placed on out-patient facilities in an effort not only to lessen the demand for more expensive in-patient facilities, but also to help hold down the cost of health care. Under the new rules, each state will have a three-year loan authorization allotment from which it can approve loan guarantees for nonprofit sponsors and direct loans for public sponsors."

The HMO program usually identified with the Nixon administration is receiving bi-partisan support as evidenced by "The Health Maintenance Organization Assistance Act" introduced by Senator Edward Kennedy and seven co-sponsors; this would provide assistance for health maintenance organizations and area health education and service centers.

Where is the data?

Much remains to be done in fundamental research into facility design and use. Obvious technological innovations such as miniaturization, computerization, distant diagnosis, etc., will have their impact. Much of the research that has been done *and* reported has been superficial, unsystematic and inadequate. It has not dealt profoundly with the major trends affecting the health care system. Architectural firms and medical programmers find no ready body of research data to help solve their technical difficulties. Most of the research in the past has been devoted to hospitals, with little attention being paid to other types of facilities.

It is estimated that only $75–$80 million, or .001 percent, out of a total health expenditure of $70 billion in 1970 went for health services research. The amounts of money spent annually on health facilities research is not known exactly but continues to be negligible.

Aware of this deplorable deficiency, the New York Chapter of the American Institute of Architects initiated in 1966 the idea of a national free-standing nongovernmental organization devoted to fundamental, systematic, continuing and coordinated research. The idea, with national support from the AIA, was pursued through several channels including an AIA Task Force and Study Group to the point of eventual joint funding from the Educational Facilities Laboratories and the Commonwealth Fund for preparation of a comprehensive proposal for Health Facilities Research, Inc. Efforts toward major funding of this national organization are now in progress. Substantial evaluation programs would be a main thrust of HFR's activity. This aspect has been seriously overlooked in the past and could make a major contribution in improving future facilities. Additional categories of research recommended: facilities for a changing system; financing, costs, implementation, obsolescence, remodeling, planning and design methodology, industrialized building technology, standardization, codes, influence of bio-medical and technological advances and analysis of functional systems.

It is an interesting paradox that while we talk of the unique complexity of hospital design and of the need to define the problem more precisely before searching for solutions—the fact is that only the most general solution is appropriate for today's rapidly evolving hospital. Studies have identified the most universally interchangeable room sizes. Computer programs search out the "best-fit" planning and structural module as related to a predetermined program of spaces. These attempts allow designers to solve the first generation user's problem without penalizing the second and third generation users who will actually function in the building throughout the major portion of its life. Many users from design phase are gone by the time building is completed, so parts of the building are often obsolete and unacceptable before it is finished.

Fascination and frustration with automation in materials handling continue without generally accepted evidence to either prove or disprove its worth. Electronic communications systems—from the technologically exotic to simple, but ingenious, light-locater systems—seem to offer the most exciting possibilities for design freedom in the near future. Nurses and other personnel can be located and directed to any point of need from a single communications center in the hospital. Thus one limiting criterion in nursing floor design—distance from the nursing station to farthest patient room—can now be eliminated. Coordinated systems of components are being developed to solve some of the vexing problems of storage, transportation, furnishings and maintenance.

Evolution through systems

Although there has been no frank revolution in health facility design, a distinct evolution has been taking place. It entails less preoccupation with "ideal" components, more interest in flexibility and cost control, and more appreciation of what is appropriate. A systems approach to design, one that places primary emphasis on flexibility and expandability, has proved most fruitful. Sophisticated systems of interstitial space and unit theory have evolved from simple beginnings such as the utility corridor and service grid. A well-conceived system of interstitial space, of intermediate levels which provide for mechanical, electrical and plumbing services separated from prime space, can produce a building adaptable to change during the construction phase and throughout its life.

Integration of mechanical and structural systems permits longer spans and more flexible use of prime space. Initial ease of installing utilities, design/construct scheduling, more flexible contract planning and time gained in the design process through separation of structural and mechanical systems from final interior planning can considerably reduce initial construction costs. Savings in operating costs attributable to simplified maintenance and increased flexibility of space use have become dominant issues in cost effectiveness and cost benefit studies.

Unit theory design, based on the building block concept, achieves the combined objectives of cost control and ultimate flexibility by synthesizing several building design and construction techniques. It is equally applicable to programs for expansion of existing facilities as to new construction. A basic planning and structural module or subassembly which responds to the constraints of particular program requirements, while at the same time retaining the architect's essential options in arrangement, saves money by repetition in the structural system, functional and mechanical flexibility and accelerated project management. The next step in achieving the fullest benefits from these techniques is "systems building."

Since the SCSD school building program was initiated in California in 1963, a few systems schools have been built.

Until recently, systems building had not been widely tested in hospital construction. Now, however, a number of hospitals are being "systems built." A national hospital management chain has started a continuing construction program in which each major subsystem will be negotiated with manufacturers and purchased directly on a package basis. Because of the chain's volume potential, this approach will be extended to the purchase of packaged equipment, furnishings and supplies.

The result will be new or expanded community hospitals of 150-250 beds, complete and in operation 18 months after the start of programming, and constructed at a cost some 25 percent to 30 percent below that of similar construction by traditional methods. Interestingly enough, this particular approach to a system is totally off-the-shelf, using many of the same subsystem packages developed for the SCSD program. There is no need to wait for "hospital systems" to be developed. They are here and architects have only to develop the skill necessary to use them appropriately.

Design of individual hospital components has reached a very high level—so high, in fact, that standardization, both in design and technology, represents a major trend. On the other hand, the skills we use to define the planning problem and to put the puzzle together seem to be little changed from the mix of empirical judgments and intuition that architects have relied on for generations. This seems unfortunate and unnecessary at a time when so many objective and rational techniques, available from fields such as industrial engineering, systems and value analysis, could be applied to hospital construction.

In 1968, the Division of Direct Health Services of the U.S. Public Health Service commissioned several teams of systems and industrial engineers, architects and health administrators to perform "systems studies" on the existing PHS hospitals scheduled for remodeling or replacement. While industrial engineering approaches to the improvement of hospital operation had been in use for several years, this study represented the first and most comprehensive application of these techniques to the design or renewal of a total hospital facility. In every case the results demonstrated potential savings in construction and operating costs over those incurred through traditional methods. One project, a program for replacement of the Galveston, Tex. PHS Hospital, indicated savings of 12 percent in construction costs and 15 percent annual savings in operating costs.

The systems study approach used quantitative techniques to identify and refine the systems for the hospital—not the form—such as functional areas, movement of people, materials and information. Working up from the lowest functional level, the benchtop, it identified all available alternatives and cost-benefit trade-offs with respect to: function and environment, objectives and performance requirements, work center and work station requirements, constraints and influences, functional area interfaces, traffic flow and density, work loads, frequency and density of schedules, costs of staffing personnel, operation and construction.

At each succeeding functional level, cost trade-off alternatives were tested and tentative commitments to "best bet" solutions were made until the "ideal" pieces were assembled into a functional, cost-effective whole. The Galveston projects were reported in P/A (Mar. 1970).

The obvious lesson to draw from this demonstration is the undeniable usefulness of systems and industrial engineering techniques in hospital architecture. A less obvious lesson, apparent mainly to the participants in the studies, is the fact that, in the final analysis, the intuitive skills of the architect proved just as critical to success as the tools of the engineers and systems analysts. Through gaming and other interactive techniques, the subjective and scientific met and combined to produce a result which was at once humane, functional and cost-effective.

The handful of firms which took part in these experimental studies came away from the experience with an arsenal of new and potent tools for better service in hospital planning and design. The process and results of their work are generously documented and would provide valuable guidelines for all health service and health facility planners. Unfortunately, the results have not been published or made available to the public. With the future of the PHS Hospital System in doubt, it seems likely that the results of this major and significant effort to advance the state of the art will remain unread forever and unused in a dusty filing bin.

Fire detection systems in hospitals

Wolfgang Kretschmann

An effective fire detection system for all areas in a hospital is a vital consideration in improving fire safety codes for all high-rise buildings

As a result of recent high-rise office building fires, many cities are revising their fire safety codes, with the following objectives:
1 Developing a means of detecting fire in its early stages.
2 Having an efficient communication system between the fire command station in the lobby and the individual floors, elevators and stairs for proper crowd control.
3 Controlling smoke spread and evacuation.
4 Recalling elevators automatically to the terminal point.
5 Compartmentalizing the building to confine fire and smoke.

To date, most of the effort has been concentrated on office buildings. Very little has been done to review and improve fire safety codes for hospitals even though many hospitals fall into the category of high-rise buildings. However, because of the nature of hospital occupancy, it is even more imperative to have an effective detection system for all areas.

Present codes outline only the minimum requirements for fire and smoke detection systems. Therefore the design team must decide whether to provide only the minimum protection of the codes, or to provide a system with maximum protection. Many times a decision is based on economics rather than life protection. Many features inherent in the proposed code revisions for high-rise office buildings are applicable for hospitals. For example: detectors in all air supply and return/exhaust systems; detectors in elevator lobbies; an elevator recall system; a fire alarm signal and voice communication system.

A fire usually occurs in the following sequence: first, combustion gases; then smoke, followed by flame and high heat. Fire detection must occur during the first two stages. Therefore, ionization-type detectors, which sense invisible products of combustion, are generally preferred.

There are certain strategic points at which detectors must be located to assure the greatest possible area coverage:
1 At the supply fan discharge.
2 In corridors at smoke barrier doors which compartmentalize the corridor floor areas into safe refuge areas.
3 In ductwork passing over smoke barrier doors.
4 In exhaust/return ductwork at each floor where it enters the shaft.
5 In elevator lobbies.

Normally a building is divided into fire zones to limit shutdown of equipment to the affected fire zone only. Smoke and fire detection control boards, fire communication control panels, and the smoke detection annunciator panel should be located at the fire command station which could be in the mechanical control data center.

Actuation of any detector should sound an alarm and illuminate the respective zone indication lamp at the smoke and fire detection control panel. One possible means of alarm indication is to actuate a code transmitter in the fire alarm panel to sound distinctive zone-coded signals on unit gongs of the affected fire zone, and general gongs elsewhere in the building.

Actuation of any duct detector in a fan casing should also shut down the affected fan system, illuminate the respective fan system indication lamp in the remote annunicator console at the mechanical data center, and record on a printer in the remote annunciator console the time, date and fan system activated.

Actuation of any space detector at smoke barrier doors should also:
1 Close all smoke barrier doors in affected fire zone.
2 Close all smoke dampers in ducts over all smoke barrier doors in affected fire zones.
3 Shut down all fan systems with detectors either in ducts or casings that serve affected fire zone.
4 Illuminate respective barrier door indication lamps in remote annunciator console.
5 Record on a printer in a remote annunciator console the time, date and door location of detectors activated.

Actuation of any duct detector in exhaust/return ducts entering the shafts within the same fire zone should also actuate equipment as outlined under 1, 2 and 3 above, illuminate the respective floor and quadrant location of the activated duct detector on the control console and record on the printer in the console the time, date and duct detector activated.

Detectors could be zoned as follows: an individual zone for each detector in the fan casing; an individual zone for all duct detectors and space detectors at smoke barrier doors on a floor basis; an individual vertical zone for all space detectors in elevator lobbies serving each elevator bank.

Actuation of any space detector in the elevator lobby within the same fire zone should:
1 Actuate the same equipment outlined under 1, 2 and 3 for space detectors at smoke barrier doors.
2 Illuminate the respective detector indication lamp in the remote annunciator console.
3 Record on the printer in the console the time, date and individual space detector activated.
4 Automatically return all elevators in the affected bank to the main lobby.

Author: Wolfgang Kretschmann is an associate with Syska & Hennessy, Inc., Consulting Engineers, New York City.

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Side effects of fire

Harold J. Rosen, PE, FCSI

Although many codes exist to guard buildings against fire, contents of buildings have been largely ignored until recently. The hazard they offer is receiving an increasing share of concern, scrutiny and code improvement

Some architects may be lulled into a false sense of security when they design structures which meet building codes for fire safety. Despite the seemingly fire resistive construction of buildings, there have been serious fires with high fatalities due, in quite a few cases, to the production of toxic gases and smoke. In many instances, the contents of the building rather than the materials used in its construction have been the culprits. Such furnishings as floor coverings, furniture, draperies and curtains are often designed and selected by architects, and their design is not always governed by codes. In case of fire, they produce noxious and lethal products of combustion.

Fire statistics reveal that a large percentage of deaths are due to the products of combustion—carbon monoxide, carbon dioxide, hydrogen chloride, hydrogen cyanide and oxides of nitrogen. Primarily these noxious gases are by-products of the burning of polymers and plastics used in furnishings and which have been recognized recently as having adverse affects on body functions.

Materials which contribute to the formation of carbon monoxide are polyethylene, polystyrene, wood, cellulose and acrylic fibers. When polyvinyl chloride decomposes as a result of burning, one of the major by-products is hydrogen chloride. Acrylic fibers produce hydrogen cyanide when burned.

Gradually some of our major codes are recognizing the dangers of smoke and toxic fumes and are limiting the amounts of toxic combustion products for materials used for interior finishes of structures. Furnishings, however, are not included in code requirements. On the subject of toxicity, the New York City Building Code now requires that "no material shall be used in any interior location that upon exposure to fire will produce products of decomposition or combustion that are more toxic in point of concentration than those given off by wood or paper when decomposing under comparable conditions." Unfortunately, a specific test method to determine this degree of toxicity is not cited in the code nor in other codes where similar requirements have been established. There is, however, an animal inhalation test that is used; albino rats in a special chamber are subjected to the fumes resulting from the burning of a sample. The animals remain in the chamber for a given time, then are removed and observed for a specific length of time to determine any ill effects. Death, weight loss and/or pathological lesions in the respiratory system indicate failure to meet the toxicity test. When smoke density is cited in the codes, the usual method to determine acceptance is the tunnel test, ASTM E84.

Since toxic gases and smoke are responsible for many deaths, fire authorities are seeking ways to restrict the use of certain products that are major contributors to the development of these by-products. To reduce the possibility of fires starting and spreading, a fire safety advisory was issued in New York City recently to cover such furnishings as carpeting, furniture, upholstery and drapery fabrics. As a general guide it recommends the use of carpeting and carpet underlayments with low flame-spread and smoke-development ratings, with stricter standards for carpeting used in exits and corridors; furniture constructed of a high proportion of noncombustible materials or of fire-retardant treated wood; self-extinguishing upholstery, plastic materials and glass fiber drapery lining, and curtain fabrics or draperies and curtains which have been certified by the manufacturer to be safe against fire. This new advisory, although not mandatory, applies to office buildings more than 100 ft high.

While the advisory states that its major consideration is to reduce the fuel content and fire load of buildings, by the very nature of its restrictions it also reduces the types of materials that produce toxic gases and fumes. In the absence of adequate standards, the following criteria for test methods and references are established. Upholstery materials including covering, lining, webbing, cushioning and padding are required to be self-extinguishing as defined by Fed. Spec. CCC–T–191, Method 5903. All self-supporting plastic material is required to be self-extinguishing as defined by ASTM D635. Fire-retardant treated wood is to be pressure treated with fire-retardant chemicals in accordance with ASTM E84. Carpeting, backing and underlayments are required to pass the Department of Commerce Standard FF–1–70 (methanamine pill test) except that only noncombustible floor coverings are recommended for exits as defined in the building code.

In the last few years there has been a growing awareness of the hazards of certain polymers and plastics used in building construction and furnishings and their contributions to toxic gases when consumed by fire. In addition, there has been a greater interest in improving the fire safety of high-rise structures. In both instances there is a need to examine and improve our understanding of factors having to do with fuel loads, and calorimetric methods to determine heat potential and heat release. As we increase our knowledge of these criteria, we will be better able to develop materials, products, test standards and references that will reduce and contain fires and the toxic products of combustion.

Author: Harold J. Rosen is Chief Specifications Writer of Skidmore, Owings & Merrill, New York City.

The unlicensed architect

Bernard Tomson and Norman Coplan

When an architect, licensed in one state, contracts to offer his services in another, the contract may be unenforceable. However, circumstances or interpretation of the law may result in such contracts being valid

The professional licensing and registration laws of most states prescribe penalties for a violation of their provisions. A person who practices architecture without a license may be subject to criminal prosecution. Perhaps a more compelling penalty arises from the fact that a contract for furnishing architectural services, entered into between an owner and an unlicensed individual, is illegal and will not ordinarily be enforced because it is against public policy. The consequence of such an unenforceable contract is that the unlicensed individual will be unable to collect compensation for the services he has rendered to the owner, if the owner refuses to pay.

On occasion, contracts for furnishing professional services by an unlicensed individual have been enforced either as a consequence of liberal judicial construction of statutory language or because of unusual circumstances. For example, in Idaho, an architect who was licensed only in Washington, but who entered into a contract for furnishing architectural services for a building to be constructed in Washington, was awarded his fee by an Idaho court on the premise that since the plans were prepared in Washington, the plaintiff was not practicing architecture in Idaho (*Johnson* v. *Delane,* 77 Idaho 172). In an Illinois decision, an architectural partnership was granted recovery of its fees, although only one partner was registered in the state where the work was performed, on the ground that the licensed partner had supervised the preparation of the plans, and, therefore, the court concluded the statute had not been violated (*Haynes* v. *East St. Louis Council,* 258 Ill. App. 38).

A recent New York decision found another exception to the general rule that an unlicensed individual rendering professional services may not recover his fee. The facts in this case (*Wormuth* v. *Lower Eastside Action Project, Inc.,* 167 N.Y. L.J. 62), involved a contract between an architect licensed in Louisiana but not in New York, for furnishing architectural services in connection with a New York project. The owner refused to pay the Louisiana architect's fee after he had completed his performance. The architect instituted suit and the owner moved for summary judgment, contending that the architectural contract was void, as against public policy, and therefore, the complaint must be dismissed.

The plaintiff argued that he had advised the owner he was not licensed under the laws of New York, and that the application for the approval of architectural plans and designs by various governmental departments would be submitted by a professional engineer licensed under the laws of New York and associated with the plaintiff. He further asserted that such a procedure was not unusual and that it was customary for prominent and able architects not licensed in New York to retain a New York professional engineer or other architect to secure official approvals required by the laws of New York. The court, in rejecting the motion for summary judgment, in a divided opinion, stated the following:

"Given the custom described in the opposing papers and the fact that defendant knew that plaintiff, a state of Louisiana architect, did not have a New York license yet availed itself of his services as architect, defendant is not entitled to summary judgment.

"Defendant waited until plaintiff's services were completed and then raised the question of the license to avoid payment. In these circumstances, the parties are in pari delicto. While plaintiff should not have practiced architecture in this state without a New York license, defendant should not have knowingly called upon him to do architecture work with respect to a New York building without a New York license.

"Accordingly, assuming the facts as presented by plaintiff, defendant would be estopped from invoking the defense that plaintiff is not licensed in New York. . ."

In a dissenting opinion, a minority of the court reached the conclusion that summary judgment should have been granted and the complaint dismissed. The minority, in response to the argument of the plaintiff that the owner would be unjustly enriched if he was not required to pay the architect's fee, said that this was a consequence which could not be avoided else the licensing laws would be meaningless.

The plaintiff had also argued that since the plans were sealed by a New York licensed engineer the licensing law should not be so technically construed as to prevent a world famous architect from coming to New York to design a particular project. In rejecting this argument, the minority opinion pointed out that the licensing law authorized the issuance of a temporary permit to an out-of-state architect for a specific project.

The question of whether licensing laws are too inflexible, or judicial construction of those laws too liberal, is dependent upon one's point of view. It is, however, an unhappy fact that such laws and their interpretation do not afford a complete and precise formula for what constitutes lawful or unlawful activity in the professional practice of architecture.

Authors: Bernard Tomson is a County Court Judge, Nassau County, N.Y., Hon. AIA. Norman Coplan, Attorney, is Counsel to the New York State Association of Architects Inc./AIA.

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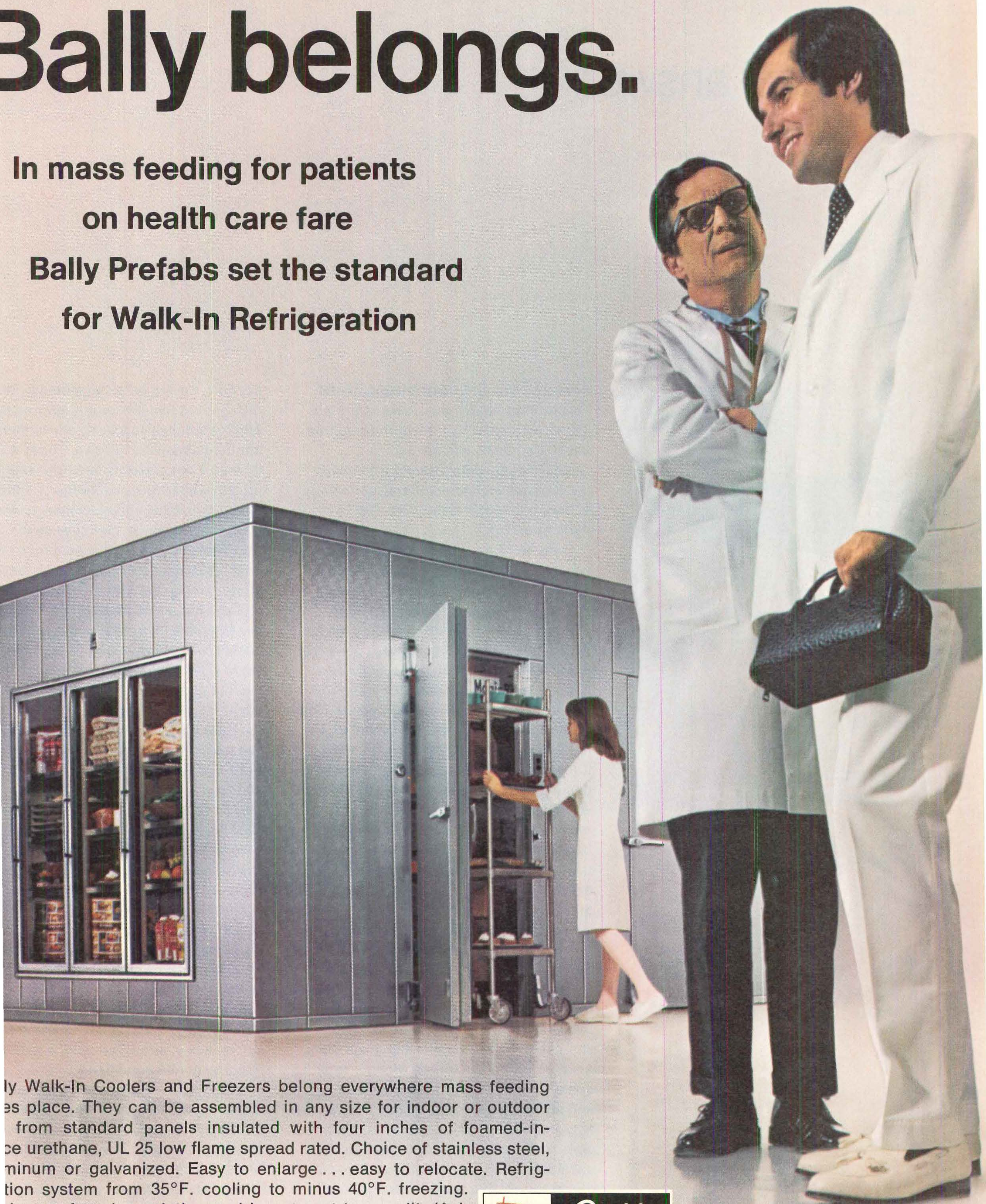

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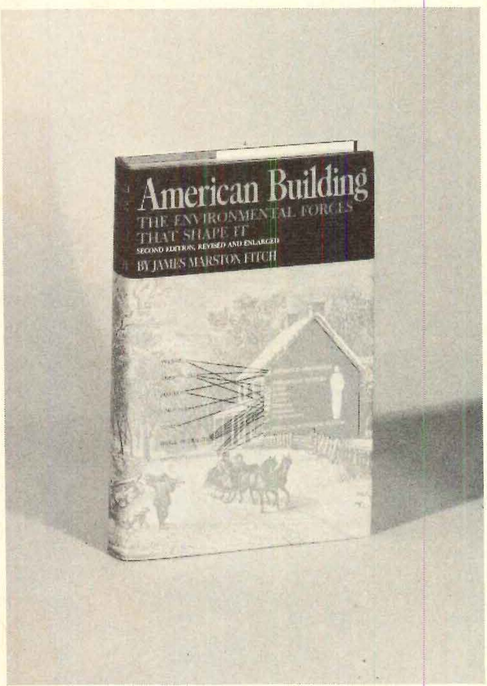

American Building: The Environmental Forces That Shape It *by James Marston Fitch. Second Edition. Boston: Houghton Mifflin Co., 1972. 349 pp. $15.*

Reviewed by Henry Wright who heads the program in environmental technology at the School of Architecture, The City College, New York.

Every so often, a book comes along which changes the whole direction of architectural thought. It is too early to say whether the second volume of James Fitch's study of American building will be such a book, but not too early to hope that it will. For a generation that is actively questioning even the need for architecture, Fitch provides a total answer. The task of architecture and city planning, as he sees it, is to "intervene in man's favor" through adroit manipulations of the whole gamut of environmental factors and forces which constitute the ultimate and abiding reason that buildings are built. He thus confronts head-on the unease arising from the fact that we are significantly less successful in our performance of this task than the Pueblo Indians.

Professor Fitch—whom I regard as one of the leading architectural theoreticians of our time—has reached real maturity since the appearance, almost 25 years ago, of the work on which the present book is based. Swimming against the tide has sharpened his arguments and given them greater coherence and conviction; separation of the original work into its historical and environmental aspects has immeasurably improved its organization. A great deal of work has gone into updating the examples used to sustain the volume's arguments and, in true dialectical fashion, this has resulted in refinement and amplification of the theoretical propositions they support. Having been neglected by his own generation and largely ignored by one immediately following, the author i about to come into his own. Today's yo if I read them correctly, are ripe for an proach which "puts it together" in the Fitch indubitably and convincingly doe

Candor, however, compels me to rec nize that wholehearted acceptance of Fitch's formulations would constitute a about-face on the part of the academic tablishment, an establishment that has considerable influence on the young, e pecially in matters of theory. During th years while Fitch's ideas have been ma ing, the architectural history scene has been dominated by the effort to exorci the Bauhaus influence—an effort whic has turned "functionalism" into a dirty word signifying shoddy curtain-wall co struction and rendering all sorts of hal gested notions acceptable on a "lesse evil" basis. And—make no mistake abo it—what Fitch has for sale is functionalism—functionalism in the fullest, rich sense of the term. A few quotes will su to show how rich:

"Good architecture, by this standar would be that which permits man to *fo* his energies on whatever he is doing, whether running a lathe or listening to concert, writing an essay or recoverin from surgery. The ultimate criterion w not be lack of stress but optimal well-b under concrete conditions. . .

"Not only is [the] modern architect largely insulated against any direct ex sure to climatic and geographic cause effect, he also seems persuaded that i longer affects him. . . . The central rea for this failure is lack of adequate theo cal—one might properly say, philosop

[continued on page 106]

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FOOTNOTES TO CHART:

(1) All given value of 1.1 for calculations. Different thicknesses of glass interlayers and metallic coatings will have insignificant effect on "U" value.

(2) No indoor/outdoor shading—Summer Value.

(3) 216 total solar BTU's—(Based on 1967 ASHRAE Handbook of Fundamentals—July 21—4 p.m.—west exposure —32° North Latitude)—Times shading coefficient. Average temperature for July 21—4 p.m.— is 93.6 degrees, with 72 degrees inside air temperature, there are 21.6 conductance BTU's to be added—Times the thermal "U" value of 1.1 = 23.76. Maximum BTU gain per square foot of vision lites—west exposure.

(4) ASG performance values taken from published data and authenticated by test reports from recognized testing laboratories. Names of specific data and laboratories provided on request.

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10GI—Gold	8	.28	.07	21
20GI—Gold	17	.30	.13	34
35GI—Gold	32	.32	.26	63
10AI—Silver	8	.30	.12	32
20AI—Silver	17	.31	.24	59
10CI—Chrome	8	.46	.19	51
20CI—Chrome	17	.48	.34	83

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	Visible Light Trans.%	Thermal "U" Value (Summer)(1)	Shading Coefficient (2)	Total Solar Heat Gain in BTU's (3)
10GL—Gold	10	1.1	.15	56
20GL—Gold	20	1.1	.24	76
35GL—Gold	35	1.1	.47	126
10CL—Chrome	10	1.1	.31	91
20CL—Chrome	20	1.1	.46	123

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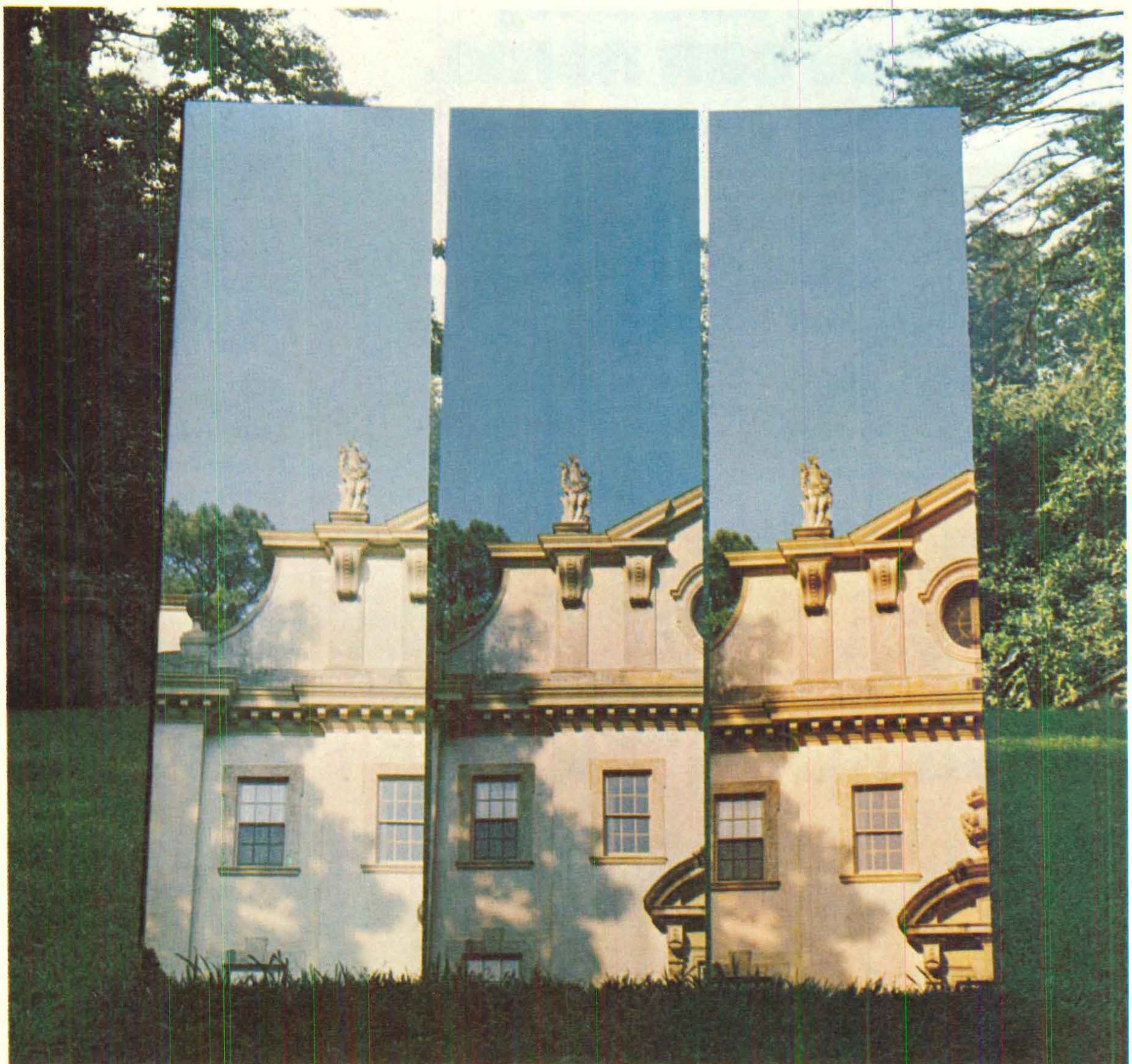

Ambient light was eliminated in the rear of the glass to show actual appearance as glazed in a building facade. Left to right: Silver, Chrome and Gold.

Books continued from page 100

ical—apparatus. It is expressed in his consistent underestimation of the magnitude of the environmental forces which play upon him, his buildings and his cities; in his failure to grasp their ineluctable unity; and in his persistent tendency to overestimate his own technological capacities for overriding or ignoring them. . . ."

The key concept around which the book is organized is embodied in the word *experiential*—a word which proofreaders have a tendency to change to "experimental" or something else familiar. It is a perfectly good word, one defined by the American College Dictionary as "pertaining to or derived from experience." The idea that a valid aesthetic evaluation of a building must be based on actually experiencing it (which Fitch shares with Rasmussen) dominates this edition of *American Building*. It is so central to all of the other concepts he presents that it is best to let the author state it himself:

". . . architecture—like man himself—is totally submerged in the natural external environment. It can never be felt, perceived, experienced, in anything less than multidimensional totality. A change in c aspect or quality of this environment in tably affects our perception of and response to all the rest. Recognition of th fact is crucial for aesthetic theory, abov all for architectural aesthetics. Far from being narrowly based upon a single se of perceptionlike vision, our response t building derives from our body's *total* r sponse to and perception of the enviro mental conditions which that building a fords. It is literally impossible to experie architecture in any "simpler" way. *In a tecture there are no spectators: there a only protagonists, participants.*"

Wholehearted promulgation of this v point (Fitch is never one to do things b halves) has led the author into knockd drag-out disputes with some of our mo masterly architectural photographers, by extension with the whole business c chitectural publishing. The communica tions industry has yet to devise means whereby we can hear the Baptistry at F or smell the Piazza San Marco, but nev despair. The Louisiana Superdome, fo stance, is about to provide instant repl on giant TV screens along with the exp riential sensations of actually attendin football game, thus dishing up the bes two worlds. A thing which even Fitch fa to mention is the intense awareness of surroundings which the tourist feels in novel environment, even when on a se country, 19-day tour. Supporting his b thesis, the Pantheon is almost nothing you are really in it, then, Wow!

In 1948, Fitch originated the concep that we live, not in a single homogene environment, but rather in a number o tinct environments which co-exist arou us: the thermal, atmospheric, aqueous minous, sonic and so on. In the curren volume, this idea has been expanded show that we respond to all these envi ments in several basic ways: metaboli perceptually and "structurally"—as wl we resist the force of gravity itself. Thus our response to the thermal-atm spheric environment is both metabolic bodies must supply heat to make up fo that lost through the skin, prolonged exposure to cold makes us shiver) an ceptual (we are instantly aware of tem ture changes). Awareness of this distinction is vital to any analysis of environmental conditions. We can ma room *seem* warmer by painting it red, this will not in any way prevent the shi ing that will commence if we take off c jackets and read for any length of tim

[continued on page 114]

those tall stories you're hearing about us are tr

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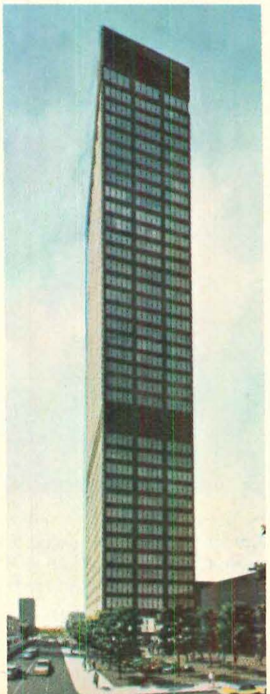
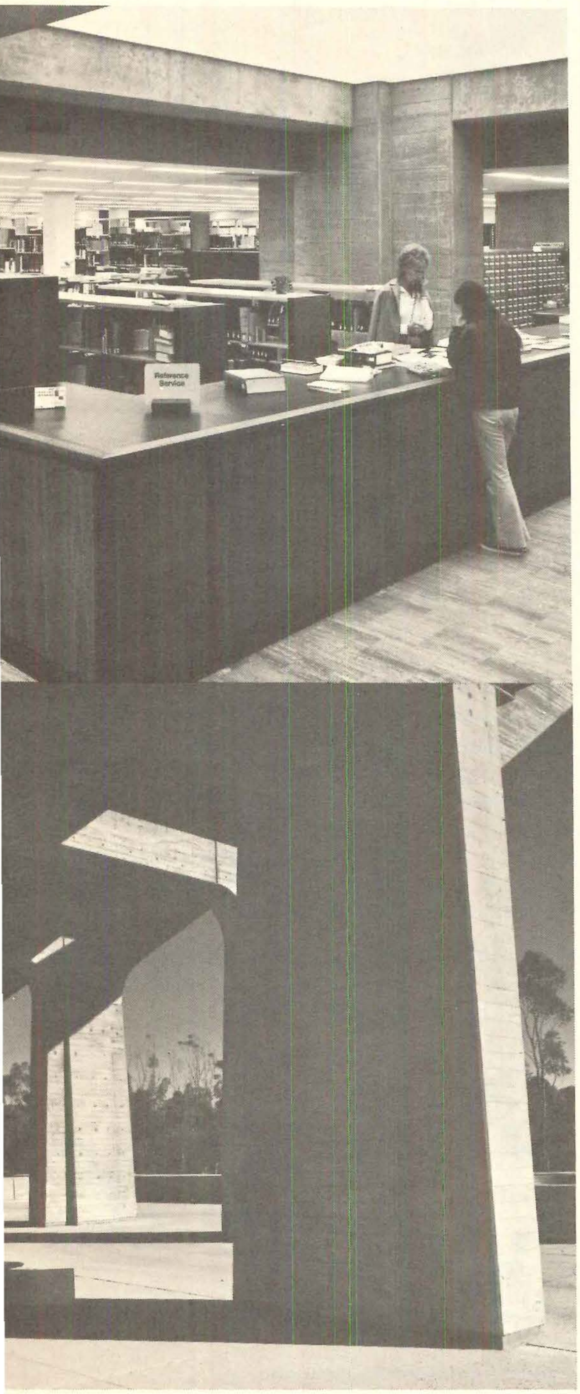


Left to right: National General Building, New York, New York, Leo Kornblath Associates / First National Bank Building, Louisville, Kentucky, Harrison & Abramovitz / Queen's Park Government Building, Toronto, Ontario, Gordon S. Adamson & Associates, Allward & Gowinlock Architects, Mathers & Haldenby Architects, Shore & Moffat & Partners Architects & Engineers.



The new library on the campus of the University of California at San Diego bears a striking resemblance to a contemporary pagoda. From a solid, compact base, its profile cantilevers outward to the fourth-floor level, then recedes to the roof line. The unique design will accommodate future seventh and eighth floors when expansion becomes necessary.

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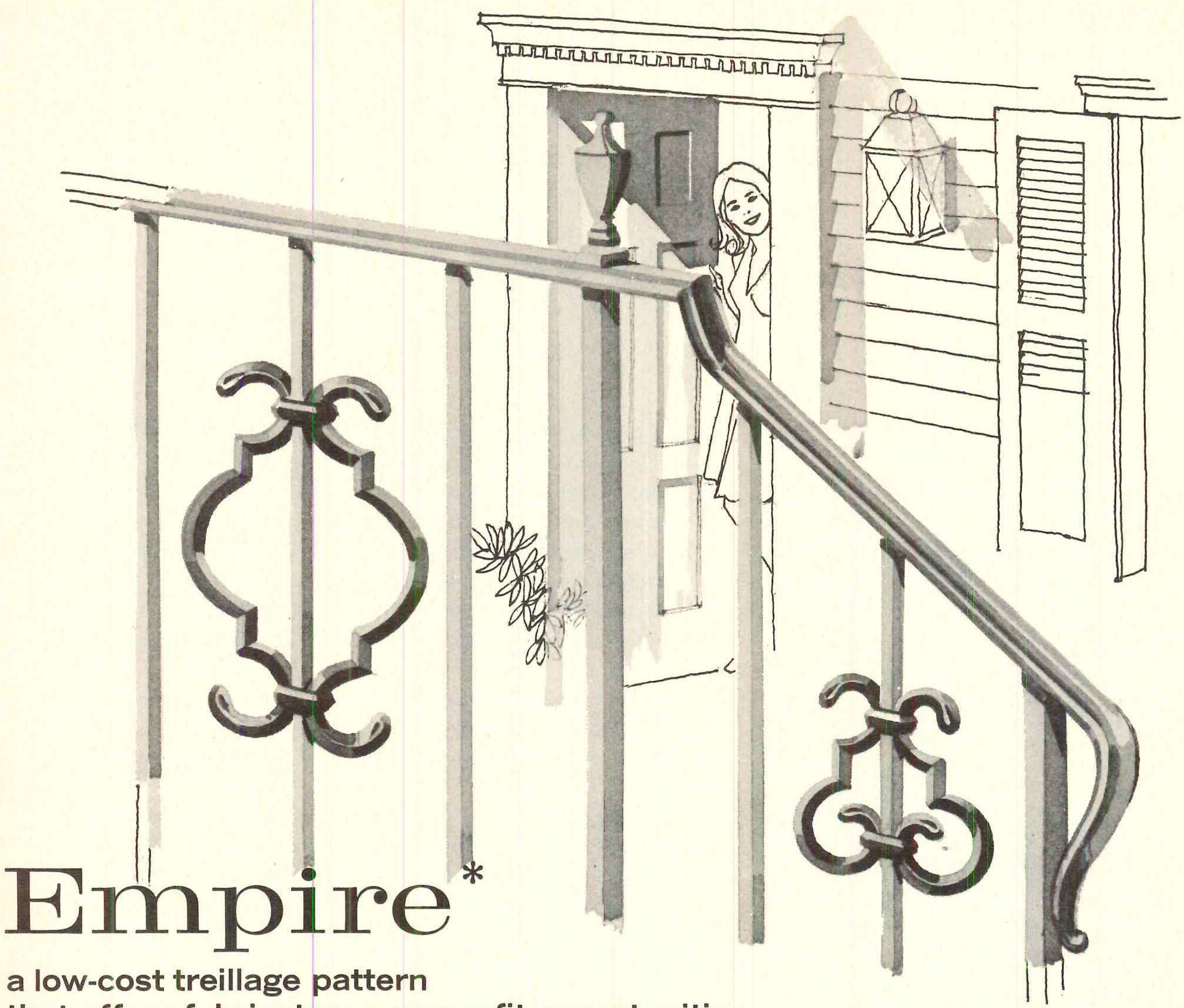

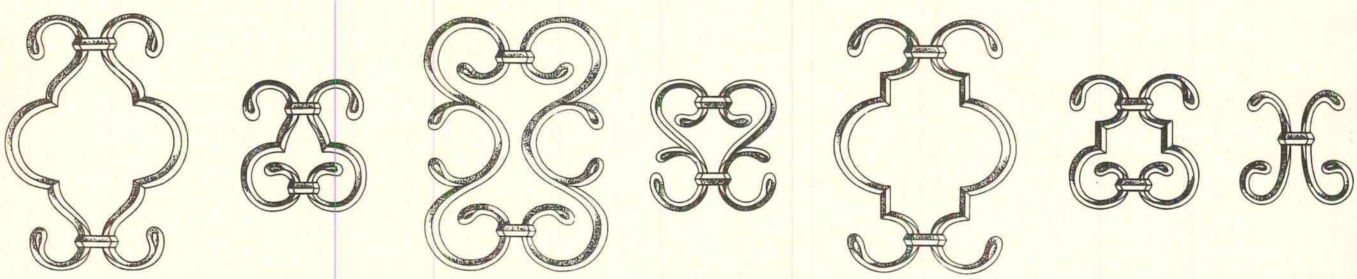

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Books continued from page 106

room that is actually cold.

Having chosen a vast canvas—the entire spectrum of human interaction with the proximate environment—Fitch covers it remarkably well. Besides chapters on light, heat and sound which include generous sections on seeing, feeling and hearing, other chapter headings include The Morphological Development of Structural Systems, Integration of Environmental Control Systems, Plan, the Instrument of Policy and Prospects for a Democratic Aesthetic.

Each chapter begins with a broad, carefully worked out statement of a number of paragraphs relating it to the central theme and sketching the background of the subject; the one introducing the chapter on the atmospheric environment is a masterpiece of generalization that is must reading for anyone who wants to do some serious thinking about pollution, since Fitch puts this currently interesting topic, with unusual accuracy, in its historical context.

It would be amazing if the author had undertaken a work of this scope without occasionally misleading his readers; no one can hope to be omnipotent on such a variety of subjects. Consequently, some of t resolutions are not as reliable as his ide fication of problems. An example is his handling of the complex question of wh happened at Philharmonic Hall, Lincoln Center, where he offers a less than conclusive answer.

It is also probably inevitable that the building art refused to sit still while Fitch worked on its portrait. Thus his biologic categories of endoskeletal and exoskele buildings, valid and meaningful as they are, should probably be expanded to include the type of building whose vital or gans have been *everted* to the outside, with the starfish who sports an exterior stomach. Anyone who has visited a recently built Holiday Inn, and enjoyed the view from a second floor balcony, know that the roof of the one-story public are looks like an exhibition hall for a convention of air conditioning engineers. A at a more sophisticated level, witness J hansen's Mummers' Theater. Outside "power" is What's Happening, Baby! It should at least have been mentioned.

If there is a significant criticism to be made of the book, it is that it is too fully packed. There is simply a limit to the nu ber of new ideas which can readily be a sorbed and digested from a single boo Overkill is a Fitchian failing: When *Ame can Building: The Forces Which Shape* first appeared in 1948, it resembled, ex as to size, an amoeba about to reprodu itself. Now that that division has been e fected, the author has added so much material that we might wish division to h pen over again. Since it has not, the so tion may be to read the present book in stallments, or several times, allowing suitable intervals for the ideas to perco It just *could* be a rewarding experience

Haussman: Paris Transformed *by How Saalman. New York: George Braziller, 1971. 128 pp. $5.95, $2.95 paper.*

How well Baron George-Eugene Hau man's plan for the rebuilding of Paris m the needs of its day is the question pos and answered in this informative volum Considering the controversy Haussma plan created at its time—1852 to 1870— that it has been in for a large share of p ning interest and discussion over the la 50 years, this reassessment is timely an welcome.

The book is illustrated with engraving plans and views. It is part of a series on "Planning and Cities" focusing on the h tory of urbanization.

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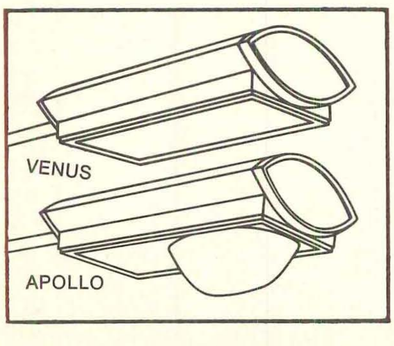

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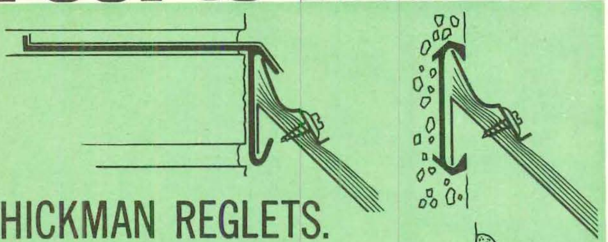

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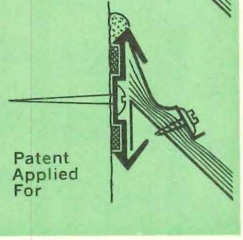

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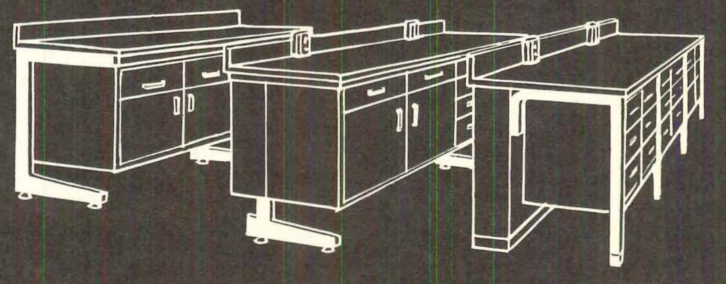

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Madden, Cooper, AIA, of Riverdale, Md.
rlington, Va.

nes R. Wilkinson, FAIA, has been
ed chairman of the board and chief ex-
e officer of Stevens & Wilkinson, Archi-
Engineers Planners, Inc., Atlanta, Ga.
m H. Barnett, AIA, was elected presi-
and **Minton V. Braddy, Jr., AIA,** was
ed senior vice president for trans-
tion and special projects. **Preston S.
ns, FAIA,** will head the new finance
ittee.

nald H. Tompkins has joined Eckbo,
Austin & Williams as a principal in the
Los Angeles office.

rald I. Li has been named an associate
ell Associates Inc. of Charlotte and
nsboro, N.C.

Zano Vannoni has been named president of City Planning Associates, Inc., Mishawaka, Ind., a division of Computer Sciences Corp.

William A. Plyer, AIA, has been named a director of the corporation for Shreve Lamb & Harmon Associates, PC, New York City.

Gary K. Adams, Joseph R. Daniels, J. Keith Greer and **Jim C. Kollaer** have been made vice presidents and principals of Ralph Kelman & Associates, Inc., Dallas, Tex. **Curtis V. Willard** was named an associate.

William C. McCulloch, AIA, has been named partner in the firm of Robert S. Borders, Architect, AIA, Los Alamitos, Calif. **Wayne Tennant** has joined the firm as graphic designer.

Donald S. Blair, AIA, has been elected president of the Compla Corporation, San Francisco.

New addresses

Turner, Rome, Cotten & Associates, Inc., 1743 Third St., Corpus Christi, Tex. 78404 and 1403 Seymour St., Laredo, Tex. 78040.

Abraham Rothenberg, 27 W. 53 St., New York, N.Y. 10019.

The Cannon Partnership, 2170 Whitehaven Road, Grand Island, N.Y. 14072.

RTKL Inc., Larimer Square, the Granite Building, 1228 15 St., Denver, Colo. 80202.

SMS Architects and **SMS Interiors,** 59 Grove St., New Canaan, Conn. 06840.

New firms

Dimension 3, Inc., 550 Park Square Court, St. Paul, Minn. 55101, with Cecil M. Tammen, AIA, as president.

L. A. Bailey & Associates, 100 Beeson Building, Edmonds, Wash. 98020.

Braun McClennen & Sze Inc., 18 Eliot St., Cambridge, Mass. 02138.

Michael L. Bobrow, AIA, Architecture & Planning, 116 South Lasky Dr., Beverly Hills, Calif. 90212.

John W. Tullock Jr., 68 Northumberland Rd., Pittsfield, Mass. 01201.

Name changes

Jack Rice Turner & Associates is now **Turner, Rome, Cotten & Associates, Inc.,** Corpus Christi and Laredo, Tex.

Haarstick, Lundgren & Associates, Inc. is now **The Lundgren Associates, Inc.,** St. Paul, Minn.

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(continued on page 124)

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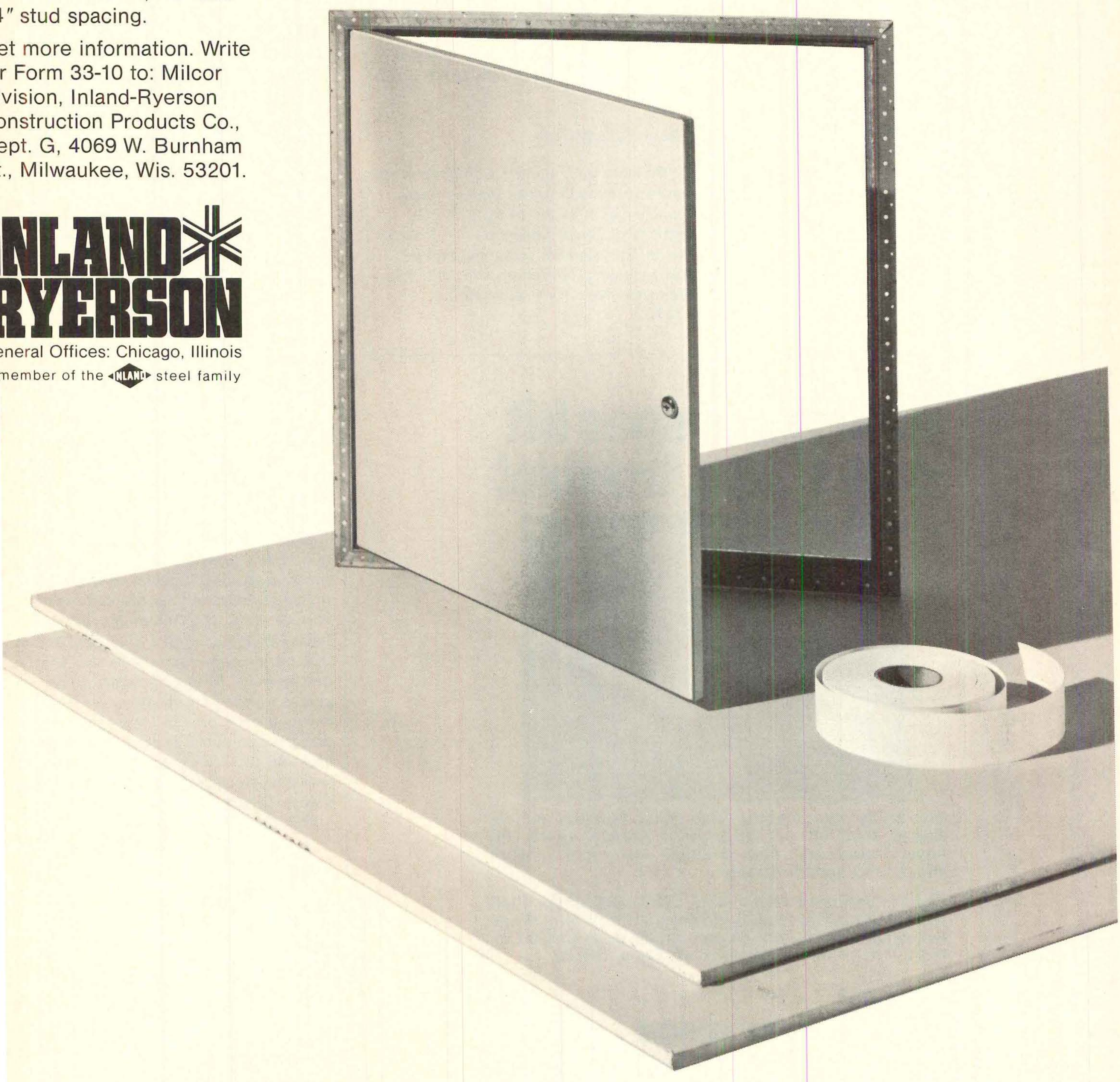

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Job mart continued from page 122

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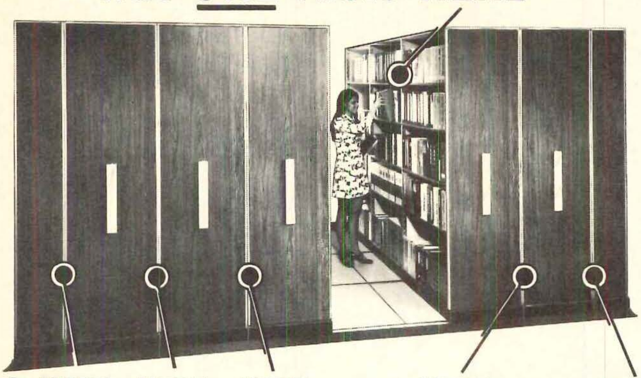

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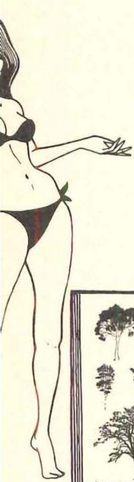

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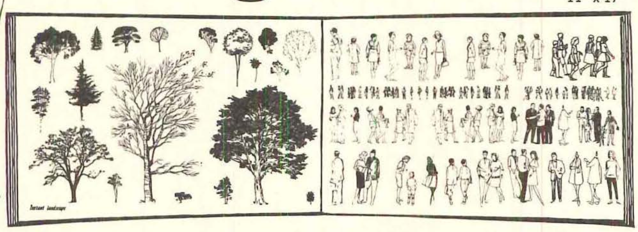

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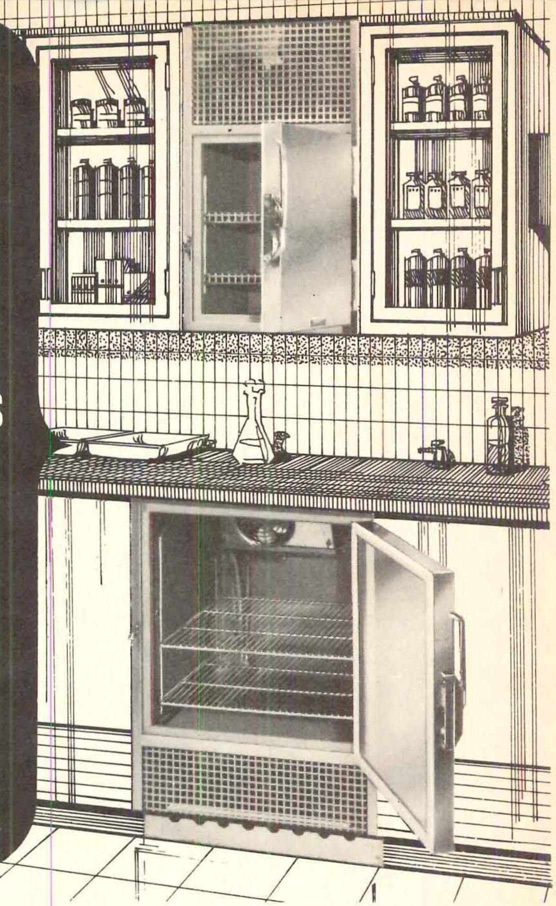
Jewett designs refrigerators for space-saving convenience



eye level (illus. model WM-CW)

In the lab, nurses station, operating room or other areas where space is at a premium, the Jewett wall-mounted, eye-level refrigerator solves the problem. Designed to fit flush with adjacent cabinet work in stainless steel or custom finished to your specifications. These space-saving refrigerators are of thin wall construction incorporating polyurethane insulation and an air-tight, thermo-break door seal. Single door models come in four sizes 18″ W. x 13″ D. x 30″ H. with 1.5 cubic foot capacity up to the 4.3 model with dimensions of 24″ W. x 18″ D. x 36″ H. Also available are double door models with capacity of up to 9.6 cubic feet.

under counter (illus. model UC-5-BC)

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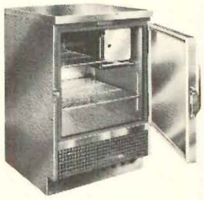
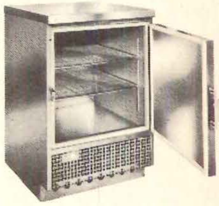
- *Dished interior bottom to protect floors from spilled products.*
- *Automatic and semi-automatic defrost system with built-in condensate evaporator and accumulator. Eliminates need for floor drain.*



LEFT: Model UC-5 Two-tray ice cuber cooling system and semi-automatic defrost.

RIGHT: Model UC-5-CW Cold wall type cooling system with automatic push button defrost.



NOTE: Jewett also makes a line of freezers and blood banks with the same dimensions and features listed above.

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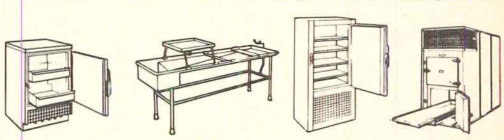

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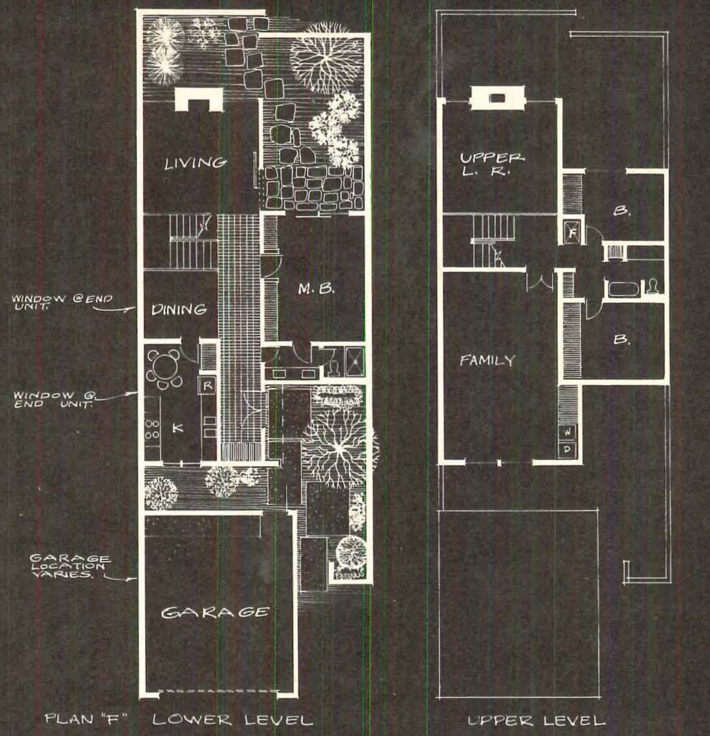

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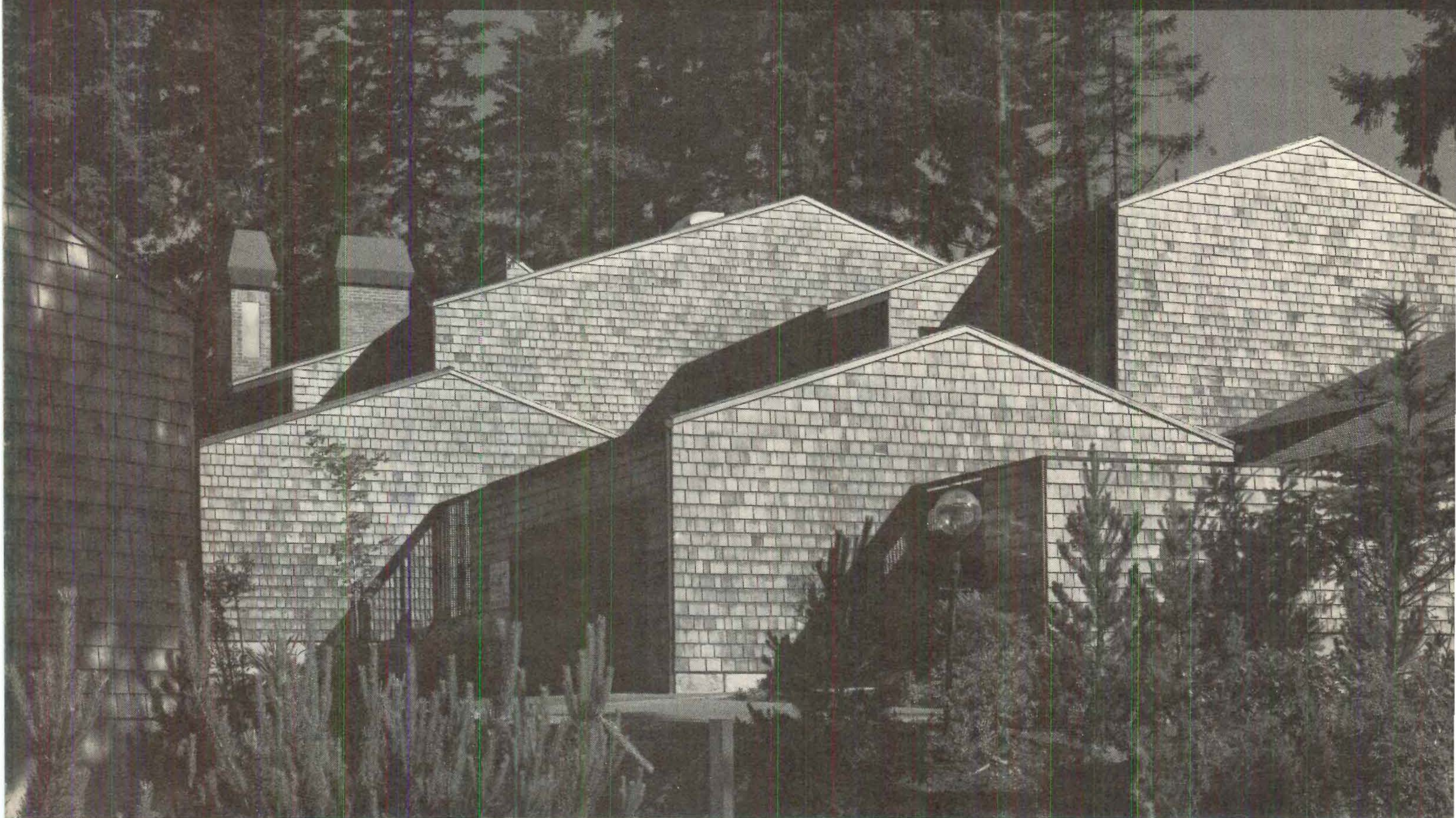

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