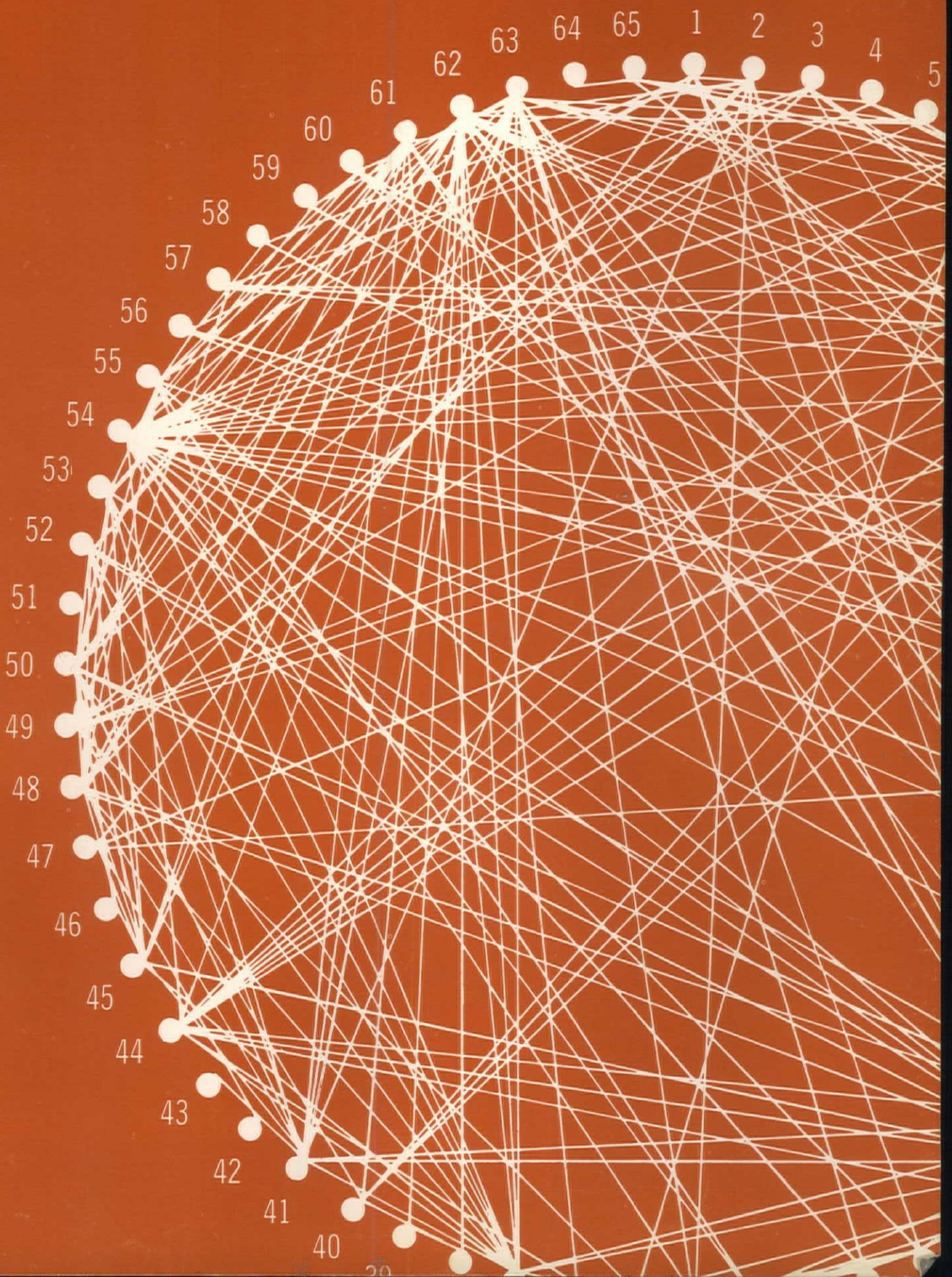
AIA JOURNAL

JULY 1971



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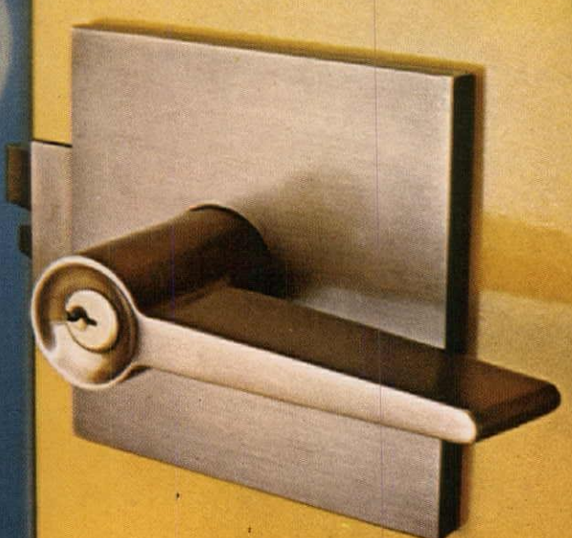

5P.0.8

Bright idea

This column shower serves 6 people with one set of plumbing connections! So it cuts installation costs up to 80%. Like all Bradley Group Showers, it saves space, too—serving more people in far less space than ordinary showers. It eliminates double-wall construction and piping in outside walls. And it has its own drain, saving the cost of drains along the perimeter. Made in 2 to 6 person units. Other Bradley Group Showers include Modesty Module®, Multi-Stall, Wall-Saver®, and Panelon types. Bright ideas—space and money-saving ideas from Bradley! See your Bradley representative. And write for latest literature. Bradley Washfountain Co., 9109 Fountain Dr., Menomonee Falls, Wis. 53055.

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Red cedar shingles restore some great planes to the Great Plains.

Owner Henry McGrew decided some rural renewal was in order after he bought this farmhouse near Kansas City. The building was structurally sound, so minimum cost turned the trick. Red cedar shingles for the expansive plane surfaces of the outside. New wall surfaces and a double-sided fireplace for the inside. New doors and windows for in-between.

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AIA JOURNAL

JULY 1971

DEPARTMENTS

COVER

What looks like a ball of yarn really represents the functional requirements of a mental hospital. Connecting lines indicate their interactions (*see* p. 22). Designed by John Friedmann.

Publisher: DUDLEY HUNT JR., FAIA; *Editor:* ROBERT E. KOEHLER, HON. AIA; *Associate Editor:* BESS BALCHEN; *Assistant Editor:* MARY E. OSMAN; *Consulting Editor:* JAMES E. ELLISON, AIA Dept. of Education & Research; *Art Director:* SUZY THOMAS; *Sales Manager:* RICHARD J. SATOLA; *Promotion Manager:* S. CHAPIN LAWSON; *Production Manager:* GEORGE L. DANT; *Circulation:* DELPHINE ROBERTSON

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VOL. 56. NO.1

New Acoustiwall™ fights noise pollution. Help your clients solve sound control problems with new Acoustiwall liner panels and familiar Acoustideck® roof-ceilings. Added cost: less than 1% of total building cost. Important? It is now. The new Walsh-Healey Act sets 90 decibels as the upper limit for plants handling federal contracts.

Embossed panels add interest through texture. Now Inryco offers the attractiveness of a stucco embossed painted surface to help you create interest and design distinction in buildings of all kinds. Available in aluminum.

Choice of profiles for distinctive shadow patterns. Who says walls all have to look alike? Not Inryco. The IW series offers seven distinctly different profiles in 12" widths. A common lock system lets you intermix in any combination. It's weather tight, and conceals fasteners. If the budget's tight, consider the M Series —four interesting profiles in fast-installing 30" and 36" widths.

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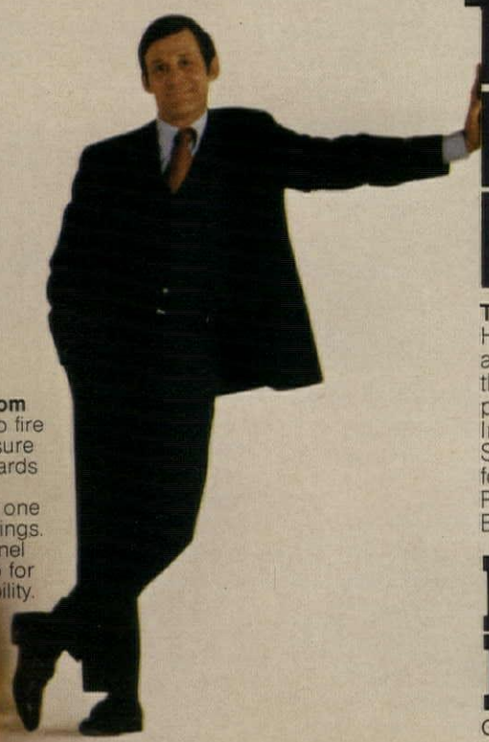

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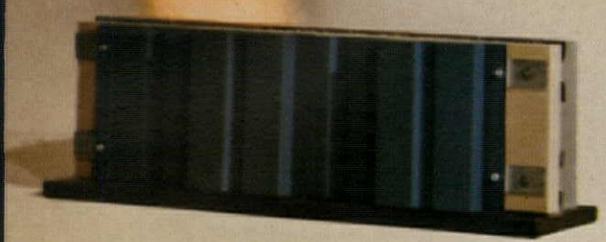

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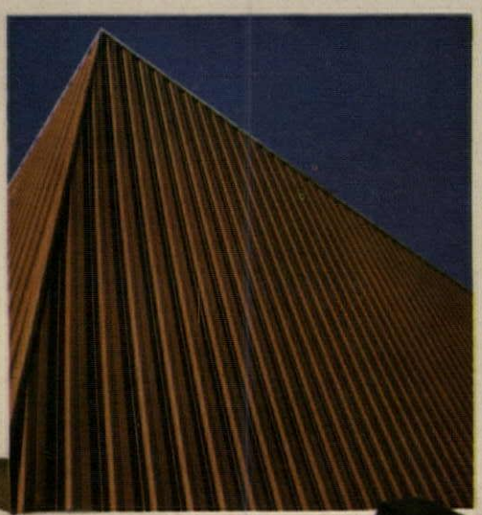

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A1-22-1

comment and opinion

THE GOVERNMENT AND THE STATE OF THE ARTS: Somehow President Nixon must have got the word that there was much unhappiness and confusion, or call it what you will, as some 500 delegates representing state and community arts councils and arts organizations met for a three-day conference entitled "Washington and the Arts." They heard and warmly applauded, for example, the outspoken member of the Federal Communications Commission, Nicholas Johnson, who called the federal funding for the arts in the United States an "international scandal."

In any event, Mr. Nixon, who was not scheduled on the original program, decided to address the Associated Council of the Arts at the Mayflower Hotel, just a stone's throw from the White House. But as any Washingtonian knows, it is not the physical distance that usually determines where and when the Chief Executive will make a public appearance. Perhaps more significant than the President's speech itself was the memorandum which was released on May 26, the same morning on which he addressed the artists. In it, he requested that the heads of executive departments and agencies pass on to Nancy Hanks, chairman of the National Endowment for the Arts, their ideas and suggestions as to how they can assist the arts and artists, and vice versa, and to report what new actions they may already have taken in those directions. His memorandum read in part:

"Americans in all walks of life are becoming increasingly aware of the importance of the arts as a key factor in the quality of the nation's life and of their individual lives — whether in terms of the availability of great cultural resources, the accessibility of exhibits and performances, or simply the esthetic enjoyment of good design.

"As you know, direct federal assistance to the arts is being sharply increased, and I have asked the Congress for a full funding of the budget authorizations for the National Endowments for the Arts and the Humanities for fiscal 1972, which would roughly double their present funding levels and raise them to more than three times what they were just two years ago. But the endowment programs are by no means the only federal programs that affect, employ or contribute to the arts. In architecture, graphics, school programs and many other activities, federal agencies are daily involved deeply with the arts in one form or another.

"It is my urgent desire that the growing partnership between government and the arts continue to be developed to the benefit of both, and more particularly to the benefit of the people of America."

Addressing the opening session of the fifth conference of the New York City-based council, Miss Hanks said that she was not afraid of a paper bureaucracy in government arts programs. "We can always burn paper," she explained. "Our real concern must be to guard against the bureaucracy of thought." She also pointed out that the state arts councils, established in all 50 states and five territories, would continue to play a strong role in the endowment's planning and programming.

In the final analysis, what is really needed — and surely just as important as any funding itself — is for the government to create an appropriate climate for the arts, and here I mean to include architecture. The credo of the Washington State Cultural Enrichment Program sums it up nicely: "In our crowded and competitive modern society, the pressures are strong to accept mass opinion as the right opinion and to confuse great quantity with great quality. The arts offer not only an effective shield against such pressures but they provide the receptive individual with moments of beauty and delight and with new insights into his own life and the lives of those around him."

ROBERT E. KOEHLER

ACKNOWLEDGEMENTS

27 — Gregory Alan Lawrence
30 — below, Walker—Missouri Tourism
38 — above, Dick Saunders
38 — below, *Cleveland Plain Dealer*, Dwight Boyer
46, 47 — courtesy Drexel University
48, 49 — Greg Gammons

NEXT MONTH

The design of child care centers, serving the spectrum of functions formerly accommodated by such grim establishments as orphan asylums, is slowly emerging from the Dark Ages. And while this area still remains one of the most neglected in institutional design, a minor revolution is underway, with profound implications for architectural programming and design. A practitioner whose firm conducted a survey of 200 sample centers for the Department of Health, Education and Welfare, gives a firsthand account of what it's all about.

In a somewhat related article, an architect who is recognized internationally for his contribution to retarded children, describes the Child Development and Mental Retardation Center at the University of Washington in Seattle. He reviews its purposes and relates the manner in which they are reflected in the physical facilities.

Other features for August offer a really varied menu. Among the entrees: an analysis of Title VII, the 1970 act which takes some initial steps in the evolution of a national urban growth policy; suggestions by a landscape architect on utilizing rooftops for something besides shedding water; a portfolio of the 1971 winners in the Awards Program for Utility Design, spearheaded by the American Public Power Association, with the AIA as one of four other cosponsors; the results of a study of the professional adaptation of Cuban architects in the USA; a down-to-earth discussion of how architects/engineers can directly control air quality within a building; a brief but delightful look at the San Francisco Bay area architecture known as Carpenter Gothic; and another pictorial presentation which illustrates that Japan and the West have met at least architecturally.

ASIDES

In our Comment and Opinion for April, we raised a few questions about this whole matter of ecology, and some rather significant things continue to happen. A few random developments:

- Jack Anderson led off his syndicated "The Washington Merry-Go-Round" column for May 27 by inviting his 45 million readers "to fight pollution in their home communities and support our College of Ecology." It seems that the trustees of Kirkland Hall College near Easton on Maryland's eastern shore have agreed to transform Kirkland Hall, under Anderson's direction, into an ecological institution.
- The National Society of Professional Engineers met in mid-June to discuss the shifting of the nation's engineering priorities from aerospace to urban and environmental needs.
- At the Atomic Energy Commission's National Accelerator Laboratory near Batavia, Illinois, chemist Robert Sheldon has developed a strong, inexpensive structural panel incorporating discarded soda and beer cans packed in honeycomb-like patterns between layers of plastic. They will be used in a geodesic dome covering part of NAL's experimental facilities. □

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Remember: your qualified electrical contractor guarantees performance not only on the electrical functions, but on the entire ceiling installation he oversees as well.

National Electrical Contractors Association
Washington, D. C. 20036

outlook

Austrian City Declares American Firm Winner of International Competition

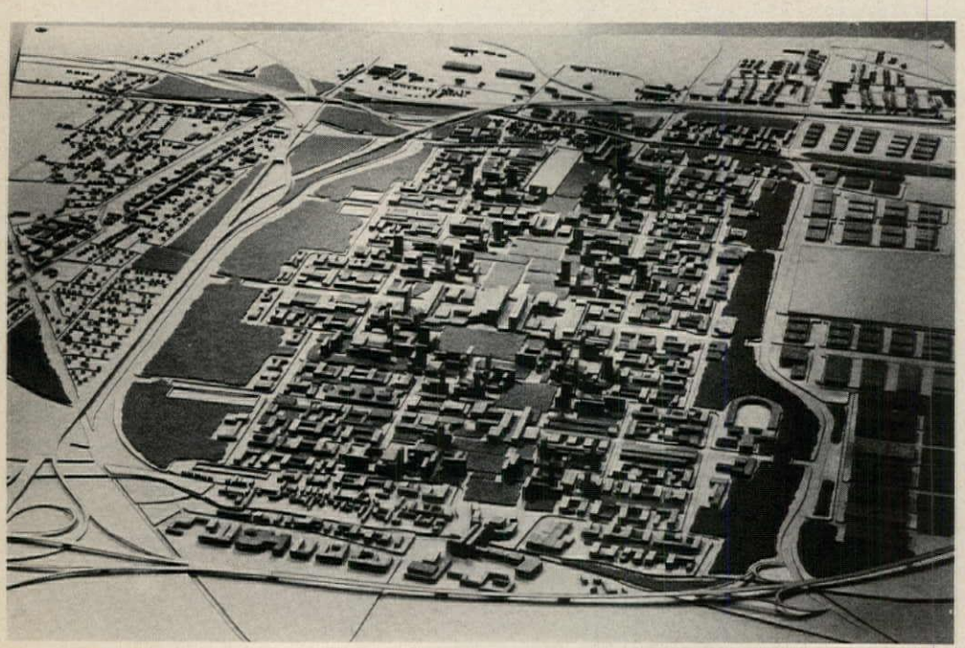
The architectural firm of Geddes Brecher Qualls Cunningham of Philadelphia and Princeton, N.J., has been awarded first prize in the international town planning competition for the urban expansion of Vienna, Austria. A jury of 11, including professors of planning schools from six countries, was chaired by Gerd Albers of the University of Munich.

The award, which includes a $28,500 cash prize, is the second major international competition won by the firm in the last several years. In 1967, it received first prize for the design of the $40 million Civic Center in Birmingham, Alabama, now underway.

The purpose of the Vienna competition was to obtain ideas and designs for the organization and phased development of a 2,500-acre new town to relieve the city core.

The winning plan envisions a new-town-in-town with projected residential units for 70,000 people. Providing for industry, offices, shopping, education and recreation, it offers a flexible "armature" for the community to grow upon. It includes greenways with terraces of open spaces and a traffic pattern to accommodate the automobile without impairing pedestrian movement. The plan relates to the city's present traffic and public transportation systems and is designed to become an integral unit of the city.

A major regional shopping center located on the prime central crossroad of the new town is proposed for the first phase.



A grid of flexible land strips, around four parallel crossroads, is adaptable to change.

Invitation for Original Research Papers For AR/8 1972 Has July 30 Deadline

In its October '70 issue, the AIA JOURNAL published abstracts of the research papers presented at the Architect-Researcher's Conference held in November. As a result, the Director of Research Programs at AIA headquarters received more than 200 requests for complete texts.

A call is issued now for papers for the 8th annual conference to be held at the University of California at Los Angeles on January 24-27, 1972. AR/8 will be scheduled in conjunction with the third annual conference of the Environmental Design Research Association, and participants will be able to attend both meetings.

Of particular interest for the coming conference are papers on user need studies; operations research and management; psycho-social studies of man/environment interaction; computer applications; and post- construction evaluation studies. Doctoral dissertations in condensed form from any relevant discipline are welcome.

Authors are requested to submit abstracts of not more than 200 words by July 30. In addition to the author's name, affiliation, address and title of the paper, the abstract should include statements of the problem, method, results and conclusions. In case of descriptive or theoretical papers, the abstract should include background, author's premise, argument and conclusion.

Abstracts of the papers selected will be published in the JOURNAL.

Abstracts and requests for information may be addressed to Don Conway, AIA, Director of Research Programs, The American Institute of Architects, 1785 Massachusetts Ave. N.W., Washington, D.C. 20036.

Herrick Chapel, designed by Ladd & Kelsey, at Occidental College, is the site of an exploration of contemporary media for worship.

Church Construction Volume Is Reflected In Religious Architecture Conference

Little wonder if a veil of pessimism hung over the 32nd National Conference on Religious Architecture held in Los Angeles in April. A total of $921 million was spent for construction of new churches and synagogues in 1970, the lowest the figure has dipped since 1958.

Department of Commerce statistics further reveal that it was the sixth year in a row that the amount of money spent in building religious facilities declined.

But as the keynoter, Dr. Arland A. Dirlam, AIA, put it, "Let us sincerely hope that the religious architecture of the significant '70s will not be measured by mere dollar volume alone but rather by what it says to people and what it does for people."

Referring to the decline, the Boston architect noted that "Some of the most vocal leaders in the church have openly discouraged building."

Dirlam went on to say that many men "who hold a position of power in the hierarchy of the church have boldly proclaimed it was a selfish — yes, even a dirty thing — to build a church. The church building dollar should be given to social action/racial issues, welfare and the myriad of other problems that are confronting us today.

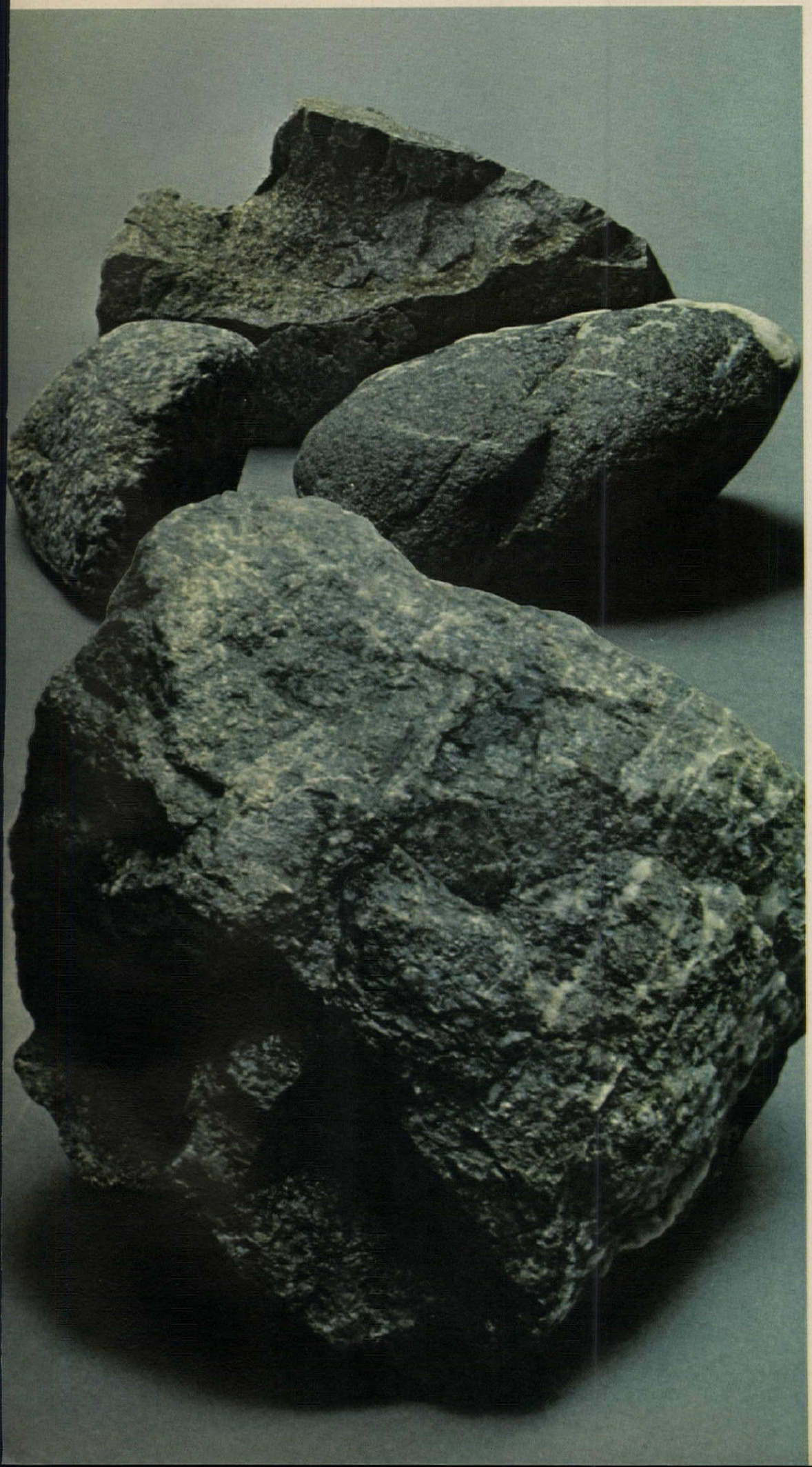
"While the purpose is noble and in theory grand, the church cannot afford to suspend its leadership in the spiritual advancement of man by merely contenting itself with social welfare. These voices, however, have been more alarming than prophetic. They describe symptoms of the spiritual decadence of the church."

The keynoter was quick to add: "Let me be the first to admit that the creation of new buildings alone is by no means proof that the church is viable, strong, healthy and aggressive. Architecture must not only be built, it must be used to be effective. However, to preach that the church should not build is to say that there is a decay — a laissez-faire and indifference to basic responsibilities."

With an allusion to the conference theme, "Art for God's Sake," the architect explained: "As for art in the church during the '60s, may I say that only 10 percent or less of the structures built during this period incorporated the elements we refer to as art — art

continued on page 12

Number 52. Cardiff stone.



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For more information, see Sweet's Architectural File, 8.1/Mir and 8.23/Mir. Or contact Kaiser Mirawal, P.O. Box 38C, Port Carbon, Pennsylvania 17965.

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APARTMENTS / TOWNHOUSES

Arlene, Washington, D. C., FHA, Arnold Schlein, *McDonald, Williams & Marshall, AIA*	9 Units
Ocean Twelve Condominium Townhouses, Bethany Beach, Del., Jos. Smith Dev. Corp. *John Richard Andrews, AIA*	12 Units
Family Housing St. Louis (Mo.) Housing Authority, Turnkey MO 1-21, Platt Constr. Co., *Barrie B. Fox, AIA*	18 Units
Village of Westbrook, Erie (Pa.) Housing Auth. PA 13-10, Tilman Rosenblatt, *Drandil, Inc., Architects*	50 Units
Village of Eastbrook, Erie (Pa.) Housing Auth. PA 13-9, Tilman Rosenblatt, *Drandil, Inc., Architects*	50 Units
Family Housing, Pr. Geo. Co. (Md.) Hsg. Auth., Turnkey MD 15-3, American Better Commun. Developers, *Francis Murray, AIA*	50 Units
Willerburn Acres/Brookville Knolls/Iverness, Montgomery County, Maryland, *Carl M. Freeman Assoc.*	80 Units
Unity Terrace, Fairmont, West Virginia, Curtin & Johnson, *Zando, Martin & Milstead, AIA*	100 Units
Potomac Village, Piedmont (W.Va.) Hsg. Auth. Turnkey WVA 29-1, Tilman Rosenblatt, *Lawrence A. Menefee, Jr., AIA*	100 Units
Family Housing, Williamsport City (Pa.) Housing Auth. Turnkey PA 62-2, *Russell Hoover, AIA*	100 Units
Hunters Green Townhouses, Reston, Virginia, Gulf-Reston, Inc., *Ronald L. Taylor, AIA*	118 Units
Elderly Housing, Brockton (Mass.) Housing Authority, Turnkey MASS 24-8, *Damon-Worley-Cady-Kirk AIA*	122 Units
Family Housing, Fargo (North Dakota)Housing Authority, Turnkey ND 14-3, *Clark & Holman, AIA*	150 Units
The Anchorage, Reston, Va., Gulf-Reston, Inc., *B. A. Berkus, Environmental Design*	150 Units
Madison Park North, FHA, Site Development, Baltimore, Md., Mid-City Developers, *RTKL Inc. Architects*	204 Units
Glenvale Condominium, Reston, Virginia, Gulf-Reston, Inc., *Sulton & Campbell, AIA*	204 Units
Hunter Woods Village, Reston, Va., Gulf-Reston, Inc., *Cohen & Haft, AIA*	222 Units
Elderly/Family Housing, Burleigh Co. (Bismark, N. Dakota) Housing Auth., Turnkey ND 21-A	250 Units
Senior Citizen Housing, Orange (N.J.) Housing Auth., Turnkey NJ 25-3, *Barnett D. Singer, AIA*	250 Units
Senior Citizens Housing, N. Bergen (N.J.) Housing Authority, Turnkey NJ 4-4 *Tito DiVincenzo, AIA*	307 Units
N. Ave. Market Elderly Hsg., Balto. Hsg. Auth., Turnkey MD 2-41, Mid-City Developers, *RTKL, Inc., Architects*	357 Units
Century III, Towson Md., The Ervin Company, *Collins, Kronstadt, Leahy, Hogan & Collins, AIA*	502 Units
Upton Housing & Community Development, Baltimore, Maryland, *Bridges & Burke, AIA*	1040 Units
Fire Damage Replacement Cost, Van Veen Residence, Bethesda Maryland	NFP
Averell Harriman Residence — Conversion for Smithsonian Inst., Washington, D.C. (Georgetown), *Thos. J. Stohlman, AIA*	NFP
Charles Henry Smith, Jr., Residence, Alexandria, Virginia, *Adler & Rosenthal, AIA*	NFP

ARMED FORCES

Woodbridge (Va.) Research Facility, Army Corps of Engineers, *Mayne, Oseroff & Van Besien, AIA*	300,000
Maintenance Facility, Camp A.P. Hill, Va., U.S. Army Corps of Engineers, *Metcalf Associates, AIA*	365,000
USMC BOQ, Quantico, Virginia, *Jansons, Roberts & Brar, AIA*	2,700,000
USMC Confinement Facility/Mess, Quantico, Virginia, *Chapman & Miller, AIA*	2,700,000
USN BOQ/Mess, CINCLANT FLT. HQ., 296 Dwelling Units, Norfolk, Va., *Collins & Kronstadt-Leahy, Hogan & Collings, AIA*	3,000,000
EM Barracks/Bn Hq/Classrooms/Post Office, Ft. Hood, Texas, Urban Systems Development Corp., Div. of Westinghouse, *Patterson Sowden Dunlap & Epperly, AIA*	12,000,000
Willoughy/Oceana USN EM/CGO Family Hsg., Norfolk, Va., 600 Units, *Mayne, Oseroff & Van Besien, AIA*	12,000,000
Renovations, USN, Patuxent River, Maryland, *Saunders, Pearson & Partners, AIA*	NFP
Tenant Alterations, USN, Washington, D.C., *Friedin & Arey/Samuel Jolles/Engineers*	NFP

HOSPITALS / NURSING FACILITIES / LABORATORIES

Nat. Inst. of Health, Modifications Intensive Care/Pediatrics Fac. Bethesda, Md., *Bryant & Bryant, AIA*	200,000
National Children's Center, Jewish Foundation for Retarded Children, Rockville, Md., *Fischer & Elmore, AIA*	3,000,000
Loudoun Memorial Hospital, Leesburg, Virginia, *Baskervil & Son, AIA*	5,000,000
Medical Education Bldg. Addn., Medical College of Virginia, Richmond, *Lee, King & Poole, AIA*	7,500,000

NFP—Not For Publication

SCHOOLS / COLLEGES / UNIVERSITIES

Trash Compactor Room Additions, Washington, D.C., Public Schools, *Balbir S. Brar, Engineer*	120,000
Washington International School Addition, Washington, D.C., *Frank Macioge, AIA*	125,000
Howard University Conversion/Remodeling Service Warehouse, Washington D.C., *Allard, Joutz & Fields, AIA*	500,000
Howard University Chem. Lab. Addition to Engineering Bldg., Washington, D.C., *Leroy J. H. Brown, AIA*	600,000
Episcopal High School Dormitory, Alexandria, Virginia, *Bull & Kenney, AIA*	650,000
Woodmont Elementary School, Arlington, Va., *Chloethiel Woodard Smith & Associated Architects*	1,000,000
Bowen Elementary School Addition, Washington, D.C., *Andrew Daniel Bryant, AIA*	1,200,000
J. O. Wilson Elementary School Addition, Washington, D.C., *Saunders, Pearlson & Partners AIA*	1,340,000
University of Maryland Addns. to Chem. Engineering Bldg., College Park, *Bacharach Assoc., AIA*	1,400,000
University of Maryland, Modular Housing, College Park, Maryland	1,500,000
Addition & Alterations to Jennie Dean Intermediate School, Manassas, Va., *Ballou & Justice, AIA*	1,700,000
Walker Jones Elem. School Addn./Neighborhood Serv. Center, Washington, D.C., *Stewart Daniel Hoban, AIA*	2,100,000
Benning Elementary School, Washington, D.C., *Berla, Abel & Weinstein, AIA*	2,100,000
Alabama Avenue Elementary School, Washington, D.C., *Leroy J. H. Brown, AIA*	3,000,000
Morgan State College Education Building, Baltimore, Maryland, *Fry & Welch, AIA*	3,600,000
Morgan Elementary School, Washington, D.C., *Fry & Welch, AIA*	5,400,000
University of Maryland Office/Classroom Building, College Park, *Warren G. Sargent, AIA*	5,000,000
Washington Highland Community School, Washington, D.C., *Johannes & Murray, AIA*	6,500,000

MISCEL. — COMMERCIAL / INDUSTRIAL / FOUNDATIONS / ASSOCIATIONS

U.S. Steel Corp. Sales-Administration Bldg./Pool-Rec. Fac., Swann Point, Md., *Neil R. Greene, AIA*	200,000
Toyota Showroom & Service Center, Marlowe Heights, Maryland, *Neil R. Greene, AIA*	200,000
Templeton Oldsmobile, Tyson's Corner, Virginia, *Sheridan, Behm & Eustice, AIA*	350,000
Indian Hills Golf & Country Club, Kansas City Missouri, *Angus McCallum, FAIA*	600,000
Xerox Distribution Center Addn., Springfield, Va., *Chloethiel Woodard Smith & Associated Architects*	1,300,000
Allentown Shopping Center, Prince George's County, Md., Samuel Rosenstein, *Bruno Aras, AIA*	4,000,000
United Virginia Bank Citizens & Marine, Newport News, Virginia, *Racorn, Wildman & Krause, AIA*	4,000,000
Proposed Office Building, Washington, D.C., *Tuskegee Alumni Housing Foundation*	6,000,000
United Virginia Bank/State Planters, Richmond, *Lee, King & Poole, AIA*	8,350,000
American Telephone & Telegraph Co., Addn. to Central Office Bldg., Wayne, Pa., *Rose, Beaton & Rose AIA*	9,000,000
Replacement Costs, Swimming Pool, Holiday Health Club, Washington, D.C., Milton Ritzenberg, *Holle & Graff, AIA*	NFP
International Club Office Building, Change Orders, Washington, D.C., *Holle & Graff, AIA*	NFP
International Business Machines, GEM Bldg., Bethesda, Md., *Keyes Lethbridge & Condon, AIA*	NFP
International Business Machines, GEM Feld Systems Center, Washington, D.C., *Holle & Graff, AIA*	NFP

GOVERNMENTS—FEDERAL / STATE / LOCAL

Langdon Pk. West Playground/Park Washington, D.C., *Laurence & Beatrice Coffin, Landscape Arch.*	200,000
Recreation Center for Sugarland Run, Leesburg, Va., Boise Cascade, *B. A. Berkus & Associates, AIA*	350,000
Kings Pk. Branch Library, Fairfax County, Virginia, *Saunders, Pearson & Partners, AIA*	430,000
Benning Park Playground Development, Washington D.C., *Nicholas Satterlee, FAIA*	1,500,000
New Fire House, Baltimore, Maryland, *Constantine Courpas, The Associated Architects & Planners*	2,000,000
Post Office, Charlottesville, Va., *Johnson, Craven, Gibson/Saunders, Pearson & Partners, AIA*	2,100,000
Court of Appeals Change Orders, Annapolis, Maryland, *Gaudreau, Inc., AIA*	NFP

CHURCHES

New Scripture Church of Christ, Washington, D.C., *Austin L. Spriggs, AIA*	120,000

MAY WE ASSIST *YOU* AND YOUR CLIENTS DURING THE *NEXT* SIX MONTHS?

outlook *from page 8*

which is worthy of being part of a religious building.

"Most of the windows were plain or tinted glass; sculpture was unknown; and the altar or the ark was too frequently model 673, page 71, in the catalog."

The program co-chairman, the Rev. Edward D. Eagle of Burbank, Calif., explained the theme this way: "In a time when worship itself is taking on new forms, and liturgies are being revised, the artist too finds new ways to communicate religious truth. Each new generation of artists reflects in its style and symbolism the beliefs and concerns of its own time."

Addressing the conference banquet, the Most Rev. Timothy Manning, archbishop of Los Angeles, said that "The church is not a building; a church is not architecture. The church is many things, many splendid things, but it is fundamentally a community, a togetherness of people who are on a journey.

"For 100 years we have copied, aped; we have lost vision," the Archbishop pointed out. "We have been caught up into the great technological progress, and something of this spark and spirit, the separation of the secular from the sacred, has fragmentized our culture and we are waiting now for the spirit to enter into the architectural field and to relate this mystery to modern times."

During the four days, the conferees also:

- Discussed the place of the religious envelope as a community center and the updating of existing facilities (a portion on earthquake considerations will be covered in the AIA JOURNAL in November).
- Recognized 12 architectural projects and 11 works of art in a variety of media for honors (to be shown in later issues of *Faith & Form*).
- Toured a number of religious buildings in the Greater Los Angeles area.
- Participated in "A Celebration of Love," an experimental worship service produced by the students of the Department of Church Music at the University of Southern California (directed by John Morgan as his doctoral thesis), "encompassing a total organic involvement of congregation and performing artists in one unified endeavor."
- Enjoyed an evening fiesta on Olvera Street and viewed the restoration going on in the area.

Although the official registration numbered 181 persons, total participants, including some 250 who only viewed the exhibits, exceeded 560.

Next year's conference, which had been set for April 11-13 in Cleveland, has been canceled. In its place, the Guild for Religious Architecture, an AIA affiliate and a cooperation organization of the National Conference on Religious Architecture, is scheduling several regional meetings, along with a nationwide one in Atlanta in April.

Designer of Federal Buildings, Author, Editor and Talented Artist as Well

Anyone over 40 will remember the movie stars Edward Everett Horton and Marie Dressler. They were featured in many movies including one based on the novel *The Narrow Street,* whose author was Edwin Bateman Morris, FAIA. A prolific writer, Morris wrote 13 novels, was a frequent contributor to the AIA JOURNAL and edited the *Federal Architect* for 15 years.

Founder of the Association of Federal Architects, he was also instrumental in the organization of the Construction Specifications Institute and its magazine. In 1953, he edited and partly wrote and illustrated the report of the Commission on the Renovation of the Executive Mansion. For the George Washington bicentennial celebration in 1932, he collaborated on a book about Mount Vernon. A talented artist also, his book *Pen and Ink, Inc.*, is composed of many of his drawings and sketches.

Employed from 1908 until 1942 in the federal Supervising Architect's office, Morris participated in the design of hundreds of federal buildings including the US Department of Agriculture South Building; the Denver Custom House; and the Waterville, Maine, Post Office.

Morris died on May 24 at the age of 89 at his home in Bethesda, Maryland. Among his survivors is Edwin Bateman Morris Jr., AIA, of Long Island, N.Y.

Seattle Architect, World Traveler, Collector of Oriental Treasures

After Arthur L. Loveless, FAIA, was graduated from Columbia University, he worked as an architect in New York City from 1902 until 1907. In 1911, he moved to Seattle and quickly made a place for himself in that city. He served as president of the Seattle Chapter AIA in 1916-17.

Loveless received many architectural awards for his buildings, including one for his last home, the Loveless Studio Building in Seattle which was cited by the AIA for "professional excellence and enduring quality."

He retired from practice in 1942. Throughout his long career, he traveled extensively in Asia, Europe and Mexico. He was a collector of Oriental art, which has been donated to the Seattle Art Museum.

Loveless died on January 5 at the age of 98. Never married, he is survived by two nieces and two nephews, one of whom is LaMonte Shorett, AIA, of Seattle.

Former Architectural Editor and Teacher

James S. Hornbeck, AIA, worked with the architectural firms of Harrison & Abramovitz and Skidmore, Owings & Merrill before becoming senior editor of *Architectural Record.* He retired in 1968 for reasons of health. After a long illness, Hornbeck died in Darien, Conn., on May 23 at the age of 63.

A graduate of the Pennsylvania State University, Hornbeck taught there for five years before continuing his architectural studies at the Harvard Graduate School of Design. After joining the *Record,* he taught design for several years in the evening program of the Columbia University School of Architecture. During World War II, he worked for the Manhattan Engineer District and helped design and develop the industrial buildings at Oak Ridge, Tenn.

Newslines

- **Robert E. Martin, AIA,** partner in the architectural firm of Schauder & Martin, has been appointed to a five-year term on the Toledo, Ohio, City Planning Commission.

- **Noisy plumbing problems** are discussed in a report called "Noise and Vibration Characteristics of Soil Pipe Systems," which is available upon letterhead request from the Cast Iron and Soil Pipe Institute, 2029 K St. N.W., Washington, D.C. 20006.

- **A National Standard Plumbing Code** has been developed by the National Association of Plumbing-Heating-Cooling Contractors.

- **John Andrews of Canada** is recipient of the Arnold W. Brunner Award for 1971. Consisting of a grant of $1,000, the award is presented to an architect who has contributed to architecture as an art. (For one of Andrews' US projects, *see* AIA JOURNAL, April, p. 21.)

- **John E. Hirten,** California urban planner, has been appointed by Secretary of Transportation John A. Volpe as Deputy Assistant Secretary of Transportation for Environment and Urban Systems.

- **The economics of highrise apartments** is the subject of a study being carried out by the New York architectural economic consulting firm of Richard D. Steyert under the sponsorship of the American Society of Civil Engineers' Construction Research Council. It will explore quantitatively the economics of buildings of alternative height, floor size, etc.

- **Two Boston area architects,** Benjamin Thompson, AIA, and Frederick A. Stahl, AIA, have been appointed to the Boston Redevelopment Authority's five-man Design Advisory Committee.

- **Housing starts are booming,** jumping to 1,918,000 units in March, highest for that month in 20 years, reports the Census Bureau.

- **Thomas F. Galvin, AIA,** chairman of the Board of Standards and Appeals of the City of New York, was honored for his services to humanitarian causes by the Architects and Engineers Division of the United Jewish Appeal of Greater New York at a dinner in May.

Deaths

JOSEPH C. CARTER SR.
Martinsville, Va.
MARTIN E. DOMINGUEZ
Ithaca, N.Y.
EDWARD A. FLYNN
Cleveland
J. FLETCHER LANKTON
Peoria, Ill.
FRANK J. MCCORMICK
Park Ridge, Ill.
MICHAEL ROSENAUER
Washington, D.C.
FRANK J. ROSS
Bronx, N.Y.
H. W. YAGER
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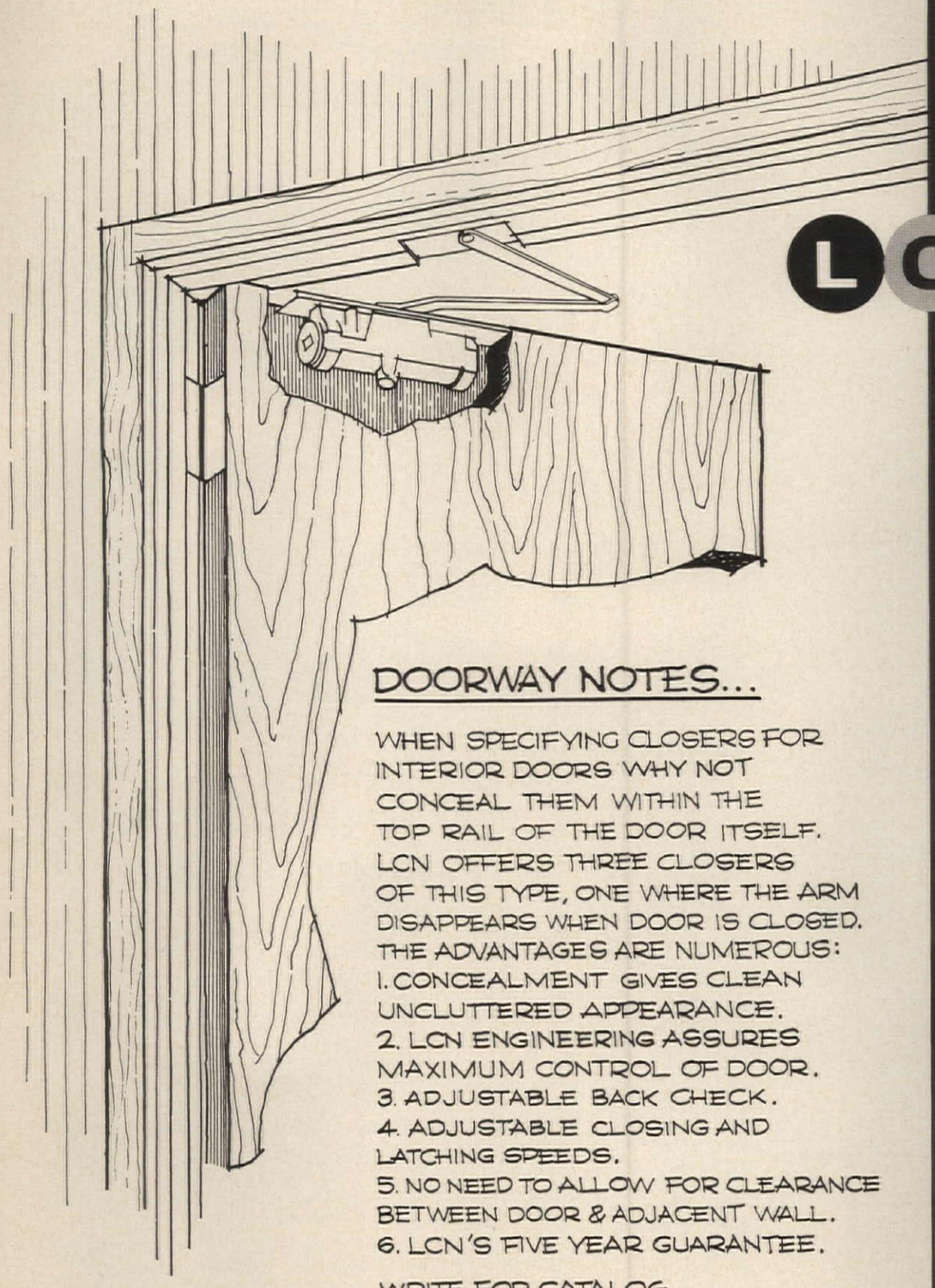
Memorial Art Gallery of the University of Rochester, Rochester, New York. Waasdorp Northrup and Kaelber, Architects, Rochester, New York.



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'Fellows of Good Respect'

by J. Roy Carroll Jr., FAIA
Chancellor, College of Fellows

At a meeting of the Executive Committee of the College of Fellows in January 1971, it was decided that a new, clear statement regarding election, organization, goals and programs of the College would be useful. Accordingly, a statement was drafted and later approved by the committee.

As chancellor, I requested and received permission to present this statement to the Board of Directors of the AIA at its April meeting in Los Angeles. The board unanimously voted its approval. It is published here for the benefit of all corporate members of the Institute, including members of the College of Fellows.

1. A corporate member of the Institute is elected a Fellow and is received into the College of Fellows by the action of the Jury of Fellows, an autonomous committee appointed by the directors. This is one of the highest honors that the Institute can bestow upon its members and is awarded to acknowledge publicly that member's special achievements in his professional and community life.

2. The College of Fellows was founded in 1952 as an organization of the members of the AIA who have been advanced to Fellowship. The purpose of the College is to stimulate a sharing of interests among the Fellows; to promote the purposes of the Institute; and to advance the profession of architecture.

3. The College of Fellows, and each newly elected Fellow, has a continuing obligation to improve the practice of architecture; to encourage the highest standards of conduct throughout the profession; to stimulate architectural research; to further architectural education; and to exchange ideas with architects of other nations toward the improvement of the physical environment.

4. The College of Fellows assists and supplements the program of the Institute but does not compete with the AIA in any manner. It may aid or sponsor activities such as lectures and the writing and publishing of books, monographs and scholarly treatises and similar endeavors relating to architecture. Fellows of the College serve as hosts to foreign architects and dignitaries at AIA conventions. Fellows assist in the exchange of teachers and architectural lecturers with those of other lands. The College also undertakes special Institute activities which may be assigned to it by the board.

5. Fellows are encouraged to meet locally or regionally at least once a year in addition to the convocation for the purpose of fellowship and for the discussion of matters of mutual interest concerning the profession or the community, for architectural criticism or for any other purpose they may desire. Convocations of the College of Fellows are held annually at the time and place of the AIA convention.

6. The officers of the College of Fellows are: chancellor, vice chancellor, secretary and bursar. They are elected annually and serve as the College's Executive Committee for the conduct of affairs between convocations. Financial support of the activities of the College is maintained by the voluntary contributions of its members who are advised of this custom each year by the bursar.

7. The College has established the College of Fellows Fund for the benefit of the profession. All Fellows are urged to support the fund which is administered by The American Institute of Architects Foundation under the direction of the Executive Committee of the College. Contributions to the fund are tax deductible and are made by members of the College and by those newly advanced to Fellowship. The fund is augmented by other gifts, grants and bequests. Disbursements from the fund are made only from accumulations in excess of $100,000 and only for approved projects or special activities relating to the profession of architecture that are consistent with the purposes of the College.

8. Election to Fellowship marks the beginning of a higher degree of professional leadership which is expected from a Fellow to his chapter, his region and the Institute. Contributions to the College in time as well as in money are over and beyond this service and leadership. □

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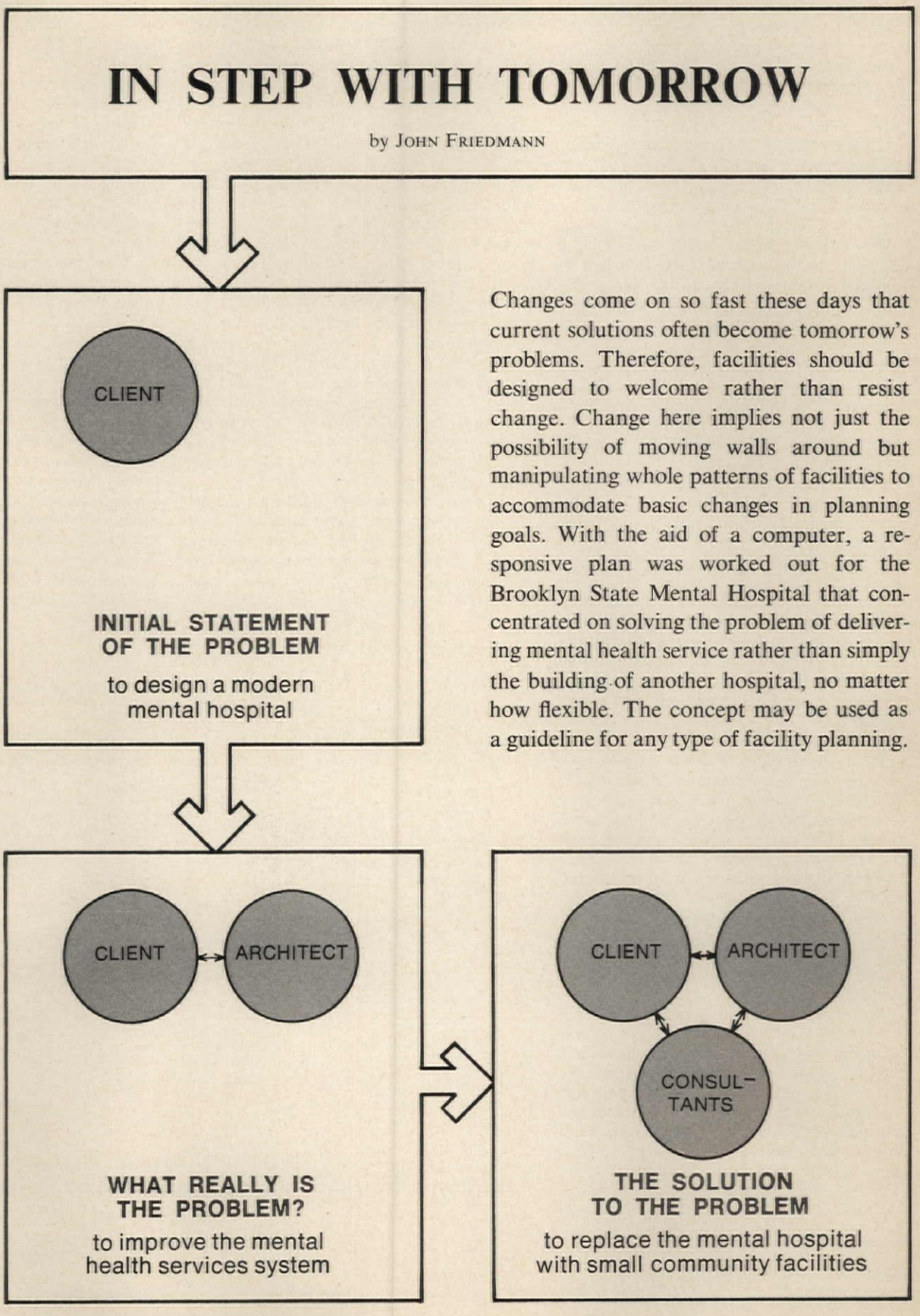
IN STEP WITH TOMORROW

by JOHN FRIEDMANN

Changes come on so fast these days that current solutions often become tomorrow's problems. Therefore, facilities should be designed to welcome rather than resist change. Change here implies not just the possibility of moving walls around but manipulating whole patterns of facilities to accommodate basic changes in planning goals. With the aid of a computer, a responsive plan was worked out for the Brooklyn State Mental Hospital that concentrated on solving the problem of delivering mental health service rather than simply the building of another hospital, no matter how flexible. The concept may be used as a guideline for any type of facility planning.



Before starting work on a solution you must, of course, be sure you know what the problem is. Architectural problems are usually defined by the client, but sometimes he unknowingly chooses the wrong building type. Therefore, unless the architect becomes involved in the problem solving, he risks designing a building that is basically wrong no matter how conscientiously designed.

We faced this dilemma with Brooklyn State Mental Hospital. The contract called for the design of a modern facility and we were looking forward to the challenge of delivering an effective and original hospital. But after analyzing the problem with the client, it became clear that the solution was to try to eliminate the hospital. As architects, it was necessary but hard to accept this conclusion because our natural desire to create buildings conflicted with the responsible solution to the problem.

Our task was further complicated by the fact that existing buildings were grossly substandard and not suitable for renovation. The immediate need to improve the hospital by new construction conflicted with the long-range need to eliminate the hospital.

Since we had redefined the problem, we had to come up with a new program. Before we thought of buildings, we had to draw a picture of mental health service goals. Only then could we think about how to shape buildings to fit the picture.

The service goals of the New York State Department of Mental Hygiene will change over the years in response to change in such factors as psychiatric theory, the role of private mental health services and political and economic realities. This change will cause service goals to zig-zag over a broad range of directions; in addition, any particular service goal could become obsolete after a few years. Therefore, architectural planning cannot be based on a single service goal (Fig. 1). We must be prepared for totally new concepts of mental health care which can make any existing pattern of buildings obsolete.

Even though we anticipate change we want to know what we should aim for now. The present service goal of the New York State Department of Mental Hygiene is decentralization, with the elimination of the large central hospital as the center for treatment and its replacement by a network of small community facilities scattered throughout the service area (Fig. 2). Ideally, the central site would disappear completely. Realistically, it will probably continue to play a role as a nerve center and backup facility for the service area.

However, decentralization is an untested theory. What if it doesn't work out as anticipated? What if political and economic difficulties prevent its full implementation? We cannot base our facility planning proposals on the ideal fulfillment of the goal of decentralization but must be prepared to maintain mental health service in less than ideal circumstances.

We incorporated this dilemma in our programming as follows, predicting the future as a plausible range of events (Fig. 3):

The optimistic prediction foresees an extensive network of community facilities and a small central site, providing 700 central beds or less (the present central site has 3,000 beds).

The pessimistic prediction foresees a substantial failure of the community facility program which necessitates a heavier use of the central site, providing 1,600 central beds.

Chances are high that the actual course of future events will fall somewhere within the predicted range. Facility planning proposals can now be created to accommodate any set of circumstances within the optimistic-pessimistic range. Armed with such options, the client can try to approach the optimistic curve as much as possible, while coping with the difficulties and constraints of the moment.

Buildings, of course, should be shaped by the organizations they serve. This principle was reversed by the existing buildings at Brooklyn State Hospital: The mental health activities were shaped by the building designs. To make the buildings completely responsive to their functions we must make it possible 1) to manipulate if necessary the overall pattern of facilities by changing the number, type and location of buildings and 2) to change the interior layout to serve different purposes.

Buildings usually represent an economic commitment of resources for about 50 years of use, but their functional patterns only have a 5- to 10-year validity. Such buildings risk being obsolete for 40 of their 50-year life because we have to go on using them to justify the investment.

To make buildings responsive to change, we must keep construction resources fluid so that they can be applied to new planning goals. This can be done by making the economic life of a building equal to its functional life. There are two obvious ways to do this. One is to design buildings so that they are adaptable to a wide variety of uses, extending the functional life through adaptability (Fig. 1). The other is to lease existing buildings or buy and sell buildings, shortening the economic life (Fig. 4). Responsive facilities will fulfill the needs of the moment, leaving the owner free to change direction at any time without excessive loss or disruption.

The specific planning program, then, which combines immediate mental health requirements with those of future changes, looks like so:

1. Implement the current mental health service goal of decentralization.
2. Formulate planning proposals so that they can accommodate both the optimistic and pessimistic predictions for the implementation of decentralization.
3. Prepare for the replacement of decentralization by new concepts of mental health service.
4. Allow buildings to respond to change by insuring that the economic life of any facility proposal is equal to its functional life.
5. Upgrade the quality of the environment on the central site as fast as possible.

The planning solutions provide answers to two problems: 1) how to set up new facilities in the community and 2) what to do with the central site.

The first problem can be easily solved by leasing space in existing buildings or buying buildings (mental health treatment does not require custom-designed architecture). These facilities form a pattern made up of architecturally independent parts which can be established gradually and in response to need and local conditions. The total number of facilities will find its own level within the opti-

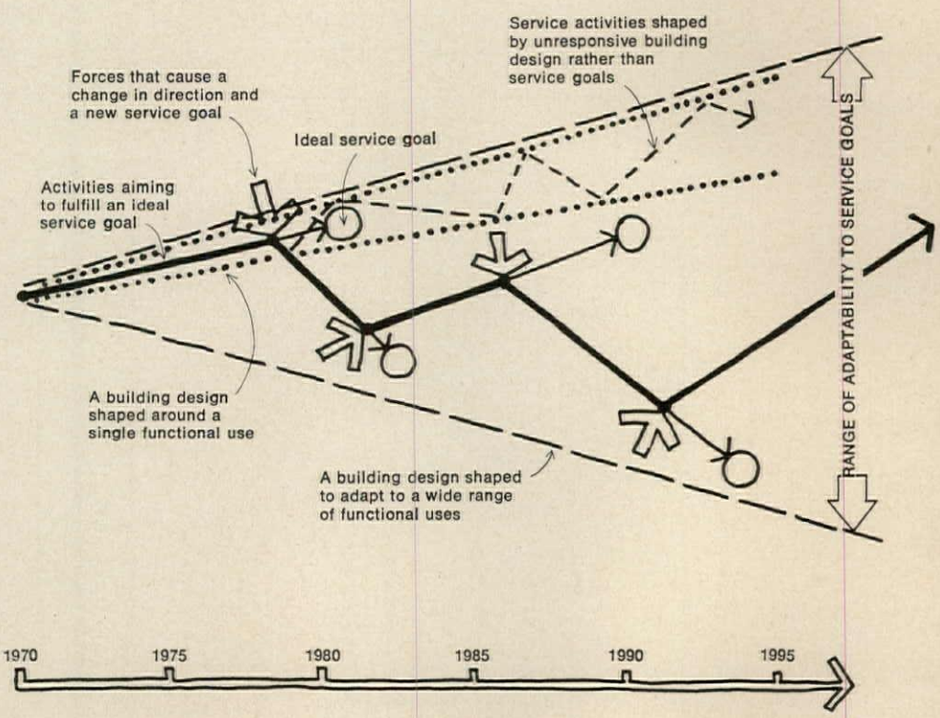


Figure 1. The ability of adaptable and unadaptable new buildings to respond to changes.

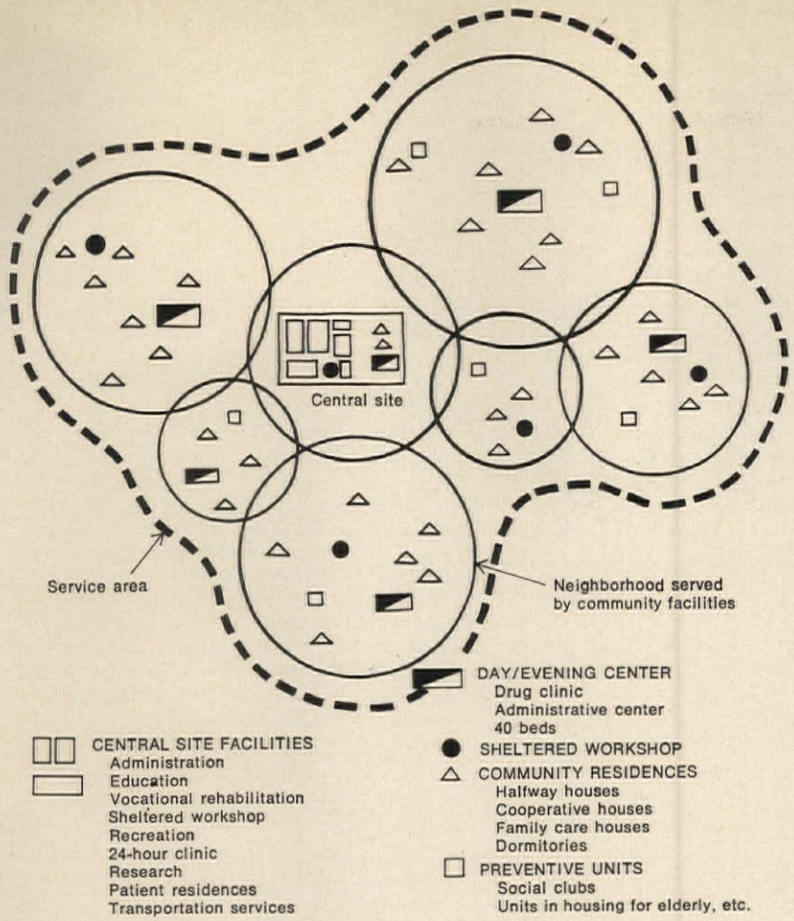


Figure 2. Brooklyn State Mental Hospital's present health service goal of decentralization.

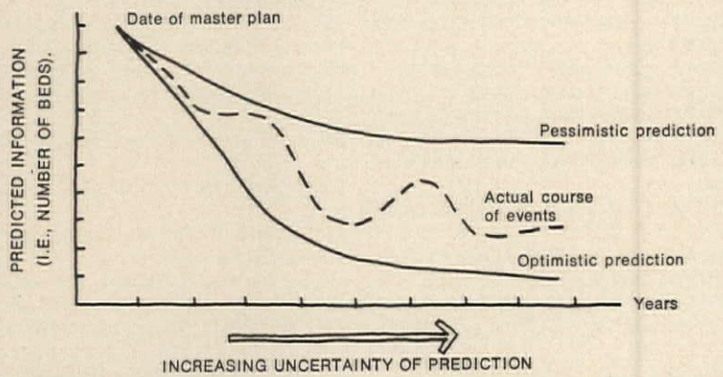


Figure 3. Predictions of plausible events defined by an optimistic and a pessimistic view.

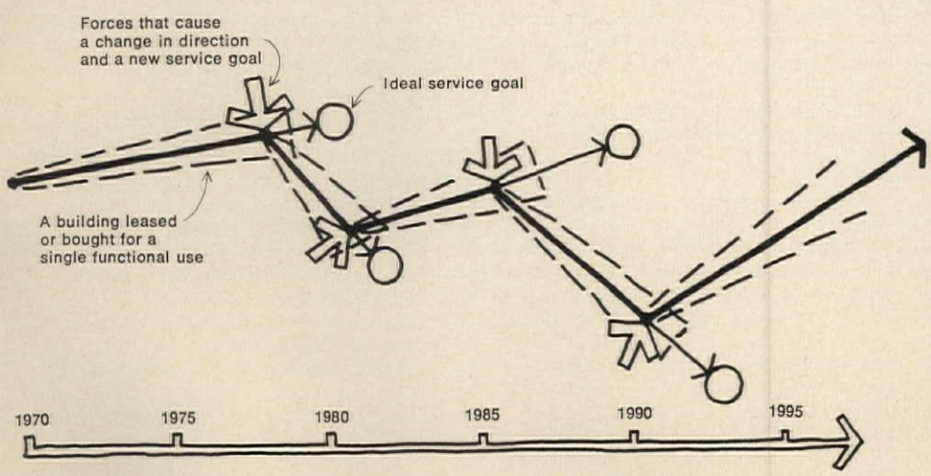


Figure 4. Adapting to changes in goals by leasing or buying and selling existing buildings.

mistic-pessimistic range. The short-term economic commitment allows the number, type and location of facilities to respond to changes in their functional life as they happen. It will be easy to close facilities if they become obsolete. Such a network of community facilities can respond to future change.

The second problem is more complicated since it involves both phasing out of old buildings and new construction. Therefore, the master plan concentrates on explaining the solutions for the central site.

We started out by making a list of 65 requirements, worked out in consultation with the client. These describe the desirable functional patterns.

The goal was to produce a schematic design that incorporated all the functional requirements. But naturally, interactions between these must be resolved before they can be reflected in the design.

Requirements are said to interact with each other when the designer cannot usefully specify the physical solution to one requirement without thinking of the solution to another requirement at the same time. For example, requirement 27 specifies that residential units should be psychologically separate from other hospital facilities. This suggests that residential buildings should be physically separate from program buildings.

Requirement 33 specifies that residential units should be designed to encourage patient/staff interaction. This suggests a mixing of residential and program facilities. Obviously, these two requirements interact with each other.

In a similar way, each requirement can be analyzed for interaction or noninteraction with every other requirement. The result is shown in the problem structure diagram. The numbers represent the 65 functional requirements. A line connecting two numbers indicates an interaction between them (Fig. 5).

To incorporate all the requirements in the design, we had to satisfy simultaneously all the requirements and resolve all the interactions. This is clearly too great a cognitive load for the intuitive capacity of the mind. The problem had to be broken down into smaller parts. The most useful of these would be subsets of requirements with the most interactions, i.e., a simplex where each element interacts with every other element.

The CLUSTER* computer program was used to break down the problem structure into simplexes. Next, the program combined simplexes into the next most highly interconnected subsets. The recomposition was continued until all the parts of the problem were put back together. The recomposition diagram (Fig. 6) shows both the breakdown of the problem into parts (read down) and the order in which the parts should be put back together (read up). It contains the same requirements and interactions as the problem structure diagram and illustrates how the computer program organizes the structure of

* "CLUSTER: A Structure Finding Algorithm" by Murray Milne in *Emerging Methods of Environmental Design and Planning*, edited by Gary T. More. Cambridge: MIT Press, 1970. This program is used as a tool in the design process as described in *Notes on the Synthesis of Form* by Christopher Alexander. Cambridge: Harvard University Press, 1964.

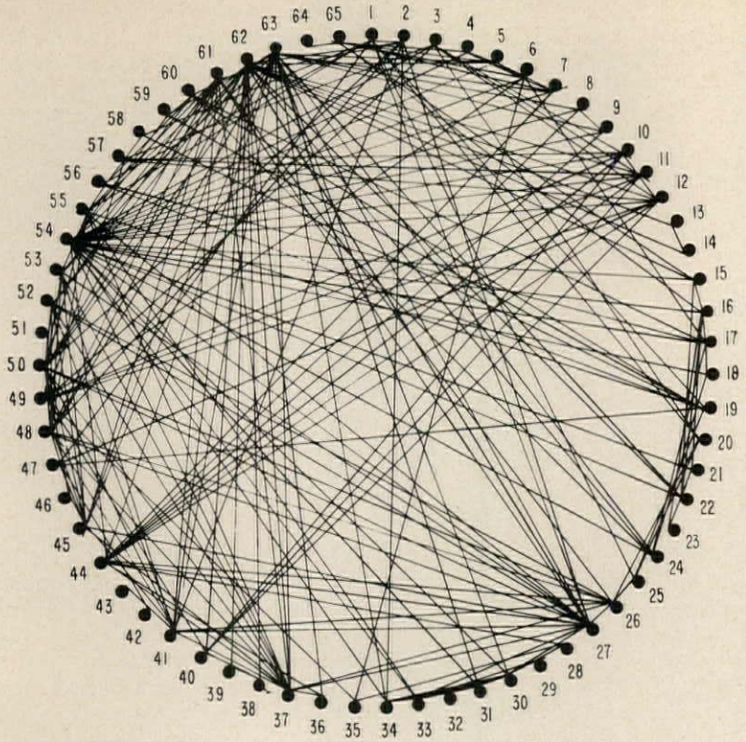


Figure 5. A picture of the problem structure showing interactions between functional requirements. A list of requirements describing the relationship between buildings and between the site and the community was developed in consultation with the New York State Department of Mental Hygiene. It is the basis for the functional program of the design of the central hospital site.

1 Central administration — convenient to electronic data processing (EDP), chiefs of service, staff social area, staff dining and parking.
2 Central administration — psychologically separate from patient areas.
3 Medical records—convenient to 24-hour clinic.
4 Vocational rehabilitation—easily accessible from community.
5 Vocational rehabilitation—with character of a community facility.
6 Vocational rehabilitation (includes occupational therapy)—convenient to patient education, geriatric units and special medical care units.
7 Vocational rehabilitation — psychologically separate from residential areas.
8 Sheltered workshop — easily accessible from the community.
9 Sheltered workshop—with character of a community facility.
10 24-hour clinic—easily accessible from the community.
11 24-hour clinic—easily recognizable from the community.
12 24-hour clinic—convenient to an ambulance dock and parking.
13 Community services—easily accessible from the community.
14 Community services—easily recognizable from the community.
15 Store and snack bar—easily accessible from community.
16 Store and snack bar — convenient to auditorium, beauty and barber shops, and outdoor recreation.
17 Auditorium—convenient to patient education and professional training.
18 Auditorium—easily accessible from community.
19 Chiefs of service—convenient to staff social area, staff dining, library and parking.
20 EDP—convenient to medical records and research.
21 Indoor recreation — easily accessible from community.
22 Indoor recreation—convenient to store and snack bar.
23 Outdoor recreation—convenient to indoor recreation.
24 Patient education—psychologically separate from all residential units.
25 Research—convenient to chiefs of service and parking.
26 Research — psychologically separate from patient areas.
27 Residential units—psychologically separate from other hospital facilities.
28 Residential units—easily accessible from community.
29 Residential units—direct access to outdoor areas.
30 Residential units—with homelike character.
31 Residential units—with distinct and easily recoginzable identities.
32 Residential units—with ability to house fluctuating numbers of patients.
33 Residential units—encouraging patient/staff interaction.
34 Residential area of residential units—with distinct and separate character from the program use.
35 Geriatric and special medical care units —convenient to an ambulance dock.
36 Halfway houses—with the character of community residences.
37 Halfway houses—psychologically separate from central hospital activities.
38 Pharmacy—easily accessible from community.
39 Pharmacy — easily recognizable from community.
40 Pharmacy—convenient to 24-hour clinic.
41 Staff living area—psychologically separate from other hospital facilities.
42 Staff living areas—convenient to parking.
43 Staff living areas—residential character.
44 Central patient dining—convenient to all patient facilities.
45 Central storage—psychologically separate from patient facilities.
46 Central storage—located so that service vehicle access does not disturb patient areas.
47 Parking areas—not to spoil living environment.
48 Transportation service facilities — psychologically separate from patient and administrative facilities.
49 Central sterile supply—convenient to 24-hour clinic and geriatric unit.
50 Maintenance shops — psychologically separate from patient and administrative areas.
51 Maintenance shops—convenient to central storage.
52 Powerhouse—not to spoil living environment.
53 Morgue—psychologically separate from all patient facilities.
54 All patient facilities—connected to patient activity areas by enclosed walks.
55 Staff social areas (an informal meeting place to encourage contact between hospital and community mental health staff)—psychologically separate from patient areas.
56 Staff social area—convenient to professional training and outdoor area.
57 Pathology laboratory—convenient to 24-hour clinic.
58 Staff dining—convenient to staff social area.
59 Library — easily accessible from community.
60 Library — convenient to patient education and professional training.
61 Patient areas—psychologically separate from administrative and service areas.
62 Patient facilities serving surrounding community—psychologically separate from all other facilities.
63 Program facilities—psychologically separate from residential units.
64 Beauty and barber shops—easily accessible from community.
65 Beauty and barber shops—convenient to store and snack bar and vocational rehabilitation.

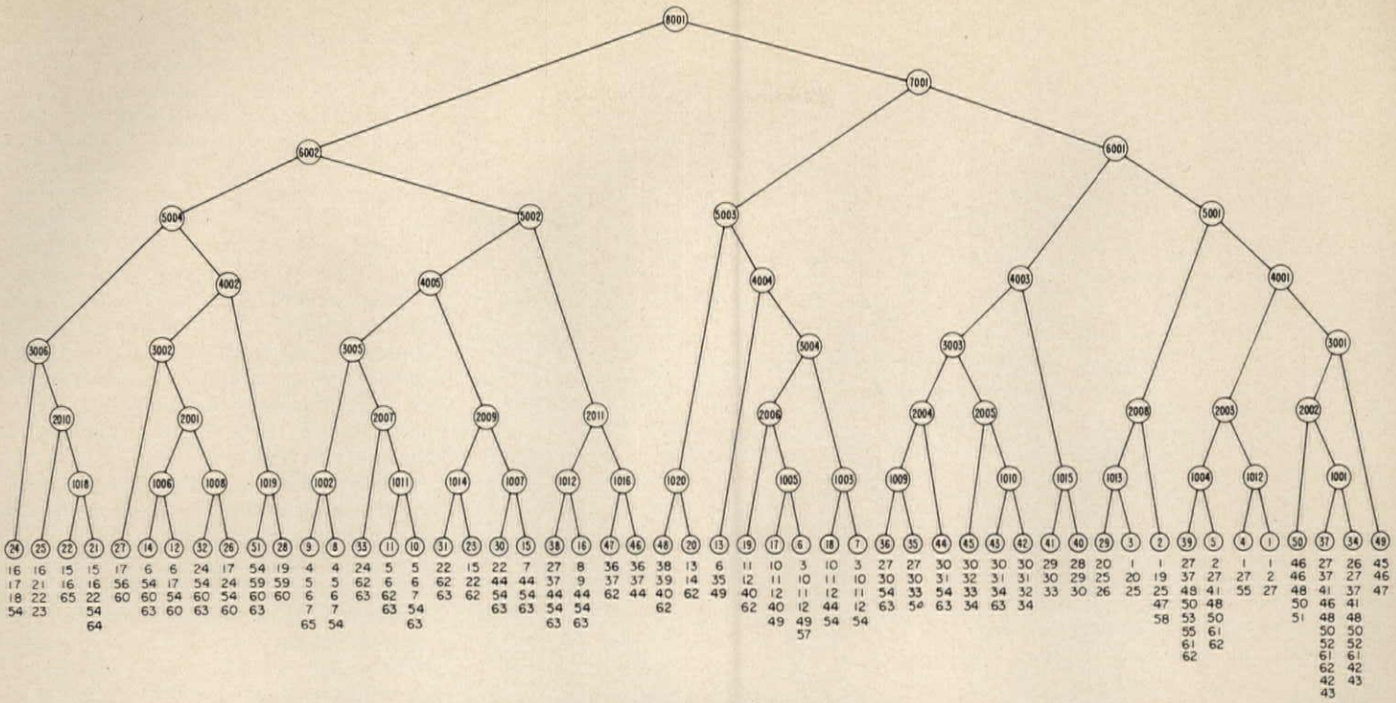


Figure 6. The problem structure broken down into manageable parts by showing the proper order of recomposition of simplexes and subsets.

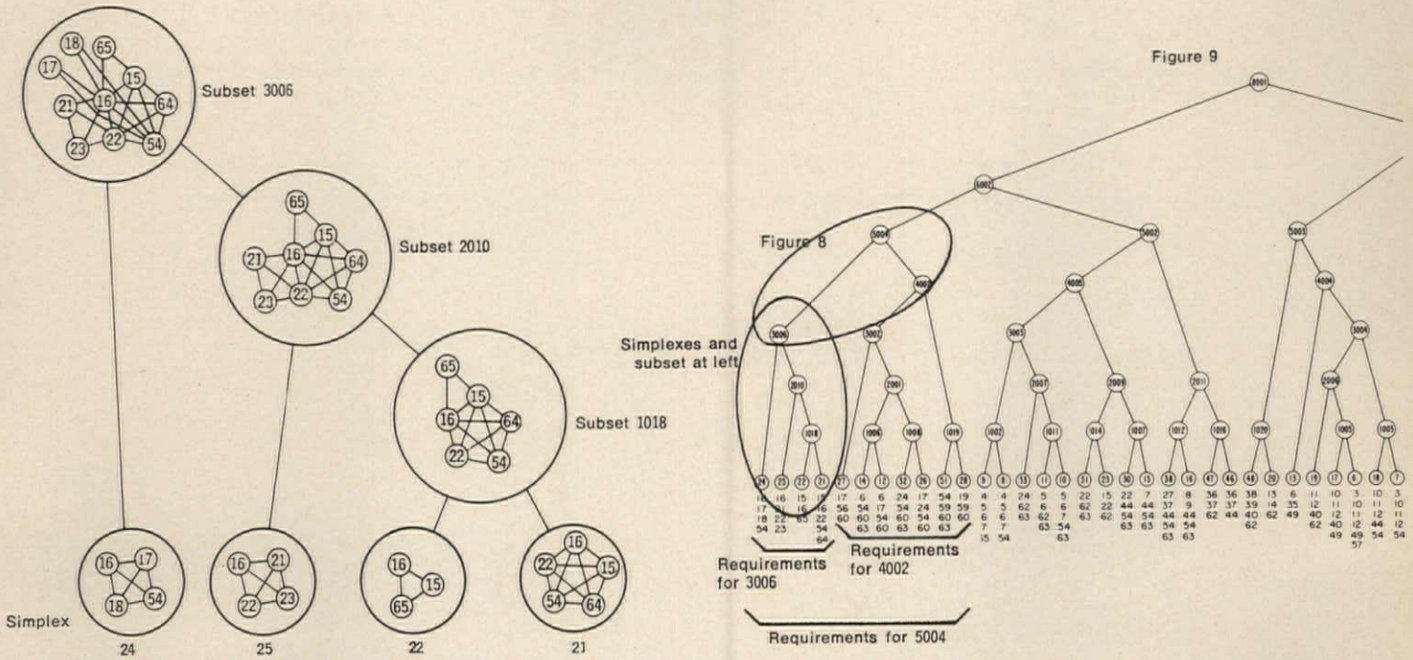


Figure 7. Simplexes combined to form subsets (illustrating the recomposition process).

complex problems. The bottom row of circles shows the simplexes. The requirement numbers contained in each simplex are listed below. The other rows of circles show the subsets of requirements formed by combining simplexes or subsets.

The design was solved by inventing a diagram language which expresses the physical solutions to the simplexes and subsets. This language lies halfway between the language of words and building plans, serving as an intermediate step between the statement of problem and solution. Starting from the bottom (Figs. 7 and 8), the diagrams were combined following the proper order of recomposition. By using this method, the problem was broken down into manageable parts, the most important problems were resolved first, and all requirements were given equal consideration. The final diagram was used to guide the site development (Fig. 9).

Since new buildings will be constructed on the central site, they will necessarily have a long economic life. Therefore, the functional life of the site must be extended by making it adaptable to a wide variety of uses. This is done by 1) orienting all buildings toward the street and 2) grouping buildings into separate areas according to their functions—residential, common activity, clinic/administration, service (Fig. 10).

The grouping of buildings into separate areas satisfies mental health requirements and also deinstitutionalizes the site by merging it as much as possible with the pattern of the surrounding community. This grouping also permits the use of the buildings in the greatest variety of combinations.

Although new mental health facilities will be built on the site, as service concepts change, part or all of the site might become unsuitable for mental health use. The grouping of buildings makes it easier to phase out the site. When no longer needed, the separate areas of the site can be leased or sold to other public agencies or to the community, i.e., the

Mr. Friedmann, an architect with the New York firm of Max O. Urbahn Associates, Inc., was project manager and designer for that office of the Brooklyn State Mental Hospital.

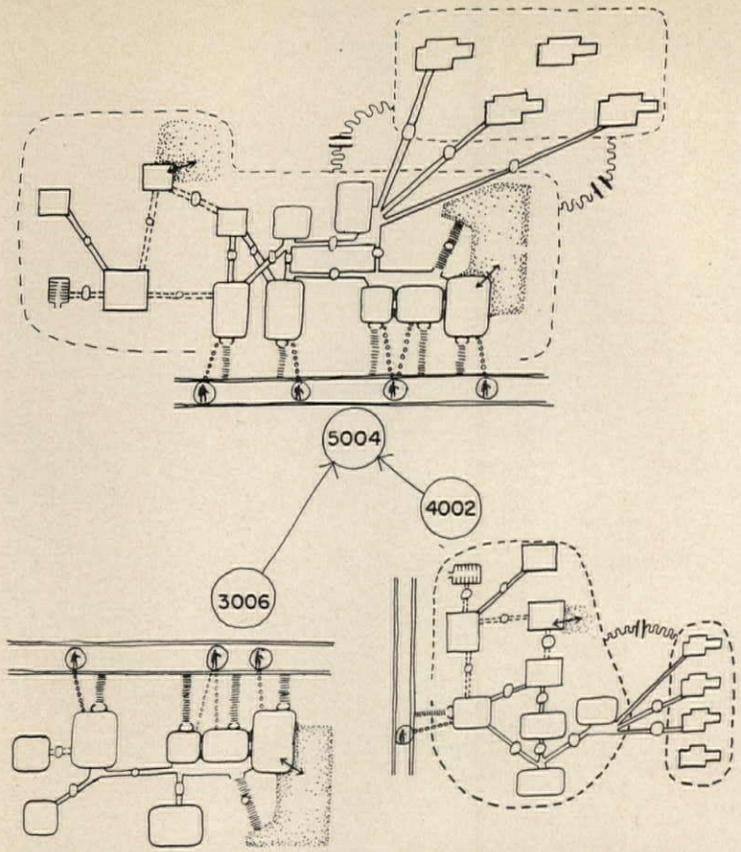


Figure 8. A diagram language used to combine the solution to two subsets into the solution for the next highest subset.

residences could become public housing, the common activity buildings a community center. This helps make the economic life of new buildings as short as possible.

It might seem wild to plan new mental health buildings with nonmental health uses in mind. However, in these days of rapid social and technological change, the time could come quickly when mental health purposes are best served by being able to get rid of obsolete mental health facilities.

At the scale of individual buildings, adaptability is provided by specifying for each building 1) the most general shape for the exterior shell to accommodate a wide range of uses; 2) internal flexibility for a change in use; and 3) the ability to expand by making additions (Fig. 11).

All the information that should guide the overall development of the site is combined in the master plan diagram (Fig. 12). The buildings were grouped by type into areas in a way that best satisfied the functional requirements. Then, the characteristics for individual building adaptability and integration with the site as a whole were added and the layout coordinated to make sure it was properly arranged for phased reconstruction.

The only remaining task is to describe the implementation of the program with a phased reconstruction plan for the central site. A series of phasing plans were used to illustrate the reconstruction process (Figs. 13, 14, 15 and 16). The phasing implements the five

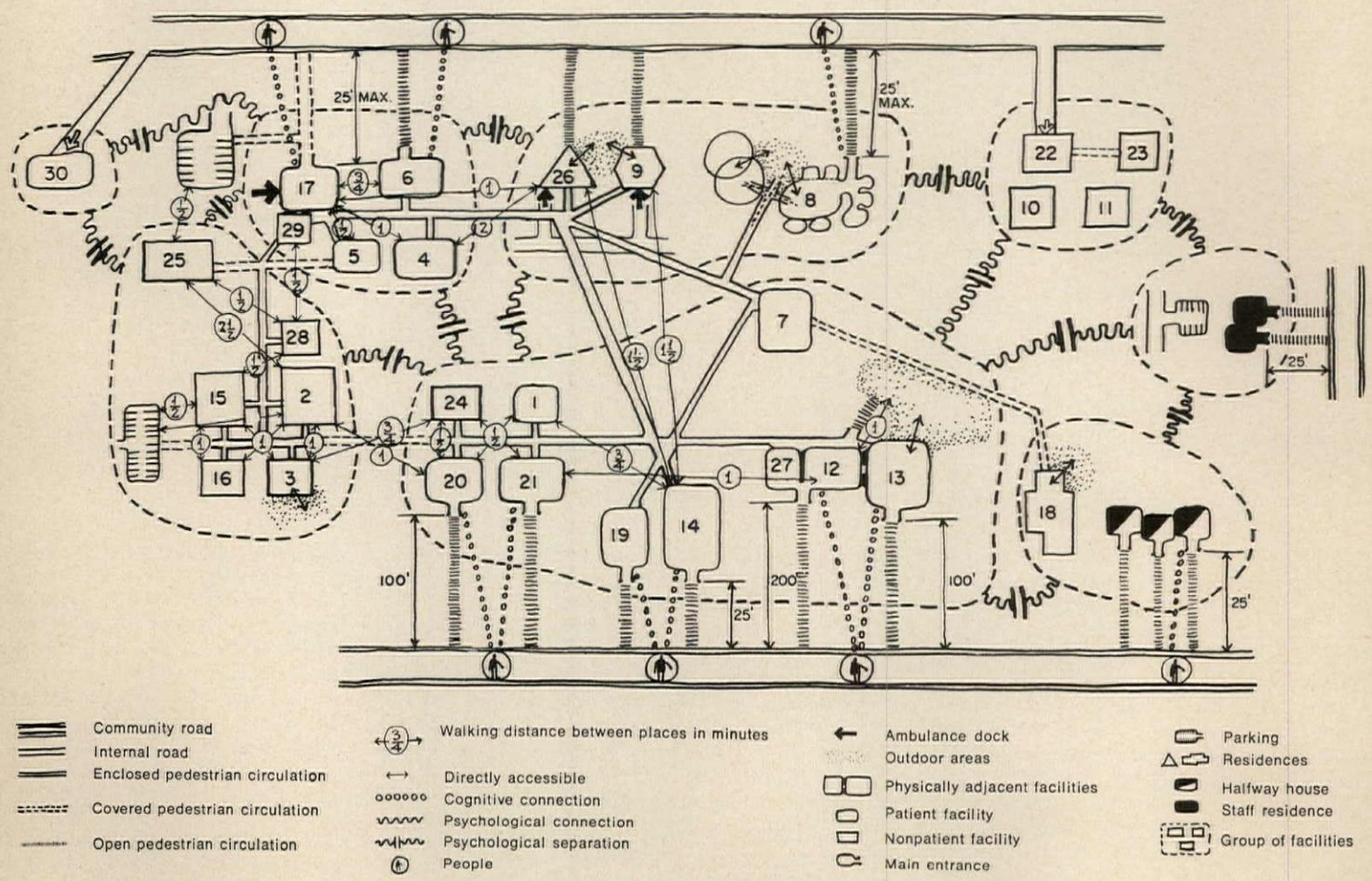


Figure 9. The final diagram which combines all simplexes and subsets and solves all functional requirements.

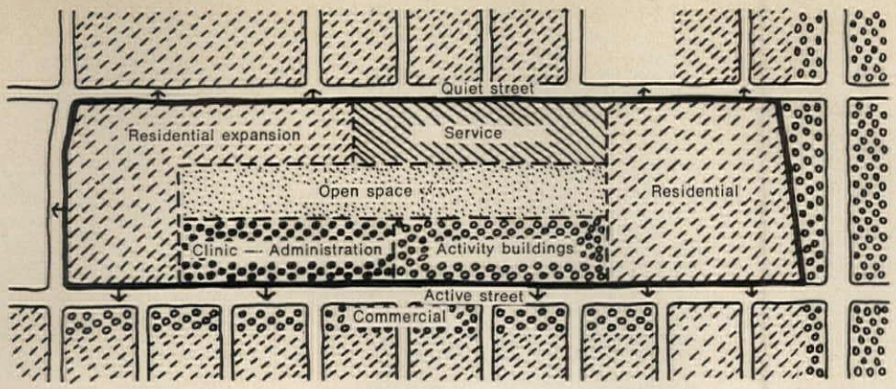


Figure 10. The grouping of buildings on the central site for maximum adaptability.

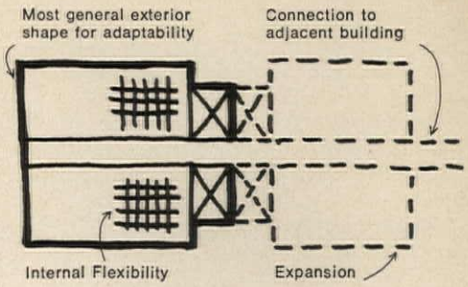
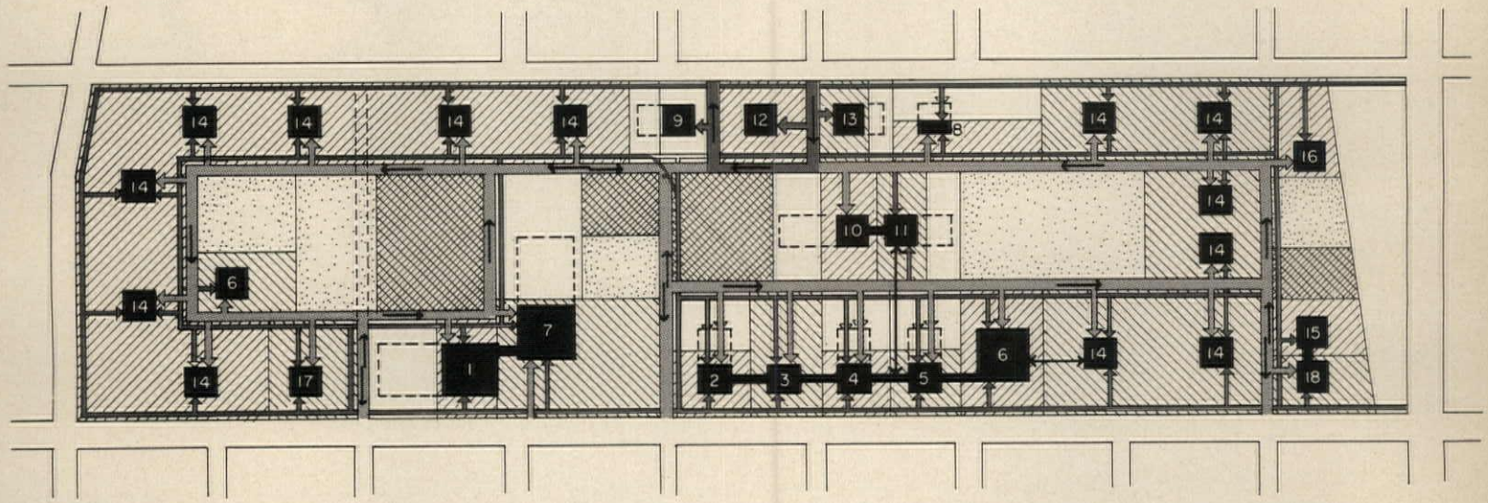


Figure 11. A schematic building plan showing requirements for adaptability.



BUILDING ZONE INDEX

1 Office building
2 Education
3 Auditorium
4 Vocational rehabilitation
5 Sheltered workshop
6 Recreation
7 24-Hour clinic
8 Research
9 Warehouse
10 Kitchen/dining
11 Dining
12 Powerhouse
13 Transportation
14 Residential unit
15 Day/evening center residences
16 Halfway house
17 Staff residence
18 Day/evening center

Building zone
Building expansion zone
Parking
Outdoor recreation

Building
Building designed for connection to adjacent building
Enclosed pedestrian connection
Connection to vehicular circulation

Connection to pedestrian circulation
Passenger vehicle roads
Heavy truck roads

Figure 12. The master plan diagram which combines all the information that guides the development of the central site.

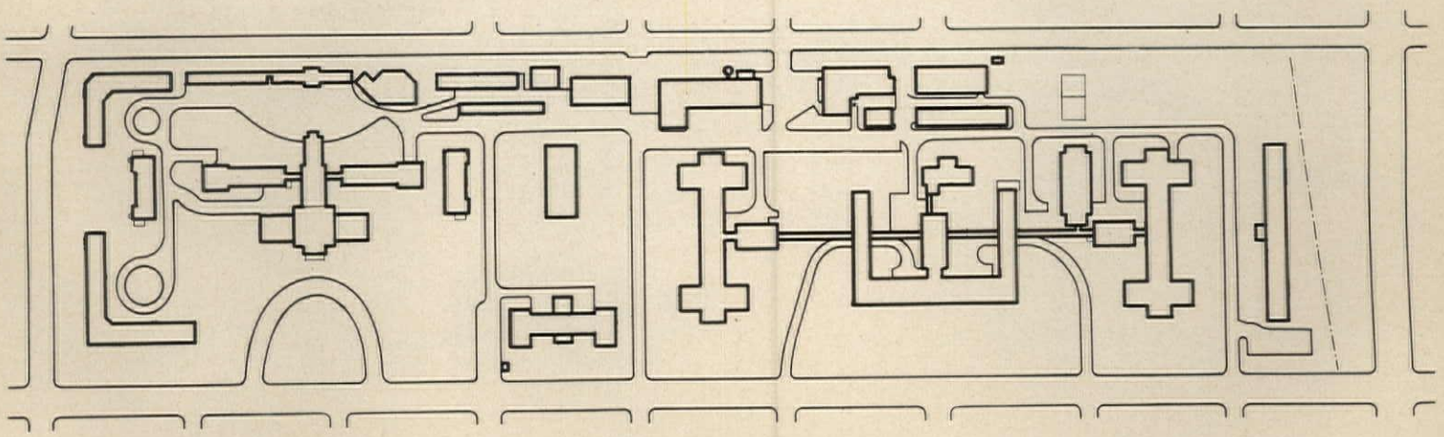


Figure 13. The existing central site.

program requirements as shown by the following solutions:

1. The central site is rebuilt to serve as a backup facility in a decentralized system.

2. The same phasing sequence can lead to either a 700- or a 1,600-bed facility.

Reconstruction can be stopped at any point because each phase provides a complete facility with a combination of old and new buildings.

Reconstruction can be continued at any time because each phase replaces the buildings that will be demolished in the next phase.

3. The buildings and the site are adaptable to a wide variety of uses and buildings are grouped so that the site can be leased or sold to others in parts or as a whole.

4. Phasing brings about a gradual shift to a direction that allows for evaluation and modification of goals at all times.

5. Old buildings are replaced by new buildings in order of the greatest need.

The solutions to facility planning for Brooklyn State Hospital show that planning for future change can be done without unusual and expensive new building types. The architect can be most useful to society by doing more clear thinking about clients' problems and less promoting of ever more complicated and expensive buildings. Sometimes the answer to a client's problem might be not to build a new building at all. Unless architects have the courage to see this, we could become as obsolete as the monumental, static buildings we so often design. □

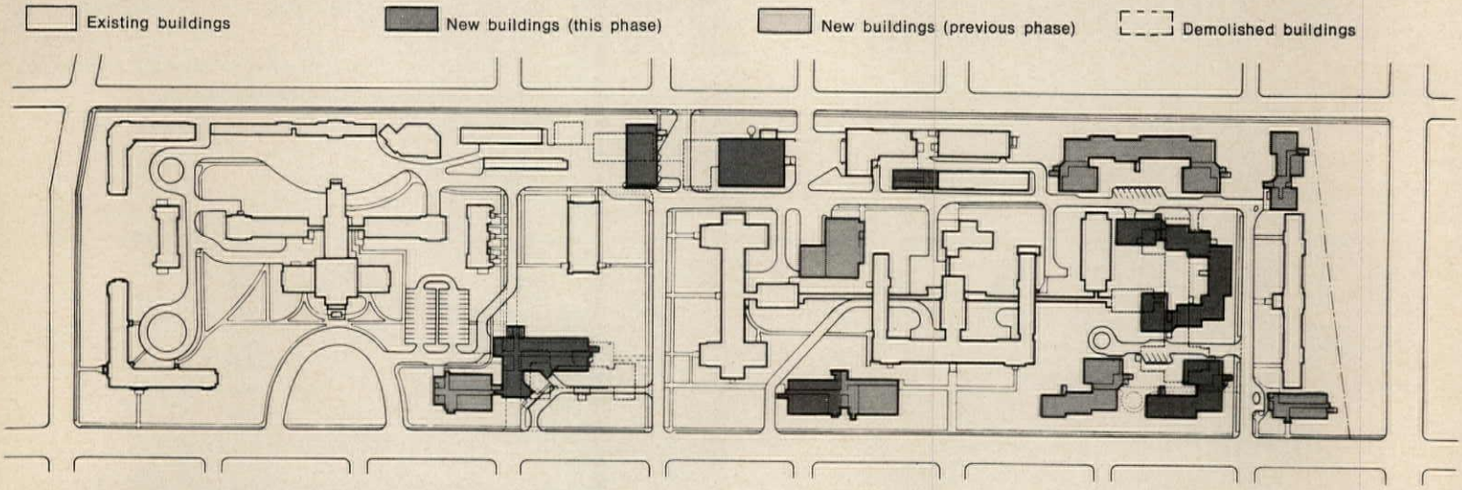


Figure 14. Phase 2: a combination of old and new buildings.

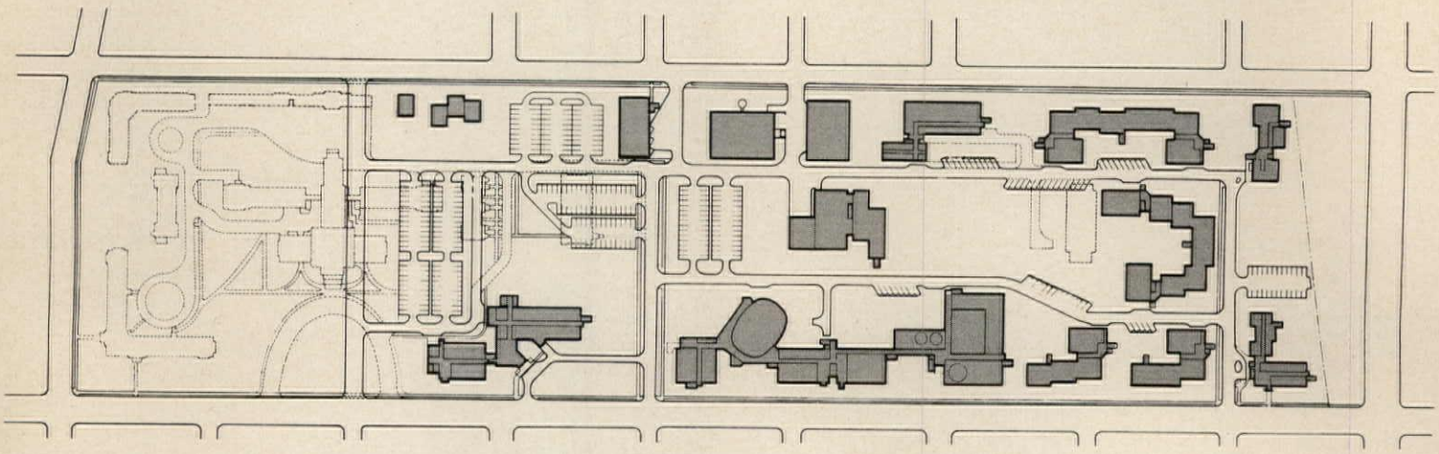


Figure 15. Phase 4: the 700-bed faciltiy—or the optimistic prediction.

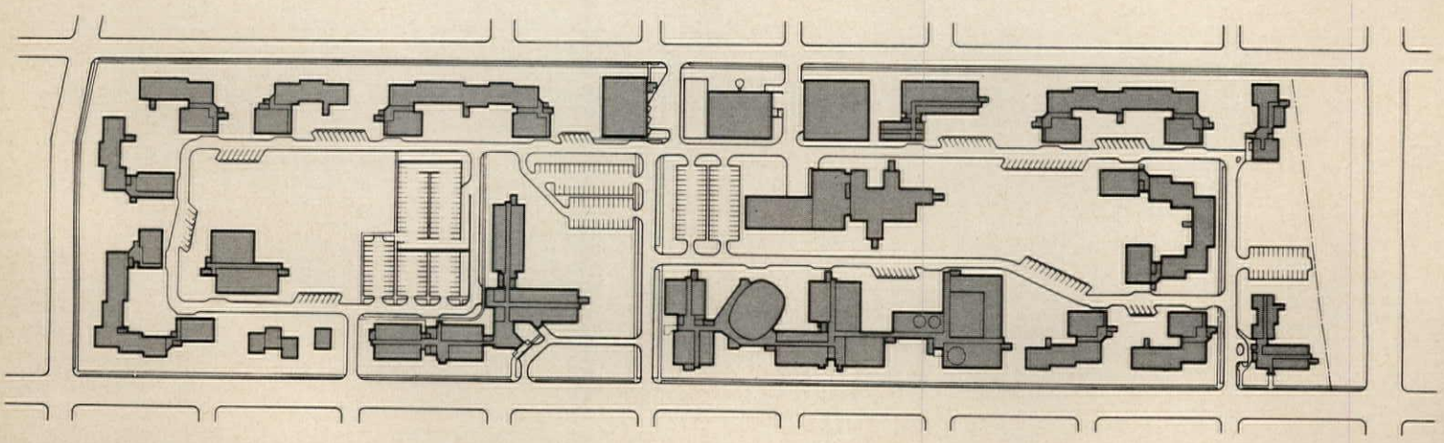
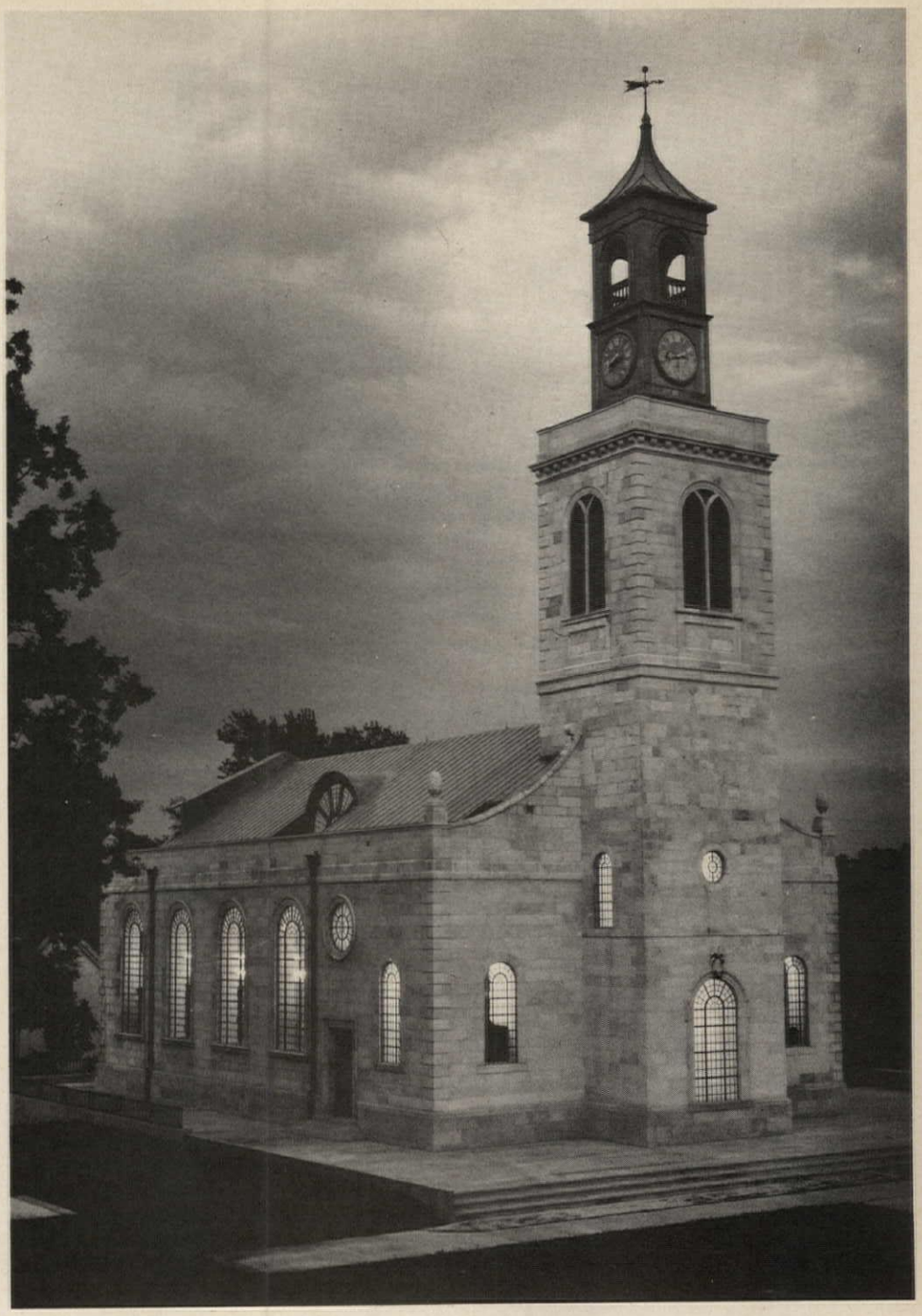


Figure 16. Phase 7: the 1,600-bed facility—or the pessimistic prediction.

TALE OF A CHURCH IN TWO CITIES



"From Stettin in the Baltic to Trieste in the Adriatic, an iron curtain has descended across the continent," said Sir Winston Churchill on March 5, 1946, in the town of Fulton, Missouri, when he accepted an honorary degree from Westminster College. Some historians view Churchill's address as one of the more significant in his long and remarkable career. President Harry S Truman called it "one of the greatest speeches I ever listened to . . . and part of the policy of the Free World ever since."

A small college (then only 250 students) located in a quiet midwestern town seems an unlikely place for such world-stirring words by a person of international and everlasting renown. But Westminster College's president, Franc L. McCluer, apparently thought big and had the perspicacity, as well as audacity, to ask Churchill to come to Westminster in the first place. And in 1961, when the college increased its efforts to find a memorial to commemorate the historic event, Robert L. D. Davidson, McCluer's successor, also had enterprising ideas.

In June 1961, in discussions with three representatives of the St. Louis branch of the English-Speaking Union concerning a memorial to Churchill's "Iron Curtain" address at Westminster College, Davidson suggested moving a historic Sir Christopher Wren church from London as a memorial. He remarked that Westminster's chapel, due to a faulty foundation, would have to be razed and that the church would provide both a chapel and a memorial.

Wren had designed some 50 churches in the last half of the 17th century; of all that had withstood the onslaughts of time not one had been left untouched by World War II. After the war, as London was being rebuilt, it was evident that some of the churches would have to be lost to new and more pressing developments. Davidson thought that nothing could be more fitting as an American memorial to Churchill, the war time Prime Minister, than a church by Wren, who himself had helped rebuild London after another disaster — the Great Fire of 1666.

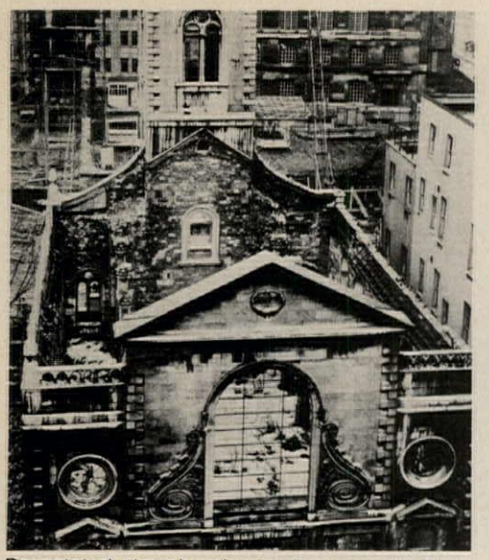
Churchill approved the idea and wrote, "The removal of a ruined Christopher Wren church, largely destroyed by enemy action in London in 1941, and its reconstruction and re-edification at Fulton, is an imaginative concept. It may symbolize in the eyes of the English-speaking people the ideas of Anglo-American association on which rest, now as before, so many of our hopes for peace and the future of mankind."

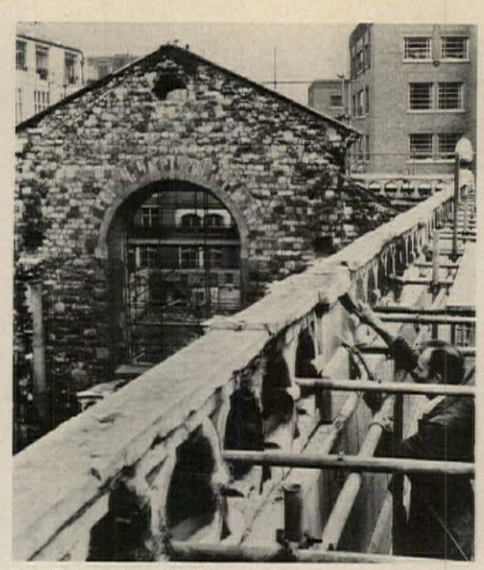
After due negotiations and fund-raising, it was finally decided that St. Mary Aldermanbury, just back of London's great Guildhall and within five minutes walk from St. Paul's Cathedral, was most appropriate for the purposes of the college as a memorial and chapel.

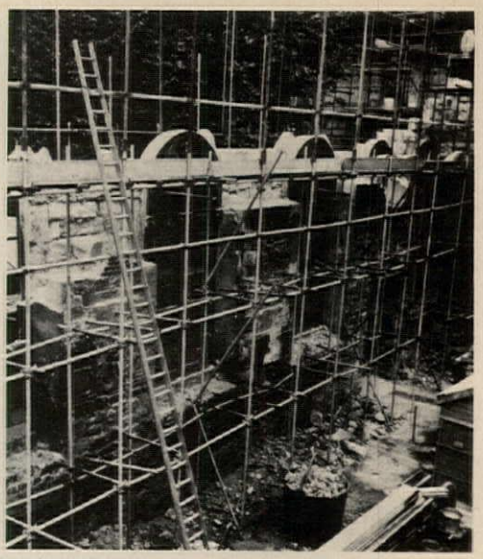
In 1964, with President Truman and British Ambassador to the United States Lord Harlech participating in the ceremonies, ground was broken for the memorial. The lifting of the first stone from the church in London occurred on July 7, 1965, under the supervision of Marshall Sisson, a British restoration architect. Meanwhile, reconstruction architect Frederick C. Sternberg, AIA, coordinated architectural plans in Fulton. And at last, by August 1967, the last stones were in place in America — five years ahead of schedule. On May 7, 1969, the memorial was dedicated and the church reconsecrated.

A collection of Churchilliana is developing in the museum beneath the church, including paintings, photographs, letters from notables and a facsimile of the signed proclamation by President Kennedy declaring Churchill an honorary American citizen, with one of the several pens President Kennedy used to sign the document. First editions of Churchill's works are in the library, and there are films and tapes of his major speeches.

Whatever one's views about moving architectural monuments from their original siting to other places, the manner in which all this transpired seems worthy of note. On the occasion of the 25th anniversary of Churchill's momentous address in March, perhaps he would have appreciated a toast to the two architects most intimately concerned with his foremost American memorial. Their stories of participation in the unbuilding and rebuilding of Sir Christopher Wren's St. Mary Aldermanbury follow. □







Devastated, the church stands as a gutted ruin after December 1940 bombing; stones are cleaned before dismantling and the unbuilding begins.

In London

by MARSHALL SISSON

To transport one of Sir Christopher Wren's war-damaged churches from London and to design its reconstruction on the campus of Westminster College in Fulton, Missouri, involved many technical and esthetic problems.

The date of the first church on the site, built over Roman ruins, is unknown, but excavation has confirmed the existence of a smaller 12th century building. In 1416, the church was completely rebuilt on a larger scale by William Eastfield, a parishioner and Mayor of London; again in 1633, a considerable reconstruction took place.

The church was devastated in the Great Fire of London in 1666, and Sir Christopher Wren and Robert Hooke were commissioned to re-erect a church on the old foundations. Formerly it was thought that the lower part of the medieval tower had been retained, but excavation has proved that this was not true. Rebuilding began in 1670 and was completed in 1677.

Various minor alterations and repairs were carried out from time to time, but in 1863 a drastic reorganization took place. The exterior was embellished by the addition of a pierced parapet, unsuitable tracery was inserted in the plain windows and some of the window openings were altered. During World War I, the windows were shattered in the first Zeppelin raid on London. Then on the night of December 29, 1940, Saint Mary's was hit during one of the heaviest Luftwaffe air blitzes of World War II, and the church was entirely gutted by incendiary bombs with the result that its roof and steeple were destroyed.

Unlike the majority of Wren's churches which were built on confined and awkward sites, St. Mary's was freestanding and regular in plan, making it suitable for an open site on the Westminster College campus. Also, unlike many other churches, it was faced with squared stone ashlar and could be re-erected; if the walls had been brick, little of the original exterior could have been utilized.

In February 1963, I met with the president of Westminster College in the snow-covered ruins of the church; during subsequent months, negotiations were carried on with all the authorities concerned with the removal of the ruins to America.

The first actual operation on the site was the removal and transport by air in April 1964 of six large stones and some partly charred wood for a cross to mark the proposed site at Fulton in connection with a groundbreaking ceremony performed by former President Harry S Truman.

Later in 1964, when the decision had been made to proceed with the work, scaffolding was erected to all the walls and the tower so that exact surveys of the structure and detailed drawings of every individual stone could be made. Concurrently with this measuring, the stonework was washed and cleaned of three centuries of London soot. When strengthened, the scaffolding was used to dismantle the church.

The intention was to rebuild the fabric of the church exactly in its original form as designed by Wren; in planning the interior, however, my aim was to satisfy the requirements of a college chapel as nearly as possible in the style and manner of Wren.

All the Victorian additions were omitted, and the missing Wren stonework restored in the drawings for reconstruction. By a study of the engravings of the 18th and early 19th centuries and by close examination of the evidence in the structure itself, complete recovery of the original external form was made possible. For example, the form of the original tracery in the belfry windows and the large east window and the scrolls at the east end could be exactly determined from slight traces in the structure.

As only the church's bare walls were left standing, the form and detail of the roofs and ceilings had to be established with the aid of measurements, engravings, photographs and original accounts of the building. I found this a most interesting piece of research which involved checking personally all the most vital dimensions and significant evidence in the structure. No scale drawings existed of the destroyed steeple; so the dimensions were ascertained with accuracy by photogrammetric methods based on exceptionally good old photographic negatives which, fortunately, were available.

First, it was necessary to establish the exact dimensions of the plan and section of the building so that American architect Frederick Sternberg could prepare the designs for the library and museum which form the platform on which the church was to be re-erected. Having been built on medieval foundations, the church was not quite rectangular or regular in plan. Dimensions were adjusted to make the north and south walls equal in length and the form rectangular. The tower was brought exactly to the center of the west wall.

My reconstruction drawings were sent to Sternberg so that he could incorporate the structural requirements necessary to comply with American building regulations and to accommodate the mechanical services.

Actual dismantling of the church began in 1965. My detailed drawings for each wall showed every stone outlined and numbered. As dismantling took place, each stone was incised with its number to correspond with the drawings so that the walls could be reassembled in exactly their original form at Fulton. The stones were strapped to wood trays or pallets for transport; the carved details were packed in crates for safety.

Only the external stone facing of the thick walls was transported. The inner part, being of brick and stone rubble from this and other churches destroyed in the Great Fire, was discarded. All parts of the stone internal columns fit for reuse were shipped as well as some of the steps of the spiral stairs in Wren's tower. During demolition, a careful watch was kept for medieval fragments in the rubble walling, and a number of carved stones were found and deposited in the Guildhall Museum.

Where stones had been too badly damaged and calcined by fire, as in parts of the tower or where the stone facing had never existed as in parts of the north and west

Mr. Sisson, of Godmanchester, England, belongs to many architectural and restoration societies and has carried out extensive projects on medieval churches, guildhalls and houses throughout his country.



Stonemason sets first stone in April 1965, supervises placement of a section of a column and smooths one of the more than 7,000 numbered stones.

sides, new stones were provided from the quarries at Portland, England. Some similar stone facing from the Wren church of St. Swithun, Cannon Street, which had not been rebuilt, was utilized also in making up deficiencies. In all, some 700 tons of stone were transported to Fulton and laid out on the ground where the arduous task of sorting was successfully accomplished.

I was most impressed and pleased by the skillful manner in which the stone walls have been rebuilt — an achievement.

As reconstructed, the exterior of the church is now almost exactly as it was when completed by Wren except where I slightly altered the design at the west end. On its former site, this end was close to adjacent houses and would hardly be seen. For its present position, however, I thought it well to insert a large west window in the base of the tower which lights the staircase connecting the church with the library and museum below. The carved keystone of this window comes from the belfry of St. Swithun.

In the interior, the 12 stone columns of the composite order with their boldly carved capitals retain all the original material thought to be sound enough for reuse. When capitals were too badly damaged, they were reproduced in cast stone.

In the preparation of detailed drawings for the renewal of the vaulted plaster ceiling, I omitted the Victorian alterations and reproduced the original Wren design which was deduced from a drawing of 1848 and the original building accounts. Models for the plaster ornaments of the main cornice and of the ceilings were made under my supervision and sent from London. The successful reconstruction of the whole ceiling is a notable achievement of the local plasterers.

All the internal fittings, for which no precedent existed in the church before its destruction, I designed especially for St. Mary's new purpose as a college chapel. They are derived closely from originals which exist in other Wren churches; in form and detail they are characteristic of the late 17th century. The altarpiece and paneling, altar rails, vestry fronts, pulpit and lectern were made in London under my supervision. The central part of the altarpiece is reminiscent in design of the 17th century reredos which is known to have existed in St. Mary Aldermanbury before the alterations of 1863. I was able to incorporate as doorways to the two vestries the beautifully carved Corinthian columns and pediments which originally formed part of the altarpiece of the Wren church of St. Dionis Backchurch, destroyed in 1878. Detailed drawings for the organ balcony and stairs and for the seating were admirably carried out locally under the supervision of Sternberg.

I am grateful to all concerned who have so accurately translated my designs for the reconstruction of St. Mary's Aldermanbury into the finished building which now stands in Fulton. □

In Fulton, Missouri

by FREDERICK C. STERNBERG, AIA

After conferences in London and examination of the English church site, we set to work. Marshall Sisson's detailed design drawings of St. Mary Aldermanbury were sent to us in St. Louis as each sheet was completed, and we began to develop the construction system for the rebuilding. Soon the working drawings were underway. Modern building methods and materials were employed in the design of a concrete foundation wall and floor system throughout the lower level and the tower and in an inner wall structural steel frame for the upper church walls and roof.

The Wren church itself is constructed over and above the library/museum portion of the memorial, which acts as a base or podium for the church. The lower area is somewhat longer and wider than the church, and its roof forms a flat terrace or promenade completely around the church. The base structure was planned with the knowledge that the church would be placed on the site. Due to the sloping nature of the terrain, it was obvious that the library could be placed below the church as an "undercroft" which would unify the complete Churchill Memorial unit.

Supporting columns, beams and walls for the church were carried down and reflected in the lower plan. This area includes a spacious central museum surrounded by library rooms and a rare book/conference room. Churchill mementos and exhibitions are on display in the museum area which is connected to the church above by means of a wide, cantilevered spiral stone staircase, recalling the original narrow spiral stair to the belfry in the church above.

The reconstruction of the church proper began with the arrival of the first carload of stone in the spring of 1966. A large open area within 500 feet of the building site was converted into the "stoneyard." All crates and pallets were opened there and the various stones arranged in the indexed numerical order. Several crates had been rearranged in shipment, and the indexing had become confused — but soon all was laid out. A local shuttle service began, the base courses of the church took form and the rebuilding was on its way.

Several of the stones were cracked or broken in transit. A number of made-up stones from the Portland limestone quarries in England had been sent along, however, and with the aid of modern stoneworking tools and equipment these were replaced and pieced with the aid of modern epoxy methods. In some cases, buff Indiana limestone was used where larger stones collapsed completely. The color difference was slight. Great credit goes to the project stonemason foreman, Rienzo Palmer, who put his heart and soul into the work. For his efforts, he was awarded a St. Louis Chapter AIA craftsmanship citation.

The thin stone joints were carefully set and finished with a stone dust and fine sand mortar. Slowly and carefully the Sir Christopher Wren design began to rise again. The old stones measured from 3x5 inches to as large as 24x30 inches. The horizontal cut stone beds aided in the numbering of the stones in London, but the rather simple system resulted in a rapid and orderly reas-

Mr. Sternberg practices architecture in St. Louis, Missouri, where he heads his own firm.

All internal fittings in St. Mary's are derived closely from originals in other Wren churches. The Isabelle R. Whitmarsh Memorial Garden is a 1969 addition at the southeast corner of the church.

sembly of the parts. The backup for the stonework was new structural clay tile several layers in thickness with a plaster interior finish. The belfry clock turret and the main roof surfacing are lead-coated copper.

The search for materials for the interior finish provided one of the more interesting phases of the reconstruction program. There is a great deal of fine new woodwork in the church, ranging from the English oak brought over for the reredos to the pews and extensive wall wainscoting of American oak. The blending of the two woods in a rather dark stain worked out admirably. Sketches made in London of existing Wren lighting fixtures were used as a design basis for those in the rebuilt church. These American-made fixtures form a beautiful lighting pattern in the church.

Upon investigation, it was found that Williamsburg restoration clear glass matched most perfectly the few samples of the original glass found at the English church site, and this was used for the glasswork. A considerable amount of ornamental plaster work was involved in the vaulted ceiling of the nave; this admirable piece of work was carried out by a St. Louis artisan, one of the few remaining classical exponents in the area. The castings were made from authentic Wren design moulds sent from England.

A complete system of climate control has been designed for the structure including heating, airconditioning and humidity control. Due to the project requirement that the church be as close as possible to the original Wren design, air delivery grilles were placed in the stone windowsills 7 feet above the nave floor; the return grilles were put in the base riser of the side pews which are parallel to the nave. Thus the grilles are kept out of sight from the church floor level.

The church contains an English-made organ which is located on the gallery over and above the narthex. It is a new instrument which follows the original Wren styling in casework. It was assembled at the site as an exemplary model of pipe organ construction of the Wren era but contains improvements which have evolved over the years.

From the planning standpoint, the memorial fits well into the overall college campus plan. It is at an important intersection, midway through the campus. The church is oriented in the same direction as it was in London. It is in a location which commands attention from the surrounding buildings — the new science center, library and auditorium are on one side and the dormitory quadrangle on the other.

The tower and belfry can be seen through the trees from the principal extremities of the relatively small campus. Stylistically, it fits rather well with the older classical college buildings, and yet its simplicity blends well with the more contemporary structures. The memorial site was determined by the college trustees after careful consideration of various proposals. Their decision was based on the central campus location, with close proximity to the student walks.

The memorial is separated from the recently built auditorium by some 250 feet. The space between on the upper or church level has been designed as an open landscaped plaza for outdoor activities, as well as a walk-through area for students going to and from classes. The lower level museum is connected to the auditorium lower lobby by means of an underground passage or connecting gallery, as it is known, extending under the landscaped plaza. The gallery is fitted for use as an exhibit area for Churchill art treasures and for travelling art shows. A gift shop and small restaurant are located in the auditorium lower level. The auditorium itself can be jointly used with the memorial when necessary.

In effect, the Wren church, the lower Churchill museum and library, the auditorium, plaza and connecting gallery all serve as a unified complex that will accommodate large or small gatherings and every day student activities. There has been little interference, one with the other, and the image of Churchill in the form of the Wren church now dominates the site and the campus as the American memorial to the great man of the 20th century. □

As professional practice expands into new areas, proposals and contracts for these additional services present special problems. An example can be found in the experience of Rahenkamp Sachs Wells & Associates, Inc., which grew in nine years from a one-man landscape architectural practice to a 20-man comprehensive land planning firm. Planning and technical services, the firm discovered, are quite different and should be proposed, priced and commissioned accordingly. ■ The firm includes professionals in city and regional planning, site planning, architecture and landscape architecture and specialists in land development economics, applied ecology and analysis of natural systems. It believes that it is possible to balance the pragmatic realities of commercial development with sound ecological principles to arrive at a quality environment. ■ Part of the firm's budget is allocated to its own research projects. It has developed a systems approach to technical documents which allows simplified schematics plus standard details to serve as working drawings in the field. A current project concerns a computer model for calculations used to evaluate the impact of a proposed development on a community. ■ The Philadelphia based firm has practiced in 11 states.

PROPOSING AND PRICING EXPANDED SERVICES

by WALTER S. SACHS JR.

Sound business practice is not unprofessional. In fact, the professional who understands business is more valuable to the project developer than one who does not. Before he can establish fee schedules for the private development market, however, the professional must understand the needs of that market and define his capabilities to serve it.

Land planning is quite a different exercise from site planning, the traditional service offered by landscape architects. We found this out the hard way. We recognized the market for expanded services and had the capability to enter the development process at the land planning stage. We were not sophisticated enough, however, to spell out clearly the difference between planning and technical services. Our clients knew the difference and were pleased to buy the whole package at part of the price.

Typical clients were accustomed to paying $10,000 for lot layouts and landscape plans for a 100-acre development. In order to design a full-fledged planned unit development, however, we were providing a total of 16 services valued at about $100,000. The clients were refusing to pay much more than the old $10,000 fee because they did not understand the additional scope of services in quantitative terms nor were we able to specify limits very precisely.

This was before land planning was generally recognized by the professions — before the term "land planning" was coined or "environment" became a national concern. While we had to learn from experience what the fee schedule should be, most other planners evidently have not because there is a wide gulf between fees being charged for land planning and those we know are required and justified to do a proper job.

We recognize that there is a difference between a new firm entering the market and one that has built a national reputation. But there are too many highly competent, nationally recognized firms that charge inadequate fees for planning services. I do not suggest that we deserve exorbitant profits, but I know from experience that a competent level of services cannot be maintained at current fees, especially in an inflated economy.

Three years ago, in spite of the risk of pricing ourselves out of the market, we set what we considered to be a necessary price level for private development work. We also clearly specified what services we could supply and spelled them out to differentiate among planning, technical and merchandising services. We developed a "Standard Services" document which describes the scope and sequence of our services; differentiates phases within each major section; stipulates range of fees and fee basis; provides a means for the client to select exactly what he expects us to do and, by implication, what we are *not* to do; and acts as a general job program and basis for a contract agreement.

Planning services cover regional analysis and marketing, master planning the overall tract and presentation for zoning and financing. These are performed on a per gross acre basis of $100 to $200 per acre, with a $35,000 minimum. The minimum protects us by eliminating developers who can't or won't pay the necessary heavy front-end expenses. This fee is not really based on acres — they are simply convenient unit measures — but on hours of effort required to complete the work.

Using an average hourly rate greatly simplifies bookkeeping and estimating. Most firms are small enough that cost accounting individual jobs by posting each worker's hours at individual rates is not justified. The simplest way to compute an average hourly rate is to divide gross operating expenses, including all salaries (except income taxes), by total gross available hours including all principals' time. It is advisable to use only a 40-hour week. This is cost per hour. A profit and contingency margin is then added.

Another method is to add up the gross payroll, multiply by 2½ or 3 and divide by the total number of available hours. If this average hourly rate is used for each hour of effort on a job, it should provide the projected profit margin. Naturally, as much contingency should be built into the hourly rate as can be justified within competitive limits. Cost structures and production efficiency are related to workload, employee attitudes, inflation and other intangibles that a contingency factor must cover. We find that an average hourly rate of $20 to $25 is required by a national firm in a major metropolitan center.

Technical site services fees are calculated in the same way but expressed in terms of dwelling units at $150 to $200 per unit. Developers prefer unit rates because they can pay the fees section by section as building and financing proceeds. Unfortunately, this works against the professional whose design system and base sheet set up expenses are not fairly amortized on a flat curve. We have overcome this by simply altering the payout curve.

It works like this: Suppose a project will have 1,000 units to be built in five sections and the fee is $200 per unit. The entire fee will be $200,000, but because the first section is usually smaller than the later ones, we charge by the section on a descending percentage of the total. We charge 30 percent for the first, 25 percent for the second, then 20, 15 and 10 percent. This way the effective fee rate on the first 200 units is $300 per unit, which covers the design and set up expense (*see* Fig. 1).

No developer is delighted by this arrangement, but it protects us under the cancellation clause that he insists be in the

agreement. We are not hurt financially if we design a successful first section and he wants to give the design to a local engineer to carry out the rest of the project. Better yet, this form of payout is an incentive to the developer to continue our services on the declining cost basis.

Merchandising services include sample gardens, signs and graphics, promotional sketches and models. These are done on a per-assignment basis, either a calculated lump sum or on a straight hourly basis. Hourly arrangements are difficult for the developer because he needs to fix his costs to estimate financing and operational feasibility. Hourly arrangements with fixed limits or upsets are no advantage to the professional, and probably create distrust and bad will on both sides.

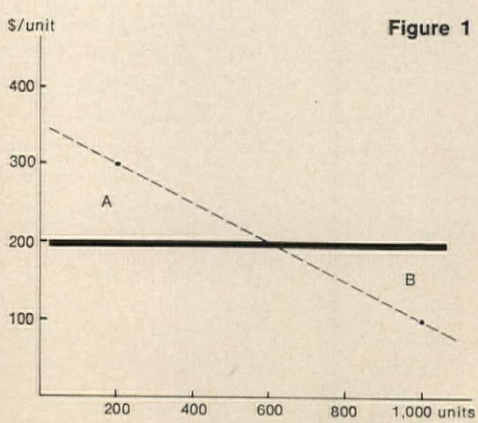
As professionals, we must recognize the economic impact of our services and fees on the development project. Our fees are up-front expenses which are not depreciable for tax purposes and which have to be paid before financing is obtained or zoning granted. They represent the bulk of equity capital required in a project at the point of maximum risk. The only way to justify these fees is to see that professional knowledge, skill and sensitivity raise the odds for the developer.

The best fee schedule in the world is worthless, however, without effective collection. The fee is one thing and collection terms another. Successful businessmen understand the difference because they understand cash flow; and the prudent developer knows that his whole operation depends on the flow of cash at least cost. As an example, the developer might pay $200 a unit; but how and when? The longer he can defer payment, the less his risk and ultimate costs. In effect, he makes the professional an equity partner without equity. If he can defer payment until the permanent mortgage settlement, he saves at least 10 percent of the fee in financing costs. Meanwhile, the professional has to borrow to pay operating expenses. The developer gains, the bank gains and we pay for both.

We insist on primary payments because we don't want to finance even the first month's work. Our terms are net 10 days from invoice date; if payment isn't on time, we want to know why. If the explanation is reasonable, and if we can financially accommodate the client, we will do so with the firm understanding as to exactly when the payment will be made.

These terms must be spelled out and understood in advance. There is no point in not talking about them or assuming they are understood. We have found that the least damaging time to lose a client, for both sides, is at the beginning and not halfway through the job. Naturally, clients are sometimes less cordial when talking about money than about design, but if good design is to be produced, it must be paid for. □

Figure 1



This diagram shows how the flat curve (solid line) at 200/unit effectively defers the costs in area A to a later time under area B. While the straight line method is advantageous to the developer, the declining fee basis (dashed line) realistically represents the professional's efforts without calling upon him to absorb the added financial costs of deferred payments.

Mr. Sachs is treasurer of the planning firm of Rahenkamp Sachs Wells & Associates, Inc.

Standard Services

Planning Services

Planning services are intended to carry the project from early feasibility and fact-finding through the necessary planning steps to obtain zoning approval and financing commitments. The fee basis for these services recognizes the speculative nature of the investment at this time, and the desire to keep commitment to a minimum, but permits adequate service to assure that conclusions are realistic for eventual design development and construction.

Regional Land Use, Market Surveys and Site Selection

Collection and analysis of existing natural (water, slope, soils), physical (transportation, land use, utilization) and social conditions (markets, preferences and characteristics) on a regional basis to develop alternate areas of specific interest. Results presented in written reports, drawings and conferences with client for final site selection.

Fee: Negotiated Sum.

Site Evaluation and Feasibility

Analysis of natural, physical and social determinants of the selected site to provide comparative recommended development programs and preliminary yield projections. Services include:

a. Subregional analysis plans and report
b. Site analysis plans and report
c. Permissible land use plan(s)
d. Tentative site layout(s)
e. Preliminary informal discussions with local planning boards (Sketch Plat).

Produces a documented report and recommendations.

Fee: $60-$120 per acre (minimum $20,000).

The Master Plan

Proceeding from an approved feasibility, development of a specific master plan showing:

a. Layout on site of dwelling units, commercial area, industrial area, open space, roads, parking and utilities to clearly define the general system and technical and economic feasibility

b. Typical units in outline form to establish coverage, density, mix and general bulk character.

Produces basic documents adequate to submit for public and financial approvals (Preliminary Plat).

Fee: $40-$80 per acre (minimum: $15,000).

Final construction and planting details

Specifications.

Fee: $60-$80 per unit.

Rahenkamp Sachs Wells & Associates, Inc.

Public Approvals

Submission of master plan for official review and approval by local authorities. Services include all necessary conference and public presentations but do not include special models, drawings, slides and other extra presentation materials. (*See* Supplementary Services.)

Fee: Negotiated Sum.

Financing Submittal

Presentation with or in behalf of the client of the approved master plan to financial institutions to establish availability and extent of financing, followed by selection of the first section for development and establishment of reasonably reliable cost estimates to enable the client to negotiate a letter of intention with the financial institution.

Fee: Negotiated Sum.

Design and Construction Services: Site

The fee for this group of services is calculated on a unit basis for those units which will be initially constructed. The same unit price will apply to subsequent sections as developed.

Preliminary Design

Preparation of required technical drawings for final plat approval of the first section, and development of preliminary designs for all site work to establish materials and methods in sufficient detail for quantity survey and cost estimate. Conclusion of preliminary design is a set of documents submitted for specific approval by the client as the basis for construction drawings.

Fee: $40-$60 per unit.

Architectural Coordination

Services include weekly conferences with the client and architect to assure coordination of architectural design with the master plan intention, within the economic framework approved by the client and financial institution.

Fee: $10-$15 per unit.

Construction Drawings

Preparation of technical documents for the site development adequate to obtain building permits and to enable contractors to perform the site work. The following documents, as required, include:

Final grading and surface drainage plan

Final dimensioned layout plan for buildings

Final utilities alignment and placement, under ground and above ground

Final plans, profiles, sections and qualifications for vertical and horizontal road alignments, bridges, etc.

Final landscape and planting plan

Inspection

Visits to the site to approve or disapprove work as consistent with drawings and generally check scheduling and procedures. Services include approval of shop drawings, checklists, change orders, progress payments and material submittals as requested in specifications. Services do not include superintendents, bidding by subcontractors or day-to-day coordination of operations. The basic inspection fee allows a maximum of two man hours per unit. When these hours have been used, or one year from the initiation of a particular parcel, lot or section, whichever comes first, additional inspection services thereafter shall be charged on an hourly basis.

Fee: $40-$45 per unit.

Supplementary Services

The common desire for a successful project which we share with the client often indicates the need for supplementary services which are available at the discretion of the client. Rahenkamp Sachs & Associates have successfully performed these services on prior projects and can illustrate their value. An equitable fee basis for these services is a man-hour rate within maximum limits established by prior agreement for each category.

Architectural Coordination

Review and comment services beyond the preliminary stage, extending through working drawings and inspection. Not all decisions can be anticipated in the drawings and specifications; therefore, coordination of field architectural decisions is often critical in order to produce a unified effect between inside and outside spaces.

Graphic Design

Sketches and construction layouts for signs, fences, symbols, brochures, advertising and promotion in order to produce a coordinated design effect.

Presentation Materials and Promotion

The production of brochures, models, sketches, promotional floor plans, photography and other presentation materials for public appearances, marketing and exhibits. Promotion includes presentation of planning and design concepts through interviews, tours, news releases and public appearances, which seek to make the project newsworthy.

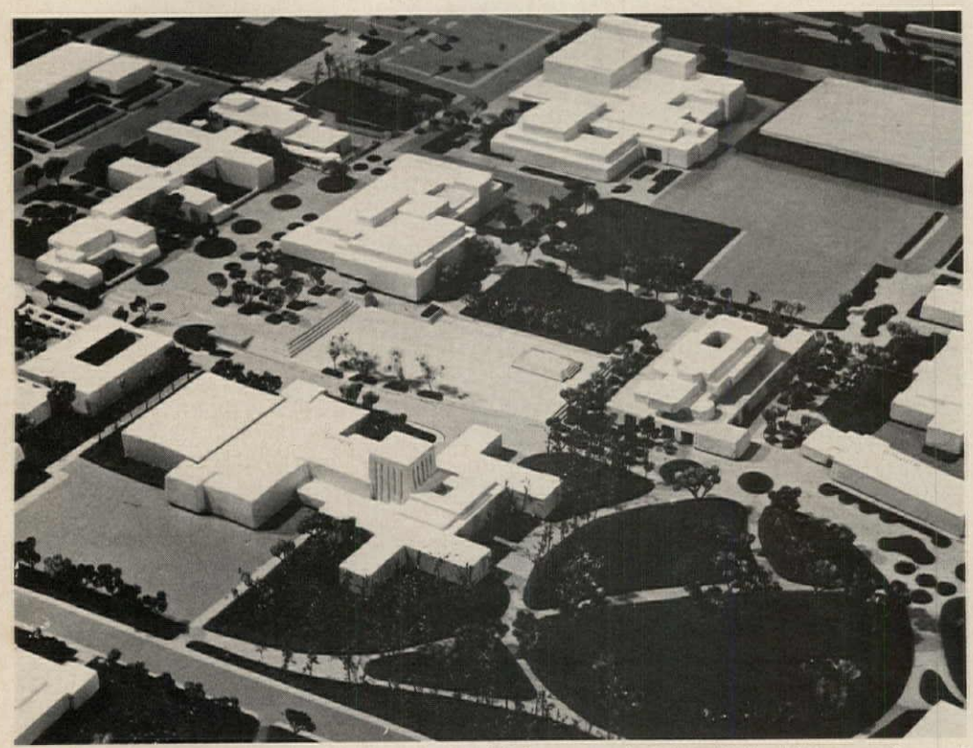
Interior Design

Furniture layouts, specification of materials, lighting and color finishes for model units and public spaces including all necessary construction drawings, instructions, sketches, coordination and inspection. □

ORTEGA HALL
UNIVERSITY OF NEW MEXICO

Albuquerque

Ministudy of a Project



Master model shows Zimmerman Library in the left foreground; Ortega Hall, which occupies part of the old football field, at the right in middle ground; and Zimmerman Plaza in the center.

Architects: Ferguson, Stevens, Mallory & Pearl, a five-partner office whose present name goes back to 1958. Averaging $6 million a year in construction volume, the firm has a staff of about 18 persons, two of whom are architects as well as engineers. The office had in-house mechanical engineering capabilities for a few years, but has gone to full use of consulting engineers for all mechanical/electrical work.

Type of Architectural Contract: Negotiated lump sum, with a negotiated fee for additional services.

Additional Services: Site utilization studies, land use analysis and a special program for development of a portion of the campus.

Consultants: Structural engineers—James A. MacCornack Associates; mechanical engineer—Claude Lyon; electrical engineers—Uhl & Lopez; landscape architects—Eckbo Dean Austin & Williams.

Type of Construction Contract: Stipulated sum (K. L. House Construction Company).

Construction Costs: $1,398,455 (mechanical, $363,240; electrical, $122,500).

Program Requirements and Solutions: With the completion of the new sports stadium on the south campus of the university, the old football field near the center of the main campus became available for other uses. This is the last remaining large open space in that area, and by administrative decision it is to be the site of most of the future academic facilities and is ultimately to have the greatest density on the main campus. The administration also wished the first new building on the football field site to establish the limits of the main plaza.

The architects were commissioned to design a building for the Department of Modern and Classical Languages, to determine its relationship to the next several structures, and therefore to suggest a master plan for the entire football field site and set the limits and character of Zimmerman Plaza. All work related to the plaza was to be done in collaboration with the university's landscape architects. Other reviewing agencies were the Office of the University Architect, the ad hoc building committee from the Department of Modern and Classical Languages, the standing campus planning committee and the board of regents.

Decisions were made in the following order:

• The old pattern of completely separate buildings, each surrounded by open space as in a Victorian residential section, should not be perpetuated in this site where density was to be extremely high and the space between buildings was needed for specific important functions.

• Since the program for the first building consisted primarily of unspecialized classrooms and faculty offices, and since most of the future structures in the complex are likely to be similar in program, a standard classroom module was adopted. This 23-foot square can serve either as a standard classroom or a group of four offices.

• The program for the initial building also contained nonconforming modules. These were a cluster of six large language laboratories, all of complex shape, a somewhat similar cluster of six audiovisual classrooms grouped for rear-screen projection from a single control room and a small audiovisual theater. The solution was for these nonconforming elements, which have heavy public use, to be placed at ground level. The roof over these would then become a main pedestrian platform which would form an apparent base for the major part of the building. The upper and most visible part of the structure would be made up of three floors of the classroom office module, each clearly expressed on the exterior. Classrooms having heaviest use would be located at deck level and entered directly from the outside, sheltered by the overhang of the floor above.

• Future buildings will repeat this vertical stratification, and one phase of building will be overlapped horizontally by the next, with stair and elevator towers serving as pivotal elements. By restricting the more exposed levels of the building to expressions of the uniform module, variously grouped, architectural unity can be maintained even with an extremely high density. The pedestrian platform will cover and unify all complex and nonconforming shapes below.

• Existing Zimmerman Library, as the most important architectural monument on the campus, and the strongest symbol of unity among the disciplines, must remain the dominant element of the plaza area. All new facades relating directly to the plaza and the library will be made up of various combinations of the classroom module. Although the ultimate megastructure will be very much larger than the library, the small scale of the parts of the new construction will preserve the library's dominance.

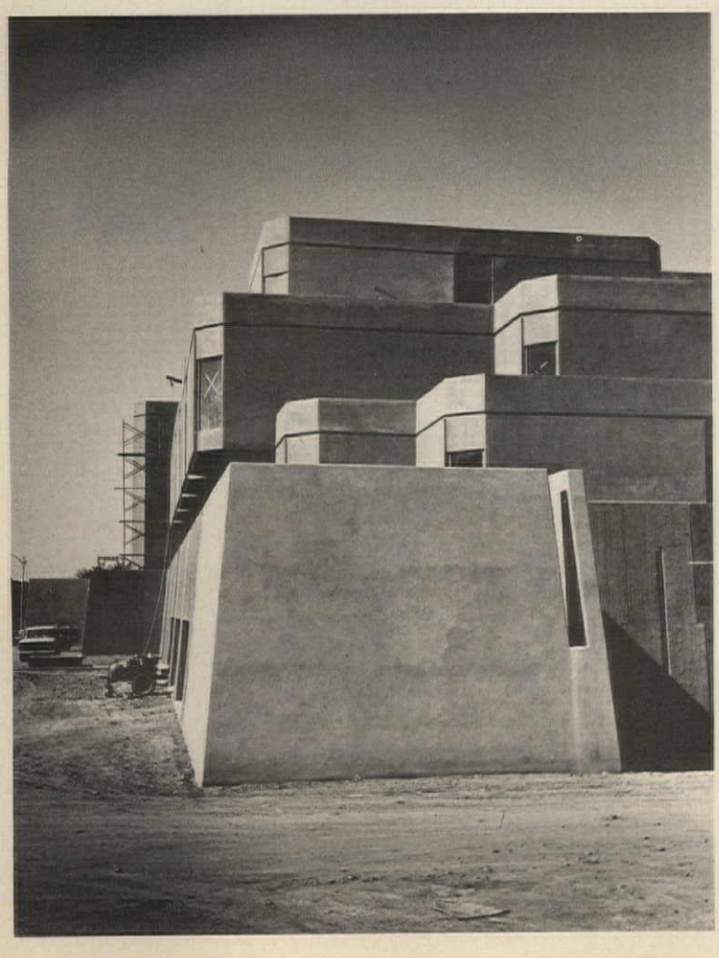
• By administrative decision, Zimmerman Plaza is to be a monumental exterior space. The existing buildings which relate to the plaza site are informal and irregular in mass. The architects' solution for the other sides of the area will also have a soft architectural outline. There is a 12-foot drop in the existing grade from the east to the west end of the plaza site. In order to achieve the definition so lacking in the architectural boundaries of the site, a hard-faced platform at mid-level was decided upon. This militantly rectangular terrace relates to the surrounding buildings in such a way as to form smaller and varied spaces for a number of activities. Exterior stairways connect this plateau to the platform level of future new buildings to the south and west.

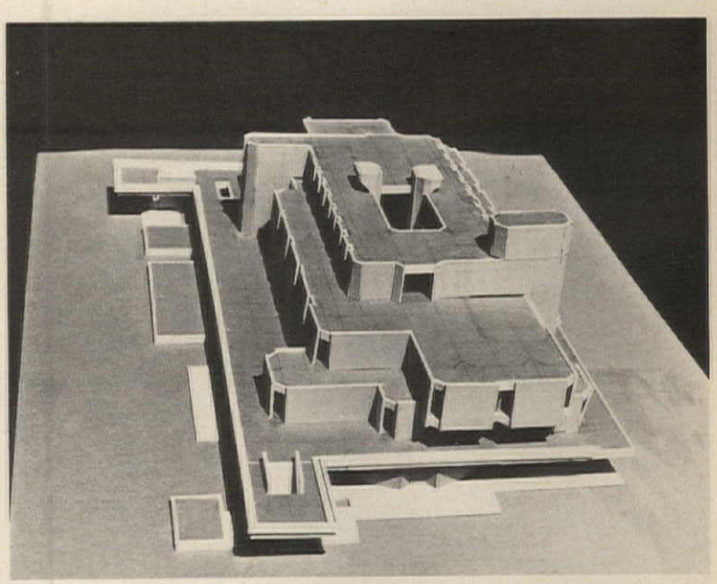
Special Benefits to the Owner: The study provided as assurance that future development of Zimmerman Plaza will not be haphazard or fragmented. The additional architectural services provided a poultice which drew the best ideas from all consultants involved.

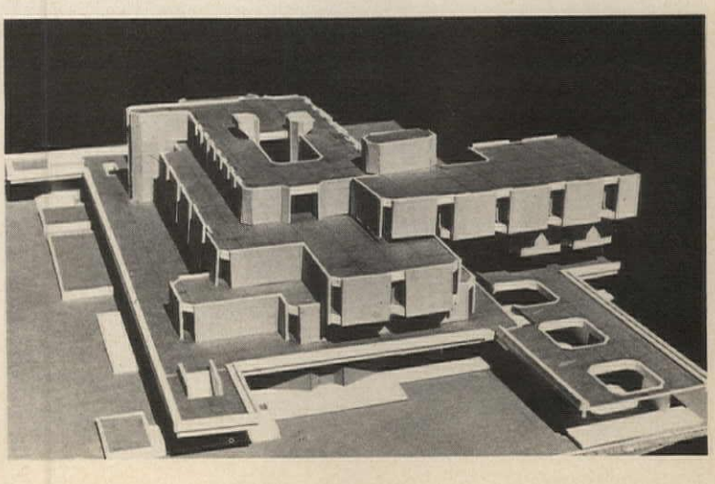
Architects' Comments: Although two years have passed and Ortega Hall is near completion, it is too early to evaluate the long-range aspects of this planning. The scale relationship between the hall and the library is what we were seeking — the mass of the library remains dominant.

But one link does not make a chain. The first increment alone cannot express the main idea of many construction phases tied together into a single structure, stratified by a major exterior pedestrian circulation deck one level above grade, with classroom-sized modules expressed above and nonconforming elements on the ground below. The test of the validity of these principles will be whether they are accepted as design parameters by the architects who do the remaining work. □

Study models illustrate the relation between phase 1 (Ortega Hall) and phase 2. Precast concrete battered walls enclose the nonconforming elements to more closely tie in with existing regional buildings. Future increments will relate more directly to the gardens.







A NATION PROBES THE LIFESTYLES OF THE ELDERLY

Beginning the week of November 28, invited delegates from every state and territory will descend upon the nation's capital to culminate over two years of planning the 1971 White House Conference on Aging. Meetings already have been held on state and community levels to initiate guidelines and recommendations, to broaden the understanding of the needs of older people and to strengthen the willingness to act on the policy proposals which will emerge from the Washington conference itself. Among the numerous organizations participating in the planning is The American Institute of Architects, officially represented in the area of housing, one of 14 technical committees which comprise the overall structure.

A View by a Nonarchitect

by EDWARD E. NASH

What has a White House Conference on Aging to do with you, the architect? Plenty. An unparalleled service could be provided by professionals who recognize the need for new and better concepts of housing and living arrangements for that inevitable adjustment as the aging process is reflected in downward mobility.

Questions such as heterogeneous versus homogeneous housing are but components of a much broader issue that is as wide as our total environment when it comes to improving living conditions for the person of retirement age.

As executive director of two associations with almost 3 million members (American Association of Retired Persons, 2.7 million; National Retired Teachers Association, 285,000), I receive daily examples through correspondence and reports from over 2,000 local units of the lack of options and the inadequacy of planning that frustrates the efforts we put forth in this vital area.

This year's is the third such conference; those held in 1951 and 1961 succeeded in sharpening the focus and bringing solutions, among them the Medicare program. But as our older population increases, as all the problems of growth that are national in scope and local in impact confront us, it seems that we are on a virtual treadmill in making progress toward a better lifestyle for retired persons.

Look at what is happening to us in numbers. In 1961, there were 17 million citizens in the United States who were 65 or older; in 1971, the number has grown to 20 million. The ranks of the elderly will continue to increase and will ultimately include all of us, if we live long enough!

The problems, however, are more than sheer numbers. Living patterns change. The role of the elderly is undergoing rapid transition. We find fewer third-generation families, and as this tradition fades away, new modes of living create problems in themselves. Seventy percent of persons over age 65 own their own homes. Many are too large or otherwise no longer appropriate for the owners.

Questions such as adequate housing and what it should be or not be are fundamental to developing a national program for older persons. But the issues are much more involved than this, as far as the architect and older persons are concerned. These include the questions of specialized housing; stubborn and unrelentless health problems; living conditions that relieve boredom and stimulate purposeful activity; the gnawing away by inflation of the economic security that pensions and savings are planned to insure; and, most of all, the increasing threats of productive employment of time to make retirement living an enriching phase of life — a time when we can slow down without being overcome by isolation. These are the challenges to security when we may least feel competent to face them: physical, psychological, sociological and economic.

What can an architect do about it? Why should a busy practitioner concentrate on one segment of the population? Principally, it is because architects are trained to think and plan in terms of communitywide concepts of development. Whatever our present age today, the extent of our concern should and will grow as we mature.

Mr. Nash is executive director of the American Association of Retired Persons and the National Retired Teachers Association, both in Washington, D.C. From 1965-1969, he was the Deputy Commissioner of the Administration on Aging, Department of Health, Education, and Welfare.

As we age, we become vulnerable to illness, and available health care becomes more important. Our access to service facilities becomes more significant; adequate safety devices take on new import; the chance for socializing isn't as readily available. Opportunities for self-expression and a sense of usefulness become a priority matter with us. Housing within our means, avoidance of catastrophic sickness and eating properly become serious challenges. By becoming familiar with the unique physical and psychological requirements of older people, architects can apply their skills in developing an "integrated design" to better meet the needs and desires of this age group.

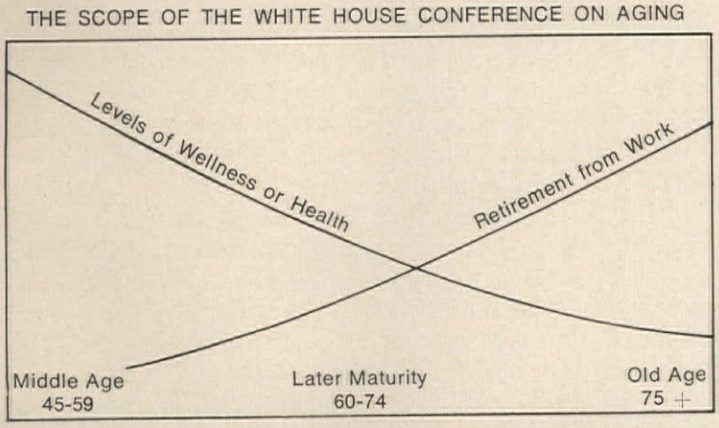
If a White House conference will elevate considerations of problems unique to the older citizen, it can serve its purpose. Our two associations have played a major role in promoting and helping to develop sound content for deliberations at the local, state and national levels.

In preparation for the 1961 sessions, our associations cosponsored with one of the largest prefabricated builders a model housing unit developed for older people. It features such elements as wider doorways, lower light switches, scores of safety features and easier access. It was viewed at the time by thousands of people, including delegates to the conference.

For this conference, we have undertaken a different approach. Recognizing that much of the substance is the advance planning and the new ideas developed in preconference meeting, we have sought to stimulate local and state discussions and planning sessions. We expect that the 3,000 White House conferees will be considering the ideas of many, many earlier participants. We hope that this will provide a vast resource treasure for professionals to seek out new and innovative concepts.

We hope you will keep up with the developments of the conference, not just to better understand the needs but to review proposed solutions in order to transfer unrelated but worthy ideas into integrated designs — designs that will help older people shape their lifestyles in the years ahead. □

THE SCOPE OF THE WHITE HOUSE CONFERENCE ON AGING



The 14 technical committees, whose work is being reviewed by three task forces, have been selected as 1) the principal needs area within which policy and action are required if American society is to be satisfied that its older people are to enjoy healthful, active and meaningful lives; and 2) the needs meeting areas which identify the primary means through which action can be brought about.

The housing committee is chaired by Noverre Musson, FAIA, with Olin Boese Jr., AIA, and Eugene D. Sternberg, AIA, as the Institute representatives. The other committees are education; employment and retirement; government and nongovernment organizations; health; income; nutrition; planning; research; roles and activities; services; spiritual wellbeing; transportation; and training.

Significant variables include 1) the urban/rural residence which is introduced to make certain that rural elderly people are not overlooked when policy proposals are being developed merely because they account for a relatively small part of the total older population and 2) maximum freedom of choice so that conferees consider alternate methods of meeting needs whenever possible.

A View by an Architectural Educator

by JOHN JAKOB

The White House Conference on Aging coming up in November will without a doubt give a lot of time and thought to the subject of housing. Indeed, it would be safe to suggest that further development in housing programs for the elderly may be expected. The particular questions which I believe should be determined at this point in such programs are the needs of senior citizens in regard to:

- location and grouping of housing units
- security and independence
- identity.

As we know, elders have many problems. One of the most overwhelming of these is that they suffer from a low social status. Our work-oriented culture places a heavy value on production and consequently elders and children tend to be ignored, or their needs are misunderstood. The child may be able to withstand some of this prejudice since his future promises an increasing number of contacts and the excitement of as much social participation as he wishes. The elder, however, can most often only look toward a decreasing number of contacts and diminishing participation. If excitement might be defined as a sudden realization of new options, it should not be surprising that the elder may have a depressed outlook.

Society collects its outcasts into ghettos where they can be watched and where they seem to be less of a threat. Certain ethnic groups, criminals and prostitutes are collected by most societies; in Marakesh, Morocco, even bachelors are segregated. For those who suggest that elders be grouped together for security reasons, I would ask that they clarify in just whose security they are interested. The very act of separating any group from society implies not so much that their special needs are being met so much as that a stigma has been placed on that group.

There are some valid reasons, of course, for separation from society. Hospitalization is one such. The benefit of having the many lifesaving resources of a hospital at hand is an excellent reason for sacrificing a portion of one's independence. However, total separation for security reasons is at best questionable. If Sun City, Arizona, for example, a senior citizen community some 30 miles from Phoenix, is a collection of people for such security, then it is also a ghetto, although perhaps a healthy one.

If Sun City's residents are making contacts, if it is an exciting environment with many opportunities for participation, then it may be healthy for those who would choose that type of separation. The question is, given an alternative, how many elders would choose a senior citizens' community? The fact that 82 percent of our elders live in detached housing may be a clue that they prefer integration into a regular neighborhood.

If the elder person must relocate, it is beneficial that he moves to a small housing cluster where there is not constant and direct contact with children and where there is not a lot of noise. By grouping elders away from children, although near them, in small clusters of 10 to 40 units instead of blocks of hundreds they can be placed in conventional neighborhoods since zoning and density regulations will not interfere.

This small neighborhood cluster concept is most ideal for the majority of elders, primarily because it allows them to live in

Professor Jakob is with the College of Architecture, Arizona State University, Tempe.

Why does housing for the elderly so often connote a museum-like atmosphere? The aging should have life around them, be given the opportunity to socialize with all age groups and at the same time be able to have privacy when wanted. They should also have easy access to safe exercise. In short, be part of the neighborhood.

close proximity to their relatives, friends and the community in general. Here, the dependence upon public or other transportation would be if not quite eliminated at least reduced. Transportation, it was established by the White House Conference on Aging in its questionnaire, is an increasing concern especially among those 75 and over. For some, the lack of transportation itself is the problem; for others, it is the lack of money for bus fare; for others again the difficulty is getting on and off buses, trains, etc. The cluster arrangement offers the opportunity for new contacts, for dining at the neighbors, for poolside parties, all nearby, as well as quiet evenings when children are not encouraged to visit.

Thirty years ago security in housing for the elderly meant grab bars, nonslip floors and no bending or climbing. Today it still means these protective devices and techniques. However, it is more clearly understood that to be secure doesn't mean that life must go on in a subdued, dark, museumlike space filled with mementos. The elder should have the choice of living in an exciting environment, enjoying bright colors and strong light contrasts. In such surroundings he performs better since his weaker eyes can perceive faster and his responses are quickened. Today the need for psychological security is more strongly articulated by the elderly. To achieve this, you must know that there are friends close by who will come when you call for help. The small cluster provides this kind of security while at the same time it makes the work of a burglar a bit more difficult.

A government survey recently asked the elder, "What do you most desire?" The answer most often given was "independence," which meant the opportunity to determine as much as possible over his own private and social life. Accordingly, the perfect image of the elderly apartment dweller would be one in which he is standing on the threshold with one foot inside the door and the other outside. From this stance he could at a moment retreat to the privacy of his room or exit to socialize.

The design of the front door and its surrounding areas can be most critical. For example, the Glenside Nursing Home in Louisville, Kentucky, has a plan in which the rooms are clustered around a central day room. The residents protested when officials, for privacy reasons, erected fixed screens in front of their doors. Many of them enjoyed leaving their doors open so that they could see out to the day room and in turn be seen by its occupants. The screens interrupted this arrangement and reduced the socializing.

The door stoop, for many cultures a prime meeting and outdoor living space, is for the elders probably the best possible location for taking part in what goes on, day or evening. The sitting porch is another neighborhood institution from which neighbors on both sides of the street can freely exchange greetings.

Housing for the elderly should gently throw people together; door spaces, poolsides, sitting porches, cross walks, club rooms, mail rooms, laundry rooms, parking areas, etc., all offer opportunities to encourage socializing.

Men and women alike feel that their work and place in the family is the very basis of their social identity and that when they retire or are separated from their families most of this identity is lost. Their needs for a renewed personal identity is immense. In Robert W. Kleemiers' *Aging and Leisure,* when elders were asked what they regard as the principal meaning of work, 70 percent gave answers relative to themselves and their identity, such as "I work to be creative; to make friends; to serve others; and for self respect." Only 30 percent suggested other purposes, such as for income or to pass the time.

Identity can be established through the environment. Noverre Musson, FAIA, author with Helen Heusinkveld of *Buildings for the Elderly,* recently addressed the College of Architecture students at Arizona State University. Said he: "The environment can and indeed must establish a basic feeling of pride for the elder." The majority of architects would agree that the elder would gain most pride from his environment and would most highly identify with it if he could pick out his own part of it. Further, if the unit is at ground level he might even establish a sense of territoriality.

In general, highrise as a housing form means less individual identity and social stratification since the many floors make natural personal exchange difficult. Perhaps their only advantage is the privacy and anonymity they provide those who wish it.

The small neighborhood cluster as a housing form probably has more to offer most people: It can provide privacy as well as identity. It can be designed for optimal socializing, keeping the elders in the community near relatives and friends. I would like to recommend that this nation undertake a concerted research effort to determine the locations and feasibility of a number of small, decentralized housing clusters for the aged. □

Playing It Safe with RADIATION

by RAYMOND L. TANNER

Where equipment which produces radiation is to be used, planning to minimize the hazards should be part of the early design stages. Here's where a radiation protection consultant can help the architect ensure safety in compliance with state and federal laws.

With proper planning the danger of radiation can be minimized wherever it exists, whether in a hospital X-ray department, an accelerator installation or a dentist's office. Moreover, such planning will increase the efficiency and use of the facility and, in many cases, will actually lower the cost and prevent premature modification.

The hazards that exist will vary in magnitude depending on the type of facility, but wherever there is a radiation source there is the probability of misuse or malfunction by untrained operators or poorly designed equipment. Even qualified operators and the best engineered equipment cannot prevent all extraneous and potentially harmful radiation exposure. The provision of proper physical construction, i.e., floor, wall and ceiling shielding, will go far to reduce such hazards to permissible levels.

The biological damage which results from excessive exposure to ionizing radiation may take several forms such as genetic changes exhibited in subsequent generations, induction of malignant disease, sterility, etc. This damage is somewhat similar to that resulting from overexposure to the sun in that there are two important factors: intensity and energy. But whereas the sun's ultraviolet rays which produce the burn only reach the skin, the energy of X-rays and gamma rays is high enough to cause biological damage beneath the skin. The radiation is not, unlike sunrays, substantially changed by passage through glass or shielding material. The purpose of shielding ionizing radiation sources is to reduce the brightness (intensity) of the radiation rather than the energy and thereby decrease the exposure and reduce damage.

All people are subject to damage from ionizing radiation. The facility design must encompass protection for the individuals who are occupationally exposed, for other employees, for patients and for the general public. Undeveloped photographic film and certain instruments must also be protected.

The three general modes of protection are:

1. Time—the shorter the exposure the smaller the hazard.
2. Distance—generally as you move away from a source intensity decreases relative to the inverse of the square of the distance.
3. Shielding—each added layer of attenuating material between you and the source reduces the intensity by a fixed percentage.

These parameters are used together to solve a given protection problem. For example, if the time of exposure of a worker using a radiation source is minimized but the exposure is still excessive, then a combination of distance and shielding is required to eliminate the excessive radiation. One solution is use of equipment which can be operated remotely, thus decreasing the shielding requirement by increasing the distance to the worker's location.

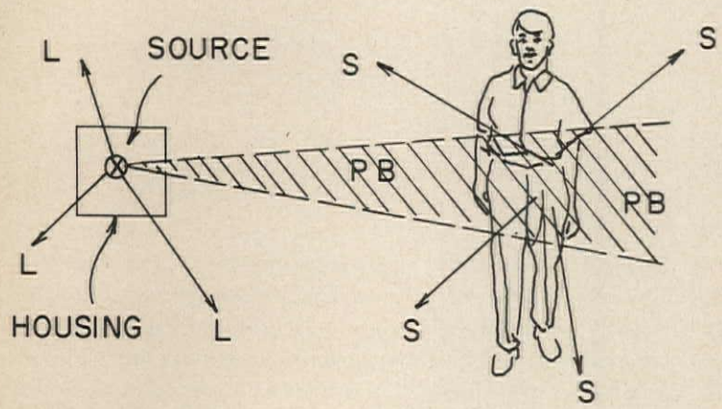
The illustration indicates the types of radiation which must be considered when a facility is designed. First, the primary beam, which is the unattenuated radiation coming directly from the source. This is the most intense, energetic and potentially most hazardous, although the hazard is greatly reduced by the equipment manufacturer's frequent use of devices to limit the primary beam direction and size. Second, the leakage radiation, which escapes through the walls of the source housing and travels in every direction whenever the machine is on or, in the case of isotope sources, at all times. Again, equipment designers usually include some inherent shielding as part of the source housing to reduce this hazard. Third, the scattered radiation, which will be much less intense than the primary and about the same or somewhat less energetic. It is often comparable in intensity to the leakage radiation.

The control of scattered radiation hazards can seldom be accomplished by the equipment designer; hence it is the responsibility of the facility planner (the radiation protection expert in consort with the architect, mechanical engineer or contractor) to include all-around protection.

In order to determine the actual thickness of shielding material which may be required in floor, walls and ceiling of a radiation facility, certain other information is required. This includes

the weekly work load of the radiation source, (the total time it is used per week multiplied by its output intensity); the use factor (the fraction of the time the source is pointed in a given direction); the occupancy factor (the fraction of time the space outside the facility beyond the barrier is manned); and the determination whether the persons in the surrounding areas are occupationally exposed (differences exist in the maximum permissible levels of exposure depending on the population size involved).

With all the above factors available, the thickness of shielding which each wall or other enclosure must provide may be calculated. Since materials such as brick, tile, plaster and wood are composed of low atomic elements and also have relatively low density, it is frequently advisable to add lead sheets (often bonded to sheet rock, lath or decorative plywood panels) to provide the necessary shielding. For very high energy radiation facilities, concrete barriers are effective and often less expensive than lead. In many installations some walls, floors and ceilings may not require added shielding. The radiation protection consultant specifies the thickness of shield needed but the choice of materials remains with the architect, contractor or engineer. Their absorbing qualities depend on the radiation energy and a sufficient thickness of one material may not be the same as that of another.



Primary beam (PB) as it leaves source by way of collimator port in housing. It continues past patient (or object to be radiographed) until it is attenuated by a shield. Scattered radiation (S) originates wherever primary beam strikes an object and spreads in all directions, so does leakage radiation (L) when it escapes through source housing.

Since the late 1920s, a federally sponsored group of experts in the field, including engineers, physicists, biologists and physicians from industry, government and universities, has formulated and published radiation protection standards and detailed technical information concerning shielding design for structure housing radiation sources. This group is now called the National Council on Radiation Protection and Measurements (NCRP).[1]

Several states have regulations governing the installation and use of ionizing radiation equipment. Sources and copies of these are available from the individual state's health department. In general the state regulations have been written to conform with the NCRP recommendations although they do not offer the detailed descriptions of shielding calculations which NCRP and National Bureau of Standards booklets provide. There also exist several books and pamphlets on the subject of radiation protection which range from the theoretical to the engineering or practically oriented books to the more elementary technical texts.[2]

The NCRP and NBS booklets referred to are easily obtained, inexpensive, rather complete and not too difficult to use in practical shielding design problems.

Once the equipment choice has been made and initial agreement on location, room size and equipment placement has been reached by the architect, manufacturer and facility owners, then a qualified expert in the field of radiation protection and shielding may be retained. Such services may be contracted for by the architect, as is generally set forth in the architect-owner agreement under the heading of additional services. Even if the equipment manufacturer furnishes shielding plans as part of his service, these should be reviewed by an unbiased radiation protection expert before construction begins. It is important that radiation shielding design criteria be considered in the preliminary stage of the facility design since final decisions on room dimensions, materials of construction, equipment placement and traffic flow patterns within the facility will depend on the radiation source location, size, energy, etc., and thus on the required shielding.

Radiation protection experts are generally accepted to be those who are certified in radiological physics by the American Board of Radiology or in health physics by the American Board of Health Physics, or who have the equivalent training and experience to those holding one of these certificates. Listings of radiation protection experts currently certified by these boards have been published.[3]

The radiation protection consultant may be expected to provide the following services:

1. Make calculations of the required shielding, its placement and thickness from the data provided him. This should include type and energy of the radiation sources; planned use of the sources, their workloads, use factors and locations; preliminary structural plans of the facility indicating enclosure masses and room dimensions; proximity and type of occupancy of all areas surrounding the radiation facility.

2. Write a report containing a list of his recommendations detailing the shielding requirements; electrical interlocks; operating procedure restrictions; mechanical limitations; any other special considerations peculiar to a given facility.

3. Conduct a postconstruction, postinstallation survey of all radiation facilities (in actual operation) to ascertain compliance with the recommendations contained above and submit a report of the survey results indicating the degree of compliance with the initial recommendations and further recommendations (if necessary) for total compliance.

The radiation consultant thus serves in both advisory and participatory roles in formulating plans for hazard control and in conducting an instrumented survey to validate such plans. □

Dr. Tanner is professor at the University of Tennessee, Memphis, where he heads the Section of Radiation Physics.

[1] NCRP Report No. 34, "Medical X-Ray and Gamma-Ray Protection for Energies up to 10 MeV." Information applies also to industrial facilities.
NCRP Report No. 35, "Dental X-Ray Protection."
NCRP Report No. 36, "Radiation Protection in Veterinary Medicine."
All reports above are available from NCRP Publications, P.O. Box 4867, Washington, D.C. 20008.
NBS Handbook No. 93, *Safety Standard for Non-Medical X-Ray and Sealed Gamma-Ray Sources.*
NBS Handbook No. 97, *Shielding for High-Energy Electron Accelerator Installations.*
Both are available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

[2] *Principles of Radiation Protection.* K. Z. Morgan and J. E. Turner, editors. New York: John Wiley & Sons, 1967.
Radiation Hygiene Handbook. H. Blatz, editor. New York: McGraw-Hill, 1959.
Radiation Protection. C. B. Braestrup and H. O. Wyckoff. Springfield: Thomas, 1958.
Fundamentals of Radiation Protection. H. F. Henry. New York: Wiley-Interscience, 1969.
Introduction to Health Physics. H. Cember. Oxford: Pergamon, 1969.
Primer of Radiation Protection. R. J. Schulz. A brief and clear introduction to shielding calculations, available from the General Aniline and Film Corporation, 140 W. 51st St., New York, N.Y. 10020.

[3] *American College of Radiology Bulletin,* July 1970, pp. 240-244. American College of Radiology, 20 N. Wacker Drive, Chicago, Ill. 60606.
Health Physics, 18, No. 6, June 1970, pp. 722-724. Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, N.Y. 10523. (These two publications are found in the periodical sections of most university libraries.)

PRACTICE AIDS 9

Preliminary Cost Estimating

by WILLIAM E. BLUROCK, FAIA

The size, quality and complexity of a project must be considered in preliminary cost estimating. These elements are reflected in a three-pronged, crosschecking system in which square footage and area of enclosure methods, joined by a percentage analysis, gives the architect a simple but effective tool early in the game.

Projecting a cost estimate in the early stages of a job is often like throwing darts at a "cost board." Frequently, the estimate is a "seat of the pants" guess, with too little backup to be truly valid. The efforts on the part of many architects to make an intelligent approach to proper cost estimating are further complicated by a multitude of pitfalls

Take the owner's budget. More than likely it was arrived at in a manner that had little or no bearing on the architectural solution. Sometimes the budget consists of monies which remain after all other items of budget have been satisfied. "That is all," says the client, "that I am able to spend." Perhaps his uncle is a contractor, or worse yet, a financial representative for a lending institution who knows that "it should not cost over $12 per square foot," regardless of the availability of utilities or of whether the proposed site is an old city dump.

With this line of reasoning, we could go on and on enumerating the obstacles and hypothetical budgets. The point is that the architect must develop methods by which cost estimates can be easily and efficiently made in the early stages of the program and the project cost budget checked before the job gets too far along. Early cost estimates are too often carried through to become the final, fixed budget — with the client becoming disenchanted, to say the least, with the architect and his services. The rectifying of this estimate to achieve a true "balance of program to budget" can make heroes of almost any architect and his staff.

What are we going to do to increase our expertise in projecting costs and reducing the gamble? First and foremost, a schematic estimate of construction cost must be made simple, direct and easy for everyone to arrive at—even the designer who claims immunity to the dirty word "cost." The designer with the project manager should evaluate and be made aware of the costs and the conditions under which these costs are valid. Therefore, what is proposed is not one system but three simple sets of rules which can crosscheck each other and be made available to work backward from budget to size of scope of project. This adds to rather than conflicts with Chapter 15, "Construction Cost Analysis," in *The Architect's Handbook*.

The accuracy of all good systems relies upon two factors: 1) a good data or historical base, whether your own or a composite from various services, magazine articles and other sources that are kind enough to supply similar data for comparison and 2) a consistent method of procedure that is *always the same* and will average out other irregularities. Every office, whether large or small, should keep a file and develop a system based upon its own needs with these two qualifications: data depth and, above all, a consistency of take-off that allows averaging of good preliminary cost estimates.

As a past member of the Production Office Procedures Committee of The American Institute of Architects, I should like to propose a simple and yet valuable cost estimating system. It can best be described by the chart outlined in Figure 1. This shows a system which allows the architect to take a budget and project it into a cost estimate or, the reverse, to take a program and project it into a cost estimate, basing its accuracy on consistency of the data base and of a three-pronged estimating procedure.

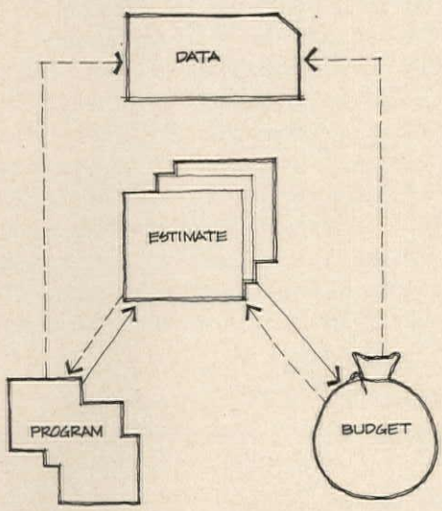


Figure 1

Figure 2 elaborates on this system in detail. I will attempt to

explain how it works, what its restrictions are and what its importance is as a means of crosscheck in averaging for a proper answer to either budget or program.

First, the budget should contain all costs, whether construction or not, and should represent the total investment by the client. Figure 3, a Cost Analysis Summary Sheet, is typically in use in many offices and attempts a breakdown of the total budget. This sheet should allow for the expansion of construction cost to include utilities, off- and on-site development and any other unusual conditions, serving as a matter of record.

The keystone in setting the limitations of the program is the budget; at the same time, the program can be the control point in arriving at a logical budget. The program includes all of the client's requirements, the most important of which is the *size* of the whole and all the parts thereof. Next in importance is the *quality* of construction, followed by *complexity,* based upon the subdivision and sophistication of the spaces.

The program should be analyzed in several ways so that the cost estimate can be compared and related to the data history of record. We propose to make all our analyses in three ways: 1) by the floor area, using AIA Document D101, where all enclosed space is computed at full area and exterior covered walks and covered paved areas, etc., at one-half full area; 2) by the enclosure unit method, similar to that which John R. Diehl, AIA, describes in the article "Creative Cost Control" in the April 1967 AIA JOURNAL and also later in this article; and 3) by the percentage method wherein portions of the building are compared on a percentage ratio of the total cost.

The enclosure area is the sum total of all planes, either vertical or horizontal. (One square foot equals one unit of enclosure.) The surfaces measured are in two dimensions: length and height and/or width, zero thickness. Zero thickness means that you measure only *once* a wall, partition or floor/ceiling sandwich. Include all units of building enclosure, projected to a flat plane parallel to surface measured. Anticipate construction (such as vaults and casework) which do not appear on the preliminaries. Tabulate areas completely for each floor and recap on summary sheet. Make all area take-offs in square feet, according to AIA Document D101. Use linometer for easy take-off.

Floor: Measure from exterior wall face, including basements, vaults, pits, etc., as full square footage. Do *not* include stair wells (these appear under "Stairs"). Calculate ramps as projected on a level plane parallel to the floor.

Exterior Walls: Measure gross square footage top of footing to floor level to floor and floor to parapet. Do not deduct openings. Include all-glass walls.

Interior Partitions: Measure floor to floor, except in areas in which partitions extend to hung ceilings only (a special case) or half-height movable partitions. Do *not* include toilet partitions but do include movable partitions.

Cabinets and Casework: Measure casework, kitchen equipment and cabinets as second wall.

Columns and Piers: Measure one-half entire exposed area of all freestanding columns and of piers projecting more than 6 inches. Estimate if necessary.

Stairs: Measure 1) square foot area of treads and landings; 2) projected area of risers; 3) projected area of rail if supported from stair.

Roof and/or Podium: Measure 1) gross area of roof projected to a plane level with the floor; 2) gross area of podium surface. Note if areas in this column are roof or podium.

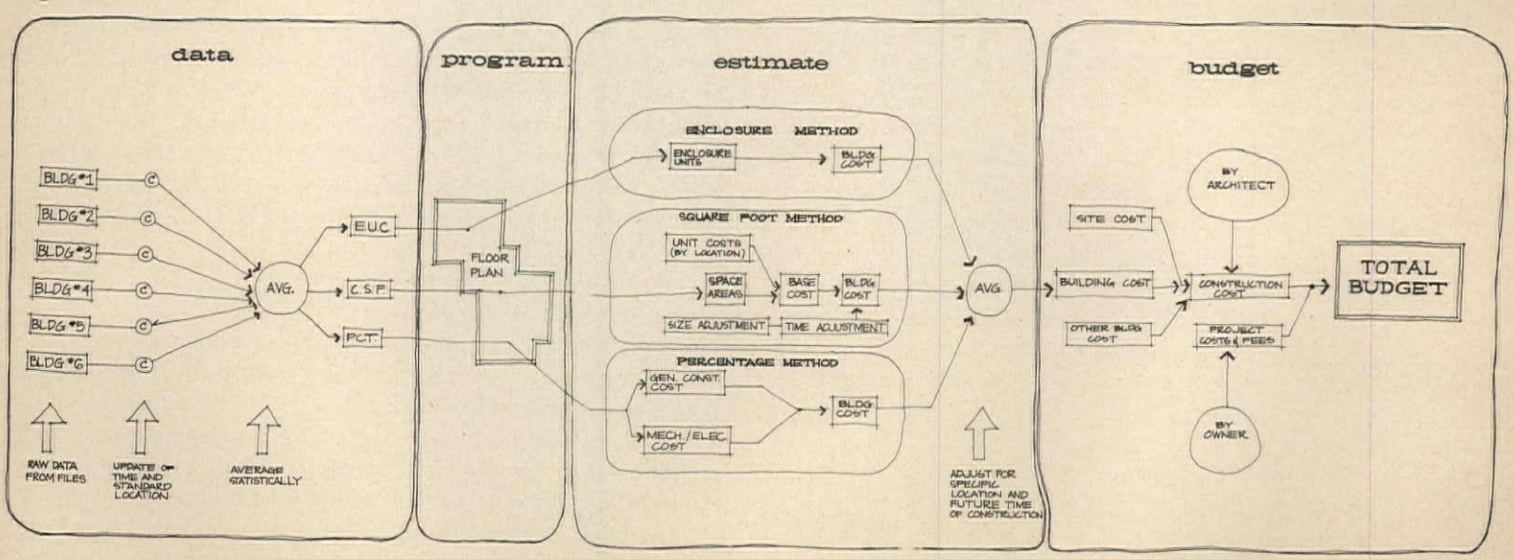
Other architects and members of the AIA Production Office Procedures Commitee have supplied us with additional backup for the unit of enclosure method, including Frank Knoble, AIA, senior associate of Deeter, Ritchey & Sippel of Pittsburgh and Joe Griffin, AIA, from the Caudill Rowlett Scott computer center in Houston.

Data follows, or leads, the estimate like the chicken and the egg, depending on which way you are going: by way of cost or by way of program. It represents a summary of various program and data information derived from past histories of projects. The comparison in a like manner of all these projects is extremely important, whether they come from office files or from other sources; that is, apples must be compared with apples.

It must be remembered that in a preliminary cost analysis the use of various types of quantity surveys is usually not valid. As we review the data in Figure 3 under "Construction Cost," we move on to Figure 4 and not only expand its breakdown but also exclude from it, for reasons of accurate calculation, the items that do not affect the ratio of square footage, area of enclosure or the percentage method of analysis, such as elevators, walk-in boxes and similar items that can be properly identified as other costs in order to obtain a reasonable base for comparison. Items of special cost to the project in question are then added back in.

In general, the square footage and area of enclosure methods have been described above; so the percentage method of analysis should be elaborated upon. The percentage analysis is a key to good balance, and a comparison of historical data will

Figure 2



qualify this. Breaking out electrical, heating/ventilation and air-conditioning, plumbing, structural elements and everything else left (architectural) will give the architect a background not only for analyzing his portion of the work, which we agree at this stage is just barely under control, but also the work of the major consultants. The percentage ratio also carries with it automatic update that makes it most convenient; i.e., it can be directly applied to a total budget or program.

The estimate represents a variety of means by which the elements are related to fit a building to its budget or vice-versa. Following Figure 2, we may take the data base combined with

Figure 3

WILLIAM BLUROCK AND PARTNERS, ARCHITECTS

COST ANALYSIS SUMMARY SHEET — FL. AREA_____ ENCL. AREA_____ ENCL. RATIO_____

PRELIMINARY ( ) FINAL ( )

PROJECT:_____ DATE:_____

OWNER:_____

A. SITE ACQUISITIONS		
1. PURCHASE PRICE	$_____	
2. APPRAISALS	$_____	
3. ESCROW COSTS	$_____	
4. SURVEYS	$_____	
5. _____	$_____	
6. TOTAL SITE ACQUISITION		$_____
B. CONSTRUCTION		
1. UTILITY SERVICES	$_____	
2. OFF-SITE DEVELOPMENT	$_____	
3. ON-SITE DEVELOPMENT	$_____	
4. RECONSTRUCTION	$_____	
5. BUILDING CONSTRUCTION	$_____	
6. _____	$_____	
7. TOTAL CONSTRUCTION		$_____
C. PLANS		
1. ARCHITECT'S FEE	$_____	
2. PLAN CHECK FEE	$_____	
3. PRELIMINARY TESTS	$_____	
4. OWNER'S LEGAL, ADMIN., INS., FEE AND ADVERT.	$_____	
5. LANDSCAPE DESIGN FEE	$_____	
6. INTERIOR DESIGN FEE	$_____	
7. SPECIAL CONSULTANTS	$_____	
8. _____	$_____	
9. TOTAL PLANS		$_____
D. CONSTRUCTION TESTING		
E. INSPECTION		$_____
F. FURNITURE AND EQUIPMENT		$_____
G. CONTINGENCIES		$
_____% OF CONSTRUCTION COST		$_____
H. TOTAL ESTIMATED COST (ITEMS A THRU G)		$_____

the program, update it with a factor for time, a typical location and the size of the job (small, medium or large) and follow the three methods of cost analysis. One does not have to follow all three, but it certainly gives a better average for arriving at a proper building cost. By adding the site work, unusual or other costs and valuing for an unusual site condition or updating for a future bid time, you have arrived at a competent total budget estimate.

In relating to the data base, the estimate cannot be overemphasized as to its consistency and depth. Many offices, including our own, have made attempts at putting this information in computer storage for quick access and for averaging. This is only a convenience; a small card file, properly organized, could hold and retrieve easily any and all data.

The computer, as you can see from the following example, does have an advantage in that almost instantaneous updating and adjustment by any factors and/or variables are possible, providing the architect properly evaluates these adjustments. Figure 4 shows how all elementary schools were taken by project number from our data file for a three-year period and given an automatic update and an individual factor of standard location so that they became comparable on an equal basis. They were then given a high, medium and low average for all pertinent data. Under ordinary circumstances, the calculations required for this procedure might require several days of office time. With the aid of a computer, the task could be accomplished in minutes.

Let us now do a sample preliminary cost estimate. Figure 5 is a typical summary sheet which follows the format of the contractor's breakdown after completion of the job and is the construction portion of Figure 3 expanded as a format for the preliminary cost estimate as well as for the final cost file data.

Our office has found some significant ratios and numbers that allow us to compare any job with a new preliminary cost estimate or with other jobs. Now, by jumping right into a hypothetical situation, using Figure 4 as a data base and assuming

Figure 4

ALL ELEMENTARY SCHOOLS

ITEM	LOW	MEAN	HIGH	VARIANCE
RATIO	2.900	3.212	3.525	6.5 PCT
ENCLOSURE COST	$ 5.27/EU	$ 6.20/EU	$ 7.12/EU	10.0 PCT
BUILDING CSF	$16.92/SF	$19.87/SF	$22.82/SF	9.9 PCT
GEN CONST CSF	$11.37/SF	$13.40/SF	$15.43/SF	10.1 PCT
MECH/ELE CSF	$ 4.81/SF	$ 6.47/SF	$ 8.12/SF	17.0 PCT
GEN REQUIREMENTS	$ .10/SF	$ .63/SF	$ 1.15/SF	56.0 PCT
STRUCTURAL	$ 4.96/SF	$ 6.75/SF	$ 8.55/SF	17.7 PCT
ARCHITECTURAL	$ 3.08/SF	$ 4.75/SF	$ 6.42/SF	23.5 PCT
MISCELLANEOUS	$ .40/SF	$ 1.27/SF	$ 2.15/SF	45.7 PCT
PLUMBING	$ 1.18/SF	$ 1.79/SF	$ 2.40/SF	22.7 PCT
HVAC	$ 1.37/SF	$ 2.48/SF	$ 3.60/SF	29.8 PCT
ELECTRICAL	$ 1.56/SF	$ 2.19/SF	$ 2.83/SF	19.4 PCT
SITE WORK	5.1 PCT	12.2 PCT	19.3 PCT	38.9 PCT
GEN CONSTRUCTION	61.3 PCT	67.6 PCT	73.8 PCT	6.1 PCT
MECH/ELEC CONST	26.2 PCT	32.4 PCT	38.7 PCT	12.8 PCT
GEN REQUIREMENTS	.3 PCT	3.2 PCT	6.2 PCT	61.2 PCT
STRUCTURAL	26.2 PCT	34.0 PCT	41.9 PCT	15.3 PCT
ARCHITECTURAL	15.5 PCT	24.0 PCT	32.6 PCT	23.8 PCT
MISCELLANEOUS	2.3 PCT	6.2 PCT	10.2 PCT	41.8 PCT
PLUMBING	6.6 PCT	9.0 PCT	11.3 PCT	17.3 PCT
HVAC	6.8 PCT	12.5 PCT	18.1 PCT	30.1 PCT
ELECTRICAL	8.3 PCT	11.0 PCT	13.7 PCT	16.1 PCT
OTHER COSTS	.5 PCT	3.6 PCT	7.7 PCT	76.1 PCT

Figure 5

COST SUMMARY NO. 29

ARDEN ELEMENTARY SCHOOL - SAN BERNARDINO, CALIFORNIA

PROJECT NO. 1027 BID DATE - OCTOBER, 1968

FLOOR AREA - 36585 SQ. FT., ENCLOSURE AREA - 121219 E.U., RATIO - 3.313

TOTAL CONSTRUCTION COST - $816,766.00

A. SITE COSTS	$134,295.	---	16.4 PCT (OF TOTAL)	
B. BUILDING COSTS:	$673,883.	$18.42/SF	100.0 PCT	$5.56/EU
1. GENERAL REQUIREMENTS	$ 3,294.	$ .09/SF	.5 PCT	
2. STRUCTURAL	$176,838.	$ 4.83/SF	26.2 PCT	
3. ARCHITECTURAL	$208,707.	$ 5.70/SF	31.0 PCT	
4. MISCELLANEOUS	$ 66,092.	$ 1.81/SF	9.8 PCT	
5. PLUMBING	$ 49,278.	$ 1.35/SF	7.3 PCT	
6. HVAC	$ 95,194.	$ 2.60/SF	14.1 PCT	
7. ELECTRICAL	$ 74,480.	$ 2.04/SF	11.1 PCT	
C. OTHER COSTS	$ 8,588.	---	1.1 PCT (OF TOTAL)	
GENERAL CONSTRUCTION (1 - 4)	$454,931.	$12.43/SF	67.5 PCT	$3.75/EU
MECH.\ELEC. CONST. (5 - 7)	$218,952.	$ 5.99/SF	32.5 PCT	$1.81/EU

that Figure 5 is a new school job, let us first itemize some observations about this sample project. For instance, the floor area is of average size, neither small nor large. That factor could change the cost up to plus/minus 10 percent. It has no remodel portions that would have to be compared with other remodel jobs. It is of average breakup for a semiopen plan school which could vary the enclosure area and its ratio from 3.100 to 3.400. The enclosure ratio (ER) is the comparison of enclosure area or units (EU) with the floor area as a ratio: ER=EU/Floor Area.

These facts are assumed from Figure 4 averages and applied to the new cost estimate. So here we go toward a budget. First, the schematic floor plans give the square footage at 36,000. Assuming a 10-foot ceiling height, our takeoff with the linometer gives 120,000 for the enclosure area. We know that this type of school should have an ER of about 3.3; the ratio works out to 3.33. From Figure 4 we investigate the complexity (EU) of this school from schematic drawings compared with the mean and make a judgment that it is somewhat simpler than average: somewhere between the low of $16.92 and $19.87. At this stage, let us use $18/square foot, or $650,000, and $5.40 EU, or

Mr. Blurock, senior member in the Corona Del Mar, California, firm of William Blurock & Partners, is chairman of the AIA Computerized Practice Aids Task Force.

$650,000. These seem to check quite well. We also know, by comparison, that the site work involves a bad soil condition and is quite extensive; so without a proper survey and a detailed plot layout at the schematic stage, we revert to the percentage method of cost analysis and combine it to come up with a logical site cost. Again, from Figure 4, we see that site work varies from 5.1 percent to 19.3 percent. On this project we will use a high of 18.5 percent, or about $150,000; thus, our combined total construction budget is a nice round $800,000.

At the preliminary or design development stage the project cost is updated and reviewed. The square footage finalizes at 36,585 x $18, or $658,530. Reducing the site work by design from $150,000, we feel that it can be brought down to $140,000, making our total budget $798,530, or near our original $800,000.

In breaking down the construction cost further, we can see from Figure 4 that an average percentage of the cost due to electrical/mechanical elements is about 32.4 percent. This being by design an average project, we have $658,530 without site work; of that, $450,000 is in general construction (including structural) and $210,000 in electrical/mechanical. This is now broken down into 11 percent electrical; 12.5 percent heating/ventilation and airconditioning; and 9 percent plumbing—to be checked with the consultants. Figure 5 gives the final cost from the contractor's construction cost record, noting a 2 percent difference in budget to bid and like comparisons on the breakdown.

Figure 6 is a unique project because we started with a $2 million budget and by the time we had arrived at schematic drawings, we determined that the client could only afford about 70,000 square feet or 180,000 enclosure units, plus the required site work and elevators which were listed under other costs. This job

Figure 6

COST SUMMARY NO. 26
ALLERGAN PHARMACEUTICALS II HIGH RISE - IRVINE, CALIFORNIA
PROJECT NO. 1020, BID DATE - APRIL, 1970
FLOOR AREA - 69245 SQ. FT., ENCLOSURE AREA - 181640 EU, RATIO - 2.623
TOTAL CONSTRUCTION COST - $2,066,000.00

A. SITE COSTS	$ 188,000.	---	9.1 PCT OF TOTAL	
B. BUILDING COSTS	$1,829,000.	$26.41/SF	100.0 PCT	$10.00/EU
1. GENERAL REQUIREMENTS	119,400.	$ 1.72/SF	6.5 PCT	
2. STRUCTURAL	739,000.	$10.67/SF	40.4 PCT	
3. ARCHITECTURAL	533,000.	$ 7.70/SF	29.1 PCT	
4. MISCELLANEOUS	12,100.	$ .17/SF	.7 PCT	
5. PLUMBING	153,000.	$ 2.21/SF	8.4 PCT	
6. HVAC	155,000.	$ 2.24/SF	8.5 PCT	
7. ELECTRICAL	117,500.	$ 1.70/SF	6.4 PCT	
C. OTHER COSTS (ELEVATORS)	49,000.	---	2.4 PCT OF TOTAL	
GENERAL CONSTRUCTION	1,403,500.		76.7 PCT	$7.73/EU
MECH.\ELEC. CONST.	425,500.		23.3 PCT	$2.34/EU

progressed through working drawings to bidding, and with the acquisition of a new product line the company elected to add another floor (14,000 square feet plus/minus). It was simple, by analysis, to arrive at the cost for the added floor by projecting $26.40 per square foot ($10 per EU) with an added cost of $370,600 plus some $9,000 other costs for added parking, utilities and elevator extension, for a total of $2,434,600. Our contract to date stands at $2,445,000 as the building is now under construction.

Now we should stop and evaluate what we have done and where it can lead us. The first example gave an average and a manner in which to compare the estimate all three ways: from square footage method, to enclosure unit, to percentage method for crosschecking. The second job has many more ramifications. First, the unit of enclosure in an office loft building must be compared with like buildings of a multistory range (this one was five stories). In adding partitions, etc., it raised the EU without the floor area changing. This indicates to the architect that the cost per unit will change, thus enabling him to show the owner that the complexity has increased not the size but the cost of the building. If the enclosure unit is used for nothing else but the demonstration of this point, it is valid. We could also take the extra floor, its walls system, etc., and project much more accurately with enclosure unit than with the square footage method.

Another reason for using all three methods is that in schools about 11 percent of each job is electrical, while in a loft building it is much less—about 6 to 7 percent; in an industrial building this percentage can vary greatly, up to 20 percent. This last comparison can be deceiving since the square foot and enclosure unit cost are low, and an increase in any one of the breakout areas will affect the overall picture. In an industrial building, the structure may be $6 per square foot and be 50 percent of the total cost, where a gymnasium of the same square footage and enclosure units might be 20 percent with the same unit cost.

After using the enclosure area and the enclosure ratio methods for almost a year, I should like to tell you some good and bad points about their use. A major advantage is that a "ratio of complexity," determined at the beginning of takeoff, can be used as a crosscheck while progressing through the project. An important example of its use would be to show the client that by adding this cabinet or that wall the cost had risen because the ratio has risen. Diehl points out in his article that enclosure ratio should be carried to the third decimal place for proper comparison. It is also interesting (and dangerous) that the ratio of complexity can remain constant while the cost per square foot could rise as much as 30 percent, as shown by the comparison of a gymnasium with an industrial building, or an office building with a science or research oriented structure. However, if you crosscheck with the percentage method and square foot cost, you have again proved the value of comparison by the three methods.

From the historical data, you will also find that the percentage ratio of breakdown will not vary as much as the cost per square foot (CSF) or the enclosure unit cost (EUC) for plumbing, heating and airconditioning and electrical work in a more complicated building; therefore this demonstrates another good reason for crosscheck of all systems. Such elements seem to keep a constant ratio with the variation of the enclosure units, but not in a direct ratio with the square foot method.

Architects are becoming aware that they are dealing with increasingly sophisticated clients. The large corporations, public agencies and developers are demanding cost control and cost budgeting that cannot be approached verbally or casually. It must be reached early in the project stages with enough accuracy that realistic banking-financing-budgeting of the project reflects profit, not loss, for the venture. A quantity survey is not accurate until all parts are pinned down. By waiting the approximate four weeks bid period, we know precisely what the cost is. Meanwhile, a year of work has been jeopardized by not *accurately* estimating in the early stages of the project.

In summary, preliminary cost estimating should consider size, quality and complexity; these factors can be reasonably reflected by intelligent use of the three methods of estimating which have been described here. Don't compare apples with oranges. The system won't work by using the wrong data base. Offices which have accumulated a good file of historical cost data with good updating information can usually make good cost projections. This leads to my final conclusion that it is essential for the profession to find means of establishing an information-sharing system and a data bank of building costs. □

The Different Chance That Drexel Offers

A part-time work/study program which offers a baccalaureate professional degree makes Drexel's Department of Architecture unique.

by JOE J. JORDAN, AIA

The usual route to an education in architecture is through study in a full-time program at an undergraduate professional school. Of the 67 accredited schools in the United States only two, the universities of Cincinnati and Detroit, have work/study programs which permit the student to combine work in a professional firm with study at the university. The student's employment is usually arranged through the college placement office and extends for a period of three or six months followed by an equal period in the classroom.

Drexel University in Philadelphia offers something different still: a baccalaureate professional degree in a *part-time* program, based on the work/study concept. A typical student in Drexel's Department of the Evening College has a three-hour class session three evenings a week. Since Drexel operates on the quarter system, summers are usually free. The student can graduate in eight years but nine or 10 years is closer to the norm.

The program has been attracting students in three different categories:

- Students who want to change professional fields. Currently, about 20 percent of the students have a baccalaureate degree in another area. An additional 25 percent have taken from one to four years of college elsewhere in a different discipline. They now want to study architecture but family obligations or economic considerations make it difficult to consider a full-time day program.
- Students who find a special appeal in the work/study concept. It lets them get actively involved in the field from the start.
- Students who have financial problems. Full-time study is expensive, beyond the reach of many. Although the Drexel program is hard, requiring about a decade of considerable self-discipline, it is a good way and, for some, the only way.

It is easy to see that in many ways the Drexel student is a different student. For one thing, he is older. Typically, he may start at the age of 24 and graduate at 32. Well before then he marries (70 percent) and by commencement time will in all probability have two children.

He is committed to architecture. He may have a few false starts, but now he knows what he wants. A student who leaves the program after the first year or two is most likely to do so because he hasn't been able to keep up with the required academic standard, or because a work week of 60 or 70 hours proves to be just too much.

He has a good deal of professional experience. Although there is no requirement that a student work in the profession, he is encouraged to do so. (In the upper four years all students are working in architectural firms.) His office experience level closely matches his academic level — the average experience of a seventh-year Drexel student will be about seven years.

By this time he has achieved a position of some importance in a firm. He may be a designer or a project manager or even have a management position as an associate. One of this year's graduates established his own successful practice three years ago.

Of graduates in the last decade only 10 percent have left architecture; 25 percent have already established their own firms; another 50 percent expect to become associates, partners or principals in the near future.

Experience has shown that the Drexel graduate is not likely to enter a post-graduate program in any field. With close to 10 years of college behind him and an established professional position (and in most cases, state registration) he has usually defined his final career course.

The student's strong and specific career goals are recognized in the program but not at the expense of allowing the school to become too practice oriented. We are convinced that a professional program should serve the entire field of architecture and not simply train practitioners. Emphasis is on theoretical aspects rather than applied knowledge. The student's education in the application of technical knowledge is being continuously expanded by his office experience; he doesn't need to get this at school.

Our graduate must be prepared to enter into a field requiring an enormous spectrum of highly specialized skills while retaining a broad understanding of the society which provides a framework for his decisions.

Two considerations were vital to the development of the new Drexel curriculum adopted with the 1970 fall quarter. First, an architectural education must be broad based; it must address itself to the field of architecture and not just to practice. Second, many aspects of the field are in a state of rapid change, especially architectural practice, so the curriculum must be a flexible network that can constantly adapt to those changes.

Three primary goals, expressed in the form of performance criteria, were adopted:

1. The graduate should possess an acceptable level of professional competence which will permit him to work and develop effectively in his career.

This goal has two elements. The first — work — means that the graduate will be capable of identifying client and user needs and of stating these needs as a problem amenable to solution within the constraints of the technological, social and political patterns of the time. He will be able to propose a solution to the problems which makes an acceptable use of the money, time and skills available.

The second — development — means that

Mr. Jordan is head of the Department of Architecture, Drexel University.

The Drexel student: in school, giving a studio jury presentation; in the office, designing; in the field, observing construction for his firm.

the graduate has reached a basic level of proficiency and has mastered the common level of shared experience necessary to communicate with his peers and to develop his technical specialization following graduation.

2. The graduate should be sufficiently aware of the forces shaping contemporary society to perceive the effect of these forces on the practice of architecture. He should be able to constantly renew and adapt his abilities in response to these changes.

The graduate should be aware of the major social, political and economic forces of the society. Awareness means that the graduate will have the basic understanding necessary to respond to changing conditions within the society, enough knowledge to communicate with the specialist who may contribute to his work, and a complete sense of the contents of these special areas to make meaningful choices regarding them.

3. The graduate should have identified his own values sufficiently to permit him to conceptualize a better environment with a sense of conviction and direction.

This goal has two implications. First, the graduate can exercise moral judgment in the selection of the most appropriate solution from among a series of possible solutions to a problem. Second, the graduate can postulate changes in the existing societal constraints which will permit better solutions to existing problems. In short, the graduate should be able to formulate a future which is different from a simple projection of present forces and should be able to work to bring about this future.

We recognize that these goals are never completely attainable for they are in conflict. Each course in the curriculum tends to satisfy one goal more than it does the other two. As we build and change the curriculum, these goals are guideposts to remind us of the effect of our decisions.

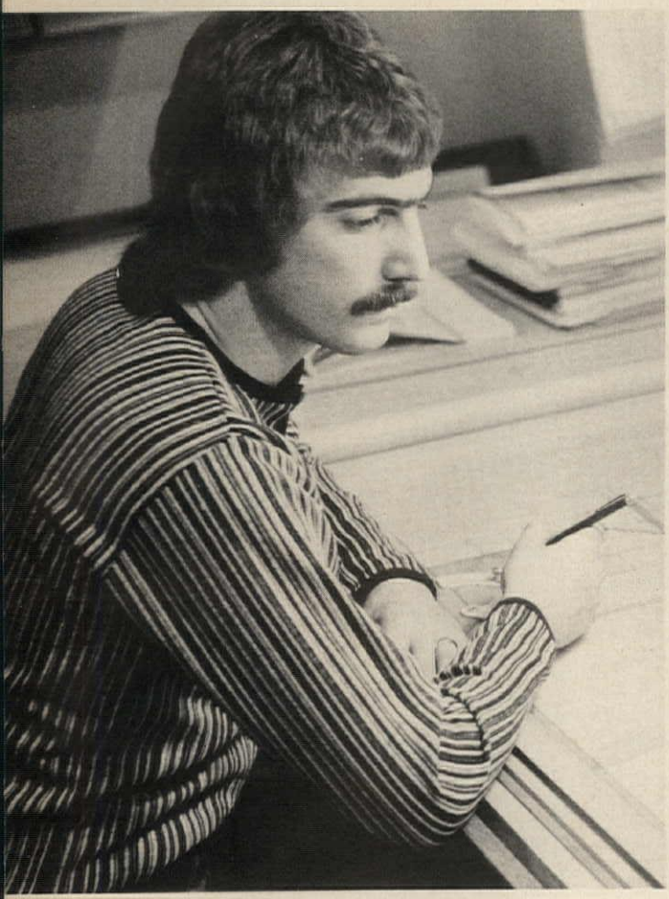
The new curriculum offers studies concerned with the theory and knowledge of the field of architecture, together with its related objectives and values. Its breadth is sufficient to allow for various career objectives.

The curriculum recognizes that a large part of the practical knowledge and basic architectural skills are easily learned by the student through his work experience. This permits the elimination of a fair amount of elementary coursework once common to many undergraduate curriculums. Gone are the courses in descriptive geometry, drafting, freehand drawing, materials and methods of construction, mechanical and electrical equipment of buildings, specification writing and office practice.

A high degree of choice in the selection and scheduling of course work is provided. Only about half of the subjects are prescribed; the remainder are selected professional courses or free electives.

During the first five years, the student is introduced to a series of ideas and disciplines that affect architecture. This is a means of discovering his own special interests and abilities. At the completion of the lower level he chooses an area of specialization. His last three years are devoted to specialized studies and research in his option.

What does the concept of an evening college professional program have to recommend it? First, the close relationship between the school and the profession. All members of the faculty are in practice and half have their own firms. In most cases, they employ some of the Drexel students. Three quarters



of the students work for firms in the area. Faculty members tend to know the students on both a scholastic and professional basis. Practicing architects in the Philadelphia area are familiar with the program through their student employees.

The school sees the profession as its ally, as part of itself. Locally practicing architects are invited to serve on the design studio juries, supplementing the faculty and contributing new viewpoints to the discussions. The student's education equips him to deal with the real constraints of practice so that he is welcomed into the local firms and often given a position with a considerable amount of responsibility.

While this close tie with the profession is an asset, it cannot be relied upon to produce a superior program. Therefore, faculty members are selected for their ability to teach and not for their achievements in practice. Half of the faculty has taught at other universities and one-third is now teaching in other architectural schools besides Drexel.

A second asset is the opportunity Drexel provides for many well-qualified students who for various reasons are unable to pursue a full-time program. Among these are students from minority backgrounds. The department expects to encourage the enrollment of these students through an active recruitment program.

A third asset is in the area of career choice. The difficulty of offering optional directions in undergraduate education is that the student is seldom sufficiently informed about the profession to know in which option to specialize. This is a dilemma in many architectural schools. Our students face this choice as they enter the sixth year. At this point they select the courses that become the foundation of their careers. Their final two years are spent in independent research or development with faculty guidance. Since most now have about five years of practice, they are mature enough to have a balanced view of the whole field. By concentrating in their field of specialization, they are able to study their areas of interest in considerable depth.

Fourth, there is the availability of advanced courses to the profession. New courses in design methodology, architectural firm management, the development process and architectural programming are taught at a level meaningful to the practicing architect. Since they are offered in the evening and on a convenient schedule, they are also available to local architects as continuing education.

A program like Drexel's will not work at every institution. Drexel is located in a large urban center where there are sufficient offices within commuting distance to easily absorb the students and provide part-time faculty resources. Drexel is set up to offer a complete range of general studies coursework, including the humanities, mathematics, physical and social sciences and a variety of elective course offerings. It has the administrative personnel available at night to take care of admissions, student counseling, academic records and all of the operations necessary to support an evening academic program.

Drexel's professional degree program started in 1950. It underwent radical changes in the '60s and is starting this decade with a completely new outlook. The department now has over 200 students and expects to hold future enrollment to a manageable 250. It will grow and it will change. It has set its course, one that will respond to ever-changing needs in the entire field of architecture. □

CHARRETTE: A Real Way to Learn

by MARVIN E. ROSENMAN

The limits of educational systems and facilities have transcended the mythical boundaries of the classroom in thought and in action. Concern for design in the classroom is giving way to design interest of a more critical nature—that of the total community.

When the city of Indianapolis hosted what is rapidly becoming a popular experiment in education and architecture—an educational facilities charrette—it became a marathon series of brainstorming and consensus-seeking meetings that lasted eight days. The sessions, which started at nine each morning and went well into the evenings, drew residents of the Model Cities study area, educators, planners, architects, engineers, economists, psychologists, business representatives, federal, state and local public officials as well as students—people of all age groups intensely studying community problems together to come up with solutions.

Sponsored by the US Office of Education, the Indianapolis Public School System and the Indianapolis Model Cities Office, the forum gave primary emphasis to educational facilities and programs as the natural catalyst for revitalization of the total community. Persons not normally involved in the decision making process had the opportunity to confront their municipal officials with their individual ideas and complaints with the hope of solving basic community problems through joint efforts. The goal was to arrive at implementable plans for community issues in a compressed time period. The forum allowed these plans to be measured against political, economic and technical restraints.

Initially, tension among all the participants was acute, but through mutual perseverance misunderstandings gradually changed to trust. Slowly at first, and extensively toward the end, the students translated the needs and desires of the community into graphic presentations. The product of their efforts covered three entire walls of the gymnasium which housed the forum.

The charrette project was a proposed elementary school to be constructed in the Model Cities area of Indianapolis. Evans Woollen, AIA, architect for the project, served as a member of the Charrette Steering Committee.

The eight days of brainstorming included committee investigations into educational programs, transportation, employment, goods and services, health, library facilities, community organization and manpower utilization. The program developed, in primitive schematic stages, envisioned a facility for more than an elementary school, serving as many community needs as possible on a 24-hour, 12-month basis through a health center, employment office, child care center, government assistance office, activities and entertainment center, vocational training center and school. A significant outgrowth of the forum was the formation of Operation Help, a community group organized to feed hungry school children and to keep streets clean, with the community's own resources. "Operation Help is only one of the many charrette spin-offs," says Melvin Ice, youth coordinator for the Model Neighborhood and active participant in the forum, "a number of groups are still meeting."

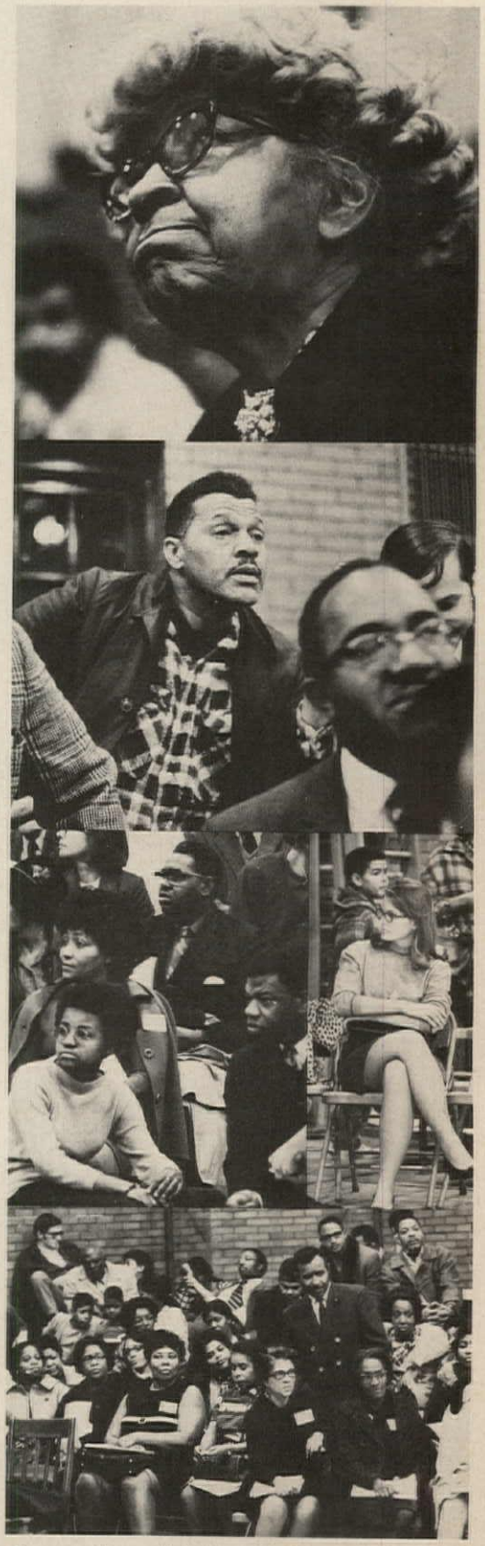
The fate of the charrette subject, the Model Cities School, now rests in the hands of the architect and the school board; however, the entire community experience generated for those involved a deeper understanding of community needs, of educational relevance and, most of all, of each other.

Thirteen students from the College of Architecture and Planning at Ball State University attended the committee meetings and forum, working under the direction of architecture professors Marvin E. Rosenman, Richard J. Pollack, Anthony J. Costello and professor of landscape architecture John Lantzius.

Harry Eggink, a fourth-year BSU student/participant, became deeply involved in the charrette process and decided to continue working with the Model Cities community on his own after the conclusion of the forum. His work progressed as an independent project in an educational facilities design studio at the College of Architecture and Planning. Last year his project received the Exceptional Merit and Eastern Regional Awards in the Portland Cement Association's student design competition, which enabled him to study in France and travel throughout Europe for a summer. His project has been exhibited in Indianapolis and Chicago.

Charrette is an unquestionably valuable process. It not only involves every member of the community in a concerted effort to achieve an improved environment but also serves another purpose: It enables outside participants, like Eggink, to recognize the real needs and desires of people, to learn how these can be achieved and, most of all, to learn how to implement similar projects in other areas. □

Mr. Rosenman is currently a consultant in education facilities design and associate professor of architecture at the College of Architecture and Planning, Ball State University, Muncie, Indiana. He is a recent recipient of Ball State's McClintock Award for research on the study "Inside-Out University: An Alternative to Status Quo Campus Planning."



Community participants show tension and concern at outset, then loosen up and approve as their needs are presented in graphic form.


matto: have some faith in all people

What's Happening in Architectural Education

Campus Notes. The University of Pennsylvania has appointed Peter F. Shepheard dean of the Graduate School of Fine Arts. Now president of the Royal Institute of British Architects and partner in the London firm of Shepheard & Epstein, Shepheard is one of the two architects who formulated the master plan for England's first new town, Stevenage.

ae Harold Box, AIA, is new chairman and a professor of the Department of Architecture at the University of Texas at Arlington. He is a partner in the Dallas architectural firm of Pratt, Box, Henderson & Partners.

ae New dean of the College of Architecture, Art and Planning at Cornell University is Kermit C. Parsons, who succeeds Burnham Kelly. Parsons, a city and university planner, has been with Cornell since 1957.

ae At the University of Oregon's School of Architecture and Allied Arts, Robert S. Harris has succeeded Frederick A. Cuthbert as dean. Harris joined the university's faculty in 1967. Cuthbert, after almost 40 years of service as AAA dean, will continue with professional consultation.

ae The School of Architecture at Rensselaer Polytechnic Institute has acquired Patrick J. Quinn as new dean. He comes from the department of architecture at the College of Environmental Design, University of California at Berkeley.

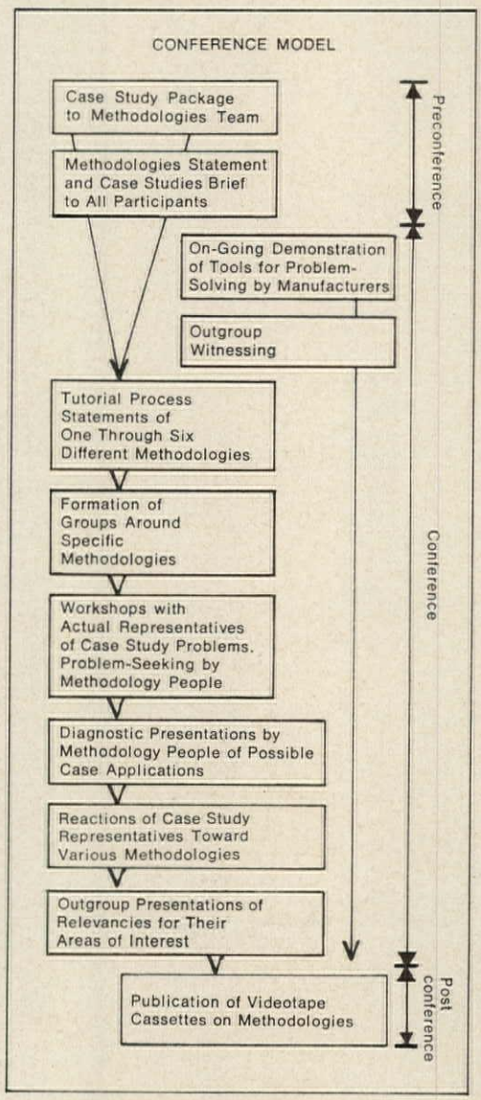
ae California State Polytechnic College, Pomona, has approved the six-year Master of Architecture degree as the first professional degree in architecture, the first in the state college system to do so. Candidates may choose from five areas of specialization: architectural design, urban design, architectural industrialization and technology, architectural administration and architectural construction administration.

ae The Southern Illinois University at Carbondale now has programs to prepare instructors for associate of technology or science degree programs in its Faculty of Technical and Industrial Education. Bachelor's as well as master's degrees are offered.

ae Columbia University is on the air across the country every weekday morning with "Summer Semester 1971." The series of 108 programs on environment and science, produced by Columbia and WCBS-TV, covers such areas of study as water and air pollution, urban planning, etc. Among individual lecture topics are "Electric Crosstown Buses and Commuter Alternatives," "Nuisances to Urban Dwellers: Noise, Overcrowding, Glare, Heat, Cold, Dirt, Density" and "New Construction Techniques for Cities." Producer/director is Roy Allen of WCBS-TV; associate producer is Winston L. Kirby, director of Columbia's Office of Radio and Television.

Off-Campus Notes. The first Annual Design Educators' Conference, the consortium brainchild of the Association of Collegiate Schools of Architecture, Association of Collegiate Schools of Planning and National Council of Instructors in Landscape Architecture, is moving into advanced stages of courtship with the Annual Teachers' Seminar.

Teachers' seminar chairman Robert Anderson, head of the fledgling School of Architecture at the University of North Carolina at Charlotte, along with William Mitchell of the same school, have been hatching the idea of an intensive case study seminar that would bring together many of the difficulties being faced in large-scale urban problems. Charles Burchard, dean at Virginia Polytechnic Institute and acting chairman for the first ADEC, is looking at a conference on the process of solving problems — a state-of-the art affair about methodologies and tools for dealing with complex and value-loaded situations and how one might turn around and use these in education, both as teaching tools and as subject matter.



After several Washington meetings the two conference strategies have developed back to back into a form shown in the diagram. The model takes six people representing contrasting methodologies for seeking and solving problems and interfaces them with actual representatives of a messy real-world case study. This case study must, of course, remain secret until the conference (some time in November) so that no one may obtain information the others are not privy to.

Participants then may align themselves with a specific methodology and move through case study presentations as a unit/resource. The "outgroup" would consist of one educator-at-large, one architectural educator, one recognized expert at problem solving, one student, one politician, etc., who would simply "witness" the proceedings and then give an impromptu report at the end of what might be the impact of such notions on their individual areas of involvement.

Suggestions and recommendations are welcomed by the consortium through the Executive Secretary of ACSA, AIA Headquarters, 1785 Massachusetts Ave., N.W., Washington, D.C. 20036.

Scholarships. This year Scholarship Committee veteran T. Triplett Russell, FAIA, had help from Henrik Bull, FAIA, and "young practitioner" John Butler Davis in dispersing $55,770 of AIA-AIAF scholarship funds after organizing, sorting and evaluating 221 applications in three categories: undergraduate, graduate and professional.

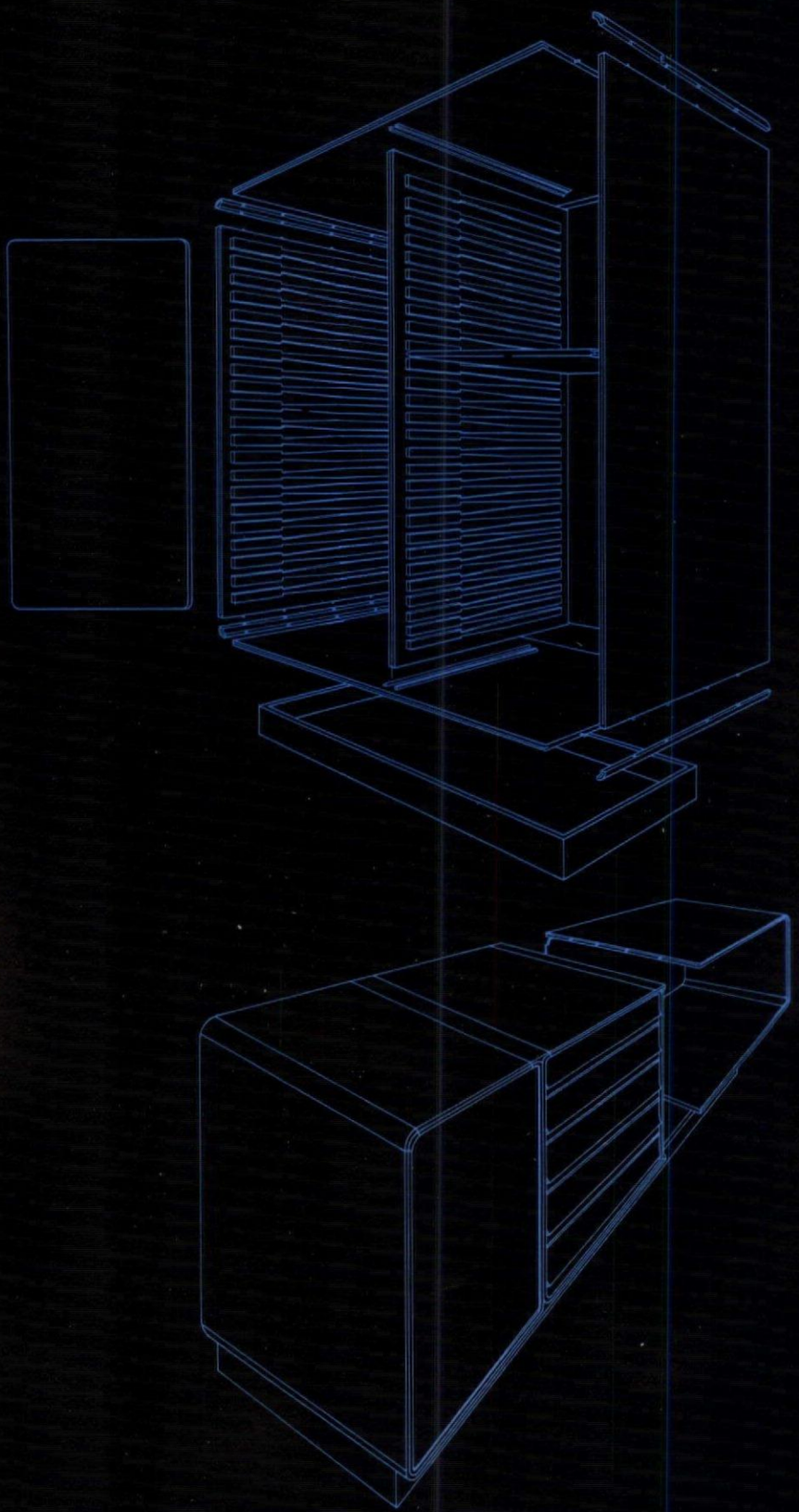
This is an arduous process because the applicants, except for those in the professional category, are preselected by their department heads or school scholarship committees. Thus the quality as well as the need have already been established. Occasionally, however, an application comes along that prompts the tired committee member to sit up and read something out loud. That's what happened when Bull read the papers of James L. Thomas, a graduate student at Yale.

Thomas needed the funds, he said, to stay in graduate school, which was typical enough. But he also elaborated on his pet project, which the committee felt worthy of support. It seems that Thomas had been spending all his spare time gathering material for a handbook on alternate modes of settlement and social organizations. This would enable individuals and groups to identify a type of organization best suited for themselves, such as urban and rural communes, kibbutzes, co-ops, condominiums, villages, etc., and provide them with an architectural strategy for best filling their needs.

He presented his credentials as experience in Tavistock study, Gestalt psychology, mental health work and mediation, and had already enlisted the aid of the Connecticut Mental Health Center, Yale Psychiatric Institute, Vincent Scully and Moshe Safdie.

Other cases as well made the committee feel that the long hours were well spent and that it was doing a lot with relatively little money, such as supporting a near A average minority student with a total family income of under $3,500 per year. DAVID CLARKE

Drexel blueprints a new environment for education.



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Architects' Data. Ernst Neufert. Ed. and Rev. by Rudolf Herz. Hamden, Conn.: Archon Books, 1970. 354 pp. $22.50.

As the trends of architectural education focus on social problems and on in-depth studies of particular aspects of our environment, the need for this and similar technical guides becomes acute. This handbook, which has prospered through 26 German editions, has at last seen the light of day in an English version.

Fundamental design data and basic technical information are compiled into one book. It is a gold mine of information for beginning designers and architectural students. The organization of the book is a plausible effort to approach design in a systematic manner. It spells out a suggested procedural approach which, when followed, should lessen the need for professional liability insurance. The obvious analog to this work in current US practice is Ramsey and Sleeper's *Architectural Graphic Standards*. The two works are supplementary but organizationally different. This reviewer would have appreciated having had this guide during his formal training years.

Drawing practices, human scale and design principles are the beginning subjects of this orderly development. Continuing, the basic principles of heating, ventilation and lighting are discussed with considerations for structures. Various types of occupancies are explained functionally. Houses and house organization are extended for 31 pages; schools and colleges fill another 17. Offices, workshops and industrial buildings, farms and airport facilities are included also. The explanation prophetically concludes with an examination of homes for the elderly, churches, museums and mortuaries.

A questionnaire is suggested at the book's beginning which is refreshing in that the form asks for the financial rating of the client; who is responsible for client decisions; what happened to the previous architect; etc. The beginning architect is further adjured to obtain a copy of the local building code, to compile records of technical investigations, to photograph the site conditions and to develop a schedule of events and activities—all of which suggestions lead to salutary results.

The major difficulty with this magnum opus is that all the detailed dimensions are noted in the metric system; for many American designers this will be a hazard. Parenthetically, in an adjoining paragraph the metric numbers are converted to the American equivalent of the metric numbers rounded off. One might carp also about the essentially British orientation of the work, but this is a minor criticism.

In a comparison of the treatment of acoustics in this book with that given in *Architectural Graphic Standards,* there can be no doubt that the subject is presented better organizationally here.

If I may quote slightly out of context from Professor Buford Pickens, AIA, in the December 1959 AIA JOURNAL, it was said: "Architecture is a profession which requires firsthand knowledge of the building process, that is, the putting together of a complexity of functional parts to form a unity—materials and structure to form space and to satisfy human need." The *how* of that putting together, not the *what,* is the emphasis of this compendium. JOHN STUART MILL, AIA

The United States Airport Market (1970-1980). New York, N.Y.: Frost & Sullivan, Inc., 1971. 340 pp. $445.

Announced as a new in-depth analysis and forecast for large and medium hub airports, *Airport Market* amounts in reality to little more than a not very thorough compilation of information on the subject.

Two sections of the book cover large and medium hub activities and projections. Much of this data may be found in Federal Aviation Administration publications entitled *Aviation Demand and Airport Facilities Requirements Forecasts for Large Air Transportation Hubs Through 1980* (Aug. '67); a similarly titled booklet for medium hubs (Jan. '69) and *A Suggested Action Program for the Relief of Selected Airports* (April '69). A supplement to the latter was published in February last year. Because of changing conditions, figures relating to future needs and costs as developed by Frost & Sullivan can only be considered as indicative of the scale of the need but are by no means definitive. Meaningful figures can only become available as program requirements are developed on an airport-to-airport basis.

The publication describes the various provisions of Public Law 91-258, the Airport and Airway Development and Revenue Acts of 1970 and the impact of fiscal year '71 and proposed fiscal year '72 appropriations on the Airport Development Aid Program authorized under the new law. This information is available — for free — from other sources to anyone who is interested. Frost & Sullivan's analysis of the act is unclear and in some instances incorrect.

In final sections of the publication is a state-of-the-art type presentation covering airport passenger, baggage and cargo handling. The appendix (or Contractor-Index) listing airport operators, contractors and management, cargo equipment, suppliers, airlines contracting and procurement, airport consultants and equipment manufacturers is incomplete and inaccurate and of doubtful value as presented. BESS BALCHEN

Internal Structure of the City: Readings on Space and Environment. Edited by Larry S. Bourne. New York: Oxford University Press, 1971. 528 pp. $5.95.

The 57 essays collected here, drawn from numerous disciplines, address themselves to

the internal spatial structure of the contemporary North American city, the created environments and the way the city changes. They are organized to reflect the definition of the city as a system: images, patterns, processes, networks, communities, activities, problems, prospects. The contributors, outstanding leaders in their respective fields, are articulate and provocative.

Lubbock Tornado: A Survey of Building Damage in an Urban Area. N. F. Somes, R. D. Dikkers and T. H. Boone. Washington, D.C.: US Government Printing Office, 1971. 36 pp. 50¢.

On the evening of May 11, 1970, Lubbock, Texas, endured the worst tornado in its history. This report on the effects of the tornado on different types of buildings is by a three-man team from the National Bureau of Standards' Building Research Division.

If current good practice in the design and construction of buildings and mobile homes had been followed, the report concludes, the damage would have been considerably reduced. The authors stress the need to develop performance criteria with respect to wind loads for certain building elements, in particular roofs, cladding, masonry veneer and glazing. Continued study of buildings affected by natural disasters, they note, can lead to improved design and construction methods that will save lives and reduce property damage as well.

The Architects of the Parthenon. Rhys Carpenter. Baltimore: Penguin Books, 1970. 193 pp. $2.65.

Going to Greece? Stick this paperback in your pocket. You may want to refer to it if you have always thought of the Parthenon as a "miracle of precision and calculation."

Carpenter, an authority on Greek art and architecture, may shake some of your notions. He suggests that Kallikrates and Iktinos, the architects, were not collaborators but bitter rivals. He views the Parthenon as a rebuilt partially completed temple with its own share of makeshift and improvisation. This does not detract from its glories but makes its history more exciting.

With Man in Mind: An Interdisciplinary Prospectus for Environmental Design. Constance Perin. Cambridge: MIT Press, 1970. 185 pp. $7.50.

This book is not a manual of techniques about what we should do to improve the environment but a practical treatise suggesting workable approaches to environmental research that can be put to use now.

Schools for Early Childhood. Paul Abramson. New York: Educational Facilities Laboratories, 1970. 52 pp. Free.

It is established that the early years of a child's life are tremendously important and that young children are able learners. Facilities for early education, however, have existed usually in church basements and in residences. This volume presents 11 distinctive environments, each exemplifying a teaching system and its implementation in a building or nonbuilding. Some have been specifically constructed for teaching the very young; others are remodeled houses, storefronts and warehouses designed to carry out successful educational programs. Also included is a nonschool approach that will assist those communities lacking the funds to develop early education centers.

A Systems Analysis Model of Urbanization and Change: An Experiment in Interdisciplinary Education. Carl Steinitz and Peter Rogers. Cambridge: MIT Press, 1970. 78 pp. $8.95.

The Harvard School of Design undertook an experiment in which it synthesized into a coherent planning model the approaches of four specialized fields: landscape architecture, engineering, city and regional planning and urban design. This book reports on the activities of the studio course conducted in the spring of 1968. The study area under consideration was the southwest sector of the Boston region. The aims of the course included an exploration of interdisciplinary teaching and the development of methods which would be useful in actual planning and design processes.

Decorative Wrought Ironwork in Great Britain. Raymond Lister. Rutland, Vt.: Charles E. Tuttle Co., 1970. 267 pp. $7.50.

Beautiful examples of architectural wrought ironwork in Great Britain and their designers and makers are presented in this reissue of a standard work first published in 1957. □

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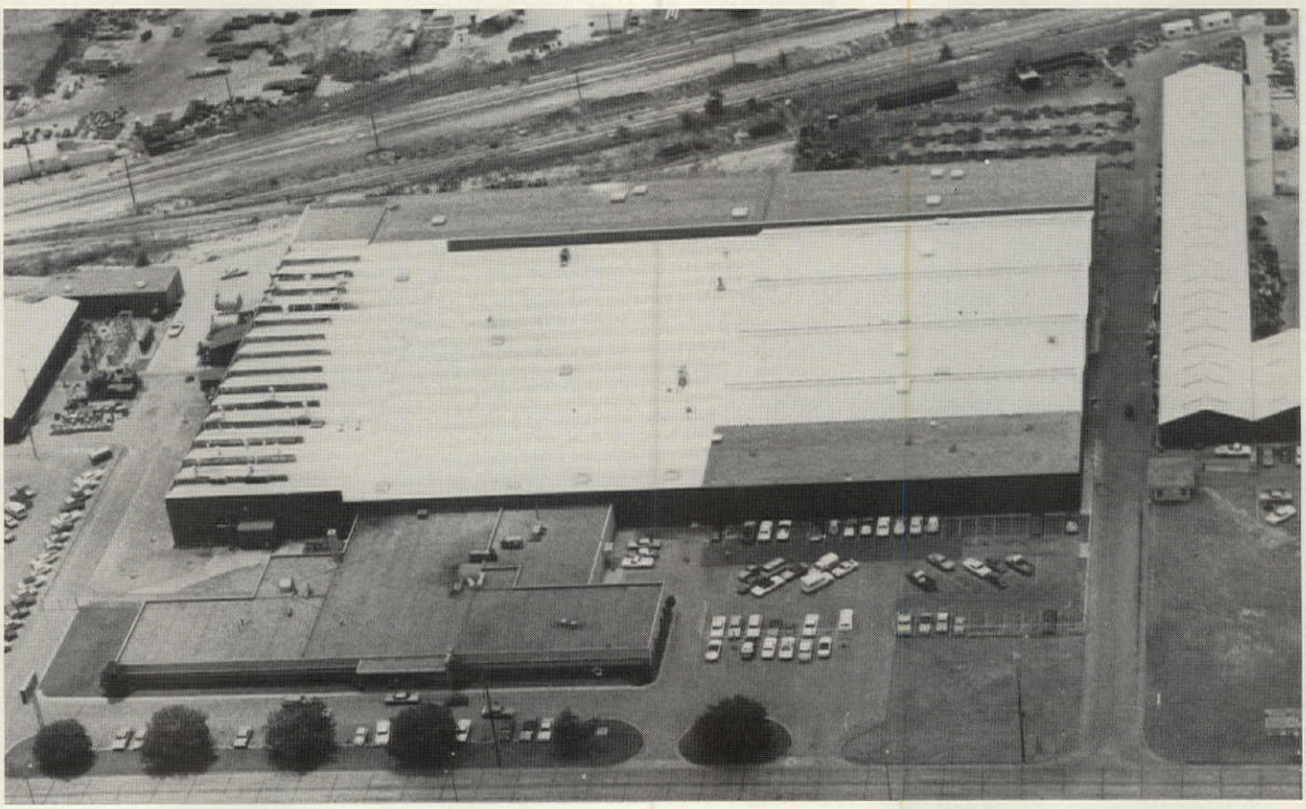

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letters

A Question Becomes an Exclamation

"Breakthrough?" in the March issue went into great detail as to all the work going on in this program. And perhaps the HUD people, as is stated, are demonstrating great managerial skills. But, alas, it is much ado about nothing. The results being achieved are not providing what is needed: housing for people *now*. The process has become the product.

Breakthrough ignores too many significant factors and assumes that technology (via corporations relatively inexperienced in housing) can solve our problems. The fact is that we already have, and have had for some time, all the technology and skills needed to solve our urban mess.

Cultural lag is the problem. Why are slums being created out of existing housing, and at such a rapid rate? Is it better that a man work on an assembly line producing housing, doing boring and repetitive work, than working in the outdoors doing a greater variety of tasks? Why have we allowed unions to stifle productivity as well as creativity?

Breakthrough has been successful in providing employment for many government people and for many firms involved in the process. But as far as producing housing, it is an unqualified failure and a waste of money.

SY RICHARDS, AIA
Atlanta

Any "system synthesizer" (?) or "environmental integrator" (??) who can't recognize that he is designing homes and not "hardware" probably would not be bright enough to recognize that out of every dollar spent for housing less than 20 cents is required to pay for direct building costs.

A program that attempts "breakthrough" on 20 percent of the problem, while barely acknowledging the other 80, is just what you'd expect from a government that brought you Vietnam, the SST and other feature length tragedies, I suppose.

If this latest nonsense is supposed to threaten my existence as an *architect* with its "mystiques," then it's time for the system synthesizers to take over. "Weep not for me —but for my children."

JOSEPH W. GERBER, AIA
La Jolla, Calif.

Robertson Ward's article is by and far the best and most accurate description and evaluation of HUD's Operation Breakthrough to be published so far. And it constitutes something that is desperately needed by the profession.

Wherever I have been since Breakthrough came into being — lecturing to students, speaking before groups of architects and others and in general conversation — I have been amazed and disappointed at the number of architects who have never even heard of Breakthrough. In spite of the program's shortcomings, it is certainly having an effect on the profession and will in all probability have a great deal more effect in the years to come. I am glad we have the review committee's report.

What most people do not know about Breakthrough is the rather significant involvement of architects and others in our industry who are not part of the government. Much of this involvement has been through the Building Research Advisory Board (BRAB) of the National Academy of Sciences, which is headed by Executive Director Robert M. Dillon, AIA.

Under contract with HUD, BRAB studied and developed a report on industry's attitudes regarding Section 108 of the 1968 Housing and Urban Development Act which called for a mass production housing experiment. That act provided the legislative basis for Breakthrough, as Ward mentioned in the article. BRAB has assisted also in organizing and guiding a technical panel with a number of subpanels which have and are continuing to counsel HUD on various aspects of Breakthrough.

In addition, I directed a program for BRAB to assist HUD in developing a data base to handle information related to housing and Breakthrough and to extract systematically information from all of the proposals received (667 to be exact) for publication in a special book soon to be released by HUD.

Many other architects, within the government and without, have also participated in the planning and execution of Breakthrough.

As with any advisory service, the advice given isn't always followed, but I believe it is noteworthy that members of the profession and the industry have been significantly involved.

My next comment has to do with what Ward says is HUD's goal of doubling the annual rate of housing production. He asked a number of pertinent questions regarding other aspects of Breakthrough but failed to comment on whether this goal is at all realistic.

To say that the nation *needs* a certain quantity of houses is not to say that if they were produced they would be purchased—subsidized or not. *Needs* are seldom the same as *demands*. And if the industry were to tool up to produce 3 or 4 million housing units per year, how soon would the market fizzle and leave thousands out of work and producers bankrupt?

Stability and steady growth of one of the nation's largest industries are important elements of the public welfare.

BENJAMIN H. EVANS, AIA
Assistant Director
Building Research Advisory Board
Washington, D.C.

Abraham D. Levitt's article on Moshe Safdie's giant killing was a perceptive view of the frustrations inherent in the current housing scene, the moral of which might be: genius escalates opposition; or, giant killing is hollow sport if the gilt egg-laying hen dies of malnutrition.

Systems designed to meet human needs do offer hope, as Levitt suggests, and his mention of the Townland System as original was appreciated. Unfortunately, the sentence structure gave the impression that Townland was an import. Not so!

Townland was designed in this country, developed under Operation Breakthrough and is currently facing all of the frustrations and obstacles of the emerging industry. But we stand always ready to learn from visionaries such as Safdie who seek to create shelter for human life.

JAMES R. MCDONALD
Townland Corp.
Cherry Hill, N.J.

Bucky Fuller and Soleri, the mechanic and the plumber, are both seen as creative visionaries and impractical while businessmen are viewed as practical. The choices in Operation Breakthrough were and still are totally captive to business thinking. The leadoff article for March reveals what is known in the building media: Breakthrough is a failure.

My process invention was turned down by HUD even though discretionary powers to fund it were built into the program. I followed all the awards closely, and two or three "big" corporations did receive experimental awards. Lest you think I am partisan and hence captive, I would like to say that my research revealing a germane process able to really solve transportation needs as well as housing is a spinoff of Bucky Fuller's thinking. In fact, I hired a mathematician (who is also a prime designer of microwave hardware and bemused that his employer never knew what he was doing) and approached housing patterning in a comprehensive way: a total entity of parts, not merely the visible hard product parts. I don't believe HUD understood, and I did cloud the presentation with idealism. What I did could be done by Fuller and any of his staff much better; he is most at home in comprehensive designing while I am only a protégé of comprehensive designing.

The mathematician, after being oriented by me, was surprised that it could all be done with simple algebra. His concern was that the invisible patterners, the dealers who make hard buildings appear, could steal the profits and would find the process irresistible. This research, this soft design strategy, demonstrated that there were large profits in low income housing. The implications that the process would guide us in solving transportation was a synergetic side result. What this revealed was that the geodesic dome is only one hard product made visible from Fuller's mind.

It is ironic that Russia with all its shortcomings of design and workmanship is very close to winning the battle of an industrialized nation for true low cost housing. Ironic because we have this natural resource, Bucky Fuller, whom we are not using or funding in any large way. His one world, one town,

continued on page 62

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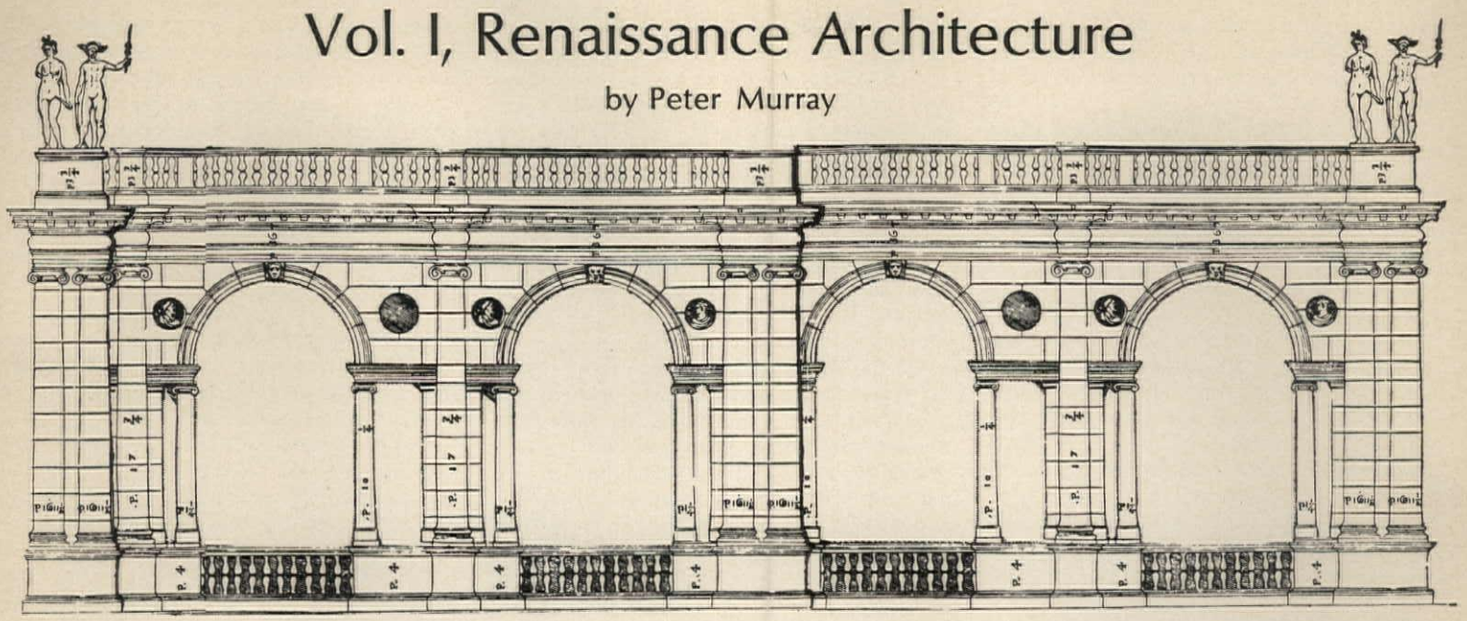

Of Renaissance architecture, Sir Kenneth Clark, in his magnificent television series, "Civilisation,' has said:

> "There seems to be no reason why suddenly out of the dark, narrow streets (of Florence, which was its birthplace) there arose these light, sunny arcades with their round arches 'running races in their mirth' under their straight cornices. By their rhythm and proportions and their open, welcoming character they totally contradict the dark Gothic style that preceded."

This volume is first in a series of 13 volumes which will deal with every period of architecture in man's history, Beautifully written by Peter Murray, it so invited reading as to catch up the reader in the movement and excitement of the Renaissance itself. Magnificently illustrated and printed in Italy, it is the only such book (and series) ever to be offered to its members by The American Institute of Architects.

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comprehensive view that is now labeled one space ship so that we can "see" it better, is not utilized because of the short-sightedness not just of business but also of the designers, the architects.

We will not admit that we are cosmeticians. Even the AIA JOURNAL has never paid much attention to Bucky's ideas—a neglect corresponding to our never having any large buildings designed by Frank Lloyd Wright because of his bad manners.

Incidentally, my research indicates that building the way Soleri suggests (February issue) is not only germane for ecological survival but is the most economically prudent thing to do. In fact, the only thing "wrong" with Soleri's thinking is that its seemingly high density is not dense enough. Eight thousand feet high seems to be for now the practical height for earth structures.

D. B. V. TRAVERS, AIA
Milford, Conn.

View from the Window

Why is it that architects, who by and large are sensitive to human needs, are often singularly insensitive to certain needs of people who will use the building? I refer particularly to the view from the window.

The ideal view is often thought of as one of peace and harmony. Few people would deny the pleasure taken in the tranquility of nature—a view of lake, woods and meadows. Most of us would choose such a sight for our picture window, all other things being equal. But for many it is not appropriate.

Consider two situations. First, in a corporation, the creative thinker may work best with bucolic views from his office window. For him, the exurban setting to which many companies are moving is ideal. He can look out at the trees without the intrusion of any jarring sights to disturb his ruminations. At the same time, those employees with more mundane jobs can look out on the power plant, the airconditioner or the parking lot. The view may also be a status symbol with the president or board chairman enjoying the most idyllic scene.

On the other hand, there are those people for whom peace and harmony are inappropriate sights. In considering the view from the window, perhaps the architect's greatest failing is a lack of understanding of the needs of those who lack freedom of mobility. People who were once active, but who have had idleness forced upon them, want to be able to look at hustle and bustle—at movement of any kind. The actions and antics of children may be disruptive to many adults, but older people get much pleasure from viewing young folks at play.

I once spent 15 months in a hospital in a well landscaped, semirural setting. The most popular rooms by far were those which looked out on the parking lot. Here was some people movement, of course, and the short skirts on windy days were always a source of delight. But the cars themselves just circulating on the lot were viewed with pleasure. Occasionally, to the great enjoyment of those confined, there was a fender crumpling incident. Let the newcomers look out at the trees; the older residents craved action!

Surely it isn't heresy to suggest that for some people the turbulence of traffic is preferable to a pastoral panorama. Take it from one who knows!

ROBERT L. MORRIS
Vice President
Alan M. Voorhees & Associates, Inc.
McLean, Va.

In the Doghouse?

I am behind on my reading and at first glance when I picked up the April issue I was sure that I was looking at the current journal of the American Kennel Club.

I know that architecture is going to the dogs, but why do you have to rub it in like you do, first with the article on the Bowhouse and now with this full butt picture of the inquisitive elkhound?

When you think about it, however, it makes a lot of sense because it reports the scene factually; and the life of an architect is, even if he hates to admit it, that of a dog. I presume that you'll get a few woofs on the cover, but we don't have to have Moshe Safdie every month. At least it's a change of pace.

HAROLD T. SPITZNAGEL, FAIA
Sioux Falls, S.D.

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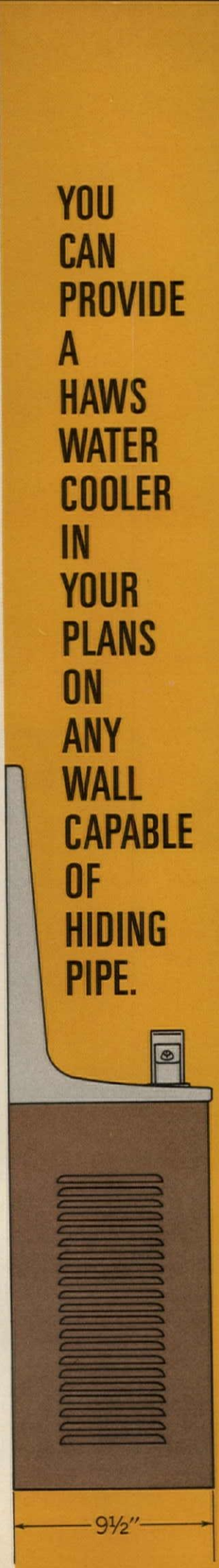

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Aug. 5-7: North Carolina Chapter Summer Meeting, Grove Park Inn, Asheville

Sept. 7-12: Western Mountain Regional Conference, Jackson Lake Lodge, Jackson Hole, Wyo.

National

Aug. 16-20: Conference on Cold-Formed Steel Structures, University of Missouri at Rolla, Rolla

Aug. 23-27: Engineering Foundation Conference on Research to Reduce Cost of High Voltage Underground Transmission, New England College, Henniker, N.H.

Sept. 19-23: Prestressed Concrete Institute Convention, Los Angeles Hilton Hotel, Los Angeles

International

Sept. 1-7: International Air Pollution Control and Noise Abatement Exhibition, Jönköping, Sweden

Sept. 5-12: International Conference of Women Engineers and Architects, Turin, Italy

Sept. 6-10: International Conference on Urban Problems, Tokyo, Japan

Sept. 8-10: International Conference on Urban Transportation, Pittsburgh Hilton Hotel, Pittsburgh

Sept. 22-26: National Association of Home Builders International Apartment Conference, Chicago

Sept. 28-Oct. 3: Inter-Group Seminar on Housing, International Union of Architects, Bucharest, Romania

Competitions

Aug. 1: Registrations due, new buildings for Tanganyika African National Union. Contact: Alex Mathias, Competition Secretary, International Competition for TANU, Box 9431, Dar Es Salaam, Republic of Tanzania.

Awards Programs

Sept. 4: Entries due, Architectural Awards for Excellence Program. Contact: American Institute of Steel Construction, 101 Park Ave., New York, N.Y. 10017.

Sept. 15: Entries due, Annual Building Excellence through Innovation Award for National Association of Home Builders members. Contact: BETI Awards Committee, National Housing Center, 1626 L St. N.W., Washington, D.C. 20036.

Call for Papers

July 23: Abstracts due, Annual International Environmental Design Conference. Contact: W. J. Mitchell, School of Architecture and Planning, University of California, 405 Hilgard Ave., Los Angeles, Calif. 90024.

July 30: Abstracts due, Annual AIA Architect-Researcher's Conference. Contact: Don Conway, Director of Research Programs, AIA, 1785 Massachusetts Ave. N.W., Washington, D.C. 20036. □

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