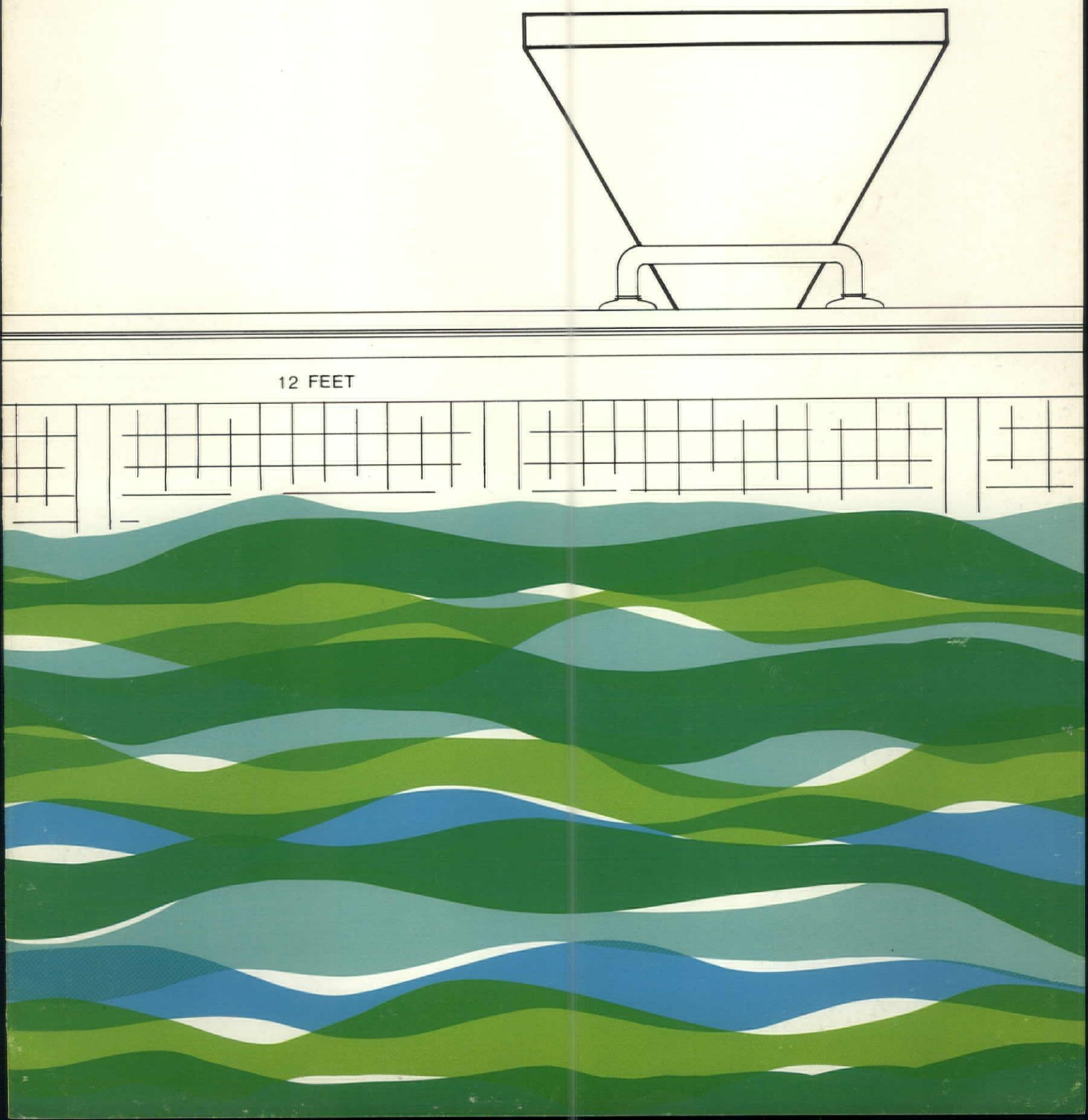
AIA JOURNAL

JUNE 1972



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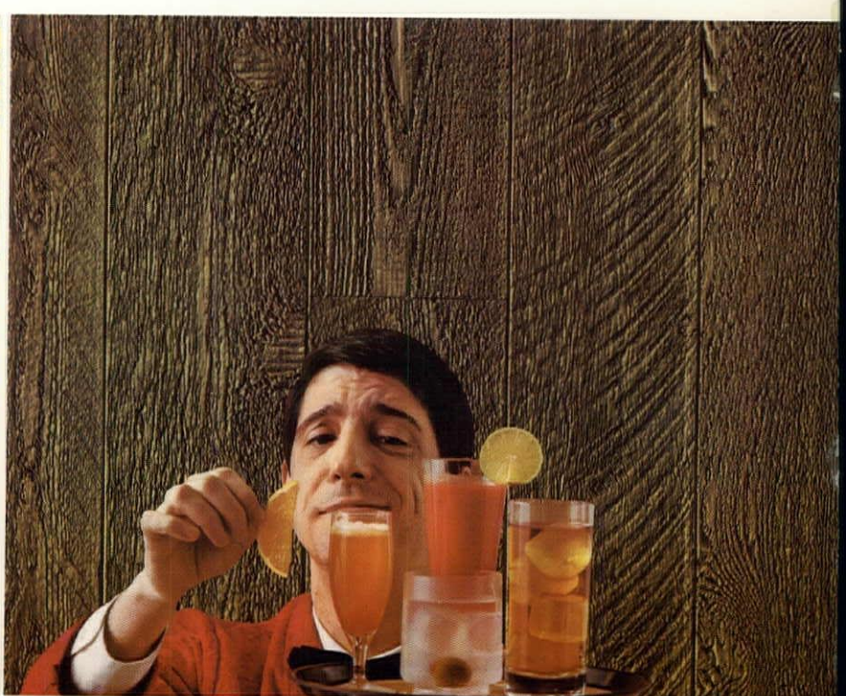

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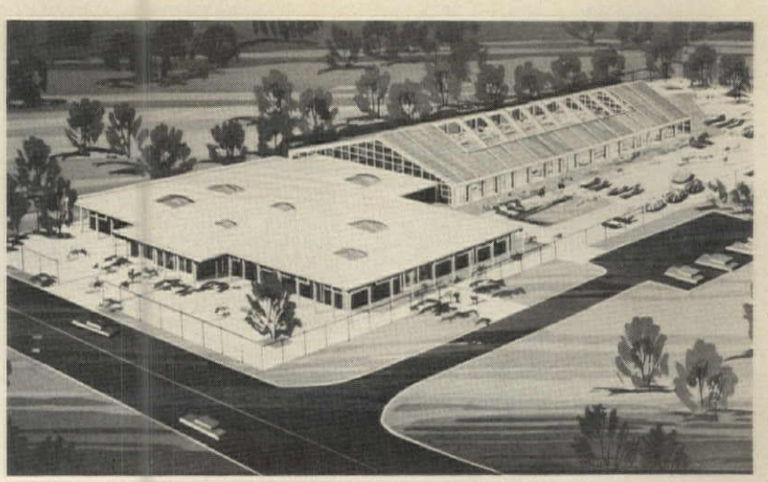

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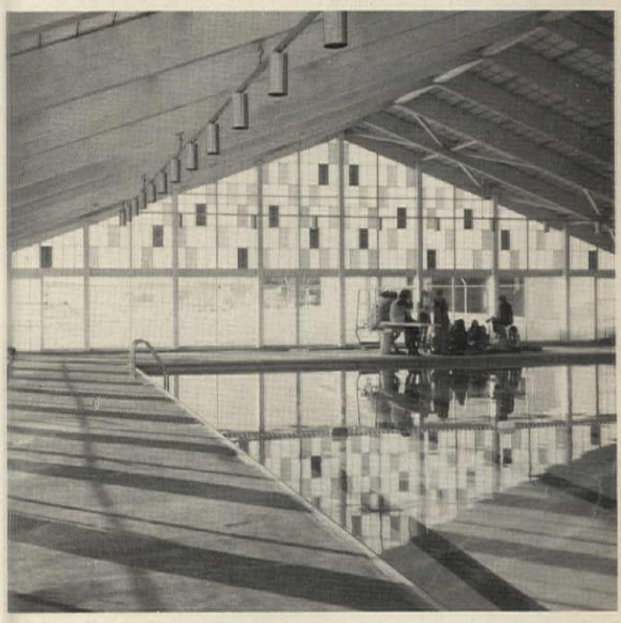

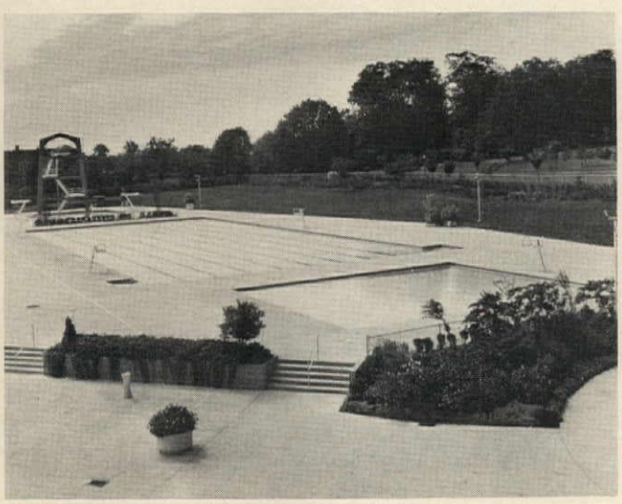

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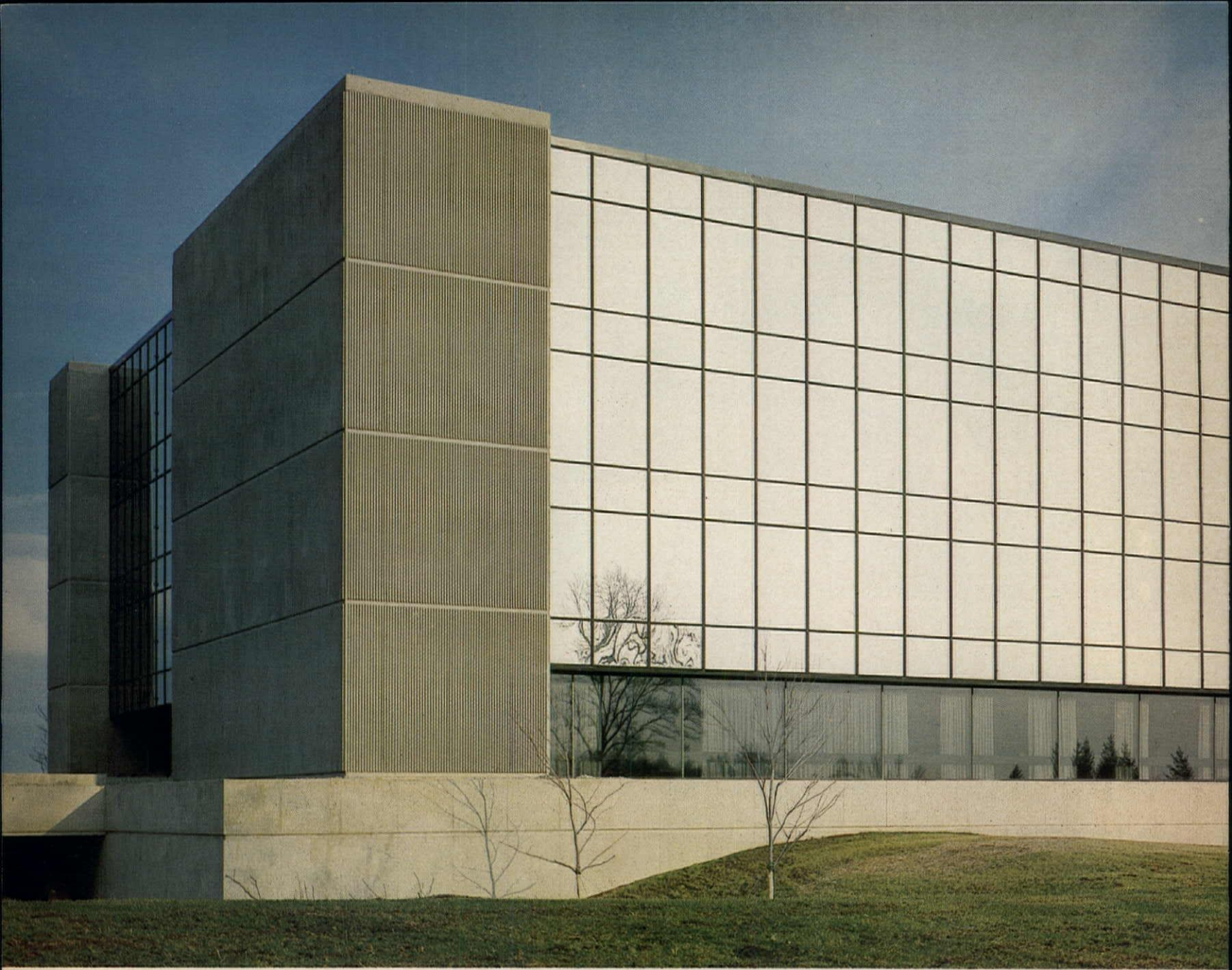

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AIA JOURNAL

JUNE 1972

DEPARTMENTS

COVER: Swimming pools — and what architects should know about them — are discussed on page 35.

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VOL. 57, NO. 6

Porcelain-enameled home for National Molasses Company

A subtle charm sifts through the crisp simplicity of National Molasses Company's new headquarters office building near Philadelphia. All-over paneling in porcelain-enameled steel is relieved with accents of sandblasted architectural concrete. Vertical severity is avoided by back-slopes at the parapets, repeated along the window-sill line.

The structure achieves unity with its environment through the selection of an earthy umber hue for the porcelain enamel. Architects are making ever-increasing use of these Nature-tone porcelain finishes, along with attractive textures and embossments. On the practical side, porcelain-on-steel panels offer rigidity, light weight, corrosion resistance, cleanliness, and fastness of color.

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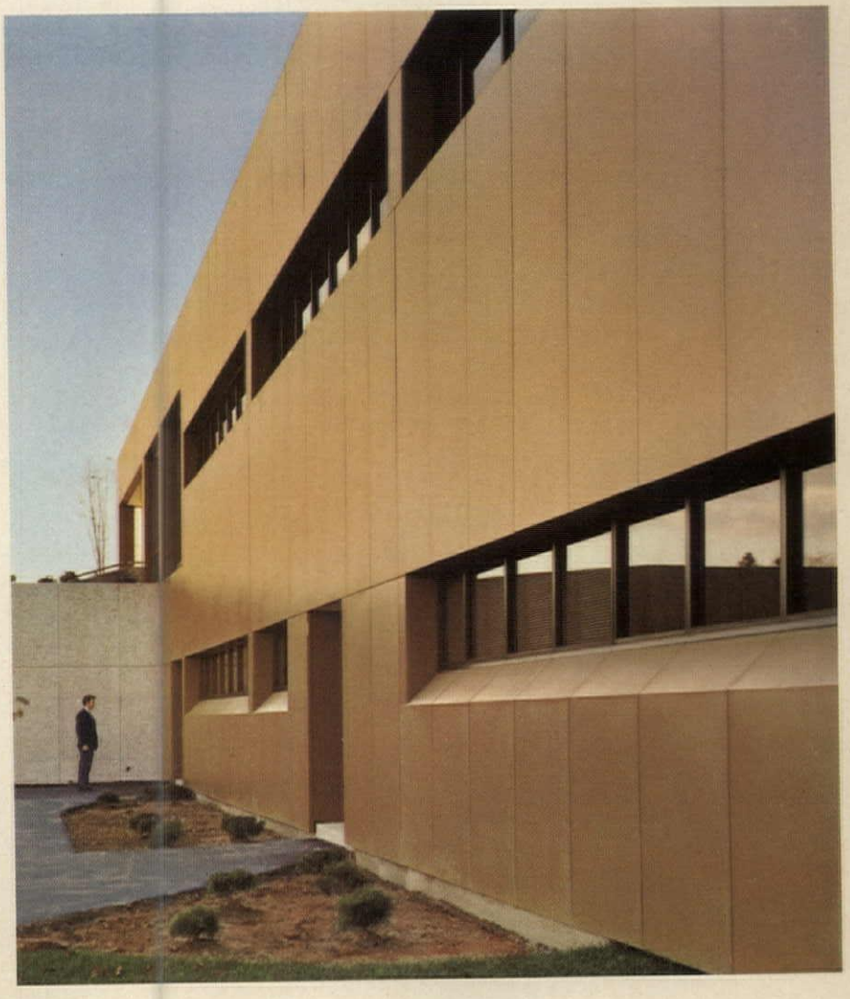

comment and opinion

SOME SHOP TALK STRAIGHT FROM THE HEART: The AIA JOURNAL learned the other day that the subject of its Practice Profile last November — a Gainesville, Georgia, partnership with an office in Atlanta — has been purchased by a Los Angeles-based architectural firm, a happening that is becoming more common in this era of acquisitions and/or mergers. My point here is not to discuss the relative merits of such a move but to emphasize that the acquisition took place because of the publication of the article in our magazine. I have been told that the purchaser did not even know that the Georgia firm existed until that issue was circulated among the principals involved. The partnership also received scores of letters, including a handwritten note from the governor of the state, and telephone calls in response to its exposure in the JOURNAL.

By now we editors have come to accept this kind of readership as a matter of course for we have learned since the series was inaugurated in 1965 that the Practice Profiles are among the best-read material as indicated by the quarterly surveys conducted by an outside research organization.

This is in line with our overall editorial philosophy which, as I mentioned here in March, is geared to an emphasis on practice, particularly in those areas which will benefit smaller firms. Furthermore, it supports the thinking of the president-elect of The American Institute of Architects, S. Scott Ferebee Jr., FAIA, who, in outlining his 1973 program, has written: "As a member and previous chairman of the Commission on Professional Practice, I have been especially sensitive to the cries for help for the small architectural office. At Grassroots meetings across the country, I have repeatedly asked what we need to be doing that we do not already do. Most members recognize that the majority of our professional practice efforts are directed toward the small office. I am convinced that what they are seeking is help in making their practices more economically viable. Generally, this means to get more work, how to get a better quality of design and how to get better fees for work done."

We are focusing our editorial efforts on these objectives, and I reflect on all of this right now for a particular reason. As was announced at the Board of Directors meeting preceding the Houston convention, Dudley Hunt Jr., FAIA, will resign his post as publishing director on June 30 and will no longer be serving as publisher of the JOURNAL. But we editors intend to continue the same editorial credo he spelled out when I assumed the editorship in July 1965. At that time he wrote that "it should be said that over the years there has been a lot of soul-searching about the audience and purpose of the magazine. Now the search has led to a single editorial purpose — that of serving architects and, through them, serving architecture. There is a small but hardy band of nonarchitect subscribers who read the JOURNAL because they *want* to know about architecture. However, over 85 percent of the circulation is now among US architects, most of them in private practice, who read the JOURNAL because they *must* know about architecture." The figure today stands at 93.1 percent.

While Dudley has been a hard taskmaster, I can only say that it has been a most rewarding experience, and all of us on the JOURNAL staff wish him well as he returns to his own activities devoted to architectural and building construction publishing.

ROBERT E. KOEHLER

ACKNOWLEDGEMENTS

11 — above, Dome City
11 — below right, Lawrence S. Williams Inc.
12 — above, Neil Maurer
12 — below, Louis Checkman
27 — Mark Miller
28 — Jerry Goffe
29 — right, above left, Mark Miller
29 — below left, 30, Jerry Goffe
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31 — above, center, Jerry Goffe
31 — below, 32 above, Mark Miller
32 — below, Dick Kent
33 — Channell A. Graham, AIA
35 — Rohm & Haas Co.
36 through 39 — courtesy National Swimming Pool Institute
40, 41, 44 above — Craig Kuhner
52 — above, left and right, Jordan Lagman
52 — below, Ed Roseberry
55 — courtesy National Swimming Pool Institute
49, 50 — courtesy *Archaeology* magazine

NEXT MONTH

More than 4,000 persons, including 1,456 corporate members and 84 associates, registered for the AIA convention in Houston, and just about everyone agreed it was a great success. The delegates heatedly debated several issues — the Justice Department antitrust action in particular (*see* Outlook) — and attended numerous sessions in the "Marketplace of New Ideas" but took out time to enjoy some genuine Texan hospitality. What they discussed and what they saw and what they did during those four days in the Albert Thomas Convention Center and the bustling metropolis is reported in depth in July.

The leadoff presentation is an insight into the work of Pietro Belluschi, FAIA, by a professor of art history at the University of Oregon. Coming to this country from Italy with its conglomeration of diverse communities, the 1972 AIA Gold Medalist became a leader in giving the Pacific Northwest a truly regional architectural expression.

And just for good measure, the quarterly Architectural Education section rounds out the issue.

ASIDES

Since "shop talk" is the subject of Comment and Opinion, it seems fitting to discuss another facet of this magazine's operation — and one which we consider to be most significant. This is the matter of our editorial content being reprinted in other periodicals, cited in bibliographical references or distributed at various conferences. Only a partial listing of the articles and organizations which have made such requests since the beginning of the year (and this does not include newspapers which often quote the JOURNAL) indicates the variety of requests we receive:

- "A New Approach to Code Problems"— National Association of Housing & Redevelopment Officials
- "The Student Quarters That Teamwork Created"— Department of Housing and Urban Development
- "The 'Temporary' Facility Comes into Its Own"— Council of Educational Facility Planners
- "Mobile Homes: The Third Alternative"— Mobile Homes Manufacturers Association
- "What Is Regionalism?"— Georgia Conservancy, Inc.
- "Urban Dynamics of Nonzoning"—*Houston Business Journal*
- "Architecture in an Ecological View of the World"— Cambridge University Conservation Society (ECO-Publications paperback)
- "CPM: Tool for Teamwork"— Department of Engineering, University of Wisconsin-Extension
- "An Architectural Prayer of Sorts"— *New Mexico Architecture*
- "Prisons: The Changing Outside View of the Inside"— National Clearinghouse for Correctional Programming and Architecture.

Regarding the last-named article, it should be pointed out that it has been reprinted in its entirety in several publications plus being quoted in scores of newspapers and other media across the country. In short, it has been a best seller! □

The economist member of the team views the county from one of the helicopters used.

overcrowded commercial strips, overburdened public services and pollution. In addition to the stimulation of industrial and commercial development and a long-range comprehensive plan for the county, the team's recommendations included promotion of cluster development to permit a mix of housing types with commerce and industry; development of a major new office and distributive center near Dulles Airport; better transportation facilities; and reorganization of the planning process to include close and continuous citizen involvement.

In offering the services of a team of experts to a community, the AIA realizes that detailed solutions to complex urban situations cannot be produced in the space of a few days. It is hoped that the proposals will generate interest and help a community in guiding growth intelligently.

Airport Noise Pollution in Los Angeles Results in City Buying Affected Homes

Last summer Los Angeles bought a house for $97,000 and paid a wrecking company $360 to destroy it. The home was one of more than 2,000 that the city will buy in a project which will eradicate residential neighborhoods covering more than 400 acres on the borders of the Los Angeles International Airport. Cost to the city will be about $300 million.

Airport commissioners agreed to buy about a third of the homes when angry protesters jammed meetings objecting to a new runway within 500 to 600 feet of their homes. The other condemned houses were near approach and takeoff paths of jetliners. For years, complaints of noise have steadily worsened.

Some of the homes have been bought by individuals and developers who move them to other sites. In one instance, the Los Angeles Community Redevelopment Agency was given 34 of the homes, moved them 40 miles from the airport and made them available to low income families.

Urban Freeway Designs Win Citation As AIA Honors Washington State

For the first time the AIA has awarded a Citation for Excellence in Community Architecture for highway design. The Washington State Department of Highways has been honored for the planning of two proposed segments of Interstate Route 90 traversing Seattle and Mercer Island, Washington.

The citation recognizes the department for its "major contribution to the design of urban freeways" and praises it for its support and encouragement to two multidisciplinary teams of architects, engineers, landscape architects, environmentalists, acoustical consultants and other experts. The department adopted substantially the recommendations of the two teams which were made after exhaustive studies and consultation with residents. The teams' proposals serve to satisfy projected traffic demands and to contribute as well to the environmental, social and esthetic quality of the surrounding areas.

Among the members of the Seattle team were architects and urban designers Durham Anderson Freed Company and planners Bridges/Burke. Included on the Mercer Island team were The Architects Collaborative Inc. and Durham Anderson Freed.

UIA September Meeting Scheduled For Resort City on Black Sea

The People's Republic of Bulgaria will welcome architects from all over the world when the International Union of Architects convenes in Varna for its 11th congress. A week of sessions of the council and of the general assembly of the UIA will take place in Sofia prior to the conference. Daniel Schwartzman, FAIA, of New York City is a vice president of the UIA and a member of the council.

The theme of the official conference, which will open on September 25 and conclude on the 30th, is "Architecture and Leisure." Among the papers to be presented will be one by William Corlett, FAIA, of San Francisco. Special events will include a film festival, an architectural exhibition, a visit to Albena and Roussalka seaside resorts and a gala concert and reception at the Palace of Culture and Sports in Varna.

At the conference's conclusion, participants will have an opportunity of making sightseeing tours through Bulgaria and to neighboring Romania, Turkey and Greece by means of several tours organized by the Union of Bulgarian Architects. Minibuses will be used for groups of six.

Mutual Problems Discussed by AIA, Labor Will Vary from Scholarships to Safety

Top representatives of the AIA and of the Building and Construction Trades Department of the AFL-CIO have inaugurated a series of meetings to establish a better working relationship between the two organizations.

Representing the Institute are George M. White, FAIA, Architect of the Capitol and chairman of the AIA Labor Liaison Task Force; William M. Linscott, AIA, of Kansas City, Mo.; Hilliard T. Smith Jr., FAIA, board member from Lake Worth, Florida; and from Institute Headquarters, William L. Slayton, Hon. AIA, executive vice president, James A. Scheeler, AIA, deputy executive vice president, and Francis A. Kelly, administrator of the Department of Government Relations. The Building and Construction Trades Department is represented by its Executive Council.

Items for possible future discussion include industrialization of the building process; a joint scholarship program for apprentices and journeymen who want to become architects; urban housing; jurisdictional disputes; manpower shortages; safety; etc.

Mixed Use Building Replaces Old Armory, School and Offices to Share One Unit

The 71st Regiment Armory at Park Avenue and 34th Street in New York City is being demolished to make way for a $47 million combined high school and office tower. Mayor John Lindsay said that the development "combines the maximum use of land in a mixed use building." Construction of the new structure is expected to be completed in mid-1974.

The school, to be called Central Manhattan, will accommodate 2,500 students in the lower nine floors of the 41-story tower. The major commercial tenant, United Medical Service, Inc., will occupy 14 floors.

Claimed to be the first of its kind in the nation to combine a high school and office tower, the structure is the design of the New York City architectural firm of Shreve, Lamb & Harmon Associates. It is sponsored by the Educational Construction Fund.

continued on page 51

School/office building replaces old armory.

outlook

Delegates Support AIA Board's Approval of Consent Decree with Justice Department

The Board of Directors of The American Institute of Architects has agreed to enter into a consent decree with the Department of Justice. The action was taken after delegates to the annual convention in Houston last month supported such a move by a vote of 1,145 for and 612 against.

Under the decree, which in normal course will become final on or shortly after June 16 upon approval by the US District Court in Washington, D.C., the Institute will remove from its Standards of Ethical Practice a prohibition against submitting price quotations for architectural services.

> The July AIA JOURNAL will carry a recap of all proposed bylaw changes and resolutions, including the entire dicussion devoted to the antitrust action. Also included will be the major address and reports by President Max O. Urbahn, FAIA, and the National Policy Task Force.

The Justice Department had contended that a ban on competitive bidding amounts to an agreement in restraint of trade, violating the Sherman Antitrust Act. The profession maintains that the public and client are best served by allowing an architect to be commissioned on the basis of qualifications and capabilities.

The decree will not limit the freedom of the AIA or its members to persuade clients, Congress and state legislatures that competitive bidding is not the best way to assure quality design in the public interest.

In a related step, convention delegates during the May 7-10 sessions voted 3 to 1 to assess each of the corporate members $10 for one year to finance an effort to convince Congress and the public of the merits of the Institute's position on the issue of competitive bidding.

The delegates voted nearly unanimously to accept the recommendations of the AIA's National Policy Task Force. The program calls for new public policies to change the "ground rules" that shape, or distort the shape, of American communities; creation of a new scale for planning and building in urban areas; and a national commitment to a major land acquisition policy to guide development in and around key urban centers.

Standing room only is order of the day as delegates debate antitrust charges and bylaws.

In a bylaw change, delegates approved a move to allow for an expanded board and multiple directors within regions, providing for a maximum of 32 members. The current board has 26.

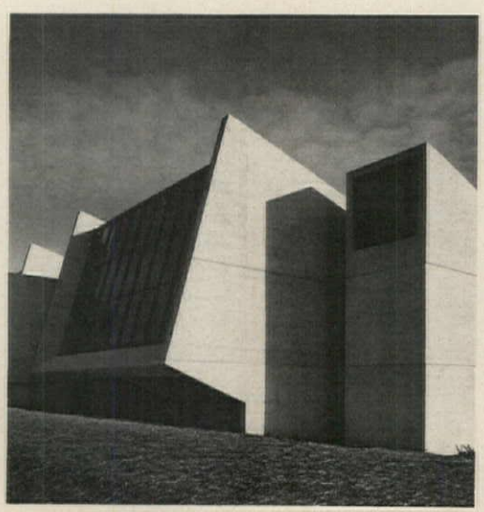
Winning the races for Institute offices, all of which were contested, were: Archibald C. Rogers, FAIA, Baltimore, first vice president; Van B. Bruner Jr., Haddon Township, N.J.; Louis de Moll, FAIA, Philadelphia; and David A. Pugh, FAIA, Portland, Ore., vice presidents; and Hilliard T. Smith Jr., FAIA, Lake Worth, Fla., secretary.

S. Scott Ferebee Jr., FAIA, Charlotte, N.C., as president elect will become the head of the AIA at the December board meeting, while Elmer E. Botsai, San Francisco, will go into his second term as treasurer.

Prestigious Academy Honors Architecture By Citing Two Buildings for Design

The National Academy of Design in New York City, the oldest art institution in the nation governed and controlled by artists, recently awarded its highest architectural honor, the Samuel F.B. Morse Medal, to the Philadelphia architectural firm of Vincent G. Kling & Partners. The award, made at the time of the academy's 147th annual exhibition, was for "excellence in design" of the Armstrong Cork Co. Product Styling and Design Center in Lancaster, Pa. The concrete structure features a slanted wall, entirely of glass, on its north side to provide a maximum of light for a large number of studios and style presentation rooms.

A Certificate of Merit was presented to Waldron Faulkner, FAIA, consulting architect in Washington, D.C., for the restoration of the old Patent Office and its transformation into the National Collection of Fine Arts and the National Portrait Gallery in the nation's capital. The work of preservation by Faulkner, Stenhouse, Fryer & Faulkner received an AIA Honor Award in 1970 *(see* AIA JOURNAL, June '70, p. 92).



Contrasting buildings are cited for design: restored Patent Office (left) and Armstrong Cork.

Virginia County Studied by Urban Team; Balanced Growth Seen a Great Problem

For four days in April, an AIA Urban Design Assistance Team studied the problems confronting Fairfax County, Va. The countywide endeavor, one of the program's most ambitious undertakings to date, resulted from interest stimulated when a similar team visited nearby Falls Church last year *(see* AIA JOURNAL, Nov., p. 33).

The architects, planners and economists on the team made an aerial tour in helicopters, met with county officials and talked with community groups in order to assess the present direction of the county's development. Final recommendations of the team were presented at a public meeting.

Led by Henry Steinhardt, AIA, of Mercer Island, Wash., national chairman of the AIA Regional Urban Design Assistance Team program, other team members included George Barton, transportation consultant, Chicago; Charles Blessing, FAIA, director of city planning, Detroit; Charles W. Brubaker, FAIA, president of the Chicago firm of Perkins & Will; Lamont C. Cole, professor of ecology, Cornell University; John W. McMahan, economist, Los Angeles; Lawrence P. Melillo, AIA, Louisville; and Joseph N. Wills, planning and housing consultant, New York City.

The team found that the county had experienced unsystematically planned residential growth resulting in inefficient use of land,

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A New System for Professional Growth

by STUART W. ROSE, PH.D.
Director, Continuing Education Programs

Two key questions form the base of all the AIA Continuing Education programs: First, what subjects are of interest to architects? Second, what are the most effective ways of learning?

For subjects, an inquiry was sent to the membership to solicit preferences on 148 topics. Responses were tabulated and form the basis of subject selection in all programs. For learning modes, the programs were divided into two categories: skill development and informational. In the former are the Architectural Training Laboratories and the Architectural Game Seminars; the latter includes the Review of Architectural Periodicals (RAP) cassettes, the in-depth cassette-based packages and the Continuing Education Reference Service.

The Architectural Training Laboratories are the only live attendance programs. Labs have been scheduled in many locations since January, reaching about 1,500 participants. They serve as low risk environments to practice new behavioral patterns under the guidance of one of the best experts in the country on a given subject. Also, lab instructors are given help in planning the labs by two experts in behaviorally based learning.

Twenty labs are currently on a "menu" from which AIA components may schedule their selections. Registrations have not exceeded $50 per day for members, and time and travel costs are nominal because the labs take place in so many locations. Each lab is evaluated upon its completion. An evaluation also takes place three to six months later to determine the effectiveness of the lab with regard to the amount of use in practice of skills learned. This procedure provides feedback for continuous improvement.

The Architectural Game Seminars are special correspondence courses that use gaming and simulation. They are planned by experts in the subject and in course administration. While AGS is also skill oriented, it may be more convenient for very small firms, remotely located firms and employees of firms that find it difficult to attend the labs. Each seminar costs about $50, taking about three months to complete. There should be six by the end of the year, the number increasing continuously.

First in the informational area of Continuing Education programs is RAP. Each month about 50 journals plus newsletters, news releases and other items are reviewed. Each month items which are directly office applicable are flagged, given an order of importance (using the questionnaire results) and compacted. A script of 30 pages is sent to the cassette producer for editing, professional reading and production. Each item included in a RAP cassette maintains a reference to the source document if the listener wants to review the full article or see related graphics. The service costs $54 per year.

Subject experts are contracted with for the in-depth cassette-based programs. Scripts are prepared that contain the most current information on a given subject. Sometimes slides or printed materials accompany the cassette. The production process is similar to the one described for the RAP cassettes. Over 20 packages should be in existence by the end of the year.

The Continuing Education Reference Service is a clearinghouse of data about all known learning opportunities in which AIA members may be interested. Two banks of data exist: "Live Events" and "Packaged Media." The former includes evening courses, summer short courses and a myriad of lectures, seminars and workshops. Facts supplied are coded by subject and include place, cost, dates, title and sources for further information.

The second bank includes correspondence courses, films, video tapes, cassettes, filmstrips, books, etc. Again, information is coded by subject and includes medium, cost, title and source. While the quality of these opportunities cannot be guaranteed, an enormous amount of information is concisely structured and made available at the local level through the area coordinators for continuing education.

Each program is structured independently financially and as a "free enterprise" system that is self-sustaining but not profit making. If one program proves useful and a second does not, the first will grow and the other will die out almost automatically. All efforts must be extremely responsive to the needs and habits of architects or they will fail to continue. This educational philosophy obliges careful and continuous marketing effort to keep in tune with needs, and evaluation to maintain the highest possible quality control. For this first year, the experience appears for the most part to have been most useful for architects; accordingly, it has been equally gratifying for us. □

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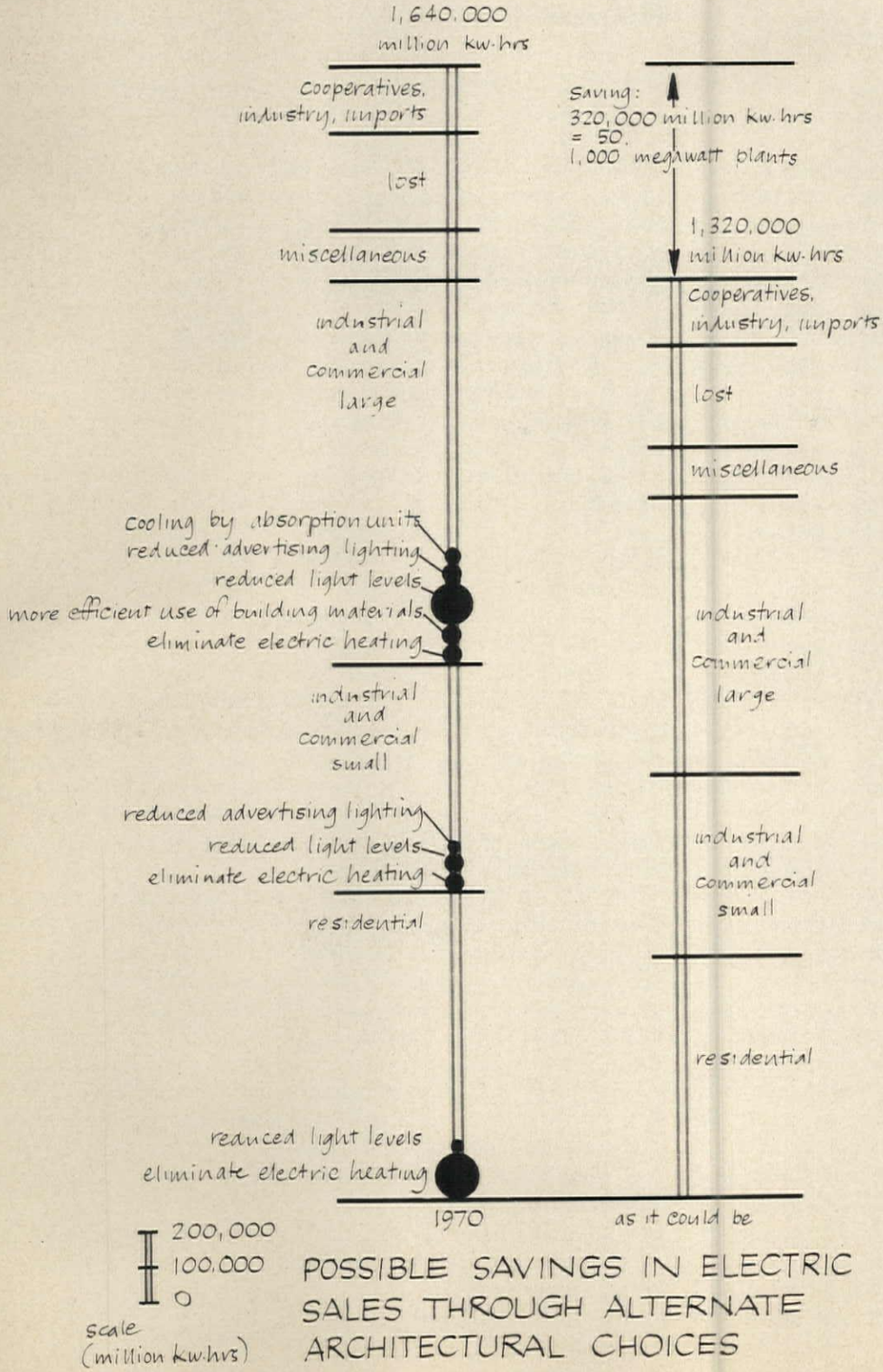


POSSIBLE SAVINGS IN ELECTRIC SALES THROUGH ALTERNATE ARCHITECTURAL CHOICES

Spotlight on the Energy Crisis

What can architects do to save electric energy? Plenty, according to Richard G. Stein, FAIA. Architecture, he holds, has a greater influence on energy use than any other major component of our Gross National Product. Addressing the annual symposium of the American Association for the Advancement of Science in Philadelphia, Stein suggested how the profession might cut consumption substantially. His paper, abstracted in the following pages, has so far drawn fire from the Illuminating Engineering Society, which takes issue with some of Stein's proposed ways of saving in the area of lighting. The IES statement follows Stein's article. There probably won't be full agreement with either from quarters concerned over and involved in use and distribution of energy. Neither pretends to have or know all the answers. But our hope in publishing the two pieces is that they will spark off a much-needed and wider communication between the various professions which to a degree can control energy consumption and more interest among architects, for the energy crisis is no longer around the corner but here, right now. THE EDITORS.

Spotlight on the Energy Crisis: How Architects Can Help

by RICHARD G. STEIN, FAIA

The nature and extent of the energy crisis facing our country and the world is becoming more evident as we look behind the trouble spots: the siting and nature of electric generating plants, the increasing difficulty of exploiting fossil reserves, the dangers in converting nuclear energy to usable energy, the pollution of air, water and land resulting from energy use and conversion, the visual deterioration caused by transmission lines and water reservoirs and the human dislocations to accommodate energy distribution systems.

There is general acknowledgement that we are dealing with rapid exhaustion of traditional sources of energy—coal, oil, gas, hydropower and uranium—with no immediate new technological means at hand to provide for the projected increase in energy demand. Therefore, new attitudes about energy use are immediately necessary.

In 1970 the total energy consumed in the United States was 69 million billion Btu's, of which about one-quarter went into electricity production and transmission—at a loss of two-thirds of the energy in the generating process. Of the 1.7 million million kw-hrs produced, the construction industry (roads and highways excluded) [1] used 128,000 million kw-hrs, or 7.5 percent (Fig. 1).

Each of us in his own field is now compelled to re-examine how his work uses or commits future use of energy from whatever source. The analysis of electrical energy consumption is particularly urgent not only because of its relative inefficiency in converting energy sources into electrical energy but also for several other reasons. First, the transmission lines require vast acreages. If the electrical industry's projected quadrupling took place in the next 20 years, the transmission lines would require an additional 3 million acres or 4,700 square miles, almost the size of Connecticut.[2] Further, the lead time for an electric generating plant becomes greater and greater, and as urbanization continues and plants become larger and therefore more dangerous, sites become increasingly difficult to secure.

Architecture, through its product the man-made environment, has a greater influence on energy use than any other major component of our Gross National Product except transportation and the military. We will examine the full interrelationship between architecture and energy to determine how and where the energy use commitments are built in, how extensive they are and what can be done to modify significantly the energy required, with emphasis on the electrical.

Electricity supplies 8 percent of the total applied energy but uses about 25 percent of all energy put into use. The inefficiencies in generation and transmission account for the difference between 8 and 25 percent.[3] Of the electrical energy sold, 24 percent goes into lighting.[4] A significant part of the balance goes into heating and refrigeration. The building industry, as reported in the 1970 US Statistical Abstract, represents 10 percent or $100 billion of the dollar value of the Gross National Product.[5] Roughly half of this amount is in the material incorporated in buildings.[6] There is a projected growth pattern which calls for an energy use increasing much more rapidly than even the mechanically projected population growth curve. On the basis of our study we do not accept this projection.

Design of Buildings

Steel, concrete and structural materials are used inexactly in the design of buildings. For instance, a steel beam is designed to resist failure at the critical point of its span. The configuration of the beam, the cross section, is generalized for reasons of manufacture and is carried through unchanged from end to end. Only in large structures or those for which weight is an important factor, such as trusses, ships, planes and bridges, is there an effort to place material where it approximates the efficient form for the structural job required.

Changes in fabrication methods and greater repetition of structural components can reduce the amount of steel used to perform largely the same job that is now being called for.

In addition, all structural design, an empirical process, has a pyramiding set of safety factors. Let us look at a simple concrete beam computation as an example.

In considering the loading, live loads are assumed to be simultaneously applied over all rooms, corridors, lobbies and stairs. A 750-square-foot classroom for 30 pupils is computed to withstand a load of 40 pounds on every square foot,[7] or a total of 30,000 pounds in addition to the weight of the structure. Thirty large children and a teacher might weigh 5,000 pounds. Thirty-one desks and chairs might add another 3,000 pounds. Adding another 1,500 pounds for friends, books, paraphernalia and miscellany would bring the total to 9,500 pounds, less than one-third of the figure used in the computation. In addition, the values given for the concrete have a 300 percent safety factor, for steel 50 percent.[8] Further, the structural designer will select steel for reinforcement and overall dimensions for his beam cross section at the first size above the size required by the computation, adding another 5 percent.

In mixing concrete, the plant will provide a product not infrequently 10 to 20 percent above the value designed for in order to avoid its rejection. On top of this, concrete continues to gain strength for years after it has been assumed to reach full strength. And as a final safety factor, no structural credit is taken either for such things as applied cement finishes or the capability of the structure to resist loads in a much more complicated and unified manner than is encompassed in the original calculation. A further overuse of material comes from economic pressure to reduce labor time at the expense of more material.

When failures occur, they generally stem from removing bracing at too early a stage or from an isolated underdesigned joint or connection. Most structural engineers would not hesitate to say that 50 percent of the material used could be safely

Mr. Stein is principal in the firm of Richard G. Stein & Associates, New York. This paper was prepared with the assistance of Diane Serber, AIA, Peter Flack, Michael Corr and others.

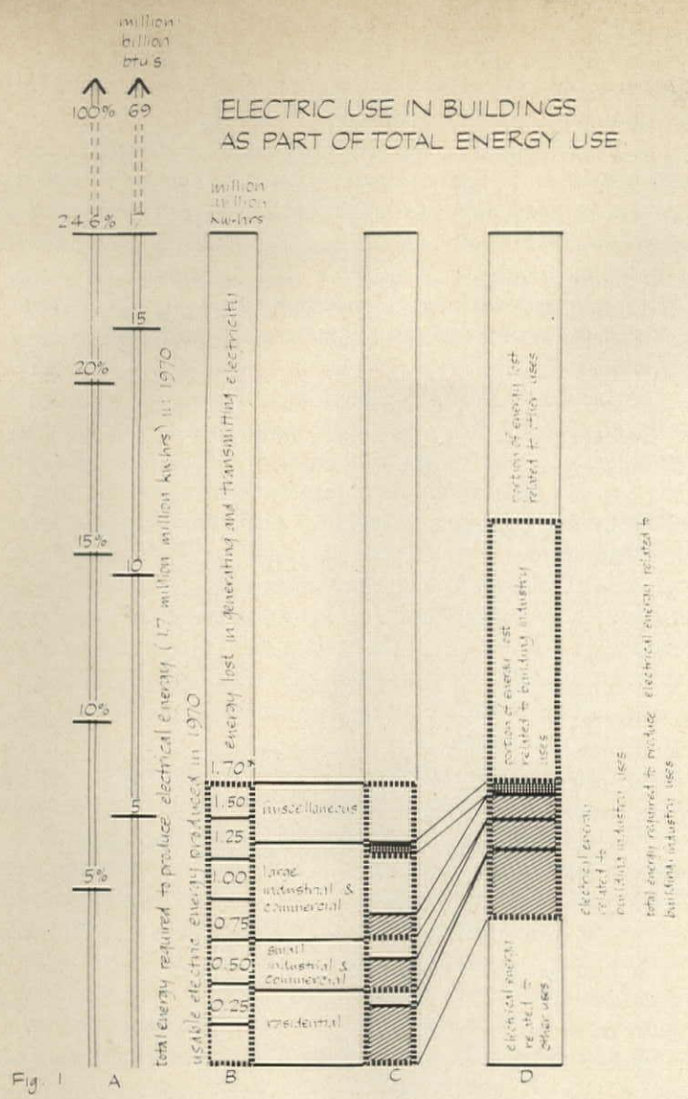


Fig. 1

A. total energy consumed in USA 1970 showing portion committed to the production of electrical energy

B. relationship of usable electric energy to energy lost in generating and transmitting

C. general categories of electric users indicating portions relating to the building industry.

D. electric and total energy related to the building industry

electrical energy related to building construction

electrical energy related to building operation

* 1.70 million million kw-hrs ≅ 5.8 million billion btu's

eliminated if more man-hours were put into formwork, the placing of steel and the pouring of the concrete, and if the building code's mandatory design standards were waived. If one goes back to 1968 production figures they show that 76.5 million tons of cement were produced at a cost of 80,000 million kw-hrs.[9] If 50 percent of this went into building construction and the rest into road, runway and similar construction, a 50 percent reduction in building use would save 20,000 million kw-hrs. Savings could be even greater since in addition to the savings described, columns and foundations designed to take the cumulative loads above them would use more refined design methods as well as the lighter loadings.

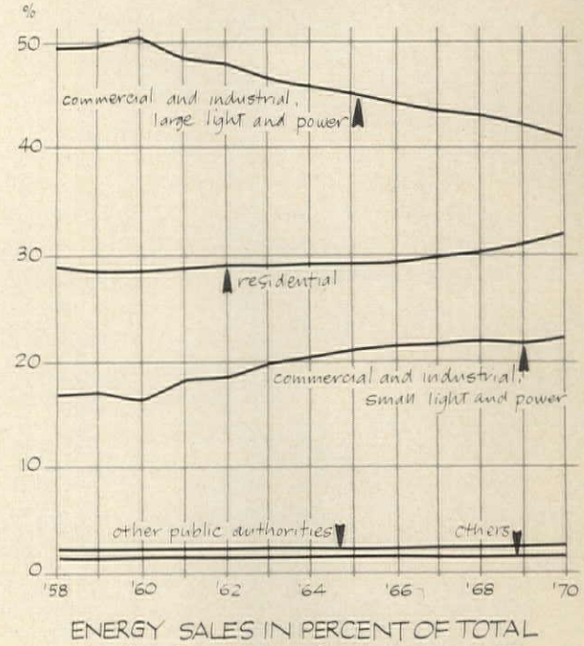
When energy consumption is given more importance than initial dollar cost, materials will be used differently than at present. For example, aluminum requires six times more energy per pound to process and assemble than does steel, and the energy is mostly in the form of electricity.[10] In order to make reasonable judgments on material selection based on energy economy, materials must be classified by energy use and obviously not on a pound for pound basis only. Then, interchangeable end products can be compared. As an example of possible magnitudes in savings, take a tower about 100 stories high. An aluminum and glass skin would require 4 million pounds of aluminum, while 5.75 million pounds of stainless steel of similar structural characteristics would be needed.[11] The aluminum would require 2.1 million kw-hrs to process and assemble, steel 0.77 million.

As the importance of energy saving in building material use becomes more widely accepted, it will also have a profound effect on design. There will be a renewed enjoyment of the taut, the tense, the spare and a falling off of the rhetorical, the overconvoluted, the use of complication of form for the surface interest generated. As this attitude takes over, I believe there will be, independently of all other factors, on this item alone an ability of the architectural profession to satisfy performance needs with no diminution in standards, with a saving of 10 percent in materials and thus in energy required to produce them.

Design of Lighting

The most apparent example of electric energy use is lighting, which takes about 24 percent of all electric energy sold. During the last 15 years, light levels recommended by the Illuminating Engineering Society, the most influential group in the field, in most cases have more than doubled and in some more than tripled. IES standards are incorporated in many building codes and in the light standards used by boards of education, industries and commercial developers. They are the references used by most electrical engineers. As an example of the increase in levels, New York City's Board of Education's *Manual of School Planning* called for 20 footcandles in classrooms in 1952. This was raised to 30 in 1957, to 60 in 1971. Libraries went from 20 in '52 to 40 in '57, to 50 in '59, to 70 in '71. Shops now require 75 and drafting rooms 100.

The rationale for the increases is contained in a 1959 report published by the IES and based on a study conducted by



ENERGY SALES IN PERCENT OF TOTAL

Fig. 2 From Edison Electric Institute Statistical Yearbook 1970

H. R. Blackwell.[12] The Blackwell report contends that efficiency in performing visual tasks is in direct proportion to the footcandle level of diffuse undifferentiated light achieved in the space.

It is now an IES axiom that contrasts in light levels are bad and a comfortable light environment depends on keeping intensities within a 3:1 ratio on either side of the required light

level. There has been no physiological or psychological verification of this assumption. Experience in the theater, cinema, television room or outdoors in a snowy landscape suggests the desirability of contrast, both for enhanced visibility and for psychological stimulation. Nevertheless, total area illumination to the levels set for particular tasks became the general practice in the lighting field. This tendency is becoming still more dominant with the publication of a newer concept by the IES, called the Equivalent Sphere Illumination (ESI), in which the lighting will attempt to simulate a sphere of illumination with the task to be lit at its focus, requiring considerably higher inputs than even those now recommended.[13]

But tests conducted by M. A. Tinker at the University of Minnesota in 1938 [14] and by P. C. Butler and J. T. Rusumore at San Jose College in 1968 [15] conclude that a light level between 3 and 10 footcandles is adequate for efficient reading and that higher light levels do not increase efficiency and may increase fatigue. States Tinker: "The experiments of Luckiesh and Moss have led them to recommend what seems to be excessively high light intensities for visual tasks . . . 20 to 50 footcandles for ordinary reading. . . . Re-examination of their data suggests that their conclusions are not justified." And he concludes: "Ten to 15 footcandles should provide hygienic conditions when one's eyes are normal and print is legible. Fine discriminations require 20 to 25 footcandles for adequate vision."

His observations seem to be borne out by the recent lighting renovation in St. Patrick's Cathedral in New York City.[16] In order to allow everyone, including the elderly, to participate in the Mass, the lighting level was raised from 4 to 17 footcandles. Thus the difference between 17 footcandles and the levels recommended by the lighting industry are not necessary for the performance of most visual tasks and are provided only for the ambience or impression they create.

The attitude that a high light level should be generalized throughout an area rather than being directed to the work area as it is in an operating room or on a drafting table substitutes large-scale energy infusions for specificity.

Further energy savings can result from a reinvestigation of the light-producing component itself: the lamp. The fluorescent lamp delivers three times the lumens per watt of a standard filament bulb. However, even though it is inherently an effective light fixture because of the large illuminated surface area over which the light source is distributed, it is usually placed in a second diffusing container, the luminaire, or fixture. If a plastic louver with a 45° cutoff is added to the bare tube, it reduces its output to 76 percent. A translucent plastic cover reduces the level to 65 percent. If the tube is mounted in a suspended semi-indirect luminaire with plastic sides and bottom, it will only deliver 25 percent of its bare tube potential.[17] As an example, in the '50s the New York City subway system installed continuous fluorescents with cast glass fixtures above the platform edge in most stations. Some 10 years later all cast glass covers were removed and discarded, raising light levels noticeably with no increase in energy input.

While some shielding may be desirable to reduce glare and while occupants of a space may be more comfortable at light levels above the minimum physiologically necessary for the task, the present recommendations are absurd.

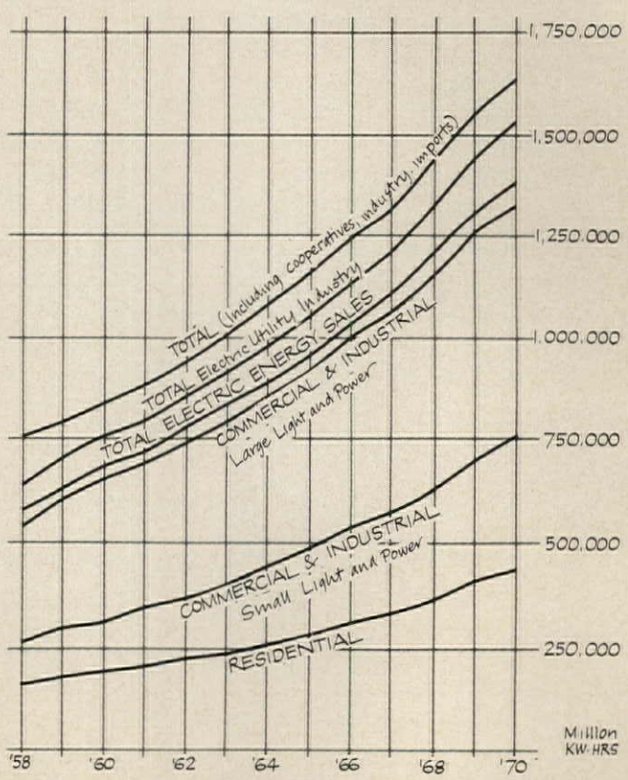
Careful study of the placement of light sources produces further reductions in installed capacity. For example, Educational Facilities Laboratories sponsored a study which demonstrated that by departing from the traditional continuous strips of lighting over an entire classroom ceiling and placing the luminaires at the perimeter, a 40-footcandle level was as effective as 60 footcandles provided typically.[18]

A large amount of the electrical energy in lighting is unnecessarily used to light the outer strip of a building, a section that can be adequately lighted by natural light. Most of this energy could be saved by circuiting the perimeter separately and by having the lights turned on and off by a light sensitive switch. Where separate switching has been provided, experience indicates that we Americans are not sufficiently motivated to do it manually.

Reduction of required light levels produces more than a straight-line saving. It is necessary to more than double the wattage of lights in order to go from 30 footcandles to 60. We can safely say that there would be at least a 50 percent reduction in electrical energy use in new buildings providing light at a level responding to physiological criteria. There is a larger part of the electrical dollar spent in lighting in commercial, educational and other public buildings than there is in residences. In a highrise office building using steam for heating and cooling, 54 percent of the electrical energy consumed goes into lighting. In a low building not requiring elevators, the percentage is 62. The pattern in schools is similar.

In residences the percentage of electrical energy going to lighting varies from 15 to 30 percent.[19] Since the largest part of the 24 percent of the electrical sales that go for lighting is not in the residential sector, a saving of 25 percent of the committed consumption of projected construction is a realistic objective for new buildings, and a reduction of 15 percent of light usage is also realizable in existing buildings. Thus immediately a 4 percent saving in total electric sales could result from this one item, and as it would be carried into new construction the amount saved would increase by 1/10 percent of total energy sales yearly.

The electric lighting and wiring industry now uses 3,450 million kw-hrs annually in its participation in the building indus-



ENERGY SALES TO ULTIMATE CONSUMERS IN MILLION KW-HRS

Fig. 3 From Edison Electric Institute Statistical Yearbook 1970

of transportation and other services. Of these 5,400 million kw-hrs, the same 25 percent can be saved in reduced installations, a total of 1,350 million kw-hrs.

Electric Heating

Next, let us consider the use of electricity for heating. In the last five or six years there has been an accelerated drive by the utility companies to increase the number of electric heating installations. The campaign has been successful. While still not the largest consumer of energy, the residential group is growing most rapidly. In 1960 it represented less than 29 percent of the market buying electricity, growing slowly to 30 percent by 1968 and jumping to 32.2 percent by 1970. The major factor accelerating the growth is the increase in electric heating (Fig. 2).

In 1970, with a 7.5 percent saturation of the residential market, electric home heating used about 66,500 million kw-hrs.[20] This represents almost 4 percent of all electric energy produced and sold (Fig. 3). In other words, if the ratio of capacity to consumption of the Con Edison generators is used, a total of about 16 million kw is required, the equivalent of twice the total capacity of all of Con Edison's generators.

The preference for electric heating has increased from 22 to 36 percent during the last six years.[21] The average consumption of electricity for heating a house is about 15,000 kw-hrs a year. If the rate of 2 million housing starts a year were just maintained and if the percentage using electric heat did not continue to rise, the commitment to electric energy would be 10,800 million kw-hrs additional every year, for home heating alone, or 108,000 million kw-hrs in a decade. This figure, totalling 11,-300,000 units, is an alarming but conservative projection. In fact, the electrical industry projects that the number of electrically heated residential units will be 19 million by 1980 and 25 million by 1985.[22]

Projections for electric heating for nonresidential construction are equally impressive. Of all new nonresidential construction in 1969, 23 percent was electrically heated, a total of almost 40,000 buildings, of which 5,400 were office buildings.[23]

Electric heating is inherently inefficient. A fossil fuel such as natural gas or oil is and will continue to be the prime fuel source for producing electricity for decades to come. The conversion of its energy to heat to produce steam to operate steam turbine generators to produce electricity, which is then transmitted with line losses to an ultimate destination where the energy is converted back into heat, uses the original heat source, the gas, oil, or coal, at less than half the efficiency with which the fuel can be used were it converted to heat at its point of use. In addition, even if there were no inefficiency, the 6 percent of total electric production used for heating could be allocated for purposes that can only be satisfied by electric energy.

The present rate structures in most public utilities provide lower energy rates for "all-electric homes" than for other electricity users.[24] In other words, there is a massive subsidy paid by most home owners and small businesses to the electric home owners. Even with this, electric heating is expensive, and utility companies insist that houses be more effectively insulated than is typical before they will provide the electricity. Since the amount of heat required is a direct factor of the heat loss of the building, the improved insulation would provide significant reductions in the required amount of competitive fossil fuel as well.

Electric heating is popular with speculative home builders because it reduces the initial cost of the house. No space need be provided for boiler or furnace, nor is the heating equipment required. No chimney or storage tank is necessary. Similarly, try. In addition, it uses 1,950 million kw-hrs as its prorated share builders of apartment and commercial buildings where low construction costs take precedence over long-range disadvantages are attracted to electric heat. This is particularly true where rent structures can be based on having the tenant pay heating costs directly to the utility company, based on individual metering. Even some public housing projects in New York City are being contemplated for electric heat in order to keep visible first costs down to spread the scarce housing building dollars further.

Electricity is advertised as a clean fuel. In reality the point of pollution is remote from the point of use. This problem is graphically apparent in the controversial Four Corners project where the neighbors of the generators at the Utah/Colorado/Nevada/New Mexico line are not the beneficiaries of the power generated and are actively and vocally opposed to the plant.

Obviously a governmental policy expressed in codes and power use regulations is necessary in order to permit electric heat only in installations where fuel deliveries cannot be made or where the presence of an open flame in an unattended building would be either unsafe or undependable.

Energy Demands of Highrise Buildings

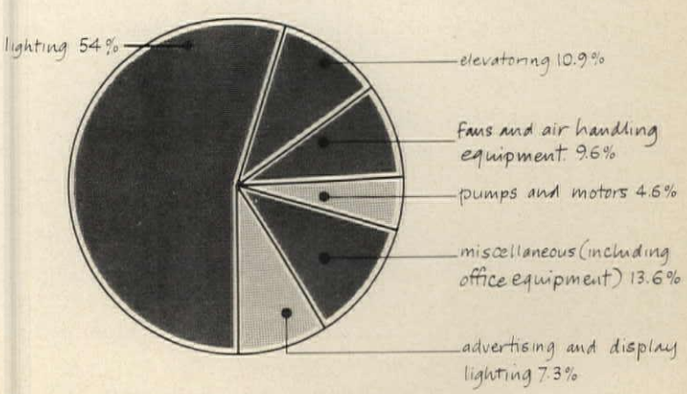
Since our central cities are highly dependent on electrical energy, we look into the question of how and where energy is used and committed. The extent and implications of the problem are indicated by the amount of new office space built in New York City in the last 20 years—67 million square feet in 195 major office buildings—and the amount projected for the next 10 years—an additional 68 million square feet.[25]

With the participation of Peter Flack of Flack & Kurtz, mechanical engineers, we studied a prototypical million-square-foot, 50-story office building to see the effects of certain alternate ways of doing things. Using the design standards that are most widely used for this type of building and assuming electrical heating and refrigeration, the annual consumption is 36.8 million kw-hrs. Of this, 15.8 million is required for heating and 3.78 million for refrigeration, according to the study.

Heating can be supplied by steam with a saving in energy similar to the saving in the residential field. And at least part of the heat may be salvaged from waste heat in the electrical generating process or in garbage incineration. Cooling can be provided through steam-operated lithium bromide absorption units.

If the remaining basic electrical uses are considered 100 percent, they can be divided as shown (Fig. 4).

If artificial light is not used on a 10-foot perimeter strip

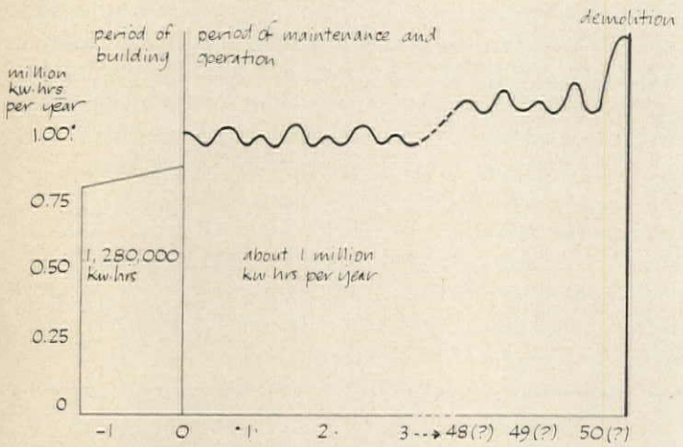


ELECTRIC USAGE IN PERCENT
FOR HIGH RISE OFFICE BUILDINGS
(with heating and cooling by non-electric means)

Fig. 4

when there is adequate daylight, the electricity used drops from 9.88 million kw-hrs to 6.79 million, a saving of 29 percent. In addition, the refrigeration load is reduced by about 10 percent since it is not necessary to remove the heat introduced by the lights. Moreover, there is the saving that would be realized by reducing required light levels as previously described. The lower light levels would reduce the 6.79 million kw-hrs to 3.5 million, 36 percent of the original load. This would also result in a further saving in refrigeration requirements.

Fans to introduce fresh or remove stale air use 1.75 million kw-hrs. Air movement is based on an empirically established three air changes an hour. Of this, 75 percent can be recirculated and 25 percent is required to be outside air. In reality, in winter building operation personnel will often eliminate outside air on cold days to reduce heating costs. I know of no factual studies that relate health or productivity to air changes, nor is there any consideration given to the quality of the outside air introduced. With windows that may be opened, particularly if there has been some research on the patterns of air movements on the face of these tall buildings, it would be possible to reduce this consumption substantially. The building is occupied 3,100



CHARACTERISTIC ENERGY UTILIZATION CURVE

Fig. 5 (per million dollars of building in million kw-hrs per year)

hours annually. Five hundred of these hours are in the temperature range in which outside air could be introduced with neither heating nor cooling. This in itself would result in a 19 percent reduction in energy for air handling, a saving of 0.33 million kw-hrs.

Advertising lighting, with 1.31 million kw-hrs allocated to it, merits its own study for its psychological impact and as a cultural manifestation. Under certain stresses the whole item can be eliminated, as was demonstrated during World War II. When lighting is used for competitive advertising the tendency is always to raise the ante until, as in Las Vegas, the amount of lighting is limited only by the amount of surface for attaching the neon tubes and the available techniques for producing the light. As an example at the other extreme, at Christmas time on Park Avenue in New York City a decorative technique has been developed, using a myriad of low intensity bulbs that are strung through branches on the trees. The effect achieved with a modest expenditure of energy is quite captivating. The only discordant note was supplied by one neighbor who went outside the vocabulary and strung garlands of lights with a much higher intensity on the facade, an act that destroyed some of the quiet effectiveness of the surrounding displays. The latent saving in the use of light for advertising is enough to warrant an exploration of its ramifications.

Refrigeration, i.e., the cooling, of a building raises questions about use of electricity similar to those in heating. When cooling can be handled from a central plant rather than with individual airconditioning units, steam operated lithium bromide absorption units can be used more economically than electrically driven compressor units. Certainly for all cooling tasks of the magnitude of the ones in our study, the use of these units has the double advantage of an overall saving in energy and a curtailing of new demand at the time of peak electrical use.

The question of savings in elevator use raises more complicated problems. Lower buildings that do not require vertical transportation have greater surface area with the attendant greater heating and cooling loads. These can more than offset the savings gained by eliminating elevator use. Moreover, lower buildings cannot be as well served by mass transportation and may require the extensive use of private automobiles. On the other hand the superhighrise buildings are more a product of high land values than of their own inner logic. To give an oversimplified example:

In creating a 100-story building you cannot simply place one 50-story building on top of another. The bank of elevators that serve the top 50 must be brought down inside the bottom building alongside its elevators. Similarly, all its services and pipe systems take up large chunks of expensive space, merely to get to where they are needed. Where a 50-story building has a roof area with a heat loss on 2 percent of the floor area, a similar floor area in three-story buildings has a loss related to 33 percent of its floor area. The difference between a 50- and a 100-story building, however, is only the difference between 1 and 2 percent.

There are many other energy-consumptive events that take place when large buildings are grouped in urban centers. The supporting arteries and systems—water, waste disposal, electricity generation, gas lines, sewage and deliveries of goods and people—extend out and traverse intensively used areas, often bypassing the service of these areas as the upper elevators bypassed the lower. By breaking apart the organism at a certain density, it is possible to create more balanced systems in which the heat from electric generation could be reclaimed for heating and cooling, more than offsetting the lesser efficiency of operating smaller plants. Since it is heating and cooling that operate to the detriment of the lower buildings versus the 50-story prototype, such a totally planned scheme would in its overall context offer additional energy savings.

To summarize, with all electric usage and using present building standards, 36.8 million kw-hrs are required annually per million square feet, requiring an original energy input of 424,000 million Btu's. In contrast, with savings in lighting, cooling and with the other modifications figured, a reduced electric consumption of 13 million kw-hrs, with an original energy input of 145,000 million Btu's, is projected, plus 56,000 million Btu's to satisfy heating and cooling needs, a total of 201,000 million Btu's—less than half the original 424,000.

Extrapolated to satisfy the operating demands of the projected 68 million square feet of New York City office space during the next decade and not considering transportation, utilities, related residences, governmental buildings, etc., 1,500 million kw-hrs per year will be required or, if electricity is used for heating and refrigeration, 2,500 million kw-hrs, twice the present capacity of the Indian Point Nuclear Generating Plant. If the projected savings are realized, the electrical consumption will drop to 885 million kw-hrs per year.

Demolition

There is another area of possible savings that ties back into national attitudes and decisions made on other than an energy basis: demolition. When we are in a period of unfilled needs nationally in regard to housing, schools, hospitals, cultural facilities and other buildings, how does one evaluate the decision to replace a building with a useful anticipated life with a new one serving the same or another purpose when this requires an energy commitment to demolish and dispose of the old building as well as to build its replacement, which in some cases will have a higher consumption of energy per unit of building?

Characteristic Energy Curves for Buildings

In all aspects of energy use through the life of the building there is a characteristic curve (Fig. 5). As a broad generalization, for every $1 million of new building there is now an electrical energy expenditure of 1.28 million kw-hrs (Fig. 6). To operate and maintain this on an all-electric basis requires 1 million kw-hrs per year with seasonal and diurnal fluctuations, rising to 1.13 million kw-hrs per year as maintenance requirements increase. It has a momentary peak at demolition and then drops to zero.

While the characteristic shape of the curve will not change, we can push down the energy required to build and maintain the building by at least 25 percent. This would have a saving in energy at the source of 35 percent. Carried back into the whole national energy picture this figure can account for 8 percent of all energy used for all purposes.

The sum of all curves for all buildings, with their individual variations, describes the share of the energy pool, electrical and other, consumed or committed by the products of the architect's decisions. It represents well over half of all electrical usage. We architects can either reinforce the rapid acceleration of energy use or dramatically reduce its rate of consumption and, in fact, can help reclaim a significant part of our present capacity. □

1. Earl Cook, "The Flow of Energy in an Industrial Society," *Scientific American*, Sept. 1971, pp. 138-9.
2. City of New York, Environmental Protection Administration, *Toward a Rational Power Policy*, April 1971, p. 64.
3. Earl Cook, op. cit.
4. Cory N. Crysler, General Electric Corporation, Nela Park, Cleveland, Ohio. The 24 percent overall average was broken down by Crysler as follows: Percentage of electricity used for lighting by various consumers: 16 percent of residential, 11.5 percent of industrial, 44 percent of institutional, 42 percent of commercial.
5. *Scientific American*, "The Input/Output Structure of the United States Economy," 1970.
6. Ibid.
7. National Board of Fire Underwriters, *National Building Code*, 1955.
8. Concrete with a rated strength of 3,000 psi has an ultimate strength of 3,750 psi. In structural computations, however, the design strength used for this concrete is 1,350 psi, only 36 percent of its ultimate strength. Steel is designed at 60 percent of its yield point, i.e., 36,000 psi steel is designed for a maximum stress of 21,600 psi.
9. *Construction Review*, Sept. 1971, p. 54.
10. This comparison deals with raw material only and not fabrication.
11. The Aluminum Association, *Architectural Aluminum Report: Aluminum in Curtain Wall Systems*, April 1970, p. 2.
12. H.R. Blackwell, "Specification of Interior Illumination Levels," *Illuminating Engineering*, June 1959, pp. 317-53.
13. Robert E. Fischer, "New Methods for Evaluating Lighting Systems," *Architectural Record*, Oct. 1971, pp. 139-44.
14. M. A. Tinker, "The Effect of Illumination Intensities upon Fatigue in Reading," *Journal of Educational Psychology*, 1939, pp. 561-71.
15. P. C. Butler and J. T. Rusumore, *Perpetual and Motor Skills*, 1969. pp. 653-4.
16. Information received from Sheldon Steiner, illumination consultant for the installation.
17. Data on luminaire efficiency extrapolated from Westinghouse Electric Corporation, *Lighting Handbook*, 1960.
18. F. K. Sampson, *Contrast Rendition in School Lighting*, 1970.
19. O. L. Culberson, "The Consumption of Electricity in the United States," Oakridge National Laboratory-National Science Foundation, June 1971, pp. 11, 14.
20. Residential electric usage 32 percent of 1,394,705=442,000 kw-hrs. (*EEI Statistical Yearbook 1970*, pp. 31-2). 15 percent of 442,000=66,500 million kw-hrs. 62,874 million+4.7 million=7.5 percent.
21. Electric Heating Association, *Electrical World*, May 4, 1970, p. 64.
22. City of New York, Environmental Protection Administration, op. cit., p. 179 (quoting from *Electrical World*, "21st Annual Electric Industry Forecast," Sept. 15, 1970).
23. O. L. Culberson, op. cit., p. 19 (quoting F. Thompson, *Electric Comfort Conditioning Journal*, April 1970, pp. 13-16).
24. For example, Con Edison's rate structure for residential users without electric heating is 2.45¢ per kw-hr over 360 kw-hr. For users with electric heating, its rate over 360 kw-hr is 1.90¢ per kw-hr from May 15 to September 15 and 1.40¢ per kw-hr from September 15 to May 15. Below 360 kw-hrs., the rate is the same for both.
25. New York City Planning Commission, Plan for New York City, *Critical Issues*, p. 31.

ELECTRICAL USE IN BUILDING CONSTRUCTION

	Total sales of this item to building construction industry (excluding highways) in GNP (million $)	Total cost/$1,000 of this item for all electric energy	Cost/$1,000 of this item for electric energy, applied directly	Total cost. All electric energy. This item (million $)	Cost, electric energy applied directly. This item, (million $)	Cost. Electric energy applied indirectly. This item, (million $)	Rate. Electric energy this industry (¢/kw-hr)	Average rate. Electric energy. All industries (¢/kw-hr)	Electric energy directly used (million kw-hrs)	Electric energy indirectly used (million kw-hrs)	TOTAL ELECTRIC ENERGY (million kw-hrs)
Electric lighting and wiring equipment	1,786	17.60	4.61	31.5	8.25	23.25	1.05	0.875	790	2,660	3,450
Heating, plumbing, structural metal products	9,557.6	21.10	4.33	201	46.2	154.8	0.78	0.875	5,920	17,600	23,520
Other fabricated metal products	1,524.4	20.07	6.39	31.6	9.72	21.88	1.43	0.875	680	2,500	3,180
Primary copper manufacturing	2,007.6	28.9	6.55	58.2	13.13	44.9	0.74	0.875	1,780	5,130	6,910
Primary aluminum manufacturing	78.2	61.4	30.63	4.8	2.4	2.4	0.32	0.875	720	280	1,000
Primary iron and steel manufacturing	2,950.6	28	13.90	82.5	41	41.5	0.78	0.875	5,250	4,750	10,000
Stone and clay products	8,785.3	27.20	14.82	239	130	109	1.04	0.875	12,500	12,500	25,000
Lumber and wood products except containers	5,872	16	6.63	94	39	55	1.23	0.875	3,160	6,290	9,450
Petroleum refining and related industries	1,303.9	16.3	5.38	21.3	7.02	14.28	0.74	0.875	950	1,630	2,580
Electric utilities	214.6	107.3	56.02	23	12	11	0.87	0.875	1,380	1,260	2,640
Gas utilities	42	9.6	0.94	0.4	0.04	0.36	0.12	0.875	30	40	70
Motor freight transportation and warehousing	1,719.7	8.5	3.37	14.6	5.79	8.81	0.875	0.875	660	1,010	1,670
Wholesale and retail trade	8,530.2	17.1	12.34	145	105	40	0.875	0.875	12,000	4,570	16,570
Business services	4,050.1	15.5	7.83	62.8	31.6	31.2	0.875	0.875	3,620	3,570	7,190
											113,230 million kw-hrs

This represents electric energy use in 88.5 percent of the construction industry's share of the Gross National Product (excluding highways); 49.3 percent represents materials; 39.2 percent represents value added. Extrapolating for 100 percent produces a figure of 128,000 million kw-hrs. Total US production of electric energy in 1969 (according to Edison Electric Institute) was 1,556,996 kw-hrs.

Sources: *Scientific American*, "The Input/Output Structure of the United States Economy," 1970; *US Census of Manufacturers*, 1967.

An Extension of the Energy Crisis: More Light on Lighting

by ROBERT T. DORSEY

The Illuminating Engineering Society, established in 1906, studies and develops standards for lighting in every conceivable space indoors and out. Among other professionals, members include architects, engineers, educators and ophthalmologists. IES leaders hold that contrary to the statements in the preceding article, the society shows deep concern for energy expended for lighting which, according to the most recent calculations, amounts to 20 percent of the total electric energy sold.

Architects are important to the lighting industry and there is a need to reach a better understanding between them and illuminating engineers. Recognizing this, the IES in 1970 established (and The American Institute of Architects endorsed) the Joint Committee on the Luminous Environment with three members of the New York Chapter AIA.

Among the projects being developed by this joint committee are: assistance with courses at universities; teaching aids for architectural schools; a lighting program for use by AIA chapters around the country; articles for architectural journals; and, looking to the future, jointly sponsored research. For many years, past AIA President Henry Wright, FAIA, has been a member of the independent Illuminating Engineering Research Institute (IERI) board of trustees. In addition, the sign industry, in cooperation with IES, for several years has conducted nationwide competitions for architects to encourage signs that enhance overall building design.

The basic purpose of all these programs is to produce current recommended practices not just for the quantity of light needed for fast accurate seeing but also to develop approaches that will ensure focus on the quality of lighting. The term "current recommended practice" means minimum design considerations, including minimum values on the task at any time, and recognizes that all levels are in accordance with available research data, limited by engineering judgment at the time of issue. Likewise, values are modified when new visual research, visual performance and psychological considerations demonstrate that other levels should be recommended. At the root of every effort of IES is the concern for effective and more efficient use of electric energy.

No longer can lighting techniques be developed creatively within the framework of the all too familiar four-step process of 1) determining footcandle level; 2) selecting luminaire; 3) calculating the number of luminaires needed; and 4) making a layout for uniform lighting distribution. Far too often the resultant uniform light distribution is not necessarily the most useful nor the most economical, and it is almost certain not to be the most pleasing visually. The challenge we face today is to learn how to add variety to lighting while we preserve the qualities of unity with task, with structure and with spatial design and planning.

Mr. Dorsey is manager, Lighting Development, General Electric Company, Nela Park, Cleveland, Ohio, and president-elect of the Illuminating Engineering Society. A professional engineer, he is a Fellow of IES.

Illumination Levels on Task

These levels are specified "on the task," not for the overall area. It is a misconception that IES recommends illumination "generalized throughout the area rather than being directed to the work area." In any field of application, where there is an opportunity to distinguish between functional areas and circulation space, levels can and should be varied. For example, the IES recommends 100 footcandles for general office work but only 30 for conferring and interviewing in private offices and 20 for corridors. This is necessary to maintain a 3:1 or 5:1 relationship in illumination which research and experience indicate desirable for pleasing and effective work environments. The problem has been that in today's modular building design the tendency is to put the same lighting in each module. With new developments, flexibility can be achieved without sacrificing architectural integrity.

Underlying the recommendations of IES is the basic knowledge provided by IERI. Research being conducted in Great Britain, Germany, France, Sweden and many other countries on the light needed to perform visual tasks fast and accurately is confirming findings in the US years ago. This knowledge formed the basis for present IES standards, established in 1959, so that today we have international agreement on a system for specifying levels of illumination.

As a matter of fact, such an enormous body of knowledge would hardly yield to an obscure and strictly limited study which is being misinterpreted to imply that a light level between 3 and 10 footcandles is adequate for office work. Until a person studies research in depth he is understandably unaware that visual tasks have an enormous range of difficulty. The fifth carbon paper, for example, requires 10 times as much light as the original for equal visibility. While one may be able to read a hymnal at a leisurely pace under 17 footcandles, the secretary, the bookkeeper, the draftsman, the computer programmer, the executive and the white and blue collar workers on the job have far more stringent demands placed upon their performances.

The IES standards were readily accepted in 1959 because lighting users were demanding better lighting than was called for by the old standards. Contrary to some claims, IES levels of illumination have not tripled during the past 15 years. This can be verified by comparing recommendations listed in the third (1959) and consequent (1966 and '72) editions of the *IES Handbook*. It is true that some organizations, among them the New York City Board of Education, have increased their footcandles for classrooms, libraries, shops and drafting rooms during the past 15 years. Actually, what they have been doing is bringing their levels up to the 1959 IES recommendations on a step-by-step basis.

Room width	Room length	Units viewed lengthwise Height above floor (feet)			
		8½	10	13	16
30	20	66	69	72	76
	30	60	63	66	68
	40	57	59	63	65
	60	53	56	58	60
	80	52	54	56	58
40	20	68	70	73	76
	30	61	64	67	68
	40	58	60	63	65
	60	53	56	58	60
	80	52	54	55	58
	100	51	52	54	56

VCP VALUES FOR 100 FOOTCANDLES (Visual Comfort Probability)

An expanded view of one part of the complete VCP table illustrates how light readings change with the size of the room and height above floor.

New Research on Older Eyes

One of the most startling areas of new developments is in research being done on individual differences. Although many people's eyes, young or old, have lens defects that require spectacles to correct them, there appears to be little difference in the visual performance between persons in the 20- to 30-year age group who wear glasses and those who do not. The 1959 illumination level recommendations were designed to meet the needs of this population segment. We simply did not have sufficient research data on other age groups.

Research being conducted at Ohio State University in connection with an ophthalmological clinic indicates that persons over 40 have a high incidence of widely varying eye defects. Although this research work is still going on, early results show that current IES standards do not provide anywhere near optimum visual performance for older eyes. Some of these defects stem from milkyness in the eye fluids; speed of seeing is reduced and so is resistance to glare.

Emphasis on Better Quality

Facing the challenge of providing better quality lighting, one can hardly justify compromising present standards and going back to uncomfortable, bare fluorescent lighting. Rather, these facts point to the current thrust of the lighting industry to turn its attention from providing *enough* light for fast, accurate seeing to developing better *quality* lighting.

The approach to better quality is along several paths:

1. *Providing good visual comfort.* A system has been adopted by IES to establish the Visual Comfort Probability (VCP) of an installation in terms of the percent of people who will probably find a given lighting installation comfortable from a direct glare standpoint. The system allows the user and the engineer to exercise their judgment as to the comfort level desirable for a particular situation, recognizing that less comfortable systems may use light more efficiently. This new evaluation method can be applied to the entire range of lighting systems.

Although light/dark adaption is one form of occular exercise, the kind of glaring lighting that causes the iris to open and close as one looks about the space can cause fatigue and production errors. Moreover, in dirt-laden environments bare fluorescent lamps have been discarded as being impractical from the standpoint of maintenance. It is only natural to expect that the lighting levels would increase if the dirty lens covers were removed; however, bare fluorescent tubes will become dirty much faster (days instead of years) and produce far less efficient lighting levels. Such a practice represents a gross misuse of the electric energy we are striving to conserve.

2. *Providing visual effectiveness.* Lighting systems generally cause some reflection in visual tasks such as writing, printing, reproduced material, etc. This reduces the contrast of the task and hence its visibility. If the light comes from the right directions, visibility is maintained, thus minimizing the need for higher lighting levels to compensate.

The IES recently adopted "A Method of Evaluating the Visual Effectiveness of Lighting Systems" (RQQ Report No. 4), which provides a quantitative method for evaluating the visual significance of contrast losses that occur in real lighting situations and a means for converting raw footcandles to Equivalent Sphere Illumination (ESI) for comparing the effectiveness of one lighting system to another.

ESI does not mean that lighting in the space should duplicate the uniform complete diffusion in a sphere. Rather, the sphere is used merely as a laboratory base line for establishing the visual difficulty of the task.

3. *Creating a more pleasing environment.* To offset the dull, monotonous environment which results when shadowless lighting is endlessly repeated throughout an area is another path. Deliberate variation, the creation of zones of interest, are well-known and well-demonstrated principles. The many new light-sources available today, such as U-shaped fluorescent lamps for modular design, low-voltage spotlights for accent and warm mercury lamps for adding sparkle and modeling to a space, give the architect and lighting designer a wide variety of choices.

Extensive tests are being conducted to determine how variables, such as color, perimeter lighting, accent spots, etc., can affect a person's appraisal of the room when they are introduced into the space. Preliminary results of this Psychological Scaling Research will be reported at the IES annual conference in July and will provide the basis for further study.

4. *Controlling heat energy.* This concept involves returning air through the lighting fixtures, thereby taking heat out of the space and reducing airconditioning power requirements during warm weather. For example, if fixtures are simply set in the ceiling, the ceiling and the fixtures may reach a temperature above 120°F, thereby creating a radiant heating system at the same time the airconditioning is trying to cool the space. Conversely in cold weather, energy from the lighting system can be distributed ef-

fectively throughout the building, providing most of its heating requirements without having a small, inefficient heating plant.

5. *Providing more efficient light sources.* The lamp industry has an outstanding record of increasing lumens per watt from approximately 20 for incandescent lamps to 80 for fluorescent types to 130 for high pressure sodium lamps. These more efficient light sources have reduced the acres of lighting equipment needed on the ceiling to provide a recommended footcandle level, thereby reducing the overall maintenance and system cost.

Emphasis on Conservation

Among ways to make the most efficient use of energy expanded for lighting are:

1. *Design lighting for the seeing tasks expected.* Less light should be used in surrounding nonwork areas.

2. *Design with effective luminaires and fenestration.* Light from either source, if not properly controlled, can reduce visibility by producing veiling reflections and disability glare. Lighting from the side can enhance task visibility by reducing veiling reflections while a heavy concentration of light from overhead and forward of the task can produce a high degree of such reflections. Likewise, well shielded, low brightness luminaires can eliminate disability glare whereas bright, unshielded windows near the line of sight can produce significant disability glare.

3. *Use efficient light sources* (higher lumen/watt output). In general, incandescent lamps of higher wattage, longer length fluorescent lamps and higher wattage high intensity discharge lamps (mercury, metal halide and high pressure sodium) are more efficient.

4. *Use more efficient luminaires.* These not only use energy more effectively but can also reduce the users' lighting costs.

5. *Use heat transfer luminaires.* By integrating the lighting and airconditioning systems less room heating and cooling load should be required.

6. *Use lighter finishes on ceilings, walls, floors, furnishings.* This will make better use of light; however, upper limits of reflectances have been recommended to avoid excessively bright surfaces which can be uncomfortable or reduce visibility by producing disability glare.

7. *Control window brightness.* Good lighting design can be achieved by skillful application of daylighting techniques. These include: redirecting available light for better interior distribution and use, such as with venetian blinds; limiting the brightness of fenestration to within comfortable limits by using devices such as shades, screens, blinds and low transmission glasses; controlling heat-producing radiation entering a space by using reflective glass coatings and sunscreening to reduce airconditioning requirements.

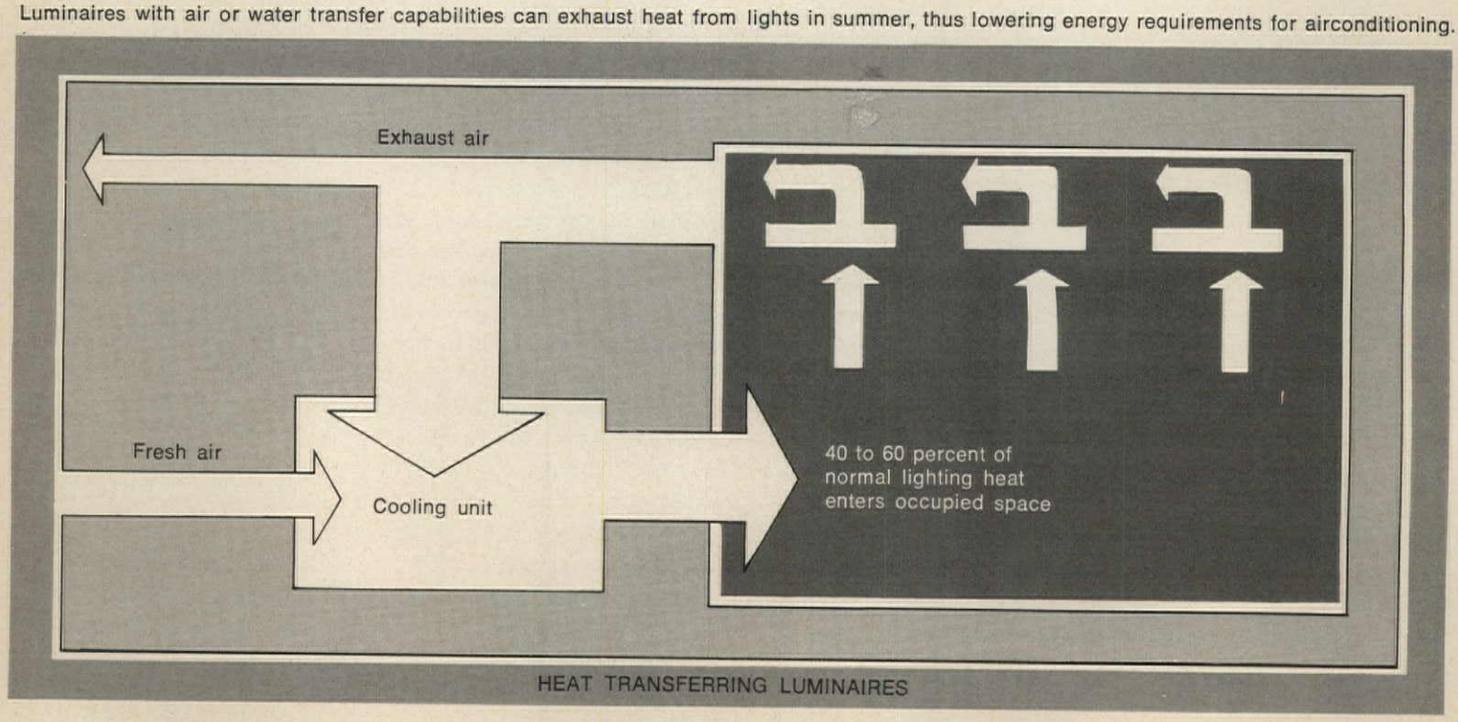
8. *Use daylight as practicable.* The lighting levels recommended by IES are not based on electric lighting exclusively. The society publishes a *Recommended Practice of Daylighting* and includes daylighting design data in its *Lighting Handbook.*

Although it is proposed that "the outer strip of a building can be adequately lighted by natural light . . . by circuiting the perimeter separately and by having the lights turned on and off by a light sensitive switch," it seems hardly necessary to point out that larger areas of glass used to take advantage of "free" natural daylight may actually result in greater use of electric energy for heating and cooling and additional expenditures for controls. Thirty years ago many schools were designed in this country where the rows of lighting fixtures closest to the window were turned off automatically by a photoelectric cell when adequate daylight prevailed. This practice was discarded because of the costs, annoyance and maintenance requirements.

9. *Keep lighting equipment clean and in good working condition.* Since studies have shown that good lighting maintenance procedures provide better use of the lighting system, more attention needs to be given this specific area in designing new systems. The client should be made aware of the maintenance procedures considered in the design.

With the desperate need for productivity and cost leadership among nations, with the need to make our cities pleasant, safe, attractive places to be, and with the need to save lives on the highways and time lost in commerce and industry, this seems not to be the time to compromise on the logical and proven functions of lighting. Rather, this ought to be a time to use the full benefit of lighting—replacing the wasteful and obsolete systems with those which use energy more efficiently and economically. □

Luminaires with air or water transfer capabilities can exhaust heat from lights in summer, thus lowering energy requirements for airconditioning.



PRACTICE

Pacheco & Graham, whose nine-member office is located in Albuquerque, combines arts and crafts with architecture, even in places far from the confines of the city.

PROFILE

A Genuine Response to the Region

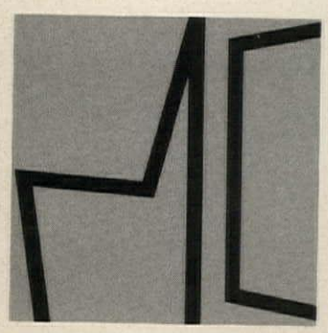
Occupying a corner site not far from the Albuquerque Indian School is an unpretentious church, the product of a bare-bones budget, lovingly built by its members using sun-dried adobe and other natural materials (total construction cost: $32,000). The sanctuary has been conceived as an "Indian house" that can receive and display native arts and crafts, representing, in fact, 12 different tribes.

The Indian Assembly of God Church is the design of Channell Graham, AIA; the handcrafted lectern and chairs at the rostrum are the work of his partner, Jesse A. Pacheco Jr., AIA. Says Graham: "The little building has had a remarkable effect on the congregation itself. The response of owning one of the tourist attractions in Albuquerque seems to have instilled a sense of pride and growth."

Such a commission may appear out of the ordinary for a good many architectural firms, particularly those located in highly urbanized areas, but not so for Pacheco & Graham. Its staff of nine is quartered in Albuquerque, the seat of Bernalillo County and a fast-growing city with a metropolitan population nearing 350,000. But a tour of the firm's projects will vividly demonstrate that the majority are not to be found in the immediate vicinity at all—and certainly not downtown—but within a 200-mile radius which often leads to out-of-the way spots.

Like most of the residents who make up the rapidly expanding Southwest, the partners, ages 47 and 44, respectively, are transplants from the East and the Midwest. Pacheco was awarded his B.S. in Architecture from the Rhode Island School of Design and his master's degree from Cornell University, writing his

Crafts adorn Indian Assembly of God Church (preceding page and above) which pastor says "allows the people to identify with their culture."



Logo is derived from earlier motifs used by principals in private practice: a chair reflecting Pacheco's background in furniture design and a channel portraying Graham's first name.

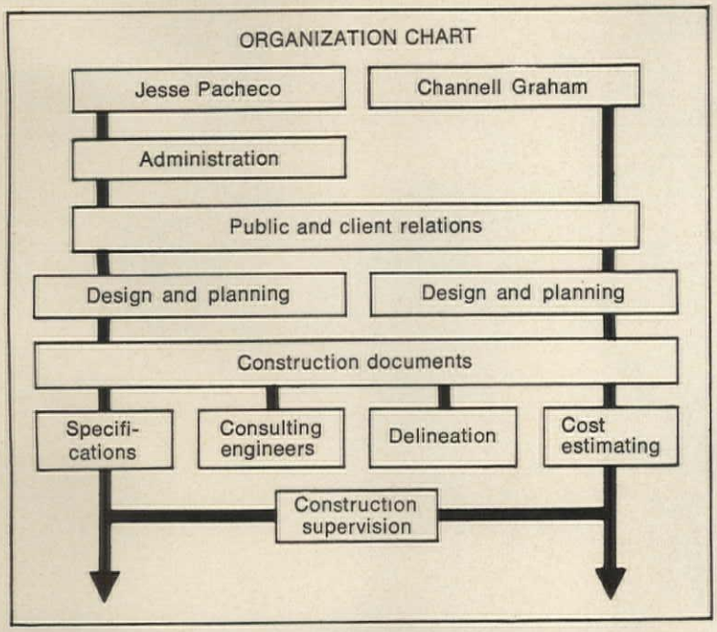
thesis on the "architecture" of furniture. Graham studied architectural engineering at Ohio University and earned his M.A. in Architecture from Cranbrook Academy of Art. His thesis, on the other hand, was based on the humanistic approach to design "wherein architecture, being more than an individual building, transcends and becomes part of the living landscape." Graham is an artist in his own right, working with stained glass and sculpture.

Both have exhibited in the New Mexico Arts and Crafts Fair in Old Town Plaza, and Pacheco won first prize at the 1964 Biennial Crafts Show in Santa Fe. It is not surprising, then, that the two men formed an association in 1963 on the premise of being architects/artists/craftsmen—a principle that continues to be evident in their practice whenever feasible. Pacheco explains the overriding philosophy this way:

STAFF BREAKDOWN

Principals	2
Job captains	2
Draftsmen	3
Field supervisor	1
Secretary	1
	9

ORGANIZATION CHART



GROSS BILLING PERCENTAGES
(1970-71 fiscal year)

College/university	53
Religious	23
Primary/secondary school	7
Commercial	7
Public	6
Housing	4
	100

Graham and Pacheco practice out of their own office building (above). Pacheco's house (left) is furnished with his hand-designed furniture, while Graham's (bottom left) features a sculptural wall.

"We left those parts of the country to which we no longer related and moved to the Southwest to become part of the vibrant physical environment and multicultural qualities of the area. Living and working in New Mexico isolates us somewhat from the mainstream of the American lifestyle and architecture, but *viva* the isolation! The compensation of sun, mountains, desert and peopleless places is positively therapeutic.

"Our work is varied, and we currently are engaged on jobs in housing for the Zuni Pueblo, recreational facilities for the San Juan Pueblo and a high school for the Navajos at Rough Rock," Pacheco points out. "We have designed churches that range from one for the Chicano community of Chimayo, 35 miles above Santa Fe, to two to Los Alamos, the birthplace of the atomic age, where Ph.D.'s abound. Our project at Montezuma Seminary was carried on for three years and provided numerous services for

Immaculate Heart of Mary Church, planned to meet early liturgical changes, serves as a "Eucharist Hall" and concert facility for Los Alamos.

The Playtowers of Julie Graham

The artistry of Pacheco & Graham extends beyond the firm itself through the environmental sculpture of Julie Graham, wife of one of the partners. She recently completed a "total environmental play park" for Albuquerque's Model Cities program with the firm acting as architectural and structural consultants. The park consists of a series of masonry and wood structures located around a central stage area. The facility also was designed for dual use as an outdoor theater.

Some years back Mrs. Graham was encouraged by architects to "think big," utilizing her background as a sculptor. The result has been a series of playtowers, at first built of native New Mexico adobe bricks and later of stacked burlap bags filled with a dry concrete mixture, submerged in water and covered with cement stucco.

Dr. Ross L. Snyder Jr. of the University of New Mexico Medical School, writing in *New Mexico Architecture* for May-June 1969, made these observations:

"As a child psychiatrist, I find Julie Graham's structures to be exciting, creative and having a multiplicity of psychological and physiological benefits for children. In addition to being economical because they are constructed from material that is either inexpensive, readily available or used, they allow men and women in the community to contribute toward their construction. As a result, frequently the community takes a special pride in the structures, and the joint task of building them together creates more of a feeling of fellowship.

"The most exciting aspect of the towers is the variety of possibilities they offer to children. While other pieces of playground equipment limit a child to mainly one type of physical activity and do not encourage group play, these structures are designed in a fashion that allows a wide range of

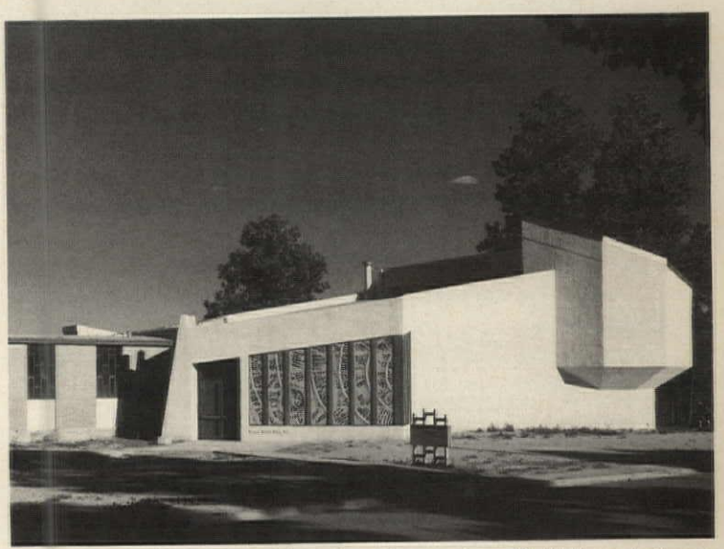
A private home is site of this playtower.

the 500 Mexican boys training in the United States for the priesthood. Since we were assisted by the Mexican Jesuit Order, language presented a problem on occasion. In sum, I believe we have had a wider variety of clients than usual and therein lies a great source of interest and experience."

Unlike some small firms where one principal is strong in design and the other is more oriented toward the practical aspects, both partners are apt to be found at the drawing boards, except that Pacheco does handle administration. In reality, each does his own thing and, in most cases, even a casual observer can determine whether Pacheco or Graham has been the architect in charge of a particular structure. This is not to say that no interplay of ideas or input exists from one to the other, but there is not what can be called a "firm style," for Pacheco's work is inclined to be more restrained than Graham's freer forms. The latter comments:

"We work in a pyramid form, assembling program data and other basic disciplines into logical and coordinated progressions toward a final design. We ask our clients to become involved and informed during the design process, and to respond critically and frankly to our concepts and proposals. Architecture is a service profession, and we are constantly attempting to improve our client communication as an instrument of service."

Project responsibility within the firm is always assumed by one of the principals, remaining throughout the preliminary, contract document and construction stages. Any work assignments to other employees are directly supervised by the partner in charge. The frequency of visits to the site is more firmly established and greatly increased by a concerted effort to obtain two or more jobs in the same general area. Because of the distances

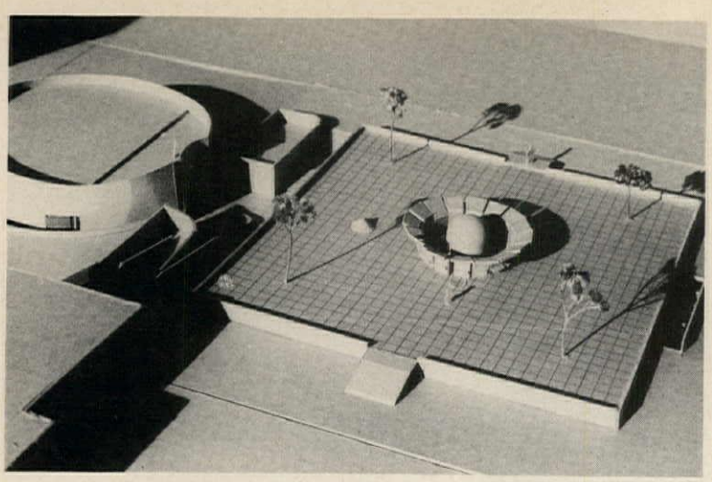


Holy Family Church in Chimayo is a far cry from Bethlehem Lutheran Church in Los Alamos with Graham's stained glass window.

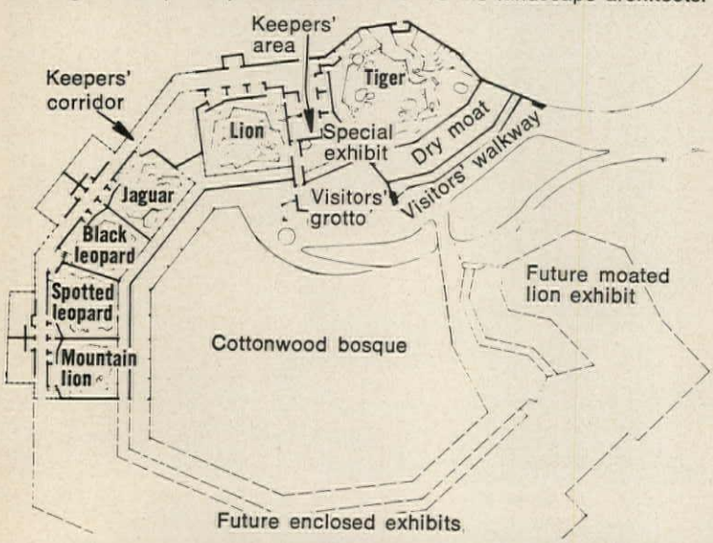
youngsters to exercise their minds and muscles in numerous ways. Parts of the towers are suitable for very small children to use. There are areas of seclusion and protection where they can be alone or play together. There are lower areas that are easily climbed and explored as well as slides and rope swings that encourage much more vigorous activity."

Early in April Mrs. Graham spent a week in Berkeley consulting with about 50 students from the University of California College of Landscape Architecture on Prospect WEY, an outreach-oriented program to design and build facilities in the community. She provided the technical experience on the bag system of construction, from which an innovative structure has emerged. It has become the catalyst for transforming an acre of solid asphalt in a local elementary schoolyard into a garden of child-geared environments. □

Sculptor's most extensive work to date is found in a Model Cities program park.



Nearing completion on the University of New Mexico campus is the Physics Laboratories and Lecture Hall, essentially an underground structure of precast concrete, acting as a foil between two large classroom buildings. Eckbo, Dean, Austin & Williams are the landscape architects.



to some of the commissions, a partner often combines a periodic visit with a two- or three-day family outing of camping, fishing, hiking or simply viewing the still unspoiled land. Thus an air of informality and flexibility of work schedules prevail in the office.

The principals feel that the firm has a present capability of accepting any project up to $4 million in volume, depending upon its complexity. Among those in the construction phase right now are a school for retarded children, two churches, a physics laboratory building and lecture hall for the University of New Mexico, two units of a prototype chain restaurant and two large apartment complexes, one for a local contractor/developer and the other for Horizon Corporation of Arizona.

On the boards are such jobs as a Boy Scout camp, two more churches, a church camp, townhouse units, a restoration of a historical cavalry fort and two projects—a marina and a stable—for Horizon City in El Paso, Texas.

No job is really too small for the firm, as is indicated by

Feline Exhibit at Albuquerque's Rio Grande Zoological Park, which responds to the animals themselves, is called the best facility of its type in United States by Dr. Charles Schroeder, San Diego Zoo director.

Soleri-designed Outdoor American Indian Theater in Sante Fe, with Pacheco & Graham as project architects, seats 2,000 spectators. The concrete forms were cast on earth with earthmoving equipment and hand finished. After the concrete had cured, the earth was removed from beneath.

an example for the Los Alamos Medical Center. "The situation here was to transform a standard hospital room into a special place of retreat, a place to hold small group services or for individual meditation," according to Graham. "In response to this request, we proposed that the room be furnished with objects made by artists and craftsmen that would express the contemplative goals of each participant and also follow the overall objective of the design problem. The 'special place' truly became a chapel through their efforts." These have included an altar, tables, chairs and pews executed by Pacheco, as well as candlesticks, a background screen, hanging lamps and a stained glass entry door produced by other artists.

The firm has been associated in several joint ventures, including a contract to engineer and detail the Outdoor American Indian Theater located at the Institute of American Indian Arts in Santa Fe. Paolo Soleri was the design consultant commissioned by the Bureau of Indian Affairs. As Graham describes it, "The office spent two exciting but hectic years threading its way through the organizational logic of the BIA and the brilliant intuitive input from Soleri. We ended up with a superb theater although it does compromise some of Soleri's design concepts, particularly in terms of his structural ideas."

The firm currently is associated with the School of Architecture and Planning, Massachusetts Institute of Technology, in the design of the already-cited project for Rough Rock Demonstration School on the Navajo Reservation. In this program the local school board receives its funding directly from the BIA without prior stipulations, acting as an independent body. Three of the seven-member board speak only Navajo so all conversation and correspondence must be translated. Pacheco feels that the end result of this three-way relationship—school board, MIT and Pacheco & Graham—will be a truly unique expression of Indian educational facilities.

Pacheco further comments, "The community of Rough Rock is situated approximately 30 miles northwest of Chinle, Arizona, the location of spectacular Canyon de Chelly. It is reached by traveling the final 16 miles over an unimproved road through typically stark and beautiful desert country: red-rock formations, mesas and vast emptiness. Out of this surround lies Rough Rock, a community of contemporary housing, schools, public health facilities, paved roads, school buses, an airstrip and most of the things one associates with today's living. Along with the new is also the old: the BIA high school, Navajo hogans and trading posts, sheepherders and sacred land. It is like many Indian communities—a people moving forward."

The partners are cognizant of their obligation to meet realistic building budgets, and cost control procedures have been incorporated into the basic operation. The use of a cost control consultant, with a small addition to the fee, at critical times during the design and construction document phases provides a check on costs in relation to the working budget. A breakdown of each completed job affords another evaluation of current cost factors. As to bidding, the firm favors negotiated construction contracts due to the problems normally associated with working

with the low bidder and a desire to team up with contractors of proven experience.

The office is well aware of the situation that exists in vying with larger, more established firms in a metropolitan region. Candidly, the principals talk about the lack of an "image" and feel that this is an aspect of the practice that must be strengthened. But they are aware, too, that there are certain areas in which any firm despite its size can compete for architectural services. Conducting a good interview is just one case in point. Sometimes the partners use a very personal approach; sometimes it is much more formal with a coordinated slide-tape presentation. Pacheco believes that, although it appears to be bucking the computerized and impersonal tide that characterizes so many relationships, the get-out and knock-on-doors approach is still a valid one. This, coupled with conviction, enthusiasm and persistence, can and does make the difference.

In any event, this is what the Board of American Missions, Lutheran Church in America, wrote to the firm a few years back: "We average a construction start about every two days and have over 400 programs in one phase or another. We see a lot of architectural drawings. Your presentation is one of the most complete and well-organized submissions we have ever seen." The job, by the way, is now finished and located across the Rio Grande River in Paradise Hills.

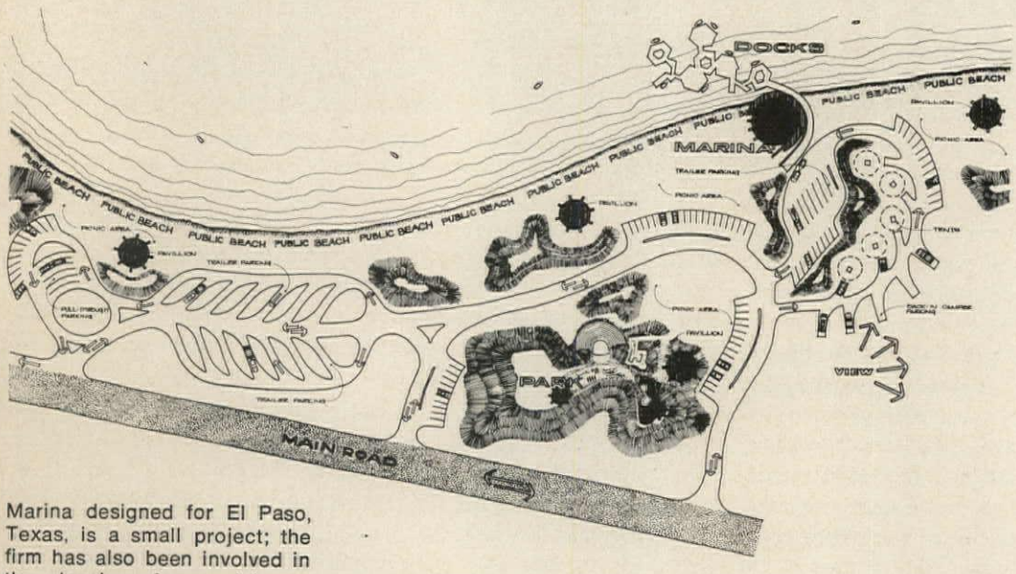
Regarding the future, Graham summed it up pretty well in a local newspaper account: "Some architects regard their work as a business commodity to be bartered. My feeling is that architecture should always be considered art, although it does have practical overtones. As a matter of fact, economics are coming more and more into play. An example is the feasibility study of certain sites, bringing into focus a close association with realtors and others in business fields."

Both partners agree that the role of the architect as a developer is a fact of professional life; furthermore, they do not like what they consider artificial barriers which have tied the hands of the practitioner in the past. They are not convinced that architect/builder relationships, design/build teams and corporate status for professionals are inherently bad. One cannot legislate good architectural practice. It is the capability, character and integrity of the individuals involved, rather than the type of organizational approach to architecture and building, that will determine how well the profession serves and survives.

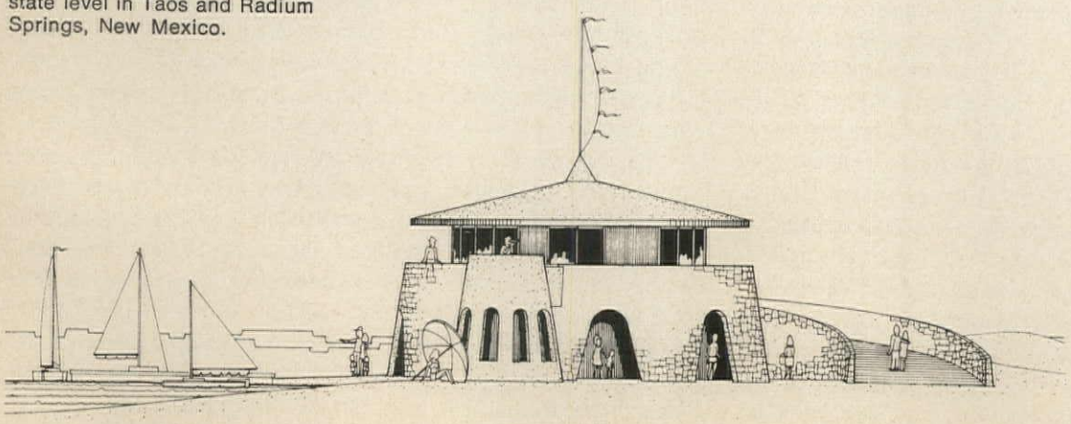
But in the final analysis, the basis for the firm's initial association remains valid and important to this day, as spelled out in the office brochure: "We believe architecture to be the great art of man when it is truly practiced within the disciplines of human and ascetic values; we believe in the arts as man's ultimate experience; we believe in the individual with human relationships that evolve on a moral and sincere basis; we believe in the land and especially the Southwest with its climate, topography and polycultures."

Office brochures too often wind up as being little more than public relations puffs, but somehow the person who has visited the firm of Pacheco & Graham and viewed its work comes away with a strong belief in that architectural credo.

ROBERT E. KOEHLER



Marina designed for El Paso, Texas, is a small project; the firm has also been involved in the planning of several larger parks, including two at the state level in Taos and Radium Springs, New Mexico.



When Your Client Wants a Swimming Pool

Designed by Aycock & Neville and appropriately named the Aquadome, this pool in Decatur, Alabama, gives children a year-round facility. The dome is of acrylic plastic.

by EDWARD P. WAGNER

Emperors of ancient Rome built many splendid public pools, doubtlessly employing the best designers of the time to achieve their monumentality. Perhaps today's pools are not quite so elegant, but recently there have been many technological improvements that would make even Caracalla envious. The growing demand in all markets for pools and pool-centered recreational complexes requires the architect to provide overall leadership in a complicated design effort. Whether he relies upon expertise from the outside or makes a specialist a part of his permanent design team, the architect needs to know some basics about pools and their surrounding areas.

Demand for swimming pools in the United States has splashed mightily from a modest ripple in pre-World War I days to almost tidal wave proportions today. A mass market now exists for single-family residential pools, the annual sales of which are approaching 3 million units, both in-ground and above-ground. Of more particular interest to architects, however, is the fact that hardly any new resort, motel, country club or middle-income-and-above multifamily residential property is being built today without a pool. And some have two or more.

Larger commercial, residential and even institutional pools run into the tens and often hundreds of thousands of dollars through the design and construction phases. Anyone who has participated in the development of such a pool understands that it is a complex system which requires the finest design efforts of an architect and/or landscape architect, the concern of a trained engineer, the experience of reliable pool contractors and the long-range care of properly trained service personnel.

In this mix of diverse disciplines, as in other areas of building and construction, the architect cannot be content to play the role of single designer. Rather, he must provide overall leadership; and to do this, he must be reasonably knowledgeable in each specific area. The purpose is to present something of a primer on pools to help the architect become familiar with pools, pool facilities and basic pool equipment. This is not meant to be a be-all and end-all of an architect's search for facts, ideas and other information pertinent to the swimming pool system.

The first rule of thumb is to *plan*—and to plan carefully. In any project under consideration for which a pool is even contemplated as a future addition, it is necessary to plan now. Too many instances can be easily cited by pool industry people in which existing facilities and buildings, such as parking lots and sewage disposal systems, have had to be destroyed or relocated because of the basic design omission of the swimming pool in the initial plan.

As a first step, the architect must, with full access to the owner's plans, ascertain such essential facts as to how the pool

and pool area will be used, what the traffic loads and patterns will be and where the best location of the pool may be, from esthetic, convenience and functional aspects.

Swimming pools designed as afterthoughts are often relegated to unused and normally unusable land. Immense and expensive problems may be expected to arise in the future if this method of planning is allowed. Construction costs can soar and maintenance expenses can skyrocket with a poorly located pool.

Several well tested guides are useful in the initial site selection for a pool:

• A high, dry, level site is most desirable. If at all possible, the equipment should be placed on the same level. A pool is, of course, a watertight structure similar to a building in many respects; therefore, swampy and hillside sites are possible, but there will be an increase in costs caused by special design factors and construction requirements.

• A high-ground water table is a definite liability which may cause an empty pool to float out of the ground. Properly designed and installed hydrostatic relief valves placed in the bottom of the pool is one method of alleviating this problem, but the pool operator must insure that the valves are open and operating whenever the pool is drained.

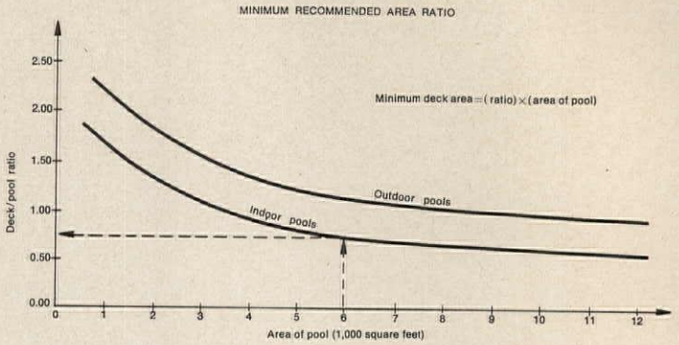
• Underpinning and piling, blasting rock and/or using large amounts of fill will substantially increase construction costs.

• The various water depths in the pool cause unequal loading on the subgrade, resulting in unequal settlement of the pool. This can actually split or crack the pool. Special attention must be devoted to this problem, regardless of pool location, type of construction or size. (Loading in a pool is generally low—about 1 ton per square foot.)

• Other buildings and the ancillary equipment planned with the pool must be considered. Bathhouses, saunas, recreation areas, etc., all have to blend in with the total design.

Usually there is considerable flexibility in pool size, depth and shape available to the designer. These aspects of pool design are both functional and esthetic and must be agreed upon with the owner in light of the basic concept of use for the pool and the pool area.

The ratios of shallow to deep water and of pool to deck are two extremely important determinations which must be made as early in the planning as possible. To a large extent these ratios are dictated by the projected use of the pool and the pool area and by the anticipated traffic load and patterns. There are accepted formulas for sizing these critical dimensions, as shown in the diagram.



Numerous organizations have promulgated guides and standards for use as minimum design criteria. Among them:

• Federal, state and local governments may have separate codes and standards for swimming pools. Often the involvement in this area is through zoning, building and/or health departments. Such codes must be carefully checked and abided by.

• The National Swimming Pool Institute and the American Public Health Association both publish minimum design standards which, to protect designer and engineer against liability, should be adhered to.

• The Amateur Athletic Union of the US and the International Amateur Swimming Federation have set minimum depths, length and widths as well as equipment standards to govern competition swimming and diving for official records.

This free-form pool for an apartment complex in Tulsa, Oklahoma, is made of pneumatically applied concrete. It is the design of Victor Watts.

• The National Sanitation Foundation has developed equipment standards for swimming pools in conjunction with the Conference of State Sanitary Engineers; the Conference of Municipal Public Health Engineers; various governmental units, including the Army, Navy, Public Health Service and Federal Housing Authority; and the National Swimming Pool Institute. In addition, the foundation has a "seal of approval" program for items covered by these standards and an equipment testing program on many of the items commonly used in swimming pools.

• The National Electrical Code, Section 680, as well as other such sections to which reference is made, must be followed for proper design approvals. (The National Swimming Pool Institute has published this section of the electrical code and provided an introduction and explanation of it.)

The types of construction commonly used in swimming pools are almost as varied as the design considerations. For the most part, the architect will not be interested in prefabricated above-ground or over-the-ground pools which generally are limited to the single-family residential and portable pool market. There are four basic types of pools which are of primary concern to him, each having its own design, construction and operation/maintenance advantages and disadvantages.

1. *Concrete.* Pneumatically applied concrete is the most popular construction method used in the permanent pool market. It offers the greatest flexibility in varying the shape and depths of the pool and yet is relatively light, very dense and strong (6,000-psi tests are common). It can be built up from day to day without contraction joints because it bonds to itself as well as to other masonry or steel units. In larger pools, a poured concrete floor with pneumatically applied concrete used for walls is frequently employed. The quality of these structures varies widely with the skill and integrity of the construction firm selected.

Form-poured concrete, the next most popular in the construction of large pools, is a conventional material with which

The Landmark Hotel pool, Las Vegas, Nevada, features an island and deck area (left); Tate & Dubrosky, engineers. Architect Robert Taylor's design of a pool in Tucson, Arizona (below), is an amenity enjoyed by all the dwellers at the Ajo Mobile Home Estates.

The National Swimming Pool Institute is an association of some 1,400 member companies representing all facets of the pool industry.

This year NSPI announced a "Pool Registry Program" which aims at refining and enforcing conformance to its suggested minimum standards for the design and construction of residential swimming pools. The program takes special note of the relationship between the diving board and the diving hopper and of the pool floor slope from the shallow to the deep end. Both measures are considered to be important safety factors, and NSPI hopes that conformance to its minimum design standards in these areas will help to reduce both the number and the severity of pool related accidents.

NSPI offers primary services of interest to architects, including publications on minimum standards for both residential and nonresidential pools, an equipment certification program, specialized reports and a referral service. NSPI also conducts a national pool design competition each year and makes awards in nine categories of semi-public, public and residential pools. □

This residential pool is commodious, allowing a 25-yard swim course. One of the winners in a NSPI competition, it is the design of Joe Hunsaker.

architects and general contractors are probably most familiar. Because construction joints on this type of pool can be a problem, more care and proper scheduling in construction are required than in the so-called "monolithic poured" pools in which floors and walls are poured continuously. Flexible steel forms are successfully used with this technique on free-form pools.

Dry pack structures are common only in certain parts of the country, particularly the Northeast. Quality control is difficult with this type of concrete since it requires more manpower and cannot be vibrated.

2. *Vinyl.* The vinyl pool has become popular in most areas of the country, particularly for residential applications. The excavation is similar to that for poured concrete, but the floor is finished with sand which is carefully shaped into the desired contour. The outside walls of wood or metal are installed and braced and are then covered with the fabricated liner of heavy gauge vinyl. Application of liner technique to large pools has been limited.

3. *Fiberglass.* The majority of pools using this material consist of a fiberglass wall, either in the form of panels bolted together or one continuous roll with a single connection, and a concrete floor. The walls are set into the concrete to form a bond. Completely fabricated shells are also available. Like the vinyl pool liner, application of fiberglass pools has been limited to the residential market in certain parts of the country.

4. *Metal.* Both steel and aluminum are used in the essentially free-standing or completely self-supporting pools. These pools are generally of standard shapes as furnished by the manufacturers. They have gained wide acceptance for rooftop and indoor, above-grade pools. In rooftop applications, particularly, extreme care must be taken to account for the weight of the water, to tie the pool into the structure and to insure the integrity of the water system to protect against leaks.

Some metal pools have been constructed below grade, but these structures must be protected against corrosion.

Special considerations in both the design and construction methods in pools for therapeutic, competitive, educational and other such special purposes arise. Similarly, indoor or indoor/outdoor and variable bottom, which is accomplished with a hydraulic system to raise and lower the pool floor, present special problems not within the compass of this article.

Heating/ventilating/airconditioning effects associated with indoor pools are not completely understood and are an area of continuing study by a number of groups. Pool enclosures present many of these same problems, but they are gaining acceptance in the marketplace since some offer the option of having either an indoor or an outdoor pool by use of sliding panels on the ceiling and/or walls. Many pool owners see them as a logical addition which, along with heaters and lights, allows a much greater return on the pool investment in terms of the number of days and months of possible use of the pool per year.

The pool itself, a very specialized type of vessel designed simply to hold water, is only part of the story. There are the problems of keeping the water pure and clean and of accommodating people both in and out of the pool when it is used simply as the focal point or backdrop for social activity.

Care and maintenance of the pool is not the direct responsibility of the architect, of course. But again, proper planning must occur in the design stages if the pool is to be maintained in

Mr. Wagner, an engineer and consultant on swimming pools and recreational facilities, heads his own planning firm in Darien, Connecticut. He is a past president of the National Swimming Pool Institute.

a safe and healthful condition at minimum financial outlay to the owner.

The filtration system, the heart of this operation, is available in a number of basic types, each having special variations. The conventional rapid sand recirculation system, at 3 gallons per minute per square foot rate and approximately a 12-gallon-per-minute backwash rate, requires three or four units if the same recirculating pump is to be used. Because of the reduced cost of the high rate permanent media filters which operate on a 9- to 15-gallon-per-minute filtration and backwash rate, these conventional rapid sand systems have lost their previously dominant position. Diatomaceous earth, both pressure and vacuum, also have broad application in the swimming pools of today.

The choice of a filter system, however, depends on many factors such as site condition, bathing load, backwash and water supply problems, space and housing availability, etc. Comparative cost is also often a matter of serious consideration which can be weighted with the advantages and disadvantages of particular systems. Regulatory authorities should be checked locally for any filtration system used.

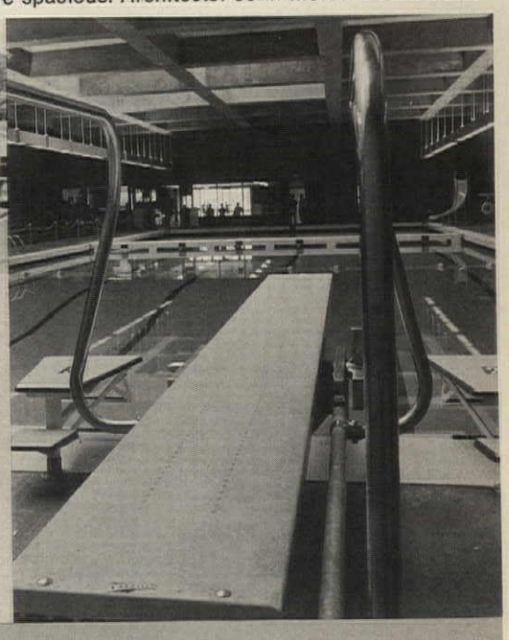
Use of decking materials such as "combed" concrete, carpeting or tile provides safety factors for pool users. Special design considerations such as a "wheelchair edge" may be required for anticipated pool use by the physically handicapped and/or the mentally retarded.

In the planning of any pool, it should be kept in mind that there are constant changes in regulations at all levels, development of new design techniques and the introduction of new equipment in one or more of the subsystems. There are many factors which demand close attention such as humidity and noise control and such additional equipment items and facilities as underwater lights, area lighting, area space heating, saunas, bathhouses, parking facilities, fencing and the design of companion recreational areas.

The complete research effort required by the general and specific design criteria of any given project may not be warranted by the architect since specialists in pools and pool facilities are readily available to assist him. Unless a particular architectural office has enough projects in-house on a continuing basis to justify the addition of a pool specialist to the staff, it seems prudent and profitable to both the architect and the owner to introduce expertise from the outside. The architect may well benefit both himself and his client by taking advantage of the knowledge of specialists.

In the final analysis, the swimming pool can provide the client with a means of satisfying the desire of his tenants, membership, guests or community for an amenity of life which is both pleasant and beneficial to health. But unless properly planned and executed, the pool can complicate the owner's life and the relationships he seeks to build with his constituents. □

A sunken courtyard leads to Seattle's Medgar Evers Memorial Pool, a city facility. Interiors are spacious. Architects: John Morse & Associates.



Sources of Information

Amateur Athletic Union
of the United States
231 W. 58th St.
New York, N.Y. 10019

American Association for Health,
Physical Education and Recreation
1201 16th St. N.W.
Washington, D.C. 20036
(see its publication *Programming for the Mentally Retarded).*

American Gas Association
1515 Wilson Blvd.
Arlington, Va. 22209
(see Information Letter No. 147, Oct. 1965: "Sizing Guide for Gas Water Heaters for In-Ground Swimming Pools").

American Public Health Association
1740 Broadway
New York, N.Y. 10019

American Red Cross, Safety Programs
18th and E Sts. N.W.
Washington, D.C. 20006

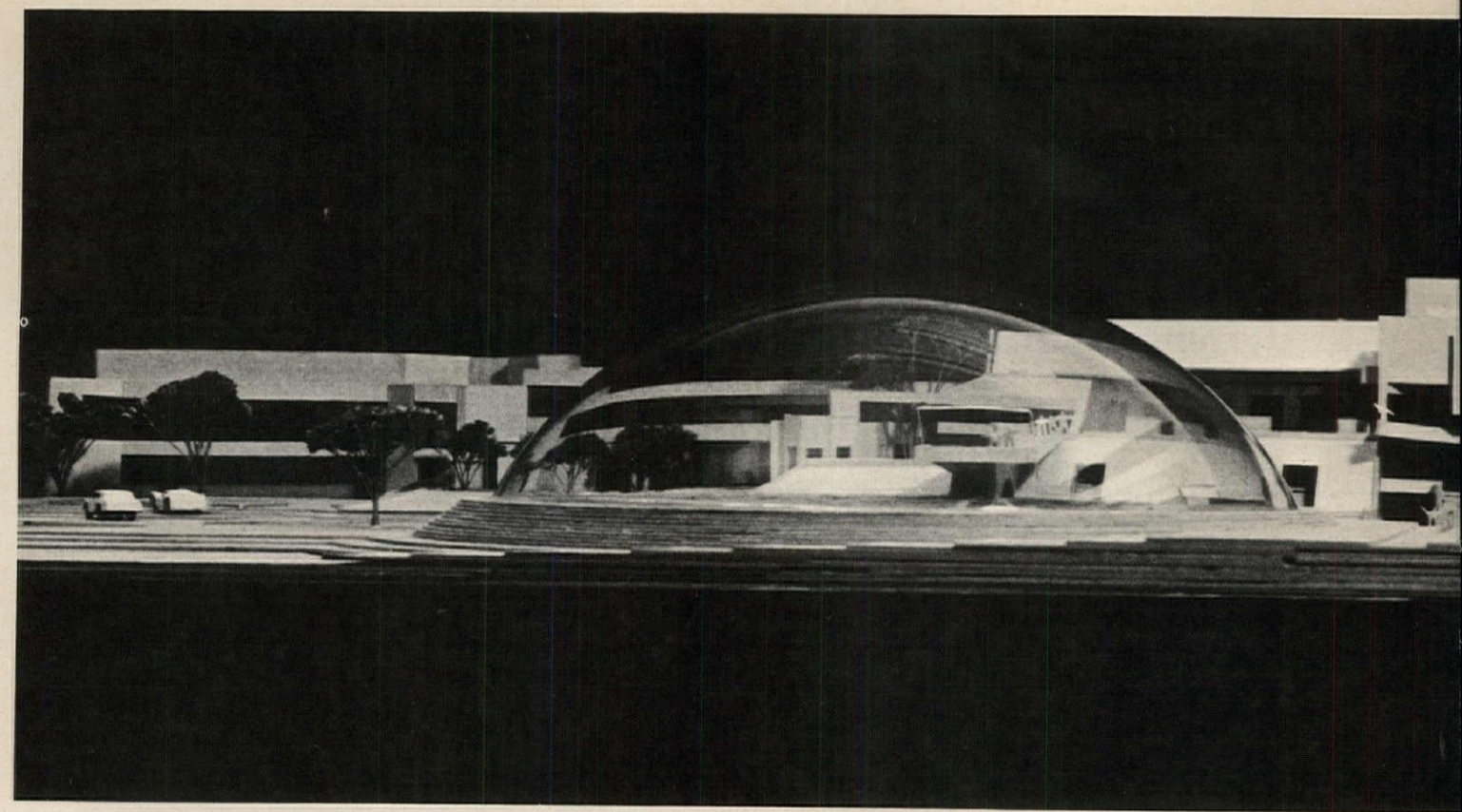
Council for National Cooperation in Aquatics
1201 16th St. N.W.
Washington, D.C. 20036
(see its *A Practical Guide for Teaching the Mentally Retarded to Swim;* also its *Swimming Pools: A Guide to Their Planning, Design and Operation,* published by Hoffman Publications).

Hoffman Publications, Inc.
Sunrise Professional Building
Fort Lauderdale, Fla. 33304

National Sanitation Foundation
School of Public Health
University of Michigan
Ann Arbor, Mich. 48106

National Swimming Pool Institute
2000 K St. N.W.
Washington, D.C. 20006

US Public Health Service
Department of Health, Education and Welfare
Washington, D.C. 20201



Let's Have Inside-Out Schools!

by Marvin Eli Rosenman, AIA,
Anthony J. Costello, AIA,
and Craig W. Mullins

Let's open our schools to the real world, let them be generators of community activity and be live parts of their neighborhoods! Let's do away with the dreary boxes with all life and excitement confined inside, the type our country is scattered with. The transformation of one such typical schoolhouse is shown here.

There are omnipresent dangers in oversimplification. There is richness and continuity in diversity; the school child at the turn of the century probably learned as much on the way to school as in school itself. Trips through the market, past the fire station, across the park, were then commonplace. Children today are carefully driven to windowless school rooms in the very vehicles that have made walking to school a hazard. Much is lost for these youngsters who thrive on environmental stimuli.

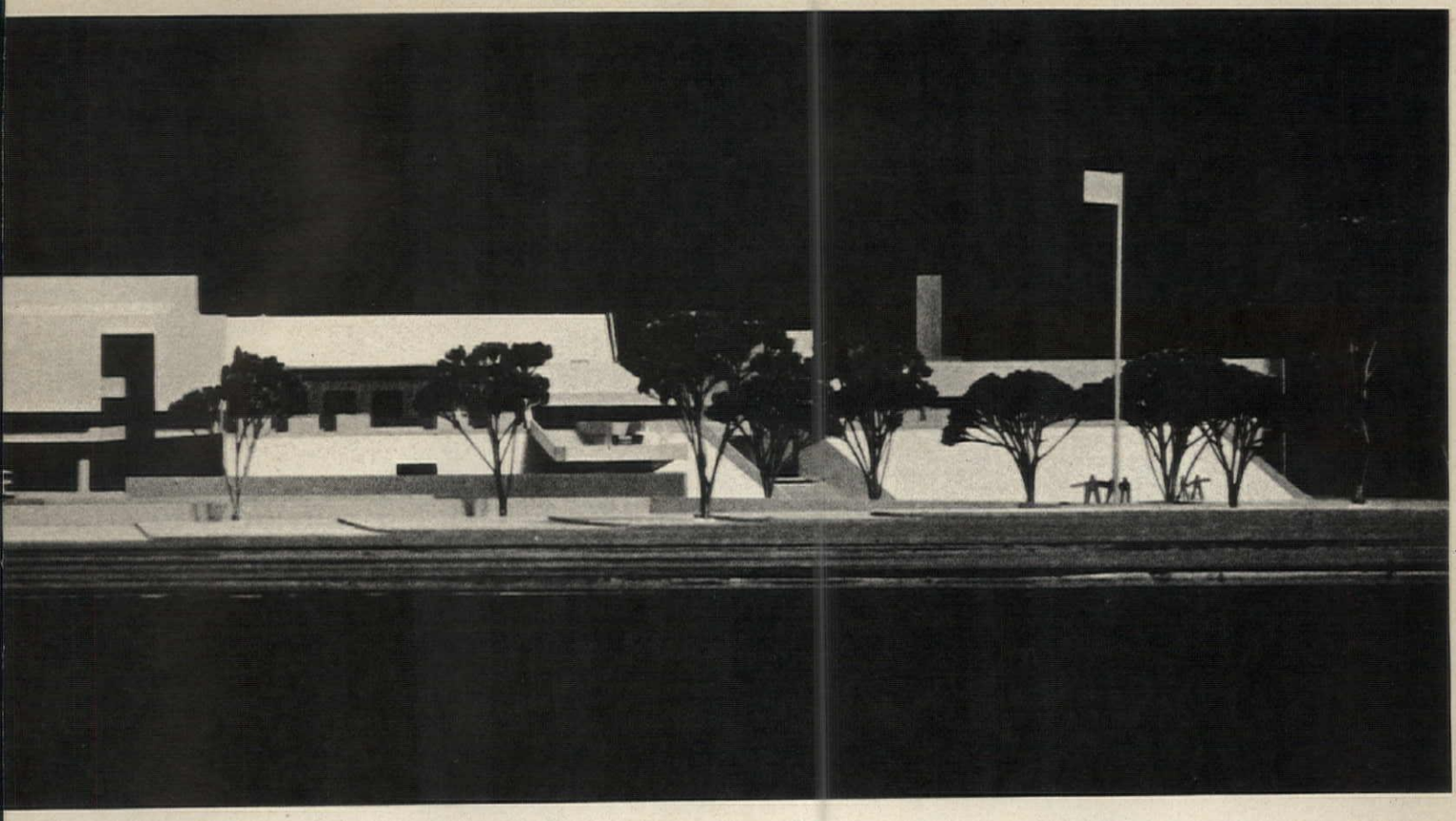
"Open plan" facilities—often "empty box" facilities—do little to inspire total environmental awareness in their inhabitants, especially outside the confines of the building. The best school could teach us how to live with ourselves and with others, and how to live with our environment, both natural and man-made. Why confine it to a box?

The best school would then seek ways of enriching its cultural/human input with interacting natural places and man-made forms and objects for an inclusive rather than exclusive environment. Why should the school duplicate the real world when the school could become the real world? Duality rather than duplicity should be the goal. Why not bring the classroom to the grocery or the grocery to the classroom? The best school becomes the city, rich and exciting, just as the city itself becomes the school.

Much of what is happening in today's schools is literally hidden from all outsiders. Valuable resources and hours of planning and preparation are often spent on relatively few. A recent article in a large midwestern university's campus paper stated:

"The music department library contains 2,000 records and 500 tapes. It is equipped with nine study booths with stereo headphones, soundproof rooms for group listening, . . . etc. The library, at the end of a long hall in the basement of the Music Building, is open to all students, but few know that it exists."

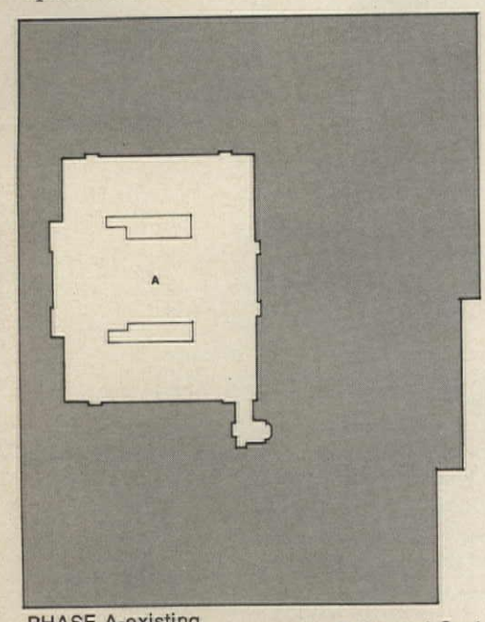
In ghetto areas of our large cities, record shop owners frequently install outdoor speakers, beckoning prospective buyers or listeners. Where are our schools and universities? Why are



they not beckoning prospective learners with more outdoor or visible experiments?

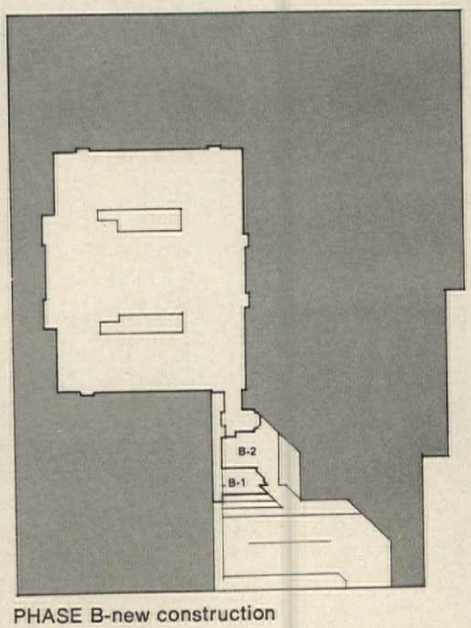
An accomplished educational administrator, when asked to describe his favorite school facility, told of a school in Texas "that was once a factory building whose three floors were opened and connected with a variety of activities, all of which could be changed if desired." When asked how someone a block away would know about it, he replied, "I guess they really wouldn't." The best open plan should in some way open into the real world. This can be achieved in many ways both in new and in remodeled schools.

Recent attention has been given to approaches that open



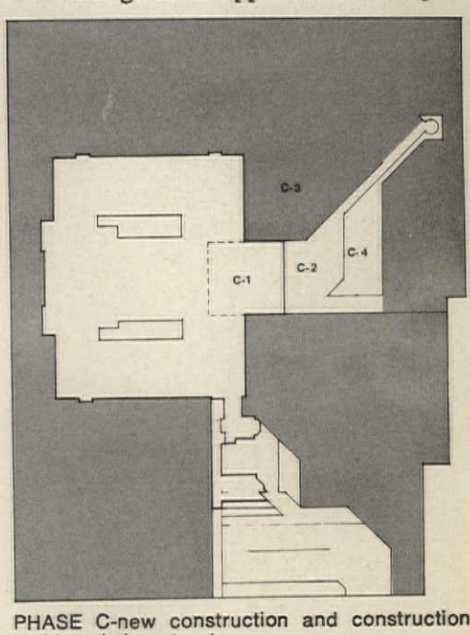
PHASE A-existing

	Estimated Cost
Phase B	$ 154,000
Phase C	267,000
Phase D	777,000
Phase E	1,543,000
Phase F	397,000
Phase G	775,100
Phase H	260,000
Phase I	865,000
General (plumbing, HVAC, electrical installations, etc.)	272,000
	Total $5,318,100



PHASE B-new construction

1. Single-story nursery with link connection to existing building; paved kinder court
2. Parking area



PHASE C-new construction and construction inside existing structure

1. Resource center
2. Public plaza
3. Park development
4. Reflecting pool

city resources to the learner, but what about the thousands of existing school facilities, bastions of learning, whose physical plants, although structurally sound, are imposing, rigid and foreboding to their inhabitants? What about new facilities, for that matter, whose internal activities are artificially separated from the real world by boring precast concrete slabs? It is not uncommon to visit new high schools where the biology greenhouse is the only thing to poke its way through the educational facility wrappings.

Inundated by "systems" and bound by budgets, architects frequently think that the best school can be built in the least time for the least money. With few exceptions, are these really schools? Or are they boxes?

The ideal environment for learning should be strongly interactive, inside and outside. It should be a place that has the unique ability to serve the talents of every individual, who may in turn interpret it in different ways. The schools, like the city, should plan for happening rather than performance—learning by accident as well as by schedule—by removing from the student the fear of judgment. The student should experiment *on* as well as *in* the school, using it as a tool to explore structure, nature and other people's ideas as well. There is wisdom in the old axiom that "We shape the buildings and thereafter they shape us." We might say: We shape our schools and thereafter they shape us, in our attitudes toward ourselves, toward others, and toward our environment. We must never overlook the critical nature and the valid interaction of 1) human/cultural; 2) natural; and 3) man-made elements in our environment. For these three factors determine our success in life itself and should all be a part of the inside-out school or university, whose outer surface would indeed be available to everyone.

We kept these points foremost in mind when we made the design feasibility study for the renovation and addition to Ball State University's Burris Laboratory School in Muncie, Indiana. Burris was designed, for the most part, in 1928. Although its educational programs are highly innovative, its physical facilities are cramped and antiquated. Its structure is sound, yet it imposes inordinate rigidity on future educational programming.

The school, a unit of the Muncie Community Schools system and a department of the Teachers College, is for testing teaching methodology and learning environments, for developing instructional materials and for involving university students in teacher education programs with children. It has 900 students.

In essence, the Burris Laboratory School sits as an island, physically isolated from its university and community neighbors. Learning operations are in many ways confined to the artificial anonymity of its monotonous brick walls. The subject matter of its classrooms has become so intertwined with real life that

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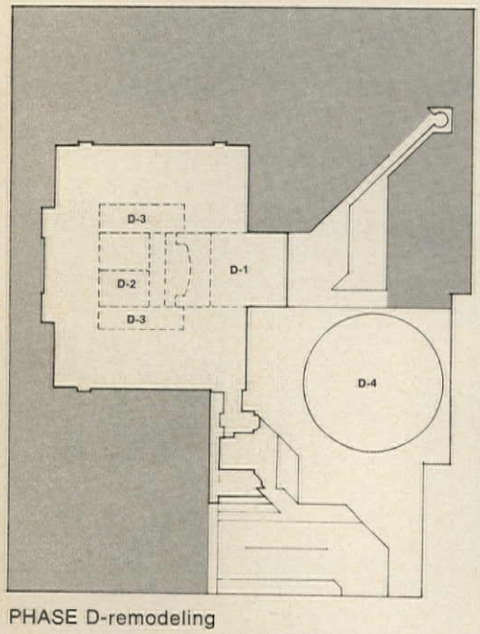
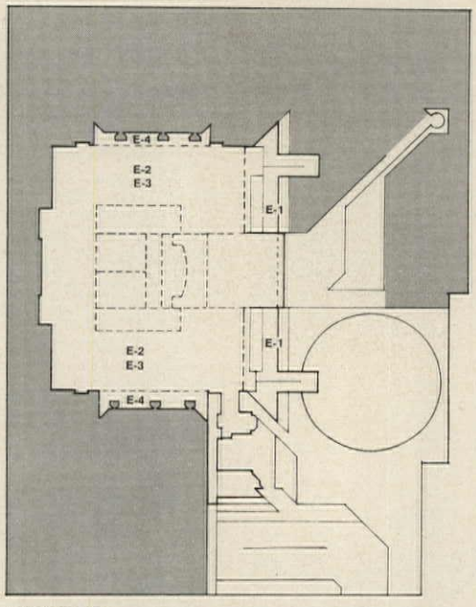
Mr. Rosenman is associate professor of architecture at the College of Architecture and Planning at Ball State University, Muncie, Indiana. He was the project director for the Design Feasibility Study for the Renovation and Addition to the Burris Laboratory School in Muncie. The study was made possible through the efforts of the Teachers College and the College of Architecture and Planning at Ball State and the New Life for Old Schools Project of Educational Facilities Laboratories, Inc. **Mr. Costello** is associate professor of architecture and **Mr. Mullins** instructor in Architecture at Ball State.



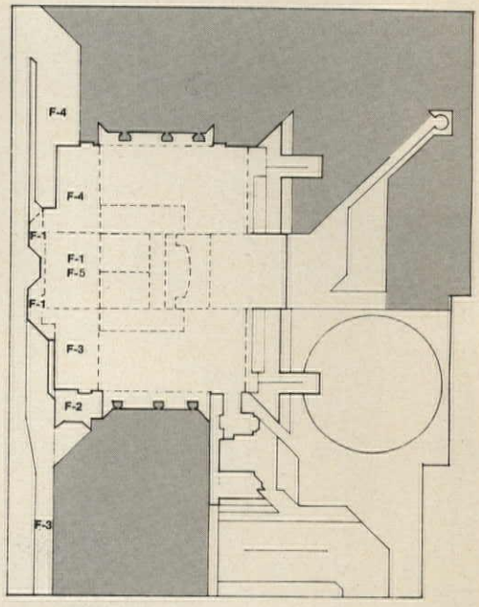
PHASE D-remodeling

1. Conversion of existing theater balcony to form two lecture halls; extension of flyloft; construction of new bridge to edge of existing balcony; removal of theater seats; realignment of floor; installment of new suspended ceiling
2. Conversion of gymnasium to create theater support area
3. Enclosure of existing courtyards; demolition of existing structures in areas; installment of plexiglass roof coverings
4. Seeding of playbowl area; erection of air inflated translucent dome-shaped canopy with heating and electrical



PHASE E-new construction connected to existing structures; remodeling

1. North/south arcade
2,3. Demolition of existing partitioning on first and second floors to create open plan configuration; construction of audio/visual totems and of new elementary resource center within existing building
4. Connection of two-story learning pods to existing building



PHASE F-new construction; modifications to existing and new work

1. Opening of existing wall for new bleachers and locker areas with ramped access
2. Single-story auto shop and entrances
3. Construction of concrete ramped access to service entrance; modifications to existing structures to provide service facilities
4. Conversion of existing basement to community rooms
5. Conversion of basement storage areas to cafeteria and food service facility

the two are becoming one; presently there is no physical indication of this at Burris.

The limits of educational systems and facilities have transcended the mythical boundaries of the classroom in thought as well as action; and flexibility in space and time, once thought the panacea for every educational facility ill, has taken second place to accessibility. Concern for the design inside the classroom is rapidly giving way to design interest of a more critical nature—that of the total community. The Burris school and scores of schools like it throughout the country can easily become more intense generators of community activity; their programs can better serve the individual and the groups; their presence can be more widely felt; their educational potentials can be enhanced through the creation and addition of new, exciting relationships, spaces and uses for everyone experiencing their environs.

The goals formulated by the Burris faculty are clear. Their primary objective is to allow a student to learn about himself, through activities stressing perception, self-expression and self-expansion. These activities may take the nonverbal forms of music, art or physical development. Another objective is to expand into the community through exposure, inviting and encouraging participation from other individuals and institutions.

Plans were based around the following enrollments: prekindergarden, 50; kindergarden, 50; grades 1 through 6, 300; grades 7 through 13, 540. The proposed design would be essentially unaffected by a gradeless situation.

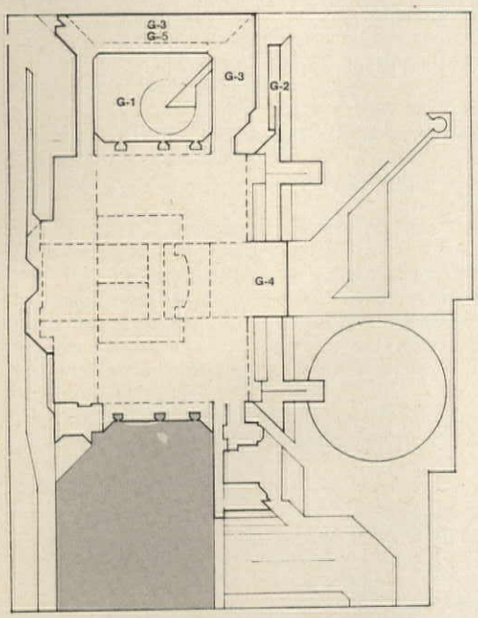
The educational program will be designed to allow for the development of continuous learning programs; i.e., to meet the needs of the individual learner. Continuous learning patterns will be in effect from prekindergarden through grade 12. The learning spaces must be flexible, designed to accommodate large groups in an area from which small groups and individuals can work in special activities. Since students will operate out of large areas, it will be necessary to have the responsible faculty centered within these areas.

The school would not be organized in terms of subject discipline but rather in terms of the large social issues confronting man. This is the school of the immediate future.

Teachers who direct programs in the large areas should have their headquarters within that instructional area, i.e., the building ought to be designed to facilitate communication among teachers. As we would see it, there would be no need for the so-called private office. However, in every area there would be places in which individuals or small groups can assemble in isolation from the total group. Also, in each area should be some place for private conferences. Serving the total program will be the gymnasia, recreation center, auditorium, library and teaching material center. The number of children in the school would warrant separate elementary and secondary libraries.

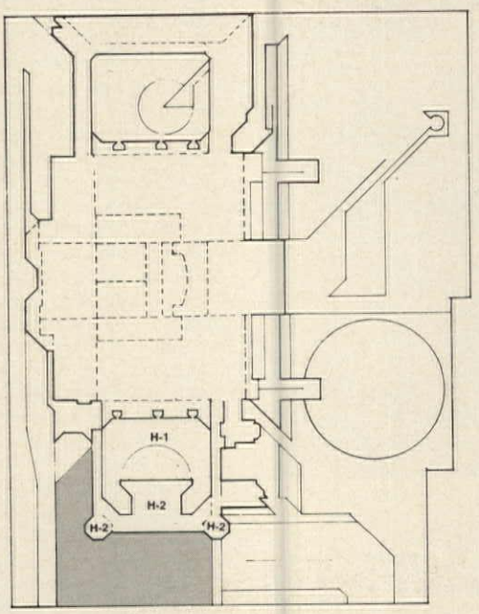
There should be administrative offices for secondary and elementary schools as well as offices for counselors. In the director's office there should be a school nurse service, provision for a social psychologist, a psychometrist and a speech and hearing therapist.

Since the laboratory school will be serving undergraduate and graduate professional education inservice programs, there



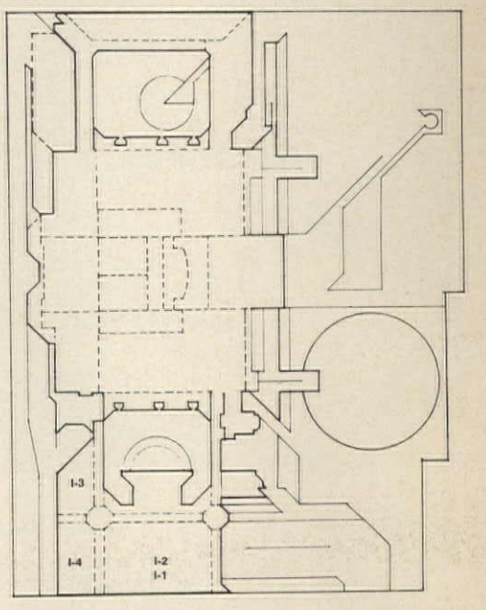
PHASE G-new construction; modifications to old administration area

1. Seeding of north garden/play court; kiln; staircase; planting
2. North/south arcade, second phase, including planetarium
3. Construction of two-story administration and professional program area
4. Remodeling of existing administration areas to form new theater lobby
5. Construction of new museum area and storefront for student center



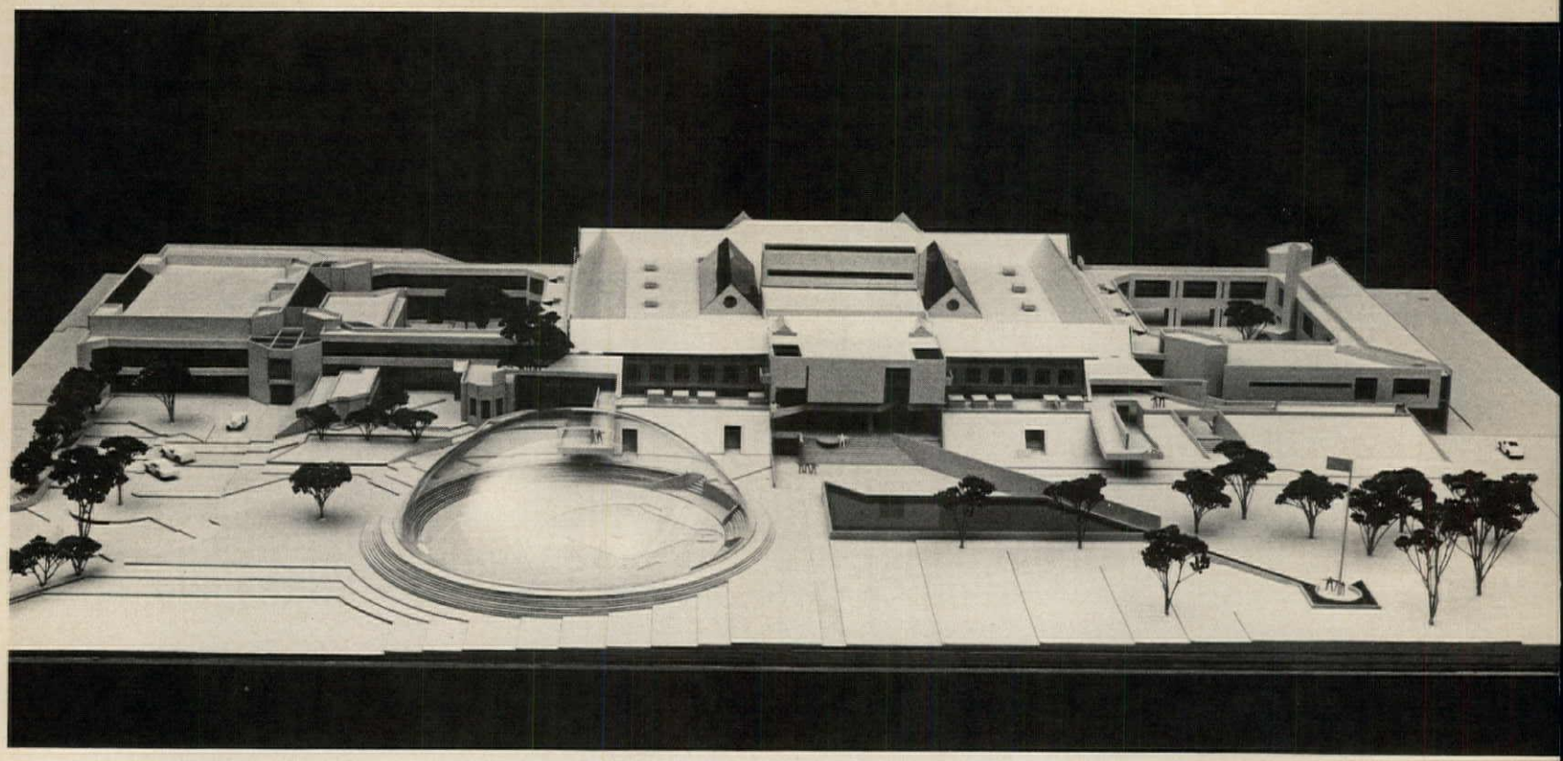
PHASE H-new construction

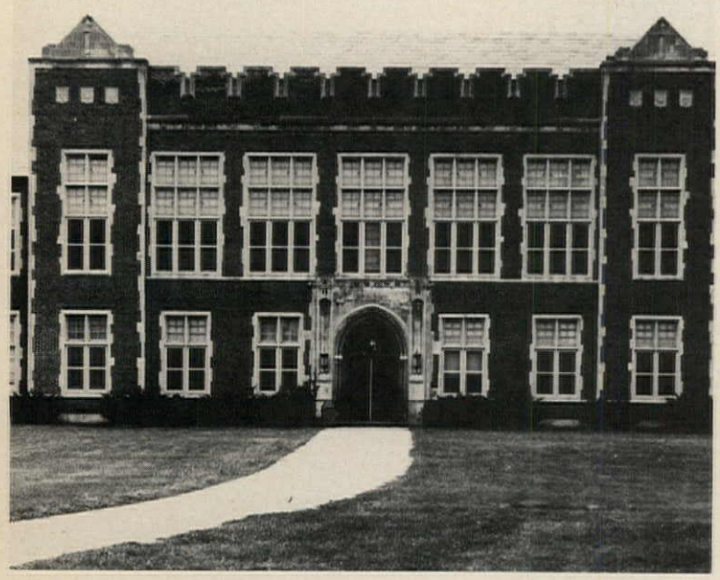
1. Paving etc. of south garden/play court
2. Construction of inside/outside music theater with movable stepped floors, learning tubes and glass enclosed walkway

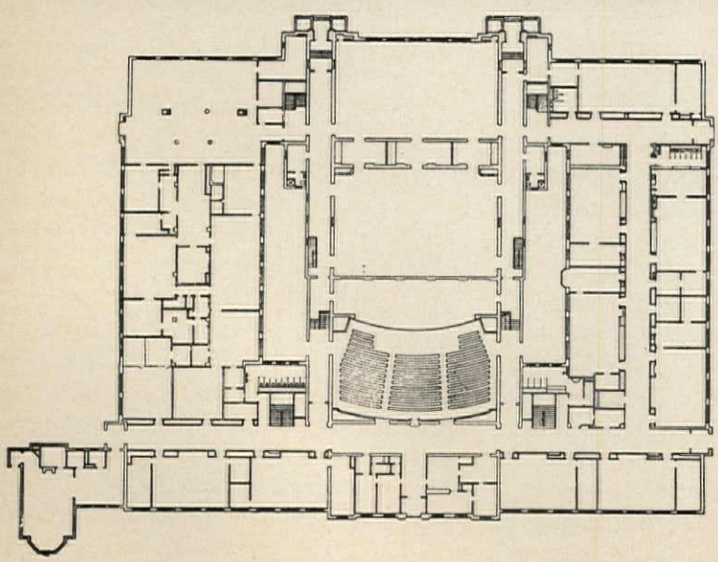


PHASE I-new construction

1. Swimming pool and locker areas at basement level beneath new gymnasium
2. Observation gymnasium
3. Additional, double-height music facility; two-story storage facility
4. Additional physical development spaces

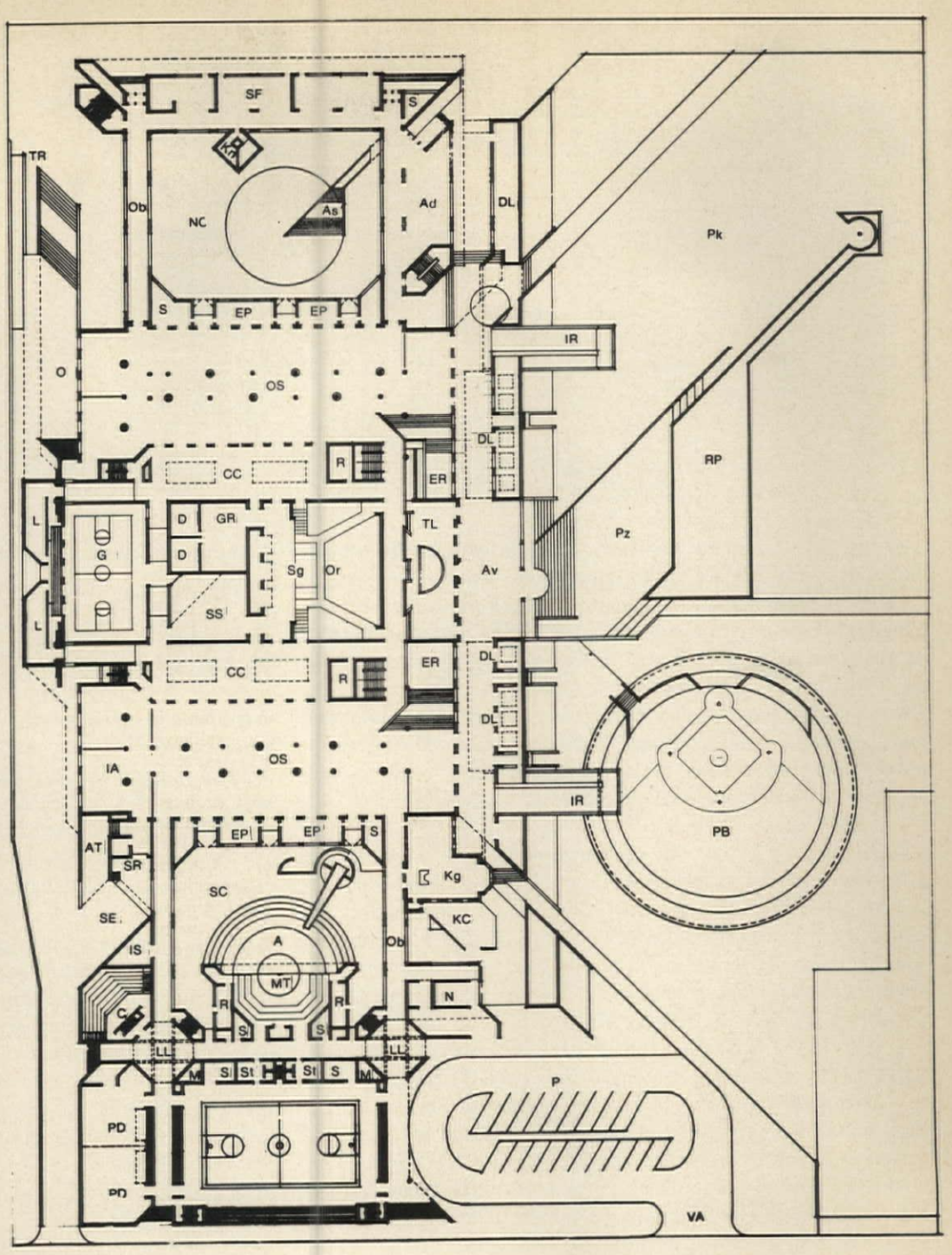






Among features that turn the rebuilt Burros School inside-out and make it an exciting part of the neighborhood, in contrast to the original facility (left), are:

- Library, or information resource center, protruding through the north/south arcade and over piazza. This forms a symbolic link between school and community. It is central in connection with the new facility but not hidden within it. It can remain open 24 hours a day, as can some of the other functions along the arcade.
- Elementary resource center directly below the main information center. This is accessible from the piazza.
- Glass enclosed, bermed and ramped north/south arcade. This is the school's circulation and activity spine; the berms are made for climbing, holes can be poked through for experiments in chemistry, biology or meteorology.
- North garden/play court with oversized "amphistair." This can be used by playgroups. A new kiln is the focal point for the crafts area and also relates to the art/crafts display along the street.
- Additions surrounding the north garden/play court. These activities reach out to the street; the lower level has a bookstore, soda fountain/student center, art/crafts display. All can be open weekends and evenings and provide an intermediate location or stepping stone between home and classroom.
- Gymnasium complex designed for group observation. Below the gym is the swimming pool, visible from the street through long, eye-level windows.
- Cafeteria which opens onto an outdoor eating area. This is partially sheltered by the gym lockers above.
- Nursery areas with immediate accessibility. These include the south garden/play court and a transparent, air-supported playbowl with a surrounding berm which may be used for spectator seating.
- A variety of land treatments: parklike area; pond (for skating in winter, wading in summer); piazza (for exhibitions and gatherings); playbowl (for carnivals and recreation the year round); vehicular access. A major walkway extends diagonally toward the center of the university and has a water channel (for model sailboats) that anchors around a flagpole.



A Amphitheater
Ad Administration
As Amphi stair
At Automotive technology shop
Av Arcade vestibule
C Choral room
Cc Circulation court
D Dressing room
Dl Discovery labs
Ep Exterior pods
Er Elementary resource center
G Gymnasium
Gr Green room
Ia Industrial arts
Ir Interaction ramp
Is Instrument storage
Kc Kinder court
Kg Kindergarden
Kn Kiln
L Lockers
Ll Learning lobby
M Mechanical equipment
Mt Music theater
N Nursery
Nc North garden/play court
O Outdoor area
Ob Observation gallery
Os Open space
Or Orchestra
P Parking
Pb Play bowl
Pd Physical development
Pk Park
Pz Piazza
R Rest rooms
Rp Reflecting pond
S Staff
Sc South garden/play court
Se Service entry
Sf Storefront facilities
Sg Stage
Sr Shipping/receiving
Ss Scene shop
St Storage
Tl Theater lobby
Tr Terrace ramp
Va Vehicular access

should be an area large enough to accommodate the maximum number of university students that would be assigned to the laboratory school for professional experiences at any one time. A rough approximation would be to serve a group of 100 university students.

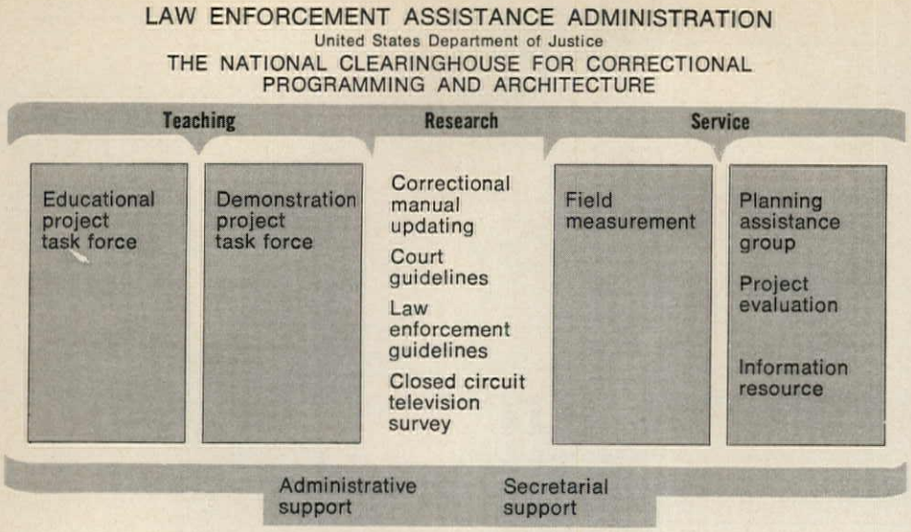
Since one role of a laboratory school is to provide opportunity for various individuals to observe the teacher/learner environment, the learning areas should be open to viewing. The interior of enclosed areas should be visible from within and without, i.e., no one-way glass except in rooms in which the learning activity would be modified negatively if the observer were visible, such as in psychometrists's testing rooms and in therapy rooms.

Associated with the laboratory school director's office should be a conference room with space for 50 to 60 people.

For the Burris School we suggested a priority-based sequence of remodeling and additions, consisting of distinct operations which can be grouped into eight major phases for purposes of financing and construction. The phases, in turn, can be combined to form larger development packages if desirable. These changes can be made without disrupting the normal operations of the existing facility.

The design proposals for the facility encourage the development of a symbiotic relationship among Burris, the university and the community. The connective tissues of these groups is felt to be a primary source of information dissemination. Through the proposed use of building form, land development, appropriate scale, materials, graphics and circulation, it is felt that the school can serve more diverse community interests.

It is hoped that the remodeled facility can set an example for many schools under similar physical restraints. □



In Answer to

by FRED D. MOYER, AIA

The last year especially has seen strong growth in the organization of forces that are out to improve our correctional system. One of the many activities expressing their efforts is the National Clearinghouse for Criminal Justice Planning and Architecture at the University of Illinois. Sponsored by the Department of Justice's Law Enforcement Assistance Administration, the Clearinghouse goes beyond the obvious function of obtaining and disseminating information. It also acts as a planning assistance center, augmenting the work of architects, planners and workers involved in the correctional field.

The main purpose of the Clearinghouse is to assist in the planning of improved treatment practices and facilities for lawbreakers and criminals. By this is not meant assistance in the construction of new versions of the old type prison—or people warehouse—with all its failures. The goal is correction of the lawbreaker, and this is seen in the change that is now taking place in planning and architecture.

This thrust is clearly expressed in *Guidelines for the Planning and Design of Regional and Community Correctional Centers for Adults**, and it is in fact this volume which lies behind the establishment of the National Clearinghouse for Criminal Justice Planning and Architecture (*see* AIA JOURNAL Sept. '71). Under the auspices of the Law Enforcement Assistance Administration (LEAA), the Department of Architecture at the University of Illinois took part in studies on how to improve our entire correctional system and developed the *Guidelines*. During these studies, the need for a pool of information on correctional planning and architecture became obvious and, consequently, LEAA sponsored the Clearinghouse.

The orientation of the Clearinghouse is diversion of suitable alleged offenders from the incarceration category and a subsequent reduction in facility size and construction cost, focusing resources upon those individuals who either represent real threats to the community or who require more structured treatment environments and who are, therefore, not eligible for treatment programming within the free community. The orientation of the Clearinghouse also supports contemporary approaches toward community-based corrections as the most promising direction for the socialization effort, maximizing interaction with the community to which the offender will return and drawing upon its resources in the most effective way to aid and advise in the reintegrative effort.

The architect who is confronted with the responsibility of performing services in the correctional field, if he assesses the real needs, finds that a new level of professional performance is required. It is all too convenient, as well as lucrative, to accept unfounded projections of facility population size and to deliver schemes "worked out" by the hardware manufacturers. The results of such practice affect people, presently some 426,000, who spend thousands upon thousands of hours behind bars in a torment which is not visualized in the drafting room.

It is to a new level of professional performance that the Clearinghouse relates. Part of our job is planning assistance. The staff of the Clearinghouse, now numbering 35 and still growing, does not supplant other consultants or professionals, including architects, but is rather augmenting the professional team. Since we are under contract with LEAA, no charge is ever made for our services. The expanded scope of services required by architects, which includes survey analysis and programming, involves for most firms an area in which they have not previously practiced. It has been our experience, however, in contacts which have been nationwide, that this is an area in which few other professionals have practiced either. Behavioral scientists have little tradition in total system planning, including assessment of need on a comprehensive basis, synthesis of projected requirements, and translation of social and physical requirements into appropriate environments and strategies for attaining them.

Thus, if the architectural profession does not respond to this broader scope of planning, the work will be done by others perhaps less qualified to undertake it, or it will not be done at all.

Planning assistance services are a component function of the Clearinghouse. We do not limit this to projects that are or may become federally funded. Where federal money is to be sought, however, our review activities are required since federally funded projects must follow the government's guidelines.

Generally, two types of funding are being sought or anticipated: planning funding and construction funding. In either case the Clearinghouse addresses itself to such activity as is in-

*Frederic D. Moyer, Edith E. Flynn, Fred A. Powers, and Michael J. Plautz: *Guidelines for the Planning and Design of Regional and Community Correctional Centers for Adults*. Urbana, Illinois: University of Illinois, 1971.

Mr. Moyer is associate professor of architecture and director of the National Clearinghouse for Criminal Justice Planning and Architecture, Department of Architecture, University of Illinois, Urbana. He directed that department's interdisciplinary team which developed the *Guidelines for the Planning and Design of Regional and Community Correctional Centers for Adults*.

Questions on Correctional Architecture

tended to result in construction of a federally funded facility. The functions of the Clearinghouse are to:

1. Render assistance in the implementation of the *Guidelines* in the following areas:

- the process of correctional problem identification
- the comprehensive planning and development of treatment programs within community contexts
- the full exploration and maximum use of alternatives to incarceration for the treatment of offenders
- the development of alternative classification, routing and treatment schemes
- the development of facility networks which provide a service capability to a defined target area
- the space programming of new facilities
- the development of architectural components in the design of new facilities
- the renovation and remodeling of correctional facilities
- the development of programming, staffing and facility budgets.

2. Provide technical assistance to LEAA grantees, planners, architects and others in the development of plans for adult and juvenile correctional programs and architecture. As a component of this service, a reference collection of correctional program statements and preliminary architectural drawings and specifications is being maintained for projects with which contact is established.

3. Act as reference source with a switchboard function for inquiries about correctional programming and architecture.

4. Conduct assessments of the efficacy of correctional treatment programming and correctional architecture as a means of contributing support to the existing body of knowledge contained by the Clearinghouse and, consequently, contributing to the conduct of work in the foregoing task areas.

5. Evaluate the results of correctional planning grants under the provisions of the Part E Amendment of the Omnibus Crime and Safe Streets Act of 1968 as a prerequisite for their funding.

6. Provide for the continuous updating and revision of the *Guidelines*.

7. Maintain a dissemination service, based on a master mailing list, as a component of the *Guidelines* updating function.

8. Function as a terminal for the National Criminal Justice Data Base and as a technical reference service as a means of obtaining the necessary statistical information, Uniform Crime Reports data, population projections, etc.

9. Develop guidelines for court-related construction projects which incorporate prevailing and emerging concepts in this area.

10. Develop guidelines for law enforcement facilities as these relate to the judicial and correctional functions.

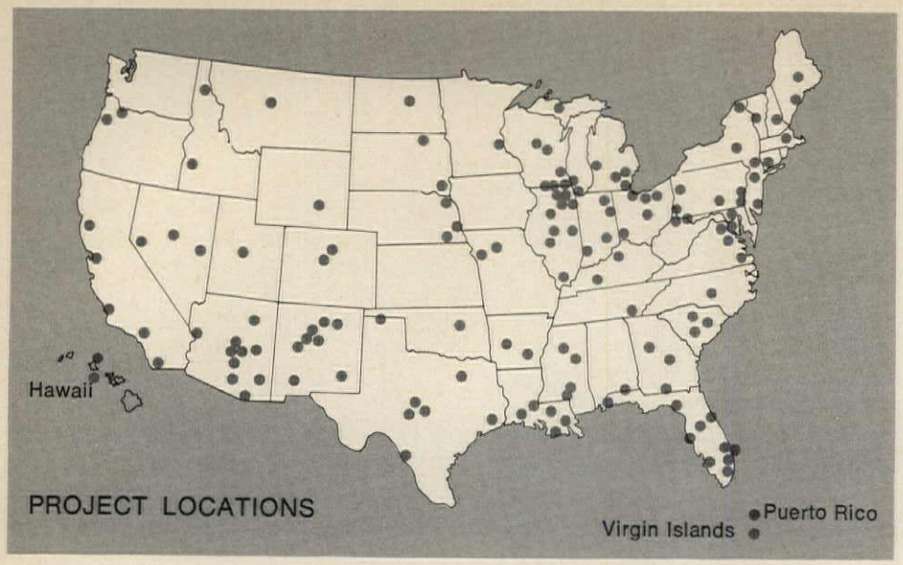
On our staff are architects, sociologists, specialists in counseling psychology, statistics, computer simulation modeling and recreation programming, as well as assistants in social work, urban planning and law—a truly interdisciplinary team.

A principal activity is that of reviewing and evaluating projects which seek federal money under the Part E Amendment, which specifically makes funds available to support the construction of facilities which provide for the accommodation of improved correctional practices. A memorandum recently prepared by LEAA is currently being distributed to the directors of all 55 state planning agencies. This outlines the procedures to be followed for certification of compliance. In requesting planning aid, an applicant should forward all relevant documents to the State Planning Agency, LEAA's regional office or the Clearinghouse directly (Department of Architecture, University of Illinois, 1102 W. Main, Urbana, Ill. 61801).

These documents, or background material, include surveys of the service area providing demographic data, offender profiles, population projections, trends in judicial practice, survey of current judicial dispositions, descriptions of pertinent contextual features, present and projected correctional program activities, present and projected staff patterns, documentation of existing environmental conditions which relate to proposed construction and other data considered pertinent to the proposed project. Contacts with our staff are then made either by a site visit on our part or by a visit to our office by the project personnel.

The nature of our review requires early involvement on our part. Rather than judging construction documents after they have been completed, we prefer to be part of the team before the architectural program has developed. This is now the case in the majority of the some 250 projects with which we are actively involved. The review function consists primarily of determining whether solutions which are derived actually do relate to local needs in the light of current knowledge and the best assessment techniques. The part E Amendment to the Omnibus Bill requires that expenditures be limited to those projects which support innovative and advanced correctional practices. While much more is known about this subject than is practiced, that practice which can be measured conclusively supports the correctional philosophy upon which the *Guidelines* is based.

As a preface to planning assistance or review activities our



One wall at the National Clearinghouse is used to track projects with which its staff is involved through planning assistance, project review, or planning and design demonstrations. Projects consist of state master plans, regionalized service delivery networks, intake service centers, community correctional centers, and a variety of other programs at state, regional, county and most local levels.

first task beyond the development of the *Guidelines* was the identification of demonstration projects which would provide our staff with "shakedown" experiences. The first of these presented itself when we received a request from Dr. Irwin Tanaka, director of the State Law Enforcement and Juvenile Delinquency Planning Agency, the state planning agency of Hawaii, to develop a comprehensive strategy for meeting Hawaii's correctional needs. Specifically, a new master plan was called for.

The Clearinghouse had already developed the techniques to undertake a survey to assess needs, trends and resources and also to establish program linkages and facility requirements. With the cooperation and participation of 58 community agencies, 12 existing correctional facilities, the four judicial circuits, Family and Juvenile Courts, the Department of Social Services, the Division of Corrections, and the staff of the Hawaii State Planning Office, questionnaires were administered to all parties for a full implementation of the *Guidelines* methodology.

The answers were computer coded and keypunched in Hawaii and tabulated in Illinois. Realistic projections of need were developed by our Clearinghouse staff.

These needs, expressed in terms of program linkages which relate individual offenders to appropriate correctional treatment programs, were derived by using detailed analysis of offender profiles projected within each judicial circuit. Emphasis was directed toward the development of early assessment and evaluation of each alleged offender so that responses could be tailored to individual need, resulting in an improved total service system.

The draft of the resultant master plan is currently in the hands of the legislature of the State of Hawaii and has been passed by the Senate. We have presented its concepts to various legislative committee hearings and it is currently progressing through the funding stages.

The total plan evolves around the contemporary concepts of community-based corrections presently viewed as the most promising direction for reintegration of offenders. The process has allowed our staff to make adjustments and refinements in certain mechanical aspects of the *Guidelines* technique, as well as to confirm the applicability of the total system planning process to widely varying contexts. Other demonstration activities are underway, each offering unique application experiences for a generalized problem-solving methodology in differing regions, scales and the socio-political climates.

In addition to the staff already mentioned, the Clearinghouse has library researchers who are developing a bibliography of materials concerning programming and facility design. The *Guidelines* embodies an up-to-date summary of the best prevailing practices in the field, but the bibliography will supply consumers with all additional sources of information. In advance of its publication we are finding ourselves providing such information on a one-to-one basis and on an international scale. Outside of the United States we have had exchanges with Mexico, Scotland, Great Britain, Japan, France, Italy, the Netherlands, Sweden, Lebanon and Morocco.

With the National Task Force on Corrections, a component of the National Advisory Commission on Criminal Justice Standards and Goals, we are contributing to the development of immediately applicable standards as well as goals which should be achieved by 1982. Included in this responsibility is the development of recommendations which will comprise national standards concerning such issues as criminal justice system routing and environmental rights of the accused and of the offender.

The Clearinghouse is in contact with schools of architecture which have expressed interest in developing programs relating to the design of the correctional environment. Several of them have acquired copies of the *Guidelines* and use it in their course work. Our most extensive participation in this area is of course with our own Department of Architecture. During the past year, 38 students at the University of Illinois have addressed the potential of some actual projects which have been identified by the Clearinghouse. Our staff has served as resource personnel for the laboratory simulation of professional activity. The constraints as well as the potentials that come with the design of a correctional project have been made part of the problem statement.

While tradition and vested interests continue to serve as significant planning determinants, we detect important new approaches and find individuals in every participatory sector who are genuinely interested in accomplishing change. Together with the continuance of provincial and outmoded approaches to contemporary problems we find receptivity to innovation and reform. The course of our work involves us in discussion with judges, senators, lawyers, ex-offenders, correctional administrators, line correctional staff, architects, planners, mayors, governors and last, but not least, the correctional client. The Clearinghouse exists to bring together and to implement the best theory and practice which can be found to meet an ever-growing need and to participate in an advisory capacity in the development of innovative and effective solutions in the area of crirninal justice planning and architecture. □

Architect and Archaeologist as Collaborators

"The proper study of mankind is man," wrote Alexander Pope. But man cannot be studied unless we know about his past—where he lived, how and why. Bruce Rippeteau, a candidate for the doctoral degree in the Department of Anthropology, Case Western Reserve University, tells the architect how he can serve the study of mankind. He can collaborate with the modern science of archaeology in the discovery of man's past cultural diversity by providing for the preservation of prehistoric sites until competent experts can investigate and take proper samplings.

Many persons associate archaeology with ancient civilizations of the Old World and particularly with its facets of art and architecture. There is, however, a chasm of interest between this so-called classical archaeology and modern archaeology. The former is romantic, esthetic, reliant upon history and concerned with the partial characterization within the last several thousands of years of one human heritage in a small sector of the entire world.

In contrast, modern archaeology has become allied closely to anthropology, the study of man in all his rich diversity. This came to be because of archaeology's unique data on the prehistory of the entire world at any time period and also because of a burgeoning interest in human behavioral changes over long periods of time.

In the New World, we have no vast heritage to which our present sociocultural entity, the international state, owes the majority of its genius. Prior to the European colonization beginning in the 1500s, we have no direct knowledge of the inhabitants of the New World and their way of life. Nor, for that matter, after almost 500 years of social intimacy, have we directly gained upon the early cryptic reports.

It is only natural that the thrust of American archaeology, beyond time and space chronicling, has been increasingly toward cultural process. That is, the focus has been upon social, economic and political organizations and their relationship by adaptation or extinction, at any and all times, to the physical and social environments.

The specification, or chronicling if you will, of past peoples in time, space and culture is of course a forever continuing duty whose value is the documentation and understanding of human sociocultural organizations and their evolution. This evolutionary frame of reference consists both of the progressive sense inherent in technological or economic advances, and in the oscillatory sense of human behavior in specific responses to local environments for the perpetuation of their particular societies.

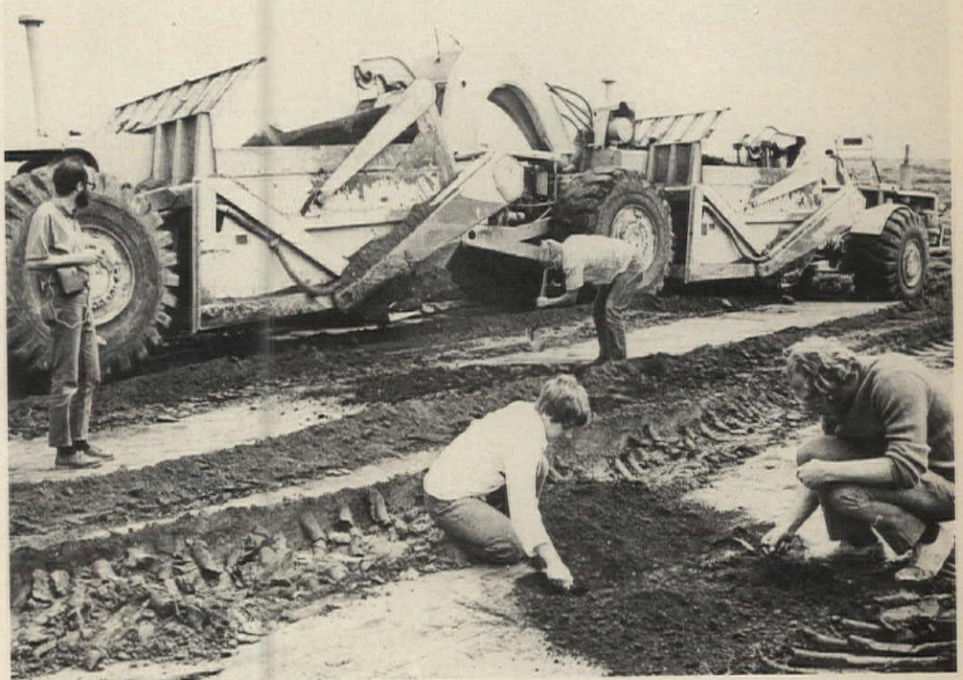
Because the landscape that surrounds us today is largely of our own manufacture, our appreciation of the natural ecosystems that determined the distribution of prehistoric peoples is subject to great error. The architect can make a crucial contribution to archaeology because of this uncertainty.

All of our information about the past, aboriginal as well as much of historic European, comes from scientifically unearthing the scant remains still extant and correlating all possible cultural and environmental data to infer human behavior. Our sole source of data exists on or beneath the surface of the ground. From this follows two critical truths: The sites must be discovered and they must not be destroyed before a useful sample of their information is competently obtained. In the development of both virgin or modified building sites, for history and prehistory, the architect controls the source.

Simply put, if the architect as master planner of a project that modifies the ground in any way would include a provision in his planning for the determination and recovery of cultural remains, he would tangibly serve the study of man. Highway construction and other major engineering projects such as dams have sometimes done this in cooperation with a "salvage archaeologist." Indeed, as much as a third of our prehistoric data stems from excavations necessitated by our dams and ribbons of asphalt. It is time that the relatively piecemeal project of urban expansion should make a contribution.

Urban renewal projects must be mentioned for their probability of exposing the earliest (the lowest) levels of an earlier city. Not only is the downtown locality often historically the oldest portion of habitation, but the economic requirements of highrise architecture also necessitate deep foundations which, combined with the increasing prevalence of underground garages, suggest the increased need for archaeological consultation by the architect.

Sites, the evidences of earlier people, consist of artifacts, remnants of dwellings and patterns of settlement as well as subtle hints from zoological and botanical analyses of human induced changes in the environment. Any result or effect of human behavior may be called an artifact, but conventional usage generally refers to tools and the smaller or portable aspects of material culture. Although the great majority of a people's remains decay rapidly and sometimes before the site is ever buried by wind or waterbourne sediment, there are usually faint traces even of perishables which may remain due to charring or special soil conditions which are obvious only to trained excavators.



At the Zuma Creek site, near Los Angeles, archaeologists undertake emergency salvage to save what they can of a past civilization, but they are able to recover only remnants of the past.

Potsherds are extremely useful for inference about the past, often reflecting a good deal more about the intent or social milieu of the maker than the subtractive nature of flint working. Also settlement patterns which reflect the social organization of a people may be revealed by plotting post molds. All that typically remains of post molds is a slight color variation that can be verified only by experience and technique. Other settlement manifestations such as hearths and refuse pits are easier to recognize by virtue of their associated concentrations of rock and charcoal or by the rich organic fill.

The amount and reliability of our data and inferences from sites decrease exponentially with extension back in time. Therefore, all new data is of value to the archaeologist and, ultimately, all men.

Architects as individuals have contributed professional talent to Old World archaeology

An Indian site dated 500 A.D. is uncovered and destroyed in a single day in eastern Arkansas, but archaeologists work hard to save exposed burials (above). At a site in Louisiana (below), they only have time to protect the materials uncovered at the very bottom of a mound.

by the application of design and construction principles. While this has been of greatest utility in the excavations of actual civilization, such as by classical archaeology, what I wish to stress here in America is the role of the architectural profession as the guiding authority in landscape alteration. This potential contribution of architecture to modern archaeology exists at such a basic and crucial level.

If the moral enjoinder is not sufficient, I can suggest favorable publicities that could be obtained from the participation of archaeologists during the construction of a project, not to mention a certain distinction to a building, as commemorated upon a plaque in the lobby, arising from the site's double service as an archaeological source of information about mankind.

A survey of the site by an archaeologist before any work is done, such as grading, would be an ideal approach. If this seems impossible, as soon as suspicion is aroused in the course of the work that archaeological finds are evident, competent authority ought to be notified and further alteration cease until the site is visited.

I appreciate the notion that construction and development cannot wait upon the possibly slow archaeological excavation of a site, but I do plead for a determination of the site's value to archaeology as soon as possible so that proper salvage can be accomplished.

How is this done? Call an archaeologist! In the full execution of his duty, the architect should notify a responsible agency, such as a state or local university department of anthropology or a museum, as to the located site and a timetable for its development. Any artifacts that have been uncovered ought to be forwarded with a map of their approximate location.

If the site appears to be of value, this hardly means cessation of work on the construction project. The site is usually available after hours during the week and on weekends. Even a small but carefully determined sampling is highly useful and can be accomplished in a few days by a small team of archaeological experts.

The essence of the contribution of architecture to American archaeology is not solely in its inherent nature of discovering sites. It also rests firmly in the necessity of preserving them intact until suitably sampled. The various remnants may well continue to remain into a distant future, but the instant they are disturbed from their context of stratigraphy and mutual association, they become stripped of scientific value. It is not the artifact itself which primarily generates information about our ancestors in time, space and culture but rather the many relationships of one artifact to another.

For the knowledge of hundreds of generations of unknown people, the architectural profession should feel it worth its while to routinely participate in the critical aspects of site discovery and preservation for proper excavation. This sort of participation is not without precedent. Thomas Jefferson, well known as an architect, is generally regarded as the first American "dirt" archaeologist. □

outlook *from page 12*

Invitational Competition Winner Chosen, Nation's Largest Convention Center

The firm of Skidmore, Owings & Merrill has been chosen as architects for the $100 million New York City convention center which will be the nation's largest with over 750,000 square feet of space for exhibitions and meetings (*see* AIA JOURNAL, Nov., p. 62). The selection was made through interviews with an invited group of 27 architectural firms. The design team of architects, planners and engineers will be headed by AIA Fellows Gordon Bunshaft and J. Walter Severinghaus, partners in the New York City office of SOM. It is anticipated that the center will be completed in July 1976 in time for the US bicentennial.

The jury for the invitational competition included Thomas F. Galvin, AIA, executive vice president of the Convention Center Corporation, set up in 1971 by state legislation; Jacquelin T. Robertson, AIA, director of the Office of Midtown Planning and Development; Seymour Durst, a real estate official; and Preston Robert Tisch, chairman of the Convention Center Corporation and president of Loew's Corp.

Training in Built-Up Roofing Systems Offered by New Institute in Denver

A facility to train architects and engineers in the technology of built-up roofing systems has been established in Denver. Called the Built-Up Roofing Systems Institute, the school will be directed by John C. Robinson. It will be located in the new Johns-Manville corporate headquarters building and will have access to the firm's technical and research facilities.

The curriculum is structured for a one-week course of study with class sizes limited to about 15 participants. Training will consist of classroom work and lectures, laboratory sessions, on-site field trips and roof systems application demonstrations. Initially, attendees will be drawn from staffs of architectural and engineering firms, but future programs will be broadened to include federal, state and local government personnel and major building owners.

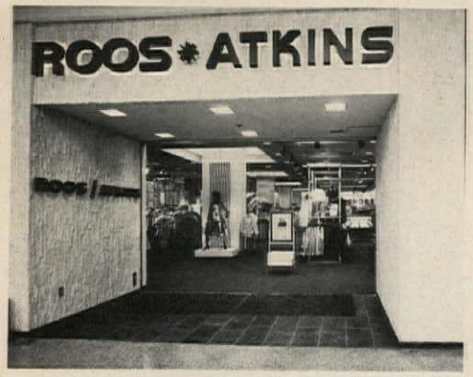
Store Interior Design Contest Winners Are Located in New Jersey, California

The National Association of Store Fixture Manufacturers and the Institute of Store Planning have named three top winners of the second Store Interior Design Contest.

First in the "major department store" category was the New York City firm C.N.I. International, Inc., for the Manalapan Mall in Manalapan, N.J. The Los Angeles firm of Burke, Kober, Nicolais & Archuleta won highest honors in the "specialty store" division for Roos Atkins, Tanforan Park Shopping Center, San Bruno, Calif. Morganelli-Heumann & Associates won the "shop within a store" award for Joseph Magnin in San Francisco. Other firms received awards of outstanding merit.

The awards program was established to

"encourage interest and understanding of the profession of store planning" and to recognize those who have made an outstanding contribution to the profession.



Specialty store winner is Roos Atkins in the Tanforan Park Shopping Center in California.

University of Virginia, HUD Join Forces In Restoration of Jefferson's Rotunda

The Rotunda, the "keystone" of the University of Virginia in Charlottesville, was the last building designed by Thomas Jefferson, completed in the 83rd year of his life. It will be restored according to his original plan with restoration completed by the nation's bicentennial year of 1976. The Rotunda is considered one of the finest examples of 19th century architecture in America.

The Department of Housing and Urban Development has made a record matching grant of $1,080,250 to the university under its Historic Preservation program. The project will cost $2,176,500, of which $1,017,903 will be provided by the Cary D. Langhorne Trust of Washington, D.C. Previously the General Assembly of Virginia had voted $55,000 for planning, and $15,347 had been contributed privately.

The Rotunda was heavily damaged by fire in 1895. In restoring the building, New York City architect Stanford White made major changes in the interior, eliminating the main floor and substituting huge columns for the twin columns designed by Jefferson. Since that time, only about a fourth of the Rotunda has been in actual use. Restoration architects are Ballou & Justice of Richmond.

Well-Known Writer and Educator Honored

Christopher J. Alexander, professor of architecture at the University of California, Berkeley, is the first recipient of the AIA Medal for Research. Given in recognition of his contributions to "an increased understanding of the relationship between man and his physical environment, and of the architect's role in that relationship," the award was made at the AIA convention in Houston.

Dean Emeritus, Outstanding Educator, 'Valued Counselor' to Many Students

One of the leaders who guided the College of Architecture at the University of Arizona into national recognition was Sidney W. Little, FAIA. He arrived on the campus in 1958, serving first as dean of the College of Fine Arts and head of the Architecture Department. When the College of Architecture was fully established in 1964, he became its dean and worked at this post until last year when he returned to full-time teaching.

At the time of Little's death on March 26 at the age of 67, Arizona's President John P. Schaefer said of him, "He was more than a teacher to those with whom he came into contact; he was a valued counselor and friend."

A graduate of Cornell University, Little received his master's degree from Tulane University and studied as well at the University of Pennsylvania and L'Ecole des Beaux-Arts in France. His career embraced teaching roles at Clemson University, Alabama Polytechnic Institute and the University of Oregon. Since 1952, his professional practice had been limited to consultation in design and urban planning.

A past president of the Southern Arizona Chapter AIA and of the Arizona Society of Architects, Little was also a director of the Western Mountain Region AIA. He served on many civic and professional committees, including the AIA's Commission for the Survey of Education and Registration under whose auspices *The Architect at Mid-Century* was published.

Called Jefferson's masterpiece, the Rotunda stands at the center of the university campus.

Swedish Architect and Urban Planner

Sven Markelius, an Honorary Fellow of the Institute, first achieved international recognition for his design of the Swedish Pavilion at the World's Fair in New York City in 1939. Architect of apartment houses, offices, concert halls and other building types he was responsible for the establishment of the new town of Vällingby near Stockholm in his work as head of the town planning department. Markelius, 83, died on February 24.

Deaths

JOSEPH T. BANNER
Laramie, Wyo.
EDGAR ROBERT FIRANT
Grand Rapids, Mich.
SALVATORE GRILLO
Island Park, N.Y.
THOMAS L. IMMEN
Kingsport, Tenn.
GENE G. JURENEC
Milwaukee
RICHARD KOCH, FAIA
New Orleans
EDLA MUIR LAMBIE
Los Angeles
GEORGE LEWIS
Princeton, N.J.
BENJAMIN F. OLSON
Evanston, Ill.
HARRISON JOHN OVERTURF
Seattle
ALEXANDER A. PAPESH
Cleveland
FRANK G. PEDRICK
Newtown Square, Pa.
FRANK C. STANTON
Mount Angel, Ore.
WILLIAM J. STRAIN
Bloomington, Ind.
JOHN STYFFE
Brooklyn, N.Y.
HARRY VIEHMAN
Pittsburgh

Newslines

■ **Contracts for new construction** in March totaled more than $7 billion, 15 percent ahead of the amount a year ago, according to a recent report by the F.W. Dodge Division of McGraw-Hill Information Systems Co.

■ **John Gaw Meem Day** was celebrated in New Mexico on February 20 by official proclamation of Governor Bruce King. Meem, a Fellow of the AIA, has retired from architectural practice but still is a force in the historic preservation of Santa Fe.

■ **The nation's cultural resources** will be studied by a panel of experts in the creative and visual arts which has been named to advise the American Revolution Bicentennial Commission. Architects on the panel include AIA Fellows Hugh Newell Jacobsen of Washington, D.C., and Harry Weese of Chicago.

■ **John C. Fleck, AIA,** of Indianapolis has been elected president of the Construction Specifications Institute for 1972/73.

■ **Consultants on historic preservation** will be listed in a reference service file being compiled by the National Trust for Historic Preservation to help answer its growing requests for professional assistance. Those interested in having record cards on file may obtain further information from the Department of Field Services, National Trust for Historic Preservation, 740 Jackson Place N.W., Washington, D.C. 20006.

■ **A. P. DiBenedetto, AIA,** of Portland, Ore., has received an Award of Merit from the Society of Federal Artists and Designers for a scale model of the Forestry Sciences Laboratory complex being built in Corvallis, Ore.

■ **The American National Standards Institute** has just published its 1972 catalog which includes all standards approved by ANSI in 1971 as well as international recommendations. The catalog is available free from ANSI, 1430 Broadway, New York, N.Y. 10018.

■ **A safety glass law** has been passed by New Jersey, making it the 17th state to invoke legislation whose purpose is to reduce injuries caused when people fall against regular glass doors or panels. The law calls for the installation of safety glass in all glass doorways, sliding doors, storm doors and shower and bathtub enclosures.

■ **W. P. Cotton Jr., AIA,** of St. Louis is the author of a folder called "Our St. Louis Architecture: What We Can Do to Save and Use It." The St. Louis Chapter AIA, 107 N. 7th St., St. Louis, Mo. 63101, is offering the piece free of charge.

■ **The Elbert M. Conover Memorial Award,** the Guild for Religious Architecture's highest honor, has been presented this year to the Rev. Glenn S. Gothard of the Methodist Board of Education. The award is given in recognition of outstanding contribution to the field of religious architecture by a nonarchitect.

■ **The AIA Foundation's new chairman** is Francis D. Lethbridge, FAIA, of Washington, D.C. Another practitioner in the nation's capital, David N. Yerkes, FAIA, has been named new chairman of the Institute's Octagon House Committee.

■ **The Construction Industry Commission** has been created by the General Assembly of Illinois "to promote economy, efficiency and improvement in the effectiveness of procedures within the construction industry" for that state. The commission has begun hearings on licensing, safety laws and procurement of professional services. Its chairman is Senator Stanley B. Weaver.

■ **William V. Reed, FAIA,** of San Juan, Puerto Rico, a prime mover in the New San Juan Center project (*see* May '70, p. 60), will coordinate center activities to provide "united thought and interface."

■ **Planning of loading dock facilities** is outlined in the revised edition of *Modern Dock Design,* now available for $1 from Kelley Co., 6720 N. Teutonia Ave., Milwaukee, Wis. 53209. □

Premiering in June '72

Developmen Building: the Team Approach

A BOOK TO GUIDE ARCHITECTS (AND OTHER PROFESSIONALS) TO SUCCESSFUL PROJECT DEVELOPMENT.

Pioneering architects all over the United States are expanding architectural services into this new domain. Evolving beyond their traditional role as designers, they are entering the decision and delivery stage of building—in some cases as co-owners, in others as consultants offering new client services in the crucial decision-making processes which affect a project's ultimate success.

The complexities of land acquisition, mortgage financing, ethical implications, liability insurance—author C. W. Griffin explores them all in clear language. More than a score of illustrations show graphically how the team approach works.

Retail $15.00, AIA Members $12.00. M135. Order from Publishing Department, The American Institute of Architects, 1785 Massachusetts Avenue, NW, Washington, DC 20036.

books

Swimming Pools: A Guide to Their Planning, Design and Operation. Revised edition. Edited by M. Alexander Gabrielsen. Fort Lauderdale, Fla.: Hoffman Publications, Inc., 1972. 224 pp. $12.50.

It seems somewhat difficult to imagine that the staid philosopher and logician Sir Francis Bacon, who was involved in many of the intrigues in the court of Queen Elizabeth I, could ever have had his mind on anything like swimming pools. In the early 17th century people had seen little of glass and the court was excited by its transparency and color. Whereupon Bacon decided that he must have "a bathing pool with sides and bottom embellished with colored glass and such things of lustre." Bacon would be at home in today's affluent society where so many have joined him in the desire for a pool.

Problems in the design and operation of a public pool are manifold. "No other recreation facility approaches the design diversification and complexity of a swimming pool, nor does any other facility have as many 'rules,' 'regulations' and 'laws' governing its design and operation," stated the chairman of the Council for National Cooperation in Aquatics in the foreword to the 1969 edition of this book. With the tremendous strides that have been made in technological improvements for pools since the book was first issued, the subject is even more complex in 1972. This extensively revised new edition, just published, is a project of the council, as was the earlier one.

There is a vast array of published materials on specific aspects of pools and on the esthetic design of individual ones, particularly those beautiful adjuncts to the landscape of homes in such states as California and Florida, but there is no single publication that really covers the myriad problems of planning and operation as this one does. Many books are called "musts," and some rightly so. This one is truly indispensable for architects, planners and members of administrative boards who are involved in any practical consideration of swimming pools.

The growth in all kinds of pools in recent years has been extremely rapid, and improvements in design and operation have kept pace with this upsurge. Nearly every community has a public pool now or expects to have two or more in the near future. Swimming is ever increasing in popularity as a recreational and health pursuit.

The major thrust of this book is toward community, school and agency pools. making it even more helpful to the architect who is more likely to be called upon to use his design talents for larger pools rather than for residential ones. Two chapters give a background for public pools with information on such matters as neighborhood versus community type pool, outdoor versus indoor pools, the role of aquatics in the school curriculum, suggested standards for school pools and hints on how to get a pool for a school.

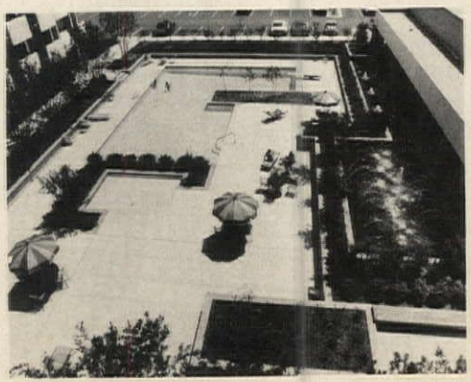
Steps are outlined for the planning of a pool, including topics such as site analysis; state and local boards of health regulations; program requirements and specifications; preparation of preliminary plans and cost estimates; selection of architect, engineer and pool consultant; submission of plans to bid; and supervision of construction.

The architect will find the section on designing the pool particularly helpful. There is data on the size of the pool, its shape, its depth, its bottom contours. There are discussions as well on overflow systems, copings, underwater lights, pool markings, diving platforms, construction materials and techniques, cost factors, electrical safety, classrooms, etc.

Chapters follow on such vital subjects as water circulation and filtration and water treatment. The latter chapter has been extensively revised in the present edition since water is a major vehicle for the transmission of disease and there has been a revolution in pool chemistry. Although procedures for testing water for bacteria are complex and technical and the responsibility primarily of health and medical authorities, nevertheless the architect must have at least a superficial knowledge of the procedures.

Another chapter that has been brought up to date in this new edition is the one on pool structures. Recent trends such as open skydome and indoor/outdoor pools are discussed as well as technical matters involving humidity, ventilation, acoustical control, illumination and color. Information is given in the chapter that follows on the bathhouse and auxiliary services: lifeguard rooms, first aid rooms, entrance foyer, equipment storage room, filter and mechanical equipment room, snack bar, sauna bath.

Pool equipment and accessories are considered along with pool design characteristics for competitive swimming. The latter chapter is revised to give the reader current information on the intricacies of water depths, marking of targets and lines, tank dimensions, type and size of diving boards and all the other things that have to be taken into account in competitive swimming.



Hotel guests in Greensboro, N.C., enjoy a pool designed by R. D. Tillson Associates.

One chapter is devoted to the administration and operation of the pool with practical discussions of such subjects as staffing, public relations, insurance, admission procedures, safety procedures, maintenance, etc. The final chapter is concerned with innovations and developments foreseen for the future if tomorrow's pools are to be even more economical, safe and adaptable.

Five appendices cover a suggested worksheet for determining the design program for swimming pools; a checklist for use in planning; the National Swimming Pool Institute's minimum standards for public pools; an example of a successful feasibility study; and sources for additional information. The illustrative materials round the book out and contribute greatly to its general usefulness for the architect.

The Council for National Cooperation in Aquatics under whose sponsorship this book is published admits that there will be differences of opinion among planners on certain aspects of the technical design of swimming pools, but anyone who has to plan one will find the volume a significant contribution. Publishers are known to overstate the value of their products on occasion, but this one is correct when he says in a letter, "This is the type of material which many architects desperately need . . . and which is not available any other place." MARY E. OSMAN

Marketing Architectural and Engineering Services. Weld Coxe. New York: Van Nostrand Reinhold, 1971. 195 pp. $11.50.

For people who seem to be always finishing second, for those brave souls who plan to establish their own practice and for those who never realized that architects must sell to survive, Weld Coxe has produced a clean, concise and reasonably complete text on what's being done and what can be done to sell successfully architectural services within professional limitations.

Beginning with what might be an overly complete though interesting look at professional ethics, past and present, Coxe's intent is to impress upon the practitioner that he must create for himself sales oriented policies of continuing promotion for his firm.

The book is divided into three sections: Rules of the Game, Business Development Process and Tools of the Trade. The most interesting part is the second. The author takes the reader through the job development process from initial contact to interview to post interview techniques. They deal with the full range of communication and sales tools available to the architect, e.g., correspondence, interviews (verbal and visual techniques), brochures, publications, etc. Since the author learned from a master salesman, these techniques have been proved to be successful and should help the architect to better understand how he can improve his current marketing methods. It is not intended that every architect adopt the methods illustrated

but rather that each practitioner use those techniques that best suit himself and his firm or develop his own.

Young practitioners with new offices may not have received much attention from the author, but they will get a good picture of what the competition will be doing. How successful they are really depends on how well they can make themselves remembered by the prospective client, i.e., remembered favorably. More established but smaller firms who don't have the financial capabilities of Klings and Luckmans can learn how to make the best use of what they do have. It is no sin to be small if the architect uses the size of his firm properly as a sales technique.

My one point of contention with the book is that the author does not seem to understand the standard contract between owner and architects produced by the AIA (B131, B231 and B331). To sell professional services and not know the contracts is looking for trouble. Coxe gets confused between basic and additional services, and he is probably not alone.

Fortunately, this misunderstanding on the part of the author represents only one page in the book and only detracts slightly from what is otherwise an excellent primer for a professional who is interested in selling his services and improving his practice.

STEVEN H. ROSENFELD

The reviewer is director of Professional Practice Programs for the AIA.

Louisiana's Antebellum Architecture. John Desmond, FAIA. Baton Rouge: Calitor's Publishing Division, 1970. 97 pp. $10.

A native of Louisiana or anyone who is at all familiar with the state will relish this handsome book of drawings and text by an architect whose work has appeared in the pages of the AIA JOURNAL on several occasions, most notably in August 1970 when a Practice Profile was done on his firm. But that doesn't exclude others from enjoying the piece, too—those who appreciate the fact that, yes, some practitioners still can draw. For few excel Desmond when he takes his sketching pad in hand.

But this is more than just a sketchbook since the text, although it is concise and to the point, is a most useful complement to the drawings themselves. In the beginning, for example, the author briefly explores the European precedents and then goes to look at Louisiana in terms of its patterns of settlement and construction.

One of Desmond's admirers, Robert W. Heck, professor of architecture at Louisiana State University, sums it up nicely in the preface when he writes: "A broad spectrum of visual experiences can be had by viewing this full palette of man's building activities ranging from the indigenously sensitive rural settlers' houses of Louisiana, through the rich spirituality of the magnificent European cathedrals, to the pulsating urban complexes of our nation."

ROBERT E. KOEHLER

AIA Guide San Diego. San Diego, Calif.: San Diego Chapter AIA, 1971. Variously paged. $3.

The result of about four years of work by the guidebook committee, this piece is small enough to slip into one's coat pocket. "It was our intent to produce a working guide and not a bookshelf, i.e., seldom used, item," comments editor John D. Henderson, AIA.

The guide is ingeniously designed so that there are pullouts of individual tours for the entire greater San Diego area. On one sheet, there is all the necessary information, including name of the structure, date, location, architect, brief description and photograph. The guide covers about 200 buildings dating between 1820 and 1970. There is also a brief history of San Diego.

A Visual Survey of Downtown Portland. Portland, Ore.: Portland Chapter AIA, 1971. Unpaged, $8.75.

Relying on volunteer work, the chapter has produced a splendid urban design inventory for the downtown area. The report graphically depicts the districts, nodes, landmarks, paths and edges, using the notations developed by Kevin Lynch.

Portland officials and citizens who study the report will see the downtown with new and more sensitive eyes. Criteria to assist local decision makers are clearly presented and are well structured. Perhaps a labor of love such as this one undertaken by local architects, planners and landscape architects is more effective than a bureaucratic effort.

The study was turned over to the city at no cost to it. Three cheers for the Portland Chapter AIA.

MICHAEL BARKER

The reviewer is director of Urban Programs at the AIA.

Sinan. Arthur Stratton. New York: Scribner's 1972. 299 pp. $12.95.

This is a biography of Sinan abdür-Mennan, a 16th century Ottoman architect who lived to the ripe old age of 99. His early life was spent as a slave and then a soldier, but fortunes changed and he was made Royal

Chief Architect by Sultan Süleyman the Magnificent. When he died, he was honored and respected by his countrymen.

The best of his buildings still stand, among them the Imperial Friday Mosques. It is regrettable that some of the photographs

which illustrate the book are not in color, for Sinan's work is vivid and worthy of the magnificence of the powerful Süleyman. The book's illustrations do not do them justice.

City Appearance and the Law: A Manual to Assist in the Development of Ordinance-Based Visual Improvement Programs in Smaller Cities. Charles N. Carnes and C. M. Smart Jr. Fayetteville, Ark.: City Planning Division, University of Arkansas, 1971. 140 pp. No price given.

This is a welcome addition to the growing literature on visual pollution in cities. The book covers four basic community appearance problems: 1) weeds and other vegetation; 2) refuse and litter; 3) outdoor storage; and 4) utility wires and equipment.

While the approach and scope of the report, financially aided through an urban beautification and improvement demonstration grant from the Department of Housing and Urban Development, are not as broad as the title would imply, nevertheless it contains solid proposals and model ordinances to attack the subject areas mentioned. The report is good evidence of the increasing cooperation between urban design and the law.

Making the City Observable. Richard Saul Wurman. Minneapolis: Walker Art Center; Cambridge: MIT Press, 1971. 96 pp. $7.50 hardbound, $3.95 paperbound.

This is a kind of *Whole Earth Catalog* for the city. It's a catalog of projects, books, ideas, guides, maps, etc., to make the city observable. For example, there is information about the National Air Photo Library in Ottawa, the New Haven census study, subway maps of Manhattan, the Boston Society of Architects' guidebook called *Boston Architecture,* Mexico City's metro graphics, the Group for Environmental Education, Inc., Frank Williams' three-dimensional urban models, etc., etc. It attempts to outline a syllabus for urban communication through the juxtaposition of some 80 objects. For Wurman, "Making the city observable implies allowing the city to become an environment for learning." Altogether, a most intriguing idea and a spiffy book.

Brought out in book form by the MIT Press, the publication is also a special issue of *Design Quarterly,* a periodical of the Walker Art Center in Minneapolis. Wurman, whose fertile brain thought of all this, is a partner in the architectural and urban planning firm of Murphy Levy Wurman in Philadelphia and currently a professor at the City College of New York.

Housing and Economics: The American Dilemma. Edited by Michael A. Stegman. Cambridge: MIT Press, 1970. 517 pp. $15.

Here in one volume are some 20 scholarly and perceptive articles by experts concerned about the economics of a housing policy.

The book is divided into four sections, each of which is introduced by an essay that provides an analysis of the papers that follow. The sections are called Macro and Micro Contexts; The Components of Housing Costs; Evaluating Housing Programs; and On the Horizon. Such subjects as land planning and the property tax, housing effects of a guaranteed annual income, neighborhood change and industrial efficiency are covered. All relate to applied economic analysis.

The editor declares that in spite of many books and articles that focus on the so-called urban crisis that none of the recent ones presents "penetrating analyses of low income housing policy." Nor do they, he says, help in an evaluation of the many "housing solutions" being offered. He calls for keener insights into the strengths and weaknesses of such proposals and has compiled this book with this view in mind.

Design and Construction of Ports and Marine Structures. 2nd edition. Alonzo DeF. Quinn. New York: McGraw-Hill, 1972. 611 pp. $27.50.

This revised edition of a book first published in 1961 gives comprehensive coverage of all aspects of the design of port and marine structures. Since the first edition, many developments have taken place which makes an updated publication welcome. There are chapters on such subjects as harbor planning, cargo handling equipment, bulk cargo shipping terminals and navigation aids, as well as technical data and illustrations for the design of such structures as breakwaters, piles and fenders for docks. □

letters

In Praise of Wachsmann

The article on Konrad Wachsmann in the March issue is a welcome tribute to a man who is continuing to make a significant contribution to architecture and design, and education.

I had the privilege of being associated with Wachsmann at the Building Institute, University of Southern California. It was a tremendously rewarding experience due to his vision of the essence of the design process which he was able to transmit to his students and staff by his own genius. His understanding of the potential of technology and human capabilities in an interdisciplinary framework has been demonstrated throughout the years.

It is fortunate that the University of Southern California has the foresight to offer him a theater where his ideas and inspirations can be passed on to those who will have the responsibility of building for all our needs.

FRED S. DUBIN
Consulting Engineer
Dubin Mindell Bloome Associates
New York City

'No Nonsense Issue'

I was glad to be greeted with the brightness of the February issue and by the fact that my article on "The Student Quarters That Teamwork Created" was a part of it.

This was a good issue in its format, the boldness of appearance and the clear graphics. It was a no nonsense issue.

EWING H. MILLER, AIA
Terre Haute, Ind.

Liability and the Law

For quite some time I have been interested in the legal problems of architects and engineers. I have published material dealing with these matters, have conducted a course for architectural students at the University of California, Berkeley, and lectured to architectural groups.

The impact of increased liability is a matter of general concern to the profession and those interested in its survival. I have tried to assist the profession in using new approaches to the liability question, but my experience with the Institute has been dispiriting and fruitless.

Many architects who have not achieved the high status of leaders of the AIA are desperately struggling to stay alive. Yet I do not believe that the Institute is taking positive measures to alleviate the plight of the numerous young architects who must face economic and legal problems.

The AIA spends a considerable amount of time seeking to persuade architects that they should be leaders in planning and design and not simply lackeys of their clients. If this is to be achieved, we must have independent architects who can function efficiently within the legal system.

At this juncture in my professional life, I am disappointed in the architectural profession and its unwillingness to engage in useful and creative work relating to legal problems. The periodic revisions of its standard forms and whatever other efforts it performs, of which I am unaware, seem to me pitifully small for a national professional group.

JUSTIN SWEET
Professor of Law
University of California, Berkeley

ED. NOTE: Professor Sweet apparently is not aware of the many things that are going on to assist practitioners in the area about which he shows concern. To mention just a few: the continuing documents program, which is by no means a small effort; the practice and management series including *Economics of Architectural Practice* (1967), *Profit Planning for Architectural Practice* ('68), *Methods of Compensation for Architectural Services* ('69) and *Computerized Financial Management* ('71-72); MASTERSPEC; *AIA Building Construction Legal Citator* book; the annual meeting for Continental Casualty Company's defense attorneys for architects' and engineers' liability; the Victor D. Schinnerer & Co. "Guidelines for Improving Practice" series; the on-going committee work resulting in JOURNAL articles on practice; continuing education seminars on practice and professional liability.

Some Like . . .

I love the cover of the January issue, but I am very envious. I want to see the sculpture without the ice, however. I suspect that the ice improves it.

UNA HANBURY
Sculptor
Sante Fe, N. M.

. . . and Some Do Not

May I congratulate you on the excellent January issue? I have watched the AIA JOURNAL as it has developed from the days of Henry Saylor, FAIA, when it was the size of the *Reader's Digest*. The January issue was of interest to others than architects, and I refer particularly to the article on the Russian architects' view of American cities and the one by George Vernon Russell, FAIA, on Soviet planning.

There is one thing that bothered me as a photographer. Although the picture on the cover is interesting, it has several bad faults. The selection of such a picture for the cover of a fine magazine puts architects in a bad light.

I refer specifically to the building "resting" on the horse's leg, and the structure that causes confusion around the horse's head. A photograph such as this would not survive the first cut-off of a Photographic Society of America salon.

W. H. TUSLER, FAIA
Sanibel Island, Fla.

The Rites of Architectural Education

L'Ecole des Beaux-Arts in Paris is now reorganized, as Donald D. Egbert points out in his article "The Rise of a New Architectural Education in France" in the October issue. What about the learning environment in US schools at the undergraduate level?

Architects team up with psychologists and educators in order to design "inspired learning space" for schools and colleges. But like shoemakers' children—proverbially the worst shod—students in architecture are frequently left with patched-up, pedagogical hand-me-downs. In spite of our familiarity with advanced educational means, media and theory, the dominant method of instruction in American schools of architecture still retains many weaknesses and inefficiencies inherited from the 19th century atelier. Even at the outset, this system was precariously grafted to the changing university.

Amid great visible efforts to swing with avant-garde progressives, many American schools, paradoxically, have never been able to shake very far away from cultlike tradition in the teaching of architectural design. The individual critique from patron to pupil is still good if given equally, but the highly competitive, sink-or-swim method is less ideal in today's terms; so, too, is the knockout charrette followed by the judgment of elaborately drafted projects, presented in a dramatic atmosphere, and sometimes with traumatic results.

The student architects' regular exposure to this ritualistic sequence serves a canonical as well as an educational purpose. Implicitly the "reviewing" ceremony held before a panel of jurors inculcates respect, encourages conformity to the current set of fashions and at the same time inhibits dissent from the system itself.

The rites involve liturgy, but no cumulative literature emerges to prepare the neophyte, no recorded insights are made available to which he can return for future assurance against what to him may seem arbitrary, personal or occasionally whimsical judgment of the jury. In this way, specific educational criteria are always conveniently elusive and indeterminate. Instead, the student learns how to use subtle flattery implied in the time-consuming equivalent of *poché*

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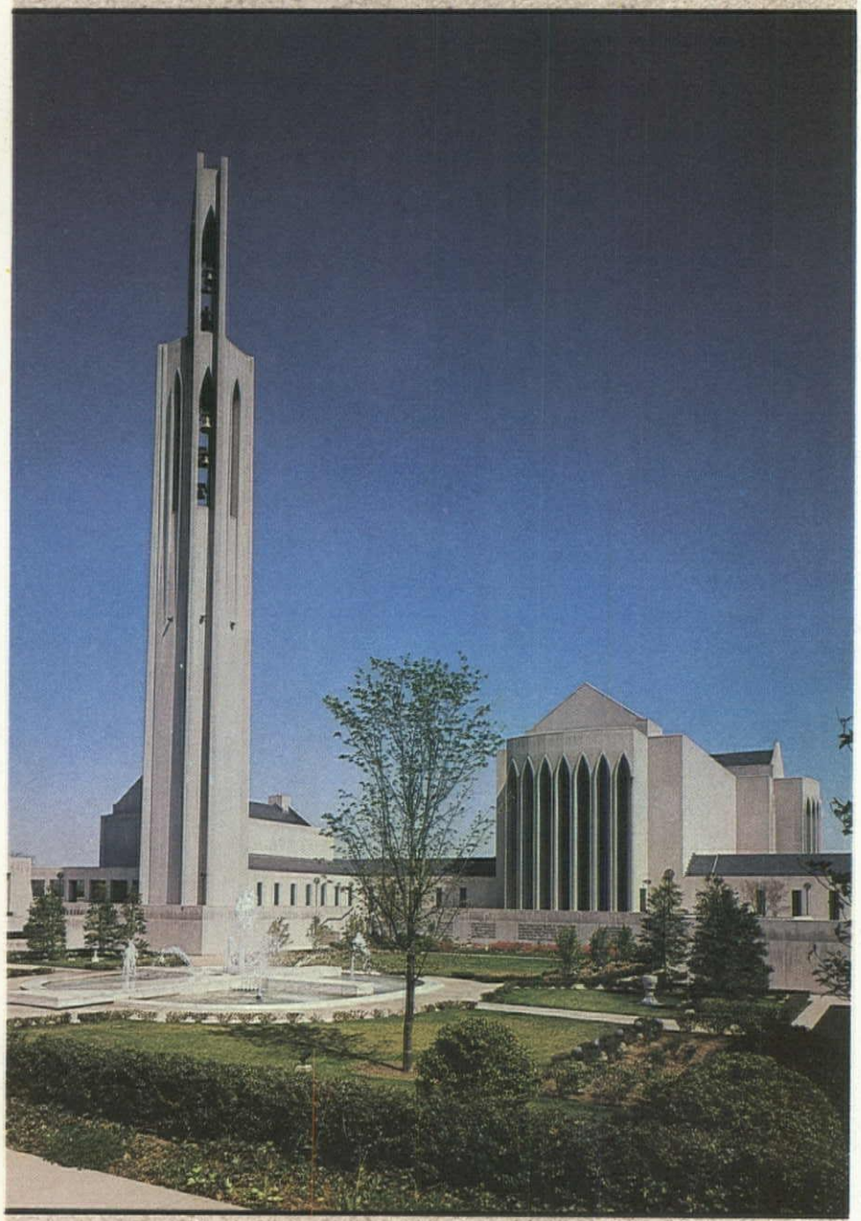

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and *entourage*, supplemented today by even more laborious modelmaking as well as natural forensic aptitudes.

Unlike the Parisian dominated Ecole des Beaux-Arts, the American system gradually has been decentralized since the 1930s. Visiting high priests of design—superstars whose charisma has been polished by the picture periodical—are called in to officiate. They come as frequently and from as far away as the school budget allows. The visitors maintain the mystique, but even more importantly they keep the school up to date by dropping off the latest vogue words and in-forms. Without these airborne circuit riders, the venerable system would fall apart.

The visitation tends to be not only extracurricular but also, in effect, anticurricular. With tacit administration blessing, the student learns that for the duration (as during the charrette), he is relieved from most academic responsibilities. Interaction with other courses, both in school and outside, is either minimal or entirely suspended as an act of faith.

Students and faculty who are directly involved communicate the hopped-up exhilaration of a séance; those who are not "high" must affect a supercharged appearance. Within the visitation proceedings, concepts and principles derived from other architectural courses seldom intrude; if not heretical, they are frequently considered simply as irrelevant. Besides, they might embarrass the visitors. Students soon get the message that to stay in the professional school only one course really counts. Upon this sacrificial altar, like monks in a monastery, they are expected to heap offerings of extra time—time that could otherwise be devoted to social, sexual or even academic life.

Each decade generates certain special areas of approved cognate subjects but, in general, other courses are usually recommended somewhat as hobbies, i.e., on condition that their normal time for classes and assignments may be freely pre-empted. No one is encouraged to ask if this parochial attitude within the university context is effectively anti-intellectual or to what extent it becomes an architect's fixation subconsciously carried into professional life.

Most schools are content to tinker with their curriculums perennially in the attempt to update the old routine; but little effort is made seriously to assess long-range results or, through sustained cooperative experimentation, to find more compatible alternative systems.

BUFORD L. PICKENS, FAIA
School of Architecture
Washington University
St. Louis

A Book Review Questioned . . .

I wish to take you to task for the intemperate review by Jason W. Frye Jr. of Isadore Rosenfield's book *Hospital Architecture: Integrated Components* that appeared in the March issue. The JOURNAL does not publish "girlie" ads such as find their way into the commercial magazines; it should be at least equally circumspect in textual matter.

I do not know the reviewer, and he probably never heard of me; so we are even. Few architects concerned with hospitals, however, are unaware of Rosenfield. He was not elected a Fellow of the Institute frivolously. I am not suggesting that a reviewer should approach him or his book with reverence and awe, but I do think that he merits respectful and professional evaluation.

The reviewer denigrates Rosenfield for not including reference in his book, published in 1969, to a paper presented at an American Hospital Association institute in 1970!

The reviewer is entitled, of course, to his subjective reactions to the book. I do not question his evaluation. I do question what I consider to be a frivolous review of a serious work by a man of considerable achievement in our field who has always stressed his subjectivity.

ISAIAH EHRLICH, AIA
New York City

. . . and the Reviewer Answers

I appreciate Mr. Ehrlich's remarks. It is encouraging and essential to the profession of architecture that we voice opposing viewpoints and opinions in the context of respect for the views of others. I think the JOURNAL appropriately performs this function.

My review was not a criticism of Mr. Rosenfield's standing in our profession. He has made many fine contributions, especially

in planning for health facilities. I have read his preceding works with interest and found them highly informative.

I can understand Ehrlich's concern at my mentioning references to material developed in 1970 if indeed my review was based on a book published in 1969. However, the Rosenfield book published in 1969 was *Hospital Architecture and Beyond*. The review in the March issue of the JOURNAL was of his book *Hospital Architecture: Integrated Components*, copyright 1971, Van Nostrand Reinhold & Litton, Educational Publishing Inc.

My review was based on an in-depth analysis, point by point of the book. I submitted to the JOURNAL many pages in support of my points, and all this material was not published, of course. Even if space were available to print the full analysis, it would not have taken the place of the more appropriate act of buying the book and forming one's own opinion.

JASON W. FRYE JR., AIA
Director, Medical Facilities Design
Golemon & Rolfe
Houston

AIA Documents . . .

We wish to reply to certain statements made by Steven H. Rosenfeld in the article "Talking the Same Language" in the February issue. We are two of the participants in the American Management Association's session on "Understanding Construction Contracts and Documents for Building Projects" included in the AMA's program on "Exectuive Management of New Building Projects," to which he directed his remarks.

Rosenfeld contends that "a considerable amount of misleading, dated and erroneous information" was disseminated, and that distribution of a 1961 article from *Civil Engineering* entitled "Who Pays for the Unexpected in Subsurface Construction?" and a monograph from the American Society of Civil Engineers' *Journal of the Construction Division* on the 1967 11th edition of AIA document A201 did not "make for an educational experience for anyone seeking background on the construction industry." We disagree for the reasons hereinafter stated.

Rosenfeld states that "the audience was encouraged to make the contractor responsible for all subsurface conditions and was told that soil borings are an unnecessary expense. It was suggested also that the standard general conditions should be changed to require the contractor to indemnify the owner for all errors, including those solely of the owner." This is not true. Our remarks, quite to the contrary, are set forth in the text of our presentation, distributed to all participants at the seminar, which we will furnish upon request to any reader.

For example, subsurface conditions constituted a major topic of discussion at the program. The 1961 *Civil Engineering* article on unexpected subsurface conditions contains an excellent discussion of the problem and is as relevant today as when first published. Rosenfeld's objection was apparently solely to the age of the article and not its contents.

We pointed out that under AIA document A201 (12.1.6) the owner assumes the risk of "changed conditions," and that even in the absence of a "changed condition" clause, the owner may be held liable in certain instances for erroneous boring information, exculpatory clauses to the contrary notwithstanding. Thus Rosenfeld apparently misconstrued this as a suggestion that the owner make the contractor responsible for all subsurface conditions and that soil borings are unnecessary. We did comment, however, on the fact that an owner, signing the AIA form of prime contract, might not realize that he was also including a provision making him liable for subsurface conditions by reasons of the inclusion, by reference, of the general conditions, which he may not have read.

Rosenfeld's statement that the implication of our presentation was "where would the owner be without his legal counsel to think up new ways to make life miserable for everyone else?" is as unfair as the statement sometimes heard: "Where would the architect be without the AIA to foist responsibilities, properly his, upon others and to insulate him for liability for his own wrongdoings?"

We feel that all parties—architect, owner and contractor alike—should be made aware of the manner in which risks, liabilities and responsibilities are assigned in the AIA contract forms. This assignment, while believed by the AIA to be a fair one, certainly cannot be believed by the Institute to be beyond question. The aim of our program

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was to impress upon each of the participants that printed contract forms may not be equally fair to both parties signing them nor applicable to all situations. The various terms and provisions should be fully understood, and no one should hesitate to make appropriate modifications to suit the needs of particular clients.

The AIA apparently shares this view, for throughout its *Architect's Handbook for Professional Practice*, in comments relating to the owner/contractor and owner/architect agreement forms, consultation with an attorney with respect to any proposed modification is suggested. Similarly, each AIA form is boldly imprinted with the caveat: "This document has important legal consequences; consultation with an attorney is encouraged with respect to its completion or modification."

At the AMA program which Rosenfeld attended, we suggested that, in some circumstances, an owner might be justified in seeking to include a provision specifying time of performance of the architect's services, particularly with respect to the "construction document phase," where the design is standard rather than esoteric. Similarly, we pointed out that while the AIA General Conditions (A201) had already gone into a 12th edition, the revision was not a major one and many of the ASCE's comments and recommendations made with respect to the 11th edition were still pertinent.

We submit that the interests of the readers of the AIA JOURNAL would be better served if there were a greater willingness to accept constructive criticism of AIA documents and less of a defensive attitude evidenced by members of the AIA staff. We look forward to an opportunity to be able to participate in future programs where both our views and those of the AIA can be shared and discussed at length. MAX E. GREENBERG

ROBERT A. RUBIN

Max E. Greenberg, Trayman, Harris, Cantor, Reiss & Blasky, Attorneys and Counsellors at Law
New York City

. . . and a Reply

Greenberg and Rubin have offered copies of their presentation at the AMA program, and I recommend that you secure a copy for your edification. For the authors' opinion on subsoil responsibility, I refer you to pages 4-6; for indemnification, see page 22.

The 1961 article from *Civil Engineering* on "Who Pays for the Unexpected in Subsurface Construction?" has been irrelevant since 1963 when its thesis was incorporated into AIA Document A201, General Conditions. As for the monograph in ASCE's journal, the Documents Board's rebuttal was published in the November 1971 issue of the same publication.

With respect to the unfair statement of "where would the architect be without the AIA to foist responsibilities, which are properly his, upon others and to insulate him from liability for his own wrongdoing?" wasn't that the gist of Rubin's presentation?

The authors also might be confused as to the program that I attended. I can't remember the reference to "construction document phase" used in respect to the placing of time limits on the architect's services, but apparently hindsight is an improvement.

As a member of the AIA staff, with responsibility for documents, I would note that we are always happy to receive constructive criticism of the documents; and whenever Greenberg and Rubin can provide it, we will listen. STEVEN H. ROSENFELD

Director
Professional Practice, AIA

. . . and a Comment

One of our major clients has recently sent some of his top officers to an AMA seminar concerned with new building projects. At this seminar, suggested changes in AIA documents were distributed. AMA strongly recommended that the participants in the seminar see that the changes are made.

Meanwhile, I have had our in-house lawyer look at the suggested changes; his comments are not favorable.

It seems to me that the Institute should review the comments. There are some significant changes suggested, and representatives of the AIA should meet with AMA personnel to discuss and hopefully persuade that organization to refrain from such practices. GEORGE E. KASSABAUM, FAIA

St. Louis

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Aug. 31-Sept. 2: Northwest Regional Conference, Anchorage Westward Hotel, Anchorage

National

June 19-21: Construction Specifications Institute Convention, Auditorium and Convention Hall, Minneapolis
June 21-23: National Exposition of Contract Interior Furnishings, Merchandise Mart, Chicago
June 25-28: American Society of Landscape Architects Meeting, Sheraton Hotel, Philadelphia
June 26-28: Design Automation Workshop, Marriott Hotel, Dallas
June 28-July 1: National Society of Interior Designers Conference, Fairmont Hotel, Dallas
June 28-July 1: NCARB Convention, Washington Plaza Hotel, Seattle
Aug. 6-9: Society for College and University Planning Conference, Sheraton-Biltmore Hotel, Atlanta

International

July 2-6: International Association of Color Congress, University of York, England
July 10-22: International Conference on British New Towns, London
Aug. 21-26: International Conference on the Planning and Design of Tall Buildings, Lehigh University, Bethlehem, Pa.
Aug. 28-Sept. 2: International Congress of Aesthetics, Bucharest, Romania
Sept. 25-30: International Union of Architects Congress, Varna, Bulgaria

Awards Programs

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July 10: Entries due, Prestressed Concrete Institute Awards Program. Contact: PCI, 20 N. Wacker Drive, Chicago, Ill. 60606.
Aug. 15: Entries due, Keep America Beautiful Awards. Contact: Keep America Beautiful, Inc., 99 Park Ave., New York, N.Y. 10016.
Aug. 26: Entries due, Architectural Awards of Excellence Competition. Contact: American Institute of Steel Construction, 101 Park Ave., New York, N.Y. 10017.

Tours

Aug. 18-Sept. 4: Orient-American Study Program. Contact: Metropolitan Association of Urban Designers and Environmental Planners, 3194 Lawson Blvd., Oceanside, N.Y. 11572.
Oct. 9-31: Architecture and Gardens Tour of Japan. Contact: Kenneth M. Nishimoto, AIA, 285 S. Los Robles Ave., Pasadena, Calif. 91101. □

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