PITTSBURGH SKYSCRAPER ACHIEVES BREAKTHROUGH IN STEEL FIREPROOFING
HIGH-DENSITY NEW TOWN DESIGNED TO CONSERVE THE LANDSCAPE
CIVIC CENTER FOR A SMALL WESTERN CITY
BUILDING TYPES STUDY: COLLEGE BUILDINGS—ARCHITECTURE SHAPED BY A MASTER PLAN
FULL CONTENTS ON PAGES 4 AND 5

ARCHITECTURAL RECORD
APRIL 1967
A McGRAW-HILL PUBLICATION  TWO DOLLARS PER COPY
FOR THE BOLD LOOK, THE CROWNING TOUCH:

NEW FLAIR FITTINGS BY KOHLER

Flair...far and away the most elegant fittings ever offered as part of a regular line. Flair...a gem-like blending of acrylic and brass. Flair...now available from Kohler in four decorator choices: amber with polished brass; charcoal, white or clear with chrome.

Flair fittings provide the crowning touch for Kohler's "Bold Look" color schemes, vividly portrayed in this year's consumer advertising. Here is Flair trim in white and chrome, fitted to an Antique Red lavatory.

Charcoal against blue, a handsome pairing. Used with Kohler Accent Color lavatories—in any of five sprightly shades—Flair fittings afford the "just right" finishing touch.

Here's a rich combination: amber on polished brass. Particularly effective when matched with Kohler's "go-with" color of the year...Avocado!


KOHLER OF KOHLER

the Bold Look for '67/Kohler Co., Kohler, Wisconsin

For more data, circle 2 on inquiry card
I use DURCON® sinks... year after year after year

And I think they're wonderful. They are corrosion resistant, look good, and are so easy to keep clean. I pour almost everything into DURCON sinks; acids, alkalies, salts and solvents. They don’t corrode; nor do they chip or crack. I'm glad we have DURCON sinks in our laboratories.

THE DURIron COMPANY, INC. DAYTON, OHIO DURCO

For more data, circle 3 on inquiry card
In schools, where there's lots of use

Series 1600 closer provides door control for these busy gymnasium doors. Even here, where the closers were selected for their ability to withstand heavy traffic, installations are attractive; compatible with other door hardware.

Series 6120 Uni-Trol controllers are used to control these main entrance doors as well as side exit doors. During off-peak traffic, units operate as regular door closers. Although traffic does not warrant it at the moment, the hold open mechanism has been engaged and the doors are being held open. Installation shown at right was made to correct a door control problem on an existing building.
and some abuse
NORTON® CLOSERS CONTROL DOORS—NOT DESIGN

Remember, the first impression received of your building is the contact made at the doors. This first contact is very important. At the same time, these doors must be properly controlled to assure the safety and convenience of the users of the building. Norton door controls have been designed with these dual purposes in mind—preservation of the esthetic appearance of the building while providing dependable door control.

This problem is particularly acute in school buildings where the volume of traffic and the exuberance of the children put all hardware to its ultimate test. On school buildings, especially, rugged dependability and efficient door control are a necessity. You can be sure of maximum safety and long life without disrupting the esthetic appearance of your building because all Norton door control products have been engineered to control doors—not design.

NORTON SERIES 1600 CLOSERS

Series 1600 Tri-Style door closers offer an almost unlimited degree of application flexibility. They can be installed anywhere and you’re assured perfect door control. Norton Series 1600 closers are capable of withstanding the heaviest traffic year after year.

Choose the mounting best suited to your decor.

INVISIBLE MOUNTING:
Perma-hold Plate is mounted to the door. Closer is then locked to the plate. No screws are visible.

BACK MOUNTING:
Closer is mounted to the door by means of thru bolts installed from the opposite side of the door.

EXPOSED MOUNTING:
Closer is mounted to the door by means of exposed screws.

NORTON SERIES 6100 CONTROLS

Series 6100 Uni-Trol control is a combination door closer/door holder. Your door is under control at all times, regardless of the volume of traffic and door frame and controller is protected from the roughest use.

This unique door control has been designed to coordinate all door control functions.

(1) Cushions the opening of the door
At almost full open, the arm engages a spring in the shock absorber mounted to the soft plate. Opening momentum is absorbed.

(2) Stops the door
As the spring in the shock absorber is compressed, the door is stopped. There’s no shock to the door, hinges or Uni-trol.

(3) Holds the door open
Spring loaded hardened steel ball in the holding mechanism is engaged by a recess in the Uni-trol fore-arm. The door is held open.

(4) Closes the door
When released a dependable Norton spring-loaded rack-and-pinion mechanism supplies power to close the door.

(5) Regulates closing and latch speeds
Dependable Norton hydraulic system provides key-operated control to regulate both closing speed and the latch speed.

FOR MORE INFORMATION CONTACT
YOUR NORTON REPRESENTATIVE OR WRITE:

EATON YALE & TOWNE

NORTON® DOOR CLOSER DIVISION
372 Meyer Road, Bensenville, Illinois, 60106
77 Carlingview Drive, Etobicoke, Ontario, Canada

For more data, circle 4 on inquiry card

ARCHITECTURAL RECORD April 1967 3
A NEW TOWN THAT CONSERVES THE LANDSCAPE
Design by architect Paul Rudolph for Stafford Harbor, Virginia, reinforces the natural topography by placing the major groups of buildings along the ridges and harbor, leaving the valleys free.

A DISTINGUISHED CIVIC CENTER FOR A SMALL TOWN
Scale and simplicity are the happy result of a design competition for the Los Gatos, California, civic center. Charles D. Stickney and William R. Hull, architects.

NEW PITTSBURGH SKYSCRAPER WITH UNIQUE FIREPROOFING

A CONTINUING STUDY OF THE WINDOW WALL
The design by Eliot Noyes of these three branch offices for IBM revolves about the architect's search for an attractive and functional curtain wall.

A SMALL WOOD-AND-STONE HOUSE RELATES WELL TO A MOUNTAIN
Hobart Wagener's careful balance between openness and enclosure make this an ideal year-round retreat in the Rocky Mountains.

COLLEGE BUILDINGS: ARCHITECTURE SHAPED BY MASTER PLANS
Each group of buildings selected was designed by architects responsible for the campus master plan as well as the structures themselves.

DESIGNED IN DEERENCE TO MR. JEFFERSON
A Fine Arts Center for the University of Virginia, designed by Pietro Belluschi and Kenneth DeMay will serve the arts of architecture, painting, music and drama, all under one roof.

A CONTEMPORARY SOLUTION, SYMPATHETIC TO TRADITION
New library, student union and business school facilities are designed to transform existing buildings and spaces into shapes which can co-exist with the noble proportions of Thomas Jefferson's Lawn and Rotunda.

BOLD SCALE FOR A RESTRICTED SITE
Science facilities for the University of Rochester, designed as a high-density complex.

QUIET DESIGN FOR A SMALL RURAL SCHOOL
A physical education building for Barrington College in Rhode Island.
A NEW AND SPACIOUS CAMPUS INSPIRES A FRESH APPROACH
Three new buildings for the University of California at Santa Cruz.

ARCHITECTURAL AFFIRMING AN OLD STYLE, ESTABLISHING A NEW
A library at the campus center, designed with deference to the great Stanford University quadrangle which it adjoins, contrasts with two outlying fraternity house complexes created in an appropriately different spirit.

ELECTRICAL HEATING—AN ARCHITECT'S APPROACH
Architect George E. Yurchison translates experience of the Niagara Power Area into thoughtful approaches to the technology and over-all economics of electric heating for all areas.

COMPUTER-AIDED BUILDING DESIGN
Computerized or computer-aided: a report on the second working conference at M.I.T., sponsored by the Bureau of Applied Technology of the National Bureau of Standards.

BUILDING COMPONENTS
The problem: to design and lay out an entire electrical and plumbing system for a $3-million complex in less than 30 days.

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ARCHITECTURE FOR SELLING

When a major oil company decides to try design—all the way from graphics to architecture—as a tool for selling, tests it and finds it works, the results may be felt across the country. Such an effort, and a variety of others that reflect a search for quality in facilities for retail selling, will be featured in next month's Building Types Study.

FIRST MAJOR PROJECTS OF A YOUNG PRACTICE

There seem to be some indications that more younger architects are managing to develop their practices at a larger scale earlier than used to be the case—or perhaps our continuing efforts to find the young architects who are doing work of high quality are more effective than before. In any event, a presentation next month of the work of Evans Woollen of Indianapolis will be the next in what has become a considerable series on the work of younger architects.

McGraw-Hill


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You see Stanley in all the best places.

Consider elegance, then decide Stanley. Stanley Hardware, Division of The Stanley Works, New Britain, Connecticut.


For more data, circle 5 on inquiry card.
Bright idea

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

from Bradley!
CURRENT ARCHITECTURE
AND ITS COMMUNICATION

Recently (February, this page) I wrote a plea for more communication from architects to the general public. Since then I have had some thoughts about how difficult that is to accomplish.

For one thing, I remembered an occasion when I was called upon to explain modern architectural thought to a layman, and how difficult I found it. For another, I have had many an occasion to observe the difficulty that the architectural profession has in sorting out its own ideas. In this complicated world other persuasions besides architecture have had trouble with philosophies and objectives and have frequently hidden in their own mystiques. For a third observation, I have suffered considerable distress in reading what is being fed to the general public by so-called architectural critics in the popular press. It is easy to rattle off the patter of the current pre-occupations, and make a great appearance of wisdom, but one has to doubt that the catchwords accomplish anything very much besides perhaps impressing the unwary listener.

First difficulty above: Some time ago, at an ordinary social cocktail party, a friend asked a seemingly natural question—what was the current hot line in architecture. Obviously he was just being what in an earlier generation was called a “good conversationalist.” He wanted to be primed for further good conversation, something above the usual run of personalities and gossiply tales.

In what I thought was his spirit I replied, “Well, just start with the assumption that we are in a period of architecture and non-architecture.” I had forgotten that he was a lawyer, and that this kind of verbal juggling was not his dish. He pressed me quite seriously to explain what I meant by “non-architecture.” I tried to relate it to art and non-art, but he wasn’t with it. I began to think of all of the complications of present endeavors and theories, and then I just excused myself to “go and freshen up my drink.”

Now I could have told him about the rash of towers, or faked towers, at the corners of buildings; and I could have rattled on about its debt to Louis Kahn or Frank Lloyd Wright. Or about massive roofs, or square shingled units with topknots at the peak. Or the rise and dilution of the old International Style. But so what; what purpose would be served by pushing out the patter, and how should I choose which particular line of patter to sell him?

Perhaps I took virtue too seriously. The world these days seems to live on catchwords, and all my friend really wanted was a little chatter to pass along in egghead josting. But I have so often snorted about the fancy pronouncements dealt out by all those “architectural critics” in the newspapers and popular magazines; I just could not join in. I am afraid that architectural writing in the public press is at a low point (with a few exceptions), and does not compare with critical views of other arts, literature or even politics. I suppose that writers for the public have to hit the dramatic notes; they are artists in their own right.

To go back to the second thought I could charge those writers more pointedly if the architectural field was more sure of its own directions. I hope nobody is going to take me to task for saying in effect that the architectural fraternity is a bit confused. I know about those basic truths, those basic necessities, those undying convictions of architecture. I am not blaming architects; I am merely pointing out that if you put all of the theorems and stout stands of architects into a computer, and asked it for a summary conclusion, the computer would buzz and buzz and then type out something like, “Are you kidding?”

Now I don’t feel as crabby as all this might sound. Architecture is, like medicine or science or anthropology, trying to prepare for a staggering future of change and overload. We are in a period of testing all old truths and principles. We are experimenting with new tools, new materials, new hopes. If you are too sure of yourself now, watch out, or you will be tagged as an old fogey. That’s a real danger in building design.

Back to communication: It gets easier as you have something definite to speak about, some particular design with logical bases, some good intentions to proclaim. To make the point again; an era of change and confusion makes explanation a real necessity.

—Emerson Goble
When products fail in use who is held responsible?

The question is a bit academic, since it seems now that the architect is held responsible for everything he has specified. But justice would seem to indicate that the manufacturer should be responsible if in fact the product does not come up to claims.

Perhaps you have already seen this “statement of policy” of the A.I.A., but it is certainly worth pushing for, and worth repeating. It is not a fact, being a statement of policy, but it is certainly timely:

“The architect is expected to recognize that he is responsible for the failure of his product to perform in accordance with written data supplied by him or his authorized representatives, as well as misrepresentations of such data.

“When a product has been installed in accordance with the manufacturer’s written instructions and written recommendations, and such product fails, then the manufacturer has the responsibility therefor. Such responsibility extends to related products affected by the failure, where the manufacturer has notice of the proposed use of such related products. In case of failure, manufacturers of the other products involved should make available their technical knowledge to the architect in the correction of the failure.

“The manufacturer is expected to investigate the relation of his product to other components likely or logically expected to be used in association with his. Such information should be available to the architect.

“The architect is responsible for proper design. He is expected to inform himself with respect to the properties of the products he specifies, though he is entitled to rely on manufacturers’ written representations. He is advised to seek the technical opinion of the research or application engineering departments of the manufacturer when his intended use is not clearly included in the printed data of the manufacturer. He is further responsible for uses contrary to supplementary written information on proper use and installation procedure of the manufacturer.

“The architect’s use of a product and its installation should extend to its compatibility with and relationship to adjacent materials and assemblies, notwithstanding the manufacturer’s similar obligations.”

And architects can help with design of products

Speaking to the same subject (products in use) the then president of the A.I.A., Morris Ketchum Jr., spoke strongly for the use of architects in the design of building products:

“Not only can the practitioner help the manufacturer to develop new products with that elusive quality known as good design, but he can also help to determine that the products meet the practical requirements of building construction. Many architectural offices make such consulting work a regular part of their practice, thereby rendering valuable service to the individual manufacturer, the building industry and the architectural profession.

“Such specialized advisory services are a necessity if manufacturers are to avoid poor design or inadequate field testing or unsuccessful market development. In any good marketing effort, design, production, advertising and distribution should be dovetailed.

“Technical advice in the complicated coordination process of this highly specialized type of marketing is the proper task of staff architects or individual practitioners.”

Manufacturers of products show interest in their use

As if in answer to the A.I.A. statement on products (above), one manufacturer has been urging manufacturers to take more notice of proper use and application of their products in building. He is Gene C. Brewer, president, U. S. Plywood Corp., who spoke thusly to the Producers’ Council last fall:

“We building products manufacturers, as a group, tend to rise in righteous indignation and appropriate horror when our products are used in a manner not intended or recommended.

“Let’s consider this. The basic manufacturer of building products has the largest single stake in the chain that eventually leads to a sale or use by the ultimate consumer. Yet, historically, we have had little to say in the final application of our products. Lack of contact and rapport with those responsible for the final form and use of a product can also have disastrous results.

“For this reason, methods of product distribution and application are undergoing reassessment. We no longer can afford the same old way.

“It seems to me there is only one logical answer: the manufacturer must exhibit greater concern over every facet of the marketing process.

“What could this eventually mean to the hard-pressed architect? It could lead to the thing he has been looking for—single responsibility. It would improve lines of communication and give some assurance that a product would be designed and used for the purpose for which it was intended.”

—E. G.
For modern luxury, nothing beats Acrilan.

Nothing

Acrilan acrylic has two kinds of luxury. The kind you see with your eyes and feel through the soles of your feet.

And the luxury of not having to be treated as if it were a tapestry. A carpet of Acrilan is made to retain its luxurious appearance in the face of repeated punishment. It actually bounces back after being stepped on by thousands of feet. And it's simple to clean.

A carpet made with Acrilan acrylic fiber in the pile is also mothproof. Mildewproof. Non-allergenic. You see, like all good modern things, Acrilan is functional as well as beautiful.

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- **Powerful output** of the 4-Square Postop means units may be spaced up to 5 times mounting height and still provide complete area coverage.

- **Square light pattern**, a unique feature of all Holophane Square Postop units, eliminates dark areas and wasteful overlapping.

- **Glare-free illumination.** The 4-Square’s exactly engineered refractors control light *prismatically*. Illumination is uniform and glare free, refractor brightness low.

- **Four “layers” of light.** Each lamp distributes light over the *total* area. There’s no dark quadrant should a lamp fail. For off-hour surveillance, one lamp can be used to deliver low, uniform illumination over the entire area.


**4-SQUARE POSTOP by**

**HOLOPHANE**

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Otis
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Anemostat diffusers continue the clean, modular look—throughout

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Mutschler Brothers Company
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For more data, circle 17 on inquiry card
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HYDRODYNAMICS DIVISION
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Architects: Drake-O’Meara Associates

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30 ARCHITECTURAL RECORD  April 1967
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<table>
<thead>
<tr>
<th>Structure, Location</th>
<th>Type of construction</th>
<th>Square feet gross</th>
<th>Total annual cost per sq. ft. — Heating &amp; air conditioning</th>
</tr>
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<tbody>
<tr>
<td>Fontana City Hall (Fontana)</td>
<td>Concrete block single story</td>
<td>15,300 sq. ft.</td>
<td>11c</td>
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<tr>
<td>California Credit Union League (Pomona)</td>
<td>Steel &amp; concrete single story</td>
<td>18,000 sq. ft.</td>
<td>14c</td>
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<tr>
<td>K &amp; S Building (Long Beach)</td>
<td>Conc. brick &amp; glass two stories</td>
<td>10,200 sq. ft.</td>
<td>12c</td>
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</tbody>
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Speakers and award winners announced for A.I.A. convention

Final plans have been disclosed for the 29th national convention of the American Institute of Architects to be held in New York City May 14-18. The theme of the convention will be "The New Architect," and the theme will be developed in four sessions followed by workshops. Theme topics and speakers include: "Education and the Future of the Architectural Profession"—Dr. Harold Taylor, educator, author and a past president of Sarah Lawrence College; "Architectural Practice"—architect Charles Luckman; "Design" (with Manhattan as a case study)—by New York's Mayor John V. Lindsay; and "Technology"—Arthur C. Clarke, astronomer, science fiction writer, lecturer and inventor.

A.I.A. annual medals for distinguished achievement will be awarded as follows: Fine Arts Medal—Costantino Nivola, sculptor, New York City; Industrial Arts Medal—Ivan Chermayeff, graphic designer, New York City; Architectural Photography Medal—William C. Hedrich of Hedrich-Blessing, Chicago; Craftsmanship Medal—Sister Mary Remy Revor, chairman of the art department at Mount Mary College, Milwaukee (for her textile designs); and Allied Professions Medal—Richard Kelly, specialist in architectural lighting design, New York City.

Receiving the Institute's Architectural Firm Award will be the office of Hugh Stubbins & Associates of Cambridge, Massachusetts. The award honors a firm "wherein the continuing collaboration among individuals of the firm has been the principal force in consistently producing distinguished architecture." The Boston Architectural Center will be the recipient of the A.I.A.'s Citation of an Organization.

Six men will receive honorary memberships in the A.I.A. They include: Joseph F. Addonizio, executive director of the New York State Association of Architects; John D. Entenza, executive director of the Graham Foundation for Advanced Studies in the Fine Arts, Chicago; James Fenelon, executive director of the Minnesota Society of Architects; John Erik Jonsson, Honorary Chairman of the Board of Texas Instruments, Inc.; Edgar Kaufmann, Jr., author and educator; and Benton Spruance, lithographer, painter and teacher.

Leon Chatelain, Jr., a past president of the A.I.A., will be presented with the F. Stuart Fitzpatrick Memorial Award for "outstanding individual national achievement in the unification of the building industry." The award is sponsored by five construction industry organizations—the A.I.A., the Associated General Contractors of America, the National Association of Home Builders, the Producers' Council, and the Building Research Institute.

Ohio State University student Kent C. Underwood (at right with his project) will receive the seventh annual Reynolds Aluminum Prize for Architectural Students. The winning project is a retractable dome design consisting of 12 telescoping segments which move simultaneously to form or retract the overhead closure. The segments are designed of aluminum stress skin construction over an aluminum cellular frame. The award carries an honorarium of $5,000 to be divided equally between the student and his school.

Architect plans fourteenth annual tour of Japan

California architect Kenneth M. Nishimoto has announced plans for his 14th annual tour of Japan and gardens tour of Japan, leaving from Los Angeles on October 7. The 24-day tour, limited to 25 participants, will include visits "to all buildings of architectural significance and gardens of renown, old and new." Participants will meet Japanese architects at a social event. Complete details may be obtained from Mr. Nishimoto, 263 South Los Robles Avenue, Pasadena.

Landscape architect wins Kirkwood Plaza competition

A design to improve a 15-acre site in downtown Kirkwood, Missouri, by St. Louis landscape architect Robert J. Stoffel, has won the $3,500 first prize in the Kirkwood Civic Plaza National Design Competition. Mr. Stoffel says of his prize-winning entry: "Definition and unity of central civic space is attained by a formal double row of trees along the perimeter. Pedestrians may walk freely through the area without interference with rail-road or vehicular traffic. A bridge connects the business district directly with the plaza."

Second prize of $1,000 was won by Chartier Newton and John J. Exley of College Station, Texas, and third prize of $500 was won by Paul E. Marti, Jr., of Webster Groves, Missouri. Serving on the jury were architect Joseph Murphy, landscape architect Carl Johnson and Kirkwood Mayor Robert C. Reim.
Academic appointments

Gibson A. Danes, dean of Yale University's School of Art and Architecture, has been appointed Dean of Visual Arts at Westchester College, a new campus of the State University of New York to be built at Purchase. His successor has not been named.

Joseph N. Bosserman has been appointed dean of the University of Virginia School of Architecture. Mr. Bosserman, who has been acting dean since last July, succeeds Thomas K. Fitzpatrick, who has stepped down as dean while remaining on the faculty as professor of architecture. Mr. Bosserman, 41 years old, received his bachelor's degree in architecture from Virginia in 1946 and a master's degree from Princeton in 1952.

Elegant construction canopy graces downtown Chicago

A construction canopy around the site of the new First National Bank of Chicago building in the heart of Chicago's loop (February 1965, page 13) has transformed what is often an eyesore and a pedestrian inconvenience into a pleasant and elegant walkway. The canopy, designed by C. F. Murphy Associates and the Perkins & Will Partnership, architects for the bank building, was cited last year by the Chicago Association of Commerce and Industry. The cantilevered archway, of structural steel and white-painted planked plywood panel construction, has unbreakable light globes hanging overhead at 10-foot intervals, a plywood boardwalk, and a four-foot paneled guard rail. Provisions for sidewalk superintendents include 11 clear acrylic plastic windows cut into the canopy walls. On-site office spaces are constructed on the roof, shielded from the street by a 8-foot-high panel border on the roof. The canopy will remain on the site for a total of five years, making life easier for the estimated 35,000 pedestrians who pass one of the corners of the site each working day.

Six RECORD editors cited for 75th anniversary issue

Six editors of ARCHITECTURAL RECORD have received Jesse H. Neal Awards for the best single issue—the 75th anniversary issued published last July—in specialized business publications having a circulation from 20,000 to 50,000. The Neal awards “recognize outstanding editorial accomplishments by editorial staff members of the American Business Press Inc.” Those receiving the awards for the RECORD included Associate Editor Jonathan Barnett and William B. Foxhall and Senior Editors Robert E. Fischer, James S. Hornbeck, Mildred F. Schmertz and Herbert L. Smith Jr.

Columbia University and United Nations develop Bahamian master plan

A joint undertaking by Columbia University and the United Nations has produced a master plan for the 60-square-mile island of New Providence in the Bahamas. The project, supervised by Columbia's new Institute of Urban Environment under Director Charles Abrams, is the first urban planning project ever undertaken jointly by the U.N. and a private university to aid a developing country.

Heading the project, which was worked on by 30 graduate students in architecture and city planning, is Paul Lester Wiener, adjunct professor of urban planning at Columbia. Under the supervision of Mr. Wiener and Francis Ferguson, instructor in Urban Planning, the students spent last summer on New Providence examining its problems and potentials. The master plan analyzes present land-use and proposes new patterns of land development. Part of the project calls for the redevelopment of a blighted area of the City of Nassau, pictured above left. The plan calls for introduction of a sanitation system, creation of recreational facilities and the gradual replacement of dilapidated housing with simple, small houses. The small houses, pictured in model photograph and plan above right, will utilize available materials and skills. Total cost of the master plan to the Bahamian government was less than $20,000, all out-of-pocket expenses.

The Institute of Urban Environment will have a teaching and research program divided between domestic and foreign affairs—between urban problems of the United States and the special problems of rapid urbanization in underdeveloped countries. The Institute has received a Ford Foundation grant of $400,000 for its work in the underdeveloped world.
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Hawaii Chapter A.I.A. presents seven honor awards and Pan Pacific Citation

Seven honor awards, the Pan Pacific Architectural Citation and an Allied Arts Award were presented in the annual awards program of the Hawaii Chapter of the American Institute of Architects. The selection jury, composed of last year's award winners, included: Kenneth Akiyama, for Akiyama and Kekoolani; Richard Dennis; Joseph Farrell, for Lemen, Freeth, Haines and Jones; Frank Robert; Edward Sullam; and John Tatom. Awards chairman for the chapter was Haydn H. Phillips. Jean Charlot received the chapter's Allied Arts Award "for his continuing outstanding contributions as artist, teacher and critic." The Christchurch, New Zealand, architectural firm of Warren and Mahoney received the Pan Pacific Architectural Citation.

Also cited at the awards presentation banquet were the chapter officers and directors. Officers included: Edward Sullam, president; Donald D. Chapman, vice president; Herbert K. C. Luke, secretary; and Howard M. Y. Wong, treasurer. Directors are Gerald L. Allison, Gregory Tong and Ernest H. Hara.

Honor Award: Pago Pago International Hotel, American Samoa. Architect: Wimberly, Whisenand, Allison and Tong Architects, Ltd.


Honor Award: Residence of Mr. and Mrs. John Bolman, Chaminade Heights. Architect: Charles J. W. Chamberland.

Honor Award: Marc Seastrom for Carol and Mary Jewelry Shop, Ala Moana Center. Architect: Vladimir Ossipoff and Associates.

Pan Pacific Architectural Citation of Hawaii Chapter, A.I.A.: to Warren and Mahoney, architects, of Christchurch, New Zealand "in recognition of singular individuality and excellence in design." Shown here is the winning firm's Christchurch College.
The Houston Natural Gas Building, designed by Lloyd, Morgan and Jones, will contain a gas-fired system which will produce all electricity, heating and air conditioning for the building. The 28-story tower, which will provide approximately 500,000 square feet of office space, will have steel frame construction with exterior facing of brick and limestone. An adjacent 10-level parking garage will accommodate 850 cars. The $13-million project is scheduled for completion late this summer. General contractor is H. A. Lott, Inc.

One New York Plaza, a 50-story office building in New York City, designed by William Lescaze & Associates with Nevio Maggiora, associate in charge, will have exposed air-conditioning shafts at the corners, doubling the number of corner offices. The building will have a 700-foot-high concrete core and composite floor construction, permitting unobstructed floor areas 50 feet deep, spanned with relatively shallow, economical beam sections. The facade will be composed of prefabricated sculptured panels, 10 by 12 feet, of aluminum and glass. The building will contain more than 2.5-million square feet. General contractor is the George A. Fuller Company.

A regional headquarters and office building for Eastern Airlines in San Juan, Puerto Rico, designed by Rene O. Ramirez, will be a 12-story structure with two underground parking levels. The exterior will contain alternating vertical concrete mullions and glass with a plastic finish on the exterior concrete. The building will cost approximately $3 million and will contain 80,500 square feet. General contractor is Edward J. Gerrits de Puerto Rico, Inc.
The Connecticut Mutual Life Insurance Company Building, Chicago, designed by Skidmore, Owings & Merrill, has been cited in the high-rise category of the 1966-67 Design in Steel Award Program sponsored by the American Iron and Steel Institute to recognize "imaginative use of steel." Fifteen projects in three building categories were honored in the program. The jury was composed of architects Morris Ketchum Jr., Walter B. Sanders and Philip Will Jr.; engineers Earle T. Andrews, James H. Harlow and Robert H. Roy; and industrial designers Donald D. McFarland, Joseph M. Parrriott, and Arthur J. Pulos. The 25-story building (above) has a steel frame with an exterior of charcoal black granite and bronze-tinted glass.

The First Federal Building, Detroit, designed by Smith, Hinchman & Grylls, is another citation winner in the high-rise category. The tri-towered structure has one tower housing vertical transportation and service facilities, and two towers housing unobstructed office space. The building has a welded steel structural system and is faced with dark granite veneer on precast panels.

The Health Sciences Instruction and Research Buildings at the University of California's San Francisco Medical Center, designed by Reid, Rockwell, Banwell & Tanics, is also a winner in the high-rise category. Each of the identical 16-story buildings, which share an elevator tower, has a structural system consisting of 12 steel columns framing 90-foot squares, spanned both ways by 93-foot steel girders. Each floor has 8,100 square feet of column-free laboratory space.
An amphitheater and recreation center in Mount Morris Park, New York City, designed by Lundquist and Stonehill, utilizes the three structures in the complex, as well as retaining walls, as a backdrop and acoustical baffle for the bandshell which has amphitheater seating for 1,600 built into a hillside. The one-story recreation building, raised to street level, will be lighted by skylights, and is connected to the bandshell. The recreation building includes a senior citizens area, art and crafts area, multi-purpose room, club room, dressing room and first aid room. The amphitheater area is flanked by one-story building for comfort station and concessions.

A doctor's office building in Rome, New York designed by Lewis, Prentice & Chan, will incorporate an electronically generated "white sound" system to assure privacy in the doctor-patient relationship despite relatively thin partition walls. The white sound system, recommended by Ranger Farrell & Associates, will generate a soft humming background noise, and will cost approximately $2,000. The $400,000, 11,500-square-foot building will serve the needs of 10 doctors in five specialties, and will house five reception areas, 12 consultation rooms, 20 examination rooms and facilities for minor surgery and radiology. The one-story building will be of concrete block cavity wall construction with brick facing. Landscape architect is Peter Rolland.

A research and quality control laboratory for Hoffman-La Roche, Inc., Nutley, New Jersey, designed by Smith, Haines, Lundberg & Waechler, expresses its laboratory function on the facade with vertical gray metal exhaust shafts. Between the exhaust shafts are a double set of windows divided by vertical metal fins. Floor levels in the nine-story structure are denoted by granite spandrels. On the first floor are research offices and service facilities. The eight floors above are laboratories on the periphery with other laboratories on the interior. At the south end is a projection for offices, while a northern projection provides special windowless laboratories. The building, which contains 303,000 square feet, is planned on a 10-foot, 9-inch module for maximum flexibility.

A gymnasium for Lake Forest College, Lake Forest, Illinois, designed by Edward D. Dart of the firm of Loebl, Schlossman, Bennett & Dart, will include health service facilities and a heating plant for the South Campus as well as athletic facilities. The building, which will cost $1.78 million, will include basketball courts with spectator seating for 1950; a 25-meter, six-lane swimming pool with seating for 400; two squash courts; handball courts with seating for 100; and classrooms. General contractor will be Chell & Anderson, Inc.
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Underdeveloped areas
I, of course, was delighted with the coverage that you gave American Samoa. I am sure that it will invoke some careful thinking in some of the other undeveloped areas of the world and thus render a real public service.

H. Rex Lee
Governor, American Samoa

Educational architecture
I am principal of Leone High School which is featured in your December article, "The Far Pacific: A New Frontier For Architecture." This school, and indeed, the whole educational system of American Samoa has frequent visitors from all parts of the world who are interested in the educational program and its architecture. I should appreciate having copies of your article to give them.

Jack H. Stoltz
Pago Pago, Tutuila

Comprehending architects
In reference to February's editorial: Your colleague who asked the questions concerning the fancy phraseology used by architects is correct in his feeling that architects tend to surround their work with a kind of verbal mystique. But all professionals have command of certain mysteries. The engineer, for example, cannot always understand the esthetics of the architect, because the relationships of space, form, texture, are a mystery to him. The architect cannot always grapple with all the legalities of the law. It is natural for professionals to protect their own control over whatever mysteries they command as it insures their professional security to a great extent.

Getting to the statement that your colleague gave as an example of jargon, I do not believe that anyone in the profession of architecture would readily understand the statement: "The building is of itself." It seems that any meaning derived from such a statement has first been read into it. Architects have been conversing in mysterious language for such a long time that they cannot always understand themselves today. There has been such little research done in the perception of spaces and forms, a type of activity which really is scholarly, that architects cannot always answer their own questions. Interestingly enough, they still are ready to answer the questions in meaningless terms. What architects really are doing is developing their own mysteries common to no one but themselves, and in turn are making themselves professionally secure only in the eyes of other architects. I think this is what your colleague meant when he said that architects are hurting themselves.

Frank L. Elmer
B. Arch., Kent State Univ.
M. CP. candidate, Ohio State Univ.

Comments and questions
In your February editorial you state, "It seems odd... that a profession so deeply involved in graphics in the visual sense should be so insensitive to verbal graphics." Firstly, although I get your point, may I suggest that the expression "verbal graphics" is a contradiction in terms and just another example of the fancy use of language which gives point to your editorial question.

Secondly, may I offer the fairly simple answer that for the very reason that architects, like painters and sculptors, have the special endowments of seeing things with their "mind's eye" and being able to express these things graphically, they generally have a corresponding weakness of verbal expression. It takes a very special effort to become ambidextrous. Maybe the same thing is true of "ambi-expressiveness." Of course, the effort should be made.

Regarding the Jesse H. Jones Hall for the Performing Arts in the same issue: I first came across this design two or three years ago and was highly pleased to see that it has now been magnificently realized and been accorded high honors, including that of being described as "the most sophisticated building of its kind anywhere in the world." Why don't you tell us who was responsible for the quote? Was it the architects? the mechanical engineer? a public relations man? a representative of the donor's estate? a critic of The New York Times? a man in the street? It makes a difference, you know. Anyway, it is thrilling to observe the highly imaginative plan and tasteful decor complemented by brilliant mechanical control of shapes and volumes.

Finally, a word of criticism regarding the continental seating—an unavoidable consequence of the parti. As nearly as I can make out from the photographs, there are as many as 50 seats in an auditorium row. Consider poor Mrs. Smith, seated at one end, who does not wish to leave her seat during the intermission. It is bad enough when the curtain comes down and she must make way for as many as 24 people on the way to the foyer, more or less all at once. But how about when they come dribbling back in ones and twos?

David Marner, A.I.A.
Asbury Park, N.J.

The phrase "the most sophisticated building of its kind anywhere in the world" was used by several of the consultants on the building as we researched the article. We did not attribute it because it might have sounded as if the persons speaking were putting themselves on the back instead of in truth stating a technical fact. At any rate, the editors of ARCHITECTURAL RECORD feel that this is almost surely the most sophisticated building of its kind anywhere in the world.

Re: the continental seating: poor Mrs. Smith would be less inconvenienced in the Jesse H. Jones Hall than in almost any other theater; there is much more than the normal space between her knees and the seat in front. The safety of this arrangement in the event of fire should be assured by fire codes. Note also that there is an exit for every few rows.

Leveling device for rehab floors
The article, "Instant Rehab Not So Instant," January, mentioned trouble with floor levels in the rehabilitation of New York City slum apartment buildings. This problem was anticipated jointly by the Federal Housing Administration, U.S. Forest Service, and the National Forest Products Association early in 1966, before the project got under way. It was at this juncture that the Timber Engineering Company (TECO) was requested to develop a device that could be used in installing level floors over existing floors. It had been determined that it would be best to leave the existing floor joists and...
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AN ARCHITECT LOOKS AT TERNE: Percival Goodman, one of the foremost living designers of ecclesiastical buildings, has this to say of the eighty thousand square feet of Terne metal roofing recently installed on Shaarey Zedek, the world’s largest synagogue: "To be entirely frank, we had originally wanted to use a considerably more expensive material than Follansbee Terne. Now that the latter is in place, however, we are satisfied that no better choice could have been made. Terne not only afforded the widest possible latitude in form and color along with time-tested functional integrity, but it did all this at a figure well below preliminary estimates for a metal roof."

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Roofing Contractor: Firebaugh & Reynolds Roofing Company, Detroit, Michigan

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floors in place rather than to remove them and install completely new joists.

A device meeting the requirements set forth by FHA and the U.S. Forest Service was developed by TECO in March 1966. Load testing and time and motion studies were completed the following month. Prototypes were then made available to the contractor handling the New York City project. Later in the year, one room using the leveling device was completed and it met with the satisfaction of both the FHA and Forest Service. Subsequent thereto, the contractor decided against using a leveling system because of time considerations. Thus floors were left unleveled.

The TECO leveling device is "V" shaped and is manufactured from 22 gauge steel. Ribbing is incorporated in the part for extra strength. Application procedures call for the device to be nailed to 2 by 3 wood sleepers (or screeds) every 36 inches. These sleepers are then placed 24 inches apart over the existing floor. The angle of the V is adjusted to accommodate the degree of sag in the floor. Two "tabs" or "feet" extend from the bottom of the V and are nailed to the existing floor. After the leveling device has been fully nailed to the sleepers and floor, plywood subflooring is laid on top. The device is designed to carry a live load of 40 lb/sq ft. At the present time, only prototype samples are available for experiment.

D. R. Norcross
Director, Products Division
Timber Engineering Company

What do we publish?
I would like some information concerning the publication of architectural projects. First, what information would you require? Second, how do you determine what work is acceptable for publication?

Leonard E. Beller, A.I.A.
Gretna, Louisiana

To consider a project for publication we must see drawings, presentation sketches or photographs (which at that early stage do not have to be suitable for reproduction). There is no single way that project reaches publication. When the material is submitted for consideration, several of our editors study it and decide whether it fits the magazine's goals and our tentative schedule. We try to publish buildings that are important either because they suggest and encourage new forms or because they are good examples of current thinking. In any event, the material we publish must be of broad interest.
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A new legislative building for the State of New Jersey in Trenton designed by Frank Grad & Sons, will group four elements in a single structure which will contain 150,000 square feet and will cost $10 million. Located on the raised 70,000-square-foot podium level we be working levels for the 40-man Senate and 80-man Assembly, each chamber being expressed as a conical shape above the podium. A five-story rectangular office building will also rise from the podium. Below podium level are parking facilities for 550 cars.

A motion picture studio for Metro-Goldwyn-Mayer, Inc. in Ventura County, California, designed by Albert C. Martin and Associates, will contain 14 sound stages of concrete battered-wall construction. Also provided will be an administration center, theater, laboratory, craft center, commissary, and areas for outdoor sets. The complex will cost $30 million and total 1.5 million square feet.

An office and residential complex, to be built on air rights above a 15-acre reservoir owned by the City of Philadelphia has been proposed and designed by the firm of Bellante and Clauss. The proposal would put twin decks over the water with parking for 1,500 cars under the top deck. Above would be two 10-story U-shaped buildings containing 1.6 million square feet, one for apartments and the other for offices. At center of the $60-million complex would be a 300-foot-high tower restaurant seating 400.
Incremental horizontal expansion proposed for Connecticut State Capitol complex

A proposal that would centralize the governmental functions of the state of Connecticut in Hartford, prepared for the state by the Baltimore firm of Rogers, Tallaferrro, Kostritsky, Lamb, calls for the construction of 4.5 million square feet of office space on a 115-acre site by the year 2000. Development of the complex would be horizontal in five-year increments along a promenade above traffic and parking facilities. As each increment is added, the buildings would be connected by the enclosed promenade. The result, says architect George Kostritsky, would be “one totally integrated structure, a three-to-four-story horizontal mass with high-rise vertical elements rising out of it at strategic intervals.” The first increment of construction, shown here, is Connecticut Square. The square is conceived as both an indoor and outdoor space surrounded by a series of interconnected buildings housing the General Assembly, offices for the governor and other elected officials, and executive branch offices.

First increment of complex includes General Assembly facilities.

Existing Capitol, left, would be connected to complex by walkways.

Enclosed walkways would connect new increments of construction.

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The world's biggest client needs professional briefing

Both houses of Congress and every Federal department and agency involved in construction, either directly or through massive and multiplying support programs, will be called upon this year for judgments affecting basic concepts of the way in which architectural and engineering professions practice.

Several bills affecting the professions have already been referred to various committees of both Houses. So-called "systems engineering bills" (S.430, H.R. 20, and S.467) seek to mobilize technical manpower to apply systems analysis in solving a wide range of problems, including pollution, transportation, housing and land usage. Consideration of these bills will require the utmost, tactful guidance from the involved professions in the implications of the terms at issue.

An Intergovernmental Cooperation Act (S.698 and H.R.5524) proposes to improve operation of grants-in-aid programs by periodic review and, further, "to permit provision of reimbursable technical services to State and local governments." It is the latter provision that has prompted both the American Institute of Architects and the Consulting Engineers Council to urge Congressmen to remove competitive implications of the Act whereby Federal agencies with in-house professional capabilities could offer services competing with private architectural-engineering firms.

There are many other bills concerning highways, water resources, clean air and grants-in-aid for the support of various adjuncts of housing and urban renewal programs about which the professional organizations keep themselves informed and individual members are urged to make their positions known to legislators.

But the most sensitive and contentious area in which Congress will need guidance deals not with current bills in committee but with possible revisions and interpretations of existing statutes affecting the fee structure and selection processes applicable to architect-engineer contracts with Federal agencies.

GAO sees existing law as forcing 6 per cent maximum fees to be bid as part of architect-engineer proposals

At press time, it was virtually certain that Congress would soon be urged by the General Accounting Office to reexamine the compensation rules by which the Federal Government commissions the professional services of architects and engineers. GAO, in preparing a report to Congress at the request of Senate and House Committees on Science and Aeronautics, could find no way in existing law to avoid the conclusion that architectural-engineering firms should include their estimated fees (within the 6 percent limit) as part of the negotiation process with Federal contracting officers prior to final selection of the design firm.

A.I.A., C.E.C. and other professional societies have vigorously protested this conclusion as contrary to professional ethics. A.I.A.'s Standards of Professional Practice specifically state: "An architect shall not enter into competitive bidding against another architect on the basis of compensation."

GAO was well aware of the architects' and engineers' professional codes that ban competitive bidding. However, GAO discovered a legal opinion (drawn for the American Institute of Certified Public Accountants) that declared such codes to be violations of antitrust law—professional restraint of bidding, even if never enforced, is restraint of trade.

Presence of the private opinion, although not expected to be spelled out in GAO's report, presented the watchdog agency with a dilemma of legalism in confrontation with the rule in the professional societies' codes of ethics.

Initially, GAO's study was welcomed as a chance to scrap the 6 per cent limit, which was first enacted in 1939 and has never been changed. GAO agrees that the 6 per cent limit ought to be wiped out; it bears no relationship to the amount or quality of professional services rendered. In doing so, however, GAO feels constrained to suggest some means of assuring the government that the price is right.

One method would be an adaptation of the so-called "Truth-in-Negotiation" Act (Public Law 87-653) whereby the selected A-E firm negotiates a fee based on some sort of defined expenses. This estimate of man-hours and materials is then checked against a post-completion audit; by this method the fee can be revised downward—it's never raised, according to GAO spokesmen.

Comptroller Staats explains position in talk to consulting engineers

Some idea of the degree of GAO's dilemma—and perhaps some hope for the meeting of reasonable and informed
minds—may be found in the following selections from the remarks of Elmer B. Staats, Comptroller General of the United States before the Legislative Conference of the Consulting Engineers Council of America on March 7, while the GAO report was still under review.

"The Congressional request for our study resulted from a rather recent audit we had made of an architect-engineer contract negotiated by the National Aeronautics and Space Administration. We found in that case that the fee payable to the architect-engineer substantially exceeded the statutory 6 per cent fee limitation applicable to the contract. Our report on this review generated a request to the (Congressional) committees by the National Aeronautics and Space Administration for legislative relief from the statutory fee limitation. Since the committees believed that it would not be proper to extend relief to NASA without regard to the similar problems faced by the other construction agencies, the committees deferred action on NASA's request pending the results of our Government-wide review.

"I must admit that our interpretation of these statutes, if implemented and enforced by the Federal construction agencies, might seriously curtail the extent of architect-engineer services which may be contracted for by the Government within the limitation. For that reason and in view of the Congressional direction to us to review, report, and recommend, we are not insisting upon adherence to our views on this point pending consideration by the Congress of the problems presented.

"I think we can all agree... that the continued use of the limitations is not conducive to sound business management... However, in reaching what I believe to be a consensus that the statutory provisions imposing the limitations should be repealed, we are left with a serious and difficult problem.

"We believe that in recommending to the Congress that it consider repealing the limitation statutes, we will be expected to advise the Congress of any alternative methods under which the Government might negotiate architect-engineer contracts with the reasonable assurance that the Government will receive such services at reasonable prices. In our opinion one such alternative already exists. I am referring to the so-called 'Truth-in-Negotiations' law (P.L. 87-653) which was enacted in 1962. . . .

"It is with reference to Public Law 87-653 that we have an issue not only with the professional societies but also with the Federal Procurement agencies. We have long recognized that negotiation is perhaps the only proper method to contract for professional services. We have always taken the position that, in view of the particular circumstances involved in the procurement of professional services, formal advertising procedures are not feasible. I believe for the first time we must face up directly to the question as to whether Public Law 87-653 imposes a mandate of competitive negotiation with respect to all contracts over $2,500 other than those specifically excepted by the statute which do not include A-E contracts.

"As you probably know, we have interpreted the competitive negotiation provisions of the law as applicable to contracts for professional services. At the same time, we are fully cognizant of the position of the professional societies that existing agency procedures, particularly those of the Department of Defense, fully conform to those provisions and to the intent of the Congress. In brief, the present procedures of the department are said to reflect the language of the statute that proposals shall be solicited from the maximum number of qualified sources consistent with the nature and requirements of the services to be procured. In other words, it is contended that the expertise inherent in A-E services and the many imponderables involved in securing such services establish the 'inconsistency' of applying those provisions to A-E services. We cannot say with all candor that such position and the current procedures of the Defense Department are wholly without merit. And it is significant to note that the current philosophy of noncompetition is based on well-established traditional methods of doing business with A-E's. On the other hand we find no substantial basis for the GAO to recognize an exception to the statute which appears to be clear and unambiguous.

We are at this date carefully considering how the picture from all aspects may best be presented to the Congress for its consideration."

Professions fear Federal uncertainty may precipitate hasty state acts

Privately, executives of the professional societies are more worried about the echo-effects of GAO's report than what might happen in Congress. They're afraid GAO's report will be used at the state and local level to justify contract awards solely on the basis of price. They feel Federal contracting officials are usually sophisticated enough to know that quality of the design team, not their price is more important overall cost of the project.

Congress isn't expected to act this year on the report; the principles involved are too fundamental to be passed quickly. However, there's much more to the problem than just Congressional action. Even before GAO made its report, at least one Federal construction agency had decided informally to ask for fee quotations in soliciting design contracts.

Systems engineering is urged as part of urban design

Overwhelmed by the complexity of socioeconomic factors required for adequate urban planning, Congress is showing a marked interest in "systems analysis" as an approach to environmental problems.

There are several bills in Congress designed to stimulate systems engineering as the management method to combat urban ills such as pollution, crime, transportation problems, housing, waste disposal and land usage. While none of the bills will become law overnight, hearings on the subject will focus attention on the potential role of systems engineering in the solution of urban problems.

One bill (S.430, introduced by Senator Gaylord Nelson of Wisconsin) proposes a grants-in-aid program to apply systems techniques to public problems. It has met little enthusiasm so far. Another bill (H.R. 20, introduced by Congressman F. B. Morse of Massachusetts) would establish a National Commission on Public Management composed of government and private members to stimulate private investment to support systems methods in meeting major problems. The Morse proposal is generally favored by the architectural and engineering professional societies.

Top policy planners within the Department of Housing and Urban Development also want to explore this approach. HUD's experts have drafted an "urban systems engineering grants program" to encourage investigation.

Policymakers at the local level should view public facility programs through "such recognized management planning and control techniques as operations analysis and research, econometrics, mathematical programming and modeling, simulation, project management and procedures for program control," assert HUD officials.
A long look ahead to megalopolis

Curious about what things will be like by the time the 21st Century gets here? The Census Bureau is—at least enough to update its projections of the population through the year 2000. So is the Urban and Institute, as indicated by its just-released analysis of the size and structure of our cities of the future. And so, too, should be architects, since these trends are bound to shape the future course of their profession.

Census’ brand new projections show that our population will grow from its present total of just under 200 million to nearly 250 million by 1980. Then, sometime in 1993 the big population clock in Washington will turn over to 300 million. And by the year 2000, we’ll have about 335-million residents—some 70 per cent more than at present.

For the historical-minded, it took well over 100 years (it depends on when you start counting, since our first census wasn’t taken until 1790) to bring the population up to the 100-million level, and another 53 years to reach the 200-million mark. We’ll be picking up our third million in only 25 more years.

From an architectural point of view, we should be able to translate this total of 335-million people into a need for buildings—homes, offices, factories, schools, hospitals, churches. As a very rough guide, today’s 200-million consumers require about $75 billion of annual construction work. If this relationship continues to hold, they’ll need more than two-thirds again as much in annual physical volume of construction by 2000. And if present cost trends persist, the bill for this work will come to something like $300 billion!

Yet large as these numbers may look, they are probably too conservative. In view of the increasing emphasis of renewal projects, we might expect the total volume of construction—both new and replacement—to increase a bit faster than population growth. Architects had better plan on seeing their workload double by the end of the century.

Using these same population projections as input for their analysis, the Urban Land Institute has come to some revealing conclusions about where all these people are going to locate themselves. In the year 2000, says the Institute, three-quarters of the population will be concentrated within a handful of regions which together will cover only about a tenth of all our land area.

For the most part, they’ll be packed sardine-tight in three primary urban zones. These three areas—the Metropolitan Belt, the California Region, and the Floridian Region—will hold some 187 million, or almost the equivalent of today’s national total. In addition, there will be 13 outlying urban regions and six free-standing metropolitan areas of one million or more persons each. The total for those 19 outlying regions and metropolises will be about 52 million.

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Budget shifts reflect need for new design approach

One of the most significant trends in modern building design is the immense shift of emphasis toward mechanical and electrical systems, which are consuming larger and larger portion of the total building dollar. This situation has created formidable problems for the architect.

First, he must himself acquire a broader, more critical understanding—if not a working knowledge—of the increasingly complex technologies involved. He needs that knowledge to make judgments on cost vs. performance that only he can make—no matter how much faith he may have in his engineers' recommendations—because only he has the final responsibility.

Second, his early approaches to design must be broader in scope as his options in adjustment to the budget spread from traditional alternates in structure, materials, and finishes to new integrated environmental systems that do not lend themselves to piecemeal paring once the preliminary design is fairly launched.

Technology and specialized labor accelerate shift in budget dollar

Examples of the change that first come to mind are usually associated with modern heating, ventilating and air-conditioning systems. Yet even plumbing systems, quite standardized in terms of building codes and A.S.A. recommended practice, and traditionally subject to little innovation, have changed significantly in technology and cost.

Laboratory equipment too is usually associated with the mechanical systems and controlled environment problems, as is other built-in equipment relating to refrigeration, processing, etc. All of these, plus the use of sophisticated electronic controls over heating, air conditioning, and elevator banks—and the fact that many of the highest paid tradesmen are involved in the installation of mechanical and electrical equipment—contribute to this increasing percentage of total cost.

The situation today is illustrated by the accompanying table of cost distribution of some typical modern buildings. Quite evidently, systems that used to ac-

count for 35 per cent of the total building cost now often amount to 50 per cent or more. It has been pointed out that this situation is not a new phenomenon, but is really just a continuation of a trend going back to the 30's and 40's.

Integrated systems call for early budget allocations

Architects understand, of course, the fact that progressively more of the building dollar is consumed in mechanical and electrical systems, but it would appear that many have not understood the full impact on their own procedures. The extent of the shift itself implies an integration of these systems with building design that simply must get early attention in preliminary phases if the architect is to remain in control of his budget.

An intelligent program of cost control must consider the following:

1) In the conceptual phase of design, the choice of mechanical and electrical systems is flexible, but the choice for a given project must be firmly established very early in the preliminary design phase. If the client cannot afford (or does not need) the ultimate refinement in multi-zone air conditioning, he must be made to realize this before actual work on design commences and a system he can afford must be found that is compatible with program requirements.

2) When estimated costs exceed the budget, architects have traditionally sought to cut costs in general construction, especially in the architectural treatment of finishes. Yet, with engineer-designed systems consuming so much of the overall building cost, even moderate budget overruns cannot be corrected by cutting back on the quality of the architectural finishes.

Breakdown of Major Contracts as a Per Cent of Total Building Cost

<table>
<thead>
<tr>
<th>Type of project and approximate cost (not including sitework)</th>
<th>General Construction</th>
<th>HVAC</th>
<th>Electrical</th>
<th>Plumbing</th>
<th>Vertical Transportation</th>
<th>Equipment</th>
<th>Total Mechanicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Junior High School Delaware</td>
<td>51</td>
<td>21</td>
<td>10</td>
<td>12</td>
<td>-</td>
<td>6</td>
<td>49%</td>
</tr>
<tr>
<td>High School Arizona</td>
<td>62</td>
<td>16</td>
<td>11</td>
<td>7</td>
<td>-</td>
<td>4</td>
<td>38%</td>
</tr>
<tr>
<td>Hospital Tennessee</td>
<td>43</td>
<td>19</td>
<td>13</td>
<td>10</td>
<td>4</td>
<td>11</td>
<td>57%</td>
</tr>
<tr>
<td>Hospital Unit California</td>
<td>58</td>
<td>12</td>
<td>11</td>
<td>5</td>
<td>3</td>
<td>11</td>
<td>42%</td>
</tr>
<tr>
<td>Medical School Pennsylvania</td>
<td>50</td>
<td>12</td>
<td>9</td>
<td>5</td>
<td>4</td>
<td>20</td>
<td>50%</td>
</tr>
<tr>
<td>University Physics Laboratory, New York</td>
<td>51</td>
<td>18</td>
<td>8</td>
<td>9</td>
<td>-</td>
<td>12</td>
<td>49%</td>
</tr>
<tr>
<td>College Dormitory Arizona</td>
<td>50</td>
<td>15</td>
<td>11</td>
<td>12</td>
<td>2</td>
<td>12</td>
<td>50%</td>
</tr>
<tr>
<td>College Library New York</td>
<td>65</td>
<td>18</td>
<td>12</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>35%</td>
</tr>
</tbody>
</table>
Savings in alternate materials are a small per cent of budget
Generally, the maximum savings that can be expected through the substitution of materials is between 2 and 4 per cent of total building cost. Even this could be accomplished only if the most austere materials were used. In most cases, the savings gained are small, especially when compared to the esthetic loss. In fact, if all interior finishes were to be eliminated entirely, only an additional 5 to 7 per cent savings would be realized. The architect must turn to his engineers for assistance in any program of significant cost reduction.

3) Mechanical and electrical systems do not lend themselves to continuous or progressive alteration once the design has been established. After working drawings have been started, significant reductions in cost cannot be introduced without substantial re-engineering and re-drafting. Most engineers feel that re-design at this stage will destroy the hope of profits for their operations.

This makes it doubly important that the architect establish realistic budget limits within which the engineer can work from the outset.

The architect more than ever must be able to balance performance with cost in establishing design criteria for his engineers. If the responsibility for one budget design is his, then he must face the task of assigning budget goals to his engineers that account for the rapidly changing role of the mechanical and electrical trades.

Construction census may be an aid to cost comparisons
At the end of this year, the Bureau of Census will include a detailed examination of the construction industry in its Census of Business. Inexplicably, this has not been done since 1939, despite the enormous impact the industry has on the American economy. Other industries, much smaller in size, have been receiving the benefits of this census for many years.

The architect cannot expect that this will replace all other sources of statistical information that he requires. It will, nevertheless, contain much new data and will provide a comprehensive background for that which is already available.

As one of the major benefits, the survey will act as a basis for improved inter-regional cost comparisons. It may also greatly assist in determining at what point a regional construction market becomes saturated and costs escalate.

On a much larger scale it should enable more accurate inclusion of the construction industry in the national input-output table. This system measures the GNP by determining inter-industry relationships. If a valuable instrument for forecasting and can determine, for example, what impact a decision by a major industry to invest in new buildings will have on the construction industry in terms of employment.

Interestingly, when this study was first introduced, it was resisted by some businesses on the assumption that it would lead to government planning. Some years later, after its value became apparent, it was re-introduced and industries clamored for the results. Some interests in the construction industry have expressed reservations about the Census of Business, fearing that information might be revealed on individual firms. The experience of other industries in the census does not substantiate this.

Hopefully, this major undertaking will elicit full cooperation from architects, engineers and contractors: it will only be to their benefit.

Costs will rise as labor seeks job security
Although a certain degree of job mobility is necessary to fully utilize the labor force in a growing economy characterized by rapid technological change, to the architect, builder and contractor mobility has come to mean soaring wage costs. Determining precisely how much mobility is needed is at best an interesting theoretical exercise. Without making value judgments, suffice it to say that construction employment is "mobile," based on the comparatively short job tenure of the average worker (2.4 years with one employer). For the construction worker, lack of job security has justified demands for high wage packages to offset off-season unemployment.

Too much mobility means instability and high costs
During peak periods of construction activity, it is difficult to see the elements of instability that face the worker. At the end of last summer, wages had risen about 6 or 7 per cent and the average hourly earnings for construction workers was $3.80. In contrast, the average for all manufacturing workers was $2.70 an hour, or some 30 per cent lower. The unemployment rate in construction was 4.9 per cent, while for manufacturing it was 3.5 per cent. Yet a few months earlier, approximately one out of every five construction workers was seeking work elsewhere.

From the point of view of the architect, contractor, builder or construction worker, too great a degree of mobility in the labor force means unnecessary costs and wasted resources.

Too much security costs more and stiflfies enterprise
At the other end of the scale—in those industries that are characterized by too little labor mobility—there are equivalent wastes. Sufficient adjustments to technological change are not made in the structure of the labor force: the condition of "featherbedding". This situation is commonly associated with the railroad industry. By way of illustration, construction craftsmen over 45 average 5.2 years with the same employer; the average job tenure for skilled railroad workers is 22.5 years per man.

Obviously, a balance must be struck between the two extremes of mobility and immobility in the structure of the labor force. The construction industry must either continue to face rising wage costs to compensate for seasonal unemployment or seek a viable alternative.

To the auto industry, the alternative has already been made clear. The U.A.W. will place a strong demand for a guaranteed annual wage in forthcoming negotiations. If successful, this would be a significant step for labor and may well be a stimulus to construction trades.

In any event, the trend toward job stability has already begun. Construction workers have been placing greater emphasis on fringe benefits and deferred wage increases. If this trend is to prove mutually beneficial to the industry one major condition must be met: in receiving the benefits of greater job stability, the unions must not seek to create a situation of job rigidity and impede adjustments to technological progress.

88 ARCHITECTURAL RECORD April 1967
INDEXES AND INDICATORS
William H. Edgerton
Manager-Editor, Dow Building Cost Calculator,
A F. W. Dodge service

PRIL 1967 BUILDING COST INDEXES
1941 averages for each city = 100.0

<table>
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<tr>
<th>Metropolitan area</th>
<th>Cost differential</th>
<th>Current Dow Index</th>
<th>% change year ago</th>
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</tr>
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<td>325.2</td>
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Differences in costs between two cities may be compared by dividing the cost differential (figure of one city by that of another); if the cost differential of one city (10.0) divided by that of a second (8.0) equals 125%, then costs in the first city are 25% higher than costs in the second. Also, costs in the second city are 80% of those in the first (8.0/10.0=80%) or they are 20% lower in the second city.

The information presented here indicates trends of building construction costs in 21 leading cities and their suburban areas (within a 25-mile radius). Information is included on past and present costs, and future costs can be projected by analysis of cost trends.

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

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<td>268.9</td>
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Costs in a given city for a certain period may be compared with costs in another period by dividing one index into the other; if the index for a city for one period (200.0) divided by the index for a second period (150.0) equals 133%, the costs in the one period are 33% higher than the costs in the other. Also, second period costs are 75% of those in the first period (150.0/200.0=75%) or they are 25% lower in the second period.

ECONOMIC INDICATORS

1941 average for each city = 100.0

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<th>Year</th>
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<th>Money Rate &amp; Bond Yields</th>
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<td>1965</td>
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<td>1966</td>
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<tr>
<td>1967 (Quarterly)</td>
<td>107.3</td>
<td>6.02</td>
<td>4.86%</td>
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ARCHITECTURAL RECORD April 1967 89
Not a boast... but an acknowledgement of the obligation of leadership

SQUARE D SELLS MORE PANELBOARDS THAN ANY OTHER MANUFACTURER

- There are three reasons for Square D's predominance in the panelboard field...

  First, the line is complete. Whether the requirement calls for AC or DC or both; lighting or power distribution or both; fusible or circuit breaker; plug-in or bolted construction; Square D has the right panelboard for practically any given job.
  
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  write for Bulletin SD-126. It tells the quality story in detail
  Square D Company, Dept. SA, Lexington, Kentucky 40501

SQUARE D COMPANY

wherever electricity is distributed and controlled

For more data, circle 73 on inquiry card
CONTRACTOR EMPLOYS DEEP FREEZE AND URETHANE FOAM BLANKET TO STABILIZE EARTH WALLS IN DEEP SHAFT EXCAVATION PROJECT

A unique method for stabilizing soil walls while making deep-shaft excavations through loose dirt and rock might have important significance in general construction, such as commercial structures, bridge footings, dams and similar projects.

The Cryomethane Co., has the general contract to construct two shafts 135' dia. by 175' deep for the Tennessee Gas Pipeline Co.,* as reservoirs to store liquefied natural gas at a constant −260°F near Hopkinton, Mass. The Perini Corp., of Framingham, Mass., had the sub-contract for the excavation through glacial till and rock.

To prepare the site, Cryomethane installed piping to freeze the ground to a depth of 195 ft. around the perimeter of the intended shafts, using a two-stage ammonia refrigeration plant that was set up nearby. Circulating pipelines were laid and connected to a manifold system of 6- to 10-inch pipe supplying the freeze wells. Sub-zero calcium chloride brine was then circulated, deep-freezing the ground and making possible the excavation of sheer vertical cuts without shoring or bracing.

In the first excavation, materials used to insulate the frozen ground consisted of 2-inch thick glass fiber mats covered by 90-lb. roofing paper held in place with wire mesh and rock bolts. During work on the second shaft, it became evident that this insulation system was inadequate. Sections of thawing earth broke loose, and dirt began sloughing into both excavations. Had this condition been allowed to continue, refrigerant pipelines and freeze wells might have been exposed.

The Mine Safety Appliances Co., Pittsburgh, Pa., was contacted to see if application of rigid urethane foam would be practical. After a short period of experimentation proved the effectiveness of this approach, two applicator crews began spray-foaming the first shaft and 20 feet of exposed wall in the partially dug second hole, completing the job in about 5 work days.

About 35,000 sq. ft. of surface was covered with urethane foam to blanket the dirt wall down to solid rock, 27 ft. down in one shaft, 41 ft. down in the other. The foam was applied to a thickness of about 3 inches (equivalent in insulating value to 6 inches of glass fiber) directly over the installed fiber mats in the first hole as it would have been too costly to remove the material.

As work progressed in the second shaft, applicator crews returned at 3-day intervals to apply urethane foam over wire mesh to the newly excavated wall areas.

An 18-inch-thick reinforced concrete lining was then poured directly against the rigid foam surface to serve as the permanent wall lining.

In this project, the reservoirs will be dome-covered, sealed gastight and freeze wells closed off. Over a period of 10 months, liquid gas will be pumped into the reservoirs to gradually lower the earth temperature to the necessary −260°F, extending the freeze line many feet in all directions.

* A Division of Tenneco, Inc.

For additional information on the use of urethane foam in other insulation and construction jobs, write on your letterhead to:

MOBAY CHEMICAL COMPANY, CODE AR-10, PITTSBURGH, PA. 15205

For more data, circle 74 on inquiry card
For dependable performance, specify the YORK open Turbopak liquid chiller

When you specify a liquid chilling machine, you expect dependability. Here’s why the York open Turbopak chiller is the best unit for any application:

- **Proven reliability.** Industry figures indicate that hermetic machine failures are more than five times higher than York open type machines.

- **Positive lubrication.** Centrifugal shaft-driven oil pump assures lubrication even during coast-down, in event of power failure.

- **Leak-proof.** The York open Turbopak is actually tighter than many hermetics. Gas can’t leak out; dirt, air, moisture can’t leak in.

- **Proven drive.** Years of experience with this gear, developed by York and Borg-Warner gear specialists, assure long life . . . quiet, dependable operation.

- **Easy maintenance.** Motor service and repair can be done by your local electrical service shop. No long delays. The York coupling requires no lubrication, no service.

For complete specification data on York Turbopak chillers, call your local York Sales office; or write York Corporation, York, Pennsylvania 17405.

More reliable than hermetics! Proof: insurance rates on hermetic motors are twice as high as rates on open motors! Maybe this is another reason why more and more of York’s shipments are now open drive machines. Sizes, 50 to 600 tons; shipped completely assembled and charged, with integral control panel; spring isolators eliminate the need for structural bases or mounting pads.

For more data, circle 75 on inquiry card
Seven common errors in architectural office management

Some of the most pressing problems with which we have had to deal during many years of management consultation with dozens of architectural firms are seven common costly errors of omission. The following observations about them, while not intended as a prescription for cure, may afford opportunities for self-examination by firm management.

1. Failure to keep in touch with past clients and prospects

This is an almost universal error and is either the most serious of all, because the citation of past work is the most important, or not the only medium for promoting firm growth. Many architects consider a formal program of follow-up with past clients to be an unwarranted, unnecessary, and frequently distasteful act of aggression. Three reasons for the omission are usually advanced. First, the partners are too busy with current work to worry about indirect or long-range promotion. Second, it is taken for granted that past clients will remember your good work and refer to their files or the brochure you left with them.

Third, during the past work, the client earned and will remember the full range of your firm’s services.

All of these assumptions are completely in error. When all the principals of a firm are too “busy” to keep in cultivation the very foundations of the firm’s growth, that growth will surely stop. Further, past clients, however pleased with your architect’s performance on an one job, relate the firm’s performance to the character of that particular job. Clients’ problems change. The individuals who make decisions in solving those problems change. If you do not cultivate knowledgeability about your clients’ problems and personnel, don’t be surprised when the next commission goes to one who does.

How keep in touch? Use the telephone. Have lunch. Write a letter. But tailor these approaches to the particular needs of your client. Don’t put him on a general prospect list to receive form letters or brochures that may be part of your new business solicitation. Tell him what you are doing that may apply to his present or future plans. Keep in touch with his problems.

2. Failure to control internal costs by relating each project budget to successive phases of the work

Hopeful ignorance as to whether a little more time spent on design refinements or optional changes or reworked detailing will throw a particular project from profit into loss is another amazingly common error. No architect will compromise the excellence of his design merely because some arbitrary point of bookkeeping has been reached in the allocations of time versus budget. There is no suggestion that he should. But for every project the design phase must somewhere come to an end if the building is to be built. Every experienced architect knows that the time allotted for design, as a per cent of elapsed time from commission to completion, must vary rather widely with size and type of building and many other factors. But it is a finite time to which he can, if pressed, apply a number—which of course, he is never quite inwardly committed. But he had better commit himself verbally and firmly if only as a datum point from which to take alarm.

The elapsed time from beginning to end of a project is usually a fixed total. The total fee for its accomplishment is also usually fixed. The over-all job is accomplished in well defined phases, each of which consumes some portion of the fee. By the simple expedient of allotting definite percentages of total time and fee to the accomplishment of each phase, and then setting up a means for keeping informed as to whether the job is proceeding within that framework, an architect can determine whether or not he is operating profitably at every phase. (See “How One Large Office Uses Construction Cost Estimates”, May, 1964.)

3. Violation of basic principles of organization and administration

A prevalent and dangerous error in architectural offices is the failure to organize and administer the work along simple lines of business discipline. The failure to delegate responsibilities and the bypassing of organization lines precipitate a situation in which senior partners are found playing the role of one-man fire departments. This situation grows, perhaps naturally, out of the inability of men who started the firm to break established habit patterns of doing everything themselves.

There are two lines of approach to correction. One involves the sincere conversion of the older partners to at least the wish for an effective system of organization. The second is the simple application of a system.

Elementary principles of management require that authority must go along with delegated responsibility, and that the number of people reporting to any one man must be limited. Organization plans should be written and strictly followed. Performance should be measured periodically. Each man should be assigned to do what he does best, and should know what is expected of him. Duplicate functions should be sorted out and corrected.

There are some helpful indicators of the business performance of architectural offices. While they may vary over fairly broad ranges from one successful office to another, and therefore should not be applied in any absolute or rigid sense, they may provide useful in-house signals of conditions that may need correction or at least attention. One such indicator is the ratio of overhead to direct technical labor. In many successful offices this ratio ranges from 65 per cent to no more than one-to-one. If it falls much below that range, it could mean that the firm is not spending enough on some essential overhead item such as promotion of future business.

Another indicator may be the gross profit before taxes. Bankers seem to look favorably on pretax earnings of 15 to 20 per cent of net fees (i.e. gross fees less consultant fees).

A third indicator is unallocated total technical time. In general, this should not exceed 4 to 5 per cent in conventional architectural and engineering work. Some research-oriented firms, however, may run 10 to 12 per cent. If there is no unallocated technical time at all, someone is padding the reports.

The indicator of sales costs as a per cent of revenue is a difficult one to assess although it is well worth watching. It is particularly clouded when the time of partners and principals is included. There are many good business
reasons for considerable variation in this ratio. A special effort to qualify for an unusually large commission, for example, or a determined effort to overcome some accidental lag in business, or to spur the growth of the firm past some critical point are some of these reasons.

4. Failure to recognize and separate operational activities
Design and manufacture are two classically separated functions. But design itself is the basic product of an architectural office, and design is so intricately enmeshed with procedures for its execution that the separation of organizational from operating activities is not always readily apparent. Nevertheless, if the separation is not clearly established in the patterns of an architectural firm's procedures, there may be very serious consequences.

Two symptoms which reveal the lack of separation between the design and operating functions are: inability to control design costs and inability to adapt the firm's procedures to developing technology in methods of production and management.

The inability to control design costs may simply represent laxity in definition of what the design process comprises. Architects tend to consider the design process as the total reason for being. And so it is, in the sense that design is the necessary prelude to execution. But if there is no execution, design falls upon sterile ground. Dillettantes and genuises may enjoy the privilege of purely theoretical design without the constraints of budget or the purpose of construction. But the architect who would survive in practice must see his buildings built—and make money in the process so that he can design some more. Like it or not, the architect must set up to stay in business; and to do that he simply must define—not compromise—the finite compass of design and the proportionate role of production.

5. Failure to understand the aims and motivations of employees
Failure to understand employees as people is one of the most costly on our list of omissions. And it is one of the most difficult to remedy. High turnover and low productivity are the insidious results of it, causing an attrition on the capabilities and profits of a firm virtually impossible to measure. Further, the state of mind at the executive and partnership level wherein this blind spot of management resides is not likely to be suddenly enlightened by lectures or books on psychology. Lack of understanding is ingrained in the habitual stance of executives wherever it occurs.

All people at work want the answers to two questions: How am I doing? What can I do to advance? One of the devices for answering these questions is a performance review of each employee by his superior on a regular basis—say every six months. But the review must be implemented by evidence within the firm that, first, the review is a fair one and second, that the road ahead is not blocked by deadwood or ill-defined policy. Well-fed mediocrity rarely moves. And if it is a policy of the firm to grant authority solely on the basis of seniority, not only are the reports of performance of ambitious and capable younger aspirants likely to be colored but the decision of the capable younger person to stay with the firm or not is likely to be based on what he can see ahead for a firm where only age has merit.

Similarly, lack of an orderly retirement and transition program can result in an excessive number of old-timers hanging on as their capacities diminish, blocking the way for new blood.

Job satisfaction is seldom exclusively dependent on the paycheck, although money is one of the appreciated rewards of merit. More important is the sense of doing a job well and seeing the pathway to development open ahead.

6. Failure to set up internal communications procedures
The sixth most common failure in architectural firms is the lack of in-house communications. This breakdown becomes especially severe as the volume of work increases.

The first step to correct a block in communications is to establish a job function within the firm in which a person will be responsible for handling all information coordination. Some of the techniques which this person may use may include: periodic job meetings (although one firm has a sign which goes up at such meetings saying "this conference is costing $12 per minute"); a firm policy of periodic memoranda summarizing current activities at various job levels; a monthly progress report; a house organ or news letter distributed regularly to all employees.

When a firm is dispersed in various offices throughout the country, principals must devise means of keeping in touch with one another. They will, of course, do this in their own way; but again, communication through a central individual seems logical. This is especially important where business acquisition activities can overlap or where a central facility for information retrieval (on materials, costs, job histories, codes, etc.) is part of the responsibility of the communications department—as usually it should be.

7. Failure to plan ahead rigorously for both near and remote future
The seventh serious omission—and one most difficult to overcome by organizational fiat—is failure to plan ahead both short-range and long-range goals. The difficulty is not in recognizing the merit of planning. It is in putting together and judiciously acting upon the myriad small steps and bits of information (internal and external to the firm that comprise and guide the goal-planning process.

One does not sit down one day and say: "Now we shall have planning." Patterns of growth and activity do not evolve on giant immutable sheets at the conference table. Viable plans evolve slowly, and above all flexible, extension toward effecting a primary decision to grow or not to grow.

Growth is a magic word in business but in professional offices it has sacred connotations. Many small architectural offices elect to stay small and happily succeed in doing so. Like the Red Queen, however, they learn to run fast in order to stand still. They plan the steady flow and competent handling of such business as they may elect to do.

Similarly, unplanned growth can generate the odd phenomenon by which the income of principals is mysteriously reduced.

Although planning to grow—or not to grow—will always be based on unique combinations of goals and personalities for each firm, there are some generalizations about planning that may be useful: 1) Try a rolling, five-year plan updated and pushed forward yearly or at shorter intervals; 2) Implement such a plan by watching various segments of the construction economy as they are affected by government support, recession, etc.; 3) Translate growth rate to dollar amounts and numbers of people so that percentage rates do not obscure genuine progress.

Decisions about goals and growth will have to be made with full cognizance of emerging technologies and the changing climate and scope of practice. But it is important to remember that all of these—and all other aspects of architectural office management—will submit to two overriding urgencies: 1) the architectural competence of the firm's product, design; and 2) the aims and desires of clients.

With regard to the latter, there may be comfort for all architectural offices, large and small, in the results of a recent survey of clients as to the criteria they considered in selection of an architect. In descending order of importance, the first four criteria were: 1) design ability; 2) cost consciousness; 3) availability of a principal; and 4) personal service.
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Paul Rudolph’s design for Stafford Harbor, Virginia, a new town that will be located on the Potomac about 38 miles south of Washington, D.C., reinforces the natural topography by placing the major groups of buildings along the ridges and harbor, leaving the intervening valleys free.

A new town that conserves the landscape
The form of the landscape—rather than the geometry of building construction—has been the major influence on the design of Stafford Harbor. Except for the marina, with its clearly artificial shoreline and piers, the configuration of the town is based upon the irregular topography, with most of the housing arranged to follow the ridges that run across the site. Each cluster of housing is in itself a little hill, made up of row houses that are backed up against a parking garage, with an apartment tower above. Sloping roofs relate these elements in such a way as to get the architect out of what Rudolph calls the “pigmy giant problem,” that is to say, the problem created by dividing a site up into a combination of high- and low-rise buildings. The valleys between the ridges are to be devoted to schools and recreation areas; and the hill and valley motif has been brought down into the marina area as well—with the housing along the water built up into a triangular section, and the administrative center placed over a podium containing various recreation facilities.

The story of how Rudolph came to design such a strong architectural image for a whole town is an interesting one in itself. The developers purchased the land—a peninsula of some 4,684 wooded acres on the west bank of the Potomac, about 38 miles south of Washington, D.C.—and then retained a firm of land planners to prepare an outline of future development. The tract’s riverfront location, and central position in the urban area between Philadelphia and Richmond, made the creation of a resort the logical first choice. Although the area is farther from Washington than the average present-day suburb, there are already good highway connections and a near-by railway line. The possible use of hydrofoils or hovercraft on the Potomac could bring Washington even closer, thus giving the area a future as suburb and retirement community as well as resort.

The land planners’ report, after setting up a road system and a density pattern for the whole site, therefore postulated a first development phase that would consist of a resort complex along the shore, containing a marina, a “boatel” and high-rise condominiums. The rest of the land in the first phase was divided among single family houses, garden apartments, occasional towers, and a golf course, with most of the densest development nearer the marina.

The architectural character, according to a preliminary brochure, was to be achieved by having each complex “name” after an international seaport, and built in the architectural tradition of that particular country. The community of Amsterdam would be of Dutch architecture, Londontowne would be of Ye Olde English, and Marseille of course, would be French Provincial. There would also be an Italian port, a Polynesian port, and so on around the world.”

However, somewhere along the line, Jervy Slagle, the president of the development company, spotted Paul Rudolph’s project for a mountainside motel in the March 1966 issue of the RECORD. In Slagle’s words: “It seemed to me that this might be the kind of architecture that would go with the ravines, valleys and virgin timber of the land we owned.” Slagle went to the local library and looked Rudolph up and the Who’s Who; and, having found his address by this means, called him up and asked him if he was interested in designing a city. Not surprisingly, Rudolph ended by taking the commission; and, again in Slagle’s words: “Rudolph has grasped the thing we were shooting for.”

Rudolph’s design covers approximately one-fifth of the total acreage at Stafford Harbor, and it is difficult to tell at this point how many of his buildings will actually be built. Stafford Harbor is being considered as the site for a permanent technological exposition, which could mean considerable modifications in the plan. In addition, market conditions and public acceptance always have an effect on the housing mix in the development of this kind. Nevertheless, Rudolph has clearly established a basic concept that is capable of guiding the course of future development, and serving as one of the possible prototypes for the new kind of higher-density living that seems inevitable in the face of continued population growth.
Perspective of the marina shows the protected harbor formed by elongating a natural projection of the land. The regular rows of docks and slips reflect Rudolph's feeling that construction of this type should be very obviously man-made. The amphitheater and obelisk mark the town center for the first stage of development. Apartments along the shore have a stepped-back configuration, which gives each unit what should be a well-protected terrace, and echoes the shape of the housing clusters in the hills beyond. All parking at the marina will be exterior and at grade.
View of a housing cluster shows how sloping roofs, terraces, and a stepped-back section integrate both high- and low-rise elements into a single composition, eliminating what Rudolph calls "the pigmy-giant problem." The core between the step-back sections is a two-level parking garage. Two parking places are provided for every housing unit, and two-thirds of these are in garages. The access roads run through the garages linking the clusters together. This arrangement offers a wide range of adjustments to the landscape.
Plan and section of a housing cluster show how high- and low-rise units relate to each other and to the garage and access roads. The party walls form chases for utilities; construction will be of a special concrete block split in half—and laid with the split edge exposed—to form a rough, corrugated surface.

A Distinguished Civic Center For A Small Town

The new civic center for Los Gatos, California, a community of 15,000 residents at the southern end of the San Francisco peninsula, demonstrates what a small town can do—if it has the will—to have fine civic architecture. In the spring of 1963, Los Gatos held a competition among registered architects in 12 northern California counties. The winners were two young architects employed in a large Bay Area architectural office, who subsequently established an office to execute the center. The jury which picked their design called it “timeless and classic, quiet and unassertive, a simple but very strong concept of civic center development in scale with the Town of Los Gatos.” The competition’s happy result is bright evidence that such a means of selecting an architect for public work can produce architecture of a high order.
The scale and simplicity of the Los Gatos civic center should dispel any lingering notions that civic buildings need to be monumental. The three pavilion-like buildings, placed at the corners of a raised public plaza, reflect the size and character of Los Gatos and the informal ways of a small town—yet in their classic restraint, precise details, and separation of public and staff functions maintain the necessary dignity of public offices. The completed complex is the first phase of the center; as the town grows to its expected ultimate population of 50,000, expansion is ingeniously provided for by the plan, which is designed to permit addition of 25-foot-square structural modules to each of the buildings. As built, the center differs little from its initial concept; the decisions made for the competition solution proved sound and even inevitable in the actual execution. The center’s design recognizes and makes full use of the natural assets of the site: 13 acres of slightly rolling land with a 500-foot frontage on Main Street, a backdrop of wooded hills, and existing side streets to facilitate access to the areas most naturally suitable for parking. By placing the buildings for the various departments—administration, police and library—at the corners of the plaza, the view to the hills and the magnificent trees is preserved, an important part of the charm of the complex. A depressed service road behind the police and administration buildings maintains the visual continuity of the land. The buildings are concrete framed, with brick fill walls. Brick walks set into the concrete plaza define the access for each department, and serve to unify the buildings on the plaza level. On the lower level, which each department has its own access stairway, a corridor around the centrally located council chamber ties together all of the city departments and makes a single building of the complex. The raised plaza makes possible a split-level scheme, with the plaza half a flight of steps up from the natural ground level and the council chamber (and lower floor offices for administration and police, and stacks for the library) half a flight down. A large lobby serves as anteroom for the council chamber, common services—reception rooms, employee lounge and storage space—are on the lower level.
The advantages of a split-level scheme are obvious: the Council chamber (above), used only for public functions, could be placed under the plaza and yet have its own important entrance (above, right), and staff offices to which the public would seldom go, and services common to all departments, could be unobtrusively located on the same level. At the plaza level, raised above parking areas and entrance walk, are the offices to which the public comes—administration, with the unusually pleasant offices for the mayor, city manager (far right) and city clerk; police; and the main library. The administration and library buildings have centrally located stairways, daylighted from monitor windows above the room (near right). Heat and air for all parts of the center are distributed through ducts in the first floor ceiling space, making possible the handsome but simple exposed concrete coffer ceiling used throughout plaza level areas. Each 5-foot-square coffer contains a fluorescent lighting fixture, shielded from notice by the depth of the coffer. The mechanical system is designed for the addition of air conditioning.
Although the square plaza makes for equally pleasant building locations, and democratically makes each equally prominent, the library has, perhaps, the choice location. It is so placed to permit access—from three directions: the plaza, the parking area and the walk from Main Street. The main reading room (right) overlooks, on one side, both the curved steps with the handsome oak tree shown on the first page, and a paved terrace overhung by redwood trees on the other. The children's room, child-scaled and of restful proportions, is entered from both the terrace and the plaza. Some of the stacks are on the plaza level; others are on the lower level, reached by a stairway daylighted by monitor windows directly above. Contract cost of the center, exclusive of casework and landscaping, was $806,755, or $23 per square foot.

The new Pittsburgh headquarters of the United States Steel Corporation, designed by architects Harrison & Abramovitz and Abbe, will consist of a triangular tower rising 841 feet (64 stories) above its plaza to dominate the city's skyline. It will provide more office area than any building except Pan Am; will have a unique structural system centering on a braced core wearing a rigidly joined "hat" restrained by peripheral columns; and will have an exterior of steel that rusts to form a protective finish coating.

But the most significant feature of the design is the outer columns, which will be self-fire-protected, since they will stand clear of the curtain wall and will be filled with circulating water. Here, for the first time, uncovered steel will serve as fireproofed structure and as finish.
The site—nearly three acres in area—is located in the heart of downtown Pittsburgh's Golden Triangle, and forms the pivot point between the business core of the city and the Civic Arena to the east. It lies next to a sunken interstate highway and the terminus of Bigelow Boulevard, and spans a railroad tunnel. The tunnel will be physically separated from the new structure and its foundation—and completely isolated structurally—so will not affect the design of the building, except that space must be allotted for it, and vibration control provided. The water table lies about 30 feet below grade and is a design factor, since there will be underground parking on three levels for about 650 cars.

The prismatic tower will have a triangular base about 41,000 square feet in area, which will cover about 56 percent of the plot. The office building will have a gross area of 2.9 million square feet, the parking area about 180,000 square feet, for a total of about 73 acres of building area.

The tower will push skyward from a paved plaza covering the plot. The spread of its paving will reach into the lobby and will be relieved outdoors by planting yet to be designed. The plaza will have changes in level in conformity with the slope of the plot, but entrance to the building will be gained from Grant Street, at the lower level.

The two-story lobby will be enclosed by glass set back 9 feet from the plane of the curtain wall above—and will provide electric stairways leading down to the concourse level or up to the second lobby level, or mezzanine. Since the railroad tunnel passes under four of the six elevator banks, entrance to these is on the second floor of the lobby, served by four electric stairways. This arrangement also acts to disperse the heavy traffic during rush hours.

The concourse, immediately below the lobby, will be devoted to a 350-seat auditorium and exhibit area, as well as a commercial cafeteria. The building truck loading area and turntable will also be located at this level.

There will be four mechanical areas serving the tower: the concourse, the 3rd, the 34th, and the two-story space at the top of the 64-story structure. The 62nd floor will be devoted to a commercial restaurant, and to several private dining rooms. The glass wall at this level will provide a spectacular view of the city, river, and hills. The 61st floor will house the board room and executive offices; will provide also a visitor's suite. Present plans call for a heliport on the roof. USS plans to occupy about 60 percent of the building on moving-in day, early in 1970.

The triangular form for the building was arrived at only after the architects—in collaboration with the engineers—considered, studied, and analyzed all the familiar developed shapes; then reviewed many new and unfamiliar ones. They considered the square, the circle, the triangle, the rectangle of various proportions and with a variety of appendages, the square with cut-out corners (Roman style), interlocking squares, and so on. Following comparative analyses involving such factors as structure, area efficiency, site, and costs, the triangular plan was settled upon as efficient structurally, and as the form most appropriate for handling the owner's requirements in a pleasing and economical fashion.

Actually, the plan is an equilateral triangle with cut-out corners, a form which neatly packages a compact arrangement of three office areas—each 42 feet, 6 inches deep by 221 feet long—about a central triangular core measuring 162 feet on a side. Each of the three areas provides 10,000 square feet of column-free space, planned on a modular grid pattern of 4-foot, 4-inch squares; a system that carries through the entire structure, including the exterior columns and curtain walls.

In accordance with the owner's request, the suspended acoustical ceilings will be flush, with no beam drops. The inner face of the exterior wall will also be smooth. Metal partitions can thus be placed on any desired modular line, for maximum flexibility. The idea at present is to provide a lighting troffer in alternate panels, although this arrangement may be modified. Linear air-conditioning supply and return ducts will be placed on modular lines running perpendicular to the core wall and spaced 13 feet apart. They can be individually controlled, or controlled in blocks, or split where partitions occur—refer to detail, page 171. Temperature will be controlled by varying the volume of constant temperature air, rather than by varying the air temperature. In addition to the inner-zone air-conditioning system, there will be a perimetral system to serve the outer offices. Finished ceiling heights in office areas will be 8 feet, 6
... inches on all floors; the floor-to-floor height throughout the building will be 10 feet, 10 inches.

All light, receptacles, and miscellaneous power will be distributed through trench header ducts and the cellular floor system, serving outlets on the floor and lighting fixtures for the ceiling below. For maximum flexibility in use, wiring will be kept out of partitions and placed in service fittings on the floor with lighting control from a central point.

The exterior of the tower—which will also follow the modular pattern—will be made of USS Cor-Ten, a steel that forms a permanent protective coating as it oxidizes, turning to a rich, dark, purple-brown color as it ages. The curtain wall will be an adaptation in Cor-Ten of standard stainless steel system developed by USS; the glass will be bronze-tinted, the sash will be stainless steel.

The exterior columns will be welded hollow box sections, set three feet outside the curtain wall. They will be filled with water which will—if the column is exposed to excessive heat—circulate by convection currents. Each column will be divided into four zones to reduce the head of pressure. The circulating water will serve as fireproofing, eliminating the need for conventional covering and permitting the structural steel to speak for itself. Potassium carbonate will be added to the column water as anti-freeze.

At every third floor, the freestanding columns will support spandrel girders and will be laterally braced by the floor construction, acting as a diaphragm. These primary floors—every third one—
will support the intervening ones, so that the building becomes, in effect, a stack of three-story structures. The design makes this fact visually evident, and by clearly articulating the structural and curtain wall elements, creates a lively threedimensional pattern expressive of the construction.

Worthington, Skilling, Helle & Jackson began the structural design by conducting an extensive study of various types of high-rise constructions, and concluded that any solution arrived at must avoid a cost penalty, would have to take care of expansion and contraction, and would result from applying present criteria—which may conceivably change as knowledge increases. These considerations become more intense as the height of a given building increases, in the ratio of the square of the difference.

Engineer Leslie E. Robertson of WSH&J explains that the structure for the USS building consists of a braced central core made rigid at the top by a horizontal space frame or "hat" that extends...
literally to the outer perimeter of the tower. This basic T-form is held in equilibrium by the outer columns, and takes care of temperature differential and wind drift, in part. The outer columns are placed in almost pure tension and compression; bending stresses are secondary, and not a critical factor. These columns are tied, every third floor, to the spandrel girder and floor construction to provide stability and keep them in alignment. This fact, and the welding on of girder tubs to facilitate erection, led to the system of primary and secondary floors, and to the three-story core bracing pattern. This type of outer wall structure allows—within its larger framework—any wall treatment the architect desires.

The shape of the building is expedient for wind; in modifying the pure triangular form by cutting out the corners, the response of the structure to wind was substantially reduced. A full range of structural steel will be used, with allowable tensile strengths ranging from 6,000 to 100,000 psi.
A rendering of the final design is pictured at right; an aerial view of the model which shows how the new tower will relate to downtown Pittsburgh is reproduced below.
A CONTINUING STUDY OF THE WINDOW WALL

BY E LIOT NOYES

The design of the three office buildings that follow centered on the architect's search for a more functional and economical window wall. In this search, Eliot Noyes was concerned with the control of light, heat, glare, sound, and vision; and with the effort to provide attractive interiors of architectural character, free of blinds and curtains—all at a cost in line with that of a standard curtain wall. His studies led him to developments in the "assembled wall"—composed of modular precast concrete panels—which have indeed yielded significant economies in construction cost and in construction time.
The two photographs at left show the interior effect the panels create, the picture above, the manner in which they are glazed. The partial elevation and typical section below indicate the way in which the building face was assembled. This particular window wall was furnish and installed, the architect says, at a total in-place cost no greater than a standard curtain wall. The next building by Noyes—now under construction near Pittsburgh—will have glazing strips and panels similar to these, except that they will be recessed rather than projected.
GLASS PANELS
PERPENDICULAR
TO WALL SURFACE

This recently completed office building on Long Island—newest of the three in this group—achieves most of the objectives Noyes was seeking, and does so economically. The precast modular units—6 feet wide and 12 feet high—were of a size and weight easy to handle, had a built-in exterior and interior finish, and were slotted for direct field glazing without window frames. Turning the two narrow glazing strips perpendicular to the wall permits only a controlled amount of daylight to enter, yet allows diagonal views and sun control. The need for blinds or curtains is thus eliminated. The situation of the building—a busy street—called for a wall that would block off sound and full vision. The interior effect is attractive, functional, and architectural in character. The exterior is of a brownish, coarse textured aggregate; the interior is smooth concrete, ready for painting. The entrance is located on the north facade shown in the photo at left.

The precast modular wall panels—6 feet wide and 11 feet, 6 inches high—are of two types; one with a window, the other blank. Their design was developed to make the units as strong, rigid, and light in weight as possible; also to make them of a size easy to transport and erect. Joints between the panels occur in the deep recesses formed by adjacent projecting flanges. The actual windows, with anodized aluminum frames were installed and glazed after the precast panels were set in place. The partial elevation and typical wall section below explain how the building wall was put together. Note how the concrete slab at ground level becomes, in effect, a platform for the entire building.
WINDOW WALL ASSEMBLED OF PRECAST PANELS

In designing this office building—earliest of the three in point of time—Noyes was concerned, first, with reducing the area of glazing as compared with that in most glass curtain walls; and second, with providing a precast modular unit that could become, in repetition, the outer wall of the building. The resulting four-story building is a handsome one that was economically built, but hardly revolutionary as far as fenestration was concerned. Vertical blinds did have to be installed as protection against sunlight, glare, and unfavorable view, and they are closed most of the time.

However, progress was made, especially in constructing the wall, to the effect that the next step—studying patterns, sizes, and arrangements of glazing panels—became clear, and was the architect’s principal concern in succeeding buildings. The decisive reveals of this particular window wall serve to create a lively light and shade pattern, and are skilfully applied so the building’s structure becomes visually evident.

The precast panels, of white quartz aggregate in a white cement matrix, are 8 feet wide, 12 feet high, and 3/4 inches thick; again, a size, weight, and shape efficient for casting and easy to transport and handle.

The massive concrete structure that supports the structural steel frame above second floor level derives its shape from analysis of various methods of achieving maximum openness at ground level. It has eight points of support, while a more conventional structural system would require 20. The interior surfaces of the panels are smooth; the joints are filled with neoprene gaskets and sealed with white caulking. The small windows are set in anodized aluminum snap-in frames.
"...BOTH WALL AND WINDOW AT ONCE"

Located near the Los Angeles airport, this office building—second of the three to be built—is situated so there is free space on all sides. Thus, it seemed desirable to give the window wall an open character, yet guard against excessive sunlight and glare. To these ends, the glass area was broken up into a pattern of small windows of gray glass, variations of which were studied in mock-up form to determine the effect upon vision when seated or standing, and to determine whether or not any claustrophobic feeling was set up. Noyes says, “It felt very good, and reminded me of the kind of window wall one encounters in India, so perforated that it is indeed both wall and window at once. It also had some of the quality of an old-fashioned back porch, enclosed in wooden latticework.”

This window wall appears, then, to succeed in providing the usual area of glass while eliminating the need for blinds or curtains, a savings in both construction and maintenance.

The pleasant interior effect can be seen in the large photo above; the wall has almost the look of a screen. The scheme seems to achieve a satisfactory balance of openness and closure—of inside and outside light—even during late afternoons, when the sun is low in the sky. Although, for safety's sake, the architect did design a simple, clip-in shading device for the small windows, no one has requested them for his office. The three photos at right, reproduced at corresponding scale, show the interesting variety of pattern the three buildings produce.
Wood, stone and the outdoors were the most powerful factors in determining the design of this house, which started with the tremendous advantage of a magnificent site on the front range of the Rockies near Boulder. Since the clients had deliberately moved out of the city to find seclusion in the mountains, they were naturally anxious to retain all the original features of the land, particularly the pine trees. Openings in several parts of the roof overhang allow the trees near the house to grow undisturbed, and are a very direct expression of the close relationship between house and site.

Architect Hobart Wagener rejected any temptation to compete with the surroundings and concentrated—most successfully—on designing a simple, logical structure “which would try to become an integral part of the site.” For this purpose, cedar beveled siding and cedar shake roof were a good choice because of their attractive weathering quality. A bleaching oil finish was used on the walls to accelerate the natural process.

A small wood-and-stone house relates well to a mountain site.
The interior is dominated by an enormous stone fireplace, an exposed ceiling structure and a dramatic view of the valley. Strategically placed clerestory windows highlight the effect of the ceiling formation and also point up the detailing of the fireplace stonework.

The house is small—with only one full bedroom on the first floor and a guest balcony behind the fireplace—but outdoor decks, the added height in the center of the house, and of course the view, extend the experience of space beyond its walls.

In addition to space and freedom, an exposed site of this kind demands warmth, shelter and a sense of permanence. This was fully recognized by the architect in the careful balance of openness and enclosure and in his sensitive exploitation of the strong, textural quality of natural materials.

Cedar is the dominant material—in the form of siding and roof shingles on the exterior, and tongue-and-groove boards and decking on the interior walls and ceilings. A baseboard hot water heating system is included in the $30,000 construction cost. Good through ventilation takes advantage of summer mountain breezes.
Campus architecture shaped by master plans

The best college buildings are those which are being designed within the framework of carefully formulated long-term campus development plans. Opportunities to design major structures go to architects who are already at work on a general plan, often with good results. Among the first consultants on the scene, they help clarify at the outset the physical problems posed by expansion, and from the beginning grapple with problems of circulation and land use. After they have established basic siting, massing and functional interrelationships it is a logical next step to refine the plans and determine the structure and materials—in short, to design the buildings. More often than not the master-plan architects are then commissioned to do one or two key campus structures and perhaps more.

By adding architects as partners, a few landscape architecture and planning firms are expanding their services to include architecture and are also beginning to receive important building commissions, some of which are shown on the pages which follow.

All the buildings in this study have been chosen to demonstrate that the insights of the master-planning process greatly enhance architectural quality. Examples shown include current work at four major universities and one college. Two of the universities, Virginia and Stanford, demand an architecture which defies to strong architectural traditions; the University of Rochester poses the problem of expansion in an urban context; the new University of California at Santa Cruz offers the challenge of a magnificent, unexploited 2,000-acre site; and tiny Barrington College in Rhode Island presents design problems which are typical for schools of its size.

Mildred F. Schmertz
Pietro Belluschi and Kenneth DeMay, design architects for a new fine arts complex about to be constructed at the University of Virginia, have not compromised their design in any obvious stylistic sense to conform to the architectural traditions of this distinguished campus. Their scheme for the Fine Arts Center has indeed been shaped to an important degree by their desire to conserve existing campus values, but these considerations are reflected in subtleties of site planning, density and scale.

The great campus at Charlottesville was laid out by Thomas Jefferson and at its heart is one of his most noble buildings, the Rotunda. The latter commands the famous Lawn, flanked by the architect’s modestly scaled pavilions, still predominantly residential, which open directly upon it. Beyond the pavilions, to the east and west, are broad uninterrupted spaces called Ranges. Jefferson’s early pattern has been most marked in the subsequent development of the area known as the Central Grounds. The University of Virginia development plan prepared by Sasaki, Dawson, DeMay Associates recommended that the Fine Arts Center be located within the Central Grounds to promote the kind of compact development which encourages pedestrian movement. Since the plan also urged that open space be preserved and the close relationship between dormitory and play fields be maintained, buildable land is scarce. Therefore, the best site available is steeply sloping and small enough to require very dense development. Belluschi and DeMay, making the most of these circumstances, have produced a notable design.

The Center will be built in phases in a period of over ten years, but each element when finished has been designed to appear and function as a complete entity rather than as a raw segment in a continuing construction process. Phasing is shown in the series of plot plans. Existing buildings to remain are indicated by the lighter brown. Construction will soon begin on the school of architecture and the fine arts library (1), the drama and speech building is next (2), the music, TV and radio facility will follow (3), then the art studios will fill the void between the existing Bayly Museum and the school of architecture (4) and finally a 500 car parking garage will be added (5).
The use of modest materials to express modest ideas produces a barren architecture, according to Kenneth DeMay. "At any major university the last of the great buildings were done before the Depression. We can no longer afford to match their rich materials and costly workmanship. But even if our materials must be modest, our ideas can be rich, and if they are, we will build well." The vocabulary of materials to be used in the new Center is a simple one consisting of structural frames of reinforced concrete with brick infill. The forms themselves, on the other hand, are quite complicated. The building silhouettes, enlivened by the frequent use of metal-covered pitched roofs, are made even more plastic by the intricately related volumes which the walls enclose.

The elevations and sections convey the large scale and high density of the project. The drawing below shows in section (reading from left to right) the school of architecture, the library, concert and recital halls, a campus road to the northwest, the parking garage and the railroad right of way. The sections in the drawing on the opposite page show the railroad, the garage, the campus road, a common...
lobby and underpass, and the architecture building. The elevations above and on the opposite page show the school of architecture and the fine arts library as they will appear when the first phase of construction is completed, and before the music building and art studios are added. The underpass in the elevation on the opposite page is a major entrance to the complex.

The floor plans below show the center as it will be when it is completed. The drawing (1) which shows the music school auditorium and the drama school theater has been made at an elevation somewhat higher than the garage roof. The next plan (2) has been drawn at an elevation 30 feet above the first and shows the upper portion of the auditorium, the roof of the theater, additional drama and speech facilities farther up the hill and the entrance floors of the library and school of architecture, at the top of the slope. At a point 12 feet higher (3) the art studios appear at the lobby level and 24 feet higher still (4) the plan shows the main floor of the existing Bayly Museum, the art studios, the upper-level drafting rooms of the school of architecture, and lofty studios for the music school.
A contemporary solution, sympathetic to tradition:
Proposals for a University Center at the University of Virginia.

Thomas Jefferson's principles of order, visual clarity, interest and human scale are reflected in the design by Sasaki, Dawson, DeMay Associates for the development of the Newcomb Hall Student Center and Alderman Graduate Library area near the core of the Central Grounds. This area at present is a fairly typical college quadrangle arrangement characterized by a loosely organized group of five individual buildings (shown in light brown on the plan below) sited in a "U" around a central space. Newcomb Hall is the large building on the northwest side of the quadrangle and the Alderman Library is to the northeast.

To the southeast are Jefferson's West Ranges beyond which lie his great Lawn and Rotunda. The Newcomb-Alderman quadrangle is now ambiguous and undefined because of its large size, unstudied breaks in grade and the mixed architectural character of the buildings. On the other hand, as the planners point out, the Lawn and Ranges are unique among college spaces. They have order and a sense of unified repose that the Newcomb-Alderman area lacks. Only the existing arcade of Monroe Hall on the southwest side of the quadrangle carries a semblance of the scale and character of the Ranges directly across the road. In the rest of this building group, circulation paths are not articulated as they are in Jefferson's work. Each building reads as an isolated, axially sited volume. By contrast, Jefferson's Lawn is defined by a continuous colonnade punctuated by the higher volumes of his pavilions, and dominated by the Rotunda. Consistent building materials, the play of sunlight and shadow, a scale which responds to the size of the human figure, and the continuous thread of the colonnade unite all the elements of the Lawn and Ranges into an overall order. The Newcomb-Alderman scheme will enhance the University's "sense of place."
The major design feature for the development of the university center consists of an articulated and continuous first floor element expressed as a colonnade on the quadrangle facades which connects the buildings which are to remain. This element will define the circulation and recall the scale of Jefferson's buildings.

As can be seen in the sections and model photograph above, portions of this element extend above the colonnade and are covered with pitched roofs which are related in shape and position to the pitched roofs on the buildings which they adjoin.

The phasing of construction shown in the plans below will begin with the addition to the school of business in Monroe Hall (1); the removal of an obsolete structure and the construction of an undergraduate library annex to the Alderman Graduate Library (2); the removal of a second obsolete structure and the expansion of the Newcomb Hall Student Center and connecting links; (3) and the creation of a terrace and parking structure to the northwest of Newcomb Hall (4). The final stage, not shown, will be the addition of a rare books wing to the northwest of the Alderman Graduate Library.
The chemistry and biology wing shown in the fully rendered portion of the elevation above and in the perspective at right comprises 296,000 square feet of dense, tightly integrated space. The scale figures indicate that the structure will be huge—yet it is only the first element to be constructed in a science center which will eventually provide approximately 683,000 gross square feet of space.

As in the new work at the University of Virginia, the scale, massing and densities are an outgrowth of the University of Rochester campus development plan, part of a continuing series of long-range studies prepared by the University's own Office of Planning and Institutional Research and Sasaki, Dawson, DeMay Associates, Inc. A principal development goal for Rochester is to further the growth of a compact pedestrian-oriented campus. With this in view, the science complex has been located within the boundaries of the main campus, rather than on an outlying site. The land selected is the only suitable portion left on a built-up main campus which cannot expand in any direction as it shares its boundaries with the Genesee River to the north and west, a public park to the south and a cemetery to the east. The site chosen for the sciences has two great advantages. It is adjacent to the School of Engineering; and it can be linked to the University Medical Center—a vast establishment beyond the main campus to the southeast—by means of a footbridge which will span railroad tracks and a traffic artery. The site is too small, however, for development at normally accepted campus densities. Challenged by the master plan, the architects have created highly concentrated forms.
In resolving the difficulties and intricacies of the program requirements, the architect managed to break down the enormous mass of the building into smaller parts better related to the scale and character of the surrounding buildings. The laboratories of the chemistry-biology wing are arranged in a simple block with a central service core. The offices, lounges, seminar and classroom spaces are arranged to give an interesting scale and silhouette to the building. Existing engineering and administration buildings which are to remain, and the science buildings within the site which are to be phased out gradually, are shown in light tan. The chemistry-biology wing to the west and the space science center to the east (architects Waaldorp, Northrup and Kaelber) are soon to be built (1). A particle physics wing will follow (2). A science and engineering library and computer center, well located in relation to the School of Engineering, will be next (3) and additional portions of the complex will be added gradually—statistics and mathematics (4), physics and astronomy (5) and geology and geography (6).
Barrington, located in the Rhode Island countryside, was never very large, but is now beginning a modest growth. The guidance of its campus development is the responsibility of Sasaki, Dawson, DeMay Associates, the same firm now planning for the steady expansion of the great universities at Charlottesville and Rochester. The problems are essentially alike at all three schools, but at Barrington they are infinitely simpler. Local architectural traditions, for example, are more easily followed at Barrington than at Charlottesville. It is not too difficult to establish the design character of new campus structures, if local Rhode Island barns are chosen to influence shapes and materials: it is a challenge of quite another order to create a new architecture in the spirit of Thomas Jefferson. Similarly, it is not too hard to devise building elements for Barrington which are human in scale with attractive spaces between—for the campus, though small, has ample room for its projected growth, and it has not yet been built upon to any significant degree; but it is an immense challenge, to achieve these qualities at Rochester—for the opposite reasons. This is not to say that the Barrington campus plan and the physical education building which will serve as a design prototype for other structures, are not up to the general standard of the Sasaki, Dawson, DeMay work. On the contrary, the three campuses are contrasted to indicate the firm's range and flexibility of approach. Barrington is noteworthy—not because it is a complex solution to a difficult problem, for it is not, but because it is the simple and straightforward solution which Barrington's problems require.

The Physical Education Building is at the northeast corner. Now under construction it is the first building by the architects to be added, and is shown in light tan along with the existing U-shaped administration wing to the south, and the commons building and T-shaped dormitory to the west. New academic buildings form a complex to the south of the commons building and new residential construction will occur in the vicinity of the existing dormitory. The principal entrance is from the east. A chapel, square in form, has been located to the south on the main axis of the commons building.
A new and spacious campus inspires a fresh approach:
Recently completed Natural Sciences Unit,
Central Services Building and Library for the University of California at Santa Cruz
in the report by John Carl Warnecke and Associates describing the long range development plan for Santa Cruz campus, and prepared in consultation with architects Anshen and Allen, Theodore C. Bernardi, Ernest J. Kump and landscape architect Thomas P. Church, the planners praise the new concepts of education which will shape this branch of the University, and speak eloquently of the architectural opportunities offered by the magnificent 2,000-acre tract of anchland. In their own words, "The program, as well as the site, with their unparalleled opportunity to start from scratch, both argue against the use of any standard, tired building types, either traditional or modern. . . . The campus will grow from unspoiled land, with no existing buildings to mark the direction it should take—land that offers a setting of unusual beauty, both a challenge and a restraint." The most articulate advocate of architectural restraint among the contributors to the report was landscape consultant Church. He said: "To a greater extent than any of us have faced heretofore, the buildings are less important in the visual composition than the trees . . . these towers of trees are 'outscale' and more related to the rugged knolls and deep ravines than they are to an academic landscape. They are therefore to be thought of less as trees to enhance, screen and shelter buildings (although they do so), than as great vertical elements of the topography with form, mass and density against which to compose the architecture. . . . It would be foolish to think that a new, startling architecture will appear here. Any design attempt to

Natural Sciences, Unit I by Anshen and Allen includes, as the plot plan indicates, a university teaching and research laboratory, lecture halls and a shop building. It is surrounded by major redwood clusters which the siting has preserved, and accommodates itself to a rugged topography which is bounded on the east and west by steep, heavily wooded ravines. The 8-foot-high roof parapet screens rooftop experimental areas from wind, and conceals green houses, fans and other equipment from view. The building columns are of precast concrete and are a light gray-white color. Spandrel panels are of light brown sand-blasted precast concrete. Floor slabs are poured-in-place concrete, post-tensioned. Parapets and roofs are surfaced with copper,
The Central Services Building by Ernest J. Kump Associates conforms to the campus-wide vocabulary of materials. The foundations and columns are of poured concrete. The upper level floor structure is a two-way concrete waffle slab. Lower level walls are tilt-up concrete slabs. The roof is supported by a grid of glue-laminated wood beams above the roof deck. The deep attic accommodates fans, gas-fired duct furnaces and ductwork zoned and modulated to adapt to a variety of partition locations.
ompete in grandeur with this site is doomed to failure..."

Now, only three-and-one-half years after the long-range development plan was prepared, enough actual building has been done by the architects of the plan to permit beginning the testing of their convictions. Warnecke has completed the first unit of the University Library, Anshen and Allen have finished Natural Sciences, Unit 1, which is approximately one-tenth of the science complex eventually to be built; and Kump has executed the Central Services Building. All are part of the campus core, at the geographic center of the site.

The architects, not surprisingly, have allowed the spirit of the general guidelines of the master plan and have endeavored to meet their own challenges. Their buildings possess a modesty in relation to trees which must satisfy Church, but no one of their structures could be called standard or tired.

Since visual coherence underlies the beauty which makes a campus memorable, the new buildings are shaped by additional master plan directives, more specific than those just cited, which apply to the entire campus. There are four of these directives: first, the basic material to be visibly expressed in columns, wall panels and all major structural elements is to be concrete; second, roofs must have a certain consistency in design and materials used, be handsomely formed and preferably of copper; third, bases of buildings should be treated as unifying elements, strongly expressing by means of terraces and flat areas the transitions from building to ground; fourth, a color palette of

continued on page 203
The University Library, Unit I, by John Carl Warnecke and Associates, is located in the midst of redwood trees which are among the finest on the campus. The photograph on the opposite page suggests that Warnecke took quite seriously landscape architect Thomas Church's urging that the trees be considered "great elements of the topography having form, mass and density against which to compose the architecture." The design of the library is more formal than that of the other two buildings which have been constructed in the campus core, as befits the dignity and ceremony of its role in the life of the University. The photograph to the right shows the sunken outdoor reading court. The structure is of reinforced concrete, poured-in place and exposed. Wall panels are precast exposed aggregate concrete. As the section and photograph above show, the building entrance is on the second level.
earth tones, with bright accents, should be used as a unifying influence. The master plan spells it out: "Lighter colors and off-whites should be used within the densely wooded forest areas, where the sun will not penetrate strongly. On the slopes and knolls, often in full sunlight, the warmer earth colors can add richness. Textures will vary from smooth to rugged. In general the more formal buildings might use smoother finishes, and the less formal ones can find rough textures and even woods and stones appropriate."

At present, approximately 15 different projects have been commissioned by the University at Santa Cruz, and four colleges are now functioning. Warnecke asserts that already a lack of design consistency has appeared, in his opinion due to the hiring of too many different architects with conflicting approaches or styles. Fortunately, as he points out, at Santa Cruz the groves of trees act as a strong unifying element.

The presence of too many architects, working within a too short span of time on a single campus, Warnecke describes as "the Yale approach" and he deplores it. He says: "The basic idea behind this approach is to seek out the most successful architects of the moment, and ask each one to design a building as he sees it. He is left alone to preserve and exercise his creativity so far as style is concerned, so that the campus will receive a masterpiece. To the detriment of continuity in campus design each architect attempts to outdo those who have preceded him. One need only to project the Yale approach to its ultimate to visualize a combination of decades of world fairs gone astray."
The building has 72,000 usable square feet and an eventual capacity of 350,000 volumes when the total building is occupied by the library. Major additions are planned for the 1970's which will increase the total capacity to about 1,000,000 volumes. The library shared honors with the Natural Sciences Unit I building in the 1966 Design Award Program of the American Institute of Architects and the Educational Facilities Laboratories in collaboration with the Bureau of Higher Education. Both were Federally funded in part under the provisions of Title I of the Higher Education Facilities Act of 1963. Under this Title, the University Library Unit I received $923,098 of a total $2,320,000 cost; and the Natural Sciences Unit I building was granted $1,000,000 of its total $2,580,000 cost.

NATURAL SCIENCES, UNIT I, University of California, Santa Cruz. Architects: Anshen & Allen; structural engineers: T. Y. Lin & Associates International; mechanical and electrical engineers: Gaynor Engineers; landscape architect: Douglas Baylis; contractor: Namellini Construction Co.

CENTRAL SERVICES BUILDING, University of California, Santa Cruz. Architects: Ernest G. Kump Associates; structural engineers: Creegan and D'Angelo; mechanical engineers: Yanow and Bauer; electrical engineers: Smith & Garthorne; landscape architects: Lawrence Halprin & Associates; contractor: King-Hannan Corp.

UNIVERSITY LIBRARY, UNIT I, University of California, Santa Cruz. Architects: John Carwile, Warnecke and Associates; structural engineers: Isadore Thompson; mechanical and electrical engineers: Keller & Cannon; landscape architect: Thomas D. Church; contractor: Rothschild, Raffin & Weirick, Inc.
A library which affirms an old style, and dormitories which establish a newer one:
The J. Henry Myer Memorial Undergraduate Library,
and Student Housing Clusters at Stanford University

Architect John Carl Warnecke has had a long association with Stanford University, first as an undergraduate, then as an All-American, and in recent years as the architect of some of the best buildings to be constructed at the heart, and in outlying areas, of its splendid 8000-acre campus. Here, in his words, are the influences which have shaped his work there: “The purpose of collegiate architecture is to inspire excellence. The student at Stanford, as he walks the Quadrangle for four years, senses from the very beginning the grand plan, space leading to other spaces, the beauty and details of the construction work, the expansive corridors which seem to lead to infinity—space to sense the harmony, to observe the nobility of the architecture.

“Stanford is blessed with a unique inheritance bequeathed by the great landscape architect Frederick Law Olmstead, who wisely placed the University in the heart of its beautiful acreage with all structures separated by at least a mile from any campus border. From the time of the University’s inception in 1891 and the construction of the original Stanford Quadrangle, a handsome design by Shepley, Rutan and Coolidge, to the period immediately following World War II, nearly all buildings maintained the spirit of the Quadrangle design.

“Another force for continuity is Stanford’s policy of awarding an architect who does a good job for the University with the opportunity to build again in the general geographic area of his first building. The architect will struggle to make his new buildings harmonize with his ‘own’ older work and to surpass it if he can.”
The Stanford Undergraduate Library by John Carl Warnecke and Associates has been centered in a new quadrangle at the intersection of two major campus axes, as the perspective sketch at the upper left shows. The ground floor is open to three sides, allowing students to walk through the library on their way to classes from other parts of the campus. The building volume consists of four smaller masses dispersed around a large central core. This arrangement has two major advantages: it achieves a maximum periphery for natural lighting, and reduces the apparent bulk of the library, making it compatible in scale with other campus buildings.

Architect Warnecke has done his best to accommodate the library to its surroundings. Both the perspective sketch and the photographs of the roofs of the famous Stanford Quadrangle, as well as the photograph at the right indicate the traditional design idiom to which the library, with its clay tile roof, bulks and columns, adheres. The library shares the same design vocabulary which Warnecke developed for the University Post Office and Book Store, shown at the bottom of the opposite page, which was constructed in 1958.

The library will provide space for 40,000 volumes in open stacks and 1,500 study seats. Except for one general reading room for 500 students which houses reference and periodicals, all study seats are distributed through the stacks with emphasis on individual study tables. The old concept of a main reading room with large tables has been discarded. The library which encloses an area of approximately 115,000 square feet, includes a ground floor for audio-visual facilities, two full floors above, and a fourth floor with open terraces. A central skylight well shown below unifies the space.
Student Housing Cluster No. 1 at Stanford University by John Carl Warnecke and Associates is the first group of four fraternity houses of 50 students each, to be completed in an undergraduate program which will ultimately provide housing for all 34 fraternities on the campus. It is located on a hilly 10-acre site at the south end of the campus near Lake Lagunita and adjacent to rolling meadows. The four houses are organized in an informal composition excellently related to the site. The landscaped open spaces between the houses and the terraces adjoining each house provide the privacy essential to study and social gatherings. The structures are wood frame with redwood exterior walls throughout. Roofs are gabled, with wide overhangs, and surfaced with wood shingles, characteristic of the San Francisco Bay Region and widely employed on the campus.

HOUSING CLUSTER NO. 1, Stanford University, Stanford, California. Architects: John Carl Warnecke and Associates; structural engineer: Stefan Medwadowski; mechanical and electrical engineer: Alexander Boone; landscape architect: Lawrence Halprin Associates.
Housing Cluster NO. 2, Stanford University, Stanford, California. Architects: John Carl Warnecke and Associates; structural engineer Stelan Medwadowski; mechanical and electric engineer: Alexander Boone; landscape architect Lawrence Halprin Associates.

Student Housing Cluster No. 2 at Stanford University by John Carl Warnecke and Associates is organized into a unified yet informal composition which looks inward to its courts and at the same time outward toward the campus. The houses are arranged in clusters of three to six units which range from one to three stories in height. This arrangement not only takes advantage of the site, but also eliminates long corridors and facilitates internal circulation. The structures are wood frame with exterior walls of stucco painted in light colors ranging from white to beige. The hipped, red-tiled roofs are part of Stanford's structural vernacular.
Building Research Institute gets a reprieve

As a result of a membership vote early in February, the Building Research Institute will continue for the time being to operate as a private technical organization. A B.R.I. board of directors-approved plan to merge B.R.I. and the building Research Advisory Board into a single organization to be known as the building Research Board failed to receive the required two-thirds majority of B.R.I. members' votes—the final tally being 298 for merger to 224 against.

The move by B.R.I.'s board to recommend merger had been in the wind or at least a year. While several reasons were behind this move, what really prompted it was a lack of money. B.R.I. implored has not been getting sufficient financial support to make it a viable organization. It has been dipping into reserve funds for several years, and unless new sources of revenue are found—for which prospects are not very promising—the reserves will shortly be used up.

Until 1962, the Building Research Institute, along with the Building Research Advisory Board, was a part of the Division of Engineering of the National Academy of Sciences. The Building Research Advisory Board (B.R.A.B.) got its start in 1949 because building industry people were warned by their Washington representatives—the U. S. Chamber of Commerce and others—that unless they, themselves, did something about the rapidly growing need for stimulation and correlation of building research, the Federal government might in the vacuum assume the role.

Two years later B.R.I. was formed to create more general interest in and broaden the base of, the building research activity of the National Academy of Sciences. B.R.A.B. had been working with a 30-man board of directors appointed by the president of the Academy. But B.R.I. was open to anyone connected with the building industry who paid the membership fee.

The feeling has grown in recent years among professionals in the building industry that there should be more independently sponsored research, especially in those areas in which building product manufacturers could not be expected to become involved.

This was one of the reasons why B.R.I. left the National Academy of Sciences in 1962—a unit of the Academy cannot initiate research. B.R.I. hoped that foundation grants might become available which would actually support an independent research program. While B.R.A.B., which is still a member of the Academy, cannot initiate research, it can nonetheless administer research grants when asked to do so by a government agency or profession or educational organizations. (Another reason that B.R.I. left the Academy was that it was about to be asked to leave anyway. Some influential people within the Academy had doubts about a "membership" organization being a proper unit of the Division of Engineering and Industrial Research.)

But B.R.I. was not able to attract money for research; and, furthermore, anticipated additional revenue from advertising and exhibits never materialized.

Currently B.R.I. income is about $30,000 a year under that of 1961-1962 figures, most of which is attributable to loss of membership. And although B.R.I. is still solvent, deficit operations the last several years have nearly devoured the reserves.

B.R.I.'s principal activity has been to hold two "research correlation" conferences each year, spring and fall. On any one three-day program you might find as diverse topics as building codes, energy plants, wind loads, and fire protection. Attendance at these conferences has also gone down.

Unfortunately, B.R.I. has not been able to muster sufficient enthusiasm to make it financially healthy. And the reasons for this are not too hard to find. For one thing, B.R.I. is not an organization that industry people must be involved with. It doesn't develop or write standards; it doesn't develop specifications; it doesn't prescribe criteria by which building products should be judged. What it has done is merely to provide a forum for the exchange of ideas on building research. And while B.R.I. conferences provided an opportunity for personal contact, this contact was not nearly as vital for many people as that at some more industry-oriented organizations.

B.R.I.'s board of directors became especially concerned about the organization's future when it became apparent early last year that B.R.A.B. was actively considering plans to expand its operations in the direction of more conferences, more general meetings, and, through an "associates program," a broad-based approach for increased industry participation. In this associates program, industrial, academic, professional service and professional society organizations may become organiza-
tional associates for a yearly fee of $300. Individuals engaged in or concerned with building-related activities may become associates for a yearly fee of $25. The right to vote on activities of or before the B.R.A.B. board is still, however, limited to board members.

As the B.R.I. board began to explore the B.R.A.B. situation, it became clear that the attitude within the National Academy of Sciences-National Research Council had shifted 180 degrees. Now the Division of Engineering and Industrial Research is encouraging all of its operating units, including B.R.A.B., to establish long-range plans to improve the breadth and depth of their activity as related to their industry.

Last September a B.R.I.-B.R.A.B. liaison committee recommended to their executive committees that a merger plan be drawn up. The merger proposal was then announced to B.R.I. members on November 16, at their fall meeting.

The suddeness of the announcement apparently took many B.R.I. members by surprise. The large number of votes against the merger on February 2 was undoubtedly due to the fact that many members had not been cognizant of how serious the B.R.I. financial difficulties were. The emotional tide of the shock thus helped defeat the merger.

B.R.I.'s board intends to present the merger proposal once again to the membership. The board feels that the combined organization is bound to be stronger than either of the separate ones. They feel that B.R.I.'s main asset is its nearly 900 members; that B.R.A.B.'s main asset is the prestige and organization of the National Academy of Sciences and, more recently, the National Academy of Engineering.

A communications gap in human engineering

While the literature in human engineering (acoustics, illumination, psychological factors, etc.) has grown tremendously in the last 25 years, particularly in the military field, apparently much of this information is little used by the equipment designer, according to a new report by Bunker-Ramo Corporation. Following a study of the work processes of 20 industrial design engineers, Bunker-Ramo concluded that, "Two problems must be overcome if we expect the designer to use human factors information and principles in his design. The first problem is the designer's unwillingness to use that information; the second is the poverty of his analytic processes." The report says that the first problem might be solved by having the customer emphasize the inclusion of human factors in design to the same extent that he emphasizes other functional requirements.

What Bunker-Ramo considers to be "poverty in analytic processes" is not exactly clear, although one might conclude from what they say that a large part of the problem is the obscure way in which much human engineering information is presented. The authors of the report, themselves, say that, "The material should be substantially simplified, avoiding the quasi-scientific report style in which most human factors specialists write. Information should be presented largely in pictorial or graphic form. Major principles should be emphasized and background or supporting material de-emphasized. Since the designer often fails to recognize the relevancy of handbook information to his problems, the material should contain copious examples of how that information can be applied directly to design."

Chicago utilities debate promotional practices

In hearings recently begun by the Illinois Commerce Commission, Chicago's huge electrical utility, Commonwealth Edison, proposed that the Commission authorize two basic promotional practices: (1) that electric utilities be permitted to pay for wiring costs of single- and multiple-family homes for the installation of designated 240-volt appliances, and (2) that the utilities be allowed to make a cash allowance to developers in connection with the installation of electric appliances or heating reported to be 1 1/2 times the estimated annual revenue.

Edison stated that it believes effective competition by utilities leads to lower costs and prices.

Peoples Gas Light & Coke Company, which seeks elimination of promotional practices, contends it must continue the practice because of competitive need. Peoples said it would generally oppose promotional practices involving financing developments in new construction including load guarantees, acquiring equity interest making the utility a partner of the developer, or leasing or owning customer utilization equipment.

"Comfort" in aerospace medical terms

The criteria for an acceptable thermal environment for a space capsule, as formulated by aerospace medics, may surprise engineers who design mechanical systems to provide thermal comfort in buildings. This is the conclusion of Frank Versagi, technical editor of Air Conditioning, Heating & Refrigeration News, who recently visited the Aerospace Medical Division, Air Force Systems Command, near San Antonio. For example, Aerospace Medical has found that men under test in environmental test chambers tend to prefer higher temperatures than those normally used in building practice; and with relative humidity varying from 30 to 70 per cent in some experiments, there was no significant effect on performance and test subjects made no comment on the humidity variation.

Aerospace Medical tends to ignore the comfort aspects of many of its tests, according to Versagi. Items: its report include almost as afterthought remarks such as the following—"...cracked lips and conjunctivitis appeared to be closely related to periodic declines in water vapor pressure in the chamber"; and "...drying of other mucous membranes were attributed to the low relative humidity."

New building systems section set up at Bureau of Standards

In an effort to better define and describe performance requirements for office space, the Public Buildings Service of the General Services Administration has contracted for a study in this area with the newly established Building Systems Section of the National Bureau of Standards.

The first phase of this project, which is to be performed over a 14-month period, is funded by a PBS grant of $84,000 to Robert W. Blake, chief of the new section, reports that this phase will involve identification and preliminary selection of systems, but not hardware performance specifications and plans. Blake states that the Building Systems Section, which is part of the Building Research Division of the Institute for Applied Technology, will concern itself with systems according to the classic definition, "people, hardware, procedure ... an aggregation of components." In the case of PBS, the research will go into the performance requirements for the visual, aural, thermal and communications environments and systems for office space.

Included in the Public Buildings Service study will be:

1) direction of proposals to manufacturers for the development of products or systems to meet performance requirements. 2) development of methods to test and evaluate products against Government performance requirements and specifications. 3) arrangement, within the technical and management regulations of the agency in effect, to procure products which are responsive to the performance standards.

In addition to the PBS study, the Building Systems Section expects to do work for the Post Office Department.
The words "electric heat" have a magical sound in today's push-button world, where electric appliances and automatic devices of all kinds have gained unquestioned acceptance. Clean, quiet, superior efficiency is the natural connotation of electric heat.

More to an economic analysis than a strict Btu comparison

It is true that electricity is a "higher" form of energy than heat from fossil fuels. But while electricity costs more than fossil fuels on a Btu for Btu basis, such an economic comparison is not realistic. For example, electric heating may appear to be more expensive than fossil fuels when the boiler is operating at peak load and distribution losses are ignored. Such a situation hardly ever exists, however, since most of the time a heating boiler operates at part load.

A Btu for Btu comparison also ignores the realities of over-all owning costs. These will be affected by the nature of building occupancy, equipment amortization costs, and, in some cases, savings accruing through the utility providing high voltage feeders to multiple distribution points within the building.

Furthermore, a straight Btu for Btu comparison also ignores the energy multiplication characteristic of the heat pump.

The architect should keep in mind that with the all-electric approach, the buildings themselves are frequently other than conventional, but, even more, the systems are different.

Energy cost itself is only one of the many factors entering into the economics of any heating system. First cost and maintenance of the system hardware are obvious factors in which electric systems have strong advantages. It is in these factors that savings through elimination of boilers, piping, flues and the space and structure required to accommodate them permit the electric heating designer to invest in refinements of control and in the long-term economy of added insulation and heat-saving devices such as exhaust-intake air heat exchangers. These investments can go a long way toward balancing or canceling out the price advantage of fossil fuel energy.

One could argue, of course, that insulation and heat savers would conserve as much energy for one system as another. But the key consideration is not conservation of energy, it is return on an investment. It is worth considerable investment in equipment to burn cheap fuel. But, comfort considerations aside, it is not worth much investment to save cheap heat—unless you can save enough to substantially reduce the capacity and cost of the heating equipment.

Two trends in modern building design tip the scales further in favor of electric heat for certain circumstances. One is the widening available selection of systems for air conditioning. Both central and decentralized cooling systems can be readily adapted to dual cooling-heating function through the inherent, pipeless flexibility of electric heating. The heat pump also may have wider use once a commitment to an all-electric system has been made. The other trend favoring electric heating is the increasing level of illumination generally prescribed for working spaces and the emergence of ceiling systems which either discard or salvage heat from lighting as the need may be. Both of these trends are supported by power-supply facilities already approaching the capacities required for electric heating.

All-electric motel incorporates energy-saving features

The Niagara Treadway Inn is an 8-story, 160-room, riverfront hotel-motel designed by George Yurchison and completed in 1963. The architect and the owners expected that an all-electric design would be optimum because of the region's noted power resources and favorable rates. Cost comparisons with alternate fuels showed this to be the case.

Considering the irregularly intermittent occupancy typical of hotels, a so-called incremental system was selected. This is a system of self-contained heating-cooling units in which resistance heating coils of 15,000 Btu per hr capacity are used for the heating cycle with a through-the-wall cooling unit of 11,500 Btu per hr capacity. Each room unit is automatically controlled, and room air is circulated by the same fan that is used for both heating and cooling.

The room control is a two-stage thermostat that permits an "occupied" or "unoccupied" setting to be selected by movement of a simple toggle switch at a master control panel near the registration desk. By setting the "unoccupied" limits at reduced load for either heating...
or cooling (e.g., a holding temperature of 55 F instead of 72 F for heating) considerable savings in operating current could be made.

In corridors and stair-wells, electric convectors were used, and in utility rooms electric baseboard heaters were installed about four feet above the floor to escape damage by maintenance equipment. All electric units were individually and automatically controlled.

Public areas, dining room, lounge and all-electric kitchen were heated and cooled by large fan-coil units supplemented by step-controlled duct heaters and electric baseboards. Make-up air which replaces continuous exhaust from toilet rooms is tempered by electric duct heaters. The elevator machine room was raised above roof level to provide a fan room for the make-up air system.

Domestic hot water for hotel rooms, kitchens and public areas presented problems in economy. The large supply for the kitchen was stored in a 2,000-gallon tank heated during off-peak hours by immersion heaters. A stand-by supply of 250 gallons was kept on full-time line to be sure of constant supply.

The architect was dubious that a proposed system of individual 30-gallon water heaters to serve back-to-back rooms would be satisfactory, since the temperature of the supply water could be as low as 35 F. The solution was to install a 3,500-gallon tank heated principally by off-peak power, but supplemented by normal daytime power flow through a permissive load control device, with no additional demand charge. This would guard against lack of a supply of hot water during the daytime which might have occurred if only off-peak power had been used. The p.i.c. device senses the electrical demand on the building as a whole and permits the water heating load to be turned on when the building demand is low. In this way the water heat-
Utility spine for all-electric building houses power supply, air ducts, water piping, laundry chutes and incinerator stack in small space. This effects an important saving characteristic of the all-electric building.
realized by running a single feeder duct up the spine of the building with a house panel at each floor serving apartment panels in each apartment. This permits individual temperature control by occupants of each apartment.

The problem of exhaust and make-up air in an apartment is less demanding than in a hotel because it is not necessary to provide constant exhaust. However, it is necessary to control cooking odors, so it is advisable to pressurize the corridors. A heat recovery system was installed to extract heat from exhaust air by a simple arrangement of connected coils in each duct. By pumping fluid through these coils, heat from the exhaust air is transferred to the incoming make-up air.

**Integrated heat-pump system uses circulating water loop**

One device that partially overcomes the inherent losses of converting electricity into heat is the heat pump, a reversible refrigeration cycle which can deliver more heat units per watt than does a resistance heater. This advantage rapidly falls off, however, when the temperature of the heat source is very low in comparison to the temperature at which the heat is transferred to a heating system by a refrigeration process.

A patented system developed in California seeks to overcome this disadvantage and at the same time salvage heat rejected in cooling one part of the building by using it to heat another. The system uses a closed loop of circulating water which acts as a heat source for heating and heat sink for cooling at individual heat pumps.

Architect Yurchison has designed several apartment buildings using this system. It has the advantage over air source through-wall heat pumps, in that no holes need to be provided in the facade, since it extracts heating or cooling effect from the water loop.
What is the role of the computer in the world of architecture? Using it for specification writing is “a little like calling in a diamond cutter to crack walnuts.” But how far away is the use of the computer from the much more complex area of design decision? Hereewith the report of a conference that explored just those subjects.

The Bureau of Applied Technology of the National Bureau of Standards has been sponsoring a series of invitation-only working conferences at M.I.T. on the subject of computer-aided building design. The first of these took place last fall, and was reported briefly in the RECORD (November, page 36); and the second was held February 10th and 11th, and deserves a somewhat longer notice, as much for what didn’t happen there as for what actually took place.

The conference was divided into five working sessions: cost estimating and specification, mechanical and structural systems, computer graphics, design evaluation, and design-decision theory.

Cost estimating and specification
This first category is, at least on the face of it, reasonably straightforward. Cost estimating and specification seem to be well-defined subjects that can benefit from computer procedures in the present state of both the building and computer art. In fact, much has been done in these areas. The RECORD reported quite extensively last month on a promising study of computerized cost-estimating (pages 163-166); and several architectural offices (for example, Smith, Hinchman and Grylls in Detroit and Skidmore, Owings and Merrill in Chicago) have operational computerized specification-writing systems.

The computer, however, is a precision instrument; whereas the basis by which architects decide what information goes into the specification and what is shown only on the drawings—as well as the relationship between the two—would seem to be far less precise. Using a computer to write your specification thus becomes a little like calling in a diamond cutter to crack walnuts: he no doubt will do a superb job, it may even make good economic sense, but his full capacity is not being used.

The same problem is present to some extent in computerized cost-estimating; that is, it would work better with a more rationalized drawing process, more sophisticated construction-cost information, and different relationships between architects and contractors than are presently available.

As a result, far from dealing with well-defined and easily manageable problems, the first discussion group tended to move towards the question of a systematic description of the architectural design process; and these are deep waters indeed—and very murky.

Mechanical and structural systems
Working group two was composed largely of engineers. Again, considerable progress has already been made in writing computer programs to calculate common classes of structural and mechanical engineering problems. The big difficulty in this field seems to be getting everyone’s computer programs to relate to each other. One of the funniest sessions (if you like gallows humor) at the first computer-aided building design conference consisted of a whole series of computer programmers getting up and saying that Fortran Four, for example, might be all right for a clumsy insensitive program like yours, but it certainly wouldn’t do for a sensitive and sophisticated program like mine—for all the world like a group of architects arguing modular standards.

The National Science Foundation is presently sponsoring a major research effort at M.I.T. called I.C.E.S.: Integrated Civil Engineering System. The objective is to produce a group of computer programs that relate to each other, and which cover the whole range of structural and mechanical problems likely to be found in a building. Like all computer programming problems, such an objective is much easier stated than achieved.
"... Computer graphics provide the key means of communication. ... However, first architects need to know something about computer graphics, and, generally speaking, they do not. The dialogue between computer experts and the architect clearly needs to go much farther before the profession grasps the possibilities."

As a single programing language doesn't seem to be possible, much of the I.C.E.S. research now centers about trying to make basic data transferable from one program to another. When this problem is solved, perhaps someone will be able to give some more attention to getting the resulting information into a form that the architectural designer can use more readily and effectively.

**Computer graphics**

The composition of the computer graphics working group ranged from Timothy Johnson, who wrote the three-dimensional Sketchpad drawing program, to a number of practicing architects, including some very skillful and thoughtful practitioners. Alas, one of them began the discussion by saying that he didn't see what application computer graphics had for architects except, perhaps, the retrieval and display of standard construction details (an operation which can be accomplished of course by several commercially available photographic methods). And one quickly got the sinking feeling that this statement is representative of the prevailing view within the architectural profession. It certainly provided the working group with a clearly stated communications gap. After several desultory attempts to bridge it, the computer graphics people returned to their own concerns, and the architects became discouraged and left. They missed some interesting discussions about three-dimensional line drawings actually displayed in real space and visible from all sides, and the possibility of computer graphics in various colors. They also missed learning about more mundane computer graphic techniques that are very close to being commercially available. (The reader who is interested in learning more about computer graphics might begin with the RECORD's October 1965 article, "Computer-Aided Design and Automated Working Drawings," as well as the latest issue of Design Quarterly, number 66/67, entitled "Design and the Computer.")

**Design evaluation**

A course of action in which all the basic assumptions and steps are known and understood proceeds in a simple, linear way to its conclusion. Trying to approach complex problems in as systematic a way as simple ones requires a constant process of checking and reviewing, a process expressed by the familiar feedback loops of the systems diagram. The design evaluation group was concerned with analyzing how such a feedback process could work in an architectural situation—a problem that, because of the diffuse and unsystematic nature of the building industry in its present state, seems very difficult to solve as a theoretical construct, although all kinds of pragmatic design evaluation techniques are now in use.

**Design-decision theory**

The fifth group, design-decision theory, was clearly the hit of the conference, with many participants from the other groups playing hookey to attend its sessions. The star turn was provided by Professor Christopher Alexander of the University of California at Berkeley (RECORD readers will remember his articles on the Theory and Invention of Form, April 1965, and Relational Complexes in Architecture, September 1966.) Alexander spoke about what he calls an urban rule system, which is perhaps closer to cultural anthropology than to any form of decision-making theory that makes use of a computer. Much of the other discussion in this group turned on concerns in which the computer was relatively incidental: there is clearly an entirely new approach to architectural theory brewing, in the architectural schools, which will draw on operations research techniques and other new types of decision-making theory.

**Computerized vs. computer-aided**

The principle decision-making issue that relates directly to the computer is the distinction between computer-aided and computerized, when the word 'computerized' is used to describe a situation in which a solution is automatically produced from a problem description. Those who invent computer machines and develop basic programs tend to like computerized approaches such as the so-called optimization programs, in which the boundaries of a problem are set and the instructions written to automatically produce the best solution according to a given requirement, such as lowest cost or largest area. The trouble with optimization programs is that there is a strong temptation to oversimplify the problem in order to use them. The complexity of architecture tend to make computer-aided procedures more desirable. In a computer-aided procedure, the architect would have direct access to a computer throughout the design process, and could use it to solve a great variety of problems, as he went along. He would always, however, have the ability to recast the terms of a problem, or introduce new factors for consideration, and he would thus stay in control of the entire design process.

Computer graphics provide the key means of communication which would allow architects to use computer-aided procedures. However, architects would need to know something about computer graphics; and, generally speaking, they do not. The dialogue between the computer experts and the architect clearly needs to go much farther before the profession grasps the possibilities.

—Jonathan Barnett
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ARCHITECTURAL RECORD April 1967 225
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Loeb Drama Center, Harvard University—Four Dover Stage Lifts are used to create a theatre that easily converts for three different kinds of staging.

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These diagrams illustrate three of the more than 100 entertainment centers equipped for flexibility with Dover Stage Lifts. Dependable, smooth-running Dover hydraulic lifts produce elaborate theatrical effects, save valuable floor space, and help in the design of multi-use halls. There are practically no limitations on platform size, lifting capacity and systems for controlling combinations of lifts. For theatres, concert halls, opera houses, auditoriums, night clubs, wherever you need a rising stage, specify Dover Stage Lifts. Send your preliminary requirements for analysis and recommendation.

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For more data, circle 118 on inquiry card
Elevated flooring permits "impossible time schedule" and great flexibility

The architect's problem: to design and lay out a highly flexible electrical and mechanical system for a $3-million research complex—in less than 30 days.

By installing heating, ventilating, electrical and plumbing services under an elevated floor similar to that in computer installations and "clean" rooms, architects Charles H. Harper Associates could start construction independently from mechanical installation, conserve time, and meet a strict deadline.

A critical shortage of existing space was the reason for the 10-month occupancy target date set for a new administrative-engineering-research complex for Globe-Union in Milwaukee. The management of Globe-Union (one of the world's largest manufacturers of automotive storage batteries) would revert to original plans for a remodeling program and shelve the new building indefinitely if the target could not be met.

Thirty days and great flexibility

When Charles H. Harper Associates began setting up schedules, they found that the date for beginning steel erection left less than 30 days to design and detail the 400,000-sq ft, three-building complex.

Further, the building had to be as flexible as possible because of the constantly changing requirements for services of all kinds in the engineering and research facilities.

The time and flexibility requirements made a one-story building mandatory: scaffolding would be eliminated and provisions for future vents and shafts would not be necessary.

Biggest problem: the mechanicals

The major difficulty with all of the commonly-used methods for locating mechanicals is that design must be complete before construction can begin. In addition, few offer the flexibility that the new complex required. A basement, for example, which would add a substantial cost, would provide an overhead complex of wires, conduit, plumbing, and ventilating shafts that might be fairly inaccessible for maintenance. Relocating the mechanicals at a future time would require breaking through the floor at the new positions and repairing the holes left by the original work. Further problems would occur if the largely unusable space were desired for parking or storage: or locating basement mechanical.

A crawl space under the floor would be less expensive, but again, the mechanicals might not be readily accessible and relocation would be troublesome.

Installing the mechanicals under the floor before the slab was poured offered no further solution, since putting the raceways, conduit, and pipe in the slab itself would be expensive and would not provide the maximum flexibility required—especially in this situation where the mechanicals are always the research go beyond the normal requirements. Special gas, acid and distilled water lines have to be installed along with special electrical requirements plus acid resistant sewer lines. Since raceways are generally installed on 6-ft centers and cannot be laid on diagonals, the possibilities for relocating equipment for present and future applications would be limited.

The solution: elevated flooring

Harper Associates considered the use of a modular raised flooring complex of the type used in data processing installations, laboratories and television stations. Such a system (coupled with movable wall partitions), providing unrestricted access through instantly removable panels to all mechanicals underneath, would give Globe-Union maximum flexibility for future modifications and relocations of their engineering and research facilities. And, because utilities could be installed right on top of the floor slab, the construction could proceed and still leave the architects plenty of time later to plan the physical placement of mechanicals.
Net installed cost: $1 per sq ft

Most installations of elevated flooring to date have been restricted to 3,000- to 4,000-sq ft areas, because of the $4 to $5 per sq ft cost that this flooring entails. For the Globe-Union complex there would have to be 120,000 sq ft.

Harper Associates tailored the building to accommodate the floor system—that is, used clear, open spans with interior walls designed to be installed on top of the floor system, thus reducing the amount of carpentry required to "fit" the floor in place.

Next, they approached the Weber Showcase and Fixture Company, Inc., makers of WEBCOM Flooring Systems, with ideas for a special 27-in. module system (normal is 24 in.). This increased panel size would cover the floor area with 25 per cent less hardware, i.e., the pedestals that support the system. With the high production volume for 120,000 sq ft, Weber engineers were able to get the installed cost below $3 per sq ft.

An additional cost-savings pattern was established by planning to have the installation of mechanicals directly atop the floor slabs, working in clean, dry conditions. Architects estimated an approximate $1 saving per sq ft for electrical installation, and $1 per sq ft for plumbing. Since the cost of the flooring was down to $3 and savings per sq ft on mechanicals was $2, the actual net price for installing elevated flooring was $1 per sq ft. There should be additional savings through unrestricted accessibility for service and flexibility for relocation.

What will the new complex provide?
The building, designed on the 27-in. module, will provide two office sizes (general offices measuring 1½ ft by 11½ ft, and executive space measuring 13 ft by 16 ft) in a one-story construction of steel frame with concrete block and brick, non-bearing exterior walls.

The engineering and research buildings, 65,000 sq ft and 55,000 sq ft respectively, have small aluminum windows, but the 20,000-sq-ft administrative building makes generous use of glass. The 24-ft by 4-ft lighting fixtures are mounted on an aluminum T-bar system which distributes air throughout the building. Air conditioning for the building totals 800 tons. The roof is metal deck with 3½-in. fiberglass insulation. The floor is elevated 24 in. above the slab and all mechanicals (except three major services, acid waste, sanitary waste, and storm sewer which are below the slab) are installed on top of the slab. Fifty per cent of the flooring is carpeted in panels, the remainder in high pressure laminates and asbestos tile.
Wallboard system helps remedy joint deformation problems

Sheetrock SW gypsum wallboard has a new rounded tapered edge that is said to help joint deformity problems caused by twisted framing, poor board alignment, damaged wallboard edges and extremes in temperature and humidity. More than 100 tests report that Sheetrock SW met requirements in extremes of temperature, handling, humidity and load. The eased edges promise to provide deeper, stronger joints and added safety margins against shadows, bumps and blisters. They are said to be easier to handle and less subject to damage. The new edge formation minimizes the need for crowning joints, resulting in flatter joints that require about the same or less compound as conventional joints.

The new system requires a few adapted tools, materials and techniques. Durabond 90, a multi-purpose compound that hardens with a maximum bond and minimum shrinkage, is used for pre-filling the grooved joints to solve potential problems of excessive or delayed shrinkage. A specially-designed head attachment for pre-filling with an Ames tool provides a “ski” that guides the tool smoothly along the joint in one application. After pre-filling, conventional finishing procedures are followed.

The company recommends DWA adhesives or Type-W screws and its patented back blocking system for use on butt joints. United States Gypsum Company, Chicago.

Circle 300 on inquiry card
STEEL ROOF SYSTEMS / An 8-page brochure describes tapered-beam, beam-and-column, truss and self-framing steel systems. Drawings show details of ridges, eaves, gables, panel splices, purlin laps and insulation. • Armco Steel Corporation, Middletown, Ohio. Circle 400 on inquiry card

GLASS / Glass for Construction is a 36-page manual on the design characteristics, uses and specifications of a broad range of flat glass products. There is detailed information on Thermopane insulating glass. • Libbey-Owens-Ford, Toledo, Ohio. Circle 407 on inquiry card

STEEL FRAME AND ANCHOR / One 4-page brochure gives isometric drawings of the various types of UL and FM frames used in masonry, wood stud, channel steel stud, and truss-type steel stud. Another 4-page brochure shows masonry anchors, UL-listed anchors, channel-type and truss-type steel stud anchors, wood stud anchors, floor anchors, and adjustable ceiling struts. • Amweld Building Products, Niles, Ohio. Circle 408 on inquiry card

AIR CONDITIONING / A 12-page engineering data manual covers 16 vertical and 16 horizontal remote fan-coil conditioners of 200-, 300-, 400- and 600-cfm design capacities. • Acme Industries, Inc., Jackson, Mich. Circle 409 on inquiry card

EXPANSION JOINT COVER / A leaflet describes a prefabricated cover in which flexible butyl rubber insulated bellows is attached to metal flanges. The leaflet explains how the center section permits full three-dimension movement at changes from —40 deg to 220 deg F. • Grefco, Inc., Chicago. Circle 410 on inquiry card

FANS / Powered Ventilation for Every Application is the title of a 12-page brochure detailing the complete line of tube axial duct fans, powered roof fans and bi-sected fans. • Strobic Air Corporation, Trenton, N.J. Circle 411 on inquiry card

HOME ELEVATORS / A catalog shows the Elevette home elevator, the Inclinet single-seat stair lift, the Inclinator two-seat stair lift, and outdoor lifts. • Inclinator Company of America, Harrisburg, Pa. Circle 418 on inquiry card

HEATING / A 16-page brochure features school heating applications. Photos show actual installations and cut-away views of the components of the panel type radiators used. • Shaw-Perkins Manufacturing Company, Pittsburgh. Circle 419 on inquiry card

*Additional product information in Sweet's Architectural File

more literature on page 29
ART METAL RECESSED ALLUME® LENSES

The first frameless round and square incandescent luminaires

The newest addition to the Art Metal Allume family of frameless luminaires are frameless recessed prismatic lens units. With either round or square Recessed Allume Lenses all you see is light. There’s no exposed metal to detract from the all-luminous look. No exposed metal to cast a dark shadow or corrode from weather exposure. The luminous lens edge gives a soft halo effect blending the fixture with the darker ceiling. Here is the first real breakthrough in incandescent frameless lighting. Available in 100W or 200W incandescent, or in 100W deluxe white mercury vapor. The gasketed lens hinges down for easy relamping.

For the Allume look, call or write ITT Environmental Products Div., International Telephone and Telegraph Corporation, 1814 E. 40th St., Cleveland, Ohio 44103.

ART METAL LIGHTING ITT

in Canada, Wakefield Lighting Ltd., London, Ontario

For more data, circle 119 on inquiry card

ARCHITECTURAL RECORD April 1967 231
You can NOW provide counter opening protection...

up to 72 sq. ft.

Trim Upward Expanding Guide

NEAT FIT ON COUNTER

Trim Rugged Bottom Bar

CREMONE-TYPE BOLT LOCK

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KINNEAR

U.L. Listed COUNTER Fire Door

The NEW Kinnear FYR-DOR Rolling Fire Door is especially designed for counters and similar applications calling for "good looks." You can now provide Underwriters' "A" Labeled fire protection for openings up to 72 sq. ft. in area or to 12 ft. widths. Though built on the Kinnear time-proven, efficient interlocking slat principle, this new FYR-DOR Counter Door offers such new design features as:

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★ Sealed box-type guides — neat and trim
★ Tubular foot piece — cremone-type bolt lock
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Above and beyond features like those listed, this new FYR-DOR Door is a KINNEAR Product — makers of the famous Akbar Fire Door that has proven its superiority in major conflagrations from coast-to-coast for more than a half century. It’s also "Registered" for Life-Extension and backed by a reliable, financially solid company with a nationwide installation and service organization.

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Write TODAY for New Fire Door Catalog (Bulletin 133) giving complete details and size limitations.

Saving Ways in Doorways Since 1895

For more data, circle 120 on inquiry card
Huge, new State University campus uses 65 miles of Anaconda copper tube for faster installation and dependable service

(Photograph of Architect Edward Durell Stone's model)


Located on a 360-acre tract of rolling hills and woodlands, New York’s new State University complex is being built with an eye toward the future, in more ways than one—minimal maintenance and lasting service.

The early decision of the consulting engineers to specify copper tube for water supply lines and for waste and vent service was based on the many advantages copper offers—ster installation, space savings, time-saving preassembly operations and dependable, trouble-free service.

Making full use of the efficient “prefabrication” techniques possible with lightweight copper tube, mechanics benchmarked at the site, multiple units required for each floor. Each unit served two bathrooms and contained hot and cold water supply, waste and vent lines. The few connections required to join these units to the system reduced roughing-in time and helped maintain construction schedules.

And looking even farther ahead, Consentini Associates specified copper tube because of its resistance to corrosion, immunity to rust, and its smooth interior for swifter flow and better sanitary conditions. A combination that adds up to minimal maintenance even after long years of service.

In terms of installation savings and long-range economical service, Anaconda copper tube is truly a product of unusual practicality...and far ahead of competitive materials. Next time, plan to use Anaconda copper tube right from the start...to come out ahead on your jobs. For further information, write: Anaconda American Brass Company, Waterbury, Connecticut 06720. In Canada: Anaconda American Brass Ltd., Ontario.

For more data, circle 121 on inquiry card
The design simplicity of electric heating and cooling components permits you to design with far greater freedom and flexibility. And since no bulky furnaces or complex distribution systems are required, you can solve problems of office and room design with far greater latitude.

Witness the oval layout of the Pine Hill Elementary School, Pine Hill, N.J. Surrounding a central library and multi-purpose room are classrooms varying in shape and size. And rooms will be added as needed—in satellite clusters.

The most modern, efficient heating/cooling system you can specify can actually be the least expensive for your client to install. With an electric system, you can eliminate costly boilers, stacks, trenching and steam piping. Not to mention fuel storage and boiler rooms. (The boiler is replaced by a compact control cabinet, like the one seen above.) You would also eliminate attendant high installation costs.

How substantially can construction costs be reduced? By going All-Electric, the designers of the 60,700 sq. ft. Hampshire High School, Romney, W. Va., for example, lowered construction costs by $62,900. A saving much appreciated by the local school board.

The principle of recovering heat from high-intensity lighting permits such impressive economies, that it seems sure to dominate the future of space conditioning. By deploying the recovered heat to the cold parts of a building, or storing it for later use, the architect can effect extraordinary operating efficiency.

Example? The new All-Electric 94,500 sq. ft. engineering and administration building of Electronic Associates, Inc., Long Branch, N.J. So efficient is this building's heat-by-light system that during mild parts of the heating season it provides enough extra heat to warm other EAI buildings.
design can offer major benefits

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In many buildings, individual room temperature control is a must. Nursing homes require it for critical health reasons. Motels want it for economy. And it is also fast becoming standard in other buildings in which occupancy and activities vary daily from room to room; e.g., schools, churches and hospitals.

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URETHANE PANELS / Pre-engineered metal-faced panel with a foamed-in-place urethane insulating core is reported to produce substantial savings in heating and cooling costs. In the manufacturing process, the inner and outer metal faces are the mold into which liquid urethane is poured and foamed. As it cures, the urethane is said to form a strong bond to the metal surfaces. The panel has a nominal thickness of one inch and the U-factor is .20. • Butler Manufacturing Co., Kansas City, Mo.

Circle 304 on inquiry card

ROOF INSULATION / Celormal-board reported to help prevent wrinkling and buckling in roofing felt, is composed of Celormal nodules held together in a bituminous binder that is compatible with pitch or asphalt. Each 48-in. by 24-in. by 1-in. board is covered with specially treated perforated paper that permits vapor flow between boards. Each nodule contains glass-enclosed cells of dry, still air and the nodule itself is sealed in a glass shield. Continuous air passages between nodules prevent vapor pressure buildup, yet the insulating air in each nodule is sealed against moisture. All materials in the system expand and contract at the same rate. • Pittsburgh Corning Corporation, Pittsburgh.

Circle 305 on inquiry card

WEATHERPROOF ROOFING / Neolox, an elastomeric, thermo-plastic coating is said to provide complete protection and good weathering characteristics in all climates; and durability for all types of roofs, regardless of shape or contour. It can be applied to Portland cement, concrete, plywood, asbestos board, insulation board, and metal. • Desco International Association, Buffalo, N.Y.

Circle 306 on inquiry card

SOUNDPROOFING / Spray-applied Acousticote, a textured self-extinguishing coating for ceilings. It is a blend of resins, fibers and sound absorbing particles. The continuous film provides a jointless installation over a variety of shapes and surfaces. Factory pigmentation is built into the material. • Desco International Association, Buffalo, N.Y.

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236  ARCHITECTURAL RECORD  April 1967
Planning an on-the-go office building? Specify a Recordlift

**VERTICAL MAIL CONVEYOR BY**

*Standard Conveyor*

The ultra-modern office buildings seen here differ greatly in architectural style—yet they do have one thing in common to give them remarkable functional efficiency.

It's a **STANDARD CONVEYOR Recordlift Vertical Mail Conveyor System**, schematically illustrated at the left.

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For more data, circle 132 on inquiry card
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Westinghouse executive movable partitions

You can design for today and for the future with Westinghouse movable partitions. The versatility you need for the future is already there.

Need surfaces befitting an executive office? You can have them in a variety of Micarta® woodgrains. Or in natural wood veneers. Or glass.

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You'll like the engineering refinements you'll find in Westinghouse partitions. They're there to make your planning easier — to make the finished jobs far more satisfactory.

Remember, Westinghouse partitions are backed by a national network of sales, service representatives. Ask one to call on you. Phone the Westinghouse sales office in your area. For more product information, see our catalogs in Sweet's, or write our Grand Rapids' office.

Circle No. 11 on Inquiry Card
clean rooms, computer rooms, raised flooring

Westinghouse clean rooms and laminar flow work stations

Westinghouse makes more than 70 models of prefabricated clean rooms and laminar flow work stations for industry, laboratories, hospitals. From this supply of prefabricated components you can plan rooms large enough to house hundreds of workers. Or specify portable stations (miniature fields of controlled environment) that roll from job to job. Or any size, any shape in between.

All functional components — Micarta clad, sandwich walls; Micarta clad raised flooring; the blowers; the filters; the illumination are manufactured by Westinghouse. And are guaranteed by Westinghouse.

Air contamination, temperature, humidity, illumination, vibration levels are precisely controlled to your requirements.

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Westinghouse computer room components

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Westinghouse raised flooring system

After buying 80 raised floors for their own computer rooms, Westinghouse decided to manufacture their own. Previous shortcomings were engineered out. Results? A rugged, corrosion-proof and almost maintenance-free raised flooring system.

It consists of tough, cast aluminum pedestals, sturdy short-length aluminum girders, and vinyl edged, Micarta clad floor panels. Floor level can be maintained at ± 1/16" in 10 ft. Especially convenient is the short girder system. It permits instant access in any direction for lay-in wiring rather than stringing services under immovable long girders. The floor is rated at 250 lbs. per sq. ft. live load. And new applications beyond E.D.P. installations are being discovered regularly.

 Truly, the floor of the future—the Westinghouse raised flooring system. See our catalog in Sweet’s Architectural File or write today for more information.

Circle No. 13 on Inquiry Card

Westinghouse Electric Corporation
Architectural Systems Division, 4300 36th St., S.E., Grand Rapids, Michigan 49508
Facing and structural support combined in one Mo-Sai unit

The textured surface of exposed natural white quartz aggregates in a light buff matrix provides the Center with a Mo-Sai facade of permanent beauty. The complete design flexibility of Mo-Sai allowed for casting of ribs that gracefully curve the height of the 22-foot Mo-Sai units. Varying in depth from one to four feet, the ribs add the desired strength to support the poured-in-place concrete floor and roof. Dowels in the base of the Mo-Sai units were grouted into the concrete foundation. Protruding reinforcing ties the Mo-Sai into the poured-in-place concrete on the second floor and roof. The Mo-Sai was smooth-troweled on the interior side and forms the complete wall unit. Permanent, maintenance-free beauty, design flexibility, fast, easy erection, and uniform high quality assured by factory controlled manufacturing methods are the advantages you receive when you specify genuine Mo-Sai manufactured by the companies listed.

For more data, circle 133 on inquiry card
EXTERIOR WALL PANELS / Individual hand-split shakes are bonded to an asphalt-impregnated backerboard to make these panels, 46 3/4 in. long by 16 1/4 in. high. The panels, which come in many colors, have shiplapped edges for weather-tight protection. • Shakertown Corporation, Cleveland.

Circle 308 on inquiry card

METAL PANELS / Bink-Rib is primarily used with metal wall panels, either single-skin or insulated. When used with insulated systems, Bink-Rib spans 12 to 14 ft without a girt. It is available in 20, 22, and 24 gauge and can be rolled to lengths of more than 30 ft. Its configuration is V-corrugations 11/2 in. deep by 7.2 in. pitch with 2-in. top and bottom flats. Choice of 20 colors. • Binkley Company, Warrenton, Mo.

Circle 309 on inquiry card

TEXTURED METAL / This non-directional pattern is said to provide a non-glaring, non-reflecting surface from any vantage point and rigidity and mar-resistance to any ferrous or non-ferrous metal. It is available in a rolling width up to 36 in. in sheet and 24 in. in coil. • Rigidized Metals Corporation, Buffalo, N.Y.

Circle 310 on inquiry card

more products on page 266
Frank Lloyd Wright believed that form should follow function.

We took him to heart when we designed Wheeler's High Bay Mercury fixture. Which explains why it performs as well as it looks. But let the specifics speak for themselves: cover, body and reflector support are all lightweight, die-cast aluminum, finished in baked gray enamel. Reflector is aluminum, Alzak-finished for highest reflectivity. The housing has a constant-wattage ballast, potted with Dri-Lok C2 (so the fill material can never leak out of the housing.) Other ballasts also available.

And you can have your choice of 400 (single or twin) or 1000 watt (single) fixtures.

Install Wheeler’s High Bay Mercury in any industrial setting, and certain things become obvious: half the beauty you can see . . . the other half is performance. Complementing the space-age styling is a remarkable ease of cleaning and maintenance.

Nothing's wasted on this fixture. The construction is simple and straightforward. It's shorter and lighter than conventional fixtures. It looks good in any company.

Contact your wholesaler for more information on Wheeler's High Bay Mercury fixture. Or write: E. Quintiliani, General Sales Manager, Wheeler Reflector Co., Inc., Hanson, Mass.

For more data, circle 135 on inquiry card
You can get 247 miles away from these genuine Onan parts...

but it isn't easy!

If you get stuck in Death Valley with a "sick" Onan electric plant... Heaven help you. You're in trouble. Because help is at least a day away. Service out there isn't really "local."

And let's face it. Even though we build every Onan plant to be 100% dependable... even though we test it to make sure it will deliver every watt of power our nameplate promises... even though it's Performance Certified by an independent testing authority... it's still a piece of mechanical equipment. Eventually, it's going to require some service.

So if you're caught without power in or around Death Valley, we're sorry for your inconvenience.

Any place else, you're in much better shape. Just minutes (a few hours at the most) away from genuine Onan parts and a full-time factory-trained Onan service specialist.

There's one or more on every distributor's staff (more than 100 authorized distributors in every major city in the country).

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It's the result of 20 years' work to develop the industry's finest parts and service capability. And it's all part of Onan's Unit Responsibility idea: one source and one responsibility for installing and servicing the complete package... no "buck passing" at all.

Call your Onan distributor (in the Yellow Pages under Generators—Electric). Or write direct for literature.

We build our future into every Onan product

Genuine Onan parts like these are available through your local Onan distributor. When yours is a high-use, professional application or one that is highly critical, it makes good sense to use only factory parts instead of the "might fits" that abound.

For more data, circle 138 on inquiry card
Coming in mid-May...

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The 20 Houses of the Year

A year in preparation, RECORD HOUSES OF 1967 will present the work of a wide variety of architects ranging from the well-known to talented unknown architects new to the ranks of major innovators. The houses will win for their architects and owners Architectural Record's coveted Annual Award of Excellence for House Design. All 20 award-winning houses are fully detailed with photographs (many in full color), plans and schematics. This highly visual presentation of each house, coupled with a clear statement of the problems and purposes behind its planning, will make RECORD HOUSES OF 1967 an ideal tool for opening your client's eyes to ways in which architecture can serve their individual needs, aspirations and way of life.

RECORD HOUSES OF 1967 comes to you as part of your subscription to Architectural Record. And again in 1967, RECORD HOUSES will be distributed to the nation's 23,000 foremost builders to accelerate the healthy trend toward greater architect-builder collaboration on tract housing. The house building and buying public will find it on sale at leading book stores.
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Schokbeton precast concrete curtain wall, Dell Publishing Warehouse, Pinebrook, New Jersey

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WHAT MAKES AN OFF-THE-FLOOR INSTALLATION COST LESS?

- **common vent (1):** Saves chase space, substantially reduces the number of connections required in a battery of toilets.

- **positioning frame (4):** Simplifies alignment, saves one or more hours of labor per bowl, saves fixture breakage, saves call-backs, acts as template for wall finish, saving tile-setting time.

- **inverted carrier body (3):** Fits all types of toilets, blow-out or syphon jet, saves handling time, eliminates stocking and ordering of different carriers.

- **buttress foot (2):** Short Bulldog feet do not interfere with any type of finished floor, saves installation time.

- **fitting and carrier are separate:** Provide more adaptability to meet changing conditions of installation, save revision time and labor.

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Now...with all the other advantages of off-the-floor fixtures...there is no reason to allow installation costs to change your mind...if you use Josam Unitron Carriers and Fittings on the job. Every feature is designed not only to save time and prevent error, but to provide the adaptability that solves on-the-job problems.

The combined savings in space, materials and installation are substantial enough to make off-the-floor fixtures the logical choice on every job...if you use Josam Unitron Carriers! For further information, write for Manual F-4.

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For more data, circle 150 on inquiry card
UNIT VENTILATORS

with self-contained refrigeration ... heat, ventilate, cool.
Use them to remodel a single room
or an entire central system.

The SC (self-contained) UNIvent is the most versatile, through-the-wall unit ventilator ever designed. It lets you air condition an entire new building or older ones one room at a time. Or the SC UNIvent can be installed first for heating and ventilating only. Then sealed refrigeration section can be added when budgets permit. Cooling capacity is 45,000 BTU/hr. Up to 100% outdoor air for natural ventilation cooling is provided for low operating costs. All motors and bearings are permanently lubricated and sealed—only maintenance necessary is periodic replacement of air filter. Award-winning design includes variety of four base colors, decorator panels in choice of six modern colors and full line of versatile classroom storage accessories.

Choose from seven fully automatic SC UNIvent models, including units for steam, hot water and electric resistance heating. The SC UNIvent readily fits supply piping from existing heating systems. Write for all the facts. American Air Filter Company, Inc., 215 Central Avenue, Louisville, Kentucky 40208.

Herman Nelson
SCHOOL PRODUCTS DIVISION

For more data, circle 151 on inquiry card
UNIT VENTILATORS for steam, hot water or electric resistance heating. Feature famous Herman Nelson one-piece, all welded construction, factory-protected from rust or corrosion. Low sound-level fan housings for quiet operation. Coils are safely positioned beneath fans. Five-year written warranty covers parts and labor.

NELSON/aire cabinet heater and air conditioner. Ideal for offices, entrance-ways and smaller rooms. Thin-profile unit adapts to any wall thickness. Can be used with steam, hot water, or electric resistance coils. Self-contained units available in 8,000, 12,000 or 15,000 BTU/hr cooling capacities. Lets you air condition now or later.

CEILING UNIT VENTILATOR. New line offers unmatched flexibility with four outdoor air inlets, four return air inlets and four conditioned air outlets. Two models (1500 and 2000 cfm) handle up to ½" external static pressure. Ideal for remote locations. Other models for operation to ¾" external static pressure include 750, 1000 and 1250 cfm capacities. Complete choice of coil options. Units can be mounted exposed, in soffit, partially or fully recessed, and concealed. Motor and bearings are sealed and permanently lubricated.

FLOOR COVERING / Recommended for operating rooms, a vinyl resin terrazzo with acrylique carbon black distributed evenly throughout the matrix is said to absolutely dissipate static electricity and retain conductivity. Even when wet, the non-slip surface of Conductive Novatraz assures safety in operating rooms. The nonporous surface resists stains, antiseptics and chemicals and has no bacteria breeding areas. • Selby, Batterby & Co., Philadelphia.

WATER-LEVEL / The manufacturer reports that one man can accurately check levels with an instrument that works on the water level principle. The Ebostat has a reservoir of water at one end, a gauge mounted on a brass staff at the other, and a plastic tube joining the two. A datum level is set on the scale, and direct reading can be taken in about 10 seconds, when the instrument is placed on another point. • HCI Sales Corp., New York, N.Y.

FLOOR ANCHOR / An adjustable anchor compensates for uneven floors when installing steel door frames by eliminating the need for shims or other improvisation. The anchor, which can be installed on any type of subfloor or finished floor, provides a firm attachment reducing the possibility of the frame being knocked out of plumb during construction. • The Ceco Corporation, Chicago.

When it comes to columns, leading architects rely on Hartmann-Sanders to fulfill their needs. Elegance, structural integrity, authenticity and quality are always part of every column. Write for complete reference Wood Columns catalog — presenting 16 design choices, all manufactured to order with design and length relationships exactly executed. Hartmann-Sanders provide "Authentic Design Service," too. Saves you time and work. It's free. Write or call for both, today.

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WITHOUT MOVING THEM OUT OF THEIR PRICE RANGE!

Thai-Teak (Botanical name, Tectona Grandis; imported from Thailand) is the most elegant flooring in the world. It’s lustrous and luxurious . . . easy to maintain with just an occasional waxing . . . withstands the hardest wear . . . resists termites, rot, decay. And now, Thai-Teak is available at a cost that compares with medium-priced carpet and vinyl . . . and comes in 85 different patterns. Only Bangkok Industries offers you this endless variety.

Consult Sweet’s Light Construction Catalog for technical data and write Bangkok Industries for Custom Design Book.

Check these features:

- Norris walk-ins, with 3" walls, are available with either frothed-in-place polyurethane or glass fibre insulation. Full protection with more usable capacity.
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- Complete selection of accessories.
- Self-contained or remote refrigeration systems.
- N.S.F. approved walk-ins available.

Write for descriptive literature designed to make it easy for you to specify!

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For more data, circle 154 on inquiry card.
A new concept in modular space division:

**New permanent-looking walls glide on ceiling tracks, lock rigidly, seal out sound**

Divide large areas into several high-income rooms in just minutes with Kwik-Wall movable walls. Panels glide on ceiling tracks (no unsightly floor tracks), lock solidly into place with a simple one-hand operation. Kwik-Wall has the look and feel of permanent construction. It has a flat, solid appearance and can be adapted to any decor with virtually unlimited choice of decorator panel facings. Laminates, vinyls, hardwood, print grains or unfinished ready-to-paint. Kwik-Wall construction is sound retardant. You can order Kwik-Wall panels with walk-thru doors if you wish. Kwik-Wall is also available in trackless panels that install anywhere. Send in the coupon today for the full exciting story of Kwik-Wall.

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☐ New construction  ☐ Remodeling

Room(s) dimensions:

Construction date:

☐ Send literature  ☐ Have representative call

For more data, circle 155 on inquiry card
MAPS, 3-D MODELS / A new method of making relief maps and similar three-dimensional models is said to offer lightness, speed of operation, simplicity and economy. The technique is to cut all the contour lines of the shape through a single flat slab of medium-density rigid polyurethane foam or similar material. Fixed to a table, a moveable beam carries a high-speed drill at one end and a stylus at the other. As the operator traces the contour lines of the original work with the stylus, the drill cuts corresponding lines through the polyurethane sheet.

HUMIDIFIER / The Turbo-Flo power humidifier runs on air from the furnace blower by means of an air turbine. Wire mesh evaporator discs lift water into the air stream, providing enough moisture reported to humidify a 2000 sq ft house. No duct-work, electrical connections, or wiring are required for the Turbo-Flo, and the unit can be used in any type of forced air heating system. • Leigh Products, Inc., Coopersville, Mich. Circle 318 on inquiry card

HOSPITAL LIGHTING / Cool Lamps promise to facilitate treatment without causing discomfort to the patient. Most of the heat-producing infra-red rays are transmitted through the back, while visible light is reflected forward. The lamps are available with specially created adjustable fixtures that direct the light where it is needed. • Swivelier Co., Inc., Nanuet, N.Y. Circle 320 on inquiry card

UNDERSLAB PANELS / Moisture-barrier sheets, installed between underlayment and poured concrete slabs, are constructed of corrugated Kraft layers with a bentonite core. The bentonite forms a gel and is reported to swell to as much as 10 times the dry volume to prevent seepage. • American Colloid Company, Skokie, Ill. Circle 321 on inquiry card

GAS-FIRED FIREPLACE / This free-standing fireplace, with a three-piece set of ceramic gas logs, has an automatic 45,000-000-BTU pilot-controlled burner that is said to produce a clean, fast, quiet, realistic "wood-fire" gas flame. The assembly, consisting of firebox, flue and ceiling collar, is available in red, white, or gold porcelain enamel, or matte black. • The Majestic Company, Huntington, Ind. Circle 322 on inquiry card

PAINTS / A latex outside house paint with a polyvinyl chloride formulation is said to expand and contract with the weather while maintaining a tight bond that prevents cracking, chipping and flaking. The paint resists mildew and is nonreactive with sulphide fumes. • Pittsburgh Plate Glass Company, Pittsburgh. Circle 323 on inquiry card

"Ty-Seal gaskets saved me more than 500 man hours on this job"

THE MAN: Robert E. Layton, Jr., Professional Mechanical Engineer and President of Layton Engineering Company, Tyler, Texas.

THE PROJECT: A recently finished 2 million dollar high school. Mr. Layton's firm installed the entire waste and drainage system. "I furnished Ty-Seal joint gaskets with Tyler pipe and fittings because I could actually reduce costs without cutting quality. I estimate Ty-Seal gaskets saved me more than 500 man hours on this job. This, coupled with the 50-year guarantee backing each gasket against failure, make Ty-Seal an outstanding product in my opinion." No wonder more and more architects and engineers are specifying Ty-Seal. Why not join them?

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For more data, circle 156 on inquiry card

Circle 319 on inquiry card

Circle 320 on inquiry card

Circle 321 on inquiry card

Circle 322 on inquiry card

Circle 323 on inquiry card

more products on page 292
The First Hot Dip Galvanized Bridge in the U.S. Spans a River of Maintenance 20 Years Wide

A zinc skin will provide 20 to 50 years of protection without maintenance for this bridge over Stearns Bayou, Ottawa County, Michigan. The bridge is 420 feet long with a 30 foot roadway and a 5 foot walk on each side. There are 8 spans, two at 60 feet and six at 50 feet. Design loading is H20-S16-44. All structural members, fasteners and other steel parts are protected against corrosion after fabrication by hot dip galvanizing specified at 2.3 ounces per square foot. Structural techniques proven successful in a hot dip galvanized bridge opened near Quebec City, Canada, in 1963 assure full friction of fastener contact surfaces plus the corrosion resistance of an unbroken zinc coat. The cost of galvanizing today is surprisingly close to that of a proper paint system. When maintenance costs are considered, galvanizing with its 20 to 50 year life expectancy is by far the most economical.

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Producers of Zinc for American Industry
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Expect the unexpected from Alma craftsmen. That's how we became the world's leading manufacturer of wood office furniture. Designs like this, the Series 400, are another reason. For a complete catalog, write Alma Desk Company, High Point, North Carolina 27261.

For more data, circle 157 on inquiry card
GJ’s VARIETY OF DOOR CONTROL DEVICES MEET EVERY BUDGET REQUIREMENT

The cost and function of GJ devices vary, but never do they deviate from a set “quality” standard. No device is made with inferior workmanship or materials to meet a price.

It’s always good judgement to specify GJ throughout, for regardless of price you can always be certain of this set “quality” standard.

To limit the door’s swing and hold doors open, insist on GJ.

GLYNN-JOHNSON CORPORATION / 4422 North Ravenswood / Chicago, Illinois 60640

For more data, circle 158 on inquiry card
Add life to new concrete with colorful hydroment®

Make a hit with everybody, by specifying colorful Hydroment. Hydroment hardens, densifies and colors concrete so it lasts longer and looks better. This floor in terra cotta looks just as handsome in Erin Green, Tile Red, Brown, etc. Specify Hydroment on your next job! You'll be thanked by everyone.

**in 10 popular colors:**
- Tile Red
- Tan
- Terra Cotta
- French Gray
- Erin Green
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- Blue Gray
- Black
- White and Natural

School Band Room, 1671 sq. ft. hydroment

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**FURNITURE** / Single, double and triple seating units, with or without arms, can be combined with tables and bench seats for reception areas, waiting rooms and executive offices. Drop-in arms and panel inserts between seating units augment flexibility. • The Sturgis Company, Youngstown, Ohio.

Circle 324 on inquiry card

**DECORATIVE OFFICE STORAGE** / A complete line of furniture offers a choice of walnut or teak woodgrain finish for 30-in.-high credenzas, 42-in.-high bookshelves, 56-in.-high cabinets and 78-in. high wall units. • S. A. Hirsh Mfg. Co., Skokie, Ill.

Circle 325 on inquiry card

**ACOUSTICAL SPACE-SAVER** / Carousel Acousti-Booth is a telephone center containing six coin telephone panels in a compact 5-ft diameter. The interior of each capsule is individually illuminated and capsule walls contain sound-absorbing material. Available in sitdown or standup facilities. • Burgess-Day Inc., Libertyville, Ill.

Circle 326 on inquiry card

For more data, circle 159 on inquiry card
The first power groove industrial fixture for 40°C (104°F) ambient temperature.

The ballast lives at the fixture end. It's the New Guth Duo-Liner. We call it THE COOL ONE!

Guth

Trusted Name in Lighting Since 1902

THE EDWIN F. GUTH COMPANY • P. O. BOX 7079 • ST. LOUIS, MISSOURI 63177

For more data, circle 162 on inquiry card
DECK / Flexicore Hi-Stress Deck is the subject of an 8-page catalog describing fully-prestressed precast concrete slabs. Load tables, typical spans of various sizes for floors and roofs, and instructions for use on steel frame, concrete frame and wall bearing construction are included. The underfloor electrical distribution system is described along with uses of the hollow cells for air supply, air exhaust, air conditioning and heating, piping, and wiring for ceiling lighting. The Flexicore Co., Inc., Dayton, Ohio. Circle 421 on inquiry card.

BULKHEAD SADDLES
Telescope to fit sill widths up to 20".

ORNAMENTAL METALWORK / A 16-page color catalog, "Stock Components for Decorative Metal Screens and Railings," features space dividers, building facades, rail moldings, railing posts, and other ornamental systems in both contemporary and traditional styles. *Julie Blum & Co., Inc., Carlstadt, N.J.

PLYWOOD / A 20-page design specification pamphlet published by the American Plywood Association presents recommended design stresses, physical properties, and design methods for softwood plywood. *American Plywood Association, Tacoma, Wash.

SEALANTS / A 4-page guide to sealants includes specifications and data for synthetic bulk compounds, oil-base bulk compounds, and synthetic extrude compounds. A selection table recommends the specific sealant for various applications. *Parr Paint and Sealing Inc., Cleveland.

PROTECTIVE COATINGS / A 32-page color booklet features 180 color standards and a two-page guide that help pinpoint a surface condition or exposure and recommends the surface preparation method and the coating system. *Rust-Oleum Corporation, Evanston, Ill.


MOULDING / WP/ Series Moulding Patterns is presented as the moulding industry standard. It is a reference work of the most popular moulding patterns and is said to be the first major moulding pattern catalog revision in almost 10 years. *Western Wood Moulding Producers, Portland, Ore.

ENTRANCES / A 104-page manual presents technical information regarding the use of architectural metals in entrance design and performance. The focus is on public entrances. *National Association of Architectural Metal Manufacturers, Chicago.

*Additional product information in Sweet's Architectural File

For more data, circle 163 on inquiry card.

296 ARCHITECTURAL RECORD April 1967
Simplified equipment suspension is provided by ready-made openings in beams and regularly spaced inserts in stems of double-tee roof slabs.

**Easy future expansion:** Precast elements are readily available for plant expansion. Existing wall panels reposition easily to new wall line.

### Economy:

**Lower overall cost** for the greatest usable area meant a saving for Honeywell over alternate construction. Precast concrete makes savings possible through integration of the basic structural system with the mechanical and electrical functions.

**Higher return on investment** is assured. By early occupancy, for one thing. (Two months earlier for Honeywell.) Important, too, is concrete's resistance to weathering and decay, even without paint. This means low maintenance cost. Also, there is concrete's long life expectancy. Concrete's inherent fire resistance provides additional economic and security benefits.

### Appearance:

**Bright, modern interiors** are obtained with concrete. For Honeywell, pleasant environment and uniform lighting has paid off as expected in noticeably increased worker efficiency.

**Attractive exterior** is created from vertically placed double-tee wall panels. The design distinction and permanent appearance of concrete reflect favorably not only on the company but help promote the community's industrial areas.

HONEYWELL, INC., plant addition, Golden Valley, Minn.  
Architect-Engineer:  
Prestress Fabricator:  
Prestress Concrete Inc., St. Paul, Minn.  
Mechanical Contractor:  
Egan-McKay, Minneapolis, Minn.

**Expand your know-how.** Send for the new "Architectural Design Aid" for one-story industrial buildings. Any questions on concrete? Just call the nearest PCA office.

Yes, send me a free copy of "Architectural Design Aid" for one-story industrial buildings. (U.S. and Canada only)

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Street________________________

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Portland Cement Association  
Dept. A4-8, 33 West Grand Ave., Chicago, Ill. 60610

An organization of cement manufacturers to improve and extend the uses of portland cement and concrete.

For more data, circle 177 on inquiry card
ON THE CALENDAR

APRIL
1-6 National Planning Conference, American Society of Planning Officials—Shamrock Hilton Hotel, Houston.
1-7 Annual Convention, American Concrete Institute—Royal York Hotel, Toronto.


MAY
7-10 29th Annual Convention of the National Association of Architectural Metal Manufacturers—Bismarck Hotel, Chicago, Ill.

8-11 First Joint Convention of the Consulting Engineers Council/USA and the International Federation of Consulting Engineers—Shoreham Hotel, Washington, D.C.
8-12 ASCE Structural Engineering Conference—Olympic Hotel, Seattle, Wash.
12-14 Annual Meeting, Association of Collegiate Schools of Architecture—Barbizon-Plaza Hotel, New York City.
20-28 International Commission of Illumination Congress—Shoreham Hotel, Washington, D.C.
31-June 3 Seventh Annual Conference U. S. Institute for Theatre Technology—Barbizon-Plaza Hotel, New York City.

JUNE
6-8 Ninth Annual Pacific Coast Builders Conference—Fairmount Hotel, San Francisco.
20-28 International Commission of Illumination Congress—Shoreham Hotel, Washington, D.C.
28-July 7 IXth World Congress of the International Union of Architects—Prague, Czechoslovakia.

ADDENDUM

The correct address of Smislova and Associates is 6010 Executive Blvd., Rockville, Md., and that of Carcaterra and Associates is 9301 Georgia Ave., Silver Spring, Md. We regret that these addresses were incorrectly listed in our January issue.
Do you specify “paints”…

or do you specify

Rust-Oleum® Protective Coating Systems?

There is a difference…

Where will the protective coatings be used? How? Under what exposures and conditions? What types of surfaces? These and many more are reasons why Rust-Oleum products are carefully formulated into systems. Each system is designed to answer specific needs with long life protection from primers through top coats. For quality through and through… specify Rust-Oleum protective coating systems. There is a difference.

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HAARLEM, HOLLAND


For more data, circle 179 on inquiry card
9500 miles from Danang, Americans are fighting another enemy.

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The VLMC System results in a better building, quicker occupancy and overall economy.

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OFFICE BUILDINGS: Available space can be readjusted over and over to suit the requirements of tenants.

MANUFACTURING FACILITIES: The VLMC System provides for economical plant expansions in harmony with the existing building.

For more about the V-LOK Modular Component System, write Macomber Incorporated, Canton, Ohio 44701.

SUNDSTRAND AVIATION GOES VLMC—Sundstrand's 250,000-square-foot, three-story Research and Development Center in Rockford, Illinois, is an outstanding example of the Macomber V-LOK Modular Component System in action. Jones and Brown Company, Inc., represented Macomber in supplying the structural components including steel roof decking. Architects are Larson and Darby, A.I.A. Consulting Engineers are The Engineers Collaborative, and General Contractor is Sjostrom & Sons, Inc.

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ARCHITECTURAL RECORD April 1967 329
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ARCHITECTURAL RECORD April 1967 339
These four reviews describe several different kinds of monographs on architect's work, from a memorial volume, to two of the "oeuvre complet" type, to a highly unconventional autobiography.

**Kiesler: the man and his vision**

**INSIDE THE ENDLESS HOUSE.** By Frederick Kiesler. Simon and Schuster, 630 Fifth Avenue, New York, N.Y. 10020. 576 pp., Illus. $13.00.

Other people's diaries and personal memorandà—irrespective of literary merit—have a certain fascination, particularly if they record the inner thoughts and experiences of an interesting mind. Kiesler's posthumously published record of the years 1956-1964 provides some of this kind of insight, although perhaps—as is the way with diaries—it reveals both more and less than the author intended.

How much you like "Inside the Endless House" will depend to a large extent on how much you knew of and liked the man; because the man does seem to come through the rather stilted text and self-conscious book design. If you search the pages for Kiesler's raison d'être, what do you find? You find a man with all the motivation and some of the potential of genius, who sought to express himself in a number of art forms and at the same time tried to translate these into the reality of new forms for architecture—a newly plastic approach to design which he usually described as "endless".

What for Kiesler might the significance of this "endless" concept have been? It certainly has a significance in architecture of today, since flexibility has become a predominant program demand; extensibility, growth and change of buildings, multipurpose use of space are all ideas which are almost too well accepted by architects today. A form that can be repeated indefinitely, a space which does not have the rigid limits of standard geometry, these are valid and important concepts, but Kiesler never quite succeeded in translating them effectively into a design method that could become a part of the language of day to day architecture.

He did exert an influence, however, both through his exhibitions and writings and through some buildings—like the Shrine of the Book in Jerusalem—although his buildings do not have the impact of prototype forms, rather they are monuments of a particular, personal aesthetic, an aesthetic whose validity has not been accepted as having a central place in the practicalities of building design: in the way people want to live.

Kiesler had many of the personal attributes of genius: magnetism, originality, disrespect for convention; but he lacked that important criterion for worldly success, the ability to translate his ideas into a reality with which the rest of the world could relate. He remains a fanciful Puck in a world of men.

Nevertheless, despite its self-consciousness, its attempt to appear to be the spontaneous jottings of a poetic mind, this book has literary merit. Sometimes profound thoughts find an almost epigrammatic, even poetic, expression: "I shall never accept the effigies of a life on the surface, instead of a life born of infinity and sustained by our creative imprint."

There are many apt and humorous descriptions of day-to-day life—"We all rose and the paper doilies were snatched off in a whiff"—as well as a number of personal revelations we could well have done without.

How, then, does one assess the concept of endlessness so fundamental to an understanding of the man and his work? It may not be too whimsical to suggest that it is ultimately the expression of a very personal longing for immortality and an emotional and intellectual level. That this was a major preoccupation is suggested by many passages in the text: "Man's greatest invention," say Kiesler in one passage, "has been continued on page 34..."
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ARCHITECTURAL RECORD  April 1967  343
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work, vast numbers of schools and university buildings. Their work extends beyond the boundaries of the United States and includes U.S. embassies abroad as well as university and town planning projects.

The architects themselves believe that the great success of their endeavors is due in large part to their collaborative method which each partner describes briefly from his own point of view. The book, generously supplied with photographs and plans, is a valuable document, for it includes some of the best architecture produced in the United States in the last 22 years.

NEUTRA


The present book, last in a three-volume series on Richard Neutra's work, records his buildings and projects of the most recent years of a distinguished career. Willy Boesiger lucidly assembles the work, much of which was done with Robert Alexander, in more than 500 photographs, drawings and plans.

The book suffers in form only from lack of development of the subject; this third illustrated list begins where the second left off—arbitrarily, undefined by any natural turning point in Neutra's style, and unclimaxed by any innovation. The volume is rather a retrospective of work which is backward looking itself. Neutra's forms of these years were only elegant variations on themes of a design vocabulary many of whose idioms had long before passed into common usage—such as the protected outdoor school corridors or the "patio-school" itself.

While Neutra's architecture was hardly free wheeling, it was farflung. Much space and detail is thus devoted to several of Neutra's major works abroad. The U.S. Embassy in Karachi, Pakistan is an example. But its outstanding element—tall, anodized aluminum sunshade louvers—was first used by Neutra a generation ago in California.

The book achieves its unity through its restatement of Neutra and Alexander's trademarks in design and philosophy whether applied in Los Angeles or abroad, whether to houses, schools, or embassies. Neutra managed to remain unencumbered by his own traditions, as the well-chosen photos show; his buildings remained light and effortless. And during these years, Neutra's famous re-
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