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ARCHITECTURAL RECORD

January 1965

Architectural Engineering

A LOOK AT THE FUTURE OF STRUCTURAL DESIGN
Engineer Paul Weidlinger suggests that advances in analytical methods applied with the computer will radically change the nature of engineering practice.

TESTS CHECK ROOFING SYSTEM FOR HUGE PLANT
The replacement of an aircraft factory roof called for investigation of the roof failure plus strength tests on the proposed new roofing system.

COMPUTER HELPS DESIGN MECHANICAL SYSTEMS
Heating and cooling loads for a particular building can be determined for as many as 250 zones, and a mechanical system checked against the weather.

BUILDING COMPONENTS: FLUID-APPLIED ROOF FOR HOUSTON STADIUM

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BUILDING CONSTRUCTION COSTS
A monthly feature prepared for the Record by William H. Edgerton, Editor, Dow Building Cost Calculator, an F. W. Dodge Company service

YASKO CITES EXCELLENCE IN NEW FEDERAL BUILDINGS

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DICTATE THE DESIGNS OF CAUDILL, ROWLETT AND SCOTT

COLLEGE PLAN A CLUSTER PATTERN
Architects Meathe & Kessler,
with site planners Johnson, Johnson & Roy, make the most of a pattern of ravines
in designing a brand-new college in western Michigan

PURPOSEFULLY REGIONAL ARCHITECTURE
Country house by Winston Elting
reflects the character of the Pennsylvania countryside

WILL THE COMPUTER CHANGE THE PRACTICE OF ARCHITECTURE?
Some new uses
of the computer are suggested at Boston Conference

Building Types Study 341: Industrial Buildings

American industry seems to be increasingly aware of the capabilities of
architects, and architects are working to provide a more comprehensive service
in the industrial field. The buildings in this study
are successful examples of this architect-client relationship

TORRINGTON NIVELLES, NIVELLES, BELGIUM
Architects: Marcel Breuer and Hamilton Smith

JOHN DEERE COMPANY DISTRIBUTION CENTER, BALTIMORE, MARYLAND
Architects: Rogers, Taliaferro, Kostritsky, Lamb

TOMS CHOCOLATE COMPANY, BALLERUP, DENMARK
Architect: Arne Jacobsen

AMERICAN PECCO CORPORATION, MILLWOOD, NEW YORK
Architect: Arthur Witthoeft

INFRARED INDUSTRIES, SANTA BARBARA, CALIFORNIA
Architects: A Quincy Jones and Frederick E. Emmons

FOLDING CARTON PLANT AND OFFICE BUILDING, CONTAINER CORPORATION OF AMERICA,
CAROL STREAM, ILLINOIS
Architects: Skidmore, Owings and Merrill
Coming in the Record

ACHIEVEMENT IN SEATTLE
The recently completed IBM Building in Seattle, the work of Naramore, Bain, Brady and Johanson and Minoru Yamasaki, seems to reflect Yam­asaki's increasing concern with structure and the architectural expression of it. The building has a unique structure composed of high­strength steel pipes covered with a precast concrete skin.

HOSPITALS OF ALL KINDS
Next month's Building Types Study on Hospitals will provide a sam­pling of the wide variety of current work generated by increasing availability of private and public funds, especially those authorized by the 1964 Hill-Harris amendments to the Hill-Burton Act extending coverage to replacement hospitals, nursing homes, rehabilitation and other health centers.


Every effort will be made to return material submitted for possible publication (if accompanied by stamped, addressed envelope), but the editors and the corporation will not be responsible for loss or damage.

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Competitions and Public Relations

Focusing his jaundiced eye sharply, this iconoclast begs permission to raise a practical point about the welfare of architects: do architectural competitions improve or damage the public image of the architect? I am thinking especially of much-publicized competitions like those for the Roosevelt Memorial or the Toronto City Hall.

Various questions about competitions have been raised in recent years. Do they encourage blissful disdain for realities? Do they devote too little attention to costs, and thus lead contestants (and sponsoring clients) into unbearable extravagances? Do the juries neglect functional considerations or normal clients' needs? Do they focus too intently on intramural preoccupations, like architects' architecture? Or do the juries, as Garrett Eckbo charged recently, focus so narrowly on such preoccupations that they forget the siting of the building, the landscape architects'—and the public's—inherent interest in the cityscape? Yes, it is time for the traditional architect to protest feelingly; let me put the words in his mouth: "Damn your questions; great architectural petitions improve the quality of our architecture, and the more public debate the better." When an architect leaves the university, he goes equipped with charger, lance, banner and devoted determination. And the blessing of this writer.

Duly self-chastised, let me pick up my question again: are competitions good for the public image of the architect?

Or to put it differently: does the architect realize the negative aspects of the resulting publicity? Such competitions as mentioned above result in quite violent reactions in the public press. If, as in these cases, the public is greatly concerned in the premises solution, one cannot expect the architects' architecture to be universally greeted with paens of praise. Indeed, it might even be that architects' hope would be that it would not, that criticism would result in more columns of calumny, and the more the merrier. Thus we raise the flag; thus do we speak to the masses.

Both the FDR Memorial and the Toronto City Hall competitions produced furious storms of protest. And the protests came from the professionals as well as from laymen. There was in fact as much violence within as without the profession. Did the results perhaps do damage, maybe great damage, to the public feeling about architects and their works?

A great many public servants in Washington may have decided that architects were not well attuned to the necessities of memorials. A great many architects did. Uncounted businessmen may have decided that a croissant was not a suitable model for an office building. A great many architects did. And millions and millions of private citizens were thoughtfully adding up the costs, both tangible and intangible, and charging them against the architectural profession.

Yes, the public had two great opportunities to review and understand the workings of architects' minds, and in both instances one suspects that the lessons got home. Architects themselves may have picked up some worthwhile observations.

Every interested follower of those designs was duly impressed with the architect's status as an artist, and probably noted the independent spirit in which the winning designs were selected.

Is this as happy a thought as it is frequently considered to be? I wonder if the architect's stature, his public image, improved any. I suggest that he doesn't need to keep asserting his artistic propensities; the public has given him this recognition for, say, a thousand years.

I have the feeling that the thought would be more pleasant if the public were more ready to follow happily along. The artist always thinks that he must lead the public, tantalize it, educate it, or to hell with it.

But it could be that in such competitions the public gets that last message. The citizenry are notoriously unreliable in their leadability. Naturally in a huge competition the sponsor, the professional adviser, and the members of the jury are not to make decisions based on public relations expediency. But I insist on the question—does the competition system contain some traps for the profession?

—Emerson Goble

ARCHITECTURAL RECORD January 1965 9
WESTERN REGIONS HOLD ANNUAL CONVENTIONS

Architects who attended the three annual conferences of the Western region, American Institute of Architects, heard more speakers than ever (34 speakers, 28 others who participated in various ways), rubbed elbows with more people than ever (though with fewer fellow professionals), and experienced more program innovations than ever before. All this added up, in the aggregate of Western conferences, to something for everyone; from theorists and philosophers to down-to-earth practitioners concerned with contracts, accounting, specifications and legal responsibilities.

But through the varieties of subject matter ran a familiar concern which suggested more professional unity than usual: the esthetics of cities and how to produce a more humane (and thus more esthetic) environment in the face of the increasing complexity contributed by scientific and technological developments. In fact, the California Council suggested in its theme, "Science in the Service of Humanism in Architecture," that science and technology might be subservient to architecture but left the question open to the individual architect.

California Council: Coronado

This theme was further developed through the choice of speakers, most of whom were professors: Pennsylvanias Ian McHarg, an ecological landscape architect; University of Southern California's Dr. John Cantelon and Eric Pawley of philosophy and architecture, respectively; California's Dean Martin Meyerson of Environmental Design; Washington University's Buford Pickens and visiting professors Konrad Wachsmann and Jacob Bakema. Non-professors included Joyce Earley Lyndon, Fellow, Institute of Landscape Architects, formerly of Great Britain, now of Santa Monica; architect Phil Daniel of DMJM; and computer-management specialists James Scouder and Donald Malcolm; Morris Ketchum, Institute president-designate and C.C.A.I.A. president Ulysses Floyd Ribe. Exhibitions included Fine Arts (for the second time), featuring California artists, and drawings of proposals for improvements to the Mexican-United States border.

Highlight of the convention was the presentation of the Council's distinguished service award to William Wilson Wurster for "dedication and achievement in architecture and education."

As it has done since 1960, the Producers' Council provided a speaker from a foreign land for one session. This year it was Kiyonori Kikutake of Tokyo who analyzed the design of his administration building for the Izumu Temple in Japan.

Northwest Region: Portland

Like previous conferences in the Northwest region, this year's meeting arranged by general chairman Joseph Rudd and program chairman Lewis Crutcher, used unusual program methods to impress its theme, "The Hand of Man," on conference, taking them out of the hotel and through the city by bus; instituting seminars with city officials; and honoring leaders from seven northwest cities, each nominated and brought to the conference by one of the region's chapters.

Robert Geddes of Philadelphia, Paul Spreiregen of the Institute staff, Charles Blessing of Detroit and Gordon Wittenberg of Little Rock presented a session on urban design which highlighted the implementation of the conference theme, Institute President A. G. Odell stirred the 100-plus registrants with a challenge to government at all levels "to take a significant part and to display greater wisdom in the functions of government which affect community development." On the final evening Seattle businessman Landgon Simonds, stating that "we need more than stringent new laws if we are to have a better environment: we need genuine leadership to create a new kind of country, to stir up a demand for better environment," unveiled the newly established Foundation for Environmental Design which will "encourage and reward excellence of design in the interrelation of our communities and the changing landscape."

Robert Martin, president of the Oregon Council of Architects, was nominated to succeed Robert L. Durham as regional director.

Western Mountain: Las Vegas

The Western Mountain region, having chosen Las Vegas as the location for its conference, wisely did not schedule evening meetings. Days were full enough, however, with such featured speakers as Herbert Swinburne, Hugh Stubbs, Vernon DeMars, Paul Spreiregen, and Don Lutes of Springfield, Oregon, who described what had been done to revitalize "One Tenth of A Town," and a series of four "scholas" on accounting, legal problems, single versus multiple contracts. Herman Light, F.A.I.A., of Los Angeles, was a surprise hit with his first hand report on damage from the Alaska earthquake, and Arthur Hood, a management consultant from Los Altos, California, electrified his hearers with his startling figures of "what they should be earning" from the "$100 billion annual gross volume of construction."

Charles Eames was the banquet speaker, pinch hitting for James Lucas of Zeeland, Michigan.

The program was organized and arranged by Howard Brandis and chapter president Jack Miller.

—Elisabeth Kendall Thompson
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KENNEDY GRAVE DESIGN IS DISCLOSED

The eternal flame, lighted by Mrs. John F. Kennedy on November 25, 1963, will remain the central symbolic feature in the final design of the John F. Kennedy Memorial Grave at Arlington National Cemetery. Designed by John Carl Warnecke, architect, in consultation with the Kennedy family, the whole concept was conceived as sculpture—the hillside contours, the walks, the terraces, the walls, all leading to the central theme of the flame within a font, which is located directly along the great axis of Washington extending from the Capitol to the Lincoln Memorial across the Potomac River to the Custis-Lee Mansion.

The final design concept was influenced by the need to provide for throngs of visitors (over 7,740,000 persons have visited the grave in the past year). Other design criteria were: the grave should be a simple final resting place for the President; the grave should reflect the office of the Presidency, but should not evaluate the late President's programs; the elements of the grave should have meaning for a full range of people; the grave should complement the visual impact of the Custis-Lee Mansion; and the grave should respect the traditions of Arlington National Cemetery.

The entrance to the grave site is marked by a curved wall and a bench. A paved walk, cut into the hill, curves upward around a mounded circle of lawn with granite retaining walls. Where the walk curves inward toward the grave, the visitor enters an elliptical terrace which serves as an overlook to the city.

Steps from the overlook lead up to the rectangular paved grave site. The material changes here from gray granite to white marble. In the center of this space, slightly elevated, is the rectangular grass plot where the President and his two deceased children are buried. In the grass plot, emerging from a low three-pronged bronze font, is the eternal flame. The terminal point of the design is a long low wall incised with the Presidential seal, which serves as a backdrop for the flame.

Toward the city, the overlook is bounded by a granite wall which will be inscribed with quotations from President Kennedy's speeches, to be selected by the Kennedy family and friends.

Actual construction is expected to begin in the fall of 1965 and will take about one year. Preliminary cost estimate is approximately $2 million with the Kennedy family contributing between $200,000 and $400,000 for the area immediately surrounding the grave site of the President.
View of the grave from the Custis-Lee Mansion showing its relationship to the great axis of Washington extending into the city.

Marked by a curved wall at the entrance, the circular walk to the left provides direct access for official visitors.

The circular walk to the right of the curved bench leads around a mounded circle of lawn to the overlook and grave site.
WINNERS ANNOUNCED IN
FOUNTAIN COMPETITION

Five winners and five honorable mentions have been awarded for the design of a monumental fountain on the Benjamin Franklin Parkway in Philadelphia in a competition sponsored by the Fairmount Park Art Association. The jury consisted of Ieoh Ming Pei, F.A.I.A., architect and chairman; Charles R. Colbert, architect; Jacques Lipchitz, sculptor; Theodore Rossak, sculptor; and Philip Price, president of the Fairmount Park Art Association. The professional adviser is Norman N. Rice, F.A.I.A.

In addition to the top four winners whose entries are shown on this page, a fifth prize of $2,000 was awarded to Reuben Nakian, sculptor, of Stamford, Connecticut. Mr. Nakian's prize is being withheld since he did not comply with the mandatory eligibility requirement of associating himself with a registered architect.

Receiving honorable mentions of $1,000 each were Lundquist & Stonehill, architects of New York City; George W. Hall, sculptor, and Curtis & Barkakarie, Architects, Corona del Mar, California; Rolf Myller, architect, and David Chapin, sculptor, both of New York City; Otto Reichert-Faciilides, architect, of Philadelphia and Peter Nicholson, sculptor, of New York City; and H. Lee Hirsche, sculptor, of Williamstown, Massachusetts, and Ronald R. Rucinski, architect, of Albany, New York.

The fountain site is pivotally located in a skyscraper framed plaza with long views up the parkway and, to the east, the Municipal Services Building, and to the southeast, City Hall (site plan below).

The first prize design by Stonorov & Haws was selected as "best of show" by a three to two vote of the jury. The jury majority praised the design because, as sculpture, it has the most promising possibilities of development, also noting that added water action could be incorporated. Minority comments criticized the fountain as an insufficient terminal for the parkway, and as having insufficient water action. A majority of the jury recommended the design for execution with the express proviso that the water action be made more important and voluminous, as well as visible from a substantial distance.
Design Unity for N.Y.U. at Washington Square

A campus arcade with an arched roof of glass and steel across Washington Place between the Main and Education Buildings is a prominent feature of architect Philip Johnson's unified design concept for New York University at Washington Square in New York City. As part of a three-year $100 million development program announced by the university, the Main Building on the left is to be remodeled, as is the Commerce Building, third from left. A new $17.5 million University Library and Study Center at the right, which will hold 2,000,000 volumes and seat more than 3,000 people, will be given highest priority because of university needs. The new $7 million Education Building, second from left, will also have a similar design. According to Dr. James M. Hester, president of the university: "Mr. Johnson has developed a concept that will preserve the traditional serenity and beauty of an important landmark in New York City."

New Buildings Designed for N.Y.U. Bronx Campus

Three new buildings, designed by Marcel Breuer, architect, are proposed for New York University's Bronx Center at University Heights as part of the new development program. To be added to the Bronx campus, which already has a unified plan for development designed by Mr. Breuer, is a new technology facility, shown at left, which will house several departments of the School of Engineering and Science. The new Life Sciences Building for biology and psychology will face the right of the campus quadrangle. In this sketch, which has a view to the west and the Guild Memorial Library, is University College Hall, to be built at a later date, shown to the right of the life sciences building.
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IN A CHURCH. The facade in St. Stephen’s Episcopal Church, Columbus, Ohio, is glazed with L·O·F Plate Glass with Thermopane insulating glass in all the larger areas. Architects: Brooks and Coddington, Columbus.

IN A LIBRARY. This is Thermopane with Parallel-O-Grey® plate glass as outer panes at Beloit College, Beloit, Wisc. Architects: Loebl, Schlossman and Bennett, Chicago.


For more data, circle 5 on Inquiry Card
In the two decades since the end of the second war, the total number of families (today about 47 million) and individuals who live alone (now about 11 million), has increased by just about 15 million. The growth, and the related gains in income, have been the basis for the strong and steady expansion in home building in the postwar years. But over this span, the grand total of all the new housing units built amounted to nearly 28 million—13 million more than the net growth in families.

It's true, of course, that because there had been little home building during the war years, there had built up during this period a delayed demand for housing to accommodate the needs of a few million families and individuals who were still living with relatives or under other temporary conditions. Filling this urgent need, and at the same time building enough extra units to permit a small but necessary part of the housing stock to stay vacant at all times, accounted for perhaps 8 million of the 13 million homes built in excess of net family growth. The remaining 8 million newly constructed homes are a pretty good measure of what it has taken to replace the housing units which were eliminated over the past two decades. In recent years, replacement housing has become a fast-growing part of the total demand for residential building, and its effect tends to be highly concentrated in the rental building markets.

During the forties and early fifties when housing was still in very short supply, any losses from the housing stock resulted mainly from fire and flood. It wasn't until well into the fifties that we began to make any real progress in removing and replacing the substantial proportion of dilapidated and otherwise substandard housing then in existence.

In the latter half of the fifties, as the pressures on the nation's housing stock began to ease a bit, deliberate demolitions (instead of natural catastrophe) became the leading cause of housing losses. Between 1950 and 1960 nearly four million units vanished from the housing stock, and better than half of them went by way of the iron ball. The vast bulk of those four million units were ones which were classified as dilapidated or substandard in 1950.

In the sixties, replacement for housing began to accelerate. Demolitions, spurred by expanding urban renewal programs and by continually growing highway construction, by 1964 have reached an annual (and increasing) rate of something like 250,000. Fire, flood and storm destruction, while small in relation to the total exposure of nearly 65 million units; nevertheless, results in an additional 10,000 losses each year, and grows along with the total stock of homes. What's more, nearly 150,000 more units vanish because they literally fall apart from old age, are converted to bigger units or to nonresidential uses, or are simply abandoned as uninhabitable. As the total housing stock is updated, these latter losses might diminish.

In total, approximately half a million housing units were torn down or otherwise removed from the total on hand at the beginning of this year. And if the pattern of the fifties still holds, something close to three-quarters of those disappearing homes were rental units. That would mean that out of the near-record 500,000 or more new apartment units built in 1964, only every fifth one counted as a net addition to the housing stock. That's part of what's behind the stable vacancy rates of the past couple of years.

George A. Christie, Chief Economist
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Building Construction Costs

By William H. Edgerton
Manager-Editor, Dow Building Cost Calculator
an F. W. Dodge service

The information presented here permits quick approximations of building construction costs in 21 leading cities and their suburban areas (within a 25-mile radius). The tables and charts can be used independently, or in combination as a system of complementary cost indicators. Information is included on past and present costs, and future cost can be projected by analysis of cost trends.

A. CURRENT BUILDING COST INDEXES—DECEMBER 1964

<table>
<thead>
<tr>
<th>Metropolitan Area</th>
<th>Cost Differential</th>
<th>Dow Index</th>
<th>Res. &amp; Nonres.</th>
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<td>8.9</td>
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<td>8.5</td>
<td>331.1</td>
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<tr>
<td>Seattle</td>
<td>8.5</td>
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B. HISTORICAL BUILDING COST INDEXES—AVERAGE OF ALL BUILDING TYPES, 21 CITIES

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<td>235.8</td>
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</table>

HOW TO USE TABLES AND CHARTS: Building costs may be directly compared to costs in the 1941 base year in tables A and B; an index of 256.3 for a given city for a certain period means that costs in that city for that period are 2.6 times 1941 costs, an increase of 156.3% over 1941 costs.

TABLE A. 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 1.25%, then costs in first city are 25% higher than costs in second. Also, costs in second city are 80% of those in first (8.0 ÷ 10.0 = 80%) or 25% lower in the second city.

TABLE B. Costs in a given city for a certain period may be compared with costs in another period by dividing index into the other: if Index 2 (1944) for one period (200.0) divided by Index for a second period (150.0) equals 133.3%, the costs in the one period are 33.3% higher than those of the other. Also, second period costs are 75% of those of the other (200.0 - 150.0 = 50.0 or 200.0 x 0.25 = 50.0) or 25% lower in the second period. CHART 1. Building materials indexes reflect prices paid by builders for quantity purchases delivered at construction sites. CHART 2. The $1.00 per hour gap between skilled and unskilled labor has remained fairly constant. CHART 3. Barometric business indicators that reflect variations in the state of the money market.
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ARCHITECTURAL RECORD January 1965
YASKO CITES EXCELLENCE IN NEW FEDERAL BUILDINGS

Progress is being made toward the goal of architectural excellence in Federal buildings, according to Karel Yasko, assistant commissioner for design and construction of the Public Buildings Service of the General Services Administration, in a speech delivered before the Architectural League of New York on December 3. Mr. Yasko is confident that President Johnson sympathizes with that goal as an objective.

In general, Mr. Yasko seemed to feel that architects of this country have responded well to his challenge to them—in his speech at the Architectural League in March 1963—to take advantage of the new architectural era launched by President Kennedy's policy on public architecture (July 1962, pages 25 et seq).

“... the government's building program, by its very nature falls into two parts—Washington and then the 50 states,” Mr. Yasko said. He feels that Washington serves as a showcase or “parlor” for the rest of the country and for foreign visitors, and thus should serve as an example of excellence to these people.

“If everything outside of Washington is considered the country, we can point to the work of Mies van der Rohe in Chicago, Gropius in Boston, as two giants contributing to their environment. There are others of stature who are giving out in behalf of quality: Skidmore, Owings & Merrill in Portland, Oregon; Max Brooks in Austin, Texas; Jim Hune'ar in Boulder, Colorado; Heery & Heery in Atlanta, Georgia; Walker, Applegate, Oakes & Ritz in New Albany, Indiana; Austin, Field & Fry and Welton Becket Associates in Los Angeles; Finch, Alexander, Barnes, Rothchild, Paschal in Atlanta; Alonzo Harriaman in Auburn, Maine; and several others.”

The government official cited four new buildings in Washington which he feels are indicative of the excellence of design that can be achieved in Federal buildings: an office building for the Housing and Home Finance Agency designed by Marcel Breuer, and Nolen & Swinburne; Federal Office Building 5, designed by Curtis & Davis, Fordyce and Hamby, and Frank Grad & Sons; the National Air and Space Museum, designed by Hellmuth, Obata and Kassabaum; and the Federal Bureau of Investigation Building designed by C. F. Murphy Associates and Beiswenger, Hoch, Arnold & Associates. It is in these buildings that concrete as a federal style might be emerging.

MITCHELL AND GIURGOLA WIN A.I.A. COMPETITION

As we go to press, it is announced that Mitchell/Giurgola, Associates of Philadelphia have won the final stage of the competition for the new headquarters building of the American Institute of Architects in Washington. In addition to the commission, the winner will receive a $10,000 advance on the fee.

Judging the competition were: Hugh Stubbins, F.A.I.A., chairman; Edward L. Barnes; J. Roy Carroll, F.A.I.A.; O'Neil Ford, F.A.I.A.; and John Carl Warnecke, F.A.I.A. A. Stanley McGaughan of Washington, D.C. was the professional adviser.

The Miami Herald Building, located on picturesque Biscayne Bay, is equivalent to seven stories high, and covers 10 acres. In selecting air conditioning machinery for this most modern plant, extreme care was exercised in choosing components that would match the structure in quality and modernity. As a result, this huge building’s air conditioning plant uses Thermal equipment.

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CATHERINE BAUER WURSTER DIES AT 59

Catherine Bauer Wurster, 59, noted author and educator and associate dean of the College of Environmental Design at the University of California, Berkeley, was found dead on November 23, after apparently suffering a fall while hiking on Mount Tamalpais near San Francisco. She was the wife of William Wilson Wurster, the dean emeritus of that college and partner in the architectural firm of Wurster, Bernardi and Emmons.

An article by Mrs. Wurster, who was an Editorial Consultant of Architectural Record, appeared in the RECORD's December issue (“Can Cities Compete with Suburbia for Family Living?”—pages 149-156).

Born in Elizabeth, New Jersey, on May 11, 1905, Mrs. Wurster graduated from Vassar in 1926. Her book, “Modern Housing,” published in 1934, was the pioneer American study of social policy and architecture of government-sponsored housing. Before receiving a Guggenheim Fellowship in 1936, she worked with the American Federation of Hosiery Workers in Philadelphia in starting the union's Carl Mackley Houses, the first major development of its kind in the country.

Mrs. Wurster was an adviser to President Roosevelt, having served as director of research and information for the United States Housing Administration from 1937 to 1939. She taught at Harvard University from 1945 to 1950, when she joined the faculty at the University of California at Berkeley.

Mrs. Wurster was the author of the housing and community planning chapter in “Goals for Americans,” the report of President Eisenhower's Commission on National Goals, and was currently a member of President Johnson's task force on urban problems.

Mrs. Wurster's awards include those given to her by the National Association of Housing and Redevelopment Officials in 1954 and the American Institute of Planners in 1959. She was a board member of the National Housing Conference, California Tomorrow, the American Planning and Civic Association, and the Loula B. Lasker Fellowship Trust. She was consultant to the United Nations, the Ford Foundation and the Rockefeller Foundation as well as numerous housing and city planning agencies.

Memorial services were held December 6 in the courtyard of Wurster Hall, the new building for the College of Environmental Design on the Berkeley campus.

ROOSEVELT COMMISSION APPROVES MEMORIAL DESIGN

The revised design of the Franklin Delano Roosevelt Memorial, designed by Pedersen, Tilney, Hoberman, Wasserman, and Beer, was approved December 10 by the Roosevelt Memorial Commission in New York, apparently clearing the way for construction of the monument. Last June the Fine Arts Commission of Washington approved the revised design (August 1964, page 26).

According to Judge Francis Biddle, chairman of the commission, unanimous approval was reached after a great deal of discussion. Judge Biddle said Representative James Roosevelt, a son of the late President, still objected to the design, “but this is a good design and this shouldn’t prevent it,” Mr. Biddle added.

The commission did not pass a flat resolution approving the design, but rather chose to list a long series of “recitals” now being drafted by Mr. Biddle. These recitals, which will enumerate in detail the origins and development of the design, will be drafted to serve as a model for conducting future public competitions, according to Chairman Biddle. “We want to put the award squarely on its history and the merits of its design, showing what a solid base it really had,” said Mr. Biddle.

The commission also discussed and will hold future meetings on the questions of drafting a report to Congress and ways to raise the $4.5 million needed to erect the monument.

I. M. PEI CHOSEN TO DESIGN KENNEDY LIBRARY

Ieoh Ming Pei of New York City has been selected by the Kennedy family to be the architect for the John F. Kennedy Memorial Library at Harvard University.

The program for the library has been expanded to include a projected institute for advanced political studies. Arrangements are being made between trustees of the Kennedy Library and Harvard officials to work out the form and organization of the institute and define its relationship to the university.

Robert F. Kennedy, brother of the late President, commenting on the selection of Mr. Pei, said: “We all feel that he will be able to capture the spirit and style that we wish to express in this building.”

There is as yet no design for the library and institute, because the complete program has yet to be formulated. It is considered possible that the present two-acre site on the Charles River might not be sufficient for the expanded program, and a new site may be selected.

Eugene Black, former president of the World Bank and a trustee, who is in charge of fund-raising for the library, said that the original goal of $10 million had already been raised.
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A monthly roundup of reports on new books of special interest to architects and engineers

Jacobsen

ARNE JACOBSEN. By Tobias Faber, translated into English by E. Rockwell. Frederick A. Praeger Inc., 111 Fourth Avenue, New York, N.Y., 10003. Unpaged, illus. $17.50.

A comprehensive presentation of the work of Arne Jacobsen has long been overdue, and this book is therefore likely to be welcomed by most architects. Most of Jacobsen's important buildings are shown, as well as some of his landscaping work and a selection of his textiles and furniture. The photographs are well chosen to emphasize the essential character of Jacobsen's work—well-ordered plans, clear uncluttered architectural forms, beautiful detailing and workmanship, and quiet harmony between buildings and their surroundings.

The text (in German and English), includes an introductory article tracing the development of Jacobsen's work—well-ordered plans, clear uncluttered architectural forms, beautiful detailing and workmanship, and quiet harmony between buildings and their surroundings.

Victoriana


The title of this book is misleading if it leads one to expect a systematic and comprehensive study of the architecture of the Victorian era. The subtitle, "An Age Revisited," is much more appropriate to this discursive collection of essays, which highlight and bring vividly to life some of the people and architectural styles which characterized this curious period from the mid-19th to the early 20th century.

Among those contributing are Pevsner, Goodhart-Rendel, E. M. Dodd, Furnaux Jordan, Paul Thompson, David Cole and a number of others. John Betjeman has contributed a brief and well-balanced introduction. Of all the essays, Furnaux Jordan's on Joseph Paxton is possibly the most charming and rekindles most vividly the spirit of the age. E. M. Dodd's study of Cockerell is an excellent appreciation of one of the most influential figures of the Victorian architectural world, and the Goodhart-Rendel lectures are always worth reading.

Post Revolution Boston


Books on Boston always have an appeal, and this, which tells the story of Charles Bullfinch and his designs for the Beacon Hill area in the period immediately following the revolution, gets off to a good start. Bullfinch was not only an architect, but was also a political and social leader who did much to improve town planning, educational and social facilities within the city. By presenting Bullfinch in his social, as well as his architectural context, the continued on page 55
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OUTLAST ORDINARY DOORS BY AS MUCH AS 10 TO 1

Rubbair Doors are designed to take the punishment in an industrial operation from fast-moving motorized vehicles. They are constructed to absorb the shock which normally would splinter door frames, shear screws or fracture hinges.

What's more, Rubbair Doors have been proved in use for the past 10 years in thousands of major industrial plants, in U.S. Post Office buildings, and other governmental installations.

Construction features are as follows:

1. Rubbair Doors are double acting, self closing type approximately 1/4" thick. They are of unit construction using rubber extrusions, or I-beams, uniformly spaced and vulcanized to a high strength (tensile strength is 3,000 lbs. per square inch) rubber casing. The space between the I-beams is filled with a high strength, shock absorbing neoprene-coated curled hair padding. Doors have good dimensional stability.

2. Rubbair Doors are supplied completely assembled and ready to mount. Simple, rugged V-cam hinges also supplied, provide smooth, easy opening on contact, and rapid, gravity-actuated recovery.

3. Safety-cushion nose, and shatterproof windows all contribute to extra-long service life and extra safety for personnel and equipment. Scuff resistant wear panels also available if required.

In addition to these features, Rubbair Doors also save the user substantial sums in maintenance...no painting...no scratching...no denting. Just hang them and forget them.

Door flexes under impact, absorbs shock: keeps maintenance to a minimum

Other Rubbair Door Advantages — Durability is only one of many Rubbair Door advantages. Here are others:

1. Flexible construction provides extra safety for personnel and equipment.

2. Positive air seal provides effective barrier against dust, moisture, odors, noise, etc.

3. Quiet operation. Ideal for hospitals, libraries, etc.

4. Smooth, rapid operation does not slow down high-speed traffic.

Write for detailed specification data. For price information on specific installations, please include size of door openers.

RUBBAIR DOOR DIVISION
STIC-KLIP MANUFACTURING COMPANY, INC.
20 Regent Street, Cambridge 40, Massachusetts

For more data, circle 34 on Inquiry Card
COOK Centri-Pac® Aluminum Blower adjusts to any discharge position on the job

CENTRI-PAC SIMPLIFIES ORDERING
Since the angle of discharge is positioned on the job, ordering is easier. Just notify if belt or direct drive and direction of rotation.

COMPACT DESIGN SAVES UP TO 30% IN SPACE, 50% IN WEIGHT
A new scroll design, airfoil wheels, and all-aluminum construction give the COOK Centri-Pac high efficiency — in a small package — at half the customary weight.

WRITE, OR ASK YOUR COOK REPRESENTATIVE FOR BLOWER CATALOG 65B. The COOK Centri-Pac® is a companion line to the COOK Centri-Vane® Straight Thru Blower and a complete line of axial and centrifugal ventilators. See our 32-page catalog in Sweet's Architectural File, Section 20c/Co, for the name of your nearest COOK representative, or for any of the products shown below.

THE LOREN COOK COMPANY · Dept. AR-1, 640 North Rocky River Dr., Berea, Ohio
Now silence comes
factory-clad in
aluminum
(and in four gleaming colors)
There’s a bright new look in acoustical ceilings. Johns-Manville Acousti-Clad* . . . the world’s only metal-faced ceiling tiles so light in weight, they can be cemented as well as hung.

Acousti-Clad, factory-faced with aluminum in silver, gold, copper and white, makes the dullest room glow with splendor the year round. And, the rigid core material, formed from either expanded perlite or mineral fibers, has millions of tiny air cells to absorb sound, reduce noise.

Acousti-Clad’s gleaming beauty is ideally suited to schools, laboratories, restaurants, hospitals, conference rooms, offices, banks, stores and lobbies. Acousti-Clad is highly incombustible (flame resistance E84—Class I). It’s highly moisture resistant. It can be easily cleaned with any good detergent.

For all the glowing details, write to Johns-Manville, Box 111, New York, N. Y. 10016. In Canada: Port Credit, Ontario. Cable: Johnmanvil.

For more data, circle 38 on Inquiry Card
why only divide space?

Unispan Adds Four New Dimensions
for Total Interior Space Flexibility!

Self-Supported
Completely Relocatable
Superior Operating Ease
Better Sound Control

Unispan is a new concept... a self-supported folding partition system. It simplifies new and remodeling installations, goes in to any overhead structure; can be relocated (even over a weekend); can be opened or closed by teacher, or student, without motors; and assures better sound control. Unispan is engineered to provide TOTAL space flexibility to classrooms, restaurants, meeting rooms, and offices. It fits today's requirements... anticipates tomorrow's needs. Available in sizes up to 19 feet high, and 40 feet wide. Write for complete details today!

See UNISPAN on the stage at AASA, and in display booths 633 to 641

HOUGH MANUFACTURING CORPORATION • JANESVILLE, WISC.

UNISPAN

For more data, circle 39 on Inquiry Card
Required Reading
continued from page 46

authors of this book have been able to show us Boston as a city whose architectural style significantly expressed the life of the times. We see all the evidence of a city in a period of transition, evolving a style of its own, but still strongly influenced by the culture it has just escaped from.

The book is well written, and the illustrations fascinating but too few.

Furniture on Display

NEW FURNITURE. Frederick A. Praeger Inc., 64 University Place, New York, N.Y., 10003. 162 pp., illus. $12.50.

Number seven in a series on furniture, this is an attractively produced volume showing a wide variety of modern designs—some very familiar and others relatively new. Chairs seem to predominate, but occasional tables and modular wall units are well represented.

Chambord


François I ordered Chambord built in 1519. In many ways it is still the embodiment of a dream city.

This beautiful book pays homage to Chambord in a manner befitting its grandeur. The photography, brilliant in its detail, re-invents moods of Chambord’s exquisite past and the poetic text evokes its immortal history.

Tiffany


Louis C. Tiffany had little interest in directing the affairs of the family firm, Tiffany and Company, but instead devoted his life to the arts. This book is a definitive study of his career, and it will also provide collectors with a means of identifying and dating examples of Tiffany glass and metalware.

With the current renewed interest in Art Nouveau, architects will undoubtedly find this book of interest. Some 350 illustrations, many in color, are contained.

World Art


Three new handbooks in the Movements in World Art series have been published, each devoted to subjects from differing cultural epochs.

“Byzantine Mosaics” illustrates mosaics from both Italy and Byzantium during the period from the fifth

continued on page 68

BAYLEY

Windows and curtain-walls

steel and aluminum

Leaders in quality window design, manufacture and service. Consult us — our years of specialized experience is available to you for the asking.

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when there's a hardware selection to be made...

this man relies on past experience

"Look-alikes" may puzzle the novice; but the man of experience doesn't just look at hardware. He looks beyond and sees—the tangibles and intangibles of his specification.

He knows the practical value of having his order analyzed as a double-check against errors, and the reassurance of custom-engineering assistance when it's needed.

He knows that the guarantee of durability and smooth function is in the original design, basic metal, precise machining and the expert finishing of an item.

He knows the time and money that are saved when the correct hardware reaches the building site on time.

Because this man knows GJ... he specifies GJ... for the quality that he demands, the service-extras he has a right to expect, and the scheduled delivery that he needs.

GJ hardware is built to endure... and LOOK S R.

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For more data, circle 50 on Inquiry Card
Harris Memorial Methodist Church
Honolulu, Hawaii

Architects:
Wilson Associates, Inc., Honolulu

Roofing Tile:
Ludowici-Celadon

When the Roof Becomes a Major Element in the Design...

Architects depend on Ludowici-Celadon tile roofing for versatility of texture and color... In this imposing edifice, modern Designer Gray is accented by the classic Greek tile motif for a pleasing effect... but equally important is the fact that the roof will retain its permanent beauty and enduring protectiveness for generations to come. We'd like to send you our free illustrated brochure.

For additional information, write Dept. AR

*LUDOWICI-CELADON CO.*
75 E. WACKER DRIVE • CHICAGO, ILL. 60601

Manufacturers of quarry tile, the nation's largest producer of roofing tile and NAILON Facing Brick

DESIGNER tile roofing is one of the several Ludowici-Celadon patterns and colors offering wide flexibility in exterior design. Here it is combined with Greek tile over the battens.

For more data, circle 51 on Inquiry Card

All this can free your time for other work. That's the job of the professional Glidden consultant. He knows how to give your jobs "client pleasing" paint appearance and performance. He knows all paints— their advantages, their limitations.

Since Glidden makes all types of paints, this consultant has no ax to grind for any one product. You'll get frank answers, and prompt technical solutions to any problem.

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Cleveland, Ohio 44114

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USES ONLY 65% OF AREA NEEDED BY ORDINARY CABINETS

IS THE ONLY CABINET U/L LISTED FOR ONE MAN OPERATION

Allenco's patented hose clip makes the HOZEGARD cabinet semi-automatic, U/L listed for one man operation. A quick pull on hose disengages clip, feeds water to hose instantly.

HOZEGARD's half-circle door rack is foolproof, permits full 180° swing, instant withdrawal of hose. Design of half-circle rack eliminates need for bulky, expensive pin type rack and saves up to 35% on installation. HOZEGARD cabinets install on any plane—provide the maximum in adaptability, and easy handling. Allenco patented HOZEGARD cabinets are available in recessed, trimless, surface and shallowall models; steel, stainless, aluminum, or bronze.

For complete details and specifications about the patented HOZEGARD and W. D. Allen's complete line of fire protection equipment contact your W. D. Allen representative today. Or, write direct.

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For more data, circle 59 on Inquiry Card
FAST SLAB FORMING
SYMONS SLAB SHORE SYSTEM
SPEEDS HIGH RISE ERECTION

Using the Symons Slab Shore System for all floor slab forming, the concrete sub-contractor on the new Hague Towers luxury apartments in Norfolk, Virginia, completed each 15,500 sq. ft. floor in a 6-day period.

The contractor divided total floor area by three, and worked pours in sequence, stripping the first pour at the same time the third pour was finished.

In addition to forming each of the 20 floors on the high rise building, the Slab Shore System served as bottom support for the spandrel edge-beam on the second floor.

Symons Steel-Ply Forms were also used to form columns varying in dimension from 12 in. x 12 in. to 28 in. x 28 inch, and in height from 8 ft. 1 in. to 15 ft. on each floor.

Contractor on the job was Standard Construction Co., of Washington D.C. The concrete sub-contractor was Con-Corp., Inc., of Rockville, Maryland. The architects were W. L. Mayne & Associates, of Alexandria, Virginia.

Symons' forms and Slab Shore System may be rented, purchased, or rented with purchase option.

Free field service and engineering layouts are available for all jobs. Using this service increases the benefits of Symons products ... means a better job, at lower cost.

Required Reading
continued on page 55

to the 14th centuries. “Korean Painting” is largely a survey of the works of Korean painters of the “Golden Age” of Korean painting, the 18th century. “Medieval Stained Glass” describes the development of the art of stained glass in Europe from the first extant examples to the masterpieces of the Gothic period.

Each contains a scholarly introductory essay and 24 color plates, one by one accompanied by explanatory notes.

New Editions


The republication of these vital studies of American architectural heritage in paperback editions is most welcome. For the architect, nothing is lost from the originals; for the layman, they lend understanding to our cultural history.


Devotees of Rococo art will appreciate this paperback reprint of the original. All the character of that art of ornament is here, from the time Rococo emerged and dominated Europe, until the advent of the classical style of the late 18th century.

Books Received

BENDINER’S PHILADELPHIA. By Alfred Bendiner. A. S. Barnes & Company, 11 E. 36th St., New York, N.Y., 10016. 175 pp., illus. $4.50.

DESIGN OF PRESTRESSED CONCRETE STRUCTURES. By K. W. Bieger. Sahu Cement Service, continued on page 78

For more information, write or call any of the Institute members listed below:

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WILSON CONCRETE CO.
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P. O. Box 208, South Omaha, Neb.

For more data, circle 61 on Inquiry Card
The beautiful way to support a roof . . .

with exposed aggregate

Mo-Sai®

precast concrete structural units

The beautiful, enduring finish of Mo-Sai®, originally a curtain wall or facing material, is now used extensively for structural units. For example, on the General Telephone Office Building, shown here, solid reinforced Mo-Sai precast concrete shafts with exposed quartz surface on all sides support an extended roof. Tapered Mo-Sai cross pieces complete the “star” design and form an unusual railing for the sheltered walkway. Prestressed Mo-Sai windowwalls with black obsidian face the building proper, forming a striking background for the white Mo-Sai structural shafts. Why not give your local Mo-Sai member a chance to work out your ideas in structural Mo-Sai?

General Telephone Company of Ohio, Marion, Ohio
Architects: Edwards and Burris
General Contractor: Garwick & Ross, Inc.
TWIN DOMES WITH 200-FOOT SPANS are distinctive architectural features of this Iowa school complex. One dome covers the field house; the other a fine arts building. Each is supported by 16 wooden arch segments, which meet a steel compression ring at their apex. At their base, a concrete tension ring post-tensioned by the Ryerson BBRV system efficiently and economically compensates for the horizontal thrust—thus relieving the foundation of this load.

Warren G. Harding Junior High School, Cedar Rapids, Iowa; Architects: Kohlmann-Eckman-Hukill; Structural and Foundation Engineers: Shive-Hall-Hattery Engineering Services; Contractor: Abell-Howe Company.

NEW STRUCTURES SHOW ADVANTAGES OF

When you specify Ryerson post-tensioning you deal with one of the nation's largest suppliers of construction steels—a company with the resources and facilities to provide a complete service package.

For architects and engineers this package includes assistance in feasibility studies on use of post-tensioning in specific projects...preliminary cost data...sharing of experience in structural design and layout...plus specification information and detailing.

For contractors Ryerson delivers tailor-made tendons, completely assembled and ready for placement. Also provided: equipment for stressing and grouting, technical jobsite assistance, architect-approved drawings, stressing data and reliable labor estimates.

For more information or help on a current project, call the nearest of Ryerson's 20 plants or write Box 8000-A, Chicago Illinois 60680

PUERTO RICO'S LARGEST, MOST MODERN OFFICE BUILDING will be Banco Popular Center, a 19-story tower now being built at San Juan. The builder wanted maximum areas of unobstructed, column-free floor space, and this was achieved economically with post-tensioned one-way joint slabs—maximum spans are about 40 feet. Ryerson BBRV post-tensioning also made it possible to build each floor (slab, joists and girders) as a monolithic structure with elements combined to achieve shallowest possible structural depth.

Banco Popular Center, San Juan: Project Manager and Rental Agents: Cushman & Wakefield, Inc.
Architects: Toro-Ferrer, and Kahn & Jacobs
Structural Engineers: Diniso & Valti, and Lev Zehlin & Associates
General Contractor: George A. Fuller Company of Puerto Rico
Subcontractor for Concrete Work: Pavarini Construction Co., Inc. of Puerto Rico
Subcontractor for Rebar & Post-Tensioning: G & H Steel Service, Inc.
THE 63-FOOT SPAN REQUIRED BY A DEEP COLUMN-FREE PORTICO was achieved here without affecting the striking appearance of structural lightness by the use of post-tensioned concrete. Six interior beams spanning the portico at roof level each contain four 30-wire Ryerson BBRV tendons. Stressing of exterior beams is accomplished with two 40-wire units.


BBRV POST-TENSIONING BY RYERSON

BONDED OR UNBONDED TENDONS
...LOCKNUT OR SHIM-TYPE
ANCHORAGE...FOR POSITIVE END ANCHORAGE AND RELIABLE APPLICATION OF FORCES

Typical movable end anchor of Ryerson BBRV unbonded (greased and wrapped) tendon after stressing.

Typical movable end anchor of Ryerson BBRV bonded (grout type) tendon after stressing.

NO ONE ENDS UP BEHIND A POST in this handsome 50,000-seat sports stadium. Extreme cantilevers, made possible by Ryerson BBRV post-tensioning of the concrete girders, will keep columns back out of sight lines. The outer edge of the oval roof canopy extends 50' over the upper seating deck. And the upper deck, in turn, cantilevers 40' over the lower deck. Roof and deck each have 96 beam lines and the girders, 75' and 87' long respectively, are each post-tensioned by 6 tendons of 42 or 43 wires.

Civic Center Busch Memorial Stadium; Engineers and Architects: Sverdrup & Parcel and Associates, Inc.; Architect-Designer: Edward Durrell Stone; Associate Architects: Schwarz & Van Hoelen; Contractors: Fruin Colnon Contracting Co. and Millstone Construction Co.

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JOSEPH T. RYERSON & SON, INC., MEMBER OF THE STEEL FAMILY

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FREEDOM of CHOICE

OR

THE PRACTISE OF

DEMOCRACIE

in the field of

LAVATORIE & WASHROOME DESIGN

(A Treatise)

This is a petition on behalf of your client—that he be given the Freedom of Choice between the two kinds of toweling available for washroom use!

All you need do is leave the standard size aperture (17 inches wide by 671/2 inches high by 97/8 inches deep) for an available, universal cabinet which will accommodate either form of toweling he may choose—either now or in years to come.

IT IS OUR BELIEF

that continuous cloth toweling is superior, in that it is both COMFORTABLE and HYGIENIC, and eliminates problems of Maintenance and general Tidiness.

We shall do our utmost to convince your clients of this.

But—in leaving him the CHOICE, in the form of this standard aperture, you will have struck a Blow for

DEMOCRACIE!

FREE DESIGN GUIDES!

They give case histories and suggestions for providing more efficient linen supply service in hospitals, motels, hotels, schools and restaurants, as well as for commercial firms, professional offices and various institutions. Write today.

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The fastest elevators in the world are in New York's Pan Am Building

They're Westinghouse Mark IV Elevators. Traveling at 1700 feet per minute, they whisk heavy traffic smoothly to the upper floors. With computerized controls, they answer calls directly. Politely, too. Doors close quickly only after the last person enters or leaves. What else would you expect in the world's largest commercial building? 71 Westinghouse Elevators and 20 Electric Stairways serve Pan Am's 20,000 tenants and 150,000 transients daily. And skilled Westinghouse Maintenance keeps elevators as efficient as the day they were installed.

You can be sure if it's Westinghouse
Forcast recessed incandescent lighting fixtures make it easier for you to create with light and achieve desired lighting effects. Uniting form, function, and performance, these fixtures help you set a mood, create atmosphere, or dramatically delineate contour, color, and texture.

Paired die castings of door and mounting frame assembly enables you to specify either a precise flangeless trim, or a minimum width overlapping flange. Combining the new smaller lamp envelopes with high performance Alzak** aluminum reflectors, Forcast fixtures provide refined control with optimum efficiencies. Ideal for use with acoustical tile or plaster ceilings, recessed Forcast units are simply and quickly installed and easily maintained.

Your most demanding incandescent design requirements can be satisfied with the esthetics and construction of Forcast.

For additional information, contact your Smithcraft representative, or write . . .
with new Controlens® by Holophane

Holophane has designed a new series of square and round Controlens which help to make Smithcraft's Forcast a superior incandescent lighting system.

These lenses, with sophisticated prismatic contours, distribute light evenly... reducing glare and providing complete control of light from any normal viewing angle. Controlens used in Forcast fixtures provide new beauty, too. Circular lenses have concentric radial bands providing additional definition to the prisms. Square lenses have a unique rectilinear pattern of prisms with square concentric radials. You can use both round and square Forcast units together with complete harmony.

Controlens for round Forcast fixtures are available in 6", 8", and 10" diameters... square units in 8" and 10" sizes. This new incandescent lighting system gives you additional flexibility in the lighting of stores, restaurants, lounges, banks, and other important areas. Complete information is available in your area through the Holophane Field Representative, or write...

HOLOPHANE COMPANY, INC., 1120 Avenue of the Americas, N.Y., N.Y. 10036
New KRUEGER Fiberglass

STACKABLES

* Comfortable
* Convenient
* Contemporary
* Durable

Designed for roomy comfort and stability.

Non-tip stacking to any convenient height.

The fresh contemporary look in a practical, portable seating design. Comfort-curved shell, in 7 decorator colors, is unitized to wide-stance, square-tubular legs—in Brushed satin Brass or Chrome, or baked enamel finishes. Self-leveling rubber-cushioned foot glides.

Exciting New Functional Beauty
Krueger Hostess HS-604
FOLDING BACK/STACK CHAIR

All-steel design with Polyfoam seat and folding backrest upholstered in mix-or-match colors of Scotchgarded fabric or Naugahyde Chromata. Brushed Brass or Chrome wide-stance legs add stability.

Look for Modernfold Partitions in Two Sections of Sweet's This Year

Includes specifications for all Soundmaster, Coil-Wal, Acousti-Seal, Woodmaster and Spolen-door operable walls and folding partitions.

Specifications and details on Modernfold's folding doors and dividers, for apartment, dormitory, retirement home, nursing home and residential use. Products are Woodmaster 500, Spacemaster and Wovenmaster.

NEW CASTLE PRODUCTS • New Castle, Indiana

For more data, circle 66 on Inquiry Card

SMITH-GATES EMBEDDED ELECTRIC

SNOW MATS®

The Preferred System
for Snow and Ice Removal

Highest Quality
Lowest Cost
Easiest to Install

For walks, driveways, ramps, parking lots, steps, etc.

Embedded in Blacktop or Concrete, Smith-Gates Snow*Mats remove ice and snow efficiently and economically. Snow*Mats are fastest, easiest and least expensive to install because they come in a variety of PREFORMED lengths up to 60" in 6 voltages and 4 heat densities. Snow*Mats are quality-produced with finest materials by the world's largest manufacturer of electric heating tape. And Smith-Gates offers you complete engineering service.

SEEKO-HEAT Mats, same as Snow*Mats except for lower wattages, are perfect to remove dampness and chill from concrete floors in basements, garages, bathrooms, kindergartens, etc.

"EMBEDDED IS FOR KEEPS...SO KEEP IT SMITH-GATES"

SMITH-GATES CORPORATION
FARMINGTON, CONNECTICUT

For more data, circle 149 on Inquiry Card
Why are Bradley Washfountains the people's choice?

Because... lavatories are fine at home, but in employee and public washrooms, people want wash fixtures that are truly sanitary, quick and easy to use, and require no fussing. Only one wash fixture fits that bill — a foot-operated Bradley Washfountain.

Management also insists on Bradleys. Washfountains save 25% or more on floor and wall space. And they serve up to 8 people with one set of plumbing connections, cutting installation costs as much as 80%.

They also save water and reduce maintenance time.

What's more, Washfountains give you a wider choice of colors and compositions than any other type of wash fixture. So, for plants, commercial buildings, schools, institutions — all modern buildings — specify Bradley Washfountains!

For complete details, see your Bradley representative. And write for latest literature. Bradley Washfountain Co., 9107 Fountain Drive, Menominee Falls, Wisconsin 53055.

For more data, circle 67 on Inquiry Card.
X-Panda Shelves
architecturally styled for
beauty, utility

"sales glamour" to the first place a woman looks in your new home or apartment. There are X-Panda Shelf styles to fit every type of closet or storage application... providing solid, strong, durable steel shelving that instantly expands to fit space without sawing or planing. X-Panda is now factory-finished in four fashion colors... never needs painting... actually costs far less than installing conventional wood shelving. Send coupon today for complete details.

Please send information on X-Panda Shelf, plus other proven products in the Home Comfort line as follows:

- VENT-A-SYSTEM attic ventilation
- LOUVERS & SHUTTERS

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Firm
Address
City State Zip

For more data, circle 68 on Inquiry Card
FINALLY a Solution to Power Load Center Problems

Kearney's NEW, REVOLUTIONARY

ISO-QUENSUR®
Interrupter-Disconnect Switch

- SAVES SPACE
- SAVES MONEY

Iso-Quensurs measure only 11\(\frac{3}{4}\) inches in depth — 50% less than other comparable equipment. Straight-line motion throughout the open — close cycle saves \(\frac{3}{2}\) or more of the depth needed for hinged blade disconnects.

Iso-Quensurs will save up to 50% of initial equipment costs — because they interrupt and visibly disconnect in one operation.

No moving parts extend beyond frame except the operating handle.

The First Interrupter-Disconnect Switch That Offers All These Features

Interrupts and Disconnects — interrupting units are so small and compact they nest in the bores of upper terminal insulators — effecting instant interruption, independent of operators speed. When the switch is operated, the bridging sleeves engage or disengage upper contacts — middle insulators telescope into the lower ones on opening, the upper ones on closing.

Safer — all live parts, except terminals, are enclosed in bushings — enclosed always, regardless of operating position. This enclosed design provides maximum protection against phase-to-phase faults and to personnel. Operating handle is self-latching in open and closed positions — can be padlocked in either position.

Visual Gap — in the open position, there's a gap for visual inspection — but the contacts are not exposed. All live parts are always enclosed in porcelain.

No Arcing — the arc is drawn between two simplified arc resistant contacts and confined within special de-ionizing materials. No conducting residue is left behind. Means longer life — well in excess of field duty.

Flexible Mounting — can be mounted anywhere with maximum protection to personnel — on a wall, in a cabinet, inside transformer housings or with switchboards. Operating handle fits on either end with extension that can be run through a wall for remote operation.

Automatic Resetting — closing the switch resets the interrupter, ready for the next operation. Iso-Quensurs safely and dependably interrupt up to 600 amperes — have exceptionally long life.

One word more. Iso-Quensur ratings available through 13.2 KV, 600 Amps, continuous and 600 Amps, load break rating, 40 KA momentary, 95 KV BIL.

For Complete Iso-Quensur Information,
See Your Kearney Representative or Write Us for Data Sheet.
Martin Price designs a high school.

By installing Zonolite® Masonry Fill Insulation in the walls, fuel bills are cut $405 a year, returning 230% annually on the investment in insulation.

What your client actually pays for insulation is only remotely connected to the cost.

For example, Consulting Engineer Marvin M. Serot of New York City, who engineered this building, found that the installed cost of Zonolite Masonry Fill Insulation in this high school was $1,903.

But that is not what the client pays, because the insulation is financed as part of the building over a 20 year period at 6% interest.

So the true cost of the insulation to the client is about $170 annually for 20 years.

Compare this with the annual savings of $405 a year, and you will see that the client gets a 230% return on his yearly payment on Zonolite Masonry Fill Insulation.

One reason for this high return is the effectiveness of Zonolite Masonry Fill Insulation. Another is its low installed cost.

Wall construction and finishing costs were also cut considerably by using Zonolite Masonry Fill Insulation. Because the insulation goes in the cavities, the interior wall surfaces were left unfinished, except for paint. Fewer materials and fewer trades were needed than with conventional wall systems.

There are other benefits, too. The cost of heating and cooling equipment is less because smaller units can be used. The building is much more comfortable. It is also quieter, because of the insulation's sound absorption characteristics.

Additional facts worth investigating are contained in our Bulletin MF-83. Write Dept.AR-15, Zonolite, 135 South LaSalle Street, Chicago 3, Illinois.

*Reg. trade mark of Zonolite Division, W. R. Grace & Co.

<table>
<thead>
<tr>
<th>Design Conditions</th>
<th>Winter Heat Loss in BTU/hr Assuring 70°F DB Indoor 60°F DB Outdoor</th>
<th>Summer Heat Gain in BTU/hr Assuring 80°F DB, 75°F WB Outdoors 78°F DB, 50% RH Indoors</th>
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<tr>
<td>Without Masonry Fill</td>
<td>With Masonry Fill</td>
<td>Without Masonry Fill</td>
</tr>
<tr>
<td>Walls (above grade)</td>
<td>4&quot; Face Brick</td>
<td>2½&quot; Hollow Block</td>
</tr>
<tr>
<td>4&quot; Face Brick</td>
<td>2½&quot; Hollow Block</td>
<td>6&quot; Insulation</td>
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<tr>
<td>8&quot; Poured Concrete</td>
<td>59,000</td>
<td>39,000</td>
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<td>Roof</td>
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</tr>
<tr>
<td>Glass: Solar</td>
<td>Insulation</td>
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<tr>
<td>Ventilation</td>
<td>20,000 Cubic Feet per Minute</td>
<td>2,389,000</td>
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<tr>
<td>Lights</td>
<td>340 Kilowatt</td>
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<tr>
<td>People</td>
<td>1,000</td>
<td>4,542,000</td>
</tr>
<tr>
<td>Totals</td>
<td>4,542,000</td>
<td>4,234,000</td>
</tr>
</tbody>
</table>

% Savings with Masonry Fill = 6.8% = 1.7%

NOTES: FUEL: No. 6 Oil @ 7.5¢ per gallon. DEGREE DAYS: 4,959 per year. Total Loads Based on Maximum Simultaneous Usage.

For more data, circle 70 on Inquiry Card.

ARCHITECTURAL RECORD January 1965 81
NEW FROM JAMISON

lightweight, space-saving JAMCO* doors developed for industrial use:

JAMCO Vertical Sliding Door
Fully counterweighted for easy manual operation. Especially suitable for enclosed loading docks. Doorways can be positioned closer together to service more trucks.

JAMCO Hinged Panel Overhead Door
Powerful torsion spring assures effortless operation. Ratchet adjustment maintains proper spring tension. For installation on loading docks and other areas with limited ceiling height.

JAMCO Horizontal Sliding Door
Heavy duty lightweight door for smooth, easy operation. Spring assist opening. Saves space in vestibules, corridors, loading docks. Compact overall dimensions facilitate installation on existing openings.

JAMCO Industrial Doors have these special advantages:
- extremely lightweight—only 2" thick
- greater thermal efficiency than 12" masonry wall
- fully gasketed
- aluminum or steel finish
- manual or power operation

Write for latest bulletin describing new line of JAMCO Industrial Doors to Industrial Door Division, Jamison Door Co., Hagerstown, Maryland.

*Trademark of Jamison Cold Storage Door Co.
a new dimension in the store front field...

A TRUE DESIGNER'S MATERIAL. Mapes' new porcelain on aluminum Shadopanels create a multifaceted design which has a sculptured appearance. Changed by every shift of light and shadow, Shadopanel installations are always distinctive—never static. Use these versatile panels for • wall facing • as penthouse type enclosures to screen air conditioning and piping • to add height in creating new building lines during remodeling (see pictures at right). Choose from six standard patterns. Create your own special pattern at moderate extra cost. EASILY INSTALLED. Mapes' simple aluminum framing system allows Shadopanels to be easily adapted to almost any building configuration. No heavy equipment needed. Minimum store traffic interruption. COLORFUL AND DURABLE. Shadopanel's porcelain on aluminum finish won't chalk or fade. Will remain bright and fresh indefinitely. Can be drilled or cut on the job. Your choice of 18 fresh, modern colors. Your special color matched at moderate extra cost. AMAZINGLY LOW-PRICED. Mapes' special system of production forming makes Shadopanels competitive with painted materials and up to 50% lower in price than other porcelain finished facing materials.

Shadopanel (patent pending) is marketed through the Glass and Store Front Industry by:

mapes & co. Division of mapes industries, inc.
Box 2067, Lincoln, Nebraska 68501
For more data circle 40 on Inquiry Card
Office furniture is an important design element. Judge it critically. Make sure it measures up to your standards of functional design and attention to detail. Make it Art Metal's 500 Group. Designed by Knoll. It's crafted for enduring beauty and utility, perfect in every respect to support the integrity of your design.

For more data, circle 41 on Inquiry Card.
Built with the strength and safety of *SPA Southern Pine

Wood-decking on Southern Pine laminated beams forms the roof structure of Northline Elementary School, Houston. This modern design contributed to four prime objectives of the School Board:

- Simplicity and integrity of structure
- Low construction cost ($9.79 per sq. ft.)
- Minimum maintenance
- Stimulating environment for learning

Northline is the first of five new elementary schools using pre-seasoned SPA Southern Pine among the eight newest in Houston. They are briefly described by Deputy Superintendent Glenn Fletcher as “the most forward-looking, functional and attractive elementary schools ever built in the Houston District. We feel that, on a long range basis, they give promise of efficiency and economy in operation and maintenance, and compare most favorably with buildings using any other structural materials.”

SPA technical consultants are available to discuss specifications and uses. For their services write: Southern Pine Association, AR-I, P. O. Box 52468, New Orleans, Louisiana 70150

For more data, circle 42 on Inquiry Card
Power that moves when people do

(BUILT-IN WIRING FLEXIBILITY WITH NATIONAL ELECTRIC FLUSH-TYPE HEADERDUCT)

Buildings are never "out-of-date" electrically with National Electric raceways. National Electric Flush-Type Headerduct combines with cellular steel floors to provide an integral wiring system that places electrical outlets in any square foot of floor space. Office arrangements can be easily changed. Wherever a desk is placed, electric service is immediately available. Telephone, office electrical equipment and communication outlets can be added without costly electrical alterations and inconveniences. Present and future electrical requirements are assured during the lifetime of the building.

National Electric Flush-Type Headerduct comes in various widths with unlimited compartment arrangements to provide segregated service within the raceway. An attractive, functional line of service fittings is also available. For more information write for our Headerduct Systems Catalog, No. 700. Electrical Division, Room 432, Porter Building, Pittsburgh, Pa. 15219.

PORTER ELECTRICAL DIVISION
H. K. PORTER COMPANY, INC.
Durable coating based on Shell Epon® resin beautifies 250,000 square feet of Baltimore Civic Center


Low maintenance coating of Epon resin selected for appearance and long service in one of nation's largest epoxy coating applications.

Interior walls throughout the $13,000,000 Baltimore Civic Center are finished with Farbo-Tile®, a tile-like coating based on Shell Epon resin. The coating was applied to an average thickness of 30 mils, in six colors. This coating gives the concrete block walls an eye-catching finish that will last for years. It can be cleaned easily and resists marring, scratching and attack from chemicals and solvents. Colors won't fade.

How coatings were applied to concrete block
The first coat was applied by brushing. Within 48 hours, following inspection and touch-up, the final coat in the specified colors was applied by airless spray. Because the coating of Epon resin is easy to clean and resists abrasion, the job was done while other construction was still in progress.

Mail the coupon below if you would like to be referred to a supplier of tile-like coatings based on Shell Epon resin.

*Farbo-Tile is a formulation of the Farboil Co., Baltimore, Md.

Mail the coupon below if you would like to be referred to a supplier of tile-like coatings based on Shell Epon resin.

For more data, circle 44 on Inquiry Card
Chances are you've never met the client who selected engineering counsel on an "or equal" basis. Nor are you likely to. It's no way to choose professional advice. So perhaps you understand our dismay when water softening systems are selected that way. Like you, we haven't met our "or equal" lately. If we did, it would be clear that the last 15 years were a waste of time and money. We've used our professional skills during that time to be sure Bruner equipment stayed ahead of the pack...to be sure we were a step ahead of the "or equal" category. That's why the man who writes the water softening equipment specifications is doing himself and his client a service when he specifies Bruner. Everyone ends up happier in the long run. A few of the reasons are documented below:

Exclusive Bruner-Matic control center assures high flow rates with unusually low pressure drop. Single control unit. No external brine injectors, butterfly controls, complicated valve systems, separate timers. Much less to go wrong.

The heart of every water softening system is the pilot valve. Bruner's compact pilot is crafted like a fine watch. Gives great flexibility with "Push Button" or "Fully Automatic" options as standard. Manual regeneration possible by simply rotating dial by hand.

Ready to install when it arrives. Every Bruner softener is shipped as a complete package. No unpleasant surprises, no complicated engineering, no puzzles to untangle.

BRUNER WATER SOFTENING SYSTEMS: UNEQUALLED FOR HOSPITALS, SCHOOLS, RESTAURANTS, LAUNDRIES...WHEREVER THERE IS A NEED FOR A DEPENDABLE SUPPLY OF SOFT WATER

For more data, circle 45 on Inquiry Card
FLIP-TOP STORE-AWAY TABLE
Just a flick of the finger releases top for quick, easy store-away. Available in choice of finishes and latest CHF base designs.

CHICAGO HARDWARE FOUNDRY CO.
North Chicago, Illinois
Showrooms in all Principal Cities

For more data, circle 74 on Inquiry Card

No other glass stops sound like ACOUSTA-PANE†

For Enduring Charm . . . Specify
Architectural METAL WORK by Fiske
Aluminum, Bronze
Stainless Steel and Iron

J. W. Fiske ARCHITECTURAL METALS, INC.
113-115 Pennsylvania Avenue, Paterson 3, N. J.

For over 100 years, Architects have relied upon Fiske for the widest choice of artistic designs, materials, craftsmanship and dependability. Now, more than ever, Architectural Metal Work by Fiske . . . in Aluminum, Bronze, Stainless Steel and Iron . . . represents the finest obtainable.

Write for our catalog of designs or send blueprints for quotations.

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amerada
GLASS CORPORATION
3303 South Prairie Avenue
Chicago, Illinois 60616

†PATENT PENDING

For more data, circle 75 on Inquiry Card
MULTI-DISCIPLINARY SPACE STRESSED FOR THE CAMPUS

The problems involved in university building expansion were discussed at a symposium held in New York City, November 2, sponsored by Walter Kidde Constructors, Inc., and attended predominantly by college administrators.

Speakers were Dr. Samuel Halperin, director of Legislative Service for the Department of Health, Education and Welfare; Dr. Howard E. Page, division director, Institutional Programs, National Science Foundation; Edwin F. Hallenbeck, director of Institutional Research and Planning at the University of Rhode Island; Robert L. Geddes, A.I.A., of Philadelphia; and Frank L. Whitney, president of Walter Kidde Constructors, Inc.; Ronald W. Haase, architectural associate, Educational Facilities Laboratories, Inc., was moderator.

Discussion at the symposium indicated the flexibility needed in campus planning.

"There is definitely a trend," Mr. Haase said, "particularly on the part of small campuses and in the larger campuses, which is realizing that its bigness must be broken down into more comprehensible units, to multi-disciplinary space. We begin to think not in terms of the physics building, the chemistry building, the mathematics building or the geography building, but in terms of multi-disciplinary spaces. The architects of Southern Illinois University, Hellmuth, Obata & Kassabaum, are designing laboratory equipment which consists of component parts which can be put together in various combinations to serve the particular disciplines that may be using the space. Other universities are expanding this concept of multi-disciplinary space as they begin to group their facilities by function, rather than by discipline." An example given was the University of Chicago with its high-density, high-activity classroom and lecture spaces concentrated on the center of the campus and low-activity, less trafficked spaces on the perimeter. The University of Cincinnati is doing the same thing vertically.

The increased attention given to equipment which goes into buildings, from higher education to pre-school centers, with particular emphasis on electronic devices and less upon the plant in which they are housed, was also identified as a trend.

Robert L. Geddes, A.I.A., partner in the Philadelphia firm of Geddes, Brecher, Qualls, Cunningham, presented suggestions on the search for architectural compatibility on the campus: the idea that it is not only the buildings themselves, but also the space between them—and their cohesion—which sets the tone of the campus.

Mr. Whitney applied the concept of "contributory planning" in his discussion of the design of university science and research buildings. He showed how some of the lessons his firm had learned as designers of research facilities for industry apply to many of the problems universities face. Among problems encountered were buildings which seem to be designed and built with a complete disregard for the research that was to be conducted in them, materials which seem to be out of economic perspective, mechanical installations planned in such a way that it would be impossible to modify or expand the building for future needs, except at prohibitive cost, and space layouts leading to inadequate work space and poor circulation patterns.

For more data, circle 77 on Inquiry Card

Construction Details
for LCN overhead concealed door closer installation shown on opposite page
The LCN series 2010CP closer's main points:
1 Efficient, full rack-and-pinion, two-speed control of the door
2 Mechanism entirely concealed in head frame and top of door; arm shows when door opens, is hidden when door is closed.
3 Hydraulic back-check cushions door if thrown open violently, saving door, wall, etc.
4 Hold-open available at 75, 85, 90 or 95 degrees setting.
5 Closers are made for heavy duty and long life

For more data, circle 77 on Inquiry Card
Modern Door Control by LCN

Closers concealed in head frame

Restaurant on John F. Kennedy Memorial Highway near Newark, Delaware
W. Ellis Preston, Architect

LCN CLOSERS, PRINCETON, ILLINOIS

Construction Details on Opposite Page
WHY CALL AMERICAN LAUNDRY MACHINERY FOR PLANNING ASSISTANCE?

BECAUSE ONLY AMERICAN OFFERS ARCHITECTS SINGLE SOURCE RESPONSIBILITY

One source for laundry department survey engineering, floor plan layouts and detailed specifications.

One source for laundry equipment of every type and size. With the long life of American equipment this can be extremely important five or ten years after a job is completed.

One source for factory supervision of all equipment installation, including wiring, piping, steamfitting, etc.

One source for continuous repair parts service and field engineering service for the life of the equipment, anywhere in the country.

Architects we have worked with find this sort of laundry planning assistance invaluable. (A list of these firms is available upon request.) Why not call American today? Our offices and representatives are listed conveniently in the Yellow Pages.

For more data, circle 78 on Inquiry Card
You can be sure that when Tru-Glaze is used, someone anticipates rugged living in its vicinity. Certainly a new elementary school fills that bill. Here, Tru-Glaze was used in the corridors, locker rooms, showers and gymnasium. (Can't you see those troops of six to twelve year-olders charging through?)

Tru-Glaze makes sense: it provides a tile-like surface for so much less than the cost of tile. It's a permanent, vitreous-glazed surfacing system, including a filler coat based on a patented water proofer, that makes it ideal for use on masonry. And especially great in the shower!

Once again, benefits resulted from the services of the Man from Devoe. He helped in many ways—supplying data on paint performance and costs, helping in color selection and with special formulae. There are many other ways the Man from Devoe can help—so for your next job, write or phone the nearest Devoe office to contact him.

Gertrude Scott Smith School, N. Aurora, Ill.; Architect: Robert F. Mall, Aurora, Ill.; Painting Contractor: Thacker Painting & Decorating Co., Inc., Aurora, Ill.

The "egret" white and light brown, used in the shower-locker room area, and the "Bali" blue and "mountain ice" white used in the corridor (right) are among more than 1000 colors available in Tru-Glaze.

For more data, circle 79 on Inquiry Card
AMELCO WINDOWS WITH NEW
control heat · light · sight
Only in office buildings like the prestige Banco Popular in San Juan, Puerto Rico is there so much control of heat and sound... such instantaneous control of light and sight.

Only in Amelco windows with the new inter-pane blind system by Flexalum do you find a noise reduction of 50%, a solar heat gain reduction of 65%, instant control of daylight or view and a blind that's concealed when raised and without room blind cords.

Amelco windows are dual glazed with a 2" air space in between and have complete thermal breaks in vents and frames closed off by super-efficient weather seals. While Amelco windows are virtually dust free, they pivot horizontally and open for ventilation and "inside the building" cleaning of all glass surfaces.

Mounted between the 2 panes of glass is the narrow-louver Flexalum aluminum blind. It has a Flexalum Mono-Control with cable tapes that are virtually invisible from a few feet away.

For more information on the blind system write:
FLEXALUM DIV., Alcan Aluminum Corp.
111 West 50th Street, New York, New York

For the full story on Amelco windows contact...
AMERICAN ELUMIN CO., 1676 Commerce Dr., Stow, Ohio

QUICK FLEXALUM BLIND FACTS
Built-in narrow louver aluminum venetian blind between panes of glass... virtually dust free... blind is concealed in top channel when raised. Flexalum Mono-Control brings control of blind within easy reach on tall windows. Control is extended crank to 'tilt' blind and to raise and lower. "Direct Drive" linkage assures fast, easy positioning of blind.

QUICK AMELCO FACTS
Double glazing... 2 panes of glass enclose 2" air space. Thermal breaks in vent and frame... no through metal. Finish and material... heat treated anodized and sealed aluminum alloy ("100") min. thickness. Sizes... available in sizes to 7' high and 10' wide not to exceed 46 sq. ft. per window. Horizontal pivoting, permits ventilation and cleaning of all glass surfaces from inside the building.

Banco Popular
Project Manager: Cushman & Wakefield Inc., New York, New York
Renting and Managing Agents: Cushman & Wakefield of Puerto Rico, Inc.
Architects: Toro-Ferrer/Kahn & Jacobs
Space Planning: JFN Associates De Puerto Rico, Inc.
Foundation Contractor: Rexach Construction Co.
Superstructure: Geo. A. Fuller of Puerto Rico, Inc.
Amelco Rep: Lorenzo A. Cruz & Associates, Puerto Rico
Brodsky-Norris Corp., New York

For more data, circle 81 on Inquiry Card
BUILDING COMPLEX HAS OFFICE-HOTEL

Chatham Center in Pittsburgh, designed by William Lescaze, architect, will include a 19-story apartment tower, a nine-floor commercial office building with a nine-floor hotel atop a glass “sky lobby,” a 650-seat theater, a 2,200-car garage area, a gasoline service station and a completely landscaped plaza. Associate architect is Harry H. Lefkowitz, and the general contractor is the Diesel Construction Co., Inc. Landscape architect for the project is Robert L. Zion.

The apartment tower (above left), faced in pearl gray brick, will have one floor housing professional suites for doctors and others, and 18 floors of apartments.

The office building-hotel facade will have a black aluminum skin covering for the first nine floors. The first floor will house a bank, restaurant, commercial stores and showrooms. The next eight floors will be for offices.

On the 10th floor will be a glass “sky lobby” for the hotel which will occupy the remaining nine floors. The facade of the hotel stories will be finished in gray brick.

The hotel will contain 330 rooms, some of which are suites, some separate rooms, with all sorts of combinations available. Patrons may park their cars in the underground garage and register electronically, receive their keys and go to their rooms without having to enter the lobby.

Both the apartment tower and the office-hotel will afford views of the plaza area which is located on top of the 2,200-car garage area. Cascading water will flow over a fountain mound of granite cobblesstones.

FOR OFFICE AND INDUSTRY

Distinctively styled, with more dependability and higher efficiency than any Intercom ever developed ... yet sensibly priced. Meets every Intercom need of office and industry. Proportioned like a book to lie flat on the desk ... only 3 inches high. Combines the look and feel of fine grained leather with the strength and rigidity of steel. Beautifully finished in charcoal gray with brushed chrome side panels.

- Chief and Chief Redi-Power Universal Systems, with normal and reserve high volume. Up to 20 watts when and as you need it.
- Deluxe Systems. Low-cost Intercommunication for use anywhere.
- 12-Station Selective Wireless System, featuring 6 separate 2-way conversations and Selective Paging with reply.


IN APARTMENT HOUSES . . . Provides instant and direct 2-way conversation between any Apartment and Vestibule in buildings of any size. Whispers, shouts and normal voice are heard clearly under any conditions. Greater performance with these exclusive Talk-A-Phone features:

- Ample volume without “boom” • Automatic privacy • Individual volume selection for each apartment • Built-in buzzer • Naturalness of tone • Simplicity of operation.

IN THE HOME . . . everyone in the family will enjoy the comfort, convenience and peace of mind this Talk-A-Phone Home Intercom-Radio System provides. From any room you can: • Listen-in on baby, children or sick room • Answer outside doors without opening doors to strangers • Talk to anyone—upstairs and downstairs, inside and out • Enjoy radio in every room with the simple flick-of-a-switch. Distinctively styled. Beautifully finished. Easily installed.

Send for Free Catalogs... Dept: AR-1

TALK-A-PHONE CO., 5013 N. Kedzie Ave., Chicago 25, Illinois

For more data, circle 82 on Inquiry Card
This stressed-skin roof system clear-spans 198'...with a dead load of less than 10 lbs. per square foot

This is Europe's largest clear span structure...198' without column, post, or beam. It's the Motta Candy Factory in Verona, Italy.

The roof, fabricated in the United States, is composed of parallel chords of steel panels, stressed to serve as load-carrying members. These panels are connected by a lightweight system of specially shaped struts. Between them, electrical conduit, mechanicals, and insulation are hidden from sight. The bottom chord, shown above, will be simply painted for an attractive, finished ceiling.

This is called the Dubl-Panl structural system...rapidly gaining in favor around the world because architects and engineers like its simplicity...like the way it makes wide column-free construction so practical...like the way it speeds field erection with bolt-together assembly.

Similar arched spans can reach over 1000'.

A complete technical manual, requested on your letterhead, is available from the Behlen Company. May we send it to you?

* Roof of the Motta Factory was designed to a live-load requirement of 30 lbs. per square foot. Actual roof size is 198'10" wide, 527' long.
Take solid, kiln-dried wood members of select fir, join them closely and securely with pre-stressed steel cables. Result—a solid wood partition that divides space beautifully—a wall engineered and built to withstand rough treatment. Coils away in its own unique coil box requiring minimum storage area. Coil-Wal may be curved or straight; small or large. (Single sizes as large as 150 ft. wide by 30 ft. high.) Turn a key and electrical operation moves Coil-Wal on or off its job of sub-dividing any large area for any purpose.
modernfold
 Coil-Wal
 Wood partitions

Wood-Wal — newest from the
makers of Modernfold. Perfect for
division of gymnasiums or
auditoriums into smaller, usable
spaces. Ideal as protective
barriers in heavy traffic areas, too.
For complete specifications,
consult your nearby Modernfold
distributor. He is a
partitioning specialist.

Woodmaster — adds the warmth and
beauty of satin-smooth walnut, oak,
mahogany or birch hardwood paneling
to instant space division.

Soundmaster — in exclusive new heavy duty vinyl
—a myriad of textures, colors and pattern com­binations. Seals off sound as it divides space.

Acousti-Seal — carries a Sound Transmission Class of 51! (Geiger & Hamme
Test NC-27 FT) Makes flat surface wall
division practical for classrooms, audio­visual rooms, or other critical sound
interference conditions.

Modern-Cote — By utilizing Modern-Cote vinyl wall covering with
Soundmaster or Acousti-Seal, you can contrast or harmonize with any color
scheme. Ends many wall maintenance problems.

NEW CASTLE PRODUCTS, INC.
Dept. A2135, New Castle, Indiana
Please send full information on the complete line of Modernfold
operable walls, and the name of nearest distributor.

Name: _______________________________
Firm: _______________________________ 
Address: ____________________________
City: __________________ State: _________

For more data, circle 84 on Inquiry Card
As an example of what Mahon can do for you, let's see what its Building Products Division recently did for a noted Texas architect.
He was planning a school.
The School Board wanted air conditioning. But at a
cost that was out of the question with conventional
air circulation systems.
The architect "bucked" the problem to Mahon. And
Mahon suggested using its new and unique Mahonaire
Ceiling System—a system in research since 1958.

This Mahon idea worked.
The use of a 7.5-in. deep Mahonaire cell system squeezed
overall requirements down 180,000 cubic feet. It gave the
architect quiet, uniform air distribution and diffusion. It
saved $1.25 per square foot.

Mahon is ideas in building equipment. When you have
a tough construction problem, "buck" it to Mahon for
an idea that may save you space, time, money. Write . . .
The R. C. Mahon Company, 6565 East Eight Mile Road,
Detroit, Michigan 48234.

For more data, circle 83 on Inquiry Card
NEW...
Beauty in a flooring that lasts and lasts!

The chips go all the way through in Royal Stoneglow the new vinyl asbestos tile from Ruberoid that combines rugged durability with downright beautiful looks. The flowing stone pattern just can't wear off—can't wear out. It resists scuffing and denting. So tough is Ruberoid's new Royal Stoneglow, that it gives beauty that lasts and lasts no matter how heavy the traffic.

Royal Stoneglow is available in 5 glowing colors, size 12" x 12", 3/8", and 3/4" gauge. For more facts, call your Ruberoid representative or write to us.

RUBEROID FINE FLOORING • 733 Third Avenue, New York, N. Y. 10017

For more data, circle 86 on Inquiry Card
Pennsylvania Slate adds dignified splendor to a segment of the walls of the free-standing circular St. Lazarus Oratory in the Diocese of Pittsburgh.

Over 30 feet in diameter and 18 feet in height, this slate segment acts as a backdrop for the Altar, complementing the stained glass and tempered glass walls and doors which allow the sanctuary to be opened 270°. Pertinent scriptures are incised on the outside of the slate.

Approximately 1400 sq. ft. honed finish slate was used. Each slab was cut to a 15'-4" radius, and all dimensions were held to close tolerance.

Myriad design and structural advantages are inherent with Pennsylvania Slate. A brochure outlining these innumerable possibilities will be mailed upon request. Specific inquiries invited. The Structural Slate Company, Pen Argyl, Pennsylvania 18072.

For more data, circle 87 on Inquiry Card
Powers new thermostats have a faster response than any other pneumatic thermostat on the market. 'Decorator styled', they can be installed horizontally or mounted vertically on narrow mullions.

Cover styles available
- Plain cover
- With or without thermometer
- Exposed or concealed adjustment
- Exposed or concealed set point

Models available
- Direct or Reverse Acting
- Day/Nite
- Heating/Cooling
- "In Wall" Aspirating

For more data, circle 88 on Inquiry Card
Incor 24-Hour Cement

Lone Star Cement Corporation, New York, N.Y., 1967

Cement—America's first—was used exclusively.

The structure is composed entirely of prestressed concrete, and in good scale... to express a structural form in a pleasing and direct manner... to keep the lines and shapes familiar, thin and in good style... to give a graceful, almost delicate appearance, but a highly functional... Architect Whitney Yamashita used prestressed concrete in a

SHUDE CONCRETE PRODUCTS, INC., Indianapolis, Indiana

CO. Indianapolis, Indiana. Precast, Prestressed Concrete Members:

Butler University Library, Indianapolis, Indiana: Architects:
"People Involvement," Research, Planning Teams, Economy and Regionalism Dictate the Designs of CAUDILL, ROWLETT AND SCOTT

"The most important thing that shapes our architecture is 'people involvement'." William Caudill's insistence on the involvement of a large team of people (including the clients) is thus stressed as the major continuing factor among the diverse approaches to design of Caudill, Rowlett and Scott. A significant result is probably that the differences of any given program, site or region are given preference over any consistency of personal or current style. Caudill explains:

"We believe that many people should be involved in the design process, particularly if they are the users of the building. As a matter of fact, we insist that at least some of the users of the building be a part of our planning team, not only in the programming aspects but during the period of conceptual design.

Communication as the Key

"The key to this approach is communication. But communication must have a broad meaning. It is being direct and frank with people. And when you can successfully do that, you have a good chance to produce a direct and frank architecture.

"It is neither an easy approach nor an expedient one. But we think it is the best one in the long run, and it just may lead us to an architecture which reflects the democracy in which we live. It carries with it a deep-seated belief that through architecture many people can be helped.

"The quality of ruggedness found in this approach is also reflected in our buildings—no namby-pamby architecture. From the beginning of Caudill, Rowlett and Scott, we have not been able to separate our process from our architecture. Our process of on-the-spot design—which is now an established institution in our firm—unquestionably has had its effect on our structures. For example, if we send a team to the mountainous regions of Colorado to design a building on the spot, there's a lot better chance of achieving an indigenous flavor than if we were to design the building in Houston.

"Formula" for Design

"Our 'formula' for a building is this: take a client, teach him to speak architecture and make him part of your team. Add technologists as well as designers to the team. Condition the reflexes of each of the members to absorb and accept ideas. Then go directly to the site and mix them up in a group. Of course, there must be strong leadership, plus plenty of imagination, as well as competence and skill, to pull off one of these things. And even more important, there must be the freedom of choice for using analyzed elements which seem capable of giving architecture a strong art form. Again, it is people involvement, but with strong architectural leadership. Most certainly we want no 'voting design'. Group action must be led by a strong designer with outstanding leadership, quality and creativity.

"Architecture is more than a reflective art of
The Role of the Observer

"Another thought with which all our partners agree is that architecture belongs to everybody—to the pedestrian who goes to market in one of the great shopping malls; to the tired businessman who, during his 30-minute drive from office to home, appreciates or detests the building groups along the thoroughfare; to the family which worships in the local church; and to the home owner who has to look across the street.

"Also, it cannot be crated and shipped to another site, another climate, for another function of another client. Since we are now practicing in 24 states and five foreign countries, the conditions are so diverse we must have diversity in our architecture. Every one of our clients has a different site, a different set of building problems, and different space requirements. Each building must respond to its own program.

Three "Commitments"

"What are our commitments? Let me sum up with our major three:

1. The Problem-Solving Approach. In some circles this is a nasty phrase. It is not with us. The practice of architecture has to do with solving problems of other people and using their money to do it. It's a big responsibility. We think a thorough architectural analysis is the prelude to better architecture. We know inspiration is derived from programing and clarification of problems. To us, programing is a creative process, and we will admit we sometimes program with a prejudice. But we know that better buildings can be designed if they are conceived in terms of thorough analysis and research.

2. The Team Concept. In this day, the 'whole architect' is having a difficult time. The increasing complexity of buildings and machines is making it impossible to know everything about technology, management and design. In order to achieve depth in any of the many facets of architecture, some of us must specialize. Our firm is a team of specialists and consequently we are not geared to do small work. But we still do occasionally, just to see if we can.

3. Architecture is for People. Without people, architecture is sculpture, a miniature art, in comparison to an artistic, functioning, economic, living structure for human habitation."
This handsome new center for the performing arts is planned to make an “event” of going to the theater. CRS partner, Charles E. Lawrence, comments that: “In the beginning we established the belief that going to a performance means more to people than receiving and responding to the art performed. It is a total experience and includes the pageantry that takes place before curtain time, during intermission and even leaving the hall. It also had to be a multi-purpose, multi-form performing arts hall, and provide the proper theater economics, acoustics and visual character for each of the arts. As planned, the form ranges from a concert hall with 3,000 seats and a 1.9 second reverberation time to a theater with 1,800 seats and a 1.4 second reverberation time. Because of the size of the site, we created the big foyer-lobby to one side of the hall, and continental seating with side entrances made it workable. Terraced lobbies which serve the various seating levels wrap around the hall. Outside, a protective verandah is defined by a classic cage of travertine. This is mainly a night building, with lighting a major design tool.”
JESSE H. JONES HALL
FOR THE PERFORMING ARTS

"As a concert hall, the walls and ceiling of the orchestral enclosure are visual extensions of the walls and ceiling in the hall, so that orchestra and patrons sit in 'one room.' The orchestral enclosure is segmented, hinged, and motorized to convert the space behind the proscenium to a full stage with fly loft. The reduction of seating capacity and volume of the hall (to reduce reverberation time) is accomplished in three steps: (1) lowering of the ceiling panels eliminates the top balcony; (2) operable vertical screens conceal the mezzanine; (3) similar screens blank out the last five rows of orchestra seating. With continental seating, all active rows are still accessible from the side entrances. Walls will be teak, upholstery red. Since the hall will serve many kinds of performances, a number of lighting environments will be programmed on punch cards, which will put the lighting through a series of evolving changes to help set the mood before curtain time. Light will wash all outside walls."
Theater arrangement for 1,800

Concert Hall arrangement for 3,000
The free-form, sculptural shapes of this building reflect a bold effort to solve the problems of a particular site and region. CRS partner, Franklin D. Lawyer, points out that: "This is a directional building which faces the Rocky Mountains, and turns its back on the noise, fumes and commercial development along an adjoining eight-lane expressway—except for one slit opening to let people know there is life behind the great wall of local stone. The building is as unique in its functions as it is in its appearance. It combines a professional building with commercial offices, an embassy, a conference center and a home office building. It houses research activities, public relations and public education services for over 19,000 persons and organizations. Facilities are divided into two elements: a four-story office building and a one-story conference center connected by a foyer. Loft spaces in the office block are readily convertible, and the conference center has nine partitions to change it from six halls into a big one for 300. Circulation balconies add sun protection for the air-conditioned interiors."
BOLD OFFICE TOWER OF CELLULAR BRICK PIERS

Benjamin Franklin Office Building, Houston, Texas

OWNERS: Benjamin Franklin Savings & Loan Association and Cockrell-Bellows Interests

ARCHITECTS: Caudill, Rowlett and Scott

STRUCTURAL ENGINEER: Walter P. Moore

MECHANICAL-ELECTRICAL ENGINEERS: Bernard Johnson Engineers, Inc.
This powerful, brick-columned tower is the first urban high-rise office building to be designed by Caudill, Rowlett and Scott. CRS partner, Thomas A. Bullock, states that: "We set our objectives early: the building should be aggressive, direct, free from the superfluous. It must also have economic success as an investment tower, as well as a home office building. A computer was programmed to calculate the optimum size building for the greatest investment return; this was reached in the 29- to 33-story range. The space was divided with parking underground, home office space at the base, rental areas above. By developing a cellular structure to transport the air system, we created deep vertical elements of a dark brick, which inherently provide shade from the hot Texas sun. Single horizontal sheets of glass are set in gaskets between columns. A cornice has intake and exhaust nostrils punched through the lintel. At the base, glass walls are set back to create a colonnade, and floors and walls are white marble. From an angle, the tower face will look solid; in front, it opens to show the glass."

ARCHITECTURAL RECORD  January 1965  119
The laboratory wing of this science building achieves a high degree of flexibility by wrapping mechanical services around interior spaces. CRS partner, C. Herbert Paseur, comments that: "It is a 'grasshopper' chase wall—an exoskeleton architecture, with load-bearing brick walls and post-stressed concrete beams—providing column-free, convertible space. Like the skin of the grasshopper, a perimeter chase of the wall contains the vital functions. The dozen systems for heating, lighting, ventilation, gas, power and science utilities are available at the application of a screwdriver to the asbestos cement panels of the inner skin. At least 30 of the scientists who would use the building were brought into the research and analysis for the design. Careful but limited use of pierced windows simplified mechanical problems and helped give the building an indigenous quality both in keeping with the region (snow, glare, wind and temperature fluctuations) and with the older buildings on the campus (massive, thick walls and deep windows). While the large wing is utilitarian, the smaller one for lecture hall and lounge is carpeted and enclosed in glass. Costs came to an economical $16.26 per square foot."
SCIENCE CENTER EMPHASIZES BOLD STRUCTURE

Science Building, University of Miami, Coral Gables, Florida
ARCHITECTS: Caudill, Rowlett and Scott
ENGINEERS: Dignum Associates
In this Florida science center, a forceful concrete structure integrates a flexible mechanical system, and provides protected but open circulation. Economy and expansibility in two stages were major requirements: a four-story unit for zoology, and a later addition for physics and botany. CRS partner, Wallie E. Scott, states that: "The simplicity of this science center lies in the synthesis of structural and mechanical parts into one modular system. Concrete beams run longitudinally, supported by concrete girders and columns at 42-foot intervals. Space between beams of adjoining bays creates a partially concealed distribution raceway, including a double duct, high velocity mechanical system. Eight structural piers contain the main supply ducts. Partitions are movable filler walls of 6-inch concrete block with metal inserts. The only penetrations of the solid exterior are finger corridors off balconies on each floor; new units will be linked at these upper floors. The first floor contains lounges and lecture halls. The cost per square foot is about $20.50 including equipment." The sketch (above) is of the final complex.
A somewhat different type of college community is envisioned in this plan for a new campus. CRS partner, John M. Rowlett, says that: “The contention that quality architecture and construction economy would be achieved if the complete plan for the campus were known, and the curriculum used as the core for planning, is manifest in the campus plans for Denison. The key was space planning rather than room planning. Man is a gregarious creature. He organizes himself along streets. What could be more appropriate for a Western Iowa town than a college campus that is Main Street? There is no zoning in the traditional sense—the academic avenue is an integration of residential and academic functions, with the accent on aliveness, human scale, the motion of pedestrians. The buildings ramble along each side thrusting silhouettes up from the hill crest site. The street, 2,000 feet in length, meanders, narrows down, then widens into a court. The space will expand and withdraw along the street behind enclosures against weather, into places where people sit and talk, eat or study, work in labs or wait before classes. The emphasis will not be on buildings, but on the experience derived from the total environment.”
An early stage of development of the campus

Master plan for future expansion
DENISON COLLEGE, IOWA

"As the college construction progresses, the street will lengthen as it expands laterally into byways for services and recreation. The first buildings will be the administration building and two dormitories. The administration unit will house an auditorium, classrooms and offices. Dormitories will have living and dining facilities for 448 students and classroom space for 600. Instead of a day college of classrooms and a night college of dormitories, the two will be combined. Social rooms will double for seminars, public lounges will serve for tutorials, dining rooms will be divisible into lecture halls. This total flexibility means reduction of required construction space and lower maintenance over the years. During the first phase, the library facilities will be decentralized with the reference library in the administrative unit."
COLLEGE PLAN A CLUSTER PATTERN

Architects Meathe & Kessler, with site planners Johnson, Johnson & Roy, make the most of a pattern of ravines in designing a brand-new college in western Michigan, overlooking the Grand River.

The design idea for Grand Valley State College—a completely new institution near Grand Rapids—is to construct a system of satellite colleges on the finger-like plateaus surmounting the wooded ravines characteristic of the unusual site. The master plan also calls for a central administrative and academic core; and (on level ground) a service center, athletic fields and room for expansion. The first stage of construction—one satellite group—is now complete, and is pictured below. The master plan (next page) includes the necessary physical facilities for an eventual enrollment of 10,000 students, many living on campus.

Residents of an eight-county area sparked the development. They acquired the spectacular 770-acre site on the Grand River, and raised one million dollars—which the state then matched—and work was begun. Adrian Languis, F.A.I.A., director of the Buildings Division for the state, was helpful in conveying to the College Board of Control the importance of a definitive master plan and of good architectural design.
THE MASTER PLAN

The nature of the site and some advanced ideas about the learning process weighed heavily in the development of the master plan, shown at left. The campus lies 14 miles west of Grand Rapids, and will serve an eight-county area. Many students live within 30 minutes driving time. For the present, all students will commute; dormitories come later in the building program. The site is penetrated by a series of deep, heavily wooded ravines reaching westward from the Grand River (bottom of plan). The remainder of the site is level, essentially a plateau overlooking the river. The finger-shaped islands—each 20 to 40 acres in extent—that reach out between the ravines take on the character of flat open spaces ringed by trees. The satellite colleges are grouped on these land fingers; each satellite consisting of three learning centers dispersed about a collegiate center, or student union. The four buildings of the first satellite group (circular detail plan) are finished and shown on the following pages. Foot bridges over the ravines will join the satellites and, in turn, the core of the college and the satellites. The core—in the central area of the site—will include the library, labs for science and the arts, administration and auditorium. Athletics and field house will occupy a level area slightly to the west; the service center is on the boundary highway (right edge of plan).

The campus is approached from three directions, all leading to the main campus drive—a curving, boulevarded road which serves as the spine of the plan and reaches all principal building sites. Student parking lies outside this drive; faculty parking within. Pedestrian circulation follows the edges of the ravines, revealing the full drama of the site.
A COLLEGIATE CENTER

The collegiate center will serve as a gathering place for the students and faculty of each satellite, or sub-college group. The building is appropriately small in scale and informal in character, opening out nicely through glass walls and by way of a series of stepped terraces to the wooded ravine immediately below. Inside, the spaces center naturally on the huge stone fireplace as a visual and social focal point. On the ground floor, architectural components and furniture are arranged to create a variety of spaces for various uses: dining; small, quiet conversation groupings; general large lounges; areas of more intense activity. Special built-in seating for groups (far left) was designed by the architects, who handled all interiors for the college. Below the ground floor, additional spaces house a bookstore, a large game room, and student activities offices and work room. As a center for large and small gatherings, the building will serve the important function of providing attractive surroundings for the social development so essential in the college experience.

The money required for the construction of the center—not available from state funds—was donated by the Seidman Foundation.

Materials and finishes for the collegiate center and learning centers: exterior finish is precast concrete, painted; partitions are block, plastered; floors are asphalt tile on concrete; ceilings are acoustical tile or plaster; sash and entrance doors are aluminum. The science building—now being built—will have a skin of self-sealing rusted steel; frames of stainless steel for the bronze colored glass; this treatment above a concrete structure from grade to the first floor line.
A LEARNING CENTER

Each learning center is designed to accommodate 500 students and 24 faculty members. To achieve proper character and scale for the site, a building of moderate size, two stories high, was decided upon. A natural division of educational needs into two parts made it possible to devote the first floor to classrooms, lecture halls and faculty offices; and the second floor to library and self-study areas (plans at left). Such an arrangement separates group movement from individual activity.

Emphasis was placed on the use of a variety of audio-visual equipment; not to minimize the role of the teacher, but in an effort to raise the quality and impact of instruction. Equal attention was paid to traditional instruction in classrooms; flexibility of classroom size is achieved by movable partitions to take care of the needs of large and small classes. A large lecture hall is pictured (far left); note the architect-designed ceiling. Faculty offices are located near classrooms in four groups of six each.

The second floor—for individual study—has a central portion with conventional library facilities (plan and bottom photo); and four groups of study desks, lockers, and certain audio-visual aids in the form of carrels, discussed in more detail on the following page.

This building thus expresses in its design two kinds of environment: the first floor introverted and disciplined; the second floor more informal and opening out to the attractive surroundings. The facades express these characteristics: the first floor of stone, with small glass openings; the second floor largely of glass, with slender columns of concrete. The use of natural stone seems proper for the site; the gracefully rounded twin columns impart good scale.
THE STUDY CARRELS

The upper floor of each learning unit houses 240 study carrels, in addition to library facilities. Designed by the architects, the carrels, or cells, are protected from outside noises. Each unit contains two lockers, a desk, drawers, overhead shelf and light, plus built-in audio-visual equipment. General lighting for the area is furnished by troffers throwing light upon the ceiling. Each carrel has a telescopic microphone, a television tube, a telephone dial, two speakers and earphones. Through the use of taped sound and televised presentations of educational material, the student has immediately available a great volume of information and knowledge not otherwise available. The basic idea of such equipment is to encourage student self-reliance; to avoid overdependency on formal instruction and conferences with faculty.
PURPOSEFULLY REGIONAL ARCHITECTURE

Country house by Winston Elting reflects the character of the Pennsylvania countryside.

Joseph W. Molitor photos
The site selected for this house was the highest point of a 60-acre property, with fine views to the north, west and southwest over rolling farmlands. In order to take advantage of these views, a central motor court scheme was adopted with circulation on the court exposures, and all living spaces on the periphery. The clients required a great deal of space, about 14,500 square feet, and the architect said: "The problem was to provide the space without spreading out all over the hillside and at the same time keep the roof line low so that the house would seem to belong to the natural landscape—just to have grown there." It was also important that the house should avoid giving the impression of a large estate. The final solution solves these problems most successfully; the house seems to be an unselfconscious and permanent feature of the countryside and because of the central court, never appears to be as large as it actually is. The relationship of the house to its surroundings is further emphasized by the use of local stone for the walls.
Landscaping around the house provides a number of sheltered patios, paved with bluestone, which provide pleasant extensions of the living areas and take full advantage of the different views. The area around the swimming pool is paved with 4- by 4-inch redwood blocks. The peaked roof of the pool house repeats the angle of the roof of the main building, making it appear as an integral part of the design.

Windows for the second story are accommodated by recessing the stone walls, thus avoiding the need for dormers and the consequent projections from the roof. The exterior walls are, therefore, on two or more planes giving interesting variations of light and shadow. Construction is wood frame on reinforced concrete foundation. Exterior walls are rubble stone gathered from the local fields. The roof is dark gray terne with 2- by 2-inch battens. All sash is aluminum with a dark bronze finish; double glazing is used throughout. Exterior trim is dark stained redwood. Interior trim and doors are white oak.
Country house by Winston Elting
The house was planned for the client, his wife and two small children, with accommodation for two older children who visit from time to time. The master bedroom is on the lower level, but a partial second story above contains the children’s and guest bedrooms. Servants rooms are provided next to the kitchen area, across the courtyard from the master suite. Although the house has a pleasant, informal, rambling quality, the plan is sufficiently compact for it to work very well as a complete unit. Sleeping areas are zoned for maximum quiet and privacy, but have easy communication with the other parts of the house. The two-story living room, large stone fireplaces and sloping roof angles all combine to make this a house which is comfortable and exciting to live in. The house is completely heated by electricity, using wire in plaster ceilings and additional drop-in units where required. Floors are oak and dark gray slate in the living areas, linoleum in the kitchen and vinyl in the bathrooms. Interior walls are stone or sand-float plaster.
The house is approached through rolling farm country, up a gravel driveway and into the motor court which is paved with granite blocks. Careful detailing and meticulous workmanship are important factors in the success of the house, and have contributed to the over-all impression of quiet elegance which it gives.

The architect says that a number of schemes were studied before the final solution was arrived at but “they were for the most part abandoned because they would have done just as well in Oklahoma, Illinois or New Canaan.” The house had to be regional in character and the design philosophy developed along these lines. In the end, Winston Elting said about the scheme: “As far as I am concerned, given the site, the countryside, the character of the client and the materials—principally stone—there was no other way for me to do it.”
Will the Computer Change the Practice of Architecture?

Some New Uses of the Computer Are Suggested at Boston Conference

By Jonathan Barnett

The drawing at the top of the page was made with a computer, and the ability to make such drawings is only one of the new technological developments, which, like it or not, are bound to have a significant effect upon the architectural profession.

During the past year there have been several conferences which discussed the application of these new developments to building construction; but the Boston Architectural Center, an organization which sponsors a curriculum of evening architectural courses, was the first to formally assess the possibilities that the computer will have for architecture. On December 5th, the Center held an all-day conference on Architecture and the Computer; and some 500 architects crowded into the ballroom of a Boston hotel to learn—to the accompaniment of squeals, howls, and stray wisps of music coming from a faulty sound system—what the electronic future might hold in store.

Of course, the computer is by no means unknown to architects, and many operations that require computers, such as critical path studies, have been familiar for some time. What was new to most people present, however, was the extent to which the computer is already a relevant and useful tool for ordinary, every-day problems of architectural engineering. Even more of a revelation were the possibilities of computer drafting, which seem only five or ten years away from general use, and the increased ease and flexibility with which the
"... About a year ago at a conference, similar to this one, sponsored by M.I.T., the community of practicing engineers first learned of a new approach to the use of the computer.

"Imagine that you were told that the computer had been trained like a graduate student in civil engineering, not how to solve special individual problems, but trained in the general classical methods of solving indeterminate structures. Furthermore this graduate student could be talked to in simple English and stood ready to go to work on any problem. All that he needed was a geometrical description of the problem with some verbal requests for the analytical information required. Wouldn't you think that the millennium had arrived?

"Well, in a way, it had. This 'graduate student' is a genie called STRESS, an acronym which stands for Structural Engineering Systems Solver; and it is well named. At that meeting a year ago, everyone present was able in one afternoon to learn the STRESS language and use the computer programed with STRESS to solve a problem of his own choice. Program writing was no longer a necessary step to solve each new problem.

"In retrospect this occasion appears to have been a real breakthrough and its effect on our own practice has been extraordinary. A whole area of engineering activity has been permanently changed . . . ."

— WILLIAM J. LEMESSURIER, BOSTON STRUCTURAL ENGINEER

"... Just imagine the work required to analyze 100 different zones for 24 hours each day of six months. The computer will print out these loads and analyze the hour and month that the maximum coincident load occurs on the building, and the structure and magnitude of this load. This load is further analyzed to determine the contribution of walls, glass, people and solar radiation. We also print out the quantity of air for heating and the quantity of air for cooling by programing a temperature for the supply air. . . .

"The computer, as a tool, can allow the designer the flexibility of prior knowledge and hopefully free him to make significant advances in creation and control of man's living and working environment."

— LISLE G. RUSSELL, CHIEF MECHANICAL ENGINEER FOR THE SYSTEMS ENGINEERING AND DEVELOPMENT GROUPS, WESTINGHOUSE CORPORATION
computer can be used.

To the surprise of some, however, very little time was spent discussing the applicability of the computer to architectural design. In fact, the conference received a stern warning, in a paper by Christopher Alexander of the University of California, that it is possible to fatally distort the nature of design by restating design problems solely for the purpose of using a computer. He reminded the conference that the computer does not become a useful tool until the full structure of the problem is understood, and it is an extremely complex and subtle task to achieve such an understanding in any question involving design.

In an evening panel discussion there was a certain amount of talk about that classic of all computer questions: will the machine eventually outsmart and replace the men who invented and used it? But, in general, those giving presentations at the conference seemed to feel that the computer, by giving the architect closer control over such operations as engineering and drafting, should give him greater control over the design process itself. They see the computer, if properly used, as a means of increasing the architect's ability to produce meaningful design, rather than as a soulless monster that would negate his creativity.

**Master Programs for Engineering**

The morning session of the conference was devoted to a most important innovation that makes computers much more accessible and much easier to use: the development of programs that can be used to solve whole classes of problems. Until recently, it was necessary to write a computer program for each problem to be solved, a cumbersome process that required the services of a skilled technician. Computers require complete explanations for every step of the process they perform, and these must be stated with absolute exactitude—necessitating hundreds of step by step instructions, each coded and punched into a separate card, and a tedious "de-bugging" process to eliminate all typographical and instructional errors. (ARCHITECTURAL RECORD, August 1963, pages 158-161). The result was that a structural or mechanical engineering problem, for example, required so much preparation to solve it on a computer that it simply wasn't worth doing, except in unusual cases.

The availability of the STRESS program (Structural Engineering Systems Solver), explained Boston structural engineer William LeMessurier, has changed the situation completely. Once this program is in the computer's memory, it is possible for it to solve many different types of structural problems; and, as the program has been written so that the machine accepts simple language instructions instead of complicated numerical codes, any engineer can learn to use STRESS after a short training period.

The result, according to LeMessurier, has been to provide his office with a tool which is both subtle and widely applicable. It saves time and frees design from dependence on standard solutions, because the office's ability to analyze complex structures is increased by what LeMessurier considers to be a factor of ten.

Lisle G. Russell, the chief mechanical engineer for the Systems Engineering and Development Groups at the Westinghouse Company, described analogous developments in the field of mechanical engineering. These new programs make it possible to simulate temperature conditions affecting a building at any season, and to rapidly assess the effect of changing the building's orientation or position on the site. Mechanical engineers usually find it necessary to make extensive calculations before they will come up with even a guess about duct sizes and other requirements affecting design. These new programs, written, like STRESS, to accept commands in "problem-oriented language," can be utilized by engineers to give architects quick answers and alternative solutions at early stages in design.

**Computer Graphics for Planning**

The last speaker of the morning session was Howard Fisher of the Technological Institute of North-
"In my opinion the question, 'How can the computer be applied to architectural design?' is misguided, dangerous and foolish. . . .

"A digital computer is, essentially, the same as a huge army of clerks, equipped with rule books, pencil and paper, all stupid and entirely without initiative, but able to follow exactly millions of precisely defined operations. There is nothing a computer can do which such an army of clerks could not do, if given time. . . .

"In asking how the computer might be applied to architectural design, we must, therefore, ask ourselves what problems we know of in design that could be solved by such an army of clerks. . . .

"At the moment, there are very few such problems. Although we speak a great deal about the complexity of problems, the complexity of architecture, and the complexity of the environment, this talk, so far, is rarely more than hand waving. In the present state of architectural and environmental design, almost no problem has yet been made to exhibit complexity in such a well defined way that it actually requires the use of a computer. . . ."

"In a recent study the computer was used to compare different hospital plan arrangements, from the point of view of the total amount of walking done by patients, nurses, suppliers, and visitors. . . . There is no doubt about the technical ingenuity of the simulation. But it is not informative or relevant. First of all, the fact that the computer had to be used, forced the authors to deal with phenomena which could be measured and encoded. That is why they analyzed walking distance and volume, instead of the well-being of the patients. . . .

"Secondly, even if we take the traffic problem seriously, we find that the helpfulness of the computer is only apparent, not real.

"Any intelligent designer could look at the various hospital plans examined by the computer, and could tell roughly what relative amounts of different traffic they would generate. The key word here is 'roughly'. It is unnecessary to know the amounts of walking generated by a plan to the second decimal place, because it is irrelevant—and only has the appearance of accuracy. It is like measuring the size of a cooking apple with a micrometer. Yet it is only in the second decimal place that the computer can do better than the designer's experience."

"It is ironic that the very tool which has been invented to unravel complexities imposes such severe restrictions on the design problems which it can solve that the real source of complexities has to be eliminated before the tool can even get to it. But for the moment that is the situation."

CHRISTOPHER ALEXANDER, ASSISTANT PROFESSOR OF ARCHITECTURE,
UNIVERSITY OF CALIFORNIA
western University. Professor Fisher is an architect and city planner, and he has been using the computer to print out complex statistical information about cities and regions in an easily readable graphic form.

Professor Fisher stressed the fact he had been a novice at computer technology and did not have an extensive mathematical background. Nevertheless, he was soon able to program the computer to make maps that show geographical distribution of various statistical quantities directly from raw data fed into the machine.

In a paper distributed to the conference participants, Walter Gropius asked two questions:

"Will it then be necessary to educate a new profession of architectural assistants for the purpose of articulating the problems to be solved into the proper language of the computer? Furthermore, will it be feasible economically to construct individual computers in the future for ordinary office use right at hand?"

Professor Fisher's experience, and the development of master programs like STRESS, would seem to indicate that the answer to the first question is that no such special architectural programers will be necessary, and the proceedings of the afternoon session made it seem that the answer to the question of economic feasibility would very soon be yes. In fact, the talk by Professor Steven Coons of M.I.T. that led off the afternoon session indicated that the direct use of the computer will be far easier and much more economical than anyone could have predicted a few years ago.

**Man-Machine Collaboration**

These light pencil techniques are a way of conveying information directly to the machine, without going through the elaborate procedure required to introduce information into a computer on punch cards. Furthermore, the face of the tube displays the results of an operation, which then can further be modified by the operator, with a stroke of his light pencil.

For example, imagine that the operator takes the light pencil and draws a cantilevered truss on the screen. He then feeds in the loads on the truss and instructs the machine, according to the STRESS program, to give him the stresses in the individual members. If he does not like the results, he can modify the truss and go through the whole procedure again.

The ability to perform this kind of operation is a tremendously important development, sometimes known as man-machine collaboration. It means that the man can have the tremendous resources of the machine at his disposal at any stage during his thinking process. According to Professor Coons, it will be possible to "instruct" the machine to perform new operations, giving it an ever-increasing repertoire of problem-solving capabilities without the intervention of a programer.

Putting a whole computer at the disposal of one man for an indefinite period of time would obviously be...
much too expensive, so Professor Coons explained a corollary development to Sketchpad, share-time techniques. A single computer can perform so rapidly that a great many subsidiary consoles, such as Sketchpad screens, can be attached to it simultaneously, with each operator receiving the impression that he is getting the machine's full attention. The principle, Professor Coons explains, is not unlike that of a master chess player playing lesser masters in round-robin fashion.

Consoles at any distance can be connected to a central computer by telephone lines, opening up fascinating prospects of information as a "public utility," vast information networks tying all sorts of installations together, and architects communicating with engineers over their office computer consoles.

**Computer Graphic Simulators**

Even without Sketchpad equipment, it is already possible to produce extremely sophisticated drawings on the computer, and the imagination of the conference was captured by the presentation of William Fetter, supervisor of Computer Graphics for the Boeing Company. Mr. Fetter showed sequences of projected and perspective drawings made on the computer, some of which are shown on the opposite page. He also showed animated motion pictures, made for the Navy, in which sequences of perspectives simulate what the pilot sees as he lands on an aircraft carrier. Other perspective simulations showed how much of a certain flight path could be tracked by radar; and, most complicated of all, a bombing run seen simultaneously in true perspective through the cockpit window, and in the corrected perspective of the simulator screen on the cockpit instrument panel, a simulation of a simulation.

Mr. Fetter, who is a graphic artist and not a mathematician, achieved the results he desired by describing the process of perspective drawing on a chalkboard, and letting others write a computer program for the mathematically equivalent operations.

There would seem to be many possible applications of the simulation techniques to the problems of architecture and urban design. Perhaps even more important, however, are the drawings Mr. Fetter showed of complex warped surfaces, like the ones shown on the cover and on pages 143-150. In the future there should be no shape or form that man can devise that cannot be shown in minutely accurate drawings such as these. As Professor Coons said about similar drawings produced with Sketchpad, they are the net over the invisible man which enable us to see his form. A monograph by Mr. Fetter entitled, "Computer Graphics in Communication," will be brought out by McGraw-Hill later this year.

In other presentations, the moderator of the morning session, Kenneth Sargent, dean of Syracuse University's School of Architecture, commented on the A.I.A. Task Force on Information Retrieval, of which he is chairman, and which has absorbed most of the A.I.A.'s attention as far as computerized technology is concerned. Although Dean Sargent didn't mention it, information retrieval techniques are now being applied to specification writing by a number of architectural offices. James Souder and Welden Clark of Bolt, Beranek and Newman, Inc.'s Los Angeles office demonstrated their systems approach to certain aspects of hospital planning, in which they had used the Sketchpad system to correlate data. (ARCHITECTURAL RECORD, March 1964, pages 86-94.) A representative of a large manufacturer of computers discussed some improvements in critical path diagraming, and revealed a disconcertingly low opinion of the intelligence of his audience and considerable haziness about what the function of an architect might be.

The conference program stated that at luncheon Professor Serge Chermayeff of Yale would synthesize the meaning of the morning's presentation, anticipate the afternoon program, and formulate questions for the evening panel discussion. A large order, obviously, and not surprisingly Professor Chermayeff disclaimed this role. What he did instead was to give
Computer

Drawings made with a computer: mathematically defined wave motion surface and a perspective of an aerodynamic configuration composed of detailed station lines and selected longitudinal lines. These drawings and the perspective of surface definition on page 143 were made by Wilfred Hoar, John Freyman, James Ferguson and Marlon Rowin of the Aerospace Division of the Boeing Co. Drawings courtesy of Boeing Co.

a rather emotional speech that was very strongly critical of the architectural profession, and which was warmly received by an audience made up primarily of architects. Apparently, either architects like to be hectored, or they all feel like the lady who said to the minister after the service: "I did so enjoy your sermon; I know a great many people like that."

Professor Chermayeff feels that the existence of the electronic computer gives new impetus to rational-functional analysis, organization and synthesis. Perhaps reasoning by analogy to the computer programs for generalized classes of structural and mechanical problems, Professor Chermayeff envisages that problems of environmental design will be solved in the future at a generalized level, with programing and testing being done on the computer. The architect would then be the agent who adapted an established building type and form to a particular set of circumstances. As Professor Chermayeff put it: "We can now say good-by forever to the slow laborious process that makes a guinea pig of every client, and, as you well know, the guinea pig in these experiments usually perishes."

Leaving the conference, it was possible to envisage that not too far in the future architects would be able to receive engineering data and evaluation of functional characteristics almost instantly, at any stage in the design process; and specifications and working drawings of the finished product could be produced with great rapidity using computerized technology. These technological advantages could help deal with urban chaos by keeping planning information up to date, correlating the activities of overlapping jurisdictions and simulating results for evaluation before plans were made final.

Ideally, the architect or urban planner would then be free to give his full attention to problems of design, use and appropriateness. Unfortunately, the same technological means could permit the architect, or someone usurping his position, to multiply stupidity on a scale never before possible, and reduce design to those aspects that can be most quickly calculated and standardized. The choice, as usual, is up to the individual practitioner; but the consequences of individual action have never been so pervasive, or so inescapable.
American industry seems to be increasingly aware of the value and extent of the contribution that architects can make to industrial building. At the same time, the American Institute of Architects, through its Committee on Industrial Architecture, is working to educate both architect and client to the elements of a truly comprehensive professional service in the industrial field.

The buildings on the following pages represent successful examples of the architect’s capability in a number of areas; and the purpose of this study is to detail the circumstances in which these successful buildings came about.
Architects Ask Questions

"The greatest benefit that Breuer has been to us," said Rufus Stillman, vice-president of the Torrington Manufacturing Company recently, "is that he takes us outside the square. He is not hemmed in by the assumptions that we have been making all along. One of the most useful things an architect can do is to ask questions; and not give us any simple answers."

Breuer’s association with Torrington Manufacturing began when he was made a design consultant for a small factory in Oakville, Ontario. The success of this first commission led to Breuer’s being made the architect for Torrington factories in Van Nuys, California; Rochester, Indiana; Torrington, Connecticut; and Nivelles, Belgium; which last is shown in detail on the following pages. Breuer is presently at work upon a sixth Torrington factory, which will be built in England.

These are utilitarian buildings, whose cost is comparable to similar facilities that are not as well designed. Torrington Manufacturing does not make consumer products; it, therefore, can not justify extra expense in terms of “image” or “prestige.” The important point is that lowest cost by itself is not the governing consideration. For example, the panels at Nivelles, with their strong pattern and sunshading, cost slightly more than a plain panel with a reinforced edge and a square hole punched in it. The architect estimates the extra amount at about $3,000 over the whole building; and there is a significant difference in what is obtained for the extra money expended. As Breuer says about low costs: “You do not necessarily drink your soup just as hot as you can cook it.”

Packaged Costs a Misnomer

Mr. Stillman has some interesting things to say about factory costs in general: “We think the whole business about packaged costs is a misnomer: it all depends on time and place. We don’t believe that going to an architect increases the cost. The intelligent architect is terribly helpful to our thinking. He can save us space over the standard-design-construction package, and he can rearrange things to make more sense.

“By keeping the same architect from project to project, we have been able to get a little bit more specific each time, so that none of the factories has been a carbon copy
TORRINGTON NIVELLES

Nivelles, Belgium

ARCHITECTS: Marcel Breuer and Hamilton Smith

ASSOCIATED ARCHITECTS FOR SUPERVISION:
Andre and Jean Polak

The factory is enclosed in prefabricated panels made by the Shock Beton process. In addition to manufacturing, this building also houses the offices and sales force of Torrington's European Division. Above: Photograph of entrance elevation. Below: Detail of entrance.
of the last. It is not so much that the functions have changed, but that our own thinking has developed. We try to do new things, and the architect becomes really involved in the success of our business. He is fashioning a tool for us, rather than a monument.

"Dividends from this process keep coming back in little ways. When you turn a corner, it's pleasant; morale is better; people take more pride in their work. When you take prospects to the factory, you realize what a fine sales tool it is. People associate the firm with progress, with working out different answers from the common cliche. It doesn't cost you anything extra to have all this; it might very well cost you less."

Torrington Manufacturing makes air moving devices and strip-wire forming machinery and builds a new plant only about once every two or three years. It does not maintain a corporate building department and has some of its process engineering done on a consulting basis. The role the architect plays for them must necessarily be different from what it would be for a larger company.

Tangible Benefits

It is significant, however, that Torrington Manufacturing puts so much emphasis on tangible benefits to be derived from the architect's independent viewpoint and creative ability. There seems to be a growing awareness, in all areas of industry, of the value of the independent professional in the design of industrial buildings. As R. H. Tatlow III of Abbot, Merkt and Co. wrote in the magazine Building Construction: "I am certain that an owner gets a great deal more for his money through the use of a professional architect-engineer, with the construction work being done by a general contractor. The package-type deal, which has been growing, may very well have application in a few limited areas, but, in general, my observations have shown that it is considerably more expensive. The owner still has to determine policy and interior requirements, and the over-all time of construction and completion is very little different. The changes made by the owner, as work progresses, are as expensive as they would be on any other construction, except that I am satisfied there are more of them with a package job."

Deere and Company, Moline, Illinois, is another case in point. Their new headquarters building designed by Eero Saarinen (July 1964) is strong testimony to the company's
Breuer has used two basic types of panel at Nivelles, details of which are shown (left). The photograph (above) shows "B" panels. "A" panels are shown (far left) and (below)
concern with good design. Some businesses, however, have been known to seek good architecture for prominent buildings, and then to minimize architectural services in areas where so-called design considerations are not felt to be paramount. The new John Deere distribution center and showroom in Baltimore is important, therefore, because it will display the architect’s design ability in a situation which is not always considered to be an architectural opportunity.

Rogers, Taliaferro, Kostritsky, Lamb have designed the warehouse on a curving plan which follows the shape of the site. It thus provides for expansion in a logical way which will ultimately make maximum use of the land available. It is hard to envisage such an elegant solution to a difficult site problem being obtained by commercial “pre-engineered” components.

*Good Buildings Attract Good People*

Deere and Company is also well aware of other benefits this new building can bring them. In the words of the chairman, William A. Hewitt:

“We have a very strong interest in good buildings—good from both the esthetic and functional points of view. We feel that first-rate architectural design is important as a means of conveying to the public an impression of the John Deere organization as a top-ranking, progressive business. Equally important, we believe that quality architectural design has significant impact on the people within our organization. They think better of themselves, their work and their company when they are supplied with a superior environment. Good buildings attract good people and induce more effective performance from them.

“Most of our buildings (factories, warehouses, powerhouses) are designed by our own internal architectural group. We believe that one of the best ways to set standards for their work and to stimulate their creativity is to engage a major independent architectural firm occasionally to build one of our major buildings. This we have done at Baltimore.

“Our working relationship with the Baltimore firm of Rogers, Taliaferro, Kostritsky, Lamb has been very excellent indeed, and we feel that the design they have proposed for our Baltimore sales branch will doubtless make it the most outstanding of our 14 United States buildings of this type.”
JOHN DEERE COMPANY DISTRIBUTION CENTER

Baltimore, Maryland

ARCHITECTS: Rogers, Taliaferro, Kostritsky, Lamb
Charles Lamb, partner in charge; James Grieves, associate

STRUCTURAL ENGINEERS: Severud, Perrone, Fischer, Sturm, Conlin, Bandel

MECHANICAL ENGINEERS: Cosentini Associates

Section through warehouse showing office and exhibition areas. These are shown in detail in plans (far left)
Mr. Hewitt’s statement brings us to an area that many an architect feels diffident about discussing: his ability to produce a better building by giving it an orderly and coherent design. The industrial architect may have good reason for staying away from the topic of “esthetics,” a word which seems to carry connotations of frivolity and unnecessary expenditure; but the ability to design, using the word in its fullest sense, is surely one of his most important competitive advantages.

_Toms Chocolate Factory_

The Toms Chocolate factory in Ballerup, Denmark is a good example to bring up at this point, because, in this case, the architect was retained for the express purpose of producing an orderly and coherent set of esthetic relationships.

The president of Toms Chocolate, Dr. A. N. Neergaard, describes the process in these words: “Through a couple of years our own staff had been planning a factory which was to be the most ideal from the manufacturing point of view, without paying any attention to the question of whether the project in all details might be placed in successful buildings or not.

“When this work had come to an end, we approached the constructional engineer, who is one of the most prominent figures in Denmark as regards construction with prefabricated elements. We asked him to project buildings which might encircle our plants in a way which would answer its purpose, and which might be built with prefabricated elements, in order to complete the construction in a short time.

“When he had finished this work, our next problem was the choice of an architect; and, as I feel convinced that it is not more expensive to build a fine factory than a plain one, we approached the architect who in our opinion was the most artistic talent, Professor Arne Jacobsen. He accepted the task and, through the teamwork between him, the constructional engineer and our own staff, the final project was carried out.

“The result is an extraordinarily well-arranged factory; and in my opinion the buildings are a very fine architectural unity, naturally owing to the influence of Professor Jacobsen.

“I may add that the total building was no more expensive than was projected from the beginning.”
TOMS CHOCOLATE COMPANY

Ballerup, Denmark

ARCHITECT: Arne Jacobsen

The factory has a reinforced concrete structure and is enclosed with prefabricated cladding units faced with tile. **Above:** Elevation of the factory complex from the entrance side of the property. **Far left:** Entrance elevation of office building and detail of lobby. **Below:** View of complex from back of site.
The factory has a reinforced concrete structure with a regular bay system. There are two typical cladding units faced with tile; one has windows, the other is blank. Behind these cladding units and a layer of insulation is a masonry back-up wall. Similar units are used for the office building, power plant and caretaker’s flat, and also for the screen walls. The panels are demountable, so that the factory can be expanded in the future.

The boiler stack, two oil tanks, and the storage silos for the cocoa beans have been grouped to form a sculptural composition. In general, however, the buildings derive their effect from the simplicity and consistency of the detailing.

The A.I.A. Committee

In the same way that industry can be seen to possess an increasing appreciation for architectural design, the architectural profession has shown an increasing awareness of the needs of industry. The Committee on Industrial Architecture of the A.I.A. has, since its formation three years ago, embarked upon an active program of education to increase the architect’s involvement with industrial architecture without forcing him into a role for which he is not qualified. On the one hand, the committee seeks to demonstrate the variety of ways in which the architect can help industry; and, on the other, the type of services the architect must offer if he is to do a truly comprehensive job.

The major vehicle for this educational program is a series of publications in the A.I.A. Journal, of which two have appeared so far. The first, on industrial leasing practice, was published in August 1963 in a two-part form: one, entitled “Comprehensive Services for Industrial Lessee Clients,” was directed at the profession; the other, “A Guide to Better Industrial Leasing” was directed to the client. Both were prepared by George T. Heery of Atlanta, the chairman of the Committee.

Mailings to Corporations

Twenty-two thousand five hundred copies of the “Guide” portion of the article were mailed to corporation presidents listed in Dun and Bradstreet’s Million Dollar Directory. A second guide, this time to better “crash” construction, was published in No-
Above left: The boiler stack, oil tanks and the silos for the cocoa beans have been grouped to form a sculptural composition. Above: View from the office building out over the roof of the factory. Far left: Facade of the office building. Left: Detail of tile cladding material used on all solid exterior surfaces.
vember, 1964. It will be mailed to 25,000 corporation presidents.

The committee plans future articles on such subjects as programing, site selection, construction cost control and flexibility of plant design.

In addition, the committee sent out a questionnaire to the presidents of 400 of the nation's largest corporations asking such questions as:

"If your company has built any facilities in the past five years, what method did you use for design and construction?
1. Designed by staff architect or engineer and constructed by your own company.
2. Designed by staff architect and engineer and constructed by independent contractor.
3. Designed by independent architect and constructed by contractor through competitive bidding.
4. Designed by independent architect and constructed by contractor through negotiation.
5. Designed and built by a single organization.

In your next building program which of the above methods would you probably use?"

One hundred fifty-four companies, approximately evenly divided between those making consumer and industrial products, answered the questionnaire. The results have not yet been fully tabulated, but seem to indicate a distinct trend among these large corporations towards the use of independent architects.

Comprehensive Services

Of course, architectural offices vary in the degree of comprehensiveness of the services they offer under one roof. A big office like that of Welton Becket and Associates can put industrial and land planners and landscape architects to work alongside their architects on investigating a site for a client; and a firm like Albert Kahn, Inc., through long association with heavy industries, has built up a group of specialists on industrial processes. At the same time, many industrial commissions, such as the building for American Pecco (illustrated on these pages), remain well within the range of a small architectural office. The message that the A.I.A. Committee is trying to put across is that the architect should recognize the various professional services required by indus-
AMERICAN PECCO CORPORATION

Millwood, New York

ARCHITECT AND INTERIOR DESIGNER: Arthur Witthoeft

STRUCTURAL ENGINEER: Harry Kaufman

MECHANICAL ENGINEER: George L. Smith

LANDSCAPE ARCHITECT: Armand Benedek

GENERAL CONTRACTOR: Chiappinelli — Marx Incorporated

These buildings house the offices and repair shop of the American subsidiary of a German manufacturer of tower cranes. The basic structure is the same for both buildings: prestressed double tees supported on a poured-in-place concrete frame (details below)
trial clients and make sure that they are available, either by providing them within his own office, or by seeing that suitable consultants are retained.

Environmental Design

The buildings for Infrared Industries of Carpenteria, California, designed by Jones & Emmons, posed a problem of environmental design both from the point of view of requiring a controlled climate for the assembly of sensitive equipment, and in the character of the design needed to provide a suitable atmosphere for research. Businesses of this kind are in strong competition with one another to secure the best personnel, and the quality of the working environment can be an important factor of choice.

The new buildings bring together under one roof Infrared's West Coast Division, its Standards Laboratory, Controls Division, and Research and Development. The latter was transferred from the company's East Coast headquarters in Waltham, Massachusetts. In addition the company's Simpson Optical Division is now housed in an adjoining building, which was begun after the first portion of the complex was already in operation.

Advantage of Views and Climate

Carpenteria is about an hour and a half from the center of Los Angeles in an area that was once purely a resort and a haven for retired people, and has since attracted many research and development facilities. Infrared has a five and a half acre site that lies along the main coastal highway, with the ocean along one side and a view of the mountains on the other. The Infrared management wanted the new buildings to take full advantage of views and climate to create a relaxed and pleasant atmosphere. At the same time, the company was in a period of expansion and was anxious to keep costs to the minimum necessary. (The two facilities provide about 80,000 square feet at a cost of approximately $1.1 million dollars.)

The principal executive offices look out to the south, towards the ocean, with the glass protected by a wide overhang; and, on the north side of the building, the offices of department heads have views of the mountains. The parking areas have been terraced and screened with plants so that they will
INFRARED INDUSTRIES

Santa Barbara, California

ARCHITECTS AND SITE PLANNERS: A. Quincy Jones and Frederick E. Emmons
MECHANICAL ENGINEERS: Ayres and Hayakawa
GENERAL CONTRACTOR: MacIsaac and Menke

Above left: Entrance to offices of Simpson Optical Division (top right hand portion of plan). Above: General view from coastal highway. Far left: Assembly areas in the electronics division. Below: Garden court which provides light and view for internal offices and laboratories.
not obscure the view. An open garden patio provides light and a view for the secretarial pool, accounting department, drafting and some of the laboratories. The research and development personnel also have their own garden terrace, as does the cafeteria.

The assembly areas are arranged to give semi-enclosed work spaces for individual skilled workers, and there is a generally orderly atmosphere, with distracting influences kept to a minimum. Provision has been made for future expansion, both horizontally and by adding a partial second story.

**Concern for Employes**

The concern shown by Infrared for the environment of its employees is part of a noticeable trend towards securing amenities for manufacturing facilities that are more directly comparable to those commonly provided in corporate offices. The Jones and Emmons office’s capability as site planners was an important factor in their ability to handle this commission successfully.

**Control of Costs**

Control of cost is usually a critical element in the design of industrial buildings, and the method followed by Skidmore, Owings and Merrill for the Container Corporation of America facilities at Carol Stream, Illinois provides an instructive illustration. In the early stages of discussion, the architects made diagrammatic presentations of the process flow in relation to building form, and of possible alternatives of bay size, ceiling height and wall section. The comparative costs and other characteristics were documented for each case. (Examples of these presentations are shown on pages 168 and 169.)

The client was able to base final decisions on clearly stated alternatives. For example, as the manufacturing conditions for cardboard cartons require a constant temperature of 72 degrees with an accompanying humidity of 45 per cent, the U factor of the wall section, rather than lowest cost, turned out to be critical, leading to the choice of wall section 4.

This wall is a pre-cast concrete panel 10 by 25 feet, with a 2-inch vapor barrier and an 8-inch concrete back-up wall. The factory area is about 385,000 square feet. A link connects the manufacturing area to a two-
FOLDING CARTON PLANT
AND OFFICE BUILDING
CONTAINER CORPORATION OF AMERICA

Carol Stream, Illinois

ARCHITECTS AND ENGINEERS: Skidmore, Owings and Merrill
GENERAL CONTRACTOR: Ragnar Benson, Inc.

Top left: Entrance for railway siding (upper right hand corner of plan). Factory Plan (far left): (1) Paperboard Stock Receiving and Storage; (2) Printing—Gravure, Letterpress and Offset; (3) Printed Stock Storage; (4) Die-cutting and Creasing; (5) Stripping and Scrap Disposal; (6) Stripped Stock Storage; (7) Coating; (8) Folding and Gluing; (9) Automatic Tape Sealing; (10) Finished Goods Storage; (11) Shipping. Left: Plans of two-story office wing.
story office building which houses design and market research departments and the administrative and sales offices. This arrangement provides an integrated process, from the design of the package and the testing of its acceptance, through its manufacture.

Both this plant by Skidmore, Owings and Merrill and the Infrared buildings by Jones and Emmons received awards from Factory magazine in the program in which Factory names the best 10 plants of the year.

The Architect’s Contribution

This study has touched upon a few of the contributions that the architect can make to industrial building. It has discussed the architect’s ability to make a factory building a tool (and not a monument), to solve difficult and unusual problems, to give a group of buildings esthetic coherence, to shape and control environment, and to present alternatives whose advantages can be evaluated comparatively. This study also shows buildings which are successful demonstrations of the architect’s ability in these areas.

Prospects for Industrial Buildings

A McGraw Hill economic survey of plans for capital spending in 1965-1966 reports that American business now plans to spend 46.9 billion dollars in new plant and equipment during 1965, which is 5 per cent more than it spent in 1964. Of these figures, 20.2 billion dollars will go to the general area of manufacturing, with an additional 18.2 billion planned for 1966.

According to F. W. Dodge Company figures, about 2.5 billion dollars was expended upon buildings for manufacturing during 1964, and Dodge figures indicate that the industrial construction field has been growing at a rate of about 6 per cent a year. A Sweets Catalog Service survey of corporate building departments indicated that the total dollar value of the facilities planned over the next five years by the companies surveyed would average about 13 million dollars per company.

Clearly there are opportunities in the field of industrial architecture, and there seems to be an increasing likelihood that these opportunities can lead to successful buildings.
FOLDING CARTON PLANT AND OFFICE BUILDING
CONTAINER CORPORATION OF AMERICA

Drawings on these pages represent some of the comparative studies presented to the client in the early stages of design. Final choices were: a 40- by 40-foot bay, structure "A," and wall section "4," which were most appropriate for the clients particular requirements.
Top left: Photograph shows link between the factory at left and the office building. Note exposed concrete waffle slab. Left: Main entrance to office building. Above: Portion of printing area on factory floor.
A survey to assess the role of plastics in future house structures was recently conducted by the Division of Building Research of Canada's National Research Council. Over 50 major plastics producers and research groups cooperated in this survey, which was conducted by personal visits and by correspondence with European firms throughout North America.

Although primarily concerned with the potential development of plastics in house structural systems, the survey points to their success as ancillary materials in buildings for coatings, claddings and coverings.

"Plastics alone are not readily suited to house structure uses," the report says, "since, although they vary greatly in types and properties, they all have characteristics which are not acceptable for structural elements in a building. Low stiffness, softening at even sun exposure temperatures, dimensional instability, creep under load, combustibility, and generally high cost rule out the logic of an all plastic house.

"Where plastics are to be used as structural elements, the obvious solution is to use low-cost fillers to modify the basic properties of the plastics. Fillers can extend the plastics and lower their final cost. They can stabilize them against dimensional change, and they can increase both their stiffness and their strength, especially at higher temperatures."

"The Role of Plastics in House Structure" may be obtained for 50 cents from the Publications Section, Division of Building Research, National Research Council, Montreal Road, Ottawa 7, Canada. Order No. NRC 7932.

While acoustics is a very important aspect of the total environment and one in which many criteria have been established, these still must be tempered with common sense, warns Robert B. Newman of Bolt, Beranek and Newman, Inc.

In a talk last month at the Winter Annual Meeting of the American Society of Mechanical Engineers he drew on a personal experience to reinforce this point: "The other day I walked into a large, covered mall in a new shopping center. The space was abundantly flooded with daylight from high windows on both sides. Discretely placed in this mall were a number of attractive groupings of bamboos and other plant materials. There were only a few people there at the time I walked in, but my senses were immediately confused. I seemed to be in a semi-outdoor space with shops all around, and yet my ears told me that I was in a very hard, reverberant interior and that the whole thing didn't quite hang together as a total environment. Every surface in the space was hard and sound reflecting, and it needed some modification with sound-absorbing finishes to give it the semi-outdoors feeling. I was also interested to observe a number of small children tagging along with their mothers. Each child seemed immediately to sense the reverberant character of the environment and began making delighted squeals and listening to the wonderful reverberation that followed. It was impossible for any of the mothers to make the children stop squealing. Perhaps the space should be left reverberant for the delight of these children; but, if the adult shopper is going to find the environment totally pleasing, his eyes as well as his ears must be satisfied.

"How quantitative can we be about criteria of this sort? We cannot say that the reverberation time of a shopping mall should be a certain number of seconds or that the background noise level in the mall should be so many decibels. This must be based on judgment and on experience and on the particular situation at hand. We do know that, if we pay no attention whatever to the design of the acoustical environment, it probably won't be right, but we must be very careful about applying hard and fast numerical criteria to such environmental questions."

A LOOK AT THE FUTURE OF STRUCTURAL DESIGN

By Paul Weidlinger, * Consulting Engineer, New York City

Fifteen years ago, I gave a paper at a symposium in which I made a number of predictions regarding the future of structural engineering. These predictions seem as valid and sensible today as they did when I first made them, but what is interesting is that the terminology in which I phrased them would be very different today. This change in terminology has considerable significance which I shall discuss later. In today's terminology what I said 15 years ago was that two developments which would substantially affect the structural engineering profession were: (1) system synthesis and (2) electronic data processing. Today I could make the same predictions but more emphatically and with greater confidence.

Five years later I made a further suggestion which also remains valid today: that important developments were in the offing, not so much in new materials or new technology, but rather in new thinking and new ideas.

Slowly Developing Discipline

Re-reading what I said on these last two occasions has alerted me to the dangers inherent in predicting developments in structures. Structural engineering, which is so much tied to the building industry, is an extremely slow moving discipline, compared to other fields of technology.

First let us look briefly at the past. Let me begin with a reminder that a very large, in fact, overwhelmingly large percentage of our theoretical knowledge which is now applied to our daily work is drawn from scientific researches which originated in the 17th and 18th centuries. I am thinking of Hooke, Mariotte, Bernoulli, Euler, Lagrange, Coulomb, and so on. This should not be regarded as derogative to the current state of the profession. In fact, these names comprise an honor roll of sciences. More significant is the fact that these names would sound equally familiar and important in numerous other fields of engineering. The structural engineering profession is, or at least has been, rather provincial—we tend to divide into specialties. But the identical laws of nature, the identical differential equations govern the design and analysis of structures in different branches of the profession. Furthermore, many of these differential equations identically describe phenomena not even remotely related to structural engineering technology.

Structural engineering originated no doubt, as a highly empirical occupation. Out of this grew a rather sceptical view regarding the place of theory in this field.

What I have said emphasizes the essential slowness of development in structures. Some of us who have had occasions to work in other fields, especially in weapons technology, know very well how amazingly short the time interval can be from development to deployment. Since the last decade it has been a fairly well recognized and common occupation to make predictions regarding anticipated weapons developments. This can be done with fair accuracy for several reasons. One of them, of course, is the unfortunate tendency, or some would say necessity, in military technology for whatever is theoretically and potentially possible to be transformed into "hardware." Obviously the work of a structural engineer, which is so aptly known as a branch of civil (i.e. non-military) engineering, is not faced with the rapid technological obsolescence which confronts the weapons system designer. On the contrary, structural engineering is expected to be a conservative branch of the profession, and this implies a slow development.

I do not advocate the immediate practical application of all theoretical developments. The demand or need of society is a more valid motivation for the progress of the engineering profession than the new frontiers of feasibility created by technological advancement. In this context, Bertrand Russell noted that "Archimedes foreshadowed the modern use of mathematics by inventing engines of war for the defense of Syracuse against the Romans." He then adds: "A Roman soldier killed him and the mathematicians retired again into their ivory tower . . ." We could probably think of many morals to add to this story, but I am quoting it to show that the interlude from development to deployment in weapons technology was very short even in antiquity and that its consequences were also somewhat unexpected. In civilian technology, the rate of development and its consequences are more variable and also unpredictable. Only 100 years ago, the Victorian era created some of the wonders of engineering and also some of the spectacular and inexcusable failures.

The structural engineer of this day and age cannot afford the type of failure which was more common 100 years ago, but which is now not infrequent in other branches of engineering. In the mind of the general public and of the profession itself, there is now nothing dramatic or glamorous in the failure of a static structure; but we all recognize, although do not condone, the drama of the failure of missiles, aircrafts and other products of space technology. The attitude of today's structural engineer is both well justified and necessary, reflecting the maturity of the profession. I believe, however, that excessive empiricism and the pursuit towards reasonable safety has led to a degree of conservatism which is not always justified. More important, it has brought about a certain state of mind which seems to have gained an existence of its own, independent of its original objective.

If this state of mind results in a rather gradual advancement of our field, then we must also reckon with the characteristic slowness and conservatism of the building industry as another factor which retards innovation.

Need for a New Attitude

Analytical theory applicable to structural engineering and general technology applicable to the building industry is very far advanced. What is now needed is a change in the

*Based on a paper delivered at the American Society of Civil Engineers Annual Meeting and Structural Engineering Conference, October 1964.
state of mind of the profession and industry in order that this knowl-
edge may be given practical application. We see this change happening
today, and I expect it to manifest itself in numerous ways. In the
broadest sense, this implies that the profession and the industry will be-
gin to apply methods which are quite common now in other fields. Perhaps
one might predict that the profession will return to a state of mind
which it had in earlier centuries, and will regain its earlier dynamic quali-
ties.

That this is already happening to some extent can be seen in an inter-
esting way in the use of a new terminology, which implies that we have
begun to recognize the interdisciplinary nature of all engineering en-
deavors. One could really call this development a revolution (or maybe
more modestly an evolution) in terminology and in semantics. What
is implied in this development is the acceptance of new concepts as well
as an increase in our conscious attention to old concepts. In reading
current engineering literature, one runs into words such as: systems,
systems design, optimization, value engineering, cost effectiveness
study, failure-effect analysis, critical path method, and so on.

Every one of these words defines, to some degree at least, concepts
which may have been previously recognized, but they represent now a
systematic and conscious approach to these and the recognition of their
usefulness and effectiveness. Signifi-
cantly, the list of words I have just
mentioned has originated in fields
other than structural engineering. I
am also certain that the application
of these concepts to the task of the
structural engineer and the building
industry will have very far reaching
effects.

As I have mentioned previously,
the profession and the industry also
have a great deal of catching up to
do in the application of available
theory and technology. This does not
mean, however, that further devel-
opments in theory and technology
will wait until we have caught up
with them in practice. On the con-
trary, the recognition of the con-
cepts which I have mentioned is al-
ready generating very important
analytical and technological innova-
tions. I firmly believe that structural
engineering has come to a point or
at least is rapidly approaching the
point where the feasibility of a
structure cannot be denied either by
the lack of analytical methods or
technology. The reason for this is
that we now have available a large
backlog of analytical knowledge
which is rapidly being developed,
and at the same time we have access
to advanced technology in related
fields.

This situation is brand new and
of crucial importance. It probably
means that the times are gone for-
ever when we were able to say in
good conscience that a structure
could not be created because of ig-
norance. Having lost this constraint,
we must increasingly recognize the
social responsibility implicit in engi-
neering design. Decisions regarding
feasibility, especially negative deci-
sions, will henceforth have to be
made in a socio-economic context in-
stead of in a purely technical one.

I think structural engineers are
now learning to use many of these
new techniques and tools. In our own
office we have been undertaking late-
ly the analytical solution of prob-
lems which not so long ago would
have been considered utterly impos-
sible. We are now handling, routine-
ly, calculations by means of data
processing systems which stagger
the imagination. We have become
“machine oriented.” But at the same
time computer specialists have be-
come increasingly conscious of the
physical significance of the symbolic
operation they are accustomed to
perform on binary variables: they
have become “problem oriented.” Ul-
turnately we will meet somewhere in
the middle of our road at the place
we today call the “man-machine in-
terface.”

Difficulties of Synthesis

And while our analytical knowledge
is advancing, we are also witnessing
at the present time the increasing
recognition of the other side of the
coin, namely that of synthesis or de-
sign. The principal task of the engi-
neer is to design; nevertheless,
structural design, in this sense and
as distinct from analysis, has been
an underdeveloped area of engineer-
ing. Many of the methods of design
we are using have evolved not only
in the last centuries but in the last
few thousand years; and they have
lead to traditional forms and shapes
and elements which serve as well to-
day, such as the arch, the post and
lintel, the beam, the cable. New
forms and elements and shapes have
evolved with the adaptation or dis-
covery of new materials. The use of
steel and reinforced concrete intro-
duced new elements into design. But
the development of these forms and
their assemblies has traditionally
been a trial and error procedure. It
is only in the last decade that we
have begun to focus our attention on
the problem of systematic design. I
think here we are entering a new
phase of development and are facing
unknown challenges and equally un-
known, and probably surprising,
consequences. I am quite certain that
the next concerted effort must be in
this direction. We will be evolving
systematic methods of synthesis, and
we will be searching for techniques
which are suitable for this purpose.

At this point it would be appro-
priate to attempt to predict some of
the results which we may expect, or
to at least hint at the achievements
to come. Also it may be enlightening
to point out the major obstacles
which have to be overcome.

There are various difficulties if we
try to approach structural design in
a systematic way. As soon as we
begin to think about this task, we
recognize first of all that the prob-
lem of systematic design, or, if you
wish, scientific design, is inherently
more difficult than the problem of
analysis. Structural design prob-
lems, paradoxically, are “not well
structured.” This lack of “struc-
turedness” (which, incidentally, is
also part of our new terminology)
implies that the problem is not well
defined, the criteria are not well de-
finite and not quantifiable. These ob-
stacles describe an area where at
least in the past one could have said
“angels fear to tread.” Today we
find that operations researchers and
systems analysts trample all over the
place. While the results are by no
means proportionate either to the in-
tensity of their activities, or to the
claims of their practitioners, there
is no doubt that structural engineer-
ing is one area where fruitful re-
results are a certainty. Although we
may have difficulty initially in quan-
tifying and “structuring” our prob-
lems, we must finally recognize that
engineering design is an essentially
quantitative undertaking.

Let me now speculate on the rea-
sons why synthesis does present
such great conceptual difficulties. These difficulties are especially marked when compared with the great success achieved in analysis, with the help of modern mathematical techniques and electronic data processing equipment.

I can offer at least one possible explanation to this puzzle. The use of numerical techniques which are suitable for electronic computations has shown us the power of matrix operations, or in more simple terms, we have found that we can tackle almost any analytical problem by reducing it to a number of simultaneous linear equations which we then solve by the aid of matrix operations and the computer. But if we take a closer look at our amazing success in this field, and I understand that the number of simultaneous equations which can be solved at the present time has reached five orders of magnitude, then we also must notice that the matrices we deal with are generally "sparse," that is, they have a great many zeros in them, and this, I think, is one of the major reasons for our success. But the fact that the matrices do have this form can be interpreted physically by the statement that the physical quantities we deal with in solving very complex analytical problems are to a great extent uncoupled, that is, their mutual interaction is weak. Although we may deal with a very large number of unknowns or variables, because of the sparseness of interaction, it is possible to deal with the problems essentially piecemeal through very ingenious methods developed for this purpose.

It appears, however, that if we attempt to systematize our design problems at least formally or symbolically in a matrix fashion, we find that more often than not the design variables are of a very large number and very often closely coupled and, therefore, mutually interacting. To make matters worse, the relations are often non-linear. What we then need is a technique which will permit us to deal with these problems, but at the present time, I would conjecture that this will be much more difficult to achieve than our most ambitious analytical undertakings.

Changing Role of the Engineer

The foregoing examples indicate that structural engineering is becoming a more complicated and difficult discipline. This is not intrinsically true but is true in a practical sense, in that the skills and knowledge required to practice this profession are increasing in complexity. I believe that this view will be supported by anyone who actually does engineering these days. The use of the computer has not made the work of the structural engineer easier, but has rather eliminated a legitimate excuse for not solving certain problems. There is no doubt that the minimum knowledge which is required of a structural engineer before he can be considered competent has been increasing and will continue to increase.

I find myself unable, or perhaps unwilling, to predict where this will lead, or what will happen. I think it was Clemenceau who said that warfare is too important to be left to the generals. I wonder if one of these days, unless we are very careful, somebody will not make a similar remark regarding the role of the structural engineer in the design of structures.

It is obvious that engineering education must play a very important role. The curriculum changes in the last years in civil engineering point to the recognition of this fact. The education of a new generation of engineers with this broader and deeper scientific knowledge, has, however, lead to a few interesting and somewhat unexpected side effects. As a result of a more thorough theoretical background, the distinction between some of the more specialized fields begins to disappear and a man trained as a structural engineer can readily find a place in fields other than the construction industry. And I may add that these other fields, such as space technology, transportation, etc., also seem to offer higher financial and other rewards. This, of course, represents a dilemma. But I am not sure whether it is useful to worry about it, because it seems to be inherent in our new merging technology. Having talked about the direction in which present trends seem to be leading us, I would now like to discuss certain goals which I think it would be worthwhile consciously to pursue.

I believe that the most urgent and immediate one is to catch up with ourselves both in the application of theoretical knowledge and in the application of available technology. As I have mentioned before, currently we use only a very small fraction of what is available in both of these fields. The solution to this problem, however, lies outside the traditional province of the structural engineer or that of the builder. It is a problem in communications, and in information retrieval. It is also a problem in education.

No doubt, society itself will pose new and challenging demands in terms of increased dimensions, increased spans, and unusual applications of structures. I am also convinced that a much closer attention to the development of new structural systems and to the problems of environmental control in general will lead to economies which will have very far reaching effects. In fact, I believe that in some areas the time is not far off when reduction of cost by orders of magnitude may become possible. If this should come to pass, the implications are staggering.

I believe that we have the scientific and technical means, for instance, to bring about a reduction by one order of magnitude in the cost of housing. To achieve this, we would not only have to apply the most advanced knowledge and technology but we would also have to redefine in an objective manner, free from traditional preconceptions, the requirements of environmental control which basically define the function of housing and living units. I believe that it is potentially possible to produce family living units, the cost of which would be closer to, or even less than, the cost of what we spend today on a single automobile.

I think that whether this and similar developments have come to pass, we will also see the disappearance of the profession which today we call, in general, engineering. The work will be performed by some sort of a new profession, with people trained in a discipline which will concentrate on the formulation of problems, the structuring of problems, and the solution of problems. Engineering will become the equivalent of scientific decision making in the general technological field. The bulk of our present skills will become obsolete and a significant part of our knowledge and experience, trivial. The prospect is exciting. Somehow I am not worried that men of imagination and intellect will be replaced by scientific techniques or computers.
TESTS CHECK ROOFING SYSTEM FOR HUGE PLANT

By Frank Couch
Smith, Hinchman and Grylls Associates
Detroit, Michigan

When the mammoth roof of a World War II vintage aircraft plant had deteriorated so badly that all of it had to be replaced, the reasons for failure were first thoroughly examined, and then a replacement system was carefully evaluated. This study included a test program to establish the fact that the built-up roofing system under consideration could withstand the stresses due to thermal expansion and contraction, especially since the expansion joints were originally spaced much farther apart than is now considered advisable.

The facility was built in 1942-1943 as the manufacturing and assembly building for military aircraft, and is still used for this purpose. The building is the largest aircraft factory under one roof in the world having a total area of 2,065,965 sq ft or approximately 47.5 acres. It is approximately 2,000 feet long, 1,024 feet wide, and has a clear height of 45 ft below the bottom chord of the roof trusses. War-time restrictions placed on certain strategic materials, especially steel, together with an urgent need for the facility, dictated the use of wooden roof decking which unfortunately was green and untreated.

In 1951 the plant was reactivated, after five years' use for Government warehousing, by Lockheed Aircraft Corporation who assumed responsibility for the operation and maintenance of the structure. From this date progressive deterioration of the roof became evident. The gradual embrittlement and cracking of the roofing felts due to the loss of volatiles in the coal tar pitch was to be expected from extended sun and weather exposure.

However, of greater significance was the fact that, increasingly, the structural roof deck had suffered from water penetration and saturation of the insulation over relatively large areas of the roof which had produced extensive infestation of the plank decking with consequent rotting and weakening of the roof structure.
On separate occasions, beginning in 1954, Lockheed engaged the services of engineering firms to investigate the condition of the roof structure and to provide recommendations and cost estimates for its restoration to a safe and watertight condition. These consultants universally agreed that the roofing felts and insulation would soon require replacement. They further recommended that substantial portions of the present wood deck would require replacement because of excessive warping and shrinkage and a loss of structural strength of the wood decking from rot and decay. In 1956 several proposals were considered; first for repair, then for replacement of the roof. While recognizing the existence of deficiencies in the present roof, the Air Materiel Command concluded that by continuing normal maintenance procedures, the useful life of the present roof could be extended for several additional years.

For the next three years Lockheed followed a program of continued inspection and maintenance which materially prolonged the serviceability of the roof. During this period, however, signs of advancing deterioration such as the splitting and rotting of the organic felt, gave increasing evidence of decay from fungal activity on the underside of the deck.

The progress of gradual deterioration of the roof changed abruptly in the winter of 1960-1961 following prolonged periods of sub-freezing temperatures. A marked increase in serious leaks gave clear evidence of progressive failures of the roofing membrane in general and that a complete rehabilitation of the roof could no longer be delayed.

The roofing membrane as originally applied consisted of three plies of standard 15-lb roofing felts, hot mopped with coal tar pitch and protective surfaced with natural gravel. The most serious defect noted was the splitting of the roofing felts over the top of the purlins. This was primarily due to deflection of the deck between purlins resulting in a general loss of bitumen and gravel surfacing causing a general embrittlement and rotting of the bare organic felts from weathering. The 9-lb density fibrous glass insulation was found to be soft and spongy.

The vapor barrier consistent with accepted practice of the time of construction consisted of one ply of red rosin paper nailed to the roof deck and covered with two plies of 15 lb tar-saturated felt, hot mopped with coal tar pitch. Because of the relatively poor condition of the primary roofing membrane, the vapor barrier in many instances was serving as a secondary roof. This condition had resulted in an entrapment of a large amount of water in the insulation as previously mentioned. To make matters worse the vapor barrier was not on warm side of the construction, but actually in the center between the wood deck and the insulation, contradictory to good construction practice.

Extreme sun temperatures softened the bituminous coatings, causing them to leave the purlin ridges and migrate to the deflected areas, leaving the organic felts devoid of their normal protection and which contributed to subsequent failure.

The Replacement Roof
Long-span cellular metal deck was selected as the replacement roof deck because it had a smooth surface for application of the insulation and roofing membrane; provided ample support for mechanical services; was lightweight, non-combustible, economical, readily available, and fire-resistant.

The inclusion of a vapor barrier to prevent water vapor penetration into the insulation was particularly necessary for the Lockheed plant because of high relative humidity of outside air frequently used directly for cooling.

Polyvinyl chloride sheet was chosen for this purpose. While usually .004 gauge material is normally employed, .008 gauge was selected to resist traffic and mechanical abrasion during the initial installation. Cold adhesives recommended and approved by the manufacturer and in the quantities approved by Factory Mutual were employed for adhering the vapor barrier to the metal deck, and in turn the first course of insulation to the vapor barrier.

Two basic types of built-up roofing were considered: (1) four-ply conventional coal tar pitch and gravel surfacing, over either glass fiberboard, perlite board or cellular glass insulation; (2) four-ply asphalt using glass felts and mineral surfaced cap roofing, over glass fiberboard insulation.

We concluded that both of these two basic types of roofing could produce a trouble-free installation. As our research and investigation continued, we progressively felt that there existed a marginal advantage were we to employ the asphalt and glass felt system. This roof became the base bid with alternates for four-ply coal-tar pitch and gravel roof.

In the construction of the original roof, water cut-offs had been employed at 30 ft on center in both directions. Lockheed felt that the water cut-offs had successfully limited the degree of wetting of the insulation when roof leaks developed and they requested them in the new roof. A 15 mil polyisobutylene film reinforced with woven glass fabric was selected for the water cut-off to provide a strong flexible material which would work equally well with both hot bitumen and cold vapor barrier adhesives.

The expansion joints on the Lockheed roof were located at 360 by 400 ft, far in excess of what might normally be considered good practice. Therefore we thought it necessary to establish the forces generated in the built-up roofing membrane due to thermal contraction, and further to ascertain whether the membrane could resist such forces effectively without any indication of failure.

Test Program
A test program was undertaken to provide data on the performance of the entire roofing system's component parts including the metal deck, vapor barrier, insulation, waterproofing membrane and flashing details when subjected to thermal shock and to thermal shock combined with movement in the supporting deck.

Thermal Shock Tests
In general, each test panel was subjected for a period of one hour to the heating effects of infra-red heat lamps raising the temperature of the roof to 118 F. The heat lamps were turned off and 3 in. of dry ice were applied over the roof surface, and allowed to remain in place for one hour, resulting in a roof temperature of approximately —100 F.

The roof system was tested in four separate methods:

The first test applied thermal shock through a quick temperature change to represent a change in roof surface
Test 1: To observe ability of roofing membrane to withstand thermal shock and to measure contraction force in membrane during rapid temperature drop.

In this test 10 infrared lamps raised the temperature to 118°F, and then dry ice was dumped on top to drop it to −100°F.

Test 2: To observe ability of roof insulation and adhesive to withstand potential shear forces resulting from contraction in membrane.

A hydraulic jack applied tension to various components of the roof system to simulate the effect of movement of the structure.

Test 3: To observe ability of roofing membrane to resist potential stresses transmitted to it by movement in structural deck.

Wind pressure was applied to various test samples according to the Factory Mutual procedure to simulate the effect of uplift.

Test 4: To observe ability of flashing detail to resist contraction stress as recorded in test No. 1.

- Indicates component clamped in position
- Component clamped, with transducer to record tensile loads
- Pull exerted through jack
- Points of measurement
Vapor barrier applied to the deck was .008 gauge polyvinyl chloride sheet. With vapor barrier down, glass fiber insulation was adhered to the deck. Final covering of the new roof system was a white mineral-surfaced cap sheet. General contractor: R & D—Lipsett Joint Venture; roofing sub-contractor: L. F. Still Roofing.

Temperature which might occur when an ice storm follows a clear sunny sky. The criteria were that no break should occur in the roof membrane nor the contraction force exceed 75 lb per in. of test width. The roof membrane was fixed at both ends during the 220 F temperature drop to —100 F. The maximum force recorded was less than 60 lb per in. of width. No splits or breaks occurred.

The second test was run to determine the ability of roof insulation, vapor barrier and adhesive to resist roof membrane thermal shock contraction stresses without movement and to record the amount of contraction in the membrane. Failure to meet the 1/4-in. maximum contraction and a recovery to 1/2-in. criteria was not cause for rejection but required a test of the flashing detail discussed in Test 4. The results of this test were a .27-in. contraction of the membrane at —100 F with a recovery to .11 in.

Test 3 introduced deck movement in conjunction with thermal shock on the membrane. Acceptable performance required that no break should occur with a deck movement of 1/4 in. at the —100 F temperature. Due to the movement observed in Test 2, Test 4 was run with the criterion that the flashing should withstand the contraction stress of Test 1 without movement or breaking.

In addition to tests on thermal contraction and deck movement, resistance to wind uplift had to be determined.

The wind-uplift tests were conducted in 15 psf load increments. At the conclusion of the first test, the panel which was loaded to 90 psf was disassembled and examined. Examination disclosed apparent failure due to separation of the insulation from the vapor barrier. No ruptures or breaks were observed in the vapor barrier or in the roofing. At the conclusion of the second test the panel which was loaded to 75 psf was disassembled and examined. The apparent cause of failure was delamination in the second layer of insulation. Both panels were considered to have met the criteria of Factory Mutual: "...no separation of any bond between the metal roof deck, vapor barrier or insulation board, up to, and including 60 psf. There shall also be no delamination of the insulation board itself."
COMPUTER HELPS DESIGN MECHANICAL SYSTEMS

New program determines heating and cooling loads, predicts system performance

A new tool may save many hours of calculation in the design of heating and air-conditioning systems. The great volumes of data, calculations and charts required to evaluate all the variables and to make an optimum selection of one of the various mechanical systems available for a given building have been translated into a new computer program by the Westinghouse Electric Corporation Construction Group. Plans are to make the program available to engineers and architects on a selective basis.

In the first phase, the physical characteristics of a building, such as lighting, occupancy, orientation and glass, together with the data for a typical design day, winter or summer are fed into the computer which comes up with the heating or cooling requirements for a building. The computer program has a capability of analyzing 250 zones and will print out the total load, the sensible heat factor of this load and the time at which the load occurs in each zone. With the design data from the first phase, a mechanical system can be selected for the building. Then using weather bureau data, the performance of the mechanical system can be determined in relation to outside weather conditions.

Some of the input data necessary for the design program are: (1) the solar azimuth and altitude for each hour of the months being studied; (2) solar radiation and diffuse radiation for the building location; (3) orientation of the building zones and any projections, reveals, or shade contributing factors of the building itself or of adjacent buildings; (4) wall thickness, mass, specific heat, conductivity, absorptivity, time lag; (5) hour-by-hour outside temperature and humidity; (6) internal heat loads and their time of occurrence; (7) electrical loads; (8) ventilation and infiltration loads; (9) complete data on the many basic types of glass, including transmissivity, reflectivity, conductivity, orientation, shading and outside air films; (10) the physical dimensions and identification of each building zone.

The computer will print-out loads and analyze the hour and month of maximum coincident load on each zone. It will determine the hour and month that the maximum coincident load occurs on the building and the contributions to this load by walls, glass, people, etc. The computer will also print-out the quantity of air for heating or cooling by programing a temperature for the supply air. Ra-

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**Top:** Cooling loads at peak hours. **Center:** Total cooling loads during July. **Bottom:** Solar loads for each zone

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tios of sensible heat to the total are also determined for the cooling cycle.

The entire computer program was developed using formulas and data described in ASHRAE papers, tests conducted over the years, and data published in the ASHRAE Guide.

Once the computer has clearly defined the nature of loads on a building, the task of arranging a mechanical system to offset these dynamic loads is exacting. Which mechanical product in which mechanical system solves the building requirements best? Which system has the lowest first cost? The lowest operating cost? The performance characteristics that best satisfy clients' needs? The practice of recording historical operating costs and system performances on other buildings and concluding that a proposed building will behave the same way may cause many financial problems.

Predicting the performance of mechanical system in a proposed building by existing manual techniques is necessarily based on a limited number of calculations operating on selected steady-state conditions. The computer can evaluate the dynamic performance of the mechanical system when actual load creating conditions are simulated over a year.

To do this, considerable extensions of standard data were programed into the computer. For example, hour-by-hour weather data must be obtained for the location of the building being studied. The values of temperature, relative humidity, absolute humidity, cloud cover, wind velocity, barometric pressure and cloud layers are needed. One of the major efforts was to make a correlation of solar radiation with a given condition of clouds, temperature, humidity and visibility.

The second important data category is the complete description of the operating characteristics of the building including heat transfer lag, the hours of occupancy, both day and night, weekends, holidays, and night set-back temperatures if desired.

The third important data category is that of the specific mechanical system being studied.

It is necessary for the engineer to select components of the mechanical system and its control sequence for fans, pumps, cooling towers, compressors and boilers. The equipment performance curves at various conditions of capacity and temperatures must be translated into the program. The electrical contribution to building load and useful work is determined and programed. In essence, the complete mechanical system is described so that when the weather and building usage create a specific load and this load is handled by the mechanical system, a measure of the load and system capacity will be stored in the memory of the computer. The effect of diversity of loads is programed.

Since the computer has determined the heating or cooling load at every hour of the year, the rate at which the mechanical system handled the load, the per cent of total capacity being used, and the amount of energy required, operating costs can be determined and the new integrated system can be evaluated.

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*Room No.* | Sensible Load (BTUH) | Total Load (BTUH) | S/T Ratio | Time of Day | Supply CFM at 56 Deg. F
---|---|---|---|---|---
1 | 23604 | 25104 | 0.94 | 1600 JUNE | 1017
2 | 11157 | 12657 | 0.88 | 1700 JUNE | 481
3 | 16570 | 18570 | 0.89 | 1700 JUNE | 714
4 | 19290 | 20790 | 0.93 | 800 AUG. | 831
5 | 28153 | 29903 | 0.94 | 800 AUG. | 1212

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*Room No.* | Sensible Load (BTUH) | Total Load (BTUH) | S/T Ratio | Time of Day | Req'd CFM at 56 Deg. F
---|---|---|---|---|---
69 | 37381 | 40881 | 0.91 | 1900 JUNE | 1610

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**Total Building**

Max. Hour 1700 JUNE

Total Refrigeration 417 Tons

0.89 S/T

---

**Room No.** | Heating Load (BTUH) | Req'd CFM at 95 Deg. F
---|---|---
1 | 25369 | 940
2 | 20276 | 751
3 | 30415 | 1126
4 | 25369 | 940

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FLUID APPLIED ROOFING FOR HOUSTON STADIUM

The 642-ft clear span dome, which will enclose the air-conditioned volume of Houston's nearly completed stadium, shuts out the weather via a roof of plastic skylights and elastomeric roofing.

Designed to give maximum light for the 66,000 capacity building, the roof of the Harris County Domed Stadium consists of a total of 4,600 cast acrylic skylights, interspersed with sound-absorbent wood-fiber panels, covered with fluid applied neoprene/Hypalon coating.

The structure is a steel lamella framework in which large trussed beams, braced in a diamond pattern, arc upwards to the apex. Cast acrylic sheet was chosen to form a transparent plastic skin, which would admit sunlight and allow the cultivation of natural grass in the arena. This type of plastic was also chosen for its strong weather resistant qualities.

In order to reduce the sound level, it was decided that half the roof area should be made of sound absorbent material. Cement bound excelsior wood panels were chosen, and these were used to cover the complete lower third of the dome, and were fitted in between the plastic skylights in the upper two-thirds. A fluid applied neoprene/Hypalon roofing system was selected to cover the wood panels, to accommodate the movement of the
roof and provide a permanent seal. The system also ensures that the membrane is completely bonded to the decking and will not lift in high winds, which are frequent in the Houston area.

The wood fiber material was pre-sealed at the factory, and re-sealed on the job as a double check against imperfection. A Portland cement base sealer was used and spread at a thickness of \( \frac{3}{16} \) in. The wood fiber board is 3 in. thick, and is cut in panels 38 in. wide by 8 ft long. The panels were covered with successive coats of neoprene up to a thickness of 20 mils. A layer of continuous roving spun glass was placed between the first and second coats of neoprene, in order to give multi-directional reinforcement to the membrane. For the final coat, white Hypalon was applied.

Construction of a dome of this size presented a number of problems. It was important for the deck to be equally distributed as it was applied, to avoid unbalanced load on the structure. Flat cars with rubber wheels were used to transport the panels on the roof top. These cars were pulled by a winch and cable, and the wheels fitted in the grooves of the steel framework. The fluid roofing system was applied during the summer when the roof was at maximum expansion, in order to prevent undue stress on the elastomeric material and to eliminate any possibility of cracking through expansion. Great care had to be exercised in applying the coating to the panels between the skylights, to avoid splattering the plastic sheet. The wood fiber panels were fitted into steel bulb-T's, and the areas of cracks between panels grouted with 800 psi concrete. The grouted strips were then covered with an elastomeric tape, which had to be blocked off to protect against solvents in the coating. In order to keep down visual glare and provide additional insulation value, the skylights are composed of double layers of acrylic sheet, the inner layer having a light-diffusing prismatic surface.

The Houston architectural firms of Lloyd and Morgan, and Wilson, Morris, Crain and Anderson have associated to design the stadium. Coordination of the roof installation, which involved Texas Roof Decks, Jones-Blair Co. (coating) and Roof Coatings, Inc. (applicator), was handled by the Dunne Company.
ACTION OFFICE—NEW CONCEPT IN OFFICE FURNITURE

"A working climate designed to support and stimulate the capacities of its occupants to maximum performance" is how Herman Miller describes its new system of co-ordinated office furniture and equipment. The new system is the culmination of three years intensive research into the fundamental requirements and behavior patterns of typical office workers. As a result of these researches, Herman Miller reached the conclusion that the physical limitations imposed by standard office equipment frequently have an adverse effect on the performance of workers at various levels in an organization. Moreover, considerations of status and established precedent often outweigh more important factors such as comfort, freedom of movement and ease of communication.

The Action Office system consists of a number of components, designed by George Nelson and Ronald Beckman to encourage each individual to work in the way best suited to himself. The units can be used and combined in a variety of ways to accommodate the many different facets of office life. Standing and sitting desks, acoustically treated telephone stands, small round tables for informal conferences, perching seats, shelves and storage units are all part of the system. Desks have built in storage bins for the convenient filing of relevant material; roll tops are provided to discourage vertical storage and to allow confidential papers to be left spread out overnight, ready for an immediate start in the morning.

A basic 32-48-96-in. module was employed. Components anticipate specific and future machine requirements by carrying wiring conduits to the floor. Herman Miller Inc., Zeeland, Mich.

CIRCLE 300 ON INQUIRY CARD
more products on page 194
The aluminum sun screens on the school building above are Deca-Grid style Borden Decor Panel. The lightweight panels were furnished with tilted spacers to provide the proper degree of shading.

The tilting of the Deca-Grid spacers is known as the slant-tab variation, in which the slant-tabs (spacers) may be mounted at angles of 30°, 45°, 60° or 90°. The slant-tabs may be specified in various lengths as well, depending on the chosen angle of mounting. With the Deca-Grid style, specifications for spacings and spacer bar positions may be varied almost indefinitely.

All the Borden Decor Panel styles, including Deca-Grid, Deca-Gril, Deca-Ring and Decor-Plank, are highly versatile in design specification and in application such as facades, dividers, grilles, fencing, refacing of existing buildings, etc. Fabricated in standard or custom designs in sturdy, lightweight aluminum, Borden Decor Panels provide a handsome, flexible, maintenance-free building component.

Write for latest full-color catalog on Borden Decor Panels

BORDEN METAL PRODUCTS CO.
MAIN OFFICE: 822 GREEN LANE, ELIZABETH, NEW JERSEY • Elizabeth 2-6410
PLANTS AT: LEEDS, ALABAMA; UNION, NEW JERSEY; CONROE, TEXAS
When in New York City, see our exhibit at Architects Samples, 101 Park Avenue
For more data, circle 92 on Inquiry Card
ACRYLIC PLASTIC PANELS
An architectural design data folder contains nine bulletins which detail the use of Plexiglas acrylic plastic panels in building applications. Each of the one-page bulletins illustrates a sample project, and gives construction drawings showing the method of installation. Some of the Plexiglas applications covered in the bulletin are: formed fascia panels, curtain wall panels, sunscreens and dome skylights. Rohm & Haas Company, Plastics Dept., Philadelphia, Pa., 19105
CIRCLE 400 ON INQUIRY CARD

MAGAZINE ON SILICONE TECHNOLOGY
The fall issue of “Silicology,” Union Carbide’s quarterly magazine on silicones and silicone technology, features a number of recent product developments including four new anti-foams, a new silicone rubber and a new 60,000 cs. silicone emulsion for difficult release operations. The use of silicone surfactants to improve the quality and insulating properties of rigid urethane foam is discussed in an illustrated article on the new CBS building in New York—the first high-rise structure in the city to employ poured-in-place foam as insulation. Union Carbide Corp., Silicones Division, Dept. 0433, 500 Central Ave., Newark, N.J.
CIRCLE 401 ON INQUIRY CARD

TECHNICAL BULLETIN ON FASTENINGS
“Fastenings for Lumber” is the seventh in a series of technical bulletins published by the Southern Pine Association. Illustrated in color, the bulletin provides detailed information on a variety of mechanical fastenings and includes descriptions and illustrations to enable the designer to specify the type of fastening best suited to his use. Tables shown in the bulletin are based on the “National Design Specification for Stress-Grade Lumber and its Fastenings.” Southern Pine Association, P.O. Box 52468, New Orleans, La., 70150
CIRCLE 402 ON INQUIRY CARD

RIGIDIZED METAL FACING
A four-page catalog gives details of Rigidized metal facings, which is available in ferrous and non-ferrous metals in a number of different finishes. In addition to displaying the latest textures and architectural applications, the catalog has a section on the proper method of specifying and applying Rigidized to curtainwall construction. Rigidized Metals Corp. 635 Ohio St., Buffalo, N.Y., 14203
CIRCLE 403 ON INQUIRY CARD

CEILING SYSTEMS
A new 56-page color catalog, AD-S-65, describing the complete line of Armstrong ceiling systems, includes the new A-50 and B-48 luminaire systems. Entitled “Armstrong Ceiling Systems—1965,” the catalog provides complete information on more than 50 different types of commercial ceiling and includes sample specifications, performance tables and engineering data. Armstrong Cork Company, Department P.I., Lancaster, Pa.
CIRCLE 404 ON INQUIRY CARD

PERFORATED METAL
Twenty-four designs of Cross decorative and commercial perforated steel are described and pictured in a new four-page brochure. Included are actual size illustrations for all perforations listed and data on available thicknesses and per cent of open area in each pattern. Over 100 suggested applications including room dividers, furniture, display units, home appliances and guards for machinery are listed. Department RDT, National Standard Company, Niles, Mich.
CIRCLE 405 ON INQUIRY CARD

CABLE INSTALLATION
A completely revised and up-dated catalog has been published covering the company’s line of above ground, ground level and underground equipment for the installation of electrical cables. Included are manhole and duct tools, overhead equipment, stringing sheaves, cable racks and arms. T.J. Cope, Collegeville, Pa.
CIRCLE 406 ON INQUIRY CARD

COMPREHENSIVE LIGHTING CATALOG
Lightolier’s new catalog contains 112 pages presenting their line of over 500 designs for decorative and functional lighting. The catalog is divided into nine specific sections: chandeliers, contemporary lighting fixtures, pendant fixtures, lighting ideas, lighting for the bath, fixtures for small spaces, utility lighting, recessed lighting and outdoor illumination. Lightolier, 246 Claremont Ave., Jersey City, N.J.
CIRCLE 407 ON INQUIRY CARD

PROTECTIVE COATINGS
A new bulletin, T-97, describes Bitumastic protective industrial coatings and Koppers Pavement Sealers. The booklet gives properties, specification data, and case history information on 10 Bitumastic cold-applied coatings and two types of pavement sealers. The bulletin also lists recommended coating systems for more than 100 common metal, concrete and masonry installations. Koppers Company, Inc., The Koppers Building, Pittsburgh, Pa., 15219
CIRCLE 408 ON INQUIRY CARD

OFFICE FURNITURE
The Series 7000 Philadelphia collection of office furniture is displayed in a handsome fold-out catalog. The line includes single and double pedestal desks, secretarial and executive L-groups and U-groups, occasional tables, conference tables and filing cabinets. Costa Mesa Furniture Co., 411 East Julianna St., Anaheim, Calif.
CIRCLE 409 ON INQUIRY CARD

REVISED SPECIFICATIONS
CIRCLE 410 ON INQUIRY CARD

*Additional product information in Sweet’s Architectural File
more literature on page 236

ARCHITECTURAL RECORD January 1965 189
View of recently completed Holiday Inn Jr. Motel, Memphis, Tennessee, supported by two main pillars.

Frame for each section consists of 14" Light Beam longitudinal members and Junior Beam cross ties overlaid with metal deck.

A four bedroom section being swung into position by crane. Two duplicate sections, facing a corridor, provide a total of sixteen rooms.
A new Holiday Inn Jr. starts here... at 50% less cost

Chalk up one more wonder for this age of "instant living." Holiday Manufacturing Company, a division of Holiday Inns of America, Inc., has created complete, factory built, transportable motel units!

Four-room sections of the new Holiday Inn Jr. are transportable to the site on demountable running gear and pulled by a truck tractor. Each 56'x10' compact room-unit is fully self-contained, with its own plumbing, heating, air conditioning, wiring and furniture—down to the rug on the floor!

Support for the Junior, which must resist deflection for both cantilever loading when in place and over the road haul, is fabricated from three 56' 14"-17.2# J&L Light Beams. The floor is a steel deck welded to the Light Beams and overlaid with 3/4" plywood.

Two four-room sections, which can be arranged in multiples, are positioned at the site to face a 6' hallway. The corridor support is prefabricated from 6" Junior Beams and bolted to the 14" Light Beams supporting each Junior unit.

The cost of building these units, Holiday estimates, is 50% less than constructing a conventionally built motel. Savings stem from factory production methods, ease of transportation and reduced on-site construction costs. For markets, HIA looks to smaller towns, not geared to plush supermotels. Possible sites include airports, truck stops and hospitals.

The Holiday story proves again that creative ingenuity is to be found everywhere on the American scene... and that J&L Steel can be an important factor in giving substance to the designer's vision.

Jones & Laughlin Steel Corporation

For more data, circle 93 on Inquiry Card
How finely detailed STOCK WINDOWS contribute to an unusual Indiana church

Would you call Orus Eash's church a courageous design? In some areas, it would be controversial. Yet the building has an eloquent majesty, a strength, a serenity, a feeling of welcome, that sets it apart as a center of worship.

Immanuel Baptist Church is a creative, imaginative design... a strong achievement of an architect's goals.

That stock Andersen Casement Windows can become a part of such designs... not inhibiting the architect in any way... is a tribute to their finely detailed lines and the craftsmanship in their manufacture.

This is window beauty... contributing to the overall architectural scheme without becoming obtrusive.

And it comes with the assurance that Andersen Casements will operate smoothly, silently, effortlessly for the life of the building. They will save on heating costs. They will
provide draft-free comfort... because they're precision built to be at least 4 times more weathertight than ordinary windows.

Check Sweet's File. Or contact your Andersen distributor for a Tracing Detail File. All Andersen Windows are readily available in the United States and Canada.

Andersen Windowwalls

America's Most Wanted Windows

ANDERSEN CORPORATION • BAYPORT, MINNESOTA
Product Reports
continued from page 187

ACOUSTICAL PARTITIONS FOR
SCHOOLROOM USE
A new type of folding, classroom partition is said to provide a high level of sound control, and to be easy to operate either electrically or manually. Full scale laboratory tests have shown that the new 700 Series partition has a 38 decibel class rating under fully operable conditions. The partitions are sufficiently sturdy to provide functional working walls which will accommodate chalkboard, tackboard and display materials. Panels can be made up to 12 ft high, in widths from 32 in. to 4 ft. The panels are 2¼ in. thick. Brunswick Corp., School Equipment Div., 2605 East Kilgore Rd., Kalamazoo, Mich., 49003
Circle 301 on Inquiry Card

RADIO PAGING SYSTEM
The new Page-Mate radio-paging system consists of a compact transmitter, microphone, antenna, control unit, and any number of receivers which are sufficiently compact in size and light in weight to fit comfortably into a shirt or jacket pocket. Round Hill Associates Inc., 434 Avenue of the Americas, New York, N.Y., 10011
Circle 302 on Inquiry Card

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For more data, circle 94 on Inquiry Card
REFERENCE FILE:
1965 Sweets' File Ao
1964 A.I.A. BPR 4.05 A-B
1965 CE SPEC. DATA FILE S-a
CSI File Div. 4
A.I.A. File 3M-5F

AA WIRE PRODUCTS
Masonry Reinforcing Bond & Ties

BLOK-LOK & THIN-JOINT

ECONO-LOK

ECONO CAVITY-LOK

ADJUSTABLE TIE FOR CAVITY OR VENEER WALL
TOTAL ADJUSTMENT 4"

CAVITY-LOK

SOLID TIE FOR VERTICAL AND HORIZONTAL SHEAR
TOTAL ADJUSTMENT 1"
MADE OF GALVANIZED, COPPER COATED OR STAINLESS STEEL WIRE

AA-LOK

weld reduces L

RECTANGULAR TIES

2" x 6"

Z-BARS

4" x 6"
nail-on brick tie for tile soaps
nail-on brick tie

FOR VENEER OF EXISTING MASONRY USE HARDENED MASONRY NAILS AND ANCHOR IN OLD MORTAR JOINT

TITEWALL CONTROL JOINT

SOLID TIE FOR VERTICAL AND HORIZONTAL SHEAR TOTAL ADJUSTMENT 1"
MADE OF GALVANIZED, COPPER COATED OR STAINLESS STEEL WIRE

DOWEL SLEEVE

CONTROL JOINT

FLEX-O-LOK

DOWETAIL FLEX-O-LOK

4 GAUGE MILL GALVANIZED WIRE

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Pat Pending

For more data, circle 95 on Inquiry Card

ARCHITECTURAL RECORD January 1965 195
HARVARD ADDS ITS 3\textsuperscript{rd} SELECTOGRAPHIC

Honeywell Selectographics will control temperature and equipment for 162 buildings when the third unit is installed

Harvard is a prime example of how control of temperatures and mechanical equipment for an entire campus can be automated to increase efficiency and cut operating costs. Harvard's 3\textsuperscript{rd} Honeywell Selectographic, which will be installed this year, will monitor the 2 units already in operation. From it, one man will actually be able to supervise 162 buildings.

The story really starts in 1960, when Harvard decided to install its first Honeywell Selectographic Control Center. Before that time, operating and maintenance men were spending hours going from building to building to perform routine tasks: checking temperatures, starting, stopping and checking equipment.

A Honeywell analysis pointed out the "inordinate amount of time" required for these operations, and Selectographic Number 1 was installed. This first unit controlled 67 buildings north of the Harvard Yard. From it, one man could:
1. view 37 schematic diagrams (projected from slides) representing systems for the 67 buildings.
2. start, stop, or listen to 42 fans up to ½ mile away.
3. operate 32 steam valves.
4. check temperatures at 100 points.
5. get warning of humidity changes in steam tunnels or library areas (which include, among other treasures, Oriental manuscripts).

Our study of estimated savings indicates that the new Honeywell equipment will pay for itself in less than 5 years.

The first installation improved service. Equipment now is being operated more efficiently because it is being started and stopped in just the right sequence at the proper time. Trouble is detected quickly...a big assist in preventive maintenance. Selectographic Number 2 was installed in 1962. This one controls 40 buildings in Harvard's South Yard.

Now, preparations are being made to install Selectographic Number 3, which will complete the job bringing the 55 buildings in the Harvard Yard under automated control. This third unit is being integrated with the first two, and will control them.

Once installed, it will be possible for one man to control all 162 buildings...to handle nearly anything but maintenance from his chair! Harvard will have a completely automated control system—one that can include new buildings as they're built.

The same thing is happening on campuses across the country—colleges of all sizes and ages. New York University's Long Island Center, for example, has a Selectographic which now controls 8 buildings, eventually will control 40. San Antonio College has one designed to control 10 buildings.

Send for free report on Harvard

Honeywell SIMPLIFIES BUILDING CONTROL

ARCHITECTURAL RECORD January 1965
1960
67 buildings controlled by Selectographic Number 1

1964
162 buildings will be controlled from a new panel now being readied for installation.

1962
40 buildings controlled by Selectographic Number 2
WHAT'S SO SPECIAL ABOUT METAL LATH, STEEL STUDS AND PLASTER?

In addition to the functional values of metal lath and steel studs, gypsum plaster with appropriate finish adds beauty to the finished structure. The excellent combination permits, through architectural creativity, sweeping curves and decorative attractiveness.

Best of all, fire resistance, sound control, strength and durability, sanitation, adaptability, economy, light weight are benefits obtained with no other combination of materials by architects, plasterers, builders and owners. Remember, too, Bostwick Metal Lath, Steel Studs and Metal Lath Accessories are mechanically and structurally unsurpassed.

The new Bostwick Catalog shows specification data on our complete line of metal lath, metal lath accessories and steel studs. It is also found in Sweet's Architectural File. A personal copy is ready for you. Write today.

Product Reports
continued from page 194

SNOw-MELTING SYSTEM
A copper-tube snow-melting system has recently been installed under the sidewalks and walkways outside a bank in New Jersey. The system utilizes approximately 17,000 feet of hard drawn copper tube. Laid on 12-in. centers under a 2-in. slab of concrete, the system covers more than 11,000 sq ft and has an output of 3 million Btu per hour. The ethylene glycol heating solution is circulated through 1-in. copper coils at a rate of 280 gallons per minute. A steam boiler provides the heat source for the solution. Once in operation, two hours are required for the system to reach maximum efficiency. Copper tube expansion joints are encased in foam rubber to allow freedom for expansion and contraction. Copper Development Association, Inc., 405 Lexington Ave., New York, N.Y., 10017

CIRCLE 303 ON INQUIRY CARD

RECEPTION ROOM FURNITURE
These pieces were designed by Milo Baughman for use in reception rooms or hotel lobbies. Metal supports and bases are available in chrome or English antique finish. The table can be supplied with walnut or rosewood top. Thayer Coggyn Institutional, High Point, N.C.

CIRCLE 304 ON INQUIRY CARD
more products on page 216
Ironbound Continuous Strip Floor System—Individual edge-grain flooring strips are interlocked with steel splines and embedded in mastic for stability, smoothness and uniform resilience. Underlayment of \( \frac{1}{2} \)" cork gives added cushioning.

Robbins Ironbound® Northern Maple Floor guarantees resilience, stability, low-cost upkeep

In gymnasiums, auditoriums and many other areas, the Robbins IRONBOUND floor system gives maximum satisfaction. Installation of MFMA Northern Hard Maple edge-grain flooring by this superior method (see photo above) is made and guaranteed by experienced, franchised applicators, and backed by Robbins.

From coast to coast, Robbins IRONBOUND Floors give trouble-free service and low-cost upkeep in schools, colleges and other institutions with exacting floor requirements. For detailed data on floor systems and name of nearest authorized Robbins installer, write: Robbins Flooring Company, Dept. AR-165, White Lake, Wisconsin. See our catalog in Sweets.
KOROSEAL® IS COLOR IN VINYL WALL COVERING

But this isn’t even half of the more than 300 colors and patterns available

While we are on the subject of color, we’d like you to know that Koroseal vinyl wall coverings can be ordered in virtually any shade you wish. Just give us a reasonable amount of time and our color experts can match practically anything.

In addition to our more than 300 standard colors and patterns, and custom color service, you’ll find Koroseal satisfies your client’s needs for durable beauty on any wall.

• Rugged Koroseal construction withstands heavy wear without cracking, chipping or scraping.
• Stains and soil marks are soap-and-water washable with Koroseal. Yet colors won’t fade—even after countless scrubbings.
• Koroseal’s tough fabric backing won’t stretch or shrink. And Koroseal is the easiest of all heavy-duty vinyl wall coverings to apply. (Ask your contractor.)

Flame retardant Koroseal vinyl wall coverings are available for fast delivery everywhere in the U.S.A. in every one of their more than 300 colors and patterns. To obtain swatches like those shown here, write to: B.F.Goodrich Company, Consumer Products Marketing Division, Dept. KVWC, 277 Park Avenue, New York, New York 10017. Or use the handy coupon below.

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Household products • Furniture products • Home furnishing products • Drug sundries

Mail coupon today for Koroseal color swatches

Please send me more information on Koroseal vinyl patterns, colors and sample swatches.

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Your title ____________________________
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City ____________________________ State ______ Zip ______

Send to B.F.Goodrich Company, Dept. KVWC, 277 Park Avenue, New York, New York 10017.
You don't see many doors like this being produced nowadays. If you're a "traditionalist," you may lament the fact; if you're a "modernist," you may just shrug. Personally, we don't take sides (we can't afford to—we're in business to serve all the architectural profession). The reason we're showing off this particular door is to illustrate an important point: while its design may be a matter of taste, its beautifully executed craftsmanship is a matter of fact. Another matter of fact is that Michaels artisans are unexcelled in producing such complex and delicate work as this. Needless to say, the same skill and care are utilized every day in producing every Michaels product, standard or custom. That's why the very name Michaels has earned such respect from architects we've served. If you're not yet among these, we welcome the opportunity to prove our claim. Inquiries welcomed.

THE MICHAELS ART BRONZE CO.

Micael's In The Kitchen

Food service equipment in the above installation is "Custom-Bilt by Southern." Why are more and more owners, architects and consultants insisting on Southern? Find out today from your "Custom-Bilt by Southern" distributor or write us for copies of our free brochures of recent installations.

Southern's In The Kitchen

at SHERATON MOTOR INN, Willoughby, Ohio
Architect: G. Lyte Leslie
Custom-Bilt by Southern Distributor: A. W. Trouben Co., Inc.

Food service equipment in the above installation is "Custom-Bilt by Southern." Why are more and more owners, architects and consultants insisting on Southern? Find out today from your "Custom-Bilt by Southern" distributor or write us for copies of our free brochures of recent installations.

SOUTHERN EQUIPMENT COMPANY

GENERAL OFFICE: P. O. Box 7115, St. Louis, Missouri 63177
EASTERN DIVISION OFFICE: 125 Broad Street, Elizabeth, New Jersey
CHICAGO DIVISION OFFICE: 620 N. Michigan Avenue, Chicago, Ill.
50 "Custom-Bilt by Southern" distributors located throughout the country. Write for the name and address of the one nearest you.
What needs cooling inside when it's crisp and wintry outside?

Answer: Any modern building flooded with bright lights, excited people, humming motors.

And sun on the windows!

There are two ways to cool down a winter heat wave:

Run the cooling compressor, and pay the power costs. Or, air condition free, with Lennox Power Saver™.

Power Saver cools free at any temperature below 60° F., with fresh, cool outdoor air.

January or June. Without compressor wear or power cost, without low ambient problems.

How much can Power Saver save?

Example: In Chicago-type climate over 4,000 of the year's 8,760 hours are in Power Saver's free cooling range: 30° F. to 60° F.

Write for temperature/hour tables on 158 leading cities.

Lennox Industries Inc.,
463 South 12th Avenue,
Marshalltown, Iowa.
See our catalog in Sweet's.

POWER SAVER is the air control center of Lennox heat-vent-cool commercial systems, including rooftop, direct multi-zone, Landmark®, Comfort Curtain® and split systems.
Unique NEW Lighting Panel Concept from Wilson

THERMALUMÉ

This lightweight, illuminated ceiling solves the problem of sealing off large roof areas effectively... economically. It is equally attractive in sprucing up small areas. Therma­lume panels consist of non-burning PVC film stretched over steel frames. Panels handle easily, fit tightly for a dirt and dust free ceiling. Insulation properties drastically cut heating costs too. Work areas are bathed in shadowless, glare-free light because Thermalume transmits up to 90% of the natural or artificial light available. Therma­lume may be used with any standard ceiling track system accommodating panels of 2' x 2', 2' x 4', 3' x 3' or 3' x 4'. Proven the world over—millions of square feet in use. See Sweet's Catalog or for a new brochure on this versatile, NEW thermal lighting panel, write: Wilson Research Corp., 2001 Peninsula Drive, Erie, Pa. Phone 814-838-1981

WILSON

For more data, circle 112 on Inquiry Card

Product Reports
continued from page 198

GRAPHIC DATA PROCESSING SYSTEM
The IBM graphic data processing system claims to offer new capabili­ties in computer-aided design, development of engineering drawings and the preparation of statistical business graphs under computer control. The new system takes advan­tage of a computer to handle informa­tion displayed in the form of sketches, drawings, diagrams and graphs. A design engineer will be able to scan an existing microfilm image, display it on a screen, change the image with an electronic "pen," and then record the new image on microfilm and, within seconds, review the new image projected at 19 times its actual size.

The graphic data processing sys­tem will operate under control of IBM's System/360. The new system includes four units, each of which can be used independently. They are: the IBM 2280 film recorder, the IBM 2281 film scanner, the IBM 2282 film recorder/scanner and the IBM 2250 display. International Business Machines Corp., Data Processing Division, 112 East Post Road, White Plains, N.Y.

CIRCLE 305 ON INQUIRY CARD

IMPROVED REFRIGERATORS
The Koch Certified M series of re­frigerators, freezers and hot food cabinets incorporate a number of im­provements. Exterior dimensions have been reduced to save kitchen space. Vinyl-to-vinyl door seals, heavy steel door hinges, cylinder-locking, positive action door fasteners and anti-overlap door stops are supplied as standard equipment. Koch Refrig­erators, Inc., Kansas City, Kan., 66115

CIRCLE 306 ON INQUIRY CARD

ARCHITECTURAL RECORD January 1965
A Kohler Distributor—A Kohler Technician
A Kohler Electric Plant
3 steps to stand-by power you can count on

When you're planning a stand-by power installation Kohler Distributors stand ready and able to survey your requirements—will recommend the Kohler Electric Plant or plants best suited to them. And to make absolutely sure your needs are being met, Kohler technicians assist Kohler Distributors in estimating those needs, in supervising installation. Your Distributor and Kohler men work together to assure traditional Kohler performance for long years ahead.

As for the Kohler Electric Plant itself, the "Kohler Check Marks of Value" below give you some idea of Kohler quality. For more information see your Kohler Distributor or write Dept. EP5-501, Kohler Co., Kohler Wis.

KOHLER MARKS OF VALUE

One source responsibility—the complete plant is backed by Kohler
Nationwide sales and service—performed by Kohler-trained mechanics
Unitized design—plants are completely assembled and tested at the factory
Built in vibro-mounds...for quiet smooth operation

Heavy duty design—Kohler plants have capacity beyond their rated output—2 hp per KW.
Automatic voltage and speed regulation—maintain power at even level
Gas, Diesel and Gasoline fuel options
Integral exciter, starting—quickest, simplest, most positive, trouble-free engine starting available.

KOHLER OF KOHLER
Kohler Co., Established 1873, Kohler, Wisconsin
ENAMELED IRON AND VITREOUS CHINA PLUMBING FIXTURES • ALL-BRASS FITTINGS • ELECTRIC PLANTS • AIR-COOLED ENGINES • PRECISION CONTROLS

For more data, circle 113 on Inquiry Card
NEW—with architectural styling!
Goes anywhere at all!

...the AAF NELSON/aire console unit

Remarkable new Mark II console unit serves wide range of heating, ventilating and air conditioning needs...offers institutional quality combined with modern architectural styling.

The AAF NELSON/aire fan coil unit provides these exclusive AAF features: modern thin design (all models only 9¾" deep); two basic cabinet styles, decorator and standard; money-saving "Damper-Guard" control; anti-blowthru ventilating damper. It stands in a class by itself for quality, styling and application versatility.

A complete line of NELSON/aire units is available for a wide variety of applications (some pictured above). Decorator units are available in all models. NELSON/aire units, designed to be compatible with the award-winning styling of famous Herman Nelson Unit Ventilators, are manufactured for use with all supply mediums. For additional information, write American Air Filter Company, Inc., 215 Central Avenue, Louisville, Ky. 40208.

For more data, circle 114 on Inquiry Card
ABC's of Prestressed Concrete

Here's flexibility in design... speed and economy in construction... continued savings in permanent, quality structures!

Prestressed concrete structural units are mass produced in the plant to exact specifications while excavation and foundation work takes place at the site. Close supervision and control of materials by a specialized work force in the plant produce a high quality product at a minimum cost.

Delivery is made as called for by contractors' work schedules.

In almost all instances, units are erected directly from truck to structure without stockpiling or re-handling at the site. Prestressed members fit readily in place to speed erection, shorten total construction time, save labor costs.

Long spans of gracefully proportioned prestressed concrete beams eliminate columns to provide more usable space. No painting or maintenance is required and little or no waterproofing. Durability and fire resistance mean low insurance premiums. Two-hour Underwriters' Laboratories label service is available on commonly used prestressed concrete members. Advantages like these account for the continuing growth in the use of prestressed concrete in almost every type of structure.

See your local PCI member for standard shapes available and costs.

ROOF AND FLOOR UNITS • GIRDERs • BEAMS • COLUMNS • WALL PANELs • SLABS • JOISTS • PILING

Prestressed Concrete Institute
205 West Wacker Drive • Chicago, Ill. 60606

For more data, circle 115 on Inquiry Card
FULL SIZE WHITEPRINT MACHINE
The Cutlass Diazo whiteprint making machine has a full size 42 in. width capacity for any length original, with automatic separation of tracing from print paper and automatic shutdown time delay. Nine models are available in four lamp wattages of 1,500, 2,000, 3,000 and 4,000, with top machine speeds of 20, 30, 40 and 60 feet per minute. The machine can be supplied as a table top model or with fully enclosed cabinet. The company claims that the Cutlass price range is as low as any so far achieved with this type of equipment. Copymation Inc., 1800 Greenleaf Ave., Elk Grove Village, Ill.

STREET LUMINAIRES
A street lighting luminaire for residential and secondary roadways is now available from Westinghouse. The end-mounting unit (Type MO-8 Silverliner) has a choice of built in ballasts to operate 100-, 175- or 250-watt phosphorcoated mercury lamps. The cast aluminum reflector and ballast housing have a hard-textured, aluminum baked enamel finish. Westinghouse Lighting Division, Edgewater Park, Cleveland, Ohio

Halsey Taylor
THE HALSEY W. TAYLOR CO. • 1554 THOMAS RD. • WARREN, O.

For more data, circle 116 on Inquiry Card

Tucks into a 10-inch recess

Takes up less corridor space

The RWM-10 is a self-contained wall-mounted water cooler, designed for high traffic areas where clear corridor space is critical. Projects just 10 inches from finish wall and needs only a 4½" back recess for mounting. Equipped with stainless steel receptor — 2-stream projector with push button operating valve. Cabinet apron finished in gray baked enamel, stainless steel, or laminated vinyl — silver spice or mocha brown.

For complete information about the RWM-10 or other Halsey Taylor water coolers and drinking fountains, write for new catalog. Also listed in SWEET'S and the YELLOW PAGES.

For more data, circle 307 on Inquiry Card

more products on page 224

more products on page 224

ARCHITECTURAL RECORD January 1965
In the Morton Grove, Illinois plant, Booster motors are built to exacting standards which assure quiet operation.

the only circulator with all parts designed, made and guaranteed by one manufacturer

More B&G Boosters are bought than any other pump made for the same purpose...a preference easy to explain. B&G Boosters are produced by an organization which stands back of its product—which offers help in any problem of system design or installation—and which has a nation-wide group of distributors who maintain adequate stocks and replacement parts to serve your needs.

B&G Boosters are preferred because they are quiet—vibration-less—no noise to ruin a correctly designed and installed circulated water heating or cooling system. They are dependable and profitable—not a cause of endless service calls and customer dissatisfaction. Basically superior design, plus sturdy construction of best materials, assure faithful performance for years. All parts of a Booster are made by B&G—permitting genuine quality control and a single source of responsibility!

The sales record of the B&G Booster is clinching proof that its superior quality and performance has never been equaled!

ITT Bell & Gossett Inc., a subsidiary of International Telephone and Telegraph Corporation, Morton Grove, Illinois, Dept. II-32.
Here’s how:

Save space by conducting air over, rather than under or around, obstructions.

Granco’s new, compact A-E (Air-Electric) Floor system eliminates bulky ductwork. This saves space at every floor level and allows you to design a maximum number of stories into a given building height.

In the illustration above, the 12-story building was designed into an 11-story building height. A-E Floor’s shallow air plenum and electrical cells (see detail right) sandwiched between structural slab and finished floor reduced over-all floor depth 25% ... saving enough space for an extra story!

Saving space is just one benefit. For more information on how the A-E Floor system permits continuous grills under floor-to-ceiling windows, luminous or exposed ceilings, full services for cantilevered floors, write for new A-E Floor catalog AE-641, Granco Steel Products Company, 6506 North Broadway, St. Louis, Missouri 63147. A subsidiary of Granite City Steel Company.
NEW! FRAMELESS PRISMATIC CUSTOMLENS
SETS A NEW STANDARD IN LIGHT CONTROL

CUSTOMLENS is injection molded in one piece, in either styrene or acrylic. The hinge pins are an integrally molded part of the lens, assuring permanent strength and consistency.

No metal frame as the lens is self framed and self hinging. No metal hinges or latches, provide larger "daylight" opening and thus more illumination per fixture.

CUSTOMLENS is simplest to handle and install, no tools or complicated instructions. Installed as final operation on job, saving costly clean-up time.

CUSTOMLENSES are available for all types of fixtures or ceiling constructions.

Molded in 1 ft. or 4 ft. and 2 ft. x 4 ft. sizes.

WRITE FOR BULLETIN 1400 ON COMPLETE ENGINEERING DATA TODAY
you can increase any building's prestige in snowy weather

When winter hits, snow and ice and slush too often detract from building design. But you can assure a clean approach to your buildings—and snow-free walks and drives for your clients. Specify electric Sno-Melter systems beneath concrete and asphalt areas. Pre-wired, roll-out mats, or stock-packaged MI Cable units. A new Sno-Melter Automatic Switch (as shown) detects snowfall, turns system on and off as it is needed. Sno-Melter results show. Write for latest illustrated literature.
Remember Styrofoam.

(If you're not using it for roof insulation now, you probably will in a few years. So why wait?)

We've talked to architects and they've told us they think Styrofoam® RM brand roof insulation is the material of the future, the near future. And we believe them. Styrofoam RM roof insulation is the new and better way to insulate built-up roofs. It has proved itself superior to other well-known roofing products. Matter of fact, can you name any other insulation that matches the advantages of Styrofoam RM? That can't absorb water? Acts as its own vapor barrier? Won't rot? Can't collect mold? Has a low "k" factor? Won't lose its efficiency? Is liked by roofing contractors because it's so light, non-irritating to the touch, and easy to install? No names come to mind? All the more reason for remembering that Styrofoam RM is the roof insulation of today—and tomorrow. Want to know more? You'll find it in Sweet's Architectural File 10a/Do and 8a/Dow. Or write us. The Dow Chemical Company, Plastics Sales Department 1312N1, Midland, Michigan. Styrofoam is Dow's registered trademark for expanded polystyrene produced by an exclusive manufacturing process. Accept no substitutes ... look for this trademark on all Styrofoam brand insulation board.

OK. Now forget it.

(Only until your next job, that is.)

For more data, circle 121 on Inquiry Card

ARCHITECTURAL RECORD January 1965
for style

monolithic reinforced concrete
is the architects' design material

- Architecture has come of age in America! In this architectural evolution, monolithic reinforced concrete is the preferred construction material. It can be molded freely into any contour and shape, and eliminates the many design restrictions imposed by all other construction methods. Through the use of reinforced concrete, architects can exercise complete freedom in the achievement of style, elegance, and individuality. Decide now to utilize the great design opportunities of monolithic reinforced concrete in your next building.
Anything that has stood this test of time has got to be good.

Kinnear conceived and developed the interlocking metal slat rolling door in the late '90s. And to this day some of the doors installed in those early years are still in service. In fact, it is not uncommon for Kinnear Doors to outlive the serviceability of a building ... even being re-installed on a new structure after 20, 30 or 40 years of dependable daily service.

And the reason for this service record is apparent. The coiling, space-saving, efficient Kinnear design is as basic as the wheel. When it is then combined with equally sound engineering and all-metal construction of the highest possible quality, the result is unbeatable. Also, it provides a door unsurpassed for automated motor operation.

So, it isn't any wonder that the Kinnear Door still establishes the standard for Door Quality and continues to grow in popularity for today's most modern buildings. Write TODAY regarding your door needs.
The Denver Hilton hotel, like most new Hiltons, first opened with the turn of a Lockwood key. Lockwood heavy-duty mortise locks were used throughout. Today, after four years the report comes back . . . not one service call has been required for any of the more than 2,000 locks supplied. Surprising? Not to us. We know just how much quality we build into every Lockwood mortise lock. We will be glad to tell you about it too . . . just ask us.
the most exciting ideas take shape in plywood
The sculptured curves of this pavilion look as though they could have been shaped only with a plastic material. Instead they were achieved with flat panels of plywood. Each roof unit is a hyperbolic paraboloid, laminated from four layers of 1/4" plywood and bolted to steel "T" sections rising to 28' at the center. Despite the complex curvatures, in-place roof cost was only $3/sq. ft., one-fifth that of aluminum and well below steel or concrete. For information on plywood building systems write (USA only) American Plywood Association, Tacoma, Washington 98401.
reproducible finishes

ANOTHER ADVANTAGE OF 3M's TEXTURE KEY SYSTEM

3M's Texture Key system opens the way to new and beautiful architectural finishes. Assures you of perfectly matched finishes time after time on window walls, panels, door and window frames, hand rails, fixtures and hardware. Finishes blend exactly even after fabrication and installation... any necessary on-the-job repairs are a simple matter. Yet, the Texture Key system of metal finishing costs no more than ordinary finishing. Get the facts, write: 3M Co., Coated Abrasives Division, St. Paul, Minn. 55119.

Product Reports

continued from page 228

NEW RANGE OF INCANDESCENT LIGHTING EQUIPMENT

A new group of surface-mounted incandescent lighting devices has just been introduced by this company. The new line includes a series of pendant opal spheres which can be used alone or with a dome or close-hugging hood. Department SI, Silveray-Litercraft Corp., 100 Dayton Ave., Passaic, N.J.

CIRCLE 313 ON INQUIRY CARD

NEW DIMMING CONTROL

Hunt Electronics Company has announced the addition of a new 600-watt, incandescent dimming control, which replaces one three-way wall switch. The unit, catalog number PC 61/3P, is easily installed in any standard 2-in.-deep single gang switch box, and can be turned on and off from either the dimmer itself or from the other three-way switch. Hunt Electronics Company, Dallas, Tex.

CIRCLE 314 ON INQUIRY CARD

AIA SPECIFICATION WORK SHEETS

AIA Document Series K, Specification Work Sheets, may now be purchased as a set in vinyl-bound, three-ring binder to match the AIA Architect's Handbook of Professional Practice.

Architects, specification writers, consulting engineers, building contractors, educators, manufacturers of building products, and many government agencies will find these volumes valuable additions to their reference libraries. They will serve as a master set of AIA Specification Work Sheets, always complete and available for ready use. Loose copies are, of course, available for use as work sheets.

In addition to a model specification text, each of the 34 titles in the series includes general notes, reminders keyed to specific text paragraphs, a check list for project representatives, sources of pertinent standards, and a bibliography. The loose-leaf format permits inclusion of supplemental material, and additional binders may be purchased where additional capacity is needed.

The American Institute of Architects
1735 New York Avenue, NW
Washington, D.C. 20006 Dept. R

Please send

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□ binders only @$2 each

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1965 EDITION
SPECIFICATIONS AND LOAD TABLES FOR HIGH STRENGTH OPEN WEB STEEL JOISTS

including:

J-SERIES joists made from 36,000 PSI minimum yield strength steel.
LA-SERIES longspan joists compatible with the J-Series
H-SERIES high-strength joists made from 50,000 psi minimum yield strength steel.
LH-SERIES longspan joists compatible with the H-Series

Here's all the information you need for fast and accurate specification of joists to carry uniform loads on spans up to 96 feet. Send coupon today for your copy of this practical, up-to-the-minute, 36-page reference manual from the Steel Joist Institute.

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For more data, circle 126 on Inquiry Card

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Investment Opportunity

Thirty years from now this dreamer will be chasing the sun around the earth in a silvery bubble satellite—his eyes our eyes, his hands our hands, his heart our heart.

Whose task is it to loft him to such heights? Whose task to nurture him? Whose to take the long years to train and teach him?

It is the task of all of us. Each of us must take responsibility. Each of us has an investment in him.

You can protect that investment by joining with other leading American businessmen to promote the Treasury Department’s Payroll Savings Plan for U. S. Savings Bonds. The Treasury’s plan works for strength in the defense of our liberties...soundness in the conduct of our personal and national affairs...foresight and preparedness in our thinking.

When you bring the Payroll Savings Plan into your plant—when you encourage your employees to enroll—you are investing in the astronauts of tomorrow. In all those children who dream of skies beyond our skies and worlds beyond ours. You are investing in America’s future. In freedom itself.

Don’t pass this investment opportunity by. Call your State Savings Bonds Director. Or write today directly to the Treasury Department, United States Savings Bonds Division, Washington, D.C., 20226.

in your plant...promote the PAYROLL SAVINGS PLAN for U.S. SAVINGS BONDS

The U. S. Government does not pay for this advertisement. The Treasury Department thanks, for their patriotism, The Advertising Council and this magazine.

234 ARCHITECTURAL RECORD January 1965
SECO custom-engineered coatings protect and beautify today's modern buildings!

SECO Surface Protective Systems wrap structures of any shape...any size...in a protective waterproof coating that lasts...and lasts...and lasts.

Shining example is the American Investment Company Building. Now nine years old, its amazingly durable SECO coating has kept it looking almost as new and attractive as the day it was built.

A SECO elastic coating expands and contracts with the movements of the building it protects—completely bridges and covers normal surface breaks and cracks. Resists abrasion, acid, fumes and gases...available in a wide choice of handsome colors that remain uniform and fast.

Write today for catalog and name of your nearest SECO representative.
RUBBER STAMPS FOR THE DRAWING BOARD
A remarkable collection of rubber stamps for the use of architectural draughtsmen is presented in a beautifully produced new catalog. Stamp designs include tree patterns, shrubbery, tree elevations, figures, arrows and automobiles, in sizes suitable for drawings of from 1/8 in. scale to 1/100 in. Design Specialties, Inc., 821 S. Neil, Champaign, Ill.
CIRCLE 412 ON INQUIRY CARD

AUDIBLE SIGNAL CATALOG
A 16-page two-color catalog gives details of the company's line of Audible Signals. General data, specifications and a section defining the various types of signal in common use are included in the brochure. Products described include the new Audibell line of heavy duty bells for AC or DC operation; motor driven sirens, weatherproof howlers and different types of buzzer. Benjamin Products, Thomas Industries Inc., 207 East Broadway, Louisville, Ky.*
CIRCLE 413 ON INQUIRY CARD

COMPLETE CEILING SYSTEM
Details of the Quartette ceiling system are given in a new illustrated brochure. The ceiling which provides lighting, acoustical control, air supply and return, and partition support in every module, is claimed to have exceptionally low maintenance and operating costs. The booklet shows a number of ways in which the ceilings can be used to give different effects. Engineering data and specifications are also included. Luminous Ceilings Inc., 3701 N. Ravenswood Ave., Chicago, Ill.*
CIRCLE 414 ON INQUIRY CARD

CABLE LADDER SYSTEM
A new catalog gives comprehensive information about the Cope Versi-Span Cable Ladder System for the support of electrical power cables, control cables and instrument tubing. The system is shown alone, or with channel and tube race. The system is versatile in its range of radii—up to 36 in. for heavy conductors and large tube bundles—and permits drop outs anywhere without special fittings. T. J. Cope, Collegeville, Pa., 19426
CIRCLE 415 ON INQUIRY CARD

MULTI-PURPOSE HYDRONIC HEATING SYSTEM
A compact system for hydronic central heating, which also has the capacity for heating domestic hot water, indirect pool heating and snow melting, is described in an illustrated brochure. The booklet contains diagrammatic drawings, data and dimensions of the different models, and a heater capacity chart. Raypak Company, Inc., 2430 Chicago Ave., El Monte, Calif., 91731
CIRCLE 416 ON INQUIRY CARD

*Additional product information in Sweet's Architectural File

Why Children — and Architects — Like Redwood
Children like redwood for the same reason they identify with trees and fields and brooks. They have an instinctive love for what is simple, unaffected, natural. Architects share this feeling and use redwood to create an environment conducive to happy, carefree living...surrounded by beauty.

To receive our quarterly publication, "Redwood News", write Department 60-A, California Redwood Association, 617 Montgomery Street, San Francisco.

For more data, circle 129 on Inquiry Card
Mattel, Inc. chooses shock-resistant **PYROFILL** Gypsum Concrete Roof Deck

**WINDS UP WITH BIG SAVINGS!**

The roof deck material in the new plant of toymaker Mattel, Inc., City of Industry, California, is **PYROFILL Gypsum Concrete**. This system was chosen for its known durability, fire safety, and rapid installation, plus its excellent resistance to seismic shock. **PYROFILL** provided all that—and more! **PYROFILL** Gypsum Concrete allowed the engineer to use the steel joists and open truss tees to their full potential—bays are 40' x 60'. The gypsum roof design proved so economical that it saved the company thousands of dollars. The entire plant floor area of 330,000 sq. ft. is at truck bed level and at rail siding level. There is a 26' minimum clearance throughout. This means the company can shift the amount of floor space in use between production and storage, a vital consideration in toy manufacturing. Job in and job out, **PYROFILL** Gypsum Concrete Roof Decks fulfill any design concept far better, for less. When poured over a network of steel, gypsum concrete sets rock-hard—locks the roof to the building structure and actually reinforces it.

Contact your U.S.G. Sales Representative for more information. Or write us at 101 South Wacker Drive, Dept. AR-51, Chicago, Illinois 60606.

**UNITED STATES GYPSUM**

THE GREATEST NAME IN BUILDING


For more data, circle 130 on Inquiry Card
New simplicity, versatility... new design freedom for today's integrated modular ceilings! Specify a Titus ceiling air diffusion system and be sure of sound air distribution that will fully meet today's needs... as well as tomorrow's.

**TITUS MODULinear...**
Outstanding architectural design for continuous line use. 180° adjustable air pattern. 1, 2, 3 and 4-slot models. Extruded aluminum.

**TITUS COV-Aire...**
Offers the ultimate in modern architectural design and sound air diffusion for cove-type ceilings. Wide flexibility of air pattern adjustment.

**TITUS LINEAR-Tee...**
Simplified, soundly engineered air distribution that integrates completely into the lighting and paneling of nearly any type modular ceiling.
A ceiling air diffusion system and complementary ceiling suspension system that provide the maximum in efficiency, flexibility and economy in integrating SOUND AIR DIFFUSION, good lighting and acoustical control.

MODU-Bloc diffuser units offer tremendous versatility in handling air -- provide the necessary air patterns and air flow rate control to satisfy the most demanding requirements. **ONE SET** of vanes controls **BOTH** air pattern (adjustable 180° to full vertical, full horizontal or any pattern in between) and air flow rate control -- including blank-off. Each MODU-Bloc unit can handle **both supply and return air**.

AND HERE IS THE MOST MODERN ARCHITECTURAL DESIGN! The extruded aluminum complementary ceiling support members fully match in appearance the smartly styled linear design of MODU-Bloc diffusers.
MODULAR WALL FURNITURE

"Masterwall" is the title of a new catalog issued by the company to illustrate its modular wall furniture systems. Specifications, installation and construction details are given, as well as dimensions and drawings of the various components. Tassell Industries, Inc., Grand Rapids, Mich.

CIRCLE 417 ON INQUIRY CARD

SCULPTURED STOREFRONT PANELING

Shadopanel, a new porcelain on aluminum storefront material, is described and illustrated in a four-page brochure. Illustrations are included to show the different light and shadow effects which can be obtained by the use of this material. Specifications and installation information are also given. Mapes & Co., Division of Mapes Industries, Inc., P.O. Box 2067, Nebraska, 68501.

CIRCLE 418 ON INQUIRY CARD

CONCRETE COLOR GUIDE

Samples of the colors available in the Williams range of colors for concrete building products are displayed in a new brochure. The color pigments are produced from natural and synthetic iron oxides and synthetic chromium oxides, and are illustrated in full strength and pastel shades in both gray and white cements. Each page includes the correct mixing formula for obtaining the colors shown. Williams Colors & Pigments, Chaussiere-Pfizer & Co., Inc., 285 East 42nd St., New York, N.Y., 10017

CIRCLE 419 ON INQUIRY CARD

STEEL DOOR AND FRAME SELECTION GUIDE

A new four-page colored selection guide of steel frames and doors is currently available from Amweld Building Products. Each of the firm’s Clean Line doors is featured with charts detailing sizes, clearances, construction features, reinforcements and sound deadening. UL and Factory Mutual “Certified” Fire Doors are included. The last page contains charts showing steel frame profiles, types and sizes as well as anchoring information. Amweld Building Products, 100 Plant St., Niles, Ohio.

CIRCLE 420 ON INQUIRY CARD

INSULATING GLASS

The design flexibility of Therm-O-Proof insulating glass is emphasized in the new eight-page catalog. The booklet describes specifications and glazing instructions and gives illustrations of various buildings in which this glass has been used in differing ways. A section explains heating and cost reductions which have been obtained by the use of insulating glass in place of double glazing. Thermoproof Glass Company, 1815 Cabot Ave., Detroit, Mich., 48210

CIRCLE 421 ON INQUIRY CARD

ELECTRIC THERMOSTATS

The company’s line of electric heat thermostats is described in a four-page color brochure. Photographs and specifications are given for each model. The equipment described includes line voltage room thermostats, dual-duty combinations and low-voltage controls. White-Rodgers, 9797 Reavis Rd., St. Louis 23, Mo.

CIRCLE 422 ON INQUIRY CARD

*Additional product information in Sweet’s Architectural File

TOTAL EXCELLENCE ... A FolDoor Exclusive

FolDoor again proves that beauty and quality go hand in hand... assuring TOTAL EXCELLENCE in every component. Example: FolDoor’s new Deluxe Grip Hardware... standard equipment on all sound-insulated models.

The new Grip Hardware is easy to "grip" for positive control. Natural downward motion of handle provides anti-panic safety action. Grip Hardware also offers a striking design that complements partition and surrounding decor with its lustrous anodized aluminum finish. Locks and privacy latches offer desired convenience and security.

Another FOLDOOR Exclusive:

NEW GRIP LATCH

assures easy operation...tight sound-seal

FolDoor offers a complete line of fabric covered folding partitions including the Super Soundguard X24 with its excellent sound retarding ability (comparable to that of an 8" concrete block wall). Eight separate FolDoor models offer the price and performance combination best suited to every situation. All are TOTAL EXCELLENCE assured... backed by the strongest warranty program in the industry.

See FolDoor details and specifications in SWEET’S 1965 ARCHITECTURAL FILE 166/Ho... or ask your FolDoor Distributor.

HOLCOMB & HOKE MFG. CO., INC.
1545 CALHOUN STREET • DEPT. F31 • INDIANAPOLIS, IND. 46207

For more data, circle 132 on Inquiry Card

240 ARCHITECTURAL RECORD January 1965
Another long-life feature for Weis Toilet Compartments: solid brass hardware. Solid brass plus the added protection and beauty of brilliant chromium plate. The latch, which continues to feature lift-free emergency access, is now recessed within the door. The stainless steel bolt automatically retracts if the door is slammed against the new wrap-around keeper and rubber tipped bumper. Handsome surface mounted hinges, proven through long service, give either 180° outswing or inswing action. Solid, these compartments by Weis with solid brass hardware.

Write for Catalog No. 36 See Weis in Sweet’s

HENRY WEIS MFG., ELKHART, INDIANA

For more data, circle 133 on Inquiry Card
Now you can choose fenestration fabrics for more than just decorative purpose. Feneshield fabrics, made from PPG Feneshield® fiber glass yarns, offer you for the first time a new, scientific approach to the control of exterior appearance and interior environment.

Research by PPG has produced a new system which provides a scientific method of selecting fiber glass draperies, based on fabric characteristics most likely to meet environment control needs. All Feneshield fabrics are classified according to weave and color combinations, and are rated for such factors as shading coefficients, outward vision, privacy, body comfort, eye comfort, and ear comfort.

This is how Feneshield fiber glass fabrics can perform in a variety of installation situations:

**Feneshield fabrics control exterior appearance.** Correct window treatment contributes greatly to a building’s exterior appearance.

**Feneshield fabrics subdue solar radiant heat.** Research shows that Feneshield fabrics reduce solar heat transfer better than other shading devices, allow much less reradiation, resulting in reduced air conditioning loads and more comfortable working conditions.

**Feneshield fabrics control glare.** Feneshield fabrics soften and diffuse light, but do not shut it out completely, allowing the best use of natural light and reducing eye strain and discomfort.

**Feneshield fabrics improve sound control.** Feneshield fabrics hung at windows, room dividers, or partitions measurably improve acoustical control by absorbing sound normally reflected by hard-surfaced walls and windows.

**Feneshield fabrics enhance a pleasing view, modify a bad one.** A Feneshield weave and color may be selected to emphasize a good
permits outward vision; center right, a semi-open weave controls glare, masks bad view; far right, closed weave subdues radiant heat, provides cold-weather protection.

view and still provide privacy and natural light. An identical color in a closer, more opaque weave will conceal a bad view, yet still admit a high degree of natural light.

**Feneshield fabrics offer savings.** Although initial cost of Feneshield fabrics may be greater than other types of shading devices, combined initial costs and maintenance costs are less for Feneshield than for other devices.

**Complete information available.** Participating fabric resources have authorized Feneshield presentations which show the wide range of fabric weaves and colors available. They can help you select fabrics for specific installations through use of PPG technical data. Write PPG for names of jobbers near you. (PPG makes the Feneshield fiber glass yarn only, not the finished fabric.) You can obtain complete technical information, including means of selection of Feneshield fabrics for any type of building installation. Just mail the coupon.

Pittsburgh Plate Glass Company, Fiber Glass Division
One Gateway Center, Pittsburgh, Penna. 15222

☐ Please send me complete technical information on Feneshield fabrics.

☐ Please send me names of authorized Feneshield converters.

Name
Title
Company
Address
City State Zip Code

*flber glass...the fiber glass for finer fabrics*

Pittsburgh Plate Glass Company
Fiber Glass Division
One Gateway Center, Pittsburgh, Pa. 15222
579 Fifth Avenue, New York, N.Y. 10017

For more data, circle 134 on Inquiry Card
HUGE EXCAVATION OPERATION WILL RELOCATE TEMPLES AT ABU SIMBEL

Salvage operations have begun to preserve the 3,200-year-old temples at Abu Simbel in Upper Egypt. Threatened by the rapidly rising Nile River backing up behind the now closed Aswan High Dam, the temples are being prepared for dismantling and reassembly on the plateau 225 feet above their present site.

Heading a team of professional engineers from Italy, Egypt, West Germany and France is resident engineer Ahmed Fahim, loaned to the project from Egypt’s Ministry of Irrigation. Joint Venture Abu Simbel, a UNESCO project enlisting resources of 47 nations is involved in the effort.

The American Committee to Preserve Abu Simbel, a group of private American citizens headed by anthropologist Huntington Hartford and including Edward Durrell Stone, architect, is engaged in a nation-wide campaign to save the project.

Already nearing completion is the first phase of the rescue operation—a protective cofferdam which will temporarily keep the Nile’s waters at bay while engineers and workers remove the huge temples, block by block, to higher ground. Nearly 1,200 feet long, the curved cofferdam has a core of 1,824 fitted steel shafts.

The actual excavation of the temples has begun as well as the smaller statues on the facade having been removed recently to the safe staging area (above right).

Inside the great temple, dug 200 feet out of the solid sandstone mountain, 280 tons of steel scaffolding have been wedged in the passageways to insures against damage from cracking or cave-ins as tons of rock are removed from above. Ultimately, 121,000 pounds of sand will completely cover the 65-foot-high colossi and the 33-foot statues of the smaller temple of Nefertari downstream. The statues will thus be protected during the excavation of 5 million cubic feet of solid sandstone from above.

NINE ACRES OF TIMBER ROOF STRUCTURE

More than 9 acres of storage for canned food products is provided under this economical roof system of 530 double cantilevered glued laminated timber beams. This includes 29-11" x 43½" x 113'-0" and 28-11" x 48½" x 96'-8" beams, with the balance in lengths from 62'-4" down to the shortest purlin 26'-4".

In addition to the glued laminated timber primary structural units, the roof system uses solid sawn Douglas Fir secondary purlins and joists and Douglas Fir plywood sheathing.

All of the beams were manufactured and fabricated to specification at Rosboro Lumber Company’s laminating plant in Springfield, Oregon.

HUNTING FOOD & INDUSTRIES, HAYWARD, CALIFORNIA
Architects: John Fortune & Associates
Consulting Engineers: King, Bennett & Associates
Contractors: Swinerton & Walberg Co.
Erection Contractor: Associated Wood and Glu-Lam Inc.

For more data, circle 135 on Inquiry Card
FOR PERMANENT, TROUBLE-FREE HEAT TRANSFER, INVESTIGATE AND SPECIFY

CERAMIC COOLING TOWERS

Maintains maximum operating characteristics over entire life span without deterioration of structure or performance. • Permanently fireproof, waterproof, stainproof. • Chemically inert Perma-Grid vitrified clay tile fill. Exterior can be any permanent material. • No free water carry-over. Permits adjacent parking. • Foundation and walls normally specified under architectural specifications; internal components, under mechanical specifications.

CUT-AWAY VIEW OF A ONE-CELL CERAMIC COOLING TOWER


Complete selection tables for all sizes, ranges and types of refrigeration, and other data, available in 3-ring Technical Manual. Please use coupon.


For more data, circle 153 on Inquiry Card

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Office Notes

Offices Opened

John M. Rowlett, A.I.A., is the partner in charge of the new office of Caudill, Rowlett & Scott, Architects, at 230 Park Avenue, Suite 626, New York City.

New Firms, Firm Changes

Lawrence H. Allen and L. Preston Wade, engineers, and M. Kent Shelton, architect, have been named associates in the Lynchburg, Va., consulting engineering firm of Wiley & Wilson. New associates in the firm's Richmond office are Elwood F. Holton, John L. Kerner and John C. Reid.

Frederick Baesaler has been appointed project administrator in the Detroit architectural and engineering firm of Harley, Ellington, Cowin and Stirton, Inc.

John R. Campbell has been named project architect in the Los Angeles office of Charles Luckman Associates.

Richard P. Cute has been named project administrator in the architectural and engineering firm of Jenkins, Hoff and Heimsath of Houston.

W. R. Dickson & Associates, Architects of Huntsville, Ala., announce the change of the firm name to Dickson, Jones & Davis, Architects, A.I.A.

F. Andrew Foord, A.I.A., has been named an associate of Ballard Todd Associates, Architects, of New York City.

Harry C. Grieme has been appointed vice president of the Heyward-Robinson Company, architectural, engineering and construction firm of New York City.

Clovis B. Heimsath, A.I.A., is a new partner in the Houston architectural firm of Jenkins and Hoff, henceforth to be known as Jenkins, Hoff and Heimsath.

The San Francisco architectural firm of Roger F. Hooper & Associates has announced a change in the firm's name to Hooper, Olmsted & Emmons.

The St. Louis architectural firm of Hellmuth, Obata and Kassabaum has established a new landscape architecture department under the direction of Neil H. Porterfield.

continued on page 278

more and more great American architects are using

M A R M E T

here are a few of the reasons:

Close liaison . . . between the architect's job captain, designers, the general contractor and MARMET's engineering staff, plant expediters and field service men ... from the moment of bid award to final execution.

Single source capability. As an engineering fabricator of all types of curtain wall, individual window units, entrance frames and doors . . . MARMET is able to render complete services and products for every fenestration need.

Laboratory checks on quality control. Full size sections are pulled from assembly lines for exhaustive testing in MARMET test laboratories. Components must exceed NAAMM standards for wind deflection, air or water infiltration before shipment.

More and more . . . experienced architects find that specifying MARMET is a long step toward successful execution of all fenestration components.

fenestration engineered to free flowing forms

NORTH SHORE CONGREGATIONAL ISRAEL TEMPLE and SCHOOL, Glencoe, Illinois

Large expanses of glass in this breathtaking structure required unusual shapes in the aluminum window framing. But rolling or shaping extruded members into precision fitting, compound radii is not a new problem for MARMET engineering. MARMET series 160 double glazed church windows were used in the temple. Series 1000 entrance frames and doors lend gleaming accents to the galleries.
An inspiration in structure to lift the spirit of the worshiper
Owner's Guidance:

Provide a variety of pleasant dining rooms for 1,000 college men.

Provide an extremely functional kitchen to minimize operational costs.

"We encourage originality and freshness."

Architectural Concept:

A design which is nondirectional, sculptural in quality, pyramidal shapes which contrast with the neighboring Palouse Hills.

Rogers-Orton Dining Hall
Washington State University

"The building had to be related to two 12-story buildings on either side. We wanted it to stand and speak for itself."

"Steel answered our design needs better than any other material."

Kenneth W. Brooks, A.I.A., Architects, Spokane

The five dining rooms are of several sizes and degrees of openness to provide a variety of dining atmospheres.

Steel rafters and purlins fireproofed for Class "A" construction. Columns are 3 in. through 5-in. pipe.

All steelwork was assembled in the shop and checked for alignment and fit before shipment to the site.

Steel channels of varying depths, and wooden blocking, support the steps in the roofs made up of steel purlins with shingle roofing.


**BETHLEHEM STEEL**

For more data, circle 155 on Inquiry Card
the only dry applied roof deck insulation that can be contour sloped to drains!

**All-weather Crete**

**ROOF DECK INSULATION**

The unique ability of All-weather Crete roof deck insulation to be pitched to drains, evenly and smoothly, allows for rapid water run-off. Its uncommon but precise combination of volcanic glass rock and thermoplastic binder, mixed on the job and applied hot and DRY, produce a jointless roof deck fill with a K-factor, .40, better than any other poured roof deck insulation.

And winter does not stop the All-weather Crete franchised installer... since it is completely workable and can be applied in below freezing temperatures.

Use All-weather Crete for all flat roofs, parking decks, re-roofing, and ice rink bases. No expansion... cannot damage surrounding walls. Eliminates any possibility of vapor pressure build-up. Contains no water... cannot freeze out or be rained out. Underwriters approved... for metal deck construction.

Write today, for a complete 12-page brochure.

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**The OFFICE VALET**

**wood and metal**

**HAT and COAT RACKS**

- Mounts on any wall
- Saves floor space
- Rich, attractive—modern
- Keeps wraps aired, dry, "in-press"

Combines the advantages of a modern coat rack and a built-in wardrobe. Holds hats, coats, overshoes apart, open to air, still out of sight. Permits utter flexibility of office layout. Crushed east aluminum brackets support hat and utility shelves and hanger rail of solid walnut rods; 4 solid walnut coat hangers and a 30" x 20" oil finished walnut panel screen.

MODEL WA 500

This is just one of the new "luxury" units created by Vogel-Peterson — shown in full color and described in Bulletin OV-52.

Write for it today.

**VOGEL-PETERSON CO.**

ELMHURST • ILLINOIS

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**newman aluminum ACCESS DOORS**

- Provide easy access through walls and to service points, valves and controls.
- Furnished complete — ready to install.
- Rigid aluminum construction.
- Caustic etched and lacquered natural finish, can be field painted if desired.
- No assembling.

WRITE FOR NEW 1965 BULLETIN

For distributors, see Sweets Catalog 16K

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**SILBRICO CORPORATION**

5901 WEST 66th STREET • CHICAGO, ILLINOIS 60638 • RE 5-3322

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For more data, circle 156 on Inquiry Card
You have added design flexibility when air ducts are out of the picture.

An in-slab heating/cooling system with J-M TRANSITE® air ducts lets you flex your design muscles. With ducts below grade, buildings can be lower. Ceilings higher. Glass areas more extensive. Furred ceilings and beam construction can be forgotten. Your client gets a more efficient, more economical system. TRANSITE ducts radiate heat, put warmth into the slab, eliminate cold spots. Smaller ducts or smaller blowers can be used, because long TRANSITE® air duct lengths and smooth bore allow air conveyance with 30% less pressure drop than sheet metal.


JOHNS-MANVILLE

For more data, circle 158 on Inquiry Card
Here's good news for all men in the U.S., aged 45 to 64. The death rate from the cardiovascular diseases in their age group dropped 7½% since 1950, the year following the first Heart Fund campaign.

This dramatic trend is making medical history. For the first time, deaths from high blood pressure and the heart disease it causes are down 50% among men in their most productive years. Deaths from strokes are down 26%.

Score it as another triumph for heart research in its quest for new ways to control and prevent the heart and blood vessel diseases. But remember—these diseases are still the nation's Number 1 killer, claiming more than 950,000 lives a year. More Heart Fund dollars will assure more gains.

GIVE...SO MORE WILL LIVE HEART FUND
Whatever you may read, hear, or be told — one thing is sure: there is no other track to equal Silent Gliss.

The reasons are clear: • No other track has the patented system of cords traveling in separated, semi-enclosed channels (to prevent drooping, tangling, and other problems of tension systems). • No other track features the silence of satin-smooth rounded nylon carriers traveling in precisely fitted channels (no annoying "echo chamber" roller noise.) • No other track has the slim, trim lines of Silent Gliss (with the gracious contours of the thoroughbred).

Silent Gliss offers fourteen track styles to choose from: tracks for surface mounting, bracket mounting, or recessing ... tracks for cord traversing or hand operation ... tracks for cubicle, extra-duty or specialty use. All are shown and described in the complete illustrated catalog shown above. Write for full details today; address Dept. AR-1.

□ Here is the secret of Silent Gliss ... with its all-nylon cord, traveling in patented, separated channels. This means minimum maintenance, because there's no drooping, no tangling ever. It's one of the reasons why Silent Gliss is the prestige track, chosen for quality installations the world over.

SILENT GLISS, INC.
Distributing Companies
Angevine Co., Freeport, Illinois
Drapery Hardware Mfg. Co., Monrovia, California
THREE OF THE Newell COMPANIES
Manufacturers of Quality Drapery Hardware Since 1903

For more data, circle 160 on Inquiry Card

Victor H. Kusch has been named a partner in the Philadelphia architectural and planning firm of Nolen-Swinburne and Associates.

Carleton W. Lockwood and Associates, Civil Engineer, of Rialto, Calif., has been renamed Lockwood Engineering & Surveying Company, Inc.

Dirk J. Luykx has been named an associate in the Boston architectural firm of Pierce & Pierce.

Robert B. Malcolm has been named an associate of The Perkins & Will Partnership in the Washington, D.C., office.

Robert A. Odermatt, Architect, is a new associate in the San Francisco firm of Rockrise and Watson, Architects.

The Los Angeles architectural firm of William L. Pereira & Associates has appointed Joseph W. Rakocy, C.P.A., as treasurer-controller.


Give to your HEART FUND

For more data, circle 161 on Inquiry Card
it takes the best to withstand 30 or more graduating classes
and still perform like new

When you order a Schemenauer Classroom Unit Ventilator—Heating or Cooling, you may pay a little more but you get much more. The tastefully designed Schemenauer unit is engineered to last longer, perform better and cost less to operate and maintain. Not just for 30 graduating classes or years—but for the life of the classroom. And it does because no other make has the 7 vital extras. The difference between ordinary and extraordinary performance. The difference between bargain or bargain in value.

However, if you're buying on price alone and don't much care about appearance, performance, maintenance upkeep, etc., 3, 10 or 30 years from now, you can find some tremendous "deals."

But if you know better than to be fooled by an inconsequential price differential on an investment involving thousands of dollars, try checking out Schemenauer. Going first-class is much more than a matter of money!

"Guaranteed the finest Unit Ventilator any amount of money can buy."

Send today for these two "Eye Opener" Bulletins on Classroom Unit Ventilators. Prepared especially for School Architects, Heating Engineers, School Administrators and School Board Members.
Think thin with Barrett Urethane.

Twice as thin because it’s twice as efficient as any other roof insulation.
Compare Barrett Urethane to any other roof insulation. You'll find others have to be at least twice as thick to equal Barrett Urethane in insulation efficiency. Trim, thin Urethane has a C factor of 0.15. That makes it ideal insulation for buildings with modern heating and air conditioning systems.

Here's the thickness needed in various materials to obtain this same low C factor:

<table>
<thead>
<tr>
<th>Material</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urethane</td>
<td>1.0&quot;</td>
</tr>
<tr>
<td>Glass fiber</td>
<td>1.8&quot;</td>
</tr>
<tr>
<td>Polystyrene</td>
<td>2.0&quot;</td>
</tr>
<tr>
<td>Fiberboard</td>
<td>2.4&quot;</td>
</tr>
<tr>
<td>Cellular glass</td>
<td>2.7&quot;</td>
</tr>
</tbody>
</table>

Easy-to-handle Barrett Urethane saves on application costs, too. Compare what a roofer would handle on a 500-square job: only 43,500 lbs. of Urethane against 210,000 lbs. of fiberboard insulation. At an average handling cost of $5 per ton, this is a saving of over $400 or nearly $1 per square. Barrett Urethane comes in large, thin, lightweight panels. You get a tough walk-on, work-on surface that won't bend, buckle or melt when mopped on with hot pitch or asphalt. There's only one way to get all the advantages of Barrett Urethane. Specify it by name. Merely to call for "1 inch of insulation" is inadequate with today's wide variations in insulating efficiency. For a detailed booklet, write to Barrett Division, Allied Chemical Corporation, Dept. ARC-1, 40 Rector Street, New York, N. Y. 10006.

For more data, circle 164 on Inquiry Card
For a modern theatre

NORTH HILLS THEATRE, Pittsburgh, Pa., is air conditioned by four York "packaged" Embassy units. Owner, Stanley Warner Theatre Corporation; Architect, Drew Eberson, A.I.A.; General Contractor, Harry Dunn Company; Contractor, Marchase Refrigeration Service Company.

you can depend on YORK AIR

Leading business buildings in every part of the country depend on York for advanced units and systems that assure year-round comfort. For large buildings, York central systems are engineered to assure a better climate for occupants.

In smaller buildings, York "packaged" air conditioners provide real "big system comfort" in compact units. These York "packaged" air conditioners can cool a small business building; or, installed in multiple, can air condition a larger building, at low cost. Easy to install, a York "packaged" unit requires only simple piping and wiring.

When you plan air conditioning for a business building—whether it's a small plant or store, or a high-rise office building—plan ahead with York. For over 75 years York has pioneered many of the major advances in air conditioning for home, business and industry. The name York on an air conditioning system or unit is your assurance of dependable performance and client satisfaction. For specification data on York equipment, contact your nearby York Sales Office; or write York Corporation, subsidiary of Borg-Warner Corporation, York, Pennsylvania. In Canada, contact National-Shipley Ltd., Rexdale Boulevard, Rexdale, Ontario.
or a medical center

LOCKE MEDICAL BUILDING, Dallas, Texas. This modern medical center is cooled by a York centrifugal Turbopak water chilling system. Architect, Harold Berry; Engineer, Herman Blum Consulting Engineers; Mechanical Contractor, Natkin & Company.

CONDITIONING

YORK EMBASSY UNITS are available in air or water-cooled models, in a complete range of sizes from 3 to 33 tons. Trim and compact, they may be installed in any available space, with only a few simple piping and wiring connections.

For more data, circle 165 on Inquiry Card
Specify a U/L Rated Vapor Barrier that meets the National Building Code...

Chemicals, used to make some vapor barriers flame resistant, leach out when exposed to moisture, allowing the barrier to burn. This cannot happen to Pyro-Kure as shown here:

1. Barriers are exposed to moisture.
2. Barriers are then dried out.

SPECIFY THESE OTHER CONSTRUCTION PAPERS AND VAPOR BARRIERS FOR MAXIMUM PROTECTION IN CRITICAL BUILDING AREAS

- **Copper Armored Sisalkraft®**
  For concealed flashing with pure copper at 1/5th the cost of heavy copper:
  COPPER ARMORED SISALKRAFT. A combination of electro-deposit copper and reinforced Sisalkraft that provides lifelong protection against moisture penetration at vulnerable points in the structure.

- **Moistop®**
  To prevent moisture migration through concrete slabs:

- **Curing Papers**
  For maximum protection and curing of concrete:
  SISALKRAFT® CURING PAPERS. Reinforced, waterproof papers prevent damage and soiling of newly placed concrete slabs. Retards hydration, provides a maximum cure for harder, denser concrete floors.

- **Pyro-Kure® 600**
  Flame resistant, abrasion resistant vapor barrier for Class I roofs:
  PYRO KURE 600. More than twice the moisture resistance of vinyl film. Will not burn when hit with hot asphalt. Approved by Factory Mutual for use with asphalt and Fiberglas® insulation on metal decks.
This demonstration shows that Pyro-Kure will always resist flames, even after subjection to a moisture environment. Its U/L Flame Spread rating of "25 or less" will not be altered because the flame-extinguishing adhesive used in the laminating process is permanent.

This is not the case with other "rated" barriers where moisture conditions can cause salts, used to impart flame resistance, to leach out. These salts can also corrode aluminum.

As a result of this permanent flame resistance, Pyro-Kure complies with the National Building Code standard for NONCOMBUSTIBILITY as defined by the National Board of Fire Underwriters.

Specify Pyro-Kure Vapor Barriers. Give your clients maximum protection against fire hazard, and against condensation. Various grades are available, including aluminum foil to kraft, vinyl film to foil, and kraft to kraft, from leading insulation manufacturers under their own brand names, or through insulation contractors for local application. All grades are reinforced with glass fibers for strength. Complete specifications are in Sweets' Catalogs.

Send for Samples and Technical Data Kit which includes perm ratings and other physical property information. Write: Sisalkraft, 71 Starkey Avenue, Attleboro, Mass. 02703.
PHYSICAL DATA

C (Conductance Value) 1" Nominal Thickness: 0.36

- Water Absorption (% by Volume): 1.5 @ 2 Hrs. Total Immersion (No Capillarity)
- Vapor Permeability: 15 Perms @ 73° F. and 51% Relative Humidity
- Concentration Load Indentation: ¼" @ 77 lbs.
- Compression Resistance: 185 PSI (50% Consolidation)
- Fungus Resistance: Complete
- Flame Spread: 25 (Non-combustible)
- Smoke Developed: 0–5
- Wt./Sq. Ft./1" Thick: 0.8 lbs. Approx.

W
Born within the intricate architecture of a grain of flame-exploded perlite is the lightness, the non-combustibility, the moisture-resistance, the thermal efficiency, the compression resistance, the permanence, the strength, that characterizes what is today, totally, the ideal rigid roof insulation board.

Building Products Department, Great Lakes Carbon Corporation, 333 North Michigan Avenue, Chicago, Illinois

For more data, circle 168 on Inquiry Card
HEALTH CENTER CREATED TO BE “VANDAL-PROOF”

Philadelphia's new District Health Center Number 5 was conceived and designed as a "vandal-proof" structure because of its location in a depressed area. "The health center was designed to provide a peaceful, gar-

den-like inner view, rather than an outside view," according to Louis de Moll, partner in charge for the Ballinger Company, Philadelphia, architects and engineers of the project.

The 25,900-square-foot rectangular one-story building, with a connecting circular auditorium, has few exterior windows opening to the street. These few, made of wiremesh glass, are narrow and recessed, unlike the larger windows opening on the building's two interior courts.

Besides extensive administrative accommodations, the center houses diagnostic and health-control examination rooms for maternity, pediatric and adult health, dentistry, tuberculosis and venereal disease. A complete X-ray room is sheathed in lead walls.

A local Philadelphia ordinance provides that 1 per cent of its cost in any building constructed with public funds must be devoted to art. Consequently, the architects commissioned a Philadelphia artist, Frances Serber, to create a ceramic mural based on Greek myth and the conquest of space.

Construction of the $592,520 center was carried out in two stages in order not to interfere with the work of the existing center. When two-thirds of the structure had been finished, the center's work was transferred there and the remainder completed.

For more data, circle 169 on Inquiry Card

ARCHITECTURAL RECORD January 1965
FROM TRANE...

DIRECT-DRIVE, COMPACT

CENTRAVAC

...a major advance in centrifugal water chillers

Trane
Trane announces a second generation CenTraVac — sizes 225 to 555 tons. Eliminates need for gears, achieves compactness without high speed compressor.

The original Trane CenTraVac, introduced in 1951, was a major breakthrough in centrifugal water chiller design. It brought to the industry a hermetic, direct-drive design concept that eliminated the need for shaft seals and speed increasing gears—prime sources of failure in open type centrifugal water chillers. More than a decade of reliable operation of over 5,000 CenTraVac installations is testimony to the dependability of the direct-drive hermetic design.

Now comes another breakthrough in centrifugal design—a second generation CenTraVac (Model PCV) with all the proven features of its predecessor... and more.
**CENTRAVAC...**

**Centrifugal Water Chiller**

**Direct-drive—no gears**

The dependability and design simplicity of direct-drive have been successfully combined with compactness. Competitive makes use more complicated high-speed gear-driven compressors to achieve compactness.

But, the Model PCV CenTraVac—designed for maximum reliability—has only one rotating part, two simple journal bearings, no gears and no high-load thrust bearings. Compare this with a high-speed, gear-driven centrifugal machine (with gears operating in a refrigerant atmosphere), dependent upon the reliability of 2 to 5 gears, up to 7 journal bearings, plus a high-load thrust bearing.

Between motor and compressor there is nothing to fail. Two-stage, back-to-back impellers are directly connected to the motor shaft. A balanced thrust arrangement—only one rotating part.

*As a result, the Trane direct-drive, compact PCV CenTraVac provides the unmatched dependability inherent in a machine of fewer moving parts to insure longer life and a minimum of maintenance.*

**Power saving two-stage compressor design**

Two-stage compressor design with inlet vanes controlling the flow of refrigerant gas to each compression stage is another important CenTraVac feature. Provides lower power consumption, smoother operation at part-load than single-stage high-speed machines for three reasons:

1. Better compressor efficiency at part-load with dual inlet vane control—regardless of number of compression stages. Inlet vanes ahead of each stage make modulation of each impeller's performance possible.

2. Wider range of stable compressor operation with two-stage control. At same entering condenser water temperature, single-stage compressor encounters surge at substantially higher part-load point. Requires intentional gas bypass with artificial loading of compressor at part-load to avoid surge.

   Means single-stage machine less efficient at part-load, does more work to compress recirculated gas.

3. Power loss, inherent in gear trains, typically amounts to at least 3% of full-load power input. Loss does not decrease with load. At 10% of full-load, gear loss alone represents at least 15% of total power required.

   So, any single-stage gear-drive compressor requires at least 50% more power input at 10% of full-load to produce same refrigeration effect as two-stage compressor with dual inlet vanes.
Space and weight-saving compactness

The compact PCV CenTraVac is substantially lower than competitive makes in the critical height dimension. It weighs significantly less than most other centrifugals and occupies little floor space.

Being lower, the advanced PCV CenTraVac may be installed in equipment rooms having low ceilings, or on intermediate floors of new or existing buildings where headroom is restricted.

With less weight, this CenTraVac may be installed on upper floors and penthouses, often with appreciable savings in building structural steel.

Here, height of PCV CenTraVac is compared to two major competitive gear-drive makes. Competitive makes range from 25 to 60% higher.

Note weight advantage of CenTraVac over other two makes which are from 18 to 45% heavier.

Rectangular floor space area required by compact CenTraVac is compared to floor space area required by competitive makes.

Factory-assembled, ready to run

The CenTraVac is a complete factory-assembled water chiller. Only external and auxiliary water piping connections and main electrical connections are necessary.

Nine models... ready now

Sizes range from 225 to 555 tons. For complete information, call your nearest TRANE Sales Office. Or, write for the new Model PCV CenTraVac Catalog.

Factory-assembled CenTraVac shown here with optional decorative front panel removed.

See the second generation TRANE CenTraVac Line at the ASHRAE Show!
MANCHESTER GIVES AWARD OF MERIT

The City Planning Board of Manchester, New Hampshire, has initiated a semi-annual “Award of Merit” to stimulate and recognize outstanding contributions in the broad area of urban design in their community. Receiving the first award was the architectural firm of Koehler and Isaak of Manchester, for their Diocesan Administration Building in Manchester, for its excellence of design, site planning, and contribution to the neighborhood and community in which it is located.

EDWARD STONE RECEIVES AWARD

Architect Edward Durell Stone (right) was given the Architect of The Year Award of the Building Stone Institute by Arland R. Krueger, outgoing president, during the institute’s 45th annual convention in New York. Mr. Stone was honored for his “inspiring contributions to the field of architecture” as well as for his “imaginative creativity in utilizing natural stone in distinguished buildings of enduring beauty throughout the world.” The Building Stone Institute represents all phases of the natural stone industry.

For more data, circle 171 on Inquiry Card
"The first phase of the Pennley Park urban renewal project in Pittsburgh involves 8 apartment structures ranging from 4 to 10 stories. Several factors influenced the choice of structural systems and materials. The program called for repetitive spaces with 20 to 24-foot spans. Subsoil was soft. We wanted a markedly residential character with pleasing scale, pattern, and texture. We wanted superior resistance to fire and sound transmission. We wanted economy."

"Solution: Transverse walls of exposed brick bear the building loads. The walls interact with 8-inch precast concrete floor planks to create stiff diaphragms. Brick walls are 12 inches thick. Structurally, they could be thinner in the upper floors, but 12 inches provides a substantial sound barrier. The spread footings solve the soil problem and, sweeping inward and upward to form the cross bearing walls, express the structural concept clearly."
Architect: Tasso Katselas; Engineer: Richard M. Gensert; Owner: Vernon C. Neal, Inc.

BRICK:
For Bearing And Beauty

Structural Clay Products Institute, 1520 18th St., N.W., Washington, D.C.
"the safe way out" in stainless steel
unmatched engineering quality

- Stainless steel housing covers are stamped and drawn from sturdy stock over $\frac{1}{6}$" thick.
- Forged bronze chassis in lock stile case reinforces a full 75% of housing area. Minimum wall thickness of chassis is $\frac{3}{8}$".
- Stainless steel master cam.
- Two neoprene bumpers between housing and chassis assure quiet operation.
- Stainless steel latch bolt and axles.

unmatched design quality

- Stainless steel adjustable roller strike permits smooth latch bolt operation with minimum wear.
- Stainless steel forged lever arms with stainless steel axles.
- Hidden "wedge-lite" fittings, extending $1\frac{1}{4}$" into crossbar, exert full-circumference locking force on crossbar, and give a really smooth, uncluttered design.
- Stainless steel crossbar reinforced with steel tube.

For enduring beauty and lasting service, there is no equal to the Von Duprin 66 exit devices. Quality engineered ... quality appearance ... quality operation.
Write for your copy of the 66 Bulletin ... full details on the industry's pace-setter, the Von Duprin 66.

VON DUPRIN DIVISION • VONNEGUT HARDWARE CO.
402 W. MARYLAND ST. • INDIANAPOLIS 25, INDIANA

For more data, circle 173 on Inquiry Card

ARCHITECTURAL RECORD January 1965 297
Forty-seven acres of roof were involved. Two million square feet over the Lockheed Georgia Co. plant (division of Lockheed Aircraft Corp.) had to be replaced—without shutting down.

It was a job that called for taking down some 127 tons of old roofing every day (without impeding aircraft production below). And taking up 70 tons of new raw material—via tractor-pulled wagons and a unique 750-foot ramp.

And it was a job that called for the best base in roofing: the Fiberglas* Taped Joint System, topped with the inorganic Fiberglas Built-Up Roofing System.

Results:
Fewer trouble spots, because larger-size roof insulation units (4' x 4' x 1½”) mean fewer joints where splitting, ridging and buckling can occur.

Insulation that serves as a unitized slippage plane protecting built-up roofing from normal deck movement, because the insulation units are “welded” at the joints with Fiberglas Roof Tape, applied with hot steep asphalt.
Owens-Corning Fiberglas “Welds” the biggest re-roofing job in the world.

Certified, in-place thermal performance, stronger bonding of insulation to roofing, because the asphalt stays on top—isn’t absorbed into the roof insulation or into the joints. So to solve big roofing problems or little ones, on new roofs or old, specify the system that gives the strongest joints in roofing. That creates the best base for every built-up roof: The Fiberglas Taped Joint Roofing System. It has proved itself on hundreds of roofs—to the satisfaction of architects, engineers and owners. Here are just a few of these jobs:

- Emerson Electric Co.—650,000 Sq. Ft.
- Chevrolet Warehouse —850,000 Sq. Ft.
- Capitol Plaza Shopping Center —320,000 Sq. Ft.
- Borden Milk Co.—101,000 Sq. Ft.
- Upper Arlington School —88,000 Sq. Ft.

For full details on the biggest roofing job in the world, write: Owens-Corning Fiberglas Corporation, Industrial & Commercial Division, 717 Fifth Avenue, New York, N. Y. 10022

This all-glass roofing system was topped with Fiberglas Perma Ply and Perma Gap roofing felts.

For more data, circle 174 on Inquiry Card
ADMINISTRATION BUILDING IS FOCUS FOR TUNNEL PROJECT

Venerable Institution Uses Ellison Balanced Doors

Over a period of years Smithsonian architects have specified Ellison Balanced Doors for durability and ease of operation. A total of 60 doors provide trouble-free service in the Arts & Industries Building, Natural History Building and the Museum of History & Technology. Ellison ONE SOURCE RESPONSIBILITY offers the architect a complete service for designing and engineering entrances for new and remodeled buildings. Your inquiry will receive prompt attention.

Ellison ENTRANCES

the BALANCED DOOR—the VARI-STILE door

in BRONZE
STAINLESS STEEL
TEMPERED GLASS
STEEL
ALUMINUM
WOOD

ELLISON BRONZE CO., Inc., Jamestown, N. Y.

The entire Administration Building for the Chesapeake Bay Bridge Tunnel, located on the Eastern Shore of Virginia at Wise Point, has been situated on a raised podium which visually separates it from the essentially flat surroundings of the local country. Designed by Williams and Taxwell & Associates of Norfolk with Sverdrup and Parcel of St. Louis, engineers for the entire bridge-tunnel project, the building is intended to provide an aesthetic focus for the vast project; to serve as an information center for tourists; and to house the executive, administrative and clerical staffs of the administration.

The building itself is of blue glazed brick with white precast quartz columns, pilasters and frieze features. It is arranged in a "U" shape around an extensively landscaped court planted with indigenous trees and flowering shrubs. Access to the building is across a reflecting pool and through the court.

The interior will feature an extensive collection of oils and watercolors by local Tidewater Virginia artists.
There's a new and luxurious apartment residence in the heart of Pittsburgh—Gateway Towers—and it is the fulfillment of a dream to create a residential area with a beautiful park-like setting in a modern downtown area. It gives Pittsburgh, for the first time, an open and landscaped residential environment with all the conveniences of urban living.

Gateway Towers, built, owned and managed by Tishman Realty & Construction Co., Inc. offers services new to apartment living. Tenants are offered such conveniences as room and catering service; lobby desk, switchboard and message service; and valet, maid, linen and laundry housekeeping services. And Music by Muzak throughout.

Muzak's scientifically planned programs enhance good architecture with an atmosphere that pleases residents and visitors alike.

In the world's finest buildings, atmosphere Music by Muzak has demonstrated a unique ability to mask noise, replace cold silence and complement smart architectural design and decor.

The Muzak sound system is a versatile communications medium for music, paging, public address and signalling. Save time and expense, specify Muzak in planning stages.
There is no such thing as "or equal" to a Bally Walk-In Cooler or Freezer
THE PROBLEM OF "OR EQUAL" HAS LONG BEEN THE CONCERN OF MANY ARCHITECTS AND ENGINEERS

Unfortunately, as everyone knows, the use of "or equal" in specifications encourages the attempt to establish non-equals as equals . . . even invites outright substitutions.

However, when it comes to Walk-In Coolers and Freezers, there is no "or equal" to a Bally.

In some ways, Bally Walk-Ins may be resembled in appearance and design. But no other Walk-In made today offers all of the important construction techniques and unusual features developed for exclusive use in Bally Walk-Ins.

If you are conscientiously seeking the best products for your client, the following features in Bally Walk-Ins will be important to you:

Urethane insulation 4" thick is foamed in place (not frothed). Has efficiency of 8½" fibreglass. Is suitable for minus 40° temperature, fire retardant and self-extinguishing.

Standard modular sections make it easy to assemble Walk-Ins in any size or shape. Since urethane is 97% closed cells, Bally Walk-Ins are ideal for outdoor as well as indoor use.

Superior section strength results from urethane foamed against metal skins. Wood structural members are eliminated entirely. Therefore, 100% of each section is hospital-clean insulation (harbors no vermin or rodents).

Bally Speed-Lok fasteners lock sections together quickly and accurately. Unlock easily for enlargement or re-location of the Walk-Ins.

Foamed lightweight door has automatic self-closing hinges, modern hand lock (inside safety release) and convenient foot treadle. Opens and closes with feather touch. Magnetic gasket provides tight seal.

Metal interior and exterior for maximum sanitation requirements. Your choice of hammered aluminum, galvanized steel or stainless steel.

Hermetically sealed refrigeration systems, factory-tested, self-contained, are available for all size normal and low-temperature Walk-Ins. Easy to install . . . reduce service problems.

Mass-produced to be substantially lower in cost than "built-ins" constructed by building trades. Cubic foot cost is less than half that of "reach-ins".

When you specify a Bally there is no need to ever accept an "or equal" or a substitute. Bally Walk-Ins are available to all dealers everywhere at uniform established prices. Write for our Architects Fact File which includes a 12-page brochure, specification guide and sample of urethane wall construction.

Bally Case & Cooler, Inc.
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