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FLOORS BY Armstrong
COVER
The red crane symbolizes the destruction now taking place of one of our significant major spaces: New York’s Penn Station. The steel framework in the middleground, incidentally, forms part of the structure replacing it, complete with 9-ft-high ceiling. The wrecker’s ball thus writes off another victim to “progress.” (Photo: Louis Reems.)

6 VIEWS
Our readers’ comments on the architectural scene.

49 NEWS REPORT
Our News staff reports on the latest developments in significant new projects and personalities in the architectural world; plus round-ups of what is new in the area of Products and Manufacturers’ Data.

77 READERS’ SERVICE CARD
A monthly service to our readers who desire additional information on advertised products and those described in the News Report.

137 TITLE PAGE

138 FRONTISPIECE
A humorous sally at the contemporary problem facing many “major spaces.” (Cartoon by Norman Mansbridge. Reproduced by permission. (C) PUNCH, London.)

139 EDITORIAL
P/A’s Editor probes a question that lies at the heart of this issue: Does the new space conception affect people’s reactions to traditional architectural space?

THE MAJOR SPACE
Introduction: P/A’s Editor defines “major space” as it forms the basis of discussion in this special issue, and cites several of our best-known architects (specially interviewed for this issue) as to their thoughts on the design and the uses of major-space structures.
HISTORY AND NEEDS: An analysis of the history and evolution of the major-space structure, including a discussion of its effects on human behavior.

INTERIOR VOLUME: A detailed analysis of the meaning and use of scale, and the specific means by which it can be expressed in articulating a major space. Plus an evaluation of The New Scale of Today.

EXTERIOR VOLUME: The effects of the various groupings of major-space structures on the cityscape: the all-powerful, single volume; major spaces unified; outdoor sculpture courts; major space within neutral volume; jewel in anonymous setting; and the all-enveloping super-shell.

STRUCTURE: An examination of the structural principles on which all building forms are based, plus a demonstration of how these principles have been put to work to evolve several major spaces.

ENVIRONMENTAL CONTROL: Problems inherent to air-conditioning large, enclosed spaces are examined in terms of two great enclosures of the 20th Century.

LIGHTING: A discussion of the philosophies and techniques of lighting major spaces, including lighting design problems encountered in two tremendous domes in the Midwest.

THE MAJOR SPACE AND THE NEW TOWN: Preliminary plans for the town center of Reston, Virginia, illustrate problems of relating major-space structures to the cityscape.

P/A OBSERVER

P/A's WASHINGTON VADE MECUM: A 16-page treasury of the capital's highlights—architectural, culinary, and otherwise—to help guide the AIA conventioneer as well as future visiting architects. Complete with lavish illustrations by Forrest Wilson.

MECHANICAL ENGINEERING CRITIQUE

William J. McGuinness reviews traditional and contemporary considerations for achieving comfort control in tropical areas.
DALLAS, TEXAS
Oak Plaza Building
Architect: Thomas E. Stanley
General Contractor: Thomas J. Hayman Co., Inc.
Dover Oildrastic Elevator installed by Hunter Hayes Elevator Co.

SPRINGFIELD, MASS.
Springfield Institution for Savings
Architects: Alderman and MacNeill
Architectural and Interior Design: Raymond Lowey / William Snaith
General Contractor: E. J. Pinney Co.
Dover Oildrastic Elevator installed by Bay State Elevator Co.

CHICAGO, ILLINOIS
3525 W. Peterson Office Building
Architect: Schurecht, Inc.
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DOVER ELEVATORS

On Readers' Service Card, circle No. 344
The Architecture of Israel
Dear Editor: Congratulations! I have long been looking for a comprehensive article on Israel’s architecture—and you have done it. I am making your article (MARCH 1965 P/A) compulsory reading for all members of my staff.

CARL ALPERT
Executive Vice-Chairman
Board of Governors, Technion
Israel Institute of Technology, Israel

Dear Editor: I enjoyed very much your article. It is one of the best I have read about architecture in Israel. It is written seriously, professionally, and with an objective approach.

DAVID REZNIK
Jerusalem, Israel

Dear Editor: I have recently read your article on “The Architecture of Israel” and want to congratulate you on your comprehensive job of reporting—not only on Israel’s architecture, but also on the environmental conditions that are shaping its architecture.

I have spent some time in Israel and have also worked for Heker, Neumann, & Sharon; I found your criticism of their city hall in Bat Yam particularly interesting. I, too, think that it is one of the most significant buildings in Israel, but I am only “disturbed” when judging it by its most incidental aspects (i.e., choice of materials).

What is significant about their building at Bat Yam is that it is concerned with three important functions of architecture: firstly, its use of the ancient wind tower idea is an attempt to solve an indigenous climatic problem. Secondly, it is concerned with the relationship of man to his “made” environment, as can be seen in the site plan of the city hall complex. And thirdly, the structure takes an integral part in shaping the spaces created.

DAVID R. SINGER
Ardmore, Pa.

Dear Editor: Your Israel article was great. It was some accomplishment for a short visit.

FORREST WILSON
Pratt Institute
Brooklyn, N.Y.

Word of Thanks
Dear Editor: On behalf of the Officers and Board, may I thank you for your wonderful article concerning Philip Johnson’s Eliel de Wolfe Award (MARCH 1965 P/A). Your articulate words gave special meaning to this annual event of ours. We are most grateful.

FREDERICK W. DAVIS
President, New York Chapter
American Institute of Interior Designers
New York, N.Y.

Fascinating Conclusion
Dear Editor: I am utterly fascinated by the conclusion you draw in your Editorial (MARCH 1965 P/A) concerning the lateness of the Porcelain Enamel Institute in sensing the shift in market from “the flat reflective curtain wall to a much more muted and plastic design.”

You concluded by pointing out that “too often, sales-trained, sales-oriented, sales-preoccupied management lose track of what it is they are selling.”

May I suggest that the correct conclusion to be drawn is “too often, management not trained in sales, not sales-oriented, and not preoccupied with sales, loses track of what it is they are trying to sell?” An alert field sales force knows which way the wind is blowing very early in the game. An alert sales-minded management listens!

L. R. BLOETSCHER
Manager Marketing and Sales
Westinghouse Electric Corp.
Architectural Systems Division
Grand Rapids, Mich.

The Psychology of Design
Dear Editor: Your discussion of the “Psychological Dimension of Architectural Space” in the March P/A Observer was excellent but far too brief. This is an area of architecture that is least understood yet is potentially the most powerful. I quite believe that history backs up this conclusion.

This has been an article long overdue, but, now that you have set the ball rolling, can we hear more about such factors as color, form, size, light, texture, and how they can psychologically affect man’s environment.

CHRISTOPHER RAPHAEL
Cambridge, Mass.

The New Government Architecture
Dear Editor: “Rejuvenated Architecture” (p. 188, MARCH 1965 P/A) may be in the making for our nation’s capital, nurtured with the benevolence of the GSA. On a provincial level, I have found this not to be the case, for as a consultant to a local firm I was given an office building plan “overlay” by the GSA and asked essentially to apply my elevations to it. If, then, the GSA wants to design the small buildings, let them do all of the design and take responsibility for the outcome. The GSA should have confidence enough in our profession to let us design significant government buildings for the people, wherever called upon.

JOHN R. HIX
Assistant Professor of Architecture
School of Design, North Carolina State College
Raleigh, North Carolina

Dear Editor: It was a pleasure for an urban designer to see the new Federal buildings presented in a related group in the March P/A Observer, rather than singly. But the rejuvenation of Federal architecture in Washington has an overall significance beyond the well-deserved tributes to the Public Buildings Service and Karel Yasko and their architectural compatriots. The design professions should take more careful note of what has happened here.

That whole group of projects illustrates a point of contemporary architectural dogma which—if lip-serviced less and thought about more—would explain why the individual designs received “... remarkable tribute(s) in view of the seemingly irremovable delays and reviews that accompany most public projects in Washington.” To wit: Each of these buildings was conceived, refined, and presented for review in terms of an established urban design for a larger area. Thus, the proposal could be more readily appreciated and acted on. Each of the final designs, only partially excepting FOB 7 and the HHFA Headquarters, is very close to the abstractly indicated form of a preceding urban design.

What you saw is as close as anyone would sensibly want—that is, because Yasko and the other architects have sought to imaginatively carry forward and develop the spirit of the urban designs. They did not ignore years of serious development at the planning level merely to do something “different.” Nor
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On Readers' Service Card, circle No. 430

Continued from page 8

Thanks to a bit of snapping by the new Commission of Fine Arts, the reevaluation and a major change were made in time—but barely. The final design, which passed as quickly as FBI or the Air Museum, brought the whole south side of the long element into play with the Mall space. The bridging is now part of a larger spatial sequence in four directions, and the 10th Street Mall axis is richly carried through this sequence to the Smithsonian, its originally planned terminus, instead of ending abruptly on a compromise.

I have needed this rather detailed explanation to show that the heavy weather of Washington building review is not always an Act of God. The trouble is that sunshine and light are not automatic here in Washington either. Especially not if one wants to see the principles of a thoughtfully developed urban design carried forward to their fullest architectural expression—as exemplified in these recent projects of the Public Buildings Service. In process, the planners and urban designers, like the architects of GSA, have also needed a large share of patience in seeing their children turn out right.

It is not surprising that the architectural translation from urban design to building design is often painful. First off, urban design is too much fenced away from what will go on inside the buildings, except in the most common and stereotyped forms. If blandness is to remain an unacceptable consequence, even in Washington, where a certain consistency and unifying theme is desired in the townscape, it takes time to bridge the gap. Secondly, we must all admit there has been more lip-service than conscious effort in the architecture of urban design. If a magazine of your stature will devote seven pages (same issue) to a critique of the new MIT Earth Sciences Tower without once moving to off-campus relationships such as having another tower, the Prudential, immediately across the river, when or where will these urban problems be discussed?

I personally assure you that just such discussion constitutes a very large part of some of those "interminable reviews." It is important to remember that the history as well as the result of these projects proves the main point of your article: that the mountain's labor pains should bring forth more than mice.

Yours for inspired genetics.

DONALD E. JACKSON, Architect
National Capital Planning Commission
Washington, D. C.

JUNE 1965 P/A
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JUNE 1965 P/A
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Moore Takes Yale Post

NEW HAVEN, CONN. Charles W. Moore will succeed Paul Rudolph as Chairman of the Department of Architecture at Yale University. Moore, 39, moves to Yale on July 1 from the University of California in Berkeley, where he has been Chairman of the Department of Architecture since 1961. Rudolph is opening his own architectural office in New York City.

Despite his relative youth, Moore has already had a distinguished career both as architect and teacher. Following graduation from the University of Michigan in 1947, Moore went to work in San Francisco, first for Mario Corbett, later for Joseph Allen Stein, and then Clark & Beuttler. In 1949, he joined P/A in 1949 as Technical Editor and was made Senior Editor, Materials and Methods, in January, 1965, has been named Managing Editor of PROGRESSIVE ARCHITECTURE. Holmes received his B.A. from Oberlin College and his Bachelor of Architecture from Yale University, and was a major in the U.S. Army Field Artillery in World War II. He worked in the architectural firm of Hulsken & Strong, Lima, Ohio, then in design development of porcelain enamel structures with Davidson Enamel Products. Moving to New York, he was affiliated with Lockwood-Greene, Engineers, Inc., serving in both the architectural and structural design divisions.

Holmes Made Managing Editor

Burton H. Holmes, AIA, who joined P/A in 1949 as Technical Editor and was made Managing Editor, Materials and Methods, in January, 1965, has been named Managing Editor of PROGRESSIVE ARCHITECTURE. Holmes received his B.A. from Oberlin College and his Bachelor of Architecture from Yale University, and was a major in the U.S. Army Field Artillery in World War II. He worked in the architectural firm of Hulsken & Strong, Lima, Ohio, then in design development of porcelain enamel structures with Davidson Enamel Products. Moving to New York, he was affiliated with Lockwood-Greene, Engineers, Inc., serving in both the architectural and structural design divisions.

Subway Will Replace Loop

CHICAGO, ILL. Ever since 1897, when the elevated railway that encircles Chicago's downtown business area was completed, the area has been known as "The Loop." It is as famous, in its way, as the Great White Way, or the Great Wall of China, and has been likened to an Italian Renaissance fortress and a French bastioned town.

Now news comes from Chicago that, within 10 years, the Loop—the actual elevated structure—will be no more. It will be replaced by a subway system, following roughly the same route. In late April, the Chicago City Council passed a motion to seek Federal funds to finance the new transit program. Chicago has already requested $1,250,000 in interest-free Federal loans to pay for year-long preliminary engineering and economic feasibility studies.

According to William R. Marston, Chicago's deputy planning commissioner in charge of transportation, the subway, which will be part of a larger transit system, would cost between $100,000,000 and $150,000,000. Of this total, $40,000,000 would be...
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transportation act of 1964.

The disappearance of the El will alter the physical appearance of downtown Chicago, as much as the destruction of the Third Avenue El altered New York City's East Side. It will also change the feeling of the Loop. What the new feeling will be is up to Chicago.

In 1959, Hartford wrote Commissioner Moses proposing an exchange of the Circle, running from Columbus Circle at the southwest corner of the park to the Reservoir in the upper part, with outdoor cafes. Moses pointed out that such a grand-scale onslaught of cafes was not likely to make money, and he suggested situating a single pavilion at the southwest corner of the park, opposite the Plaza Hotel. There, in a busy corner of the park, traffic could be brisk, patrons could arrive and depart by car, and a concession-operated restaurant might turn a profit. Hartford said he would be glad to donate such a cafe. And Moses, accepting, suggested it be named the Hartford Pavilion. But there was no joy at Fifth Avenue and Central Park South, the corner picked for the honor.

Four neighbors — 795 Fifth Avenue Corporation; Fifth Avenue and 59th Corporation; Andrew Y. Rogers; and Tiffany and Company — brought suit against the city in 1960, shortly after the proposed gift was announced. For five years, the case dragged through the New York courts, until this spring the New York State Supreme Court handed down a decision, without an official opinion, ruling against the cafe's opponents. Suit was brought under a New York State statute stating that no building may be put up in a park unless it has a park use. This spring's decision came at the end of the case's third trial, granted on procedural grounds. The court found that the proposed Hartford Pavilion was indeed a park use building, even though two-thirds of the building's space will be on the upper level, entered from the street. Four entrances are from the street; one on the lower level from the park.

Hartford's desire to have a sidewalk cafe in Manhattan, (referred to by then-commissioner Moses in a staff memo as the advice of a friend, but questionable character) came from seeing such cafes in London and Paris. But New York offers a different set of circumstances. The sidewalks of New York are narrow, offering little protection to anyone seated in a cafe from the roar of traffic or the exhausts of buses and trucks. Besides, land prices in mid-Manhattan are prohibitively expensive — often as high as $3,500,000 an acre, and while a cafe built on park land would circumvent the latter problem, it would not solve the former.

Hartford believes that his pavilion would bring more persons into the park. That seems hardly likely, or desirable, at that already heavily trafficked corner. And he thinks of it as giving persons a place to sit quietly and contemplate the park. But why not sit in the park, on benches or on the grass, and have the contemplating done there? The area is always filled with persons doing just that in good weather. And a building there only reduces the amount of available land.

As the city grows and land prices soar, speculators and "benefactors" always look eagerly at park land. It is vacant; it is often centrally located. Why not build on it? Because you gradually strangle what life a city has. Because a city must have park space as surely as it must have housing, business, and transportation. Remove the parks and you kill the desirability of living in the city. In Manhattan, which lost 200,000 residents between 1950 and 1960, the desire is waning already.

Olmsted and Vaux saw the problem clearly over 100 years ago, before the skyscraper or the motor car. They put it this way: "As the city grows larger, projects for the public benefit multiply, land becomes more valuable, and the park more and more really central, applications for the use of ground upon it for various more or less plausible purposes, are likely to become increasingly frequent and increasingly urgent, and there will thus be a strong tendency to its conversion into a great, perpetual metropolitan Fair Ground, in the plan and administration of which no general purpose need be recognized, other than to offer for the recreation of those who may visit it, a desultory collection of miscellaneous entertainments, bounded together by a series of crooked roads and walks, and richly decorated with flowers and trees, fountains and statuary."

"The only solid ground of resistance to dangers of this class will be found to rest in the conviction that the park throughout is a single work of
art, and as such, subject to the primary law of every work of art, namely, that it shall be framed upon a single, noble motive, to which the design of all its parts, in some more or less subtle way, shall be confluent and helpful."

Building a café and pavilion at 59th Street and Fifth Avenue in Central Park would be no more "confluent and helpful" to the park or to Manhattan than would the building of a Rockefeller Center be to Paris.

Unfortunately, plans for the Hartford Pavilion are moving ahead. Although the estimated cost of the building has soared from an original estimate of $750,000, to $1,712,000, with architect Edward Stone receiving a 15 per cent commission $750,000, Hartford says he is ready to put up the money. Hartford's financial position, though, is reportedly unstable. He recently sold Show, his money-losing magazine of the arts; he is trying to sell Paradise Island, a resort venture in the Bahamas, and his Gallery of Modern Art at the southwest corner of Central Park is seeking contributors.

It looks indeed as if the pavilion project is the stepchild of the misguided munificence of a cultural Casanova. The proposal is in its way as silly as earlier suggestions for the park, defeated by the citizens, who evidently must protect themselves against their own city government. One early proposal suggested the park be turned into a burial ground for the distinguished men of this country. Another called for the launching of a ship in the reservoir to train the merchant marine; and a third suggested turning the whole park into a topographical map of the United States.

If the Hartford saloon can be built in Central Park legally, what will come next? And who will protect the park? Hartford's financial position, though, is reportedly unstable. He recently sold Show, his money-losing magazine of the arts; he is trying to sell Paradise Island, a resort venture in the Bahamas, and his Gallery of Modern Art at the southwest corner of Central Park is seeking contributors.

for Manhattan's Pennsylvania Station site. In both cities, the opportunity for a truly memorable public facility has been lost, and a routine, "functional," large-capacity center substituted. Architects might ponder the lessons taught by such examples in reading this issue of P/A on "major spaces"—what they are, how they are attained, and how not.

Mies Apartment Opens in Baltimore

Baltimore, Md. Highfield House, at 4000 N. Charles Street in Baltimore, brings to that city a Mies van der Rohe design executed in concrete. Like most Mies buildings, Highfield House is distinguished by the orderly progression of its façade. Its tinted glass windows do not go from floor to ceiling in each room, but they do stretch from supporting column to supporting column, giving the building a feeling of horizontality, which makes its 13-story height less noticeable in an area of smaller buildings and individual homes.

Beneath each window is a buff-colored brick sill, which gives the façade a punctuated rhythm. This effect is reiterated by gradations in the exterior concrete columns, stepped back every few floors, as Mies did with the columns in his Chicago Promontory apartment house in 1949. At the rear of the building is a sunken garden with a swimming-pool fountain, opening off a recreation room.

A "City" Is Not a Home

The Bronx, N.Y. Fourteen times the size of Clover, South Carolina, seven times the size of Fair Plain, Michigan, and three times the size of Bountiful, Utah, Co-Op City will soon raise its head in the Bronx. The "city," which will house about 60,000 people in 15,500 units (about the size, all told, of White Plains, New York) will be built on a 300-acre site—the grave of Zeckendorf's bankrupt Freedomland.

The site was purchased for $15,000,000 from the National Development Corporation by the United Housing Foundation, who will sponsor the project. The Foundation, begun in 1951 and headed since 1959 by Abraham E. Kazan, has sponsored seven other such cooperative developments...
Centralized Schools for Kindergarten Through 14th Grade

EAST ORANGE, N.J. This New Jersey community of approximately 80,000 persons, located within a 3.9 sq mile area, is thinking of building a school plaza that would accommodate all the city's school children. Abandoning the neighborhood school and locating all school buildings (from kindergarten through junior college) in one large complex is a solution many cities have considered. It seemed an especially appealing idea to East Orange, which was faced with the possible need for a new junior high and the definite need for renovations and additions for 10 other school buildings.

To help the people of East Orange decide on such a radical approach and to aid the city's Board of School Estimates in approving it, architect Emil A. Schmidlin presented the school board with this rendering of what the school plaza might look like. The complex would be built over a 15-year period; if started soon, a middle school for about 3000 fifth- to eighth-graders could be ready in about three years. Added after that would be a "resource tower" for a curriculum center, a junior college, and central offices. Next would come a high school for 3600 students. Step four would provide a primary school for 3850 children in the first through the fourth grades. The last stages would add a gymnasium, a stadium, an arts center, and a parking area.

Other communities, notably New York City, have been considering such centralized schools to aid integration.

Architecture Exhibit at MOMA

NEW YORK, N.Y. In 1932, the Museum of Modern Art's newly established Department of Architecture, headed by Philip Johnson, introduced the concept of a large, architectural retrospective with the show, "Modern Architecture, International Exhibition." Every 10 years or so since then, the museum's expanded Department of Architecture and Design has presented a sizable review of "modern" architecture. The latest one, entitled "Modern Architecture USA," opened there on May 18. Selected and installed by department head Arthur Drexler, it includes some 71 buildings, built since 1900, by approximately 38 architects.

According to Drexler, "Some of the buildings shown are unique masterpieces; others are primarily of historical significance. Some buildings are shown because they launched an idea; others because they carried an idea to its conclusion. All of them remind us that architectural excellence has many forms."

Drexler's introduction to the exhibit goes on to say: "The exhibit begins with an early
work by Frank Lloyd Wright (Unity Temple, 1906, shown), illustrating some characteristics of his architecture much admired in Germany and Holland. What follows is the emergence in the 'twenties of a new architecture for an industrialized world. Its principles were meant to be internationally valid, but its European aspects were emphasized at the end of the 'thirties when refugees, converging on the United States, made major changes in the teaching of architecture as well as its practice.

"The post-war building boom provided ample opportunity for contending schools of thought, but through the late 'forties and most of the 'fifties the American imagination was dominated by the inspired method of Ludwig Mies van der Rohe. The great French architect Le Corbusier has been an acknowledged influence everywhere since the 'twenties, and in recent years his use of complex sculptural form has coincided with a world-wide restlessness—a suspension of dogma that has led to new freedom as well as disorder."

"Throughout this American story Frank Lloyd Wright appears in numerous guises. His work may be called a sustained explosion. Aspects of his architecture once rejected as naive—mass and solidity, for example—again seem relevant and curiously 'modern.'"

"Younger generations of architects are now building with brilliance and virtuosity. Indeed, modern architecture in the United States abounds with distinguished buildings and more than a few masterpieces. But however splendid this achievement may be, it does not begin to cope with the great problems of urban planning—not because the social and economic procedures that would make their ideas a reality do not yet exist. There are other problems as well: we do not yet have an effective means of preserving important buildings, and we have not yet educated all our public officials to a just appreciation of what building as an art can do to enhance our lives. But we can look forward to finding solutions to these problems that will rival and perhaps surpass our recent achievements."

"Modern Architecture USA" has been designed to travel here and abroad: all buildings are shown in large color transparencies, each mounted in its own prefabricated light box. These boxes are set into prefabricated, free-standing panels of varying heights, supported by square aluminum tubing.

**Sculptural Control Tower**

MALTON, ONT., CANADA The control tower of the new Toronto International Airport has a more striking form and texture than the terminal buildings it services (p. 46, DECEMBER 1962 P/A). The control cab is supported on three legs of reinforced, patterned concrete containing—respectively—elevator, stairs, and ductwork. The tower rises from a Y-shaped, one-story building housing telecommunications, air traffic control, and service area in as many wings. Exterior materials used in the base, which blend with the concrete of the tower, are gray brick for the walls and precast concrete panels for the fascia. John B. Parkin Associates of Toronto, architect of the terminal, performed the same services here.

**FDR Memorial Put on Ice**

WASHINGTON, D.C. When Francis Biddle resigned last month as chairman of the Franklin D. Roosevelt Memorial Commission, it looked as if plans for the controversial memorial were indeed, as Biddle said, "put on ice." Biddle's resignation capped a long struggle against opposition from the Roosevelt family, notably from commission member James Roosevelt, who felt that his father would not have liked the proposed memorial. Most recent disappointment to those who hoped the competition-winning design could be put up (see pp. 47-50, FEBRUARY 1961 P/A; p. 59, AUGUST 1964 P/A) was an indication that funds for the $4,500,000 structure would be virtually impossible to raise. Biddle had waited to start fund raising until a group headed by Adlai Stevenson raised money for a memorial to Eleanor Roosevelt. When Stevenson's group, even with the blessing of the Roosevelt family, had difficulty, Biddle believed that efforts for the FDR memorial would be fighting insurmountable odds. The commission still has the site, in Potomac Park between the Jefferson and Lincoln memorials, and at least one commission member, New York Senator Jacob Javits, who vigorously backs the FDR plan, hopes that the site can still be used, perhaps with a less ambitious scheme. Suggestions for saving the site propose landscaping, fountains, maybe a statue of the late President, and in the meantime signs proclaiming that the site will be used. Biddle plans to write the Smithsonian Institution in hopes of having the winning design kept by the Government for possible future use. On architectural grounds alone, it would be a shame to see such a stately proposal come to naught.

**Come Alive**

NEW YORK, N.Y. For about one month, from March 11 to April 7, Park Avenue executives, women with shopping bags, children old and young,
could throw a dart, roll a marble, pin a tail, or spin a wheel (shown) at a new exhibit—all in the spirit of fun and games. The exhibit, in coordination with the American Merchandising Council, is now traveling to major department stores throughout the nation. The “come alive” games, most of which are no more than dyed, crayoned, and shellacked plaques, and wheels at the Pepsi Cola Building was the moving spirit of del Sol Productions, of which Norman Laliberte is director of creative design. The organization, a small one with 10 employees, is based 43 minutes outside of New York, in Ossining, under a liquor store. The studio was started in 1962 as Sol Productions at St. Mary’s College (Notre Dame, Indiana), where Laliberte and del Sol executive vice-president James Cronin were teaching at the time.

The next year saw a move to New York and the beginning of del Sol’s exhibit design capacities. At the suggestion of architect and designer Charles Eames, Laliberte was made design consultant for the Vatican Pavilion at the New York World’s Fair. There, some 88 of his needleworked banners, ranging in size from 12” x 12” to 5’ x 12’ and decorated with “found” objects (daguerreotypes, bells, medals, tassels), portrayed various Biblical subjects.

The final stage of development came in the summer of 1964, when, under the instigation of George Beylerian, owner of a New York crafts and accessories shop, del Sol turned to the commercial production of toys, games, banners, silk-screened items, and wooden plaques. The rugs are not to be tread on lightly—they retail at F. A. O. Schwarz for $595; plaques used as decorative accents run from $5 to $12 and Pin-a-Tail on the unicorn is inexpensive $2.50. Many of the del Sol designs also made the rounds in the Manhattan galleries; in September of 1964, the Osborne Gallery featured Laliberte’s banners; the toys found their way into the Museum of Contemporary Crafts’ show “Amusements Is.”

At present, del Sol is retained by Official Films as a consultant on creative ideas, and by the Boston Arts Festival as creative consultant. Soon a Durst Organization Building in New York will sport Laliberte banners.

Laliberte’s art is a natural outgrowth of his background. A Roman Catholic and former teacher at the Rhode Island School of Design, Laliberte obtained his bachelor’s degree and masters degree in art education (his thesis was on the iconography of the Cross) at the Institute of Design in Chicago (before it was incorporated into the Illinois Institute of Technology). His art, whether in banner, plaque, or game form, abounds with symbol and is both timely and timeless. A Reinhold book on his banners and plaques is in the works.

**Merit Scholars Choose Architecture**

**EVANSTON, ILL.** In late April the National Merit Scholarship Corporation announced results of the tenth annual Merit Scholarship competition. Open in high-school seniors throughout the nation, the competition awarded college scholarships to more than 1900 students. Of these, eight announced their intention to study architecture. And of the eight, two will study at Rice University. The eight and the colleges they will attend are: William N. Scott, Fort Smith, Ark.: Georgia Institute of Technology; Elliott Kakee, Palo Alto, Calif.: undecided; Patrick R. Hayes, Washington, D.C.: Rice University; Larre H. Nelson, Jamestown, N.Y.: Rensselaer Polytechnic Institute; Robert M. Martin, Duncan, Okla.: Oklahoma State University; Chris A. Carter, Oklahoma City, Okla.: Rice University; Woodrow W. Hammond, Fort Bliss, Tex.: University of Texas; Evelyn M. Stevens, Charlottesville, Va.: Massachusetts Institute of Technology.

**Los Angeles, Calif.** Out-of-town professional buyers visiting Los Angeles were long faced with time-consuming freeway dashes in pursuit of product showrooms. Now their problem is at least partially alleviated by the opening of the 462,000-sq-ft California Mart, where many manufacturers have taken display space; and it will be further lessened by the completion of the recently started second building that is rising on the site to the left. A third stage—construction of a hotel and convention center—will follow shortly.

**New Design on New Site Is Winner in Winnipeg**

**WINNIPEG, CANADA.** Green Blakstein Russell Associates of Winnipeg won an architectural competition in 1960 for the design of a new Winnipeg City Hall (p. 74, February 1960 P/A). The competition design was for a site on Broadway and Osborne Streets, and when the site was changed to Main Street, where the old City Hall then stood, the design had to be changed, too. GBR did the redesign, but the recently completed building, which cost $5,900,000, in no
way resembles the original winning design. In redesigning, the architects were restricted by the lack of an official renewal plan for that site. At present, the provincial government and the City of Winnipeg are preparing to build a concert hall and museum directly across the street. It was thus necessary to open up the site to allow an approach from Main Street to a future public building to the west of the City Hall.

The solution was an inward-looking group of buildings whose character the architects could control, to provide, on however small a scale, a civic square. They separated the two functions of civic government: legislative (on the left) and administrative (on the right) into independent buildings, linked only by a podium, and, below grade level, by a gallery that accommodates city archives. This separation established a cross axis on the site, formerly Market Street, that now awaits the future public building to complete the project’s grouping.

One other consideration was purely visual. Because of a quirk in the city’s gridiron arrangement, the site appears to be close off Main Street from the intersection of Winnipeg’s two main streets, Portage and Main. This condition is further emphasized by the framing effect of two older high-rise office structures, one on each side of the street. The strong horizontal emphasis of the group of new buildings effectively closes and completes this composition, and the pedestrian approach is fittingly terminated by the courtyard.

Both buildings are faced with Manitoba Tyndall stone and Quebec granite; bronze is used for framing elements, screens, and hardware. The bold roof line of the legislative building is echoed by the spandrels of the administration structure. And the strength of the legislature’s supporting columns is mirrored by the subdued columns on the administration building.

All things considered, it seems as if Green Blakstein Russell Associates produced a better design on the new site than they would have on the original site with their competition-winning proposal.

First Sectional Model of Sydney Opera

SYDNEY, AUSTRALIA When completed sometime in 1968, the Sydney Opera House is expected to look like the model shown here, enlarged 96 times. Built at a scale of 1” to 8’, the model gives a meticulously detailed idea of how the building will look, complete with 2200 cast-metal figures depicting audience and sightseers. From the exterior, the building will be distinguished by 10 roof sections that soar beyond the building like lateen sails above an Arab dhow.

The building’s interior is just as intricately striking. The main auditorium seats 2800 persons, rises steeply from the stage, and has a raised gallery on either side. A movable stage will drop out of sight, making way for the placement of the next act’s scenery. Backstage are 11 platforms that move up and down electrically. A piece of scenery, constructed in the ground-level workshop, will typically be raised on one of the platforms and then lowered to the stage.

Expected cost of the structure is $39,100,000. It will be constructed on Bennelong Point in Sydney Harbour. Joern Utzon is architect for the opera house. Ove Arup & Partners, London and Sydney, are consulting engineers.

Canadian Structural Steel Design Awards Announced

TORONTO, CANADA A jury of 8 Canadian architects and engineers pored over 74 entries in Canada’s first structural steel design awards program and awarded 4 citations of excellence. Initiated by the Department of Industry and the National Design Council in cooperation with the Canadian Institute of Steel Construction, the program called for submissions in four categories: buildings costing under $2 million,
No Man Is an Island: Memorials Can Be

WASHINGON, D.C. Visitors to this month's AIA convention may have a chance to visit Olmsted Island at Great Falls on the Potomac, 12 miles upstream from Washington. Known as Falls Island, until its rededication this spring, the wild natural beauty of the area was preserved by the National Capital Park and Planning Commission, of which Frederick Law Olmsted, Jr., was a member from 1926-32 and for whom the area is now named. Olmsted, Jr., (1870-1957) the son of America's first professional landscape architect, is credited with having "contributed more to the planed growth, orderly development, and beauty of the Federal City than any other individual since Pierre L'Enfant." Olmsted's association with Washington was a long one. In 1902, he was a member of the McMillan Committee, which revived and extended L'Enfant's original plan of 1791 for the city. From 1910 to 1918, he was a member of the first Washington Commission of Fine Arts. And in 1916, he framed the language of the Congressional Act establishing the National Park Service "to conserve the scenery and national and historic objects in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." Olmsted also designed the grounds for the Washington National Cathedral.

Outside the capital, Olmsted prepared city plans for many communities, including Rochester, Pittsburgh, and New Haven. His landscape architecture enhanced such housing projects as Roland Park in Baltimore, Forest Hills Gardens, L.I., and Palos Verdes Estates, Calif. He also planned the grounds of the U.S. Military Academy at West Point, St. Paul's School at Concord, N.H., and the Brooklyn Botanic Gardens.
How to Do What You Can With What You Have

COLUMBUS, INDIANA This county seat of 25,000 souls is well on the way to becoming the New Haven of the Midwest, having erected buildings, since World War II, by Eliel and Eero Saarinen, I. M. Pei, and Harry Weese—and now, a "test" block of municipal renovation styled by Alexander Girard. This project was not a matter of "rip it all down and put up something new and bigger (therefore better)," but a carefully thought-out scheme to preserve and enhance the typical blockfront of the city (generally dating from the 19th Century and the early 1900's). Girard's approach was cosmetic, to be sure—painting, sympathetic sign design, awnings and canopies, bird control—but the effect is admirable, and other merchants in Columbus have responded by bringing their buildings up to snuff in a like manner. Columbus is now planning a similar blockfront renovation in another part of town, and other towns, small and large, might well take heed.

Vanishing New York

NEW YORK, N.Y. Victims of the computer age, New York's stately old hotels are disappearing to be replaced by motels and other glossy, automated, glass-and-plastic hostleries that process a guest much the way a Detroit assembly line processes flippers. But the quiet architectural grandeur of the few remaining older luxury hotels is still a solace to visiting architects and others who want grace instead of glitter. Playing on this unsettling change in the New York hotel scene, one of the stateries, surviving inns. The Plaza, whose neighbor the Savoy Plaza will soon vanish to make way for the gigantic tale reads like this:

"It didn't happen all at once. They did it very gradually. We can't alarm the people!" They said. So they removed a little house here. And a great hotel there. And then a few limestone banks and all the east iron store fronts they could find. And very quietly one night they stole a railroad station and buried it in New Jersey.

"A few people grumbled. Some found temporary shelter at The Dakota when Park Avenue disappeared. Others moved to Westchester. And some completely disillusioned out-of-towners went to Philadelphia instead. But most people were complacent. Until the day they discovered that their city had been entirely replaced with glass.

"Then they complained. But it was too late. So the faces of the city grew grimmer than they had ever been before. Clocks stopped. And the glass began to crack.

"Soon after this, on one ghastly glittering morning, an observant executive walking to work paused on Fifth Avenue at Fifty-Ninth Street to clean his heavy dark goggles. Squinting, he looked around. And gasped!

"There was The Plaza where he had always remembered it. 'It can't be!' he said and rubbed his eyes. He looked again. 'It is there!' he said. And ran to work.

"He called his wife. 'We'll go there tonight, before it's too late. Don't tell anyone!' he hissed. So she only told her very best friend. Soon everyone knew.

"Crowds gathered. They wandered in the lobbies. They caressed the marble, admired the gilded cherubs. And the caryatids in the Palm Court where palms still swayed. They feasted in the baronial splendor of the Edwardian Room... etc., etc."

Bucky's Housing Plan for Upper Manhattan

NEW YORK, N.Y. Under the title "Instant Slum Clearance," the April issue of Esquire magazine described a Buckminster Fuller plan for Harlem as "a proposal to rescue a quarter million lives by completely transforming their environment." Actually, the transformation would be far from instant. The first year, for instance, would be consumed in tooling up for the mass production of structural parts of the massive structures Fuller would superimpose on Harlem. Construction would take two years after that, and would provide living space for 110,000 families (almost four times as much as New York City's Housing Authority has provided in the last five years).

Looking more than a little like giant blast furnaces, the structures would rise 100 stories above the ground, supported by a central pillar from which circular decks would be suspended from steel supporting cables. "Open space between decks avoids a sense of
Comfort-Engineered Seating
by HEYWOOD-WAKEFIELD

Boston's War Memorial Auditorium is handsome in design, extremely functional and well equipped. This balcony view shows most of the 1,836 Heywood (TC-477) fixed chairs.

Main floor view showing 4000 Heywood-Wakefield deluxe portable chairs (TC-290 FA) for supplementary auditorium seating.

Close-up view of TC-477 balcony installation showing well-padded foam cushion seats with concealed self-rising mechanism.

This installation of fixed and portable seating in Boston's War Memorial Auditorium, a part of the new Prudential Center, is typical of Heywood-Wakefield's ability to supply superior seating to meet the varied requirements of all types of auditoriums or arenas. No matter what the seating problem, or whether it involves floor or riser installation, there is a Heywood-Wakefield design to meet your requirements. Write for complete folio—or see Sweet's Catalog, Section 36d/He.
impenetrable mass. From the masthead, lenses capture the light and heat of the sun." (Remember when Jon Hall used to amaze the natives by lighting straw with a magnifying glass?)

Roadway ramps would circle the central pillar, and tenants could drive to their apartment doors and park there. Fuller estimates that each family would have an average of 1200 sq ft of living space (roughly 500 sq ft more than the present Harlem average), not including parking areas and exterior balconies. By starting each tower's living space 10 stories above the ground, room would be left beneath for highway cloverleaf interchanges or even for existing housing.

Perhaps this plan, developed by Fuller (with Fuller and Sadao, Inc., as associates) would ease the squalid, crowded living conditions in Harlem, bringing different housing to that area. But would it work structurally or socially? Someone should find out.

**Church Plan Stresses Participation**

PARMA, OHIO What the Holy Family Catholic Church in Parma wanted was a building that would seat 1350 persons and express, in its design, the revitalization of the liturgy (see pp. 133-137, MARCH 1965 P/A). Since this revitalization requires that the congregation participate—visually as well as verbally—in the liturgy of the Mass, the congregation must be as close to the altar as possible. In Conrad & Fleischman's design, the altar is the focal point, with the ceiling sloping down toward it and the congregation spreading out directly in front of it.

The church's curved walls will be cast-in-place concrete with a white limestone aggregate. All exposed concrete will be bush-hammered. The façade is distinguished by the alternation of concave and convex surfaces and by the variations in the height and roof-slan of its facets. The church opens this year.

**Israeli Pyramid Plan Proposed**

TEL-AVIV, ISRAEL If built according to plan, the structural technique used in the Tel-Aviv Air Terminal may be the first idea Israel has consciously taken from Egypt since the Exodus. The idea comes with modifications; for although the structural shape is a pyramid, the components forming it are truncated hollow tetrahedrons instead of solid cubes, and the interior of the structure will be open instead of solid. Each
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or enclosures

56' diameter dome Pool Enclosure at Park Place Motor Inn, Traverse City, Michigan.
Architect, Paul Hazleton, Traverse City, Michigan.

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June 1965
tetrahedron will be lifted into place by a crane, and windows and doors will be formed by the openings between elements. Each tetrahedron is cast of concrete 1" thick.

The building will be a gathering place for passengers departing from the city by bus for the airport. Pedestrians enter on one side, taxis from another, and buses from the third. Offices occupy a small gallery, projecting over the pedestrian entrance.

Architects are Alfred Neumann and Zvi Heker of Tel-Aviv.

AISC Holds Its Largest Engineering Conference

At the American Institute of Steel Construction’s 17th Annual National Engineering Conference, held in Memphis last April 22 and 23, some 700 conference heard numerous papers delivered by national authorities on various aspects of structural design and fabrication.

Of special interest to architects were two papers describing how large amounts of steel could be saved by novel design. Horatio Allison, Consulting Engineer of Rockville, Maryland, explained the achievement of unusual economy in multistory building framing by designing for full continuity in both directions, using regular-bay spacing and making use of high-strength steels. William J. Mouton, Consulting Engineer of New Orleans, demonstrated that a 50 per cent savings in steel could be effected in high-rise office buildings through a system of box-framed latticed trusses.

Although the present AISC design specification does not include design rules for composite design using lightweight aggregates, the conclusion of several papers presented was that it is quite possible to use aggregates of this type with composite design.

Research reports in plastic design in multistory buildings revealed the feasibility of designing both braced and unbraced frames by the plastic method.

Auto-town Trade Mart

DETROIT, MICH. Ground was broken last month for Detroit’s Trade Center, long considered a needed addition to the Detroit business scene. The developers plan to spend $10 million on the project, providing displayers with 450,000 sq ft of display space. As designed by Detroit architects Smith, Hinchman & Grylls Associates, Inc., there will be two buildings joined by a general tower that houses elevators, power equipment, and other mechanical and service facilities. The undistinguished exterior has exposed concrete columns. Interior includes a restaurant, cocktail lounge, the usual supporting shops, a large auditorium, and conference and hospitality rooms.

Author Seeks Material

Architect E. Abraben is now preparing a book on franchise motels. Architects, students, designers, and motel owners wishing to submit their motels for consideration may mail the material to E. Abraben, Architect, P.O. Box 1196, Boca Raton, Fla.

ERRATA

• Joseph J. Roberto, referred to as the former University Architect for New York University in the April 1965 P/A (p. 221), is still quite active in that position. “News of my demise is greatly exaggerated,” he writes P/A, and we thankfully restore him to the living.

• P/A’s April announcement (p. 63) that Glen Paulsen will become head of the Department of Architecture at the Cranbrook Academy of Art did not mean to imply that he is giving up his private architectural practice. Paulsen and his firm, Glen Paulsen & Associates, will continue to operate at the same old stand in Bloomfield Hills, Mich.

The Buildings That Bloom in the Spring

CHICAGO, ILL. Nineteen Chicago buildings were laureled this spring by the Chicago Association of Commerce and Industry and the Chicago chapter, AIA.

The two honor awards went to Edward D. Dart for the Chicago Theological Seminary Faculty Housing (1, interior) and to I. W. Colburn & Associates, Inc., for the St. Anastasias Church (2).

Citations for excellence went to the Volkswagen Building by Hausner & Macsai (3); to United Parcel Service Distribution Center and the Henrich residence by Edward D. Dart (4); to the Madison Elementary School by Cone & Dornbusch; the Jens Jensen Elementary School by Harry Weese & Associates; the Decorol Corporation by Don Erickson; to the garden townhouse by Y.C. Wong, R. Ogden Hannaford & Associates; to the Hawthorne Court Townhouses by Ralph Anderson Associates; 1
Today, in the construction field, many people are doing a "take off" on Mark Twain. "Everyone," they say, "talks about the high costs of construction, but no one does anything about it."

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P/A News Report

Federal Savings & Loan Association by Fridstein & Fitch; the Home June 18, which closes the 97th at the banquet and ball on their fellowships will be for these are newly appointed, and

654 Fellows. Thirty-seven of Philosophies and Ideas." He in education: Lawrence B.

WASHINGTON, D.C. The AIA has honored are:

for service to the profession of architecture: Mario C. Celli, McKeesport, Pa.; Frank I. Hope, Sr., San Diego, Calif.; Amedeo Leone, Detroit, Mich.; and Adrian Wilson, Los Angeles, Calif.


NEW YORK, N.Y. The 1965 winner of the Lloyd Warren Fellowship from the National Institute for Architectural Education is University of Illinois senior Patrick Leamy, who won the competition for the design of "A World Center for Philosophies and Ideas." He will spend several months at l'Ecole des Beaux Arts in Paris, then take a study tour of Europe.

Lloyd Warren Winner

M. Weese

Need for new Fellows

WASHINGTON, D.C. The AIA has 654 Fellows. Thirty-seven of these are newly appointed, and their fellowships will be formally conferred at Washington at the banquet and ball on June 18, which closes the 97th annual convention of the AIA and the XI Pan American Congress of Architects. Newly honored are:


For design: Giorgio Cavagli, New York, N.Y.; William Francis Cody, Palm Springs, Calif.; Harwell Hamilton Harris, Raleigh, N.C.; Philip C. Johnson, New York, N.Y.; Robert Andrews Little, Cleveland, Ohio; and Arch Reese Winter, Mobile, Ala.


For public service and service to the profession of architecture: Mario C. Celli, McKeesport, Pa.; Frank I. Hope, Sr., San Diego, Calif.; Amedeo Leone, Detroit, Mich.; and Adrian Wilson, Los Angeles, Calif.


Personalities

Hervey Parke Clark and John F. Beutler of the San Francisco firm of Clark & Beutler were awarded the Henry Hervey Memorial Medal by the National Sculpture Society in recognition of their use of sculpture in San Francisco's West Coast World War II Memorial. . . . Elected president of the New York Building Congress was Robert W. Cutler, partner in the firm of Skidmore, Owings & Merrill . . . Dan C. Cowling, partner in the Cowling & Roark firm of Little Rock, has been elected to a three-year term as the director of the Gulf States Region of the AIA. . . . Richard J. Neutra recently received his fourth honorary degree—this one from Rome University, Italy. The other three come from the University of Graz, Austria; the University of Berlin, West Germany; and Adelphi University, New York . . . Mary E. Dunn was re-elected national president of the American Institute of Interior Designers for her third consecutive term. Everett Brown will also take his third term as national chairman of the board . . . Frederick J. Woodbridge will serve as his second term as president of The Fine Arts Federation of New York . . . William F. R. Ballard, New York City's Planning Commissioner has accepted the resignation of Jack C. Smith, Chief of the Office of Master Planning, who is leaving to become a special consultant in the field of urban planning . . . The National Academy of Design has elected architects Lawrence B. Anderson (Boston), Waldron Faulkner (Washington), Louis I. Kahn (Philadelphia), Eldredge Snyder (New York) and Harry M. Weese (Chicago) to Associateship in the organization . . . Henry Kleinkauf, of Omaha, Nebraska, and executive chairman of the board of Natkin & Co., was elected president of the Mechanical Contractors Association of America.

Competitions

The design of a super-highway service station is the subject of this year's architectural student competition sponsored by the Committee of Stainless Steel Producers, American Iron and Steel Institute. Further information may be obtained from the National Institute for Architectural Education, 115 East 40 St., New York, N.Y. 10016.

Awards

DALE MORLEY TAYLOR, a fourth-year architecture student, was one of two students at The University of Texas chosen to receive the Roy Crane Award in the Arts. Mr.
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Crane, newspaper cartoonist and father of the Buz Sawyer adventure strip, established the award this year to encourage independent achievements in the arts. Taylor was honored for his design of a segmented hyperbolic stress-skin dome.

WASHINGTON/FINANCIAL NEWS

The annual “Let’s jump on J. George Stewart” exercise on Capitol Hill started just a little earlier than usual this year, with the annual introduction of a bill (S.1658) by perennial sponsor Senator Paul Douglas.

As usual, the bill would require that the “Architect of the Capitol” be, in fact, an architect; and that he be appointed by Congress, not by the President.

Also as usual, the bill was accompanied by Douglas’ oratory concerning the incomprehensibility of an “architect” who is not an architect at all (though Mr. Stewart is a graduate civil engineer), and of the President naming an official whose principal duties include keeping Congress house in order.

And true to form, nobody seemed to pay much attention to the matter—certainly not the President who holds his appointment for life (he was named by President Eisenhower in 1954). Stewart incidentally, succeeded another nonarchitect, David Lynn, in the post.

The move, however, this year comes at a time when there is a mounting drumfire of criticism of architecture in the capital in general—focused most of all on the President’s house. Some Congressmen feel it is an example of the builder’s art. Blame for the building is hard to place; for Congress, lack of “appropriate emphasis” on the need for good architecture in the capital is general focused in part on the great pile of stone and steel known as the Rayburn House Office Building, a huge, expensive, unhappy example of the builder’s art. Blame for the building is hard to place; for Congressional committees took a major hand in the building’s design during the years it was under construction.

Adding to the general criticism was, for one thing, a growing argument about what some Congressmen feel is an overemphasis on concrete for exterior finish of many Government buildings; considerable uproar over monuments to past Presidents (the two Roosevelts, for instance); for another, debate about a “grand plan” for Pennsylvania Avenue that includes demolition of several of the city’s most valuable privately held real-estate parcels (including the huge Nation­
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by committees and subcommittees in early May, and didn't seem likely to move out for floor debate before mid-June.

Win a Few, Lose a Few

Professionals made a little headway in their tussles with Federal bureaucracy, though not gaining all of what they wanted.

In one case, the long fight to gain exemption from registration as "foreign agents" when architects or engineers work for foreign clients didn't succeed. But the floor debate in the Senate did produce a flat statement (by Foreign Affairs Committee Chairman Fulbright) that: "Professional services by attorneys, architects, engineers will not require registration" unless their efforts for a foreign client constitute political activity; and a definition (in amendments finally passed) of "political activity" that effectively takes architects out of the picture.

On another front, professionals took on the General Accounting Office, which had criticized "excessive" use of consultants on Federal-aid highway jobs. Answer was a bill (HR 7113) "to provide for the utilization" of qualified engineers (and architects) in private practice "in connection with public works and other projects undertaken by the Federal Government."

Of major importance to the construction industry (and those who must worry over costs) were hearings that started May 10 on a series of bills (HR 6363 and others) that would permit "common situs'' picketing of a construction site — now barred by interpretations of the Taft-Hartley Act.

This has been a major objective of construction labor for some years—the right to close down an entire site, even if the dispute is with only one of many contractors. Similar moves have failed in Congress over a number of years, but this time there seems to be growing support.

Increase in Airports

There's still plenty of future for designers of airports, according to latest compilations of the Federal Aviation Agency. But the outlook isn't quite as optimistic as it may look from a quick glance at the figures.

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74 P/A News Report
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Construction

Metal-Lath/Gas Concrete Domes

Hasty Chef Systems, a subsidiary of Chefless Restaurants, Inc., has chosen twin, thin-shell, metal-lath/concrete domes as the efficient and distinctive shelters for its franchised operation. Known as "Re-informed" thin-shell construction, the twin domes are created by the space frame, reinforcing-bar, rib metal lath, and spray-on concrete technique that was developed and tested at Tavernier Keys, Florida, in 1963 (NEWS REPORT, AUGUST, 1963 P/A). Technique was developed by Architect Richard A. Rose of New York, and by Consulting Engineer Bertram S. Warshaw of Coral Gables. Sidney L. Kotkin of Miami was the architect for the construction of the initial Hasty Chef restaurant, with Rose as associate architect. Warshaw handled the engineering portion of the construction.

Structure is composed of two domes, with its floor slab only a few inches above grade, and the tops of the 6 pedestals about 2' above the floor slab. After the 8 shop-formed curving space frames were attached to the 6 pedestals, 1'-sq steel-tube arches were affixed to them in each direction, to provide the support grid for the ½" rib metal lath. Six complete circles of reinforcing bars were placed around each dome, closely spaced above the arched openings, to resist the horizontal dome thrust. Lightweight concrete, using an additive ("Vinfoam," manufactured by Vin-Lox Corp., Miami, Fla.) to create gas bubbles in the finished product, was sprayed onto the metal lath armature to produce a finished shell with a thickness of 3/4". According to Warshaw, the cost of the shells, foundations, and floor slabs was approximately less than $3.00 per sq ft. Metal Lath Assn., Engineers Bldg., Cleveland, Ohio.

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Recent line of composite "C" joists are used with concrete slab construction to produce composite floors. Joists handle loads applicable for standard open web steel joists of the same size designation. Joists have the top chord inverted to provide a flanged support or shelf for a deck form. Extensive...
sions of the web system projecting above the top chords provide positive shear connections with the poured concrete slab uniformly along the joint length. Joist design features a beaded angle for an improved welded anchorage of the web panel joints. It also serves to minimize the amount of concrete leakage through the joints and to provide for the formation of a key of concrete throughout the length of the top chord. Test results comparing composite joints with standard joist and slab construction show that composite joist system has 20 per cent less deflection, produces savings in cost of steel because top chords need only be designed for the basic support of construction loads, and reduces amount of bridging or lateral support. Laclede Steel Co., Arcade Bldg., St. Louis, Mo.  On Readers' Service Card, Circle 104

Relocatable Classrooms

Low-cost, relocatable classroom unit has recently been designed by Neoplastics Structures of Osseo, Minn., to meet the needs of expanding educational space. Structure weighs 18,000 lbs or 12Â½ tons and provides two 700-sq-ft classrooms per building. Each classroom, which will provide space for 70 students, can be erected in less than two weeks for as little as $12,000 to $15,000 per classroom. Roof and wall panels consist of Monsanto's "Lustra-Span" rigid vinyl spandrels, making the roof 500 lbs lighter than it would be with other materials. Roof can withstand a minimum load of 40 psf; it is a laminate of a coated plywood exterior, 6" of insulating foam, and white opaque .068 interior vinyl panels. Walls are also made of laminated panels and are available in variety of colors. Classroom unit can be air conditioned. Structure also has an individual fire alarm system. Monsanto Co., 800 N. Lindbergh Blvd., St. Louis, Mo. On Readers' Service Card, Circle 105

Electrical Equipment

Sunken Street Lights

"Magdisc" pancake lights are used in off-street installations. System employs 8" cylinder-shaped units, set in 2Â½" in the pavement with only a 6" rise of the conical-shaped top protruding above the ground level at a 7° slope angle. Manufacturer states that units do not interfere with moving vehicles or snow-removal equipment. System has a light intensity of over 600 ft-c "on sunny days as well as at night." Light beam can be uni- or bidimensional and color coded by filters. Continued operation of the other lamps is unaffected by failure of any bulb. Strong Electric Corp., 524 City Park Ave., Toledo, Ohio. On Readers' Service Card, Circle 107

Surfacing Veil

"Pellomac" is a nonwoven surface coating for use in exterior and interior building construction. Coating prevents hairlines, wind, and other related cracks in newly plastered walls. When applied to existing walls previously painted, cracked, or with poor substrates, Pellomac prevents cracks from showing through after application of the paint. It prevents humidity and moisture penetration and "impregnable" tilelike finish. It is said to resist industrial fumes and chemicals, dirt, grime, and scuff marks. Coating may be applied to wood, plaster, concrete, cinder block, etc. Pitt-Glaze is said to last five times as long as conventional finishes and to wash more easily than a high-gloss enamel, even on a semiflat finish. Coating may be applied by roller, spray, or brush. Pittsburgh Plate Glass Co., 632 Fort Duquesne Blvd., Pittsburgh, Pa. On Readers' Service Card, Circle 109

Doors/Windows

Plastic Glazing for High-Rise

"Lexan" polycarbonate sheet for use as glazing in windows of multiple dwellings has received approval by New York City Board of Standards and Appeals. According to the manufacturer, impact strength of Lexan is 50 to 100 times that of glass and 35 times that of acrylic. Lightweight sheet transmits up to 89 per cent of the available light and is self-extinguishing. It can be supplied in translucent colors or it can be transparent. Glazing material is especially useful in schools or in areas where there is a high degree of vandalism. General Electric, Chemical Materials Dept., Pittsfield, Mass. On Readers' Service Card, Circle 106

Colored/Acoustical Ceiling or Wall Finish

Low cost, sound-absorbing and noncombustible acoustical finish can be applied in one operation to ceilings and walls. Called "Faserit Acoustical," it is made by a patent process of combining various chemicals, cellulose fibers, expanded volcanic stone, bonding agent, and water. It has neither particle fallout or flaking. Material can be applied directly to monolithic concrete or poured on concrete with no special preparations. Finish can be applied to acoustical plaster, ceiling tile, sheetrock or portland-cement base coat, plywood, galvanized duct, aluminum, etc. It may be colored and textured before application to match any decor. Application of diamond dust or metallic fleck can be added. Specified Ceilings & Walls, Inc., 77 Montauk Ave., Brooklyn, N.Y. On Readers' Service Card, Circle 108

Tilelike Coating System

"Pitt-Glaze" liquid coating system combines the nonyellowing property of polyester with the stain resistance of epoxy to provide for all interior surfaces exposed to hard wear, an electrical connection is not mentioned. The system is adequate as a fire barrier, as it can provide for the formation of a key of concrete throughout the length of the top chord. Test results comparing composite joints with standard joist and slab construction show that composite joist system has 20 per cent less deflection, produces savings in cost of steel because top chords need only be designed for the basic support of construction loads, and reduces amount of bridging or lateral support.

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Even the shopping centers themselves come packaged* these days for controlled economy

All framing—long and short-span steel, joists, composite system, V-LOK, columns—decking and ribbed steel centering—compatible in every way, sold, serviced and shipped from a single source—it’s saving builders dollars, time, and headaches everyday.

The latest to take advantage of the benefits of the single source is the Gibbons-Grable Company, general contractors who are putting the finishing touches on the $10,000,000 Mellett Mall (pictured above) a shopping center complex in Canton, Ohio.

More than 965 tons of steel were used in the shopping center—all of it perfectly mated at Macomber with coordinated delivery that permitted most efficient construction.

"It cut days off our field labor costs," stated Herbert G. Barth. "One source of responsibility makes sense when you're dealing with a quality house like Macomber."

* All Steel Framing Components and Steel Roof Deck.

MACOMBER INCORPORATED
CANTON, OHIO 44701
SUBSIDIARY OF SHARON STEEL CORPORATION

On Readers' Service Card, circle No. 468
adverse effects caused by expansion and contraction of paint surfaces. It has high resistance to solvents, industrial fumes, and rot. Coating can be used with all latex or alkyd paints. Pellon Corp., 1120 Avenue of the Americas, New York, N.Y.

On Readers' Service Card, Circle J10

Furnishings

Do Your Drawers Remember? These Do

Drawers molded of a copolymer (a mixture of polypropylene and polystyrene) reportedly causes them to return to their original shape, even after being twisted or bent in storage for a long time. This new addition to the line of “Mod-U-Line Molded Plastic Drawers” is more flexible than its predecessors and virtually unbreakable; an antistatic additive assures greater cleanliness. Available in eight sizes, and shrinkproof, warpproof, and nonsplintering, the drawers are suitable for hotels, schools, pleasure boats, restaurants, and stores. Amos Molded Plastics, Edinburg, Indiana.

On Readers' Service Card, Circle 111

“Swan” Sofa

Adapted from his famous chair, the “Swan” sofa by Arne Jacobsen has molded sides and back, is upholstered with foam rubber, and covered in fabric or leather. Base is aluminum. Dimensions are 30” x 57” x 29”. Fritz Hansen Inc., 305 East 63 St., New York 21, N.Y.

On Readers' Service Card, Circle 112

Guidelines For Interior Consultants

Architects should know that three pamphlets are available to guide interior designers not accustomed to working with architects on a fee basis. Included is “The Path to Professional Interiors,” a procedural pamphlet that notes some pitfalls peculiar to interior design specifications. A second item, “Standards of Professional Practice for the Interior Design Consultant,” is based on corresponding AIA Document J330. The third one, “Check List for Interior Furnishing Specifications,” lists both general and specific conditions for writing specifications covering movable furnishings. The pamphlets are offered by Products for Professionals, a group that is trying to resolve some of the working problems of interior furnishing. Trefzger’s, Inc., 3014 Woodburn Ave., Cincinnati, Ohio 45206.

On Readers' Service Card, Circle 113

Sanitation/Plumbing

Ventilated W/C

Built-in toilet ventilator, called “Vent-Away,” eliminates w/c bowl odors. Device, operating in the toilet tank, is noncorrosive and has no moving parts. It employs the venturi principle: water falls in a tube inside the tank, thereby creating air suction behind it; odors are drawn through the rim punchings in the bowel and carried with this water to the normal discharge outlet. Lifting the regular trip lever on the tank activates the ventilator. Ventilating action stops when the lever is depressed for flushing. Flushing of the closet bowel can take place without using Vent-Away by normal operation of the trip lever. American Radiator & Standard Sanitary Corp., 40 W. 40 St., New York, N.Y.

On Readers' Service Card, Circle 115

Innovation in Carpet Weaving

Innovation in manufacturing processes is rare in carpet making. Now, however, E. T. Barwick has developed machinery that applies nylon fibers electrostatically to jute backing — 17,500 individually applied per sq. in. The result is not a conventional flocked fabric nor a tufted or woven fabric; it is a velvet-type carpet, called “Veltron,” of singularly lustrous texture (hence the ‘Vel’; ‘tron’ is for the electronic process). The ½”-thick durable pile remains perfectly vertical and resists abrasion due to its unusual density. Color pattern is achieved by Colorset—Barwick’s silk-screen process which was introduced last year. A great range of solids is also available. Carpet comes in widths up to 15”, with or without rubber backing. E.T. Barwick Mills, Inc., Chamblee, Ga.

On Readers' Service Card, Circle 116

No Handle Jiggling

“Adjust-A-Flush” is a recently developed tilt valve for w/c. By turning adjustment lever to the right or left, a 3” range of...
This will roof nine squares

...so will this

It's BFG ONE-PLY, a complete self-flashing roofing system from B.F. Goodrich. ONE-PLY is made of Hypalon® synthetic rubber backed with neoprene-bound asbestos. Black or white. It's rugged, durable, quickly and easily applied. For roofs of nearly any shape. Lightweight? Nine squares of 4-ply, gravel-surfaced conventional roofing, in place, weighs nearly three tons. Just 365 pounds of ONE-PLY will cover the same area. And ONE-PLY offers big savings in on-site handling and installation costs. Performance? So good it's guaranteed watertight... free from leakage... for five full years under normal conditions. Want complete information? Just write Building Products Department PA-19, The B.F. Goodrich Company, Akron, Ohio 44318.

June 1965
water will remain in the tank at the end of the flushing cycle. When flushing the bowl in a normal manner with the water supply shut off, a level of 0” to 3” of water in even increments is left in the tank. There are five snap positions and openings for water control in this lever arrangement. Buoyant chamber replaces a counterweight cap and makes it much easier to direct water into the overflow tube. According to the manufacturer, valve completely eliminates handle jiggling to stop running water. Universal-Rundle Corp., New Castle, Pa.

On Readers’ Service Card, Circle No. 117

Special Equipment
Model Viewing

“Modelscope,” a hand-held optical instrument, allows architects or clients to examine scale models in perspective, as they would look if actually constructed. The Modelscope can be moved among a cluster of models or even inside a particular model to give the viewer an illusion of seeing these models from ground level. Wide-angle lens with short focal length is fitted to the end of a slender repeater-system telescope 12” in length and 3/16” in diameter. Modelscope has a depth of field from about zero to infinity. It can be adapted to photography and television cameras. Viewer is supplied with a detachable eyepiece in a wood case. Modelscopes range in price from $250 up. HCI Sales Corp., 141 East 33 St., New York, N. Y.

On Readers’ Service Card, Circle 118

Water-Like Falls

“WonderFall” is an animated method of creating the motion of rain, waterfalls, and waterfountains. Droplets of a special liquid flow down taut nylon strands. Droplet sizes and flow can be varied. Liquid is non-toxic, non-evaporative, non-corrosive, and non-combustible.

Furthermore, it does not conduct electricity. Clear liquid can be colored with vegetable or fluorescent dyes. Liquid collects in the lower tank of the system. Gas or electric lighting can be easily incorporated into the system. Display can be stopped by switching off the pump. Nylon strands can be angled up to 30° from the vertical. Density of the droplet flow can be varied by adjusting the spacing of the strands and the number of rows of strands. WaterFall system can be used for shopping centers, stores, banks, offices, restaurants, theaters, etc. It can also be used inside churches, museums, art galleries, etc. Navan Products Inc., Subsidiary of North American Aviation, 1320 East Imperial Highway, El Segundo, Calif.

On Readers’ Service Card, Circle 119

Model Making

Lightweight plastic material made of epoxy derivative cellular material, called “Mock-Up,” can be easily carved into any desired shape or form. Plastic is impervious to solvents, does not melt or burn, and is nontoxic. Once the material is shaped, it can be hardened into a durable solid by coating it with “Mock-Up Hard Coat,” which is a low-viscosity epoxy resin with good penetrating qualities. Coating is easily applied with a brush or a two-component spray gun; it does not change the tolerances of contoured surfaces. Mock-Up is available in any size or shape up to 8½’ x 8½’ x 9’. General Laboratories, Div. of American Polymers, 635 Massachusetts Ave., Arlington, Mass.

On Readers’ Service Card, Circle 120

Stabilizing Soil

“Siroc” grout, a one-shot modified silicate-base solution, is used in soil stabilization or moisture-control problems. It strengthens soil under foundations, stops water seepage into basements and stabilizes soil during construction. Siroc works in any groutable soil and provides strengths ranging from 30 to 1000 psi. Actual strength depends on the make-up of the soil and concentration of the Siroc solution. Given the required time, Siroc grout penetrates range of medium gravel through all grades of sand and into coarse silt. Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland, Ohio.

On Readers’ Service Card, Circle 121

Surfacing

Thin Epoxy Floor

Thin, hard topping of epoxy resins, bonded to underlayment of “Marbleloid” cement, produces durable flooring system that can be poured over wood or concrete substructure. Consecutive layers of metal lath, a ½” deep cushion of Marbleloid cement and ¼”-topping of epoxy are built-up over wood subflooring; lath can be omitted when decking concrete. Seamless, colored epoxy composition (Trowelled-on) as well as the terrazzo surfacing are available. Epoxy floor is said never to spall, fragment, or pry loose from its substructure. It has impact strength of 23.3 psi and compressive strength of 7450 psi. Marbleloid Corp., 2040 88 St., North Bergen, N. J.

On Readers’ Service Card, Circle 122

Tile Supports

Computers

“Linotile” is a resilient tile used with pedestal floors that support heavy equipment such as computers. Floor is mounted on pedestals so that large electronic cables can be installed beneath them. Cables can then be reached by lifting sections of the floor. Special manufacturing process gives tile greater density. Linotile supports up to 200 psi without permanent indentation. Material resists stains, grease, burns, and cleaning agents. It costs less than plastic flooring and provides greater resiliency.

On Readers’ Service Card, Circle No. 373

Cork Co., Lancaster, Pa.

Linotile is available in 12” x 12” size in white, beige, green, brown, and gray. Armstrong Cork Co., Lancaster, Pa.

On Readers’ Service Card, Circle 123

June 1965

On Readers’ Service Card, circle No. 373  

48 Products
The new Cominco Product Research Centre in Sheridan Park near Toronto, Canada, has put lead quite literally on top. On top of the laboratory roof, to be exact. Only time will tell if this particular lead roof will pass all the tests of long use. However, many lead roofs have served for over 500 years, so no one is very worried.

Cominco’s reasons for choosing lead roofing may well relate to your needs, too: 1) Lead will outlast the building it shelters. 2) With modern thinner, lighter, stronger lead-alloy sheets, lead installation costs are competitive with other metals. There’s no “spring-back”. Lead conforms easily to the workman’s will and the roof’s irregularities. 3) The beautiful natural grey patina of lead only improves with age. 4) There’s never any staining of adjacent stone, concrete, or light-colored painted surfaces. 5) Lead has high sound-proofing performance. 6) If building becomes outdated, lead has high salvage value.

Ventilator/School Designs

"Architects Are Ingenious People" is the title of a booklet that discusses the integration of unit ventilator air louver systems with the design of schools. Introduction describes development, characteristics, and advantages of unit ventilator systems. Unit ventilators prevent overheating by introducing cool air (in winter, cool air from outside the building), without causing the stratification or drafts usually associated with under-window ventilation and poor air distribution. Plans, sections, and photos illustrate 30 installations integrated with school planning. Four sections are shown: Sherwood, Mills & Smith's Turn of River Junior High School in Stamford, Conn., (1) shows how brick grillework conceals outdoor air intakes. Knapp and Johnson's Plainridge Junior High School in Long Island, N. Y., (2) shows how ceiling-type units located in a continuous soffit allows low-silled window and continuous subsill radiation. The Giffels & Rossetti, Incorporated, Classroom Building for St. John Fisher's College in Rochester, N. Y., (3) shows how ventilators are integrated with soffit of the cantilevered second story. Reid, Rockwell, Banwell & Tarics' Crestmoor High School in San Mateo, Calif., (4) shows how concealed, ceiling-mounted units deliver air to ceiling diffusers in modular, loft-plan school.


Acoustical Materials Study

Acoustical Materials Association has just published its 1965 manual (90 pages) entitled "Performance Data of Architectural Acoustical Materials." Recently, the AMA won a 1964 Certificate of Merit for the previous issue of the manual from a competition sponsored by the AIA and the PC. Manual is divided into two types of tables: "Summary Tables" classify acoustical materials according to appearance and composition; "Producers' Tables" contain all the listed acoustical materials of each of the 13 member companies and detailed data concerning them. Performance data includes: thickness of materials; types of mounting used in the sound absorption tests; light reflection values based on the average of five tests on three different samples; flame-resistance, flame-spread, and fire-resistance; surface appearance; sound absorption coefficients; noise reduction coefficients (NRC) and NRC spec range; size of units on which sound absorption tests were made; nominal weight of the product as designated by the manufacturer; and ceiling attenuation factors. Study is available at $1 per copy. Acoustical Materials Assn., 335 East 45 St., New York N.Y.

Sound-Control Ceilings

"Sound-Control Ceilings," a 52-page booklet, describes decorative acoustical panels and tiles made of glass fiber, mineral wool, asbestos, perlite, perforated metal, and wood fiber. Photos show decorative effects of panels and tiles in actual ceiling installations. Charts give characteristics of each type of panel and tile. Specs given for installation of sound-control ceilings include isometric sketches and section details.

Johns-Manville, 22 East 40 St., New York, N.Y.

Air/Temperature

23 for 1

Gas or oil fired "Commercial-Aire" central-station multizone unit can handle up to 23 zones with simultaneous heating and cooling through separate ducts with local zone thermostats. By using dual ducts with heating and cooling controlled at local diffuser outlets, temperatures may be controlled in any number of zones consistent with the capacity of the unit selected. Units have heating up to 2.5 million Btu, refrigeration up to 95 tons, and air delivery up to 38,000 cfm. Four-page brochure includes specs and charts. Mammoth Industries, Inc., 13120-B County Road 6, Minneapolis Minn.

Year-Round Chiller-Heater

"Arkla-Matic" is claimed to be the first oil-operated absorption chiller-heater for year-round residential central air conditioning. Liquid traps and changing pressure levels within...
a vacuum-tight system produces circulating water as low as 40°F or as high as 70°F. Water is delivered to chilled-hot water coils in conjunction with air handling equipment for year-round conditioning. Three-and-a-half-ton unit has heat input of 120,000 Btu/h that provides a rated heating capacity of 96,000 Btu/h. Cooling input of 82,000 Btu/h produces a chilled water capacity of 43,000 Btu/h. Number of hand-welded joints required in chillers-heaters fired from other energy sources had previously been 216, but by using the tubes the number was reduced to 18. Low weight per ton ratio was achieved by combining within one shell the three tanks housing the absorber, condenser, and evaporator. Unit stands 69" high and is about 2½' x 2½'. Brochure diagrams the unit. Oil Air Conditioning Co., Div. of Arkla Industries, Inc., P.O. Box 475, Evansville, Ind.

On Readers' Service Card, Circle 203

Film Depicts Concrete in America

"Twelve Decades of Concrete In American Architecture" (from 1844 to the present) is the subject of a 16-mm sound-color film series in four separate parts. Part I is entitled "The Long Years of Experiment (1844 to 1920)"; Part II, "The Search for a New Architecture (1920 to 1950)"; Part III, "The Material That Focuses On Steel"; and Part IV, "The Architect's Material," which shows the work of 21 architects, is available on 16-page booklet. Doors are made of aluminum, bronze, or stainless steel. They are equipped with a panic-proof collapsing mechanism that permits the wings to fold together when excessive pressure is exerted against any two opposing wings. Photos illustrate various models available. Crane Ful- view Glass Door Co., 1201 Crane Drive, Deerfield, Ill.

On Readers' Service Card, Circle 207

Construction
Lobby Hung from Steel Arches

Problem of designing the 9000-sq-ft bank lobby of the Founders National Bank in Oklahoma City without interior columns was solved by using two exposed steel arches to support a suspended steel-framed roof. Arches are fabricated on all sides with ASTM A36 steel plate, ¾" thick. These members are reinforced by steel angles acting as diaphragms and hanger mounts. Roof structure consists of curved bar joists that all have the same radius and crowns at a constant elevation. Roof is suspended from the arches by A36 gal ¾"-diameter steel bars. Steel plate, 6' x ½", was used for mullions. Vertical glazing units act as steel tension members counteracting wind lift. These members prohibits roof movement due to temperature expansion of the supporting arches. Brochure gives details, elevations, sections, and photos. Architect is Robert Alan Bowlby of Oklahoma City. American Iron and Steel Institute, 633 Third Ave., New York, N.Y.

On Readers' Service Card, Circle 204

Revolving Doors

Selected details of revolving door entrances are contained in 16-page booklet. Doors are made of aluminum, bronze, or stainless steel. They are equipped with a panic-proof collapsing mechanism that permits the wings to fold together when excessive pressure is exerted against any two opposing wings. Photos illustrate various models available. Crane Fulview Glass Door Co., 1201 Crane Drive, Deerfield, Ill.

On Readers' Service Card, Circle 207

Aluminum Finishes

Reynolds Metals Company has published a study of the application of various types of their aluminum alloys, Each type is fully explained and includes color photos of an actual installation as well as samples. Also provided are a "Guide to Aluminum Alloys For Architecture"; hard-coat color-chart comparing Reynolds, Alcoa, Kaiser, and Kawneer aluminum; specs; and Aluminum Association Design System for aluminum Finishes that covers mechanical finishes, chemical finishes, anodic coatings, resinous coatings, vitreous coatings (porcelain and ceramic types), electroplated and other metal coatings, and laminated coatings. Booklet, 37 pages, illustrated. Reynolds Metals Co., 530 E. Main St., Richmond, Va.

On Readers' Service Card, Circle 208

Odorless Paints

"Valentine Master Decorator," line of "odorless" and fire-resistant interior and exterior paints, enamels, and varnishes, is presented in loose-leaf notebook. Each sheet pertains to a particular finish and contains specs, chemical analysis, and test results of that finish. Types of finishes are latex in white and eight pastel colors, a satin finish enamel in white and eight colors matching the latex colors, enamel undercoat, quick-dry vinyl sealer, two alkyd flats, and a quick-dry nonyellowing white enamel. Also included are an exterior primer, two white house paints, and a short line of varnish finishes. Valspar Corp., 200 Sayre St., Rockford, Ill.

On Readers' Service Card, Circle 210

Welding Concrete

"Uniweld" is a concrete structural welding agent consisting of epoxy and synthetic resin alloys. It can join fresh, wet concrete to existing cured concrete. This feature allows contractor to schedule phased, progressive casting or pouring, and greater use of precast designs. Uniweld is unaffected by aging, alkalis, and most acids or chemicals. Once cured, it does not soften, saponify, or emulsify. Photos illustrate application procedure and chart gives performance data and product uses. Permagle Corp. of America, Commercial St., Plainview, N.Y.

On Readers' Service Card, Circle 211

Manufacturers' Data
It's a Mirror  .  .  . (from the brighter side)

It's a Window  .  .  . (from the dimmer side)

**Furnishings**

Template Aid for Dormitory Designers

To help architects plan dormitory interiors, Simmons has developed “Work-Saver” transparent plastic stencils of its entire dormitory line. All items—wardrobes, chests, desks, and beds—built-in and freestanding—are drawn to 1/2” scale; materials and spec data are included. New to the line: several new sizes, a large wardrobe with bi-fold doors that may be ordered in custom sizes, and a double chest of drawers with continuous top. Simmons Co., Merchandise Mart Plaza, Chicago, Ill.

On Readers’ Service Card, Circle 212

**Steel Furniture**

John Vesey has released his first furniture catalog, which illustrates both traditional and elegantly modern tables, desks, chairs, and stools, all framed in steel. Much of the seating combines polished stainless-steel with tufted leather; the tables have glass tops and stainless-steel bases, some with brass accents. One new design, a well-proportioned chair by George Ray, contrasts lush suede upholstery with base and arms of flat steel bars. Rubber web supports down-filled cushions; suede comes in seven rich colors and is “Scotchguarded.” John Vesey Inc., 969 Third Ave., New York, N.Y.

On Readers’ Service Card, Circle 213

**Lunning Supplements**

Two supplements from the Lunning Collection have been made available for placement in Catalog 63. First illustrates four-seater sofa, table, lounge chair, couch, tea cart, dining table and chairs, side board, and double sofa-bed. Second
HOW LONG IS THE LIFE OF YOUR BUILDING?

* Norton aluminum door closer shells ARE GUARANTEED IN WRITING THAT LONG!

ANOTHER INDUSTRY FIRST! Norton door closers are guaranteed in writing for a full five years. Norton closer aluminum shells are guaranteed in writing for the life of the building.

YOUR WRITTEN ASSURANCE
Now, you have in writing, assurance that the Norton door closers you specify and install will give you the long trouble free service you have come to expect. Here's a guarantee architects can pass along to clients to assure them of quality products that give dependable service. Here is a formal policy building owners and managers can keep, knowing Norton door closers will perform.

SPECIFIC PRINTED POLICY
It has always been the policy of the Norton Door Closer Division to assure the satisfactory performance of Norton products; even beyond the terms of our former guarantee. Now, we have put this policy in printed form so that hardware distributors, architects, and owners will have a written statement of our guarantee policy.

WHY A LIFETIME GUARANTEE ON ALUMINUM SHELLS
Naturally, Norton closers could be manufactured from any metal. However, we have chosen aluminum because we believe it to be the best metal for door closers. It offers the obvious benefits of better looks, better styling, lighter weight and longer life. We want everyone to know, specifically, that we not only believe aluminum door closer shells to be best, but also guarantee it. We simply state they will last as long as the buildings in which they are installed.

A GUARANTEE WITH BACKING
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Guarantee
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Larsen Fabric Samples

Color brochure is designed to show 19 colorful patterned designs available from Jack Lenor Larsen. Groundcloths range from heavy velvets to handwoven silks, all of which are suitable for upholstery, wall coverings, and drapery. Also available at $15 per copy is "Larsen Weave Library," which is color-keyed four volume upholstery index containing 200 swatches of the most frequently used Larsen weaves. Swatches are easily removed from slotted pages for layout, specification, and replacement. Each book is chromatically arranged to show textures in 22 color ranges. Jack Lenor Larsen, Inc., 677 Fifth Avenue, New York, N.Y.

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98 P/A News Report

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June 1965
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"We cannot, however, lay down fixed proportions of space as architecturally right. Space value in architecture is affected first and foremost, no doubt, by actual dimensions; but it is affected by a hundred considerations besides..."

GEORGE SCOTT
Architectural space, which is contained or defined space, will be with us as long as man builds buildings. So it might be worth to ponder awhile about the possibility that the average person's feelings about architectural space—his psychological reactions to it—are changing.

In previous civilizations, except when in the presence of some natural phenomena such as high mountains or tall forests, man's greatest spatial experience was when he entered a large building. The importance of cathedrals and similar great structures is therefore obvious—they were not only symbols of material and technological achievement, but also places that stirred the spirit by the powerful impact of their spaces.

But is the impact the same today? Does contemporary man react emotionally to a large architectural space the same way he did in the past?

Today, we have many spatial experiences that did not exist before. Air travel, for instance. After a jet flight among the clouds, can one be really stirred by the architectural space within the terminal building? Or, assuming that there is a church on top of a skyscraper, how will a worshipper react to it after a thrilling ride up into the sky in a glazed, exterior elevator? Is looking down 500 feet from an upper floor of a high-rise tower a greater spatial experience than looking up 100 feet at a domed ceiling? And in the not too distant future, when man will be floating through the vast spaces of the celestial void, how will he react to earth's puny architectural spaces, however great they might be in the traditional sense?

The subject of space—of the changing space conceptions—has, of course, been discussed many times by many writers. Moholy-Nagy in his *Vision in Motion* said that "every great period in human civilization organically creates its particular space conception" and the whole book revolves around this subject. Giedion, in *Space, Time and Architecture*, also dealt at length with "space-time," which he called "the new space conception," and urged that "contemporary spatial approach has to get away from the single point of reference."

Yet many architects have been swinging back in recent years to a renewed interest in the well-defined, clearly contained, and therefore more traditional space.

It is worth noting that the destruction of Pennsylvania Station in New York did not evoke a public outcry of any significance. Those who were trying to prevent the demolition could be divided into two groups: well-schooled architects and sentimental preservationists. The former, because of their training, did appreciate the importance of the station's magnificent spaces; but the latter were upset only because another piece of familiar New York was to be taken away from them. The public at large—newspaper reporters, city officials, those who used the station, almost everybody else it seems—had no idea what the preservation struggle was all about. Most could comprehend only the value of the station's Doric colonnades; the importance of the great spaces as such meant nothing to them.

Is it then really true that the stationary architectural space, however grand, is psychologically becoming less and less significant to the new breed of fast-moving, space-age men? Or—like earth, water, fire, and air—is it elemental and eternal, and is a reawakening of public sensibilities to it therefore in order?
From the time man knew how to build, he tried to erect structures that enclosed large spaces. The need for big volumes of interior space is partly functional (to accommodate great quantities of people in a single room) and partly emotional (to achieve a sense of awe and grandeur). The history of architecture, which is the best record of succeeding stages in man’s cultural and intellectual evolution, is to a large extent the history of evolution of single-space buildings.

The exact purposes for which such structures have been created have changed and evolved throughout history; there are some building types today that are almost identical to their counterparts of many years ago, there are some that have survived in altered form, and some that are new.

The position of these buildings in the community has changed, too: where formerly a cathedral was the most prominent building in town, socially and visually, today it is often dwarfed by the towering cellular blocks of offices and apartments.

The purpose of this special issue of P/A is to take a look at the single-space buildings being built today—to examine their meaning to individuals, to consider their position in the cityscape, and to explore the technical and
aesthetic problems they pose for architects.

In the discussion that follows, we are using the term The Major Space. This will be our label for a building whose dominant part is a single room. Major spaces can also be outdoor spaces, such as plazas. We refer to such unroofed spaces, but only when they are relevant to the discussion of roofed-over spaces. In other words, in this issue we are limiting ourselves to a discussion of major-space buildings.

In preparing the issue, we talked with many architects, studied existing architectural literature, combed the archives, and, of course, pondered the subject ourselves.

There is, obviously, no doubt that architects are preoccupied with space. As Le Corbusier said:

"Space is the foot that walks, the eye that sees, the head that turns."

And James Fitch, discussing Michelangelo recently, wrote:

"Whatever the scale and purpose of his building, he treats it as a vessel, a container for human life and activity."

There is also no doubt that the concept of space enters into every definition of what architecture is all about. As Bruno Zevi has said, for instance:

"Architecture is a great hollowed sculpture which man enters and apprehends by moving about within it."

It is only when one begins to discuss large spaces of today that the controversy begins. Sir John Summerson dwelt at length on the subject of monumentality (a quality inevitable in a major-space building) in an essay entitled "The Mischievous Analogy":

"I have heard it hopefully said that the cathedral of the 20th Century is the school
or the hospital or the power-station, as if such things could bear any conceivable relation to buildings in which the utilization of space was the very last consideration in the world—buildings which were built as abstract monuments to objectify and render conspicuous certain collective ideas which could be communicated in no other way. It is surely certain that we shall not build cathedrals or anything remotely analogous. (This statement, I am aware, quite untrue. We shall build cathedrals and they will be strictly analogous to medieval cathedrals—hence their utter unimportance either as architecture or as expressions of religious life.) A power-station may be as vividly striking in mass and silhouette as Durham Cathedral, but it would be childish to attempt to elaborate or 'heighten' it to the degree required by a religious building—or to pretend that it signifies anything more profound than the provision of that necessary power which in the past was provided by a large quantity of firewood and many thousands of horses. The power-station is not the 20th-Century cathedral. It is the 20th-Century power-station—nothing more and nothing less than that. . . . Today, to endeavour to be monumental is to be untrue to our own times. Except for churches and certain other very exceptional things, the kind of buildings we need have no aptitude to the monumental. Houses, blocks of flats, schools, libraries, hospitals, offices, administrative buildings—none of these in their modern form are susceptible of that grand increase of scale which is the essence of monumentality. Even theatres and great halls seem entirely to have lost that character of being places of formal assembly which would warrant their being conceived on monumental lines. The fact is that the whole idea of formal assembly in public has withered; and with it has gone the need for an architecture reflecting that collective sentiment which goes with the love of formal assembly. Today, wherever we go and whatever we do, we go and act as individuals. If we go to the theatre, we demand a comfortable seat, an uninterrupted view of the stage, and room to manoeuvre at the bar in the interval—and nothing else except a certain sense of amenity. We do not demand to be canopied under a golden dome, with floral pendants, and nymphs riding in a painted heaven. At the town hall, where, if we go at all, we usually go to complain about something, we demand courteous attention and expeditious service; we do not really care to be reminded by the grand staircase of the majesty and greatness of Mr. Mayor. Of course, some of us may think that these things are nice. Perhaps they are. But they are no longer of the slightest importance. And to pretend they are or can be important is to enforce an analogy which has no natural force of its own.

"Now, this loss of the natural impulse to monumentality should not be a matter for regret. It is a perfectly natural reflection of the change which is taking place in the whole character of Western culture. All those things which suggested and supported monumentality are in dissolution. The corporate or social importance of religion was one of them. The sense of the dominance of a class—of the exclusive possession of certain privileges by certain groups of people—was another. The prestige and competitive ambition of commercial corporations was another. Monumentality in architecture is a form of affirmation; and affirmations are usually made by the few to impress the many. Today, the few are becoming increasingly merged in the many and there are no groups by the few to impress the many. Today, the very smallest idea of spending an equal amount on a civic venture would be three to five blocks. It is surely certain that we shall not build cathedrals or anything remotely analogous. If one place to another but we're not spending a cent for what we get when we get there. I am talking about the lack of vision, the lack of any interest in what must be served.

"Chartres could not have been built if it weren't for the bishops who wanted it to be good. The problem of architecture in this world is the lack of values of the people who commission it. They want to look poor when they should be driving around in specially built Rolls Royces with three extra axles. There is no interest to build a building which is in a real
way worthy of our culture."

I.M. Pei also doubted that our major assembly spaces are as important as those of the past:

"We are not really as big as we think, compared to olden days. Today, we are much less. The group is smaller now. In the olden days, the whole town turned out for the festival. The town had only 100,000 people and for a festival the streets were filled with 100,000 people. We don't have this kind of mass activity anymore. The figures closest to this kind of thing are 70,000 people out of several million attending a World Series game. What is that?"

In that there is a spiritual need for major spaces, Philip Johnson was emphatic:

"I do think you are changed in your abilities by what is around you. When you're swimming for a record, you need good architecture. The only analogy that works is that people respond to great spaces with their guts. I think that people will respond in the sense that the swimmer doesn't know why he swims better, the singer doesn't know why he sings better, the people may not know when they go to my State Theater at Lincoln Center, why they enjoy it more—because they have enjoyed the intermissions more. I am not sure that the public can specify at all. Breuer once said a wonderful thing. People don't see architecture, he said. What they see is landscaping and detailing. And that is perfectly true. I lectured in the State Theater this afternoon. I talked space. But what they asked me was, 'What are those curtains made of? And those awful statues.' That's what they think of on the verbal level. But what did they say before they started thinking in words? They were appreciating space when they didn't have any idea they were appreciating space. I think people have an instinct for space. It's something they like, like good food, sex, or anything else, but the last thing they can do is to talk about it. It is best to watch their eyes. Of course, they think it's religion when they walk into Chartres. But it is space that moves them."

When discussing the subject of all the needs for major spaces, Kevin Roche gave us a good summary of the prevalent feeling:

"Is there a functional reason for a great space? The large spaces were built because people needed places of assembly. Our reasons for building them will also be valid if they truly come out of the need for solving the mass assembly problem of getting people together in sensible ways so that they can do whatever brings people together in a city."

"Yet Grand Central Station in New York, which is a large space, actually had little reason for being in terms of assembly. Its major role was one of image-making—the creating of the façade of the image of the railroads. But you could conceivably 'need it' because, as we are fond of saying about Dulles Airport, it is a major gateway."

"If you put that to one side, you can ask, are there other needs for it? Is there some psychological need? And then you get into the scale of crowd. When you multiply one person by a thousand, you get a thousand people. Can you put them all under a 4 ft high ceiling? You can't. If you took the whole city and covered over the streets, where would you cover them over? At a practical height of 8 ft? Or 12 ft, which clears everything? If you did, of course it would be terrible. I think everybody would want to get out into the open again. You really have the psychological need. Besides, major spaces are big opportunities for expression; one makes them automatically, not because of understanding of needs, but because the opportunity is there."

The discussion of the way major spaces should be treated architecturally also took many directions. Typical is this remark by Paul Rudolph:

"Ninety-five per cent of the building needs of today are probably just as well housed in cages of the rectilinear type. But whether works of worship, auditoriums, gathering places of all kinds are varied within a cage-type building, or whether they become separated structures undoubtedly has to do with their use in the cityscape itself."

And the one by John Johansen:

"We always have positive and negative space—the positive space with the form negative around it. When you set out to design a major space, you make sure that everything about that structure—function and all—subordinates itself to that space, that positive, most compelling idea of the whole structure."

And also a comment by Roche:

"The scale of the single human is expressed in the 4-ft or 5-ft module of the typical office building. But many of these are unhuman, because they have no larger module, no group or crowd module, that would express formless heaps of individuals. The crowd is very much a reality, and it just doesn't fit into rectangular spaces—the flow of people should determine the shape of space."

Also pertinent to this discussion is a paragraph from a 1924 book called Bad Manners in Architecture by Trystan Edwards. He wrote:

"A few people standing up here or there in a theatre audience might get a better view of the stage, but if they all stood up they would be no better off than before. The rule of urbanity is synonymous with good manners, or proper behavior, in town planning."

Good manners is, of course, one of the problems when designing major spaces. But what manners are good? To quote Kevin Roche again:

"It is easy to make a small building large, or a large building small. The subtle problem is to make it right."

And so the discussion continues. These few samples from the interviews we conducted and the literature we studied are merely an indication of the complexity of the problem and the diversity of ideas.

On the following pages is an attempt to coalesce some of the aspects of major-space buildings. The subject, however, is too vast for a complete treatment. All that we could hope to do was to touch on it, to create an awareness that it does exist, and to point out some of its ramifications. If we manage with this special issue of P/A to start architects thinking of major-space buildings—of their function, design, and position in the urban hierarchy—as being unique and therefore requiring a special study, then our purpose will have been achieved.—JCR
HISTORY AND NEEDS

Some thoughts on the history of major spaces, on man's reasons for building them and his psychological response to them.

This is an age of bigness—the bigness of expanding populations and sprawling metropolitan centers; of mass media and the "multiversity"; of huge expenditures for weapons of almost incomprehensible destructiveness; of vast, unexplored distances beyond our planet.

Buildings, too, are larger—larger spans and heights are possible; larger volumes are attainable. But do the biggest buildings necessarily constitute major spaces?

Big Buildings Do Not Necessarily Constitute Major Spaces

Some of the most dazzling, large buildings of the 1960's are, of course, simply aggregations of cells. They would have been small buildings, except for their continuation in space beyond the limits that were previously considered the sensible or the possible. Yamasaki's proposed World Trade Center in New York, for instance (which, if built, will be the tallest building in the world, and will encompass the greatest square footage), is simply a succession of floors superimposed on each other, each eventually to be subdivided into cubicles no different from those in smaller buildings.

Arrangement in Space Versus Creation of Space

As buildings get larger, it is worth considering whether architecture must not be more than an exploitation of technique (however brilliant) for the provision of shelter (however necessary). The stuff of architecture, after all, is space, and despite attempts at the World Trade Center to enlarge the entry and to fashion a plaza (which, one writer immediately rhapsodized, "could be a modern Piazza San Marco"), this monumental ode to the elevator will probably be a good example of what Susanne Langer calls the arrangement in space, as distinguished from the creation of space.

What happens to architecture—the creation of space—when many of the needs for shelter can be served by cages? Paul Rudolph gives a quick guess that this is true today for 95 per cent of all building. There are few occasions for the major space, the grand single-room building. (Perhaps there were never many occasions, but in past ages they accounted for a larger proportion than now of a master-builder's work, the lesser structures simply getting built somehow by others.)

Before looking at some of the major spaces being designed today, it seems pertinent to consider one major space that is being destroyed: the ill-fated Penn Station. To have reproduced the ancient Baths of Caracalla as a modern railroad terminal, providing commuters from Long Island with a glimpse of the grandeur of Imperial Rome, will remain an anomaly long after the columns have been laid to rest. But there is nothing inappropriate about the scale of these latter-day baths. Only in such a major space could the traveler enter the city, or embark on a trip, with a feeling of drama that was exciting to the spirit, thrilling to the senses. The life-enhancing qualities of that experience will be gone when the height of the arrival/departure space is only slightly more than that of the average man. The underlying thought, it would seem, is that space—grand, non-utilitarian space—either was not appreciated or was not necessary, and definitely did not pay. It was more than "architectural heritage" that was at stake when the battle to save Penn Station was being fought; it was the whole meaning of architecture as space, no matter of what period.

Major Space in History

We have covered a lot of ground since the days of ancient Rome, Penn Station notwithstanding. But it was Rome that witnessed the first realization of the idea of grand, enclosed space. The Greek temple had been mainly sculptural, with little internal space, and little emphasis on the sense of enclosed space. One walked only within the peristyle; the innermost place was reserved for the deity. And earlier, the vast monuments of the pyramids of Egypt also had little internal space, being conceived architecturally as volumes in space. In Rome, however, as the structure of its society was different—more man-centered, more pragmatic, more hedonistic—so was the structure of its architecture: concrete vaulting now made possible the spanning of immense distances. And there was a new emphasis on enclosed space, as seen in several new building types: the basilica, attesting to the importance of business and law; the bath, serving as social club for a hedonist citizenry; the amphitheatre, arena for life-and-death spectacles. But it was the Pantheon, a Roman temple, that
The Greek temple was mainly sculptural, with little internal space. The pyramids of Egypt also had little internal space, being conceived architecturally as volumes in space. Shown here (facing page) are the Aztec temple and Pyramid of the Magician, Uxmal, Yucatan, and (above) the Parthenon, in perspective; plan of the Temple of Theseus, Athens; two of the many temples of Pagan, Burma, in perspective and section; and a village of Indian temples at Tiruvanamalai.
marked what Sigfried Giedion calls the “complete breakthrough” of the second space conception, the creation of interior space as the primary aim of architecture. Hadrian’s Villa at Tivoli was also significant in the development of major spaces, its barrel vaults and domes marking the beginning of complex interpenetrating spaces. (At this point, we should repeat that, for the purposes of this issue, our consideration of major space excludes exterior spaces such as the Roman forum and confines itself to interior spaces—either fully enclosed ones, such as the Pantheon, or those with a strong sense of enclosure from an implied roof, such as the Roman Colosseum.)

“Space in the process of expansion” is Bruno Zevi’s description of Hagia Sophia, differentiating it from what was simply the expanded space of Roman architecture. Lighting has always been an important element in the creation of major space, and the band of light encircling the upper dome of the mosque at Hagia Sophia sets off the great dome as if it were the very heavens. Light, of course, played a major role in the Gothic cathedral, intensifying the emotional impact of the space. Structural potentialities in particular were intimately connected with the kinds of major spaces that were built in any age. The realized space could never be more than the technical means made possible. (Giedion has expressed the close relation between space and structure by noting that “each form of vaulting has almost become the symbol of its age.”)

**Major Space Today**

The course of Western political history, with its periodic changes in the social structure, itself gave rise to other types of major-space buildings: the grand houses of palace and chateau, and the house of the municipality, the town hall. Then, with the Enlightenment, the egalitarian political revolutions, and the Industrial Revolution, came new major spaces—the large chambers to house popular
governments, the train sheds, the factories, museums, libraries, exhibition pavilions. And, in present times, there are the utilitarian spaces of the airplane hangar, the nuclear reactor, the power plant, the rocket assembly shelter.

This last is a considerable change. The reasons for major space in the past were congregation—the ceremonial or functional gathering-together of people—as spectators, participants, worshippers, workers, travelers. But today, there are vast spaces built solely for machines, or for things. “Nobility of use” is certainly not a criterion for the creation of this kind of major space. Also, since these more recent major spaces often have their size and shape quite precisely specified by their functions, the creation of space is often of less than primary importance. With an airplane hangar, for instance, no one asks: “But what is the space for?” Clearly, if there were less space, the building would be inadequate to its purpose. But the pragmatist is not convinced of the purpose of gratuitous space—of space as space. He will ask why we want it; he will doubt whether we need it; he will deny that he himself responds to it.

A theory is prevalent today, that, as a society, we do not need major spaces. Sir John Summerson, writing in 1941, believed that, “To endeavour to be monumental is to be untrue to our own times.” He maintained that, with very few exceptions, the kind of buildings we need “have no aptitude to the monumental.” In fact, said Summerson, “the whole idea of for-
Unusual major spaces built in recent years include Philip Johnson's New York State Pavilion at the World's Fair, which is an interior volume that is really out of doors (right), and Kevin Roche's projected Ford Foundation building, which has as its major space an outdoor court that is really indoors (see page 164). These cross-types, however, are in the mainstream of architecture, which has, since the early 19th Century, been more and more ambivalent about the distinction between interior and exterior.

Another type is the underground major space. The St. Pius Basilica (above) by Pierre Vago and Eugène Freysinnet was built to accommodate 22,000 pilgrims in inclement weather. Its elliptical plan measures 660 ft by 266 ft. So as not to disturb the open space in front of the principal shrine, the basilica was built underground. Also underground is the "Valley of the Fallen" (section, facing page), the enormous national memorial to those who died in the Spanish Civil War. General Franco has had the 853-ft long shrine carved out of a mountain.
mal assembly in public has withered." We move as individuals, wherever we go, whatever we do. Monumentality, he claimed, is simply no longer "suggested and supported" by the groups dominant in Western culture. He very matter-of-factly stated that this is not a cause for regret; it is simply fact. (It was Sir Banister Fletcher's contention that such massive buildings as the pyramids of Egypt would have been impossible without despotic government. And a contemporary commentator, Philip Johnson, feels that people today have no interest in a Great Building; he remarked that he himself "would like to live in a town where everybody got together to build even a pyramid.")

Psychology of Major Space

The forces responsible for initiating a major space have unquestionably changed. Today, they are more likely to be an institution, a corporation, a governmental body, than an Emperor Hadrian, an Abbot Suger, a Medici merchant. But if the causes and purposes of major spaces have changed through the ages, the emotional effect of a major space, of whatever age, remains compelling. What does space mean to the individual? Geoffrey Scott, in The Architecture of Humanism, first published in 1914, was one of the earliest of the modern architectural writers to discuss the effect of space and its power to "control the spirit." But he also said that we tend to overlook space "as merely the negation of the solid. (Banister Fletcher, in his monumental comparison of the world's architectural monuments, did overlook space as space. He exhaustively discussed buildings in terms of their plans, walls, openings, roofs, columns, moldings, ornament. Space as the measurable or immeasurable result of all these elements, and as an aim of architecture, was simply not in his schema.)

Perhaps because one's reaction to space is not on a fully conscious level, because the reaction is quite largely instinctive, the subject eludes precise verbalization. Le Corbusier has said, with poetry, "Space is the foot that walks, the eye that sees, the head that turns." Geoffrey Scott, too, has suggested that the experiencing of space is largely a question of instinctive movement; space, to him, was "liberty of movement," and he postulated that "a dependence upon physical firmness and security is not less fundamental to our nature than that instinctive need for expansion which gives value to architectural space." Philip Johnson has said that people have an instinct for space but cannot talk about it: "At Chartres, they think it's religion." And when László Moholy-Nagy spoke about space, he did so in such a way as to emphasize its unknowability. The effect of space on the individual is undeniable, though. Viollet-le-Duc, writing in the 1880's, was sensitive to the different emotional and physical reactions of a man who was first in a low, broad crypt and then in a soaring nave.

Architectural Space and Human Behavior

Today, the individual's reactions to space are being explored from another viewpoint. Psychiatrist Humphrey Osmond distinguishes between two kinds of space according to their effect on behavior—sociopetal space is that which brings people together; sociofugal space that which keeps them apart. Both are necessary. According to his definition, sociofugal buildings are those that "do not encourage interpersonal relationships; when group relationships occur, they are of the shoulder-to-shoulder type found in a crowd." This psychiatrist suggests that railway stations are "perhaps the apogee of sociofugality." (See the April 1965 P/A for the application of some of Dr. Osmond's ideas.)

Dr. Edward T. Hall, an anthropologist, is also studying the ways in which space acts on people. Using Osmond's distinctions, Hall suggests that "many public and semipublic places are sociofugal—auditoriums, railroad stations, airports, lecture halls, classrooms." Some of these, of course, are the "major spaces" we have been accustomed to thinking of as bringing people together; but, from the behavioral scientist's point of view, it is possible to see that people can gather in great numbers without really coming together, without having meaningful interactions.

Addressing a recent AIA convention, Hall pointed out that men perceive space in different ways, and that their responses to space are not controlled and intellectual, not even characteristically or exclusively human. He urges that it is now necessary and possible "to conduct valid research in our use of space."

Ironically, perhaps the most careful investigation of individual response to space has been carried out in connection with space travel, where the emphasis is on the smallest space possible. There is no room for spatial extravagance on a journey into space. And the other area in which scientific investigation has been conducted is on animals, as in studies that link stress to overcrowding, but again these point mainly to minimal space requirements. At the AIA convention in St. Louis last year, Dr. Osmond suggested that the most carefully designed buildings today are zoos: if not properly provided for, an animal will die; a human, however, learns to adjust. Unquestionably, it is possible for a man to exit from Penn Station via several hundred feet of tunnel, but something will have died in him.

Confined in a very small place has been a form of torture since ancient times. But what about enclosure in a vast space? Is there a point at which space becomes too immense, and the soul-expanding qualities become soul-diminishing? We can build larger structures today than ever before; but as single spaces become larger, increasing attention will have to be paid to the details that will mediate between man and his shelter. Major spaces will be built for various purposes, at the instigation of various forces in our society; the architect's job remains that of making space meaningful to man, and the great spaces comprehensible.—EP
Problems of creating an interior volume that reads as a major space are discussed in this section.

Granted that man feels a continuing need to build major spaces, we then turn to the question, "How does an architect achieve a major space?" The answer has two parts: first, an aesthetic how, and second, a technical how. The latter will be discussed in other sections of this issue. Here, we turn to a consideration of the aesthetic means of expressing the fact that a space is major.

The answer given most immediately today is the word "scale." However, as Philip Johnson briskly reveals, "We don't know what that is, do we? Let's face it." And I. M. Pei concurs, saying simply, "The mystery of scale is something about which I am not qualified to speak."

Human Scale

Scale has always been a pivotal idea in architectural theory, but any reading of 19th-Century academic systematizers will reveal a paucity of direct definitions illuminating this mirage of a concept. Yet we hear the phrase "human scale" vaguely bantered about all the time. What are the definitions? Viollet-le-Duc observed that a particular balustrade "recalls human size"; other writers refer to the 12-ft dimension of columns as relating to the size of the "demi-god," man being the measure of all things architectural. Bruno Zevi explains this in his *Architecture as Space* by saying, "The Greeks had achieved their human scale through a static proportion between the columns and the height of man."

In Functionalist theory, those elements that must be dimensioned for the use of the human being—the height of window sills, balustrades, door widths and heights—acquire a physical size called "human scale."

We must remember that the word scale itself, in one of its meanings, refers to physical size. Architects, as we all know, often talk about the "big scale" of a building—by which they clearly mean "size."

Scalelessness

Yet today there is an increasing concern among architects about interiors of enormous size that do not read as major spaces. Hangars and single-span factories that we know to be huge, for example, often appear to be scaleless. We frequently see photographs of large buildings that look a single story high. Long spans do not always impress us as being exceptionally long. In other words, we often cannot tell how big a space actually is.

"One of the great disappointments in my life," says Philip Johnson, in citing a case in point, "was going to the River Rouge Ford Plant. I had always wanted to see those great modern automobile plants, which I understood had such wonderful spans and terrific spaces. Henry took me through one day—but it was no space.... And in Chicago, where Mies reigns supreme, they made Mies's 20-ft spans 28, then 40, and now the latest that Mies's students use are all 80. But they tell me that all an 80-ft span does is to make a 20-ft span look blown up, and there's no scale at all. After all," Johnson continues, "what does 100' x 100' of something look like? The Crystal Palace, what did it look like? Was it very boring? We don't know. The only man who had the courage to say it stank was Ruskin. He said, 'This endless multiplicity, this endless rhythm of glass. There is no architecture to it. It leads the eye on, and all of a sudden it stops.' As often in a dome, it has no architecture. But why hasn't a dome architecture? To me, it's undistinguishable, a pseudo-ceiling; it's a cycorama. A cycorama has no definition of space."

Other critics also question whether there is any sense of scale in the repetition of a single unit without variation, as in Buckminster Fuller's domes, which are thought to produce a scaleless assembly. "In other words," Johnson says, "some
SETTING FOR "VOYAGE TO THE BOTTOM OF THE SEA," ABC-TV.
spans are expressive, and some aren't. Size is only one of the elements in all of this thing."

I. M. Pei concurs, "It is the treatment of the space, not its size, that makes it important. I have seen a catacomb in Italy by Albini that has a very low ceiling and is a very small space, but it is tremendously monumental. And there's one church in Rome by Borromini, a tiny little church, that is a very powerful space."

Thus the "treatment" that Pei mentions must be the use of "scale." And where does that leave us in defining this "treatment"?

Bruno Zevi most nearly strikes the heart of the matter in his definition: "Scale means dimension with respect to man's visual apprehension, dimension with respect to man's physical size."

**Definition of Scale**

Our definition of scale, then, is that it is the aesthetic impression conveyed about physical dimension. It is the product of the Gestalt ratio between a physical object and the mental impression conveyed to an observer about the size of that object. Thus, two relative forces are involved in the aesthetic concept, scale: first, the physical aspect of size; and second, and more important, the philosophical and psychological aspect of man's image of his own stature. For scale is primarily an affective aesthetic concept: the ontological aspect of the object—its physical nature or size—is less important than the affect on the observer—his apprehension of the object and his reaction to it.

In architecture, this ratio is created between individual functional elements, which are dimensioned for human use, and the over-all impression (which these elements help to create) about the size of the space in the mind of the observer. Thus those windows and balustrades that are said to give "human scale" are often the means of creating the desired impression about the size of a building. The Pan Am building, for instance, despite all its mass, looks like a stack of tiny elements, whereas the Seagram building, which is much smaller in over-all size, has a monumentality that is majestic. Such are the different effects of scale.

**Scale As Keynote of an Age**

Throughout the history of architecture, scale has revealed man's philosophical relationship to the objects or buildings of his highest aspirations. In the Middle Ages, for example, the Gothic cathedrals soared forcefully toward heaven; today, they demonstrate to us medieval man's aspirations to the God on High. In the Renaissance, on the other hand, when churches of even greater dimensions were built, such as St. Peter's, the buildings read as much smaller than their actual physical dimension. The aspirations of society had changed. Now everything was manipulated to increase man's own stature, and scale expressed this philosophical outlook. Therefore, scale gives us significant knowledge about an age.

**Manipulation of Scale**

One of the best examples of conscious and highly sophisticated manipulations of scale was in Baroque times. And today, also, we have examples that show a breaking away from these old effects, examples that reveal their architects' sufficient understanding of the concepts to manipulate scale in a playful manner. There have been trick effects with scale that illustrate how man can be made to look smaller or larger at will (facing page, top). The most obvious architectural example today is Philip Johnson's Gazebo at his Glass House (left and below). Claes Oldenburg's pop-art light switches create the opposite effect (facing page, bottom).

The methods that have been used in the past to create these varying effects of scale, and therefore to express a major space, will be the aim of our investigation on the following pages. Perhaps we can ultimately arrive at some understanding of present-day problems of scale.

"Those things that create scale, that make scale real," remarks Philip Johnson, "are the divisions of space into meaningful units, units that make the space exciting." How this Gestalt ratio—scale—is made real, and what meaningful units create major spaces, can be revealed by examining the following methods individually:

**Methods of Achieving Scale**

First of the means used to express a major space is the Vitruvian concept of "Order." Or, as I.M. Pei says, "Usually when you break up the space, the busier the space is, the less monumental it gets. I think simplicity is somehow related to monumentality." Classical concepts such as balance and symmetry, which are closely related to the concept of order, function in the same ways to convey the impression of scale.
Proportion

Second is that other Vitruvian concept—Proportion. As Zevi explains in *Architecture as Space*, "The most common definition is this: the relation of the parts to each other and to the whole of the building." (Yet Auguste Perret had said, "Proportion is man himself," indicating that he considered it ambiguously as an equivalent of "human scale.") "Proportion is closely tied to the scale of a building," Zevi continues, since the elements based on human size must be taken into account when relating to each other the physical elements that compose the space.

Focus

Focus is another of the methods of achieving scale. The emphasis in the Gothic church on having all lines point to the altar, is a clear example of this device (right). More complex were the Renaissance uses of perspective.

Much like scale itself, "perspective is not merely an optical illusion," as art critic John Berger wrote recently in *Realités*; "it is a visual method of putting man in his place—that is, at the center of events. It is not at all important that the railway lines meet: what is important—and what they did not teach us at school—is that by seeming to meet in the way they do, they reveal the point from which we are looking. All perspective is centered on us, on man—whether as artist or as viewer." Like the circular plan of the Renaissance church, perspective was employed architecturally to put man at the center of the universe, not nature or God.

Focus on a single object or point for the purposes of achieving scale need not be confined to exaggerated tricks of Op architecture, like those of Scamozzi's permanent background for the Teatro Olimpico in Vicenza or Bernini's Scala Regia at the Vatican, to name two of the most famous examples; it can also be achieved with other elements of interior composition, such as, most prominently, color.

Contrast

Contrast can also play a part in expressing scale. Contrasts in spatial sequence—a small, narrow entry, for instance—can prepare one in such a way as to emphasize the finally revealed large volume. Philip Johnson's reducing the ceiling height as one progresses up the stair to the Promenade of the New York State Theater is a recent artful example of such contrast. John Johansen also achieved this kind of contrast in Clowes Hall Auditorium, which he describes as follows: "There are
static spaces and fluid spaces. The major spaces are probably the static spaces, where you come to rest for some particular purpose. The process of getting there is by fluid spaces in which there should be no rest at all.

There are also contrasts of light and shadow that can emphasize the scale of a space. Etienne-Louis Boulée thought of himself as working with "the architecture of shades and shadows," and in his drawings indicated the enormous effect on a shady space that shafts of light from skylights could have "to make it appear grand," as he said (drawing, facing page, bottom right). Paul Rudolph has also worked for such effects in his Tuskegee Chapel, as he describes below.

Physical Elements of Scale

Since all of the above methods have been known to architects in the past, they should be available to us today to apply to each of the physical elements that compose space. Yet scaleless space seems to be on the increase.

Decoration

Architectural critics have questioned whether this is not the result of our living in an age whose architecture is without handicrafts, and therefore without applied decoration—moldings, carvings, sculpture or paintings, friezes, and frescoes—that would give scale to spaces, as was the case in the past (photos, these pages).

Commenting on the effect of decoration, Viollet-le-Duc observed, "The interior of the Church of St. Sophia appears still more vast than it really is, while the interior of St. Peter's at Rome appears comparatively small on account of the colossal sculptures and moldings which constitute its decorations," (this page). Such are the possible methods of manipulating scale with decoration.

Texture

Walter Netsch feels that texture is today's equivalent of ornamental detail and that it can give scale to interior space. Paul Rudolph, who has done his fair share of evolving architectural textures in concrete, feels that, to replace the decorations, "in an age whose architecture is without handicrafts, and therefore without applied decoration—moldings, carvings, sculpture or paintings, friezes, and frescoes—that would give scale to spaces, as was the case in the past (photos, these pages).

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Structure

The last of the physical elements of space to be considered with regard to its effect on scale is the structure itself. To contrast with the repetition of identical structural members throughout the assembly, as in a Buckminster Fuller dome, many critics point to Pier Luigi Nervi, who, in expressing physical stresses, reduces the size of structural members as they ascend, or tapers them as they stretch horizontally (overpage and p. 163, left), and, in so doing, more clearly creates a scale for his building. Functionalist critics point out that Nervi's structural expressionism is not always physically required for support, and that, like the entasis of the Greek column, it is a refinement in dimensioning, created for optical effect.
Columns Also Give Scale

One of the most frequently and successfully used devices to give scale is the contrasting of open space with structural elements—in particular, the column (facing page). Auguste Perret was especially interested in the aesthetic effects of the column. As Peter Collins noted in his book, Concrete, Perret "proliferated [columns] with all the enthusiasm of the architects of the past. It was not only the inherent structural dignity of the column itself which captured his imagination but the powerful emotional effect created by receding ranks of columns, and the optical function fulfilled by such rhythmic sequences in creating an awareness of scale beyond the effective bounds of stereoscopic sight. However much the Renaissance principles of perspective might be outmoded as a means of pictorial representation, the abiding reality of its laws as a means of apprehending spatial relationships seemed to him incontestable, and instead of diminishing or camouflaging his structural supports, he sought every means at his disposal to isolate them in space, and make their rhythm provide the dominant unifying element of his designs. This did not mean that he limited himself on principle to spans only possible in older types of construction, or multiplied columns unnecessarily where they were not structurally required; but it did mean that instead of feeling morally bound always to use the maximum spans obtainable by civil engineering, he considered himself free to use intermediate supports whenever desirable, and saw no objection to dividing a large hall with interior colonnades, provided that these were not in any way detrimental to its use."

Philip Johnson also is strongly articulate on the effect of the column in achieving scale: "The problem with any interior space is, how do you make it work on people as exciting space? We were discussing whether we could span 800' x 800'—of course we could. And I said, 'But what if I don't want to span it?' The more I think about it, to cut that span down makes the space more meaningful and large, in a screwy way. I like big spans—the spans in our airplane factories, and so on—but some are expressive and some aren't. My favorite room in this respect is the Seully Steel Plant in Newark (facing page, bottom, right); and that has 125-ft bays in both directions, and it's 6 or 7 bays by 6 or 7 bays with a sawtooth roof that brings those great rays of light down. But what is important is those columns—and the fact that there is nothing else there. It seems to me that the human mind measures things by recognizable divisions. "Great rooms can only be great if they are articulated. This is one of my problems in the auditorium of the State Theater: I tried to make these bulging pseudo-box things a measurable stop to the eye as it goes around; unlike the Philharmonic, which just has these ribs, none scaleful. Now, the promenade in the theater is nothing without people under the tiers to give it articulation. I am asked why the tiers go all around the room on the front side too. Well, I did it because I have seen it in prisons—and I liked it. Also, because in the multistory building, one assumes 12 ft for the height of a floor and since these tiers are 10-ft high, the room looks higher than its 40 ft. That's a manipulation of scale. But that space, without those balconies, would have had a blankness that would never have let you know how high it is. The Guggenheim has no articulation as you go around; I think that's obnoxious. Yet that room still has a greatness—it gives you something, and it gives you something all the way up. (Architects is a great deal of luck—unless a man's a genius.) "Yes, the reduction and breaking up of scale is important. My preference is for great columns, because I think trees give scale to buildings—I mean artificial trees. The great interior space by Frank Lloyd Wright at the Johnson's Wax Building has columns which weren't necessary, but the columns make the space, don't they? Or that great hall in Turin by Nervi, and a third, I'm sure, although I haven't been there, is the anteroom to the Senate chamber at Chandigarh—all with their useless, wonderful, extra columns. Now, Nervi could have spanned the whole thing, but it took separate explosions to make the space meaningful. Size isn't important; it's what you do with the size. Again, the articulation of space by the column. Space is the modularization of things. Those things which create scale, which make scale real, lie in dividing up space into meaningful units, units that make it exciting."

The use of the column to define and express space can obviously be questioned in many cases on the grounds of structural necessity, as in fact Johnson has done, and Perret before him. In the same way, Nervi's structural expressionism has been queried: the refinement in dimensioning structural members is created for optical effect, not out of structural necessity.
Today's Scale

In line with this thinking, Kevin Roche points out some of the differences between today's approach to scale and the approaches of the past:

 "To learn about scale we have to go back to more mature architects than we have at the moment. In classical architecture, they understood what scale was; they understood that a building began, had a middle, ended. It had spaces beyond; it had a volume. It had a composed entity, in which all of the parts were related to each other. And they filled specific roles; they composed a total whole.

Now, in our fabricated architecture, the module has become the measure, as it was in classical architecture, but the module in classical architecture was used to relate larger things to each other. In our architecture, the scale (i.e., size) of the single human is expressed in the 4-ft to 5-ft module of the typical urban office building, where it is simply the measure for laying out partitions, windows, and fabricating pieces. Many of these buildings are inhuman, because they do not have a larger module—no group or crowd module. The total volume is simply made up of a very fine grid of modules, expressing only formless heaps of individuals. You have that which is the human scale, and then you have nothing else until you end the building. Actually, it is characteristic of these buildings that they don't end; you could add or subtract a floor without making any appreciable difference in the scale.

"In this architecture, the main problem is being forgotten. The problem is, of course, getting from the thumb of man to the next larger thing—to the city block, to the whole city, to the region. There are successions of scale, and we haven't gotten beyond the first module."

"In the Ford Foundation Building," Roche goes on, "we try to express two modules. One is just the individual in his office; he comes from the sidewalk into a small lobby into a small elevator into another small lobby and into his office—five or six spaces—all of them just the same kind of volume. It is hard for him to have any sense of awareness of people who are involved in the same sort of endeavor that he is, to understand the size of the family. What do you belong to? This can be expressed from the outside, where you build an individual tower, and it has a name, and that's what you belong to; that's the physical reality of the corporation you belong to. But the need to see the man across the way, to know the other people in the family—that's why we have the living room (the living room is the place where the family as a larger unity actually exists). Shouldn't an office building also have a living room. Shouldn't it have a larger space which ties together all these smaller spaces? And so the Ford solution: where you have the little cubicles and the larger space, which really fulfills the function of being the center, of the heart or core, and allows people to see people across the way—and of course provides a year-round garden. We felt that, in terms of psychological need and in terms of function, we were taking the next step up from the module—from the cell, to the larger space, to the living room.

"In our Air Force Museum," Roche continues, "there is also a progression of scale: from the individual, to the aircraft (which increase in size as one progresses historically through the exhibition), to the over-all building. And the building itself as a whole also expands, as one passes through it, to illustrate this progression of scale through the history of aviation." Perhaps this is a new, fluid, "kinetic scale," related to a similar movement now current in other arts.

"It is easy to make a small building seem large," Roche says, "or a large one seem small. The subtle problem is to make it right." And Talbot Hamlin writes in his Architecture Through the Ages that, "To have scale is to make buildings appear their true size."

But what is "right" or "true" in terms of scale? As we have seen, throughout history the use of scale has varied in expressing the ratio between physical size and the impression the observer receives about the size of the building.

A New Scale for Today?

Paul Rudolph suggests a new view of scale, one that is pertinent to our day: "I think we fall into the trap of judging today's architecture by classical rules. I don't believe that the Renaissance notion that a building must have a beginning, a middle, and an end is always applicable. If you're dealing with a Renaissance-proportioned building, well then, OK, that's one way of looking at it. But if you're dealing with a parking garage that is 3 miles long, that notion doesn't have any meaning at all, and if you're dealing with a 60-story high office building, it doesn't have any meaning. These are structures which have no beginning and no end.

"There are other rules, which are of the 20th Century, and we just don't understand these rules very well yet. What was efficient in theory is not efficient in terms of our production today. For instance, I personally don't think that diminishing the scale of structural members can be counted on for very much today. The nuances of change in structural dimensions have their limitations because of efficiency; in other words, it is economically more efficient to make a wide-flange column the same dimensions for all of its 40-ft height than it is to diminish it. Now, that doesn't bother me, because it is merely one of the facts of life. It is the efficient thing and the efficient thing never bothers me. (That probably sounds strange coming from me, but, believe it or not, I think there's something sublime about that.)"

"I think that is a new rule dictated not by architects but by economics. And again, one has to work with it, not against it."

The New Scale of Today, then, may well be a kind of scalelessness that architects resist, or deplore. On the other hand, perhaps it is so new that, however contemporary scale should be expressed, we have not yet come to understand it sufficiently to do so.

L. M. Pei says, "The more I observe these things, the more I learn how little we know. In the next 5 to 10 years, we'll really see some development of it."

Yet today, man's view of his own size in relation to the size of his most aspirational buildings is clearly not one that shows the individual at the center of the universe, nor one that makes him insignificant before an omnipresent God.

What does today's scale say about our age? Will future historians reveal that the 20th Century, through its approach to scale, merely expressed the depressing inconsequentiality of the individual vis-à-vis the collective activity of society—merely the "scalelessness" of man himself within the vast megalopolitan complexes and the even vaster outer space?—CRS
EXTERIOR VOLUME

The space-molding envelopes, discussed in the previous section from the interior point of view, are here analyzed in terms of their external impact.

A structural envelope, in other words, has two properties: it captures space, and, at the same time, displaces space, forcing its impact on urban space. John Johansen calls this dual function of the envelope, the form positive and the form negative. James Fitch speaks of Michelangelo's buildings as vessels or containers of human life and activity in two forms: the open or urbanistic, and the closed or architectural. Bruno Zevi clarifies the dual nature of architecture in stating that every architectural conception has an equivalent urbanistic one. And Susanne Langer, writing in more general terms in her book Feeling and Form, likens the envelope of a building to a living creature's skin or carapace, which serves as protection against the world and at the same time as the point of contact and interaction with the world.

It is in this respect—the interaction with the world, the relation of the single piece of architecture to the larger environment—that the outer form of the major space assumes such importance.

Set within the landscape or the cityscape, these major spaces have invariably served as important visual punctuations. Master builders throughout history have been fascinated by their placement, their size, their shape, their structure, the choice of material and color, and have found innumerable and ingenious ways of utilizing these major spaces in the urban context. There are, for example, the all-powerful, single volumes (1), which dominate their settings in an unqualified way. There are the groups of major spaces (2), unified and neutralized to define urban outdoor spaces. There are the monuments (3) — "the outdoor sculptures," as Philip Johnson calls them—standing free and independent of each other. There are the major spaces—sometimes lifted off the ground—expressed plastically (4) within larger, though neutral, complexes. There are the jewels (5), set within anonymous, sometimes overwhelming, surroundings.

All of these depend essentially on visual contrast: the vertical against the horizontal, the large against the small, the finely detailed against the coarse, the rich against the modest, the busy against the quiet, the plastic against the modular.

Interestingly enough, all of these design approaches have their modern counterparts as shown in the following pages, though it is apparent that this contrasting of foreground architecture and background architecture is no longer easily accomplished by today's architects, nor is the contrast as clear-cut as it has been in former times.

New technological possibilities, new demands, and economic pressures automatically encourage the construction of larger buildings—most of them of a cellular nature. "It is simply a matter of getting things in larger and larger envelopes," says Kevin Roche; "it will happen, because it will be the only thing one can do as architect—the economics suggest much larger buildings." It is obvious that this trend will make it more and more difficult for the major-space structure to compete with the huge cellular structures. And, looking still further into the future, there are today plans for super-structures which could span across the most imposing of the historic buildings, thus suggesting still another type of major space—the all-enveloping super-shell (6).

Such super-shells would unquestionably be more in scale with the huge and inhuman scale of railroads and highways which at present tend to dwarf major buildings. "The future of architecture," says Paul Rudolph, "is going to be very much concerned with how we relate the automobile to buildings." I. M. Pei, too, believes that "automobiles do a great deal of damage to space-making. We will have to rethink the problem," he says.

How, then, are today's architects approaching the design of major space? And what impact will these commanding structures have on the present and future environment? Some of the difficulties as well as successes of these architects are brought to light in their own words and the designs that follow.—IMR
Above the jagged skyline of Milwaukee, this new 999-ft observation tower (1) is to establish itself as the new visual focal point of the city. Comparison of the new tower with the nearby existing church points to the vastly changing scale of urban environments and to the complexities of expressing visually the multiple functions of future buildings. According to Robert E. Rasche, architect of the tower, its various segments are to house (from top to bottom): A revolving restaurant, cocktail lounge, observation galleries, exhibit areas, aquarium, deer park, historic museum, pump room, offices, hotel rooms, and parking spaces. Dr. Lev Zetlin is the engineer for the circular hyperbolic paraboloid structure.

The vertical and dominant element—the tower in Paul Rudolph's new Health Center for Boston (2)—is made up of many small office cubicles, as is the horizontal block which circles the tower. Is it justifiable, some architects ask, to force a quantity of small office cubicles into a tower for the sake of an urban focal point? “It can obviously be criticized,” says Paul Rudolph, “because you have offices in the tower, as you do in the lower portion. I justify that in terms of urban design by saying that this is a public building and therefore should read from a distance. But because of the large site, it would have been wrong to have only a tower. You also have to define the streets. First, you have to make peace from a distance; second, you have to make peace with what’s on the other side of the street; third, with how you approach the thing. There is a small auditorium within the volume of the building, but it would have been too small an element to pull out.” Continuing this train of thought, he observes, “One of the most disastrous things that’s happened in urban design is the so-called “binuclear” scheme, which has been used willynilly direct from the Harvard school of architecture.”

On rare occasions, it is possible today for the architect to design a major space in the traditional way—as in this case, playing the verticality of the church against the horizontality of the houses. “We had at our disposal a clear, dominating site in the new part of Neustadt,” say architects Hans Kammerer and Walter Belz, who designed this new church (3) in the center of a new housing estate in Southern Germany. “With our church we hoped to gain a center of gravity in the new town, not unlike the church in the old part of town.” In attempting to express the dominant volume, the architects remark, “We did not want to experiment with new forms, but wanted to find again the old forms with the means of our times.”
MAJOR SPACES UNIFIED: PROCURAZIE NUOVE, PROCURAZIE VECCHIE SEEN FROM ST. MARK'S CATHEDRAL, VENICE
Major Spaces Unified

It is fashionable today to build centers of all kinds—cultural centers, civic centers, commercial centers. These collections of major buildings have, to some, taken on the symbolic content of the major landmark in the cityscape. Some of these have been architecturally successful; most however, reveal the difficulties of the design-by-committee approach. Lincoln Center, now nearing completion in New York, is a case in point. Shall the major elements be neutralized to form a unified whole?

3 Shall one of the major spaces dominate? Or shall each major space be treated individually? Most often, it is the last of the three approaches that is followed for mere convenience's sake. "Each of us had an idea of a great outdoor space," said Philip Johnson, who was assigned the task of designing the New York State Theater, "but, since there were six architects, of course there were six buildings (1). I wanted to make what is now an exterior plaza into an interior space (2), although without a roof. My original idea was a colonnade around the whole thing, 70 ft high, with anonymous buildings backed up against it. I was going to create the space outdoors and let the buildings be anonymous (3) . . . like the Place des Vosges (4), like the Palais Royal (5). In the space that I was going to make out of that plaza, the Metropolitan would have dominated, as St. Mark's cathedral (6) dominates the square in Venice, as St. Peter's (7) dominates its plaza."
Outdoor Sculpture Courts

Though they may be related to each other on a site plan, major buildings when completed often take on the appearance of exercises in a sculpture garden.

This is the case with Berlin's new cultural center (1). Scharoun's completed "Philharmonie" one of the strongest of the contemporary major-space buildings, appears curiously unrelated to the projected State Library (center of model photo), also by Scharoun. Mies van der Rohe's Gallery of the 20th Century (right, in model photo), the third major building in the complex, stands, in turn, as a monument by itself.

The demands of advertising and transportation were responsible at Kennedy International Airport in New York (2) for another kind of sculpture garden. Individual major spaces, each serving as a billboard for its airline owner, are necessarily widely dispersed to leave enough room for the parking of cars and planes.

The epitome of the outdoor sculpture court, Philip Johnson believes, is Brasilia (3). "That derives from Le Corbusier's idea of the building," he says; "his feeling is sculpture—he does not care about cities."

Major Space Within Neutral Volume

The Swiss architect Walter Foerderer, among others, proposes the incorporation of major spaces into the framework of cellular or neutral structures. A chapel, for instance, could be incorporated into an apartment tower (4). The major space—the chapel—would be expressed plastically, in contrast to the geometric, regular grid of the apartment tower. Foerderer's main design effort would be concentrated on the molding of the interior space and its artistic enrichment. Urbanistically, this approach has the advantage of letting the trend toward larger buildings take its natural course, while the major space can still be freely expressed.
"In cities, we have no longer the opportunity of disclosing buildings in any grandeur," observes Lawrence Halprin. "The most important buildings—those that have great symbolic value—are often the smallest."

The theater by John Johansen for Baltimore (1) is a typical example of an important civic building being dominated by higher though less significant structures. Johansen's design approach has been to shape a plastically strong form that would contrast with the modular office structures.

Viljo Rewell encountered this problem in the design of the Toronto City Hall (2). But instead of submerging the Council Chamber into the necessarily bulky office blocks, he has laid bare this major space and treated it as a jewel. In their curving and embracing form, the two office structures appear to give added emphasis to this small but important civic building.

There are obviously still other ways for a building to assert itself, but, as Paul Rudolph points out, "How to make a small but significant building dominate remains one of the great 20th-Century problems for architects today."
ALL-ENVELOPING SUPER-SHELL: SQUARE-NILE RETRACTABLE ROOF OVER RECREATION CENTER OF LARGE NORTHERN CITY.
All-Enveloping Super Shell

"The furnace and the forge shall be at your service," predicted John Ruskin at a gathering of Members of the Architectural Association of London in 1857. "You shall draw out your bars of iron till you have encompassed us all—you shall put, if you will, all London under one blazing dome of many colors that shall light the clouds round it with its flashing."

"It is entirely possible today to construct such roofs economically," says one of today's serious investigators of superstructures, Dr. Frei Otto. He and his group of young German architects feel, however, that it may be unrealistic and even dangerous at the present to cover densely populated cities with great closed roofs as Buckminster Fuller has proposed for New York (1). Instead, they are concentrating their design efforts on structures for intemperate climatic zones. These could be smaller roof structures, such as the retractable glass roof suspended from a multistory building (2), or the "translucent, removable pillow structure" supported by three-dimensional cable-net structures containing offices and dwellings (3). A climate-controlling enclosure of this nature is indeed reported to be underway in Siberia, where parts of the diamond mining city of Aichal are to be covered.

But, as Dr. Otto suggests, "the structural problems of the superstructure are minimal compared to the sum of other matters of a city's structure that must be considered." He would restrict the use of superstructures "to new or easily adaptable smaller tracts in the metropolitan area." The convertible indoor-outdoor spaces, devoted to parks, theaters, and recreation areas, he believes, could become the "dwelling rooms" of the city—that is, the new major spaces.

Whether it is possible to give architectural and spatial definition to such vast, continuous structures, or whether they will become a dehumanized non-space, can only be imagined at this point (4). Their possible impact on the cityscape and the landscape is revealed by Dr. Otto's drawing of a square-mile roof (facing page), over part of a northern city, which is to close automatically as temperatures reach below 14 F. "These structures," he says, "provide the opportunity to create very stimulating and concentrated cities developed in three dimensions. It is only a question of time," he predicts, "before city planning thinking will include such structural systems in a useful way... these superstructures may be the new centers of urban life."—IMR
After a brief examination of the structural principles upon which all building forms are based, the author proceeds to demonstrate how these have been put to work by designers to evolve some of the great spaces of our recent history, including the Paris Exhibition Palace and the Houston Stadium.
The design of space is the business of architecture. Yet space by itself cannot be directly comprehended. Only by its boundaries can we perceive a particular space. But even boundaries must be perceived. Imagine being somehow suspended in a vast, translucent, evenly lighted sphere. If we are prevented from moving, making a sound, or seeing with both eyes at the same time, perception of space would be impossible. It is through sound reflection, relative motion, variability of light, and perturbations of boundary form that space is experienced.

Space is defined by its boundaries in two opposing ways. Within our imaginary translucent sphere, we find enclosed space. Being clearly defined by its enclosure, the space has a static solidity. But an observer outside would see an altogether different space, limitless in all directions except as it impinges on the sphere. This is enclosed space. It is dynamic, fragile, and strongly defined only in the region of the form that it surrounds. Enclosed space is less easily perceived, yet it is an essential ingredient of design. Major spaces are always a mixture of both enclosed and excluded subspaces. Defining the interplay between space enclosed as a whole, and the excluded space surrounding the means of enclosure, is the function of architecture.

Perhaps because it so strongly defines both kinds of space, Eiffel's Tower induces a special experience. We must for a moment forget the strong image of the Tower as an object with its two-dimensional decorations to see its spatial grandeur. From miles outside Paris, it dominates the excluded space around it, but as it is approached and as one passes between its four great piers, the sense of powerfully enclosed space is dominant. Ascending and descending the Tower, an infinite gradation of spatial nuances is felt, which if it does not lead to vertigo, will deepen our understanding of space in all its dimensions. Although we will speak only of enclosed spaces hereafter, this structure sets a standard that emphasizes both aspects of spatial quality.

**Basic Principles**

All structural forms are based on a few principles that are inherent in the geometry of statics and may be found as common elements in every structure. A brief examination of these principles will provide us with tools for the comparative evaluation of structures.

The simplest structural form is a straight bar that transmits a constant force between two points. In an imaginary world of straight bars—truly homogenous materials—and ideal forces, a bar's cross section would be arbitrary. In the real world, no perfect member, ideally loaded, occurs. The effect of gravity, deviation from perfect straightness and homogeneity, and transient secondary forces, all prevent the realization of the ideal form. However, when the transmitted force is tension, these effects are often trivial and with many materials the structure in tension adjusts itself under load to approach optimum performance. Under a compressive force, the opposite is true. To the extent that the structure deviates from a straight line or is subject to extraneous forces, the compressive load will amplify the structural distortion. The important point for our discussion is that the ideal prismatic bar carrying a load between two points is a one-dimensional form, incapable of enclosing space.

**Closed Loop**

Structures that are architecturally useful redirect or modulate forces. They always involve action and counteraction within the structural form. Restricting ourselves momentarily to two dimensions, all structural forms may be diagramed as a closed loop, or series of closed loops. The simplest example is the pin-jointed triangle (1). The closed loop, easily apparent, is made of elemental bars. The magnitude of the forces within the structure and the amounts of material are functions only of material strength and the proportion h/L. At this point, it is important to see that the simple arch and cable structures (2a and 3a), are also closed-loop structures, essentially the same as shown before (1). The closing link in the loop is provided by the earth, replacing the link that is shown as a dotted line (2b and 3b). It is characteristic of all these forms that their ideal proportions are never arbitrary. Provided that material properties, cross-sectional proportions of the prismatic links, and all forces are fully defined, an optimum value of h/L will exist. Looking at one of the elements (4), we see that the function of the structure is to redirect the force P/2 parallel to itself, but translated a distance L/2. This redirection may be stated formally as the product P/2 x L/2 = PL/4, which is a bending moment. To produce this redirection, the structure develops compensating forces that counterbalance the external moment (5). These compensating forces H, separated by the distance h, also produce a bending moment, Hh. The condition for equilibrium is that the external moment PL/4 equals the internal moment Hh. The design variables are the material and cross-section of the bar and the dimension h. The important variable from the visual and functional point of view is h, the internal moment arm of the loop. If we neglect the structure's own weight as small in relation to P (3a), it may be shown that the optimum h is L/2. For each loop, there will always be a proportion that may be optimized. This is the proportion between the external moment arm of the loads and the internal moment arm of the structure.

**Chain of Loops**

We have stated that all planar structures may be diagramed as closed loops. A four-link loop which is, however, unstable is illustrated (6). If we make a triple-loop (7), we form a chain of loops. Thus, the common Howe Truss may appear as a chain of loops again with an optimum value of h/L. The ordinary beam is the extreme case of a chain of loops having in effect an infinite number, giving it ability to be loaded at any point. Diagrammatically, however, the simple beam may best be thought of as a single loop consisting of continuously connected tension and compression regions. Beams also have optimum depth to span ratios. This optimum will depend on the load intensity in relation to material strength and the proportions of the cross-section.

Finally, useful structures are made of chain loops, which themselves form higher order loops. Thus, the three-hinged structure (8) may be diagramed as (9). Here, the dimensions a, b, and h are each the moment arm of a loop. As a final example, a common suspension bridge made of two loops, defined by a/b and s/L, is shown (10). Here, b and L/4 are external moment arms, and a and s are internal moment arms. All of these two-dimensional structures have their equivalent forms in three dimensions. The triangle (1) is matched by the tetrahedron (11). The beam in two dimensions corresponds to the slab. Each form is a closed loop in three dimensions. Each form will redirect forces in two directions and have two ratios of internal moment arm to span.

In looking at structural forms, the clearest understanding of their action will follow from seeing the loop of action and counteraction, which is defined by the internal and external moment arms.

**Optimization of Structural Form**

We have spoken of the optimization of a structural form. It must be understood that
this is a purist's abstraction. In planning structures for real buildings, the limitations of manufacturing technique, the cost and character of secondary structures, and the functional utility of space itself, all modify the importance of the efficiency of the primary structure. But when we consider the enclosure of large spaces, the cost of structure is relatively high, so that perfection of structural form is a proper objective. The larger the space, the more demanding is the need for structural efficiency. It is no accident that the largest spaces have been enclosed with some form of dome or arch. These forms are simple loops with large internal moment arms. We are likely to continue using them for many centuries, although the inflated tension dome may replace the gravity-compression dome of today.

The purest structures built by civil engineers are bridges, and the largest are suspension bridges. The suspension bridge of several-thousand-ft span uses tension cables not primarily for efficiency of tension over compression, but because construction by "spinning" a cable is the only practical means of getting the bridge in place. Given the suspension bridge as a form, the designer's variables are back-span length and cable sag. The proportions that have been worked out over the past 100 years are familiar to all of us. Yet we take them for granted without realizing that a process of optimization has produced them. Except possibly for domes, no commonly understood proportions have yet emerged as far as large-span building systems are concerned.

**Distribution of Materials**

We have seen that the three-dimensional forms that enclose space may be diagramed as closed surfaces and that optimum proportions for these surfaces exist within defined criteria. Independent of these proportions, however, are the principles that govern distribution of material within a form. Here, the principle of concentration operates. This may best be understood from a few examples. A bridge over a lake is shown (12). The designer must decide the spacing of the piers. It is obvious that pier cost will he lowest with the fewest piers or the greatest spacing. But while piers get cheaper, the deck spans become more expensive. At some spacing, the combination of pier and deck costs will be a minimum. The principle of concentration applies to the piers, which become more efficient as their number decreases and their individual load increases. The optimum concentration depends on the efficiency of the deck.

A similar situation exists in distributing material in flat surfaces. Assume two parallel walls with girders spanning between them a distance of L at a spacing of s (13). Since the weight of bending members (provided that their cross-sections are geometrically similar) increases only as the two-thirds root of the external bending moment, the girder material will decline with increasing spacing. In other words, the more the load is concentrated on the girders, the more efficient they become. In conflict with the increasing girder efficiency is the greater effort required by the secondary beams to span between the girders. As s increases, they will clearly require more material. It follows that an optimum spacing will exist that minimizes the total material used. For any given materials and framing system, there will always be optimum proportions.

An exception to the principle of concentration occurs with tension members. Since a tension member will not buckle as long as it remains in tension, the allowable axial-stress level is independent of slenderness. In fact, in most materials, the highest strengths are achieved in the smallest fibers. In certain structural forms where reversal of stress can be prevented, a diffuse, closely spaced web of tension cables will naturally result from the need to minimize infilling material.

**Conclusions from Principles**

What conclusions may be drawn from these principles that apply to the structural enclosure of large spaces? Of greatest importance is the need for a structural loop whose dimensions are in proportion to the space being spanned. Not only is this important for structural efficiency, but equally so for comprehending the space. When the structural loop is concealed, the space can become scaleless. Compare the experience of driving over a suspension bridge to traversing a bridge whose deck is supported by an
arch below. In the first case, the sweep of cables down from the towers makes the scale of the span apparent, while the second is seen only as a one-dimensional deck.

Within the form set by the over-all loop of structure, we may expect to see the principle of concentration at work. This will lead to a hierarchy of structural elements, each being balanced with its subordinate members to achieve an efficient whole. When this balance is achieved, further visual clues to scale will automatically follow. Boundaries will be modulated and articulated, leading to the most direct comprehension of space.

Application of Principles

How are these principles put to work by the designer? The process is most often an evolutionary one. The number of steps forward made by an individual design are usually modest. It is the collective experience from which perfected forms gradually evolve. Structural efficiency is learned; the optimization of a single design is rarely attempted. In any case, the pursuit of material efficiency is bound to go on as we build ever greater spaces. It is a cliché of United States designers to say that high labor costs prevent the use of efficient structures. But this is only relatively true. When structural forms are conceived that are truly efficient, they invariably come to market because our industrial genius learns how to produce them efficiently. Let us review the progress we have made so far.

Three-Hinged Framing

For 2000 years, man's great spans were built with masonry vaults or domes. Although substantial spans were achieved, our contemporary scale depends on the 19th-Century's development of metal structure. Within a few decades, the character of long-span construction was permanently changed. The culminating example, both technically and aesthetically was the Galerie des Machines built for the Paris exposition of 1889 (14). Spanning 374 ft, its great three-hinged frames boldly dramatized the total form, which included the ground plane as a tension tie within the structural loop. As designed by the engineers Contamin, Pierron & Charton together with C.L.F. Dutert, Architect, its full impact is achieved by the scale and organization of individual elements. The frames, whose internal moment is 11 ft, are spaced 65 ft apart. This generous spacing, which concentrates the load on the three-hinged frames, was achieved by an efficient infill consisting of trusses 39 ft o.c. supporting
continuous beams 16 ft o.c. that finally support purlins at about 6 ft. The final enclosure was glass spanning 20 in. between muntins. This hierarchy of elements remains a classic statement of the principle of concentration. The 20th-Century eye, which is accustomed to sleeker structures, may fail to see the extraordinary lightness of the Galerie des Machines. Nevertheless, this lightness was not lost on contemporaries who complained that the supports were "too empty." The Galerie des Machines was conceived as a one-way structure, but, within this limitation, it was a very nearly perfect solution. Although we have improved materials and connecting techniques, the structural form remains a timeless model.
**Space Trusses**

The 20th Century has contributed several new forms for building larger spaces. One which has been talked about more often than built is the space-truss. In the attempt to achieve economy through two-way action combined with manufacturing duplication, many designers have proposed versions of the three-dimensional truss. The 700-ft-sq design for a Convention Hall in Chicago proposed by Mies Van der Rohe in 1953 is a prototype (15, 16).

The space truss was to be built of members defined by a module equal to a cube with sides one-twenty-fourth of the span.

This scheme is in direct contradiction to the principles of efficient structural organization previously described. The entire loop of structure is compressed into the limited depth of the truss, while the material is dispersed into hundreds of members each carrying loads of equal order of magnitude. Except for the bold diagonals in the walls, no hierarchy of scale exists. One expects that had the building been erected, comprehension of its size would have been difficult.

An actual example of the space truss was constructed for the roof of the Air Force Academy dining hall by Skidmore, Owings & Merrill at Colorado Springs (17, 18). Its size is about 40 per cent of Mies’s scheme with a clear span of 266 ft and structural depth varying from 11 to 13 ft.

The inefficiency of this structure is shown by published reports that 1150 tons of steel were required for its construction. At 24 psf, this substantially exceeds the amount required for many similar spans. The impersonal, unfocussed space that is the result was, undoubtedly, sought by the designers. However, as a structural form, this building design offers negative lessons.

**Domes**

The dome has shown its abiding vitality as a useful form in recent years. Used to surround space three-dimensionally as well as span a large distance, the dome naturally has a generous ratio of depth to span. Distinctions between domes arise in the way material is distributed in the structural surface. That smooth, thin domes of concrete are possible should not mislead us into the false conclusion that such constructions represent optimum distributions of material. All domes must be designed for unbalanced loads and must have resistance to buckling. These requirements become serious in large spans and give an advantage to ribbed or otherwise articulated surfaces. The true brilliance of Nervi is that, recognizing this, he has developed efficient construction techniques to build the articulated surfaces demanded by the logic of material economy.

When a dome as vast as the Harris County Stadium at Houston is attempted, stringent control of material distribution is vital for economy (19, 20). The organization of the design, created by Architects Lloyd & Morgan and Wilson, Morris, Craig & Anderson, with a lamella arrangement of steel ribs including circumferential rings for true dome action, is a simple, direct solution. The geometrical problem has been solved by dividing the roof in 12 segments. This division is overemphasized by the arrangement of skylights, which give too much visual importance to the boundaries between sections. The resulting effect of 12 giant ribs is at variance with the equal importance of other members. Although this may affect a ballplayer’s ability to catch flies, it may actually help in giving scale to the 642 ft span.

The current leader in the honors race for long spans is an architecturally unfortunate monster in Paris. The Exhibition Palace of the National Center of Industry and Technology, conceived by Architects Camelot, de Mailly, and Zehrfuss, may be classified as a dome, although it is triangular in plan (21, 22). Each side appears as a great tied arch spanning a clear 676 ft with a rise of 152 ft. But being plugged with low buildings of several prosaic stories, these great spans lose their impact.

The contribution this extraordinary building makes is in the design of its double-layered corrugated shell. By building two cast-in-place thin shells separated by precast webs from 6 to 9 ft deep, the total amount of concrete used was equal to a solid slab about 7 in. thick. Using a great rise for the whole form, together with a large moment arm locally in the hollow shell, this span was built with the same rate of concrete required for 20' x 20' flat slabs. The corrugated surface of the Exhibition Palace roof reveals the structural organization and helps the eye to measure the scale. It is a pity that the magnificent space has been spoiled by unrelated appendages, however important.

A third domelike structure now in construction promises to set new standards of both structural logic and visual force. Although dwarfed by the Houston Stadium and the Paris Exhibition Palace, the 420 ft span of Oakland’s (California) new Arena is still a major design (23, 24).

Here the dome is inverted, being formed by 96 radial tension cables. To resist wind uplift and flutter, a system of deep precast-concrete radial ribs braced by concentric rings of precast diaphragms is provided. This ingenious system is an improvement over other hung roofs, which have relied on the dead weight of a complete inverted concrete dome for stability. The ribs, which appear inside, will outline a web whose inverted form will emphasize the large span. In addition to its beautifully conceived roof, the Oakland Arena solves the problem of vertical enclosure with great power. The vertical support of the compression ring is accomplished by diagonal columns that also provide lateral and torsional support to the building as a whole. By visually and functionally separating these elements from the enclosing glass, the vertical structure clearly shows that it surrounds an open interior. This design, by Skidmore, Owings & Merrill together with Ammann & Whitney as structural engineers, should produce a building that will elegantly but directly sum up the principles of efficient structure.

**Future**

The definitive design for a great 20th-Century space is still ahead. The enormous spans at Paris and Houston have carried the compression structure to a fine point of perfection and even greater compression domes will certainly be built. But the logic of structure points to a different way.

We have previously referred to the principle of concentration. Pursued to its ultimate meaning, this implies that compression forces must be gathered in a few paths and that tension members, which can be diffused into many repetitive elements without loss of efficiency, will be the primary means of enclosure. The result will almost certainly be formed of saddle-shaped surfaces for their ability to resist load reversal, and the loop of structure, the action and counteraction of pull and resistance will be clearly evident. The prototypes have already been built, but so far, each has been flawed by extraneous forms. Nowicki’s Raleigh Arena comes closest, but its solution is visually weakened by the heavy columns supporting the compression arches. Saarinen’s Ingalls Rink at Yale is muddled by romanticism and the awkward structural terminations of its longitudinal cables. Yet a solution will surely come. The evolution of structural form takes place slowly. But as the buildings already built are better known and understood, structures that resolve tension forces clearly and directly will enclose the great spaces of the future.
Problems inherent to the air conditioning of all large, enclosed spaces are similar. How two of the great enclosures of the 20th Century were air conditioned is here analyzed. One of these is a brand new structure, while the other required solutions applicable to modernization.

BY JOHN E. PLANTINGA

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From the viewpoint of the mechanical engineer, just what is a major space? If you take, say, as a very minimum, 30,000,000 cu ft of space, then that volume, taken in the abstract, constitutes a major space. If that same volume, however, were enclosed in a 60-story office building, it could be called large but not major. By the same token, a single-story factory or warehouse encompassing that volume would equally be considered large but not major. After all, all such structures—the high-rise office building, the factory, the warehouse—can enclose large volumes of space and offer many difficult problems to the engineer, yet they are, in essence, only the sum total of a series of smaller spaces. If, however, more than 100,000,000 cu ft of space were encompassed within a single, gigantic room—that is, if that space were to constitute a single, uninterrupted whole, not subject to the subdivisions and physical partitionings true of an office building or factory—then we have a major space.

One definition of major space, then, is that it must constitute a single, uninterrupted whole; such a space would be large enough, for example, to permit football or baseball to be played, or to accommodate a political convention.

The engineer’s first reaction when he is asked to design the air conditioning for a space of this magnitude is that, if not impossible, it is at least impractical. Once the initial shock has worn off, the problem is seen in its proper perspective: it is not insoluble, after all.

Year-Round Operation

The costs of erecting and operating large assembly buildings such as stadia are so high today that it is essential they be operable on a year-round basis, no matter what the weather. The best way to entice people to attend events is to provide them with a comfortable, protected environment. Television in the home is, after all, a formidable competitor.

Television requires operable on a year-round basis, no matter what the weather. The best way to entice people to attend events is to provide them with a comfortable, protected environment. Television in the home is, after all, a formidable competitor.

The philosophy in air-conditioning the sort of space we are considering must be to provide climate control rather than the usual individual room control typical of an office building. When it is possible to seat 60,000 to 70,000 persons within a single space, individual control is out of the question. However, each of these individuals must have clean, fresh air at all times. Herein lie the critical points of the problem. How much air for each person? How to condition it for the maximum comfort? And finally, how does one deliver the air where it is needed?

Inherent Problems

Before we describe the recently installed air-conditioning systems for two major spaces, let us review some of the inherent problems. In a sports arena, convention hall, or exhibition space, tobacco smoke constitutes a serious problem. Not uncommonly, it accumulates to such an extent in a poorly ventilated space that visibility is seriously impaired. This can be potentially dangerous for performers, is certainly uncomfortable for nonsmokers, and is an inconvenience for smokers.

Several years ago, when Philadelphia Engineer Charles Leopold was commissioned to design the air-conditioning system for Madison Square Garden in New York City, he set up photoelectric cells diagonally across the arena from calibrated lights. These devices permitted measurement of smoke density for several different types of events, as well as changes in density during the events themselves. Events catering to predominately male audiences were found to have higher densities, with the curve during the performance rising rather more parabolically than linearly. Because he was working with an existing structure, Leopold was required to make some compromises, although anyone who has been in the Garden will admit that the results are good.

Another problem, not necessarily as important as smoke, is that of body odor. Generally, any event or function held in a great space is an exciting one, under which circumstances people tend to perspire more. Generally speaking, however, the elimination of the smoke problem will tend to eliminate the odor problem. Furthermore, during circus performances, which are commonly staged in this type of space, people expect to smell the animals. During other performances, the excitement is so intense that people will tend to overlook human odor—even though they may complain of smog due to heavy smoke concentration.
How Much Air Conditioning?

A third major problem involves the amount of air conditioning required. Obviously, to attempt to cool and dehumidify the high, unoccupied portions of a major space—those above the highest tier of seats—would be wasteful and virtually impossible. The problem, we soon realize, can be reduced to five major air-conditioning loads: population; lighting; heat transmission through the walls and the roof; solar radiation admitted through plastic skylights; and, finally, the degree of cooling of the fresh air required to properly ventilate the space. When the loads are thus simplified and properly localized according to the occupied areas of the structure, a complex problem is greatly simplified. This simplification offers no solution to the problem, but merely a guide to a compromise. Since funds available for construction and for operation are usually not unlimited, there can be no ideal solution to the problem of satisfying the total expected load. When the theoretical calculations are complete, the engineer must view them critically and make every cutback that appears reasonably prudent.

Distribution

The fourth important problem facing the designer of air-conditioned major spaces involves methods of getting the conditioned air to the spectators. During a baseball game, the spectators are arranged around a 350-ft circle; during a football game, they are stretched along the sidelines. In a boxing match, the arena may be less than 50-ft sq. This represents a 50 per cent variation in population and nearly a 100 per cent variation in the location of the required air distribution. In popular terms, a second baseman or a boxing fan might welcome a fresh breeze of cool air, whereas a politician sitting on the honorary dais during a convention might prefer warm air. Although the long throws required for the air distribution system constitute a serious problem, the variations required in conditioning the arena present an even more serious problem.

Houston Solution

The new Harris County Stadium in Houston, Texas, was designed by Architects Lloyd & Morgan and Wilson, Morris, Crain & Anderson. The air conditioning was engineered by I.A. Naman & Associates. More than 100,000,000 cu ft of space is encompassed in this gigantic space, which is 642 ft in diameter and 213 ft high.
The engineers for the Harris County Stadium determined that the heat and moisture load for the building required an air circulation of 2,500,000 cfm. Normal air conditioning criteria calls for a minimum of 30 cfm of fresh air for each person. Even when this is discounted to one-half, or 15 cfm, the fresh-air requirement during a boxing match would be 990,000 cfm of outside air. The design engineers of the stadium have provided only 250,000 cfm, which represents a saving of about 4000 tons of refrigeration that would have been added to the presently installed 6000 tons. There is thus a significant saving in first cost, as well as in operating expense. The latter is particularly important, since the Houston climate is such that daily use of the equipment is advisable. Naturally, the savings indicated by a reduction in the size of the refrigeration plant cannot be entirely recovered when a compromise is made. In this case, the penalty resulted from the use of electrostatic filters in series with activated carbon air purifiers. The electrostatic filters remove about 90 per cent of the solid particles in the air, and the activated carbon absorbs about the same percentage of the odorous vapors present in the return air. The net effect of 10 per cent outside air and 90 per cent purified air is nearly equal to total fresh air, without the penalty of the additional refrigeration load. In normal office building air-conditioning practice, activated carbon is extremely expensive, primarily because the total fresh air required per person is relatively small. In other words, we are comparing a 66,000-person board room with a 20-person board room, the rest of the office space being rather thinly populated, with only half of the people smoking.

The architects provided a large hole in the center of the dome. Since hot, smoke-laden air tends to rise, an exhaust system was unnecessary. As fresh air is brought in, the same quantity of vitiated air is forced through the hole. This is certainly an economy.

The last, and probably the most formidable, problem the engineers encountered was that of air distribution. Since several articles on this problem, as encountered in the Houston stadium, have already been published, it will be touched on only briefly. As previously stated, the problem is to get the air evenly distributed without chilling the performers, missing the spectators, and without losing any expensive cool air out the roof vent. The Barber Coleman Company worked closely with all of the designers, and the result is an air-distribution system that will project air for as much as 350 ft in a controlled stream (2). Our original requirement that each individual patron be supplied with the proper amount of air at the proper conditions has been fulfilled.

All types of unusual instruments will keep tabs on indoor and outdoor conditions. One—a pyrheliometer—measures the brilliance of the sun's rays to help program stadium lighting and air-conditioning. And up on top of the dome—200 ft above the playing field—a special weather station measures wind direction and velocity, outdoor temperature and dewpoint: the temperature at which condensation occurs. Inside the stadium, special portable radio thermostats broadcast coded signals giving temperature and dewpoint readings from any seat in the house to sensitive radio receivers scattered throughout the stadium. Information from all these instruments is fed to an electronic "brain"—a control center.

Early in the season, ballplayers had difficulty catching fly balls. Painting the acrylic daylight panels solved this. "Black light" also helps players and fans keep their eyes on the ball. An unusual Honeywell-engineered ultraviolet sensor runs a continual check on the transparency of the air. If it gets murky—from dust or tobacco smoke—the system signals stadium engineers to open a battery of cupola exhaust dampers. Because air cleaners continuously scrub the air clean electronically, then pass it through special charcoal filters to sieve out any odors, air inside the stadium normally is fresher and cleaner than the air outside.

The system has an ultraviolet lamp (located underneath the seats near the third-base dugout) focused on an ultraviolet sensor near the first-base dugout. 700 ft across the stadium. These continuously indicate the transparency of the air between them on a meter located on the control center. Any time the transparency of the air drops to the point where a player would have difficulty seeing a baseball in play 550 ft away, a warning light flashes on. The system automatically compensates for sunshine and artificial light to give a true reading for both day and night games. Even TV-viewers are able to see the difference, because the cameras do not have to look through a haze of cigarette smoke and dust. People watching Houston games on TV will therefore get an unclouded picture.
Atlantic City System

When Engineers Meyer, Strong & Jones were commissioned to air condition the existing Atlantic City Convention Hall, which is 480 ft long by 300 ft wide, with approximately 175 ft from the floor to the center of the roof arch (3, 4), many of the same problems that faced the engineers for the Harris County Stadium had to be solved. However, the advantages of a new architecture that could be tailored to alleviate some of the fundamental problems were denied. The structure and all of its various parts were virtually fixed and many compromises had to be made. For one thing, there was no hole in the barrel-type roof; hence the existing exhaust systems had to be retained. In fact, virtually none of the existing ventilating systems could be appreciably altered.

When the maximum possible refrigeration load was totaled, a requirement of over 4000 tons was determined. However, by taking the known demand factors into account, the maximum anticipated demand fell to 3300 tons, which became the installed capacity.

A further consideration that affected the design of the refrigeration plant was the mode of operations of the building. It is quite normal to allow two weeks for erection and demolition of an exhibition scheduled to last one week. With an operation frequency of one out of three weeks, and that for only the warm weather months, operating costs assume much less importance than that for the Harris County Stadium. Naturally, the cost reductions were in refinements that could be paid for out of operating savings. In other words, MS&J studies showed that economy of construction carried more weight than they would in a 365-days-a-year type of operation.

Although the Convention Hall is most certainly a major space, the prime problem faced, after the economic and load problems were solved, was fitting the required new equipment into the existing, available space. When the entire project was complete, only 1400 sq ft of rentable area had been pre-empted, and this was used for new electrical switchgear.

Ideal Solution

The basic principles behind the air conditioning of any voluminous space are the same. This is as true for the smallest theater as for the largest stadium, although in spaces such as concert halls, acoustical control becomes of paramount importance. This latter consideration also affected the Harris County dome design and the ratio of plastic to solid.

The ideal air-conditioning system for a major space would be one that provides fresh conditioned air for every occupant in such a manner that he would not be aware of it. He would neither see, hear, nor feel the air conditioning. This ideal is reached through capable and imaginative architecture and engineering.

None of these remarks should be taken to mean that the design of air conditioning for major spaces is simple. There is no reason, however, why any competent engineer should not be able to air condition an entire enclosed city, as long as he brings to the task the conviction that nothing is impossible, a diligent attention to detail, experience and skill.
A discussion of the philosophies and techniques of lighting major spaces, including lighting design problems encountered in two tremendous domes in the Midwest.

BY ABE FEDER
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As our civilization has grown, gregariousness and economics have drawn it together into vast, increasingly large man-made enclosures in which to work, play, and live. These are not empty monuments or pyramids for the dead; these are enclosures for human activity. The present rate of development foretells of an enclosure that may some day be deposited in space, with some of us or our progeny in it.

Architecture serves and anticipates this growth in creating increasingly larger spaces; lighting design is an integral part of it. As structures tower beyond human scale, architecture tends toward abstraction and light design follows. We look at these results daily without realizing what is happening. Walls are beautifully lighted, instead of the floors where people walk. People are quite literally forced into shadow for the glorification of a building. Magnificent patterns of light are traced into ceilings that are completely divorced from the human activity underneath. A visitor from another planet, if he had a keen aesthetic sense, would believe that earth people are equipped to walk on ceilings. It is unfortunate indeed that a building cannot be hung on the wall of a museum.

Human Scale
Everyone speaks of protecting the individual and human scale—but how to accomplish this is the problem. Within the large structure dwells the human being, in the empty space between the walls and ceiling. This is his space, which he occupies bodily and/or visually. There is only one medium that can deal with this interior space without obstructing it or precluding its use—this, of course, is light.

It is in this area of providing scale that the light scheme should be dedicated to the individual and his needs. Too much lighting design is based on the premise that the brighter a room is, the easier it is to see. The emphasis must be on the human eye and how it functions best and most comfortably. Seeing is a complex process. It should not be treated as an insoluble problem, but as a challenge. Sight and light are wedded. The eye, guided by the brain, seeks out certain objects and areas because of their significance. It is on them that light for visual acuity should be focussed, with the resulting contrast that comforts. Color is of prime importance to pleasantness. This applies even where critical seeing is of paramount concern. Also, light is something that enables us to be seen. This obvious fact is of utmost importance, particularly to the female. “Wrong” light or light improperly placed can be absolutely disastrous to one’s physiognomy.

Humanization of Space
These generalized objectives of good lighting lead in one direction: the humanization of interior space. It is the same whether a space is small or large. But, as the single room gets larger, the challenge increases in several ways. There is the challenge of getting the light to each of the thousands of individuals gathered in one room.

In recent times, there has been a drive toward enclosing areas for purposes normally associated with the outdoors. We have always had large churches, public halls, ballrooms, and the like. But the enclosed area—and this is equally true of our towering apartment houses, hotels, and office buildings—has been subdivided and treated essentially as interior spaces. Floors and ceilings need support, which alone precludes the subdivision of enclosed areas, if only by columns. There is constant development of the means for creating greater distances between supports, resulting in larger, unbroken interior spaces. But to date, nothing conceived on the basis of the cube matches the dome for emptiness. For with the extension of the dome, we find a vast space unbroken by columns and walls, space conceived essentially as so much outdoors covered over to protect against the weather.

Geodesic Dome
Buckminster Fuller’s geodesic dome in Baton Rouge was designed for the Union Tank Car Company (above). The daring use of the laws of physics overshadowed the more important meaning of the design: the deliberate use of an enclosed space as the outdoors. Normally, anything as large as a railroad car is left outside, where it belongs, or is covered provisionally without the complete control necessary for efficient working conditions. That dome, 385 ft in diameter and with no
obstructions, makes it possible to roll the cars indoors, providing both ideal weather and lighting regardless of outdoor conditions. Inside, the cars are moved from repair shop to paint shop to inspection crews or wherever, and then out again, where they can be put to use once more. As though to emphasize how exterior this interior space actually is, a complete office building sits in the center of the dome.

Once the exterior was brought under cover, the enclosure of such other exterior spaces as shopping malls and amphitheaters followed quickly. Economics alone would have dictated this, if the architectural imagination were not, after all, unlimited. It is not inconceivable that we shall see, perhaps in our lifetime, whole communities enclosed against the elements so that unusable areas of the world might be made usable.

**Exterior or Interior Space?**

In coping with these vast, unbroken enclosures, the lighting designer must decide whether he is dealing with an exterior or interior space. His decision depends on the individual’s reaction. Picture a man somewhere between 5 and 6 ft tall walking into a dome where the walls, farther away than the next street, curve into a “ceiling” 20 times his own height. His first reaction would probably be to escape. We build interiors not just for safety, but to reduce the world to sizes with which we can cope. No normal person can cope with a room which he cannot encompass and familiarize himself with at a glance. Unless the individual were to increase in size about 10 times, he would never be able to handle these vast areas comfortably or feel secure in them. Even columns would help, making the individual feel at least slightly secured against danger. But there are no columns in domes.

This reaction is the key to one aspect of the lighting design: an unbroken, enclosed area of vast dimensions should be treated as an exterior. For an individual who will accept the infinity of sky without a murmur, but when he is indoors, he wants to be surrounded by a space whose limits are defined and perceptible. The humanization of a space in which an individual is going to be active remains the prime goal in lighting any space, but in lighting something as vast as the interior of a dome, part of that humanization means providing an exterior look as well.

**Limitation to Good Lighting**

It is the dome which most points up the mechanical limitations to achieving the objectives of good lighting design. First, there is the stubborn fact of wiring. Every lamp must be attached to a wire, which in turn is attached to another wire, and so on until finally it reaches the source of electricity. We may live in an age when radio and television waves can be sent from one antenna to the next without a wire between them, but not light rays, although all radiation is essentially the same. Lighting requires that lamps be located and, with them, wires that serve as a means of transmission. There is also a definite limit to the number of bulbs that can be used.

More basic, however, is the fact that there is a bulb. There is no limit to what can be done with light, yet a bulb imposes so many limitations that it drastically limits the possible choices available. Each bulb type imposes its own set of rules about what can and cannot be done: a particular bulb can produce only so much light, project it only so far, last only so long, and create only one color temperature. The bulbs that produce the most light are short-lived; those that last the longest either do not throw their light far enough or have poor color values. And no bulb can change its color values the way daylight does in the course of a day. This is the nature of bulbs, and although we have made do quite well till now, when we are faced with the extension of enclosed areas, we are also faced with the fact that the existing lighting tools are outmoded.

There is, quite literally, no place inside a dome to locate wires or hang bulbs. There is no ceiling and therefore no beams from which to hang heavy lighting fixtures safely, nor the plaster or tile to mask them. There are neither walls nor columns where wiring can be located nor fixtures that can be hung. The one overriding reality for a lighting designer is that there is no place to hide.

Design concepts involving a baseball or football stadium, which add a roof to protect the gate in bad weather, essentially produce a stadium that, incidentally, has a cover. The same old batteries of lamps are mounted on tall standards (or attached at the upper levels). This is fine for a stadium, but such thinking hardly begins to exploit the full potential of a dome. It will not solve the problems of domes used as factories, or domes used as combinations of sports arena, concert hall, theater, and public hall, as was the problem with the University of Illinois Assembly Dome (overpage). Putting up poles means replacing columns, which defeats the precise reason for a dome. There can be no obstructions to function or view, making the problems of wiring and mounting locations almost insurmountable.

**Solution at a Price**

Available bulb types are designed primarily for smaller enclosed areas, and not for an enclosed area that is 120 ft high at the apex, 400 ft in diameter, and well over 1200 ft in circumference. Those designed for general service that last the longest are the fluorescent and mercury types; yet the former cannot push its light out too far from the lamp, and the latter has such poor color values as to be practically unusable inside a hollow cavern that must be made cheerful. Solutions within present limitations are possible, but at a price.

At the Baton Rouge dome, wire was brought around the entire circumference and strung out in radial lines across the top of the dome, providing electricity wherever it was needed for light. Fine ribs of extruded aluminum were outrigged from the sides of the dome, not too high above a man’s head, and to these were attached the lights for the various “shops” around the perimeter. The then-new power-groove lamps were specified for the outriggers. Producing more light on a three-to-one basis than the standard fluorescent tube, they cut the number of lamps and wiring needed by two-thirds. Housed in special reflectors to increase
efficiency and provide directivity, they were located at a height that permitted intense illumination over an entire shop from the floor up. This put the light where the people were. The design also broke up the dome visually into a series of smaller, man-size places without the use of walls or columns, helping to establish the necessary comfortable atmosphere. As for color—and the solution with artificial light is always a compromise, at best—the warmest power-groove lamp available was the cool warm white deluxe type, which was specified. (All 1500 m.a., fluorescent lamp types are now available in warm white.)

**Lighting the Skin**

This design solved the shop lighting only, and not the over-all problem of turning an enormous, hollow cavern into a place where people could feel at ease. Large lamps, used to fan out light around the skin of the dome and bounce it back to fill the interior with a sense of brightness, were mounted on the tower of the centrally located office building. No existing lamp of comparatively long life and sufficient projection was available, so a new lamp—the R-80, 1000-w mercury vapor lamp—was developed to do the job. It has a self-contained reflector to give the mercury vapor source the directivity it does not have. A special reflector housing was designed to increase the directivity and projection power of the lamp. With these developments, only 80 lamps were required. To correct the severe color limitation of mercury-vapor light, the housing reflector and the skin of the dome itself were finished in a warm tint. The effect created an over-all feeling of daylight, that necessary exterior look previously mentioned. Solutions to the lighting problems were solved by demanding and getting from the lamp industry larger and more efficient lamps, and developing new reflector curves to bolster the characteristics of the new lamps. But the solutions were still within the limitations of bulbs themselves. As long as there are bulbs, however new, all lighting solutions are, again, compromises.

The closest to the ideal (warm daylight) that we have in artificial light is incandescent. It is warm, not diffuse, and therefore can be placed in definite patterns in precise locations, and it can be made to reach considerable distances. Unlike fluorescent light, it does not hover like a cloud around the light source, or dissipate itself by bouncing around in all directions. To insure good lighting control and color, there is nothing like the familiar incandescent light source. The trouble is that it does not live too long, being rated from 750 to 2000 hrs, but in reality lasting only from 600 to 1600 hrs, depending on the type. In a factory where it is to be used 24 hrs a day, the cost of relamping a huge incandescent installation every 30 to 60 days is prohibitive, and the incandescent bulbs have to be sacrificed for fluorescent and mercury vapor, which will burn 24 hrs a day for considerably more than half a year. This, again, is what makes the light bulb so limiting.

**Illinois Dome**

For the Assembly Hall Dome at the University of Illinois, the solution was entirely different. A grid, shaped like a Swiss cross, was hung 80 ft above grade (40 ft below the apex), and all lighting equipment was located there. Electric service was brought up one side of the dome to this one point. Again, the R-80 mercury vapor lamp was used to provide the daylight feeling. But because the dome was to be used for spectator sports, every possible type of theatrical and musical event, and for exhibits, conventions, student activities, etc., only incandescent sources were used for direct lighting. It was essential to use bulbs that could be controlled with precision by focusing their light beams exactly where events were happening, and it was essential to use bulbs that could throw light to 80 ft below. For these reasons, the largest and most efficient PAR lamp—the 500-w, 2000 hrs, PAR-64 lamp—was chosen. Because the dome covers a multipurpose hall, all lighting (except the mercury vapor lamps for the general, indirect light) was placed on dimmer control. This meant that it was not necessary to mount one complete installation for one event, and another for a second event. Dimming control made it possible not only to select certain lights for basketball games and some of the same lights plus others for an exhibit, but also to provide the varied intensities required for different events. Dimming control was the key to cutting down the number of lamps required and prolonging their life as well.

**Goals**

Unquestionably, the goals for good lighting design, summed up in the single goal of humanizing large enclosed areas, remain the same. It is the solution that varies. A dome could be written on ingenious solutions of maintenance problems within a dome alone, without once discussing the lighting design. The whole problem is reduced to the simple fact that lighting interiors as large as domes, with present light sources, requires far too much ingenuity. Given today's lighting tools, it would be almost impossible to light a dome, say, 600 ft high and 1800 ft wide, quite apart from it being economically prohibitive. Our antiquated way of producing artificial light may well put a limit on the size of enclosed areas.

The lamp industry has been moving rapidly to improve its mechanics. The romance with the fluorescent lamp is finally over: At last it is apparent that it does not solve all problems, and the discarded incandescent bulb is making a fast comeback in large installations. This is where the most comprehensive improvements are being made today. The use of the PAR-type lamp, the most controllable of all available lamps, is spreading. The newest bulb type for general use is the 1000-w, PAR-112 quartzline incandescent lamp. It was specifically developed for
the newly opened sports arena of the Tulsa Assembly Center and the rehabilitated San Francisco Civic Center Auditorium. Both are large, multipurpose halls. Although neither has the masking and mounting problems or sheer size of a dome interior, in both instances light had to be thrown considerable distances to reach its target, the area of action, with full intensity and accuracy. The new PAR-112 lamps, projecting light at far greater distances than the smaller PAR-64 lamp and with greater intensity, replaced the older lamp on a one-to-three basis. The PAR-112 lamp alone is a big step forward in the handling of large areas.

The whole development within the quartzline incandescent field has only begun to move forward. These lamps are considerably smaller than standard incandescent bulbs, and much more intense. They can only help with the problems of lighting enclosed areas.

A serious problem with lamps today is their short life. Large enclosures and frequent relamping can break the back of any maintenance budget. The fluorescent light source, with its actual burning time of about 6000 hrs, is not useful for large areas except for decorative and other special purposes. It is a mistake to cover a dome ceiling or walls with fluorescent tubes and think the interior is being lighted. Fluorescent light gets nowhere to speak of, and from heights of 50 to 100 ft or more, it will certainly not reach the audience. The mercury vapor light source, with its actual burning time of 4800 hrs, is again not useful in such applications, except for special purposes. The sickly color of mercury vapor light precludes its use, and it is less controllable and has less directivity than incandescent light. The lamp industry has come up with the new metal arc lamp that somewhat corrects the color of mercury vapor—but not enough.

But all this is as nothing when we think of the great expanses that can now be brought under one roof. One degree better control, a touch more red in a lamp, a few more thousand hours of life—these are tiny steps, while architecture rushes along in giant strides. The lighting industry has to think bigger and come out from behind the bulb.

It is time to put our effort into discovering how to capture and store light rays directly. There must be a way of dealing with light directly, without having to fight the inflexibilities of lamps. A way must be found of omitting wires. By the time the cost of wiring has been totalled, little money is left for the fixtures themselves. One does not mind having a wire or two to activate a system, but why must a wire go everywhere a lamp does? Perhaps the solar battery comes first, then a solar lamp, and finally a panel control, not unlike a switchboard that activates and controls the light rays sent by a central antenna. This is fantasy, but if ever we needed the fantastic, we need it right now in the lighting industry.

Enclosed areas will undoubtedly get larger, since the need is there. A rapidly growing population alone demands it. More people need to be fitted into sports arenas, shopping malls, recreation facilities, and so on. Strangely enough, exploration of outer space also demands it. We can now foresee the day of scientific outposts set out in space, completely enclosed but large enough for extensive equipment, a complete team of experts, and perhaps even their families. Nor is it untenable to foresee the enclosure of communities in deserts or frigid areas as land gets scarcer. How will this affect lighting? All we need is new tools.

Although lighting design must necessarily serve architecture, its first goal must be to protect human scale by making these enormous enclosed areas more livable. It means putting light where people are; it means visually dividing an area into more man-size proportions; and it means creating a warm atmosphere. There is no limitation to what light can do: the limitation lies only in the present mechanics of lighting. We need direct control of light if we are going to put it exactly where we want it in these new enclosed areas, and in the exact amounts and color values necessary. As long as there are people, the basic goals of lighting design will remain the same. It is the tools and techniques that must change.
THE NEW TOWN 
& MAJOR SPACES

Preliminary plans for the town center of Reston illustrate problems of relating major-space buildings to the cityscape.

Has anyone since our grandparents ever seen Carnegie Hall in New York City? Isn't it simply a doorway on 57th Street? This startling realization highlights one of the difficulties of assuring suitable locations for important major-space buildings in existing city planning schemes. In a very dense gridiron, for instance, a major-space structure will very likely be swallowed up in the mass of the block; in a less developed area, it may sit back in the middle of the square surrounded by a space that serves to set it off—but so may the Safeway or the gas station sit gloriously enthroned, surrounded by spacious parking lots. In one case, the unrelated gridiron leads to the overpowering order of the two-dimensional façade; in the other, it is nothing but a checkerboard ground plan for three-dimensional chaos. A popular alternative plan for major-space structures (exemplified in many recent civic centers) proposes freestanding buildings formally arranged in space, like sculptures in a garden. The problem with such a solution is whether it creates a useful urban space or not, whether the buildings have the continuity and cohesion that constitute a cityscape, and whether the structures are not, in fact, isolated in a vacuum.

Given the background of these two major experiments in gridiron and "civic center" planning, it is intriguing to see what an architect will do with a city plan in the mid-1960’s. How will he produce a strong relationship between major-space structures and the rest of the city?

Recently, Whittlesey & Conklin, architects for the new town of Reston, Virginia, developed a series of designs for the town center that juggle precisely this design problem. The town center, designed by William Conklin with James S. Rossant and William H. Roehl, Associate Partners, will be the focal point for the seven villages of Reston, which will be constructed in the surrounding countryside. (See plan facing page and pp. 98ff., August 1962 P/A, for a report on the first village.) The town center had to be designed to be built in stages—to grow as the new villages are added and to eventually serve a total population of 75,000, only 3,000 of whom would live in the center proper. Basic to the schemes, shown on the following pages, is the recognition that two elements are essential to a cityscape: one, the unifying façade of anonymous buildings; and two, the occasional, salient, monumental structure—with both working together to form an integrated whole. According to Conklin, the architecture of a town is largely background tapestry: "It simply defines outdoor space and provides a setting for people. Occasionally, it is true, a major building will emerge as a personality and exert its influence, like the church in the Middle Ages. But generally, architecture is just a backdrop. It should be. A town has to make a strong, coherent statement; you must know when you enter it, and once inside, there should follow an intense sequence of spaces—spaces where people of different occupations meet and mix. This is why I cannot think of Chandigarh as a city. First of all, various functions are segregated, and then those official buildings are isolated, in so much space. They are appropriate for some religious center; they inspire awe. Sure, I admire them as pieces of sculpture, as monuments, but then what?"

The idea of including monumental structures, such as major-space buildings, as distinctive but integral parts of the fabric of the city grows out of current rethinking on what actually constitutes a socially dynamic city. Both Robert Simon, the developer of Reston, and the architects exemplify the trend toward designing cities for people—not gods, kings, or automobiles. Behind the Reston plans is a knowledge of the pedestrian-oriented towns in England such as Stevenage, the recreation towns such as Tapiola in Finland, and the strong civic statement of the new towns such as Cumbernauld in Scotland. A more important influence on both developer and architect has been Jane Jacobs with her perceptive analysis of the social characteristics of a city: how closely they are dependent upon the economic and architectural structure of the town. Her book, and Reston itself, are a reaffirmation of the city as the coalescence of civic and social involvement and real privacy. They oppose the chaotic sprawl of the suburban town with its destructive isolation of social functions: the civic and business area isolated in the center, the shopping center surrounded by its sea of parking lots on the outskirts, and the rows and rows of houses that claim the illusive privacy of postage-stamp lawns only to destroy the real privacy of uninhabited land.

The center of Reston attempts to re-unite the town again, to reinstate the city as a desirable and exciting place to live in and to distinguish it from more rural areas. The final plan proposes a series of squares that grow, medieval-style, one out of the other. The automobile is demoted to underground facilities. Key major-space buildings such as the churches and a conference center occupy important and socially symbolic places in the structure of the city— they jut out into squares (claiming a certain amount of religious attention) or straddle an entryway (defining the boundary of the town). The cinema is slightly de-emphasized, and sits back, above a row of shops, in the central square. All the major-space buildings are bounded by a façade of shops, and offices, town houses, or shops with apartments above. They are intermixed with the everyday circulation of the city.

If finished according to plan, Reston will be a new experiment in city living and a new answer to suburbia. "Who knows," ventured Conklin with a grin, "how a city plan may affect a way of life, a civilization. Just think what might happen to investors if they saw mothers pushing baby carriages down a Wall Street. Business might become less abstract, investments more involved in human issues . . . who knows?"

Meanwhile, for the architect, the series
of sketches that lead up to the final scheme are an intriguing demonstration of a planner's mind gradually detaching itself from the compulsive geometric pattern of the gridiron, from the free-standing sculptures concept, and also from a rigid segregation of functions within the townscape; and gradually working toward a more meaningful relationship between major-space structures and the background buildings that define the daily life of the town.—MD

**Scheme 1**
City blocks raised high on parking platforms—a variation on the gridiron scheme—appear in the first thumbnail sketch for Reston. On each block, all buildings are arranged around the edge of the top deck to construct a façade around an interior plaza for pedestrians. There is little opportunity for a major-space structure to become prominent: the dominant masses of the city are the mammoth blocks themselves. The main highway also cleanly bisects the town; and the isolation of the blocks—except for pedestrian bridges—might complicate interblock traffic.

**Scheme 2**
In this Op-art, inside-out gridiron pattern, buildings are out in the street and spaces where solids used to be. Ground-level courts are surrounded by three stories of shops, interblock roadways, and parking. The principal buildings stand independently in the plazas. Just how well they could adjust to this rigid façade is debatable.

**Scheme 3**
A grandiose "civic center" scheme proposes a sweeping circular façade around a vast pedestrian plaza containing a cluster of free-standing buildings. The main highway runs along the top of the circle, and three terraces of roadways with built-in shops wind their way down to the center. There is no strong relationship between the enormous frame and the independent buildings that stand in the center and also attach themselves like barnacles to the exterior circumference. The architects felt walking distances might be a little excessive in the arena, and the plan disturbingly resembles an upside-down Tower of Babel that might end up glorifying the automobile rather than the pedestrian.
Scheme 4

The "dumbbell" plan of most shopping centers forms the basis of this design. The twin plazas on either side of the highway, connected by a shopping mall, closely resemble the two large department stores, which sit like magnets at either end of the conventional shopping arcade in order to pull the customer back and forth through the merchandise. This east-west pedestrian walkway is emphasized by stringing the majority of buildings along the north and south sides of the city, with two enormous parking garages buttressing the mall in the center.

Scheme 5

An elaborate, master-minded city plan, similar to Scheme 4, developed into the first detailed proposal. It is an authoritarian scheme. The two plazas are now on top of a gigantic three-story parking structure that underlies the entire city. The platform is divided into rectangular sections— theoretically to be added to one another as the town grows— with each unit containing a service elevator and escalator connecting the parking levels to the surface (see, "Lower Level"). Above (see, "Pedestrian Level"), the functions of the city have been dogmatically segregated. The western plaza, which opens out onto the industrial zone, features industrial and commercial buildings: an exhibition hall and trade mart. The eastern plaza, which connects with a high-density housing sinew, appropriately specializes in cultural and housing structures: a museum, a conference center, churches, and a concert hall. In the middle is an ice-skating rink.

Although this type of logic simplifies the allocation of building sites, it is questionable—as it is questionable in conventional shopping centers—whether such a "magnet"
SCHEME 5: PEDESTRIAN LEVEL

SCHEME 5: LOWER LEVEL

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scheme can pull together the isolated sections of the plan. The commercial center might be as dead as Wall Street in the evening while the cultural plaza blazes with light.

William Rossant's drawing (below) shows a modulated but close-knit courtyard façade where major-space buildings occupy prominent but not isolated positions. The way in which the church is situated, snuggling against one side of the plaza, resembles the irregular placement of the cathedral in medieval squares. The entire complex presents a strong, unified civic statement—a compelling design.

Perhaps too compelling. The developer, Robert Simon, was somewhat staggered by its monolithic quality: it was too grand and formal for a town center servicing 75,000 people. Financially, it would be difficult to induce commercial interests to sink a preliminary investment into three levels of parking lots, particularly in the initial stages of developing the town. It was a master plan—to be executed by a government, a king, but not a 20th-Century developer. Furthermore, the suspicion existed that such a bold and formal architectural statement might arouse strong likes and dislikes. Perhaps a little more chaos might be more neutrally attractive—to everyone.

After seeing the plan, Simon reduced the area from 1,000,000 to 425,000 square feet, and suggested a more modest proposal, a more conventional, small-town center where buildings are constructed individually—at ground level.
Schemes 6 and 7

The two resulting conventional plans swing back to commonplace planning, with blocks surrounded by streets, cars, and people. Most of the parking is on ground level, except for a few lots under major buildings such as the auditorium. A principal plaza is retained in the first plan, to form a civic center. The second plan was influenced by a trip Simon took to London, where he was so taken with the Bloomsbury district that he promptly sent his architects copies of the plan. Finally, however, neither scheme pleased the architect or developer. The towns were too diffuse to make a strong civic statement, occupied too much space, and perhaps lacked individuality. These two plans, however, may have served to release the architects from their tendency toward overplanning, and the developer from a desire for too much conventional chaos. Certainly they led to an appealing compromise solution.
Scheme 8

A neo-medieval design emerges as the final plan for Reston's town center, and in spite of the anachronism it seems entirely natural and appropriate: when finished, the town makes a strong urban statement, and yet it grows in modest, economical stages, finally achieving the form illustrated on this page. The architects simply take advantage of the terrain, start the town at the top of the hill with a nucleus of buildings constructed at ground level surrounding a pedestrian plaza. As the town grows, the parking on the peripheral slopes is covered and more plazas are built on top—until the borders of the town are reached (see overleaf).
Four clay models illustrate the concept of expansion:

The first stage begins with 75,000 sq ft of shopping space and parking on grade for 1500 cars.

The second stage has 240,000 sq ft of shopping space with 1000 cars under cover and 2000 on grade.

At stage three there are 400,000–450,000 sq ft of shopping space with 3,000 cars under cover and 2,000 on grade.

Model at bottom, left, shows a more detailed elaboration of the town center architecture as it might eventually evolve.

The architects are now working on a more detailed study of the final scheme. Below is a diagrammatic plan showing distribution of various types of buildings; major-space structures are shown in color.

From the formal point of view, the medieval square concept requires the tight façade proposed in scheme 5, with close-fitting town houses, shops with offices or apartments above. The major-space buildings are freed for more imaginative treatment. The diagrammatic sketch shows three churches pushing out into separate squares with varying degrees of evangelical zeal. They are all, however, cleverly anchored to a common educational center as if God had one mind and three faces, which is probably the case in the 20th Century. But the church is reinstated as an important community function.

Besides making a "social" statement, major buildings can also be used to define the formal structure of the town. Romantically, whimsically, high-rise apartments can turn into looming pylons flanking the eastern and western gates to the city, and an enormous conference center may rise like a triumphal arch at the southern edge.

If, in criticism, some should say that we no longer live in the 12th Century, the reply might be made that, whereas towers, battlements, and portcullis were once designed to keep the enemy outside from getting in, they may just as well serve to keep the enemy within from getting out—to keep Reston from sprawling out in an endless, formless, ever-multiplying aggregate of equal-density blocks that peter out over the landscape.
PROGRESSIVE ARCHITECTURE'S

WASHINGTON VADE MECUM

or

The Genteel Architect's Indispensable Companion to Resorts of Pleasure and Sites of Distinct Architectural Peculiarity in the Capital City of Our Nation, Containing Data Calculated to Educate the Eye, Titillate the Palate, Slake the Thirst, Gratify the Intellect, and Contribute to the Enjoyment of Multitudinous Other Stimuli Too Legion to List in This Space

Presented by the World-Traveled Editors of Progressive Architecture and Lavishly Illustrated at Great Expense with Original Drawings by that Nonpareil of Draughtsmen, Professor Forrest Wilson
Washington is a city of Southern efficiency and Northern charm," President John F. Kennedy once said. Architects sweltering through a mid-June convention are likely to agree with him. Still, this sprawling city exerts a strange hold on most visitors and residents. The malady known as "Potomac fever," which strikes the young congressman from the Midwest and leads him (hopefully) to spend the rest of his days here, is only the most severe form of Washingtonitis. A peculiar sense of participation inhabits even the casual tourist, and causes him to know that he is where the action is. A visit to the White House leads him to visualize the President upstairs in conference. The Congress and the Supreme Court can be seen forming and enforcing the laws that affect everyone. He can pass in the hotel lobby or sit in a restaurant next to Vice-President Humphrey, Eunice Kennedy Shriver, Senator Dirksen, or Perle Mesta.

Official tourist Washington is known to practically everyone who visits the city. For those who need them, there are the usual guides to sights and restaurants available in plentitude. The P/A Washington Vade Mecum will provide the architect-visitor with a more offbeat collection of things to see and do while in the capital. In the following pages are to be found esoterica ranging from palmists to a horseshoe vendor, and such aesthetic items as where to find Lucretia Mott in the Capitol and where you can see the wildest collection of cornices in the city.

Together with artist Forrest Wilson, we put in strenuous days and nights in Washington running to ground the unusual and interesting to help architectural conventioneers and those who visit Washington in the future.
1 CATHEDRAL OF ST. PETER AND ST. PAUL (Washington Cathedral: facing page), Wisconsin and Massachusetts Aves. NW. A Penelope's winding sheet of a building, it has been under construction so long (almost 60 years) that its completion will probably herald the Second Coming. Architect Philip Hubert Frohman has been in charge since 1917; his latest completed element, opened last month, is the rare book library. Kneeling cushions in the chapel to the right of the nave are embroidered with names, sayings, and symbols of such noted people as Louis H. Sullivan, Frederick Law Olmsted, Edna St. Vincent Millay, and Millard Fillmore. There is also a rather touching tribute to Norman Prince, founder of the Lafayette Escadrille in World War I.

2 BRITISH EMBASSY, 3100 Massachusetts Ave. NW. New main legation building is bland office-building contemporary. Consular section next door looks like an oversized tribute to their Williamsburg (which used to be their Williamsburg, come to think of it).

3 ISLAMIC CENTER, 2551 Massachusetts Ave. NW. Loudspeakers have replaced the muezzin atop this mosque built under the sponsorship of 15 Moslem countries. It was dedicated by the noted mystic, Dwight D. Eisenhower. Note narrow, vertical pulpit and Technicolor decorations. "Painting and writing by Abdelaal Hassan and assistants M. Mahdi and T. Ahmed, Egypt," reads the credit line.

4 GERMAN EMBASSY, 4645 Reservoir Road. NW. The most notable recent building in Washington by a foreign power (or by our own, for that matter). Designed by Egon Eiermann, it is decidedly worth a visit.

5 DUMBARTON OAKS MUSEUM ADDITION, 1703 32nd St. NW. Philip Johnson's jewel box for the exhibition of pre-Columbian art nestles handsomely in the garden next to Dumbarton Oaks. Opens at 2 p.m.

6 OAK HILL CEMETERY, near Rock Creek Park, NW. A Byronic setting where old sea captains and much of Washington's upper crust await the Last Trump. Across the river is resting place for poorer folk, more run down, with a real Southern Gothic feeling (right).

7 WOODROW WILSON HOUSE, 2340 S St. NW. Property of the National Trust for Historic Preservation, this Georgian-style house is the only museum in a former President's house in Washington.

8 HEADQUARTERS OF THE MUSEUM OF THE SOCIETY OF THE CINCINNATI, 2118 Massachusetts Ave. NW. Repository of an impressive collection of Lafayette memorabilia, it is appropriately a good copy of French chateau architecture. Across the avenue is the Cosmos Club, which Robert Kennedy quit because of its alleged discriminatory membership policies.


10 PHILLIPS COLLECTION, 1612 21st St. NW. Washington's leading collection of contemporary art, in a setting out of Truman Capote.

11 TARAS SHEVCHENKO, 22 and P Sts. NW. A fine old Beethovenian gentleman, the "Bard of the Ukraine" has been sculpted in mid-dithyramb.

12 DUPONT CIRCLE on Connecticut Avenue. Washington's Washington Square, where the Op, the Pop, and the Beat gather on warm evenings for conversation, cards, and song.

13 HEURICH MANSION, 1307 New Hampshire Ave. NW. An 1892 castle on the Rhine built by a brewer, it is now owned by the Columbia Historical Society.

14 FISHING HOLES, along Rock Creek and Potomac Parkway NW. The pole-and-line set congregates here with as much patience as the one along the Seine, and frequently with more success. The condition of the Potomac, it should be noted, convinces one that the water-pollution prevention program should start at home.

15 NATIONAL GEOGRAPHIC SOCIETY, 17th St. near M, NW. Edward D. Stone's new headquarters building houses travel and adventure exhibits well worth taking Junior to see. Here you can also see where those old magazines you read in your dentist's office come from.

16 HOUSING AND HOME FINANCE AGENCY, 1626 K St. NW. What need be said that architects do not know to their joy or sorrow? A repository of commissions, design prizes, the possible first Secretary of Urban Affairs, and enough red tape to reach from here to Yoknapatawpha County and back.

17 ST. JOHN'S EPISCOPAL CHURCH, H and 16th Sts. NW. As your commercial guidebook will tell you, all Presidents since Madison have attended services here. You will not discover, unless you visit, that the glass was evidently selected by the one with the worst taste.

18 LAFAYETTE SQUARE, H St., across from the White House. John Carl Warnecke's designs for this area, prepared under the aegis of President and Mrs. Kennedy, are under way. While here, you can see the equestrian statue of Andrew Jackson that has been immortalized on the label of New Orleans's Jax Beer, or join a convenient picket line and march for higher fees, more art on buildings, or the return of nickel Jax Beer.

19 OLD COURT OF CLAIMS BUILDING, H St. NW, next to Blair-Lee mansions. Built for the Corcoran Gallery in 1859, it is a fine old example of overrusticated baroco by James Renwick, Jr. Deserted now, it probably will not be around much longer.

20 GENERAL SERVICES ADMINISTRATION, E St. between 18th and 19th Sts. NW. Drop in to the GSA cafeteria for a casual cup of coffee and maybe you will run into Karel Yasko and a commission.

21 OCTAGON ANNEX, 1735 New York Ave. NW. The AIA headquarters building. This will probably be your last chance to see this 1940 addition to the Octagon by Eggers & Higgins before Mitchell & Giurgola's winning design replaces it. If you just have a few minutes, though, see the Octagon instead.

22 CORCORAN GALLERY, 17th St. and New York Ave. NW. If you cannot see all the major Washington galleries, see them in this order: National, Phillips, Freer, Dumbarton Oaks, Corcoran.

23 CONSTITUTION HALL, 18th and D Sts. NW. Headquarters of the DAR. Check to see if there are any concerts scheduled here. It's unlikely to be Marion Anderson; she has retired.
26 EXECUTIVE OFFICE BUILDING, 17th and Pennsylvania Ave. NW. Formerly the State, War, and Navy Building, designed by A. B. Mullett, 1871-88. Thought of as a dreadful monstrosity for many years, this recently cleaned product of America's "Gilded Age" has begun to attract respect from architects.

27 THE WILLARD HOTEL, Pennsylvania Ave. and 14th St. NW. Called (mainly by the management) the "hotel of Presidents." Chief Executives who stayed here include Lincoln, Taylor, Fillmore, Buchanan, Taft, Wilson, Coolidge, and Harding. The Willard, along with the nearby Occidental Restaurant and Washington Hotel, will come down in the near future (after all, Pennsylvania Station was ''the new SOB" or "the young SOB" or ''the old SOB." Whether this one is to be called "the new SOB" or "the young SOB" or "son of the old SOB" is not yet known.

28 DEPARTMENT OF COMMERCE, 14th St. between E St. and Constitution Ave. NW. A big machine in the lobby, counting American births and deaths, shows that we are doing our level best to control the population explosion.

29 WASHINGTON MEMORIAL, The Mall. Look at some of the runners-up in the design competition for the monument and thank your lucky stars that this one was built—and without the originally proposed stuffy colonnade around the bottom.

30 MUSEUM OF HISTORY AND TECHNOLOGY, The Mall at 14th St. NW. Part of the Smithsonian complex. A very uneasy compromise by Steinman, Cahn & White (née McKim, Mead & White) between "Federalese" and the 1960's. Hopefully, the last of its breed.

Horatio Greenough's seminude statue of Washington as Caesar is said to be found here and proves that the author of Form and Function was a much better author than sculptor.

31 FREER GALLERY, The Mall. Also part of the Smithsonian, it has the best collection of Oriental art in the country.

32 SMITHSONIAN INSTITUTION, The Mall. James Renwick, Jr. 1's tribute to Sir Walter Scott, with even more kitsch than Donnizetti got into "Lucia di Lammermoor." The Charles Addams atmosphere is heightened by the rockets and missiles standing around in the courtyard.

33 TEMPOS, on Independence Ave. between the Smithsonian and the White House. Two World Wars gave birth to "temporary" structures designed to house wartime offices. These, from WWI, are some of the last of a slowly dying race (after all, Pennsylvania Station was just a little older, and they are tearing it down).

34 RAYBURN HOUSE OFFICE BUILDING, Independence Ave. and 1st St. SW. By nonarchitect J. George Stewart, Architect of the Capitol, out of Harben, Hough, Livingston & Larson. Not to be missed by the connoisseur of the unbelievable. "Majesty of Law" and "Spirit of Justice" have been dug up from the old WPA days and placed on either side of the entrance. At the sides are some kind of hybrid cornucopia-cum-gargoyles obviously placed there as a pigeon pleaser. If every effort had been expended to make this a satire on the old WPA, a carillon to the Capitol Hill label is the only free-standing monument to a legislator on the Hill. Taft's shaft, it was feared, might lead to a parade of similar memorials for various favorite sons. Fortunately, this fear has thus far proved groundless.

35 GRANT MEMORIAL, before the Capitol. A couple of fine, swirling groups of Feds at either side of the General's equestrian statue, by Henry M. Shrady.

36 THE CAPITOL. There is an exhibition of the architectural history of the Capitol in the "crypt" below the main rotunda, principally drawings and studies of the dome by Thomas U. Walter, fourth Architect of the Capitol. The crypt is a pre-Pop sculpture of the Suffrage Movement worthy of Marisol or George Segal. Elizabeth Cady Stanton, Susan B. Anthony, and Lucretia Mott, looking like the first act of "Macbeth," rise from a sea of marzipan. Sculptor: Adelaide Johnson.

Our friend J. George Stewart's East Front can be observed by those with a taste for nonarchitecture. Stewart is now exclaiming, Chicken Little fashion, that the dome may fall if the West Front is not extended. A visit will be safe.

37 FOLGER SHAKESPEARE LIBRARY, Constitution Ave. and 1st St. NW. Guess who? J. George Stewart, practicing up for his chef d'oeuvre, the Rayburn Building. The old Senate Office Building, incidentally, is fondly known as "the old SOB." Whether this one is to be called "the new SOB" or "the young SOB" or "son of the old SOB" is not yet known.

38 NEW SENATE OFFICE BUILDING, Constitution Ave. and 1st St. NW. This ding-dong tower by New Haven's Douglas Orr (it adds a carillon to the Capitol Hill label) is the only free-standing monument to a legislator on the Hill. Taft's shaft, it was feared, might lead to a parade of similar memorials for various favorite sons. Fortunately, this fear has thus far proved groundless.

40 PENNSYLVANIA AVENUE. Walk from the Capitol to the White House along this historic route and try to visualize what it will be like when the grand plan developed under the Kennedy Administration goes into effect. Architect Nathaniel Owings has been given the "go" signal by President Johnson on the implementation of the plan.

41 NATIONAL GALLERY OF ART, Pennsylvania Avenue. The Mall. This great collection was swelled last month with the addition of the famous Chester Dale Collection, which is to French Impressionism what the Freer is to Oriental art. Don't miss.
MAJESTY OF LAW
42 GAZEBO, Pennsylvania Ave. and 7th St. NW. "Presented by Dr. Henry D. Cogswell of San Francisco, Cal." Dr. Cogswell evidently had no fondness for the grape, this odd little structure being emblazoned with the virtues of Temperance, Faith, Hope, and Charity. A dolphin within and a crane and papyrus reed atop presumably symbolize these attributes.

43 PLAQUE TO FRANKLIN DELANO ROOSEVELT, Pennsylvania Ave. and 9th St. NW. This is the site and type of memorial proposed by President Roosevelt himself. It was contributed by a group of private citizens and is not to be confused with the Pedersen-Tilney-Hoberman-Wasserman-Beer design proposed for Potomac Park.

44 DEPARTMENT OF JUSTICE, Federal Triangle, Pennsylvania Ave. NW. The FBI will move from here across the street when its new headquarters by C. F. Murphy & Associates has been completed. Meantime, you can still see such cultural phenomena as the straw hat Dilinger was wearing when shot down, and gunnery demonstrations where agents prove that they can outdo Elliott Ness any day. Very elevating for the kiddies.

45 FORD'S THEATER, 10th St. between E and F Sts. NW. Having housed a motley "Lincoln Museum" for many years, the theater is undergoing renovations to restore it as closely as possible to its condition on the tragic night of April 14, 1865. Washington architect William M. Haussmann is in charge of the renovation for the National Park Service. Hugh Hardy of New York is consulting on the possibility of restoring the theater for actual, live performances.

46 BIBLE HOSPITAL, 908 G St. NW. Should you give the Gideon in your room too heavy a workout, you can take it to the Bible Hospital, which advertises, "Old Bibles Never Die."

47 CALVARY BAPTIST CHURCH, H and 8th Sts. NW. Interesting old brickwork. The Northern Baptist Convention was formed here in 1907 with Charles Evans Hughes as its first president. Chief Justice Hughes was the grandfather of Charles Evans Hughes, III, New York architect.

48 HORSESHOES. Should you have arrived in town the same way President Washington did, you may need the services of W. S. Jenks & Son, H and 7th Sts. NW, who boast "Washington's Leading Purveyor of Fine Horseshoes."

49 CORNICES. Looking south on 7th St. past the Jenks emporium, you will see as wild a collection of cornices as you have seen in many a day. Delightfully, they terminate in an old classic court building now being renovated (below).

50 OLD PENSION BUILDING, between F and G and 4th and 5th Sts. NW. A building of imposing solidity with a first-floor cornice made of a band of repetitive fired clay figures dealing with troop activities in the Civil War.

51 UNION STATION, confluence of Massachusetts, Louisiana, and Delaware Aves. NE. Architects who want to take a bath in a railroad terminal can no longer use Charles Follen McKim's replica of the Caracalla tepidarium at New York's Pennsylvania Station. Perhaps they will be satisfied with Daniel H. Burnham's version (1908) of the central hall of the Baths of Diocletian in Rome, reproduced as the main hall of Washington's Union Station.

52 SOUTHEAST AND NORTHEAST AREAS. The Southeast is gradually emerging from somewhat run-down conditions in many blocks, mainly through the renovation of existing buildings. A number of interesting older structures can be spotted. The Northeast is in poorer condition. Neither exhibit the squalor of the Southwest area in the 40's, when the famous photographs of slums within sight of the Capitol were taken.
53 SOUTHWEST URBAN RENEWAL AREA. Quality ranges from Early Urban Renewal (Satterlee & Smith), through middle period, or Webb & Knapp, Pei, down to atypically jazzy Charles Goodman. Harry Weese’s Arena Stage is in this section, at 6th and M. Sts.

54 FISH PIERS AND MARINA, on Washington Channel. Worth a visit on your way to inspect the Southwest redevelopment area.

55 POTOMAC PARK between the Lincoln and Jefferson Memorials. As the site of the beleaguered Franklin D. Roosevelt Memorial, it might be called Francis Biddle’s Lament. The Judge finally resigned as head of the memorial commission last month, leaving serious doubts as to the fate of the prize-winning Pedersen-Tilney-Hoberman-Wasserman Beer design.

63 THE PENTAGON. (Do you need an address?) The greatest maze since the Palace of Minos at Knossos. It is rumored that the Andrews Sisters disappeared into this pile just after World War II and have not been heard of since. The strange cries that you hear from the War Room are just Dr. Strangelove and Werner von Braun talking over the good old days.

57 L’ENFANT MEMORIAL, Arlington Cemetery. Besides the one to Richard Morris Hunt in New York’s Central Park and Olmsted Island in the Potomac, this is the only memorial to an architect or planner we know of (except for Jefferson, of course). Designed by Welles Bosworth.

OUTSIDE THE CITY

RESTON. A short detour on Highway 202 going to or from Dulles International Airport. Some housing by Charles Goodman and Chloethiel Smith is up now; the notable designs by Whittlesley & Conklin are in the works. America’s prime example of a post-Greenbelt new town.

DULLES INTERNATIONAL AIRPORT. The world’s handsomest air terminal is reportedly losing money hand over fist because people insist on coming in or leaving by the more prosaic but more convenient Washington National Airport. If you did the same, you might go to Dulles for dinner one evening (there is a good restaurant) and give yourself an architectural thrill.

If you visit Mount Vernon by river or highway, take time to go to nearby WOODLAWN PLANTATION, where you will see not only the plantation house, designed by William Thornton, first Architect of the Capitol, and presented as a wedding present by George Washington to his nephew and Nelly Custis, Martha Washington’s granddaughter, but also the POPE-LEIGHY HOUSE, a 1940 Frank Lloyd Wright Usonian house recently moved here by the National Trust for Historic Preservation, which oversees both properties. On June 16, Interior Secretary Stewart Udall will open the Wright house to AIA-XI Pan American Congress delegates and visitors in a tour that will also include Mount Vernon and Woodlawn.

MISCELLANEOUS

subjects not coverable in itemized guide

GIRL-WATCHING: On any square of grass, and there is plenty of it, around lunchtime. Weekends and after work, in Potomac Park, along the river, and in Rock Creek Park. It’s enough to make a man proud and a little humble.

PALMISTS: A matter that might bemuse those who think about the conduct of the Government is the frequent occurrence of palmists in Washington. These clairvoyants are to be found in most parts of the city, and evidently enjoy steady employment. Should you care to have the future course of your practice revealed, you might try Mme. Fonda, 731 11th St. NW; Mme. Lane, 907 G St. NW; Mme. Anita, 716 7th St. NW; Mme. Roma, 623 7th St. NW; or Mme. Dana, 1732 Pennsylvania Ave. NW. Mme. Dana, incidentally, has her consulting salon in a splendid stepped-gable Dutch building.

UNDERCOVER WORK: Ride the Senate subway or the new one beneath the Rayburn Building. This is good for politician-spotting.

ASSOCIATIONS: If life with AIA or the Pan American Congress is not enough for you, you can always visit one of the other associations in which the capital abounds. A brief selection: American Foot Health Foundation, National Duck Pin Bowling Congress, Association of Oldest Living Inhabitants of the District of Columbia, Institute of Shortening and Edible Oils, Benefolent and Protective Order of Reindeer, American Hot-Dip Galvanizers Association, and National Investigation Commission on Aerial Phenomena. For the lobbyist with time on his hands, there is even an American Society of Association Executives.

WASHINGTON COMMERCIAL BUILDINGS. The new business buildings of Washington almost without exception exhibit a stultifying blandness of the square-holes-poked-in-curtain-walls school. A deplorable exhibit for our nation’s capital to have to show to visitors.

CONGRESSIONAL CEMETERY, eastern end of Pennsylvania Ave., 17th and E Sts. SE. Thornton, Hadfield, and Mills, architects important in the early development of the capital, are buried here. A group of 85 cenotaphs designed by Benjamin H. Latrobe and erected between 1838 and 1877 to legislators who died in office give the place its name. Upon the motion of Senator Hoar of Massachusetts, who said on the floor of the Senate in 1877 that the prospect of being interred beneath one of these atrocities added a new terror to death, an act was passed discontinuing their erection. Besides, the improvement of rail service had made it possible to get the remains back to the constituency before too much harm had been done.

PLACES WE DID NOT GET TO INVESTIGATE, BUT MAYBE YOU WILL: Crazy Amusements, 7835 Eastern Ave., Silver Spring, Md.; Noah’s Ark, 8914 Grant St., Bethesda, Md.; Mrs. Keiko Hiratsuka Moore, instruction in Japanese woodblock printing, 3116 M St., NW; the candidly named Thieves’ Market and Pirate’s Den, antique shops in Alexandria and Rockville; the Washington Christadelphian Eclesia Chapel, 1601 23rd St. SE, and, most tantalizing, Clara Lane, Social Introductions, 711 E St. NW.
Wilson "composite" of Washington commercial buildings
CONTINENTAL

A. LE BISTRO, 1827 M St. NW. 338-4622. Excellent and expensive French cooking in intimate low-ceiling setting. Back room is a discothèque cocktail lounge. Eat at conventional hours or waiters get cranky in good old Gaullist fashion. Daily 11:30 a.m.-12 M.


C. JOCKEY CLUB RESTAURANT in the Fairfax Hotel, 2100 Massachusetts Ave. NW. CO 5-0222. One of Washington’s best and most expensive French Restaurants. Daily 12 N-11 p.m. Closed Sundays.

D. THE MADISON HOTEL, 15th and M St. NW. 483-6400. Good food, elegant setting, and expensive (“You need dollar bills hanging out of your pockets to exit through ‘the tip line’”). Impressive imported hors d’oeuvre cart with delicacies concocted by imported Norwegian chef. Telephone outlets for those who like to keep in touch with their answering service, and only round tables—“no push-together squares.” Dolley Madison hangs prominently; the “other Madison” is in the corner. Daily 12 N-12 M.

E. OCCIDENTAL RESTAURANT, 1411 Pennsylvania Ave. NW. DI 7-6467. This may be one of your last chances to dine in this fine old Washington restaurant—before the Federal bulldozer comes lumbering around the corner, leveling an historic site to create still another mall in bemalled Washington. Chef Mueller prepares excellent beef Burgundy, soft shell crabs, etc.; “authentic” Hungarian gypsies fiddle in the background. Walls are lined with portraits of notables, who are listed in the catalogue under headings such as “businessmen, statesmen, generals.” “Authors” is added to the book in pencil, and the only architect to be found was Lorimer Rich, designer of Unknown Soldiers’ Tomb, sandwiched between Robert Frost and Chief Justice Warren. Daily 11:30 a.m.-1 a.m.

F. PAUL YOUNG’S RESTAURANT, 1120 Connecticut Ave. NW. FE 7-7000. Some tout it as the best food in Washington, although a little paler (or subtler) than Rive Gauche and more expensive. Kennedy breakfasted here after inaugural revelries, and it is frequented by many listed in “Who’s Who.” Impression-making State Department atmosphere with 3-ft-tall pepper shakers, an elegant brass lamp that used to hang over a pool room in Switzerland, and numerous other bits of foreign lore—some hidden out of reach of pinchy fingers. A family-run affair with Ma in the kitchen, an uncle out collecting wines in Europe, two sons among the tables, and a cousin who was converted to Indian mysticism and painted the powder-puff ladies on the bathroom doors. Daily 11:45 a.m.-3 p.m.; 5:45 p.m.-11 p.m. Closed Sundays.

G. LE PIGALLE RESTAURANT CABARET, 1921 Pennsylvania Ave. NW. 338-9226. This expensive little nightspot (also serving lunch) has excellent food—lobster en chemise, for one—along with a musical trio from the streets of Marseilles who come in their original Marlon Brando tee-shirts. Postage-stamp dancing. Sedate crowd to go along with fuller pocketbooks. Daily 11:30 a.m.-3 p.m.; 6 p.m.-12 M. Dancing from 8:30 p.m. on. Closed Sundays.


J. TINO’S CONTINENTALE, 1721 Wisconsin Ave. NW. NO 7-1000. Leisurely dining. Call for reservations, since the management does not believe in the rapid turnover mania of most restaurants. Flambs are a specialty. Pianist 8 p.m.-12 M. Restaurant: Daily 12 N-12 M.
MISCELLANEOUS

K. ARBAUGH'S, 2606 Connecticut Ave. NW. AD 4-8960. First-rate barbecued spareribs and coleslaw. Slightly kooky bright-yellow-and-blue Radio City Music Hall exterior with flower boxes leads to sober, cool, comfortably beer-scented interior decorated with pictures of missiles (because the clients are in the business) and horses (because the owner likes them), and a pen and letter from the White House celebrating the owner's contribution to the advancement of alcohol in the District of Columbia. Whatever it was, wasn't enough. Daily 5 p.m.—12 M; Sundays 3 p.m.—12:30 a.m.

L. CLEAVE'S CAFETERIA, 1715 G St. NW. For your last day, when you have spent all your money at the night spots on 14th St., NW, you can get "1/4 baked chicken with cranberry sauce" for 39¢ here. If you have more than 39¢, of course, go back to Rive Gauche.

P. MARKET INN, 200 E St. SW. DI 7-4455. Seafood, steaks, and chops are served in cozy, crowded, gemütlich, smokey atmosphere, through which Jimmy and Tex at piano and bass dimly emerge along with a rare collection of pictures of antique cars, missiles, and nudes. Choose your room according to your hobby. Daily 8 a.m.—2 a.m. Sundays 11 a.m.—12 M.

Q. THE MONOCLE ON CAPITOL HILL, 107 D St. NE. LI 6-4488. Small, Boswellian restaurant noted for illustrious political visitors. If you have a hankering to see Hubert Humphrey, he frequently dines here. Should you miss him, there is a tall, spindly object near the door that looks like a post from a bed H.H. once slept in. It's not, but—next best—is a 3-ft-pepper mill Humphrey and the owner brought back from Puerto Rico. Bass fiddle and vocalizing pianist from 8 p.m.—12 M. Daily 11:30 a.m.—2 a.m. Closed Sundays.

R. THE ROTUNDA, 30 Ivy Street SE. 546-2255. Down by the railroad tracks, there is a plush but dignified little villa where Senators can revel in a Roman atmosphere. Barmaid wear brief tunics—"the Washington policy for BM's," according to one waiter explaining the customs of the nation's capital. Dancing: Daily 9:30 p.m.—1:30 a.m. Saturdays 8:30 p.m.—11:45 p.m. Restaurant: Daily 11 a.m. Closed Sundays—Pax day.

S. SAM'S ARGENTINE BAKERY AND DELI-ATESSEN, 1735 F St. NW. A hole in the wall around the block from the Octagon features Sam's fresh-baked bread: Pan Frances, Pan Ruso, Pan Felipe, Pan Integral. Also strudel, tortas, knishes, sandwiches, etc., to be eaten in the park, or stand-up style with a bowl of borsch.

T. THE SHERATON PARK, 2660 Connecticut Ave. NW. CO 5-2000. The Cheshire Cheese room has good—and the only good—cooking in the hotel. Charcoal broils, the specialty, are served in cozy, pub-type setting, more intimate than most grandiose hotel hash houses. Daily 11:30 a.m.—12 M; 5:30 p.m.—7:30 p.m.; 8:30 p.m.—12 M.

U. THE SHOREHAM, 2500 Calvert NW. AD 4-0700. The terrace has outdoor dining and dancing and a floor show. Dining 7 p.m.—11 p.m. Dancing 8 p.m. Shows Mon—Thurs. 10:30 p.m.; Fri. and Sat. 9:30 p.m. and 12 M.

V. THOMAS' GRILL, 308 6th St. NW. A sign above the bar in this neighborhood bistro proclaims "Mom's special extra large glass of beer—25¢."

W. THE WASHINGTON HOTEL, 15th and Pennsylvania Ave. NW. ME 8-5900. Excellent view from terrace on top of building, but the food does not match it. Better eating can be found across the way at the grill in the EBBITT HOTEL, 1000 H St. NW.

CHINESE

X. THE PEKING RESTAURANT, 5522 Connecticut Ave. NW. (WO 6-8079), and 711 13th St. NW. (ME 8-2129). Excellent Chinese and Moosh Pork. Typical Chino-American restaurant (uptown branch) with booths and formica tables combined with yellowed scrolls and glass chandeliers. Note maidens playing in the grasses above entrance while Cupid lurks behind a classic bust. Daily 11:30 a.m.—12 M.

Y. YENCHING PALACE, 3524 Connecticut Ave. NW. 362-8200. War broke out between rivals when this restaurant opened downstream from the Peking, called itself the Peking Palace, and stole the real Peking's secret ingredient—OO Soup. The outcome of the strife was a change in name of the restaurant to Yenching (the name of Peking, ca. 900 AD—real one-upmanship) and of the brew to Palace Soup. Good Moosh Pork; also Nos. 103, 120, 20, 64, and 37 on the menu. Daily 11:30 a.m.—12 M Fri.—Sat. to 1 a.m.

THE MYSTERIOUS EAST

Z. IRON GATE INN, 1734 N St. NW. RE 7-1370. General Nelson A. Miles once gave a very fine horse to Buffalo Bill, but now his Spanish-style pink stucco stable is a restaurant specializing in Malfoof, Kifka, and grape leaves. Though the food is a little less tasty than The Sands, the setting is one of the most pleasant in Washington, with a small, quiet court and shady tree hidden from the fumes and trample of the street by the gray stone mansion of the General Federation of Women's Clubs. In case of rain, move into the stalls. Daily 11:30 a.m.—2:30 p.m.; 5:30 p.m.—10 p.m. Sundays 12 N—10 p.m.

JUNE 1965

BB. THE SANDS, 2605 Connecticut Ave, NW. AD 2-7755. Best Near-Eastern restaurant in Washington. Call in advance for raw Kibeh—raw ground lamb with crushed wheat and onions. All seasoning and pastry prepared by the owner, Mrs. Lucas. Her baklava is so excellent, she gets orders from Turkey. One flight up, nondescript décor with Near-Eastern memorabilia. Bar is downstairs at BACK DOOR—a dim hole with piano player from 9 p.m. on. Restaurant: Daily 5 p.m.—2 a.m.; Bar 7 p.m.—2 a.m.

CC. AV RISTORANTE ITALIANO, 607 New York Ave. NW. RE 7-0550. From among the dreary auto body shops, wheel aligners, and tire sales along New York Avenue leaps Neptune on a half-shell driving three white horses out of a pink marble fountain surrounded by a glorious cheese-colored parking lot. AV's is a splendid example of that Italo-American exuberance (that strange alchemy that also grows pink flamingos on suburban lawns). Food not as good as Phil's, but you can hear "Rigoletto" from the juke box. Daily 11:30 a.m.—3 a.m. Sundays 1 p.m.—1 a.m.

DD. PHIL'S ITALIAN RESTAURANT, 7303 Georgia Ave. NW. RA 3-9753. Inconvenient location, near the District-Silver Spring line. Excellent Italian food with the best cannelloni our consultant Robert Glynn has ever eaten. Daily 8 a.m.—2 a.m.

EE. HALL'S RESTAURANT & GARDEN, 1st and V Sts. SW. 543-5800. A little bit of ante-bellum nostalgia uprooted from its authentic location by the Land Re-development Agency and patched together again on the borders of the Anacostia River. Miss Hall in her purple feathered hat, a ferocious painting of the expulsion of Adam and Eve (not appropriate here), and an old bar with brass rail are among the momentos salvaged from more glorious days. Crab cakes and river view are not bad. Pleasant outdoor dining. Piano bar driven by a blonde with little sparkle but Daisy Mae proportions. Daily 11 a.m.—2 a.m.

FF. HOGATE'S SEAFOOD RESTAURANT, 9th and Maine Ave. SW. RE 7-3013. Very touristy, but a chance to eat on the river-front. Daily 11:30 a.m.—9 p.m.; Sundays 12:45 p.m.—9 p.m.

GG. O'DONNELL'S SEA GRILL, 1221 E St. NW. RE 7-2101. Pretty good seafood served beneath the mast overlooking a seacoast. Shack at end of pier doles out the "liquid bait," but if things begin to rock don't blame the boat—it is but a painted presentiment anchored in downtown Washington. Daily 11 a.m.—12:45 a.m. Sundays 12 N—12 M.

HH. BILLY MARTIN'S CARRIAGE HOUSE, 1238 Wisconsin Ave. NW. FE 3-5400. Decent beef, American food, large ye olde half-timbered restaurant with multiple-choice rooms, one of which—the Snuggery—used to feature Jackie Kennedy as well as the piano player. Daily 11 a.m.—1 a.m.; Sat. and Sun. 11 a.m.—12 M.

II. BLACKIE'S HOUSE OF BEEF, 22nd at M St. NW. FE 3-1100. Beef, of course, abounds in this New-Orleans-style restaurant crammed with overstuffed red velvet furniture and antiques, including a sarsaparilla soda fountain and Emperor Maximillian's dining table and chairs. A labyrinth of rooms is coordinated by a push-button console at entrance, with emergency buttons to sound the alarm when beef runs out. Daily 9 a.m.—10:30 p.m. Closed Sundays.

JJ. GOLDEN OX, 1615 L St. NW. 349-0010. Beef restaurant owned and operated by the Kansas City Stock Yard Co. Daily 11:30 a.m. till closing. Closed Mondays.

KK. COLLINGWOOD-ON-THE-POTOMAC, SO 8-7944. Five miles south of Alexandria on Mount Vernon Memorial Highway. The flavor of ante-bellum South. Daily 12 N—4 p.m.; 6 p.m.—9 p.m.


NN. SEAPORT INN. 6 King St. Alexandria, 549-2341. In old port section of Alexandria, near Dockside Sales—a bric-a-brac shop of all nations. Daily 11:30 a.m.—10 p.m.
NIGHTSPOTS

THE AREA AROUND 14TH ST. NW. between I and L Streets is good for nighttime slumming with SPEAKEASY (rapttime piano, kitchen-sink '90's decor, leggy leggy waitresses). CASINO ROYAL (discothèque), GOLD RUSH (ecdysiasts), PORT SAID and SUEZ (danses du ventre for the U.S. Navel Observatory).

MISCELLANEOUS spots are: THE JUNK-ANOO, direct from the Caribbean to 1629 Connecticut Ave. NW., featuring native Bahamian and American cooking, exotic drinks and exotic dancing; the CASBAH at 1211 U St. is a nightclub specializing in limbo contests; HOWARD'S, 7th and T Streets, NW., has rock'n'roll stage shows featuring usual hyperthyroid audience reactions. Usually a midnight presentation on Saturdays (nondrinking night).

THE STRIP in Georgetown around Wisconsin & M Streets is the Greenwich Village of Washington: a Montmartre of thousands of embassy secretaries, buried in limbo contests; HOWARD'S, 7th and T Streets, NW., has rock'n'roll stage shows featuring usual hyperthyroid audience reactions. Usually a midnight presentation on Saturdays (nondrinking night).

THE PITSTOP is a motorcycle-hotrod rev-up place that can be joined for the sum of $15. At night, the arty taries of unfamiliar embassies) and THE CORRAL LOUNGE is a murky hole vibrating with the Frug, Monkey, and Fish, and featuring a greasy-haired beatle-like team called "Creatures, Inc."—a nonsequitur of cultures that saved the venerable pound in England. THE CRAZY HORSE down the street shows four experimental films at the four corners of the room at the same time—a feat that even Plato could not predict with his shadow box at the bottom of his cave. One piece on surfing is superbly dizzying. Jazz and folk music are featured at the SHADOWS and the CELLAR DOOR, where Saint Marie once played the Jew's Harp. KIKI'S up M Street has "Scopitone"—the latest electronic invasion of man's drinking precincts, and beloved by him. If you can get to the buttons before the ecstatic proprietor, push the French ones: they have some superb bits of cinematography—including some superb bikinis.

GEORGETOWN FLOOD: Warning. Try not to be on the streets of Georgetown at midnight Saturday. That is when the bars close, and the most amenable barmaid turns adamantine in her refusal to moisten parched palates. The drought leads to a sudden exodus of pumpkins—thousands of embassy secretaries, bureau underlings, Jaguars, and postdoctors hit the road in a mad rush to get home to the next glass. A truly memorable sight. (Incidentally, for most visitors, liquor purchased by the bottle in Washington is cheaper than at home.)

MUSIC

Not much in music: at press time, Lisner, Constitution Hall, and the Library of Congress report nothing—unless someone has a passion for graduation exercises (Constitution Hall). Just about the only classic thing going is a coloratura singing with her husband pianist at the NATIONAL GALLERY—Constitution Avenue at 6th St. NW. Call RE 7-4215 for more information. Sunday afternoons and Monday evenings there are concerts at the PHILLIPS COLLECTION, 1612 21st St. NW. DU 7-2151.

THE CARTER BARRON AMPHITHEATER, 16th and Colorado Ave. NW. TU 2-2520, opens June 14 with Henry Mancini and his orchestra, the New Christy Minstrels, and Charlie Byrd (guitarist) out of doors. If you hear some thumping around the Lincoln Memorial, that is a service band gratuitously filling the air with Sousa, at WATERTAGE. A pleasant way to attend the concert is by canoe. Seats are available—for free.

Every Friday night a MARINE RETREAT is held at the Barracks on 8th and I Sts. SE.—a production of sound and light to delight children. Architects can gaze at the Commandant's House attributed to Latrobe, 1805, and barracks by Hornblower & Marshall, 1902.

FOR INFORMATION on what's going on in theater and music, call Hayes Concert Bureau, 1108 G St. NW. NA 8-7151.

THEATERS

Washington's pre- and post-Broadway theater, THE NATIONAL, 3231 E St. NW., NA 8-3393, presents "Oliver!" in June. Fringe benefits of The National are a nearby paperback bookstore that stays open as a sideshow before performances, and an outdoor café on the corner—Bassin's—where you can sip a snort to the passing crowds and air pollution.

THE ARENA STAGE, 6th and M Sts, SW, 638-6700, a theater-in-the-round by architect Harry Weese, presents two plays at convention time: "The Lonesome Train" and "Hard Traveling." which are two semimusical Americana pieces by Millard Lampell. Do not buy box seats if you are hard-of-hearing.

Off-off Broadway—the WASHINGTON THEATER CLUB, 1632 O St. NW. (483-9607) and the THEATER LOBBY, 17 St. Mathews Court (EX 3-5818) often have excellent productions. At press time, they were not quite sure what plays would be produced in June.

THE OLNEY THEATER, Rte. 108, Olney, Md., is a barnlike summer stock theater—a pleasant 45-minute ride out into the country. Jean Kerr's "Poor Richard" is playing, and stars in the lead role John Colicos of Stratford, Ontario. For tickets, call 347-5774 in Washington, D.C.

NAUTICAL PURSUITS

CHESAPEAKE AND OHIO CANAL BARGE TRIP. A perfect way to get away from the ennui of convention business meetings. Better yet, follow the example of Supreme Court Justice Douglas and hike it. Don't tell anyone else about it, though, or it will be just like the Monday luncheon meeting of the Apalachicola (Florida) Rotary. Call FE 7-8080 for reservations.

BOAT RIDE TO MOUNT VERNON, Pier 4, Maine Ave. & N St. SW. Good way to combine sun-tanning and sightseeing—or moonlighting and dancing. Call EX 3-8300 on day and night cruises.

SWAN BOATS across from the Jefferson Memorial can be rented for a quarter. Probably the most pleasant of the three: here you are your own skipper, your own engine (foot-operated), and can get away from the rest of the tourists.
Northern charm and Southern efficiency or vice versa, Washington is a compelling metropolis. Of great assistance to us in preparing the P/A Washington Vade Mecum have been lawyer Robert Glynn of the World Bank; Deborah Ann Holmes of the Highway Research Board, National Academy of Sciences-National Research Council; Richard Debar of Dober, Walquist & Harris, Inc.; Jessie MacKenzie of the office of Senator Thomas Kuchel; Mrs. M. H. Morton, Jr., Managing Editor, Department of Information, National Trust for Historic Preservation; E. E. Halmos, Jr., P/A’s Washington columnist; and John Y. Cunningham of “Materials in Design Engineering.” We extend thanks to them all.

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8. Movable contact terminal plate of .040" thickness; brass on 15 amp and bronze on 20 amp
9. Movable contact button 3/16" in diameter, of silver-alloy
10. Stationary contact of .040" thickness; brass on 15 amp and bronze on 20 amp
11. 11/32" long terminal screws with 3/8" head diameters
12. Back and side wired
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16. Lubricated spring assembly
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Tropical Architecture

BY WILLIAM J. McGUINNESS

Traditional and contemporary considerations for achieving comfort control in tropical and semitropical areas are reviewed by a practicing mechanical engineer.

It has been the privilege of some architectural schools in the United States to contribute to the education of those who will practice architecture in the tropics or in semitropical areas. For several years, Pratt Institute has offered a Master's degree in Tropical Architecture. Under the direction of Professor Marvin Sevly, it has enlarged its scope to bring emphasis to the education of those who come from the countries mentioned below; the approximate general latitude of each is indicated.

<table>
<thead>
<tr>
<th>COUNTRY</th>
<th>APPROXIMATE LATITUDE</th>
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</thead>
<tbody>
<tr>
<td>Thailand</td>
<td>15° North</td>
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<tr>
<td>Viet Nam</td>
<td>12° North</td>
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<tr>
<td>Peru</td>
<td>10° South</td>
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<tr>
<td>Nigeria</td>
<td>7° North</td>
</tr>
<tr>
<td>Turkey</td>
<td>40° North</td>
</tr>
</tbody>
</table>

In many of these areas, protection against the effects of heat and humidity is of vital concern. Only a few of them require heat during the cooler season. Turkey, whose latitude (40° North) is the same as that of New York, is the obvious exception. Following long tradition, the minimization of "sensible heat gain"—namely, the increase in air temperature—is relatively simple. Buildings must be left open and arranged to make use of natural air currents. Heavy masonry, with its 12-hr time delay due to great thermal capacity, postpones its reradiation of heat to the interior until the cool dark hours when warmth is welcome. Keeping glass away from the orbit of the sun, which causes its rays to fall on the east wall, roof, and west wall of a building, reduces the solar gain to one-tenth of its fierce intensity. Double roofs, water sprays, or water pools standing on the roof, lower roof transmission to a value more in keeping with that of the less troublesome walls.

It is well known, of course, that lowering the moisture content of the air is a much more powerful tool in achieving hot-weather comfort than controlling air temperatures. When the decision is made to dehumidify, everything changes. The space must be sealed. Heat gain contributed by human bodies, cooking, lights, bathing, and washing can no longer blow away. It must be "pumped out" by refrigeration. Fresh air, so much needed to minimize odor, especially in hot climates, may be admitted, but only if it can be conditioned to conform to the standards of the interior climate. Humidity now becomes the major problem.

Fred Dubin, of Fred Dubin Associates, Consulting Engineers, who taught the course in Climatology to the Pratt graduate class in Tropical Architecture in 1964, has some persuasive opinions about the methods of dealing with this problem. He observes that, unlike desert areas where dry bulb temperatures often go above 100 F, humid tropical areas, especially those near large bodies of water, seldom exceed 90 F. The wet bulb temperature, however, is often as high as 79 F, indicating a high humidity that usually persists over long periods. His extensive experience in the design of conditioning installations in these areas has convinced him that the reheat method is the most effective in maintaining a low humidity.

Reference to the diagram shows that the amount of cooling (cycle 1) to be provided in changing the temperature from 90 F to 75 F is relatively small, but results in moisture-saturated air. Further cooling (cycle 2) is needed to reduce the absolute moisture content to about one-half of its former value. The air-moisture mixture is then too cool for use (about 56 F) and must be reheated. In the tropics, heating systems are generally nonexistent. It is suggested, however, that if hot water or steam is to be used for reheat, the prime source of power for cooling must also be hot water or steam used for cooling in an absorption machine.

In addition to the fact that the power (see total heat scale) for dehumidification (cycles 2 and 3) is about six times that for sensible cooling (cycle 1), an additional item of importance is that ventilation by outdoor air be strictly limited if possible. The Guide and Data Book of the American Society of Heating, Refrigerating, and Air Conditioning Engineers suggests rates of fresh air use between limits of 4 and 38 cu ft per min per person, depending on conditions. The generous but sometimes unnecessary use of the high limit can increase this part of the cooling cost tenfold.

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MECHANICAL ENGINEERING CRITIQUE

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Alternate Systems of Writing Specifications

BY HAROLD J. ROSEN
Comments on the merits of alternate systems of writing specifications are presented by the Chief Specifications Writer of Skidmore, Owings & Merrill, New York.

Specifications can be written on the basis of methods or results. When the method system is employed, the specifier describes in detail the materials, workmanship, installation, and erection procedures to be used by the contractor in the conduct of his work operations in order to achieve the results expected. When the specifier elects to specify results, he places upon the contractor the responsibility for securing the desired results by whatever methods the contractor chooses to use.

The methods approach to writing specifications can best be described as a "descriptive specification." The results system is best described as a "performance specification." An analogous example of these approaches can best be made by comparing them with building code standards. The "specifications code" sets forth specific materials and methods that are permitted under the law in the construction of a building. Under the "performance code," materials and methods are left to the architect and engineer to employ, provided that the performance criteria for fire protection, structural adequacy, and sanitation are met.

As a matter of fact, both the descriptive specification and the performance specification may be used together in the same specification, each in its proper place, in order to achieve the prime objective.

Before the advent of material standards such as ASTM Specifications or Federal Specifications, materials were minutely described in the specifications so that the contractor was completely cognizant of what the specifier wanted. In many instances, these descriptive specifications for materials have been supplanted by the aforementioned standards. For example, in lieu of describing portland cement in detail, as to quality, fineness module, and other characteristics, the specifier now simply states that "Portland Cement shall conform to the requirements of ASTM Specification C150, Type ——."

This method of specifying has resulted in a type of specification that can best be described as a "reference specification." By making reference to a standard, the standard becomes a part of the specification to the same degree as descriptive or performance specification language is used.

The term "reference specifications" can likewise be applied to workmanship standards. Various trade associations such as the Tile Council of America, The Gypsum Association, the Painting and Decorating Contractors of America, and others such as the American Standards Association, have prepared standard workmanship requirements in project specifications. By so doing, detailed, descriptive workmanship clauses for these sections of the specifications need no longer be copied cumulously, but are made a part of the project specifications by the reference method.

The Construction Specifications Institute has a study underway entitled "Reference Workmanship Standards," which is an attempt to prepare workmanship clauses for various sections that can be incorporated in project specifications by reference.

A descriptive specification can be defined as one that describes in detail the materials to be used, and the workmanship required to fabricate, erect, and install the materials. As an example, a descriptive specification for a masonry wall would describe the materials to be used; the brick and mortar ingredients; the composition of the mortar; tests of individual components; weather conditions during erection; workmanship involved in laying up the brick; type of brick bond; jointing; and, finally, cleaning procedures. This allows all those concerned with specifications an opportunity to check each of the items specified. The supplier furnishes the brick and mortar as specified; the laboratory tests the components in accordance with specified test requirements; the inspector checks the workmanship requirements so carefully specified. If the specifications have been accurately prepared, the masonry wall is erected, accordingly, and the result the architect envisioned has been achieved through his minute description.

Performance specifications can be defined as specifying end results by formulating the criteria for its accomplishment. As an example, in a performance specification for a paint material, the end result is obtained by specifying or formulating the following criteria:

1. The painted surface shall withstand 10 washings with a mild detergent.
2. The painted surface shall show no sign of alligatoring or crazing.
3. The painted surface shall be resistant to abrasion when using the Taber Abrasive Method.
4. The painted surface shall have an eggshell finish.

Another example of a performance specification is one for a complete installation of a heating system. The specification spells out these performance requirements:

1. The heating plant shall be capable of providing an interior temperature of 70 F when the outside temperature is 0 F.
2. The heating system shall utilize No. 6 oil and shall be a hot-water system.
3. The heating elements shall be fin-type, baseboard radiation.
4. Controls such as thermostats, aquastats, and other safety devices shall be provided to regulate heat and prevent explosion.
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Fees for Work Designed But Not Built

BY BERNARD TOMSON AND NORMAN COPLAN

P/A's legal team discusses the problem of assuring full and appropriate compensation to an architect for work designed but not executed. They suggest incorporating a specific clause assuring such compensation and providing a formula for calculation of fee.

One of the more persistent and recurrent problems with which architects must deal involves their right to compensation when an owner, under an architectural contract that provides the architect's fee must be based upon the project construction cost, decides not to build. Disputes on this subject may arise when a project or some part thereof is abandoned because of lack of funds, because the cost is in excess of the budget allowance, because of the death of the architect or default of the owner, or because alternates have been designed that are not utilized by the owner. In each of these circumstances, the legal consequences affecting the architect's compensation may differ, depending on the provisions of the architectural contract. In some situations, the architect may be deprived of any fee whatsoever in connection with portions of his work not executed, and in other circumstances he may be limited to a recovery based upon the "reasonable value of his services" as distinguished from contract price (see It's the Law, August and September 1962 P/A). To assure full compensation for work designed but not executed, the contract must contain a clause dealing with this problem.

Disputes relating to the architect's fee when based upon the cost of construction are most often engendered in situations where the architect has either designed alternates that are not selected and constructed, or, if selected and constructed, reduce the total cost of the project. An example of such a dispute is a decision recently issued by the Commissioner of Education of the State of New York relating to a dispute between members of a Board of Education in connection with fees paid to an architect (Matter of Levy, Commissioner's Decision No. 7464). This case involved the interpretation of a contract between a board of education and the architect retained by the board in connection with the design of a school building. The architect's contract provided that the architect's fee would be "6 per cent of the cost of the work." The cost of the work was defined as meaning "the cost to the owner, but which cost shall not include any architect's fees or special consultant's fee or reimbursements or the cost of a Clerk-of-the-Works." The architect designed the project, together with several alternates, and bids were obtained. Several of the alternates were not selected, but the architect was paid not on the basis of the cost of the project actually constructed, but on the bids for the entire project, including the alternates not executed. A member of the board of education challenged the propriety of the majority of the board making such payment, and the issue was presented to the Commissioner of Education of the State of New York for decision.

The Commissioner concluded that, in the absence of contractual language that justified the payment based upon the bid price as distinguished from the actual cost of the work constructed, there was no legal justification for paying the architect for the alternates designed by him that were not selected and constructed. The Commissioner stated:

"There would have been nothing to have prevented the Board of Education from agreeing to pay the architect on the basis of base bids. However, once the contract is entered into and both parties become bound thereby, the terms of payment cannot be varied without consideration therefor. In other words, the Board of Education may not gratuitously compensate the architect over and beyond the agreement. On its face, this contract calls for payment to the architect on the basis of cost. What happened was apparently that after the plans had been submitted, the Board rejected several of the alternates so that the cost fell below the base bids. It is alleged that if payment is made on the basis of cost and not on the basis of base bids, the architect should receive some $16,000 less. The cases, upon which the attorneys have advised the Board that it has the legal authority to pay upon the basis of bids, involve factual situations where a separable portion of a contract or an entire contract has been abandoned. Under these situations the courts have held that the architect is entitled to compensation on the basis of quantum meruit for drawing the plans and specifications. In this case, however, the alternates which were used by the respondent were a part of the plans and specifications drawn by the architect. The work not performed was not a separable part of the total project."

As this case illustrates, an architectural contract that merely provides for a fee based upon the cost of construction is inadequate. The Standard Form of Agreement between Owner and Architect on a basis of construction cost issued by the American Institute of Architects (AIA Document B-131, 1963) seeks to deal with this problem under Article 6. This article states that project construction cost "means the total cost of all work designed or specified by the architect" and further provides that such cost shall be based upon either the lowest acceptable contractor's proposal or upon estimates of cost, with precedence in the order listed. Even this language, however, is not entirely clear and does not encompass all possibilities. The simple approach is to provide expressly that the architect is to be compensated for work designed but not constructed, and to incorporate a specific formula for fee calculation.
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This is the new Beckman Auditorium at the California Institute of Technology. It was designed by Edward Durell Stone, built by M.J. Brock & Sons, Los Angeles, and the roofing job was handled by the Lytle Corporation of Pasadena. This was a tough job, and Last-O-Rooft was chosen because it makes tough roofing jobs easy. Last-O-Rooft is a single-membrane, plastic elastomer product that can be installed in one step. It’s a complete roofing system of totally compatible components... roofing membranes, cements, flashings and finishes. (The gold circles on the roof are a decorative paint.) Applied cold, Last-O-Rooft can be used on low or steep slopes as well as involved configurations.


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Unadorned Recapitulation

BY ROBERT B. RILEY
CONTEMPORARY ARCHITECTURE: ITS ROOTS AND TRENDS, by L. Hilberseimer. Published by Paul Theobald and Company, 5 Wabash Ave., Chicago, Ill. (1964, 291 pp., illus., $12.75). Reviewer has served as Editor of Potomac Valley Architect and is currently a practising architect and architectural writer in Albuquerque, New Mexico.

No matter what the title implies, this book is a history of modern architecture, from the Crystal Palace through the work of the 30's. Current trends are briefly discussed, but only insofar as they can be exemplified in the postwar work of Wright, Mies, and LeCorbusier. Histories of the modern movement are being published at a great rate today, but this one will be used long after the others have been forgotten, even though it contributes no new historical or philosophical insights. Not a source book, it has few reference notes, no bibliography, and no index. It is an introductory text requiring no previous knowledge of architectural history, and would serve equally well as a book for an interested layman or an introduction to an architectural student's history course.

Ludwig Hilberseimer was a participant in the great architectural ferment of the early decades of this century. His book is the work of a practicing architect, planner, and writer, not of a critic, historian, or professional popularizer. Moreover, it is written from a distance in time that makes it unnecessary, in his view at least, to propagandize. He writes with a sense of architecture as a living, continuing adventure; the result is an unusual blending of inside knowledge and fervor with a modesty and tolerance rare in architectural writing.

This is a simple, thoughtful book, both in style and format. The approach the author has chosen is primarily narrative, not interpretive. He omits the philosophical gymnastics familiar in Giedion, Banham, and Pevsner and restricts his attention to major trends, covering these thoroughly with a nice balance between discussion of actual buildings and the ideologies that produced them. There are omissions and simplifications, but, given the purpose of the book, none are serious. He is not reluctant to state his own views, but they are plainly presented as just that, and not disguised as great historical truths or aesthetic laws.

Hilberseimer's style is plain to the extreme, sometimes sinking to the simplicity of a high school text, but always free from gobbledygook and pomposity. What it lacks in elegance it makes up for in clarity. Accustomed as we are to fat, heavy, note-laden texts or ostentatious, overdesigned coffee-table books, this one, at first look, seems plain and slightly stodgy. But its careful, unassuming format, one soon realizes, is largely responsible for its excellence. Illustrations and text are balanced and carefully related. Every building discussed is illustrated, and almost every building illustrated is evaluated in the text. Best and most unusual of all, the illustrations are always exactly where they should be, within a page or two of the relevant text. The layout is orderly and uncluttered; the type is large, handsome, and generously spaced. One is struck by the parallel between its design and the characteristics of Hilberseimer's and Mies's architecture—sparse, airy, logical, and restrained.

Reading the book, one realizes anew what an ideological debt we still owe to the years from the First World War through the early 30's. Few new serious ideas have arisen either in planning or architecture since then, at least until recently. Our actual buildings have in the meantime been only fulfilling or catching up to principles laid down then, not expanding upon them. The social and aesthetic convictions of those earlier years make our current fascination with composition seem frivolous. Just now, similar deep concerns seem to be stirring once again. I hope that, in a few years, a chronicler as capable as Hilberseimer will be writing about our ideas and our architecture. Until that time, if a non-architect friend asks you what contemporary design is all about, give him this book.

A DISCOVERY TO CONTEMPLATE
BY HERB GREENE
THE NEW CHURCHES OF EUROPE, by G. E. Kidder Smith. Holt, Rinehart & Winston, Inc., 383 Madison Ave., New York, N. Y. (1964, 291 pp., illus., $17.50). The reviewer is Associate Professor at the School of Architecture, University of Kentucky. A house he designed in Oklahoma City appeared in last month's P/A.

This book registers immediately as a contribution to architecture. The photographs are clear, essential, yet almost casual. They manage to endow their subjects with a reality uncommon for black-and-white pictures. So many fine passages of structure, materials, and architectural spaces are illustrated that the following conclusions are inevitable: the author has made his selection with care; he knows what he is looking at; and there is more quality in the new church architecture of Europe than we have hitherto realized. As a result, most of us will suffer the ominous doubt that an analogous discovery should be made of contemporary American churches.

Kidder Smith is primarily concerned with space for worship. His commentary is terse—a reportage of the central idea including only those features that are outstanding by their success or failure. The collection is arranged by nations, including only those features that are outstanding by their success or failure. The collection is arranged by nations, in alphabetical order, which proves at once unobtrusive and surprisingly valid in conveying national character. An 18-page coverage of Ronchamp and La Tourette provides a stout bulwark. My main regret is that some of the pictures are too small to be legible.

Continued on page 227
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Important questions are implicit in certain churches. Is Gothic height valid for contemporary structures? The Church of Notre Dame by Guillaume Gillet is a dramatic statement of technology in reinforced concrete and is undoubtedly interesting in its own right, yet there is a difficulty with misplaced time. The relation to time past and present is poignantly tangled by the Norwegian Village Church by the late Magnus Poulsson. The structure and form of this church are an homage to its stave church forbears and to the Norwegian landscape, but the interior space and neo-folk paintings that crowd it seem sentimentally atavistic. The commentary only touches on these questions. But because Kidder Smith has brought together so much interesting and serious work, so many good buildings and several great ones, his book should provoke contemplations never suspected from its unprepossessing cover.

American Culture Hero
BY NATHAN SILVER
BULFINCH'S BOSTON 1787-1817, by Harold Kirker and James Kirker. Oxford University Press, 417 Fifth Ave., New York, N. Y. (1964. 305 pp., illus., $7.50). Reviewer is an Assistant Professor at the School of Architecture, Columbia University.

There was a moment in the history of American cities when an architect had the highest political power, and it was just at the time that another architect was President. Charles Bullfinch was, like Jefferson, an amateur architect of sensibility, but, unlike Jefferson, he was innocent of the social responsibilities and opportunities presented by the Revolution. His ambitions for Boston were hopelessly limited by a colonial mentality. This precisely suited his conservative clients; they were Essex merchants who thought the war had been fought for commercial, not individual, freedom. They knew that Bullfinch would be good for business-as-usual. Through their support, and despite his personal unpopularity, Charles Bullfinch became chairman of the Boston Selectmen. He built some feeble Burlington and Adam buildings in town, and even tried to slip in a little Bath city planning. Boston was, after all, the fourth largest English-speaking city, and English culture was not a bad thing for trade.

Unluckily for an interesting subject, this inept and unfeeling book entirely

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evades discussions of the above kind. Nothing about Bulfinch's social ideals, cultural philosophy, or the responsibilities of his power is touched on. It is hard to get by in our post-Hausser, post-Giedion day with architectural histories that are narrative rather than analytical. If, forswearing a modern social history, the authors meant only to assess Bulfinch's buildings in the traditional Fiske Kimball-Talbot Hamlin manner, one might excuse their other insensitivities. But there is neither examination of details nor analysis of style here; the authors are not even offering an old-fashioned history of architecture.

Standards of scholarship in this book fall under suspicion when many disputed buildings are claimed for the architect without documentary support. The writing is often so clumsy that the sense is lost, and poor editing has allowed whole paragraphs of identical information to appear several times. Imprecision dogs the authors and misleads us. For example, Bulfinch's Tontine Crescent is called an ellipse—but it was an arc. The Royal Crescent at Bath by John Wood II was a real elliptical segment. The difference is that the ends of Wood's crescent plunge forward and stop, whereas an arc crescent is indefinitely long and has no sinewy ending. Distinctions like this should be important to those who write about architecture.

Bulfinch was an earnest man and true, at least, to his own principles. Boston now reveres him. It is far easier to like him today than it probably was in his own time. He ought to have a better cultural biography. A city, especially an architect's city, even deserves a poet's account, such as David McCord's About Boston. What a good prose subject for Robert Lowell! Charles Bulfinch, impiously Tory in his revolutionary city, was our own successful Kinsman, Major Molineux.

Rigid Framework

BY LEONARD K. EATON

Architectural, Urbanism, and Socio-Political Developments in Our Western Civilization by Carl B. Troedsson. Published by Akademifforlaget-Gumperz, Chalmers Institute of Technology, Göteborg, Sweden, Distributed by Scandinavian University Books, P.O. Box 65642, Los Angeles, Calif. (1964, 325 pp., $14.50). Reviewer is a Professor of Architecture at the University of Michigan.

This volume is an accompaniment and expansion of the same author's earlier Growth of the Western City during the Middle Ages. Published in the United States by a consortium of Scandinavian presses, it is available through Scandinavian University Books. Mr. Troedsson is a former research professor in Sweden and at present a practicing architect and planner in southern California.

Briefly stated, the book's thesis is that all of Western history since antiquity is divided into "concentrative" and "decentralizing" cycles, and that the growth of cities is closely coordinated with these periods. Thus the author sees the Carolingian rulers as the first great concentrators of the Middle Ages, and the powerful feudal lords who followed them as decentralizers. Like all historians who orient their material around a rigid ideological framework, Troedsson runs into a good many difficulties, particularly in the latter part of his book. Most American historians, who are usually brought up in a pragmatic and empirical tradition, will object to his schematization, as they did to that of Toynbee.

Moreover, many of Troedsson's interpretations are at variance with those now currently accepted. For example, he sees Gothic architecture as primarily a product of the medieval commune. Recent scholarship has generally viewed it as flowering under the patronage of the French monarchy. Perhaps because his theory has a hard time explaining it, Troedsson gives almost no space to the achievement of the late Gothic style in Central Europe. He likewise has very little to say about the rise of modern architecture.

Notwithstanding these deficiencies, the book has something to be said for it. The thesis is provocative, and it is good to have material on the development of Copenhagen and Stockholm available in English. Unfortunately there are no illustrations. These, it is assumed, will be found in the earlier volume.

Colorful Documentary

BY C. RAY SMITH

Color for Interiors: Historical and Modern by Faber Birren. Published by Whitney Library of Design, 18 E. 50 St., New York 22, N.Y. (1963, 210 pp., illus., index, $15). Reviewer is an Associate Editor of P/A.

Twenty years of experience as a color consultant and a great deal of thought are behind this book. The text contains a section devoted to the colors used in

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Lofty in Concept
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CRAFTSMANSHIP IN THE PACKAGE
Continued from page 232

the major decorative periods of history and a section on modern colors for use in hospitals, schools, industrial buildings, offices, stores, and food service facilities. Both sections, which are well illustrated with black-and-white photographs of typical interiors, are offered as a guide to using color in ancient and modern interiors.

Most valuable to architects will be the section on modern uses. Here, the author professes to greater freedom with color than the engineering approach would recommend, but he reveals that this section, unlike the historical one, is directed at the common man, at the great mass of shoppers, workers, eaters, and patients. "While aesthetics and creative originality may be appropriate—and demanded—in a home, an exclusive shop, or restaurant, they may be out of place in environments where people are expected to do more than sit about and indulge their senses," he tells us. The author also intriguingly points out that there are functional uses of color. In his explanation, he reveals a loyal attachment to various hues of pastel green as the panacea for perfect rest, concentration, education, and cold storage.

The most interesting and perhaps most valuable part of the book are charts of color chips (238 paint samples on 16 charts)—one group for historical periods and one for modern interior types. The results of the author's personal research and experience, the charts can be of enormous value to designers who have no other resources in this area. Also valuable is the inclusion of chips of the code of caution colors, which the author was consultant for and which are now becoming fashionable in both architecture and clothing.

A Wealth of Information

BY WILLIAM J. McGUINNESS

REINFORCED CONCRETE by E. Sigalov and S. Strongin, Translated from Russian by S. Klein. Published by Gordon & Breach, 150 Fifth Ave., New York 11, N.Y. (1963, 393 pp., illus., $12.50). Reviewer is a Contributing Editor of P/A. On this review, he had the assistance of his son, James T. McGuinness, who is a candidate for a master's degree in Civil Engineering.

Although similar in general content to many American texts, this book reflects the current practices in structural analysis, design, and construction of reinforced-concrete buildings in the Soviet Union. It provides the reader with a wealth of information—both theoretical and practical. It advocates the wide use of precast and prestressed concrete, standardized modules and mass production, which involves the sacrifice of some architectural freedom but undoubtedly results in more economical buildings. So distinct is this feature that much of the content relates to individual discontinuous members and the methods of assembling them into buildings. Only in later chapters is there a discussion of in situ (cast-in-place) concrete monoliths. In these sections, however, the subject of continuity is well handled.

There are good sections on the properties of concrete materials, design principles, compression members, tension members, bending, slabs, creep, and the redistribution of bending moments. The sections on shells folded plates, vaults, arches, and foundations fall short, mainly because they are too brief. Although there is a chapter on reservoirs, hoppers, and bins, the work is confined largely to buildings. Bridges, heavy

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<th>Round Structural Tubing</th>
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<td>Yield point, min, psi</td>
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<td>Elongation in 2 in, min, percent</td>
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(a) Applies to specified wall thicknesses 0.120 in. and over. For wall thicknesses under 0.120 in., the minimum elongation shall be calculated by the formula:

percent elongation in 2 in. = \( \frac{56\sqrt{t} + 17.5}{t} \)

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Continued from page 238

on items that the everyday designer is sure to find helpful, including lines of reasoning worth pursuing when arguing the costs and benefits of site development.

Those concerned with preparing public presentations and client education will want this volume in their library as a special source book.

Villanueva In Toto
By GEORGE KUBLER
CARLOS RAÚL VILLANUEVA AND THE ARCHITECTURE OF VENEZUELA by Sibyl Moholy-Nagy. Published by Frederick A. Praeger, 111 Fourth Ave., New York 3, N.Y. (1961, 178 pp., illus. $12.50). Reviewer is a member of the History of Art Department at Yale University.

Mrs. Moholy-Nagy here declares that the architect of the University of Caracas is ranked "in the small select group of international masters." She does not reveal the names of the other "masters," nor does she say who else agrees with her. Her comments suggest that she bestowed this accolade based on a combination of sociological, urbanistic, and aesthetic criteria.

The sociological conditions of Venezuela are characteristic of Latin America. Since the 16th-Century, town planners have had nearly absolute authority, unlike their colleagues elsewhere in Europe and America. Villanueva has not abused this traditional authority according to the municipal alarife. All his works show that he is guided by a belief in the possibility of realizing an ideal community.

Villanueva’s urbanistic aims are governed by an insistence upon the primacy of architecture. He is a regionalist in his awareness of local environmental conditions and in his respect for traditional habits. He is reluctant to accept mere machinery or unnecessary mechanical adaptations like air-conditioning, when serviceable local traditions, such as “breathing walls” and under-eave ventilation, achieve the same purpose. Mrs. Moholy-Nagy notes throughout his work a commendable ability to separate the private and the civic domains, finding that in this he perpetuates a Roman achievement that also is part of the Latin American tradition.

It is as a designer, however, that he finds him most meritorious. He has been an unceasing exponent of continuing creativity, in seeking to renovate and adjust long-term plans to changing conditions, instead of insisting like others upon the
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The book is attractively presented, with 11 color plates and wide margins, although the proofreading is uneven and the English text is less idiomatic than the accompanying Spanish translation. A more extended discussion of Villanueva's technical collaborators and assistants would have been welcome. One also misses some discussion of his debts to others in the "small select group of international masters." His Beaux-Arts training in Paris and a doubtful early debt to Perret are mentioned only in passing. Mrs. Moholy-Nagy's assessment comes close to the cult of an isolated personality, separated from the sustaining matrix of associates, assistants, teachers, contemporaries, and followers.

A useful epilogue contains extracts from Villanueva's lectures and articles, as well as a table of dates and works.

The title is misleading because it suggests that works other than those by Villanueva are discussed. Actually, only some passing comparisons to colonial buildings are illustrated.

**Picurial Survey**

*BY C. RAY SMITH*

*New Furniture 7. Edited by Gerd Hatje. Text by Karl Kaspar. Published by Frederick A. Praeger, Inc., 64 University Place, New York 3, N.Y. (1964, 162 pp., illus. $12.50). Reviewer is an Associate Editor of P/A.*

Like its six predecessors in the series, *New Furniture 7* is a pictorial presentation of the most recently produced furniture of all nations. Following a short introduction on the status of furniture design ("the period of stagnation is over"), there are some 441 illustrations and accompanying captions (in English, French, Spanish, and German) containing technical data, such as designer, date designed, country of origin, description of construction and salient features, and manufacturer. Furniture is grouped in continued on page 252
In Washington D.C.... An architect's mark of distinction with 2,000 precast units of

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Summary: Cost if done by an outside shop: $270.00
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Continued from page 248

sections (chairs, seating arrangements, sofas, beds; tables; office furniture; cabinets and shelves; nursery and school furniture). Three indexes (by manufacturer, designer, and photographer) facilitate using the book as a reference.

Another index in future editions (distributors or sales agents in other countries) could make the books more immediately valuable as shopping guides in the office.

One aspect implicit in the Editor's selection and juxtaposition of designs also makes the book valuable to the history of furniture design. Whereas Volume 6 contained furniture up to 1961, the most recent volume includes pieces dated from 1963 back to 1955. It becomes apparent that items are tacitly shown in groups of evident design similarity. The date of each design, therefore, takes on a somewhat damaging and curiously fascinating significance.

Mystical Meadows
BY PAUL T. FENNER

The growing concern today with the future of America's natural heritage has led to a controversy among those involved in the planning and design professions as to the possible ways in which pleasant places in which to live may be created and conserved. Much of this controversy arises from the problem of how a region should best be expressed in physical design form and still be preserved for future economic use.

Jens Jensen practiced landscape architecture in the Chicago region from 1886 to the early 1940's, during which time he left a wonderful legacy of conservation in the Chicago Park System and in private estates. All his work strongly expressed and preserved the native American landscape; all of it was intended for use and enjoyment.

Jensen was a contemporary of, and for a time worked with, Frank Lloyd Wright. He embodied the Prairie Spirit in landscape architecture much as Wright did in architecture. Jensen, like both Wright and Sullivan, worked mainly in Chicago and in the Midwest, and, although many
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Do
of his works survive as testament to his genius, he never achieved wide fame. Little has been written about him.

Professor Eaton, through exhaustive research and travel, has written a book that treats Jensen thoroughly and nobly. It brings to life the spirit of his work—the simple, direct use of plants, terrain, and water with which he mastered outdoor space and created elegant landscapes.

Jensen was an activist; the campfire, not books, was his teacher. Underlying his work was a certain mysticism, a deep feeling for nature, and an ability to express the particularities of the region in which he worked. Jensen's rapport with plants and outdoor space developed from his childhood in Denmark and from many years of daily contact with the outdoors. The effects he produced were dependent on each individual site. They were simple and powerful.

Wright used flowing space and horizontal lines to symbolize the Midwestern prairie. Jensen symbolized the prairie by using trees to form great open spaces. He took his time before bringing the viewer to the main statement of the site, and one cannot help but be overwhelmed by the impact of Jensen's meadows.

The book is divided into four sections. First, generous space is given Jensen's Danish background. Following this, Professor Eaton deals with his early years in the United States that were spent in public park work. Jensen's private practice is discussed in the third section. Throughout, the author has chosen excellent photographs.

The fourth section concerns Jensen's later life, when he established The Clearing, a kind of school somewhat similar to Taliesin, where he conveyed some of his ideas to selected students. The Clearing had for more than a literal meaning—it fulfilled the hopes of a lifetime. Here he could write, speak, and enjoy life away from the city, which to him was becoming increasingly unpleasant.

This book contains much wisdom and insight. The ideas expressed are timeless. To read Jensen, and to walk through his beautiful meadows and along his quiet streams, is to hear the landscape speak as only he intended.

Unusual Pictures, Unnerving Subheadings

BY RICHARD W. SNIBBE


A book that is composed mostly of pictures will appeal to architects because most of them do not read anyway. The author, with the help of a grant, the AIA, and two research assistants, has gathered many interesting and some unusual pictures of buildings, places, and details. He has put these together on facing pages (regardless of when they were built) to illustrate architectural elements such as form, surface, and space. The short text contains subheadings, one of which reads: “Pure Cubical Form Geometrically subdivided with a deliberate emphasis on perfection of proportion and details.” Under headings like this appear explanations that are sometimes historical and other times technical or just some elaboration on the theme.

At times, this seeming jumble and extraneous juxtaposition of anything anywhere is just that. At other times, there

Continued on page 262
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*Performance test data, published March 1, 1965—Pennsylvania State University.
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Continued from page 256

is a brilliant set of choices that more than justifies the miscellaneous character of the whole. I happen to like this approach, even if it is forced at times, because it creates a feeling for the complexity of the subject and shows the author’s respect for the reader’s ability to think. It even encourages him to do so. This is not a book for the amateur or for the freshman student of architecture, but the notion would get through even to them that understanding architectural design takes more than 20-20 vision.

I particularly liked the statement, on page 20, about “exploded building masses expressing each element separately as opposed to the classical approach to design,” as an indication of the origins of some of our current work. Let me recommend, too, the short statements on “Major Periods of Western Architecture” at the end. These—and indeed the entire book—contain fewer “weasel” words like “functional,” “honest,” etc., than any book on architecture written by an architect I have ever read.

A Dust Collector

BY HAROLD J. ROSEN

This reviewer has received the earlier editions of the Building Products Register and finds very little improvement in the Third Edition. The two earlier volumes have rarely been used by this reviewer, and this edition, too, seems destined to be a mint copy in his office.

This negative attitude is based on the unreliable information contained in reported physical characteristics and the lack of standardization of test procedures in comparing like products.

For example, in checking the ceramic tile illustration on “How To Use The Building Products Register,” several manufacturers indicate that their glazed tile meets Fed. Spec. SS-T-308b for chemical, impact, and abrasion-resistance. These requirements are not listed in the Federal Specification for glazed tile. Similar inaccuracies abound throughout the Register.

In comparing physical characteristics of roof insulation (on page 203), compressive strengths are required as the

“home” is sleek, slender at 4000 N. Charles

HIGHFIELD HOUSE APARTMENTS BALTIMORE

Now on Charles Avenue . . . a place that glitters with contemporary BALTIMORE high rise apartments . . .

Highfield House accommodates 165 apartments within the modern, classic form of a Mies van der Rohe structure. The sky shooting white columns contrast smartly with the duranodic ebony of custom engineered, MARMET individual, aluminum window units. Tenants enjoy this sophisticated urban scene through large fixed lites ventilated by twin hoppers at the bottom. At ground level, a glass enclosed lobby provides entry off the plaza through ultra slim stile MARMET 2200 doors.

More and more . . . experienced architects find that specifying MARMET . . . with its single source capability, close liaison on design . . . and laboratory checks on quality control . . . is a long step toward successful execution of all fenestration components.
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Arvin "tuck-in" permanently installed ELECTRIC WALL HEATER

The complete home heating system featuring individual room control...
- So powerful it heats an entire room
- So compact it tucks neatly between studs!

Fan-forced, compact unit provides instant, ceiling-to-floor heat. Clean, fume-free electric heat gives you complete decorating freedom. Simple, quick installation thanks to Arvin's built-in junction box. 1000, 1500 and 2000-watt capacities for any size room.

Rely on Arvin Electric Heat to add warmth to your living with a complete line of permanent and portable electric heat... all with built-in safety features. Ask your builder, architect or electrical contractor for more information.

5 year GUARANTEE on heating element

Arvin permanently installed TEMPERED AIR INLET

Provides a constant turnover of fresh air, pre-heated to room temperature... reduces electric heating costs!

Arvin's Tempered Air Inlet rid your home of stuffiness and "dusty" air as it gently provides fan-forced circulation. Reduces the excess humidity by introducing normally drier outside air into your living area. Reduces your electric heating costs by setting up pressure lock to keep cold air out and warm air in.

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minimum psi at 10 per cent deformation. Thermal conductivity is reported at 75 F and 50 F. How can the architect or specifications writer compare products with dissimilar test references? The Register is replete with this incongruent method of comparing products.

The only outstanding feature of the Register is the bibliography at the end of each category, which abstracts specification standards such as A.S.T.M., Fed. Specs., Commercial Standards, and association standards.

OTHER BOOKS TO BE NOTED

To be reviewed.

To be reviewed.

The Architecture of the European Synagogue. Rachel Wieschnitzer. The Jewish Publication Society of America, 222 N. 15 St., Philadelphia 2, Pa., 1964. 312 pp., illus., $6.00
To be reviewed.


Spanish architecture, whether in Spain, South America, Mexico, or the Caribbean, is traced from the days of Juan de Villanueva and Antonio Gaudi up to 1960. Photographs are plentiful, well placed, but poorly reproduced. The text moves like a brook—frequently without depth. Still, this marks a beginning in a much-needed area.


Most of the book is the author's belief that theories of beauty are closely related to the civilization that produces them; thus he describes the hieratical Byzantine civic service, its system of art patronage, and explains the anonymity of its artists. Mathew has been University Lecturer in Byzantine Studies at Oxford since 1947.

This report summarizes a two-year investigation of comfort-conditioning a split-level residence with ducted air systems. Results of
THINK COPPER...

With copper plumbing you save on high-rise construction costs!

First Federal Building, Detroit, Mich.; (owner, First Federal Savings of Detroit); Smith, Hinchman and Grylls Associates, Inc., architects; Russell F. Stem, associate and chief mechanical engineer; Spitzley Corporation, mechanical contractors; Lorenz Supply Co., Anaconda Distributor.

Described as Detroit's most distinguished building, the new twin tower First Federal Building is truly copper-protected—actually more than 4 miles of copper tube were used; Type L for hot and cold water lines in sizes 1/2" to 3" and Type DWV for sanitary drainage in sizes up to 6". By specifying copper tube, the architects and mechanical engineers saved piping space, and cut installation time and costs throughout the 23-story structure.

Chief Engineer Russell F. Stem reported that, "due to limited vertical pipe space between building column and exterior wall, copper was specified. Ease of installation and less supported weight were also key factors in our decision."

You, too, will find all-copper plumbing best all around. As J. H. Spitzley, president of Spitzley Corp., says: "DWV Copper offers many advantages—space-saving, light weight, and ease of fabrication and installation."

Copper saves money everywhere. You're the No. 1 man to achieve these savings. So plan on copper plumbing from the start. Anaconda plumbing products include Copper Water Tube, Copper DWV Drainage Tube, Copper Tube Fittings and Valves, Red Brass and Copper Pipe.

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.

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for just a few pennies more per opening you can have THIS instead of THIS McKinney Moderne Hinges bring you so much more

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- Fewer horizontal lines to break the clean, modern lines of this beautiful hinge.
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- Stainless Steel Oil-Impregnated Bearings to carry the vertical load, to provide lifetime lubrication at points of greatest wear, to resist corrosion for the life of the door.
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Architect Marvin Hatami designs a college dormitory

At -10° indoor wall surface temperature is increased from 50° to 62° by insulating the block walls with Zonolite Masonry Fill Insulation.

The project consists of the first section of a dormitory complex, located on a hilly meadow site, accommodating fifty-two single rooms.

It was designed by Marvin Hatami and engineered by Cator, Ruma & Associates, both of Denver, Colorado.

The rooms are composed around a two story central lounge and every three rooms share common bathroom facilities. Developed modularly, the second floor is superimposed over the ground floor in a way to express each individual room in an interwoven and interlocking manner.

The structure is composed of 12" x 8" x 8" reinforced lightweight concrete block bearing walls, insulated against thermal and sound transmission with Zonolite Masonry Fill Insulation.

It cuts thermal transmission through the walls by 50% (see chart), raises the interior wall surface temperature from a miserable 50° to a comfortable 62°, thus reducing heat transfer and convection currents in the rooms.

This cut the operating costs 9.2%, or about $90 a year.

The savings more than pay for the cost of the thermal insulation over the 20 year mortgage period.
For complete information about Zonolite Masonry Fill Insulation, write for our Bulletins MF-79 and MF-80, Dept. 000-00, 135 South LaSalle Street, Chicago, Illinois 60603.

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---

**Winter Heat Loss in BTU/HR. Assuming 70° F Indoor —10° F Outdoor**

<table>
<thead>
<tr>
<th></th>
<th>Without Masonry Fill</th>
<th>With Masonry Fill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masonry Fill</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12&quot; x 8&quot; x 6&quot; Lightweight Concrete Block</td>
<td>142,000</td>
<td>71,000</td>
</tr>
<tr>
<td>Roof</td>
<td>Roofing, 6&quot; Concrete</td>
<td>98,000</td>
</tr>
<tr>
<td></td>
<td>2&quot; Insulation</td>
<td></td>
</tr>
<tr>
<td>Floor</td>
<td>6&quot; Concrete on Grade</td>
<td>26,000</td>
</tr>
<tr>
<td>Glass</td>
<td>1&quot; Insulated Glass</td>
<td>242,000</td>
</tr>
<tr>
<td>Ventilation</td>
<td>9600 CFM</td>
<td>260,000</td>
</tr>
<tr>
<td>Totals</td>
<td>768,000</td>
<td>697,000</td>
</tr>
</tbody>
</table>

1/4 Savings with Masonry Fill

768,000 - 697,000 = 71,000

71,000 / 768,000 = 9.2%

---

**1. Increased wall attenuation characteristics reduces sound transmission considerably.**

**2. Raised indoor wall surface temperature from 50° F to 62° F provides added comfort.**

**3. 14,100 sq. ft. of walls (includes 8,200 sq. ft. of interior walls) @ 184 sq. ft. = $2,538 installed.**

**4. Additionally the operating costs are reduced by over $90 per year based on 5673 degree days $0.053 per therm gas boiler.**
Continued from page 268

this method.

To be reviewed.

Nueva Vision de Gaudi. E. Casanelles. La Poligrafa, S.A., Balme?, 54-Barcelona, Spain, 1965. 260 pp., illus., $15.00
To be reviewed.

This is the first book in English on early Russian mosaics and frescoes, 11th to 16th centuries. The great Russian icons have been frequently studied, but the wall-painting contained in this volume is much less known. Most of the pictures are entirely new to the West; they were taken for this book specially by the Soviet Institute for the Restoration of Works of Art. The author is the President of the Russian Academy of Art.

The title of this book indicates a new field for both economists and city planners. Occasioned by the growing concentration of the world's population in cities, urban economics treats many of the well-known problems of large cities: work relief and welfare, taxes and public services under political fragmentation, urban sprawl, and traffic congestion. The author, an economist at Wayne State University addresses himself to these social problems with the tools of economic analysis.

To be reviewed.

Therapy by Design. Lawrence R. Good, Saul M. Siegel, and Alfred Paul Bay. Charles C. Thomas, 301-327 E. Lawrence Ave., Springfield, Ill., 1965. 193 pp., illus., $10.00
To be reviewed.

Toronto, No Mean City. Eric Arthur. University of Toronto Press, Front Campus, Toronto 5, Canada, 1964. 280 pp., illus., $15.00
A history of Toronto, from its origins as a palisaded village, through the days when it was Governor Simcoe's capital, York, and through its days of serving as a battlefield in the War of 1812. The story ends, oddly enough, at the turn of the century. Photographs record Toronto's handsome buildings that survived demolition as well as some that did not.

NOTICES

Branch Offices, Showrooms

DEALER TO THE TRADE, a division of HELIKON FURNITURE COMPANY, INC., will act as an office furniture dealer and showroom at 315 E. 62 St., New York, N.Y.

Design Research, designers of furniture, fabrics, accessories, and women's clothing. Showroom at Clock Tower, Ghirardelli Sqr., San Francisco, Calif.

New Addresses

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New Firms

BAY GROUP, Architects and Planners, 2321 Pine St., San Francisco, Calif.

COX, GRIBBIN AND CATANI, Architects, Engineers, Planners, 187 Union St., Hackensack, N.J.

DESIGN MANAGEMENT CONSULTANTS, 285 Winter St., Weston, Mass.

RICHARD A. DEMON, Architect, 9719 Holmhorst Rd., Bethesda, Md.


LOEBL, SCHLOSSMAN, BENNETT & DART, INC., Architects, 333 N. Michigan Ave., Chicago, Ill.

BIRGER LUNDBERG, Architect, Clarke Bldg., Tahoe Valley, Calif.

continued on page 278
The preservative in Western Red Cedar would have cost $10,000,000 to develop.

[Thank goodness nature gives it to you free]

The handsome color tones and natural beauty of Western Red Cedar are the result of a unique preservative oil locked deep in the cells of the wood. This oil, which defies scientists' efforts to duplicate in the laboratory, is death on fungi and other decay-producing organisms. And it makes cedar one of the most durable woods known to man.

This is why Western Red Cedar doesn't need paints and stains for protection although it takes them very well. They're for color only.

Whether this beautiful aristocrat of the Western forests is left to weather naturally or finished other ways, it is appropriate to any kind of architecture.

Highly popular 3/4 x 10-inch bevel siding with smooth or saw-textured surfaces adds character to both homes and commercial buildings. Western Red Cedar is also available in a broad range of other grades and sizes including boards, dimension, decking and other items. For more information, write us: Western Red Cedar Lumber Assoc., Yeon Bldg., Portland, Oregon.

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three kinds of L·O·F plate glass  
to reduce solar heat, soften glare

In the college building above, Parallel-O-Grey® plate glass blends in smoothly with the face of the building; and from the inside, sun and snow glare is reduced.

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In the library on the left, blue-green Heat Absorbing plate glass softens the light entering the building, yet transmits ample daylight.

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Now choose the design you want in nickel stainless steel.
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Almost everybody's making them. And, for appearance, durability, low maintenance and competitive cost, more and more architects are specifying standard revolving, sliding and swinging doors of stainless steel. It's among the strongest of metals, permitting use of narrow stiles and lighter, more economical gauges. The subtle sheen of stainless blends with other materials—complements and highlights its surroundings. And because nickel stainless steel is highly corrosion resistant, it won't pit, tarnish, dull, whiten or deteriorate under normal conditions. It's virtually care-free—washes easily with detergent and water. Low maintenance costs alone often make up any difference in price between stainless and other materials. Best of all, the doors shown here, and others, are readily available. For your next design, consider the advantages of stainless steel for doors—as well as curtain walls, windows, hardware, fascia and railings. And write for Inco's informative series of "Suggested Guide Specifications For Stainless Steel Doors." Their format follows AIA Specification Worksheets.

On Readers' Service Card, circle No. 464
Appointments, Elections

CHASTAIN & TINDEL, INC., Consulting Engineers, Atlanta, Ga., have elected Karl T. Decker, Jr., vice-president and Thomas B. Harrell, Jr., associate.

Designs for Business, Inc., has elected Eli Kaplan, vice-president.

The Engineers Collaborative, Chicago, Ill., have named Edward S. Hoffman and Charles James McDonald partners, Rafael C. Codero and Charles G. Noval as associate partners, Arthur G. Jones, David V. Remely and Ewen Tokai as participating associates, and Thomas F. Naughton and John J. White as Project Engineers.

John Hans Graham & Associates, Architects-Planners, Arlington, Va., announce that Herbert Kaplan has been made head of the specifications and cost control dept.


Rose, Beaton, Corse, Dearden & Crowe, Architects-Engineers, New York, N.Y., have appointed as new associates: Charles L. Koester, Louis H. Li, Robert J. Vanneck, George Harrison and Lee Hilton.

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Durable finishes, accessible components and fastenings, sturdy construction that withstands hardest abuse. Result? Little or no maintenance during their lifetime!

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PAGE 156: top: Courtesy, ABC-TV
PAGE 157: bottom: Robert R. McElroy

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George Thiele, Inc., 509 Madison Ave., New York, N.Y.

Turner Jones Co., Inc., Textiles, 555 Madison Ave., New York, N.Y.

Wed Enterprises, Inc., Walt Disney's architectural services and engineering firm, 800 Sonora Ave., Glendale, Calif.

New Partners, Associates

Bunts & Kelsey, Architects, Colorado Springs, Colo., have named Ralph E. Fowler and Duane R. Waldo as associates.

Randolph Frantz & Associates, Architects, Roanoke, Va., have made John W. Chappelar, Jr., a partner.

Hornbach, Steenwyk and Thrall, Inc., Architects, Grand Rapids, Mich., have just named William Thrall a partner.

Howard, Burt & Hall, Architects, Butler, Pa., have named John E. Kosar an associate.

Albert Kahn Associates, Architects-Engineers, Detroit, Mich., have named Joseph F. Ebenhoch an associate.

Leo Kornblath Associates, Architects and Interior Designers, New York, Washington, D.C., and San Juan, P.R., have named Karl Kaufman a partner.

JOSEPH F. EBENHOECH Engineers, Detroit, Mich., have named ALBERT KAHN ASSOCIATES as participating associates, and CHARLES L. KOESTER, LOUIS H. LI, ROBERT B. HARRELL, JR., as new partners, Architects, Colorado Springs, Colo., have named RANDOLPH FRANTZ & ASSOCIATES as participating associates, and CHARLES G. NOVAK as associate.

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JUNE 1965 P/A
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Want proof? Send for your copy of the pioneer study: "Cost Analysis of Solar Controls" by Alfred J. Jaros, Jr. of Jaros, Baum and Belles, Consulting Engineers, New York. This article, from the July 1963 issue of Buildings Magazine, explains the most efficient way to handle the large glass in today’s modern buildings.

FLEXALUM® DIVISION, ALCAN ALUMINUM CORPORATION
111 West 50th Street, New York, N.Y.
Dear Editor: We are puzzled by your reference to Carnegie Tech in the article "Urban University," on page 225 of the April 1965 P/A.

I am wondering if you are perhaps thinking of the University of Pittsburgh, whose main building, of course, is a famous skyscraper? The only other "high-rise" building to which you might be referring is our Morewood Gardens residence for women. This building, which is adjacent to the campus, is a converted apartment building and is not at all unattractive. With student accommodations so hard to come by these days, we are only too happy for this apartment building to be given to us for use as a student residence.

DANTON BEAL
Director, Department of Public Relations
Carnegie Institute of Technology
Pittsburgh, Pa.

[Mr. Beal is quite correct. The writer was thinking of the University of Pittsburgh's tower and its newer high-rise dormitories. Closeness of the two schools lead, in part, to the confusion. We hope that the loyal sensibilities of Carnegie Tech and University of Pittsburgh alumni are not irreparably exacerbated. —JTB, Jr.]

Disciplined Research
Dear Editor: It seems to me that the Rosenfields, in reviewing the research project reported in Planning for Hospitals: A Systems approach Using Computer Aided Techniques (p. 228, March 1965 P/A) have made a mistake not uncommon to architects. Because of our training, we architects tend to assume that we can solve any problem—no matter how large—by a single brilliant effort. We tend to design buildings that way. One at a time, with an architect to lead the effort, even though others may be needed to fill in the details like a structural system that won’t fail, or a mechanical system that can weave its way around the structure, or a communications system bolstered by electronics where it fails to work otherwise. But research when it is done well and within the discipline of mature science and technology is seldom like that. It consists of carefully worked-out, discrete advances in knowledge, the sum of which moves man closer to solving the riddles of the universe, or providing a cure for cancer, or sending a man to the moon.

The Rosenfields, in suggesting that we need “... the ability to think, to find new insights into the vital problem of how, through physical planning, we can help to make sick people well and how we can develop principles for such planning” believe that they thus pose a challenge so dramatic in its scope that the effort of Souder and Clark pales by contrast. Their assumption is that in stating a challenge of this magnitude that half the job of solving it has been done. They seem to forget Edison’s comment that his work was 10 per cent inspiration and 90 per cent perspiration.

Architects abound in imagination and in inspiration, but they will continue to delude themselves if they believe that their contribution to improving the fabric of the lives of those who will live in the latter one-third of this century can be confined to the sort of inspirational inputs architects made in the first two-thirds. We need to undertake not a few large, brilliant research projects, but thousands of small but important ones that will build a base for an occasional stroke of genius. The W-59 project was an important contribution to this base—let’s have a lot more like it!

JOHN P. EBERHARD
Deputy Director, Institute for Applied Technology
U.S. Department of Commerce
Washington, D.C.
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