RCHITECTURAL RECORD

9 SEPTEMBER 1962 • TWO DOLLARS PER COPY

BUILDING TYPES STUDY: HOSPITALS

LINCOLN CENTER FOR THE PERFORMING ARTS

ACOUSTICS OF PHILHARMONIC HALL

FULL CONTENTS ON PAGES 4 & 5

Rendering by Ara Derderian

PWARDS, A FIRE BARRIER;
OWNWARDS, AN AIR DIFFUSER

All five stories and penthouse of the two-million-dollar National Cash Register Building at Hartford, Conn., will be air conditioned — with Armstrong Ventilating Fire Guard Ceilings distributing the air. In this new system, a stub duct feeds conditioned air to the plenum, where an even pressure forces it down through the perforated ceiling into the room below. Using Armstrong's Plenum Engineering Procedures, the engineers varied the proportion of Ventilating to non-ventilating Fire Guard thereby allowing a common plenum to supply several conditioned spaces, each with different air flow requirements. Both regular and Ventilating Fire Guard lay-in units easily satisfy the 1½-hour fire-protection rating required for this building. And Ventilating Fire Guard ceilings (instead of a duct-and-diffuser system and intermediate fire protection) saved at least $40,000.

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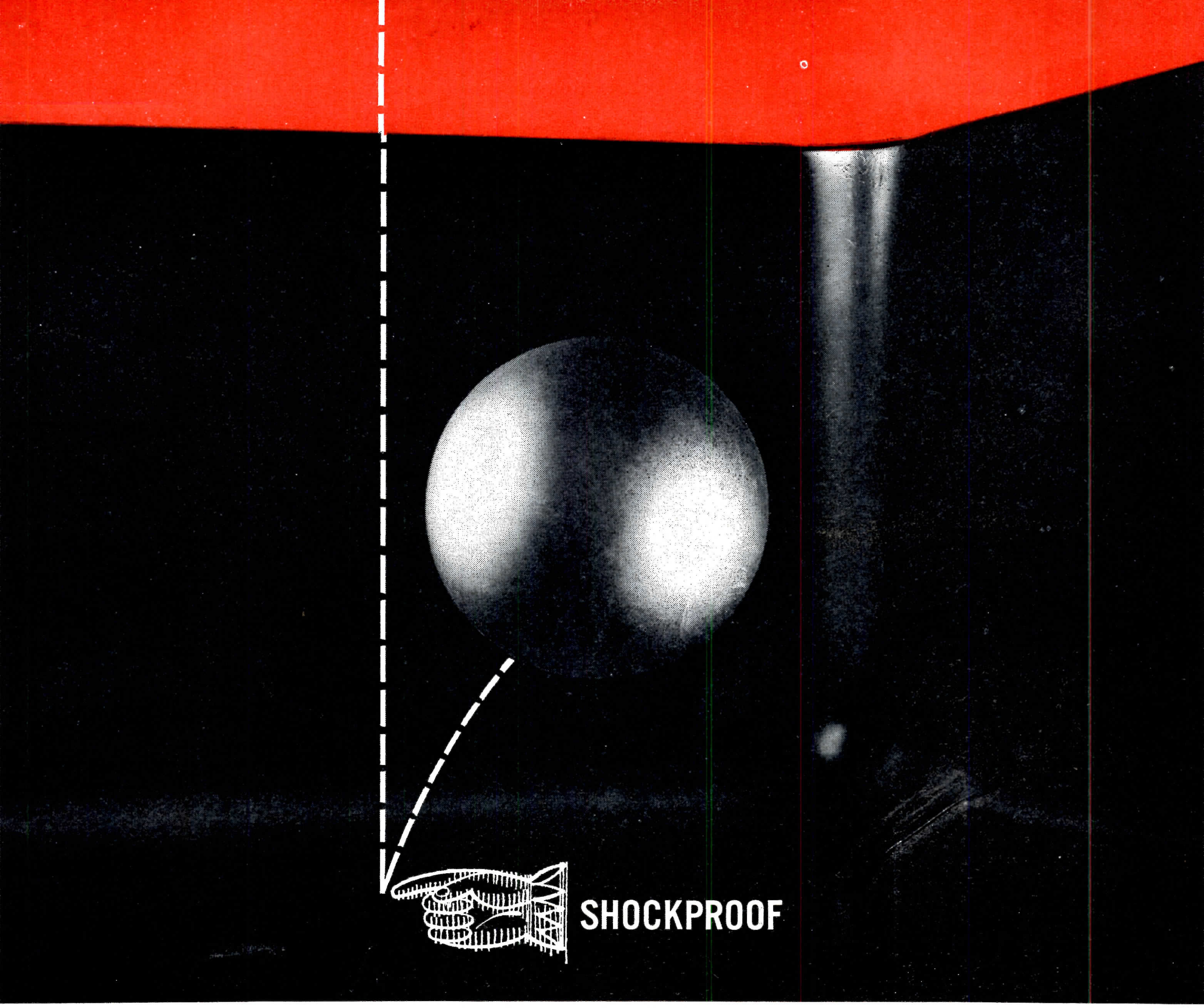

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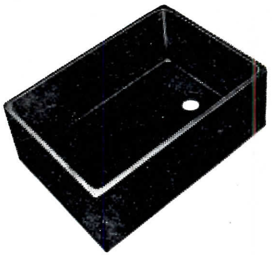

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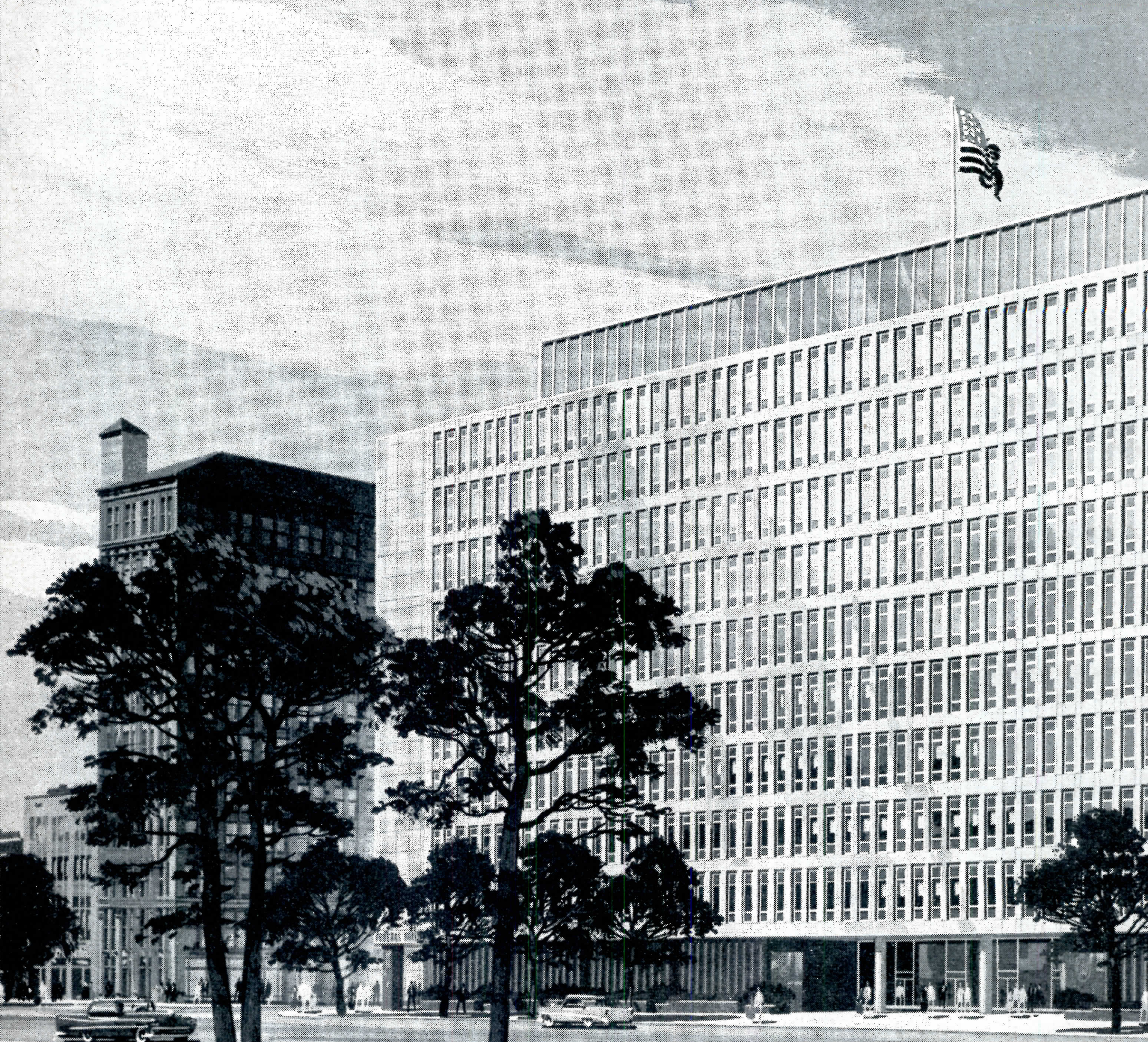

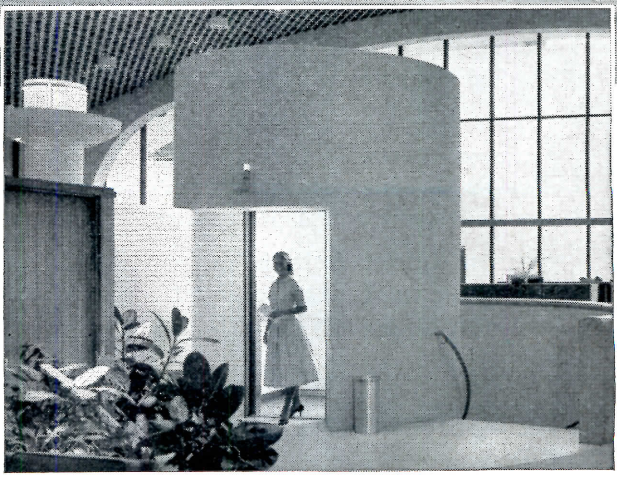

ABOVE
Federal Office Building, Cincinnati, Ohio. To be equipped with 13 Dover high-speed elevators. **Architects and Engineers:** Potter, Tyler, Martin & Roth; Vogt, Ivers & Associates; Harry Hake and Harry Hake, Jr. **General Contractor:** J. W. Bateson Company, Inc., and J. W. Bateson Construction Company, Inc., Joint Venturers.

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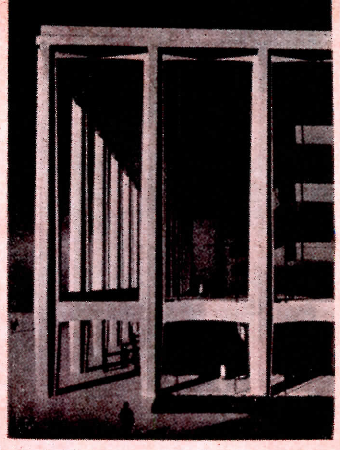
Architectural Engineering



Cover:

Philharmonic Hall, New York City.
Architect, Max Abramovitz. Photograph by Louis Checkman

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ARCHITECTURAL

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RECORD

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September 1962

Building Types Study 311: Hospitals

Coming in the Record

CITY ARCHITECTURE: A SERIES OF ARTICLES BY LEWIS MUMFORD

Few authors on few subjects would seem so significantly met as Lewis Mumford with the architecture of the city, and there can be few subjects—perhaps none—of greater relevance to architects in our time. Next month, "The Disappearing City," first article of a series.

SCHOOLS, AND WHAT'S NEW WITH "AUDITORIUMS"

The quotation marks will be understood by all architects involved in school design, because these days there are not only many new concepts but a clutch of new names for spaces which once would have been easily recognizable as, and called by no other name than, auditorium. In the Building Types Study on schools next month, an architect, an architectural researcher and a systems design authority cover current principles and practice in design of auditoriums, their newest uses as instructional spaces and the related design possibilities opened up by new developments in equipment. Examples are schools whose facilities range from "forum" to "cafetoria"—to auditorium.

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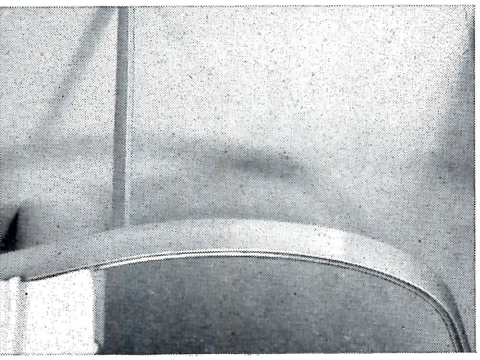

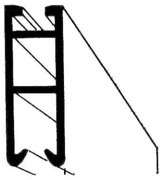

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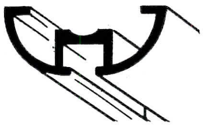

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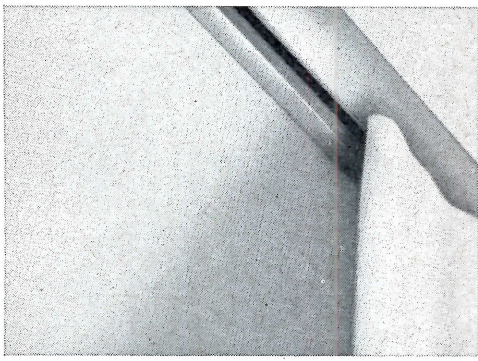
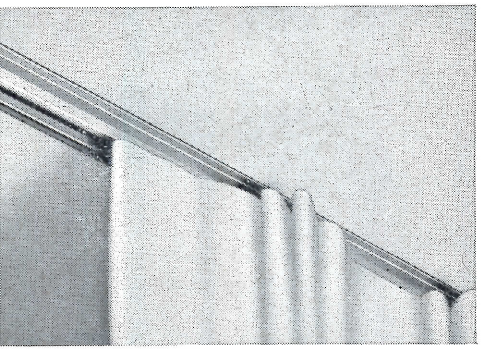
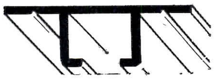
Features ingenious mounting levers which are attached to ceiling first, then swung out-of-sight to lock track in place. May be curved.







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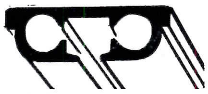

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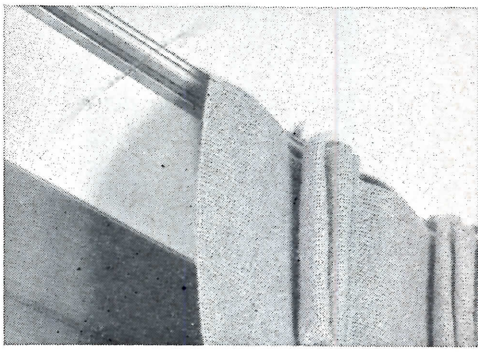

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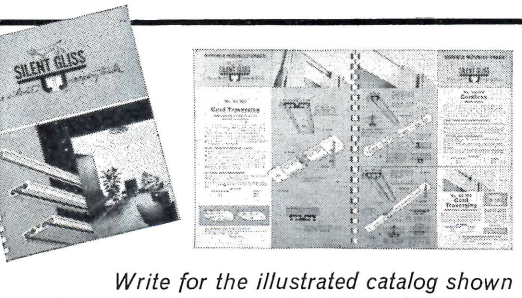

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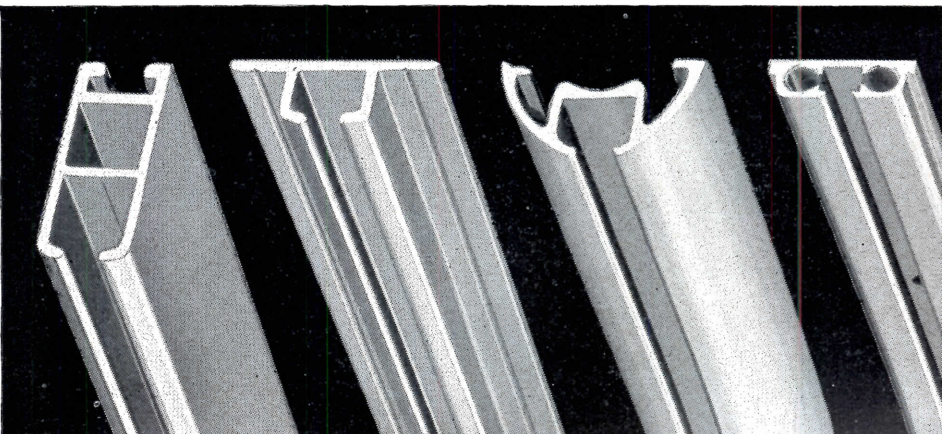


Design-Oriented Education

In its preoccupation with the expanded role of the architect, the American Institute of Architects has assigned an *ad hoc* committee to look into the implications for the education of architects. Obviously architects are not going to gain new status merely by asking for it: increased competence will have to be the basis for any forward steps.

One of the members of that committee has campaigned for years for some way to attract more and better trained engineers to the building field. He is Robert Hastings, head of the huge architect-engineer organization of Smith, Hinchman & Grylls of Detroit (and an editorial consultant to the ARCHITECTURAL RECORD staff). He points out that other scientific and engineering fields are more lucrative and more glamorous than building design, and that at least we should be able to offer more recognition than we now do to boys who might choose the technical side of building design, be they engineering or architectural students. He has argued for the architectural-engineering type of education in the hope of developing a new group of technically competent building designers.

Others have pointed out that no engineering students are specifically trained for building design, and that architectural students cannot be expected to study technical subjects as an engineering student should. It is difficult for architectural students to take courses taught by engineering faculties because they need an architect's view of the material rather than an engineer's.

Now comes another member of the A.I.A.'s *ad hoc* committee on education with a still more radical proposal: the training of engineers for building design by the architectural faculty. He is Dean G. Holmes Perkins of the University of Pennsylvania, who offered his suggestion in a speech before the Royal Architectural Institute of Canada. He bases the idea on the importance of a dedication to design:

"The essence of his (the architect's) professional contribution to society is and should remain his unique dedication to creative design. . . . The change in architectural education which we anticipate lies not in any change in the basic creative orientation of the profession but in the expanded areas of service where he will be expected to exercise design leadership. Several professions quite properly claim a special competence in portions of the field. A school for architects can no longer confine itself to those traditional skills required for professional registration which reflects only too devastatingly the state of the profession of ten years ago. We must prepare the student for his role tomorrow. The first essential is the maintenance of leadership in design."

How educate for such leadership?

"The corollary to this proposition is that all those contributing to the design of the urban environment should be educated by a single faculty embracing all the needed skills. Under such a design-oriented faculty the planner, the architect, the landscape architect, the artist and those structural and mechanical engineers who are concerned with buildings can receive a sounder and more mutually rewarding education. They will learn from one another by working together in preparation for professional collaboration in practice."

He continues: "A creative attitude must prevail in all the parts—from the design of a city to that of a structural system. Under the umbrella of a single faculty dedicated to the design of the total urban environment, programs in landscape, in structural and mechanical engineering, in art, in planning, and in architecture will all contribute their share to the common cause. The fragmentation prevailing today fails to attract good candidates in several areas—notably in engineering, where the more talented are seduced by the glamour and high rewards in rocketry and electronics. The new faculty with its emphasis on creativity can bring a heightened prestige to all the design professions."

—Emerson Goble

STUDY OF WASHINGTON SKYLINE WOULD SET DESIGN OBJECTIVES FOR FUTURE DEVELOPMENT

What seems likely to be the most intensive analysis in history of a city skyline will be undertaken in Washington, D.C., in a study planned for the next year by the National Capital Planning Commission in cooperation with the Commission of Fine Arts.

Purpose of the study, as defined by Morton Hoppenfeld, urban designer of the N.C.P.C., is "to evaluate the present and potentially committed skyline toward the establishment of design objectives for future development."

In a report which will be the basis of the study, Mr. Hoppenfeld noted that, as the U.S. capital, Washington should have a skyline of "a quality unique in the United States if not in the world" and added that "special attention will be given to the pre-eminence in the skyline of the Capitol dome, the Washington Monument and the Lincoln Memorial, and their relation to the rest of the city."

The report also discussed the significance of the skyline in the city-planning-building process generally:

"Traditionally, the skyline is considered at the city scale; that is, the total skyline, or at least portions which, in the consensus of the beholders, represent the essence of the city. This is undoubtedly the most important aspect of the skyline. However, there are others. Each street, sector and district of the metropolis has its own skyline, which has served to evoke local loyalties and a sense of belonging.

"The city's skyline inevitably serves to state symbolically its essential character, scale and communal values. The skyline of each street, sector and district serves in a similar way to give focus and orientation and to state the nature of the immediate environment. Both at the macro-scale of the metropolis and at the micro-scale of the neighborhood, the skyline serves as a basic aspect of the image of the community in the minds of the beholders.

"Reading the skyline, as we all do daily (consciously or unconsciously), is one of the principal ways in which we gain intelligence about our city. The skyline, combined with other visual aspects, special streets, pathways, places, landmarks, etc., is a structuring element of city design. As part of our way of perceiving our environment, it is subject to esthetic response. When the skyline is consistent with everything we think and feel about a place, it gives us pleasure; when it is inappropriate, it disturbs us.

"If we can accept the traditional concept of the skyline as a manifestation of other urban phenomena and values, then it cannot be studied abstractly or in isolation. It should be noted here, however, that the skyline is not conceived only as a product of other forces. In the design of the city, apparent form is of prime consideration. As the situation warrants, the visual aspect might well dominate the other determinants of urban form."

Elements of the study were outlined as follows:

1. A visual survey of the existing skyline—primarily photographic, but supported by maps and analytical sketches.

2. An analytical study of topographical features and present zoning criteria intended to produce a picture of "the present *potential skyline*."

3. Careful and continuous consideration in the evolution of the comprehensive plan of "the skyline as both product and objective."

4. Articulation of skyline implications in special area plans as they are developed.

5. Special skyline design studies, at various scales and points of view, to establish formal objectives.

LUCKMAN IS U. S. CHOICE FOR NEW YORK FAIR

After months of Congressional foot-dragging, the U. S. last month had $17 million to finance its participation in the 1964 New York World's Fair and in rapid succession named a commissioner and an architect.

The commissioner is Norman K. Winston of New York, chairman of the board of Winston-Muss Corp., volume builders of houses and apartment buildings; and the architect is Charles Luckman Associates of Los Angeles and New York.

Theme of the U. S. exhibit is "Challenge to Greatness" and the pavilion to house it will contain 190,000 sq ft of exhibit space and will be erected on a circular site of four and a quarter acres.

Mr. Winston's assignment is to supervise development of a pavilion that represents "significant American contributions to art, science, industry and culture," and he pledged his best efforts to creation of an exhibit which will describe for the world "the benefits of our way of life."

And Mr. Luckman said of his commission: "We recognize this as both an opportunity and an obligation. To fulfill this obligation, we are in the process of developing a unique design concept which we hope and believe will be worthy of the appointment."

More specific information there was not—at least for release—at press-time.

Responsibility for Federal participation in the Fair has been assigned by President Kennedy to the Department of Commerce, with the General Services Administration to supervise design and construction.

THREE ENTRIES SHARE TOP PRIZE IN THIS YEAR'S RUBEROID AWARDS

For the first time in its history, the Annual $25,000 Architects' Competition sponsored by the Ruberoid Company divides its three major national awards totaling $17,500 equally among three entries (shown across-page). All four winners of the three grand awards are connected with architectural education, three being 1962 graduates of architectural schools while the fourth is a university professor.

On the jury were Chairman Edmund Bacon, A.I.A., executive director, Philadelphia City Planning Commission; Vernon Demars, A.I.A., San Francisco; James J. Hurley, chairman, Taylor-Hurley Associates, Inc., New York; Ralph Rapson, A.I.A., head, School of Architecture, University of Minnesota; William L. Slayton, commissioner, Urban Renewal Administration, Washington. B. Sumner Gruzen, F.A.I.A, New York, served as professional adviser.

The jury of this fourth annual competition, which had 158 entries, felt the three grand award winners presented completely different approaches to the problem of urban renewal, which was this year's theme. They decided to give equal recognition to avoid the designation of any one as a pattern containing all the elements sought.

The problem involved a theoretical city whose former reason for growth—river bank textile mills—had vanished and whose present state was one of blight, with mixed factory and residential structures and a growing population based economically on a new industry—electronics. Located at the center of an expanding urban sprawl, the area was to become the city's heart. Entries were to develop the site by providing all major facilities and environment for living, working, culture and recreation in balanced quantities for residents there and also to provide various activities to benefit people throughout the region. This meant residences for at least 5,000 families, including housing for the elderly, offices, shopping areas, a community college, expansion of an existing hospital and full recreational facilities.

In addition to the three national grand award winners, *national merit* awards of $500 went to: Minoru Takeyama, Pratt Institute, Brooklyn; Herman F. Goeters, J. D. F. Boggs Jr. and Robert F. Lindsey, Goeters, Boggs & Associates, Houston; Jan Lubicz-Nycz, Marquis & Stoller, San Francisco; John D. Dyer, Thomas S. Marvel and John W. Shenefield, Harvard Graduate School of Design, Cambridge, Mass.; Jean-Michel Charnet, Murphy & Mackey, Architects, St. Louis; and Joseph L. Young and F. Kempton Mooney, Lyles, Bissett, Carlisle & Wolff, Columbia, S.C.

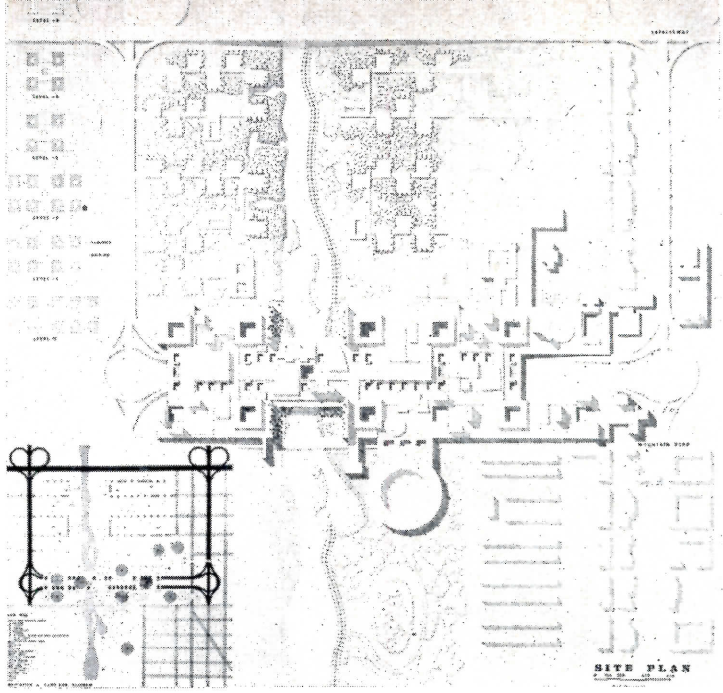
Student first prize design is shown below. Second prize of $1000 went to Michael Marczuke, University of Minnesota; $500 third prize, to Daniel E. Green and Eugene J. Mackey, Washington University, St. Louis; $250 merit awards, to Jay Barton Walter, Edward Richard Nile, Duk Won Lee, Melvin Leon Ford, University of Southern California; Terrence Andrew McCormick and Ilmar Reinvald, University of Illinois; Elam L. Denham, Tadeusz M. Janowaski, Donald E. Sporleder, R. Alan Forrester, Anthony Pellecchia, Ilmar Reinvald, University of Illinois; Richard A. DeVine and H. Stow Chapman, University of Illinois.

$2,000 FIRST STUDENT PRIZE: Edward Z. Jacobson and Kenneth Schwarz, Carnegie Institute of Technology

"This design has a rich variety of building types through which are distributed institutions. It has a richness of urban spaces and a human urban quality. An eminently practical project to build and possibly economically feasible. The design demonstrates considerable maturity at the student level in terms of solving in a very practical way a very difficult urban problem"

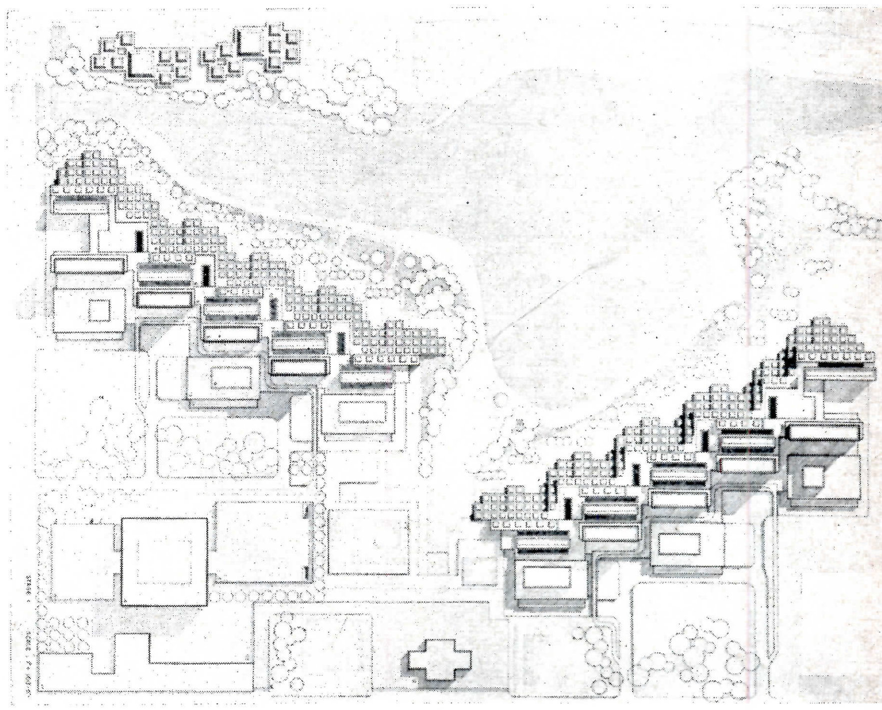
GRAND AWARD: Stephen N. Abend, Washington University, St. Louis

". . . Boldly experimental . . . urban . . . very clear, sharp, big circulation pattern that leaves interior circulation relatively free of over-all circulation. Presents interesting idea of raising automobile parking off the ground, leaving land free for living and playing. Clear separation between rigid discipline of urban core and fairly free treatment of residential areas is important. Its incorporation of small industry in residential section, presumably with the walk-to-work idea, is noble and should be tried in practice"



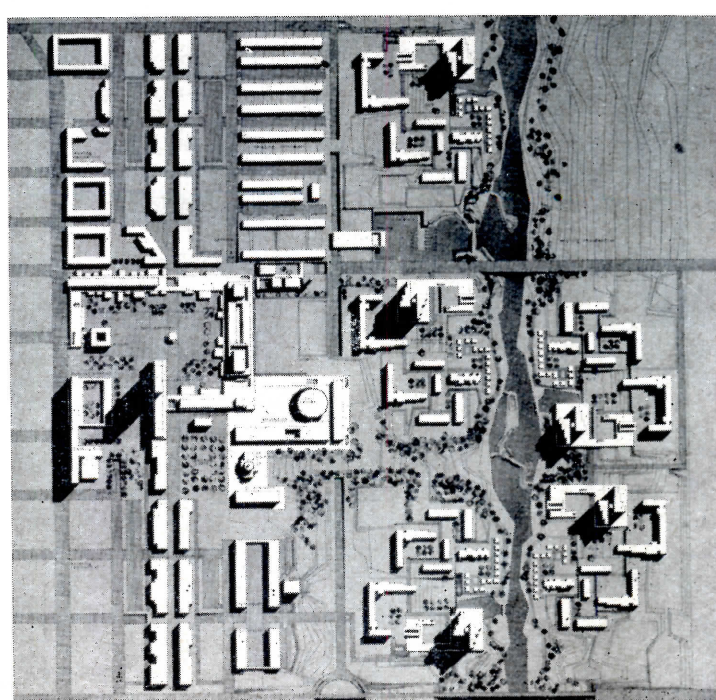
GRAND AWARD: Ralph L. Knowles, professor, Auburn University

"One of the very few solutions derived from the broad regional aspect of the natural topography rather than imposition on the land of arbitrary preconceived architectural forms. Transition from irregular topography at edge of river to rigid demands of building technology on the city side is extremely well handled. Clear differentiation between what is nature in the park and what is related to man in the structure is an outstanding characteristic of the design. Handling of traffic and parking and truck service, while economically difficult, is imaginative as is also the intermixture of office space, retailing and manufacturing in the residential structure . . . a basically new solution to the problem"



GRAND AWARD: Stuart K. Neumann and Donald L. Williams, University of Illinois

"General skill of the whole design and the well-balanced study that has gone into the parts, unit plans; every aspect is particularly well presented. Grouping of communities and intermixture with each community of a considerable variety in living types from apartment houses to row houses is striking. This variation would not negate total concept of the design and therefore it is a design that could be staged. Its strong statement of clusters of housing with open space in between has great potential with many significant ideas that could be related to urban situations"



EIGHT CHURCHES CITED IN AWARDS

Eight churches won awards of merit at this year's 22nd National Conference of Church Architecture in Cleveland.

The three-day conference, attended by some 1,500 architects, artists and church men, was jointly sponsored by the Church Architectural Guild of America and the National Council of Churches' Department of Church Building, in cooperation with the Cleveland Chapter, American Institute of Architects, and the Cleveland Area Church Federation. The purpose of the conference was to stimulate creative and practical thinking on the basic relationship of architecture and planning to the needs of the church.

Architectural awards to the eight churches shown on these pages were given on the basis of "success in creating a contemporary religious affirmation."

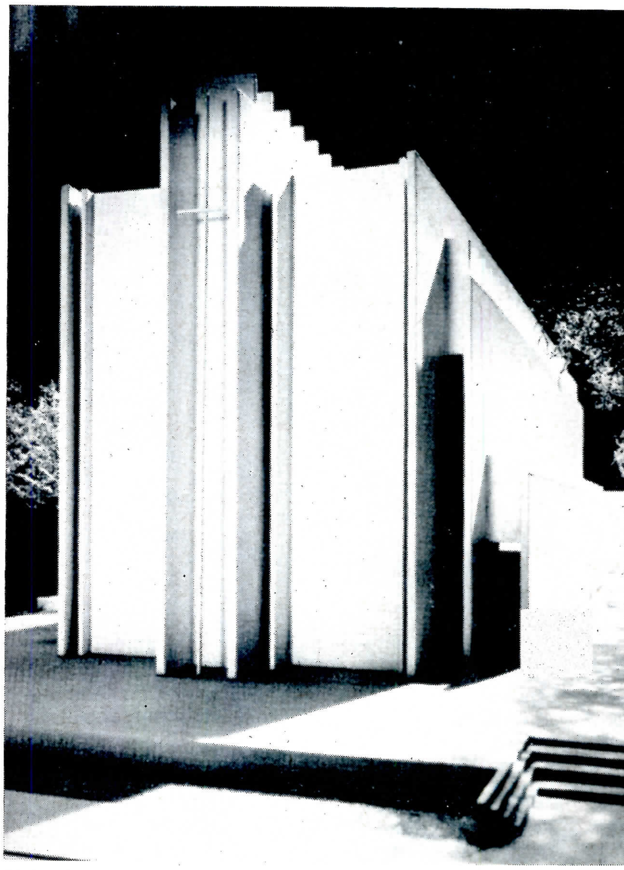
The jury which selected the eight from 152 exhibits submitted was composed of Rev. Dr. Hugh T. Kerr, professor of Systematic Theology, Princeton University; Dr. Robert Iglehart, chairman, Department of Art, University of Michigan; and Paul Hayden Kirk, F.A.I.A., Seattle.

"For a church building to express 'contemporary religious affirmation'," concluded the jury, "at least three requirements must be met: (1) authentic and meaningful symbolism as to what a church is and what it has to say in and to our culture; (2) functional, economical and imaginative use of material and technical skill; and (3) manifestation of a living tradition in forms that speak in a positive way to us today."

On Symbolism: " . . . There is no answer to what is most authentic or meaningful about religion today . . . The older symbols no longer speak with authority . . . The church building today cannot compete with office skyscraper, factory, or high-rise apartment building . . . Both architect and churchman are confronted with staggering problems of definition which cannot be easily decoded as they cannot be avoided or evaded. . . . In many areas besides religion and the church, the problem of contemporary life is to know how to affirm positively what is most surely believed. Religion and the church partake of our contemporary confusion and tend frequently to add to our perplexity instead of acting as a beacon of light. . . . Here is the assignment for church architect and building committee; here also is their evident responsibility and the possibility of their religious affirmation in the world today."

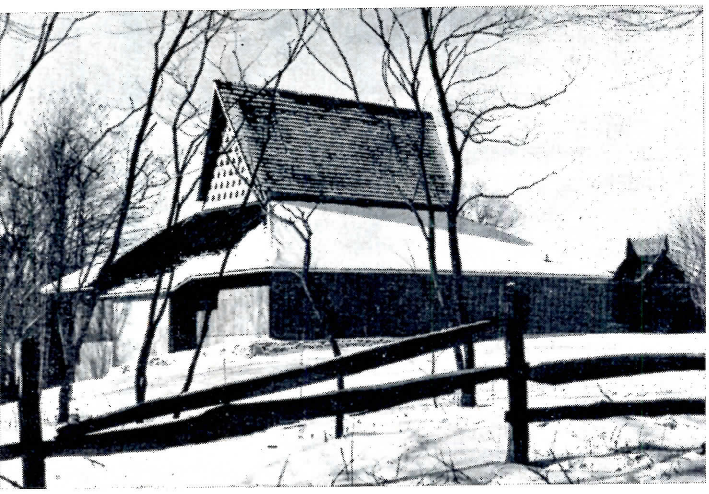
On Structures and Techniques: ". . . The jury felt the need for solutions of more intimate scale and relationship to the religious needs of the individuals. . . . The lack of proper regionalism reflecting climate and orientation was ever evidenced."

On Tradition: ". . . The life of a tradition is in the spirit of the forms and not in the particular forms of any past period. . . . The church, the congregation, the region, should each seek its own expression of its faith and purpose and function."

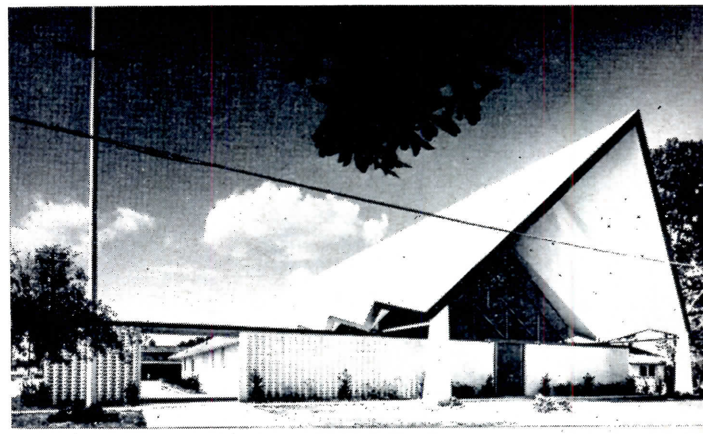


University Reformed Church, Ann Arbor, Michigan
Architects: Birkerts and Straub
"A simply organized, direct solution to a difficult site problem . . . interesting use of baffled light, good unity o

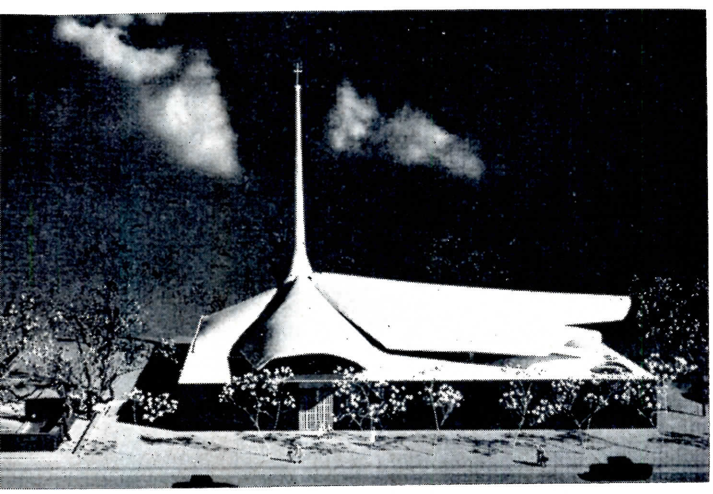
Westminster Presbyterian Church, Eugene, Oregon
Architects: Stewart and Richardson
"A fine simplicity of regional materials achieving both dignity and quiet. Excellent use of site . . ."



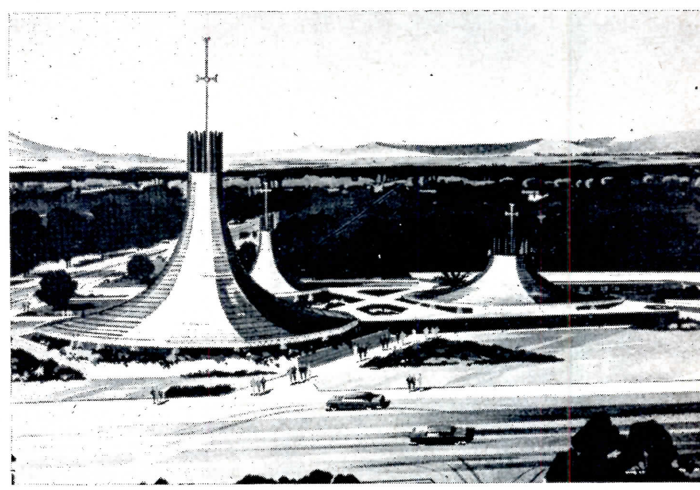
Community Church, Chesterland, Ohio
Architects: Herk Visnapuu and Robert C. Gaede
"A particularly fine exterior, fitting well into its rural setting, echoing without copying traditional rural forms"



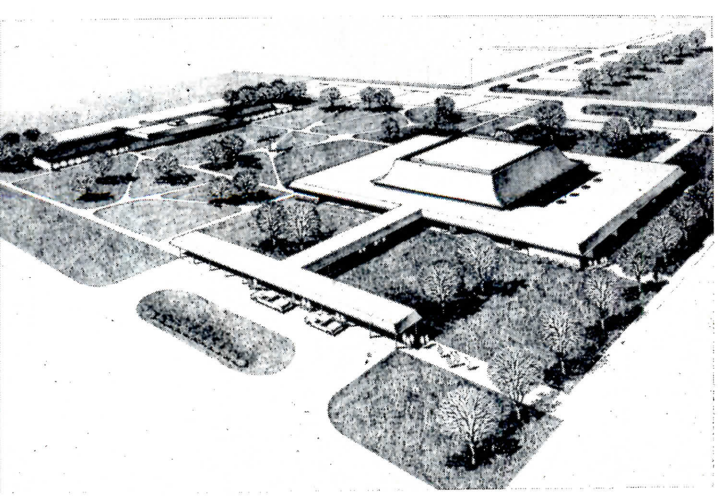
Immaculate Conception Church, Marrero, Louisiana
Architect: Curtis and Davis; assoc. architect, Harrison Schouest
"A structural expression providing dramatic, functional space . . . quiet, well-integrated chancel and sanctuary . . ."



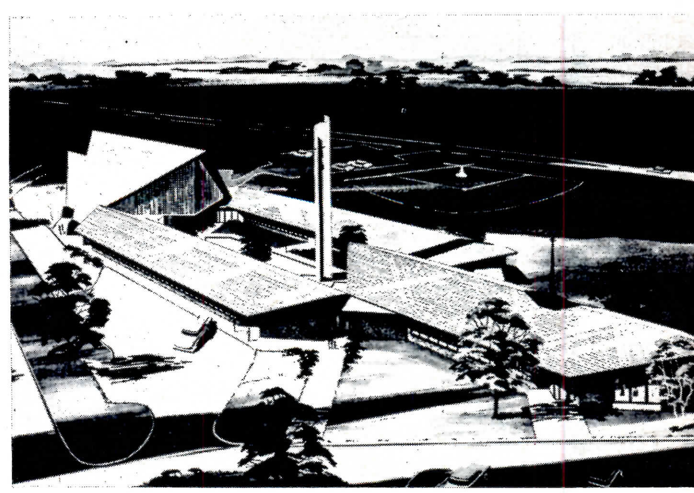
St. Francis Cabrini Roman Catholic Church, New Orleans
Architects: Curtis and Davis
"Inventive roof structure results in interesting interior forms, lighting. An effective integration of spire, roof and altar"



Scottsdale Congregational Church, Scottsdale, Arizona
Architect: W. D. Over
"An instance of ingenious regional expression which meets the symbolic requirement as well. A pleasant human scale . . ."

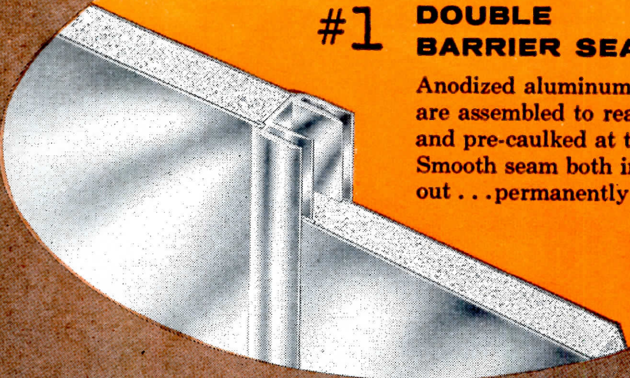


St. Anselm Roman Catholic Church, Chesterland, Ohio
Architects: Dalton, Dalton Associates
"Quiet, dignified plan echoes certain past forms without archaism . . . clear, simple relationship of parts"



Bethany Lutheran Church, Columbus, Ohio
Architects: Wright and Gillfillen
"A commendable effort to establish unity among a group of buildings by the use of a continuity of roof form"

DESIGNED TO MEE



#1 DOUBLE BARRIER SEAMS

Anodized aluminum extrusions are assembled to rear panel and pre-caulked at the factory. Smooth seam both inside and out . . . permanently leakproof.

#2 COVE CORNER INTERIOR

All four corners have 1" radii with no corner joint, crack or crevice. Can't harbor grime and germs—sanitary—easy to clean.

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THE COMMANDER

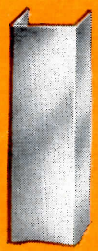
Check the five key values found only in the new *COMMANDER* shower by *Fiat* and you'll find the answer to long-life, good appearance and low maintenance for shower rooms in school, college, club, industry and institution.

Just three factory-fabricated sections (plus headrail) complete the *Commander Cabinet* which erects on the widely used and approved *Fiat PreCast Terrazzo Floor*. Actual tests prove the *Wonderwall Commander* to be many times faster and much easier to erect than any conventional shower. Labor saving drastically reduces total installed cost.

Unlimited design and service requirements are satisfied by three models. Each model available in stainless steel, baked enamel or a combination. For complete information on the *Commander* write for copy of the new PLAN BOOK, or see Sweet's $\frac{26c}{Fi}$.

#3 *WONDERWALL* SANDWICH PANEL

Full inch of expanded polystyrene is permanently bonded between two sheets of rust-proofed metal. Temperatu changes, high humidity, boilin water, soaps, alcohol or detergents are daily duties the Commander handles in stride.

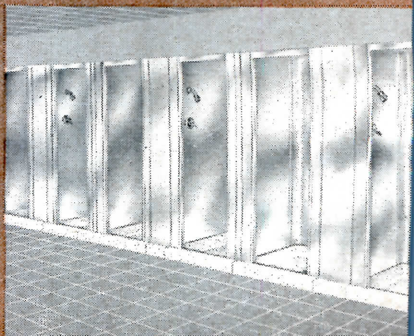


#4 STAINLESS PILASTER CAP

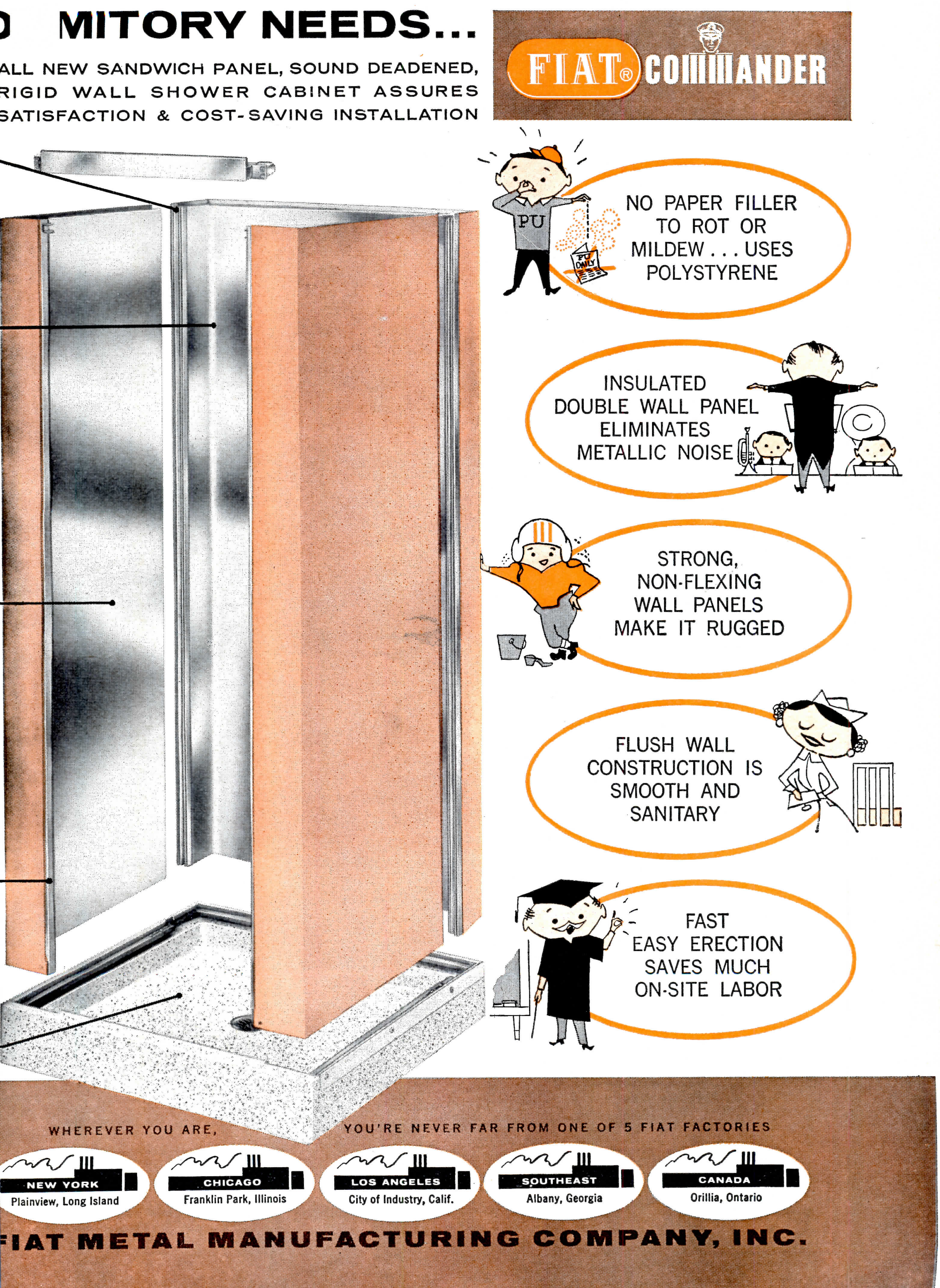
Added service and neat appearance maintained by factory applied stainless steel cap running the entire length of pilaster.

#5 DEEP TERRAZZO FLOOR

Permanently leakproof and sanitary; high shoulders keep wall joints well above water level. Stainless steel connecting flange and brass drain cast integral.



The rigid, rugged **Commander** cabinet combines with **Fiat** Dressing Enclosures as single units or in battery arrangements to provide added convenience and privacy. (Enclosures not illustrated.)



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STRONG, NON-FLEXING WALL PANELS MAKE IT RUGGED
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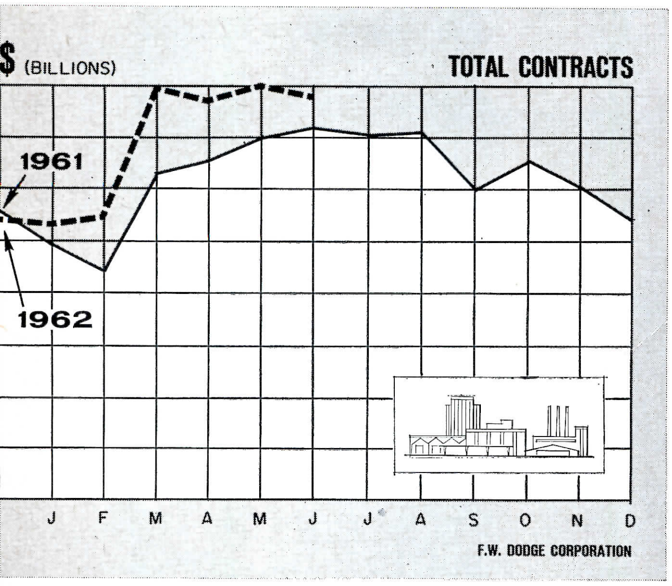
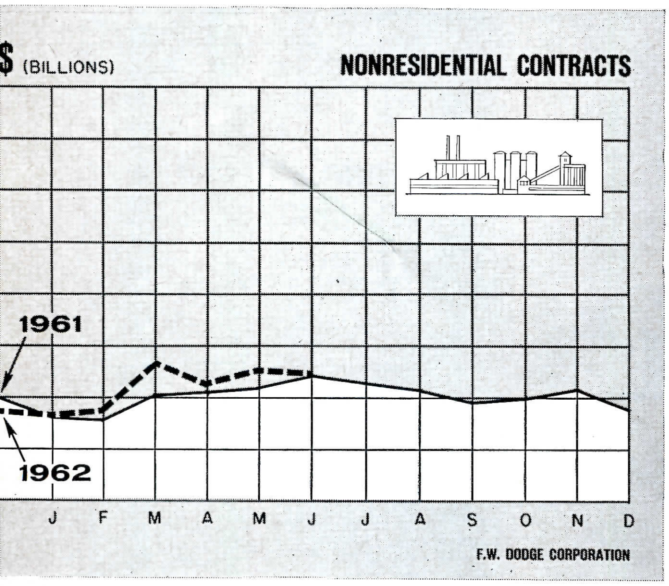
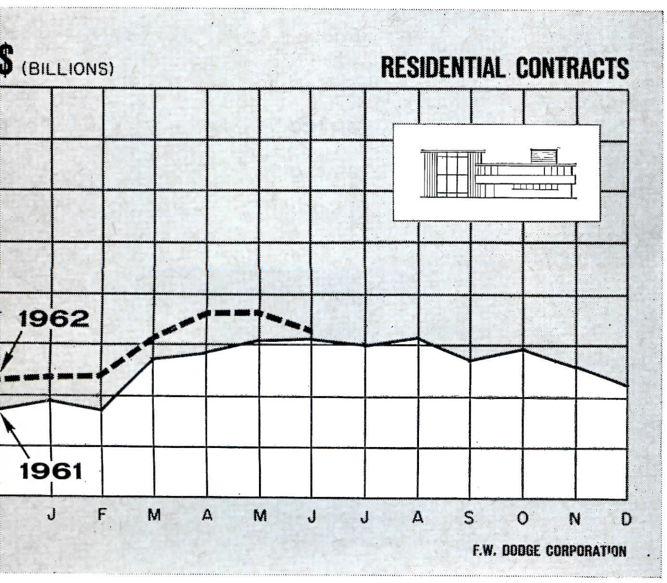


Total contracts include residential, nonresidential, heavy engineering contracts





HOSPITALS EXPECTED TO SET NEW RECORD IN 1962

KEEPING UP with our exploding population's need for hospital facilities in the postwar period has been a big undertaking. Since 1945, more than 1600 new hospitals have been added to the nation's stock, and most of the 7800 hospitals then in operation have been enlarged greatly. Much of this building took place in the late Forties when, in an unprecedented spurt of activity, the rate of hospital construction better than quintupled during the first five postwar years. The peak rate set back in 1950 was not reached again until just last year as the second wave of hospital building gathered momentum. With the volume of work contracted for in the first six months of 1962 as a guide, there is every indication that the current year will set a new record by a large margin.

Despite the net addition of over 400,000 beds, as well as a host of diagnostic and treatment facilities, the need for hospital services has kept up with construction in an alarming way. Where in 1946 we had eleven beds for every 1000 persons, today's count shows only ten. This traditional measuring rod is perhaps a bit misleading (for the present, at least) due to the extraordinary growth in the younger segment of our population, where need for hospital services is minimal. Even so, the high birth rates of the Fifties put a severe strain on maternity facilities. By another standard there has been some slight improvement. Compared with 1950, the present proportion of beds to *patients* is fractionally higher even though the average number of persons hospitalized —currently about 1.5 million on an average day—has climbed steadily. Another important factor, helping to make existing capacity go farther, has been the reduction in the average length of stay at the hospital.

HOSPITAL BUILDING at mid-1962 is almost 20 per cent ahead of last year's record pace. The Western and North Central states are providing most of the current expansion as both these regions topped six-months-1961 contract awards by about 50 per cent. The Middle Atlantic states, on the other hand, are lagging behind last year's volume of construction by more than one third.

MANY CONTINUING developments point the way to further expansion of hospital construction in the years ahead. The achievements of past years have served well to hold the line against the rapidly expanding need for hospital services. Our increasing numbers and a more intensive use of hospitals made possible by rising real incomes and medical insurance have all but cancelled out the capacity added since the war. Substantial deficiencies continue to exist at the present, particularly in the areas of specialized hospitals for mental patients and the chronically ill. Obsolescence is another factor to contend with. It is estimated that no less than 20,000 hospital beds should be replaced each year. The highly predictable growth in the number of persons at advanced ages, whose medical needs are twice those of younger persons, will further intensify the per capita demand for hospital facilities. As for the hospitals themselves, the trend toward semi-private care continually requires a greater porportion of floor space per patient. To ease the pressure of such inflexible forces will require continued high levels of hospital construction.

GEORGE A. CHRISTIE, *Economist*
F. W. Dodge Corporation
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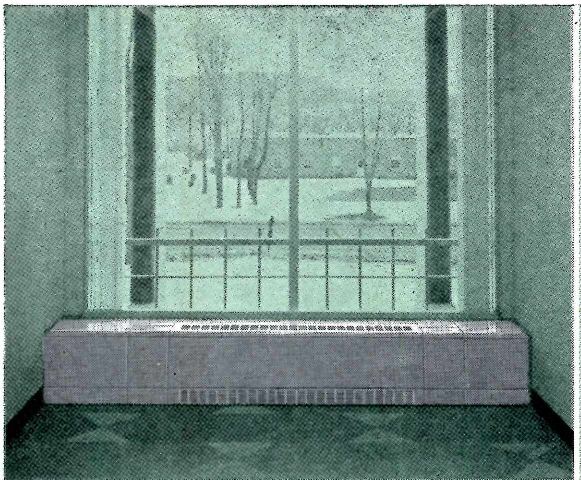

Laboratory and Engineering Offices, Perkin-Elmer Corporation, Norwalk, Conn. Architect: Caproni Associates, New Haven. Consulting Engineer: Hill and Harrigan, New Haven. Mechanical Contractor: Foskett and Bishop Co., New Haven. McQuay Representative: Eskola Air Equipment Co., New Haven.

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For more data, circle 202 on Inquiry Card

Construction Cost Indexes

Presented by Clyde Shute, Director of Statistical Policy, Construction News Div., F. W. Dodge Corp., from data compiled by E. H. Boeckh & Assoc. Inc

Labor and Materials: U.S. average 1926-1929=100

NEW YORK

PERIOD	RESIDENTIAL Brick	RESIDENTIAL Frame	APTS., HOTELS, OFFICE BLDGS. Brick and Concrete	COMMERCIAL AND FACTORY BLDGS. Brick and Concrete	COMMERCIAL AND FACTORY BLDGS. Brick and Steel
1935	93.8	91.3	104.7	108.5	105.5
1939	123.5	122.4	130.7	133.4	130.1
1949	243.7	240.8	242.8	246.6	240.0
1950	256.2	254.5	249.5	251.5	248.0
1951	273.2	271.3	263.7	274.9	271.8
1952	278.2	274.8	271.9	265.2	262.2
1953	281.3	277.2	281.0	286.0	282.0
1954	285.0	278.2	293.0	300.6	295.4
1955	293.1	286.0	300.0	308.3	302.4
1956	310.8	302.2	320.1	328.6	324.5
1957	318.5	308.3	333.1	345.2	339.8
1958	328.0	315.1	348.6	365.4	357.3
1959	342.7	329.0	367.7	386.8	374.1
1960	351.6	337.2	377.7	395.8	380.6
1961	362.5	343.0	398.2	422.4	397.0
April 1962	369.0	346.8	411.0	437.5	410.0
May 1962	369.0	346.8	411.0	437.5	410.0
June 1962	370.4	347.4	412.9	440.9	411.2
	% increase over 1939				
June 1962	199.9	183.8	215.9	230.5	216.1

ATLANTA

PERIOD	RESIDENTIAL Brick	RESIDENTIAL Frame	APTS., HOTELS OFFICE BLDGS. Brick and Concrete	COMMERCIAL AN[D] FACTORY BLDGS. Brick and Concrete	COMMERCIAL AN[D] FACTORY BLDGS. Brick and Steel
1935	72.3	67.9	84.0	87.1	85.
1939	86.3	83.1	95.1	97.4	94.
1949	189.3	189.9	180.6	180.8	177.
1950	194.3	196.2	185.4	183.7	185.
1951	212.8	214.6	204.2	202.8	205.
1952	218.8	221.0	212.8	210.1	214.
1953	223.0	224.6	221.3	221.8	223.
1954	219.6	219.1	233.5	225.2	225.
1955	225.3	225.1	229.0	231.5	231.
1956	237.2	235.7	241.7	244.4	246.
1957	241.2	239.0	248.7	252.1	254.
1958	243.9	239.8	255.7	261.9	262.
1959	252.2	247.7	266.1	272.7	273.
1960	259.2	253.3	274.7	282.5	278.
1961	256.7	249.7	275.8	284.5	275.
April 1962	261.3	254.7	280.0	289.1	278.
May 1962	261.3	254.7	280.0	289.1	278.
June 1962	261.9	255.3	281.1	289.8	279.
	% increase over 1939				
June 1962	203.5	207.2	195.6	197.5	195.

ST. LOUIS

PERIOD	RESIDENTIAL Brick	RESIDENTIAL Frame	APTS., HOTELS, OFFICE BLDGS. Brick and Concrete	COMMERCIAL AND FACTORY BLDGS. Brick and Concrete	COMMERCIAL AND FACTORY BLDGS. Brick and Steel
1935	95.1	90.1	104.1	108.3	105.4
1939	110.2	107.0	118.7	119.8	119.0
1949	221.4	220.7	212.8	215.7	213.6
1950	232.8	230.7	221.9	225.3	222.8
1951	252.0	248.3	238.5	240.9	239.0
1952	259.1	253.2	249.7	255.0	249.6
1953	263.4	256.4	259.0	267.0	259.2
1954	266.6	260.2	263.7	273.3	266.2
1955	273.3	266.5	272.2	281.3	276.5
1956	288.7	280.3	287.9	299.2	293.3
1957	292.0	283.4	295.2	307.1	302.9
1958	297.0	278.9	304.9	318.4	313.8
1959	305.4	296.4	315.0	329.8	323.9
1960	311.4	301.0	322.2	337.2	329.2
1961	315.1	302.0	329.0	346.8	332.2
April 1962	320.8	306.3	338.7	357.7	339.5
May 1962	323.6	308.9	342.4	361.9	343.3
June 1962	323.6	308.9	342.4	361.9	343.3
	% increase over 1939				
June 1962	193.6	188.7	188.4	202.1	188.5

SAN FRANCISCO

PERIOD	RESIDENTIAL Brick	RESIDENTIAL Frame	APTS., HOTELS OFFICE BLDGS. Brick and Concrete	COMMERCIAL AND FACTORY BLDGS. Brick and Concrete	COMMERCIAL AND FACTORY BLDGS. Brick and Steel
1935	89.5	84.5	96.4	103.7	99.
1939	105.6	99.3	117.4	121.9	116.
1949	213.0	207.1	214.0	219.8	216.
1950	227.0	223.1	222.4	224.5	222.
1951	245.2	240.4	239.6	243.1	243.
1952	250.2	245.0	245.6	248.7	249.
1953	255.2	257.2	256.6	261.0	259.7
1954	257.4	249.2	264.1	272.5	267.2
1955	268.0	259.0	275.0	284.4	279.
1956	279.0	270.0	288.9	298.6	295.
1957	286.3	274.4	302.9	315.2	310.7
1958	289.8	274.9	311.5	326.7	320.8
1959	299.2	284.4	322.7	338.1	330.1
1960	305.5	288.9	335.3	352.2	342.
1961	308.7	290.2	345.1	362.9	350.2
April 1962	313.2	294.2	352.0	369.4	355.
May 1962	313.7	294.4	352.7	370.7	356.1
June 1962	313.7	294.4	352.7	370.7	356.1
	% increase over 1939				
June 1962	197.1	196.5	200.4	204.1	205.7

Cost comparisons, as percentage differences, for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.:

index for city A = 110
index for city B = 95

(both indexes must be for the same type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

$$\frac{110-95}{95} = 0.158$$

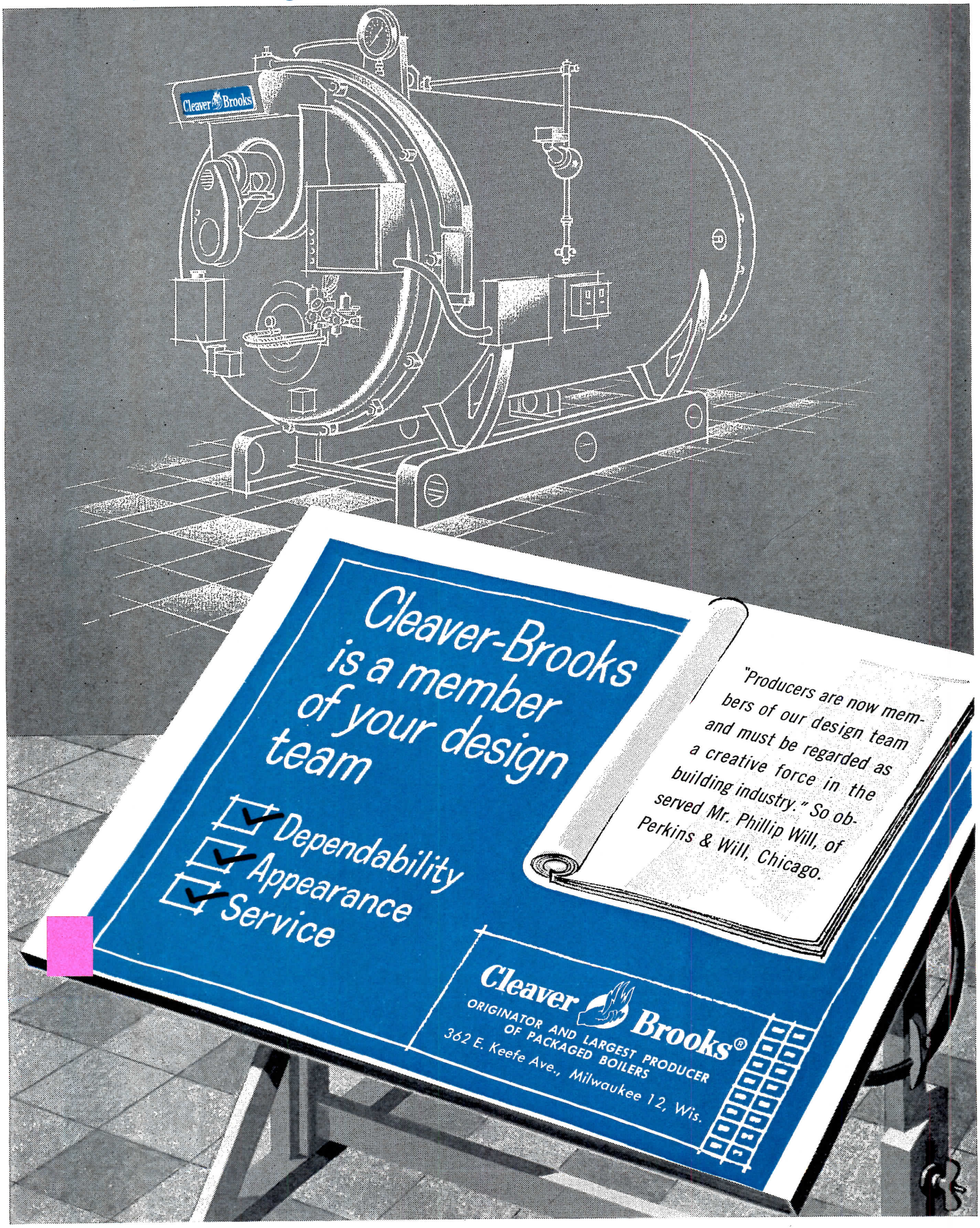
Conversely: costs in B are approximately 14 per cent lower than in A.

$$\frac{110-95}{110} = 0.136$$

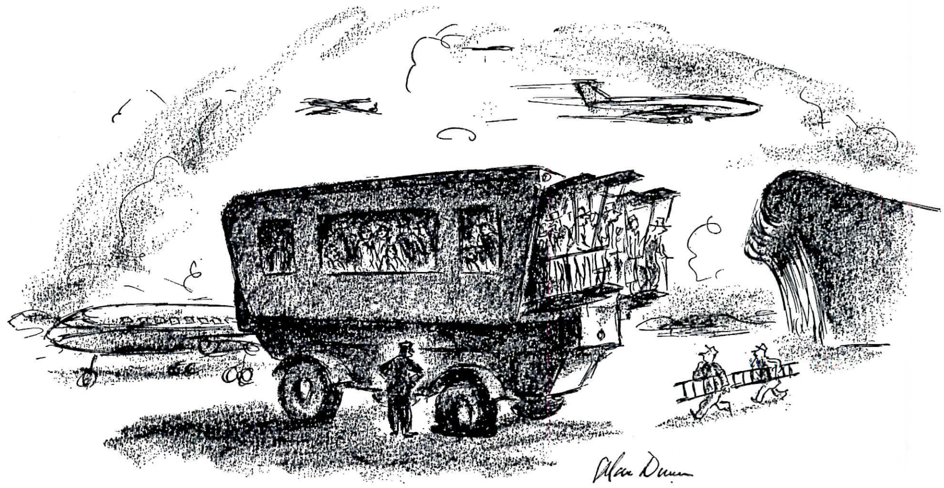
Cost comparisons cannot be made be[-] tween different types of constructio[n] because the index numbers for eac[h] type relate to a different U. S. aver[-] age for 1926-29.

Material prices and wage rate[s] used in the current indexes make n[o] allowance for payments in excess o[f] published list prices, thus indexe[s] reflect minimum costs and not neces[-] sarily actual costs.

Engineering Excellence stands out...



For more data, circle 9 on Inquiry Card



—*Drawn for the* Record *by Alan Dunn*

ARCHITECTS WANT PENN STATION SAVED, THEIR PICKET LINES HAVE PROVED IT: WHAT DOES PUBLIC INTEREST REQUIRE?

A most remarkable public demonstration of architectural concern over architectural history and its relation to the future of cities occurred in New York during the evening rush hour on August 2, when nearly 200 architects marched in organized picket lines in front of Pennsylvania Station to protest its imminent demolition.

Subway-bound city-dwellers and even the hustling commuters paused to gape at bright red and yellow and blue placards bearing such legends as "Stop Demolition—Save Penn Station"; "Don't Poison Penn"; "Save Your Great Station"; "Ban the Wreckers"; "Save Penn Station"; "Don't Amputate: Renovate"; "Be a Penn Pal"; "Save Face—Keep Penn in Place"; "Preserve Our Heritage"; etc., etc.

The picket lines walked in two long ellipses, and old friends kept meeting and greeting on their rounds, and often falling out for a while to chat; camaraderie joined high purpose, and there was a spirit rather like a Fourth of July combination of dedication and celebration. TV cameras and tape recorders were busy, and two of New York's amiable and noncommittal policemen watched over all.

Not the least remarkable aspect of this unique occasion was the roster of its participants, among them many leaders in the world of modern architecture—architect Philip Johnson, who once so eloquently defined it and now as eloquently creates it; Mrs. Eero Saarinen, one of the most gifted of writers on modern architecture and widow of one of its greatest practitioners; John Johansen of New Canaan; Ulrich Franzen of New York; Arthur Drexler of the Museum of Modern Art; and many others.

The demonstration was organized by the Action Group for Better Architecture in New York ("AGBANY"), an association of younger New York architects recently formed to advance the public purposes of architecture and planning. Not only preservation but prevention, and advocacy as well, are among the ultimate aims of the group, which has made the preservation of Penn Station its first great cause.

To this cause, AGBANY has been able to rally some distinguished support here and abroad. Besides those already named, non-member supporters include critic Lewis Mumford; August Heckscher, White House Special Consultant on the Arts; Chairman Paul Rudolph of Yale's Department of Architecture; pioneer modern architect J. J. P. Oud of The Netherlands; and editor Nikolaus Pevsner of the British *Architectural Review*.

For all the distinguished support, and for all the poignant bravura of the demonstration, it seemed possible that AGBANY's first cause would be a lost cause. The hope was for delay, any delay that might permit consideration of "alternatives"—might the Port of New York Authority be persuaded to buy Penn Station?—might the city be persuaded Penn Station should be preserved as the nucleus of a redevelopment area?

But the Pennsylvania Railroad in June had awarded the Turner Construction Company a contract for redevelopment of Penn Station and foundation work for the new Madison Square Garden Center to be built above it; plans for the Center were filed in July by the architect, Charles Luckman Associates; and construction was scheduled to start in early fall.

Only extraordinary political action could save Penn Station now: and only extraordinary evidence of extraordinary public interest could spur such action. What does the *public* interest require?

← For more data, circle 10 on Inquiry Card

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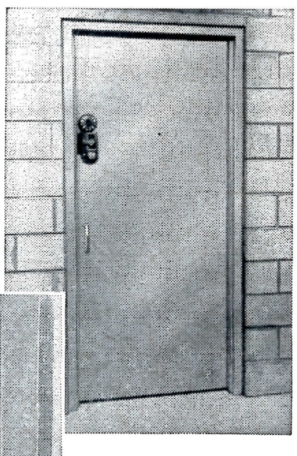
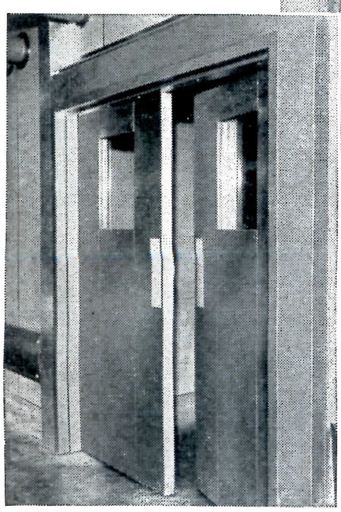
Ten Jamison DC Double Horizontal Sliding Doors help maintain 45° - 50°F. temperature and facilitate loading at Pfaelzer shipping dock. ▲

View from outside of shipping dock. ▶

Attractive, aluminum clad, uninsulated door opens to outside of building. ▶





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For more data, circle 11 on Inquiry Card ▶

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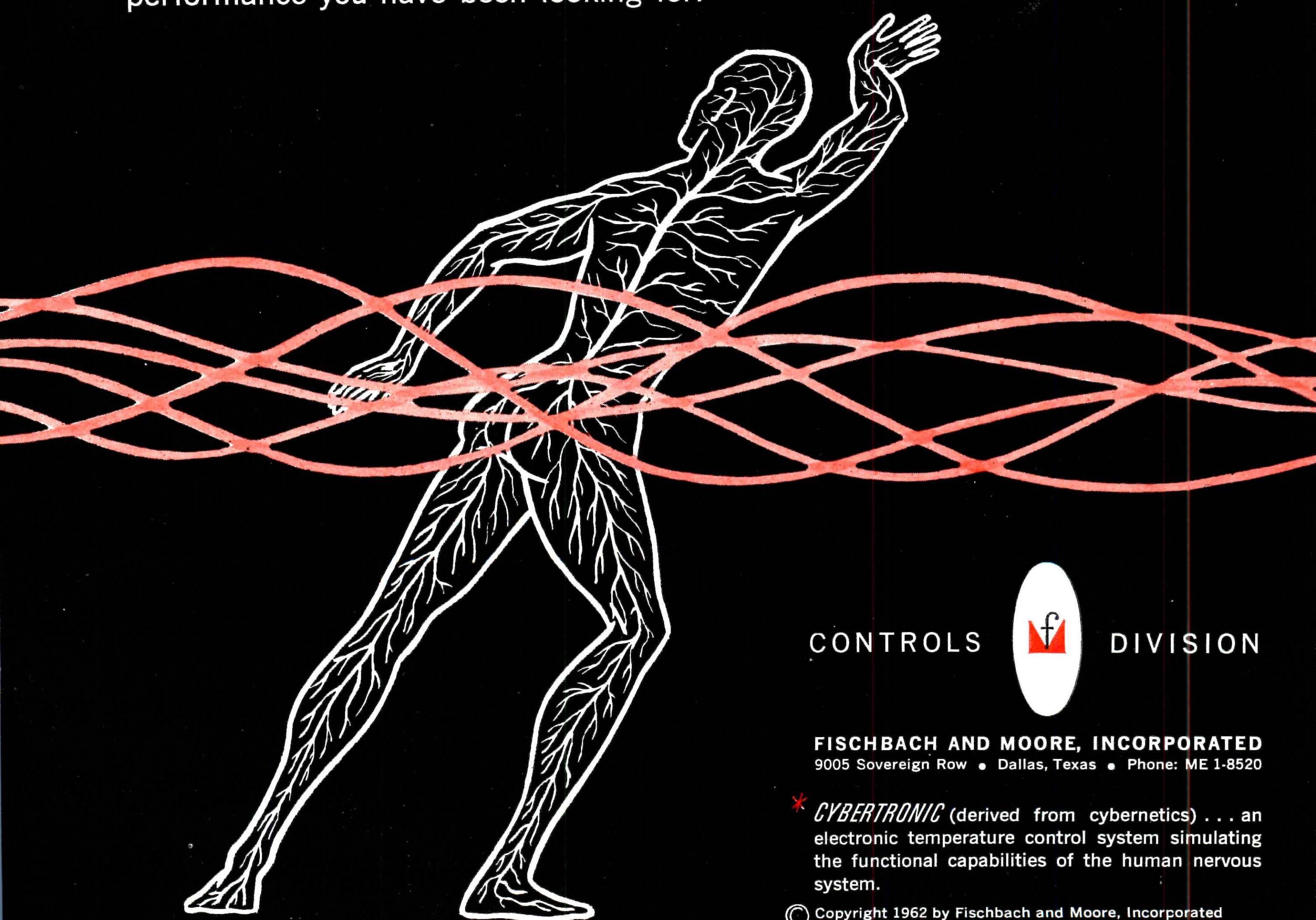

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* *CYBERTRONIC* (derived from cybernetics) . . . an electronic temperature control system simulating the functional capabilities of the human nervous system.

EDUCATIONAL BUILDING CONFERENCE URGES INTERNATIONAL INFORMATION CENTERS

Establishment of an international educational building center and three regional centers was recommended by the International Educational Building Conference held July 25-August 2 in London.

The centers would be focal points for dissemination of technical information and skills needed to implement the world's educational building programs, particularly those of the emerging nations.

The conference was held under the auspices of the United Kingdom National Commission for UNESCO, with advisory and financial assistance from UNESCO. Purpose was to consider how to share among the countries of the world the limited available resources of professional, technical and administrative skill; and to consider also the need for permanent machinery for international collaboration toward the most efficient and economic realization of educational building programs.

Three architects were on the six-man U. S. delegation headed by John L. Cameron, chief of the School Housing Section of the U.S. Office of Education. Delegates were: Henry L. Wright of Los Angeles, president of the American Institute of Architects; Alonzo J. Harriman of Auburn, Maine, chairman of the Schools and Educational Facilities Committee of the A.I.A.; John A. McLeod, A.I.A, of Washington, D.C.; Carroll W. McGuffey, assistant director of School Plant Administration of the Florida State Department of Education; and Harold B. Gores, president of Educational Facilities Laboratories, Inc., as the representative of the Ford Foundation, which was invited to send an observer.

The conference recommended that UNESCO take the necessary steps, in close consultation with the International Union of Architects, to create machinery "to secure the pro functioning of an international e cational building center."

The regional centers would be up in Bandung, Khartoum and M ico City, and their activities a those of national centers to be est lished later would be coordinated a implemented by the internatio center.

A commission studying creation a center to serve Europe and No America recommended delay until international center was in ope tion, and the conference accepted t recommendation.

U.S. delegates designated School Housing Section of the U Office of Education as the natio contact in this country with n centers elsewhere until the U.S. its own national center.

Recommendations of the conf ence will be considered by UNES at its November General Conferen

WORLD CONFERENCE ON SHELL STRUCTURES OPENS SEPTEMBER 30 IN SAN FRANCISCO

Architects and engineers from as many as 50 countries will be gathering this month in San Francisco for the World Conference on Shell Structures, to be held September 30-October 4 at the Sheraton-Palace Hotel.

Architect Oscar Niemeyer of Rio de Janeiro will be entering the U.S. for the first time in many years to speak at the conference. His and four other names were announced last month as additions to an already-impressive roster of speakers.

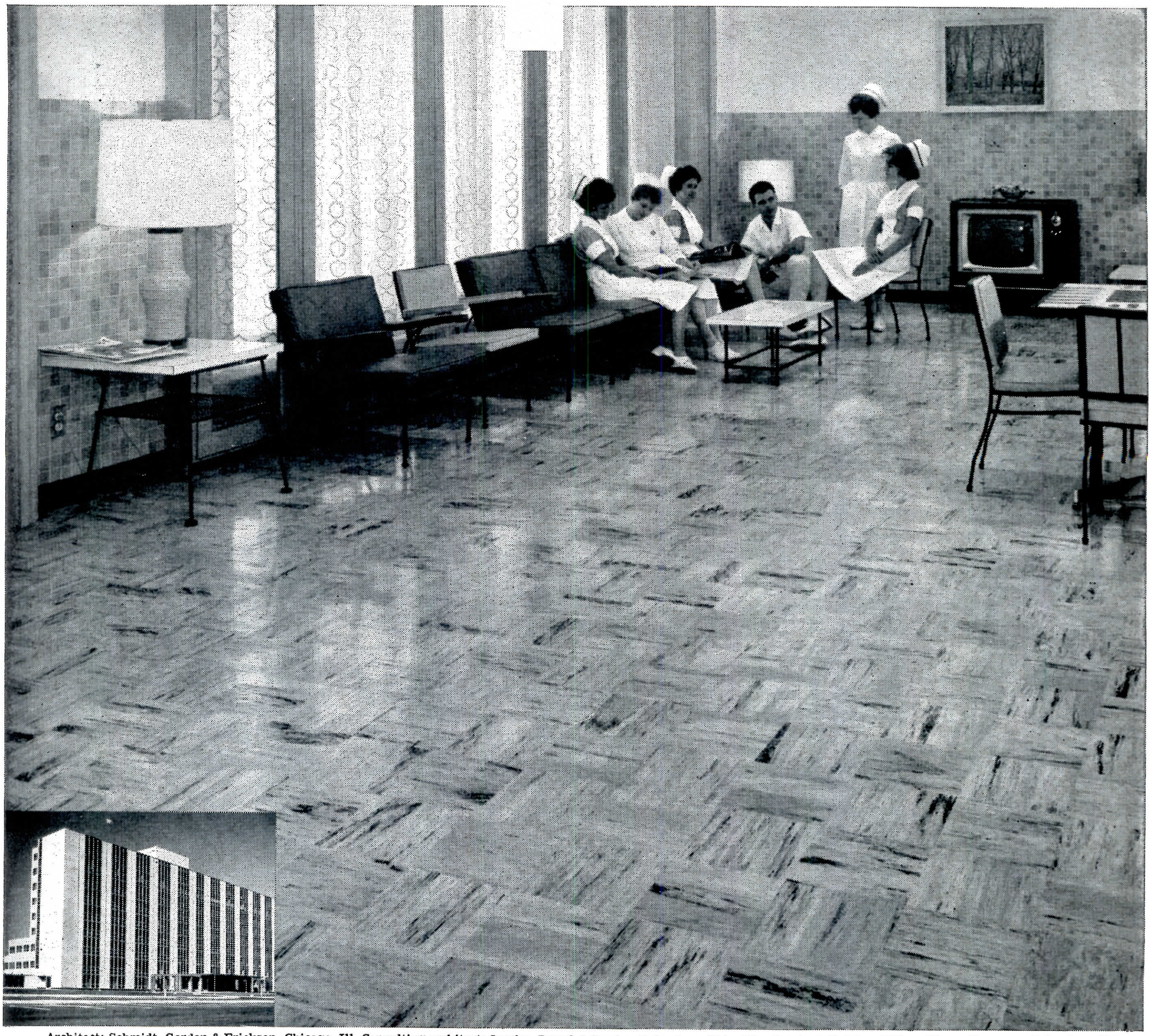
Additions besides Mr. Niemeyer: O. D. Oniashvili, engineering consultant and theorist on shells, of the Georgian Academy of Sciences at Tblissi, U.S.S.R.; Heinz Hossdorf of Basle, Switzerland, who will describe a radical design for a plastic shell to be built at the Swiss National Exhibition in 1964; Ronald Jenkins of London, member of the engineering firm for the Sydney Opera House; and Yoshikatsu Tsuboi of the University of Tokyo, to present his analysis for a cylindrical shell structure.

Some 67 speakers altogether are scheduled to present papers at the conference, and their individual and collective eminence is such that it seems certain to become a historic point of reference for later students of shell structures.

The architecture of shells will be the subject of the opening session, "Structure—Form—Architecture," at which Prof. Lawrence Anderson, chairman of the Department of Architecture, Massachusetts Institute of Technology, will preside.

Succeeding sessions will cover Form—Environment—Materials; Construction Methods—Economics; Computers—Numerical Methods—Analogues; Creative Applications (two full sessions); Models—Expe mental Studies—Tests; Analysis Examples; and General Theory.

The conference, under the cha manship of Prof. Egor Popov of t University of California, is present by the University of Californ Berkeley; the Building Research A visory Board of the National Aca emy of Sciences—National Resear Council, and the International Ass ciation for Shell Structures, in coo eration with the American Concre Institute, American Institute of A chitects, American Institute of Co sulting Engineers, American Socie of Civil Engineers, Associated Ge eral Contractors of America, Buil ing Research Institute, Consulti Engineers Council, Prestressed Co crete Institute, Producers' Coun and Structural Engineers Associ tion of California.



Architect: Schmidt, Garden & Erickson, Chicago, Ill. Consulting architect: Inscho, Brand & Inscho, Columbus, Ohio. Flooring installed by: Wilson Floors Company, Columbus, Ohio.

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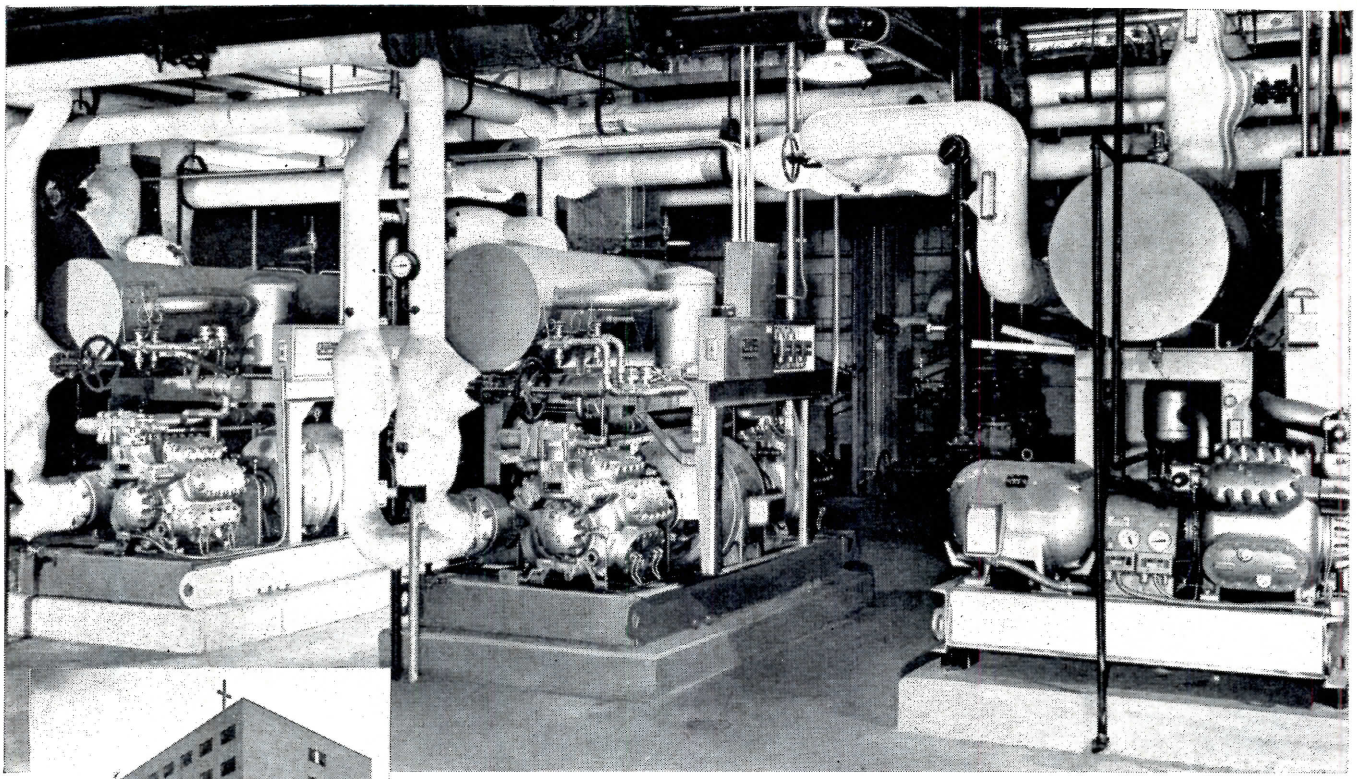

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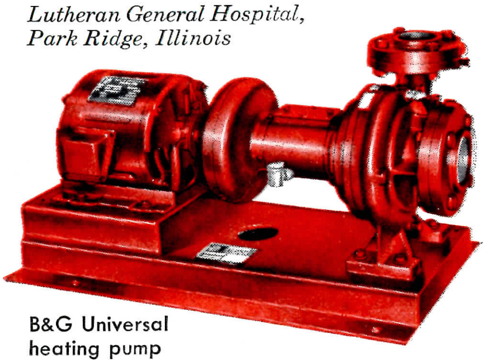

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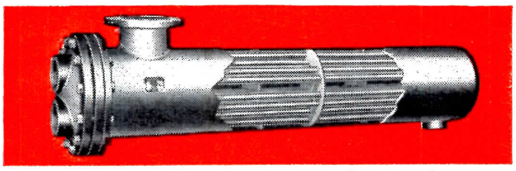

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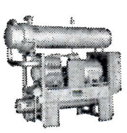

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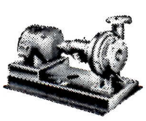
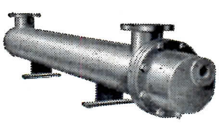
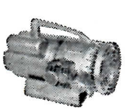


Centrifugal Pumps



Heat Exchangers



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ARCHITECTURAL RECORD

Western Section©

including *Western Architect and Engineer*

WESTERN SECTION EDITOR: *Elisabeth Kendall Thompson, A.I.A.*

2877 Shasta Road, Berkeley 8, California

Value Analysis: K-I-S-S

"The basic function of a pencil?" queries the instructor.

"To write with," promptly replies the student.

"Not so," says the instructor. "A pencil's *basic function* is to make marks. They can be marks of any kind—writing is one kind of mark. What's a hammer's basic function? To build with? Not necessarily. Its basic function is to hit."

Such back-and-forth is part of a program being used increasingly in some of this country's "frontier" industries—such as nuclear engineering, electronics, missile design and production—as described in a recent issue of the quarterly *Skyline,* published by North American Aviation. This program is called Value Engineering, or Value Analysis, and its goal in industry is to "produce the essential product at the lowest cost."

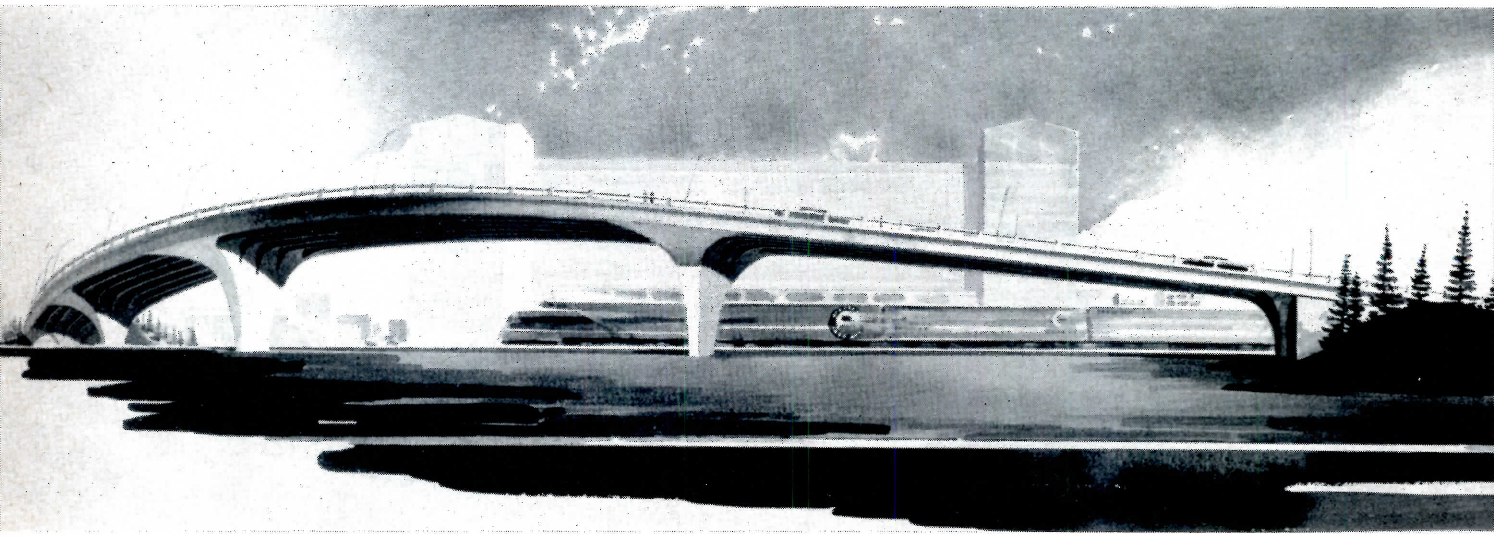
Applied to engineering production, Value Engineering is a means of "thinking and designing away production and cost troubles before they're manufactured into a product, or of finding a simple way to a desired end. To make the program's aim easier to recall, the letters K-I-S-S are used: "Keep It Simple, Simon." Not a bad adage, in or out of industry.

Applied to architecture, what meaning has Value Engineering? Although something very like value analysis is implicit in the process of design, it is often given the once-over lightly instead of the full treatment it requires if it is to yield the benefits it offers. Value Engineering focuses on the *basic* function first, amplifies it for specifics, and leads into a solution that is suitable, straightforward—and simple.

Today in architecture the same enemies of quality are at work as in these "frontier" industries: Tradition and Time. Tradition because it forms habits of thinking and doing and demands their continuance. Time because it hurries solutions regardless of their value.

Today in architecture, the technological potentials are so many and so varied that here, too, a reminder is needed lest we go over the deep end with techniques and lose the basic concept. "Keep It Simple, Simon" could well read, for architects, "Keep It Suitable, Straightforward, Simple."

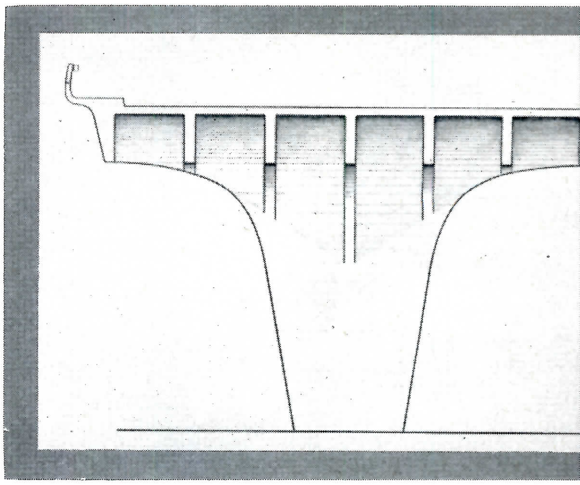
E.K.T.

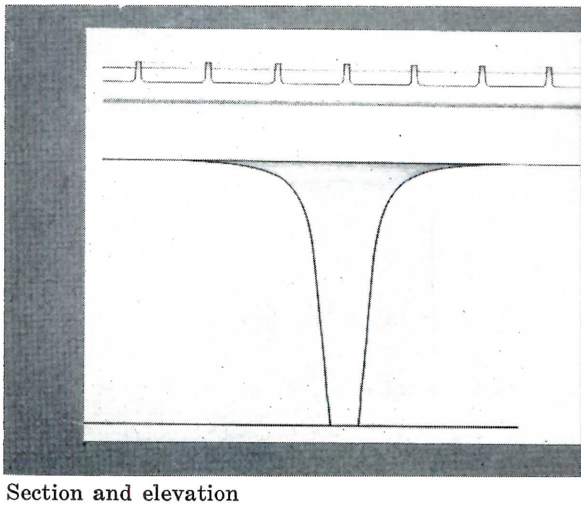


DESIGNED FOR BEAUTY: OVERPASS IN OAKLAND

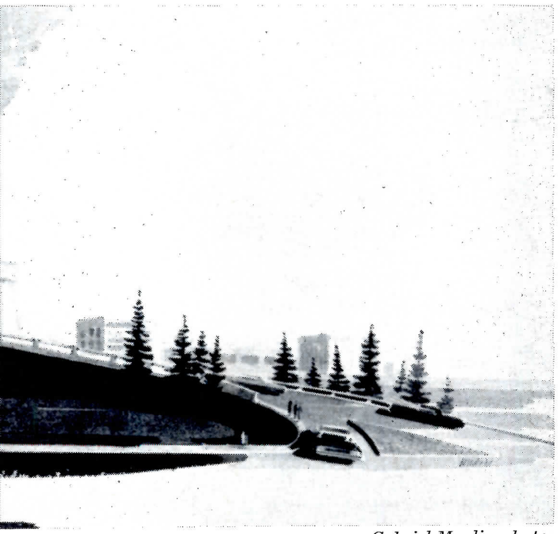
The graceful sweep of this overpass and the sculptural quality of its design make a clear case for beauty in highway structures. It was designed to be beautiful; in fact, the program required that it be "of outstanding design" as a "stimulus to the early redevelopment of the surrounding industrial area," in addition to providing efficient and safe access—for vehicles and pedestrians—to and from nearby industries. The prestressed concrete girders, exposed beneath the reinforced concrete deck, merge with the four tapered concrete piers to give a strong sculptural feeling to the structure's profile. The curve of the overpass path is effective for its functional purpose but also adds to the over-all grace of the design. The design of light standards and fixtures, both above and below deck, fits into the over-all design and takes into account the curve of the structure. Each span is 165 ft, amply spacious for rail and motor traffic at ground level. On either side of the bridge are landscaped open spaces—actually small parks—which form green oases in the blight of the area. Estimated cost is $830,000.

23rd Street overpass for city of Oakland, California; joint venture of John Carl Warnecke and Associates, architects and planning consultants, and Kaiser Engineers. Lawrence Halprin and Associates, landscape architects; T. Y. Lin and Associates, structural engineers

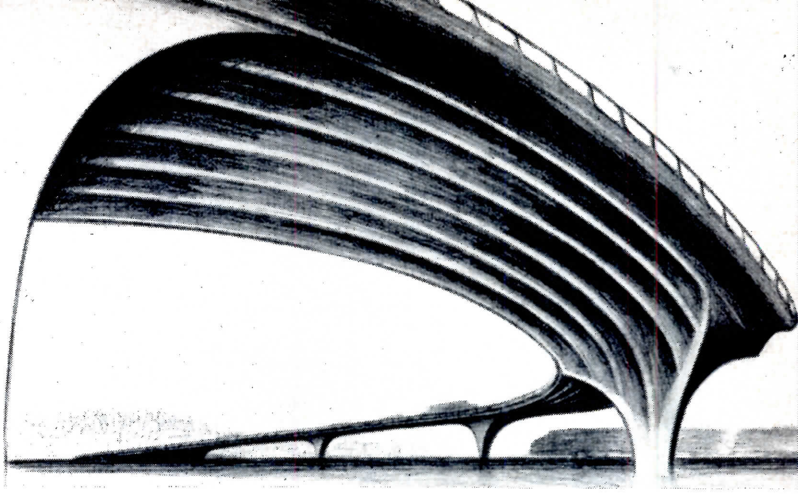


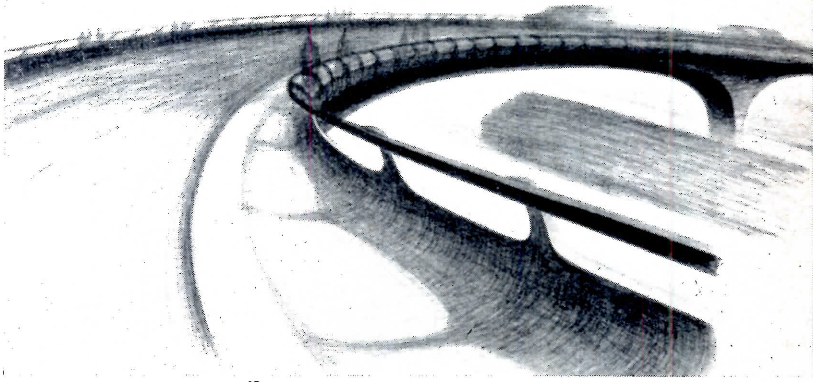


Section and elevation



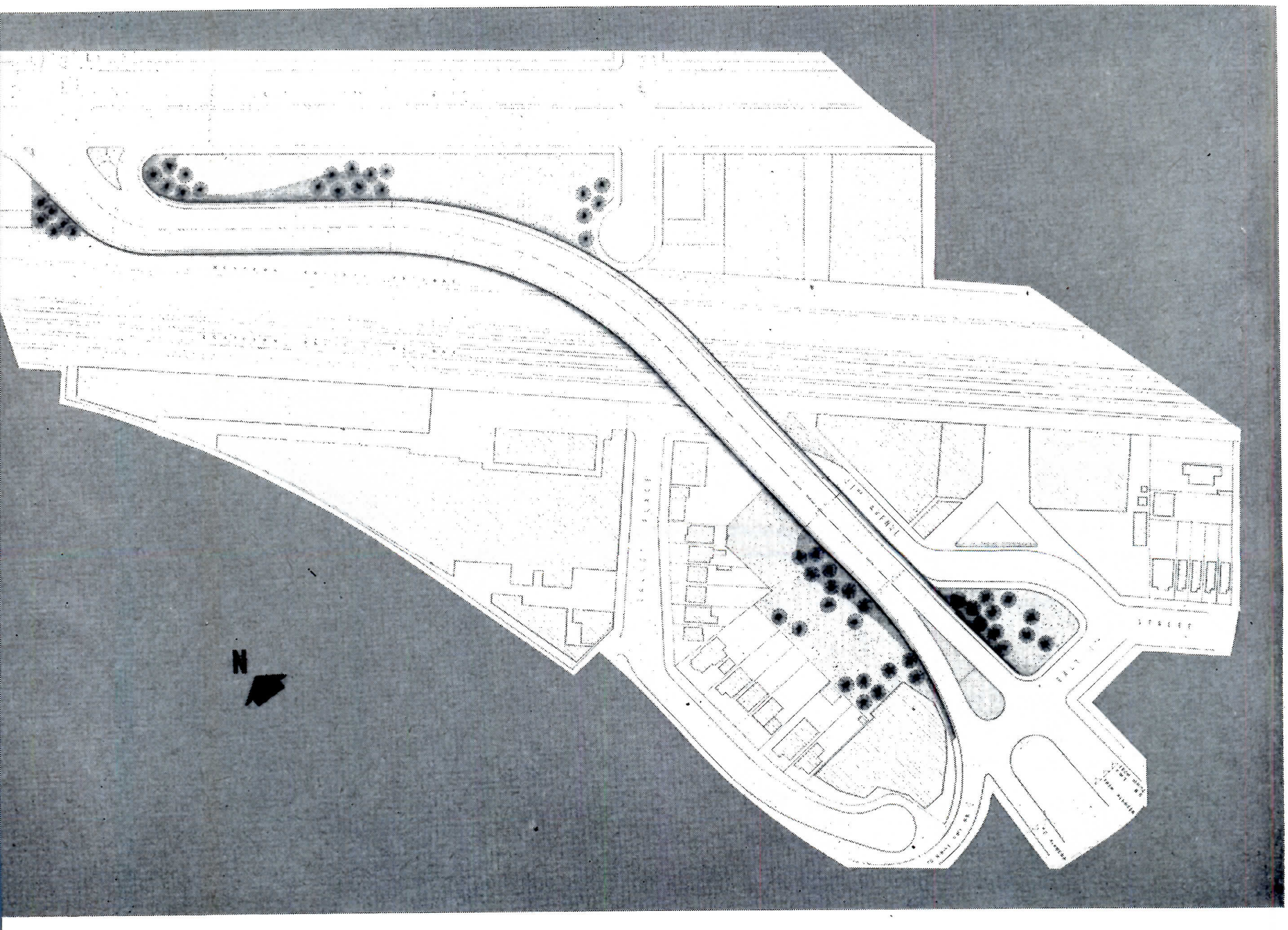
Gabriel Moulin photos





Lights under the deck provide general lighting in vicinity of overpass and accent sculptural effect of structure and grace of its design. All details (lights, railing, etc.) were part of design. Landscaping on each side of structure was part of design contract. Completion date is 1963

Details of **pier and rail**

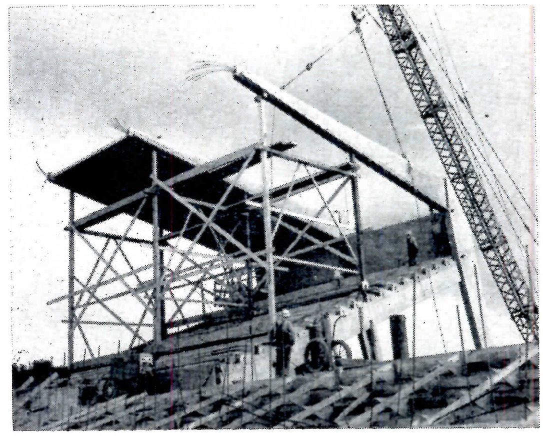


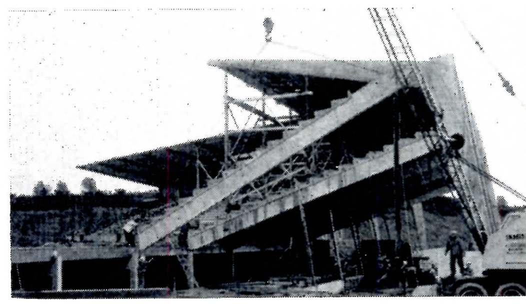
STADIUM DESIGNED AND BUILT IN FOUR MONTHS

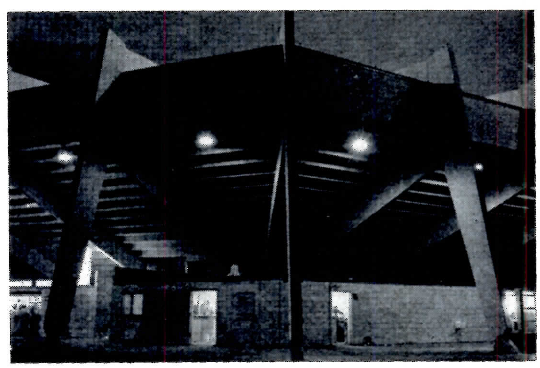
Richards photos (except construction photos)

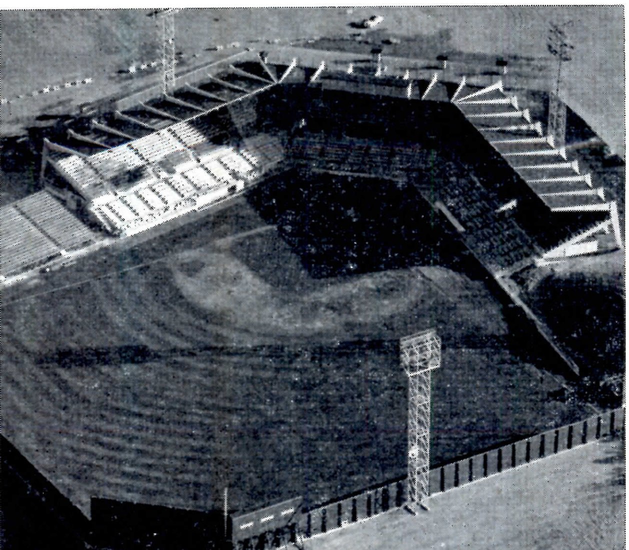
› design and build a 6,700-seat stadium in four warm, ınny months would be an achievement in itself, but to › this in winter weather with freezing temperatures and ıow, and in the rainy spring months, is a noteworthy :hievement. It was possible, the designers say, because ıuch of the construction used precast elements. All 1,600 these precast members were fabricated and erected ithin a nine-week period. Preliminary designs were be-ın on December 20; the stadium was occupied on April ł for the first ball game of the season. The schedule was tight, however, that working drawings were being ırned out even while construction was under way. De-gn requirements were that the design be simple and raightforward, that there be an unobstructed view from 'ery seat, and that the structure be fireproof and easily aintained. Precast columns, 12 in. wide, are set at an ngle on cast-in-place footings and connected by weld; ɔan between columns is 20 ft. The prestressed concrete ɔof beam cantilevers 45 ft from the column and varies depth from 4 ft 6 in. at the column to one foot at its ıter edge. Precast L-shaped seat slabs fit onto 8-in.-wide, ł-ft-long slotted beams to form the seating. Team rooms re fitted into areas on one side of the main entrance, ɔncessions on the other.

heney Stadium for Pierce County and the city of Ta-ɔma, Washington: Anderson, Birkeland and Anderson Robert Mast, project engineer), designers; E. L. Mills, rchitect for city of Tacoma; Earley Construction Com-ɑny, builders; Concrete Technology Corporation, pre-tressed members

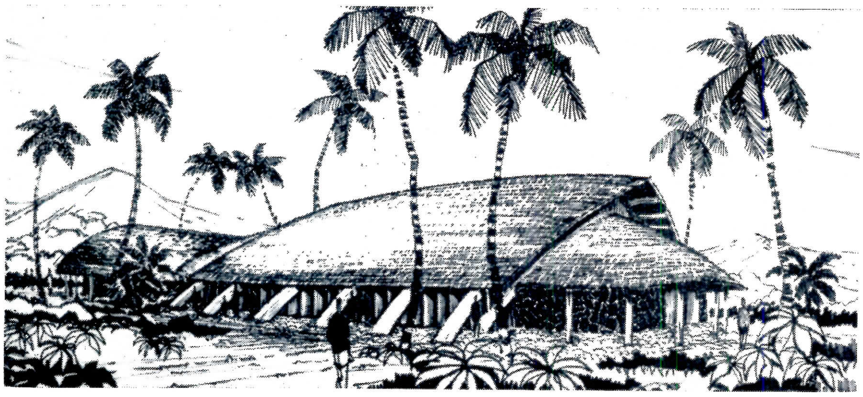








Western Buildings in the News



This version of the Samoan "fale" was the scene of the recent important South Pacific Conference held at Pago Pago to discuss problems of health, economics and welfare for the three million inhabitants of the Pacific islands and atolls. The meeting house was completed on schedule in time for the conference, although this had been considered "impossible" by many. Architects for the building were Wimberly, Whisenand, Allison and Tong of Honolulu, architectural consultants to the government of American Samoa. The conference, first held in the Polynesian islands, was the first opportunity for the U.S. to show off results of the rehabilitation program in American Samoa it hopes to complete by 1964

Forde photos

This demountable brick building is the Sermons from Science Building at the Seattle World's Fair. Johnson, Nesland and Sibold were the architects. Filler panels for the walls are of reinforced brick, prefabricated and lifted into place by a vacuum-grip materials handler attached to a mobile crane. The panels are laid up in soldier bond in various sizes, the largest 78 sq ft, the smallest 19.7 sq ft. They are one brick thick and act as exterior and interior walls. For one section of the building, one side was glazed cobalt blue. Panels were cured seven days before moving, and were installed by sliding down between two 6-in. WF columns. Bed joints were shimmed and mortared and a neoprene rubber strip was used for sealing

FALL IS THE TIME FOR CONFERENCES

Western Mountain Region, A.I.A.

Robert F. Hastings of Berkle Mich., O'Neil Ford of San Antoni Robert E. Alexander of Los Angel and Institute President Henry Wright will headline the program the Western Mountain region's a nual conference, to be held this ye at Sun Valley, Idaho, September 2 29. The program's theme is "Arch tecture—Its Influences."

A seminar on "Expanded Practic and one on the new plan for Dow town Salt Lake City devised by t local chapter will also be schedule Ashley Carpenter of Salt Lake conference chairman, and Lloyd Snedaker is regional director.

California Council, A.I.A. and California Region

"World Search" is the theme of t program which George Hasslein, he of the department of architectur engineering at CalPoly, has plann for the 17th annual C.C.A.I.A. co vention at Monterey, Calif., Octob 4-7. The near conjunction of th convention and the World Conferen on Shell Structures offered the o portunity to incorporate some of t latter's speakers in the Californ Council program, enriching it wi such names as Oscar Niemeyer, Fr Otto of Germany, Mario Salvadori Rome and New York, Joseph All Stein of New Delhi, India, and Fel Candela of Mexico City. In additio the Producers Council speaker w also be from abroad. He is Sir Hu Casson of London. A panel on E panded Practice will include Per Johanson, Seattle; Donald Lute Springfield, Oregon; James M. Hu ter, Boulder, Colorado; and A. Odell, Charlotte, N.C.

Northwest Region, A.I.A.

Harold Spitznagel of South Dako Alfred Bendiner of Philadelphia a Philip Johnson of New York are t principal speakers at the Northwe conference at Surftides Reso Oceanlake, Oregon, October 11-14.

Theme of the conference is "T Art of Doing." Robert Wilmsen conference chairman; Robert L. Du ham, regional director.

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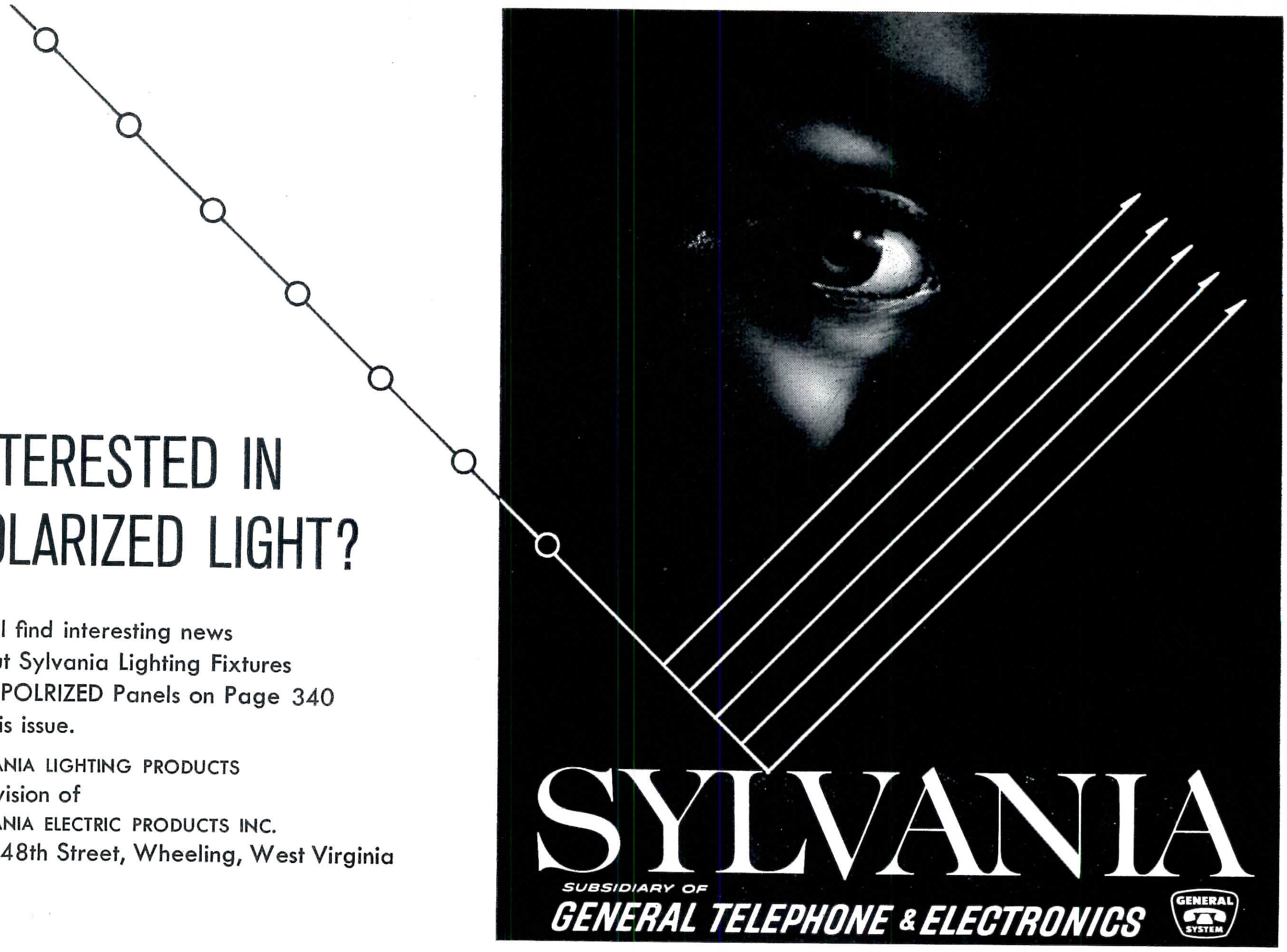

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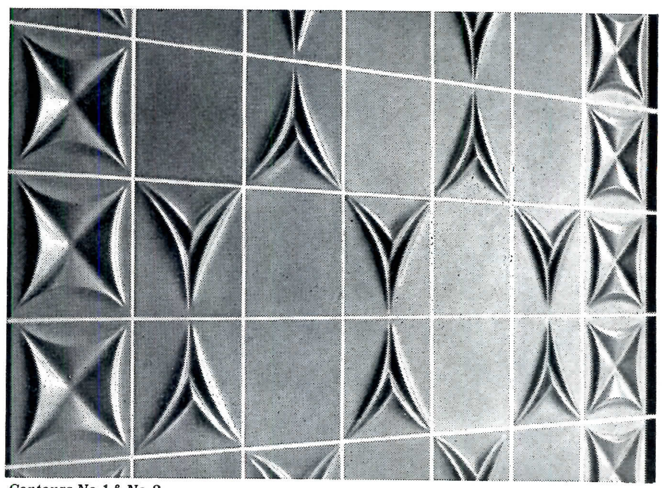

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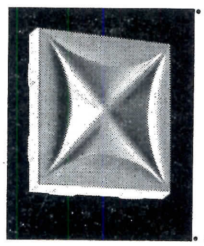

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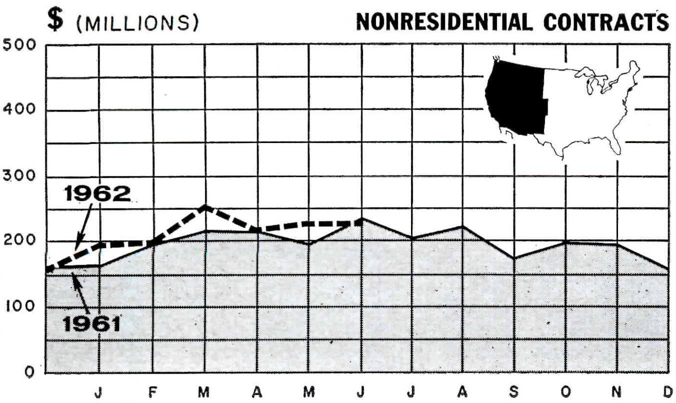

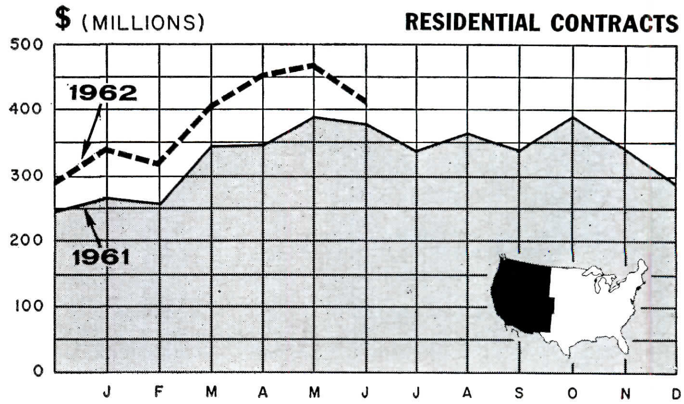

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WESTERN CONSTRUCTION TRENDS

(For analysis of construction trends nationwide, see page 18)

After three record-breaking months, the sizzling pace of contract awards in the Western states tapered off in June. Total construction contracts in the eleven states amounted to $848 million, just about even with the June 1961 value. The cumulative gain over last year skidded back a bit from 10 per cent at the five month mark to 8 per cent ahead for the half-year.

Residential building, which has been providing most of the drive in Western construction since last fall, continued to run ahead of 1961 in June though by a considerably smaller margin than during the previous five months. And this narrow lead in June home building was almost exactly offset by declines in the nonresidential and heavy engineering categories.

It is almost certain that the recent work stoppages, tying up most of the building trades in California, adversely affected new contract awards in June. Although another month's data will tell more, it appears that the strikes led to a cutback in Western residential contracts.

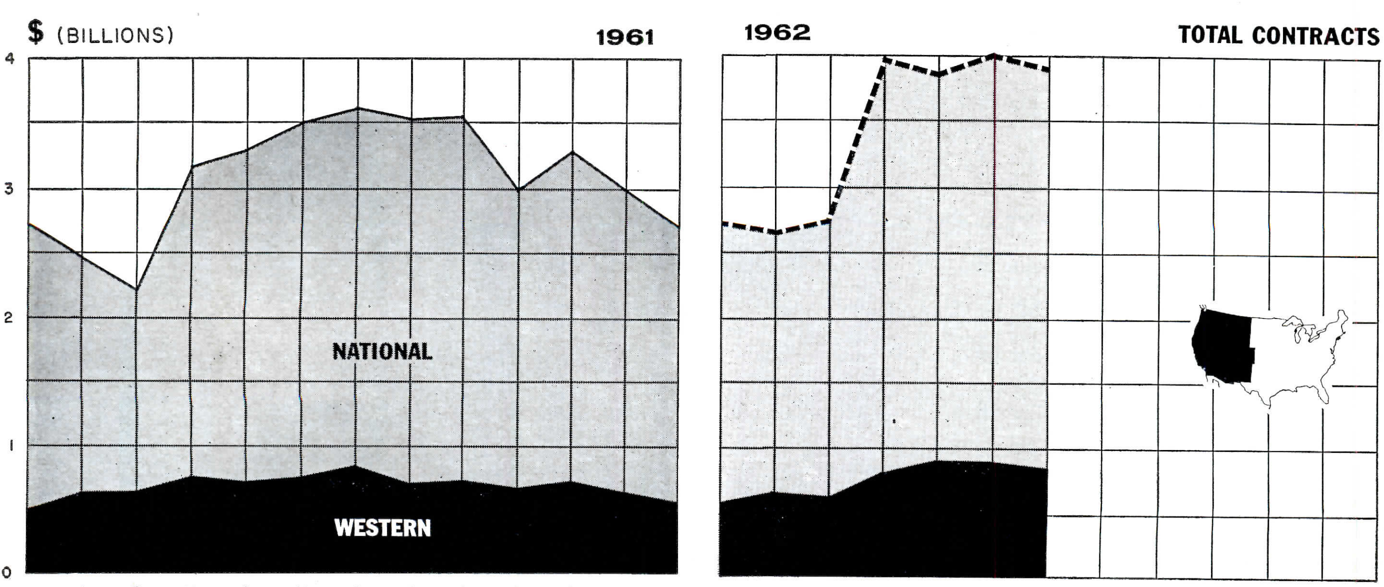
Through May, 1962 the monthly gains in the residential category were impressive. Four of these months bettered their 1961 counterparts by 20 per cent or more, while the other was just a shade off that pace. June, by contrast, registered a gain of only 7 per cent. The hardest hit building type in the residential group was apartments which, nationally as well as in the West, had been running a full two-thirds ahead of last year's rate. While elsewhere in the country June apartment contracts chalked up another huge gain, in the Western states they fell back to less than 10 per cent over the previous June total.

In non-residential building, both commercial and manufacturing contracts fell short of last year's performance for the month. Manufacturing still led 1961 for the six month period, but commercial building has been lagging since February.

Heavy engineering contracts were down from 1961 levels. The biggest decline for the half year was in the utilities, where electric light and power companies showed the only signs of strength. Public works construction (mainly highways, dams, and sewer systems) was little changed from 1961.

With half of 1962 on record, the aggregate value of construction contracts in the Western states amounted to $4,761,220,000—22.6 per cent of the national total.

GEORGE A. CHRISTIE, *Economist*
F. W. Dodge Corporation
A McGraw-Hill Company



Total contracts include residential, nonresidential, heavy engineering contracts

F. W. DODGE CORPORATION

Estimator's Guide: SAN FRANCISCO BAY AREA

The Estimator's Guide alternates monthly among four Western areas. The prices below are compiled from average quotations received by LeRoy Construction Services for commercial work of approximately $100,000-$250,000 total value. Except as otherwise noted, prices are for work installed including all labor, material, taxes, overhead and subcontractors' profit. Material prices include local delivery as noted, but no state or local taxes.

EXCAVATION

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Small pits	CY	1.35-1.85
Trenches	CY	1.75-2.50
HAND WORK IN COMMON GROUND		
Large pits & trenches	CY	7.00-11.00
Small pits & trimming	CY	10.00-14.00
Hard clay or shale, 2 times above rates		
Shoring, bracing & disposal of water not included		

SEWER PIPE MATERIALS

VITRIFIED		
Standard 4″	LF	.41
Standard 6″	LF	.71
Standard 8″	LF	1.04
Standard 12″	LF	2.23
Standard 24″	LF	8.85
CLAY DRAIN PIPE		
Standard 6″	LF	.38
Standard 8″	LF	.70

Rate for 100 LF FOB Warehouse

CONCRETE & AGGREGATES

GRAVEL, all sizes	TON	3.75
TOP SAND	TON	4.00
CONCRETE MIX	TON	4.10
CRUSHED ROCK		
1/4″ to 3/4″	TON	4.00
3/4″ to 1 1/2″	TON	4.00
ROOFING GRAVEL	TON	4.10
SAND (#1 & 2)	TON	5.00
CEMENT		
Common, all brands (paper sacks)		
Small quantities	Per Sack	1.40
Large quantities	Per Bll	4.45
Atlas White	Per Sack	3.80
CONCRETE MIX		
6 sacks in 5-yd loads	Per Yd	15.65
CURING COMPOUND		
Clear, 5-gal drums	Per Gal	1.45

STEEL MATERIALS

SHEETS		
Hot rolled	LB	.11
Cold rolled	LB	.12
Galvanized	LB	.12
PLATE	LB	.11
STRIPS	LB	.13
STRUCTURAL SHAPES	LB	.115
BARS		
Hot rolled	LB	.11
Cold finished	LB	.15
Reinforcing	LB	.105
REINFORCING MESH		
6 x 6″ #10 x #10	SF	.04
6 x 6″ #6 x #6	SF	.07

2000# FOB Warehouse

STRUCTURAL STEEL

$340.00 and up per ton erected when out of mill.
$370.00 and up per ton erected when out of stock.

BRICK AND TILE

ALL Prices—FOB Plant

COMMON BRICK		
Common 2 1/2 x 3 3/4 x 8 1/4″	M	55.00
Select 2 1/2 x 3 3/4 x 8 1/4″	M	62.00
Clinker 2 1/2 x 3 3/4 x 8 1/4″	M	60.00
Jumbo 3 1/2 x 3 x 11 1/2″	M	95.00
FACE BRICK		
Standard	M	75.00- 85.00
Jumbo	M	120.00-140.00
Roman	M	100.00-120.00
Norman	M	100.00-120.00
BUILLDING TILE		
8 x 5 1/2 x 12″	M	180.00
6 x 5 1/2 x 12″	M	140.00
HOLLOW TILE		
12 x 12 x 3″	M	165.00
12 x 12 x 4″	M	185.00
12 x 12 x 6″	M	245.00
MANTEL FIRE BRICK		
2 1/2 x 9 1/2 x 4 1/2″	M	180.00
GLAZED STRUCTURAL UNITS		
2 x 6 x 12″ Furring	SF	.60
4 x 6 x 12″—1 side	SF	.91
6 x 6 x 12″—1 side	SF	1.32
4 x 6 x 12″—2 sides	SF	1.00

CONCRETE BLOCKS

4 x 8 x 16″	EA	.23
6 x 8 x 16″	EA	.29
8 x 8 x 16″	EA	.34
12 x 8 x 16″	EA	.51
Add for color	EA	.02
AGGREGATE		
Haydite or Basalite		
All sizes in bulk	CY	6.80

BRICKWORK AND MASONRY

COMMON BRICKWORK, reinforced		
8″ walls	SF	2.90
12″ walls	SF	4.20
SELECT COMMON, reinforced		
8″ walls	SF	3.05
12″ walls	SF	4.95
CONCRETE BLOCK, reinforced		
6″ walls	SF	1.70
8″ walls	SF	1.85
12″ walls	SF	2.30
BRICK VENEER		
4″ Select Common	SF	1.60
4″ Roman	SF	2.70
4″ Norman	SF	2.70

BUILDING PAPERS AND FELTS

BUILDING PAPER	
1 ply per 1,000-ft roll	4.20
2 ply per 1,000-ft roll	6.40
3 ply per 1,000-ft roll	8.75
Sisalkraft, reinforced, 500-ft roll	9.50
SHEATHING PAPERS	
Asphalt sheathing, 15-lb roll	3.35
30-lb roll	3.80
Dampcourse, 216-ft roll	3.30
FELT PAPERS	
Deadening felt, 3/4-lb, 50-ft roll	1.95
1-lb, 50-ft roll	2.45
Asphalt roofing felt, 15-lb 300 SF	2.10
30-lb 216 SF	2.45
ROOFING PAPERS	
Standard grade, smooth surface	
432 SF rolls	
Light, 45-lb	2.20
Medium, 55-lb	2.50
Heavy, 65-lb	2.90
Mineral surfaced	3.50

LUMBER

DOUGLAS FIR			
Construction	2x4-2x10	MBM	96.00-104.00
Standard	2x4-2x10	MBM	93.00- 98.00
Utility	2x4-2x10	MBM	75.00- 82.00
Economy	2x4-2x10	MBM	57.00- 68.00
Clear, air dried		MBM	198.00-231.00
Clear, kiln dried		MBM	231.00-264.00
REDWOOD			
Foundation grade		MBM	140.00-150.00
Construction Heart		MBM	120.00-130.00
A Grade		MBM	230.00-270.00
Clear Heart		MBM	260.00-290.00
PLYWOOD (DOUGLAS FIR)			
1/4″ AB		MSF	90.00
1/4″ AD		MSF	70.00
1/4″ Ext. waterproof		MSF	77.00
3/8″ AB		MSF	105.00
3/8″ AD		MSF	95.00
3/8″ CD		MSF	70.00
1/2″ AB		MSF	140.00
1/2″ AD		MSF	120.00
1/2″ CD		MSF	91.00
5/8″ AB		MSF	156.00
5/8″ AD		MSF	136.00
5/8″ CD		MSF	102.00
3/4″ AB		MSF	178.00
3/4″ AD		MSF	158.00
3/4″ CD		MSF	135.00
5/8″ Plyform		MSF	170.00
SHINGLES			**Square**
Cedar #1		Square	17.00-19.00
Cedar #2		Square	14.00-17.00
SHAKES			
Cedar			
1/2″ to 3/4″ butt		Square	19.00-22.00
3/4″ to 1 1/4″ butt		Square	21.00-24.00
Redwood			
3/4″ to 1 1/4″ butt		Square	21.00-24.00

INSULATION AND WALL BOARD

FOB Warehouse — **Per M SF**

FIBER GLASS INSULATION—foil backed	
1 1/2″ thick	44.00
2 1/4″ thick	48.00
3 5/8″ full thick	58.00
SOFTBOARDS—wood fiber	
3/8″ thick	61.00
1/2″ thick	74.00
ALUMINUM INSULATION	
35# Kraft paper with alum. foil	
1 side only	24.00
2 sides	30.00
GYPSUM WALLBOARD	
3/8″ thick	51.00
1/2″ thick	62.00
5/8″ thick	84.00
HARDBOARDS—wood fiber	
1/8″ thick, sheathing	67.00
3/16″ thick, sheathing	82.00
1/4″ thick, sheathing	111.00
1/8″ thick, tempered	89.00
3/16″ thick, tempered	120.00
1/4″ thick, tempered	152.00
CEMENT ASBESTOS BOARD	
1/8″ flat sheets	145.00
3/16″ flat sheets	190.00
1/4″ flat sheets	255.00

ROUGH CARPENTRY

FRAMING		
Floors	BM	.24-.29
Walls	BM	.30-.35
Ceilings	BM	.28-.34
Roofs	BM	.27-.32
Furring & blocking	BM	.35-.55
Bolted framing, add 50%		
SHEATHING		
1 x 8″ straight	BM	.22-.28
1 x 8″ diagonal	BM	.25-.30
5/16″ plyscord	SF	.19-.24
5/8″ plywood CC	SF	.27-.32
SIDING		
1 x 8″ bevel	BM	.40-.45
1 x 4″ V-rustic	BM	.45-.50
Bolted framing, add 50%		

DAMPPROOFING & WATERPROOFING

MEMBRANE		
1 layer 50-lb felt	SQ	9.50
4 layers dampcourse	SQ	14.50
Hot coat walls	SQ	8.50
Tricosal added to concrete	CY	1.00
Anti-Hydro added to concrete	CY	1.50

ROOFING

STANDARD TAR & GRAVEL	**Per Sq**
4 ply	17.00-22.00
5 ply	19.50-25.00
White gravel finish—Add	2.00- 4.00
Asph. compo. shingles	20.00-24.00
Cedar shingles	24.00-28.00
Cedar shakes	32.00-38.00
Concrete tiles	36.00-48.00
Clay tiles	42.00-52.00

SHEET METAL

ROOF FLASHINGS		
18 ga galv steel	SF	.70-1.10
22 ga galv steel	SF	.60-1.00
26 ga galv steel	SF	.50- .90
18 ga aluminum	SF	1.10-1.60
22 ga aluminum	SF	.90-1.40
26 ga aluminum	SF	.75-1.15
24 oz copper	SF	2.00-2.50
20 oz copper	SF	1.80-2.30
16 oz copper	SF	1.60-2.10
26 ga galv. steel		
4″ OG gutter	LF	1.10-1.35
Mitres and Drops	EA	2.00-4.00
22 ga galv. louvers	SF	2.75-3.75
20 oz copper louvers	SF	3.50-5.00

CHIMNEYS, PATENT

FOB Warehouse

6″	LF	1.45
8″	LF	2.05
10″	LF	2.85
12″	LF	3.50

Rates for 10-50 LF

MILLWORK

All Prices FOB Mill

D.F., clear, air dried S4S	MBM	220.00-250.00
D.F., kiln dried S4S	MBM	225.00-275.00
DOOR FRAMES & TRIM		
Residential entrance		17.00 & up
Interior room entrance		9.00 & up
DOORS		
1⅜″ hollow core		8.00 & up
1¾″ solid core		19.00 & up
1⅜″ Birch hollow core		10.00 & up
1¾″ Birch solid core		22.00 & up
WOOD SASH		
D/H in pairs (2 lts)	SF	.55
Casement (1 lt)	SF	.65
WOOD CABINETS		
¾″ D.F. plywood with ¼″ plywood backs:		
Wall hung	LF	10.00-15.00
Counter		12.00-17.00
EXTERIOR TRIM		
Fascia and molds	BM	.48-.55

Birch or maple, add 25%

FINISH CARPENTRY

ENTRANCE DOORS & FRAMES		
Single		60.00 & up
Double		100.00 & up
INTERIOR DOORS & FRAMES		
Singles		36.00 & up
Pocket sliding		46.00 & up
Closet sliding (Pr.)		52.00 & up
WINDOWS		
D/H sash & frames	SF	2.00 & up
Casement sash & frames	SF	2.30 & up
SHELVING		
1 x 12 S4S	BM	.31-.52
¾″ plywood	SF	.41-61
STAIRS		
Oak steps D.F. risers		
Under 36″ wide	Riser	14.00
Under 60″ wide	Riser	19.00
Newels posts and rail extra		
WOOD CASES & CABINETS		
D.F. wall hung	LF	15.50-20.60
D.F. counters	LF	18.50-25.75

HARDWOOD FLOORING MATERIALS

OAK 5/16″ x 2″ STRIP		
Clear	M	210.00
Select	M	200.00
#1 Common	M	190.00
OAK 5/16″ RANDOM PLANK		
Select & better	M	280.00
#1 Common	M	235.00
OAK 25/32″ x 2¼″ T&G		
Select	M	200.00
#1 Common	M	190.00
MAPLE 25/32″ x 2¼″ T&G		
#1 Grade	M	305.00
#2 Grade	M	280.00
#3 Grade	M	230.00
NAILS—1″ FLOOR BRADS	KEG	18.00

HARDWOOD FLOORS

Select Oak		
Filled, sanded, stained and varnished		
5/16″ x 2¼″ strip	SF	.50- .55
5/16″ random plant	SF	.55- .60
25/32″ x 2¼″ T&G	SF	.85-1.00
Maple		
2nd grade & better		
Filled, sanded, stained & varnished		
25/32″ x 2½″ T&G	SF	.90-1.05
Wax finish, add	SF	.10

RESILIENT FLOORING MATERIALS

Linoleum, standard gage	SY	2.65-2.85
Linoleum, battleship	SY	2.95-3.10
⅛″ Asphalt tile, dark	SF	.10- .11
⅛″ Asphalt tile, light	SF	.14- .16
⅛″ Rubber tile	SF	.40- .44
.080 Vinyl tile	SF	.67- .70
.080 Vinyl asbestos tile	SF	.18- .19
⅛″ Vinyl tile	SF	.78- .82
4″ Base, black	LF	.15- .16
4″ Base, colored	LF	.26- .30
Rubber treads	LF	1.60-2.30
Linoleum paste	GAL	.75- .90

FLOORS

⅛″ Asphalt tile, dark colors	SF	.25- .30
⅛″ Asphalt tile, light colors	SF	.30- .35
⅛″ Rubber tile	SF	.60- .70
.080 Vinyl asbestos tile	SF	.40- .45
.080 Vinyl tile	SF	.85- .95
Linoleum, standard gage	SY	3.75-4.25
Linoleum, battleship	SY	5.25-5.75
4″ Rubber base, black	LF	.35- .45
Rubber stair treads	LF	2.25-2.75

LATH & PLASTER MATERIALS

METAL LATH		
Diamond 3.4# copper-bearing	SY	.57
Ribbed 3.4# copper-bearing	SY	.62
ROCK LATH		
⅜″ thick	SY	.36
METAL		
¾″ Standard channel	LF	.047
1½″ Standard channel	LF	.065
3¼″ Steel studs	LF	.112
4″ Steel studs	LF	.122
Stud shoes	EA	.03
PLASTER		
Browning, hardwall	Sack	1.58
Finish, hardwall	Sack	1.75
Stucco	Sack	2.50

LATH & PLASTER WORK

CHANNEL FURRING		
Suspended ceilings	SY	2.80-3.05
Walls	SY	2.90-3.25
METAL STUD PARTITIONS		
3¼″ studs	SY	3.00-3.35
4″ studs	SY	3.20-3.50
Over 10-0 high, add	SY	.25- .35
3.4# METAL LATH & PLASTER		
Ceilings	SY	4.20-4.95
Walls	SY	4.25-5.05
Keene's cement finish, add	SY	.45- .65
ROCK LATH PLASTER		
Ceilings	SY	3.20-3.70
Walls	SY	3.30-3.80
WIRE MESH & ⅞″ STUCCO		
Walls	SY	4.60-5.80
STUCCO ON CONCRETE		
Walls	SY	3.30-3.80
Metal accessories	LF	.25- .55

TILE MATERIALS

FOB Warehouse

CERAMIC TILE		
4¼″ x 4¼″ glazed	SF	.72
4¼″ x 4¼″ hard glazed	SF	.74
Random, unglazed	SF	.72
6″ x 2″ cap	EA	.19
6″ cove base	EA	.31
¼″ round bead	LF	.18
QUARRY TILE		
6 x 6 x ½″ red	SF	.51
6 x 6 x ¾″ red	SF	.53
9 x 9 x ¾″ red	SF	.65
6 x 6″ cove base	EA	.23

TILE & TERRAZZO WORK

CERAMIC TILE, stock colors		
Floors	SF	1.90-2.30
Walls	SF	2.00-2.50
Cove base	LF	1.10-1.35
QUARRY TILE		
6″ x 6″ x ½″ floors	SF	1.80-2.20
9″ x 9″ x ¾″ floors	SF	1.95-2.40
TERRAZZO		
Terrazzo floors	SF	2.15-2.65
Cond. Terrazzo floors	SF	2.30-2.80
Precast treads & risers	LF	3.60-4.60
Precast landing slabs	SF	3.00-4.10

WINDOWS

STEEL SASH		
Under 10 SF	SF	2.50 & up
Under 15 SF	SF	2.00 & up
Under 20 SF	SF	1.50 & up
Under 30 SF	SF	1.00 & up
ALUMINUM SASH		
Under 10 SF	SF	2.75 & up
Under 15 SF	SF	2.25 & up
Under 20 SF	SF	1.75 & up
Under 30 SF	SF	1.25 & up

Above rates are for standard sections and stock sizes, FOB Warehouse

GLASS—CUT TO SIZE

FOB Warehouse

SSB Clear, aver 4 SF	SF	.17
DSB Clear, aver 7 SF	SF	.28
Crystal, aver 16 SF	SF	.35
¼″ Polished plate, aver 50 SF	SF	1.90
⅛″ Obscure, aver 7 SF	SF	.35
⅛″ Ribbed, aver 7 SF	SF	.45
⅛″ Rough, aver 7 SF	SF	.45
¼″ Wire plate, clear, aver 40 SF	SF	1.90
¼″ Wire plate, rough, aver 40 SF	SF	.90
⅛″ Heat absorbing, aver 7 SF	SF	.90
¼″ Tempered plate, aver 40 SF	SF	3.60
½″ Tempered plate, aver 40 SF	SF	6.40
GLASS BLOCKS		
6″		.70
8″		1.15
12″		3.10

GLASS & GLAZING

SSB Clear	SF	.55
DSB Clear	SF	.80
Crystal	SF	.95
¼″ Plate	SF	2.00
⅛″ Obscure	SF	.80
⅛″ Heat absorbing	SF	1.35
¼″ Tempered plate	SF	4.75
½″ Tempered plate	SF	9.00
¼″ Wire plate, clear	SF	2.90
¼″ Wire plate, rough	SF	1.50

PAINT MATERIALS

All prices FOB Warehouse

Thinners 5-100 gal	Gal	.63
Turpentine 5-100 gal	Gal	1.59
Linseed oil, raw	Gal.	2.36
Linseed oil, boiled	Gal	2.43
Primer-sealer	Gal	3.12
Enamel undercoaters	Gal	5.54
Enamel	Gal	5.58
White lead in oil	LB	.36
Red lead in oil	LB	.36
Litherage	LB	.32

PAINTING

EXTERIOR		
Stucco wash, 1 coat	SY	.48
2 coats	SY	.80
Lead & Oil, 2 coats	SY	1.10
3 coats	SY	1.60
INTERIOR		
Primer-sealer	SY	.45
Wall paint, 1 coat	SY	.54
2 coats	SY	.98
Enamel, 1 coat	SY	.65
2 coats	SY	1.14
Doors & trim	EA	14.00
Sash & trim	EA	16.00
Base & molds	LF	.18

Old work, add 15-30%

VENETIAN BLINDS

RESIDENTIAL	SF	.45 & up
COMMERCIAL	SF	.55 & up
VERTICAL	SF	1.25 & up

PLUMBING

Lavatories	EA	200.00-250.00
Toilets	EA	250.00-310.00
Bath tubes	EA	270.00-370.00
Stall shower	EA	150.00-200.00
Sinks	EA	180.00-240.00
Laundry trays	EA	120.00-180.00
Water heaters	EA	115.00-350.00

Prices based on average residential and commercial work. Special fixtures and excessive piping not included.

HEATING

Furnaces, Gas Fired, Av Job

FLOOR	
25,000 BTU	120.00-140.00
35,000 BTU	128.00-150.00
45,000 BTU	145.00-165.00
Automatic control, add	27.00- 37.00
DUAL WALL	
25,000 BTU	136.00-160.00
35,000 BTU	147.00-170.00
50,000 BTU	174.00-195.00
Automatic control, add	43.00- 55.00
GRAVITY	
75,000 BTU	420.00-510.00
85,000 BTU	450.00-530.00
95,000 BTU	500.00-650.00
Forced air furnace, add	85.00-150.00
Automatic control, add	20.00- 30.00
HEAT REGISTERS	
Outlet	13.00- 28.00

ELECTRIC WIRING

Per Outlet

Knob & Tube	EA	11.00
Armor	EA	18.00
Conduit	EA	23.00
110-V Circuit	EA	29.00
220-V Circuit	EA	108.00

ELEVATORS & ESCALATORS

Prices vary according to capacity, speed and type.
Consult elevator companies.
Slow speed apartment house elevator including doors and trim about $4,000 per floor.

Western Cost Construction Indexes

Presented by Clyde Shute, Director of Statistical Policy, Construction News Div., F. W. Dodge Corp., from data compiled by E. H. Boeckh & Assoc. Inc.

Labor and Materials: U.S. average 1926-1929=100

	DENVER					LOS ANGELES				
	RESIDENTIAL		APTS., HOTELS OFFICE BLDGS.	COMMERCIAL AND FACTORY BLDGS.		RESIDENTIAL		APTS., HOTELS OFFICE BLDGS.	COMMERCIAL AND FACTORY BLDGS.	
PERIOD	Brick	Frame	Brick and Concrete	Brick and Concrete	Brick and Steel	Brick	Frame	Brick and Concrete	Brick and Concrete	Brick and Steel
1948	217.8	218.1	202.7	207.0	206.7	215.9	216.5	205.8	210.0	209.8
1949	215.8	212.9	211.0	215.3	214.6	207.0	203.2	209.9	212.4	210.2
1950	230.0	228.2	218.8	221.3	221.2	224.1	222.8	217.4	219.0	217.5
1951	249.7	246.6	236.5	237.2	238.9	241.0	239.5	235.1	236.9	236.6
1952	253.6	249.4	243.4	245.1	245.6	243.8	241.7	239.8	242.6	241.5
1953	259.6	254.0	255.0	260.9	258.1	250.5	246.5	252.3	258.2	255.3
1954	258.9	252.0	259.1	266.2	263.4	251.0	245.3	257.7	265.7	261.8
1955	266.6	260.9	266.3	273.2	271.7	262.1	256.6	269.3	278.0	273.9
1956	274.9	269.3	275.8	282.3	285.1	272.6	266.7	282.9	292.9	289.3
1957	281.3	272.2	285.4	293.1	296.4	275.4	267.9	292.8	303.3	303.7
1958	282.2	272.0	288.1	295.9	298.8	277.9	286.6	302.6	314.5	316.4
1959	288.7	278.9	295.2	302.9	304.8	288.7	279.1	314.9	326.9	327.6
1960	292.2	282.7	301.3	309.0	310.0	299.8	287.7	329.1	342.7	339.6
1961	294.4	285.0	307.7	316.1	311.9	303.4	288.5	339.4	355.1	347.6
April 1962	298.0	286.3	316.0	326.9	318.4	309.0	294.3	345.8	360.1	354.3
May 1962	298.5	286.6	317.0	327.6	319.5	310.2	294.9	347.4	362.7	355.2
June 1962	298.5	286.6	317.0	327.6	319.5	312.4	296.2	351.0	367.9	359.4
	% Increase over 1939					% Increase over 1939				
June 1962	166.5	155.7	173.0	178.1	173.1	221.4	216.4	222.9	250.7	238.4

	SAN FRANCISCO					SEATTLE				
1948	218.9	216.6	208.3	214.7	211.1	216.3	211.4	211.5	216.6	216.9
1949	213.0	207.1	214.0	219.8	216.1	214.2	203.9	220.7	228.5	225.3
1950	227.0	223.1	222.4	224.5	222.6	224.1	213.6	227.1	234.5	230.3
1951	245.2	240.4	239.6	243.1	243.1	245.1	232.7	247.7	255.8	251.0
1952	250.2	245.0	245.6	248.7	249.6	254.3	239.8	258.8	267.7	263.8
1953	255.2	257.2	256.6	261.0	259.7	254.8	239.0	262.7	273.6	269.5
1954	257.4	249.2	264.1	272.5	267.2	253.3	236.1	266.6	279.1	274.0
1955	268.0	259.0	275.0	284.4	279.6	260.6	243.3	273.7	287.3	282.4
1956	279.0	270.0	288.9	298.6	295.8	273.5	254.0	288.5	303.4	299.0
1957	286.3	274.4	302.9	315.2	310.7	275.6	254.0	298.2	313.1	311.2
1958	289.8	274.9	311.5	326.7	320.8	279.9	256.4	306.0	324.0	320.8
1959	299.2	284.4	322.7	338.1	330.1	291.5	267.8	318.8	336.9	331.8
1960	305.5	288.9	335.3	352.2	342.3	298.9	272.4	330.5	351.2	342.9
1961	308.7	290.2	345.1	362.9	350.2	296.5	268.2	335.3	357.6	345.6
April 1962	313.2	294.2	352.0	369.4	355.4	305.5	277.6	345.2	367.4	353.5
May 1962	313.7	294.4	352.7	370.7	356.1	306.1	278.2	346.0	368.0	354.1
June 1962	313.7	294.4	352.7	370.7	356.1	306.1	278.2	346.0	368.0	354.1
	% Increase over 1939					% Increase over 1939				
June 1962	197.1	196.5	200.4	204.1	205.7	193.2	187.7	190.3	193.7	198.3

Cost comparisons, as percentage differences, for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.:

index for city A = 110
index for city B = 95

(both indexes must be for the same type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

$$\frac{110-95}{95} = 0.158$$

Conversely: costs in B are approximately 14 per cent lower than in A.

$$\frac{110-95}{110} = 0.136$$

Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926-29.

Material prices and wage rates used in the current indexes make no allowance for payments in excess of published list prices, thus indexes reflect minimum costs and not necessarily actual costs.

ARE YOU PUZZLED?

Architects and specification writers know that there are Roofing Asphalts available to fit the requirements of all climates and roof deck slopes—but may be puzzled by the selection of proper type because wide local variation in climate is typical of the West.

THIS SHOULD HELP:

Asphalt and gravel built-up roofs may be specified for any climate and for any roof slope from "dead-level" to 3″ per foot. Maximum service life may be expected if the Asphalt used is of the lowest possible Softening Point (i.e., the softest), consistent with roof deck slope and climate. Simply stated, this means that the Asphalt should be soft enough so that any tiny cracks which may develop through thermal expansion and contraction in the deck, or through building settlement, will tend to flow together, or "heal," during warm weather; but should not be so soft that it will flow down the roof during a hot spell.

Selection of Asphalt Softening Point may often be done on the basis of local experience. Where such experience records are meager, the following table will serve as a guide for your selection and specification of roofing Asphalt type:

DECK SLOPE	NORMAL[1] CLIMATE	HOT[2] CLIMATE
0″—½″	dead-level	dead-level
½″—1″	flat	flat
1″—1½″	flat	steep
1½″—2″	flat	steep
2″—2½″	steep	special steep
2½″—3″	steep	special steep

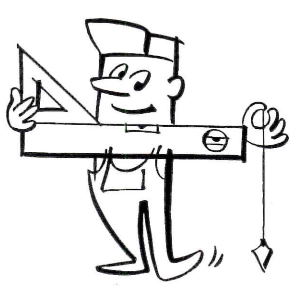
1 Not more than an occasional day with air temperature over 95°F.

2 Extended periods with day-time air temperatures over 95°F, with clear sky, bright sun.

Note: Typical Softening Points are:

dead-level .... 140°F
flat .... 170°F
steep .... 190°F
special steep .... 210°F

Assure your next building of trouble-free, low-cost protection by specifying the proper Asphalt roofing materials. Want more information? Fill out and send coupon.



THE ASPHALT INSTITUTE
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Gentlemen: Please send me without obligation more information on Asphalt roofing.

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TITLE ____________________
FIRM ____________________
ADDRESS ____________________

For more data, circle 207 on Inquiry Card

Raise the roof in record time

Sheffield steel roof deck is fast, economical and versatile. Whether you're building schools, office buildings, warehouses, shopping centers or any other type of commercial building, it will pay you to consider all the advantages of Sheffield steel roof deck:

Fast and Easy to Install. Whether you install Sheffield Steel Roof Deck on steel joists, or other construction, you will approach the shortest possible elapsed time for erecting a completed roof. It can be fastened to the structure by welding the deck sheets to supporting steel members. Use it for flat, pitched or arched roof construction. Best of all, it can be installed even in bad weather.

Lightweight and Strong. Fabricated from 18, 20 or 22 gauge steel. For normal roof load, deck may be spanned up to 10 feet. Type A — with ¾″ ribs — comes in 18″ and 24″ widths, and in lengths up to 30′2″. Type B — a stronger deck with 2″ ribs — comes in the same widths and lengths. Weight per square foot varies from 1.9 to 3 pounds, depending on gauge and number of spans.

wit   Sheffield steel roof deck

ttractive and Low Cost. Improves appearance of all ypes of commercial and industrial buildings. Exposed ibs aid in sound diffusion. Usually costs less than omparable materials. Its light veight reduces dead load—which educes weight and cost of beams, olumns and footings. Insulated onstruction gives further savings. It's strong, durable nd permanent.

SHEFFIELD
Steel Roof Deck

pecial Widths and Accessories. Side closure sheets re available. Also such accessories as clips, cant strips, hip plates, valley plates, closure plates, and sump pans.

Durable. Sheffield Steel Roof Deck becomes a roof that lasts. This deck has a gray primer protective coating with rust-inhibiting Zinc Chromate Pigment.

Write for Free Specification Brochure. Gives complete technical details, tables, recommended specifications, other information. Write to: **Sheffield Division, Armco Steel Corporation, Sheffield Station, Kansas City 25, Missouri.**

ARMCO   Sheffield Division

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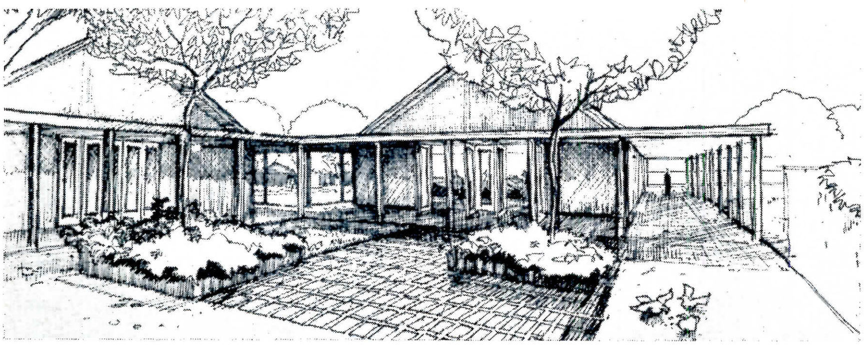
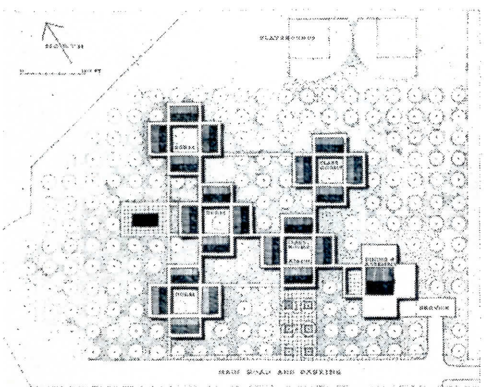
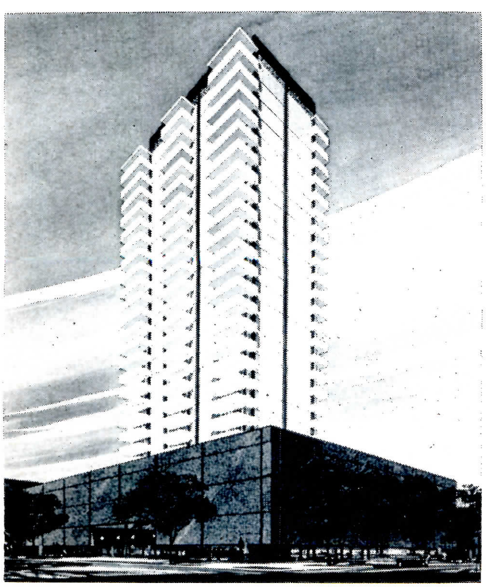
Western Buildings in the News

A "dodecagon with a concavital conoid roof," as the architect describes this pavilion at the bus stop in Sausalito, Calif., this little building replaces a ramshackle old—and unattractive—shelter which the city had been trying to get rid of for the past five years. In a recent election campaign the pavilion became a focal point of controversy; but the candidate who attacked it lost the election. Charles Finney, architect





This cluster-plan scheme is for California's first school specially designed to provide for a specific training program for mentally retarded children. Approximately 150 will be accommodated in these buildings on a 10-acre hilltop in San Jose, Calif. The program they will have is designed to fit them for a useful place in society. The buildings are designed in a domestic scale. Del Campo & Clark of San Francisco, architects



Another tall building will join Denver's growing number of skyscrapers when this building, a combination office and apartment building, is completed. The building will have three floors of ramp-type parking, three office floors, and a tower of 24 stories with 145 apartments. The upper floors will have penthouse apartments. Separate lobbies and elevators will serve the apartment and office buildings. Total cost is expected to be approximately $3 million. Construction on it is to get under way before the end of the year. Donald R. Roark of Denver, architect

ROCKRISE RESIGNS POST AS PLANNING COMMISSIONER

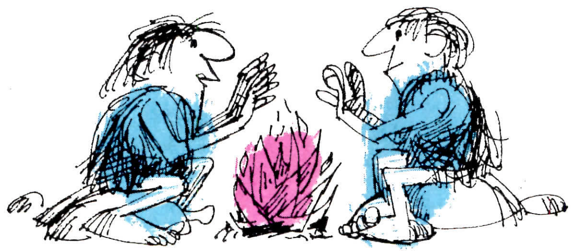
Architect George Rockrise, appointed last year to the San Francisco Planning Commission, has resigned after a brief but voluble career during which he frequently spoke out with considerable strength at threats to San Francisco's beauty. But while he had been something of a controversial public figure, his resignation came because of the "conflict of interest" rule.

Many cities, counties and states have such rules, intended to preserve unbiased handling of public affairs. Rockrise had inquired whether his position as commissioner would prevent him from taking part in a study of downtown San Francisco now under way under sponsorship of the San Francisco Planning and Urban Renewal Association.

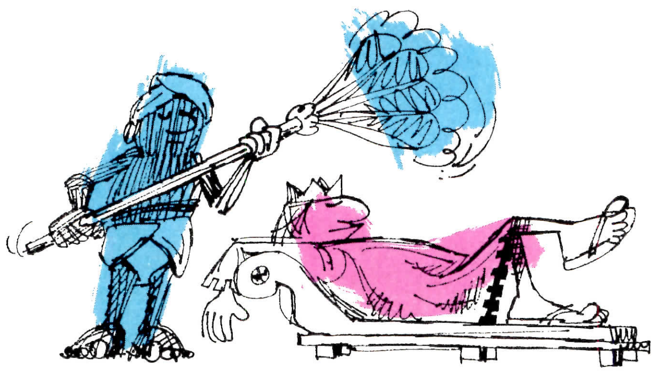
It would depend on the wording of the contract, the city attorney told him. In fact, he said, any architect would be up against it if he tried to serve his city as a commissioner and had an active practice in the city, since a job in which he was involved might require a decision by the Planning Commission before a building permit could be issued for it. The mayor regretfully accepted the resignation and appointed Alvin H. Baum, an attorney, to succeed him.

PASADENA TO DEVELOP OPEN LAND AS RENEWAL AREA

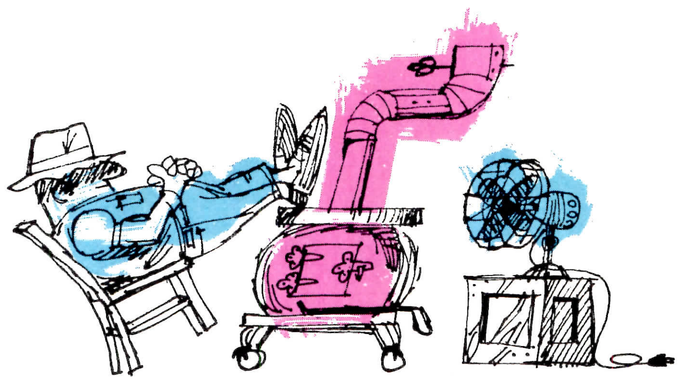
A project based on the same unusual provision in the California Urban Renewal Act as used in San Francisco's Diamond Heights is that of South Pasadena, which recently dedicated its first project, a 309-acre plot of open land in its Monterey Hills section. Using the clause which permits qualification for renewal funds if land has been laid out without regard for contours, this hilly section of Pasadena, a city where urban renewal would seem to be without meaning, has been designated a "re-development" project. The land will be broken up into 640 lots of approximately half an acre each, for single-family houses, and eventual development is expected to be similar to that of nearby San Marino or Palos Verdes on the coast.



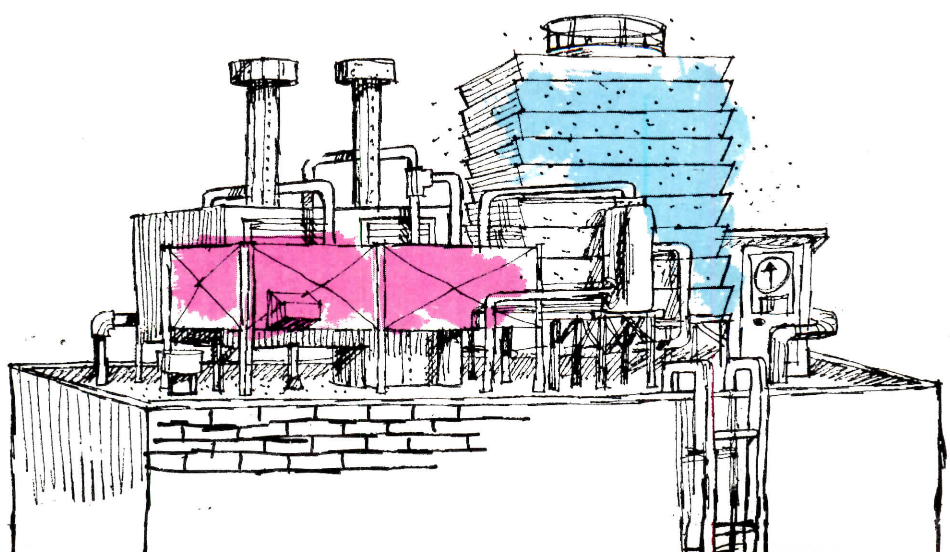
SINCE THE BEGINNING, MAN'S STRUGGLE TO KEEP WARM



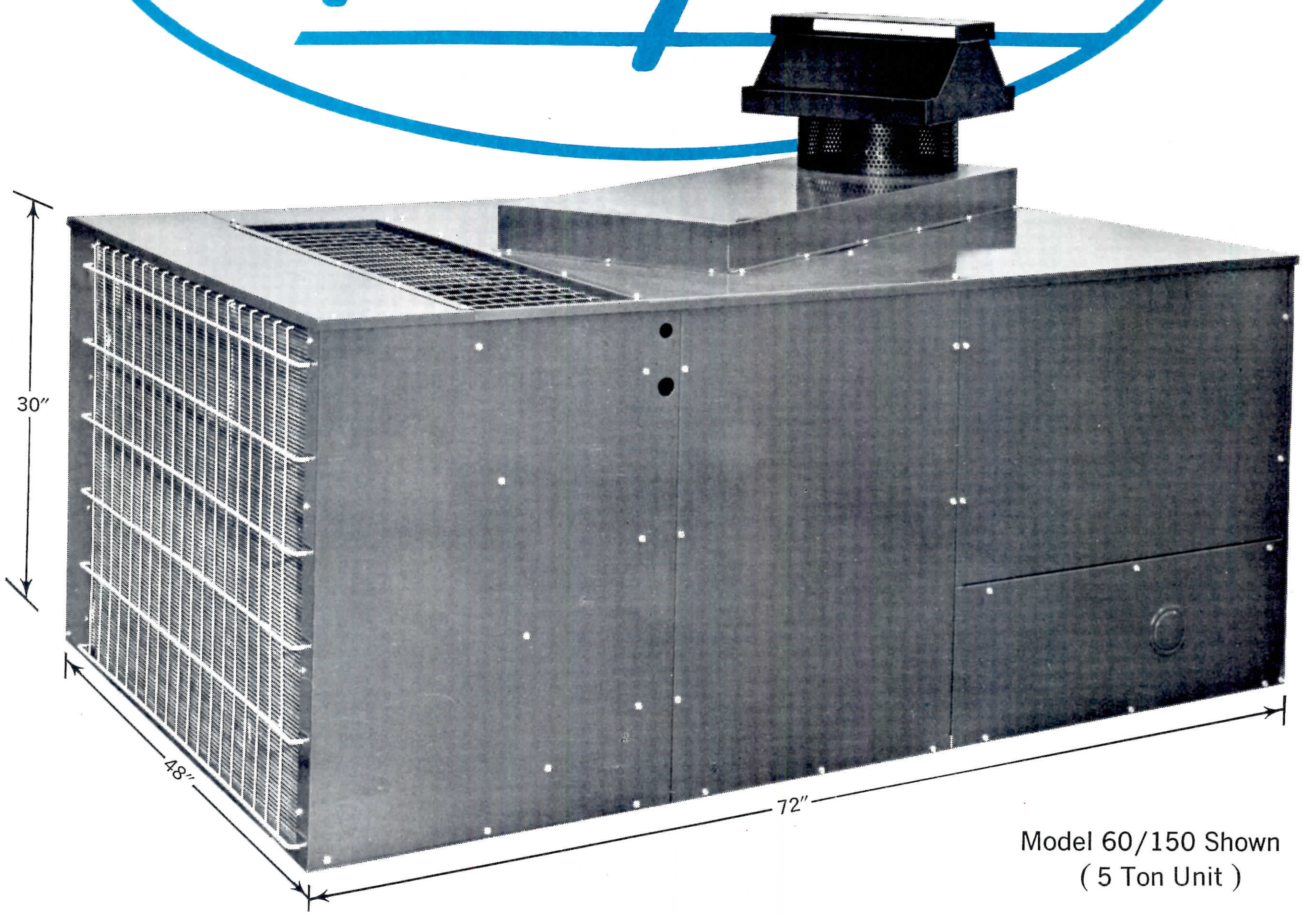
AND KEEP COOL HAS PRODUCED ONE INAPPROPRIATE,



INADEQUATE INVENTION AFTER ANOTHER UNTIL



Payne



Model 60/150 Shown
(5 Ton Unit)

EconoAir

HEATS WITH GAS
COOLS WITH ELECTRICITY
INSTALLS OUTDOORS

s much work as units twice its size

1 ree times its weight!

A here's the proof by comparison:

MANUFACTURER*	Overall Height	Overall Length	Overall Width	Weight	Cooling Capacity 000 BTUH	Heating Capacity 000 BTUH	One Piece Const.	AGA App'd for outdoor application	ARI Cert'd.
Payne Econoair Model 60/150	**30**	**72**	**48**	**800**	**60**	**150**	**Yes**	**Yes**	**Yes**
A	65	153	83	2000	65	100	Yes	No	No
B	49	147	36	1550	59	150	Yes	No	Yes
C	56	154	41	2127	59	150	Yes	No	No
D	40	106	45	1200	61	100	Yes	No	No
E	58	132	44	1970	55.6	150	Yes	No	No
F	38½	144	47	1880	57	150	Yes	No	Yes
G	44	128	45	1250	60	96	No	No	No

Comparison of 8 and 10-ton units reveal similar contrasts
*Manufacturers' name on request

Air IS:

heating and cooling—complete air conditioning in 1 compact outdoor unit.

for shopping centers, motels, churches, schools, homes, and other light construction.

Air WILL:

heat your building the best way... with economical gas.

cool *your building with reliable* electricity.

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require any inside floor space.

require more than normal building insulation.

require unsightly vent pipes.

require refrigerant lines.

EconoAir CONSTRUCTION

- A single, complete unit of proven Payne components.
- Designed and assembled at the factory by experts.
- Ready to install. No charging or refrigerant piping necessary.
- Future service requirements reduced to a minimum.

EconoAir

Payne

Here's the proof of reliability

In both controlled laboratory tests and on-the-job field tests, the performance of the Payne **ECONOAIR** was everything we had hoped for, and more!

In **WIND TESTS,** the **ECONOAIR'S** pilot and unique venting systems were undisturbed even though subjected to gale force velocities of 60 mph.

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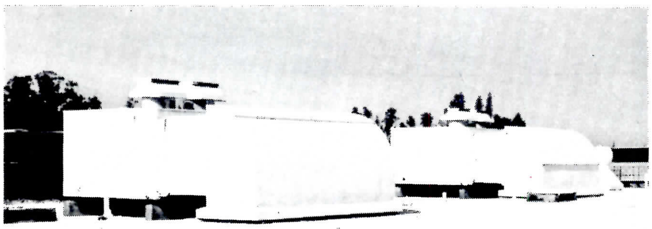
In **SUN AND SNOW TESTS** — units in the field, on job throughout the country — the **ECONOAIR'S** perfo ance and dependability were proven through, first scorching summer, and then, through the roughest wir in years. Glowing reports have come back on **ECONO** units covered by snow for weeks.

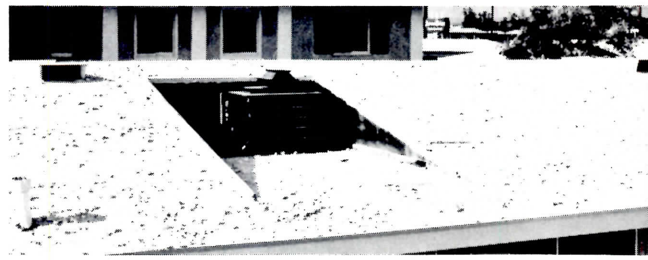
Here's the proof of acceptance



2 model 96/220 Econoair units provide the patrons of this new restaurant in Anaheim, California with year around comfort.

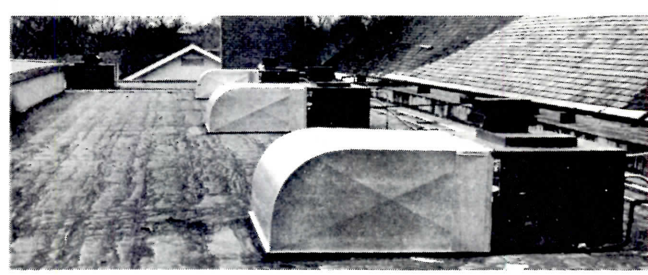
58 units on this 2-story building located in Arizona occupied by apartments, various shops, and a restaurant.

9 units, mounted on the roof of a convalescent home, offer patients the maximum in comfort in San Diego.

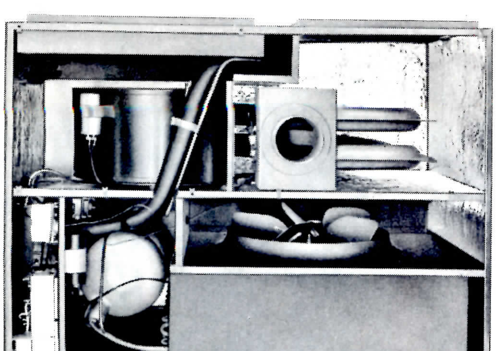


60 model 24/60 Econoairs recessed in "dormer type" installations for modern Sherwood-Riviera apartments in Orange County, California.

23 units for individual climate control by various shops in this super shopping center on the West Coast.



8 Econoair units installed on rooftop of the First Nazarene Church in Nampa, Idaho advances quiet-comfort for congregation.



Open view photo of 24/60 Econoair

MODELS AVAILABLE IN CAPACITIES RANGING FROM: 24,000 BTU cooling and 60,000 BTU heating

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120,000 BTU cooling and 270,000 BTU heating;

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2 and 3 ton sizes for home use; and 5, 8 and 10 ton sizes for commercial use.

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Elegance on a Budget

INTERIOR:
Glenn Craft, A.I.A.
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The unique beauty of Ludowici special shapes shale flooring tile is now practical for your most budget minded client. Because of greatly increased demand, price reductions have been made on all special shape styles. No difference in quality or texture.

You can now afford the world's most beautiful flooring tile.

Provence, Valencia and Renaissance patterns available in brushed or smooth, in red or fire flashed colors.

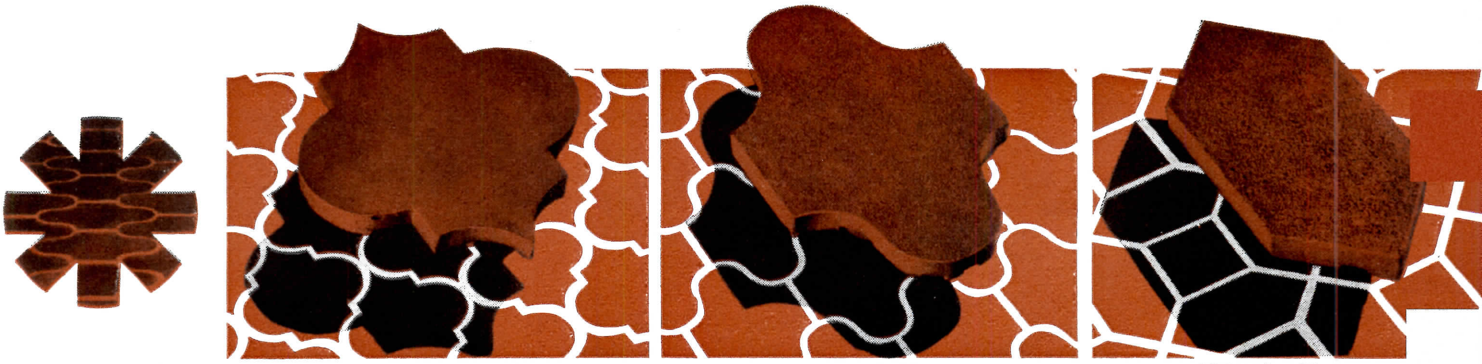
For complete information and the name of your nearest distributor write:

FLOORING TILE DIVISION—Dept. R.

LUDOWICI-CELADON CO. • 75 East Wacker Drive, Chicago 1, Illinois
Manufacturers of quarry tile, the nation's largest producer of roofing tile and NAILON Facing Brick

WEST COAST REPRESENTATIVES: **Gladding, McBean & Co., Los Angeles, San Francisco, Portland, Seattle, Spokane, Phoenix**

HAWAII REPRESENTATIVES: **Lewers & Cooke, Ltd., Honolulu**

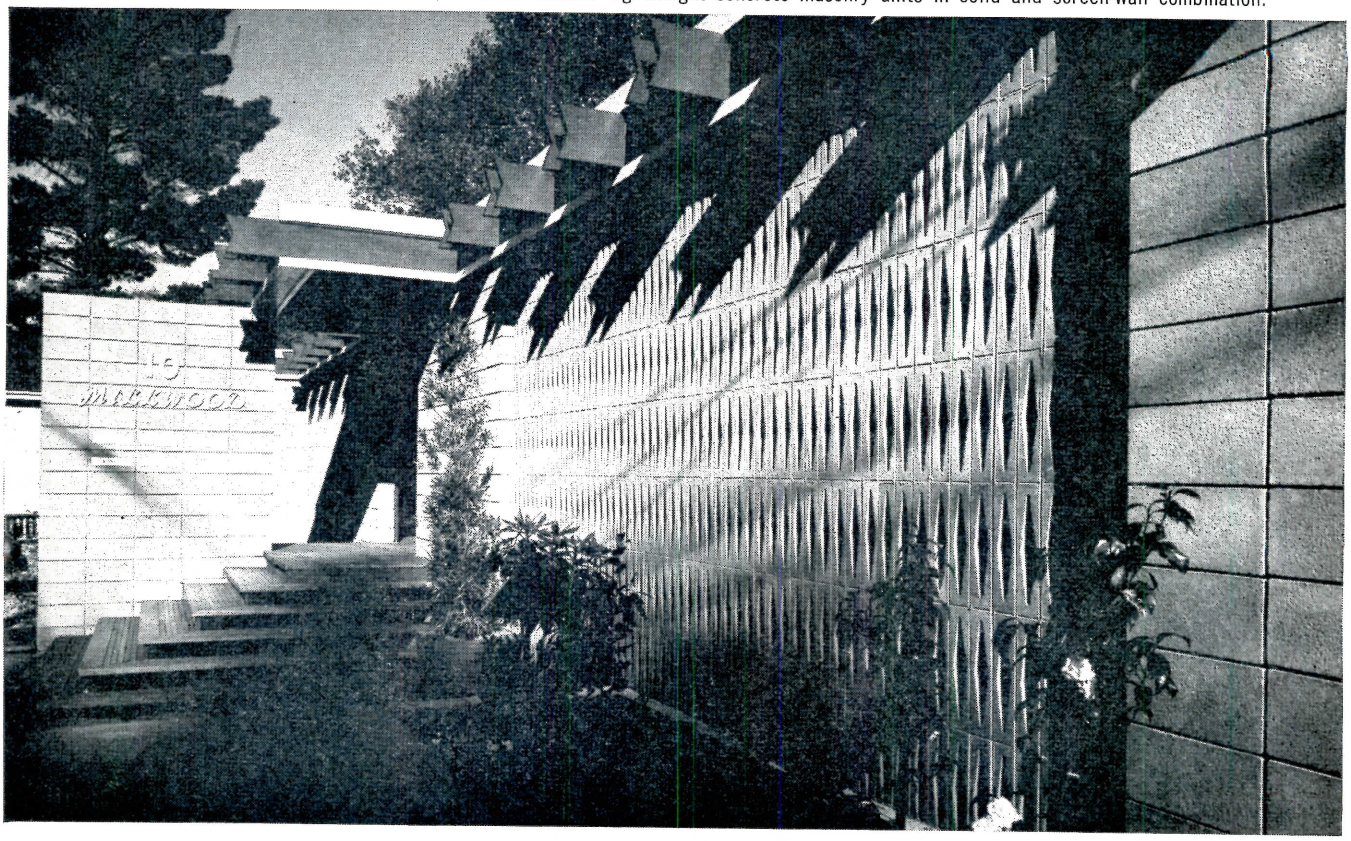


VALENCIA **PROVENEC** **RENAISSANCE**

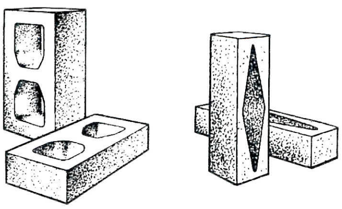
← For more data, circle 209 on Inquiry Card

For more data, circle 205 on Inquiry Card

This suburban medical office building in Mill Valley, California, designed by Michael Wornum, A.I.A., San Francisco, features Basalite lightweight concrete masonry units in solid and screen-wall combination.



BASALITE COMBINATIONS IN CONTRAST



BASALITE is precision-made in 155 shapes and sizes, in several colors. Lightweight, expanded shale aggregate yields **permanent** values: fire safety which affords lower insurance rates, earthquake resistance, natural insulation, and immunity to weather and termites.

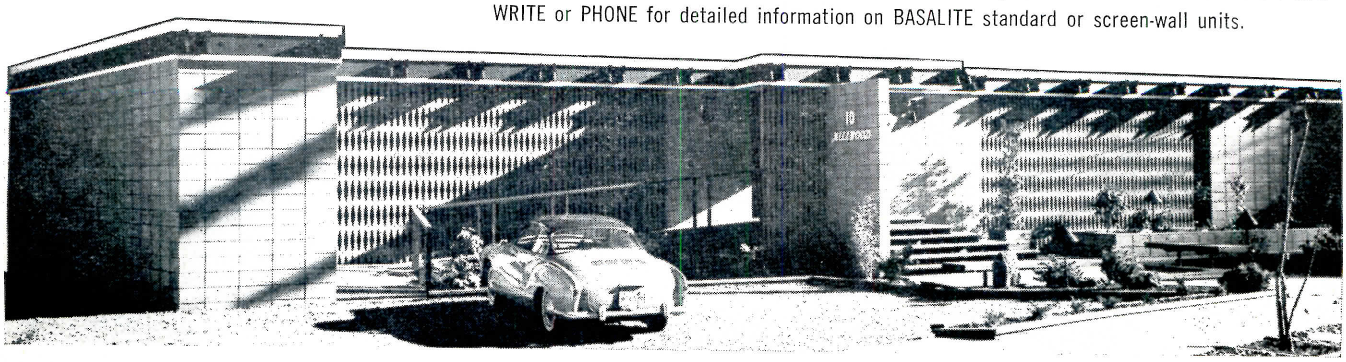
The HARLEQUIN unit is also available (on special order) filled in contrasting colored concrete or exposed aggregate particles.

BASALITE lightweight concrete masonry units provide a basic structural material with unlimited design possibilities. A striking effect can be achieved by combining standard and open grille patterns, as in this effective use of Basalite's basic unit and Harlequin screen-wall. *However,* the basic Basalite unit creates dramatic design combinations in contrast with stone, wood, glass or glass block, architectural concrete, stucco, metal skin... in fact with *any* other construction material.

BASALITE

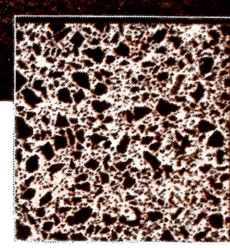
Lightweight concrete masonry units • Products of BASALT ROCK COMPANY, INC. • Napa, California • BAldwin 6-7411

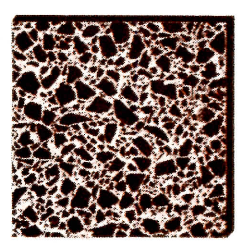
WRITE or PHONE for detailed information on BASALITE standard or screen-wall units.



For more data, circle 213 on Inquiry Card

Owners: Dr. and Mrs. F. R. Rossi, Jr., Green Valley, California
Architects: Lillis and Smith, A.I.A., Vallejo, California—Masonry Contractor: Lloyd Gregory, Napa, California





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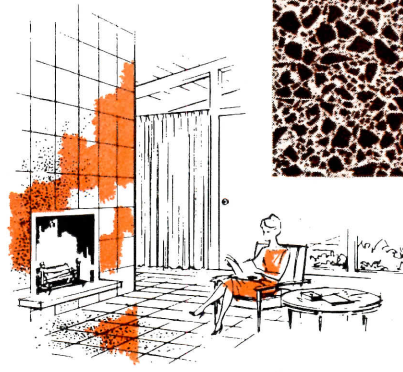
TERRAZZO TILE! Basalt's experience and distinctive Western onyx and marble bring *you* Mediterranean color and texture with the strength of American technology! Basalt's Terrazzo Tile provides beautifully polished elegance, with a wide selection of hues and textures. Easily installed, easily maintained—Basalt Terrazzo is perfect for dramatic effects in residences, institutions or commercial locations. Write for our brochure that tells full rewarding story!



BASALT *Terrazzo Tile*

made only by **BASALT ROCK COMPANY, INC.** / Napa, California / BA 6-7411

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REBUILDING WESTERN CITIES: RENEWAL MOVES AHEAD

With ground breaking ceremonies for two of the West's largest redevelopment projects—Golden Gateway in San Francisco and Ocean Park in Santa Monica—and Los Angeles' Bunker Hill and San Francisco's Western Addition under construction, urban renewal is well on its way in Western cities.

Besides these more developed—and dramatic—projects, there are many more in various stages of progress, from land acquisition to final sale of land, in smaller Western cities and towns too numerous for listing.

Farthest along in actual development is Sacramento's Capitol area project, where a pleasant group of garden apartments has been in use for the last two years. The West's first redevelopment project to replace a blighted area, the Ann Street section in Los Angeles, with a new industrial area, recently finished selling all its parcels of land to private investors, and construction will get under way shortly on the first buildings in the area. Portland officials proudly watched recently when ground was broken for the first structure—an office building—in its South Auditorium renewal area, and is proceeding with sale of other pieces of property in the area. A few houses have been occupied in San Francisco's Diamond Heights, and construction is expected to start soon on the apartment group on Red Rock Hill.

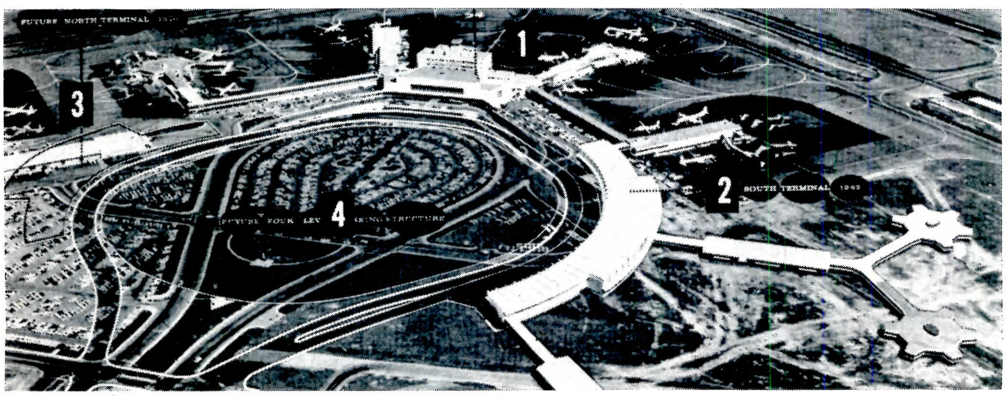
In Colorado, progress has been slower than elsewhere, but the Denver Urban Renewal Agency had to go through a court test before it could actually begin work on its first project, Avondale. Officials were disappointed when, last May, they offered their first parcel of land for sale and it drew not one bid. However, competitive bidding for larger parcels in the commercial area and for the choicest piece of land in the area—the apartment house location on the high point of the property—was expected to bring considerable interest when these acreages are put up for sale.

COLORADO UNIVERSITY NAMES DEAN, FORMS NEW SCHOOL

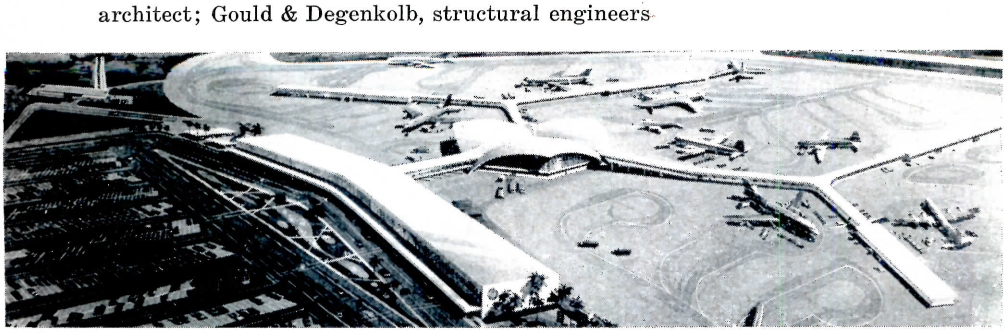
DeVon M. Carlson, professor of ar chitecture and acting head of th department of architectural engi neering at the University of Colo rado, Boulder, has been named dea of the newly created School of Archi tecture at the University. Professo Carlson is a graduate of the Univer sity of Kansas, University of Colo rado and Columbia University, an has been a member of the faculty a Boulder since 1943. He is a membe of the Colorado State Board of Archi tectural Examiners.

The school will offer a five-yea curriculum in architecture and ar chitectural engineering, with pro grams in landscape architecture, in terior design, urban planning and ar scheduled for students entering i 1963. A statement from the Univer sity indicates that freshman an sophomore requirements for profes sional degrees within the College o Arts and Sciences are prerequisite to entrance.

AIRPORTS EXPAND FACILITIES TO MEET JET NEEDS



SAN FRANCISCO AIRPORT'S existing terminal (1) is being expanded: south terminal (2) is under construction, with north terminal (3) to be built later. Welton Becket & Associates, architects. An 8,000-car garage is soon to be built (4) Edward B. Page, architect; Gould & Degenkolb, structural engineers



MCCARRAN FIELD, LAS VEGAS, terminal will have thin-shell roof. Welton Becket and Associates, architects

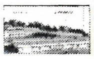
The West's big cities—Los Angele San Francisco, Seattle, Portlan Oakland, Salt-Lake City—have all re cently undertaken to improve thei airports—out of necessity. An smaller cities with sharply increase traffic—for many, the plane is th only means of transportation in cer tain directions—are also trying t catch up with the jet plane's require ments and the facilities it makes ne essary. Oakland's new termina (John Carl Warnecke & Associate architects), to be ready this fall, an the new terminals at San Francisc and Las Vegas (Welton Becket Associates, architects), all of whic use thin-shell structural concepts fo their roofs are indications of a ne awareness of the drama of the mo ern airport and the potential for e pression of this through the archite tural design of an airport's building But as yet airport boards and com missions generally tend toward th "tried and true" look of earlier ai port buildings.

New **colored** Pab-Flex brings a bright revolution to exterior siding.

Siding like this doesn't grow on trees.

Saves time!	Trouble free!	Tough!	Beautiful!
integral color	minimal maintenance	won't burn	clean, modern appearance
no waiting for paint to dry	cleans with water spray	won't scratch or dent	ten built-in lifetime colors
no waiting for stucco to set	untroubled by sun, rain, wind	won't rot	textured or smooth
no job delays because of rain	termite proof	won't blister or peel	designed for Western architecture

We've just finished a handsome new booklet explaining the whys and wherefores of Colored Pab-Flex asbestos-cement board. It shows the variety of colors available, where and how to use Pab-Flex, as well as some new exterior decorator ideas using this versatile siding. For your free copy, drop a note to Dept. F Pab-Flex, Pabco Roofing Division, Fibreboard Paper Products Corporation, 475 Brannan St., San Francisco., California.



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WHAT'S HAPPENED TO:

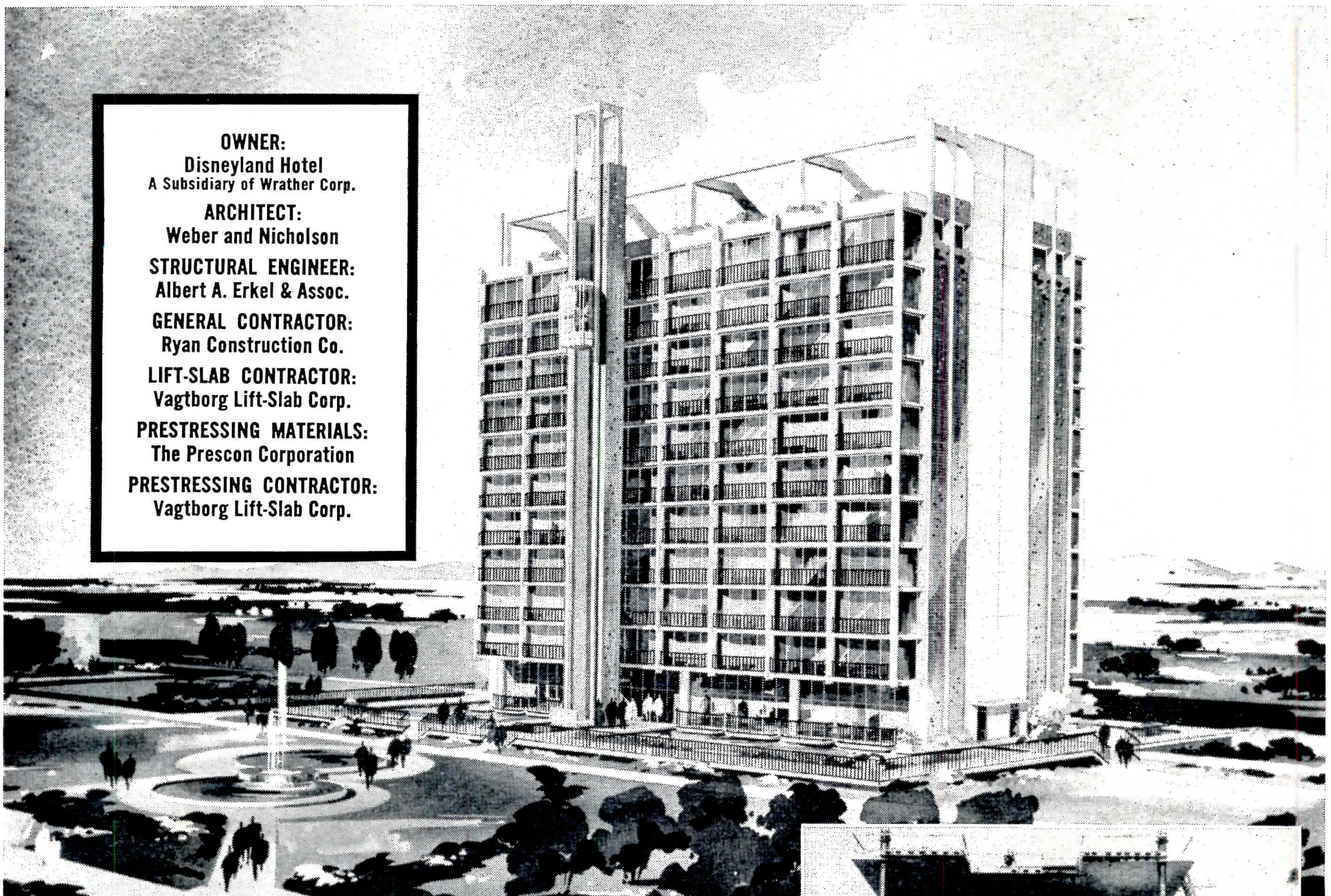
Portsmouth Square, once the scene of San Francisco's birthplace as an American city, whose redesign as a parking garage with terraced park on top caused a furor two years ago? It was dedicated and opened to use on August 24, 1962, A.D. California Heritage Council's president commented: "Once you dig up historic ground, it's not historic anymore." But not enough people agreed with him. They all had cars to park.

The Joseph Worcester house, built in 1875, on the summit of Russian Hill, San Francisco, destined for oblivion to make way for a 20-story apartment building? Hill residents won a 60-day reprieve for the lovely old shingle house and several others, of slightly later date, also on the block, and a design for a proposal of a master plan for the hilltop is under way to perserve some of the historic buildings and also provide some open space.

Magic Island, the multi-million-dollar development of "made land" off the shore of Ala Moana Park in Honolulu? Henry Kaiser's Hawaii-Kai Construction Company was low bidder on the first part of the first phase of the project—reclaiming eight acres—and is now at work on a seawall and filling operation. Eventually Magic Island will consist of about 300 acres for development of hotels, apartments and parks.

Summit House on Pike's Peak? Delayed by a court suit in regard to issuance of bonds for financing the $540,000 project, a new summit house is still in the future. But Colorado Springs' City Council took action this summer—spurred by complaints from tourists of the inadequacies of the present Summit house (built in 1882)—to nudge a new building off drawing boards and into construction: it appointed a committee to study ways and means of financing it.

The Air Force Academy Chapel? The Air Force was due to accept the building this month, a year and a few months later than originally anticipated. Visitors to the Academy who have seen the chapel report that its three worship areas are beautiful, each in its own way.



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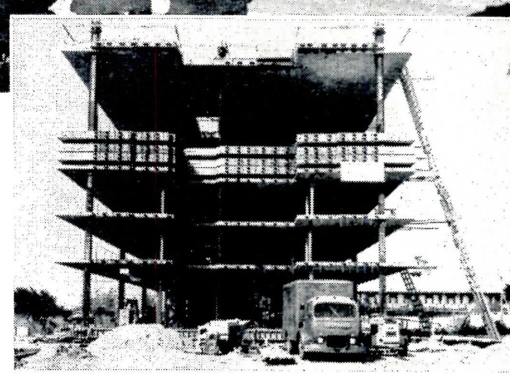

The stressing hardware can be seen at the ends of the slabs which are being lifted into position by the Vagtborg Lift-Slab Corp.

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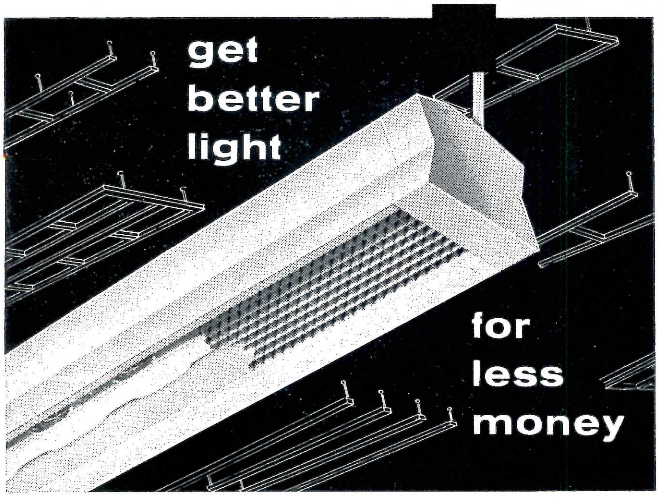

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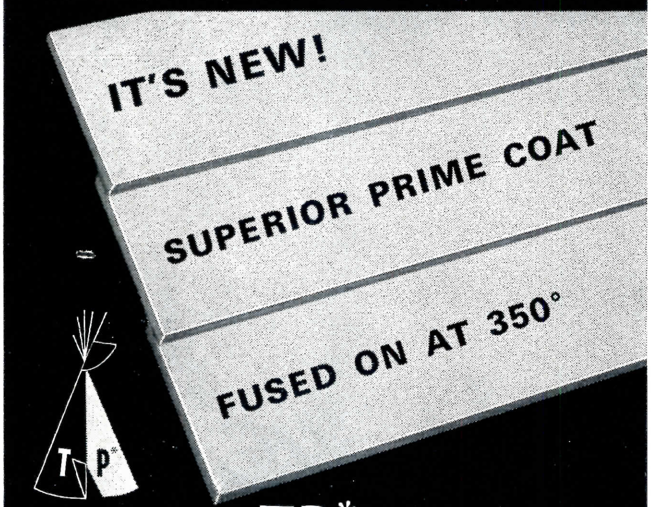

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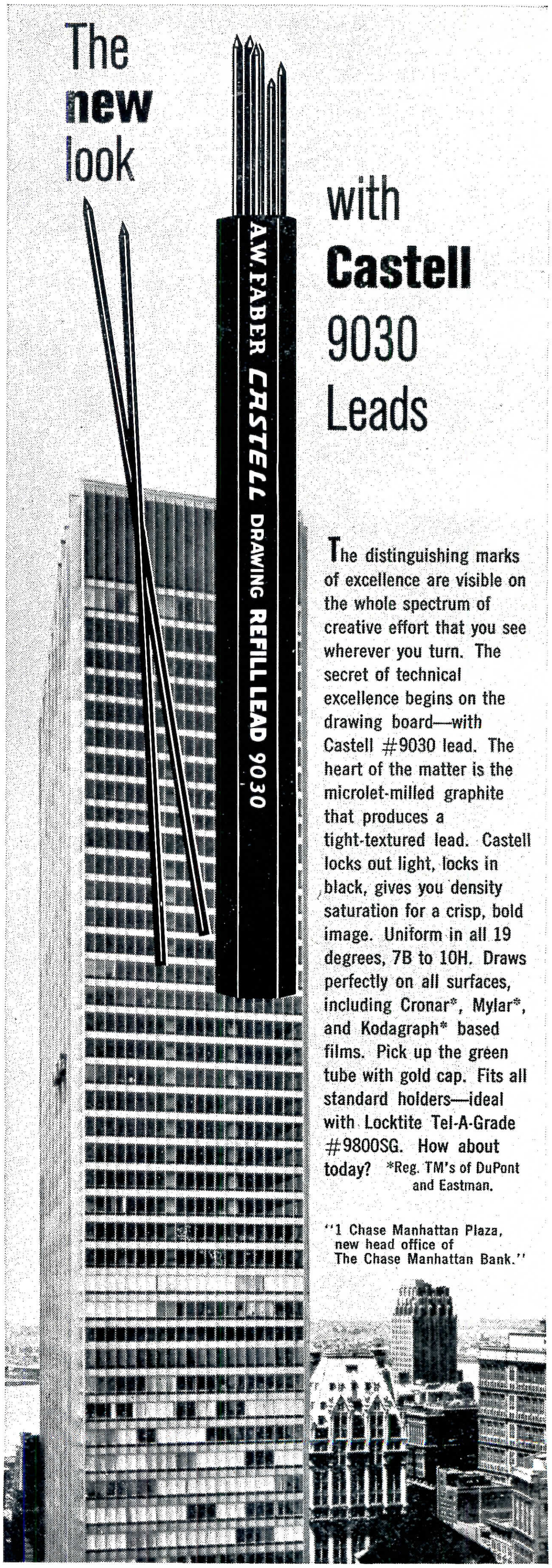

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Professional News

Awards

Eighteen architects, architectural teams and firms were honored at Architects' Day at the Seattle Fair when medals were presented to them "for their part in making the Seattle World's Fair beautiful": Paul Thiry, primary architect for the Fair and architect of the State of Washington Coliseum; Clayton Young, director of site development and director of liaison between the Fair and the Post-Fair Action Committee; Walker & McGough, Spokane; Robert B. Price & Associates, Tacoma; Seattle architects Waldron & Dietz and Naramore, Bain, Brady & Johanson; Minoru Yamasaki and Associates, Detroit; Seattle architects Durham, Anderson & Freed and B. Marcus Priteca and James J. Chiarelli; Kirk, Wallace, McKinley and Associates; Tucker & Shields; Wendell H. Lovett and Ted Bower; John Graham & Company; Adrian Wilson & Associates, Los Angeles; Richard Bouillon, Seattle; Tokyo architects Kazayuki Matsushita and Kideki Shimezu; John A. Phillips and Harry B. Rich, Seattle.

New Firms

Frederick Noel and *John Robert Henderson,* architects, have formed a partnership and opened offices at 309 West Cabrillo, Santa Barbara, Calif.

Sol Silver, architect, has opened an office at 1736 Stockton Street, San Francisco, Calif.

Bruce Lionel Johnson, architect and planning consultant, has established an office, with Keplar Johnson as associate architect, at 2426 Taraval Street, San Francisco.

Herman D. Ruth, A.I.P., and *Abraam Krushkov,* A.I.P., have formed the firm of Ruth & Krushkov, city and regional planners, at 2409 Telegraph Avenue, Berkeley.

Willem A. M. Wils, architect, has opened an office at 1842 South Dahlia Street, Denver, Colo.

Jack Hermann, architect, formerly a partner in the firm of Hatch, White, Hermann and Steinau, has opened his own office at 190 Bon Air Road, Kentfield, Calif. Hatch, White and Steinau continue in their offices at 680 Beach Street, San Francisco, Calif.

John B. Ferguson and *John Hutchison,* architects, have formed a partnership under the name of Ferguson, Hutchison & Associates, with offices at 14606 Victory Blvd., Van Nuys, Calif.

New Addresses

Architectural Art Services, Paule Anglim, director, has moved to 545 Francisco St., San Francisco.

Hans A. Feibusch, consulting engineer, has moved to 110 Market St., San Francisco.

Joe Davis Allen, architect, has opened an office at 680 Beach St., Suite 20, San Francisco.

Richard T. Crandell, architect, has moved to 939 Grant St., Denver.

Claude A. Nash, architect, has moved to 1869 S. Pearl St., Denver.

Goetz & Hansen, architects, and *David S. Johnson,* associate, have moved to 3530 Grand Avenue, Oakland, Calif.

John Charles Wilson, David Kerr Burton, and *Linda Witten Wilson,* architects, are now located at 3735 San Pablo Dam Road, El Sobrante, Calif.

Allan & Olsson, architects, have moved to Suite 200, Mayer Central Building, Phoenix 12, Ariz.

For more data, circle 223 on Inquiry Card

Professional News

Firm Changes

George S. Gatter, planning consultant, has joined Wilsey, Ham & Blair, engineers and planners, of Millbrae, as head of the city and regional planning department.

Leron A. Hester, architect, has been named an associate in the firm of Blurock, Ellerbroek & Associates, Corona del Mar, where he heads the specifications department.

L. Spencer Smith, architect, has been made an associate in the firm of Dean L. Gustavson Associates, Salt Lake City.

Robert C. Farnsworth, Robert E. Millsap and *Gustav H. Ullner* have been made associates in the firm of Albert C. Martin & Associates, architects and engineers, Los Angeles.

Douglas M. Merrill, architect, is a new partner in the architectural firm of Gillis, Merrill & Forell, San Francisco.

James A. Willis has been appointed chief structural engineer and associate in the structural engineering firm of Blaylock & Associates, San Diego.

Fred Bassetti and *John M. Morse,* architects, former partners in Bassetti & Morse, have established independent practices. Fred Bassetti & Company are temporarily located at 1602 Tower Building, Seattle. John M. Morse & Associates have permanent offices at 1610 Tower Building, Seattle.

New Addresses

The Hawaii chapter, A.I.A., and the *Honolulu chapter of the Producers' Council* have opened a joint office at 1210 Ward Avenue, Honolulu.

Calendar of Western Events

- September 27-29: Western Mountain Region, A.I.A., annual conference, Sun Valley, Idaho
- September 28-29: American Concrete Institute fall meeting, Olympic Hotel, Seattle
- September 30-October 4: World Conference on Shell Structures, Sheraton-Palace Hotel, San Francisco
- September 30-October 5: American Society for Testing Materials, Fourth Pacific Area National meeting, Statler-Hilton Hotel, Los Angeles
- October 3-7: California Council, A.I.A., annual convention, Mark Thomas Inn and Casa Munras, Monterey, Calif.
- October 4-6: Structural Engineers Association of California, annual convention, Hotel del Coronado, Coronado, Calif.
- October 4-6: Photo-vision '62, Third annual conference, sponsored by American Society of Magazine Photographers, Department of Journalism, U.C.L.A. and Department of Arts and Humanities, University Extension. Miramar Hotel, Santa Barbara
- October 4-7: National Trust for Historic Preservation, 16th Annual meeting, San Francisco
- October 6: Japan Architects Tour leaves San Francisco and Los Angeles
- October 11-14: Northwest Region, A.I.A., annual conference, Surftides Resort, Oceanlake, Ore.
- October 15: Due date, drawings for National School Fallout Shelter Design Competition

WESTERN SECTION

Index To Advertising

Manufacturers' Pre-Filed Catalogs of the firms listed below are available in the 1961 Sweet's Catalog Files as follows:
a Architectural File (green)
ic Industrial Construction (blue)
lc Light Construction File (yellow)
Page numbers of manufacturers' advertising elsewhere in this issue shown in italics

Western advertising offices: LOS ANGELES, Robert L. Clark, 1709 West Eighth Street; SAN FRANCISCO, John I. Howell, 255 California Street

Machu Picchu, Peru
—from *Site Planning*

Art Apart from Style

THE SHAPE OF TIME. *Remarks on the History of Things. By George Kubler. Yale University Press, 143 Elm St., New Haven 7, Conn. 136 pp. $3.75.*

Much criticism of art and architecture and many histories of art rest upon a substratum of unexamined assumptions that have been accepted for so long that they have come to seem self-evident. One such assumption is "universal style," the concept that at a particular time within a particular locality all artists should be producing work that can be classified under a single heading, epitomized by a single type.

This assumption is a weak frame of reference in which to consider the art of the last two hundred years; but, for some reason, the tendency has been to blame the artists and not to revise the theory. Everyone is familiar with the ingenious formulations that proclaim one classification of art "universal" and castigate the others as "retrogressive," thus transferring the uncertainty of the theorists into an impression of general malaise. *The Shape of Time* opens a way out of the impasse by subjecting the history of man-made objects to a fundamental analysis. In the process it becomes a very subversive book without in any way proclaiming itself to be one. By calling into question the concept of universal style as it is generally accepted, it undermines much that has been written about the history of art, and does so in language that is understated, distilled, and most felicitous.

Instead of a past neatly stratified and tabulated into historical periods, Mr. Kubler would prefer to look at the history of art in terms of its continuity. He acknowledges that "it is in the nature of being that no event ever repeats, but it is in the nature of thought that we understand events only by the identities we imagine among them." The unit of understanding that Mr. Kubler puts forward, however, is not the historical period, but particular classes of artistic problems, and the sequence of solutions to them, corresponding to the well-known progression from archaic, through "classic," to late work. In Mr. Kubler's view such sequences may co-exist in time, may even co-exist at different stages of development. In fact, a sequence can be resumed after long intervals of space and time, as African primative art was picked up in Europe at the beginning of this century.

Paradoxically, Mr. Kubler attaches great importance to the moment at which the artist makes his "entrance" into the sequence of ideas available to him. In his view, each artistic solution within a given frame of reference inevitably restricts the solutions that come after it. He rejects absolutely the concept, so beloved in the 19th century, of the artist as a Connecticut Yankee who could rewrite the past in terms of subsequent events.

Mr. Kubler's view of the history of art as a continuous thread, whose variegated strands are classes of artistic problems, leads him to reevaluate the extent to which lives of artists define an historical moment and the profit to be gained by considering a work of art in terms of the culture that existed at the time of its production. He is also lead to re-examine the nature of artistic sequence, to define the difference between intentional change and modification through repetition.

The reader may find that there is much in this study that he cannot accept without further investigation; he may also find that there are some things with which he cannot agree. One does not expect otherwise in a philosophical formulation of such wide scope. The significant point is that Mr. Kubler has re-opened a subject too long left closed, and thrown a strong light upon the trivialities which have been multiplying in obscurity. —JONATHAN BARNETT

The Larger Architecture

SITE PLANNING. *By Kevin Lynch. The M.I.T. Press, Massachusetts Institute of Technology, Cambridge, Mass. 248 pp., illus. $8.*

Mr. Lynch has successfully met his intention, declared in his preface to *Site Planning*, of writing "an introduction to the art, an exposition of its principles, and a condensed technical reference." The book will probably give its greatest service to architectural and planning students. At the same time, however, Mr. Lynch's approach and style—direct

continued on page 66

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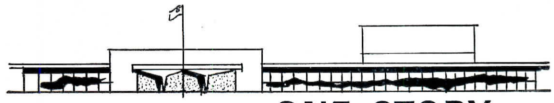

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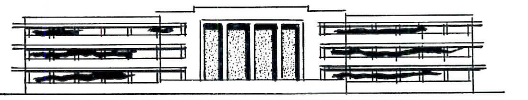

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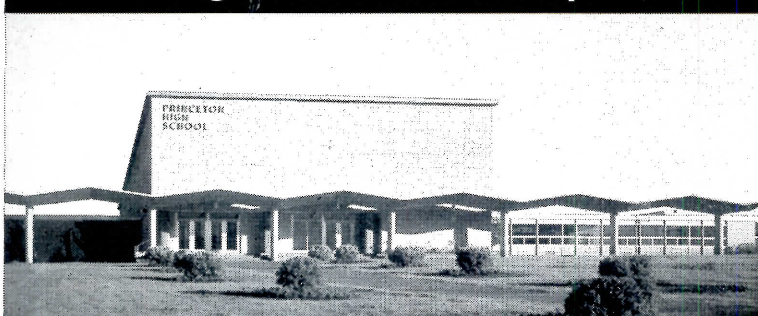

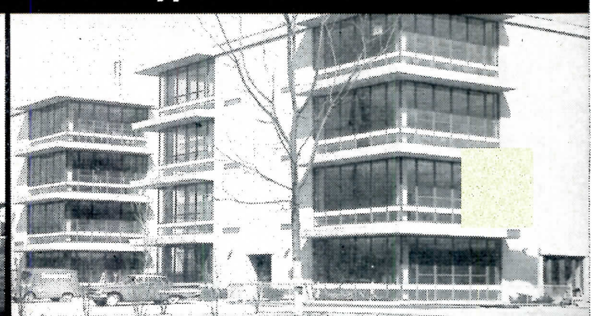

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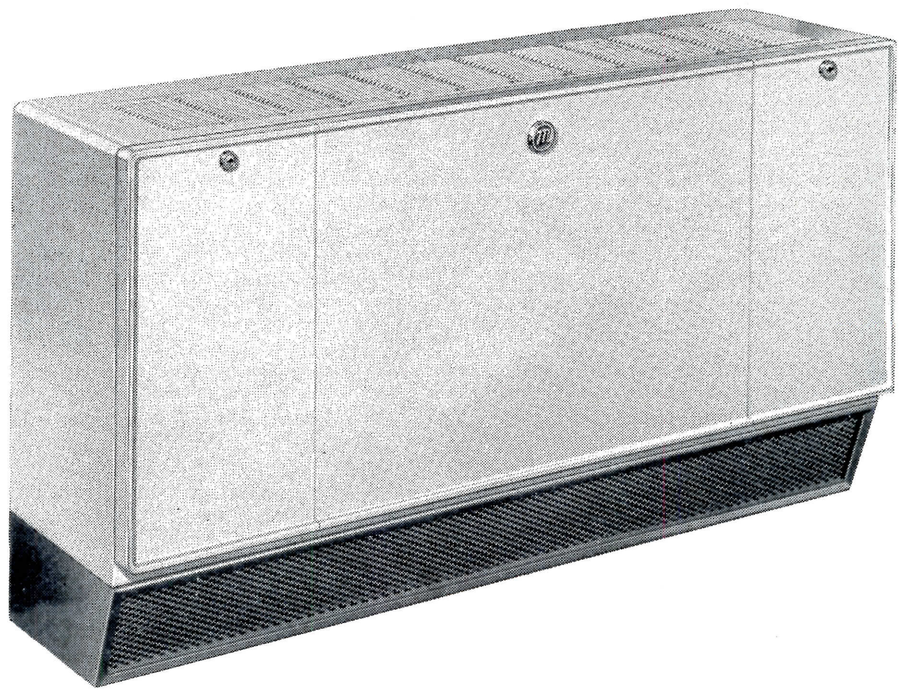

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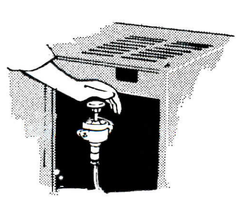

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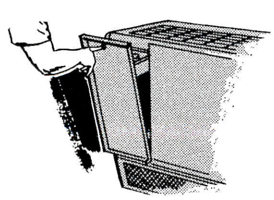

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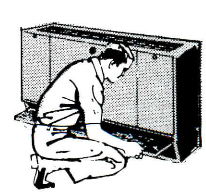

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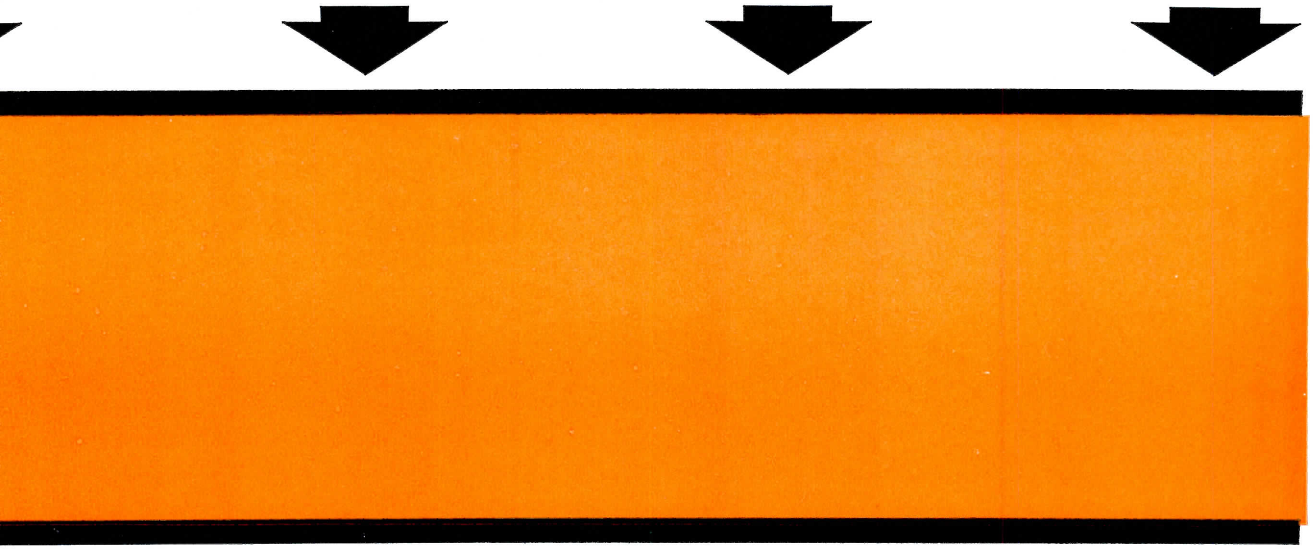
Left to right: Jerry Heyman, salesman, Tennessee Coal and Iron; S. S. Kenworthy, structural engineer; Eugene J. Pidgeon, vice-president, Pidgeon-Thomas Iron Company. Auditorium addition: Watkins Overton High School, Memphis, Tenn. ■ Architect: A. L. Aydelott & Associates, Memphis. ■ Structural engineers: S. S. Kenworthy & Associates, Memphis. ■ Structural fabricator and erector: Pidgeon-Thomas Iron Company, Memphis.



Required Reading

continued from page 58

(even dry), admirably free of professional hokum, and embellished by occasional eruptions of opinion and humor—should recommend it to practitioners who may have forgotten, in the hurly-burly of daily activities, the full possibilities of good site planning.

The book is divided into two sections: Fundamental Technique, being the exposition of principles, and Detailed Technique, being the condensed technical reference. The illustrations include half-tones as well as plentiful and helpful marginal sketches.

The Capital as City

WASHINGTON. *Vol. I, Village and Capital, 1800-1878. By Constance McLaughlin Green. Princeton University Press, Princeton, N.J. 445 pp., illus. $8.50.*

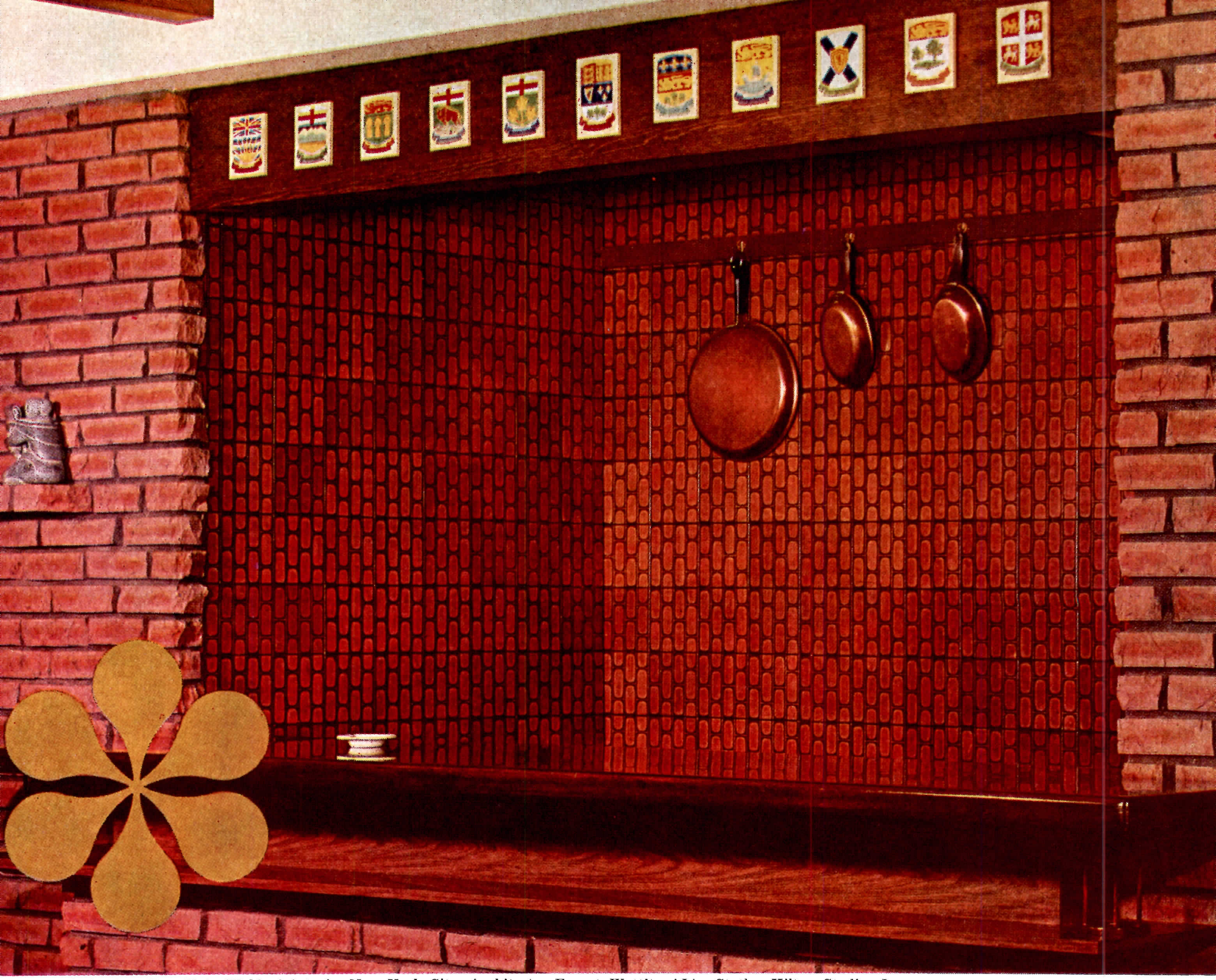
Mrs. Green allows, in her introduction, that in this book Washington's "architectural developments net attention only insofar as they marked a change in public interest in the capital." Nonetheless, buildings, city planning improvements and real estate have their place, as do society, politics, education, health and race relations, in her well-knit history of the growth of Washington as a city and as the nation's capital. Washington, with its lack of industry and its unique political structure, is not, of course, typical of other American cities, but Mrs. Green's account, which almost simultaneously describes the city's various civic phenomena, is both generally and specifically interesting.

Paperbacks

SCOPE OF TOTAL ARCHITECTURE. *By Walter Gropius. Collier Books, 60 Fifth Ave., New York 11. 158 pp., illus. $1.95, paperbound.*

This is a reprint, in the publisher's *World Perspectives* series, of Dr. Gropius's writings. The result is apt for the purpose of the series, which

continued on page 74



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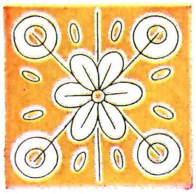

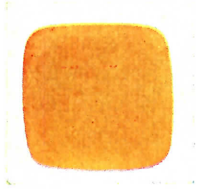

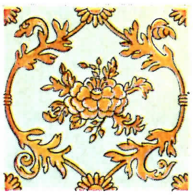

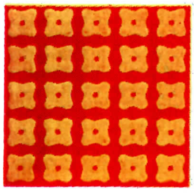

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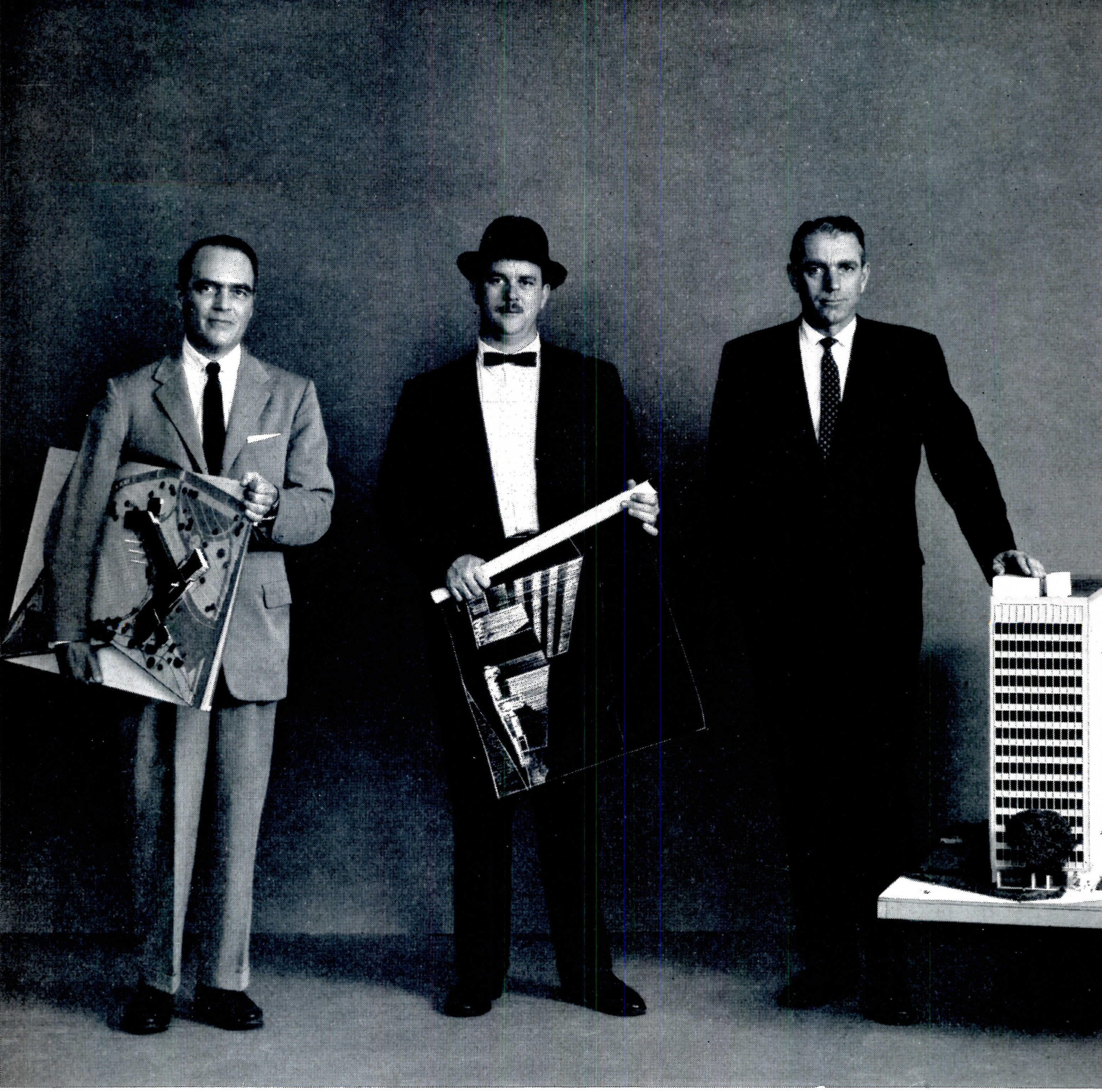
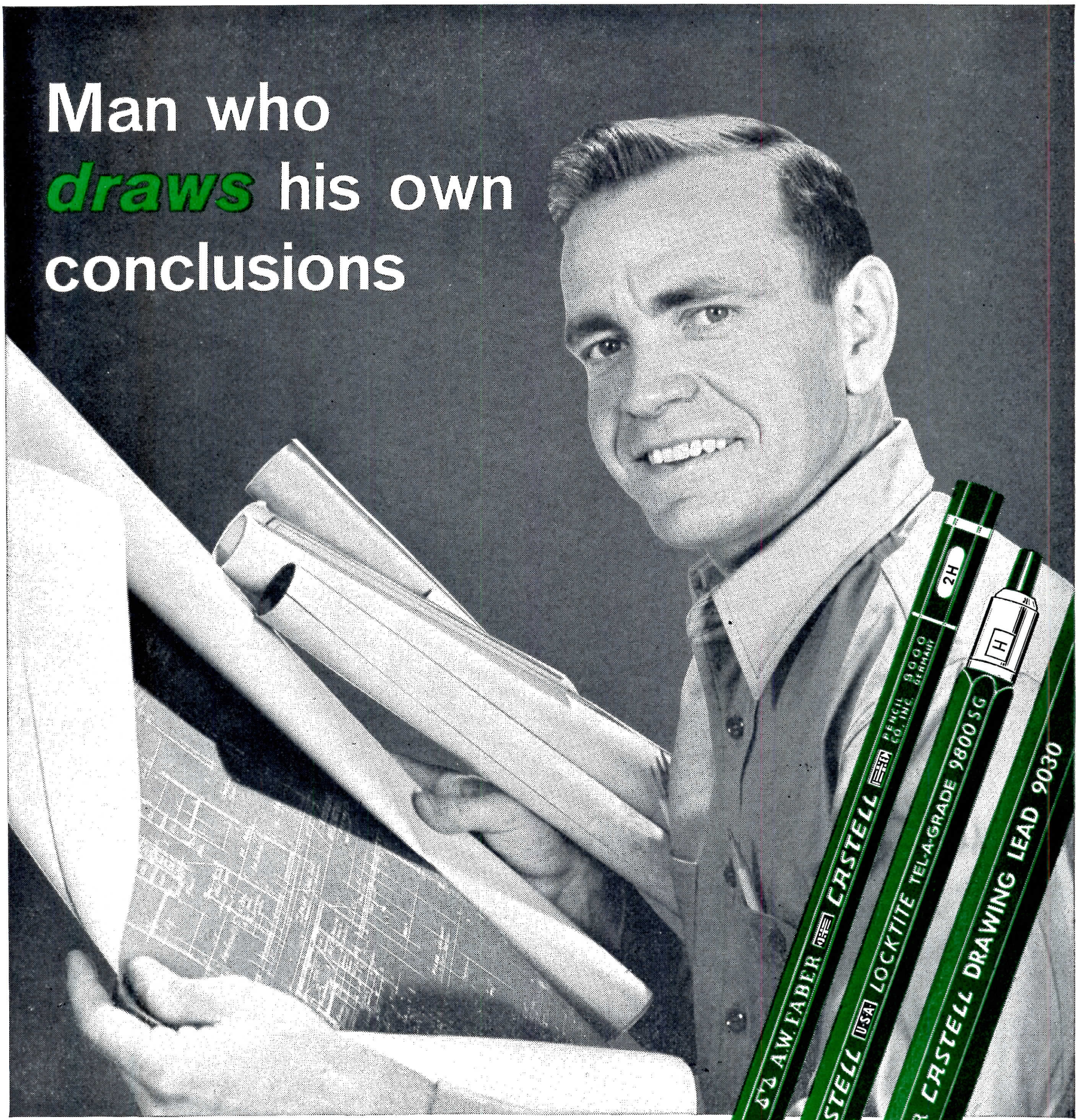


Man who *draws* his own conclusions



CASTELL TIGHT-TEXTURED LEAD

locks out light — locks in black

This man's drawing produces the highest number of sharp, bold Diazotypes or blueprints—without feathered or "burned out" lines. Chiselpoint or needlepoint, CASTELL gives him the point strength and the unvarying uniformity of grading he must have in his work. Only CASTELL's exclusive microlet milling can produce the tight-textured graphite that locks out light, locks in black. Draws perfectly on all bases, including Cronar*, Mylar*, and Kodagraph* based films. 8B to 10H. Try CASTELL wood pencil or LOCKTITE Tel-A-Grade holder with CASTELL Refill lead and draw your own conclusions.

Helps the hand that shapes the future.

*Reg. T.M.'s of DuPont and Eastman

A.W.FABER-CASTELL Pencil Company, Inc., Newark 3, N. J.

For more data, circle 42 on Inquiry Card

Why were Flexalum Twi-Nighter® venetians chosen for the 8,200 windows of the new Equitable Life Assurance Society Building?

It wasn't just because they submitted the lowest bid

It was because Flexalum offered two unique skyscraper modifications that complement the lines of curtain-wall buildings. How? By not having any tapes visible from the outside (we hide them behind the mullions)... and by limiting the tilt cycle, only the special grey exterior tone is visible from the outside. A special off-white was chosen for the inward side of the slats. (The tapes are also 2-tone.) Flexalum's skyscraper modifications fully integrate the venetians with the design of the building.

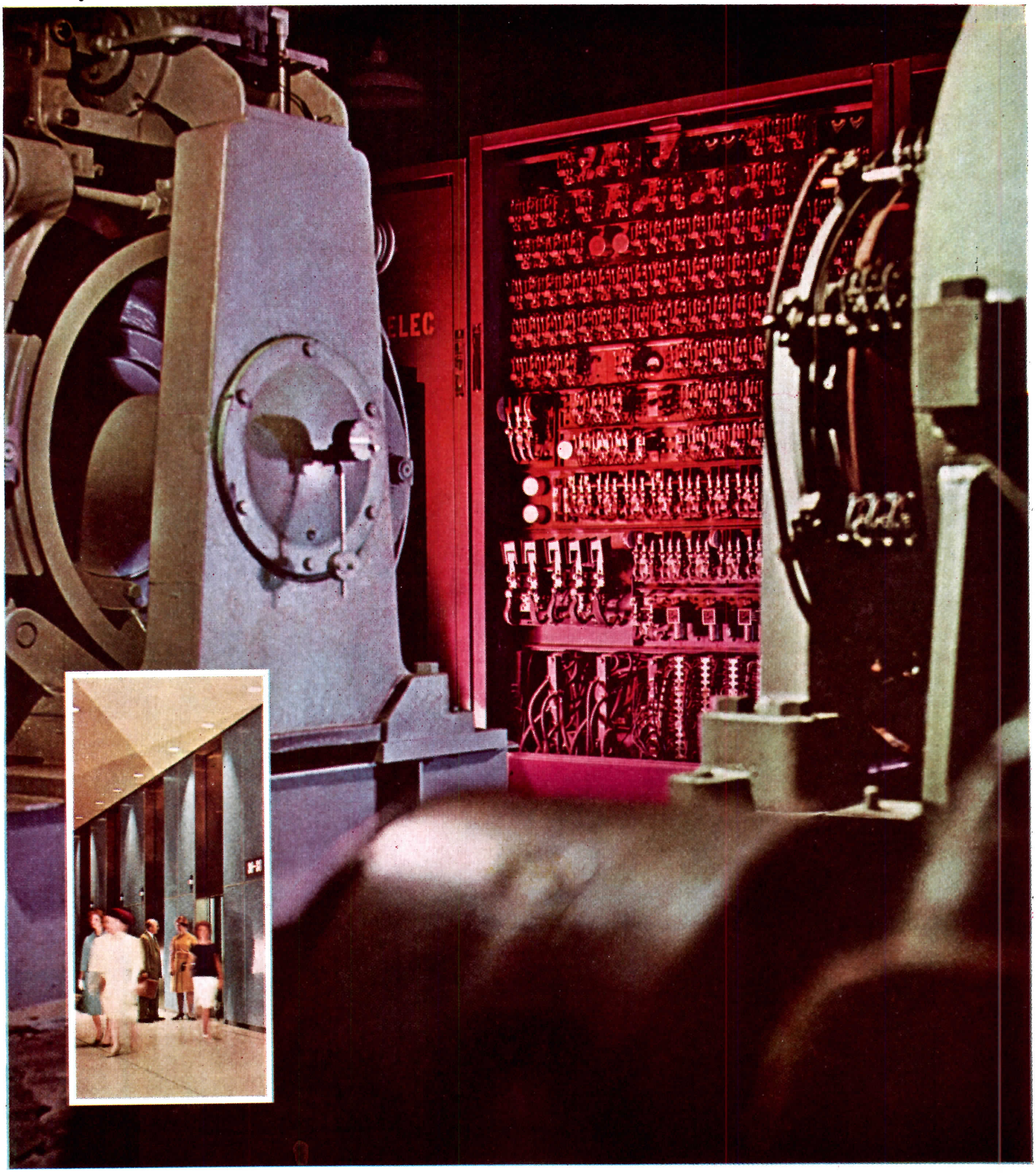
Flexalum Twi-Nighters seldom, if ever, need repairs, look new longer and don't have to be pampered. They're backed by a 5-year Bonded Guarantee. All things considered, maybe the Flexalum Dealer did submit the lowest bid... by far.

For information on skyscraper modifications, write to Bridgeport Brass Co., Hunter Douglas Division, 30 Grand Street, Bridgeport, Conn.

Flexalum® Twi-Nighter Special-Purpose Venetians

For more data, circle 43 on Inquiry Card

You're looking into an AUTOTRONIC penthouse. The 'brawn and brain' source. Brute strength of the electric lifting machine. Unlimited 'intelligence' of electronic supervision.



Today it's unlimited elevator automation

—a still further advance in AUTOTRONIC® elevatoring. By the leader in elevator automation—OTIS. It's unexcelled! What does it mean to you? As an elevator rider: Almost instant service. Anytime. Anywhere in the building. As a building owner: Unequalled service. With the least number of cars.

For more data, circle 44 on Inquiry Card

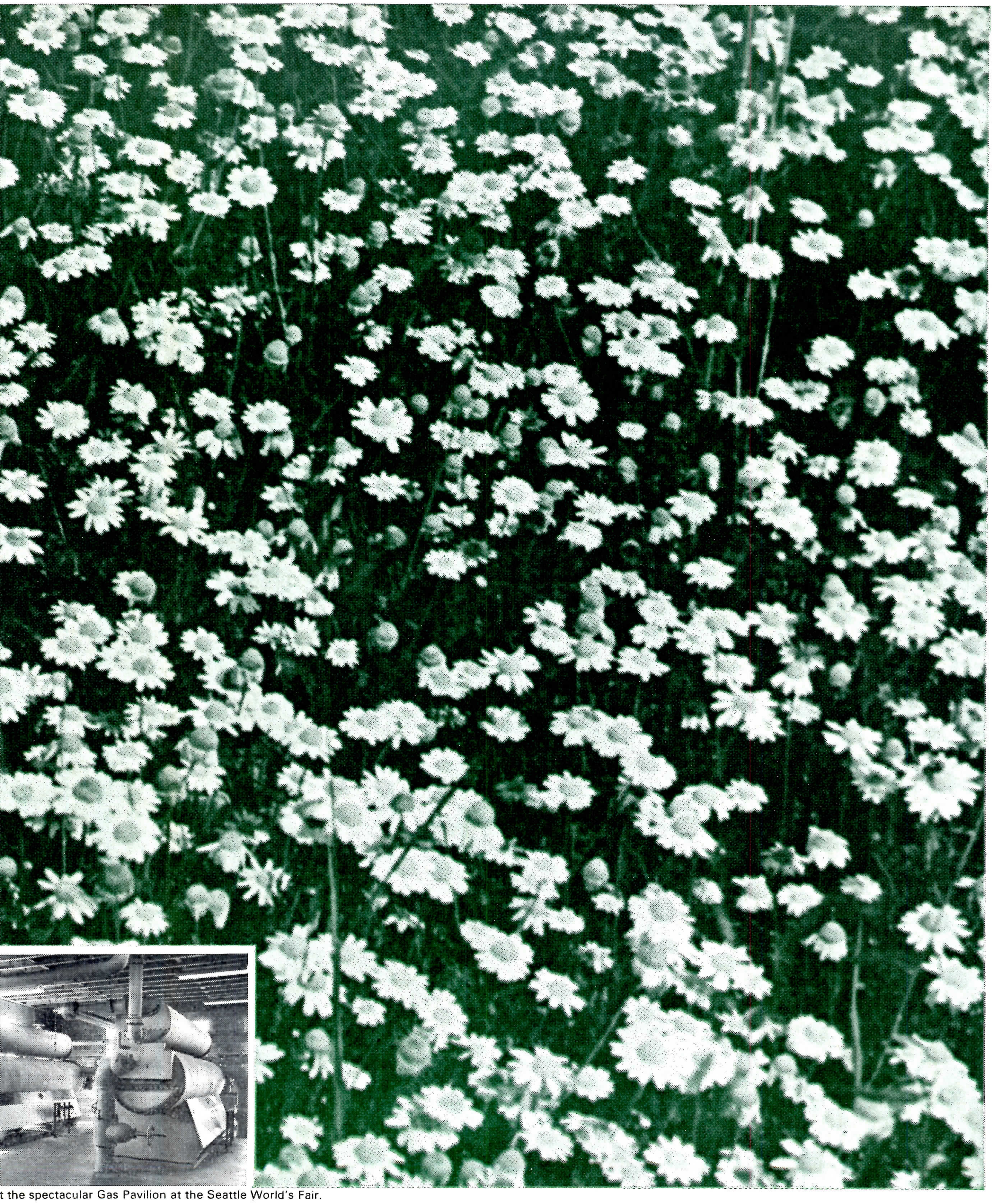
Otis

OTIS ELEVATOR COMPANY

260 11th Avenue, New York 1, N. Y.
Offices in 460 cities around the world

Architect: Inscho Brand & Inscho. Consulting Engineer: Schmidt Garden & Erickson. General Contractor: G. W. Atkinson & Son. Mechanical Contractor: The Huffman-Wolfe Company

Inside
it's Spring
the year-round



t the spectacular Gas Pavilion at the Seattle World's Fair.

***ecause a Gas-powered Carrier System** completely air conditions the new Riverside Methodist Hospi-*
l, Columbus, Ohio. Two 342-ton capacity Carrier Gas absorption units supply chilled water to the hospital.
hree more Carrier Gas units, with a total 340-ton capacity air condition the nearby School of Nursing and
iverside Medical Building. All are operated from the same gas-fired boilers that supply steam for heat-
g and hot water. Result: the heating plant runs efficiently on a year-round basis. And economical
as is good medicine for hospital budgets. Want more facts? Call your local Gas Company. Or write
arrier Air Conditioning Co., Syracuse 1, N.Y. ***For heating and cooling...Gas is good business***

AMERICAN GAS ASSOCIATION

For more data, circle 45 on Inquiry Card

Required Reading

continued from page 66

is to promote a synthesis of moder thought. The result is not quite s apt, however, as a study of Dr Gropius's thought. The pieces includ ed were written over a 30-year perio —1924-1954—but are not arrange chronologically. Some of the chap ters, furthermore, are abridgement and combinations of two or mor earlier articles, sometimes separate by a number of years. This editoria treatment, with its shifting styles may be occasionally confusing to th reader.

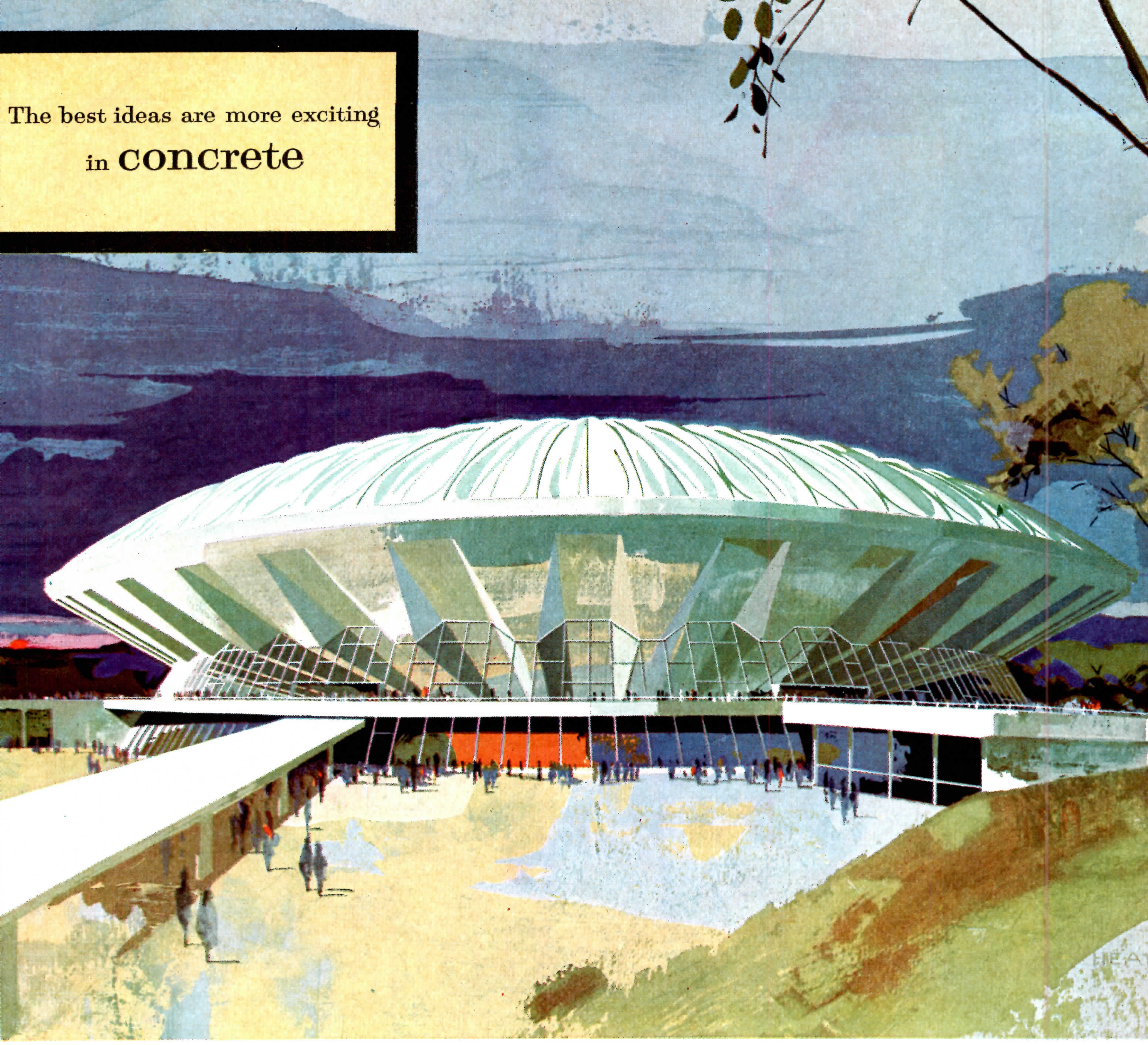
This is not to say that it is im possible to follow Dr. Gropius thought; it has, as a matter of fac been extremely consistent over th past 30 years—although it is fair t say that his view of man has becom less relentlessly socio-statistical, an his expression of the *mystique* of th team more clear.

In any case, these articles origi nally appeared in a number of maga zines, both American and European in other books, and even in Congres sional reports, and the convenienc of having Gropius, chopped up o not, between two covers is a boon One may wish now for a *real* collec tion.

THE CITY. *By Max Weber. Translate and edited by Don Martindale an Gertrud Neuwirth. Collier Books, 6 Fifth Ave., New York 11. 256 pp illus. $.95, paperbound.*

Weber's germinal sociological his tory of the city, published in 192 was important for its recognition o the city as a complex of economi social, political, and military inte relations. But whether the reader i 1962 will agree with Mr. Martindale prefatory comment, "The age of th city seems to be at an end," will d pend on the acceptance he give Weber's definition of the city. How ever comprehensive, this definition limited to the city-states of Antiquit and the Middle Ages.

The text is unfortunately marre by careless proofreading and sting punctuation, and further by irrita ingly pointless footnotes (surely n one requires two sources to bolst the assertion that Thomas Ediso invented the electric light bulb).

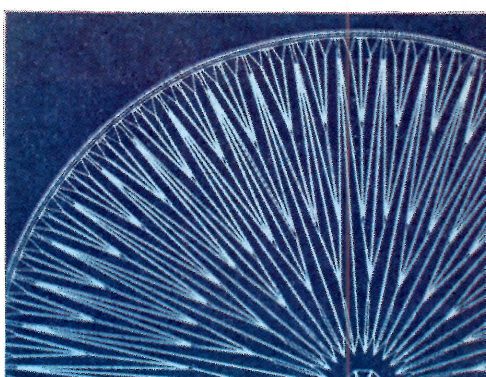


University of Illinois Assembly Hall, Urbana, Illinois. Architects: Harrison & Abramovitz, New York. Structural Engineers: Ammann & Whitney, New Yor Mechanical-Electrical Engineers: Syska & Hennessy, Inc., New York. University Architect: Ernest L. Stouffer. General Contractor: Felmley-Dickerson, Urbana, Illinoi

Floating saucer" of folded concrete roofs 3 acres

ee of any supporting columns, the roof of the new University of Illinois Asnbly Hall will seem to "float" over the spectators. This is the world's largest ncrete dome, 400 feet across and weighing 5,000 tons. It is borne entirely by peripheral ring of prestressed concrete resting on 48 concrete buttresses. There's an unobstructed view from every seat in the house for sports events. ating arrangements and staging are readily adaptable for theatricals and conts. For insulation and acoustical control, the underside of the roof will be ed with cement-wood fiber panels.

The use of concrete to effect such architectural and engineering achievements seen more and more today. Everywhere architects are turning to versatile conete to create designs of outstanding beauty and functionality.



Intricate design pattern of roof *is shown in this detail sketch. The webs of the interlacing folded plate segments of concrete are as thin as 3½ inches. The center of the dome is 128 feet above the floor.*

PORTLAND CEMENT ASSOCIATION

A national organization to improve and extend the uses of concrete

How to end up in the middle

It is certainly possible to design an air conditioning system by specifying a variety of major components made by different manufacturers.

You may even save the owners a few dollars—with refrigeration equipment from one source, cooling and heating coils from another and fans from somewhere else.

But each added source of supply multiplies the owners' problems when they try to fix responsibility for performance. There they are—right in the middle.

Whom will they call if mechanical trouble develops? Which component needs attention? Where will they turn for service?

The answers come easily when you specify equipment from one responsible supplier of major components—able to keep the equipment in first-class operating condition.

Although not the only air conditioning manufacturer offering a broad line of components, Carrier is best prepared to serve the owner should trouble come. For our company and our dealers maintain the largest and best-trained service organization in the business—over 11,000 men strong.

Carrier ***Air Conditioning Company***

For more data, circle 48 on Inquiry Card

Open-and-shut case for economical service entries

Milcor Steel Access Doors provide the convenience and economy of a completely prefabricated assembly — no on-site cutting and fitting. You get a better-looking installation — flush with the surface — made of durable steel so it won't warp, crack, swell, or bind. You can select from five styles — each suited to a particular surface — and thirteen popular sizes. Milcor Access Doors have recently been redesigned: new frame construction makes units more rigid; wider flanges afford easier fastening; new prime coats increase protection. For details see Sweet's section 16k/In, or write for catalog 210.

Member of the INLAND Steel Family

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Milcor Metal Lath and Trim Products

METAL LATH • CORNER BEADS • CASING BEADS • CHANNELS • STUDS • PARTITION SYSTEMS • ACCESS DOORS • WINDOW STOOLS • METAL BASES

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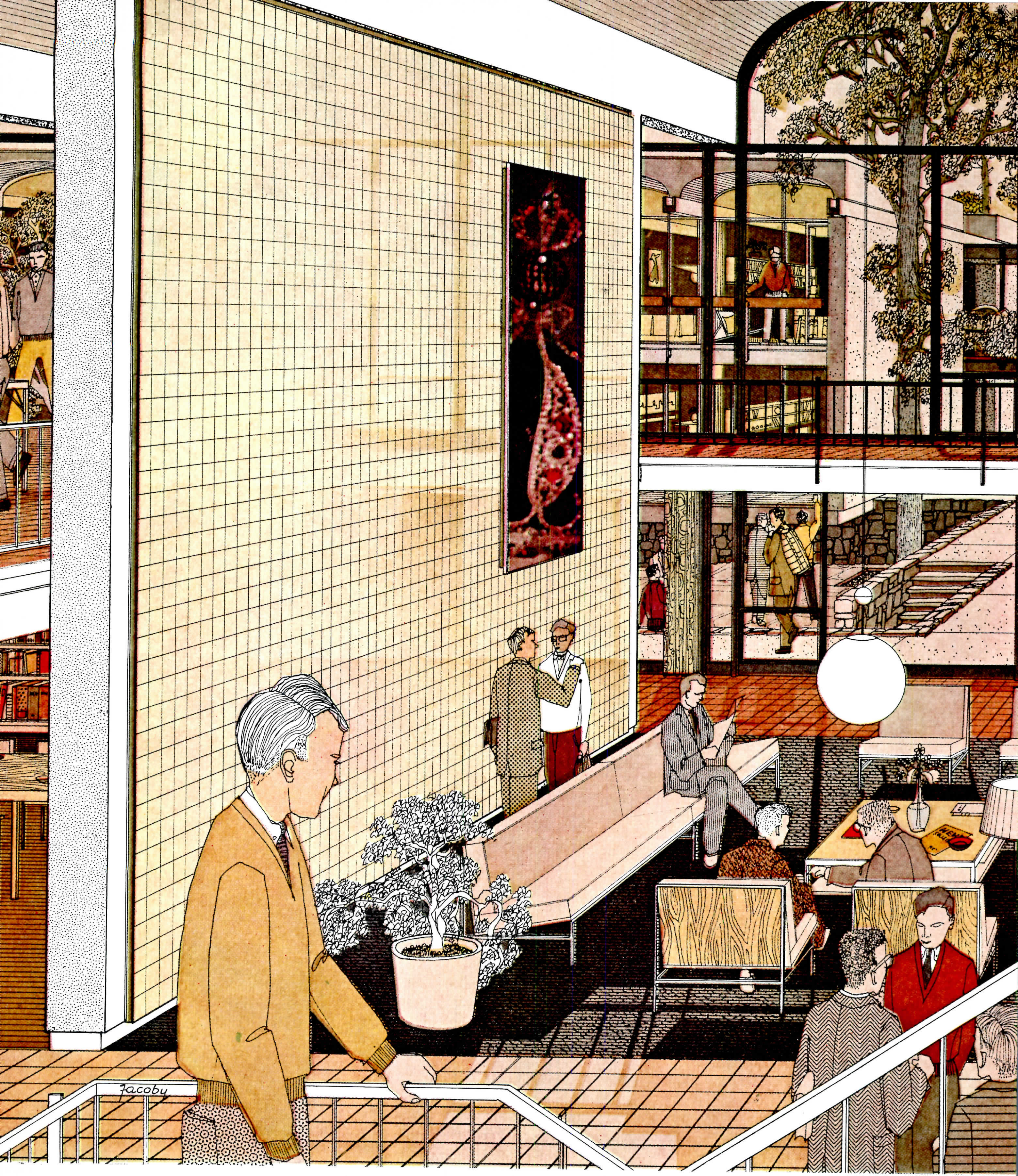
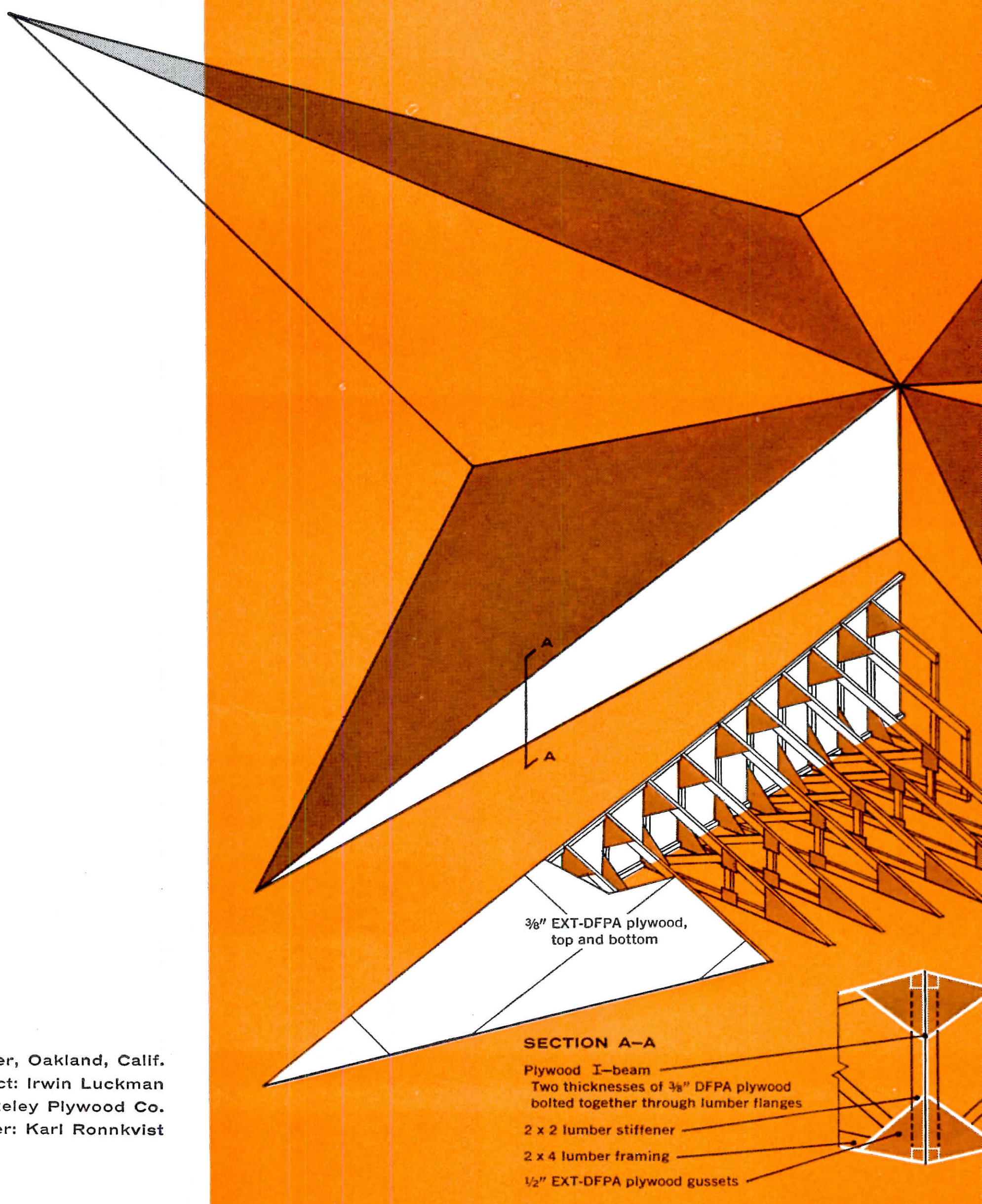
ML-58

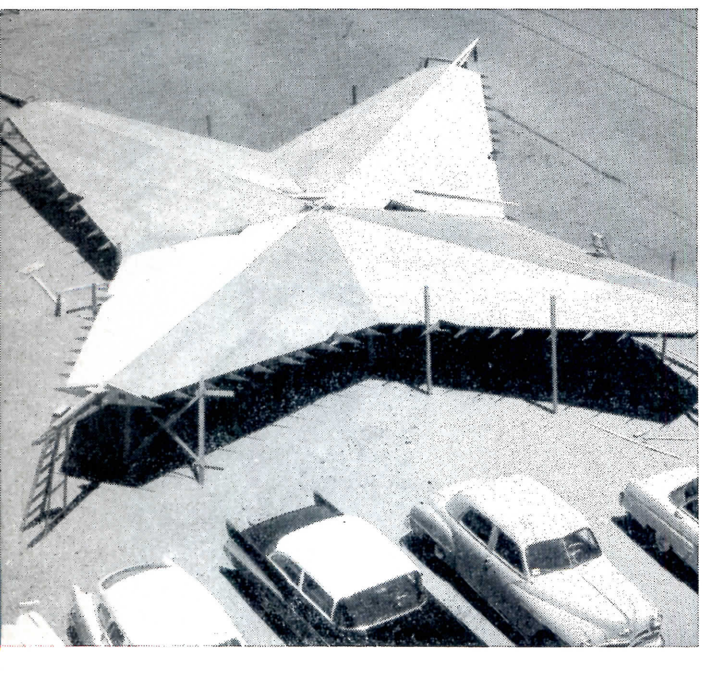
BALTIMORE 5, BUFFALO 11, CHICAGO 9, CINCINNATI 25, CLEVELAND 14, DETROIT 2, KANSAS CITY 41, MO., LOS ANGELES 58, NEW YORK 17, ST. LOUIS 10, SAN FRANCISCO 3

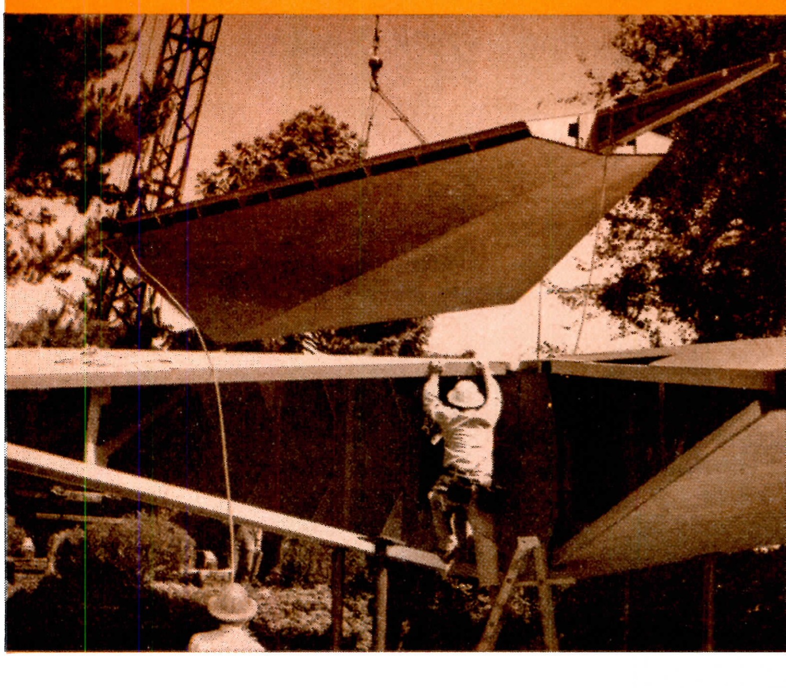
For more data, circle 49 on Inquiry Card

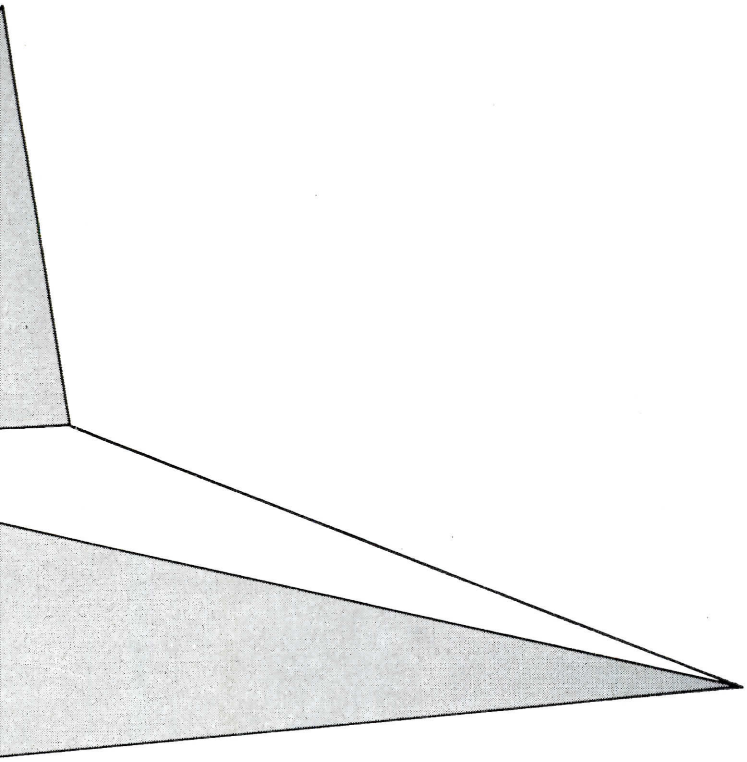

Jacoby



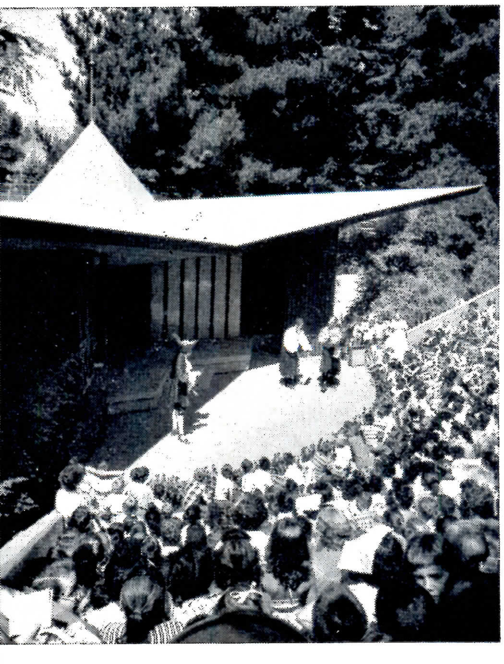
Arroyo Viejo Children's Theater, Oakland, Calif.
Architect: Irwin Luckman
Fabricator: Berkeley Plywood Co.
Builder: Karl Ronnkvist







e most exciting ideas take shape in fir plywood



THIS INGENIOUS STAR-SHAPED ROOF demonstrates the remarkable structural forms that can be achieved with plywood. Deceptively simple, the design bears more resemblance to airplane wings than a conventional roof, with interacting plywood and lightweight lumber members forming skeleton and structural skin.

Four plywood I-beams radiate from the center to form the spines of the 22 x 38-foot wings. Trusses cantilever off both sides of the beams and plywood skins form a rigid diaphragm that provides structural integrity for the entire assembly. The roof is supported by only eight steel columns. Components were temporarily bolted together by the fabricator to check tolerances, then trucked to the site for installation.

For further information on plywood and other new plywood structural systems, including folded plates, space planes, Delta structures, components, etc., write (USA only) Douglas Fir Plywood Association, Tacoma 2, Washington.

ALWAYS SPECIFY BY DFPA TRADEMARKS

NEWS OF ENGINEERS: JONES WINS A.S.C.E. FELLOWSHIP; N.S.P.E. AWARD TO DRAPER

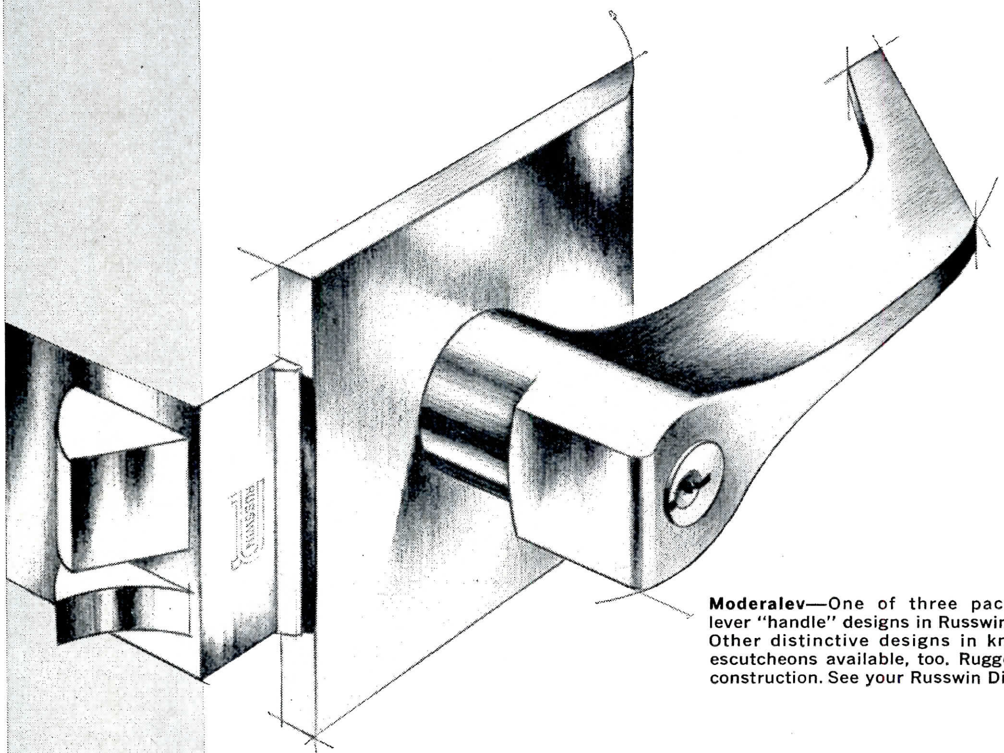
Russel C. Jones, a doctoral candidate and part-time instructor in the department of civil engineering at Carnegie Institute of Technology, has been selected to receive the $5,000 American Society of Civil Engineers' Research Fellowship. He will devote full time during the 1962-63 academic year to research toward his Ph.D. degree. His work involves using well established dislocation models to predict behavior of materials on a macroscopic scale.

Dr. Charles Stark Draper, found and director of the Massachuset Institute of Technology Instrume tation Laboratory and head of t Department of Aeronautics and A tronautics, received the 1962 N tional Society of Professional Eng neers Award for outstanding servi to the engineering profession. I Draper, widely known for his wo in fire control and inertial navig tion devices, was presented t award—the 12th since its initiati in 1949—at the National Societ June meeting in French Lick, Ind.

Dr. Robert L. Kondner, assista professor of civil engineering Northwestern University, has w the Alfred A. Raymond Award f his paper, "Bearing Capacity Friction Pile Groups in Cohesi Soils." The award, a $1,000 fi prize in a national foundation d sign contest, is sponsored (and h been since 1958) by Raymond Co crete Pile, division of Raymond I ternational, to build interest in fou dation engineering and soil m chanics. Dr. Kondner took a new a proach to designing pile found tions. He used data from model tes then put this in nondimension form suitable for solving all desi problems involving pile groups clays.

Alfred H. Samborn, partner in Sa born, Steketee, Otis and Evans, To do engineers, has been honored the Toledo Society of Profession Engineers for outstanding service the engineering profession, partic larly through his activities in loc state and national engineering so eties. Mr. Sanborn is past preside of both the T.S.P.E. and Ohio Socie of Professional Engineers, has be a director of the national organiz tion for the past five years, and h held 21 elected offices and comm tee chairmanships in the thr groups over the past 12 years.

Dr. Roy A. Seaton, dean emeritus Kansas State College, and **Dr. Li ton E. Grinter,** dean of gradua studies at the University of Flori were awarded honorary memb ships in the American Society f Engineering Education. The prese tation was slated to be made on Ju 18 during the annual meeting A.S.E.E. held at the U.S. Air For Academy, Colo.



Moderalev—One of three pace-setting lever "handle" designs in Russwin Unilocs. Other distinctive designs in knobs and escutcheons available, too. Rugged "unit" construction. See your Russwin Distributor.

To accent your creative design...

RUSSWIN

...the doorware that lives up to your reputation

For more data, circle 53 on Inquiry Card

When planning your dream kitchen, consider one of these glamorous servants by Elkay.

The Cuisine Console is the ultimate in fashion and function. An exclusive worklight eliminates shadows (doubles as night light). Compartments drain by remote control. Other advanced features include convenient disposer switch and appliance outlets. Available with two or three compartments. NuTone power unit optional.

Write for free literature describing sinks for all living areas: kitchen, bar, patio, laundry, bath.

Cuisine Centre'

Available with 2 or 3 compartments. NuTone power unit optional.

Two Fifty Plus

Economy model with oversized compartment to accommodate roasting and broiler pans.

ELKAY MANUFACTURING COMPANY • 2700 S. 17th Ave. • BROADVIEW, ILL.

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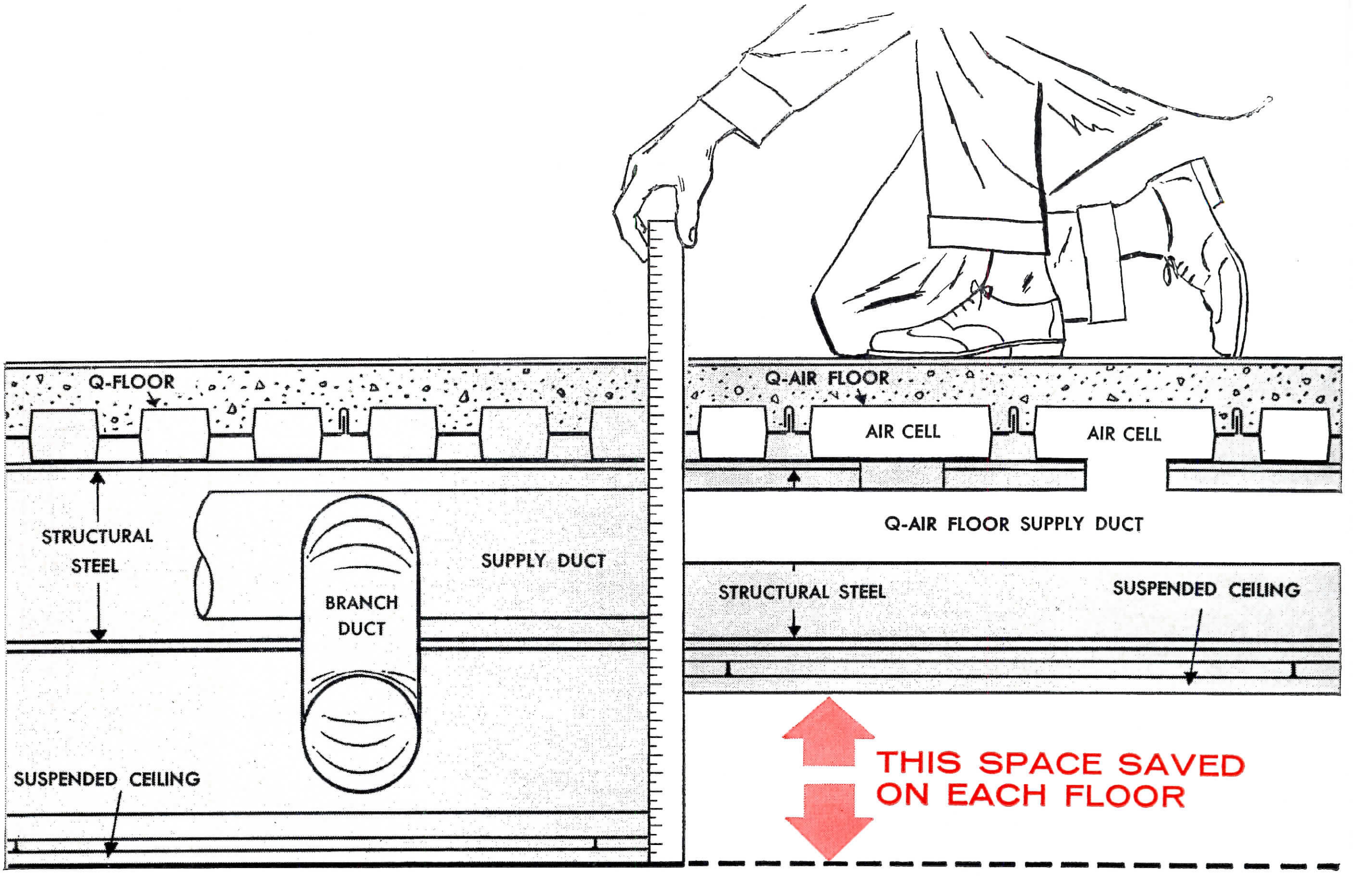
compac.ion



Compaction is the word that describes the space saved in a modern air conditioned building when Robertson Q-Air Floor is used. Because the cellular steel structural floor distributes hot and cold air as well as power and communications wiring, the distance between floor and ceiling below can be reduced as much as a foot. Compaction is assured **because the secondary ducts go over the beams.** This feature alone can save as much as 5% of the material cost of a building. Use the coupon below to obtain the latest Q-Air Floor Catalog.

ROBERTSON

Q-AIR FLOOR

H. H. ROBERTSON COMPANY

FARMERS BANK BUILDING • PITTSBURGH, PA.

In England—
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I would like to have more information on Q-Air Floor. Please send me your Q-Air Floor Catalog.

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Title ______________________

Firm ______________________

Address ______________________

City ____________ Zone ________ State ________

For more data, circle 55 on Inquiry Card

Design unlimited with new J-M *low* walls and J-M *high* walls

These new J-M movable walls acc
an unlimited variety of interesti
finishes. Cover them with a marb
ized pattern, as shown above. Fin
them with one of the many new vi
fabrics. Paint them in bright col
or pastel tones. Veneer them w
wood. Apply mosaic tile or a b
relief.

Or have the asbestos-cement f
ings integrally colored, a treatm
available on special order.

Besides their unusual decorat

where the hardware schedule is complex,

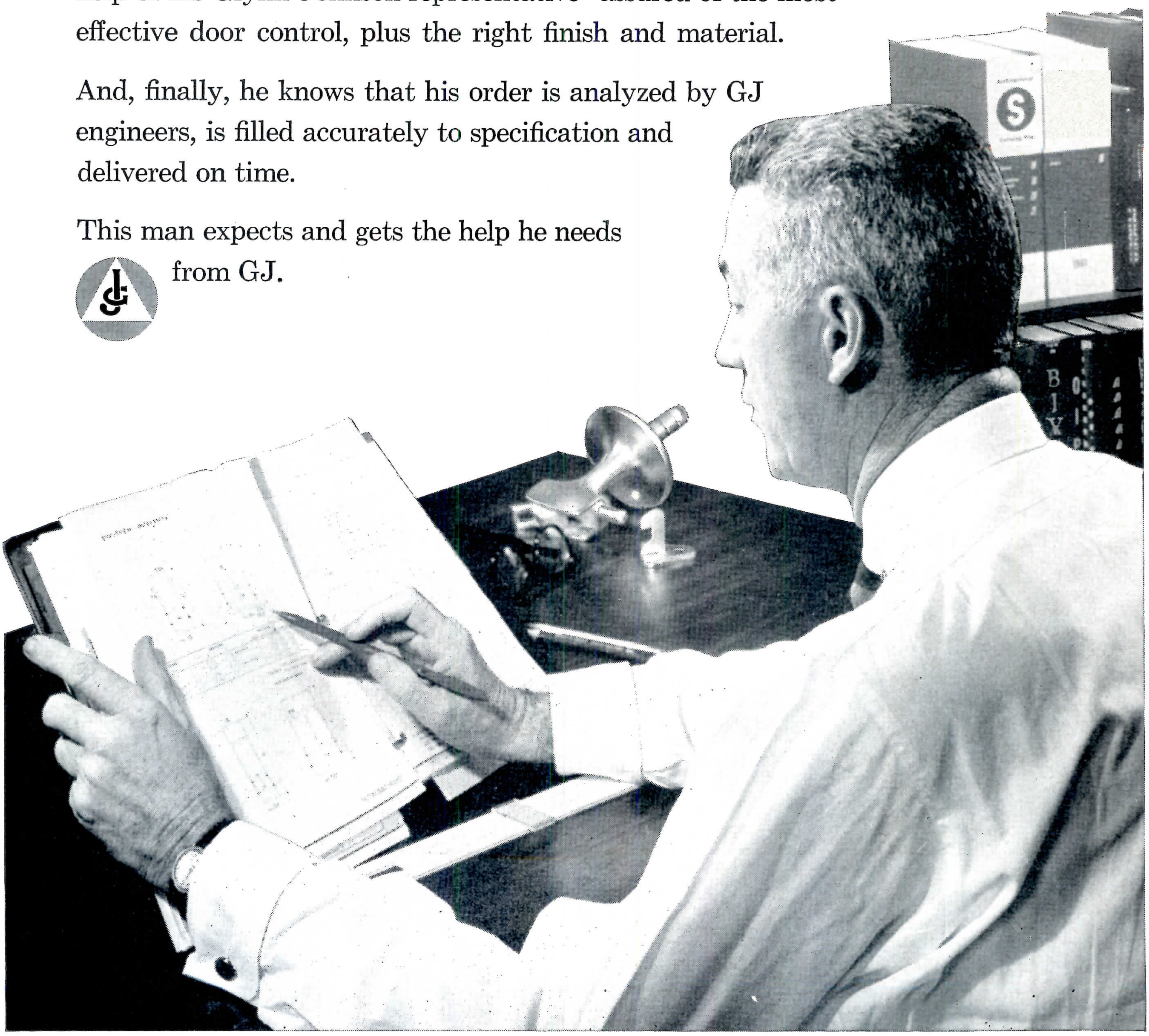
this man specifies...assured of

EXPERIENCED ORDER ANALYSI

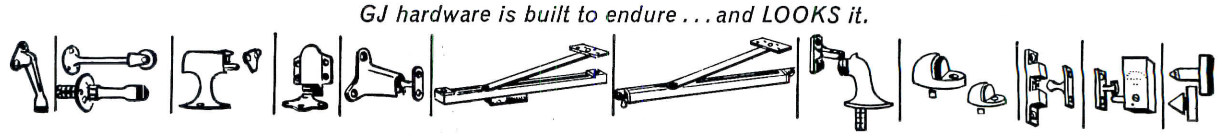
He knows that his GJ catalog offers a wide variety from which to make his choice. If there is a problem he welcomes the help of his Glynn-Johnson representative—assured of the most effective door control, plus the right finish and material.

And, finally, he knows that his order is analyzed by GJ engineers, is filled accurately to specification and delivered on time.

This man expects and gets the help he needs from GJ.

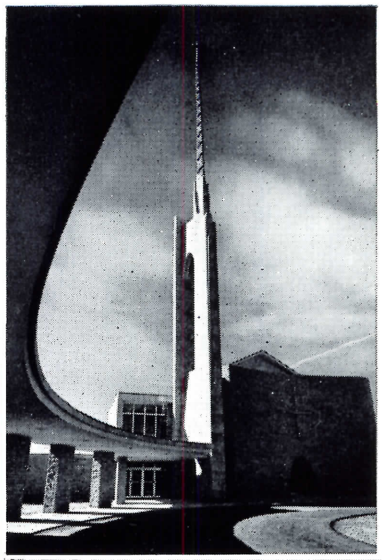


GJ hardware is built to endure . . . and LOOKS it.

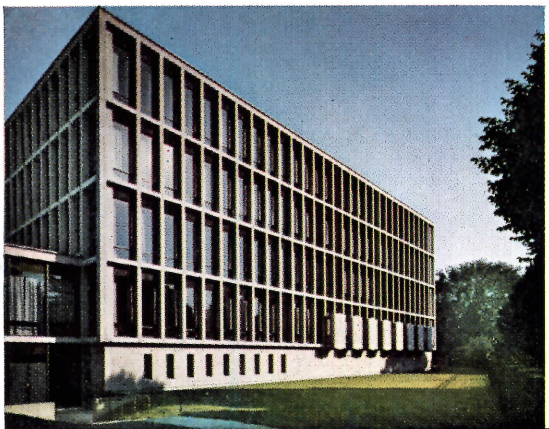


GLYNN · JOHNSON CORPORATION/4422 no. ravenswood avenue • chicago 40, illinois

For more data, circle 57 on Inquiry Card



First Presbyterian Church, Gastonia, N. C.



Simmons College Library, Boston, Mass.

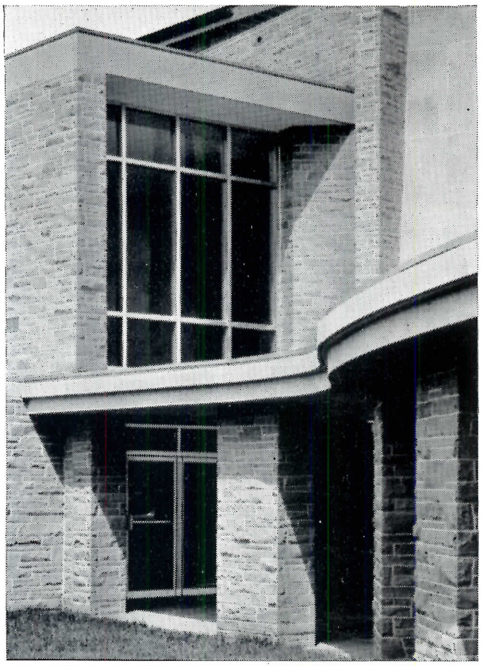
Allstate Insurance Co., Atlanta, Ga.

Creating dynamic exteriors with glass

West Virginia University Medical Center, Morgantown, W. Va.

You can produce innumerable moods, a countless variety of effects with glass. It all depends on how you use it. The smooth hard brilliance of the glass curtain wall has been so successfully exploited that many other personality traits of this versatile material have been neglected. The buildings discussed here are interesting because they use glass dynamically, in active coordination with other building products. None is a "glass building" per se. Yet all use glass as a major design element, exploring its many properties and possibilities to achieve the overall effect.

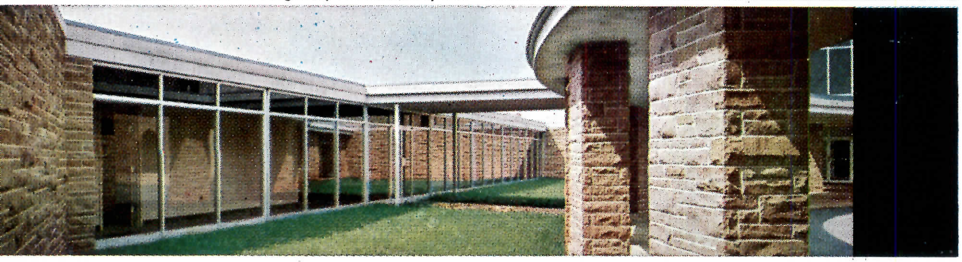
AMERICAN-SAINT GOBAIN



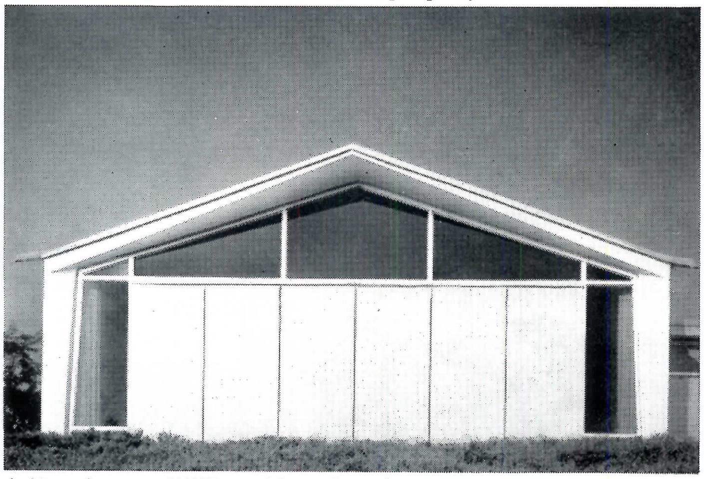
Architect: Harold E. Wagoner, Philadelphia, Pa.

TO RELIEVE THE FORMIDABLE STONE MASSES of the First Presbyterian Church without disturbing the impression of weight, substance and dignity, clear, heavy sheets of Lustracrystal® are set deep into surrounding masonry, shaded and confined by the heavy slab of the roof.

(Left below) BY FAITHFULLY REFLECTING COLOR and texture of adjacent stonework, even these very large expanses of Lustracrystal® serve rather to complement the building's basic structure than to overwhelm it, or diminish the feeling of solidity and mass.



(Below) LUSTRAGRAY® DRAMATIZES the handsome tapered lines of concrete roof and corner posts in the employees' lounge section of the Allstate building, provides a brilliant contrast around the entire periphery of the framework.



Architect: Stevens and Wilkinson, Atlanta, Ga.

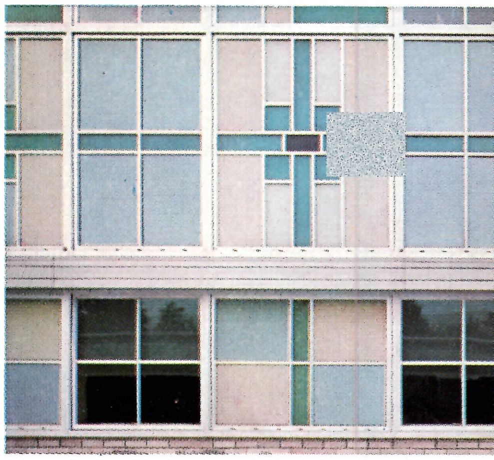
GLASS PLAYS SUPPORTING ROLE GRACEFULLY at the Allstate building. Ground floor windows of Lustragray® sash and spandrels of horizon blue Huetex® are inset into the surface to emphasize concrete, create a pattern of strong shadows. In the second floor a concrete screen obscures the shape of windows while it suggests their presence. The straightforward structural lines prevail here, too: each panel of the screen is confined on all sides by solid concrete.

Glass is a good mixer

The effective-ness of glass in a building exterior need not depend on the actua

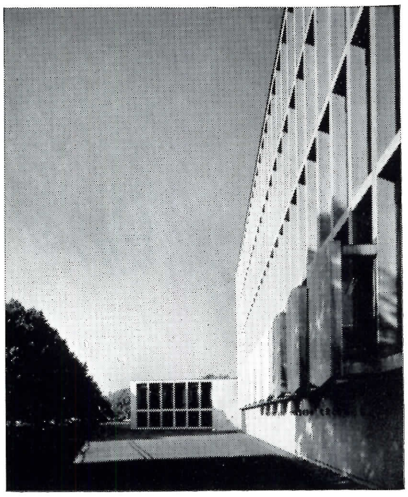
A FENESTRATION PROBLEM was turned into an aesthetic opportunity at West Virginia University Medical Center. Strictly functional planning of teaching, laboratory and hospital facilities precluded a rhythmic pattern of window openings. The solution was to integrate window glazing into a mural of colored, frosted and patterned glasses. Projecting cantilevers or borders, and strong aluminum frames, limit the lively pattern to allow the clean planes of gray speckled glazed brick to assert themselves.

(Far right) THE BLUE-GREEN PANELS are Aklo* heat-absorbent glass, patterned and frosted. Light gray areas are frosted Huewhite®. Medium gray areas are Luminex®, frosted and patterned. This construction also includes specially prepared Luminex with dark gray or black enamel fired onto one side, and Feurex® borosylicate glass, polished on one side, with dark gray metallic oxide coating on the other.



Architect: C. E. Silling and Associates, Charleston, W. Va.; Associate Architect: Schmidt, Garden & Erikson, Chicago, Ill.

Architect: Campbell and Aldrich, Boston, Mass.



TO PROVIDE MAXIMUM DAYLIGHTING without the all-glass look, the windows at Simmons College library are recessed deep into the limestone facade. The resulting waffle pattern throws the masonry into strong relief, emphasizes its mass, color and texture. The extra panel in the corner windows visually supports and confines the rows of windows, much the way a bookcase encloses rows of books. Glare-reducing Lustragray® complements exterior color, relieves the uniform facade by reflecting color and movement from sky and landscape, and controls light and heat inside the building without color distortion.

mount of glass used. A discriminating combination of glass with ny other building material can produce an overall effect that displays the best properties of both with equal force.

Creative ideas in glass

*Reg. T.M.—Lic. by Corning Glass Works

Dynamic coordinates

The wide range of plate, patterned and sheet glasses available from American-Saint Gobain permits exceptional freedom in combining glass and other construction materials to create varied and highly individual effects. Here are some combinations of A-SG glass and popular building materials—some exotic, some very businesslike—that suggest a small part of the broad, colorful A-SG line. ■ You can get all these types of flat glass from American-Saint Gobain. Your A-SG glass distributor is listed in the yellow pages. For more information, call the A-SG Sales Office nearest you, or write to American-Saint Gobain Corporation, Dept. AR-9, Kingsport, Tennessee.

AMERICAN-SAINT GOBAIN CORPORATION

SALES OFFICES: Atlanta, Boston, Chicago, Dallas, Detroit, Kansas City, Los Angeles, New York, Pittsburgh, San Francisco, Seattle.
PLANTS: Kingsport and Greenland, Kingsport, Tennessee; Jeannette, Arnold, and Ellwood City, Pennsylvania; Okmulgee, Oklahoma.

NEW SCHOOL OF ARCHITECTURE AT COLORADO U.

A separate School of Architecture has been established at the University of Colorado, Boulder, and Professor DeVon M. Carlson has been named its first dean. Professor Carlson was formerly acting head of the Department of Architecture and Architectural Engineering, since 1952 a division of the College of Engineering.

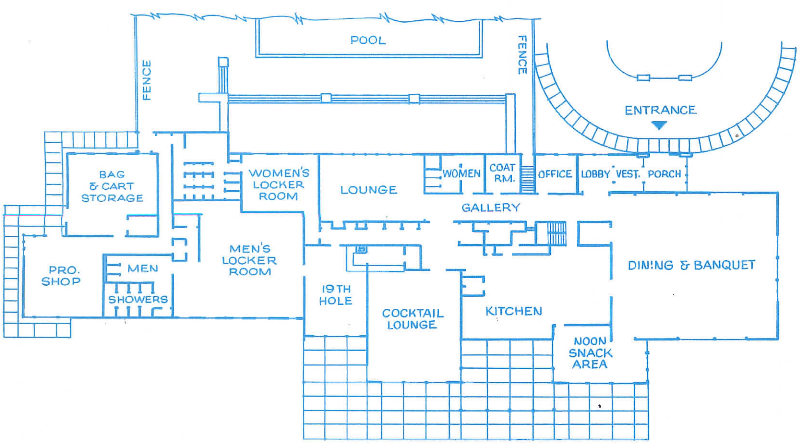
Offering the Bachelor of Architecture degree and, in conjunction with the College of Engineering, the Bachelor of Science degree in Architectural Engineering, the new school will revise the five-year curricula now taught in the department. Beginning in the fall of 1963, additional programs will be made available in various related disciplines, such as landscape architecture, interior design, urban planning and art.

Prospective students will complete freshman and sophomore requirements for professional degrees with the College of Arts and Sciences or other C.U. colleges before enrolling in the school.

HALLOCK HEADS DEPT. OF ARCH. AT PENN STATE

Philip F. Hallock has been named acting head of the Department of Architecture at Pennsylvania State University. He succeeds Dr. Milton S. Osborne, who retired with emeritus rank on June 30. In addition to his administrative duties, he will continue teaching architectural design and the professional practice of architecture.

Professor Hallock came to the University in 1947 as a part-time instructor, and by 1953 was professor of architecture. A 1935 graduate of Penn. State, he received his M.S. degree in architecture in 1937. He has designed a wide variety of buildings in Illinois, Ohio, New York and Pennsylvania. Since World War II he has been active in committee work in the American Institute of Architects, the Pennsylvania Society of Architects and was president of the central Pennsylvania Chapter in 1956.



WEST COAST DOUGLAS F
WEST COAST HEMLOC
WESTERN RED CEDA
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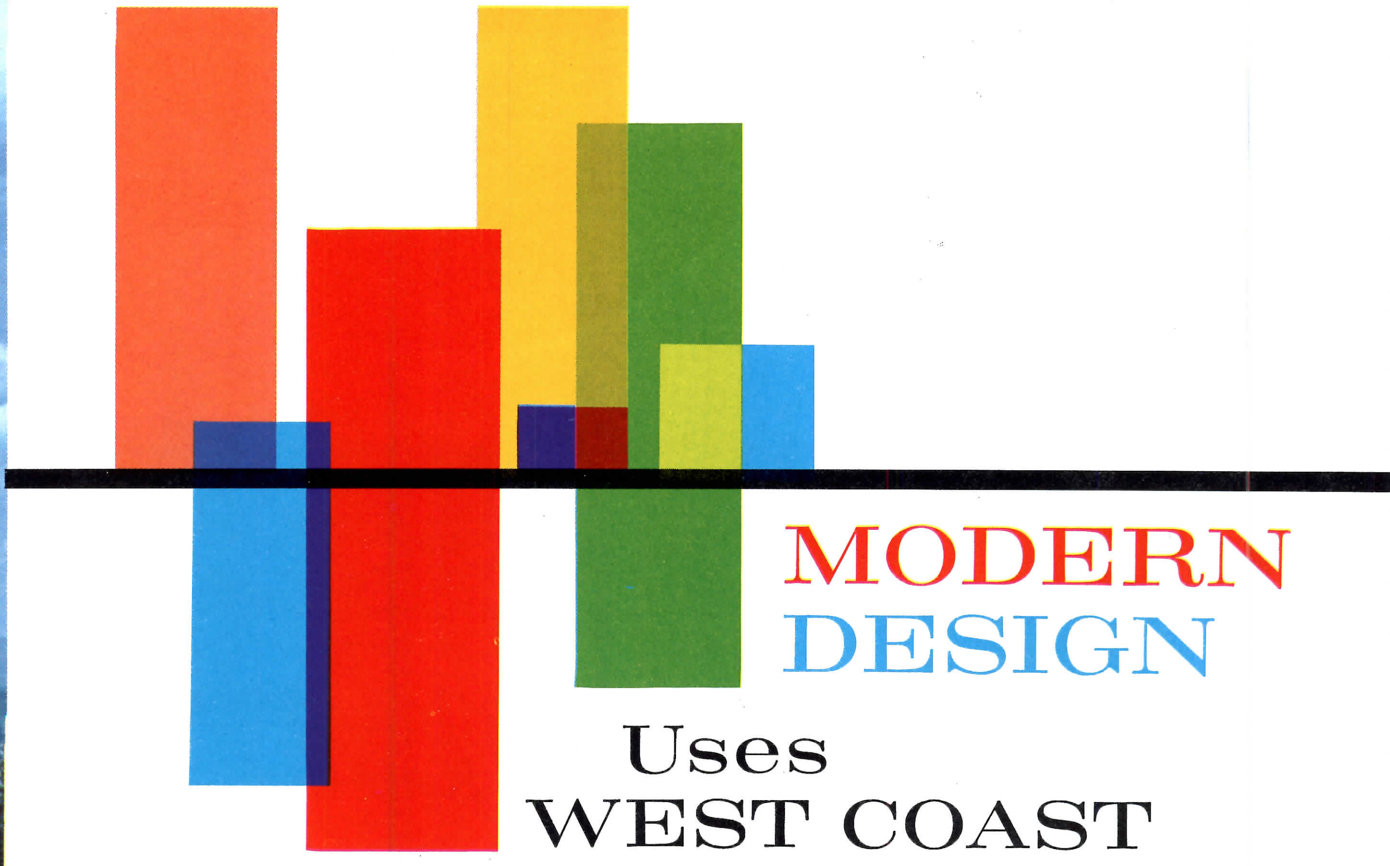
WHITE F

ARCHITECTS: William J. Bain & Harrison Overturf, A. I. A.
F. M. Smith, Jr., Associate Architect



MODERN DESIGN

Uses WEST COAST LUMBER

An interesting wall pattern is developed with the vertical application of ¾" x 10" West Coast Hemlock bevel siding in the club's cocktail lounge.

A variety of sizes and grades of Coast region West Coast Lumber was used to create a harmoniously rustic atmosphere for this Everett, Washington golf and country club.

Constructed in two stages to meet the club's financial capabilities, the completed clubhouse offers facilities for the membership's family enjoyment of golf and swimming, then serves equally well as a social center for both formal and informal gatherings.

Paneling in the social rooms are of West Coast Hemlock and Western Red Cedar, applied to a hemlock framework. Interesting grain patterns and the natural, beautiful colors of these species provide a warm welcome. Equally important, the ease of upkeep saves time and eliminates the need for redecorating for years to come.

Your design objective is reached easily and simply through the use of a variety of sizes and grades available in Coast region West Coast Lumber. Ask your retail lumber dealer. He is your dependable source for planning information and supply.

Technical West Coast Lumber Information:
Joists: 2" x 10", 2" x 12" West Coast Hemlock.
Wall Framing: 2" x 4" West Coast Hemlock.
Beams: 7" x 17⅞", 7" x 21½", 9" x 17⅞", 11" x 17⅞", 9" x 19½", 5¼" x 13" glue laminated West Coast Douglas Fir.
Roof Trusses: 64' and 60' widths made of 2" x 12", 2" x 8" West Coast Douglas Fir.
Roof Decking: 3" x 6" tongue and groove, end matched West Coast Douglas Fir. 4" x 6" tongue and groove Western Red Cedar exposed in dining room.
Panelings: 1" x 6" Western Red Cedar, ¾" x 10" West Coast Hemlock bevel siding.
Siding: Western Red Cedar ¾" x 10" bevel siding, 1" x 10" boards, 1" x 10" boards with 1" x 3" battens and 1" x 10" reverse board and batten.
Fencing: 1" x 3" Western Red Cedar spaced 1" applied to 2" x 4" West Coast Douglas Fir rails and 4" x 6" posts around swimming pool.
Millwork: Fir and Hemlock.
Lockers: West Coast Hemlock.
Exterior Finish: Penetrating stain.
Building Area: 86'-8" x 272'-4" (16,570 sq. ft.). Basement: 9,455 sq. ft. Terrace: 8,000 sq. ft. Swimming pool: 30' x 75'.

"Modern Design with West Coast Lumber," full color, 40 pages of building ideas.
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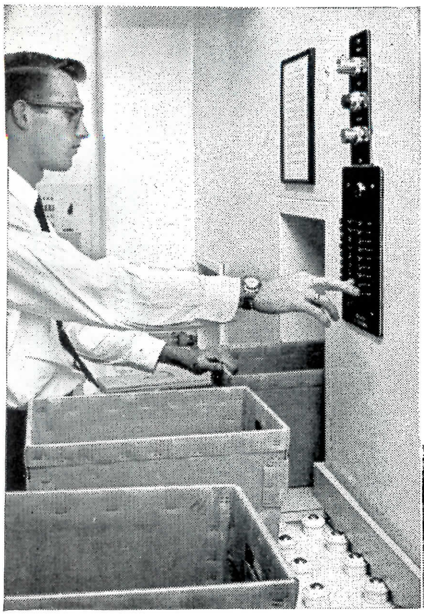
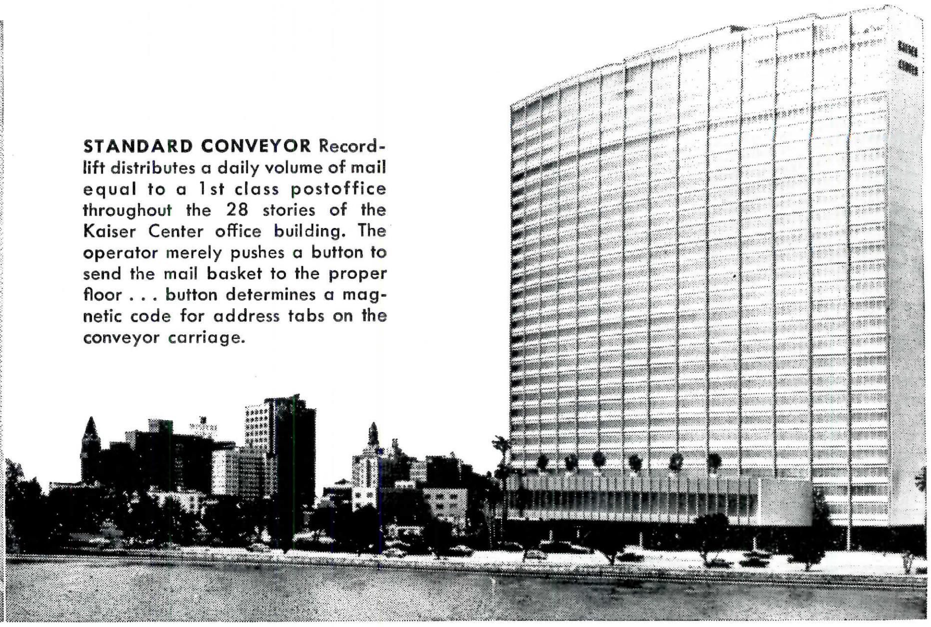
WEST COAST LUMBERMEN'S ASSOCIATION

1410 S. W. Morrison Street, Portland 5, Oregon

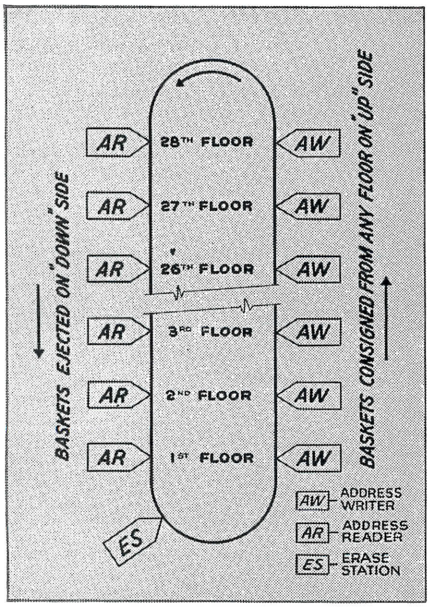




STANDARD CONVEYOR Recordlift distributes a daily volume of mail equal to a 1st class postoffice throughout the 28 stories of the Kaiser Center office building. The operator merely pushes a button to send the mail basket to the proper floor . . . button determines a magnetic code for address tabs on the conveyor carriage.

KAISER CENTER, Oakland, California. ARCHITECTS: Welton Becket & Associates. GENERAL CONTRACTOR: Robert E. McKee General Contractors, Inc.

High speed mail distribution streamlines the paper flow in new Kaiser Center



"Magnetic memory" control system has no moving parts, no levers, no between-station wiring . . . nothing to wear out. Diagram shows how address "writers" and "readers" are located between the building's 28 floors. If you are planning a multi-story building where mail distribution can be a problem, get the full details now on fast and efficient Recordlift!

At Kaiser Center's towering new 28-floor office building, mail is distributed every half hour. Yet it's all done without the usual cost and confusion of interfloor mailboy traffic.

Instead, a modern and efficient STANDARD CONVEYOR *Recordlift* whisks the mail, interoffice correspondence and other vital business records to central dispatching mailrooms . . . rapidly, economically, automatically.

Dispatching is simple, speedy, selective. The operator merely puts the material in the container, pushes the button for the proper floor and *Recordlift* delivers it in minutes. Mailboy hours are saved . . . speed and efficiency are gained.

If you have a multi-story building project pending, remember *Recordlift,* the modern mail system. It saves your client the cost and clutter of interfloor mailboys . . . with push-button speed, economy and efficiency!

Write today for illustrated data file . . . or simply clip this ad to your letterhead and mail it.

Check into these typical Standard Recordlift Installations

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- State of Minnesota Department of Highways, St. Paul, Minnesota
- Ohio Oil Company, Findlay, Ohio
- Ontario Hospital Services Commission, Toronto, Ontario, Canada
- Bank of America Service Center Building, San Francisco, California
- Bankers Life Company, Des Moines, Iowa
- State of California Compensation Insurance Fund Building, San Francisco, California
- State of Minnesota State Office Building, St. Paul, Minnesota
- State of Oregon, Salem, Oregon
- Western Electric Company, New York, N.Y.
- First National Bank, Minneapolis, Minnesota
- Lincoln National Life Insurance Company, Fort Wayne, Indiana
- City of Minneapolis, Public Library Division, Minneapolis, Minnesota
- Great West Life Assurance Company, St. Boniface, Manitoba, Canada
- Mutual Service Insurance Company, St. Paul, Minnesota
- State of Texas Employment Commission, Austin, Texas
- David Wohl Memorial Hospital, Washington University Clinic, St. Louis, Missouri
- State of California, California State Teachers Association, Burlingame, California
- Ohio National Life Insurance Company, Cincinnati, Ohio
- Research Hospital, Kansas City, Missouri

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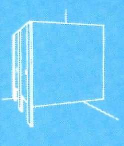
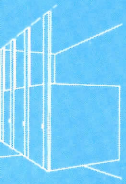
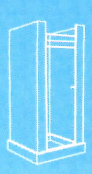
An installation of two Stallpack units with standard urinal screens of matching Ozark Grey Veined marble.



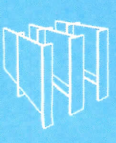
STALLPACK, the packaged marble toilet enclosure



SPACEPACK, the ceiling-hung Stallpack



SHOWERPACK, the complete marble shower cabinet



ECONOPACK, multi-unit marble dressing room and shower

URINAL SCREENS, standard screens in Stallpack marble

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Stallpack gives you the unique durability of solid marble partitions precut to standard size, predrilled ready to assemble, and offered in a package unit complete with door and chrome plated rustproof hardware. These package units are ready to be shipped immediately.

All you do is indicate water closets 2′ 10″ on centers on your drawings, then specify Stallpack. With that one easy specification you give the toilet rooms of your building the lasting beauty and trouble-free durability that cannot be had with any material but marble.

Stallpack marble partitions will not rust or deteriorate. They will never need refurbishing. Washing with mild soap and water is all it takes to keep Stallpack marble partitions in perfect, shining condition. Imagine the savings in upkeep expense over the life of a building!

These remarkable partitions are easy to keep clean because they are solid marble. Flush construction with solid marble leaves no inaccessible hollow places around the base of the stiles to breed germs and retain odors.

Stallpack partitions are made of fine Ozark Grey Veined marble. This lustrous light grey marble blends beautifully with any color scheme, stays beautiful as long as your building stands!

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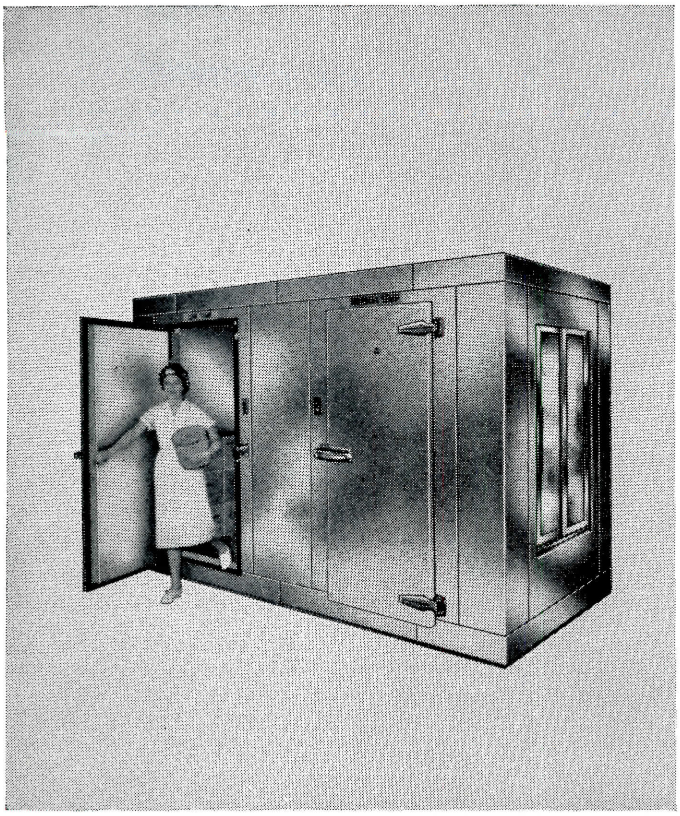

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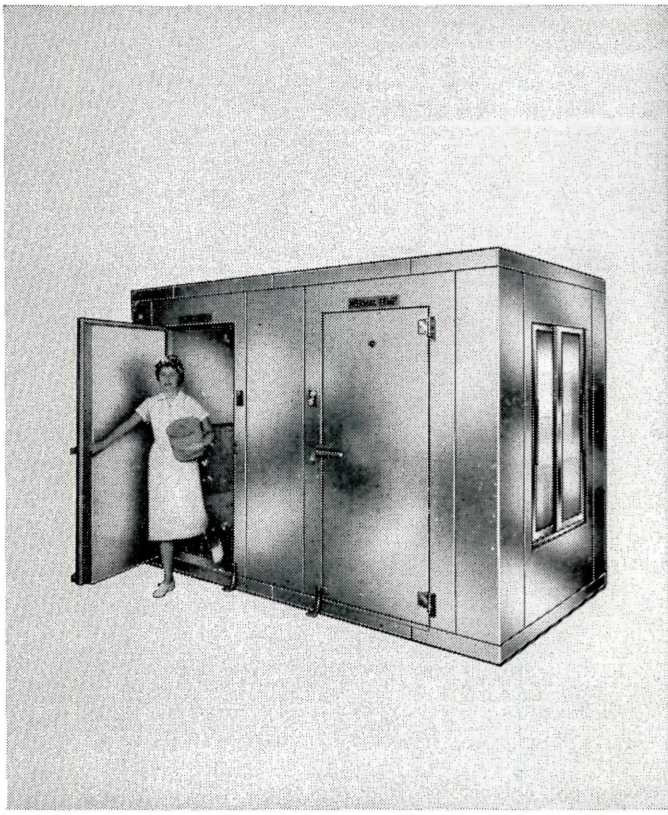

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Bally Walk-in Coolers and Freezers are now made with science's new wonder insulation . . . Rigid Urethane "foamed-in-place"

The tremendous advantages of this new insulation represent a major design advancement . . . one that obsoletes all conventional insulated Walk-Ins, both prefabricated and built-ins. ◆ With 97% closed cells it cannot absorb moisture . . . maintains forever peak efficiency, indoors or outdoors ◆ Has double the insulating value . . . Bally 4″ urethane equals 8½″ of conventional insulation. Standard models ideal for use as minus 30° freezers ◆ Urethane, poured as a liquid, foams in place and while rigidizing binds tenaciously to the metal for great strength. Eliminates need for structural members. Replaces that space with highly efficient insulation ◆ Lightweight urethane and new construction reduce weight to one-third for tremendous freight savings . . . make erection fast and easy ◆ Foamed door is extremely lightweight, to open and close with little effort. Unique magnetic gasket provides positive continuous seal ◆Thinner walls increase usable inside space ◆ Fire-retardant.

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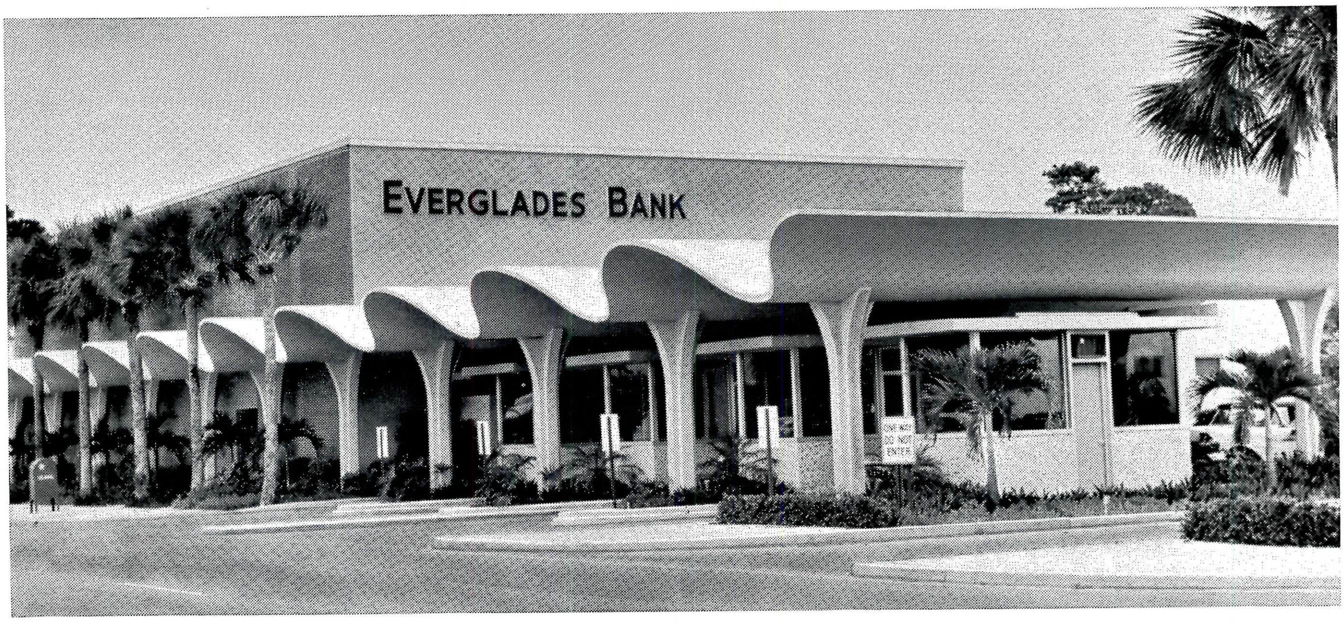
PRESTRESSED CONCRETE SHELLS
add interest to Florida Bank

(Above) With precast columns in place, half-shells are set with minimum difficulty. Note the temporary edge beam and vertical supports which were removed as each completed pair of shells took up the load. Shell units are 48′ long, 8′ wide, 3″ thick and weigh 7 tons each. The precast columns are 44″ wide at the top, 16″ wide at the bottom. Each is 11′9″ long.

(Below) The canopy is 200′ long, including the decorative extension along the front of the original building. At night, lights behind each column shine upward into the canopy for a striking visual effect.



Undulating prestressed roof shells and precast columns make a practical and attractive all-weather canopy for the new drive-in tellers' booths, recently added to the Everglades Bank, Ft. Lauderdale, Fla.

In addition to its interesting and practical effect, the roof was easy to erect. The abutting shell-halves were placed by a single crane. They are supported at the ends of their 48-foot lengths by neat precast columns which also mark the driveway boundaries for each teller's booth. Strength, freedom from maintenance and initial low cost are built-in advantages in this type of roof construction.

In the manufacture of these precast concrete units, Meekins-Bamman Precast Concrete Corp. used Lehigh Early Strength Cement. Here, as in almost any concrete work, this cement helped save time and money — both in quicker re-use of forms and earlier availability of units.

Owner: Everglades Bank, Ft. Lauderdale, Fla.
Architect: Anson & Kerr, Ft. Lauderdale, Fla.
Structural Engineer: Gustav R. Mayer, P. E., Miami, Fla.
Contractor: Caldwell-Scott Engineering & Construction Co., Ft. Lauderdale, Fla.
Concrete Units: Meekins-Bamman Precast Concrete Corp., Hallandale, Fla.
Erection of Units by: Erectors of Florida, Inc., Ft. Lauderdale, Fla.

LEHIGH CEMENTS

Lehigh Portland Cement Company, Allentown, Pa.

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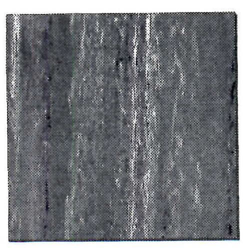
Amtico floors another fine building... Amtico Vinyl patterns and colors create pleasing effects in store decor

Interior architecture and design of the new Gimbels store in Paramus, N.J. are by Copeland, Novak & Israel. Amtico installation by William S. Holmes, Camden, N.J. In the Gifts & Silverware section, an Amtico Vinyl Floor of Marbleized White & Black has rectangular inserts of Marbleized Charcoal.

A floor of Amtico Vinyl in Marbleized White & Black helps to establish a fresh, airy atmosphere that invites customers at the entrance of the Beauty Salon and Restaurant. In the foreground, strips of Marbleized White & Black Vinyl alternate with Marbleized Taupe.

In selecting Amtico Vinyl, interior designers Copeland, Novak & Israel found . . . "in addition to its durability and ease of maintenance, it affords patterns and colors of sufficient variety and catholicity of appeal to meet the tastes and preferences of the great numbers of people who visit Gimbels Paramus each day." Like all Amtico Vinyls, Amtico Marbleized stands up to heavy traffic and is resilient to walk on. Even lightest colors clean easily. Excellent for residential and commercial installation on wood floors above-grade; concrete floors above-, on-, below-grade; walls. Standard 9″ x 9″, 12″ x 12″, 36″ x 36″ tiles and special sizes. 1/8″ and .080″ gauge. Over 200 coordinated colors in Amtico Vinyl. Noted for quality, Amtico also manufactures complete lines of fine rubber, vinyl asbestos, asphalt floorings. See Sweet's Files for complete information and specifications.



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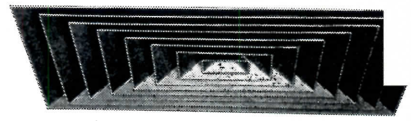

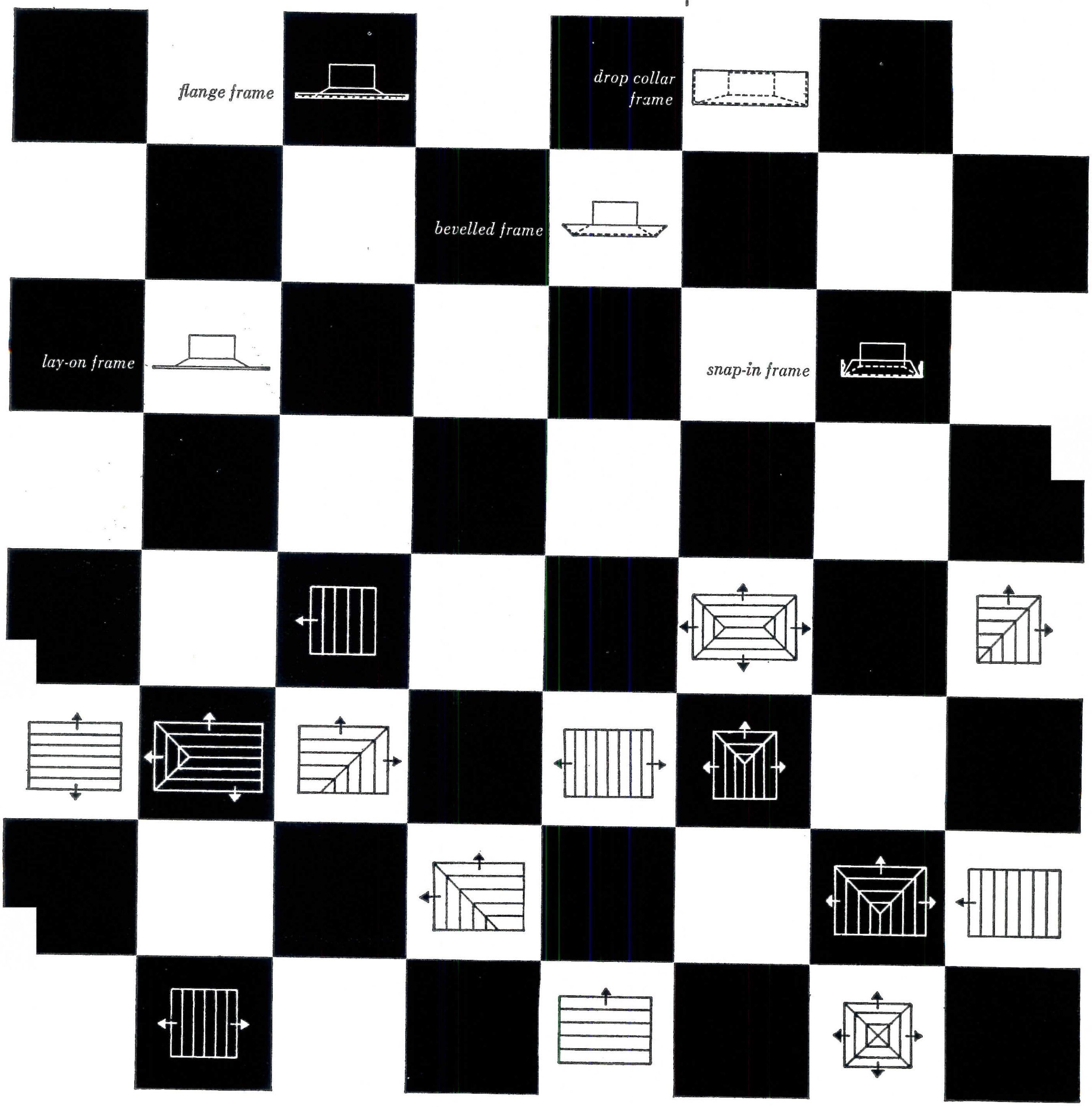

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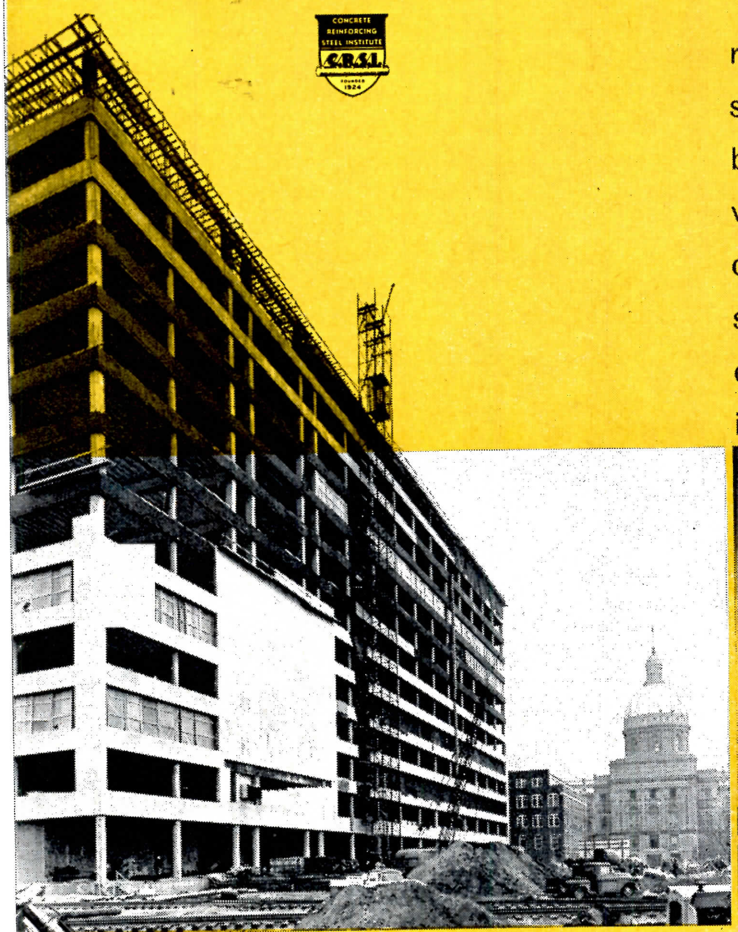
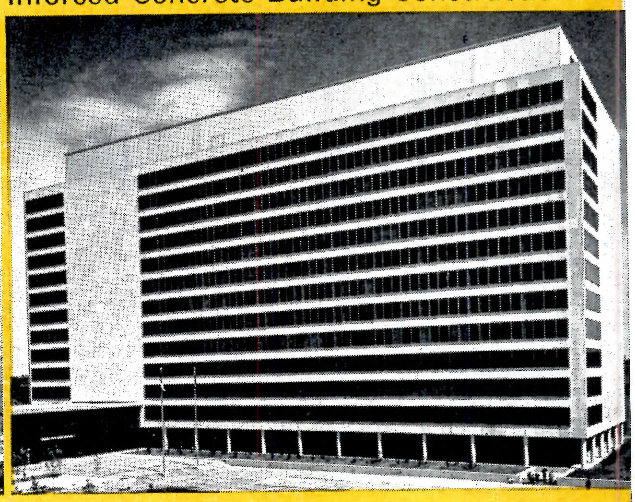
For most types of buildings, monolithic reinforced concrete is the cost-saving structural method. Before YOU design or build, be sure to investigate all the advantages of this superior method including cost, design flexibility, and overall construction time. Write for the new booklet entitled "The Economic Advantages of Reinforced Concrete Building Construction."





Indiana State Office Building, Indianapolis, Indiana
Architect and Engineer: Graham, Anderson, Probst & White, Chicago, Illinois; and Raymond S. Kastendieck, Gary, Indiana
General Contractors: Virginia Engineering Company, Inc., Newport News, Virginia

monolithic reinforced concrete holds the line on construction costs

CONCRETE REINFORCING STEEL INSTITUTE
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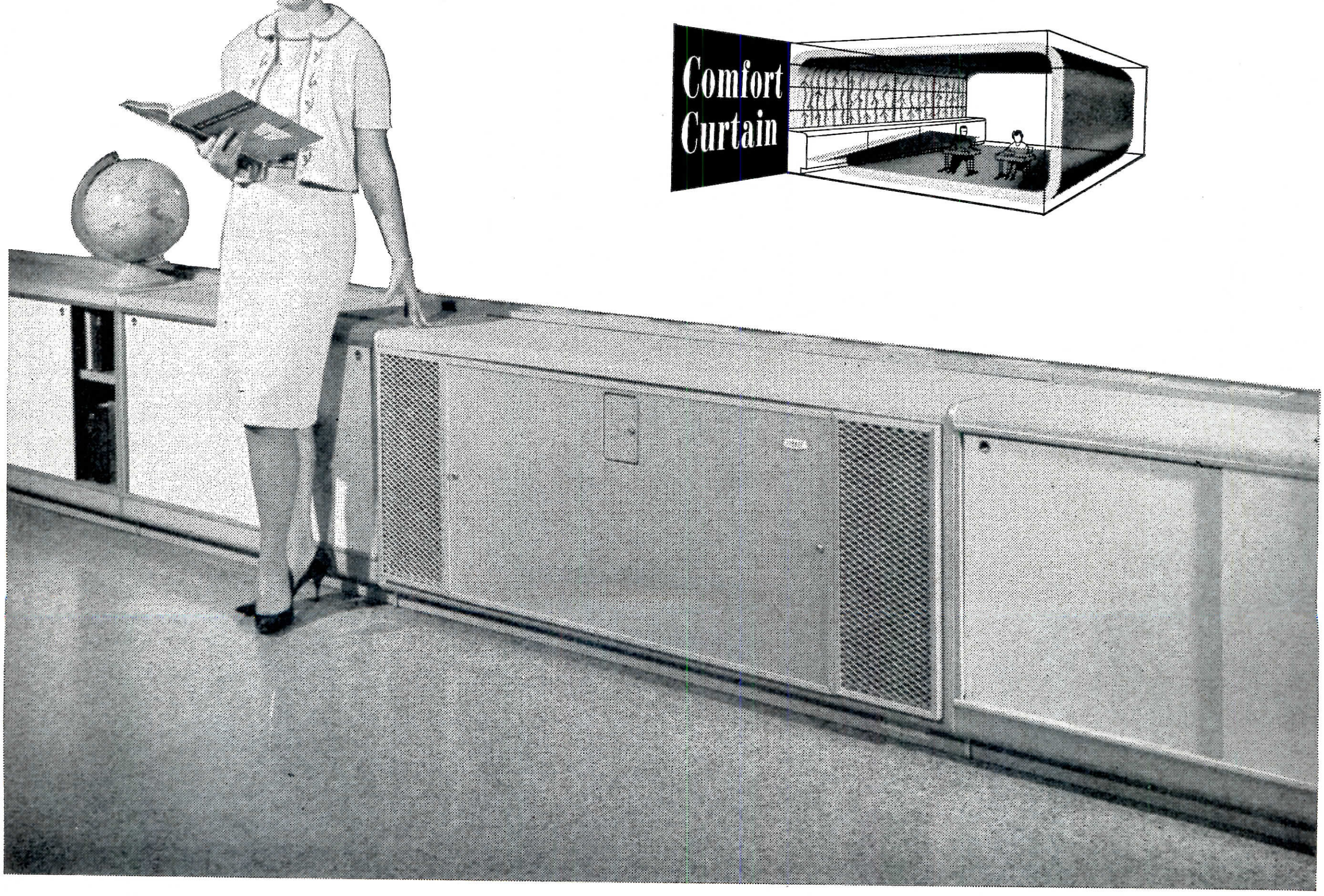

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Misceramic Tile
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Shown: Misceramic's "Coral Reef" in Buckshot Pattern, 1" x 1" tiles. Tiles also available in 1" x 2", 2" x 2" and in combination.


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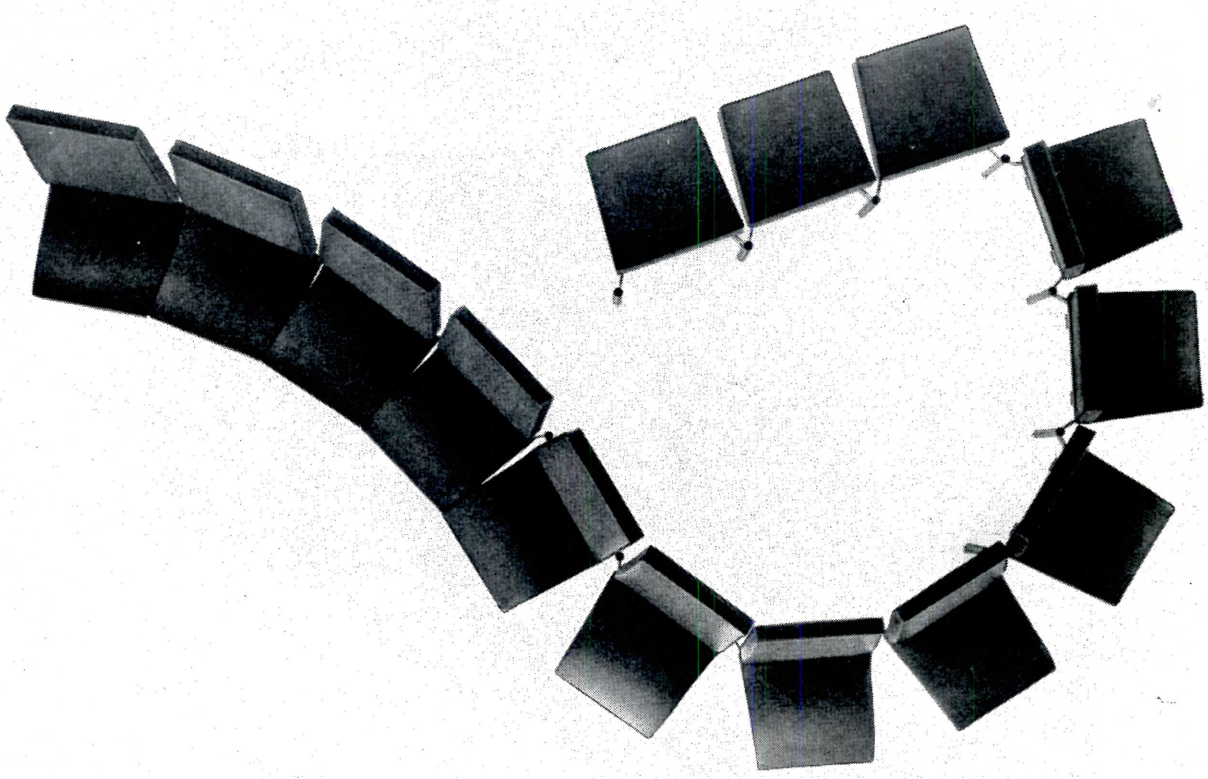
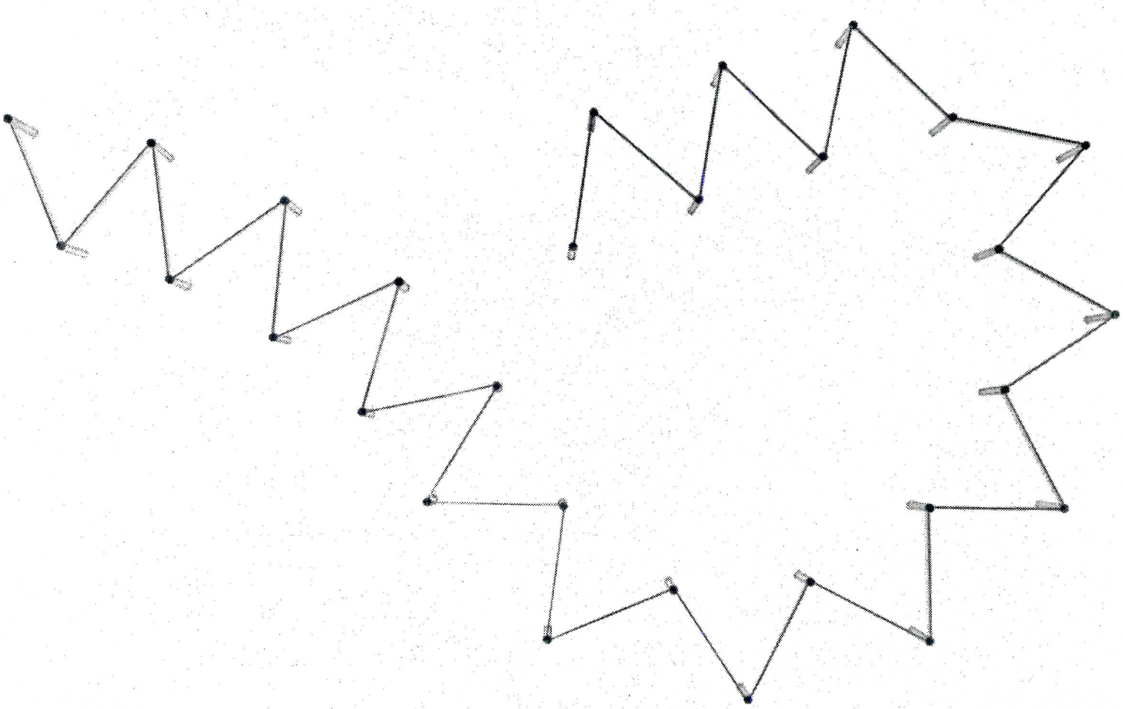
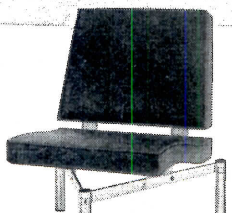


Curves, twists, bends, goes anywhere.



Here's why.

PAT. PEN



Royalmetal's new Viscount 65 seating is based on an entirely new idea, an entirely new kind of base: one that actually flexes. Viscount 65 can wrap around a column. Turn a right angle. Circle a square. Square a circle. Or hold an arrow-straight line. Think what this means. New freedom to design interiors, to realize ideas that could never work with ordinary lounge seating. And if you never ta Viscount 65 to its full capabilities, you'll still have th most beautiful seating ever designed. The most unique, to since only Viscount 65 has "floating seat" styling. Soun interesting? Write today for full information. ROYALMETA CORPORATION, Dept. 10-L, One Park Ave., New York 16, N.Y

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Most chalkboard materials look good when they're new. But, after years of use and abuse, the colors may fade, the surfaces turn slick and shiny and impose a visibility-impairing glare. With Johns-Manville Colorlith®, this *can't* happen because the color is an integral part of the sheet and retains its soft shade indefinitely.

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For full details on J-M Colorlith, write to J. B. Jobe, Vice President, Johns-Manville, Box 14, New York 16, N. Y. In Canada: Port Credit, Ontario. Cable: Johnmanvil.

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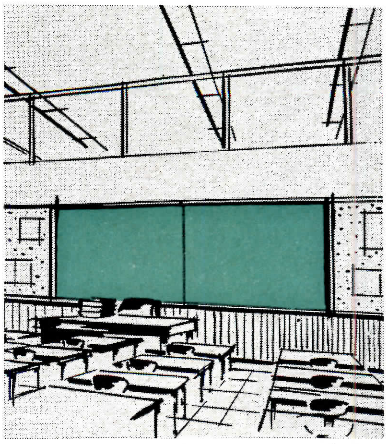

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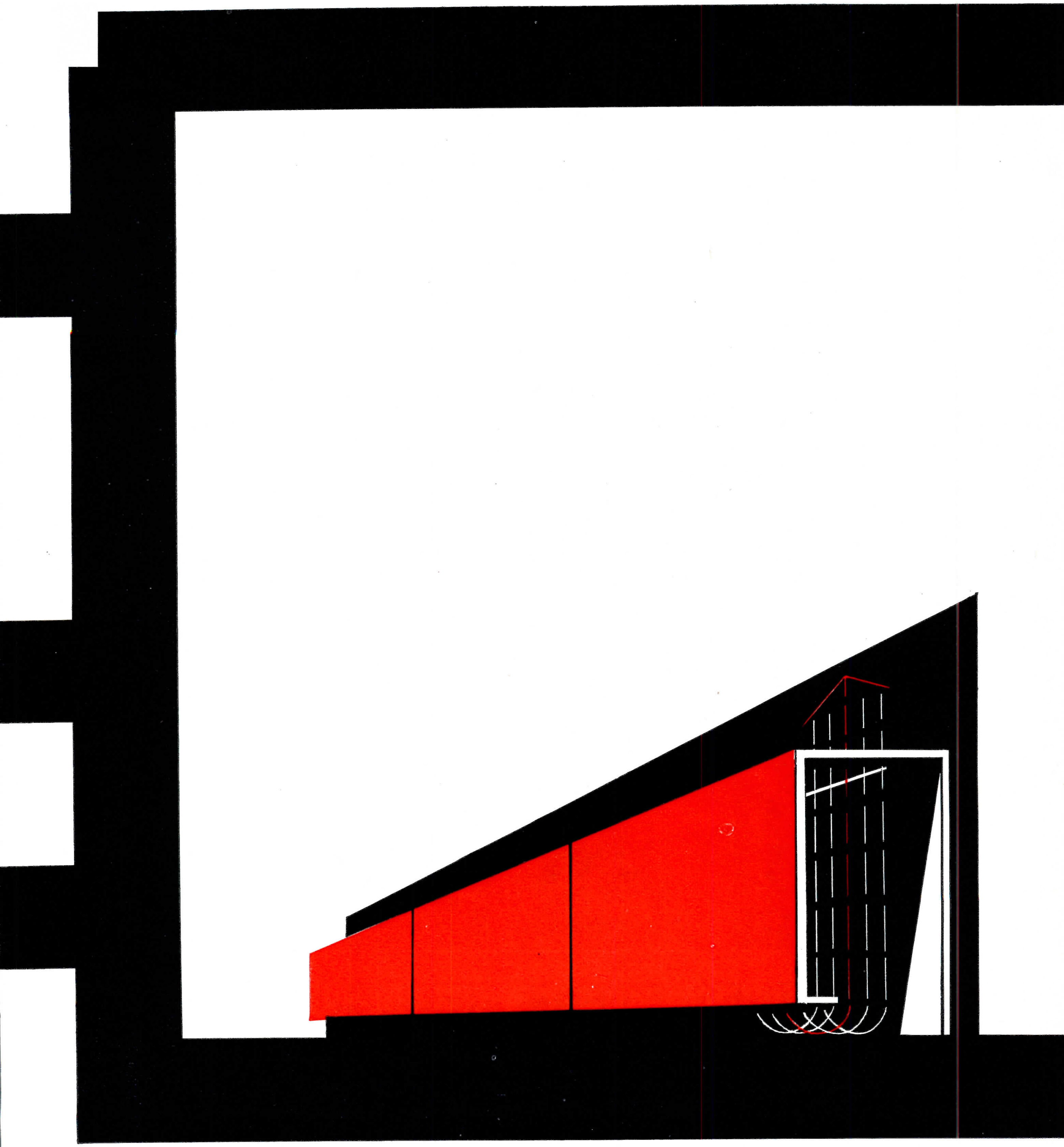
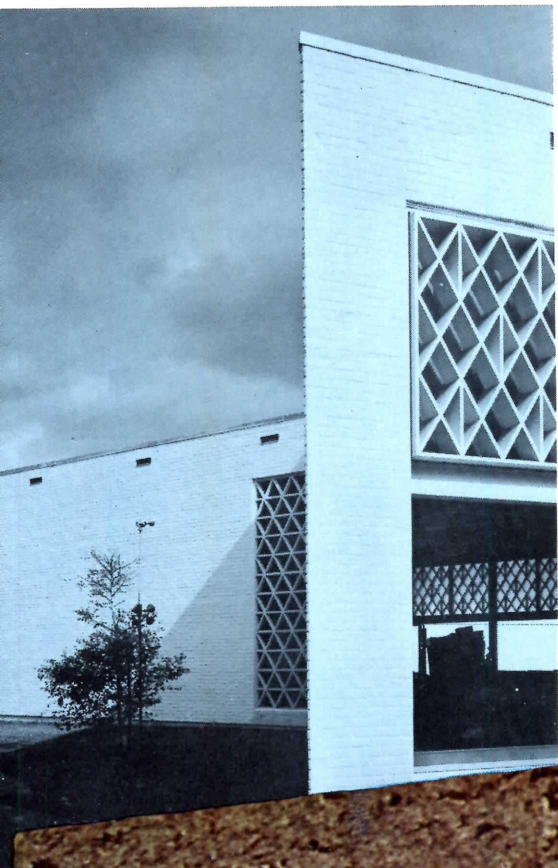
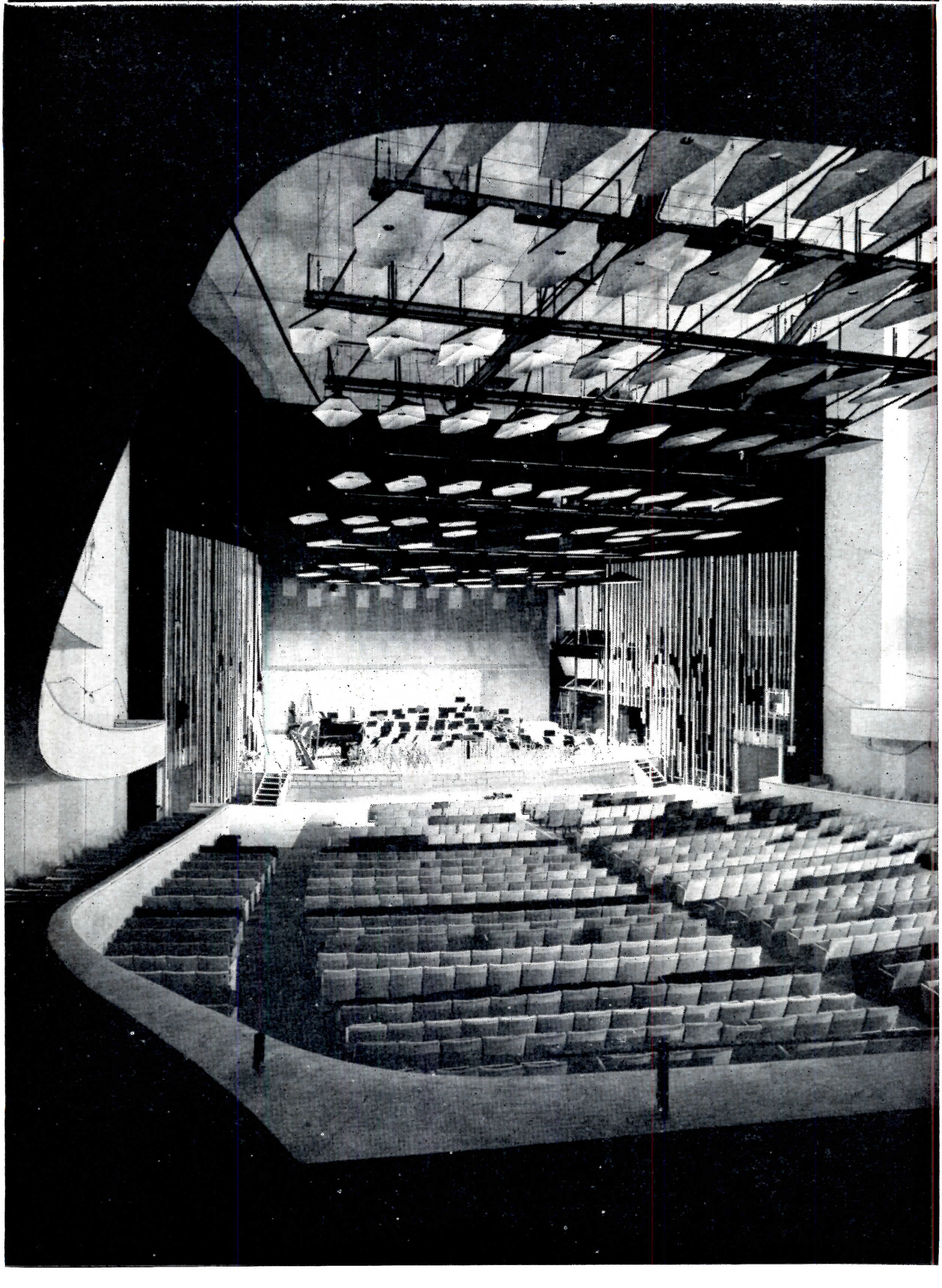


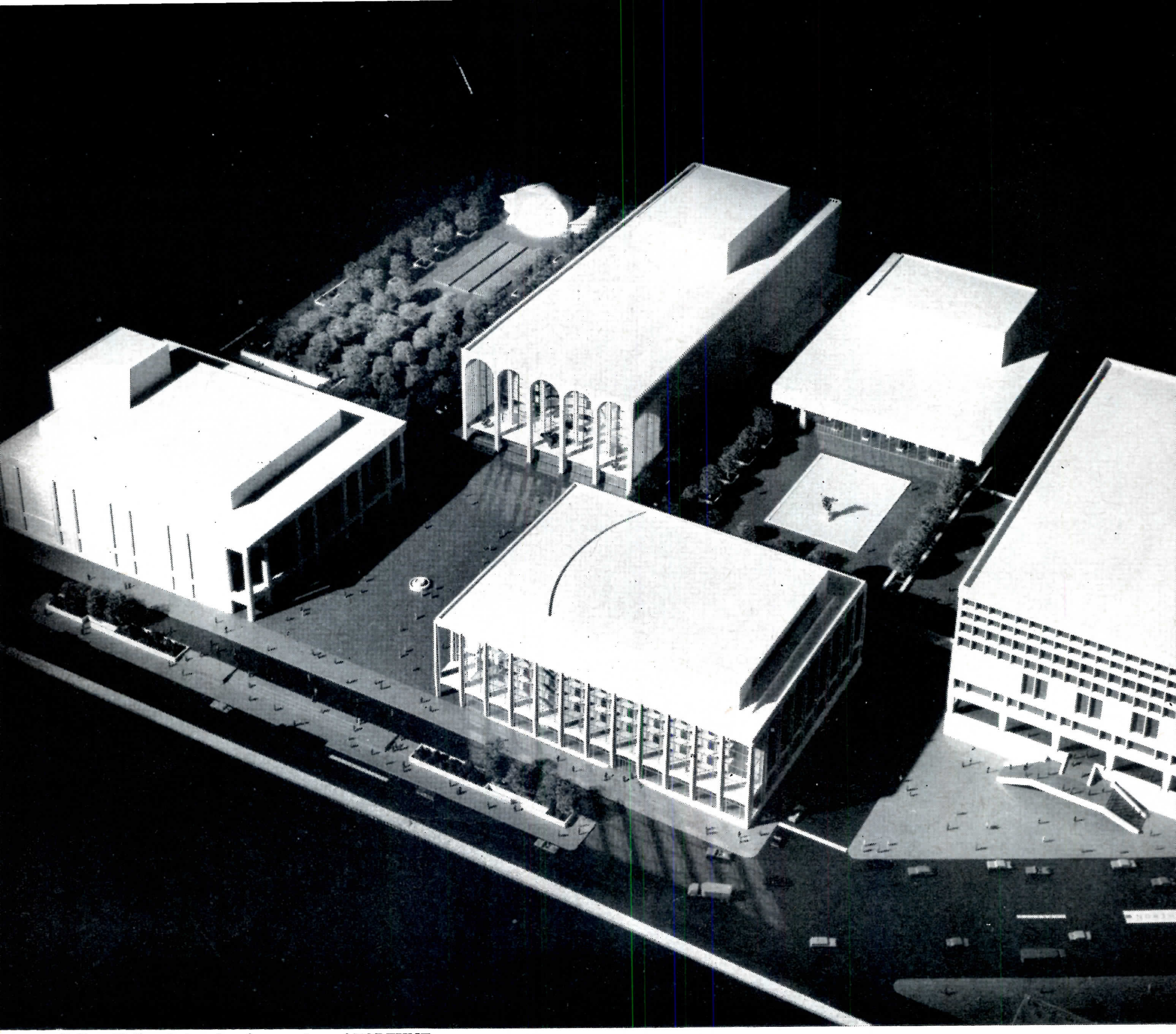




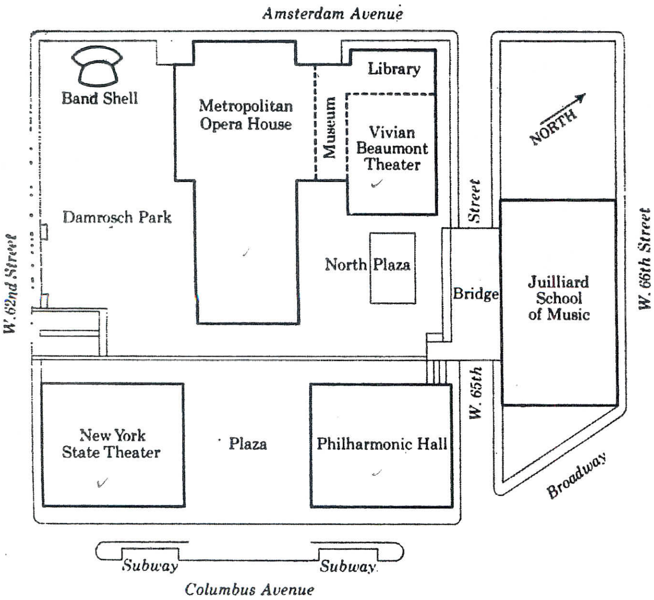
Philharmonic Hall interior, © Ezra Stoller photo

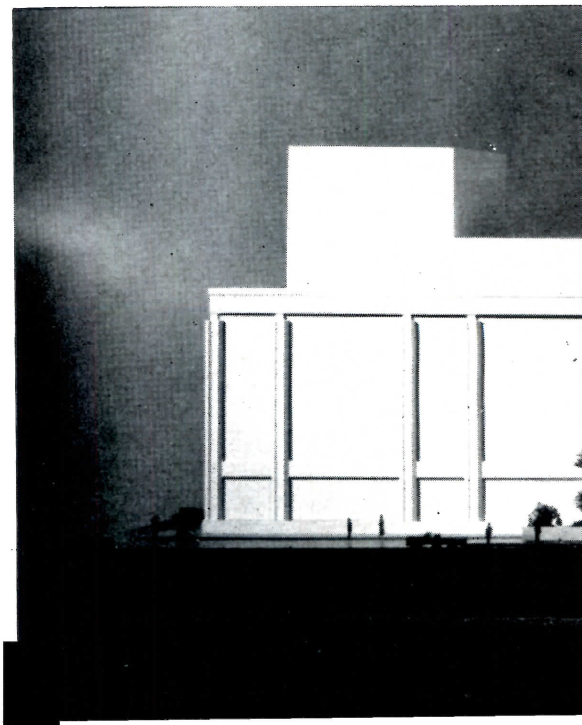
LINCOLN CENTER, NEW YORK

A comprehensive design report
on a unique new center for the performing arts,
presented as the first unit — Philharmonic Hall — opens



© Ezra Stoller photos; drawing courtesy of FORTUNE





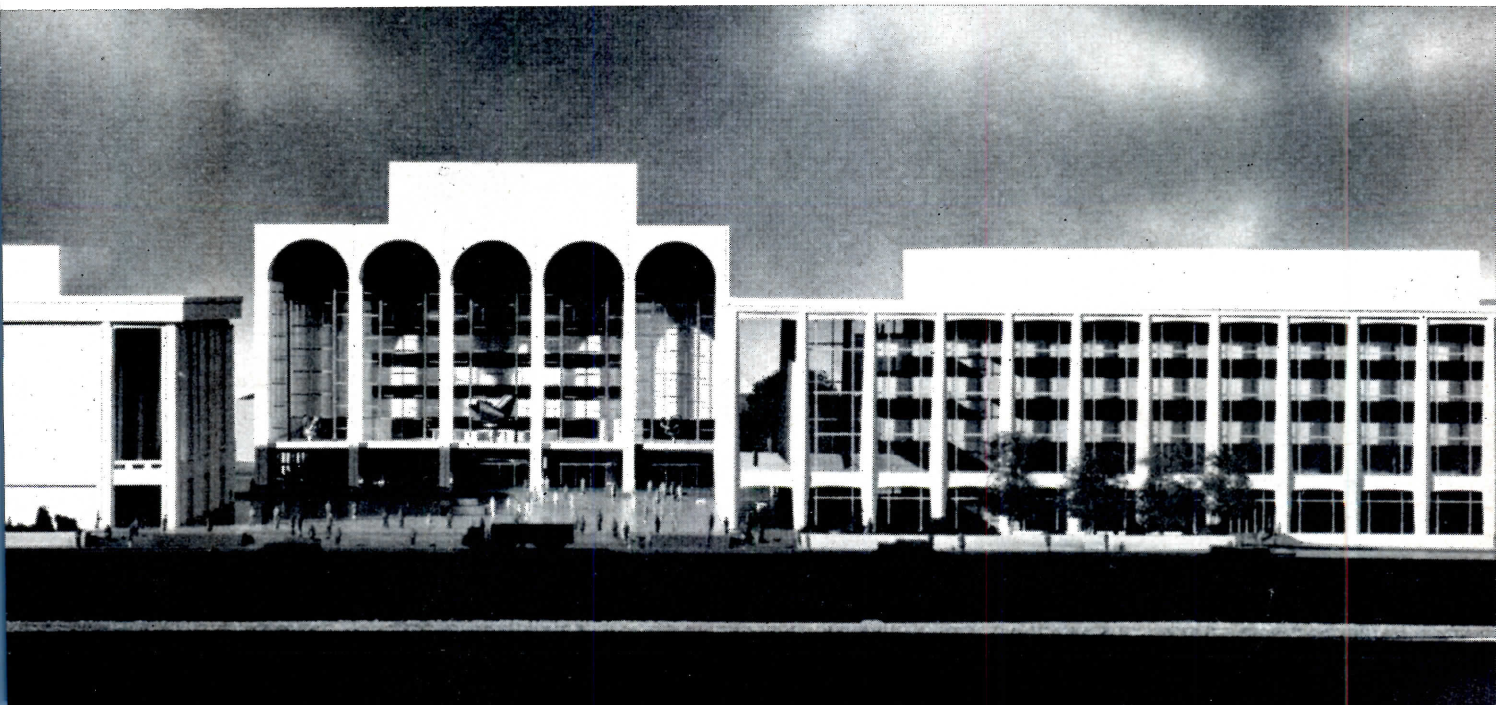
Dan Weiner

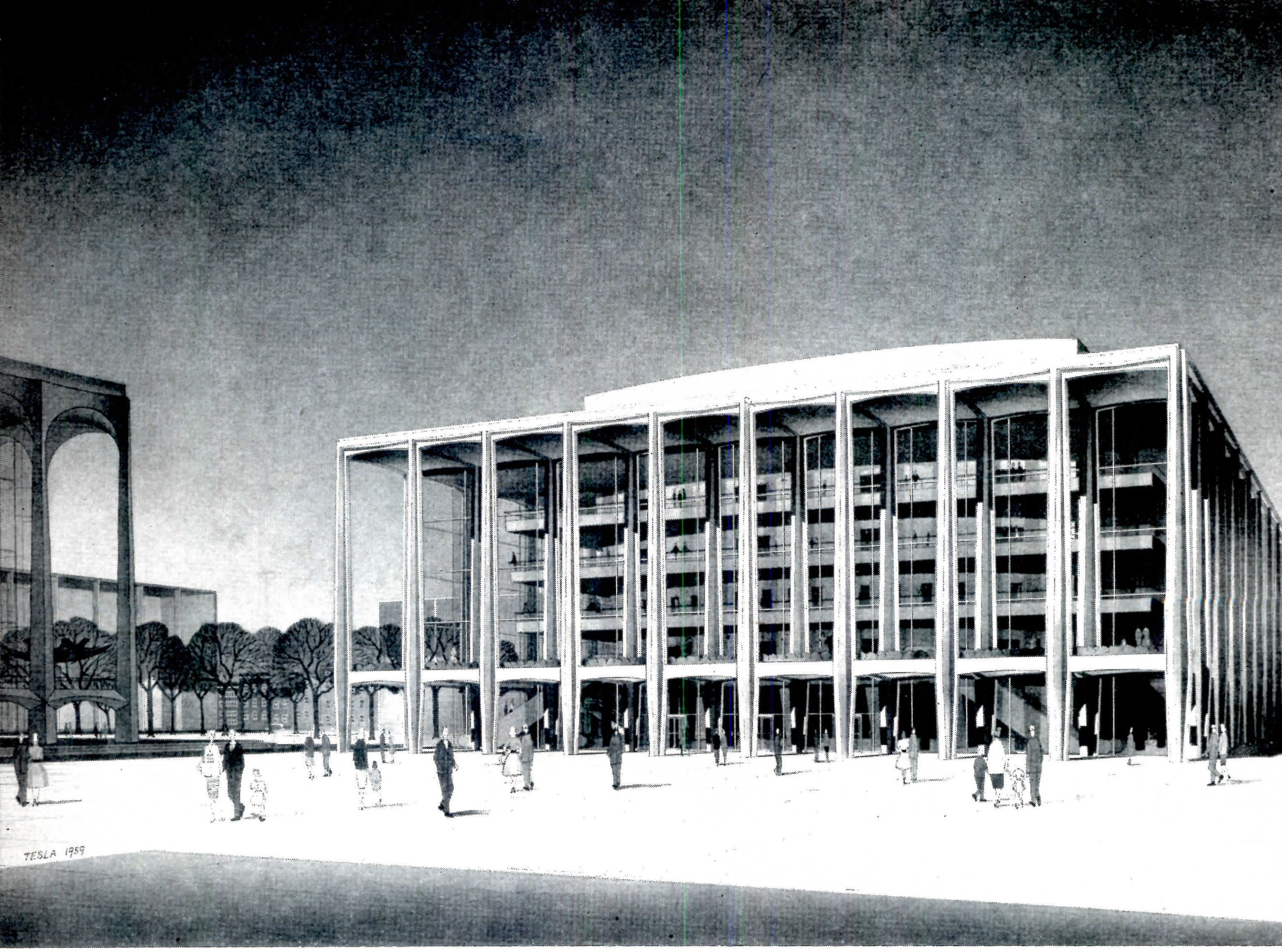
Pietro Belluschi Max Abramovitz
Wallace K. Harrison Philip Johnson Eero Saarinen Gordon Bunshaft

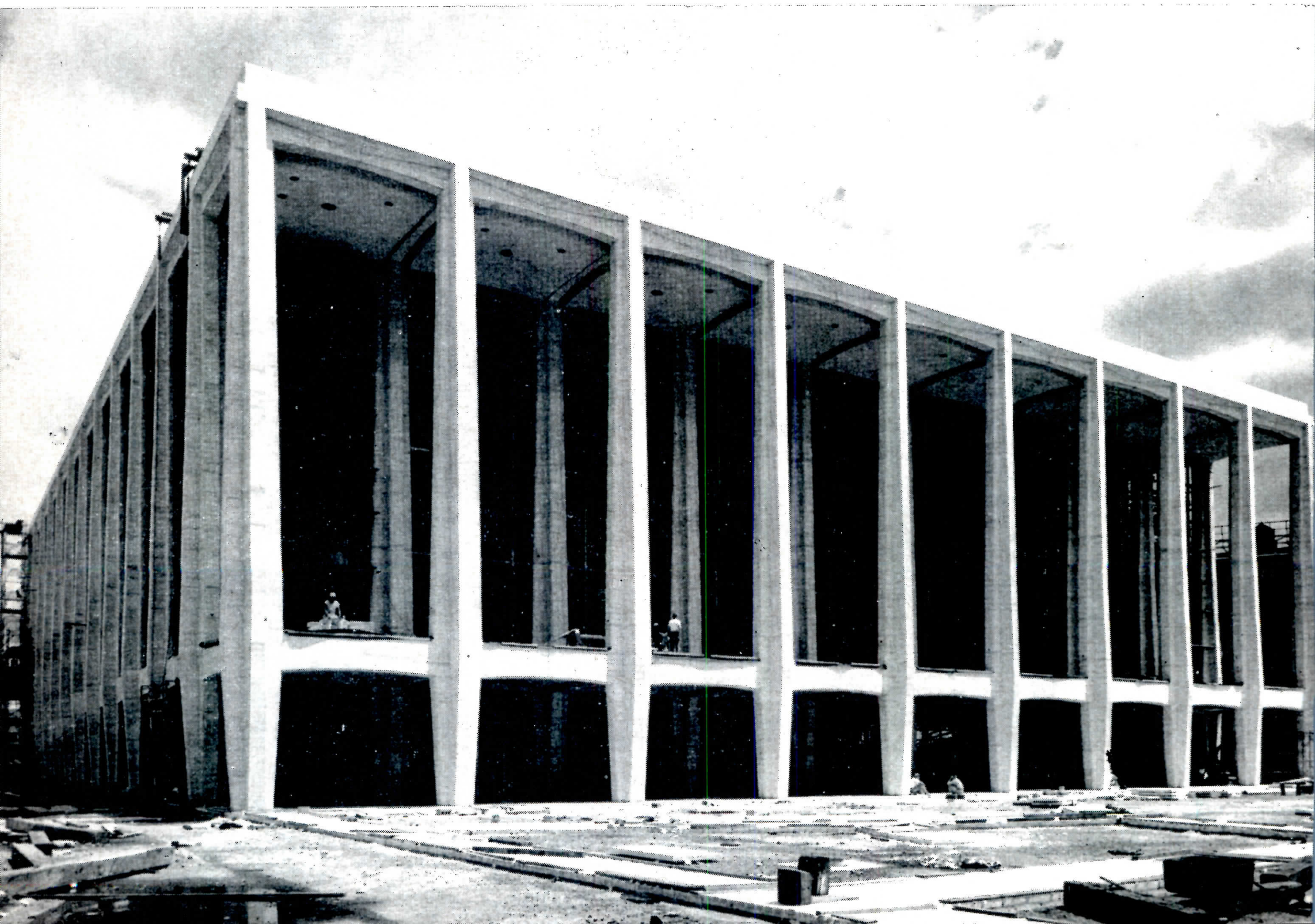
CULTURAL ADVENTURE — ARCHITECTURAL CHALLENGE

The story of Lincoln Center is the story of the development and realization of a bold idea: to bring together top flight organizations and performers in opera, symphony, drama, and the dance—and professional training in these arts. The constituents will maintain their autonomy, but will be bound by the common purpose of creating a unique cultural center dedicated to the finest in public enjoyment, appreciation, and service; to the training of talented youth; to the encouragement of creative endeavor.

Six buildings, plus a park-amphitheater, will comprise the $142 million, 14-acre center. The Metropolitan Opera (Wallace K. Harrison, architect; to be finished in 1965) will dominate the east plaza, which will be flanked by Philharmonic Hall (Max Abramovitz, architect; opening September 23) and the New York State Theater for ballet and operetta (Philip Johnson, architect; completion 1964). The Vivian Beaumont Repertory Theater (Eero Saarinen, architect; completion 1964) and Library-Museum of the Performing Arts (Skidmore, Owings & Merrill, architects) are in a single building which will face the north plaza, while the new Juilliard School (Pietro Belluschi and Catalano & Westerman, architects; completion 1966) will lie in an adjacent block linked to the north plaza by a pedestrian bridge. Underground, there will be service drives, parking for 732 cars, and pedestrian walkways linking the buildings.




TESLA 1959



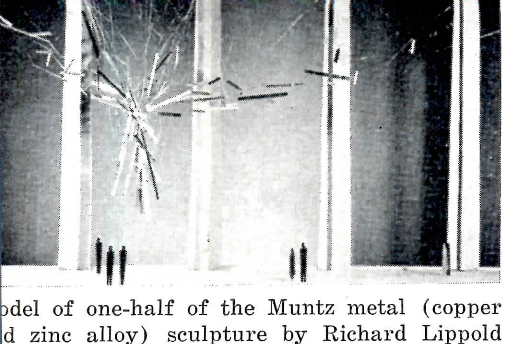
HILHARMONIC ALL

CHITECT: *Max Abramovitz*
ditional credits, page 148

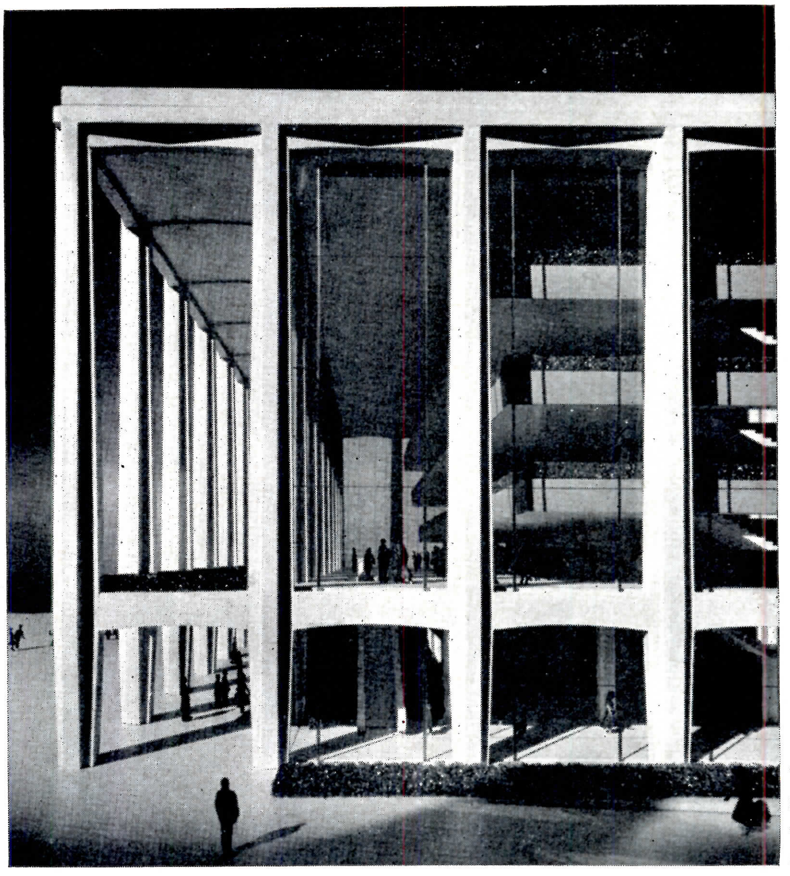
ne $15.4 million Philharmonic Hall will at 2,644; will be the permanent home America's oldest orchestra; is the first ncert hall built in New York since 1891; d will open on September 23. Every nsideration was made secondary to the ain requirement that the hall should ovide the best possible quality of sound r the listener. Its design was heavily fluenced by the study of great concert lls here and abroad (see article beginng on page 196).

The hall is essentially rectangular in ape, and contains three terrace-balnies which were made very shallow so at there are almost no seats "under balnies." Promenades will encircle the terces on three sides, and look over the aciousness of the great foyer. There ill be 1,384 orchestra seats, 392 in the chestra circle, 454 in the first terrace, d 414 in the second terrace. The cantivered seats are designed for sound abrption equivalent to that of an occunt, and will be upholstered in shades of ld. The plaster ceiling and walls will be inted blue; the terrace fascias and sofs will be gold-leafed.

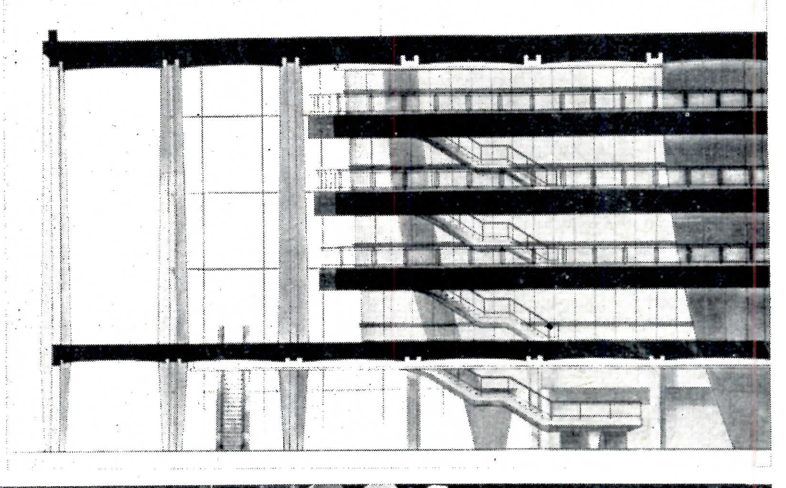
Adjustable acoustical reflectors—also vered with gold leaf—will be suspend- from the ceiling and will create both a nctional and decorative pattern. The ck and sides of the stage will be finhed by screens of vertical wood slats.

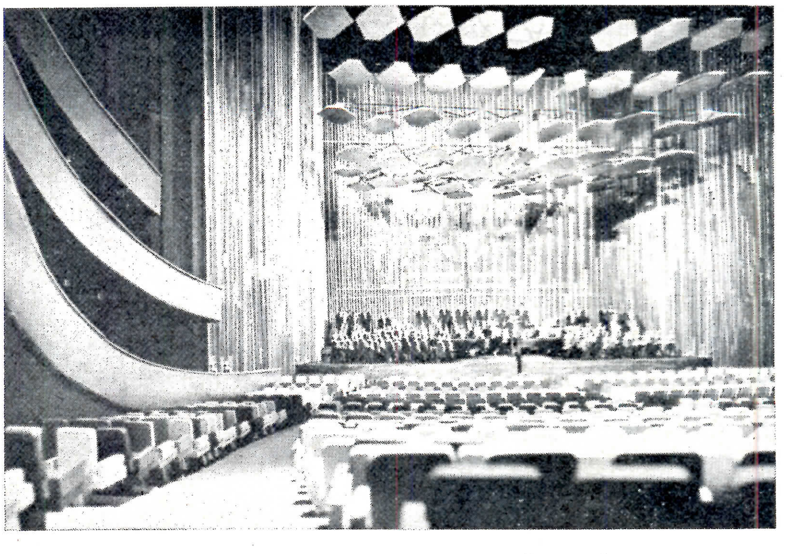


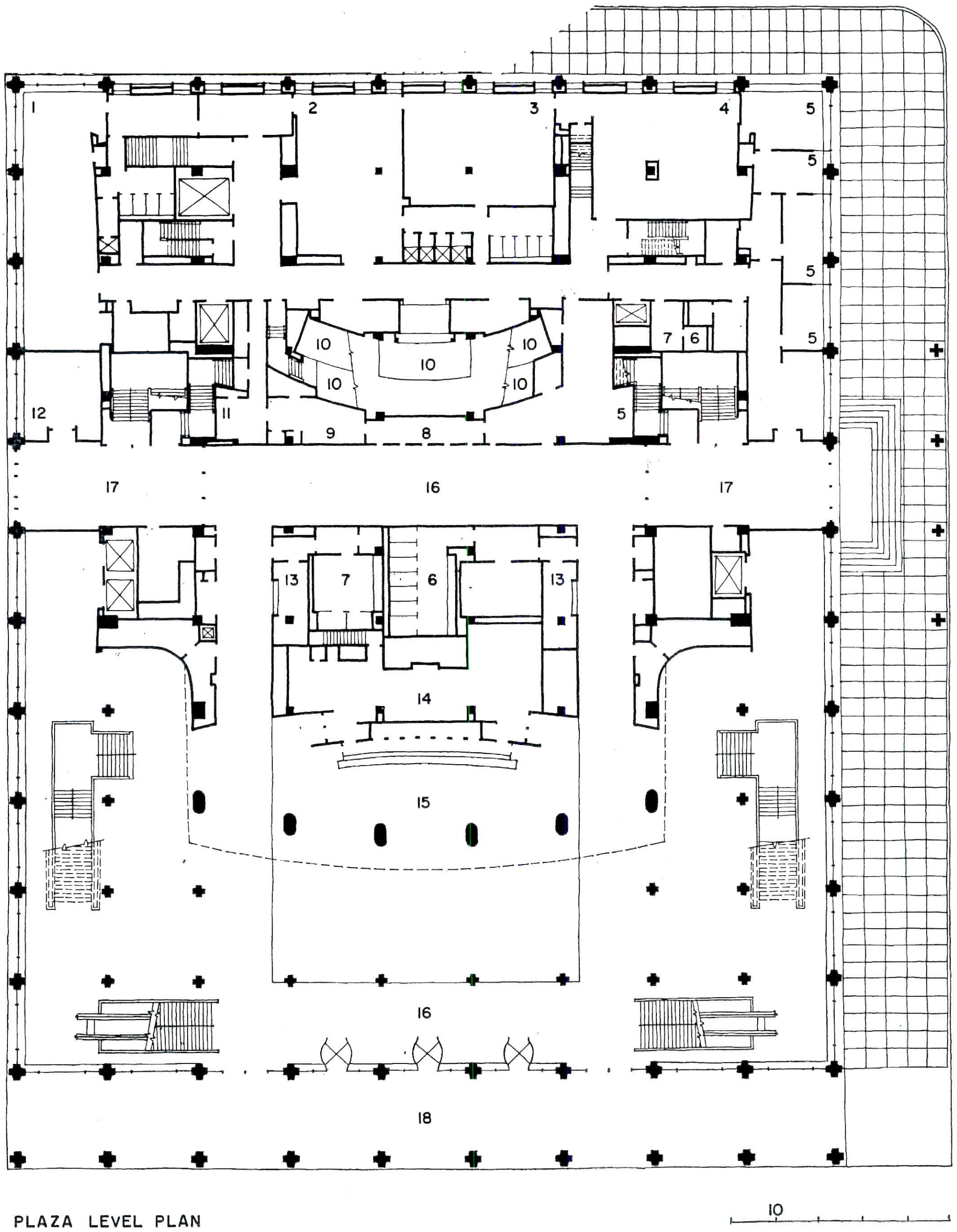
odel of one-half of the Muntz metal (copper d zinc alloy) sculpture by Richard Lippold led "Orpheus and Apollo," created for the eat foyer of Philharmonic Hall. The view is om inside looking toward the large plaza



Louis Checkman







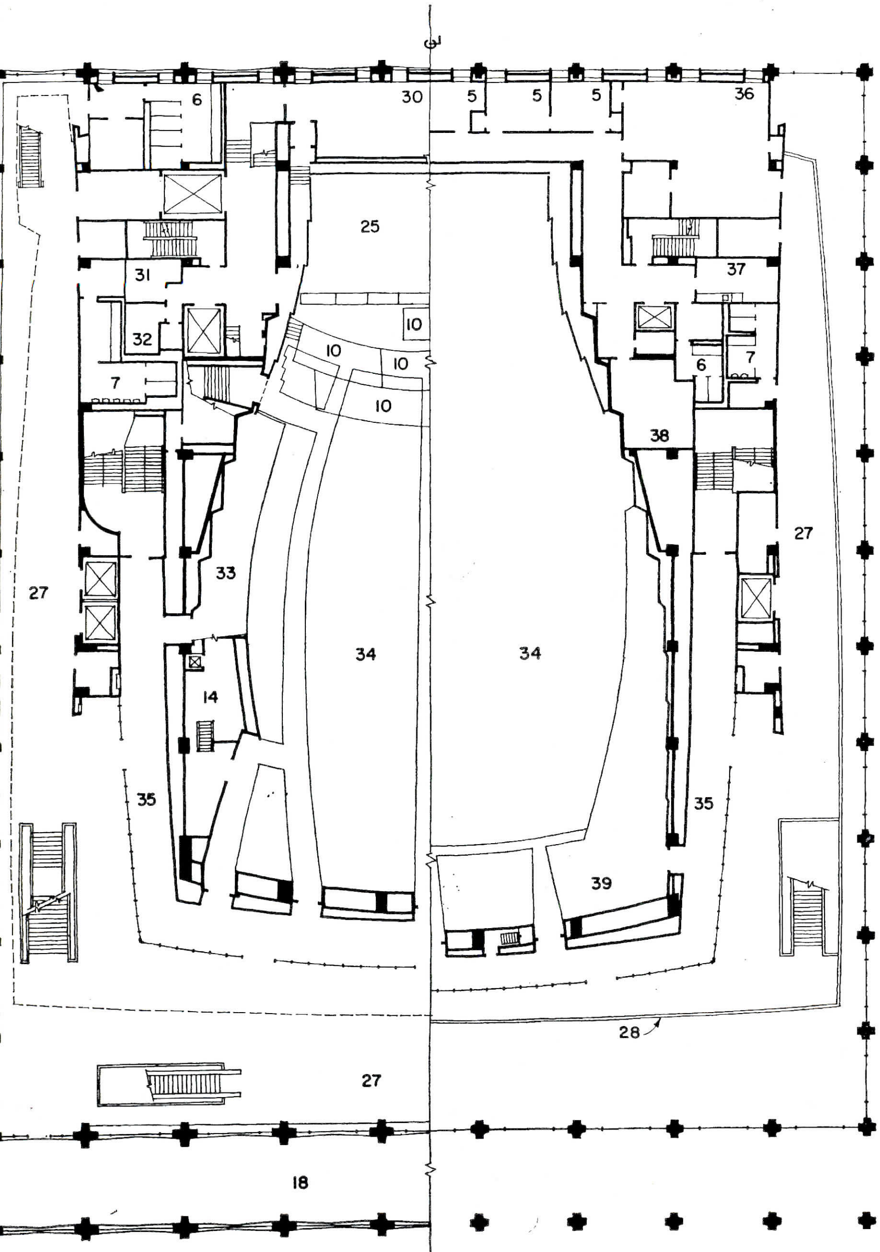
PLAZA LEVEL PLAN

PHILHARMONIC HALL

The patterns of vertical wood slats at the sides and rear of the orchestra platform are acoustically transparent. Adjustable reflectors or absorbents will be placed behind them, dependent upon the program. The 98-rank pipe organ is located at the rear of the stage, and can be concealed or revealed as desired, by means of lighting and a scrim curtain.

The platform is 60 by 40 ft and will accommodate the 120-piece Philharmonic orchestra. Platform elevators will increase its depth to either 48 or 56 ft to handle full orchestra plus chorus of 200, or to provide an orchestra seating for recording.

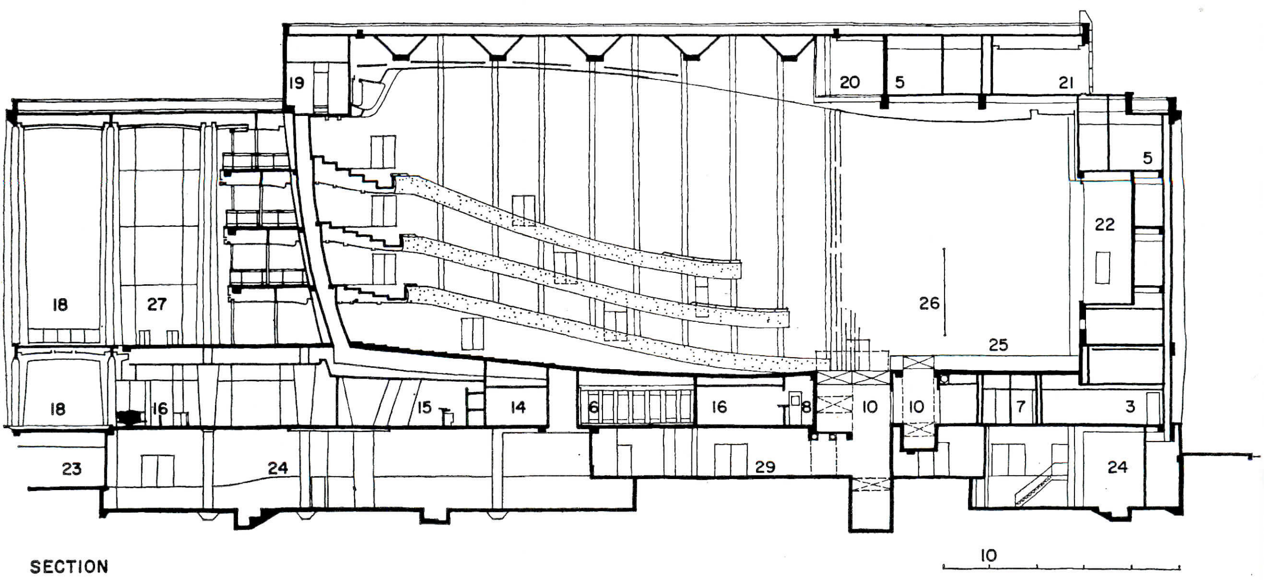
The orchestra floor can be readily converted to several terraced levels and its seats replaced by tables and chairs for 800 for "pops" concerts. Refreshments can be served from two adjacent pantries. At plaza level, the great lobby extends under a portion of the auditorium and houses a cafe seating 300. The box office, cloakrooms, and a music shop are also located on this level.



ORCHESTRA PLAN

SECOND TERRACE PLAN

1. Women's chorus dressing room
2. Visiting dressing room
3. Philharmonic dressing room
4. Philharmonic lounge
5. Office
6. Ladies room
7. Mens room
8. Box office
9. Mail
10. Lift
11. Visiting manager
12. Music store
13. Coats
14. Pantry
15. Lounge & cafe
16. Lobby
17. Vestibule
18. Portico terrace
19. Projection booth
20. Catwalk
21. Board room
22. Organ chamber
23. Pedestrian tunnel
24. Fan room
25. Platform
26. Screen
27. Promenade
28. Face of first balcony
29. Storage
30. Tuning room
31. Personnel office
32. Conductor's retiring room
33. Orchestra balcony
34. Auditorium
35. Emergency passage
36. Publicity
37. Staff room
38. Telephone room
39. Second terrace balcony



SECTION

IETROPOLITAN PERA HOUSE

RCHITECT: *Wallace K. Harrison*
dditional credits page 148

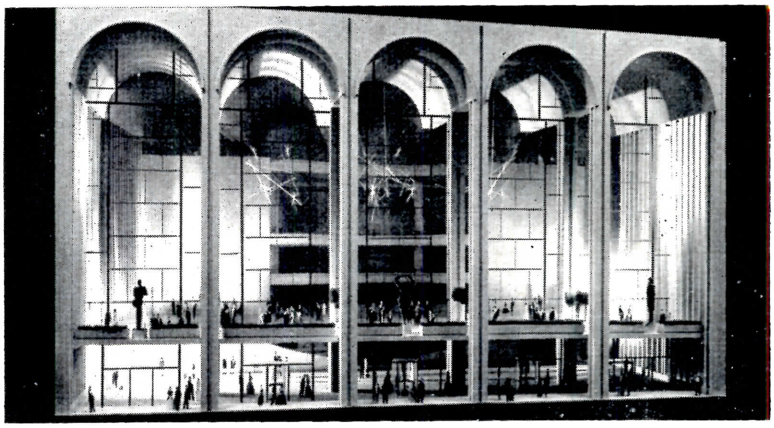
he new $35.4 million Metropolitan Op-
ra House will seat 3,800 and is sched-
led for completion in 1965. The new op-
ra—as all buildings at Lincoln Center
-will be air-conditioned, permitting
ear-around operation and "off-season"
cheduling of visiting organizations.

Its five great arches of travertine will
ecome the focal center of the east plaza,
hile its side walls will be of a similar
ravertine with a rougher face, bonded
 precast concrete mullions.

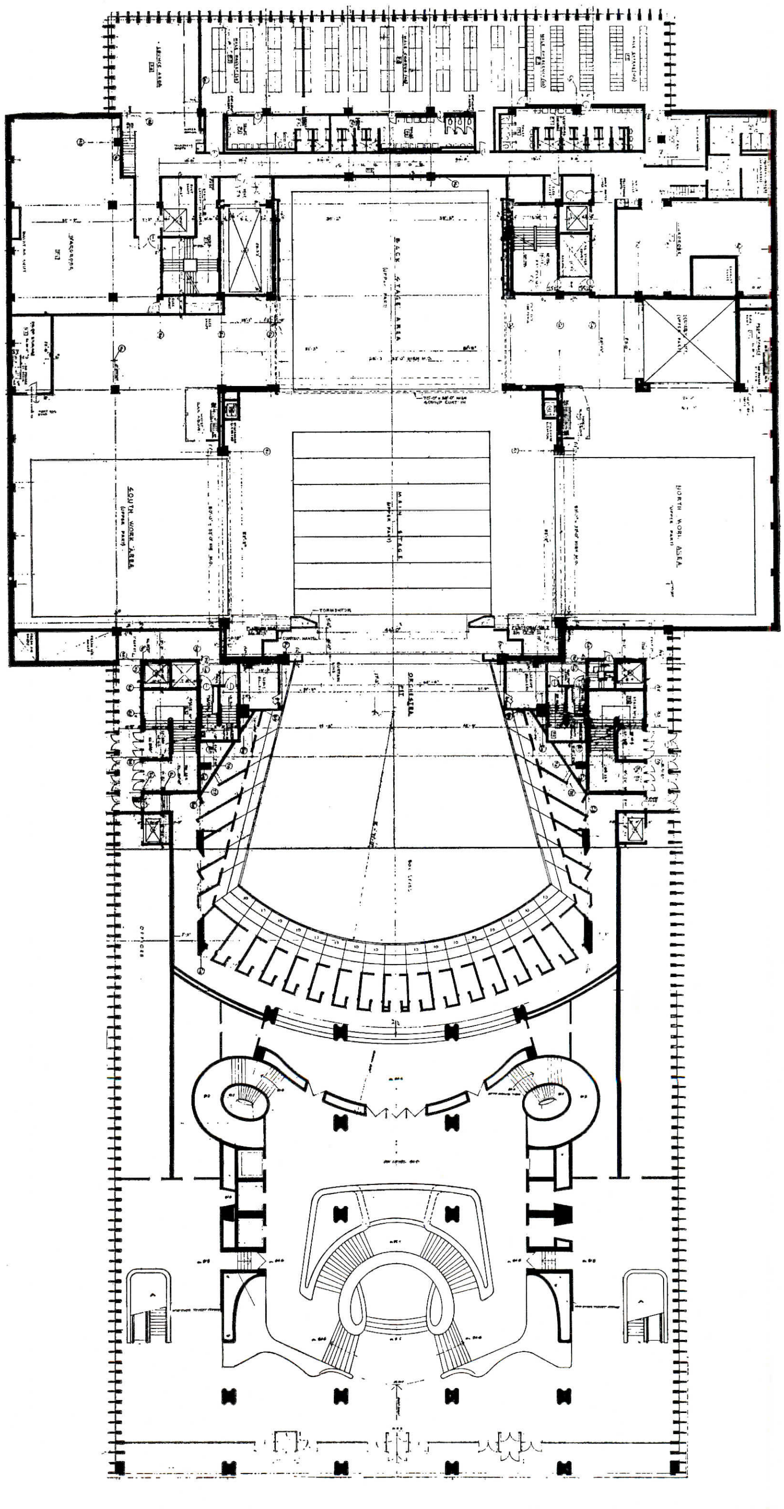
The auditorium proper—which will be
arried out in traditional red and gold—
ill have nearly parallel sides to rein-
orce the sound, an acoustically transpar-
nt rear wall, and an enclosing arched
ructure at the stage for sound rever-
eration. Suspended glass panels near
he stage will serve as acoustical reflec-
ors and as lighting fixtures. Seats will
e arranged at four levels: orchestra and
oxes, grand tier, dress circle, and family
ircle. Due to late arrivals, and for eco-
omic reasons, seats will be in blocks
eparated by aisles.

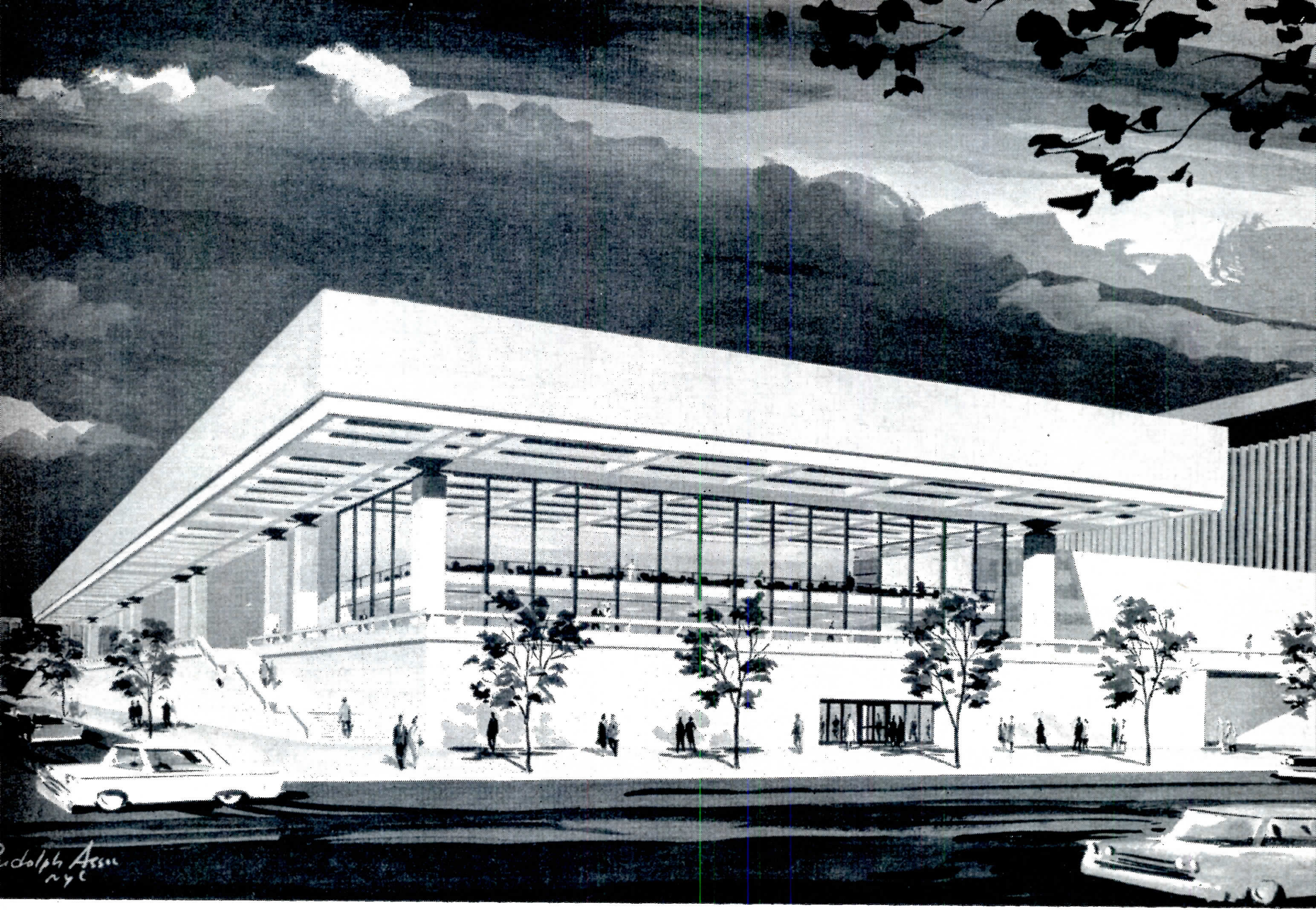
The ceiling will be essentially flat, ex-
ept for a large central dome of plastic,
hich had to be made very flat for sound
einforcement. Side walls will be of wood;
he flooring material is yet to be deter-
nined.

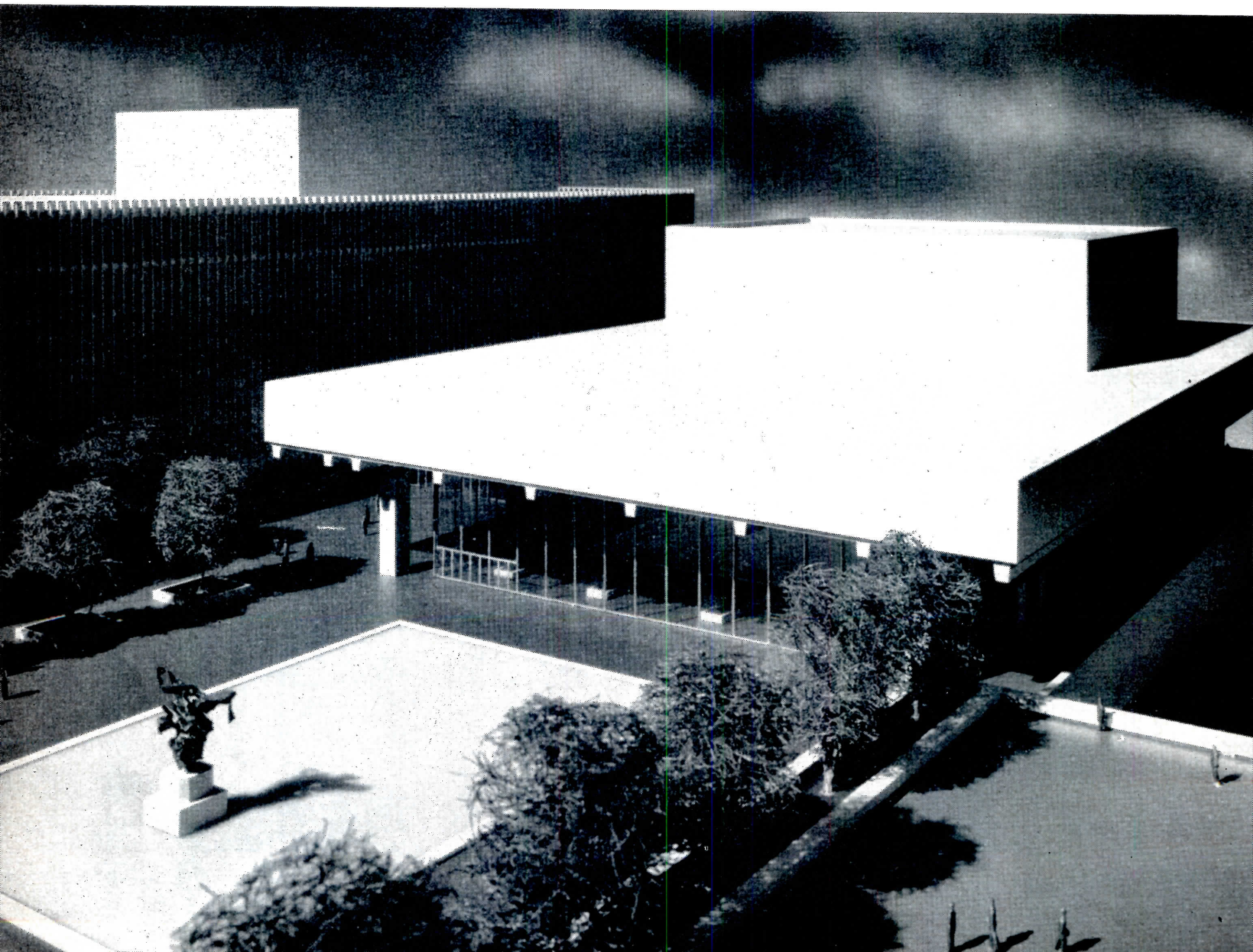
The stage and backstage facilities will
e as large and as completely equipped as
ny in the world. There will be four mov-
ble stages, so that several productions
an be mounted at the same time. The
ackstage areas will be a veritable maze
f shops, storage areas, dressing rooms,
ehearsal rooms, offices, etc. Stage light-
ng will be complex in nature and of the
ost advanced type; there will be an in-
ernal TV system with double equip-
ent, and also an internal supplemental
ound system.



Joseph W. Molitor





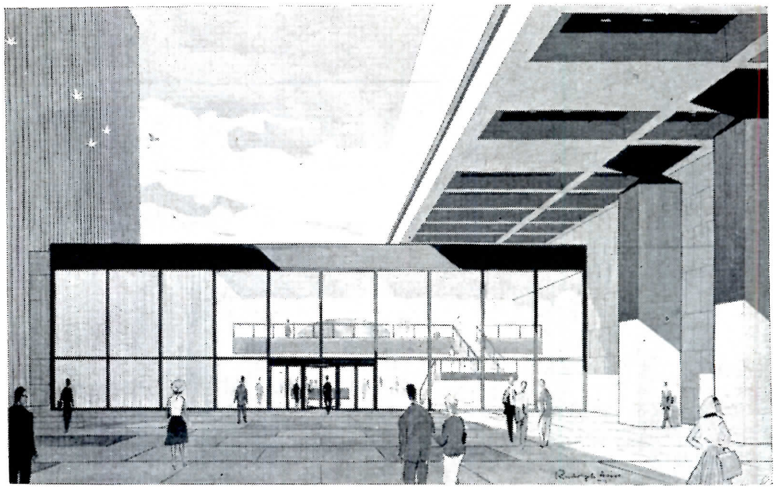


IVIAN BEAUMONT REPERTORY THEATER

RCHITECTS: *Eero Saarinen & Associates*
OLLABORATING DESIGNER: *Jo Mielziner*

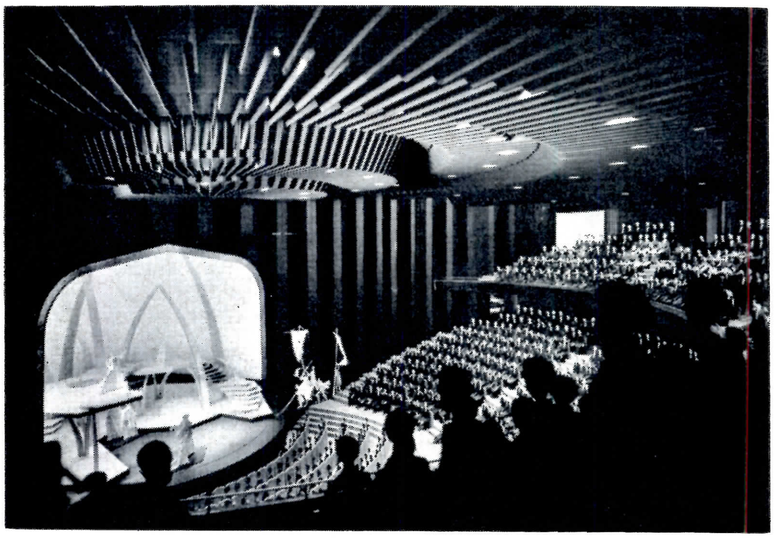
IBRARY-MUSEUM OF THE PERFORMING ARTS

RCHITECTS: *Skidmore, Owings & Merrill*
dditional credits page 148

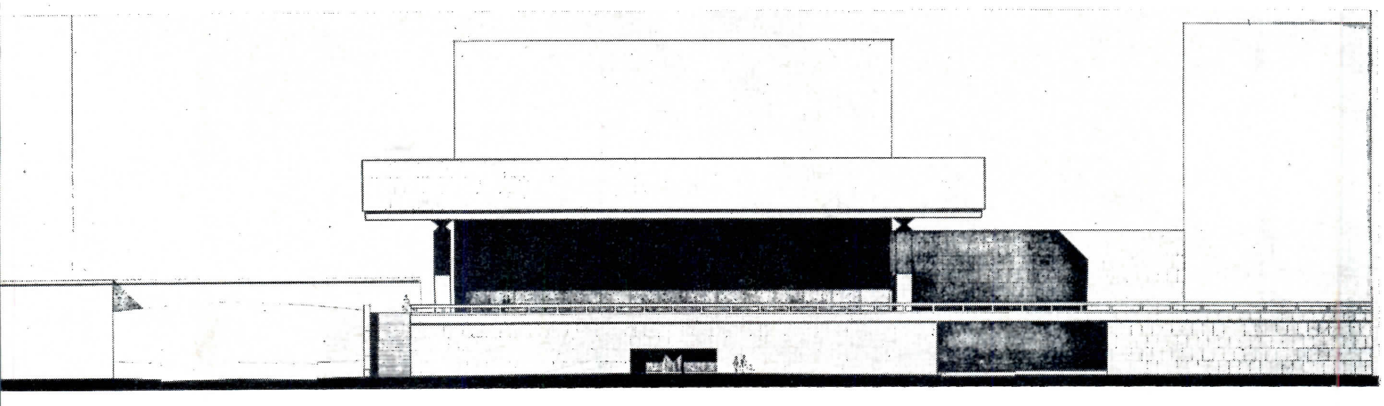


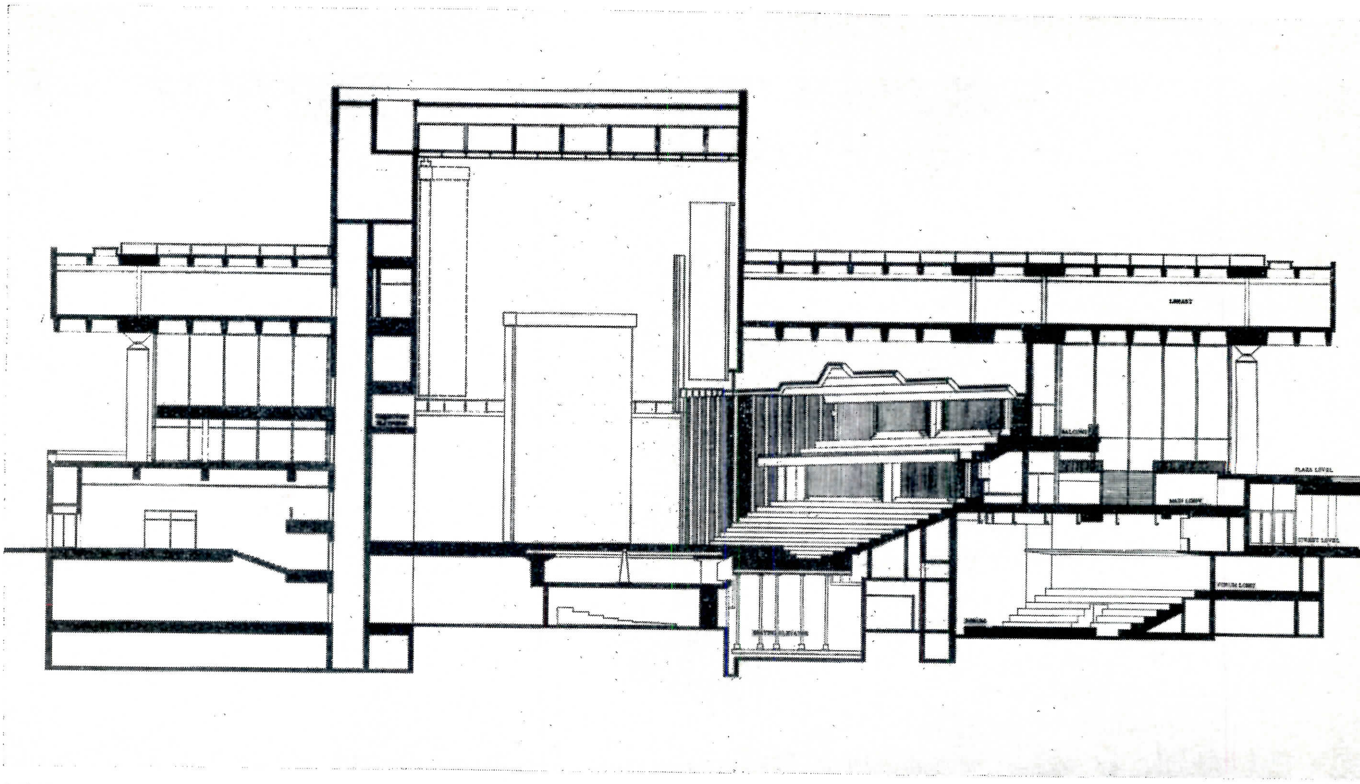
ite limitations necessitated combining oth the repertory theater and the library-museum in a single building, which ill cost $15.2 million and be completed early 1964. The two architectural firms orked closely together to coordinate eir respective portions of the building.

The circulating library and museum ill surround the theater at plaza level; e research library will be housed in a olid upper block which is pierced by the age loft of the theater. The uninterrupted theater space is spanned by 18-ft-eep concrete trusses resting on two rows f free-standing columns 150 ft apart. he research library is contained within e depth of the trusses; the under-side f the library block is deeply coffered by xposing the bottom chords of the trusses nd beams. The library-museum will inlude 7,000 sq ft of exhibition space, an uditorium, a children's library, and sevral conference rooms—in addition to e public circulating library and reearch library. Exhibits will be combined ith books, sound systems, and related aterials to create expositions on varius aspects of music, drama, and ballet. he library-museum portion of the builng will be given to the city.

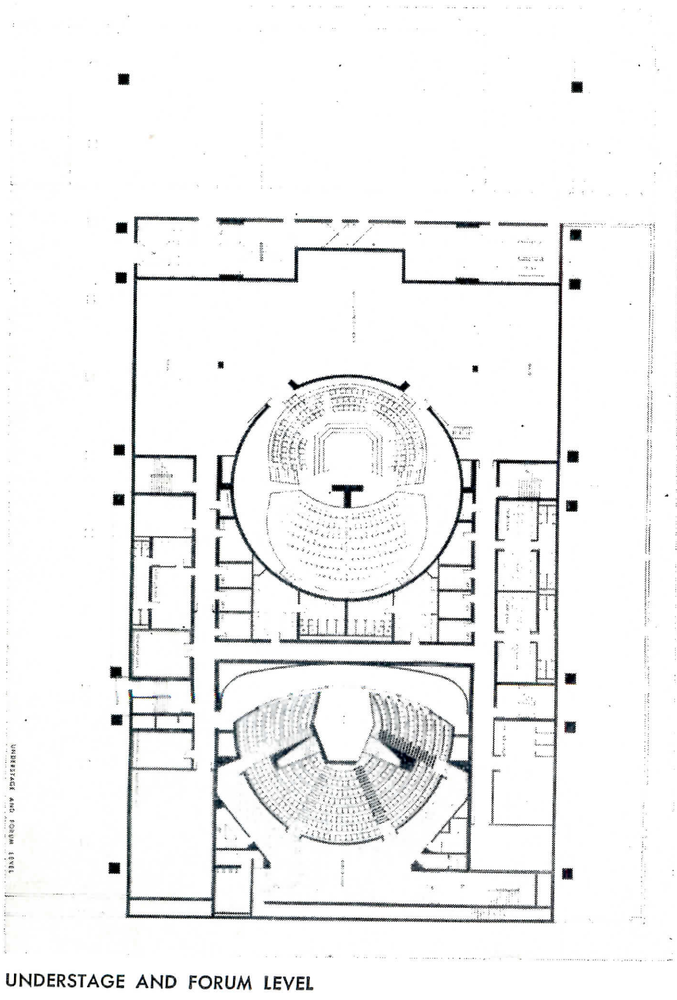


© Ezra Stoller model photos

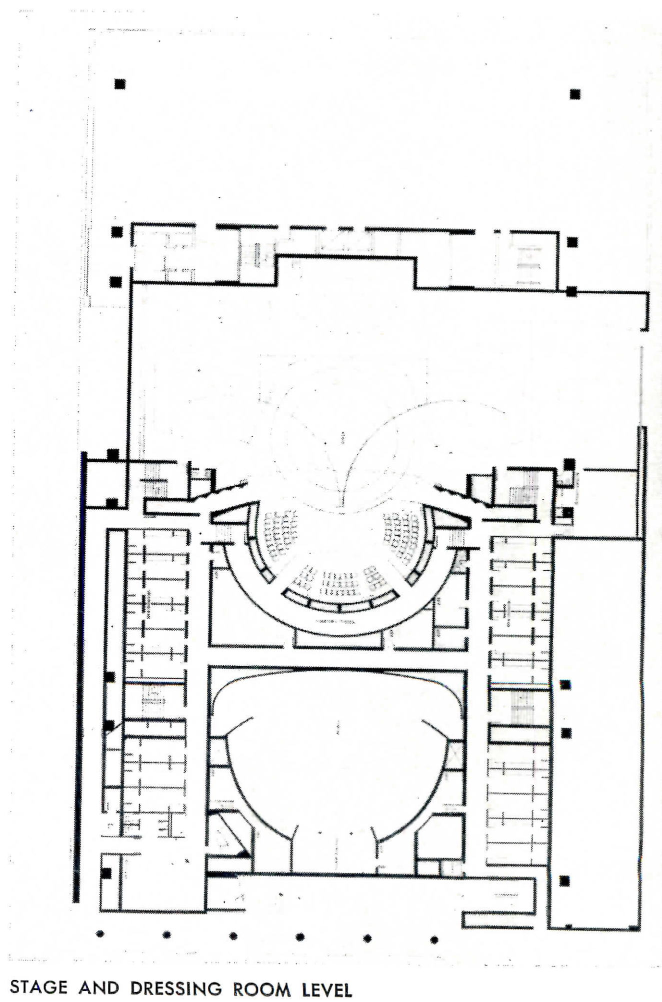




LONGITUDINAL SECTION



UNDERSTAGE AND FORUM LEVEL

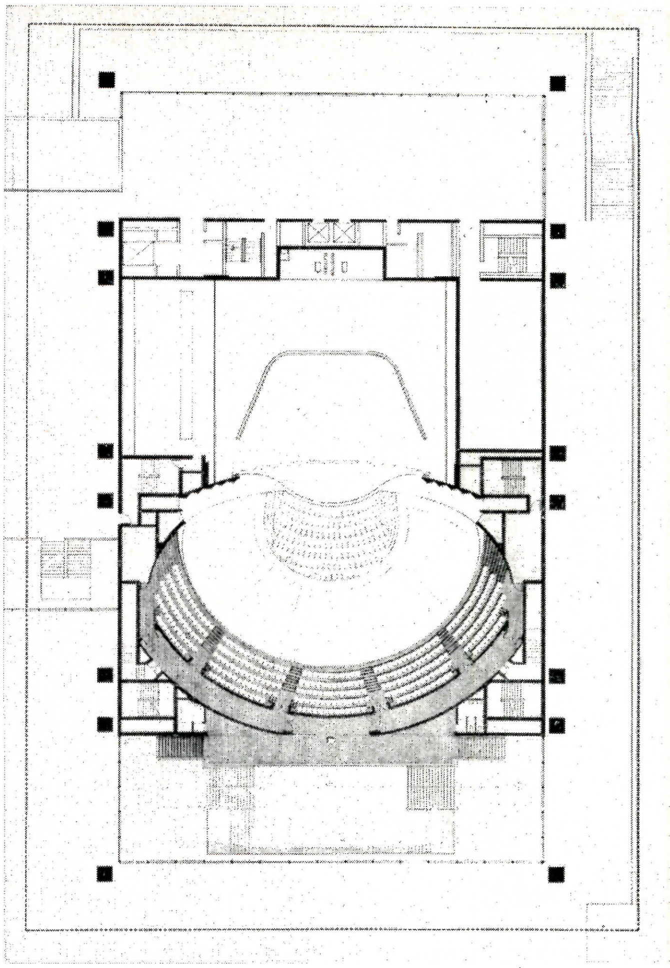


STAGE AND DRESSING ROOM LEVEL

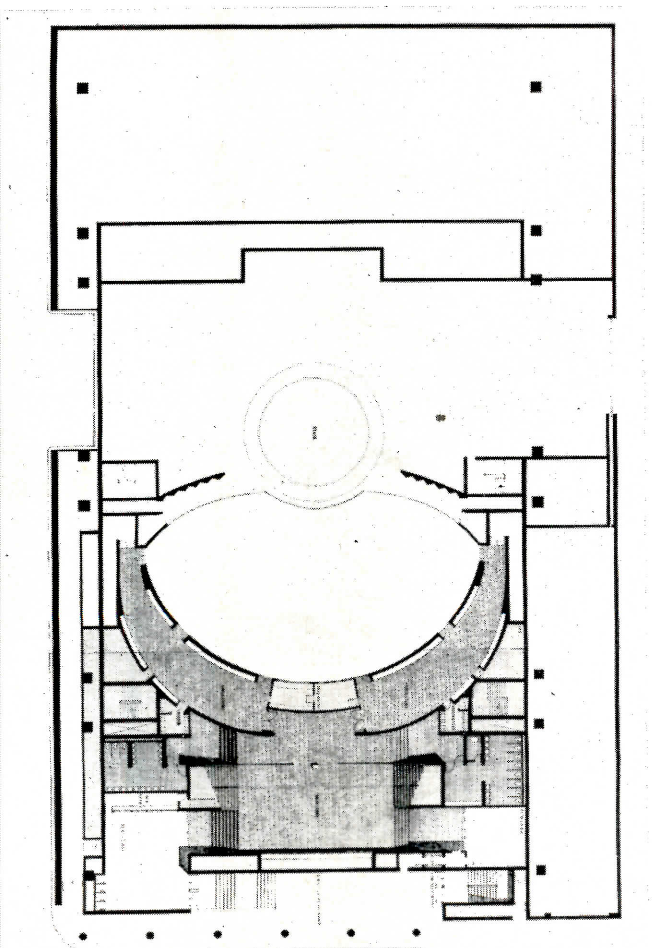
EPERTORY THEATER AND IBRARY-MUSEUM

he main theater will seat 1,100; a lower-vel, unelaborate amphitheater—called The orum—will seat 300. The building will be e home of the newly formed Lincoln Rep-rtory Company.

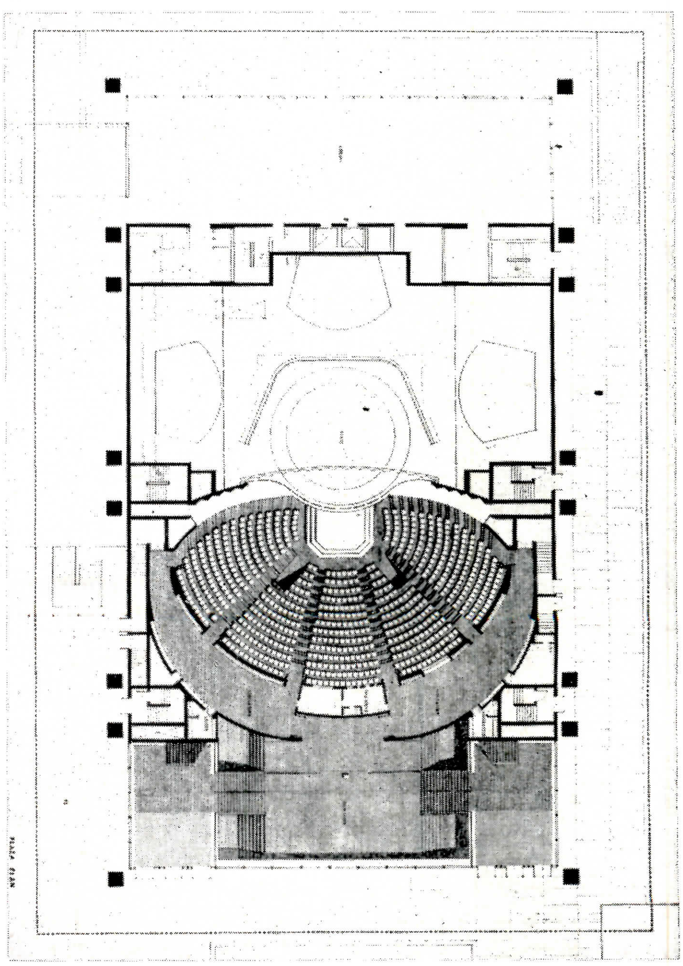
The main theater can have either a pros-enium stage or an open stage of extreme rust, or a combination of the two. The thea-r will achieve great intimacy between idience and actor; the audience is virtually wrapped around the stage"; no seat is more an 65 ft from the stage. There will be mo-rized scenery facilities, ample shops, and e 11,000 sq ft stage will have an additional ,000 sq ft for scenery and costume storage.



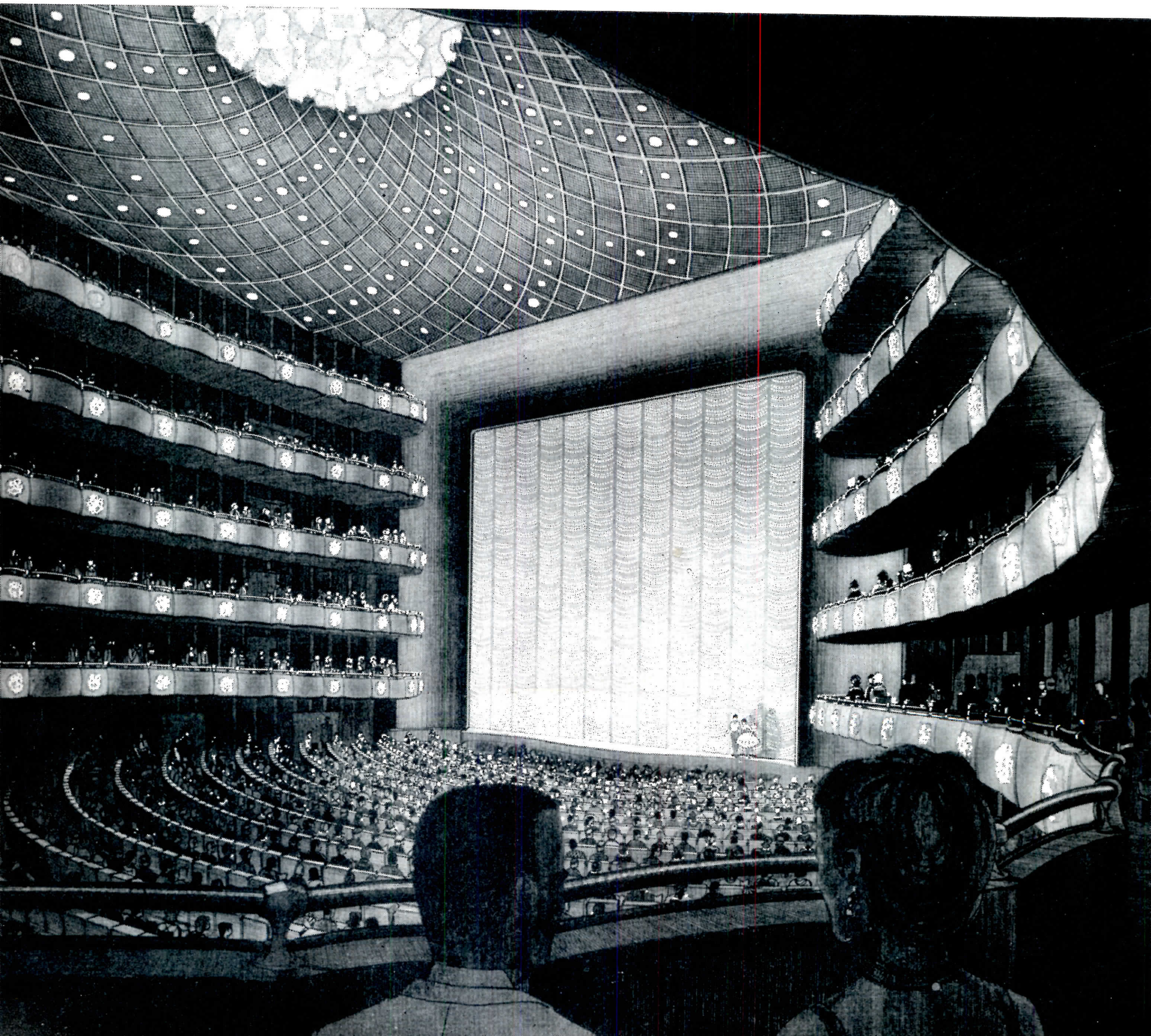
BALCONY LEVEL



TREET ENTRANCE LEVEL



PLAZA LEVEL



HE NEW YORK TATE THEATER

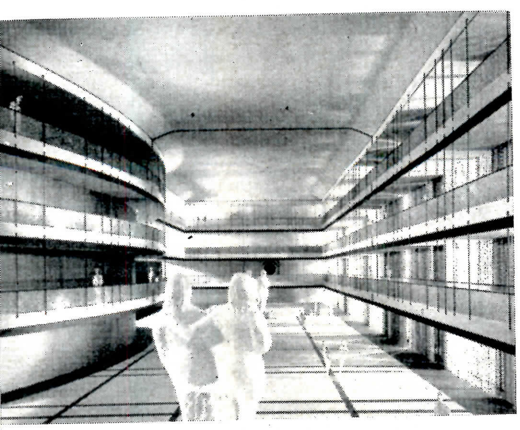
CHITECTS: *Philip Johnson Associates*

ditional credits page 148

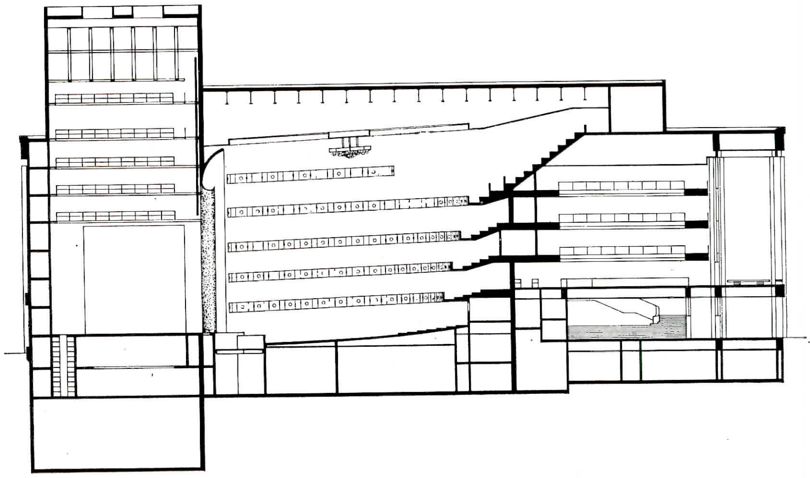
e $18.2 million New York State Thea- for the dance, which will seat 2,801, scheduled for completion in early 1964. design is carefully integrated in scale d materials with its neighbors facing e plaza—Philharmonic Hall and the etropolitan Opera. Like these, the con- ete structure will be faced with tan oman travertine. Like Philharmonic all, it will be about nine stories in ight.

The auditorium is horseshoe-shaped d holds five tiers of shallow balconies. he wide horseshoe plan creates audi- ce intimacy, and the concentric rings ntinue to the proscenium and unify the ace—give it visual focus. No seat is ore than 140 ft from the stage. The allow balconies create an effect the ar- itect describes as "peopled walls." The rchestra will have continental seating d no aisles.

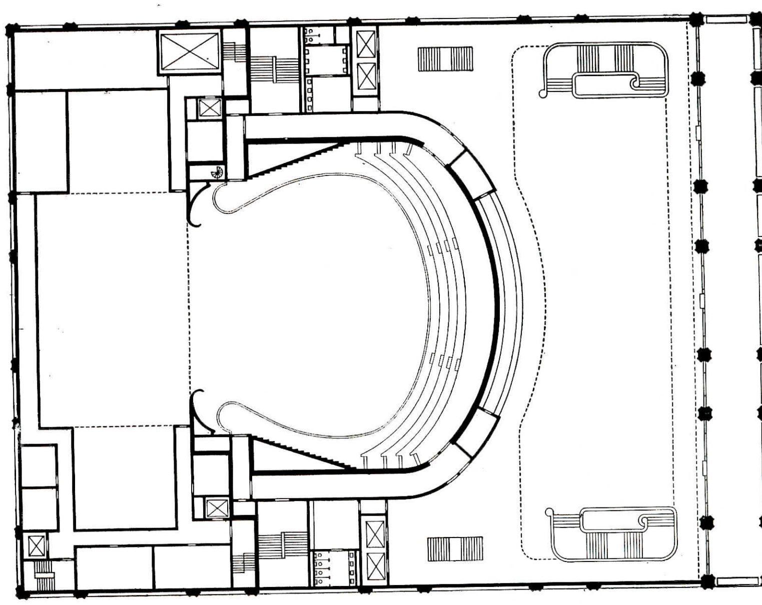
The air of elegance and gaiety in the uditorium will be enhanced by color and aterials: garnet red walls and seats; roscenium and balconies off-white with old-leaf linear design; a shimmering age curtain of plastic spangles; and rystal lights on the balcony fascias ev- ry six feet. Chains of lights in the dark eiling will provide house illumination.



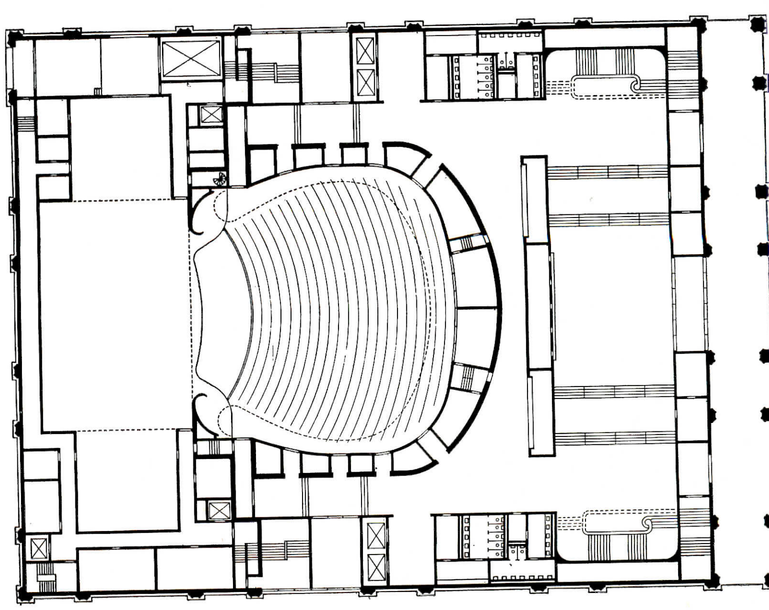
Model of the grand foyer of the theater, located t first balcony level. This spacious hall will be sed for exhibitions, official receptions, state and ivic banquets, etc. Three tiers of upper prome- ades look out over the 45-ft-high room



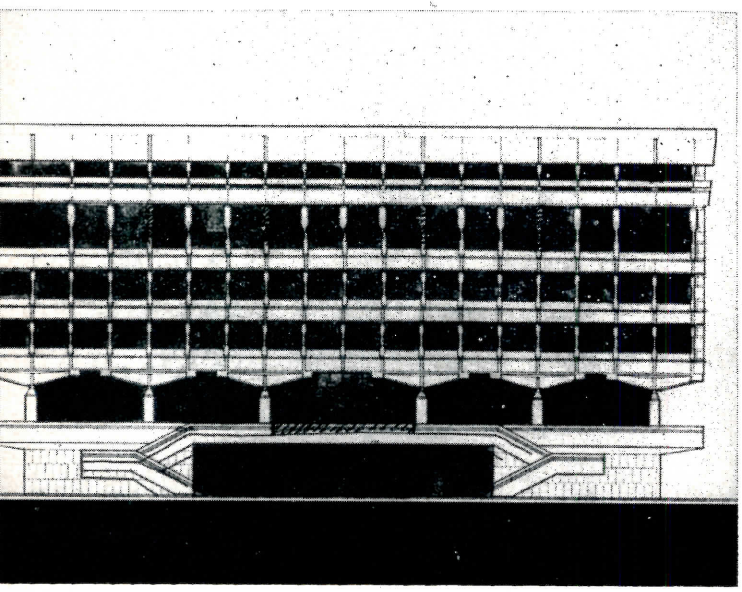
LONGITUDINAL SECTION



TYPICAL BALCONY PLAN

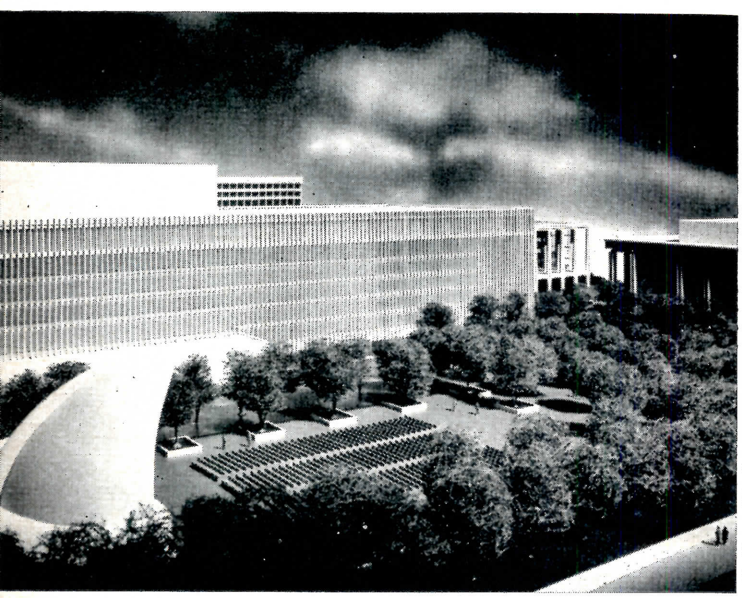


ORCHESTRA PLAN



JUILLIARD BUILDING

Scheduled for completion in 1966, the Juilliard Building is still in design; the latest elevation study (subject to revision) is shown above. The school will provide facilities for advanced training in music, drama, and ballet; residence for 200 students; a theater seating 750; a chamber music hall seating 800; a recital studio seating 300; and a drama studio seating 250.



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GUGGENHEIM BANDSHELL, DAMROSCH PARK

The Daniel and Florence Guggenheim Bandshell will be built in 2⅓-acre Damrosch Park, just south of the Metropolitan Opera House. The open area will seat approximately 3,500; additional seating will be provided under the trees. The shell will seat a full symphony orchestra or band, and will be constructed of concrete, surfaced with an exposed marble-chip aggregate mix.

BUILDINGS AND CREDITS
LINCOLN CENTER FOR THE PERFORMING ART

PHILHARMONIC HALL, pages 136-139
ARCHITECT: *Max Abramovitz*
STRUCTURAL ENGINEERS: *Ammann & Whitney*
MECHANICAL & ELECTRICAL ENGINEERS: *Syska & Hennessy*
ACOUSTICAL CONSULTANTS: *Bolt, Beranek & Newman*
ADVISORY ACOUSTICAL CONSULTANT: *Hope Bagenal*
INTERIOR DESIGN CONSULTANT: *Donald Oenslager*
LIGHTING CONSULTANT: *Richard Kelly*
THEATER SEATING CONSULTANT: *Ben Schlanger*
THEATER SEAT DESIGN CONSULTANT: *Don Wallace*

METROPOLITAN OPERA HOUSE, pages 140-141
ARCHITECT: *Wallace K. Harrison*
STRUCTURAL ENGINEERS: *Ammann & Whitney*
MECHANICAL & ELECTRICAL ENGINEERS: *Syska & Hennessy*
ACOUSTICAL CONSULTANTS:
Dr. Wilhelm Jordan and Dr. Cyril Harris
STAGE & STAGE EQUIPMENT CONSULTANT: *Dr. Walter Unru*
SEATING CONSULTANT: *Ben Schlanger*

VIVIAN BEAUMONT REPERTORY THEATER & LIBRA RY-MUSEUM OF THE PERFORMING ARTS, pages 142-14
ASSOCIATED ARCHITECTS:
Eero Saarinen & Associates and Skidmore, Owings & Merri
THEATER COLLABORATING DESIGNER: *Jo Mielzner*
STRUCTURAL ENGINEERS: *Ammann & Whitney*
MECHANICAL ENGINEERS: *Syska & Hennessy*
ACOUSTICAL CONSULTANTS: *Bolt, Beranek & Newman*

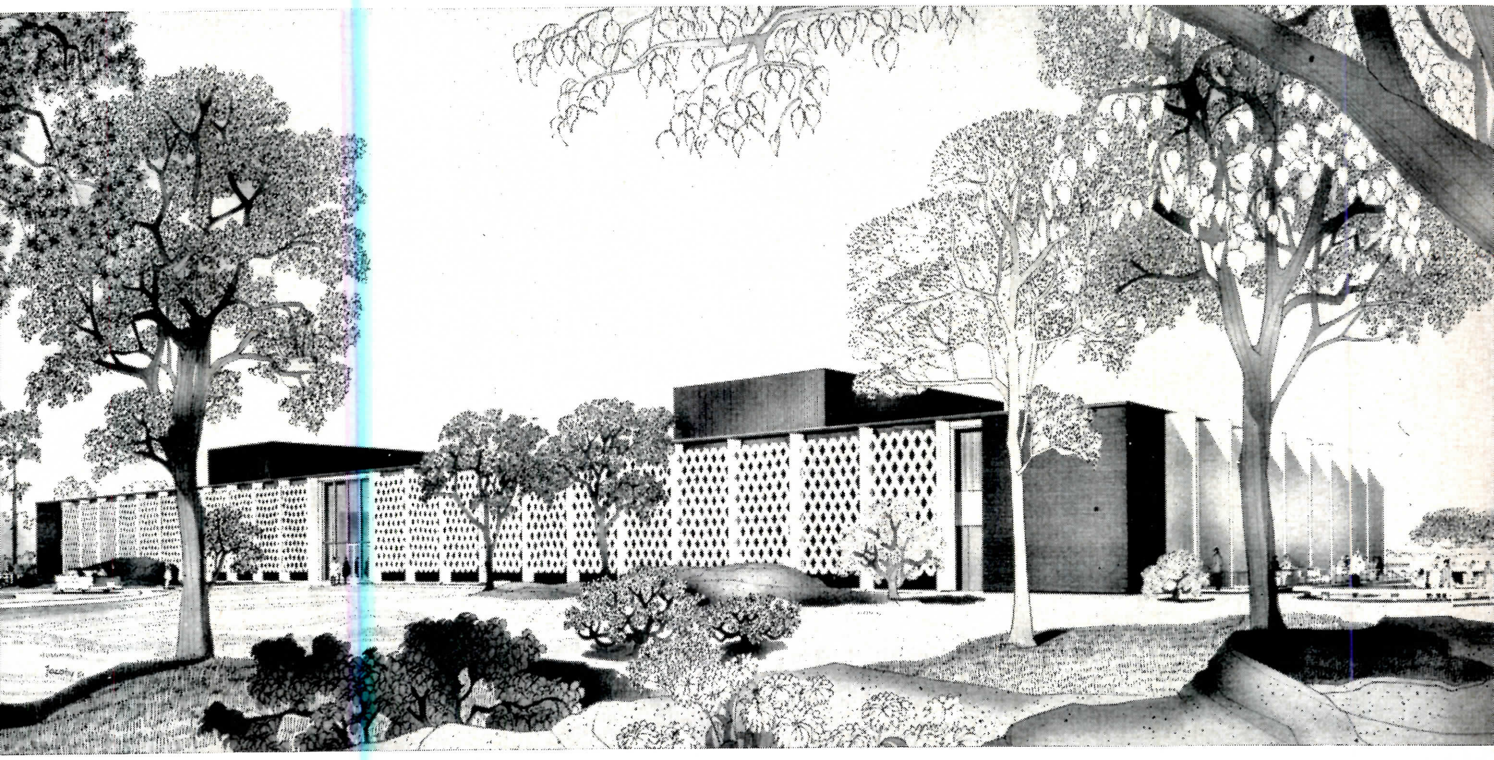
NEW YORK STATE THEATER, pages 146-147
ARCHITECT: *Philip Johnson Associates*
STRUCTURAL ENGINEERS: *Severud-Elstad-Krueger-Associates*
MECHANICAL ENGINEERS: *Syska & Hennessy*
ACOUSTICAL CONSULTANTS:
Dr. Wilhelm Jordan and Dr. Werner Gabler
LIGHTING CONSULTANT: *Richard Kelly*
THEATER CONSULTANT: *Ben Schlanger*
STAGE CONSULTANTS: *Donald Oenslager and Dr. Walter Unru*

THE JULLIARD BUILDING, page 148
ARCHITECT: *Pietro Belluschi*
ASSOCIATED ARCHITECTS: *Catalano & Westerman*
STRUCTURAL ENGINEER: *Paul Weidlinger*
MECHANICAL & ELECTRICAL ENGINEERS: *Syska & Hennessy*
ACOUSTICAL CONSULTANTS: *Bolt, Beranek & Newman*
THEATER CONSULTANTS: *Jean Rosenthal and George Izenou*

GUGGENHEIM BANDSHELL & DAMROSCH PARK, page 14
ARCHITECTS: *Eggers & Higgins*
LANDSCAPE ARCHITECTS: *Webel & Darling*
STRUCTURAL ENGINEERS: *Severud-Elstad-Krueger-Associates*
MECHANICAL & ELECTRICAL ENGINEERS: *Syska & Hennessy*
ACOUSTICAL CONSULTANT: *Michael Kodaris*

PLAZAS AND UNDERGROUND GARAGE
ARCHITECTS: *Harrison & Abramovitz*
STRUCTURAL ENGINEER: *Jacob Feld*
MECHANICAL ENGINEERS: *Syska & Hennessy*
LANDSCAPE ARCHITECT: *Dan Kiley*
LIGHTING CONSULTANT: *Richard Kelly*

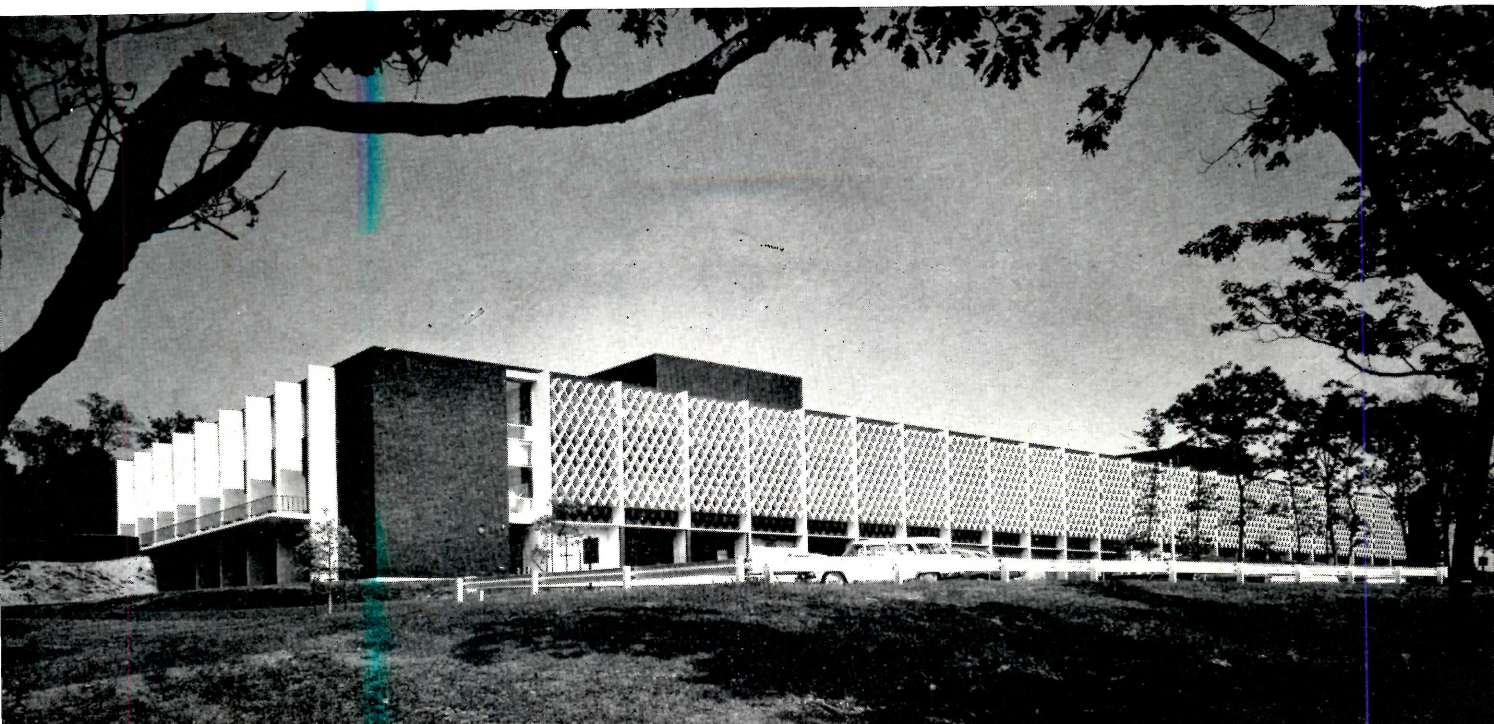
THE GENERAL CONTRACT *for the entire Center was assumed b Fuller-Turner-Walsh-Slattery, a joint venture of the Turne Construction Co., George A. Fuller Co., Walsh Constructio Co., and the Slattery Contracting Company*

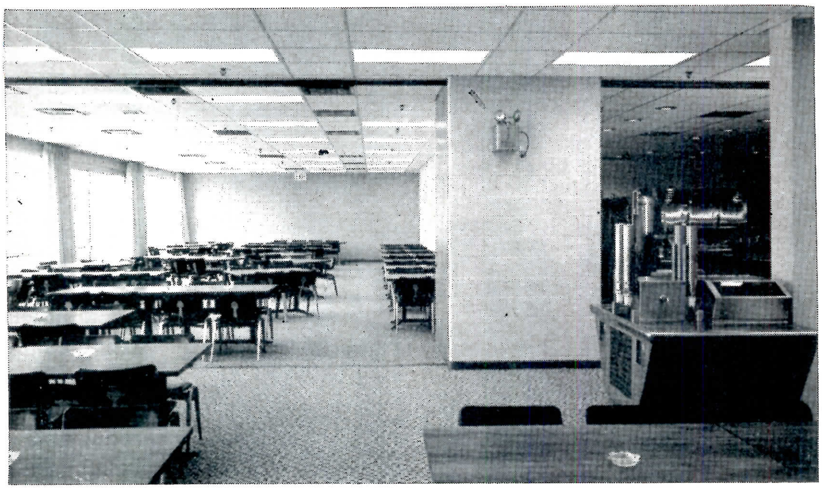


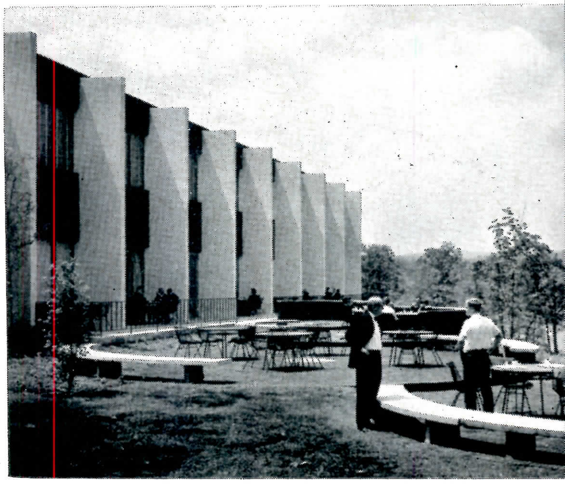
FLEXIBILITY KEYNOTES NEW I.B.M. LAB

herwood, Mills and Smith use a two-foot module to achieve maximum adaptability
this very pleasant product development laboratory

Joseph W. Molitor photos



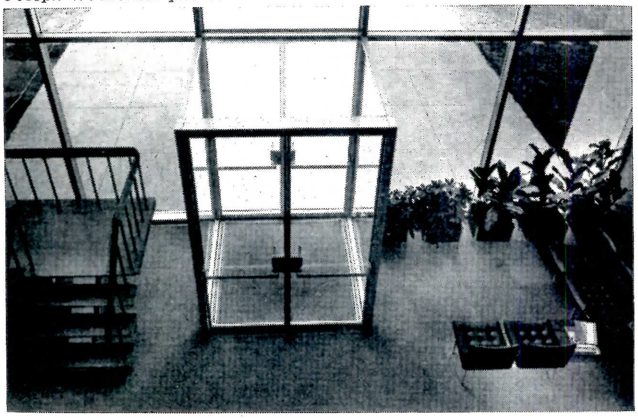


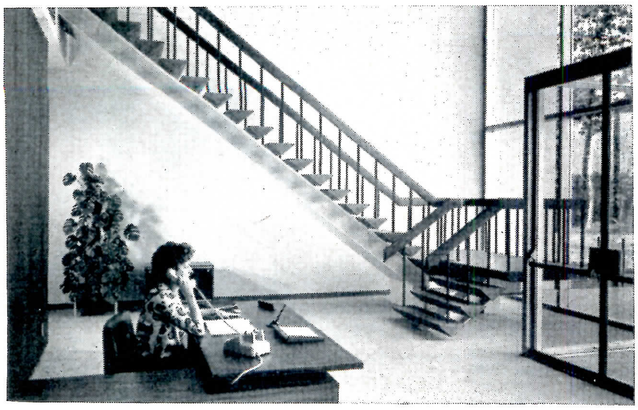


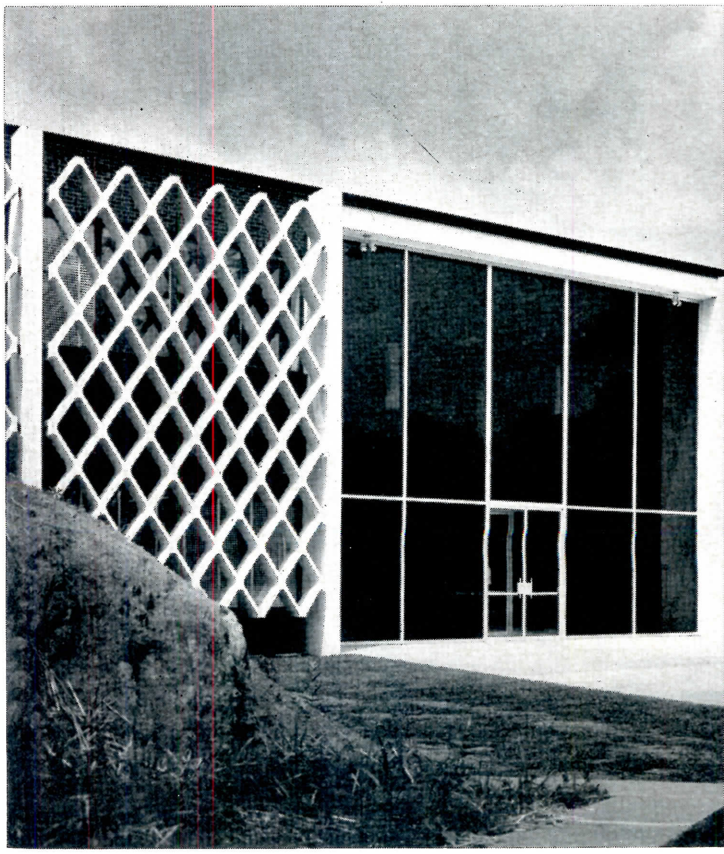
I. B. M. Data Systems Laboratory
South Road, Poughkeepsie, New York
OWNER: *International Business Machines, Corp.*
ARCHITECTS: *Sherwood, Mills and Smith*
GENERAL CONTRACTOR: *Walter A. Stanley Construction Co.*
ENGINEERS: *Seelye Stevenson Value and Knecht*
SITE ENGINEER: *Jack L. Staunton*
LANDSCAPE ARCHITECTS: *Green and Ogan*
FOOD SERVICE CONSULTANT: *Henry H. Rothman*

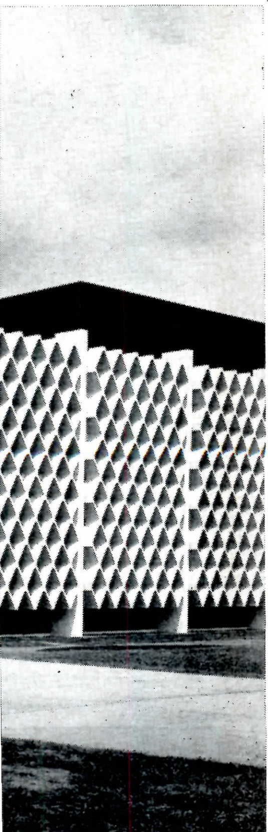
Amenities for the employes form a pleasantly conspicuous theme in this laboratory building. The site is park-like (with ample parking space) on a bluff overlooking the Hudson River, north of the main Poughkeepsie I.B.M. manufacturing plant. The building, which will be used for the development of advanced computers and data processing equipment, has a large central laboratory area surrounded by offices. The offices are located at the periphery of the building, and protected by sun baffles, to permit glareless views to the outside. The central location of the labs allows full use of extensive wall areas for installation of equipment. The basic design includes plans for expansion as required.

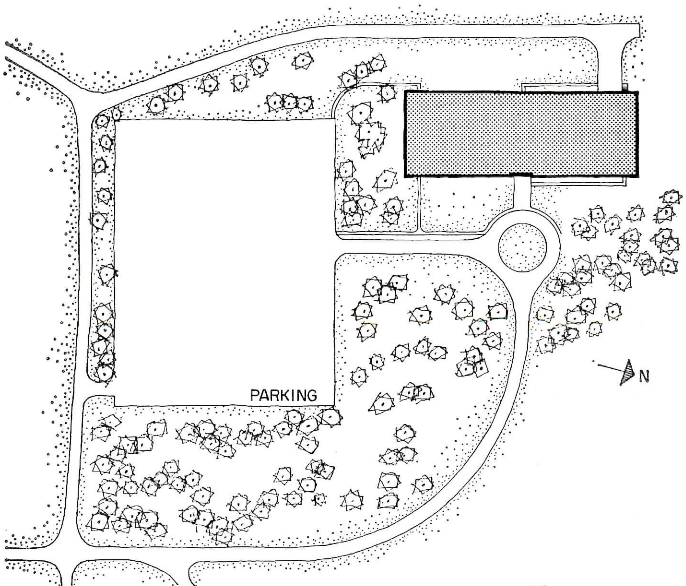
Joseph W. Molitor photos



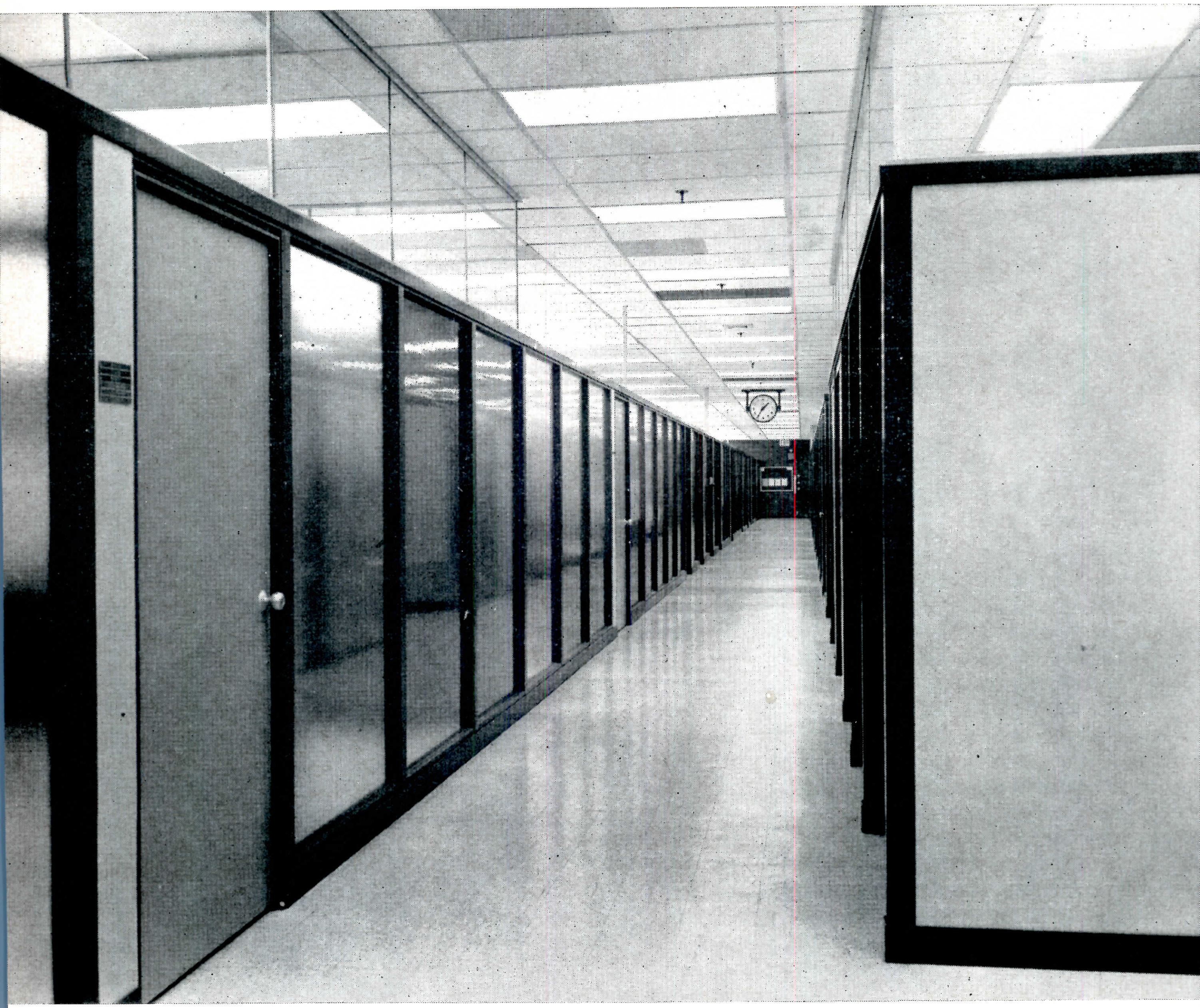


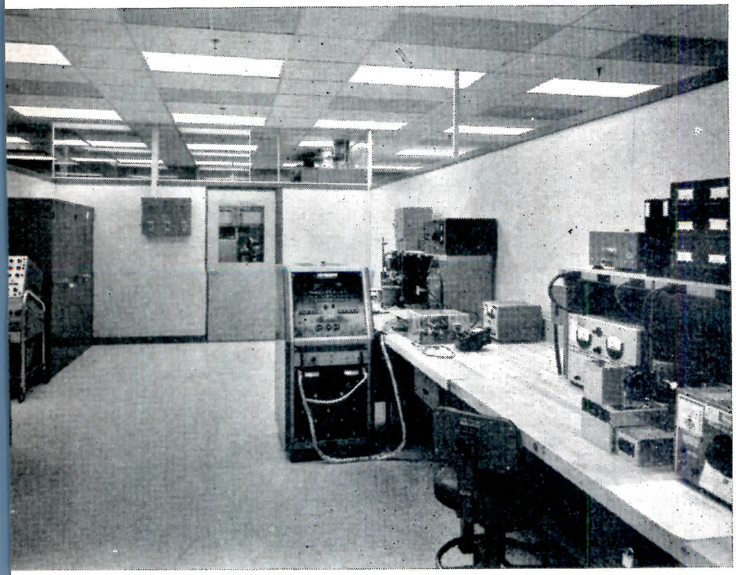


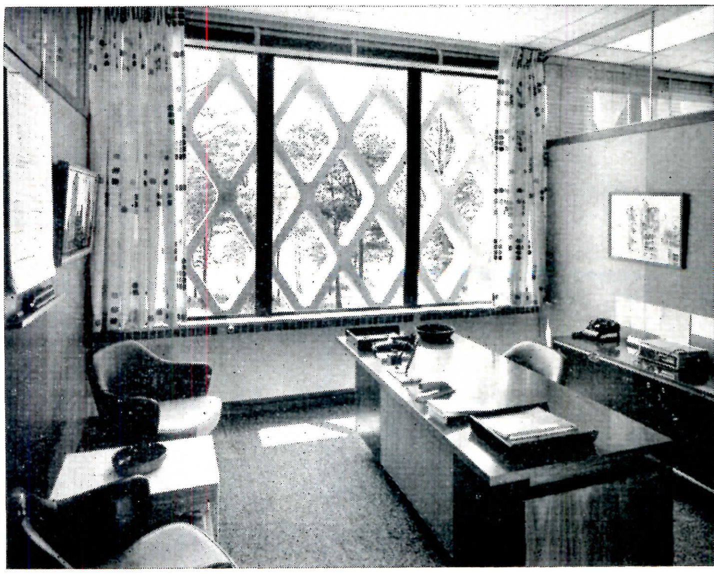


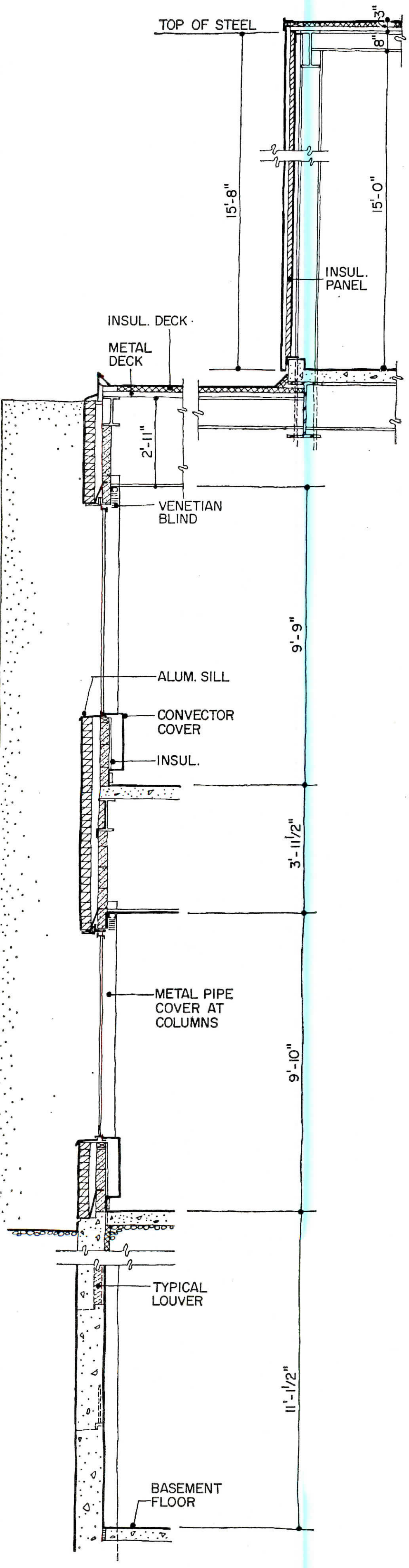


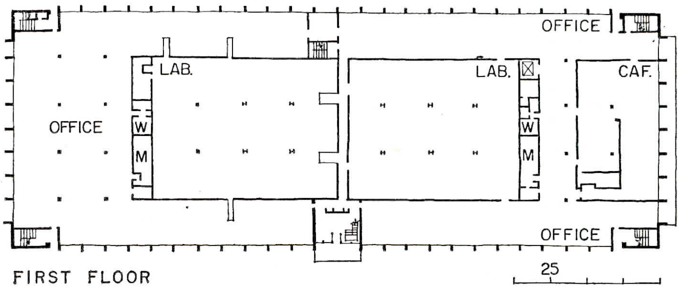
PLOT PLAN









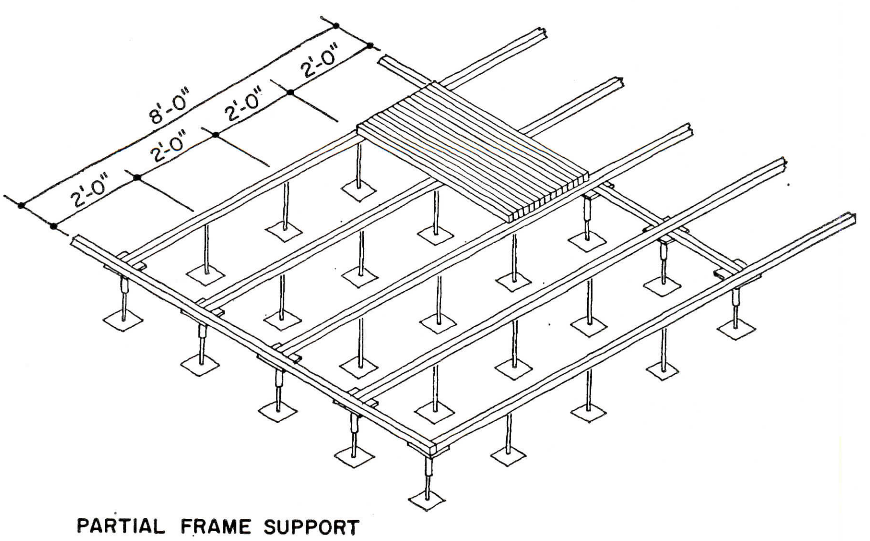


FIRST FLOOR

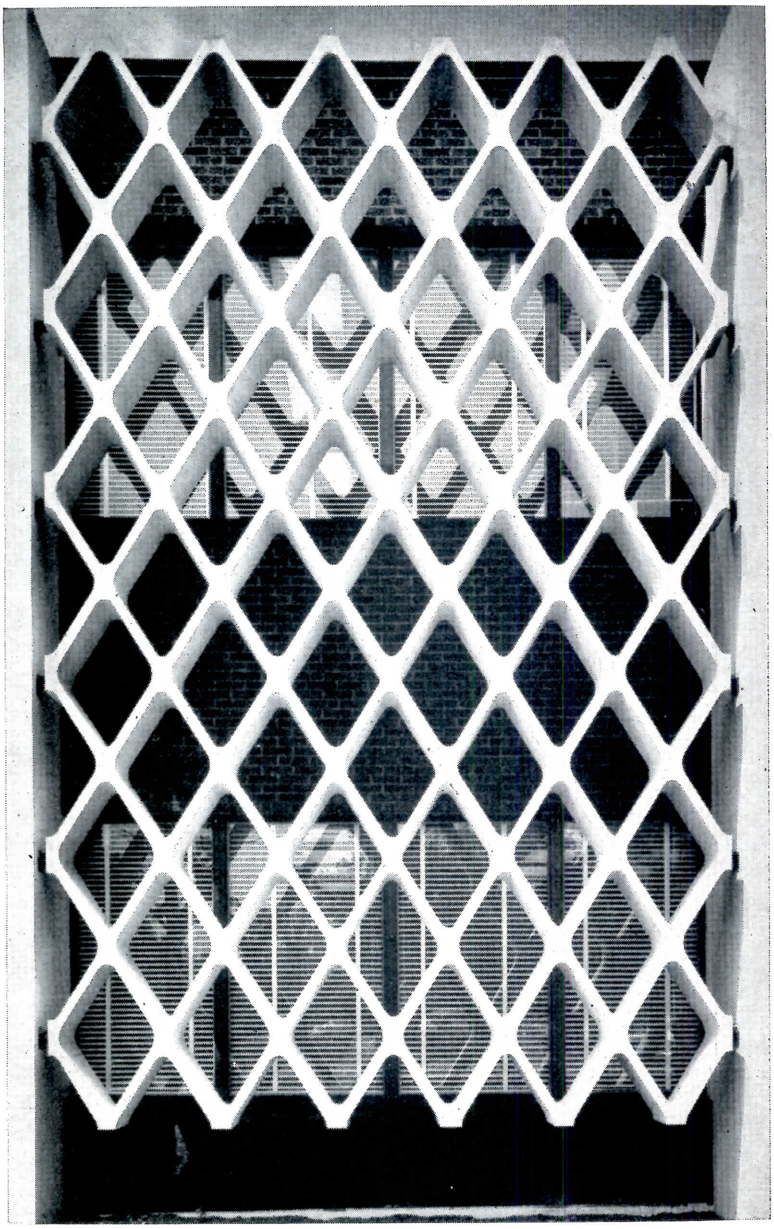
Great flexibility for both office and lab spaces has been provided to make the building adaptable to the various product development projects which may arise. All mechanical, heating, and electrical services are planned to permit partitions to be moved at will on a 2-ft module. The two main floors and the service floor contain 163,000 sq ft of space. Offices are enclosed by a combination of movable glass and steel partitions to provide light or wall space where needed.

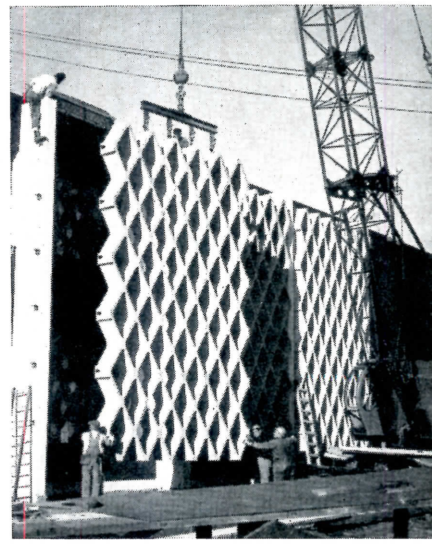
The main laboratory area is enclosed with concrete block partitions, and has sufficient acoustical treatment to confine noise to this area. A 12,000 sq ft raised floor area (see detail below) accommodating the applied programming computing systems has been installed in the south laboratory on the first floor. Provision has been made in the design for the installation of a similar arrangement in the first floor north lab, as well as those on the second floor.

The site was selected near enough to the firm's existing South Road Laboratory for utility services to be extended to the new building from the older plant.



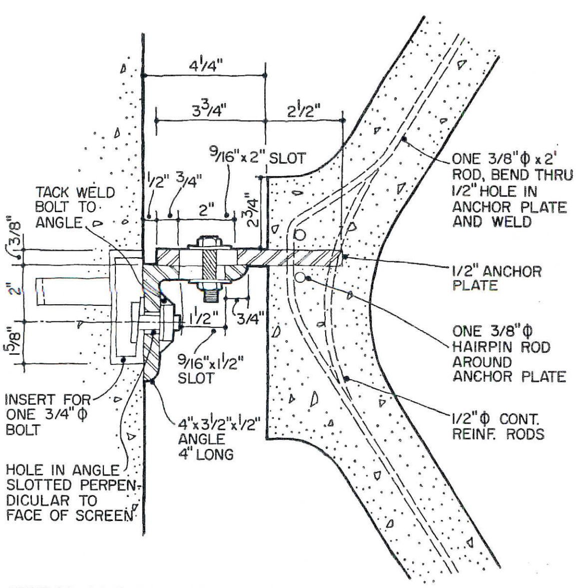
PARTIAL FRAME SUPPORT



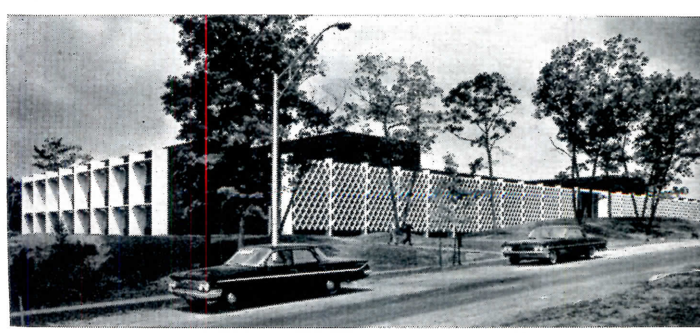


On the exterior, the lab building has a large precast sun screen on the east and west; fin-like baffles protect the other two sides. All are white to contrast with the brown brick walls. The screen is made up of 46 panels, each weighing 5½ tons and measuring 22 ft high, 14½ ft wide and 16 in. deep.

A crew of six men jockeyed the big screen panels into position, with the aid of a 40-ton mobile crane. Each panel was cast with four removable eye bolts in threaded inserts at the top. A steel lift bar secured to the bolts and suspended from the crane raised the panel into position



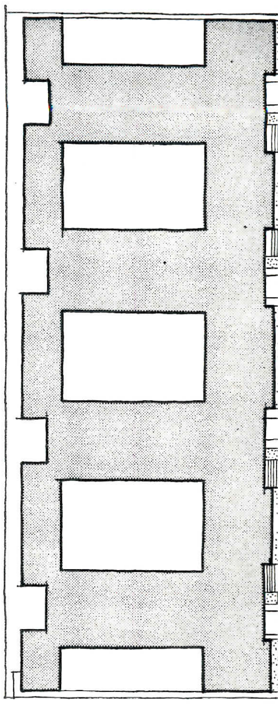
SECTION OF TYPICAL CONNECTION



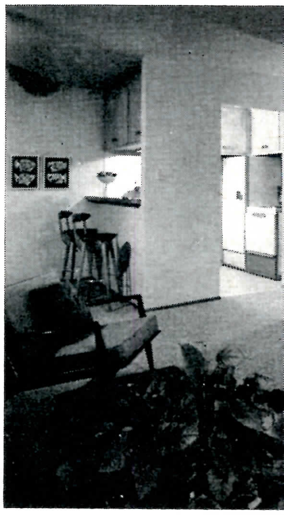
BIG APARTMENT WITH ROW HOUSE LOOK

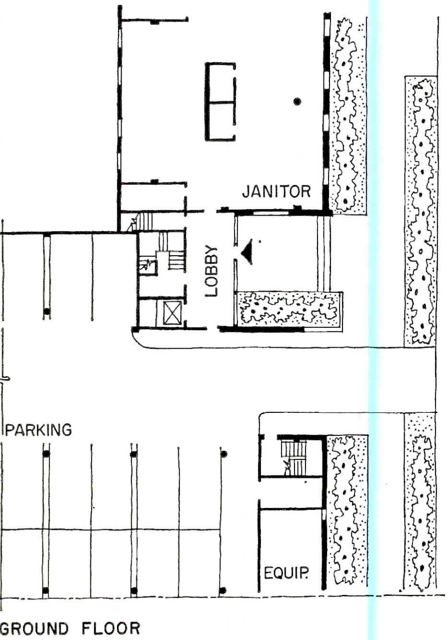
Wurster, Bernardi and Emmons give an agreeable domestic scale to a 192-unit apartment by use of three courts and varying the mass of the design

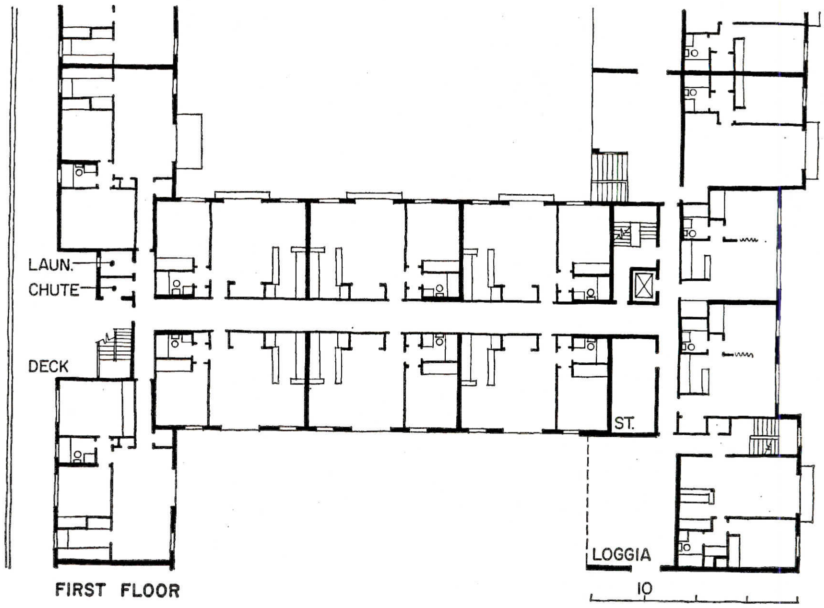
Jackson Lake Apartments
Oakland, California
OWNER: *Gerson Bakar and Associates*
ARCHITECTS: *Wurster, Bernardi and Emmons*
STRUCTURAL ENGINEER: *David Welisch*
MECHANICAL ENGINEER: *Daniel Yanow*

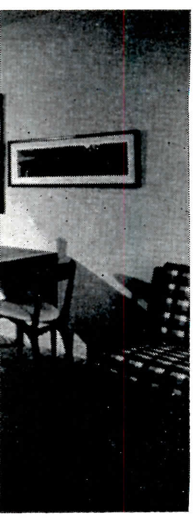


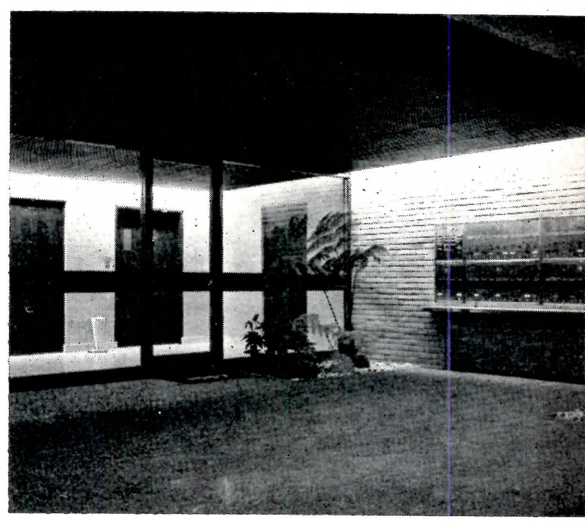
PLOT PLAN 25







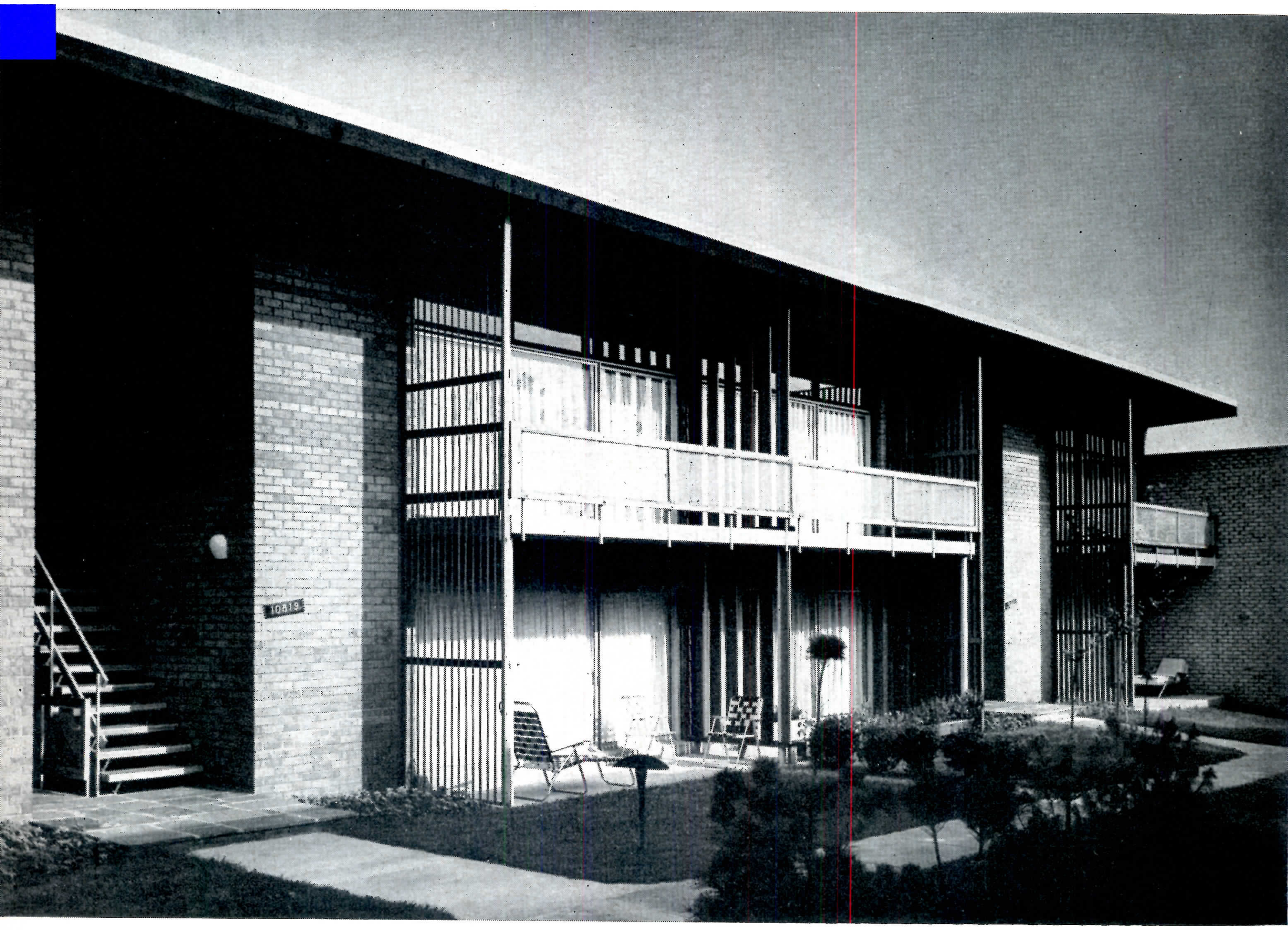


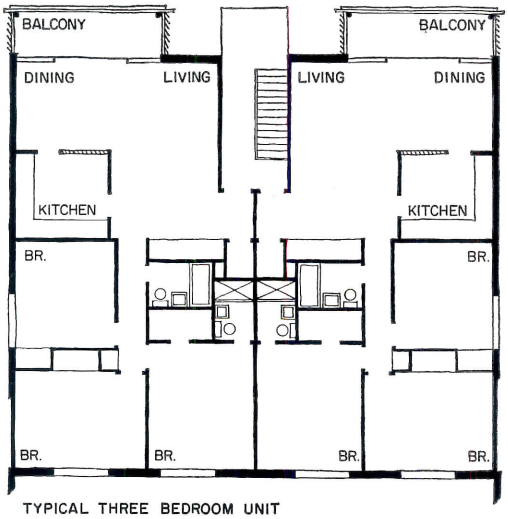


This apartment house, the largest in Oakland's East Bay area, was planned as a low-rise structure to permit more economical wood-frame construction and lower rents suitable for the area. To get maximum land use, and maximum floor area, the building was designed as close to the perimeter of the rectangular lot as set-back restrictions allowed. This posed two chief design problems: to minimize the bulk of the building, and to give light and nice outlook for each of the 192 apartments. The use of three courts (two with swimming pools) and balconies for each unit solved the outlook problem. The structure actually operates as four separate buildings: there are four lobbies, four elevators and four mechanical systems. A typical section is shown as in the first floor plan above.

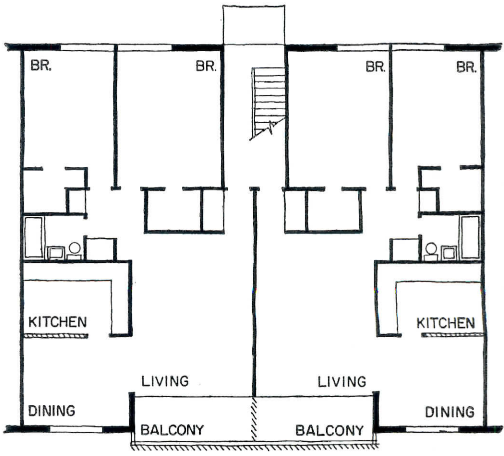
Parking space for each apartment is at ground level (note partial plan); also on this level are several small shops. A partial fourth story houses eight larger penthouse apartments.

The exterior is painted stucco, interiors are gypsum board. For soundproofing, there are double walls and suspended ceilings between each of the separate apartment units.





TYPICAL THREE BEDROOM UNIT



TYPICAL TWO BEDROOM UNIT

APARTMENTS FOCUS ON BIG GARDEN

Low-rise apartments turn backs to traffic and face wooded grove

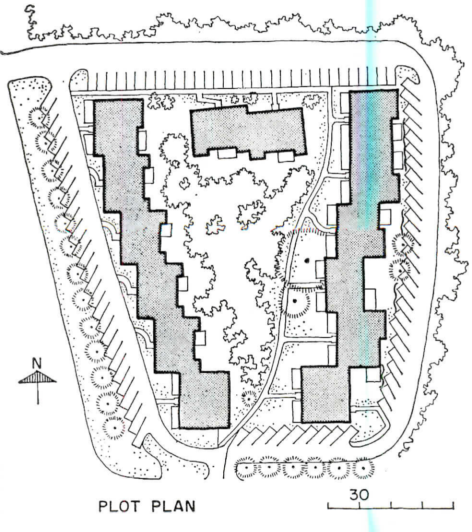
A fresh, residential scale and character were given this project by staggering units around the periphery of a sloping site filled with locust trees. Long, typical apartment hallways were avoided by arranging attractive open entries for each group of units, with a flagstone stair and brick walls, and with stairs under cover and protected from the weather. This covered entry leads to individual apartment foyers which have vinyl floor covering.

Good circulation was provided by designing through-units, rather than back-to-back types, and the advantage of cross ventilation for each apartment was also gained. Living-dining areas have a higher roof height, with wide, 7½-ft overhangs.

The site was developed so that all apartments face onto the inner court via window walls and balconies. All entrances are on the high side of the sloping site; the lowest level of all buildings is a half-basement containing laundry and storage facilities set into the site. At the low side is an apartment at ground level.

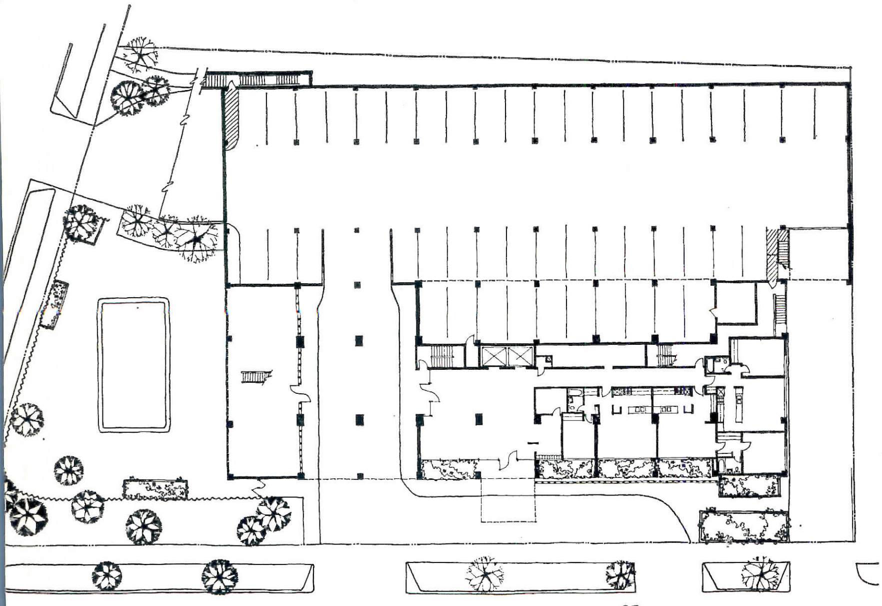
Wheaton House Apartments
Wheaton, Maryland
OWNERS: *Mr. Maurice Lipnick and Mr. Calvin Cafritz*
ARCHITECTS: *Cohen, Haft & Associates*
CONTRACTOR: *Lipnick Construction Co.*
LANDSCAPE ARCHITECT: *Thurman D. Donovan*

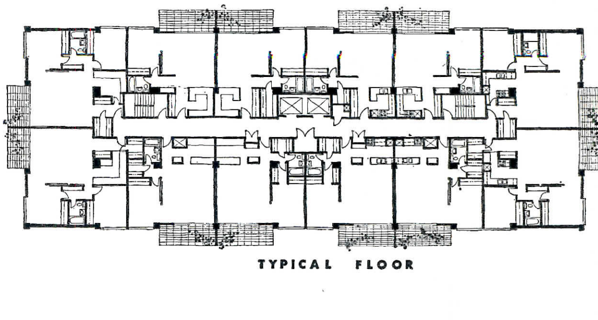
Robert G. Lautman photos



PLOT PLAN

Gordon Sommers photos





LUXURY FOR SMALL UNITS IN HIGH-RISE

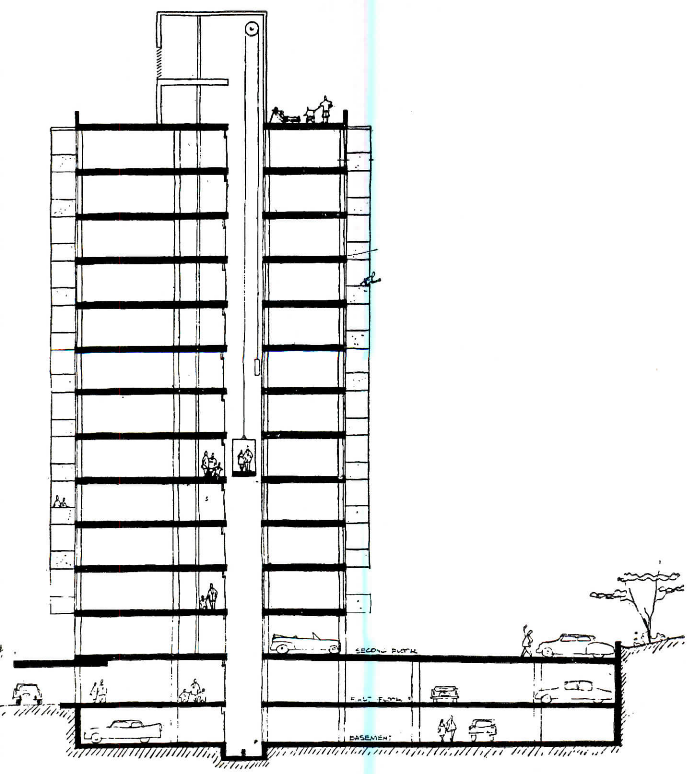
Victor Gruen Associates' new apartment house features sliding walls, balconies, a pool, and a lot of electrical equipment

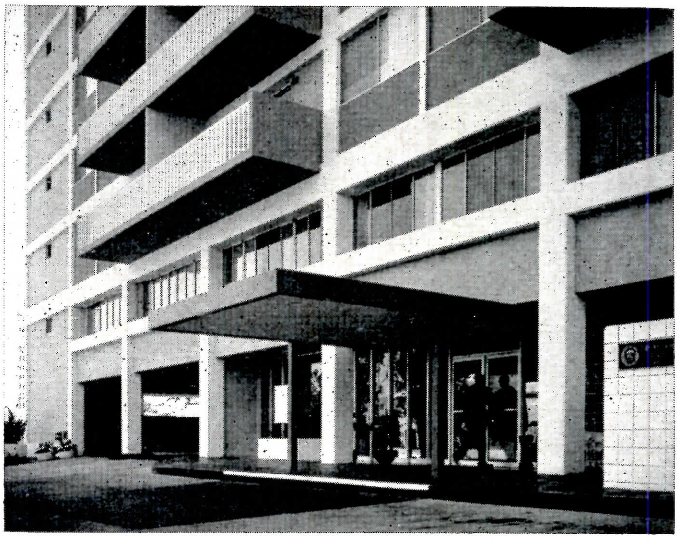
Park Westwood Tower
Los Angeles, California
ARCHITECTS: *Victor Gruen Associates*

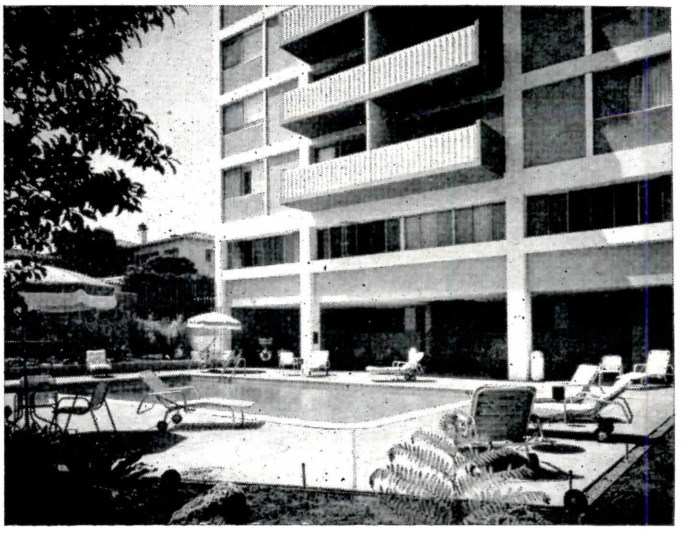
An all concrete structure, Park Westwood Tower is said to be the first building of its kind in Southern California to obtain FHA financing under Section 207 of the National Housing Act. The building contains 144 units: 96 with one bedroom area, and 48 two-bedroom units, plus two studio apartments.

The units are exceptionally well planned and equipped. Each has a private balcony, reached by sliding glass walls. In most apartments sliding wall room dividers are installed between the living area and one bedroom to allow optional room usage. Each unit is acoustically isolated from the next, and elevators, mechanical equipment and plumbing were engineered for minimum noise level. Most kitchens have a pass-through into the dining area, and are fitted out with built-in ovens and cooking units, dishwashers, and food waste disposers. Heat pumps for heating and cooling are located at the ends of the balconies.

On the roof, which is also used for recreation, a laundry room, with washers, driers and ironers, is available for the tenants use. The structure is built of fireproof materials, with a sprinklered three-level underground garage. Three entrances at different levels eliminate internal ramps in the garage. All equipment in the building is electric. Cost was about $3 million.

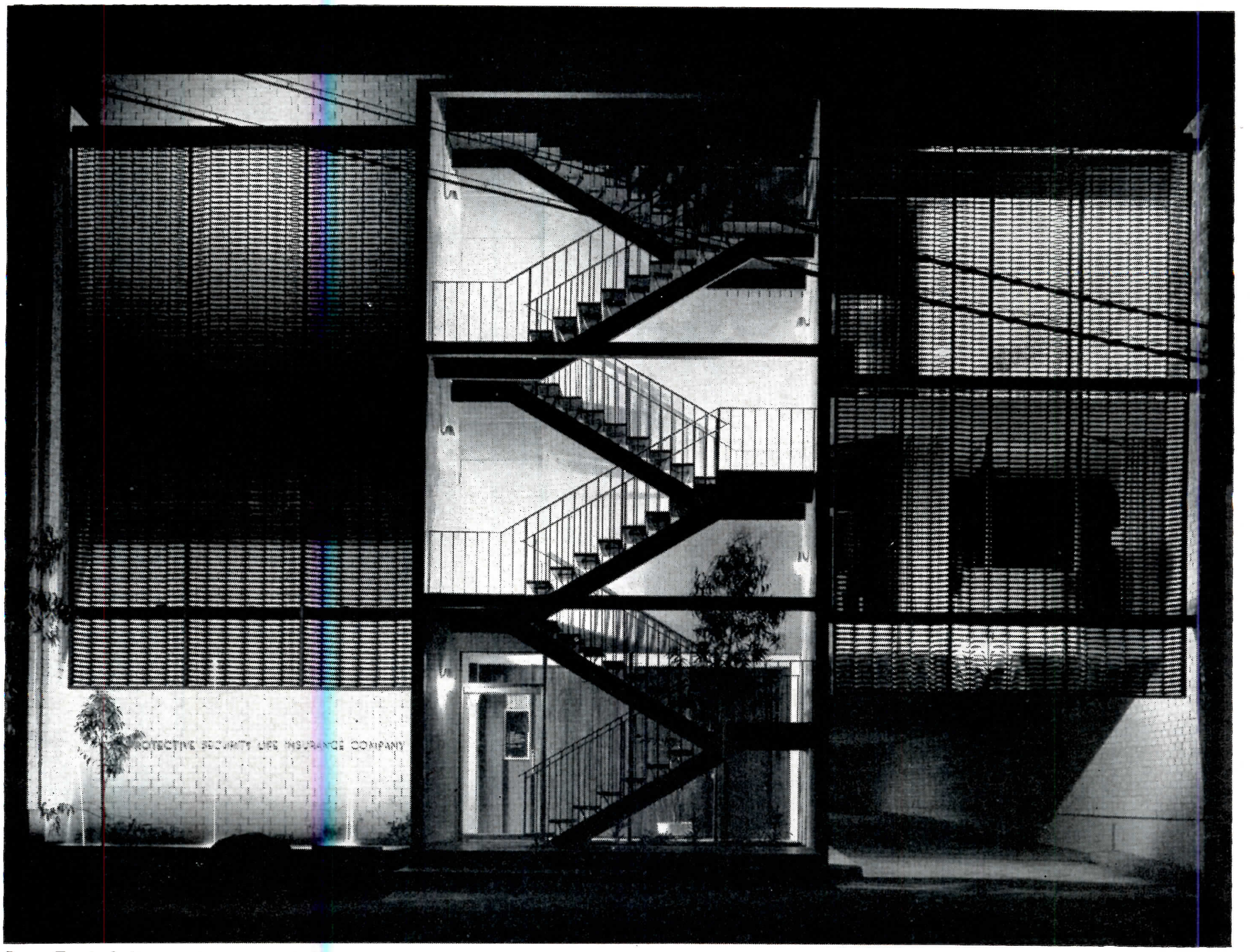






The lobby, top photo, has a handsomely furnished waiting area, with floors of terrazzo, and walls of glazed tile and polished marble. All colors, furniture, planting and graphics were designed by the architects.

A living room and bedroom of a typical apartment are shown at right and below. The interior design is by Herman Guttman, who was partner-in-charge of the entire project for Victor Gruen Associates. Well-planned closets provide ample space for general storage and for out of season clothing. Higher than standard ceilings add to the spaciousness of each room



Larry Frost photos

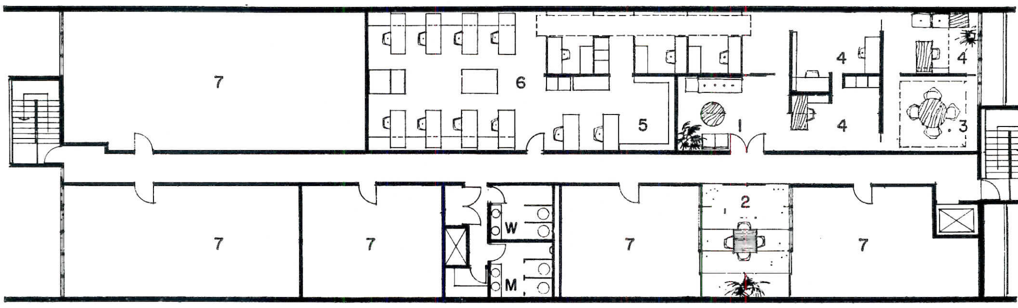
NARROW LOT AND PARKING NEEDS DETERMINE PLAN

Office Building
Beverly Hills, Calif.
ARCHITECTS: *Richard Dorman & Associates*
STRUCTURAL ENGINEER: *Woodward Tom*
MECHANICAL ENGINEER: *Ira Tepper*
ELECTRICAL ENGINEERS: *Norman Levenson & Associates*
CONTRACTOR: *M. Saltman*

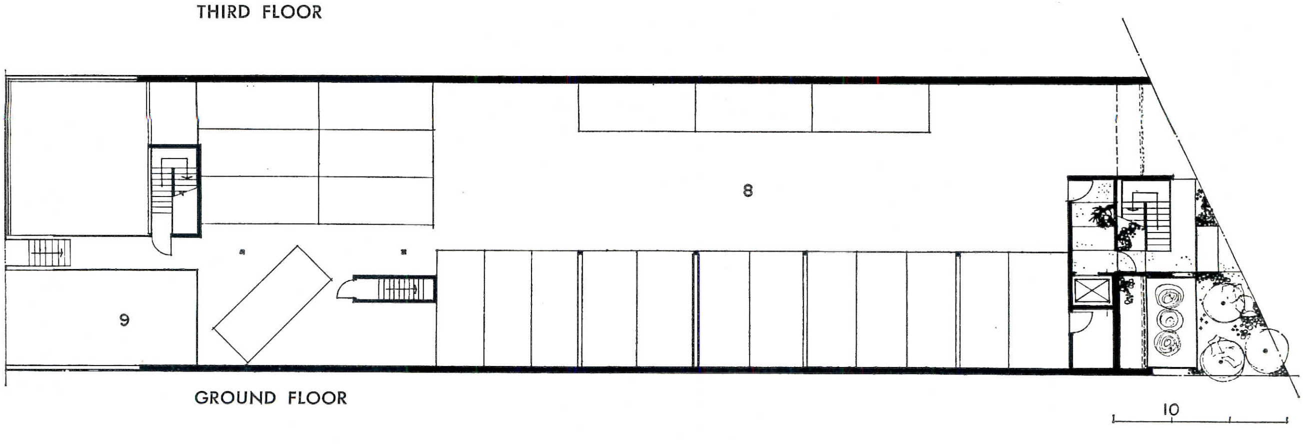
Two major problems in this building were: (1) how to place an office building on a narrow, 50-ft lot, 217 ft deep and (2) how to provide adequate parking without using up too much space or letting the automobiles obtrude on the habitable area. The architects solved these problems by designing a building with no windows on its long sides, extending completely through the block from the street on the front to another on the rear, providing it with a landscaped court, reflecting pool, and fountains on the front, and placing parking not only on the ground floor, but in an excavated basement below grade. The architects did the interior of the third floor, which they occupy.

The building has a steel frame with wood joists and lightweight fill floors. Exposed stairs at either end of the building are also steel. Exterior walls are brick; flooring is terrazzo or vinyl asbestos tile; ceilings are pneumatically applied plaster, trowelled smooth.

An aluminum and glass store front forms the wall on the ground floor at the entrace. Aluminum sun shields are hung from the building frame outboard of the stairs at the second and third levels.



THIRD FLOOR



GROUND FLOOR

e ground floor and basement the building are mainly de-ed to parking. The second r is occupied by an insurance npany, the third mostly by the hitects themselves. To pro-e more natural light and cre-relationships with the out-e, the architects designed an erior garden patio on the rd floor, as shown in the plan; s providing glass doors and dows for three of the offices this floor. In addition, a led plate skylight was placed the roof over the architectur-conference room.

Tot only does the skylight al-daylight to enter through clerestory course, as shown the right, but the added ght makes the conference a seem considerably more cious. At the right, above, is wn a view of the architect's vate office, giving an indica-of the finishes and furnish-s used throughout the pri-e areas of architects' offices

N LEGEND
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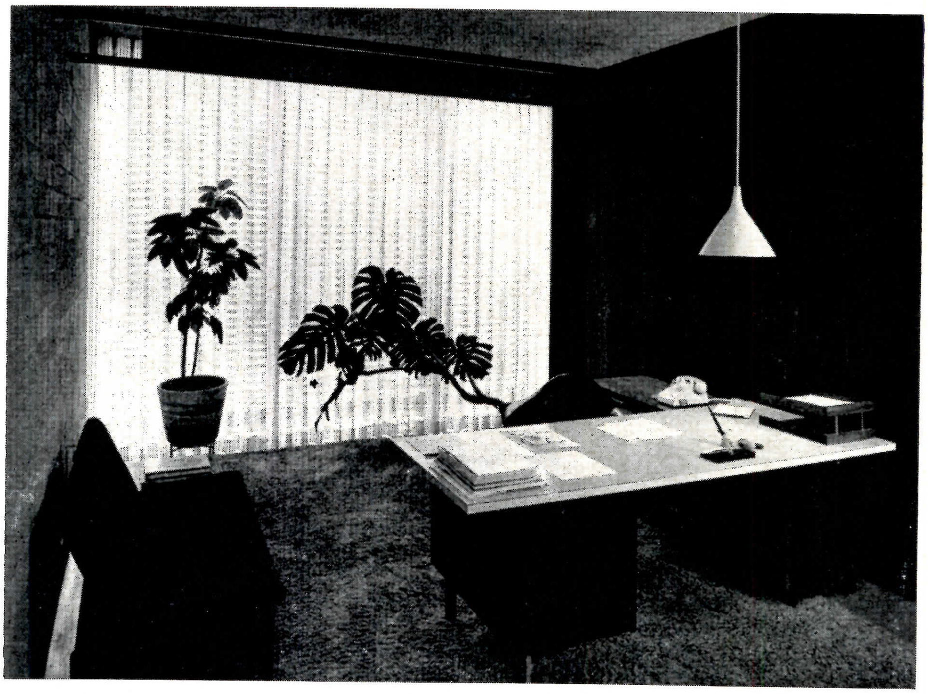
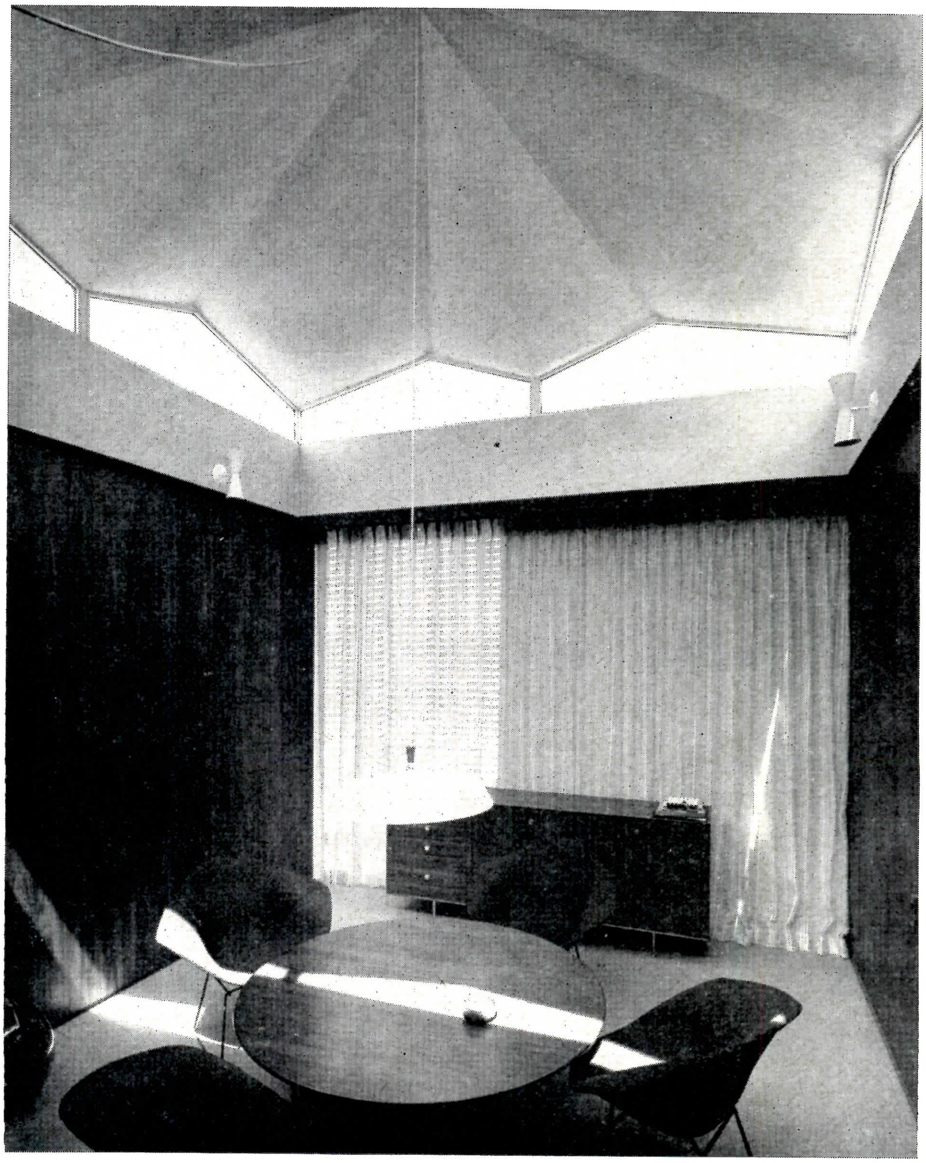
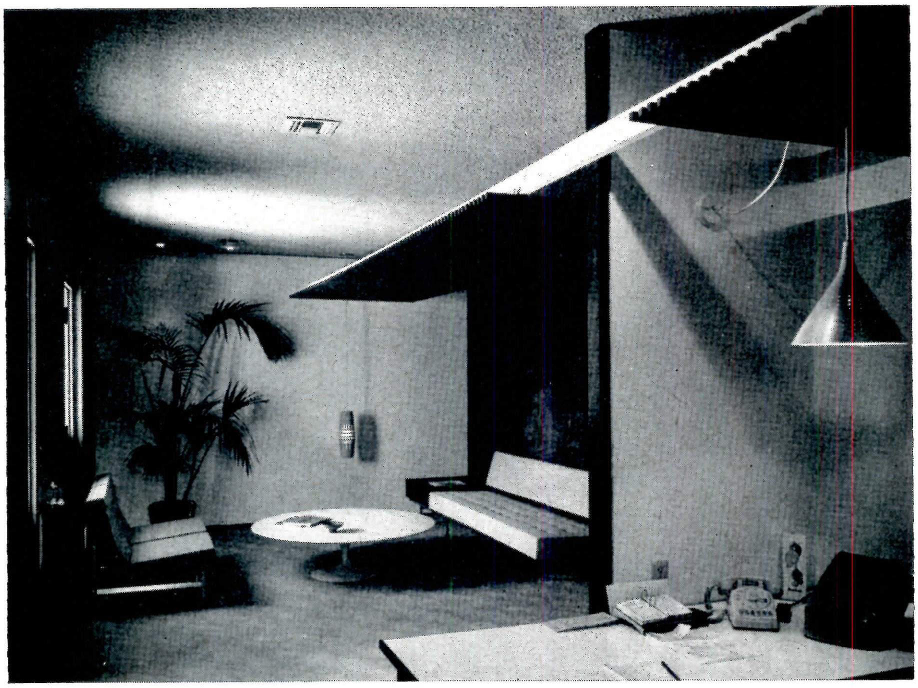
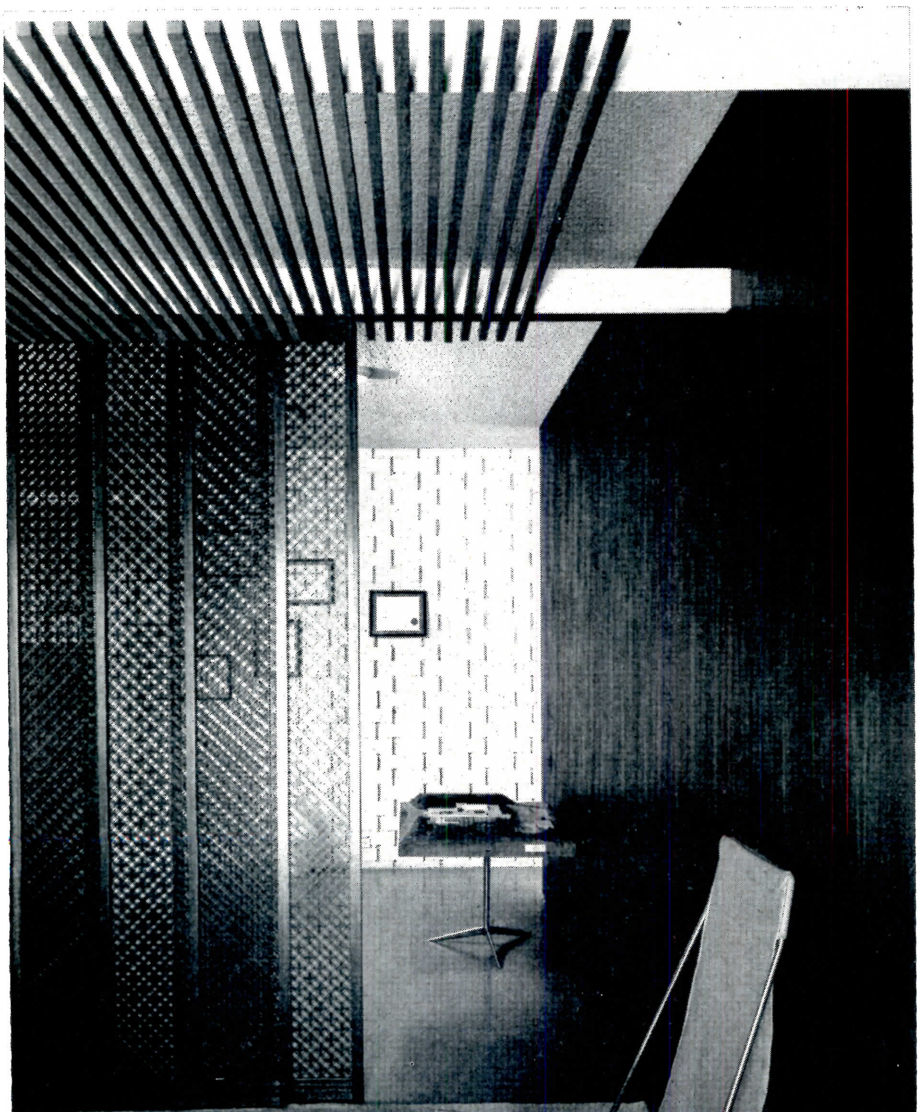


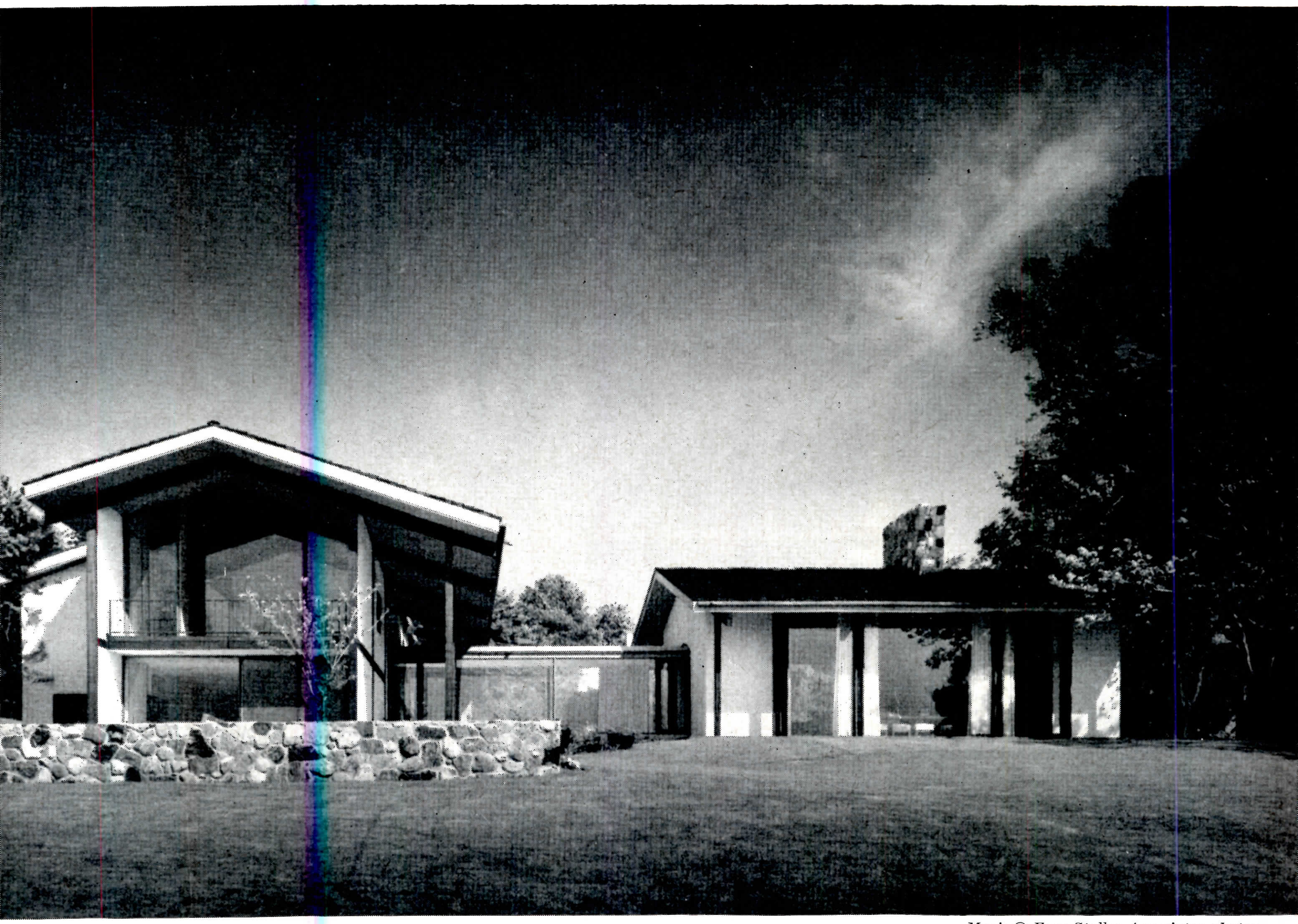




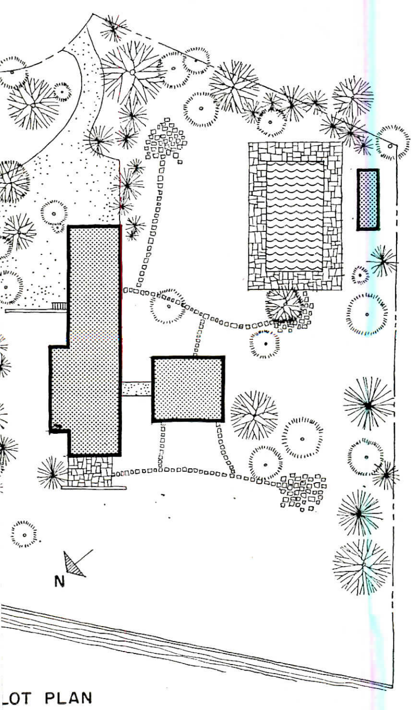


The architectural firm occup
about 4,500 sq ft on the
floor of the building. Interiors
this area were handled by
architectural firm. As shown
the views at the left, finishes
generally sprayed plaster c
ings with vinyl asbestos
floors or carpeting. Architect
al space dividers and hung c
ings and grilles are used to
fine and break up the spa
and to lend interest to the
teriors. Walls are either pain
plaster, walnut paneling or
posed brick with raked joint.

The reception area, shown
the left, above, was so placed t
positive control of the circu
tion of clients could be achie
by the receptionist from her d



Maris © Ezra Stoller Associates photos

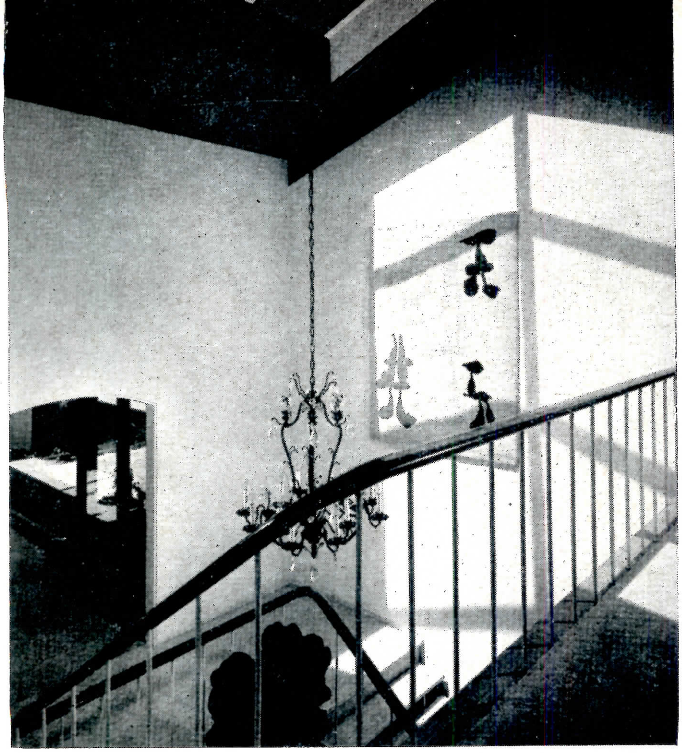


LOT PLAN

A WATER-FRONT HOUSE OF WARMTH AND CHARACTER

George Nemeny combines the familiar with the new for a large but intimate family home

The Marshall Safir House
Kings Point, Long Island
ARCHITECT: *George Nemeny*
ENGINEER: *Edward S. Klausner*
HEATING CONSULTANT: *Edward Simpson*
LANDSCAPE ARCHITECT: *J. J. Levison*
INTERIOR FURNISHINGS: *Evelyn Jablow*

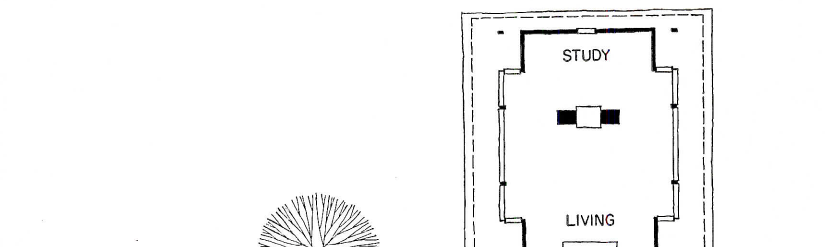


The calm, well-proportioned design of t
Safir house is worth a bit of reflection in th
period of architectural "statements." As e
citing as the latter can be, the plain fact
that they are not suitable as homes for ever
one. Nor, on the other hand, are the eclec
or drab schemes of too many developmen

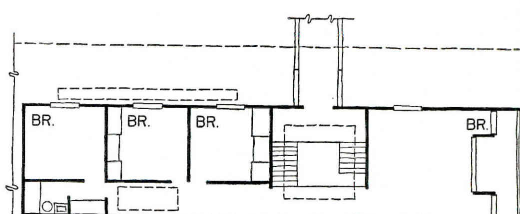
In his approach to this design, Nemeny h
set himself the task of looking afresh at t
full range of materials and techniques ava
able to us today, old ones as well as the ne
And with a nice descrimination of cho
among them, he has come up with a desi
that is fresh and full of little surprises, y
which has a ring of comfortable familiari
Arched doorways, shingled roofs and stu
walls combine with a bi-nuclear plan, p
and beam frame and glare-resistant sl
lights.

The house was planned for a family w
three boys and a live-in maid; the progra
called for a scheme suitable for private fam
life and for frequent (and simultaneous) e
tertaining. This was achieved by separati
functions into smaller elements within t
house. A portion of the main block was
aside for the children's activities; the oth
end, separated by the stair hall, was reserv
for the parents. Big rooms for entertain
are detached completely by a glass corrid
and entered at mid-level.

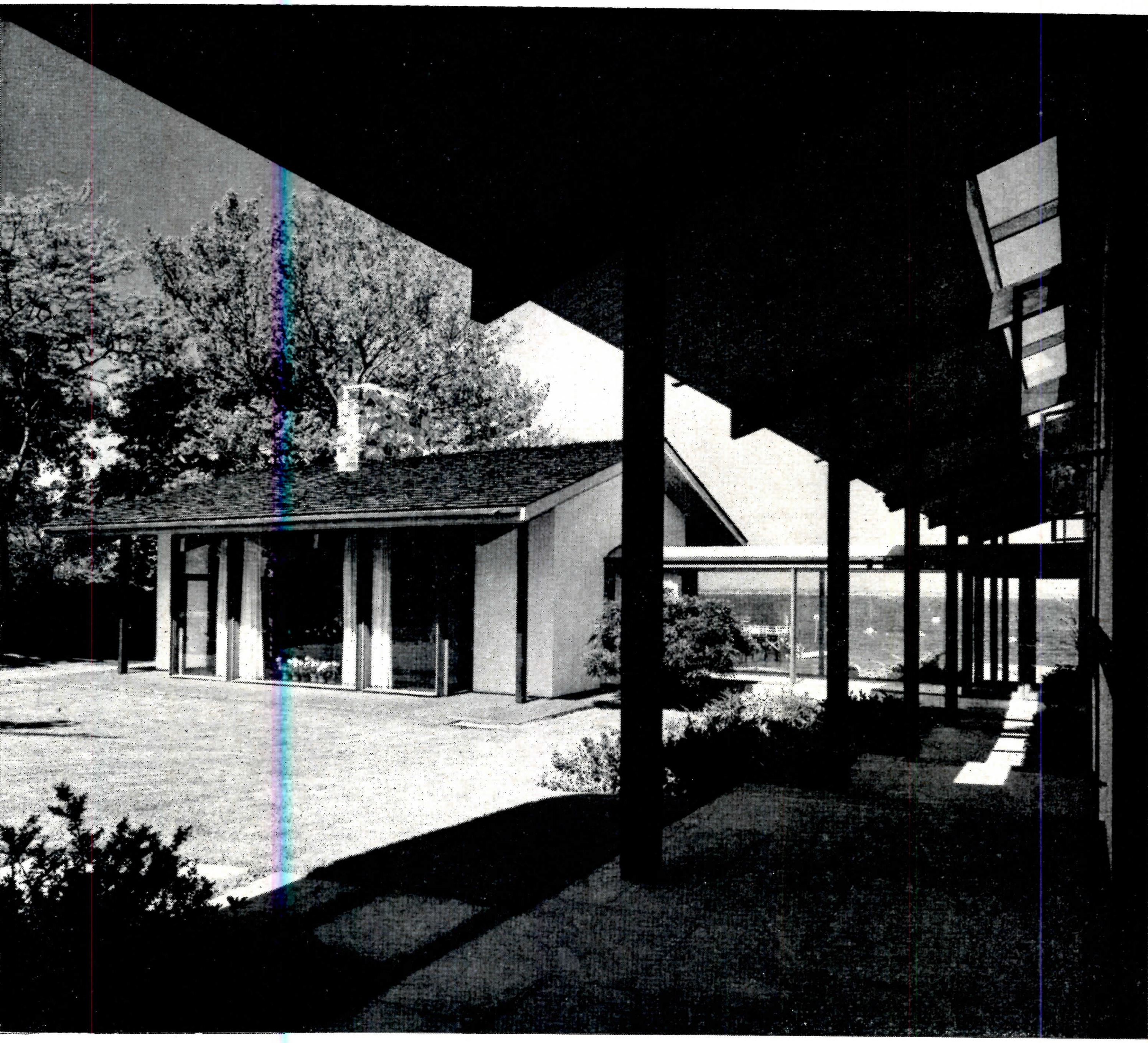
The plan was also organized to creat
sheltered garden on one side, and take in
view of Long Island Sound on the other

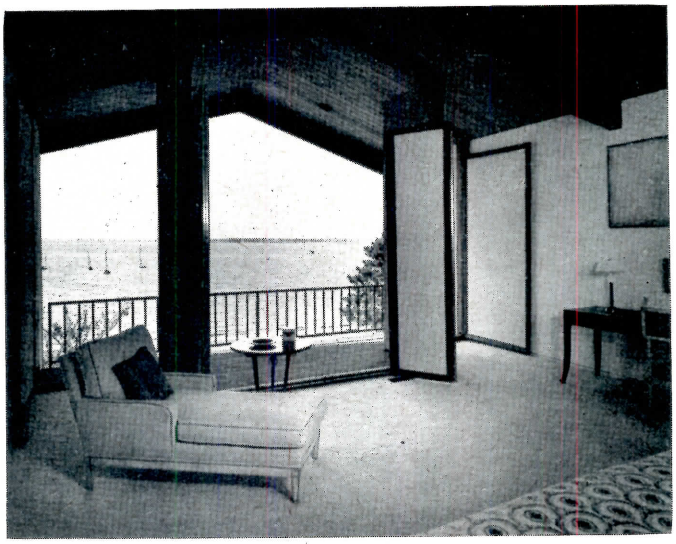


LOWER LEVELS



UPPER LEVEL





The site is one of sloping contours, with the house set into the slope; it is visible from above when driving in, and from the water below. The stone garage (shown above) was planned to visually anchor the compound to the site. The entrance approach from the parking area is under a roof (see preceding page) between the garage and the service entrance, with first a vista of the garden, then along the covered walk to the glass entrance link overlooking the sound. The view is also shared by the master bedroom (top) which has shutters for an added sense of shelter on stormy days

HOSPITALS

UILDING TYPES STUDY 311 ®

Just as the patient is the focus around which all activities of the hospital should revolve, the central consideration in hospital planning might be said to be the patient care unit.

Accordingly, it is good news for architects when the Architectural and Engineering Branch of the U.S. Public Health Service arrives at the point of publication of a brand-new study of the patient care unit. The results of this study are reported on the following pages. Intended to act as a guide for the planning of new patient care units or additions to existing hospitals, the present study treats, in considerable detail, all of the important aspects of the subject. No attempt is made to direct the design and planning of patient care units; rather the implicit intent of the study is informational. Covered in the study are such subjects as sizes and shapes of patient care units, design of patient rooms, materials and equipment, and engineering data. Also discussed are isolation and security rooms, nurses' stations, treatment rooms, supply facilities.

The story of the master planning and redesign of a complete medical center at Charlotte, N. C. by A. G. Odell Jr. and Associates follows the Public Health Service study. In this building may be seen the application of some of the principles discussed in the patient care unit article, as well as a practical demonstration of how one architectural firm handled the problem of modernizing and expanding an existing hospital—a current problem in many communities. A large neuropsychiatric hospital completes the present study.

Planning the
PATIENT CARE UNIT IN THE GENERAL HOSPITAL

Prepared by Architectural and Engineering Branch, Division of Hospital and Medical Facilities, U.S. Public Health Service, Department of Health, Education, and Welfare

The original "Elements of the General Hospital" was published in 1946 to serve as a guide in the design of hospital construction under the Hill-Burton program. With changing concepts and practices in hospital care, the "Elements" is reviewed and revised from time to time.

This publication seeks to indicate good current practices and the direction in which developments in the design of patient care units seem to be moving. It is based on findings resulting from current research; visits to general hospitals of all sizes across the country and consultations with many people active in the field of hospital care. Among those consulted were physicians, nurses, administrators, dietitians, pharmacists, technicians, architects, hospital consultants, manufacturers' agents, construction and maintenance personnel, and patients.

The principles are emphasized because their application by architects and others concerned with hospital planning will help to develop increasingly efficient means of implementing patient care requirements.

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While hospitals differ in size, complexity, and in details of procedures, they all work to provide the best patient care at the least cost. All departments are designed to serve the patient, either directly or indirectly. Since most patients spend most of their time in the patient care unit, most services are focused here. "Best patient care at least cost" depends in part upon how effective that focus is.

Developments continue in equipment and materials and in administrative, operational, and nursing techniques. These are directed toward improved patient care and better utilization of personnel at all levels. The design of physical facilities must implement these aims and at the same time keep down construction and operating costs.

The extent to which automation can be applied, directly or indirectly, to patient care unit functions is a matter of considerable interest. Efforts are being made in several areas, namely charting and chart handling, food service, medications, and supply. It is reasonable to assume that these and other efforts will result in better utilization of personnel time and improved patient care.

Facilities required for conventional units and for intermediate care units in a progressive patient care organization of in-patient services are substantially the same. However, additional space will be required for conferences, instruction, medication preparation, laboratory procedures, charting, and similar functions in hospitals havin medical, nursing, or other educational programs.

The principles and plans for the patient care unit included in this publication are based on the following assumptions:

1. An efficient *administrative department* exists to di rect and coordinate the activities of the various depart ments
2. The *dietary department,* using a centralized syster for food service, will meet the dietary needs of the patien
3. *Diagnostic facilities,* such as X ray and laboratory are designed and staffed to fulfill the needs of the hospita
4. A *central service department* is organized to provide in a combination best suited to the individual hospital such services as:

(a) A *pharmacy,* responsible for filling prescription and maintaining supplies for the medication room on th patient care unit

(b) A *central sterile supply,* responsible for all cleaning packaging, and sterilizing of supplies, materials, an equipment

(c) *Housekeeping,* responsible for all cleaning, includ readying rooms after patient discharge and decontaminat ing rooms after infectious cases

(d) A *laundry,* responsible for processing and supply ing required complements of linen and other laundere material (such as mopheads) to the patient care unit an other departments

(e) *Central stores,* responsible for the care and availa bility of supplies, materials, and equipment for the patien care units and other departments. (Purchasing may b here or directly under administration.)

(f) *Central distribution,* responsible for the delivery o all required supplies, materials, and equipment to all de partments and to patient care units

5. A *maintenance and operation department,* responsibl for care of the physical plant and the operation of me chanical equipment.

The plans, shown in figures 1 and 2, illustrate som ways of applying principles set forth here. These example are concerned chiefly with medical, surgical, or medica surgical units, although many of the principles are ap plicable to other types of patient care units. The plan shown are not, by any means, the only solutions to th various problems in planning patient care units, but ar intended to serve as guides in meeting the particula needs of individual hospitals.

SIZE OF PATIENT CARE UNITS

In current practice, the patient care unit provides accon modations for patients whose prescribed and routine ca is the responsibility of one nurse (head nurse, charg urse, or other title). In an effort to utilize scarce nursing alent to the fullest, many hospitals are now experimenting with various nurse-staffing patterns and divisions of esponsibilities. At the present time, the question of just ow broad the "span of control" should or can be in the atient care situation apparently has no final answer. owever, the number of patients whose care one nurse an direct and the number of personnel she can supervise fficiently will depend upon: (*1*) her own characteristics education, experience, temperament, leadership); (*2*) umber, training, and experience of the personnel working under her supervision; (*3*) efficiency of the patient are unit plan and hospital services provided; (*4*) degree which nurses are freed from duties which can be more ppropriately, and economically, handled by ward clerks nd the other departments of the hospital; (*5*) type of paent, rate of turnover, and variety of patient health probms; (*6*) number of doctors and their standards of pracce; (*7*) teaching and research programs of the hospital.

Information on all of these questions is seldom availble when a patient care unit is being planned. However, ney should be borne in mind because one or more of these actors may affect the size or design of the proposed unit. or example, patient care units in hospitals having stuent-teaching programs generally are smaller than those hospitals having no teaching programs. The greater deands on the nursing staff and the increased number of ersonnel working on such units in teaching hospitals ake the smaller unit desirable. More conference rooms, ffices, and such facilities will be required in teaching hositals, however.

Most authorities agree that quality of patient care ased on the real needs of the patient should be the criteon for determining the size of the patient care unit. Alough this criterion is difficult to measure, apparently it closely related to the adequacy of supervision.

In the absence of conclusive data and in the presence of rong convictions among nurses at all levels of adminisration, nursing education, and patient care, and among any physicians and administrators, about 30 to 35 apears to be the maximum number of patients whose care an safely be directed by one nurse even on the most effiiently designed unit. Reasons for this are: (*1*) the head urse must be fully aware of the needs of all of the paents as well as of the staff. When the census of the unit xceeds 30 to 35, the span of control of the head nurse is eakened; (*2*) staff morale and the quality of patient care re decreased when, because of a large census, head urses are unable to receive and/or assimilate a full report on each patient or to visit each patient at least once day; (*3*) relationships between medical and nursing taffs are strained when the volume of work is comounded by a large census. The head nurse is unable to rovide the kind of information and observation desired y the physician; (*4*) orientation of new and temporary ersonnel is more difficult with a large census due to the creased "busyness" of the unit.

Each hospital must decide what combination of size and ype of patient care unit and other factors will produce he best patient care at the least cost in its particular sitution. Those who plan to exceed 30 to 35 beds per unit hould do so only with full understanding of the staffing, atient care, supply, and traffic problems involved. In any ase, the size and design of units in an individual hospital hould be as nearly identical as possible (except for specialized units such as pediatrics) to facilitate standardization of supplies, equipment, and staffing.

SHAPE OF PATIENT CARE UNITS

Each shape of patient care unit—rectangular (single or double corridor), round, square, cross, or T-shape—has its advantages and disadvantages. The choice of a shape should evolve from a careful study of the site, orientation, types of transportation and distribution intended, number of beds per floor required, hospital program, plans for expansion, relationship to other departments, air conditioning and heating loads, and construction costs. It is clear that no one shape will fulfill the requirements of every situation.

PATIENT ROOMS

Number of beds per room, the desirable number of beds in a room and the proportion of different size rooms on the patient care unit will vary. A unit made up of one-bed rooms offers maximum flexibility of use and maximum privacy for the patient and the physician. However, such a unit is more expensive to construct and, because of greater distances between patients, may result in a reduction in the nurse's time spent in bedside care. A patient care unit made up of multiple-bed rooms has less flexibility and provides less privacy for patient and physician. But, it is less expensive to construct, provides more opportunity for observation of patients, and may save nursing time because the distance between patients is less.

The two-bed room is a compromise among: (*1*) the administrative need for flexibility; (*2*) some patients' needs or desires for privacy; (*3*) privacy for the physician; (*4*) the need to give patients individual attention; and (*5*) the over-all need to keep costs down. Like most compromises, it fully satisfies none of these needs. From an administrative point of view, the two-bed room is more flexible than the four-bed room (although not as flexible as the one-bed room). However, many believe that from the nurse's point of view and possibly from the patient's, it is less desirable than either.

Studies indicate that patient preference between the one-bed room and the multiple-bed room is influenced not only by the type and degree of illness and by the cost (which is related to the terms of hospital insurance) but the socio-economic group to which the patient belongs. Some nurses favor the four-bed room over the one- or two-bed room because: (*1*) "attention of varying kinds can be given by one nurse to more patients simultaneously; (*2*) there is more room for maneuvering equipment, beds, and stretchers; and (*3*) more frequent patient observation is possible. On the other hand, some authorities believe that patient demands, as opposed to needs, tend to increase in the multiple-bed room.

Except in special circumstances, however, the two-bed room appears to best meet the fluctuating needs and the cost requirements of the individual hospital. Currently, most patient care units consist of one-, two-, or four-bed rooms in a proportion chosen to meet both medical requirements and community preference as interpreted for each situation.

A minimum of 20 to 25 per cent of the beds on a patient care unit should be in one-bed rooms for isolation and other medical reasons according to information currently available. Special circumstances and local requirements may increase this percentage. The practice of using double

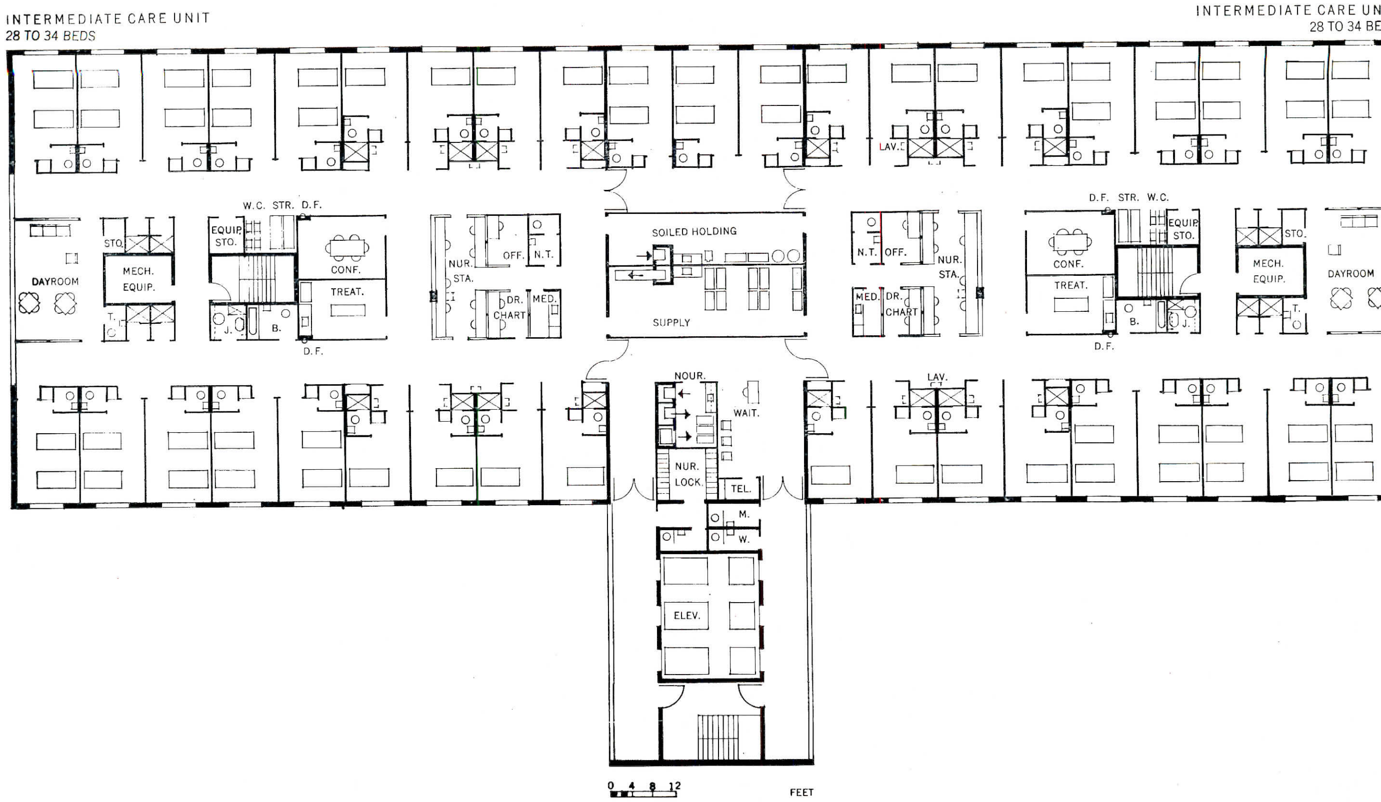


Figure 1. Double-Corridor Patient Care Floor. Consists of one 30-bed and one 32-bed unit, and utilizes centrally located mechanical conveyors for handling of supplies and food tray services

rooms as single rooms, when required, obviously breaks down under a high daily census.

Room design, patient rooms are designed and equipped to meet the physical and psychological needs of the patient and to provide a setting in which required medical and nursing care procedures can be performed. The interpretation of these requirements varies. However, for this country, at this time, certain observations can be made.

Size of room, clearances around the bed should be sufficient to permit the nurse to carry out nursing procedures; to move patients in bed, stretcher, or wheelchair; to accommodate necessary furniture and equipment; and to facilitate housekeeping.

In multiple-bed rooms, each bed should have a side wall clearance of at least 2 ft 6 in. Beds should be at least 3 ft 6 in. apart, preferably 4 ft. A two-bed room should have a minimum width of 11 ft 6 in., preferably 12 ft, for movement of beds and stretchers, and a minimum depth of 15 ft clear, preferably 16 ft. Four-bed rooms should have a minimum of 5 ft between bed ends and a minimum depth of 15 ft clear, preferably 16 ft. In hospitals having medical student or other teaching programs, patient rooms should be large enough to accommodate several students as well as the doctor and nurse around the bed during rounds.

Some hospital authorities believe that because of fewer equipment requirements one-bed rooms on an intermediate care unit may be smaller than on a unit for critically ill patients. However, in many situations a need for flexibility and interchange among patient care units would seem to preclude reducing the size of patient rooms belo a size that would permit satisfactory care of critically i patients. For instance, most intermediate care patient could probably be cared for satisfactorily in a bed wit its side against the wall. This arrangement, which re duces room widths and consequently corridor length would lessen total floor area and walking distance for th nurse; but whether it would accommodate equipment an lend itself to an island bed arrangement, if necessar must be considered for each hospital's requirements.

A full-length built-in locker or closet large enough t accommodate outside coats and clothing on hanger should be provided for each patient. These should be s arranged that no patient's locker interferes with the pri vacy of another patient. Each locker or closet should hav drawers beneath and luggage storage above, unless thes are provided elsewhere in the room. Day storage for indi vidual patient's blankets should also be provided for.

Doors should be fire safe, and measure 3 ft 10 in. to ac commodate wheelchairs, stretchers, and beds.

Toilet room and lavatory, each patient room should hav a toilet and a lavatory with gooseneck spout for fillin basins, blade handles, mirror, and shelf. The lavatory are should be equipped with paper towel holder, soap dispens er, and waste receptacle. Dispensers using soap tissue eliminate contaminated soap bars and stopped-up liqui dispensers. A grab-bar should be provided as well as a emergency call button.

Whether the lavatory should be located in the toile room or in the patient room will depend upon the hosp tal's attitude toward the relative importance of the lava tory's availability to the patient for handwashing immediately after using the toilet and for personal hygiene, or to doctors and nurses for handwashing. The location may be compromised by placing the lavatory in the toilet room so that it is visible from outside the toilet room and can be used by doctors and nurses without closing the door. This location encourages handwashing by patients after using the toilet, reduces the problem of the contaminated door knob, provides privacy for the patient while using the lavatory, and permits doctors and staff to observe handwashing techniques. Arrangements whereby the lavatory is in the patient room, but is screened from patient beds, fulfill most of these requirements and is more convenient for use by personnel. Toilet-room doors should not open directly toward patient bed areas.

The decision as to whether floor-mounted or wall-hung toilets are to be installed should be made early in the planning stage, as this may influence the location of fixtures and the design of toilet room areas. The toilet should have a bedpan flushing attachment, located to the right of the toilet, either a foot-operated or a rigid type activated by the toilet flushing handle. Most objections to these devices are traceable to improper adjustment or faulty maintenance, or to insufficient instruction of nursing personnel in handling them.

A single toilet room serving two patient rooms should be considered a minimum facility. This arrangement, however, may create inconvenience for patients and nursing personnel and reduce flexibility of room use, especially in infectious cases. Such an arrangement should have a lavatory in the toilet room and a lavatory in each patient room to fulfill handwashing requirements of patients and staff. In any arrangement, one toilet should serve a maximum of four patients.

Windows, when determining window size and type, the following should be considered: (*1*) the effect of glass area on air conditioning and heating costs; (*2*) the problem of maintaining even temperatures throughout multiple-bed rooms; (*3*) the cost and effectiveness of light or sun control by curtains, blinds, and similar furnishings; (*4*) whether the view from the windows justifies the viewing; (*5*) window washing and other maintenance costs; (*6*) safety and ease of operation.

Lighting, lighting the patient room has many aspects, especially where two or more patients must be considered simultaneously. The patient, the nurse, and the doctor each require a different level of illumination.

Lighting levels required in the room range from a fraction of a footcandle for night lighting, up to 100 footcandles or more for examination or treatment. Several steps of lighting levels between these extremes are needed for patients' use and for routine nursing care. These steps should be carefully considered so that lighting requirements will be met while initial and maintenance costs are kept low.

Noise, noises from many sources and following many pathways are disturbing to patients on many patient care units. The sources of most of these noises are known. Steps taken during the planning and construction stages can eliminate or reduce them.

Ventilation, since any patient room may house a known or unknown infectious case or an odorous case, the ventilation should be so designed that air is *not* recirculated to other patient rooms or areas.

Miscellaneous, electric outlets for equipment should be provided at shoulder height at the head of each bed. Emergency power outlets should be so located in corridors as to be available to any patient room.

Telephone outlets should be provided in each patient room.

All patient rooms should be equipped with piped oxygen and, if possible, vacuum.

Built-in cabinets between, and opening to, the patient room and the corridor are designed to store supplies, thus reducing trips by the nurse to the supply and holding rooms and entries by service personnel into the patient room.

Television and radio, provision should be made for television sets and/or radios in accordance with hospital policy as to whether sets are to be rented by the hospital or from outside the hospital, whether sets are to be remotely controlled and have under-pillow speakers, whether a fixed shelf is to be provided, and whether a central antenna system is to be installed. Since in most areas proper operation of the sets will depend upon a central antenna system, its installation at the time of construction should be considered.

ISOLATION AND SECURITY ROOMS

The type of provisions on the patient care unit for patients requiring isolation will depend upon the frequency with which the problem arises and the techniques employed. Since patients are usually isolated one to a room, it appears that a number of single rooms on each unit should be designed to accommodate the isolation techniques employed in the hospital. The number would be governed by the expected maximum number of isolated patients. It is reported that the number of patients in general hospitals requiring isolation may be as high as 20 per cent under normal non-epidemic conditions.

If the hospital will have only an occasional patient requiring isolation, special arrangements can be made, as needed, on the patient care unit. However, if the hospital will have a number of patients in isolation simultaneously, the unit should be designed to facilitate the carrying out of isolation techniques.

The techniques employed will determine the provisions to be made. For example, if technique requires handwashing after personnel leave the isolated patient room, a convenient lavatory outside the room will be required. Any technique would probably require that items such as clean gowns, masks, and supplies must be stored outside the room. Most fire exit codes, however, do not permit the cabinet or cart in the corridor outside the isolated room.

The most strict isolation technique requirements can be met by an alcove between the patient room and the corridor containing: (*1*) a lavatory with gooseneck spout, foot- or knee-operated faucets or at least blade handles, and provided with paper-towel holder, soap dispenser, and waste receptacle; (*2*) space for foot-operated waste can for soiled masks, if technique so requires. (Soiled gowns would be removed inside the patient room and placed in foot-operated waste can with waterproof liner); (*3*) storage facilities, either on a small cart or on shelves above the lavatory, for clean gowns, masks, and other supplies.

A lavatory in an alcove off the corridor might be so located that it would serve several rooms used for isolating patients. This would reduce the number of lavatories required.

If isolation technique in the hospital permits final handwashing in the patient room, this can be done at the lavatory provided, and clean supplies, gowns, and masks can be kept on a cart or cabinet in the alcove adjacent to the patient room or in a built-in cabinet accessible from the corridor and the patient room.

Since many isolated patients are ambulatory and may remain in the hospital longer than the average patient, bathing needs can best be met by a shower provided in addition to the toilet and lavatory normally provided for patient rooms.

The problem of handling, cleaning, and storing patient clothing, not normally kept in the isolated room, must be considered.

To provide for proper isolation technique, the ventilation of patient rooms should be so designed that the air is not recirculated to other patient rooms or areas.

Security, most hospitals from time to time need to house, temporarily, a disturbed patient. If the hospital does not have a psychiatric unit and does not provide for these patients in the emergency department, provisions must be made on a patient care unit. At least one room should be constructed so that it can be converted quickly to such use. Such a room should have a door with a view-window cutting off the toilet room and lockers; a detention screen at the window; recessed ceiling light, switches outside the door, and detachable over-bed light; key-operated oxygen and suction outlets; proper hardware on the inner door; and radiant heating or protective covering for the radiator or heating element. For normal occupancy, the room should be converted to a typical patient room.

TREATMENT ROOM

Some treatments and examinations can be carried out with greater safety and privacy for the patient and for the physician, as well as greater convenience for the staff, in a treatment room.

Whether a treatment room is provided will depend upon the type of patient on the unit and upon hospital policy as to where treatments are given. Since both of these factors are subject to change, the treatment room should be arranged so that it can be converted to another function if it is no longer required for treatments. If no treatment room is provided, a conveniently located patient or other room should be designed for possible conversion to a treatment room. This would involve roughing in for a sink and installing additional electrical outlets. An increase in the percentage of single rooms on the unit may (or may not) affect the use of a treatment room. This will depend upon hospital policy.

The treatment room should contain, in addition to space for necessary equipment, a counter sink with gooseneck spout and blade handles for preparations for treatment, rinsing, and handwashing. The sink area should be equipped with a paper-towel holder, soap dispenser, and waste receptacle. Piped oxygen and vacuum should be provided. A bulletin board should be provided.

As a precaution against possible cross-infection, materials should be readily cleanable and procedures for infection-control must be established and followed. The treatment room should not be used for other purposes such as storage or team conferences. Treatment trays, some of which may be used in a patient room, and other general supplies should not be kept here, except such emergency trays required by hospital policy. Treatment trays should be kept in the supply room and soiled materials disposed of in the soiled holding room. An X-ray film illuminator may be installed here, if required.

Doors should be 3 ft 10 in. wide to accommodate wheelchairs, stretchers, and beds.

BATHS, SHOWERS, AND TOILETS

Each patient shower and each dressing area should be at least 3 by 3 ft to provide room for a stool or wheelchair and for grab-bars. Plumbing fixtures should include a hose attachment for a sit-down shower. Shower rooms need not be segregated by sex but should have a light in the corridor controlled by the switch inside the room to indicate occupancy. The same switch should control mechanical ventilation. Emergency call buttons should be provided in each dressing area, reachable from either shower or dressing space. Floors should be flush with corridor floors, with no raised thresholds, to accommodate wheelchairs. The dressing area should drain into the shower for safety and ease of cleaning.

Opinions vary as to the number of showers required on a patient care unit. The type of patient and community preference will influence the number provided. With scheduling, however, it appears that a minimum of four common showers should suffice on a 30- to 35-bed unit, especially if each single-bed room is equipped with a shower for isolation purposes.

At least one tub should be provided in each patient care unit for treatment and for patients who require or prefer a tub for bathing. Whether the tub should be a raised-island type will depend upon the type of patient on the unit and local preference. A toilet should be provided in the tub-room. This can be used as a training toilet. Some hospitals prefer the fixed-type sitz bath to the portable type. Tub and sitz baths should be installed in separate rooms, each equipped with grab-bars, emergency call, and occupancy light. Each room should be able to accommodate a wheelchair patient.

A toilet and lavatory should be provided for the dayroom, with nurses' call, grab-bar, mirror, paper-towel holder, soap dispenser, and waste container.

Except in small hospitals each patient floor should provide toilets to accommodate doctors, non-nursing personnel, and visitors.

NURSES' STATION

The nurses' station is the communications, administration, and charting center of the patient care unit. It should be centrally located within the unit to reduce distances to a minimum. Although it is desirable for the nurses' station to be so located that activity within the unit may be generally observed, it is not usually considered necessary that the nurses' station command the entrance to the unit or to the elevators except on special units, such as a psychiatric unit. Visitors should be screened and directed at the main lobby and, if desired, by a volunteer stationed at the elevators on the nursing floor during visiting hours. Hospital personnel requiring information can go to the nurses' station.

Charting positions should be provided for nurses and a ork station provided for at least one ward clerk who, is assumed, will among other duties: (*1*) take incoming lls on the telephone and call systems; (*2*) handle pneuatic tube system, if provided; (*3*) make out and process equisitions; (*4*) obtain and return charts to central ecords department; (*5*) make such entries on charts as ospital policy requires; (*6*) direct visitors and personnel, necessary; (*7*) operate record imprinter.

The number of charting positions needed will depend n the number of patients and on the nurse-staffing patrn of the unit. Five or six charting positions and one ard-clerk station are usually adequate for a 30- to 35-atient unit. Ward-clerk stations should be provided hether or not ward clerks are contemplated, since these nctions must be carried out by someone and facilities ould be conveniently related to the station.

Counters should be open underneath, where possible, ith drawers placed only where required. This will help scourage the storage of unrelated items. Forms should e kept in a rack at the back of the counter and extra rms should be stored in a special cabinet, in drawers at e station, or in the supply room.

A safe storage place for nurses' purses should be proded in specially designated cabinets, drawers, or purse ckers either at the nurses' station or in a lounge. Adeate bulletin boards should be provided.

A nurses' toilet with lavatory should be provided conenient to, but not opening into, the nurses' station. The vatory should be equipped with blade handles and proded with paper-towel holder, soap dispenser, waste reptacle, mirror, and shelf. Whether a nurses' lounge is rovided on the nursing unit will depend upon hospital licy.

Because of conflicting responsibilities and the number personnel involved, the staffs for more than one patient nit should not usually operate out of a single nurses' ation, even though the station may be large enough to ccommodate them. Each patient care unit should have its wn nurses' station and supporting services. Supply, holdg, and nourishment areas, however, may serve more than e unit, provided they are located so that they are conenient to all units.

EDICATION ROOM

he medication room is used for the storage and preparaon of medications. This room should be enclosed for quiet, ear-glazed for observation both in and out, and sized to ccommodate more than one person, because with team ursing, students, private-duty nurses, preoperative and ostoperative care, several persons may often work here multaneously. The pharmacy should be responsible for ocking. Minimum requirements for a medication room re: (*1*) shallow or stepped shelves divided by some means or individual patient medication, with a system for ready changing patient identification; (*2*) a double-locked arcotics safe, with red warning light to indicate when e safe is unlocked, installed at eye level above the couner; (*3*) a counter having drawers underneath for storage f syringes and similar items, but open below without abinets; (*4*) a bulletin board.

A sink large enough for handwashing, equipped with ooseneck spout and blade handles, should be installed n the counter. This area should be equipped with paperowel holder, soap dispenser, and waste receptacle. A separate waste receptacle for broken glass and other nonburnable items should be provided.

A refrigerator mounted above the counter is more convenient, provides better visibility for drug storage, and allows greater ease in cleaning. An undercounter refrigerator with slide-out, removable tray shelves is acceptable.

Various methods of using automation for greater accuracy and speed in dispensing medications are available or being tested. Some require specially designed areas. The applicability of these systems will depend upon the individual hospital situation.

CHARTING AREA

Patient charts are used by the doctor, the nurse, and the ward clerk. These people should have ready access to the charts and a quiet place in which to work on them. Some authorities believe that a separate charting room should be provided for doctors, with provision for dictating and for passing charts through to the nurses' charting area. An X-ray film illuminator and a bulletin board may be installed in the doctors' charting area. Others believe that doctors' charting should not be separated from nurses' charting because of the need for close cooperative relationship among doctors and nurses. If separate charting areas are not provided, a separate dictating room or booth should be provided. In hospitals having medical student teaching programs, the area required for doctors' charting is greatly increased and should reflect the practices of the individual hospital.

CONFERENCE ROOMS AND OFFICES

One office located adjacent to the nurses' station should be provided for the use of the head nurse and for conferences between the head nurse and other staff members. This office should have clear-glazed walls to permit observation, with draw curtains for privacy.

A conference room, accommodating 6 to 10 persons, should be provided on each unit for reports, team conferences, in-service programs, and conferences with patients or family. Bulletin boards, blackboards, and provisions for visual aids may be installed here. Hospitals having teaching programs will require additional office and conference space, depending on the nature of these programs.

Current experience indicates that hospitals employing a ward or floor manager plan may require an office for the manager. The location will depend upon the number of patient care units for which the manager is responsible and the division of responsibilities with the nursing service.

DAYROOM

The size and location of the dayroom will vary with the type of patient and with hospital policy. If many patients on a patient care unit are ambulatory and are encouraged to leave their rooms for therapeutic reasons, more space is required for a dayroom than if few patients are expected to leave their rooms. If patients are to be served meals in the dayroom, additional space is required and the room should be located as conveniently as possible for food service and removal of trays.

The percentage of patients expected to use the dayroom for recreation and/or dining should be established. This may be 50 per cent or more on some intermediate care units. Twelve sq ft should be allowed as recreation space for each patient or 25 sq ft for each patient served meals.

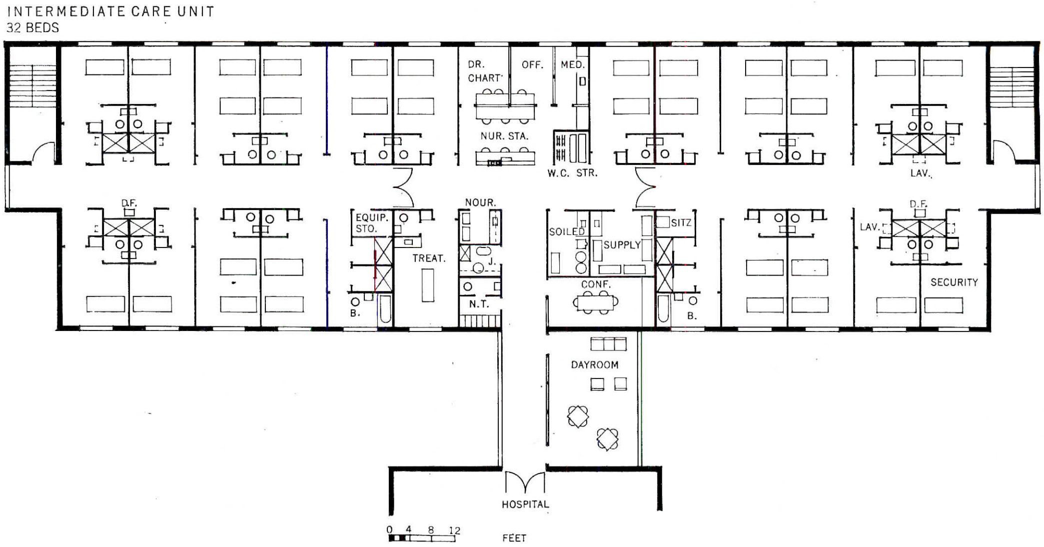


Figure 2. Single-Corridor Patient Care Floor. One patient care unit, utilizing carts for transportation of supplies and food trays to and from unit. This type of unit can be used for additions to existing hospitals, or in modified form wherever single-corridor units are indicated

A toilet and lavatory may be installed near the dayroom for the convenience of patients. A bulletin board should also be installed. If the dayroom is to be used for overflow patients, it should be provided with oxygen, suction, nurses' call, electrical and other necessary outlets, and the toilet should be equipped with a bedpan flushing attachment.

If visitors are permitted or encouraged to use the dayroom or if it is to be used as a television room, it should be located and designed so that the noise will not be disturbing in patient rooms. Locating the dayroom across from the nurses' station is usually objectionable. This location tends to increase noise and traffic in an already congested area and also to reduce the privacy of doctors and nurses in and around the nurses' station.

In any event, the uses to which the dayroom will be put should be determined before it is sized or located.

Additional space away from the patient care unit, such as a roof-deck or penthouse room, may be used to advantage by many patients and their visitors. Such a facility may complicate control but helps reduce traffic and noise on the unit.

SUPPLY ROOM

The supply room is the central storage and distribution point for all sterile and nonsterile supplies used on the unit, including linen, but not including: (*1*) office supplies and forms usually kept at the nurses' station—but sometimes kept in the supply room; (*2*) medications; (*3*) dietary supplies which hospital policy requires keeping in the nourishment room; (*4*) equipment which is kept in the equipment storage room.

Supplies should be replenished on a complement basis, by central service personnel, and stored on either fixed shelving or shelving on wheels. The latter type has the advantage of: (*1*) flexibility of available shelf space; (*2*) visibility, which facilitates locating and replenishing items; (*3*) convenience of use; (*4*) greater ease in cleaning the shelves and the room; (*5*) less handling of materials.

The number of carts required depends upon comp ments worked out by the hospital. Specialized nurs units will require special cart complements. However, carts should be of uniform size with adjustable shelv easily movable, equipped with adequate bumpers at w base level and quiet casters.

In addition to storage space in this area for carts counter sink with a gooseneck spout and blade hand should be provided for handwashing and for such sim preparations for bedside use as may be necessary. T sink area should be equipped with a paper-towel dispens soap dispenser, and trash receptacle. A bulletin boa should also be installed.

SOILED HOLDING ROOM

This room is designed for the care and holding of soi utensils and materials, except dietary items, awaiti transport to other areas, such as the central sterile su ply or laundry.

Facilities needed are: (*1*) clinical sink, with foot co trol, for disposal of liquid waste. Wall faucet, with fo control or blade handles, for rinsing. Rim of sink shou be 28 to 30 in. above the floor; (*2*) counter sink, wi gooseneck spout and foot or knee control or blade handl for handwashing and for rinsing. Sink area should equipped with paper-towel dispenser, soap dispenser, a waste receptacle; (*3*) space for carts and hampers f soiled articles and linen awaiting return to the cent sterile supply or the laundry. Grossly soiled articles shou be wrapped or bagged. Contaminated articles should specially wrapped or bagged in accordance with hospi policy. Space convenient to the counter should be pr vided for storage of wrapping or bags; (*4*) shelf conve ient to both sinks to hold liquid disinfectants used in t room; (*5*) space and/or refrigerator for short-time st age of specimens awaiting delivery to laboratory may necessary, depending upon hospital policy; (*6*) bulle board.

Trash from patient rooms and other areas should taken directly to the incinerator when collected, if pos

. If it must be stored temporarily, the soiled holding
[r]om (not in the janitor's closet) is the place for such
[sto]rage.

[LI]NEN

[Au]thorities agree that linen should be handled as few [tim]es as possible to reduce the chances of cross-infection [an]d to conserve personnel time. This indicates the use of [car]ts small enough to be returned easily to central service [or] laundry for stocking, parked in the clean supply room [wi]th other clean supplies, and moved to patients room [do]ors during routine bedmaking. A 30- to 35-bed patient [ca]re unit would usually require two linen carts of the [sm]all size. Bags of soiled linen should be deposited in the *[soi]led holding room* for return to the laundry.

Following patient discharge, the cleaning and prepara[tio]n of the patient room is usually the responsibility of [ho]usekeeping. Packaged linen for discharge beds may be [st]ored in the supply room or on a special cart containing [al]l necessary equipment for the preparation of discharge [ro]oms. This cart may be stored, cleaned, and replenished [in] central service or housekeeping department and [br]ought to the patient care unit when required.

Linen chutes have been found to distribute airborne [co]ntaminating elements to all floors served and are *not* [re]commended. If installed: (*1*) linen must be securely [ba]gged on the patient care unit; (*2*) wet or damp linen [m]ust be bagged in waterproof bag or liner; (*3*) chute [do]or must be located in a well-ventilated soiled holding [or] chute room, *not* in a corridor or clean area. Because of [m]isuse of linen chutes, some hospitals have found it nec[es]sary to restrict use of the chutes to designated per[so]nnel.

[H]OUSEKEEPING

[T]he chief function of housekeeping on the patient care [u]nit is the removal of soil and dust from all surfaces in [or]der to prevent cross-infection and re-infection of pa[ti]ents and to protect personnel. This should be accom[pl]ished with the least interference with nursing activities [an]d without transferring undesirable elements from one [su]rface to another through poor cleaning techniques. The [te]st for cleanliness in hospitals of all sizes should be the [la]boratory culture, not the degree of shine on surfaces.

Controlled studies indicate that wet-mopping and damp-[d]usting (or washing) with a carefully selected disinfect[a]nt cleaner employed according to a specific technique give [t]he best results in removing dust and soil. However, clean[in]g agents, cleaning techniques, and the scheduling of [cl]eaning operations will vary widely, depending upon the [m]aterials of the surfaces to be cleaned, type of patient, [a]ctivity on the patient care unit, and the standards of [c]leanliness set by the hospital.

In order to facilitate the carrying out of proper clean[i]ng techniques, the janitor's closet on the patient care unit [s]hould contain: (*1*) a depressed floor sink with bucket [h]ook on wall-mounted mixing faucets (a hose attachment [m]ay be used if a vacuum breaker is provided). The de[p]ressed sink permits flushing out the room without pro[v]iding an additional floor drain; (*2*) a mop-handle rack [o]ver the sink. Mopheads should be removed after use and [p]laced in the soiled holding room for return to the laundry. Soiled mopheads should not remain in the janitor's closet; (*3*) shelves for detergents, disinfectants, cleaning cloths, [a]nd other cleaning materials; (*4*) a rack on the wall for a ladder; (*5*) a paper-towel holder, soap dispenser, and waste receptacle convenient to the sink faucets. Hand-washing by housekeeping personnel should be an integral part of the hospital's sanitation and safety program.

The floor area should be sufficient for storing mop-buckets on a roller carriage, a wet and dry vacuum machine, and a small floor-scrubbing machine, but should not be so big as to encourage the storage of unrelated items. Floor and wall surfaces should be easily cleaned. Lighter colors for surfaces than are customary will promote cleanliness by making soil more apparent. Adequate mechanical air exhaust is important to prevent the spread of odors and airborne contaminants.

Equipment used for cleaning rooms after patient discharge and for daily cleaning should be kept on special maids' carts in central service or housekeeping and brought to the floor and returned by the maid as required.

All waste receptacles on the patient care unit should have disposable liners which are closed before removal to a wheeled, closed refuse cart for transportation to the incinerator. Trash chutes, even under the best conditions, have been found to distribute airborne contaminating elements to all floors served, to be a fire hazard and a source of vermin. They are not recommended. If installed: (*1*) chute should conform to the National Fire Protection Association (N.F.P.A.) Regulation 82-A; (*2*) all trash should be securely bagged (no loose trash); (*3*) wet or damp trash should be bagged in waterproof bag or liner; (*4*) chute door should be installed in a well-ventilated soiled holding or trash room, not in corridor, janitor's closet or clean area (*5*) a seven-day-a-week service for removal of trash from the bottom of the chute must be maintained for fire safety.

Supplies such as paper towels, toilet paper, and dispenser refills of soap tissues should not be stored in the janitor's closet, considered a "dirty" area. These should be kept in the clean supply room.

Dry vacuum machines, if used on the unit, should be equipped with high efficiency filters, should have exhaust blowing upward (not down), and should be usable as wet vacuum when needed for picking up gross spillage and for floor flooding after infectious cases. Whether a machine is kept on each unit will depend upon housekeeping techniques and availability of machines.

If floor maintenance machines are used for corridors, they should be kept in central service or the central housekeeping for proper cleaning, maintenance, control, and availability. As used here, central service refers to over-all service control.

In hospitals employing a ward or floor manager system, a housekeeping equipment room may be provided convenient to the patient care units to be served. Its size and facilities will depend upon the number of units served and the hospital's requirements. Sanitation safeguards should be emphasized both in design and use. A small janitor's closet may be required on each patient care unit to take care of spillage and similar incidents. In some cases, however, equipment for this purpose may be kept in the soiled room, since this cleanup must often be done by nursing personnel.

NOURISHMENT FACILITIES

The hospital dietary department generally employs a centralized system for patient food service.

Food trays may be transported either on enclosed carts, heated or unheated, to the patient care unit by an elevator, floor-level dumbwaiter, or vertical tray conveyor. These trays may be hand-carried to patients or may be transported on small carts by nursing or dietary personnel.

Food trays may be returned directly to the central dishwashing room by the same method used to service the unit. The speed and efficiency of the system of service will depend upon layout, equipment, and proper utilization of personnel.

In addition to providing three meals daily, other patient dietary requirements must be met. Prescribed nourishments, tube feedings, and deferred meal trays should be centrally prepared and transported to the unit by one of the ways previously mentioned. Distribution on the unit may be made by dietary or by nursing personnel.

Nonscheduled nourishment involves a request for nourishment service other than at appointed hours. Requests made between 7 A.M. and 7 P.M. should be filled by the dietary department, whereas requests made between 7 P.M. and 7 A.M. must, in many instances, be filled by nursing personnel. If the policy of the hospital provides for substantial nourishment, such as tea, soup, and toast in addition to the usual juice, milk and crackers, facilities for storage and preparation become more elaborate. There is a trend in many hospitals toward reducing the variety of available, unscheduled between-meal nourishment. Ideally, the dietary department should make provision for meeting dietary requests at all hours; however, few hospitals are able to absorb the costs for these additional services. A separate facility on the patient unit will provide for the preparation of the occasional dietary request. This nourishment room can serve more than one unit if conveniently located.

Preparation and service of ice water was considered a routine function, until recently. However, since studies on the bedside carafe and the handling of ice for the carafe have revealed both to be potent sources of contamination, hospital management now recognizes the importance of more adequate control of this service. Responsibility may be assumed by the dietary department or by the nursing service. When responsibility is assumed by the dietary department, wide-neck water carafes and glasses are washed in the central dishwashing room; carafes are iced in the dietary department or the patient care unit nourishment room and distributed to patients by dietary personnel. Glasses are placed on the patient's meal tray. If assumed by the nursing service, carafes may be washed in the central sterile supply or in the dietary department, but not on the patient care unit, as an acceptable standard of cleanliness is not apt to be achieved here. Icing of the clean carafe should be done in the nourishment room.

The provision of an ice-making machine on the patient care unit will depend upon the need of ice for treatment and drinking purposes. For example, the use of sealed, plastic freeze packs for treatment and the service of ice water by the dietary department would presumably eliminate the need for an ice-making machine on the unit. In any case, if ice is required, it should be manufactured by a self-dispensing type of machine on the patient care unit, to eliminate the use of a scoop and to reduce the possibility of contaminating the ice. Ice should not be transported in bulk from any other part of the hospital.

In new construction, consideration may be given to the installation of central piped ice water to patient rooms as a means of eliminating the ice-making machine and the u of carafes, thus reducing the possibility of contaminatio With the piped system, the use of freeze packs for trea ment would therefore be required. Success of this syste would depend upon the type of patient and upon hospit policy.

STRETCHERS AND WHEELCHAIRS

The number of stretchers and wheelchairs required on t unit will depend upon: (*1*) whether surgery, X ray, a other departments send for patients (which is the accep ed current practice), whether nursing personnel bring p tients to these departments, or whether a central patie transport service is provided; (*2*) hospital policy on mo ing patients in beds; (*3*) hospital policy on use of trea ment rooms.

One stretcher and two wheelchairs are recommended a minimum for each 30- to 35-bed medical, surgical, medical-surgical unit. These should be stored in an alco off the corridor.

It is probable that an intermediate care unit in a pr gressive patient care nursing program will require mo wheelchairs than a traditional unit since the critically and self-care patients on a traditional unit would not no mally need them. A minimum of four wheelchairs is re ommended for a 30- to 35-bed intermediate care unit.

EQUIPMENT STORAGE

A direct relationship exists between the efficiency of t distribution system within the hospital and the amount storage space required on a patient care unit. If equipme is readily obtainable from central service or central sto age in a hospital of any size, minimal or no equipme storage space is required on the unit. This saves expensi space on the unit, helps to reduce the required over-all i ventory, and discourages hoarding.

With a reasonably efficient system of distribution in t hospital, the maximum storage requirements on a p tient care unit would include space for the followi equipment: (*1*) inhalation therapy equipment. (If a ce tralized piped oxygen system is installed, the accesso equipment is minimal in size and one set can be kept in t supply room for emergency use); (*2*) suction equipmen (If a central vacuum system is installed, one set of suctio apparatus can be stored in the supply room for emergen use); (*3*) bedrails. (Storage of these will not be require if beds have integral bedrails); (*4*) floor-type intrav nous stands. (Bed-type rods can be stored in the supp room on a wall rack if not permanently attached to beds (*5*) patient lifter, walker, or similar equipment. (Su equipment may be required on some units for a period time, during which it may be stored here or with whe chairs and stretchers. When no longer needed, it should returned to central service to be cleaned and to be avai able to other units); (*6*) patients' scales. (These may kept in the treatment room).

LOCKERS FOR NURSING PERSONNEL

Some hospitals provide locker rooms for nursing perso nel, including practical nurses and aides, on each patie floor. These usually serve staffs from more than one p tient care unit. If these facilities are provided, they shou be near the elevator or entrance to the floor so that nurs will not pass through a patient care unit on arrival a departure. Individual full-length lockers for each perso and a toilet with lavatory are required. A lounge or rest room may be included, depending upon hospital policy.

Advantages of providing lockers are: (*1*) personnel may report for duty more promptly; (*2*) coats, umbrellas, and other personal items will not be brought onto the unit; (*3*) morale of floor personnel may be strengthened by closer association of the group.

Disadvantages are: (*1*) transfer of personnel to other units may complicate locker assignment; (*2*) personnel may be tempted to leave the unit more often.

TRANSPORTATION

The movement of equipment, supplies, food, and people to and from the patient care unit has become increasingly complicated and important because of rising costs, scarcity of personnel, new methods, and increased infection rates. The choice of transportation methods will generally be one of the chief determining factors in the layout of the hospital plan and should be established before the physical plan is begun.

Hospital planners should give careful and detailed attention to the methods of transporting and handling all types of material in and out of the patient care unit. Every item, no matter how small, should be accounted for. Planners sould be aware of the relative efficiency and the possibilities of contamination of various arrangements and transportation methods.

Carts, in hospitals of all sizes, the cart has long been used to move supplies. As personnel time and infection rates have become matters of increasing concern, it is clear that supplies, once placed on a cart, should not be removed except by the user. This has led to the wide use of specially designed carts as shelves on wheels. These carts, along with food conveyors and equipment, are usually moved vertically by elevator or, if properly sized, by floor-level dumbwaiters. Such carts may be used in conjunction with mechanical conveyors as a means of storing materials and supplies in the supply room on the patient care unit or moving supplies about the unit without additional handling.

Elevators, elevators should, where possible, be located outside or separated from the patient care unit. They are a source of contamination and of noise disturbing to patients. Because of the many people entering and leaving, and because of air turbulance caused by the action of the car as it moves in the shaft, the elevator car and lobby are highly contaminated areas. If the lobby is placed within the patient care unit, it should be enclosed, should have adequate air exhaust to reduce the spread of contaminated dust, and should, along with the car, receive special housekeeping attention.

The question of using the same elevator for clean and soiled materials, for food conveyors, supply carts, and for people, is controversial. Consideration should be given to designating one elevator for service and to assuring special housekeeping attention. For hospitals of 200 beds and over, separate service elevators and smaller high-speed passenger elevators should be considered to speed service and separate traffic. Controls should be carefully designed to accomplish the control of elevators desired in the individual hospital.

Dumbwaiters, either counter-level or floor-level dumbwaiters may be used to advantage, if properly located. The floor-level type often eliminates two handlings of the material being transported, by accommodating a cart which is rolled on at the source and off at the destination. Either type should be installed only where charge and discharge openings occur in areas which are normally manned, and not in corridors.

The counter-level type can best be used where the number of stations is limited, such as between pharmacy and pharmacy dispensing, or where use is limited, such as between the dietary department and the nourishment room on the patient care unit for supplemental between-meal nourishment service.

Mechanical conveyors, vertical and horizontal conveyor systems provide direct and rapid means of transporting either food trays from the kitchen to the patient care unit, or supplies from central service to the patient care unit. The arrangement of the hospital rather than its size is apt to determine the use of such a system. Its use for moving supplies also depends upon a centralized distribution system. Although no precise information is currently available, indications are that clean and soiled food trays, and certainly clean and soiled materials, should be transported in separate shafts.

Responsibilities and techniques for cleaning and maintaining the shafts and equipment must be worked out, understood, and followed in order to provide safe and efficient service.

Pneumatic tubes, the pneumatic tube was originally designed to convey messages. However, in the automatic routing models, it can be utilized for transporting a wide variety of materials. This may include patient records, pharmaceuticals, and laboratory specimens. Its use is limited chiefly by size, packaging methods, and hospital policy. Before a tube system can be intelligently laid out, the interdepartmental relationships and divisions of responsibilities within the hospital must be clear. Such a system can be a valuable aid in hospital efficiency, but only through careful planning for maximum use can its cost be justified. By its nature, the pneumatic tube system generates noise. Positive steps must be taken—by insulating the tubes and padding the stations—to reduce the effects of this noise.

COMMUNICATIONS

A complete discussion of the communications requirements of hospitals was published in the March, 1962 issue of ARCHITECTURAL RECORD, pages 189 through 192.

References used in the preparation of this study include the following: (1) Thompson, John D. and Pelletier, Robert J. *Yale Studies of Hospital Function and Design.* (U.S. Public Health Service Grant W-53.) Yale University Department of Public Health, New Haven, Connecticut, December 1959; (2) Gohr, Frank, R.S., M.P.H. Spotlighting hospital sanitation: Handwashing. *Hospital Management,* Vol. 91, No. 3 (March 1961), P.38; (3) U.S. Department of Health, Education, and Welfare, Public Health Service. *Lighting for Hospital Patient Rooms.* Division of Hospital and Medical Facilities, Architectural and Engineering Branch, Washington 25, D. C.; (4) How to Keep Hospitals Quiet: Summary of a special study on major causes of hospital noise. *The Modern Hospital,* Vol. 96, No. 4 (April 1961). Reprinted by U.S. Public Health Service, Division of Hospital and Medical Facilities, Washington 25, D. C.; (5) Brown, J. W. Hygiene and education within the hospital to prevent staphylococcal infections. *Journal of the American Medical Association,* March 8, 1958, pp. 1185-1191; (6) Gohr, Frank, R.S., M.P.H. Spotlighting hospital sanitation. *Hospital Management,* 91:37-41, (March 1961); (7) Walter, C.W. Aseptic technique in the postdoctorate program. *Hospital Topics,* April 1956

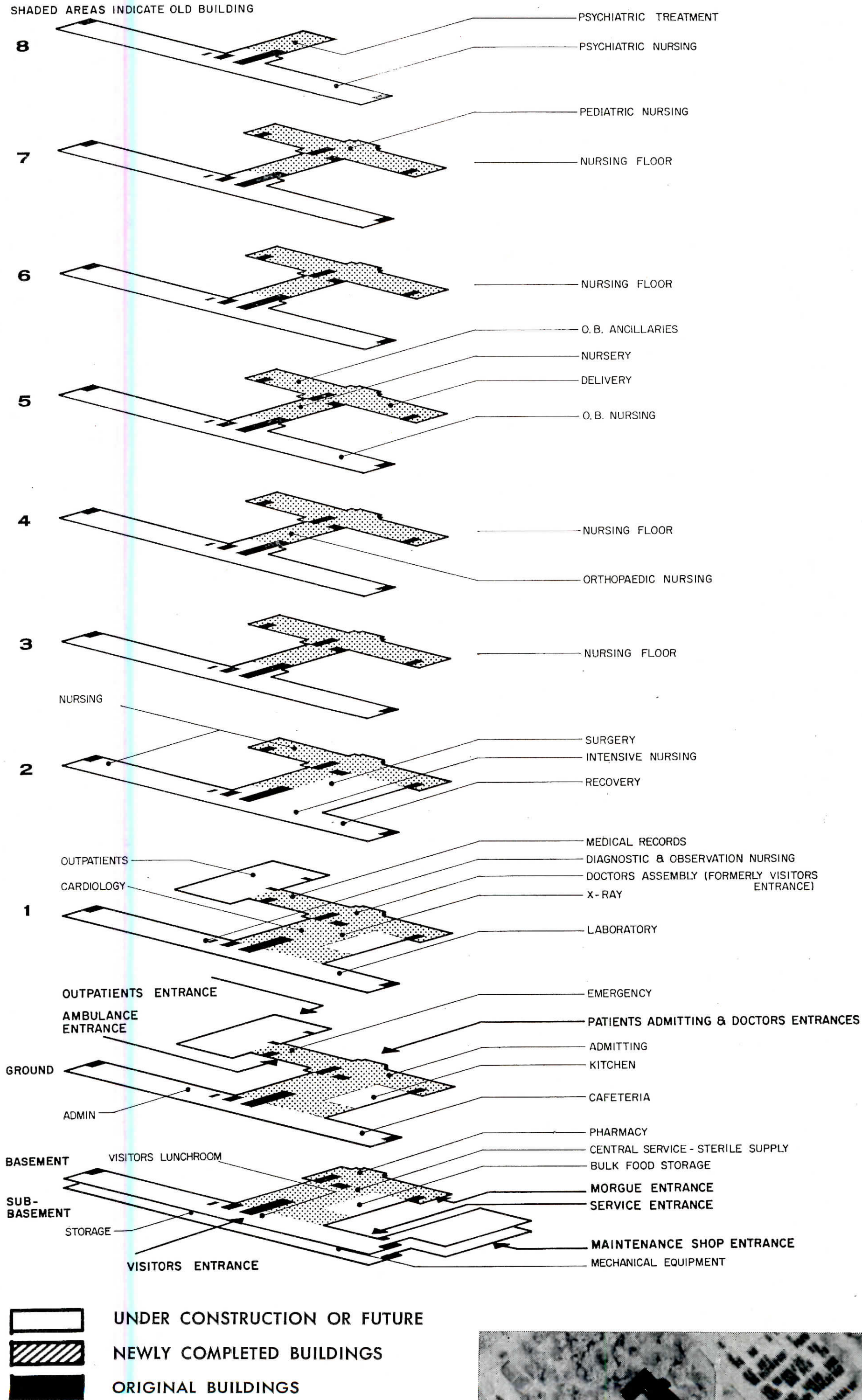
COMPLETE MEDICAL CENTER REALIZED THROUGH MASTER PLANNING

Charlotte Memorial Hospital
Charlotte, North Carolina
ARCHITECTS: *A. G. Odell Jr. & Associates*
CONTRACTOR: *Little Construction Company*

How to modernize existing hospital facilities? How to provide for current over-all hospital needs? How to project and plan for future needs and growth? These problems—and they seem to exist all over the country—have been met square on by the architects of the Charlotte Memorial Hospital. What has been accomplished here, and what has been learned, should be of benefit to the many communities faced with similar problems and to the architects called on to solve them.

Faced with an existing 350-bed hospital, built over twenty years ago, the architects of the present project found it adequate in many ways, but antiquated in others. Around the main building, other structures had been placed in a somewhat haphazard and inefficient manner. Circulation patterns between buildings had become snarled and tangled. Some of the buildings were temporary and the reasons for their existence had long ceased to exist.

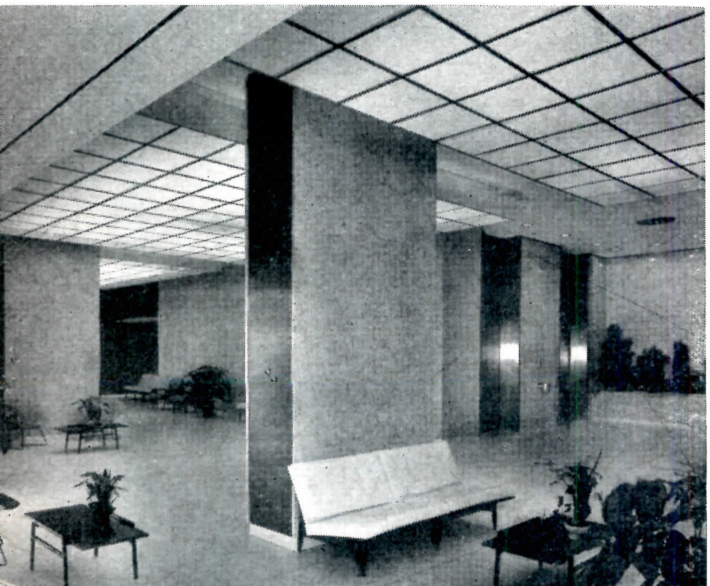
The present architects studied the situation, arriving at a program for a total of 800 beds, together with a master plan for all elements of a complete medical center and teaching hospital. Additional needs will be met with satellite hospitals around the perimeter of Charlotte.



The isometric schematic shown above indicates the old main hospital building and the new additions. The major functions of the building are shown in a manner indicating their prime relationships to each other, as these now exist. The older portions of the hospital have been completely renovated and related to present hospital functions.

The hospital facility now includes the main building, with its connecting laundry building and two-story, out-patient building, and remotely located steam plant. In front of the main building is an existing spastic and rehabilitation center; behind and to one side is the existing home for unwed mothers. A large new nurses' quarters building has been built recently; this building connects with an older nurses' quarters. Future work includes a nurses' educational building, a student union, and apartments.

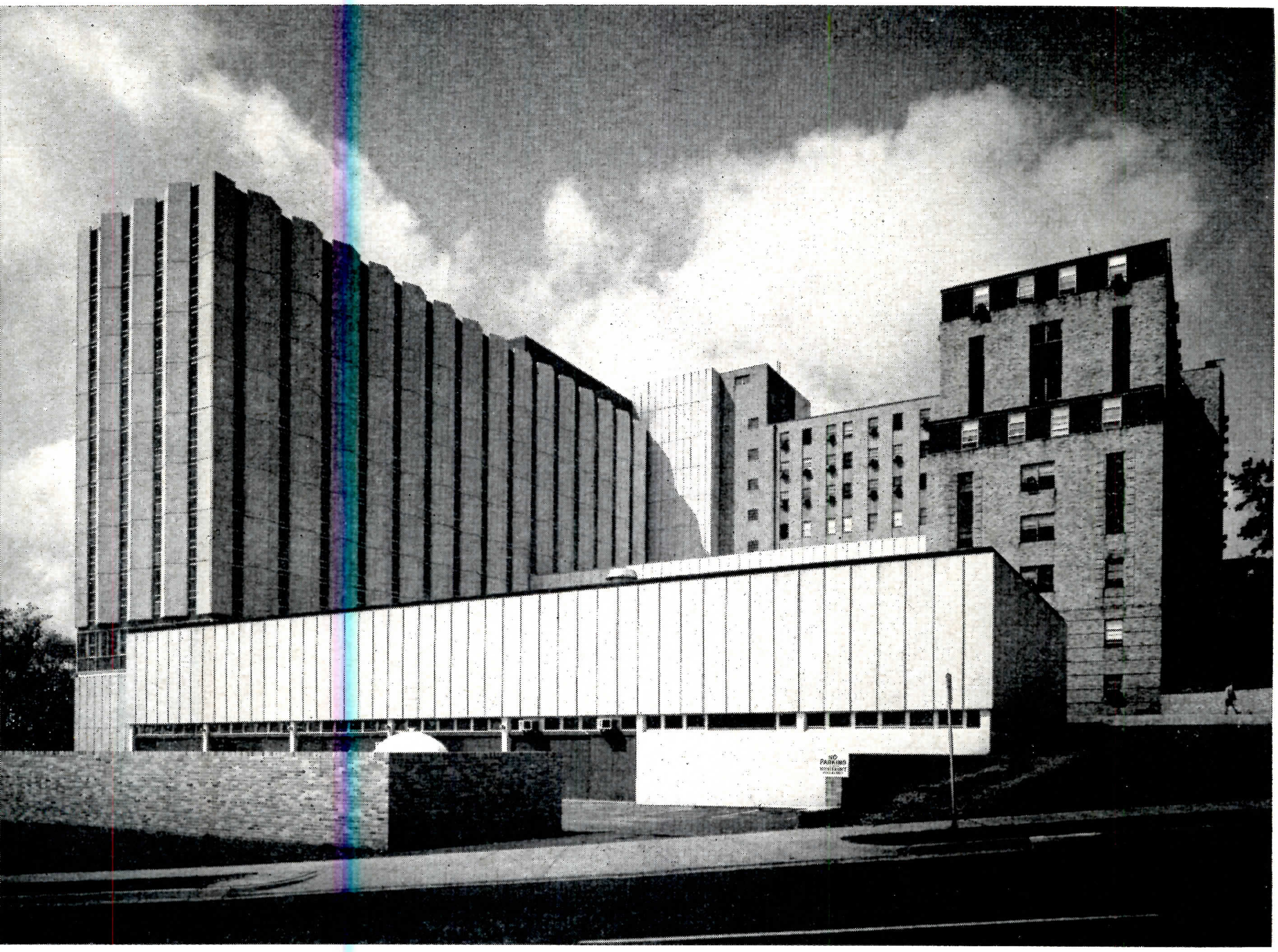
New patient wing and main entrance



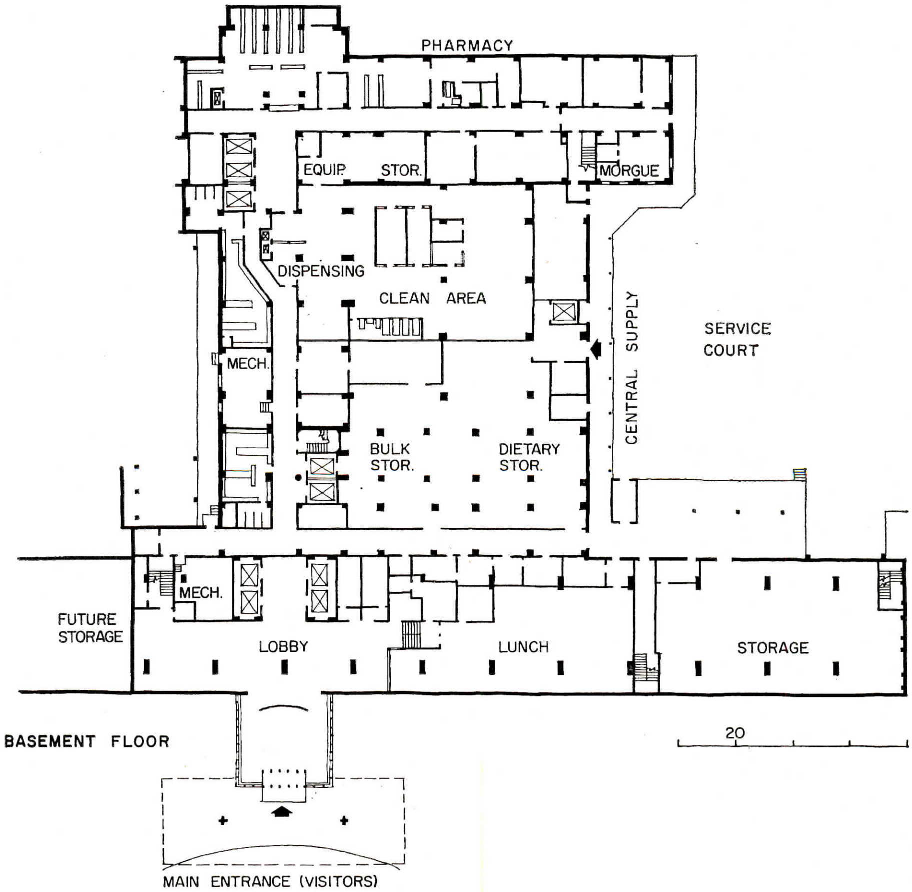
Main waiting room

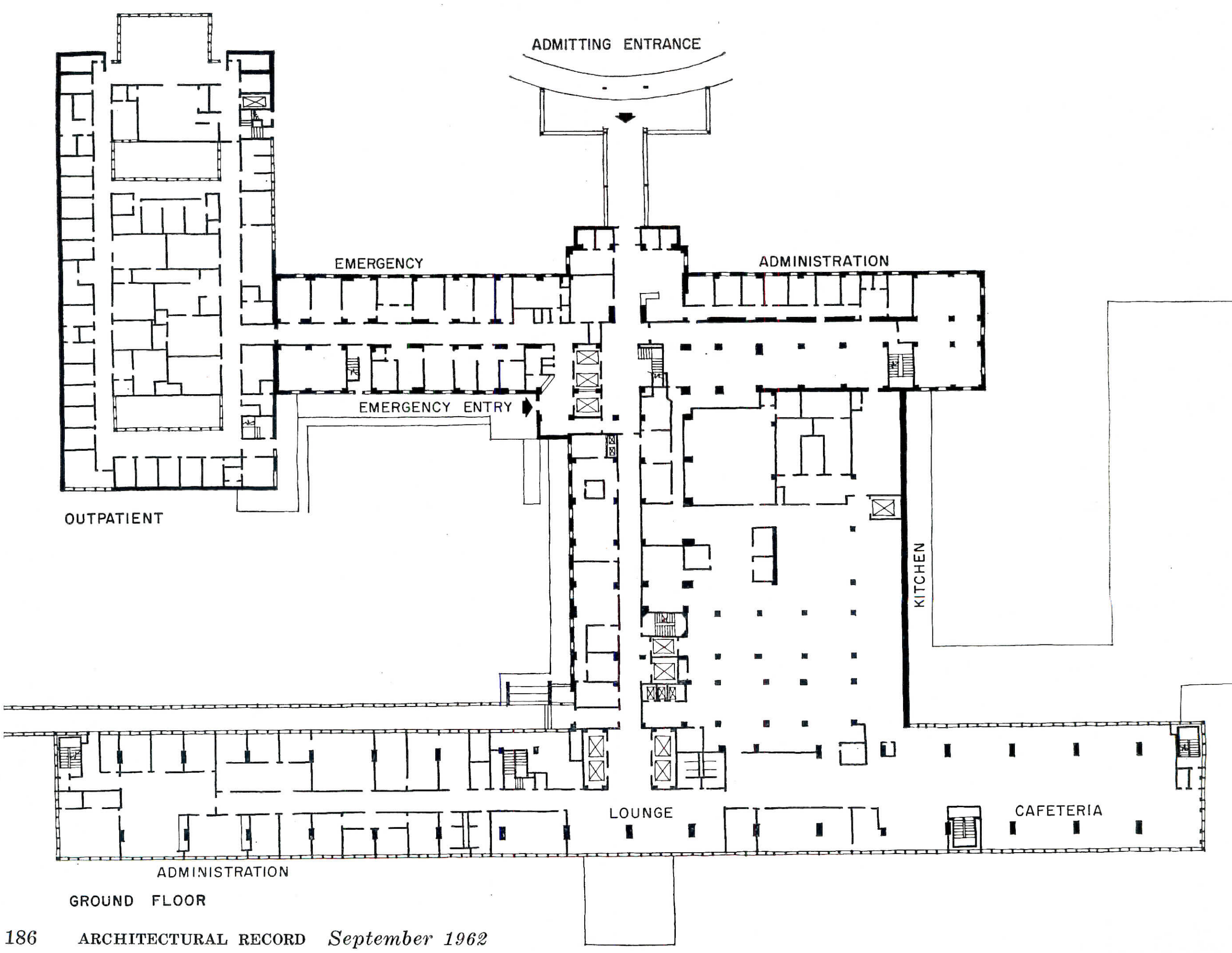
In the master plan for this hospital, the architects provided for changing the old main entrance to the opposite side of the grounds. In this way, the hospital was reoriented toward a more permanent and major street than that faced by the older building. Also, this made possible better traffic and circulation plans on the hospital grounds and an opportunity to separate hospital circulation into four types. The main entrance has been placed on the basement level of the new hospital wing, where visitors and others can enter directly into the waiting room which is shown in the illustration on the left. The old main entrance was closed and a new admission and medical staff entrance placed on the ground floor of the old hospital area; a new canopy was provided to protect this entrance. The emergency entrance was placed at one side of the building, the service entrance at the other.

As may be seen in the illustrations, the exterior of the new portion of the hospital is finished with precast concrete panel with exposed white quartz and white cement, alternating with aluminum curtain wall units. The view, across-page, top, shows the old hospital section at the right, the new at the left; in the foreground is the new laundry building.



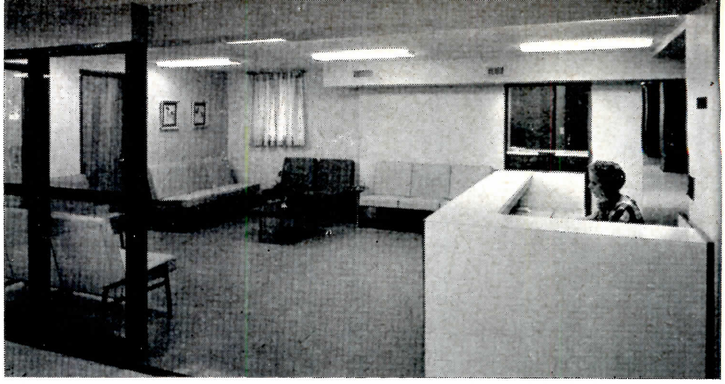
w and old hospital sections, laundry in foreground

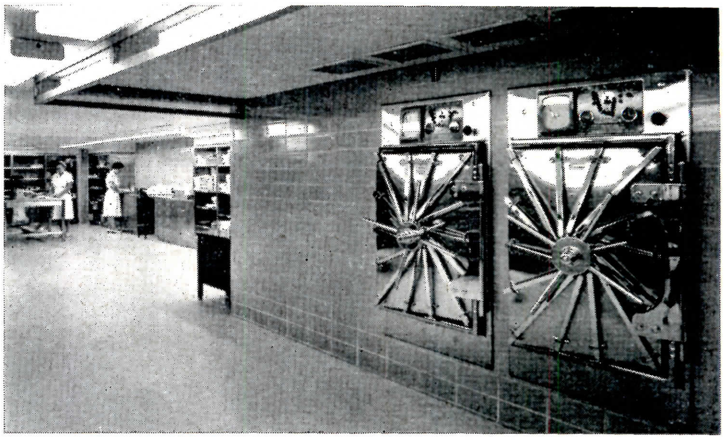


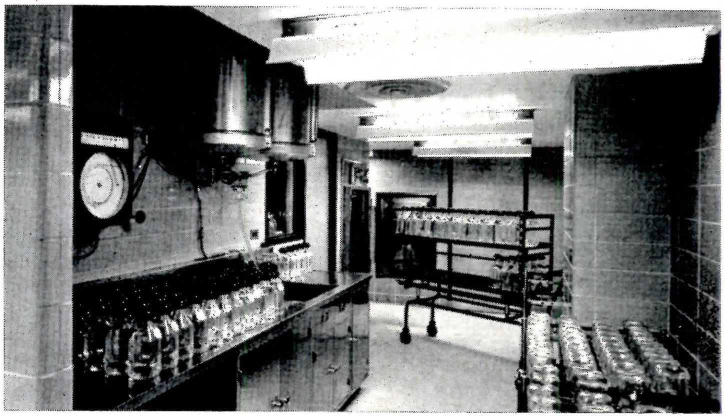

ADMITTING ENTRANCE
EMERGENCY
ADMINISTRATION
EMERGENCY ENTRY
OUTPATIENT
KITCHEN
LOUNGE
CAFETERIA
ADMINISTRATION
GROUND FLOOR

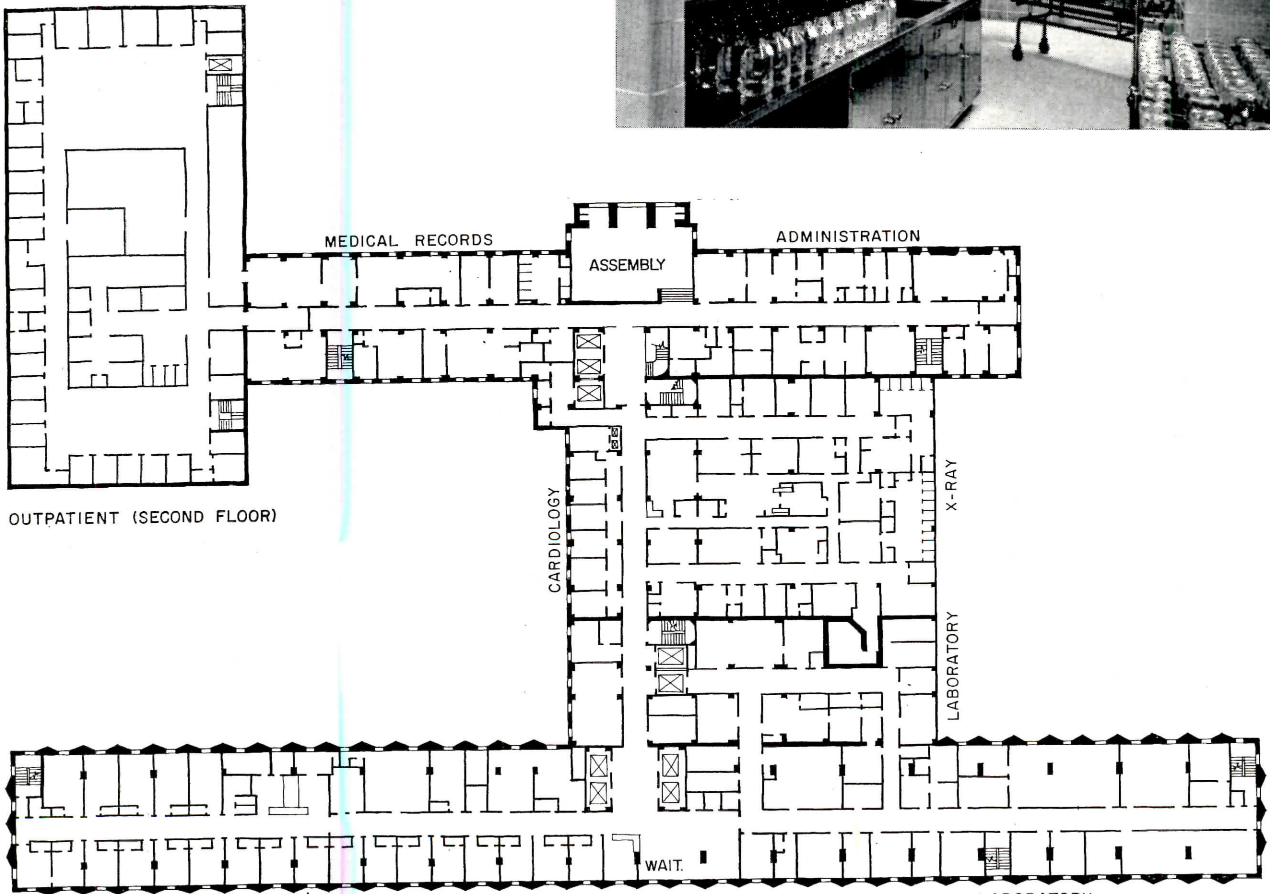
e illustration, across-page on the left, shows the ently completed out-patient building. At the pres- time, a second story is being added to this unit, nging its capacity up to 50,000 patient visits per r. As may be seen in the plans, this wing is direct- connected into the hospital proper on both levels. luded in the out-patient building are complete ic facilities of all types. In addition, certain facili- in this building, such as the X-ray department l operating rooms were designed so as to supple- nt the facilities of the hospital emergency areas. the event of a catastrophe, the entire building can quickly converted into a supplemental emergency ility.

As may be seen in the plans, the ground floor of hospital is mainly devoted to administrative func- ns and the cafeteria. One wing of the old building been remodeled into an emergency department. e patient admitting entrance, shown at top, right, l the staff entrance are on this level. The old main rance on the first floor has been closed, and the a it occupied converted into a staff assembly room. ner facilities on this floor include administration l records, laboratories and one of the largest and st complete radiology departments in the country. the right are illustrations showing portions of the pply area, center, and pharmacy, bottom



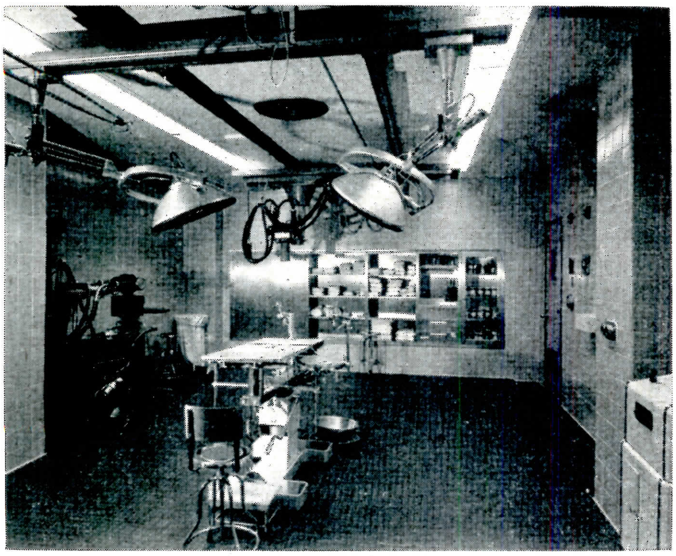


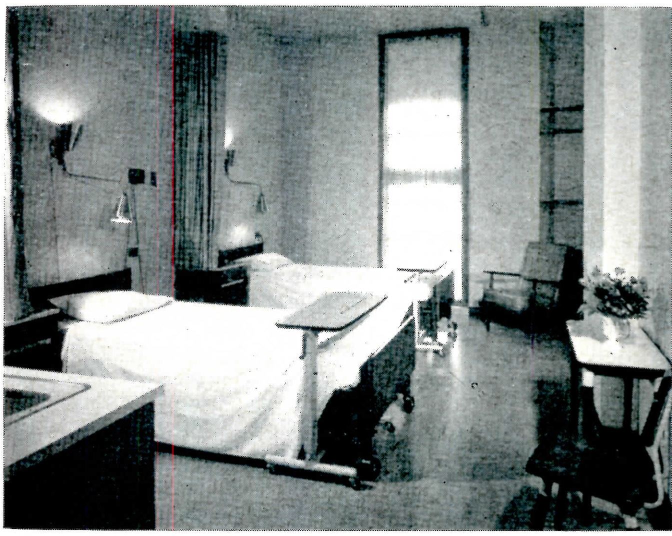


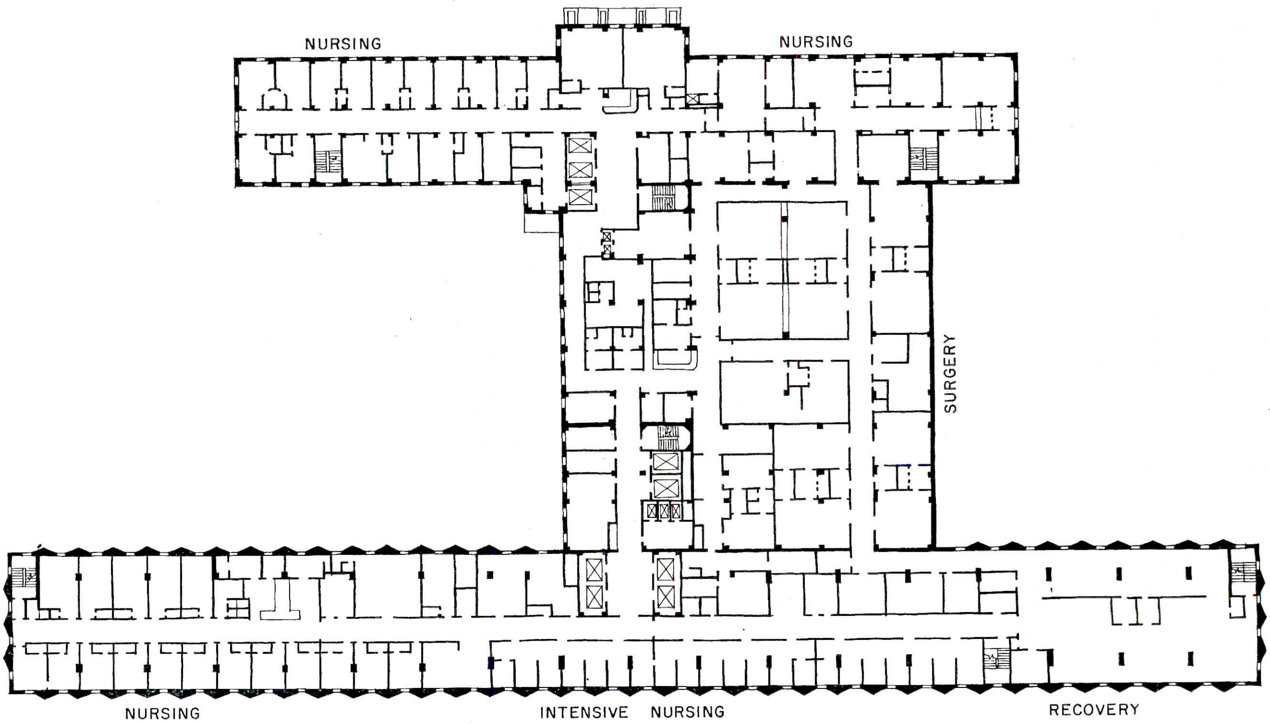


OUTPATIENT (SECOND FLOOR)

FIRST FLOOR

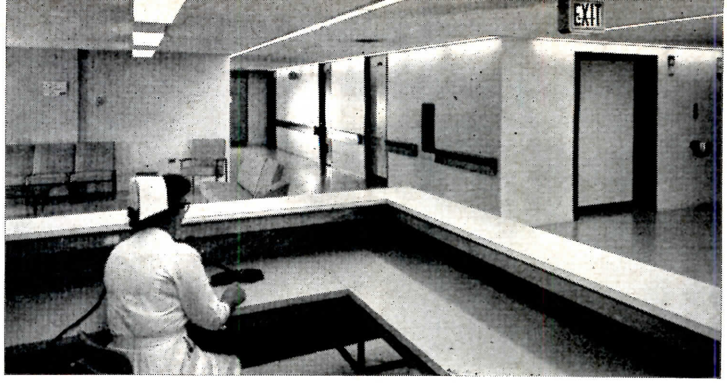


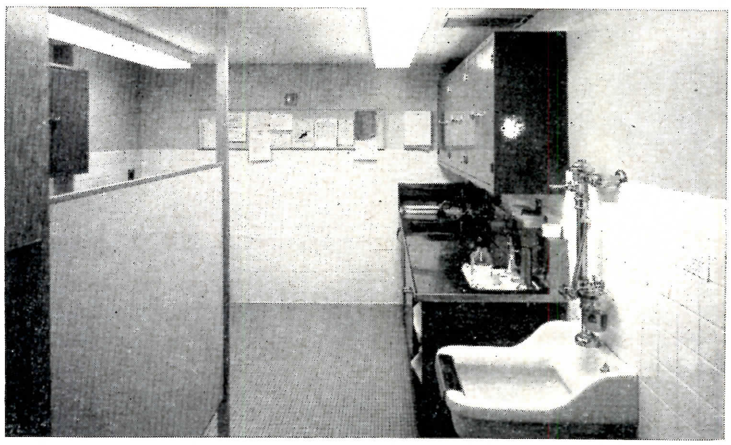


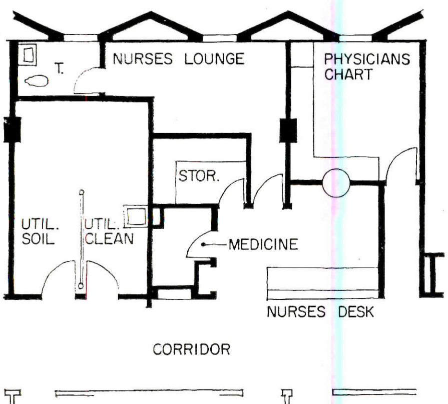

NURSING
NURSING
SURGERY
NURSING
INTENSIVE NURSING
RECOVERY
SECOND FLOOR

ross-page at the top, are illustrations of a typical
erating room and the recovery area. Below these
e typical single- and double-bed patient rooms. On
e right are shown: at the top, an information desk,
e of which is located on each patient floor; middle
d center, a nurses' station and the utility room
ated adjacent to it. This general area is shown be-
v in the enlarged portion of the plan. As may be
en, the layout of this area was carefully studied,
sulting in good relationships between elements and
such features as the combined soiled and clean
lity area divided only by a low partition.

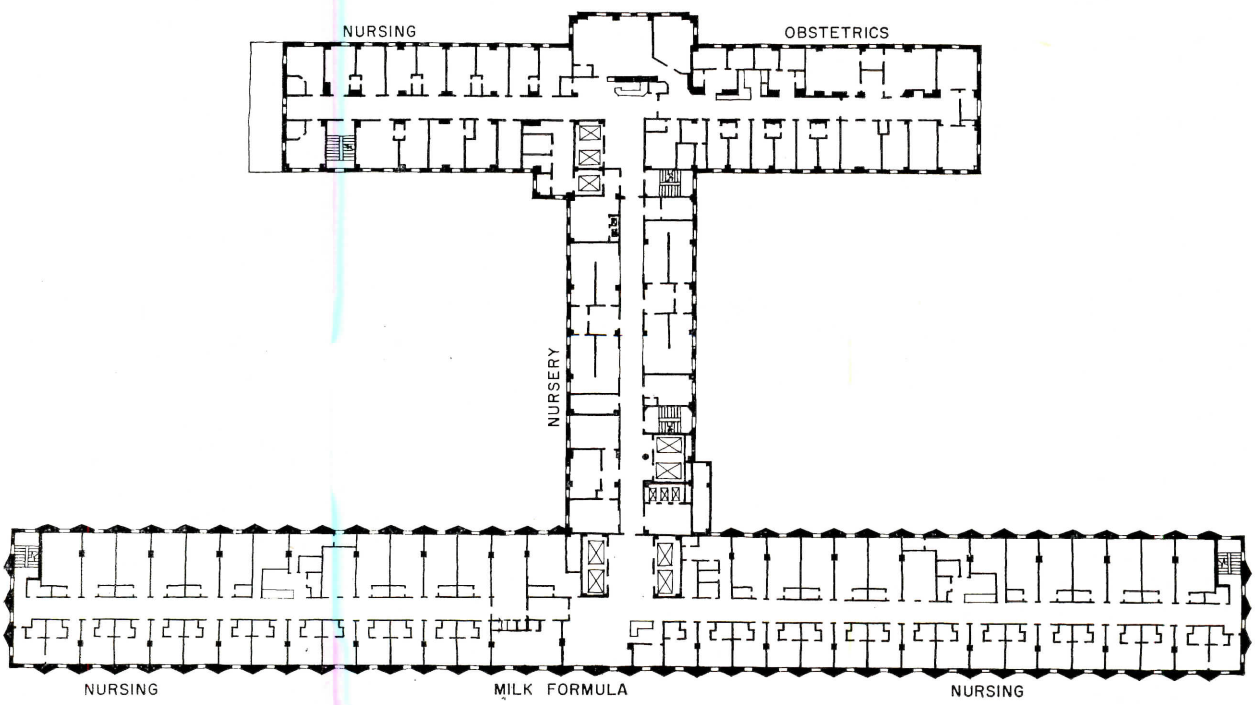
As shown in the plan, surgeries, recovery area, and
rgical nursing units—including three 7-bed inten-
e care units—are located on the second floor. The
rd, fourth and sixth floors contain general nursing
its; the fifth floor is devoted to obstetrics; the
hth to psychiatric care



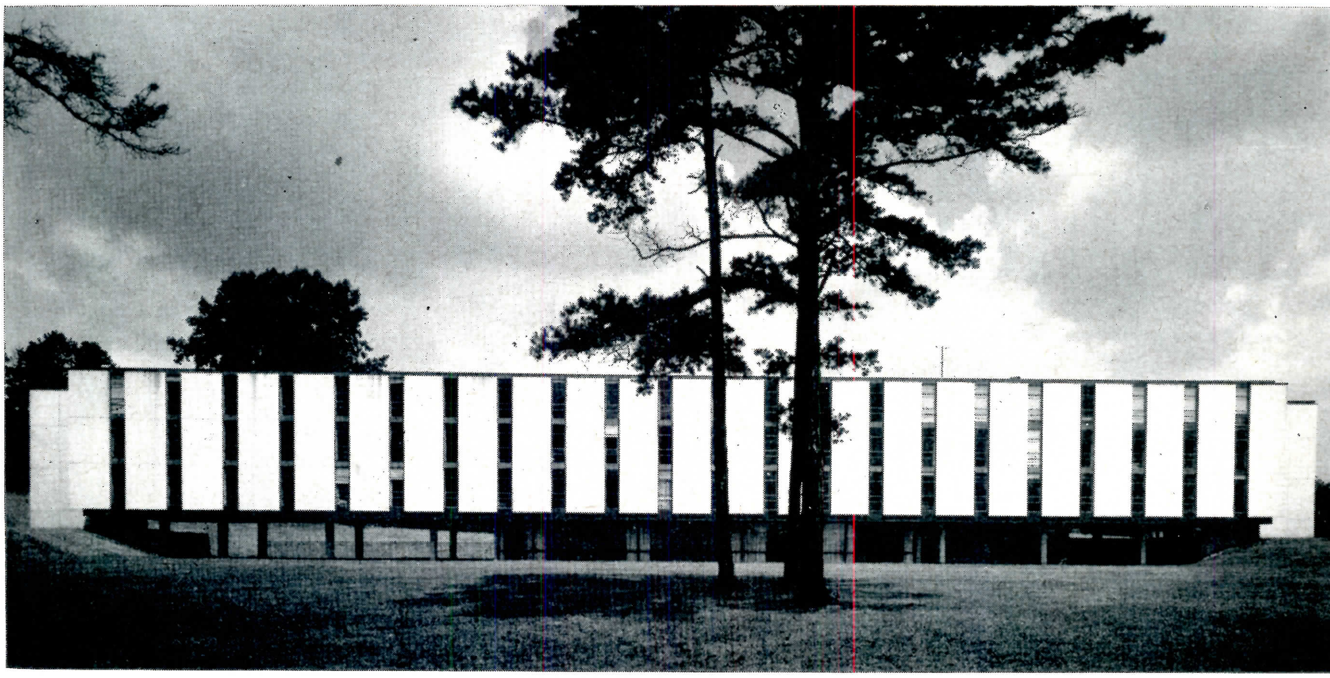


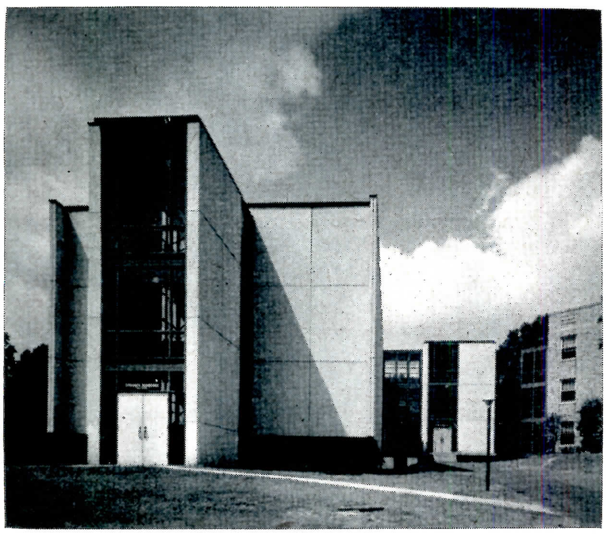


TYPICAL NURSES STATION



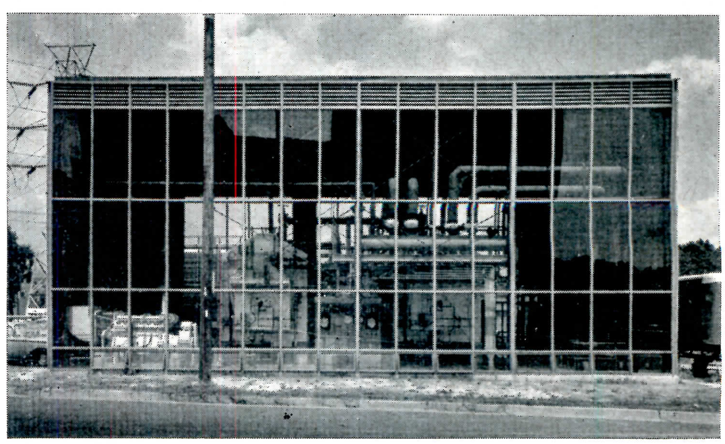
FIFTH FLOOR

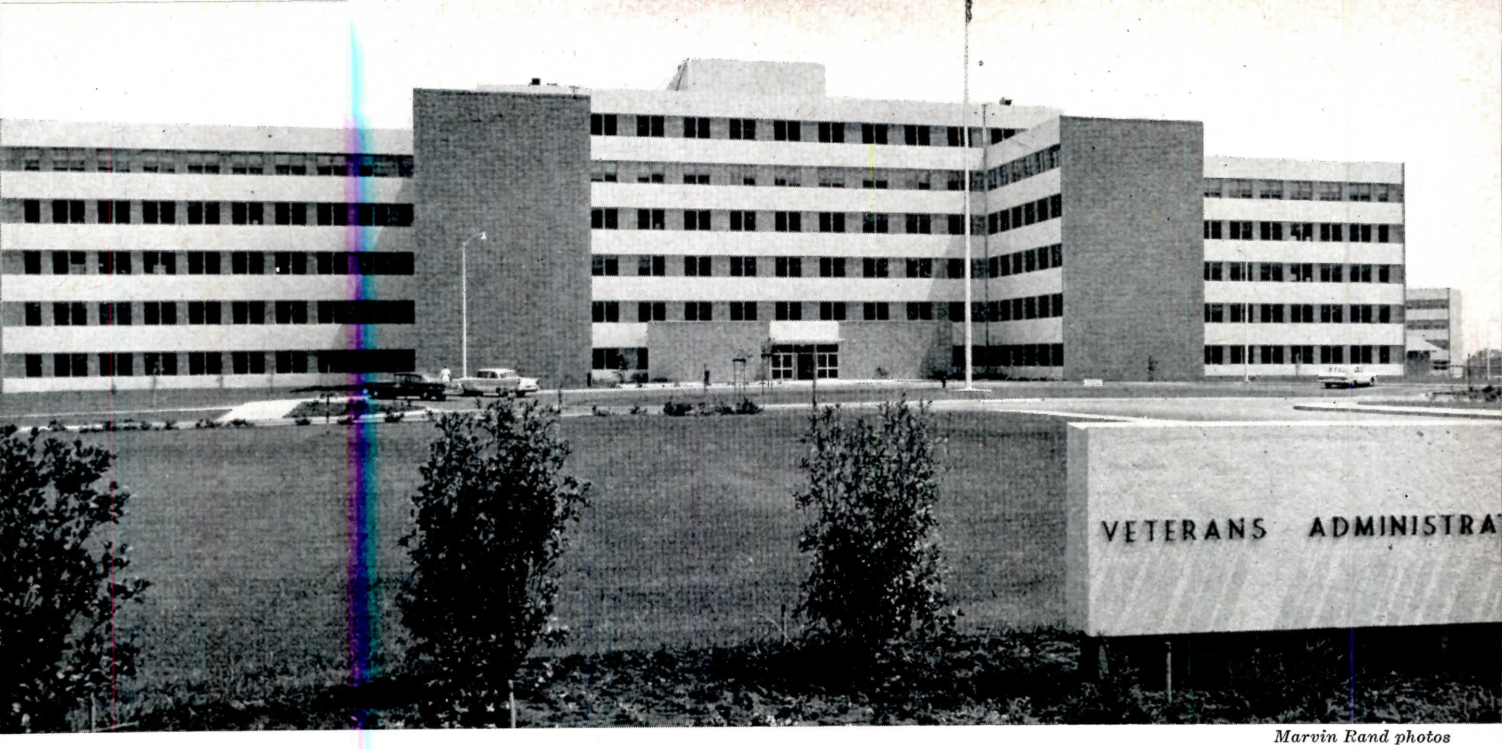




The illustration at the top of the page shows the new student nurses' residence and those below it show the end of this building and its connecting link with the old residence and a view of a typical student nurses' lounge. The building houses student nurses, two to a room, on three floors. There is a lounge, similar to that shown, on each floor. Across from the lounges are shower and toilet rooms. Lavatories are included in each bedroom. The ground floor has been left open, but will eventually be used for a student library. On the right is the new steam plant.

Structure of the new hospital section is concrete frame with flat plate floors, only 10 in. thick in order to allow space for air conditioning ducts and yet allow floor elevations to be the same in both old and new areas. Exteriors are precast concrete curtain wall panels with exposed quartz aggregate and aluminum windows glazed with sheet glass. Other new buildings are of similar construction, except the steam plant which is steel frame and glass





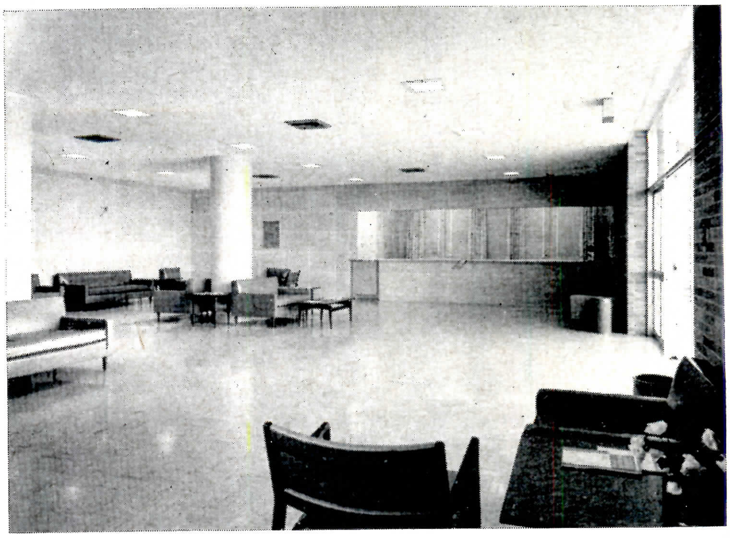
Marvin Rand photos

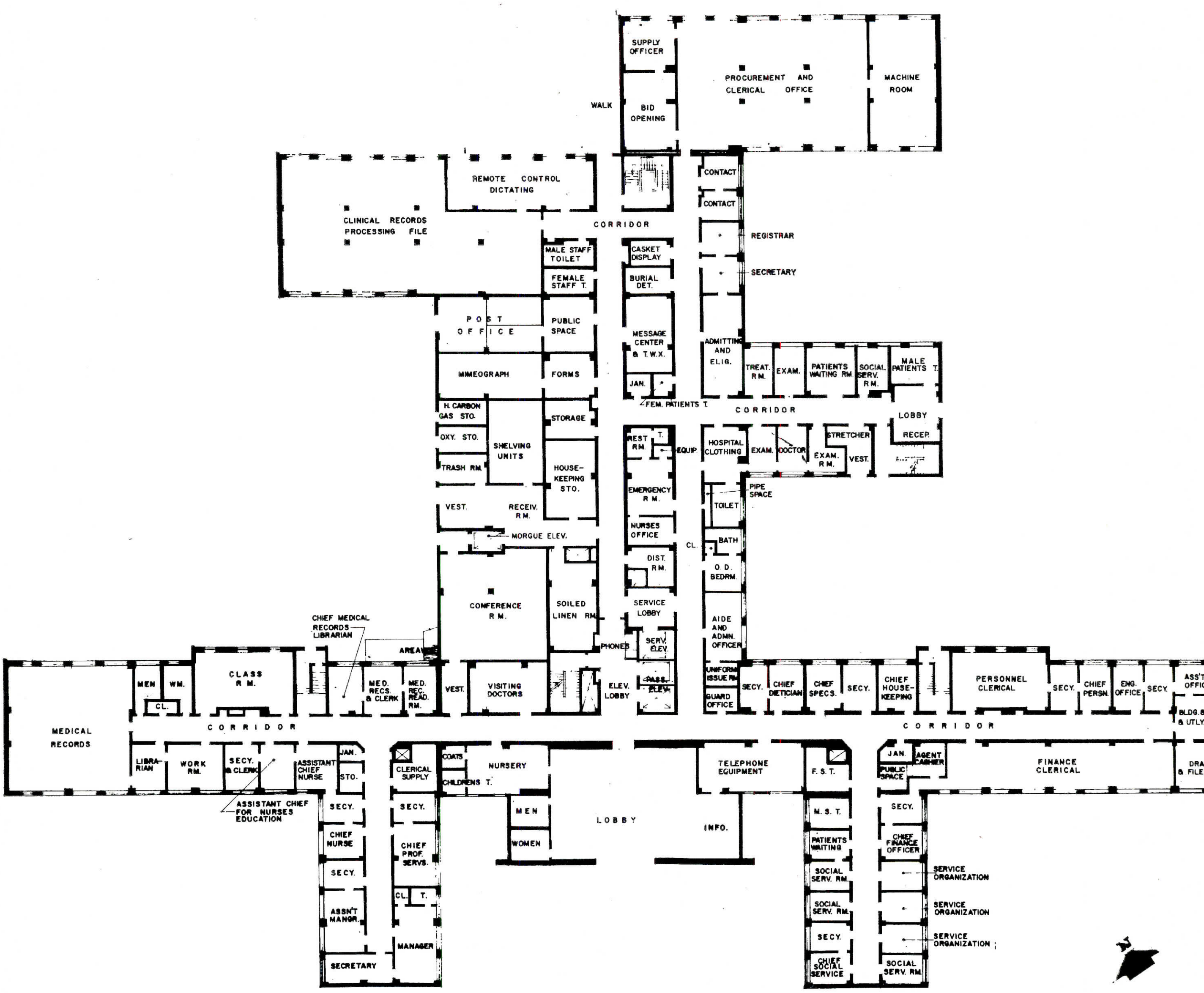
NEURO-PSYCHIATRIC HOSPITAL PLANNED LIKE CAMPUS OF A COLLEGE

The great size of this neuro-psychiatric hospital (1,000 beds), and its complexity and completeness posed major problems in its design. The solution derived by its architects is a 15-building, campus-planned hospital on an 85-acre site. The buildings are varied in height, massing, and placement on the site. Walking distances between buildings are at the minimum consistent with elimination of congestion. The whole complex is tied together by careful placement of units in the master plan and by the use, on all buildings, of similar exterior treatment. This consists of alternating strips of light tan exposed architectural concrete and steel windows with Norman brick between. The same brick is used on the ends of all buildings and on the ends of building wings.

The completed building complex operates as a unified and efficient neuro-psychiatric hospital, yet at the same time one that is economical in first and operating costs. And too, the over-all atmosphere is more nearly that of a college campus rather than of a cold institution.

Veterans Administration Hospital
Palo Alto, California
ARCHITECTS & ENGINEERS: *Welton Becket and Assoc.*
CONTRACTOR: *Robert E. McKee*

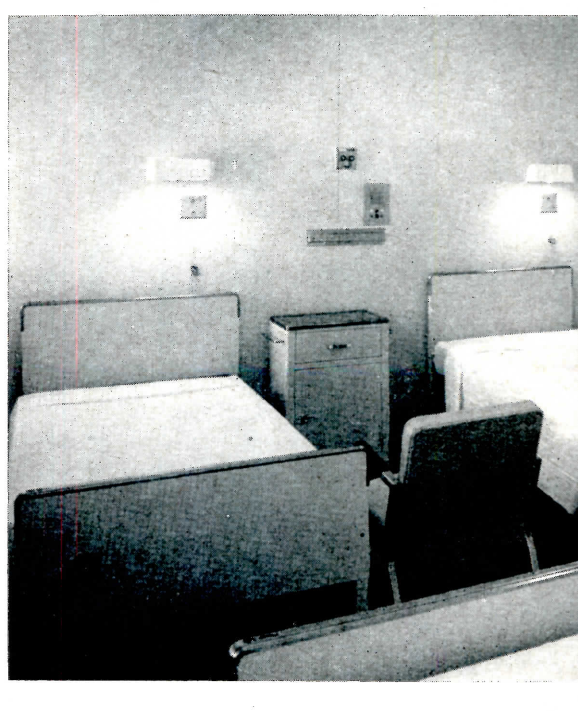


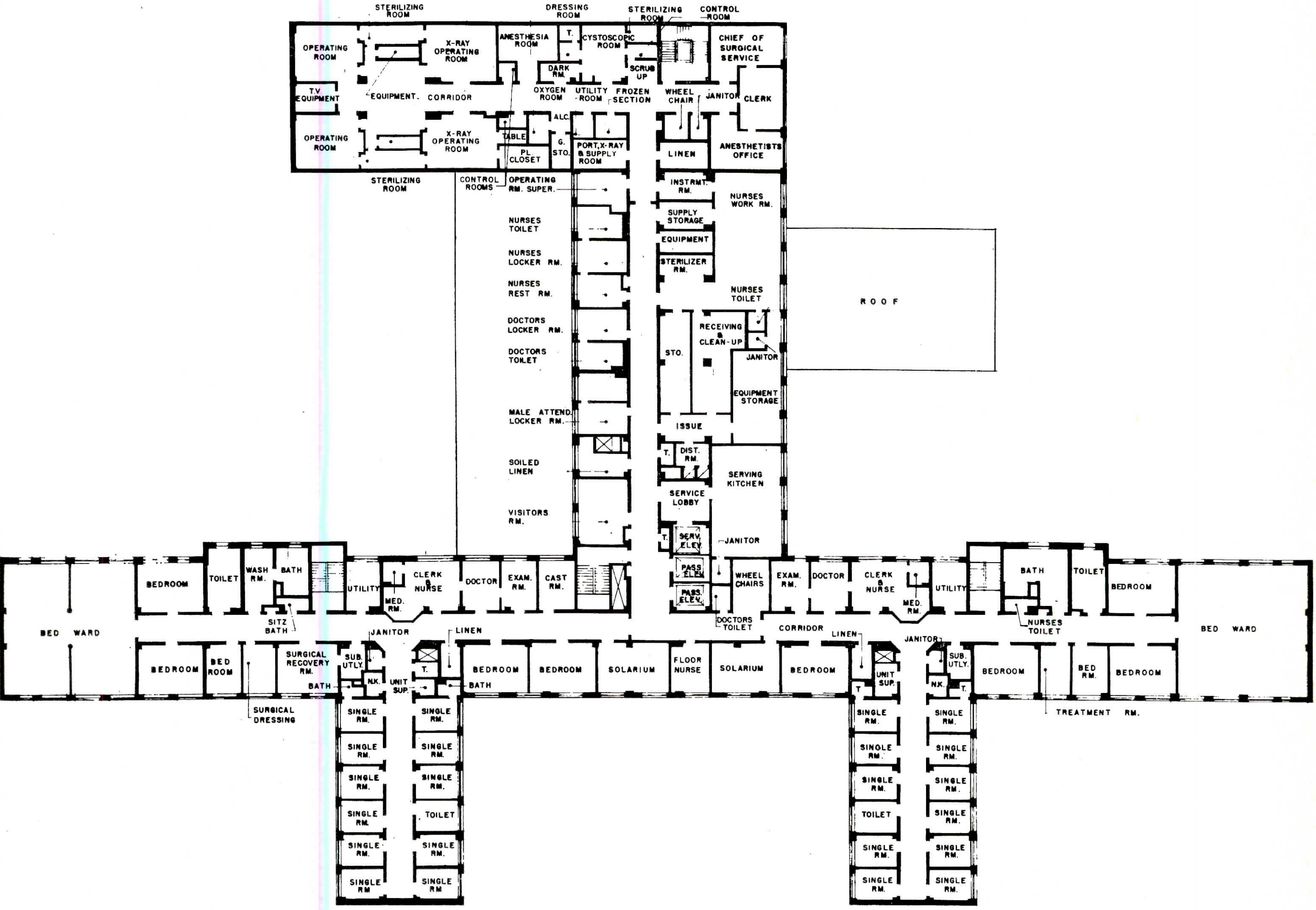


MAIN FLOOR

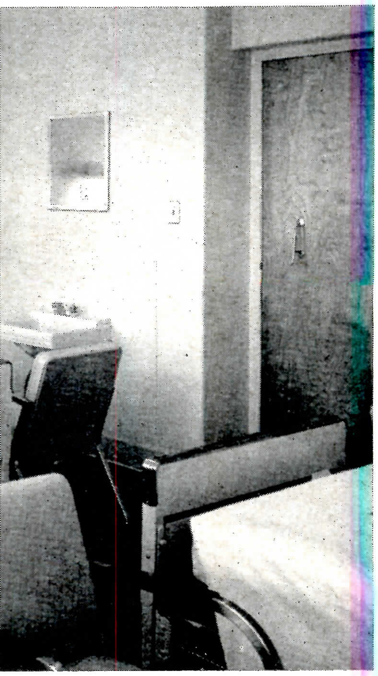
The largest building in the VA complex is the General Building shown on these pages. In this building are located the administration offices for the entire complex; a quite complete medical research laboratory occupies the second floor along with the dental and radiology suites. In the basement are the animal research suite, offices, and storage. The third floor houses the surgical areas. Nursing units are located on this floor and the fourth and fifth. Patient rooms vary in size from single-bed rooms, to two-bed, four-bed, and 16-bed rooms.

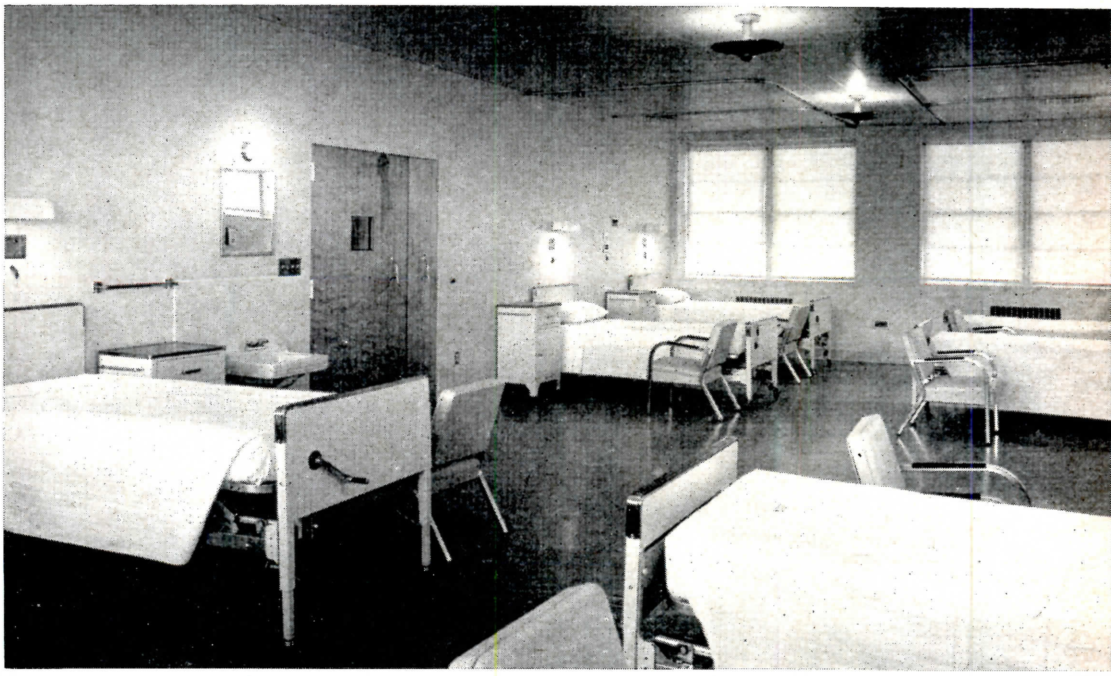
Other buildings include a medical rehabilitation building for occupational therapy, an infirm building for 200 aged veterans, a disturbed building for 108 patients under restraint, a therapeutic exercise clinic with gymnasium and swimming pool, and a special services building which has a six-lane bowling alley and other facilities for recreation. Also included are a dining hall, with kitchen for 1,000 patients and 1,150 employes, a chapel, and an admission and treatment building with 164 beds for temporary patients, a women's building for 114 patients, a 141-bed neurological building, and utilities buildings

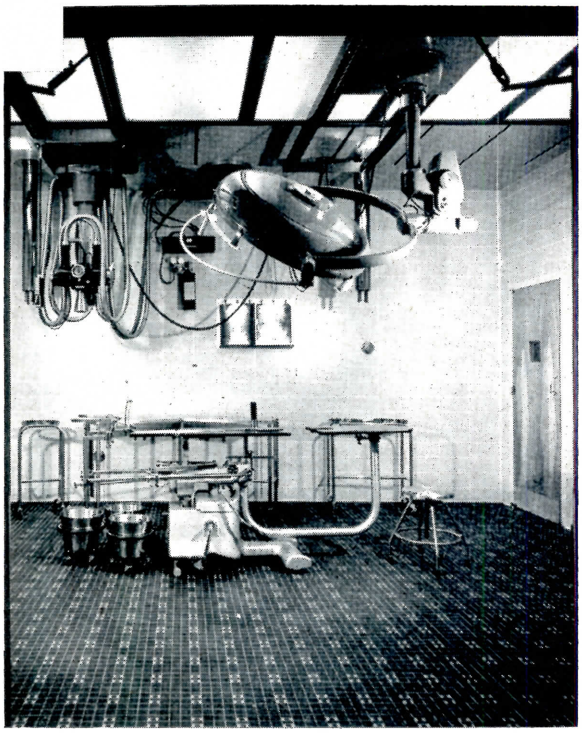



STERILIZING ROOM
DRESSING ROOM
STERILIZING ROOM
CONTROL ROOM
OPERATING ROOM
X-RAY OPERATING ROOM
ANESTHESIA ROOM
T.
CYSTOSCOPIC ROOM
CHIEF OF SURGICAL SERVICE
DARK RM.
SCRUB UP
TV EQUIPMENT
EQUIPMENT. CORRIDOR
OXYGEN ROOM
UTILITY ROOM
FROZEN SECTION
WHEEL CHAIR
JANITOR
CLERK
OPERATING ROOM
X-RAY OPERATING ROOM
ALC.
TABLE
PL CLOSET
G. STO.
PORT. X-RAY & SUPPLY ROOM
LINEN
ANESTHETISTS OFFICE
STERILIZING ROOM
CONTROL ROOMS
OPERATING RM. SUPER.
INSTRMT. RM.
NURSES WORK RM.
NURSES TOILET
SUPPLY STORAGE
NURSES LOCKER RM.
EQUIPMENT
STERILIZER RM.
NURSES REST RM.
NURSES TOILET
ROOF
RECEIVING & CLEAN-UP
DOCTORS LOCKER RM.
STO.
DOCTORS TOILET
JANITOR
EQUIPMENT STORAGE
MALE ATTEND. LOCKER RM.
ISSUE
T.
DIST. RM.
SOILED LINEN
SERVING KITCHEN
SERVICE LOBBY
VISITORS RM.
T.
SERV. ELEV.
JANITOR
PASS ELEV.
PASS ELEV.
BEDROOM
TOILET
WASH RM.
BATH
UTILITY
CLERK & NURSE
DOCTOR
EXAM. RM.
CAST RM.
WHEEL CHAIRS
EXAM. RM.
DOCTOR
CLERK & NURSE
UTILITY
BATH
TOILET
BEDROOM
MED. RM.
SITZ BATH
MED. RM.
DOCTORS TOILET
NURSES TOILET
BED WARD
JANITOR
LINEN
CORRIDOR
LINEN
JANITOR
BED WARD
BEDROOM
BED ROOM
SURGICAL RECOVERY RM.
SUB. UTLY.
T.
BEDROOM
BEDROOM
SOLARIUM
FLOOR NURSE
SOLARIUM
BEDROOM
T
UNIT SUP.
SUB. UTLY.
T.
BEDROOM
BED RM.
BEDROOM
BATH
N.K.
UNIT SUP.
BATH
N.K.
SURGICAL DRESSING
TREATMENT RM.
SINGLE RM.
TOILET

THIRD FLOOR





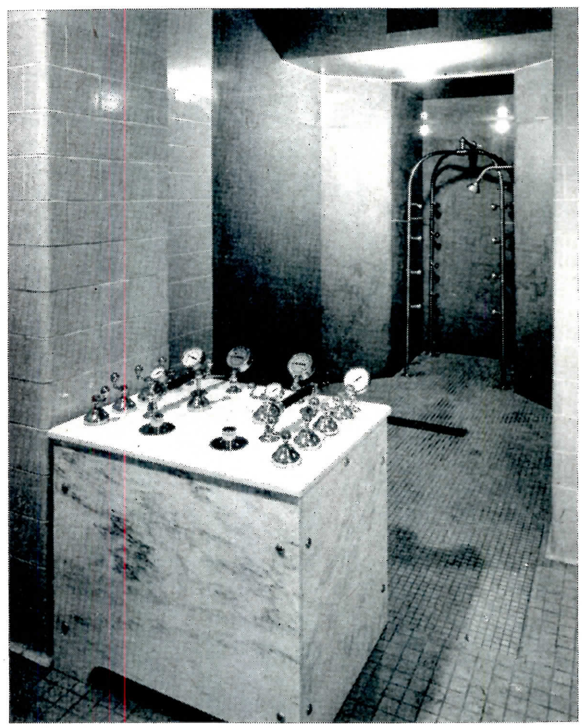


Main Building—typical operating room

Main Building—dental treatment room

The construction of the buildings in the VA complex is reinforced concrete frame with brick and concrete exterior walls. Floors are generally asphalt tile, except in operating and X-ray rooms where conductive ceramic tile is used, and kitchens which have quarry tile. Ceilings are acoustical metal pan. Windows are hollow steel double-hung, except in lobbies where fixed plate glass is framed with aluminum. Lighting is incandescent. Heating is generally two-pipe vacuum, steam system powered by three boilers. Central air conditioning is supplied only to operating and recovery rooms, animal suite, allergy wards, and a few other specialized areas.

The VA complex is an unusually complete hospital for treatment of the neuro-psychiatric disorders of veterans and virtually all medical or surgical ills of those who are hospitalized here



Admission & Treatment Building—tonic shower

Chapel—seating for 224 persons

Architectural Engineering

Structural Engineering and Architecture

Relationship of engineering to architecture, and, consequently, engineer to architect have been greatly discussed. The burden of the discussion seems to be, "Why don't engineers think like architects?" Some reasons why they don't and their implications have been offered by Frank Newby, partner in Felix J. Samuely & Partners in the June-July issue of the *Architectural Association Journal* (London): "Efficiency as a structural technician combined with facility to create structural form does not imply capacity [in the engineer] to create architecture."

The structural engineer is trained to be a two-dimensional stress man or a confirmation man, according to Newby. He is given little or no time or encouragement to carry out creative design, (or in other words, creating the problem to be solved) and is not introduced to the trials of initial design and integration.

"On the other hand, none too many architects have that control of technical skills necessary for design in the present increasingly industrialized building climate. Architects often like to compare themselves with the old master builders without ever really comparing the control a master builder had over his materials and techniques with that of the present-day architect. The architect's tools are his consultants—the all-important thing the architect has to do is to learn how to use them without allowing them to make their own particular mark."

Engineering Research Needs, 1965-1985

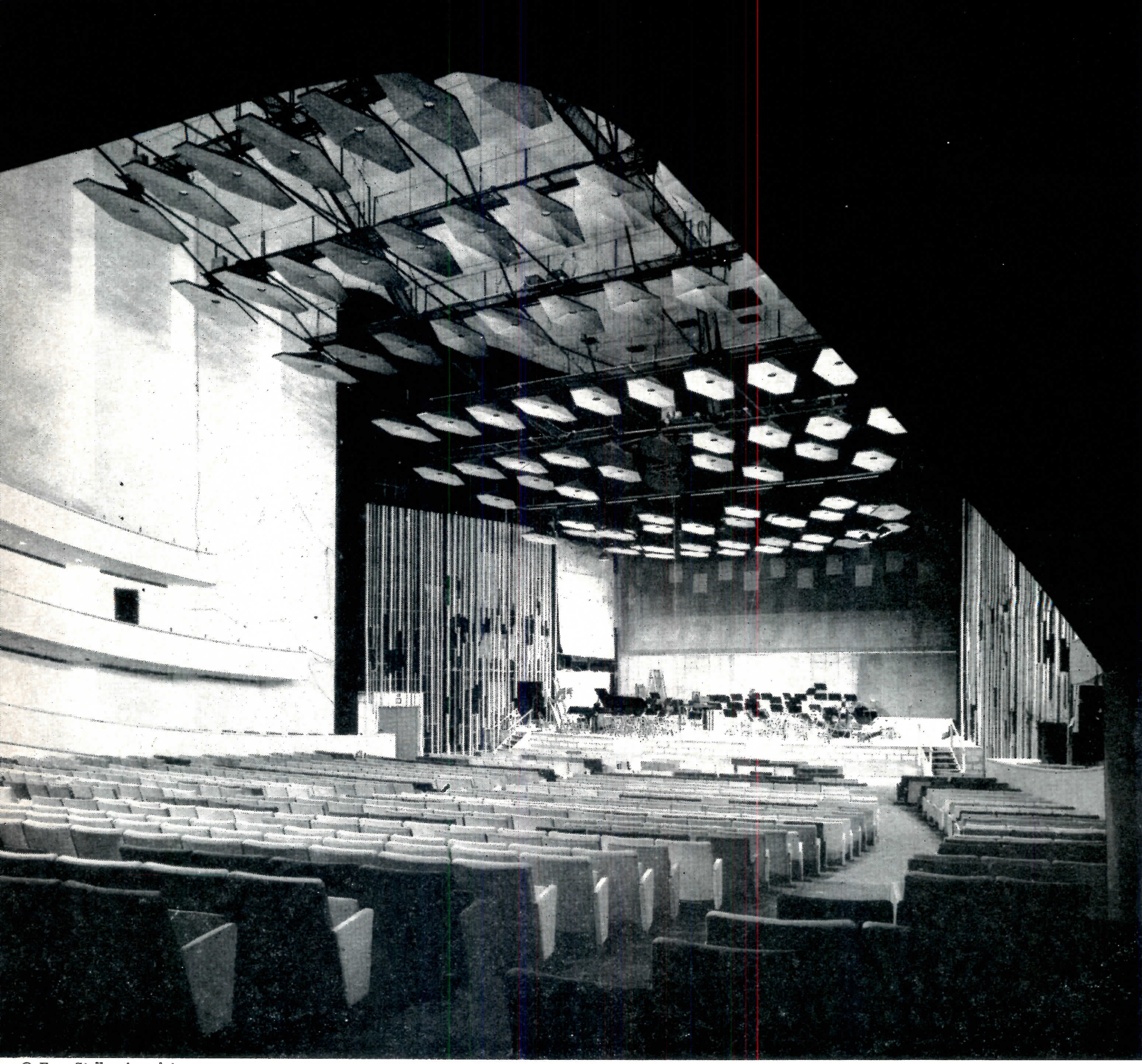
All sorts of new terms and concepts are entering the engineer's lexicon—from bionics to magneto-hydronamics. These are but a few of the terms that pop up in a new report by the Engineers' Joint Council on "The Nation's Engineering Research Needs 1965-1985." The study was prompted by E.J.C.'s concern over: (1) the relatively slow recent growth of the U. S. economy; (2) the apparent rigidity of institutions associated with engineering professional societies, engineering schools, research foundations, and industrial and government organizations which are slow in recognizing and responding to changing needs of society; (3) the apparent imbalance in our national technical effort (concentration on military-atomic-space technologies with neglect of other critical needs); (4) steady decline in U. S. engineering enrollments.

A blue-ribbon committee cited several areas that relate to buildings and to their urban environment: (1) the contribution of atomic energy over the next several decades will be influenced by how much of the economy is electrified. By 1985 there may be serious supply limitations on further expansion of oil and gas using devices; (2) in the area of health services, costs might be cut by operations research, facilities layout, work simplification; (3) while technology can contribute to technical teaching aids, there is a danger of over-emphasizing physical technology for improving educational process; (4) modern digital computers and ancillary devices can vastly reduce the routine actions of handling and applying information for design, maintenance and operation, restoring large elements of personal independence and ingenuity into the specialized intellectual manpower of the nation. An edited version of the "Engineering Research Committee Summary Report" can be obtained from the Engineers Joint Council, 345 E. 47th St., New York 17, N. Y.

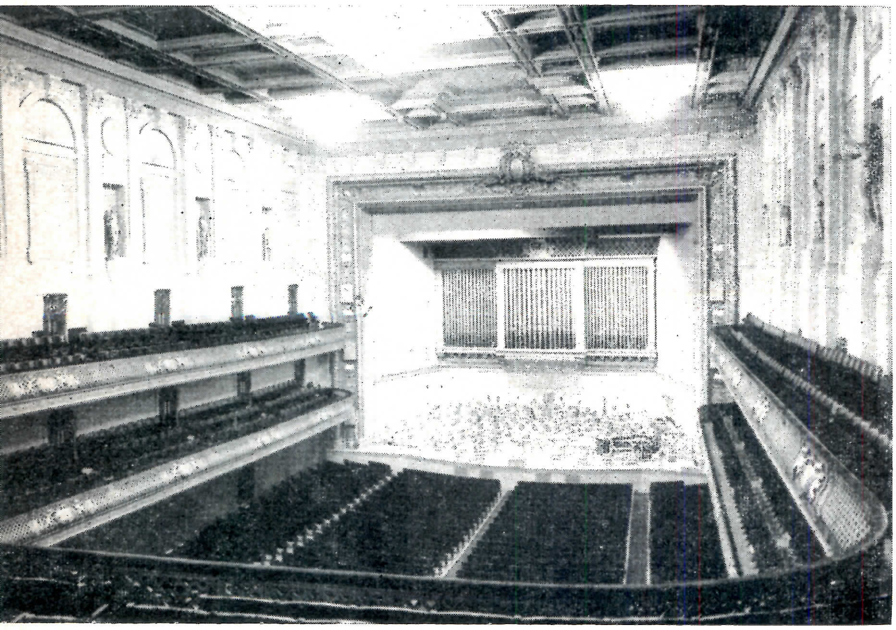
Trees Cause Foundation Failure

Clay soils are known to wreak havoc with foundations when changes in moisture content make these soils swell or shrink. But probably few people would suspect that their favorite shade tree might be an accessory to foundation damage in a clay soil. An article on "Soil Shrinkage Damages Shallow Foundations at Ottawa, Canada," in the July issue of *The Engineering Journal* (Canada) by M. Bozouk, Division of Building Research, National Research Council gives this prescription: (1) lawns and gardens should be watered frequently during summer months; (2) trees should not be planted too close to structures; and (3) foundations should be placed at a depth in the soil where seasonal moisture changes are minimal.

This Month's AE Section



© Ezra Stoller Associates



Symphony Hall in Boston illustrates a style of architecture of the 19th century that is compatible with good acoustics. Important features are small audience area, rectangular shape, shallow balconies, high ceiling and relatively long reverberation time. The New York Philharmonic Society wanted the acoustics of Philharmonic Hall to approximate those of Boston's Symphony Hall as closely as possible

ACOUSTICS OF PHILHARMONIC HALL

ortuitous circumstances mainly were responsible for the good concert halls of years past. But today ost of the physical characteristics of halls that produce happy acoustics can be predicted accurately. hese characteristics greatly affect twelve attributes of acoustics important to music, according to B.B.N. hat they are and how they were provided for in Philharmonic Hall are related here

y Leo L. Beranek, Bolt, Beranek and Newman, Inc.*

nilharmonic Hall is the first hall de- gned exclusively for concerts in ew York City since Carnegie Hall, hich opened in 1891.

The difficulties of achieving good oustical results in the new hall ere not underestimated, since, be- een 1900 and 1959, no concert hall r more than 2,000 persons had hieved the reputation of first rank. e Royal Festival Hall in London, e Fredric Mann Auditorium in l Aviv, the Alberta Jubilee audi- riums in Edmonton and Calgary, rchestra Hall in Chicago, the Ford uditorium in Detroit, the Eastman eater in Rochester, the Usher Hall Edinburgh, the Aula Magna in racas, the Salle Pleyel in Paris— are said by musicians not to pro- le the warm, brilliant, live, clear d intimate acoustics of Boston's mphony Hall, Amsterdam's Con- rtgebouw, Basel's Stadt-Casino, d Vienna's Grosser Musikvereins- al.

The scientific literature offered no ective guides to why these large ncert halls failed to achieve excel- nce. The experience with new halls continental Europe during the peri- of reconstruction following World ar II has not been helpful, because e median occupancy of these con- rt halls and opera houses is about 00 persons, while the median oc- pancy in North and South America, Great Britain and Israel is about 3,000 persons.

In 1955, I had already resolved to journey to some of the world's best-known halls to learn about their architecture, interior finishes and acoustics. This program was accelerated when Philharmonic Hall was proposed. The study was eventually extended to include 60 halls in 20 countries located as far north as Turku and Helsinki, as far south as Buenos Aires, as far east as Moscow and Jerusalem, and as far west as San Francisco. In addition, Russell Johnson and I interviewed in depth about 25 of the world's best-known conductors and about the same number of professional music critics of the United States, Canada, England and Germany to learn their opinions on the acoustics of these halls. Ultimately obtained were detailed architectural drawings, acoustical data, and a subjective rank ordering of 54 halls according to acoustical quality.

ACOUSTICAL ATTRIBUTES

It appears that twelve attributes in the acoustics of a concert hall are important to music and that a rating scale for each attribute can be devised. In relative order of importance these attributes are:

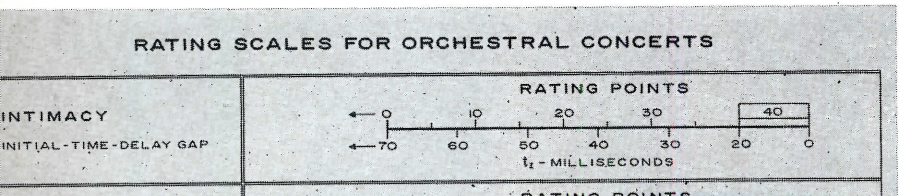
1. *Acoustical intimacy,* which is related to the gap in time between the sound that arrives at a listener's ears directly from the performer and the sound that first arrives after reflecting from a wall or ceiling. The greater this gap, called the "initial-time-delay gap," the less intimate the sound (40 points maximum).
2. *Liveness,* which is related to the reverberation times at mid and high frequencies (15 points maximum).
3. *Warmth,* which is related to the reverberation times at low (bass) frequencies (15 points maximum).
4. *Loudness of the direct sound,* which is related to the distance of the listeners from the performers and the nature of the sound-reflecting surfaces at the front of the hall (10 points maximum).
5. *Loudness of the reverberant sound,* which is related to the cubic volume of the room and the reverberation time (6 points maximum).
6. *Balance and blend,* which are related to the design of the stage enclosure and the sound-reflecting surfaces at the front part of the hall (6 points maximum).
7. *Diffusion,* which is related to the detailed manner in which the sound is reflected about the room (4 points maximum).
8. *Ensemble,* ability of the performers to hear each other (4 points maximum).
9. *Freedom from echo* (5 to 40 points are subtracted from the total for the presence of echo).
10. *Freedom from noise* (5 to 40 points are subtracted from the total for the presence of noise).
11. *Freedom from tonal distortion* (5 to 20 points are subtracted from the total for the presence of tonal distortion).
12. *Hall non-uniformity* (5 to 15 points are subtracted from the total for non-uniformity of the sound in the hall).

Those attributes that contribute positively to the acoustical quality of a concert hall are, therefore: intimacy (40 points), liveness (15 points), warmth (15 points), loudness of the direct sound (10 points), loudness of the reverberant sound (6 points), balance and blend (6 points), diffusion (4 points), and ensemble (4 points).

A surprising result is that the re-

his article consists of excerpts from a forth- ning book by Dr. L. L. Beranek, *Music, Acous- , and Architecture,* John Wiley & Sons, Inc., Park Avenue South, New York 16, New York. lication date is September 21. The staff of Bolt, anek and Newman, Inc. who participated in design of Philharmonic Hall were L. L. Ber- k, principal in charge; F. Russell Johnson, ject manager; Laymon N. Miller, subway, air- ft, and air conditioning noise control; Ronald McKay, building noise isolation; David L. Klep- , organ location and sound systems; and Theo- e J. Schultz and Howard Hershberger, tuning k activities. Hope Bagenal of Leaside, Eng- d, was engaged as advisory acoustical con- ant

Serating photo



Above: New York Philharmonic tries out t new hall during "tuning week." Splayed pan around the stage periphery can be adjusted deflect less or more sound toward the musicia to control the loudness of certain instrumen to shorten reverberation time or to adjust t warmth or brilliance of the music. Only p of the acoustically transparent wood-s screen is in place. At the back of the stage scrim will conceal the pipe organ

FIG. 1: Rating scales for the acoustical attr utes of intimacy, liveness and warmth. T quantity t_I is the initial-time-delay gap. M frequency reverberation time is the average the reverberation times at 500 and 1,000 with full occupancy. Low frequency reverbe tion time is the average of reverberation tim at 125 and 250 cps with full occupancy. B ratio is the ratio of low-frequency to mid-f quency reverberation times

erberation times at mid and high requencies (liveness) contribute nly 15 points and that diffusion ontributes only 4 points to a total f 100 points for a perfect hall. ere is most of the reason why coustics have been thought to be a atter of chance. These two factors, e positive ones usually emphasized engineers in the past, add up in nportance to only 19 per cent of the tal.

The principal discovery of these esearches is the predominant im- rtance of acoustical intimacy in tting the quality of a hall. Because e main ceiling must be high to reserve the necessary liveness (re- rberation time) in the room, this nding signifies that an excellent ll for music must either be small, rrow, or else have hanging panels elow the main ceiling to provide und reflections similar to those that ould occur from the side walls of small hall.

Another discovery is the relatively rge importance that low-frequency ass) reverberation in the hall plays in contributing warmth to the music. As examples, the rating scales for the three most important attributes of concert hall acoustics are shown in Fig. 1.

Of equal importance was the discovery that audiences absorb up to 50 percent more sound than had been published in standard acoustical handbooks. Thus to achieve a desired reverberation time the cubic volume of a hall must be about 25 percent greater than was previously thought necessary.

BLE 1

BIC VOLUMES AND MID-FREQUENCY VERBERATION TIMES FOUR EXCELLENT CONCERT HALLS

Name	Volume cu ft	T_{MID} sec
sel, Stadt-Casino	370,000	1.7
nna, Grosser Musikvereinssaal	530,000	2.05
ston, Symphony Hall	662,000	1.8
sterdam, Concertgebouw	663,000	2.0
Median	600,000	1.9

BLE 2

LATION BETWEEN AREA PER SEAT AND E NUMBER OF SEATS THAT CAN OCCUPY ,000 SQ FT

ea per seat* sq ft	Number of seats possible in Philharmonic Hall
(Boston)	3,160
(Vienna)	2,860
(San Francisco)	2,770
(Stuttgart)	2,570
(London, Royal Festival)	2,540
(Buffalo)	2,430
(Caracas)	2,370
(Bonn)	2,120

cludes allowance for aisles up to 3.5 ft wide if uded within the audience seating area or around periphery

GOALS FOR PHILHARMONIC HALL

Lincoln Center, the architect, Max Abramovitz, and the acoustical consultant agreed from the start that the acoustical goals were three:

First, Philharmonic Hall was to accommodate principally the regular repertoires of the New York, Boston, and Philadelphia orchestras. Although other uses were contemplated, it was not to be an "all-purpose hall." A large pipe organ and a sound-amplification system for speech were planned, but the acoustics of the hall for symphonic concerts were not to be compromised in favor of either organ or speech.

Second, the seating capacity of the hall was to be no greater than is consistent with good acoustics.

Third, no effort was to be spared that would enable Philharmonic Hall to assume a place among the best halls in the world—halls like Boston, Vienna, Amsterdam, and Basel.

The views of the New York Philharmonic Society were presented in a letter to the architect from the late George Judd Jr., on April 20, 1959:

Dear Mr. Abramovitz:

I should like to confirm by this letter the Society's position relative to the acoustics of the new Philharmonic Hall.

Not being technicians in the field, we shall not state our desires in figures or formulas but shall relate them to acoustics of halls in existence. . . . In the Society's judgment, the acoustics of the Hall should approximate as closely as possible those of the Boston Symphony Hall when filled, but in no event should the reverberation time be shorter. We feel the reverberation time of London Festival Hall too short, while that of the Vienna Grosser Musikvereinssaal and Amsterdam Concertgebouw may be slightly longer than is necessary. We understand, however, that it is much more feasible to adjust from a longer reverberation to a shorter than vice versa. If this is true, special care should be taken not to run any danger of too short a time. . . .

We must look to yourself as the architect and Messrs. Bolt Beranek and Newman as the acousticians to translate these desires into the technical formulas necessary to produce the corresponding best results in the new hall.

George Judd Jr., Manager

DESIGN CONSIDERATIONS

Some of the important design considerations, which were established early and which formed the basis for specific detailed recommendations as the project progressed, are listed here:

Cubic volume. Table 1 gives cubic volumes of four excellent halls that were suggested as appropriate models for Philharmonic Hall. The median of their volumes is 600,000 cu ft. At the time the plans were being considered, no hall whose cubic volume was greater than 850,000 cu ft—which is Carnegie's size—had impressed any of the conductors or music critics we had interviewed as a satisfactory acoustical model. The musicians spoke of the sound in large halls as "muddy" or "barn-like." There was no question that a cubic volume as small as 600,000 cu ft would accommodate far too few seats for a city the size of New York. We recommended a limit of 850,000 cu ft for the size of the hall, a limit that exceeded by about 40 per cent the median of the four excellent halls in Table 1. We accepted the compromise on cubic volume with the expectations that the application of new principles and techniques could bring about the intimacy heretofore so closely dependent on small size.

Liveness. On the basis of the information on liveness given in Fig. 1 and in accordance with the request contained in the Philharmonic Society's letter, it was recommended that the reverberation time of the hall with full audience at mid-frequencies be between 1.85 and 1.95 seconds. The mid-frequency reverberation times of the four comparison halls, also with full audience, are given in Table 1.

Warmth. The interviews with the musicians established that the best-liked halls are relatively rich in bass. It was recommended that the bass ratio (see Fig. 1) be 1.2, or even slightly higher. In order to achieve this ratio, virtually no thin wood could be used in the hall unless it was cemented securely to a solid backing, with the exception of some wood strips around the stage. The

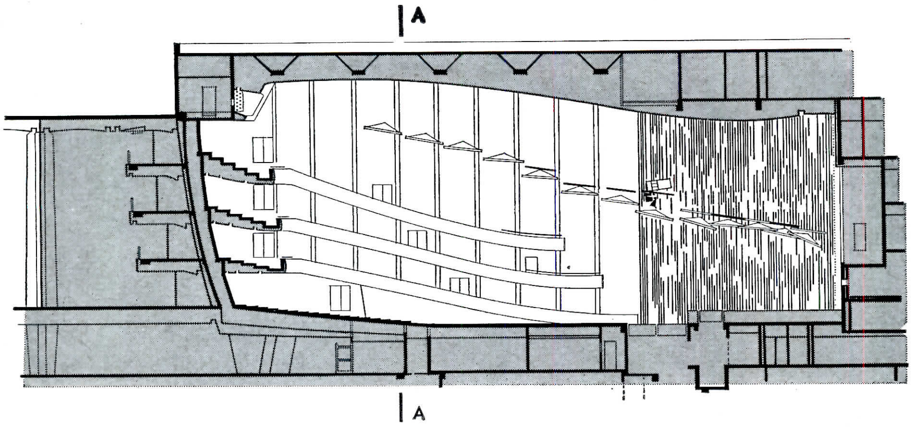


FIG. 2: Longitudinal section of Philharmonic Hall along the centerline. Total seating capacity is 2,644 divided as follows: orchestra (main floor)—1,384; loge (first balcony)—392; first terrace—454; second terrace—414

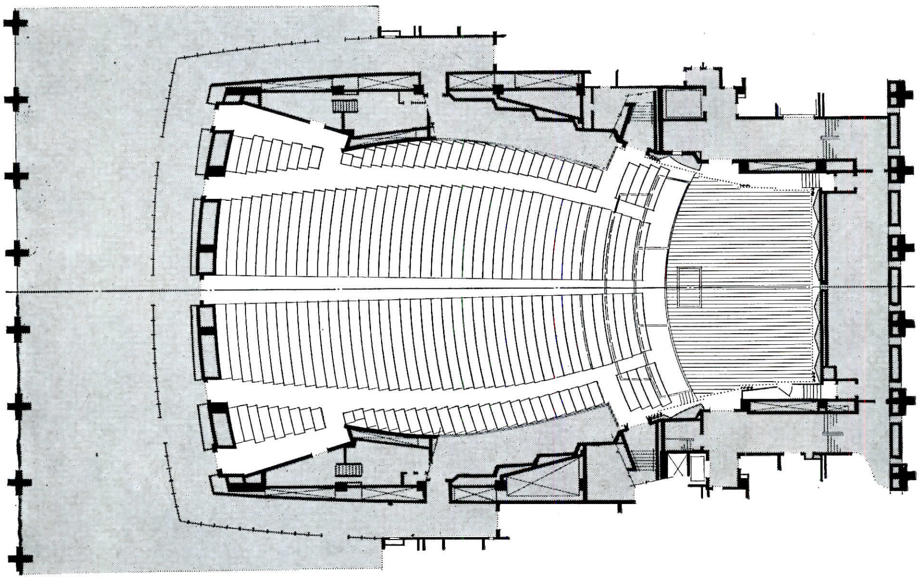


FIG. 3: Plan of the orchestra (main floor). By removal of several rows of seats on the main floor, the stage depth can be increased from its basic depth of 40 ft at centerline to either 48 or 56.5 ft

FIG. 4: Plan of the loge. Television, radio and observers' booths are located behind windows on both sides of the hall, 50 ft from rear wall of the stage

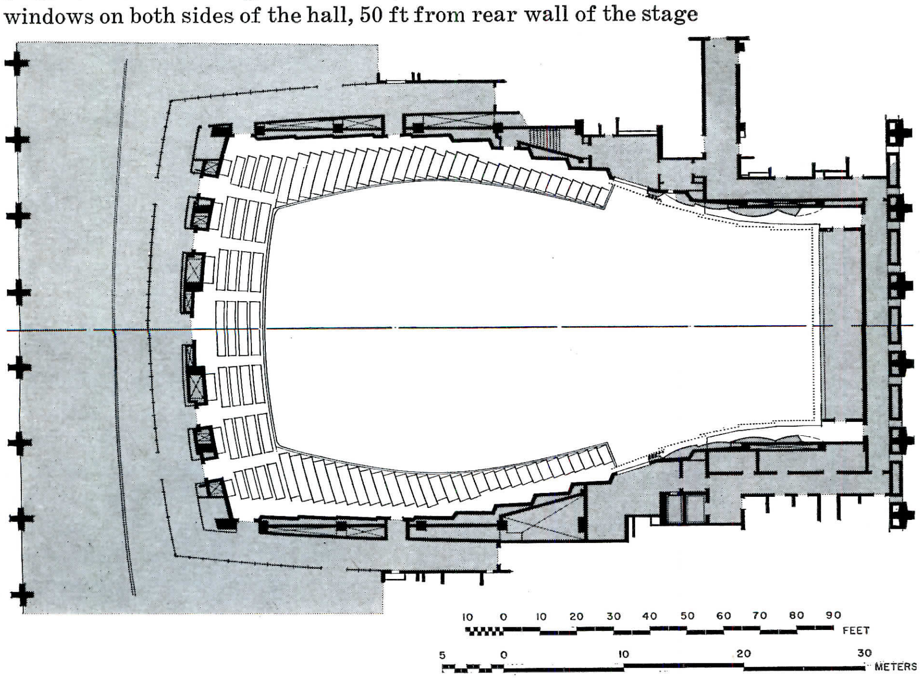


TABLE 3
PHYSICAL PROPERTIES OF THE HALL

Length of hall, projected horizontally from the front of the 40-ft-deep stage to the most distant listener	130
Width of the upper hall at the transverse section A-A measured between the walls (Fig. 4)	106
Distance between faces of loge at transverse section A-A (Fig. 3)	80
Height of the ceiling at transverse section A-A (Fig. 5)	66
Area of audience seating, with aisles up to 3.5 ft in width (40-ft-deep stage assumed) (S_A)	17,150 sc
Width of stage at rear, inside acoustic screen	52
Width of stage 20 ft from rear, inside acoustic screen	5c
Width of stage 40 ft from rear, inside acoustic screen	6'
Area of 40-ft-deep stage	2,050 s
Area of 48-ft-deep stage	2,600 s
Area of 56.5-ft-deep stage	3,100 s
Volume	865,000 c
Number of seats with 40-ft-deep stage (N_A)	2,(
S_A/N_A (area per seat, including 3.5 ft of aisles)	6.5 s
Row-to-row seat spacing:	
Main floor, center	33.5
Loge center	38
Terraces 1 and 2, center	36
Center-seat-arm to center-seat-arm spacing:	
Main floor, center	21-23
Loge, center	25
Terraces 1 and 2, center	20-23

Ceiling:	1½-in. plaster on metal l suspended from rubber mou
Hanging panels:	1½-to 2-in. plaster on me lath
Side walls:	plaster on solid cement blo
Floors:	rubber tile
Carpets:	on all aisles of the main fl and loge; none under sea
Stage floor:	2-in. wood over wooden jo over 3-ft air space
Stage height:	42 in.
Seating:	top of seat bottom and b rest upholstered in porous hair cloth, over thick, po polyurethane pads, springs; underseat is me perforated with six 2-in. h and covered with porous hair. Rear of backrest, sa covered with mohair

-hall study thoroughly debunked e myth that "wood is good" in con-t halls—the best halls have plas- interiors, the least-liked halls ve thin-wood interiors.

Audience area. On the assump-n of a volume of 850,000 cu ft, a verberation time of 1.9 seconds at d-frequencies with full audience, rpet covering part of the aisles, me wood strips around the stage, d seating area for the orchestra of out 2,000 sq ft, it was recommend- that the audience area must not ceed about 18,000 sq ft.

No specification was made for the mber of seats to be contained in the l; however, once the allowable to- seating area is established within e framework of a given acoustical sign, considerations of safety and mfort determine the actual number seats. Table 2 shows the number seats that would fill an audience ea of 18,000 sq ft according to the ea per seat allowed in eight other lls. If the seating could be as owded and the aisles as narrow as neteenth-century standards permit-, then as many as 3,000 seats might ve been squeezed into Philharmonic ll. However, an area per person of out 6.6 sq ft (including aisles up 3.5 ft wide) was considered neces-ry by the architect and owner for e comfort and safety of New York diences. As finally designed, Phil-rmonic Hall seats 2,644 persons h the normal 40-ft-deep stage, and newhat fewer when the stage is ex-ded into the audience area.

ntimacy. Because the most im-rtant attribute of the acoustics in oncert hall is intimacy, it was rec-mended that sound-reflecting pan- be hung over the stage and the nt half of the auditorium at such a ght that the initial-time-delay gap sound from the concertmaster's ition would not exceed 23 milli-onds at the center of the main or (see Fig. 1). It was also recom-nded that the hall be as nearly tangular in cross sections and as row as possible. The incorpora-n of these features in the design uld ensure that the sequence of nd reflections would be conducive clarity, good attack, brilliant nd, and adequate fullness of tone.

Balconies. It was also recommended t the balconies overhang as little possible. The final architectural ign extends the shallow balconies the sides. This reduces the effective acoustical width of the hall. The rear balcony overhangs do not cover more than four or five rows of seats.

Stage dimensions. In order to assure ample space for chorus and orchestra, without sacrificing good ensemble, balance and blend, it was recommended that the stage be no wider than 55 ft at the front and no less than 48-ft deep at the centerline; it should be extendable to accommodate a large chorus in addition to the orchestra. The stage dimensions finally chosen are somewhat wider and shallower, almost identical to Carnegie Hall's dimensions—in deference to the request of the New York Philharmonic Society.

Stage canopy and side wall design. To assure good ensemble it was recommended that a large reflecting canopy be erected over the orchestra at a height above the front of the 40-ft-deep stage of no greater than 27 ft. It was recommended that the height of the canopy and the angles of the individual panels in it be adjustable. It was also recommended that an acoustically transparent but visually opaque screen be constructed about 4 ft inside the structural wall surrounding the stage. Splayed sound-reflecting panels were to be installed behind the screen where they would not be seen, both to reflect sound across the stage and to project it into the auditorium.

Additional sound-absorbing materials. No special sound-absorbing materials were to be used in the hall. However, in order to eliminate as far as possible undesirable changes in reverberation time resulting from partial occupancy, fully upholstered seats and carpeting under the seats were recommended. The acoustical recommendation called for no carpeting in the aisles; some carpet was permitted, however, for architectural reasons. In order to reduce the reverberation time for occasions in which clarity of speech or musical drama was essential, it was recommended that draw curtains be provided for the upper spaces at the sides of the stage. For adjustment of balance and blend, a small amount of sound-absorbing material might be added in back of the visual screen behind certain sections of the orchestra. Draw curtains were recommended for this space also. The need for such materials was to be determined during the tuning period.

Ventilation noise. It was recommended that the steady noise from ventilation not exceed the customary NC-15 noise curve at any seat in the hall. Care had to be taken with the mechanical system design to ensure that air supply and return ducts supplying the hall would not transmit the noise from the equipment or any other noise to the hall, and that the air conditioning outlets would not generate an appreciable amount of noise.

Noise from exterior sources. Intermittent noises in the hall from sources outside the hall should not exceed the NC-20 noise curve in the lowest two octave bands, and the NC-15 curve in the other bands. Three important sources of external noise that required careful consideration were outside city noise, the nearby subway, and jet aircraft.

Sound system. A sound system of a quality adequate for radio broadcasting was required for amplification of speech and solo singing voice, and for cinema. No provision was made for amplification of orchestral music or for drama.

THE FINAL DESIGN

The final architectural design of Philharmonic Hall drawn to emphasize the acoustical features is shown in Figs. 2 through 7. The dominant architectural features of the completed hall are the glittering gold leaf of the canopy overhead; the gilded faces of the loge and the two terraces above sweeping downward, like great arms, toward the stage; the gold screen surrounding the stage; the side walls and ceiling of deep blue; and the seats upholstered in four shades of gold. Sight lines and thus "hearing lines" are ideal for all the seats.

Consideration was given to the probability that there will be a continuing evolution of musical tastes and preferences. The reverberation time of the hall can be shortened by the addition of sound-absorbing materials above the hanging panels, or lengthened by the removal of carpets from the aisles—for this reason, the floor beneath the carpet is rubber tile. The stage can be enlarged by means of the lifts to accommodate larger groups of performers. Hearing conditions on the stage can be changed by adjustments in the height and details of the stage canopy and by modifying the sound-reflecting surfaces behind the acoustically open screen at

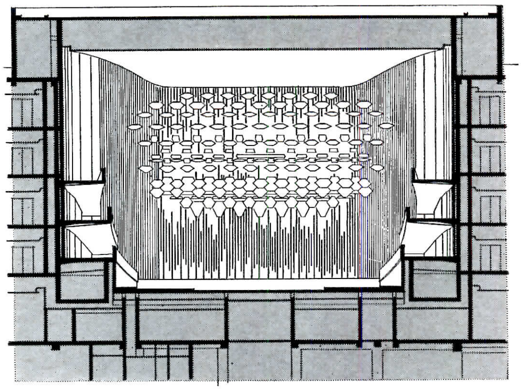


FIG. 5: Transverse section A-A. Note rectangular cross-section of the hall

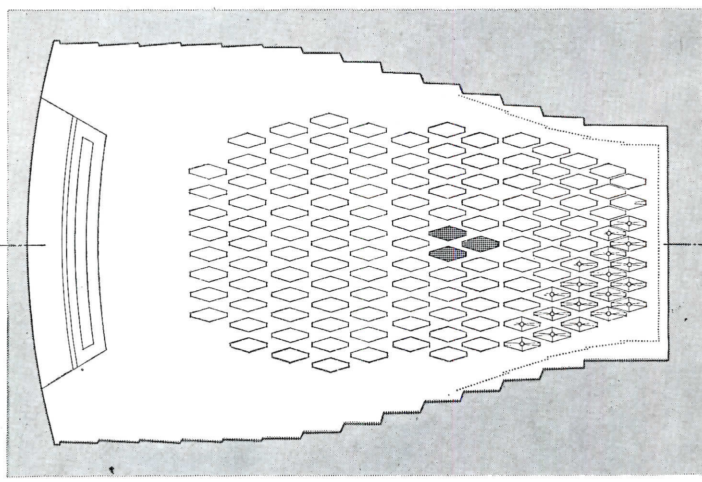
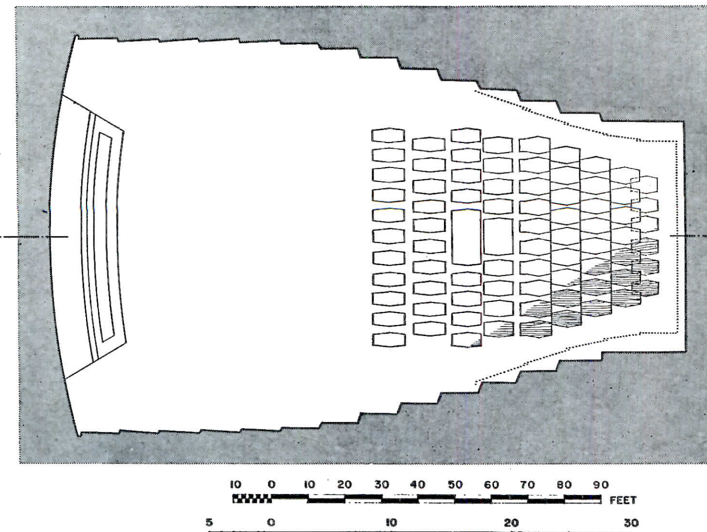


FIG. 6: Reflected ceiling plan showing the lower layer of sound-reflecting panels. These panels are made of hard-white finish plaster over metal lath and colored by gold leaf. Three panels in the center, however, are wire mesh only so that they will be acoustically transparent to the loudspeakers behind them. The loudspeakers are not used by symphonic orchestras, but only as required for dance bands, popular vocalists, public speakers, etc.

FIG. 7: Plan of the upper level of sound-reflecting panels, painted deep blue, and located about 2 ft above the gilded panels



the sides and back of the stage.

Philharmonic Hall is probably t first hall to be designed as a livi hall—a hall whose acoustics can changed as musical tastes dema at low cost, without gross or visil changes in the structure.

The basic design features inc porated into the building to cont earth-borne and structure-borne s way noise and vibration included t use of lead-asbestos vibration iso tion pads under all columns of t building, the insertion of a vibrati isolation joint in many of the exteri and interior walls and partitions or near the basement level, and t use of a resilient isolation lay (glass fiber pads plus gravel) arou all underground exterior walls on t subway sides of the building.

Vibration measurements made 1961 revealed that subway-induc noise and vibration will be of no co cern within the main hall. When t vibration levels are compared wi recognized criteria for "feelabilit of vibration and audibility of no radiated by a vibrating structure, is found that vibration definit

TABLE 4
REVERBERATION TIME FOR PHILHARMONIC HALL FULLY OCCUPIED ESTIMATED BEFORE CONSTRUCTION

Frequency, cycles per sec	Reverberation time, seconds	Estimate accurac of predicti seconds
67	2.7	±0.4
125	2.4	±0.3
250	2.2	±0.2
500	2.0	±0.1
1,000	1.8	±0.05
2,000	1.6	±0.05
4,000	1.3	±0.1
6,000	1.1	±0.1

TABLE 5
REVERBERATION TIMES MEASURED DURING TUNING WEEK

Frequency, cycles per sec	Reverberation time with orchestra without audience, seconds	Reverberat time wit orchestra simulate audience seconds
67	3.3	3.3
125	3.1	3.0
250	3.1	2.6
500	2.9	2.2
1,000	2.6	2.2
2,000	2.4	2.1
4,000	1.8	1.6
6,000	1.3	1.2

l not be felt and that subway se probably will not be heard in- e the hall when subway trains pass along Broadway—even during y quiet intervals when no music being played. These results were firmed during the recent "tuning ek" in May.

To exclude aircraft and street noise ceiling of the hall is suspended m elastic hangers, resonant at very low frequency, and the side lls and entrance doors are sepa- ed from the street by two layers glass.

The ventilation system was quieted a combination of package sound- enuating units at the outlets of the s, by duct linings and by ade- ate closures between the fan rooms l the auditorium. Acoustical meas- ements were performed on the nufacturer's premises to assure edom from noise at the grilles of e auditorium diffusers.

The walls of the auditorium are n.-thick concrete block. At each el, surrounding the hall, a glass- lled corridor is provided to ex- de noise (and smoke in case of e) originating in the lobbies. Care s taken to exclude from the hall e sounds of the tuning of instru- nts by use of inner floating walls l floors in the tuning rooms behind e stage.

HE TUNING PERIOD

om the inception of the project, was anticipated that certain fea- res of this undertaking would ben- t from an opportunity for fine- ale adjustment or additions prior the finishing. In the present state the acoustical craft, it is possi- e to predict accurately the re- ired cubic volume, the area to be owed for the seating, the general ape and basic proportions of the ll, the dimensions of the stage, e allowable amounts of carpet and er absorptive materials, and the sic acoustical design for a reflect- g canopy above the stage and front rt of the hall. Acoustics have not t developed a way to determine, ac- rately and in advance of the design, e fine details—the orientation of e reflecting panels above and ound the stage, and the exact ight and proportion of open area the canopy.

"Tuning week" started on Monday, ay 28, 1962. The adjustments of e acoustics were made with the help of the Philharmonic Orchestra and a group of highly qualified listeners, working together with the acoustical consultant, the architect, and the building contractor. So far as we know, in no major American hall, from the Academy of Music in Philadelphia in 1857 to the Ford Auditorium in Detroit in 1956, have the acoustics been adjusted experimentally prior to its opening.

The orchestra performed at nine rehearsals. The repertoire included selections from all the principal musical periods, and called for various sizes and combinations of instrumental and vocal groups. In all, compositions of 30 different composers were played.

Since the acoustical adjustments would have significance only for the occupied hall, one of the important problems of tuning week was how to provide an "audience" of 2,600 people. The corridors, stairways and approaches to the building were not completed and entry by a large number of people was deemed unsafe. Even if a live audience could have been arranged, there would have been the difficulties of carrying on experiments in a "goldfish bowl" and of keeping a succession of audiences quiet and entertained for a total of 22 hours during the week. It was of no little significance, moreover, that the ventilation and air conditioning equipment was not yet in operation and the hall would have been virtually uninhabitable for an audience on some of the 90-degree days of tuning week. Consequently, a synthetic audience, real only in the acoustical sense, was provided. Each seat could be "occupied" by a flexible, glass fiber mat, 30 by 40 in. and 1 in. thick. An advantage of the simulated audience was that the audience occupancy could be held constant throughout the week, and all the evaluations of acoustical changes were made under exactly similar conditions.

Acoustical measurements were made at nearly every rehearsal during the week. Sound sources included: impulse noises produced by a pistol and a small yachting cannon; continuous and interrupted white noises (i.e., noises of all frequencies) in octave frequency bands; warbled tones; and pulses of sine waves. Measured were: reverberation times at 25 frequencies between 40 and 10,000 cps for empty hall and hall with simulated audience; initial-time-delay gaps at main floor and first terrace seats; and ratios of direct-to-reverberant sound intensities at several locations in the hall.

Acoustical measurements made with electronic instruments alone do not demonstrate all the important acoustical characteristics of a hall. Tests must also be made with the orchestra as the source of sound. In order to include all the frequencies that can be produced by the full orchestra and all in proper balance, special orchestral sounds were needed. It occurred to us that if these sounds were ever to be repeated in the hall with a real audience, they would be better received if they were made part of a composition that in itself would have musical interest.

Bolt, Beranek and Newman, therefore, commissioned composer Daniel Pinkham of Boston to incorporate a special set of chords into a musical composition four minutes in length, to be used as an acoustical test in both empty and occupied halls. Delivered a few days before tuning week, Pinkham's *Catacoustical Measures** has proved to be a lively diversion as well as a valuable tool.

Much music performed during tuning week was preserved for later study on a pair of two-channel magnetic-tape recorders, connected to the electrical output of two binaural "dummy" heads. The dummy heads were specially designed to approximate the acoustical properties of the human head, and each of them was equipped with two miniature condenser microphones for ears. The binaural heads were mounted on small boxes and were placed on two seats, one on the main floor and one in the first terrace.

A special listening panel which judged the quality of the acoustics at each phase of the tuning consisted of Leonard Bernstein, music director, three assistant conductors and the manager of the Philharmonic Orchestra; and representatives of Lincoln Center, Juilliard School of Music, Columbia Records, the architect's office and Bolt, Beranek and Newman. From time to time, this panel was joined by Erich Leinsdorf, Leopold Stokowski, Andre Kostelanetz, Bruno Zirato, and several of New York's music critics. The com-

*Webster defines *catacoustical* as the "science of reflected sounds or echoes." [*Webster's New International Dictionary,* Second Edition]

Serating photo

During "tuning week," the seats of the hall were occupied much of the time by "instant people"—30- by 40-in. glass fiber blankets bowed into each seat—in order to approximate the sound absorption of an actual audience

ments of this special listening panel were recorded and used as the basis for the changes made in the hall during and following tuning week.

In addition to the special panel, the members of the orchestra filled out "comment cards" and returned them for tabulation and study.

The experimentation with various arrangements of the orchestra led to recommendations on the number and height of stage risers. The number, height and angles of the elements of the stage and audience canopy were finalized. A small echo from the projection booth was located and removed. The sound-reflecting panels behind the acoustically transparent screen around the stage were experimentally positioned and the required number determined.

It was found desirable to shorten the reverberation time for special concerts, where music for small orchestra is played—say baroque or chamber music—or where opera theater is performed. Accordingly, it was recommended that manually-operated draw draperies be installed in the spaces above the canopy on either side of the stage. Operable draperies were also recommended in the wall beneath the organ at the rear of the stage to control the loudness of the bass and percussion. Also, a solid wall was recommended along the rear right side of the stage to strengthen the double basses. And, finally, in order to ensure the richest possible bass, instructions were issued that no thin plywood was to be used in any part of the final construction.

Tuning week ended optimistically with the feeling that after it had undergone whatever further tuning was suggested by its initial year, Philharmonic Hall would satisfy the goals its planners had set for it.

REVERBERATION TIMES

The reverberation times calculated before construction of Philharmonic Hall are given in Table 4. During tuning week, part of the carpets and nearly all of the wood-slat screen around the stage were missing. Se eral rows of seats at the front the hall were yet to be installe With these omissions, the reverbe tion times were measured for tw conditions: (1) the orchestra stage, auditorium seats empty; a (2) the orchestra on stage, synthe audience in the hall. The results a given in Table 5. It is estimated th when the hall is completed, the verberation times will fall within t range of values given in Table 4.

Thus Saturday, June 2, 1962, t last day of tuning week, ended fi years of sympathetic cooperati among a variety of artistic and e gineering disciplines. Whether h tory will award Philharmonic Hal position among the world's finest vironments for concert music it still too early for us to judge. But understanding engendered amo musicians, architects and acous cians during the 54-hall study leadi to the final result should enrich t acoustical designs of the future a avoid many pitfalls of the past.

IOSPITAL AIR CONDITIONING

ospital layout and design are affected by special conditions temperature, humidity, and pressure required in various areas

y Alfred Greenberg, Consulting Engineer

sign of air conditioning for hospi-
s differs from design for other
ilding types in two major respects:
) Air circulation and filtration are
tical factors in the control of air-
rne infection. (2) The relative im-
obility and depressed physical con-
tion of patients impose a demand
r close control of temperature, hu-
idity and air movement.

Architects must design the vari-
s hospital areas with reference not
ly to traffic and material flow but
so to the flow of possible contami-
tion. Air should flow at all times
om sterile toward contaminated
eas and should be exhausted to the
tside as far as possible (at least
5 ft) from the air intake. No air
thin the hospital should be recir-
lated unless it passes through deo-
rizers and filters approaching 100
r cent efficiency. Even then, a small
nount of contamination and odor
n pass through the filtering sys-
m. In fact, unless cleaning sched-
es are faithfully maintained, de-
osits in the system can become a
urce of recontamination of the air.
certain critical areas, such as op-
ating rooms, this is a chance that
ould not be taken. Outdoor air, by
tion of sun and massive dilution,
ill probably be less contaminated
an recirculated air, both given the
me degree of filtration.

There are two arguments advanced
ainst using 100 per cent outside
r throughout the building. The first
aintains that not all areas are con-
minated; therefore, complete flush-
g of the building is not necessary.
n the surface, this premise is valid;
t even with the most careful air
nditioning design, it is difficult to
redict air movement at all times in
l areas. The action of stair wells,
evators, vertical conveyors, laundry
utes, dumbwaiters and pneumatic
ibes can set up air currents other than those intended. Opening of just a few doors and windows can completely reverse the desired effect of the most accurately balanced air distribution system.

The second argument is that the use of 100 per cent outside air increases fuel costs for both summer and winter. This is true, but fuel costs must be measured against the following compensating factors:

(1) First cost of a system using all outdoor air is lower than cost of a recirculating system because of the decreased ductwork, fan systems and controls.

(2) In many hospitals the ratio of critical sterile area to total area is so great that only 20 to 30 per cent of the total air can be recirculated anyway. This very often is reduced to less than 10 per cent when the layout of spaces is considered in relation to practical recirculating systems.

(3) Systems for so-called non-contaminated areas almost always are designed with less exacting air filtration than those for contaminated areas. Any accidental pollution of the air in the uncontaminated area will increase the possibility of pathogen colonization on filters, coils, air outlets and elsewhere. Recirculating systems, therefore, should have the same, exacting filters and cleaning schedules throughout. By use of all outside air, this troublesome expense is kept to a minimum.

Although hospitals are normally open 24 hours a day, few departments other than nursing units operate around the clock. It is not difficult to determine the work schedule for most hospital departments and to correlate this with a master air conditioning scheme such that departments having similar time schedules are served by the same air units. These units can be shut down when the departments are not in use; thereby effecting substantial operating economies.

TYPES OF SYSTEMS

Many air distribution systems[1] are applicable for hospital use. However, the following systems should not be considered for new hospitals:

(1) Self-contained units because they have poor temperature and humidity regulation, are noisy, have poor air distribution characteristics and low filter efficiencies, and require frequent maintenance.

(2) Conventional fan-coil units for the same reasons, although these units are a definite improvement over self-contained units.

(3) Single duct, zone volume control systems because it is necessary to know where hospital air is coming from and going to at all times in order to control spread of airborne contamination. Varying the air volume of different areas at different times defeats this purpose.

Applicable systems are:

(1) *Fan-Coil Units With Central Outside Air System.* In general, this is the least desirable of the acceptable systems for hospitals, unless 100 per cent outside air is used with high efficiency filters. For proper noise control, units should be sized to carry full design load at the middle of three fan speeds. These filtration and size criteria will increase the cost of the system. One advantage is that individual units can be shut off in any room when it is desirable to do so.

Although the outside air is centrally filtered, each fan-coil unit should also contain a filter for recirculated room air. Filters, coils, con-

[1]A résumé of physical and mechanical characteristics of various systems was given in Mr. Greenberg's article on motel air conditioning in the August, 1962, issue

TABLE 1—AIR CONDITIONING REQUIREMENTS FOR HOSPITALS

Area	Temperature[1] Range, Deg F	Humidity[2] Range, %	Relative[3] Pressure	Hourly Air Changes	Hours[4] of Use
1. Patients' bedrooms	72-80	40-50	N or B	6-8	24
2. Outpatient clinics	72-78	40-50	N or B	8-12	12
3. Administration	72-78	40-50	P	6-12	12
4. Operating suite	68-85	*55-65	P	18-30	24
5. Radiology	72-78	40-50	N or B	8-15	12
Dark rooms	68-82	*40-50	N	12	12
6. Laboratories	72-78	40-50	N	6-20	12
7. Animal quarters	68-80	40-65	N	12-20	24
8. Morgue & autopsy	68-78	40-50	N	20+	12
9. Pharmacy	72-78	40-50	P	8-12	24
10. Central services	72-78	40-50	P to N	6-12	24
11. Physical medicine	72-90	*30-60	N	6-12	12
12. Maternity	74-82	*40-55	P	6-10	24
13. Service	72-78	40-50	N	8-20	12

[1] First figure is winter setting; second is summer inside design temperature
[2] *Winter humidities may fall below ranges shown except where marked by asterisk
[3] N = negative; B = balanced; P = positive
[4] These generalized schedules will vary for individual hospitals

densate drain pans and connecting pipes are sources of recontamination unless cleaned and sterilized at regular intervals.

(2) *Induction Units.* Although they produce more uniform temperature and humidity conditions than fan-coil units, induction units have about the same noise and maintenance characteristics.

In rooms where infection, odors, radioactivity, fine powders, or chemicals can become airborne, equipment that recirculates any portion of room air should not be used because of the possibility of accumulation of contaminated deposits in recirculated air channels.

(3) *Single Duct System.* There has been a tendency in the past to design single duct systems in hospitals at very low velocities (800 to 1,000 fpm). This is unnecessary and in part undesirable, because entrained foreign matter can more readily settle out and promote bacteria growth. Systems using standard velocity (about 2,500 fpm) or high velocity (to 4,500 fpm) and designed to maintain moderate noise level (NC-35 in all patient areas) are satisfactory. In general, single duct systems do not require much maintenance except at coils, humidifiers, filters and air outlets. Every few years, depending upon the main filter efficiencies, the inside of the ductwork should be cleaned through access doors provided at suitable intervals to allow easy reach.

(4) *Dual Duct Systems.* Terminal units of dual duct systems may be placed under windows or in hung ceilings. Maintenance of units under the window is simpler, but that location also is more susceptible to contamination. Access must be provided for regular maintenance and cleaning of the mixing boxes.

This type of system, though about the most costly to install, will produce the best over-all results considering the variety of hospital functions it is called upon to serve.

(5) *Radiant Panel Systems.* Where it is planned to use a perforated metal acoustical ceiling, an attached pipe grid to provide both heating and cooling may be suitable for areas having low humidity where no moisture can condense on pipes or ceiling. Ventilation air must be furnished by a supplementary system, and in areas requiring large quantities of air, radiant systems are not economical because the treated ventilation air can usually handle the entire load at lower cost.

Contamination of perforated pans by convection air currents seems at least theoretically possible, but available data are insufficient to assess this hazard.

Experience is lacking, also, on cleaning problems possibly associated with ceiling plenum systems which deliver air through perforated or fissured ceiling materials. Such systems seem otherwise attractive when large quantities of air at low velocity are required.

HOSPITAL AREA ANALYSIS

Some of the more common divisions found in hospitals are listed in Table 1, which gives ranges of design conditions for each area. Temperature and humidity ranges encompass the complete variation encountered in the author's experience and research. Upper and lower levels are those used (or envisioned as desirable) by medical authorities[2] for complete flexibility of function. Obviously they do not pinpoint control settings and many hospitals will operate satisfactorily within more limited ranges. Exact design figures should be ascertained from the hospital medical advisory staff when the scope of the project is first discussed. Notes pertaining to Table 1 are as follows:

(1) *Patients' Bedrooms.* Most patients are quite sensitive to drafts. Hence, in patients' areas, air distribution should be uniform and air velocity at patients' level from about 12 to about 30 fpm, with an upper limit at about 35 fpm.

If air is exhausted through patients' private bathrooms or toilets, makeup air should not be drawn from the outside through windows, as this will greatly increase control and housecleaning problems. If the corridor air is under positive pressure, odor-free, and not contaminated by nearby functions, then this air may be transferred through the patients' bathrooms for exhaust. Another advantage in maintaining the corridor under positive air pressure is that it maintains air motion toward bedrooms and reduces cross-infection.

Patients with contagious diseases, however, must be kept out of positively pressurized corridors. If the treatment program for infectious diseases is such that corridors cannot be pressurized with respect to individual rooms, architects must make every effort to provide sufficient ceiling and shaft space for the extra ductwork required for mechanical control of supply and exhaust for all areas including corridors.

(2) *Outpatient Clinics and Treatment Areas.* Usually these are designed in a similar manner to equivalent areas within the hospital. However, there are often special laboratories and testing rooms which may

[2] The author's work on many hospitals has included study of recommendations of USPHS, VA, AHA and other medical authorities

re specific criteria. These should obtained from the hospital staff or uipment manufacturers.

(3) *Administrative Areas.* Offices treated in much the same man- as an office building. Since op- tion is usually 10 to 12 hours per , offices may be combined with outpatient clinic into one air dis- bution system, if that is archi- turally and mechanically feasible.

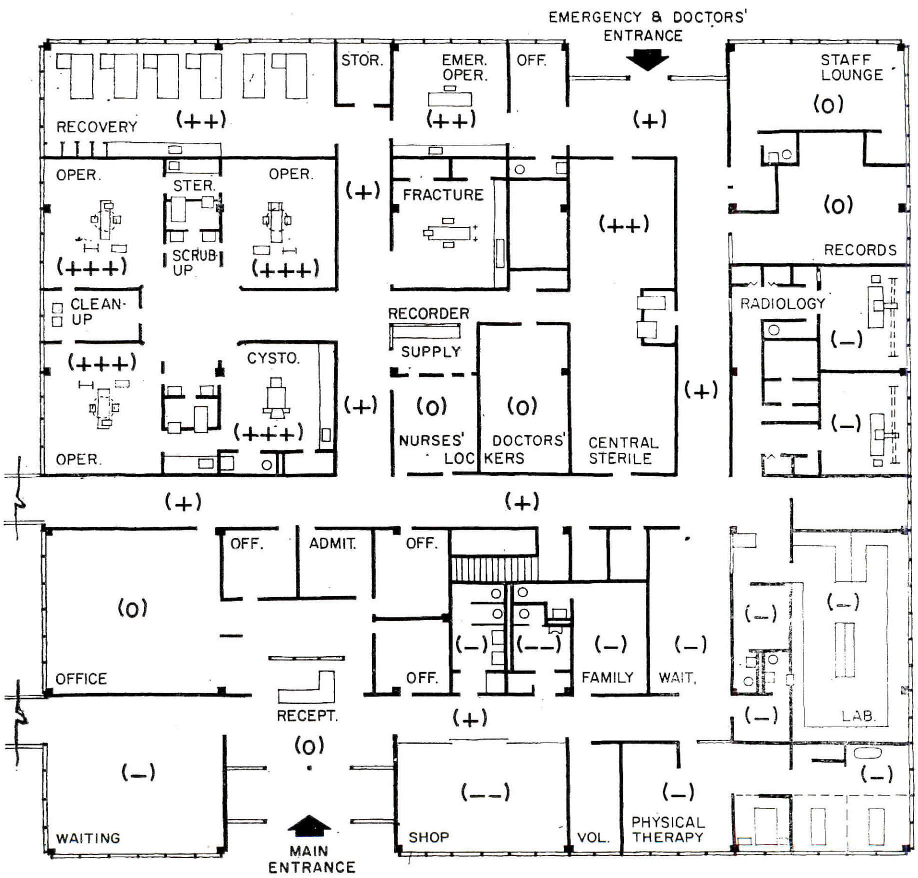
(4) *Operating Suites.* There are eral basic schemes, and many mod- ations thereof, around which op- ting suites (including spaces for gery, delivery, recovery and in- sive therapy) are designed. From air conditioning point of view, y can all be broken down into rile, non-sterile and contaminated eas. By translating this into high, dium and low air pressure areas, pectively, we have developed the sic tool for properly designing the distribution system for this suite.

The operating room must be at a her air pressure than any other a connected to it. This also holds e for the recovery room, surgical rses' workroom, anesthesia work- m, sterile storage and work areas l special laboratories such as bone l tissue and frozen section. These as are most often interconnected a network of corridors maintained an intermediate air pressure ich allows the sterile areas to ed some air constantly into the ridors. The corridor air is then hausted through the non-sterile or ntaminated areas. All efforts uld be made to have the air sys- n in each hospital area independ- tly balanced with relation to adja- nt areas. It must be recognized, wever, that opening of doors be- een any two areas will generally set the balance momentarily. Some ought might be given to air locks air curtains, but no system is a bstitute for careful aseptic tech- ques on the part of personnel.

Humidity levels are kept at 55 to per cent to minimize the possi- lity of static discharges which ight cause explosions of combus- ble anesthetics. Also, certain types surgery require high levels of hu- idity. Steam jet or spray humidi- rs should be used rather than ns, which can grow bacteria.

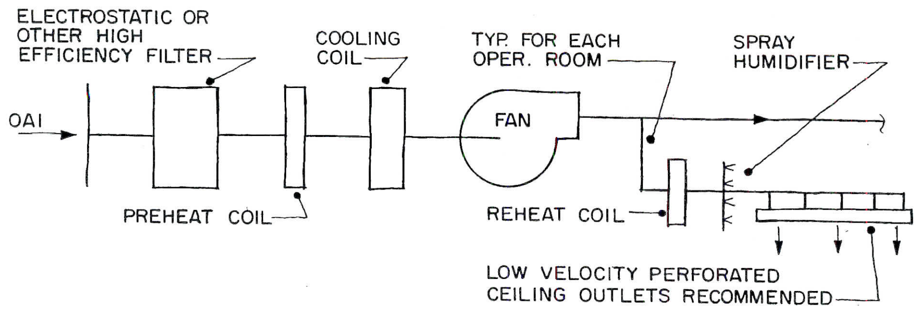
Although most operations are per- rmed at from 72 to 80 F, provisions should be made in at least one oper- ating room for obtaining substanti- ally lower and higher temperatures. Each operating room must have in- dividual, explosion proof controls for temperature and humidity. Tempera-

Horizontal sun shades cut air conditioning load at U. S. Navy-Marine Hospital, El Toro, California. Welton Becket and Associates, architects

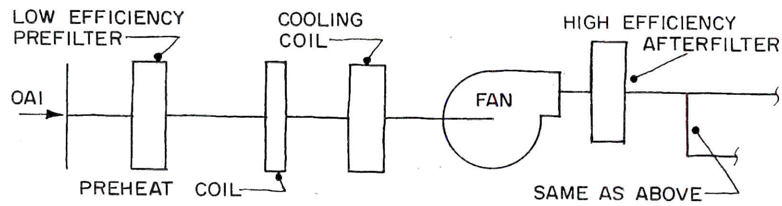


(+) = POSITIVE; (O) = BALANCED; (–) = NEGATIVE AIR PRESSURE

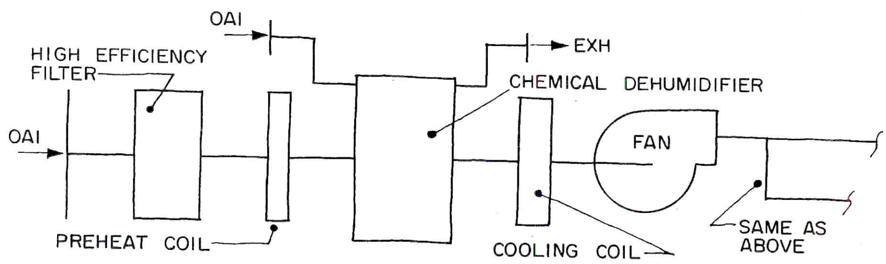
Hospital department areas should be arranged not only for flow of materials and personnel but with consideration of maintaining a flow of air from critically sterile areas toward possible sources of contamination. This layout of a wing attached to a general nursing building shows how positively pressurized areas center on the operating suite at upper left. Corridor doors to control pressure are not shown, but would be secondary in importance to proper design of air supply to each area



Schematic of a conventional system for operating suite. This arrangement is low in cost and requires less space than modifications shown below. Needs regular maintenance to keep algae under control



Operating suite system with double filtering provides more definite assurance of clean air, has same algae problem as system above



More elaborate system requires additional ductwork and louvers but keeps algae and micro-organisms to a minimum with some increase in operating cost

ture variation can be obtained by means of booster heating and cooling coils or by a dual duct system.

The range of operating room temperatures may lead one to think that individual room systems would be desirable, but this is not so from the viewpoint of balancing pressures in the over-all suite.

Because of the high humidities required, relatively low temperature differentials must be maintained between entering air and room air to prevent condensation on air outlets. Since cooling loads for operating rooms are often substantial, large air quantities (18 to 30 air changes per hour) are normal. This makes good air distribution a necessity in order to maintain no more than 40 fpm air velocity. At this velocity, the air will not pick up and distribute dirt and bacteria. By way of comparison, people walking within the operating room will impart motion to the air of about 40 to 60 fpm. Since 50 fpm has been determined as the apparent threshold at which air currents can dislodge lint particles from a smooth surface, it can be seen that operating room techniques are an important element in bacteria distribution.

Aspirating or induction type ceiling diffusers and side wall registers create too much air motion. Perforated or other wide-area, low-velocity outlets at the ceiling provide much better air distribution.

The wide-area perforated outlet tends to dilute and push down the air within the room in a piston-like action, except at the operating table, where lighting and equipment interfere. About 80 per cent of the air is exhausted through low registers located at the room corners and 10 to 15 per cent into the adjacent corridor and scrub-up room. Over the operating table a ceiling exhaust register vents the hot air from the lights, prevents the collection of anesthetic gases at the ceiling and draws cool air into the work area. This exhau[st] register needs to eliminate no mo[re] than 50 to 150 cfm depending on t[he] size of the operating lights.

It may be desirable to design t[he] air conditioning system so that t[he] operating suite is partially served [by] each of two systems. Thus outage [of] one system will not shut down air co[n]ditioning for the entire suite.

(5) *X-ray and Radiology Sui[te]*. The air conditioning problems e[n]countered in this suite are fourfol[d]: protection against radioactivity, c[o]ordination of duct design with X-r[ay] equipment, odor, and equipment hea[t].

The problem of radioactivity [is] most acute in the cobalt and de[ep] therapy rooms but must be thoroug[h]ly analyzed in all X-ray and fluor[o]scope rooms. In most instances, d[e]signers should obtain the advice of [a] physicist specializing in radioacti[ve] problems.

In general, any mechanical or ele[c]trical facilities that pierce the co[n]crete or lead walls of the cobalt a[nd] deep therapy rooms must be le[ad] lined or otherwise shielded to prote[ct] adjacent areas within range of t[he] radiation source. Some authoriti[es] still recommend lead lining for co[n]siderable distances in all ducts whi[ch] pierce X-ray rooms, but this practi[ce] has been greatly modified by ma[ny] hospital authorities.

Door louvers, transfer grills or u[n]dercut doors should not be used [in] radiation equipment rooms.

Some X-ray equipment is ceilin[g] supported on structural beams [or] operates on horizontal overhea[d] tracks at the hung ceiling. This r[e]quires close coordination in the la[y]ing out of ductwork and electric[al] conduit. Ideally, no piping should [be] run in the hung ceilings over t[he] X-ray rooms.

Certain procedures, such as thos[e] involving barium enemas and som[e] types of malignant conditions, em[it] odors which must be removed by us[e] of the upper limit of air changes (15[)] shown in Table 1.

Considerable heat is given off b[y] the X-ray machines, controls a[nd] transformers. In some rooms, flu[o]rescent lights cannot be used becau[se] of their afterglow effect upon phot[o]graphic plates. Therefore, incande[s]cent lighting with its greater hea[t] output must be used. The extent an[d] intermittent character of the equip[]ment and lighting heat load ma[y] warrant some consideration of regularly scheduled cycling of air conditioning in some rooms.

(6) *Laboratory and Research Areas.* The type and size of hospital will determine, in general, the kinds of laboratories it contains. The one thing all laboratories have in common is that the suite as a whole should be under negative air pressure, although some rooms, such as those for physiological testing or sterile techniques, may require positive pressurization with respect to others in the suite.

When all the exhaust air goes through work hoods, each hood should be designed with its own duct system and exhaust fan so that, whether or not the hood is being used, the exhaust fan will run. Laboratories without hoods should eliminate at least part of the exhaust air from the floor level in order to pick up stratified odors and fumes from spilled substances.

Special requirements of various kinds of laboratories must be checked carefully with hospital administrators and equipment manufacturers.

(7) *Animal Quarters.* This area should be isolated from the rest of the hospital by means of a negative air pressure zone in which about 20 per cent more air is exhausted than is supplied.

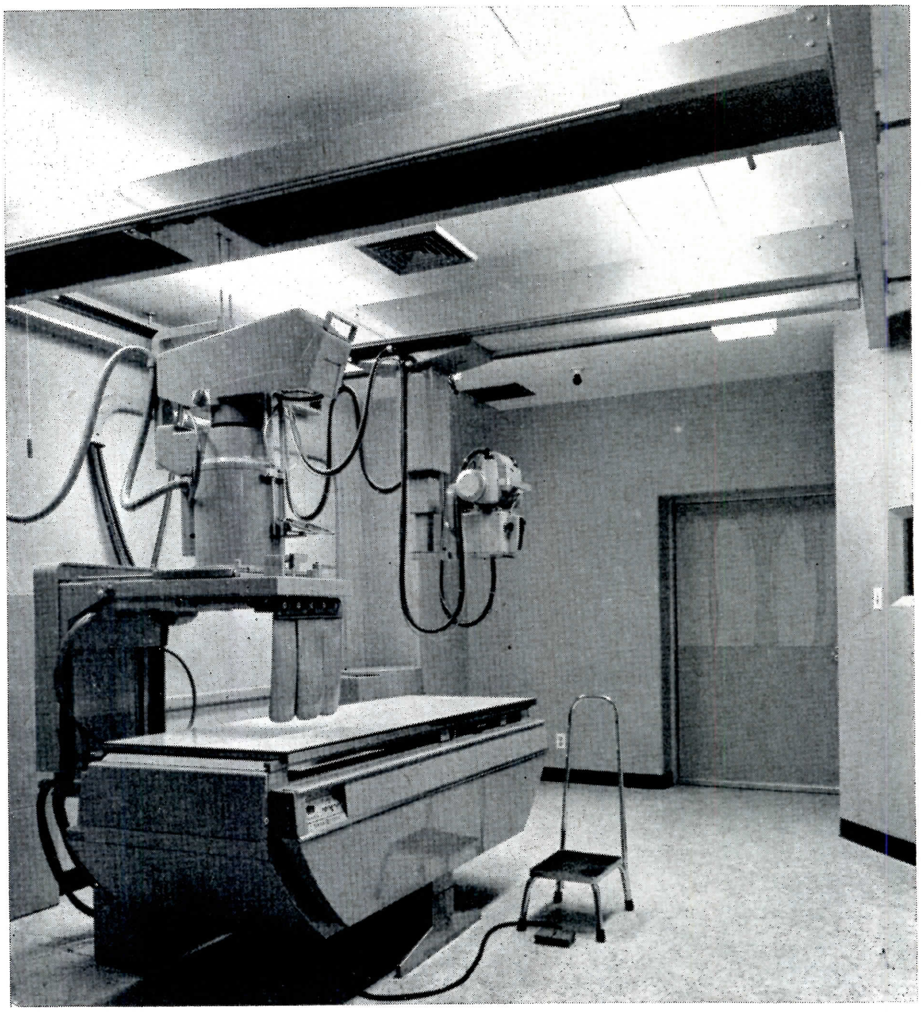
There are, however, certain relatively clean or odor-free areas, such as animal operating rooms, food preparation rooms, offices, etc., which will be maintained under positive air pressure with respect to all others. Healthy animal rooms should be maintained at a 10 per cent positive air pressure toward infectious animal rooms. Under no circumstances should air from animal quarters be transferred into corridors or other rooms because of the possible spread of odor, hair and bacteria.

To assure draftless air distribution, perforated diffusers or other wide-area panels should be used for the air supply. Exhaust air should be expelled above the highest roof level and far from any intake.

(8) *Morgue and Autopsy.* Exhaust ducts should be located at the head and foot of each autopsy table. This, of course, fixes the position of each table in the room.

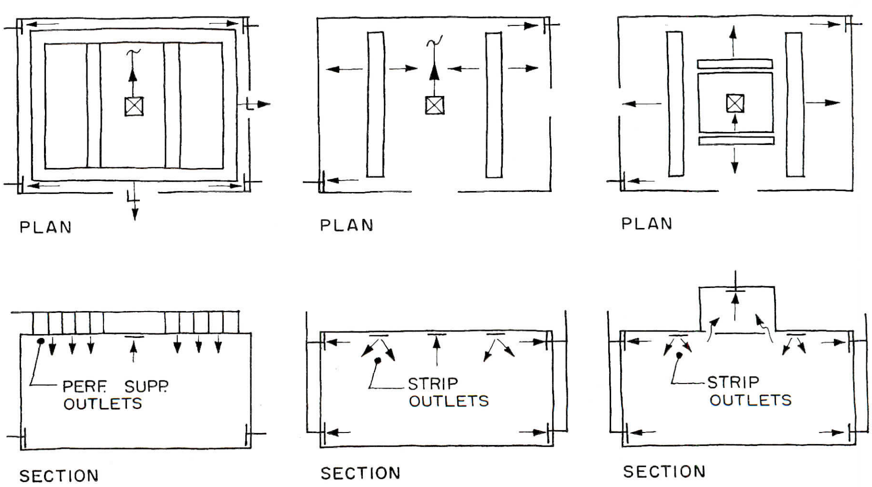
Refrigerated drawer compartments, or, in larger hospitals, refrigerated walk-in boxes, are provided for storage of cadavers. A ventilation rate of 20 air changes per hour will have to be continuously exhausted from the boxes to the highest roof level or 150 ft from any outside air intake.

(9) *Pharmacy.* This area should be considered as a sterile zone, maintained under a positive pressure,

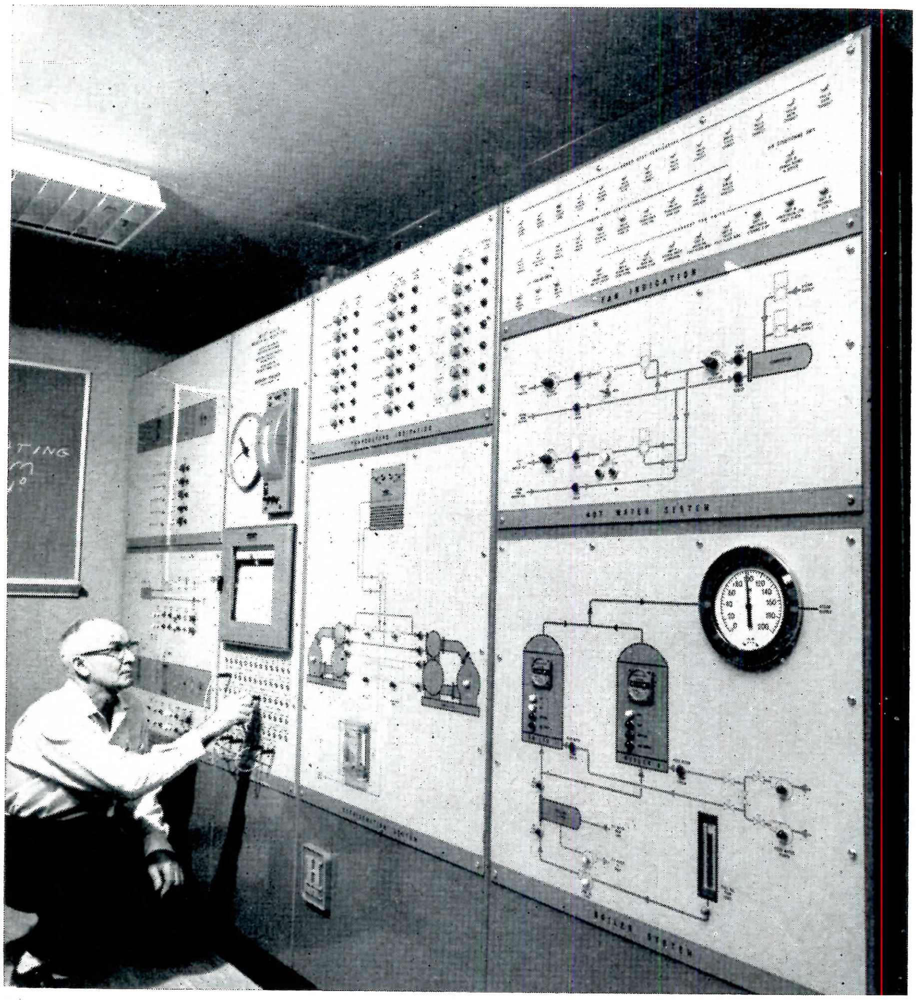


Stewart Storey photo

Air supply and return for X-ray rooms must take into account the overhead supporting members and permanent location of X-ray equipment. Room above is at Parkview Episcopal Hospital, Pueblo, Colorado. Fisher and Davis, architects



Three good, wide-area, air supply arrangements for operating rooms. Note low exhaust at corners and ceiling vent for heat relief over operating table lights



Surveillance and control of conditions throughout the 250-bed West Allis, Wisconsin, Memorial Hospital (Darby, Bogner & Associates, architects) is centered at a single station where one staff member can watch and record operation of the system

with dispensing and work areas at higher pressure than associated storage, compounding, and office spaces.

(10) *Central Services.* Receiving, disposal, preparation of equipment and instruments, cleaning and sterilization, storage in sterile or non-sterile areas, and delivery of stored items for use are included. Central service departments are designed with the same regard for prevention of contamination by maintaining cleaner areas at positive pressure to keep out contaminants.

(11) *Physical Medicine and Rehabilitation.* In its simplest form this area consists of a simple exercise room. Hospitals and health centers which specialize in this field may include various types of baths, pools, facilities for manual arts, occupational and physical therapy and special laboratories.

It is desirable to have a separate air handling unit for the pool enclosure capable of maintaining air temperatures of 80 to 90 F when the water is up to 100 F.

The manual arts room is in effect a machine shop with hoods on machines and a dust collecting system. The occupational therapy room may contain kilns which require hoods.

Certain electronic testing rooms may have to be electrically shielded, and ductwork to them should be indirectly connected by non-metallic methods.

In all treatment and bath rooms, it should be possible to maintain the air temperature as high as 85 F.

(12) *Maternity and Nursery.* These areas should have a separate system operating 24 hours a day. Incubator rooms, delivery rooms, labor rooms, nurseries and all auxiliary areas require individual temperature and humidity controls. Delivery rooms are treated as operating rooms. Air should move at about 15 to 25 fpm.

(13) *Service Areas.* These include soiled linen rooms, chapels, kitchens and dining rooms, libraries, bowling alleys, game rooms and auditoriums. Air pressure gradients and sound isolation follow the same line of reasoning that has been set forth pertaining to other areas.

MECHANICAL EQUIPMENT

As a rule, hospitals require more mechanical space than most other types of buildings because of the larger number of systems and the higher degree of flexibility. To prevent complete interruption of service, an emergency generator should cut in automatically when utility power fails. Generators should be operated at least once a week to be sure they are functioning properly.

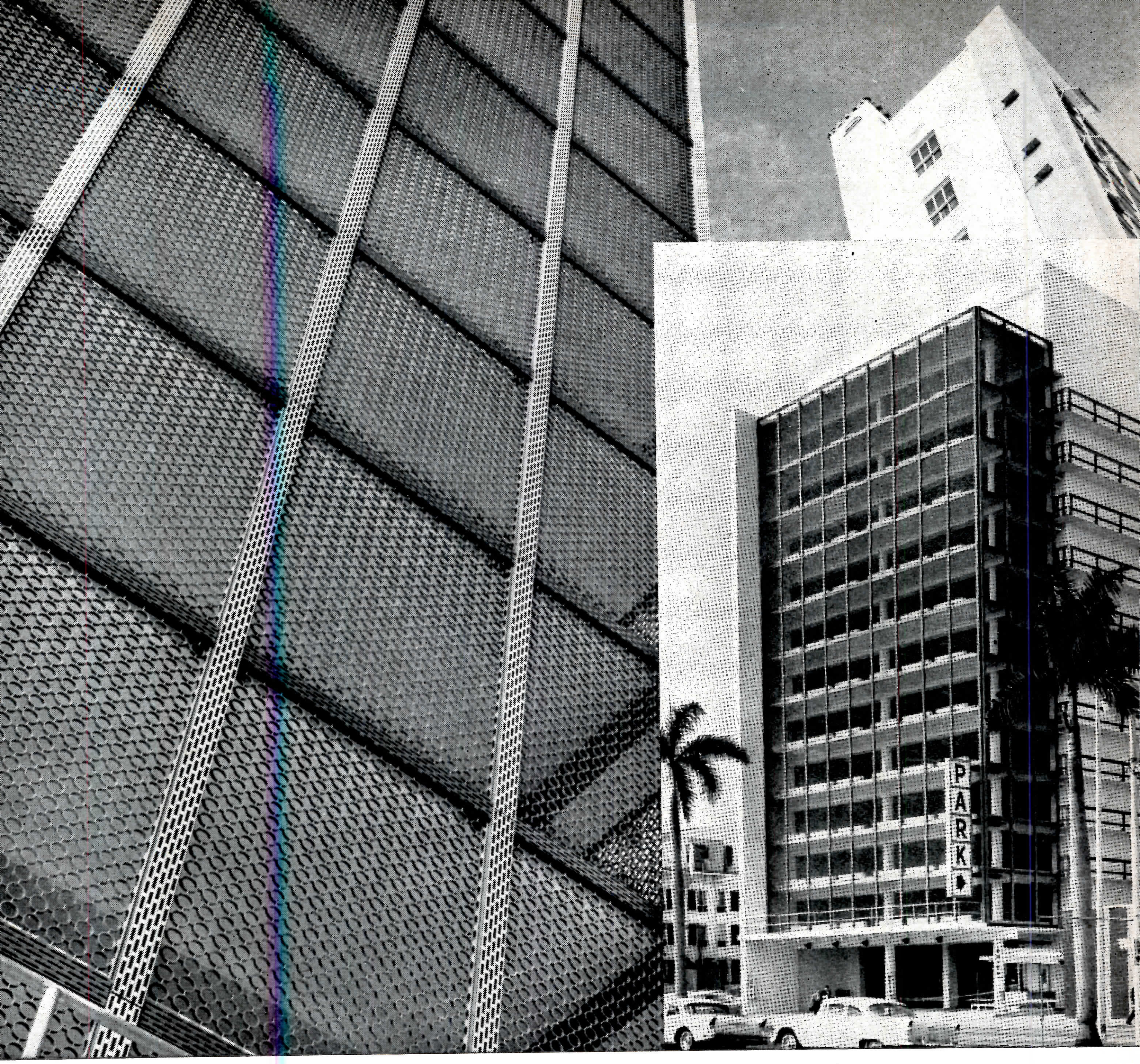
Filters used should be of the direct impingement, dry, replaceable type. Electrostatic filters are not recommended because they build up clusters of particles on the ionized plates which flake off and must be caught by back-up filters.

Scrubbing of the air with an aqueous chemical solution such as lithium bromide will require greater first cost and larger space. Ultra-violet lamps are effective against micro-organisms, but turbulent flow devices are required to make them truly effective. As the lamps get older and collect dust, they become less efficient and require replacement.

Chemical aerosols have a germicidal effect, but none has yet proved to be sufficiently safe for general use.

CENTRAL CONTROL ROOM

Operating costs of the air conditioning systems are a relatively small part of the total operating costs of the hospital. These costs tend to rise as the equipment gets older. It is usually difficult to obtain and keep qualified operating and maintenance personnel. Hospital mechanical and electrical facilities are so diverse, complex and spread through-out the building that the physical observation and checking of all equipment is a task requiring more help than the hospital usually can afford. The installation of a central control room, in which are contained all control and alarm functions and the means of resetting various control points, will greatly simplify the building operation and maintenance and will generally pay for itself in a very few years.



ORDEN ARCHITECTURAL DECOR PANELS: DECA-RIN

Borden Architectural Decor Panels are finding preference as the modern medium of architectural expression. The decorative, sturdy, lightweight aluminum panels are used for facades, grilles, dividers and many like applications. They are available in several types and innumerable variations of the types.

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The circular Deca-Ring pattern is currently produced with 3½″ O.D. rings assembled at 4½″ centers. Depths of ¾″ and 1″ are available. For more detailed information on Deca-Ring and other Borden Architectural Decor Panels, including Deca-Gril, Deca-Grid, Decor Plank and their many variations and subtypes, write for our new eight-page catalog on Borden Architectural Decor Panels.

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How to save by designing with Bethlehem high-strength steel reinforcing bars

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Look at the comparison diagrams on this page. They show you how to save on both concrete and steel. Still other savings are realized by increasing net floor area, lowering height of structure, reducing dead load, shortening the time needed to place materials.

Bethlehem bars are furnished with certified mill test reports that assure you of their mechanical and physical properties. Bethlehem high-strength bars are easily identified on the job by the numbers rolled right into the bar—"6" for 60,000 psi min yield bars and "7" for 75,000 psi min yield bars.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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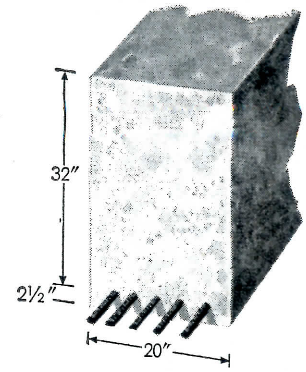
BEAMS

Fig. 1 is a basic beam of conventional design having a 30 ft span. Figure 1A utilizes A-432 steel and ultimate strength design for savings of concrete. Fig. 1B shows the savings in steel when the beam size is left constant.

FIGURE 1



ASTM A-15
Intermediate Grade

4 #11 + 1 #9
As=7.24 sq. in.
f′c=2500 psi
fs=20,000 psi
Basic Design

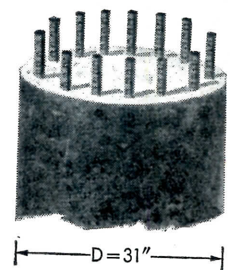
CONVENTIONAL DESIGN

ROUND COLUMNS

Fig. 2 is a basic round column of conventional design supporting a load of 914 kips. By using bars of A-432 or A-431 steel (Fig. 2A) column diameters are decreased. Maintaining the same column diameter as Fig. 2, Fig. 2B shows the resultant savings in steel.

FIGURE 2

ASTM A-15
Hard Grade



13 #11; As=20.3 sq. in.
f′c=3000 psi
fy=50,000 psi
Basic Design

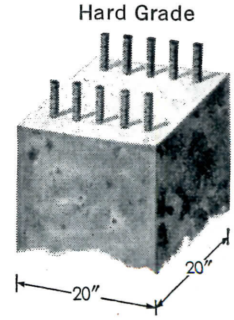
CONVENTIONAL DESIGN

SQUARE COLUMNS

Fig. 3 is a basic square column of conventional design supporting a load of 352 kips, having an eccentricity equal to 10 per cent of the column size. Fig. 3A demonstrates the savings in steel resulting from the use of A-432 steel bars, with column size unchanged. Fig. 3B shows the savings made using ultimate strength design. A-432 steel offers savings under either method of design.

FIGURE 3

ASTM A-15
Hard Grade

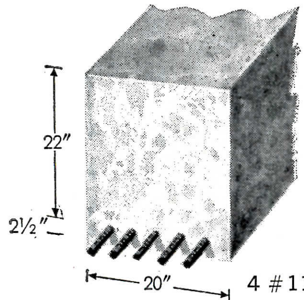


10 #11; As=15.60 sq. in.
f′c=3000 psi
fy=50,000 psi
Basic Design

CONVENTIONAL DESIGN (e=0.1t)

BETHLEHEM STEEL

FIGURE 1-A

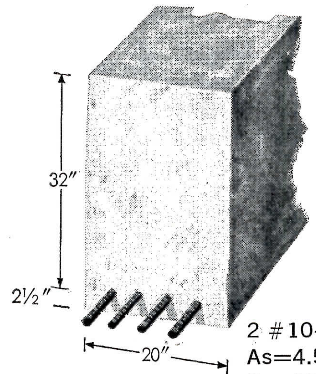


ASTM A-432

4 #11+1 #9
As=7.24 sq. in.
f′c=2500 psi
fy=60,000 psi
Saving Over Basic Design
Concrete=29%

ULTIMATE STRENGTH DESIGN

FIGURE 1-B



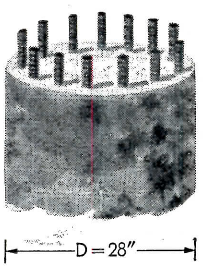
ASTM A-432

2 #10+2 #9
As=4.54
f′c=2500 psi
fy=60,000 psi
Saving Over Basic Design
Steel=37%

ULTIMATE STRENGTH DESIGN

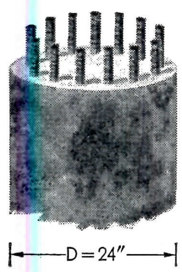
FIGURE 2-A

ASTM A-432



13 #11; As=20.3 sq. in.
f′c=3000 psi
fy=60,000 psi
Saving Over Basic Design
Concrete=18%

ASTM A-431

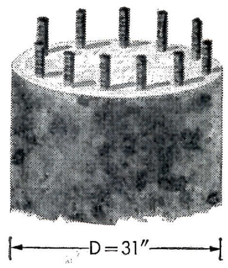


13 #11; As=20.3 sq. in.
f′c=3000 psi
fy=75,000 psi
Saving Over Basic Design
Concrete=40%

CONVENTIONAL DESIGN

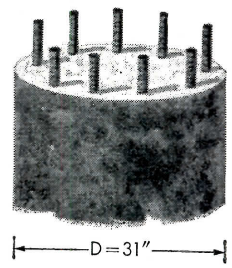
FIGURE 2-B

ASTM A-432



11 #11; As=17.1 sq. in.
f′c=3000 psi
fy=60,000 psi
Saving Over Basic Design
Steel=16%

ASTM A-431



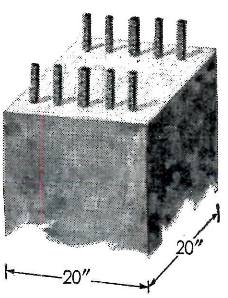
9 #11; As=14.0 sq. in.
f′c=3000 psi
fy=75,000 psi
Saving Over Basic Design
Steel=31%

CONVENTIONAL DESIGN

Spirals omitted from round columns for simplicity

FIGURE 3-A

ASTM A-432

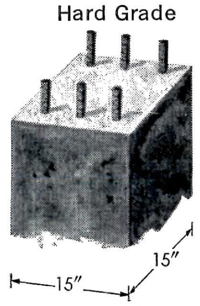


2 #11+8 #10; As=13.28 sq. in.
f′c=3000 psi
fy=60,000 psi
Saving Over Basic Design
Steel=15%

CONVENTIONAL DESIGN (e=0.1t)

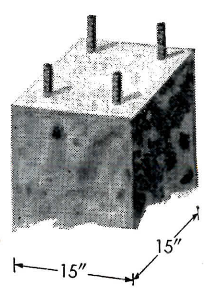
FIGURE 3-B

ASTM A-15
Hard Grade



6 #10; As=7.62 sq. in.
f′c=3000 psi
fy=50,000 psi
Saving Over Basic Design:
Steel=51%
Concrete=43%

ASTM A-432



4 #11; As=6.24 sq. in.
f′c=3000 psi
fy=60,000 psi
Saving Over Basic Design:
Steel=60%
Concrete=43%

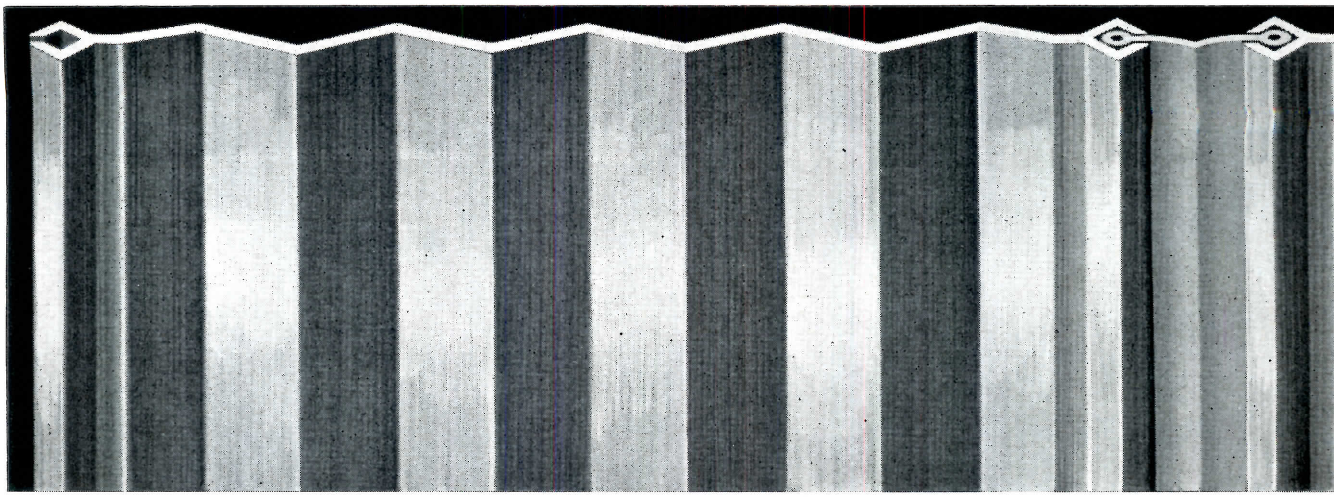
ULTIMATE STRENGTH DESIGN (e=0.1t)

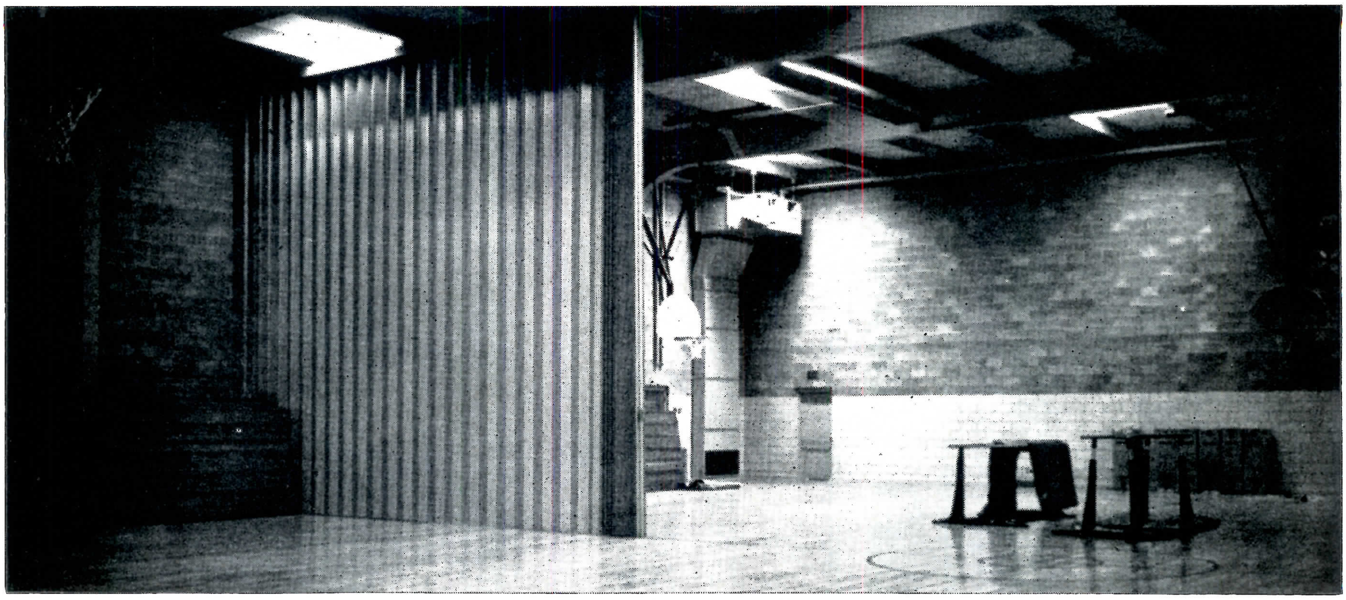
for Strength
. . . Economy
. . . Versatility

Steel

Ties omitted from square columns for simplicity

For more data, circle 91 on Inquiry Card





INISHES FOR CABINET WORK

ecifications Recommended by the National Association of Store Fixture Manufacturers

onclusion. First part of this article appeared in August)

**Toner finish for exposed hard-
od surfaces (continued):**
Finish for fine-textured woods
Toner finish—plain*
Apply toner. Spray one light coat
allel to the grain of the wood, fol-
ed immediately by a second coat
even up coloration. The amount of
er sprayed should create a uniform
or without closing the pores of the
od.
Spray water-white lacquer wash-
t and dry.
Sand lightly with 6/0 opencoat
asive paper. Dust off with air jet.
oid cutting through to bare wood.
ndthrough to wood should require
ch-up with toner and washcoat re-
lication.
Apply lacquer sealer and dry.
Sand with 6/0 opencoat abrasive.
st with air jet.
Spray water-white lacquer top-
t and dry.
Spray second topcoat water-
te lacquer and dry.
Toner-glaze finish.*
Spray toner parallel to grain to
form coloration. Dry thoroughly.
Spray lacquer washcoat.
Sand lightly with 8/0 opencoat
asive paper, parallel to grain, and
t off with air jet.
Apply glaze in thin coat over all
ed surface. Wipe in circular pat-
n to deposit glaze evenly in small
es. Follow by wiping with a clean
cloth parallel to the grain. A uni-
m color should be maintained
rall. Deposits of glaze in corners
similar places should be removed.
Spray lacquer sealer and dry.
Sand sealer with 6/0 opencoat
asive and dust with air jet.
Spray topcoat of water-white
quer and dry.

(h) Spray second topcoat of water-white lacquer and dry.

5. Opaque or pigmented finish for exposed hardwood surfaces:
A. *Opaque finish for coarse textured woods*
(1) Apply paste wood filler according to directions for filling under 1.A.(2).
(2) Dry thoroughly.
(3) Apply full wet coat of approved undercoating lacquer enamel. This undercoat shall be an appreciably different color from the finish coat to assure against skips in the spray pattern, and of a proper ground color with relation to the aforesaid finish coat. Dry.
(4) Sand all undercoated surfaces with 5/0 opencoat abrasive paper or finer, to complete removal of all roughness.
(5) Apply full wet coat of lacquer enamel. Dry thoroughly and scuff sand with 6/0 opencoat abrasive paper to remove accumulated roughness. Dust off completely with air jet.
(6) Apply second coat of lacquer enamel. Dry completely.
B. *Opaque finish for fine textured woods*
(1) Follow exact procedure outlined for coarse textured woods (5.A.) but eliminate step (1), the filling operation.

6. Finishing exposed particle board:
A. *Natural finish*
(1) Follow procedure under 1.B.
B. *Stained finish*
(1) Follow procedure under 2.B.
C. *Opaque or pigmented finish*
(1) Follow procedure under 5.B.

7. Opaque or pigmented finish for exposed paper-overlaid particle board:
Follow exact procedure outlined under 5.B., except eliminate second lacquer enamel topcoat.

8. Finishes for exposed fiberboard:
A. Natural—Follow procedure outlined under 1.B. (water-white lacquer shall not be mandatory).
B. Opaque or pigmented finish—Follow procedure under 5.B. eliminating second lacquer enamel topcoat.

RUBBING AND POLISHING

For each wood material used, and each finishing schedule used, the rubbing and polishing method should be selected by the architect from the following systems. He should specify which areas (tops, sides, etc.) will be rubbed and/or polished.

1. No rubbing or polishing:
Unexposed interior areas, drawer sides and interiors, shelving, and similar parts should not require any rubbing or polishing, other than removal by fine abrasive paper of any roughness created by the finishing process used.

2. Steel wool—Dull satin:
A. 3/0 steel wool should be used parallel to the grain of the wood, to remove roughness and create an all-over dull satin sheen in those areas specified by the designer.
(or) B. 4/0 steel wool should be used, parallel to the grain of the wood, to remove roughness and create an all-over dull satin sheen in those areas specified by the architect. 4/0 steel wool will create a slightly higher luster than 3/0 steel wool.

3. Dull satin:
A. Machine or hand sand, with 320 grit silicon carbide abrasive paper, using a non-blooming lubricant. All rubbing should be done parallel to the grain of the wood. Follow with an even rub in long continuous strokes with 4/0 steel wool. All lubricant and rubbing slush must be removed. Surface shall be clean and dry before waxing.
(or) B. Repeat procedure in (A) above, except use 360 grit silicon carbide abrasive paper in place of 4/0 steel wool.

4. Period satin:
A. Machine or hand sand with 320

---

either schedule for fine textured woods, if the
r is one having a high lacquer binder content,
coating may be eliminated. Light sanding
8/0 opencoat abrasive paper should be used
nooth toned surfaces before proceeding. Any
through of toned surface should require re-
ication of toner to match surrounding area
resanding with 8/0 abrasive paper

material was prepared by GLENN P. BRUNEAU,
rtment of Wood Technology, The University
ichigan

or 360 grit silicon carbide abrasive paper, using a non-blooming lubricant, until all orange peel and other irregularities in surface film are removed. Follow this by hand rubbing with 3-F pumice using a soft felt pad, in long continuous strokes. All residual pumice and rubbing slush shall be removed. Dry completely before waxing.
(or) B. Repeat procedure outlined in (A) above, but substitute 500 grit silicon carbide abrasive paper for the 3-F pumice. Rub in long continuous strokes parallel to the grain of the wood. Clean up thoroughly, dry and wax.

5. High sheen satin:
A. Sand, by machine or hand, with 360 grit silicon carbide abrasive paper, using a non-blooming lubricant, to remove all surface film irregularities. Follow with 4-F pumice by machine or hand, with soft felt rubbing pads. If a higher sheen is desired, small amounts of rotten-stone shall be added to the 4-F pumice.

6. High luster:
A. Sand surface, parallel to the grain, by machine or hand, with 320 or 360 grit silicon carbide abrasive paper, using a non-blooming lubricant. Follow with a final sanding with 400 grit silicon carbide abrasive paper to create an all-over fine scratch pattern. Irregularities in flat surfaces missed by these two operations should be rubbed by hand with soft felt pad, using 4-F pumice. Clean the surface so that no abrasive particles or pumice remain. Apply rubbing compound and buff with rotary buffer to all-over even sheen. Clean up excess compound and then polish lightly with rotary buffer and clean lambs wool pad. Care should be exercised in both the compounding and polishing operations to prevent burning or softening of finish by frictional heat.

FINISH FOR UNEXPOSED AREAS

1. Unexposed drawer surfaces:
A. Apply one coat of lacquer sealer on all inside surfaces of drawers and outside surfaces of drawer sides and back. Skips, in corners or elsewhere, shall not be allowed. When dry, hand sand with 6/0 opencoat abrasive paper to remove roughness. Dust thoroughly with air jet.

2. Accessible interior parts *(shelves, partitions, etc.)*:
A. Apply one coat lacquer sealer. Dry.
B. Remove any roughness by scuff sanding with 6/0 open coat abrasive paper.

UNIFORMING OF COLOR

1. Used where noticeable color differences exist on a unit, or between units in the same group.
2. Uniforming color should be applied without obvious lap marks or streaks, and shall not obscure the grain of the wood.
3. Wherever possible uniforming should be done on the last sealer coat, followed by a protective topcoat.
4. Uniforming colors should be formulated to give excellent adhesion to the surface on which they are applied.
5. Uniforming colors should have fade resistance equal to that of the entire finish system used.
6. Application of uniforming color on the final topcoat, instead of the sealer, should not create a surface roughness or sheen different from that of the topcoat.

FIELD PAINTING

1. Large panels and other items which cannot be satisfactorily finish painted in the shop may be painted in the field when specified by the architect.
A. All such items should be factory primed in a manner appropriate to the selected finish coat.
B. Finish painting in the field should conform to the appropriate preceding paragraphs presented in this article and the previous one (August).

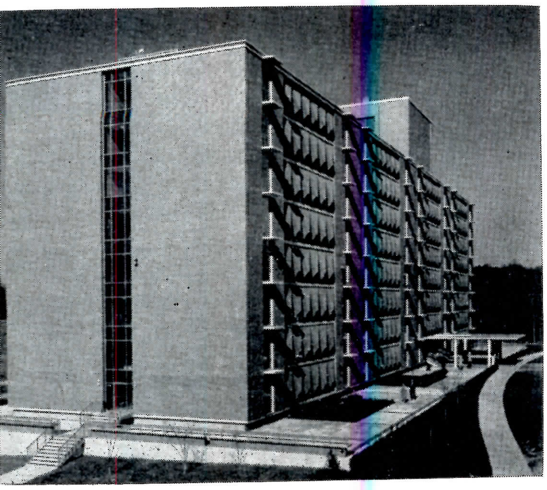
WORKMANSHIP; PREPARATION

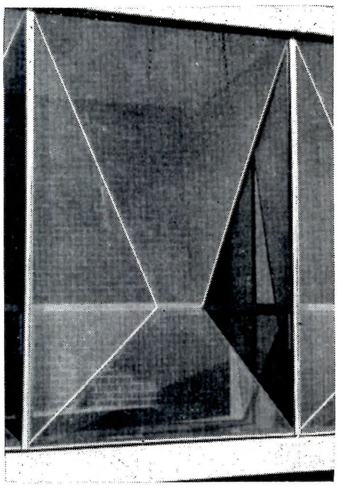
Workmanship Specifications
1. All workmanship shall be the very best with all materials evenly and smoothly applied. Runs, sags, bubbles, brush marks, heavy orangepeel, and other detrimental surface effects shall not be allowed. All finishing shall be performed under expert supervision.
2. Unless otherwise specified herein, all materials shall be applied in strict accordance with printed directions of the finishing-material manufacturer.
3. No finish shall be applied over a preceding coat unless the precedi coat is completely dry.
4. Doors and other components th are free to warp shall be given a su ficient number of coats of finishi material on opposite side and edg to equalize moisture gain or loss a thus minimize warpage.
5. Holes for locks and catch stri plates shall be touched up to mat adjoining surfaces.

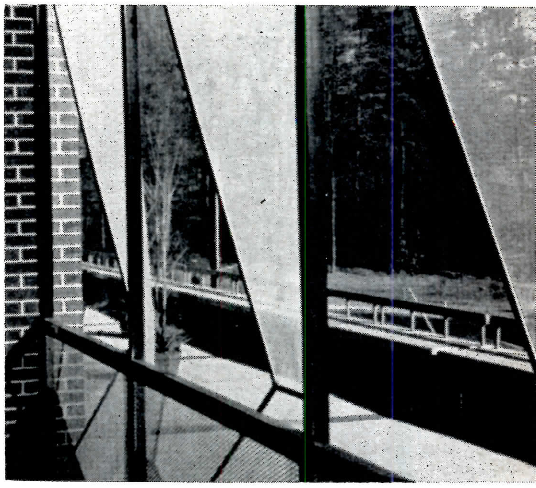
Preparation for Finishing
1. Before any finish is applied, wood surfaces shall be thorougl sanded, by machine or hand sandi
A. All sanding shall be done para to the grain of the wood.
B. A succession of grit sizes shall used, each removing in turn all coarser grooves created by the p ceding grit.
2. For all exterior or exposed s faces, a final grit size of 4/0 or fi shall be used.
3. Sandthrough at edges, corners other areas of veneered surfaces sh not be allowed, except for opac finishes.
5. Veneered panels having excess bleedthrough of adhesive due to h or cold-press gluing shall be admit for opaque finishes.
6. No cross-grain sanding ma shall be admissible for any finish s tem on veneered or solid wood me bers.
7. For surfaces to be water stain the 4/0 sanding shall be followed an application of glue sizing (part, by volume, hot animal glue to parts water at approximately 140 applied lightly and evenly over sanded surfaces. The sized surfa shall be thoroughly dried and th lightly sanded with 5/0 openc abrasive paper, by machine or ha to remove all raised grain created sizing. Water staining can then p ceed with a minimum of raised gra
8. All knife-edge corners shall carefully eased with 4/0 abras paper.
9. All wood surfaces shall be k free of dust, dirt, oil, adhesives, other substances which would in fere with normal finishing proced
10. On surfaces to receive opa finishes, dents, cuts, nail holes similar damage shall be filled, d completely and then sanded f with 4/0 abrasive paper. The fil material selected shall be one giv excellent adhesion to uncoated w surfaces.

For more information circle selected item numbers on Reader Service Inquiry Card, pages 233-234

GLASS FIBER BALCONY SCREENS OFFER PRIVACY AND SAFETY







A uniformly textured façade for apartment buildings with balconies is provided by screens of *Fiberglas* cloth, held in aluminum frames to form any desired pattern.

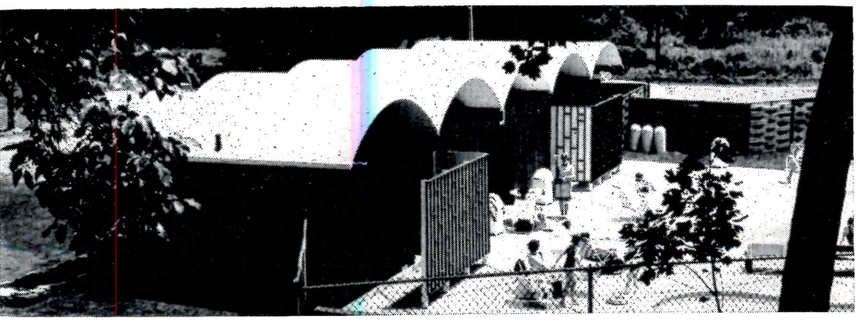
Fibers of glass are coated with weather-resistant vinyl to form colored yarns which are woven into a lightweight flexible cloth with a tensile strength of 140,000 psi.

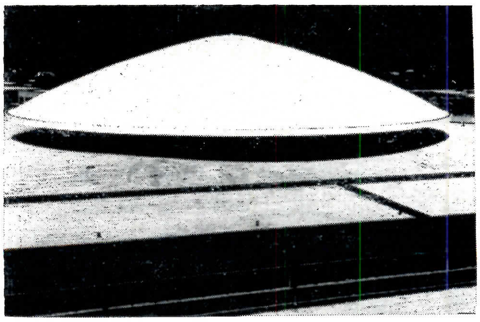
The screens also give privacy and safety to balcony users. While the interior is shielded from outside view, people in the balconies can see outside. The screen panels also provide a safety barrier without the need for railings or bars. Heavy particles of dirt, insects and birds are screened out, while objects on the balcony cannot fall out.

Picture on the left is an apartment house in Atlanta by architects Heery and Heery. Center picture is an outside view of the panels used. Aqua and dark green were used to create a shadow effect. The picture on the right was taken looking out through a different set of panels. *Owens-Corning Fiberglas Corp., Toledo 1, Ohio*

CIRCLE 300 ON INQUIRY CARD

ONE-PLY ROOFING FOLLOWS ALL CONTOURS





Weatherproofing of roofs of any contour, such as curved shells, folded plates and hyperbolic paraboloids, as well as domes and flat roofs, is possible with a one-ply built-up roofing system which can be used on any nailable or non-nailable flat or steep roof deck.

Ruberoid's *T/N 200* combines asbestos fiber with Du Pont's *Tedlar* polyvinyl fluoride film. The roofing membrane is produced by forming asbestos fiber into asbestos felt to which *Tedlar* is then laminated.

Conventional application techniques, with either hot or cold adhesives, are used. A pressure-sensitive tape of the same plastic film is used to seal end and side flaps.

T/N 200 has an expected life of up to 30 years. The surface film is resistant to most chemicals and solvents and impermeable to gas and vapors. It remains flexible at temperatures from -50 to 250 F. *The Ruberoid Co., 733 Third Ave., New York 17, N. Y.*

CIRCLE 301 ON INQUIRY CARD

more products on page 222

Office Literature

For more information circle selected item numbers on Reader Service Inquiry Card, pages 233-234

FIRE STATION DESIGN

Pictures, floor plans and descriptions of more than 90 fire stations from 26 states and Canada are featured in the new edition of "Fire Station Design." Several combination fire and police stations are included in the 80-page book. *The Circul-Air Corp., 565 E. Milwaukee Ave., Detroit 2, Mich.*

CIRCLE 400 ON INQUIRY CARD

BUSINESS FURNITURE

Classic 1000 models of executive desks, secretarial desks and consoles are available in oiled walnut or teak with stainless steel trim. There is a range of sizes. *General Fireproofing Co., Youngstown 1, Ohio*

CIRCLE 401 ON INQUIRY CARD

VINYL BUILDING PANELS

Self-extinguishing, translucent rigid vinyl building panels available in several colors can be used for skylights, siding, roofing, partitions, ceilings, canopies, shelters and other decorative uses. *Monsanto Chemical Co., 800 N. Lindbergh Blvd., St. Louis 66, Mo.*

CIRCLE 402 ON INQUIRY CARD

PIPE INSULATION

Drawings and explanations of the mechanical systems of nine basic types of air conditioning and refrigeration systems are included in a 26-page booklet which tells what kind of insulation to use and where it should be applied to prevent excessive heat loss or gain and to stop condensation and frost formation. *Armstrong Cork Co., Lancaster, Pa.*

CIRCLE 403 ON INQUIRY CARD

LOW WATTAGE LUMINAIRE

Circlelux Mark I incandescent low wattage luminaire is designed for outdoor residential lighting and low-level commercial installations such as motel walks, swimming clubs, etc. Data sheet gives details. *Pfaff & Kendall, 84 Foundry St., Newark, N.J.**

CIRCLE 404 ON INQUIRY CARD

WATER COOLERS

(A.I.A. 29-D-42) Thirteen design categories of electric water coolers for offices, plants, cafeterias and other locations are illustrated in a 16-page brochure. *Haws Drinking Faucet Co., Fourth and Page St., Berkeley 10, Calif.**

CIRCLE 405 ON INQUIRY CARD

LUMINOUS CEILING PANELS

(A.I.A. 26-A-9, 31-F) Translucent glass fiber reinforced plastic luminous ceiling diffuser panels are available in a variety of patterns. *Filon Corp., 33 N. Van Ness, Hawthorne, Calif.*

CIRCLE 406 ON INQUIRY CARD

DOOR CLOSERS

(A.I.A. 27-B) Norton *Tri-Style* line of door closers is described in a 16-page manual which includes photographs, dimensional drawings, sizing charts and specifications. There are three mounting styles. *Norton Door Closer Co., 372 Meyer Rd., Bensenville, Ill.**

CIRCLE 407 ON INQUIRY CARD

STORE LIGHTING

(A.I.A. 31-F-23) Advantages of incandescent and fluorescent lamps are discussed in terms of store lighting needs. This engineering report points out places where either should be used alone and where the two may be combined for good visibility and eye comfort. *Holophane Co., Inc., 342 Madison Ave., New York 17, N.Y.*

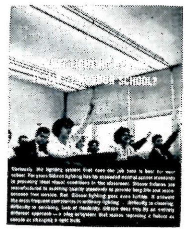
CIRCLE 408 ON INQUIRY CARD

SHOWER SYSTEMS

(A.I.A. 29-D-21) Engineering details and specification data for thermostatically controlled shower systems for residential, commercial, school, industrial and public recreational use. All feature a thermostatic water control which senses and corrects temperature and pressure fluctuations. *The Powers Regulator Co., 3400 Oakton St., Skokie, Ill.**

CIRCLE 409 ON INQUIRY CARD

SCHOOL LIGHT FIXTURES



Plug-in lighting fixtures for schools are available for both pendant and surface mounting. *Uni-Race*, the permanently mounted wireway can be installed before the room is completed with fixtures added after painting is done. Cleaning and repairs can be done in the shop, while spares are used in rooms. *Gibson Mfg. Co., 1919 Piedmont Circle, N.E., Atlanta, Ga.*

CIRCLE 410 ON INQUIRY CARD

PRECAST ROOF SLABS

Precast concrete roof deck slabs are presented in a catalog which has descriptions and specifications on all lines. *Duwe Precast Concrete Products, Inc., Oshkosh, Wis.**

CIRCLE 411 ON INQUIRY CARD

TRIANGLE VENTS

Triangle-shaped vents have arched louvers for extra strength and rigidity and more effective weather protection. *Leigh Building Products, Div. of Air Control Products, Inc., Coopersville, Mich.*

CIRCLE 412 ON INQUIRY CARD

"CLEAN ROOM" REFERENCE

A bibliography on "Clean Rooms and Contamination Control" and "Sampling and Monitoring Air in Clean Rooms" has references to reports, specifications, articles, speeches and books on these subjects. *Controlled Environment, Inc., 915 Great Plain Ave., Needham 92, Mass.*

CIRCLE 413 ON INQUIRY CARD

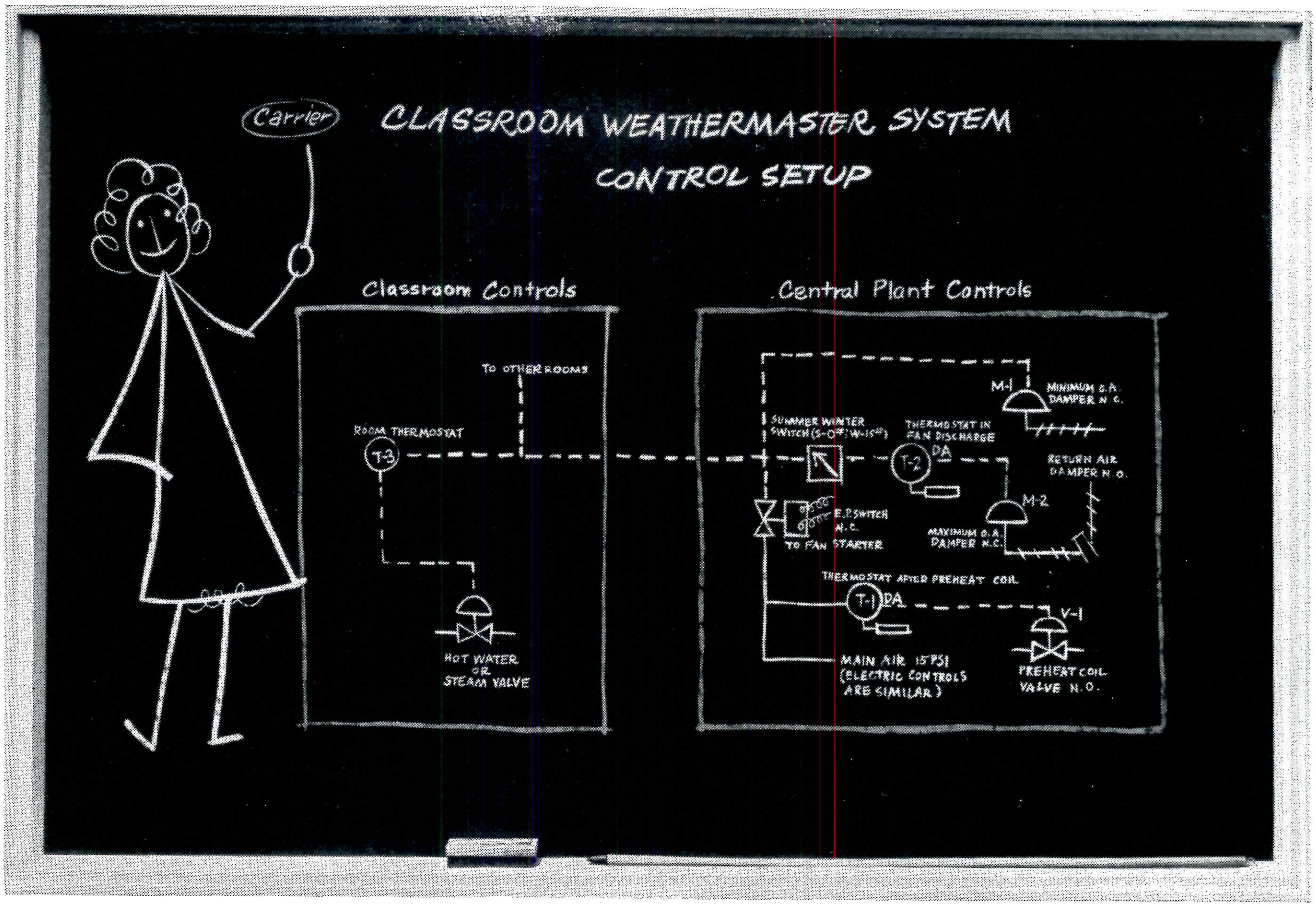
POLARIZED LIGHT

Recommended uses and benefits of polarized light and photometric data on polarizing panels in commercial, industrial and institutional lighting are included in an 8-page brochure. *Day-Brite Lighting Inc., 6261 N. Broadway, St. Louis 15, Mo.**

CIRCLE 414 ON INQUIRY CARD

**Additional product information in Sweet's Architectural File*

more literature on page 266



How to provide good control of school climate while greatly simplifying the control layout

Some systems suitable for schoolhouse heating, cooling and ventilation are a lot easier and less costly to control than others. A real jewel in this respect is the single duct, all-air cooling system featuring Carrier Classroom Weathermaster* Units.

This type of induction system requires only one room thermostat and one hot water or steam valve in each classroom. Equally important, the control setup in the central machine room is extremely simple (see above). With or without mechanical refrigeration, this approach assures the best possible automatic control of temperature in the classrooms.

Compare this control economy with other methods. For example, some types of classroom units require these controls to do the complete job: 1 room thermostat, 1 low-limit thermostat, 1 hot water or steam valve, 2 sets of dampers, 2 damper motors, 1 relay. Multiply this battery of controllers by the number of classrooms and you get the true picture.

Simplicity of control is just one important advantage of the induction system approach to school heating, cooling and ventilation.

For more architectural and engineering facts on Carrier Classroom Weathermaster Units and the system they serve, write today for Carrier Bulletin 36BA86. Carrier Air Conditioning Co., Syracuse 1, New York.

*Reg. U. S. Pat. Off.

Carrier Air Conditioning Company

For more data, circle 94 on Inquiry Card

For more data, circle 95 on Inquiry Card

Moisture constantly seeks a point of access into every type of construction. It will never find weak spots if you have the right flashing in all the right places. ■ WASCO flashing, properly installed, is permanent insurance against water damage. Yet the cost of this complete WASCO protection is generally less than 1/20 of 1% of total construction investment. ■ Only Cyanamid offers every kind of thru-wall and spandrel flashing you need to keep water out — from parapet to foundation. You can specify 14 types of flashings including copper-fabric, copper-asphalt, copper-lead, fabric, plastic and aluminum. For exceptional flashing problems, you are invited to consult the Cyanamid Engineering staff. For full product details, see Sweet's Architectural File 8g/Wa.

WASCO® FLASHING

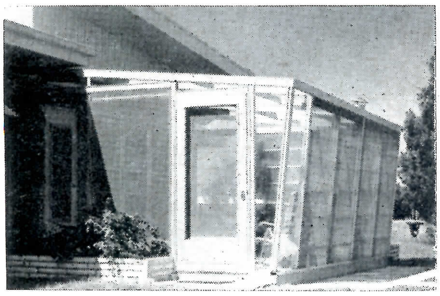
BUILDING PRODUCTS DIVISION CYANAMID 5 BAY STATE ROAD, CAMBRIDGE 38, MASS.

Product Reports

continued from page 217

ALUMINUM AND PLASTIC ROOM HAS RETRACTABLE WALLS

Flexible, clear, translucent plastic reinforced with aluminum rods is used for retractable walls and roofing in add-on family or private rooms or for patio coverings attached to existing

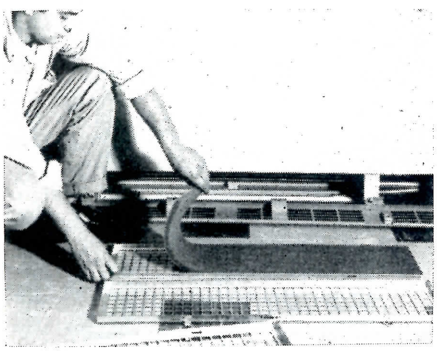


structures. Standardized panels are fire and wind resistant. Disappearing *Retractawals* operate as window shades manually or automatically. *Guaranteed Weather, Inc., 514 Manatee Ave., W., Bradenton, Fla.*

CIRCLE 302 ON INQUIRY CARD

WASHABLE FOAM FILTERS FOR SCHOOL VENTILATORS

Available for installation in classroom unit ventilators manufactured by John J. Nesbitt, Inc., are plastic foam filters fabricated from Scott industrial open-pore polyurethane

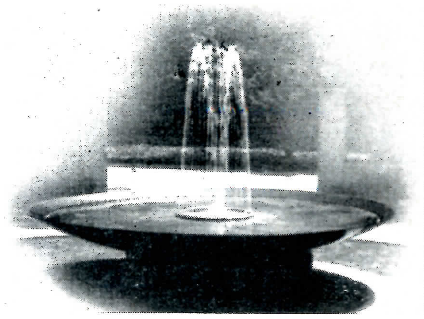


foam. The filters, washable in lukewarm water with mild detergent, require washing only about every two months in normal use. After being washed, filters are wrung out like a sponge and reinstalled immediately. They require no re-oiling and may be washed as often as necessary without reducing filtering efficiency. *John J. Nesbitt, Inc., Philadelphia, 36, Pa.*

CIRCLE 303 ON INQUIRY CARD

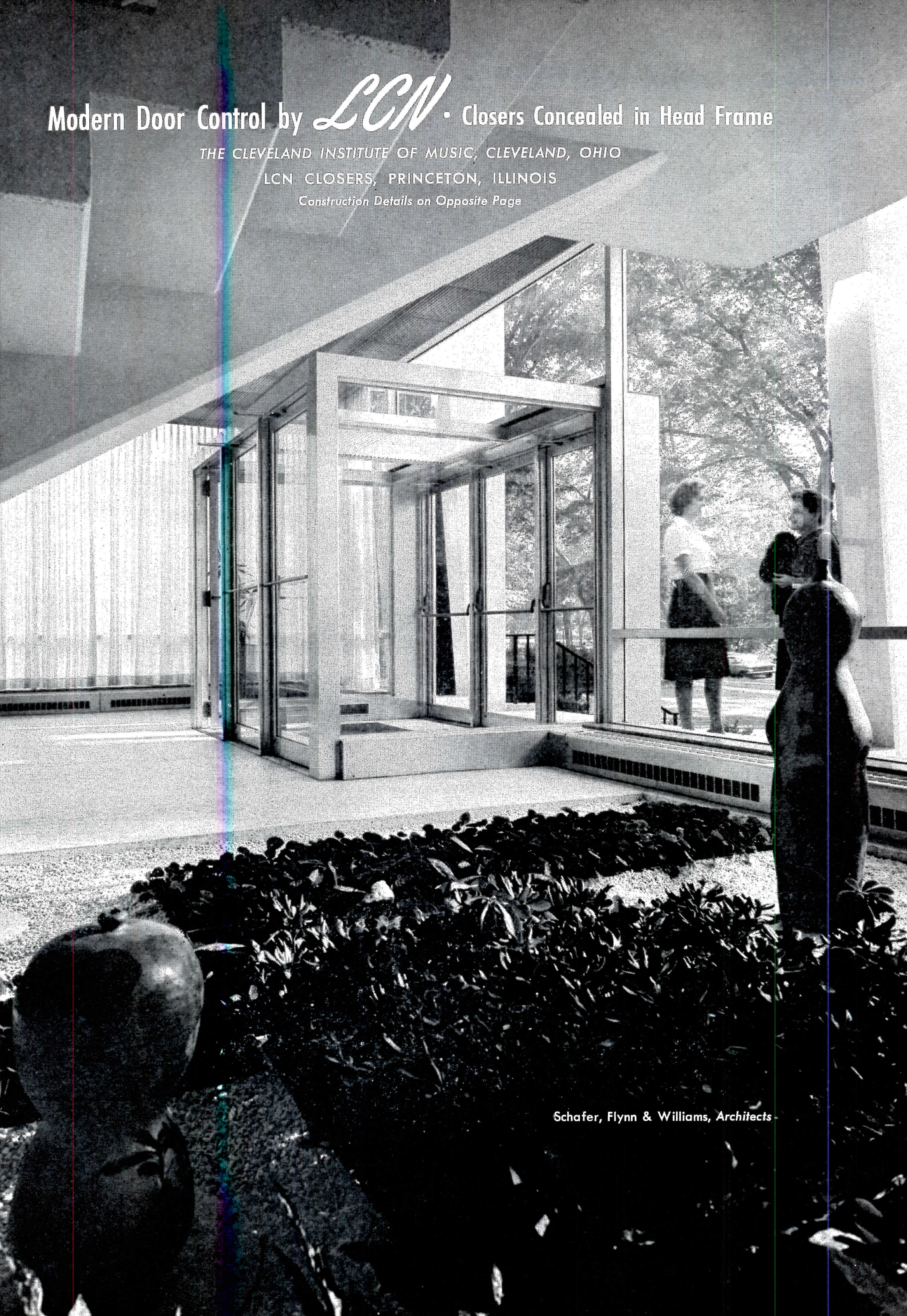
PRE-FAB FOUNTAINS AND WATERFALLS

Reflection pools and fountains of any size, complete with water sculpture, lighting, recirculating pumps and statuary, are made of lightweight fiber glass and crushed stone. All units are delivered complete and ready for immediate use. A wide choice of finishes and colors is available, including ceramic tile permanently bonded to pools with epoxy adhesives. *Jabon Studios, 14847 Bessemer St., Van Nuys, Calif.*



CIRCLE 304 ON INQUIRY CARD

more products on page 22


Modern Door Control by LCN · Closers Concealed in Head Frame
THE CLEVELAND INSTITUTE OF MUSIC, CLEVELAND, OHIO
LCN CLOSERS, PRINCETON, ILLINOIS
Construction Details on Opposite Page
Schafer, Flynn & Williams, Architects

DUKANE

DEPTH OF SERVICE

on-the-spot sound and communication system consultation, installation supervision and follow-up service!

Since 1922, DUKANE has built a coveted reputation for electronic excellence, beauty, dependability and long life in sound and communication systems. DUKANE Depth of Line and Depth of Experience is backed by Sales Engineering Distributor Depth of Service.

A call to your local DUKANE Distributor starts the ball rolling. After a consultation with you regarding your sound and communication system needs, the DUKANE Distributor will make his recommendations to provide the most efficient system consistent with requirements and budget.

After specification, he follows and supervises the sound and communication system installation to completion. His training assures you proper installation for complete satisfaction.

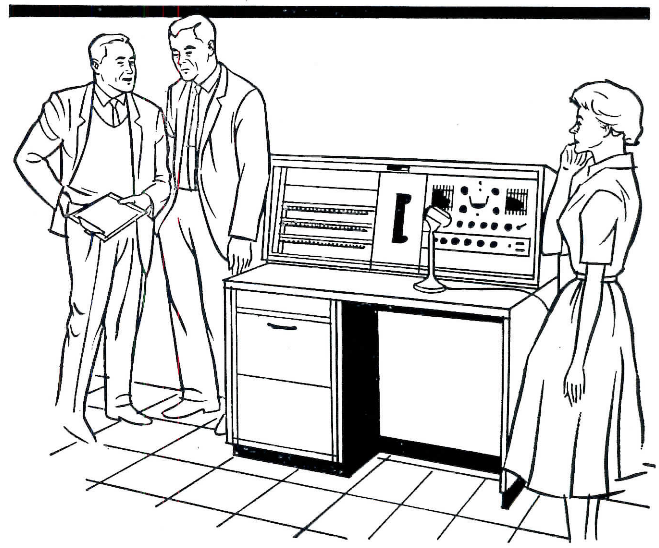
Keeping the system operating to your customer's or client's complete satisfaction over the years is a responsibility your DUKANE Distributor assumes in a service contract. He also sees that customer personnel are efficiently schooled in operation and usage of the system.

The proof of his experience is the countless number of DUKANE Sound and Communication System installations which are turning profitable and high efficiency records in hospitals, schools, business, industry, churches, sports and recreation areas, hotels, motels, etc. 300 DUKANE Sales Engineering Distributors nationwide assure "phone call" nearness for consultation and service.

CONSULTATION SERVICE

INSTALLATION SUPERVISION

FOLLOW-UP SERVICE



WRITE TODAY FOR FULL DETAILS ON DUKANE DEPTH OF LINE IN SOUND AND COMMUNICATION SYSTEMS

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DUKANE CORPORATION

Communications System Division

DEPT. AR-92 / ST. CHARLES, ILLINOIS

For more data, circle 97 on Inquiry Card

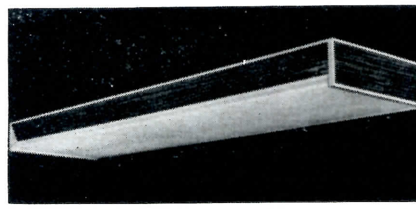
For more data, circle 98 on Inquiry Card

Product Reports

continued from page 222

WOOD BRACKETS FOR LIGHTING

Madera, a fluorescent lighting devi to be mounted on either ceiling c wall, has oil-finished wood surface and prismatic lens diffusers. Ceilin



model may be surface or stem moun ed. *Dept. M, Silvray Lighting, Inc 100 W. Main St., Bound Brook, N.*

CIRCLE 305 ON INQUIRY CAI

ULTRA-THIN HI-FI SPEAKER

Syl-o-ette, an ultra-thin (4 in. depth) high fidelity speaker syste has low 500 cps crossover, so woof need not extend itself to reprodu both bass and mid-range frequencie Three-dimensional frame cabin comes in walnut veneers and gril fabrics of hand-embroidered pet point, silk-screened neo-classic a and cane. Special hardware and easi removable base permit use on floor c wall, horizontally or vertically. *Un versity Loudspeakers, 60 South Ke sico Ave., White Plains, N.Y.*

CIRCLE 306 ON INQUIRY CAI

UP-FLOW, DOWN-FLOW FURNACES

A new series of up-flow, down-flo furnaces in the 200,000 to 750,0 Btuh range are available for con mercial and industrial building hea ing applications. Up-flow model designated *U-Pak,* are designed wit cabinet blower on the bottom an heater on top, return air bein brought in either at lower back c from underneath, discharge air take off vertically at a top back duct co nection. On down-flow models, calle *D-Pak,* cabinet blower is on top a heater is on bottom. Discharge air taken off vertically at a bottom ba duct connection. Both models come two sizes. *Reznor Manufacturi Company, Mercer, Pa.*

CIRCLE 307 ON INQUIRY CAI

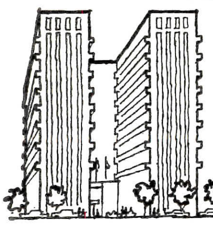
more products on page 2

LOWEST MAINTENANCE . . . DURABLE . . . EXCLUSIVE FINISH . . . WIDEST CABINET SELECTION

Geneva

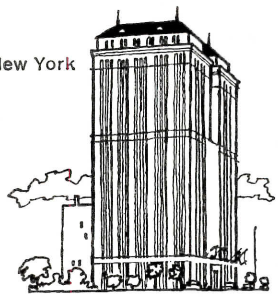
NATIONALLY PREFERRED FOR APARTMENT KITCHENS

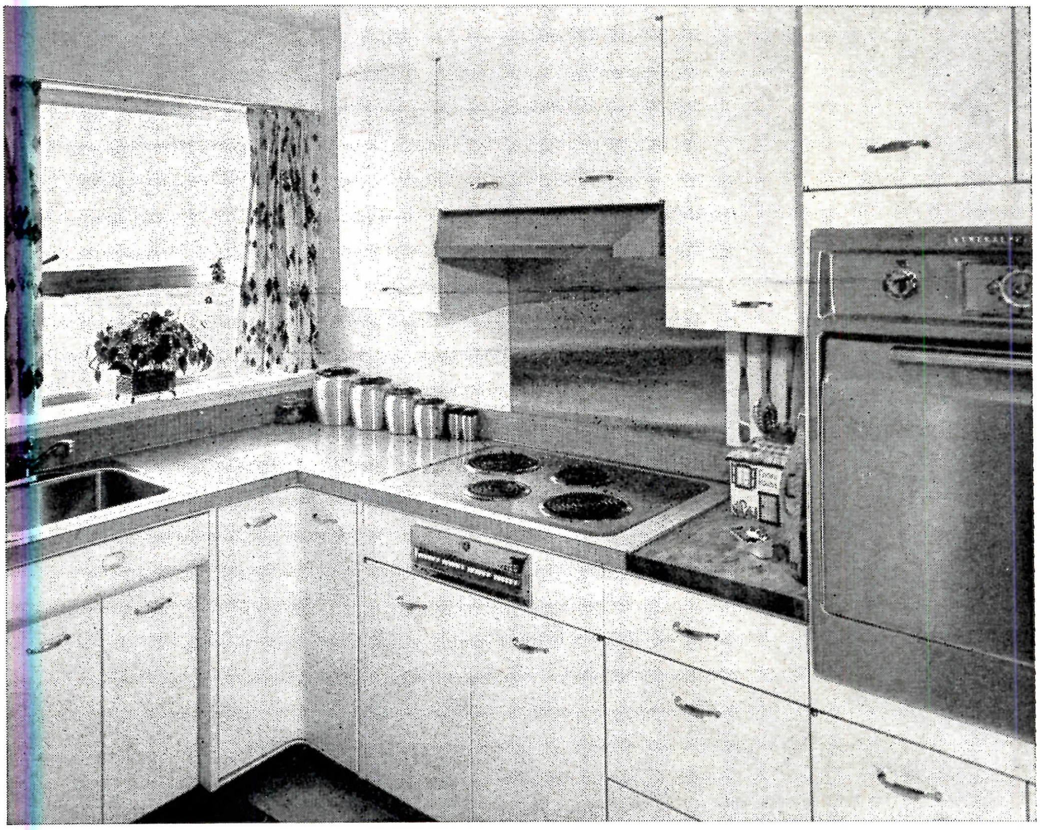
San Francisco



Chicago

New York





El Paso

From coast to coast, border to border GENEVA is the preferred kitchen for apartments — **and with good reason.**

LOWEST MAINTENANCE— Cost studies prove Geneva kitchens require far less maintenance than competitive products . . . a consideration extremely important to apartment owners.

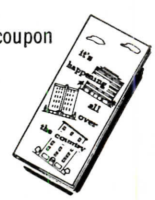
DURABLE—Geneva kitchens retain their original beauty for years and years — even when subjected to the severe abuse of renter families.

EXCLUSIVE FINISH . . . CHOICE OF COLORS— Only Geneva offers IMPASTO, the non-gloss textured finish. Attractive, durable, stain resistant, cleans with a damp cloth. Choice of many fashion colors.

WIDEST CABINET SELECTION — Geneva offers the widest line of standard cabinets . . . permits designing to the specific room dimensions at no price penalty.

EXPERIENCED ASSISTANCE — A factory trained Geneva specialist will be happy to assist you on kitchen design . . . is your right arm on supervising installation.

WRITE FOR LITERATURE — Use the coupon



Geneva KITCHENS

GENEVA MODERN KITCHENS

Division of Acme Steel Company

GENEVA MODERN KITCHENS
Dept. AR-9-62, Geneva, Illinois
Please send me free literature.

Name____________________

Address____________________

City__________ Zone_____ State________

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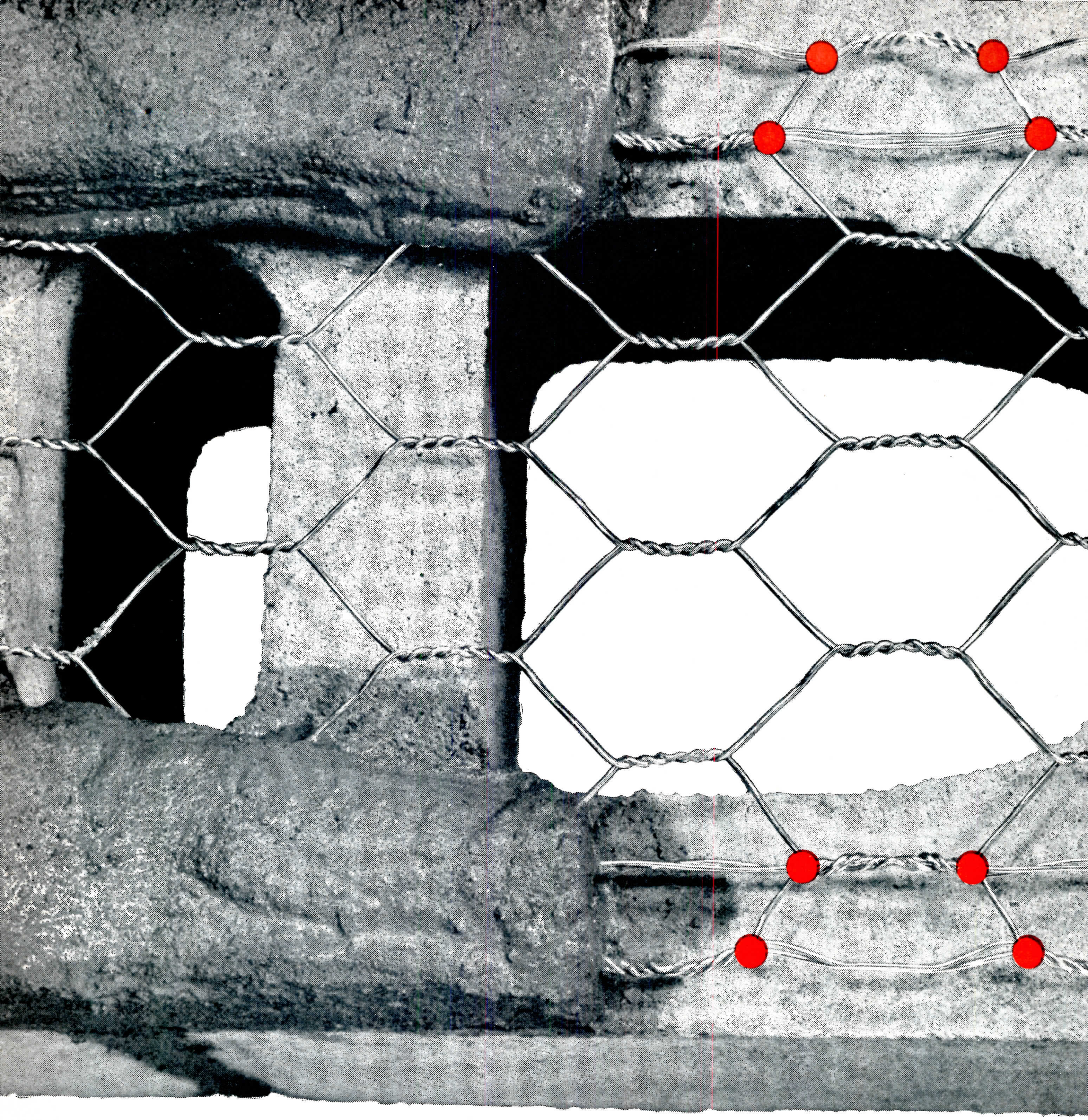
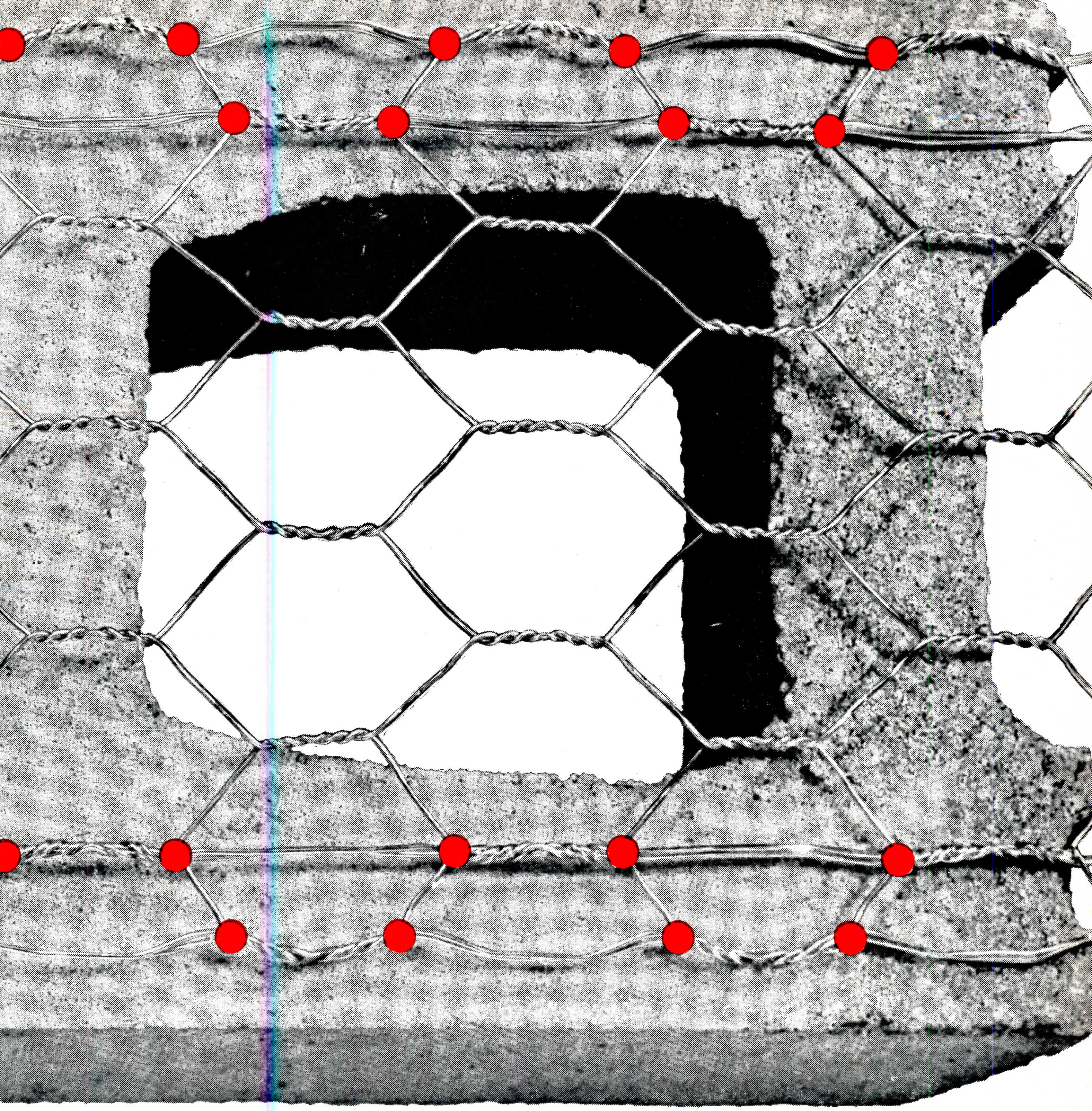
For more data, circle 106 on Inquiry Card



KEYSTONE STEEL & RE CO PANY Peoria, Illi



28 mortar locks to the block foot with Keywall reinforcement. The more locks, the more resistance to cracks resulting from shrinkage. Movement is restrained at each of Keywall's mortar locks. No one lock has to restrain more than the movement in 3/4" of block. That's the kind of reinforcement that works.

MORE LOCKS TO THE BLOCK WITH KEYWALL

AKERS OF KEYCORNER • KEYSTRIP • KEYWALL • KEYMESH® AND KEYMESH PAPERBACKED LATH • WELDED WIRE FABRIC • NAILS

Product Reports

continued from page 226

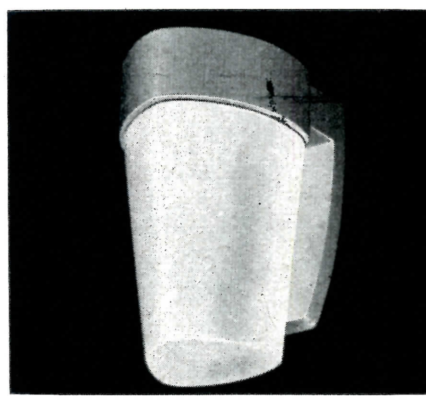
FIRE DETECTION COMBINES WITH HOME INTERCOM

Model 42 residential *Detecto-Com* provides around-the-clock fire detection throughout the house and carries two-way voice messages between any number of stations. A three-transistor amplifier is powered by the front door chime transformer and does not need a warm-up. Callers can talk into an outdoor remote station answered from any indoor station. Push-buttons at indoor stations open door. *Fasco Industries, Inc., Rochester 2, N. Y.*

CIRCLE 308 ON INQUIRY CARD

WALL BRACKETS FOR OUTDOOR, INDOOR LIGHTING

Triangalite, of cast aluminum and anodized finish, is available in 100 and 200 watt sizes. Both will accommodate either triangular glass or



conventional round globe. Cast aluminum guards and vapor-tight wiring boxes are available for all units. A choice of three colors is offered in an epoxy luster finish: satin aluminum, brass or copper, or an anodized satin aluminum finish. *Moldcast Mfg. Co., 236 South St., Newark 14, N.J.*

CIRCLE 309 ON INQUIRY CARD

COMPUTING SLIDE RULE

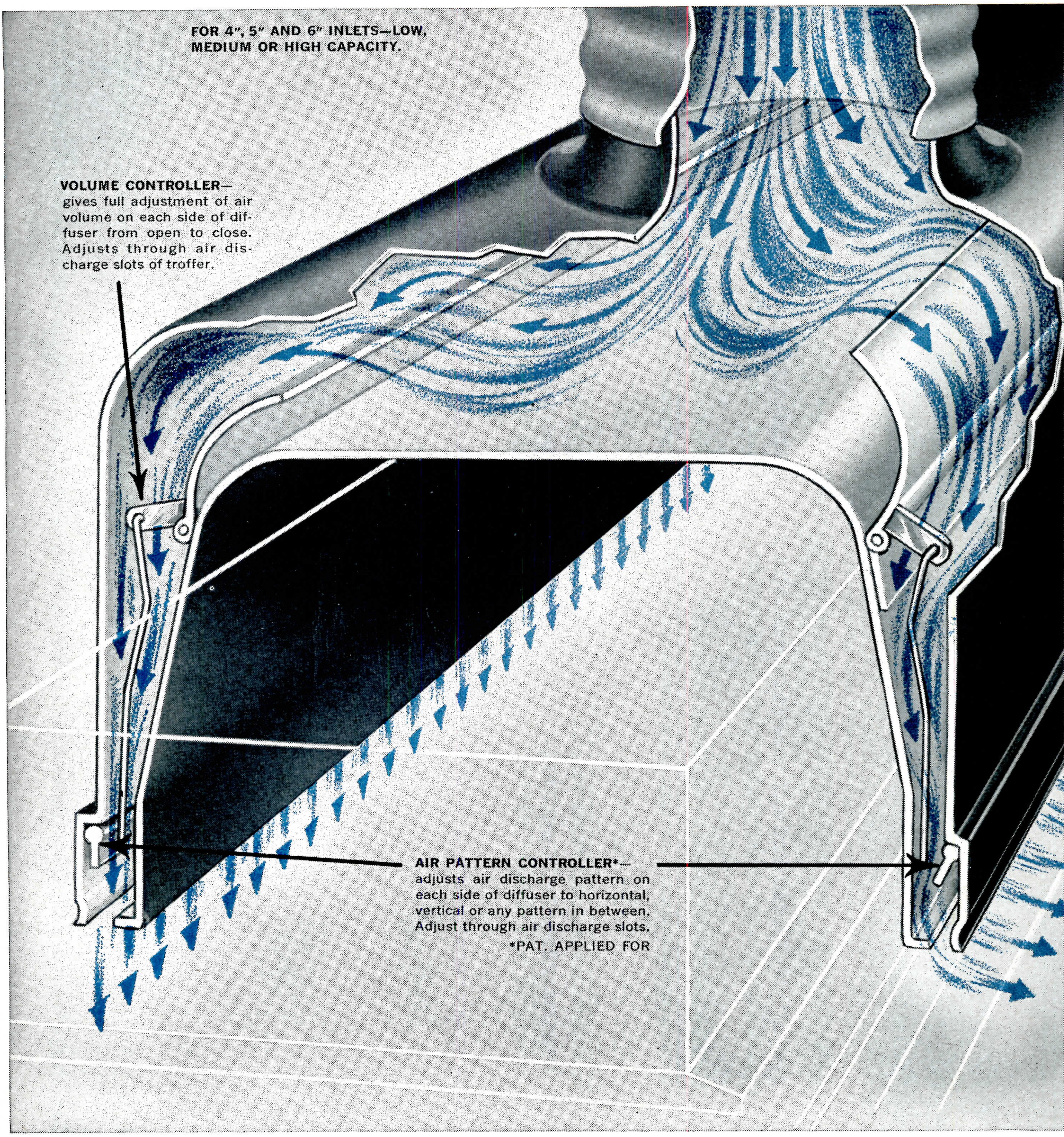
Deci-lon, a new engineering-science slide rule, built on the principle of the Deci-trig, features 26 scales, extended calibrations, and a redesigned easier-to-manipulate indicator. These features provide greater consistency and faster readings. *Keuffel & Esser Co., Hoboken, N.J.*

CIRCLE 310 ON INQUIRY CARD

more products on page 244

For more data, circle 108 on Inquiry Card

← For more data, circle 107 on Inquiry Card


FOR 4", 5" AND 6" INLETS—LOW, MEDIUM OR HIGH CAPACITY.
VOLUME CONTROLLER—gives full adjustment of air volume on each side of diffuser from open to close. Adjusts through air discharge slots of troffer.
AIR PATTERN CONTROLLER*—adjusts air discharge pattern on each side of diffuser to horizontal, vertical or any pattern in between. Adjust through air discharge slots.
*PAT. APPLIED FOR

NEW *complete line of* CEILING DIFFUSERS

Today's first for <u>unrestricted</u> use with modified light troffers; superior air distribution on any application

Here, for the first time, is a line of air diffusers that can be specified *entirely independent* of the light troffer* selected! This means architects, engineers and contractors can now be sure of the finest air distribution . . . *regardless of modified troffer used . . . regardless of ceiling application.* *(Contact Titus reps for names of qualified light troffer manufacturers.)

LOOK AT THESE BENEFITS YOU GET ONLY WITH THE NEW TITUS AIR DIFFUSING UNITS:

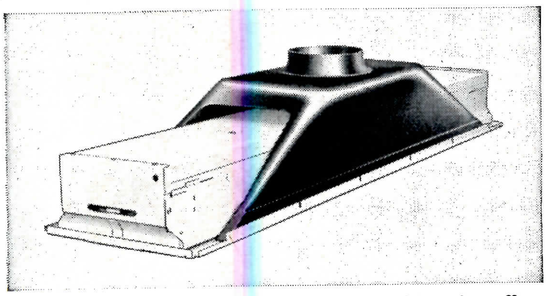
1. Completely adjustable air pattern. The air pattern on each side of each Titus unit can be quickly, easily adjusted to a horizontal discharge, a vertical discharge, or to any pattern in between, to exactly suit the space requirements. Simply adjust pattern controller through troffer air discharge slot for pattern desired.

2. Complete air volume control . . . from open to closed position. Adjusts through air discharge slot of troffer. Both air pattern controller and volume controller can be adjusted anytime before, during, or after diffuser installation.

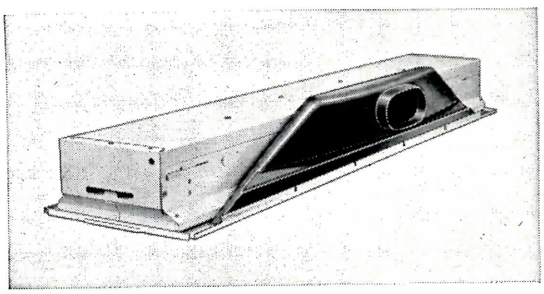
3. Diffusers are of one-piece, air-tight construction. This means faster, easier, lower-cost installation—*maximum isolation of air diffuser from light troffer.* Because diffuser is independent of troffer, heat from troffer is dissipated uniformly to ceiling space—no supply or return air can enter troffer. This assures maximum light output and color stabilization.

4. Today's only complete line. One-piece models to fit every need. Furnished in units that feed air from top, or in single and double units that feed air from side. Models to fit 1 x 4 and 2 x 4 light troffers.

Don't settle for "second best" air distribution . . . SPECIFY TITUS DIFFUSERS AND BE SURE OF *THE* BEST . . . regardless of modified light troffer you select.



● **MODELS LT-14 and LT-24.** For 1 x 4 and 2 x 4 troffers. Feed from top. 4″, 5″ or 6″ inlet . . . low, medium or high capacity. Each side has individual, fully adjustable air pattern and air volume control. Use as supply or return units.



● **MODEL LT-10.** For use as single unit or double side unit. Individual feed, individual air pattern and volume control. Can be used with both sides supply or return . . . or with one side supply and other return. Snaps into troffer.

MAIL COUPON FOR NEW CATALOG

TITUS MFG. CORP., WATERLOO, IOWA
Branch Mfg. Plants — Hialeah, Fla., Terrell, Texas

( ) Rush new Catalog on Titus Ceiling Diffusers for *unrestricted* use with light troffers.
( ) Have representative call.

NAME ______________________
COMPANY ______________________
ADDRESS ______________________
CITY ______________ STATE ______________

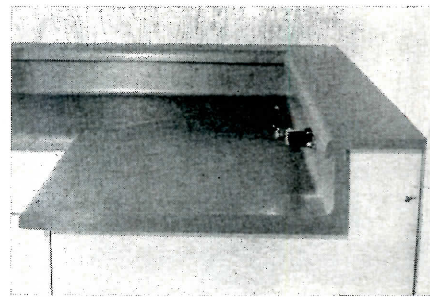
For more data, circle 110 on Inquiry Card

Product Reports

continued from page 240

LABORATORY TOPS

Gregg laboratory tops are seamless and fully formed in sections up to 10 ft in length. Longer lengths are manufactured with factory fitted "lock joints" and sealed with chemical resistant caulking. Surfacing of *Chem-Guard* is a non-porous material de-

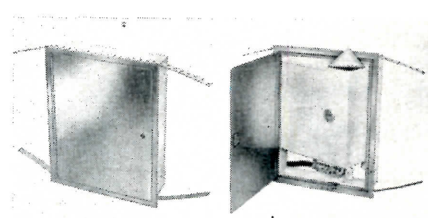


signed to withstand all conditions normally present in research, commercial or educational laboratories. Its wearing surface extends through to the reinforcing material, and is free of fibers. Gray tone offers a non-glare working area. A heavy resin overlay insures a long usable life. Surface scratches can be sanded or buffed with steel wool. Severe damage is repaired with a color-matched caulking compound. *Gregg Laboratory Tops, Nashua, N.H.*

CIRCLE 311 ON INQUIRY CARD

RECESSED LIQUID SOAP TANK

Two-gallon liquid soap tank, *N. SH-2*, for gravity feed systems is recessed in the wall with only the flush-mounted, stainless steel front ex-



posed. White enamel tank swings out and is filled from the top; requires no funnels to fill. Soap level indicator is on front of tank. *American Dispenser Co., Inc., 860 Broadway, New York 3, N.Y.*

CIRCLE 312 ON INQUIRY CARD

more products on page 250

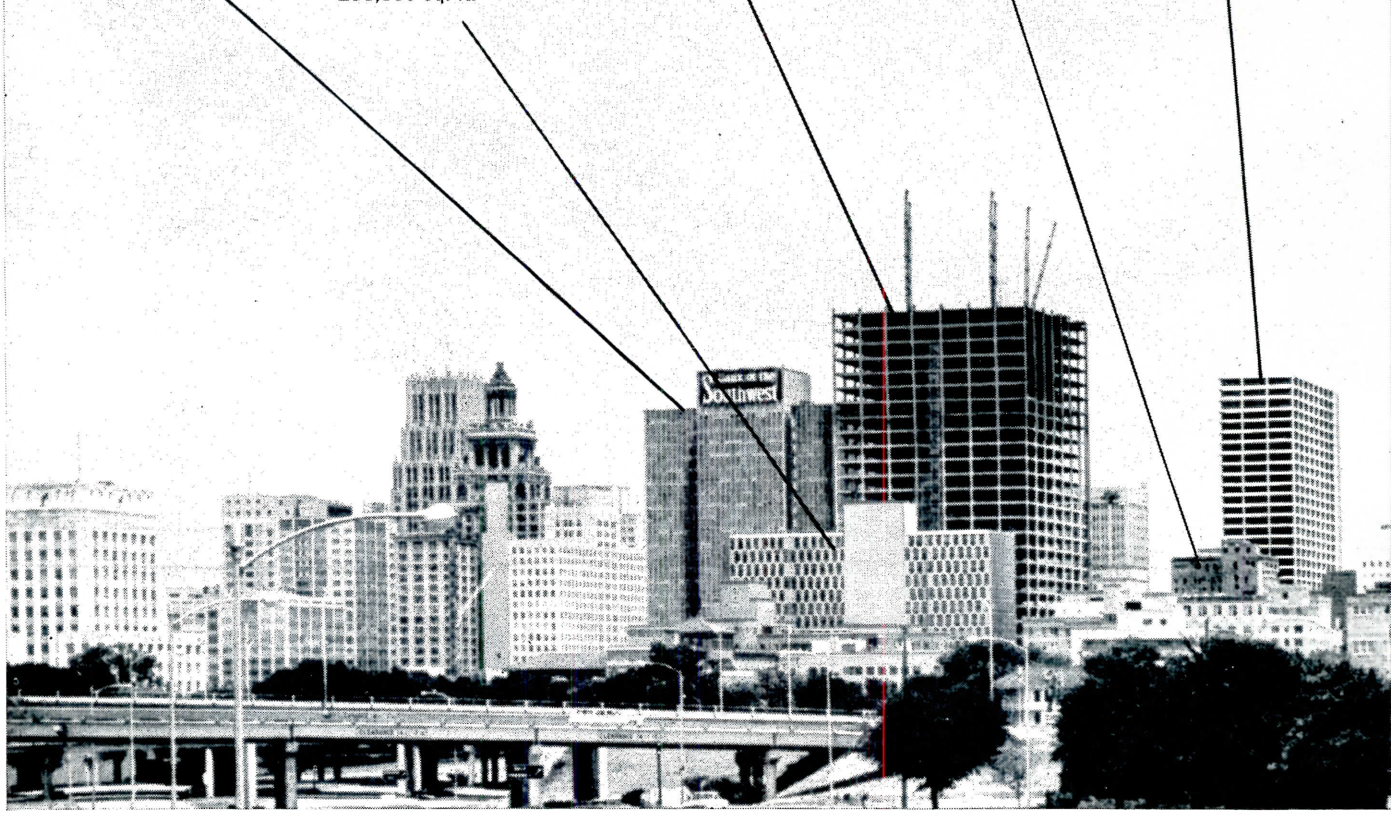
Architect:
Kenneth Franzheim
Contractor:
W. S. Bellows Construction Corp.
Bank of the Southwest. 4-hour Zonolite gypsum suspended fireproofing below floors and beam, and 4-hour Zonolite gypsum column fireproofing. Approximate floor area 825,000 sq. ft.

Architect:
Wirtz, Calhoun, Tungate & Jackson
Contractor:
Manhattan Construction Company
Memorial and Professional Building. 4-hour Zonolite gypsum suspended fireproofing below floor and beams, 4-hour Zonolite gypsum column fireproofing, and 4-hour Zonolite concrete exterior spandrel wall. Approximate floor area 250,000 sq. ft.

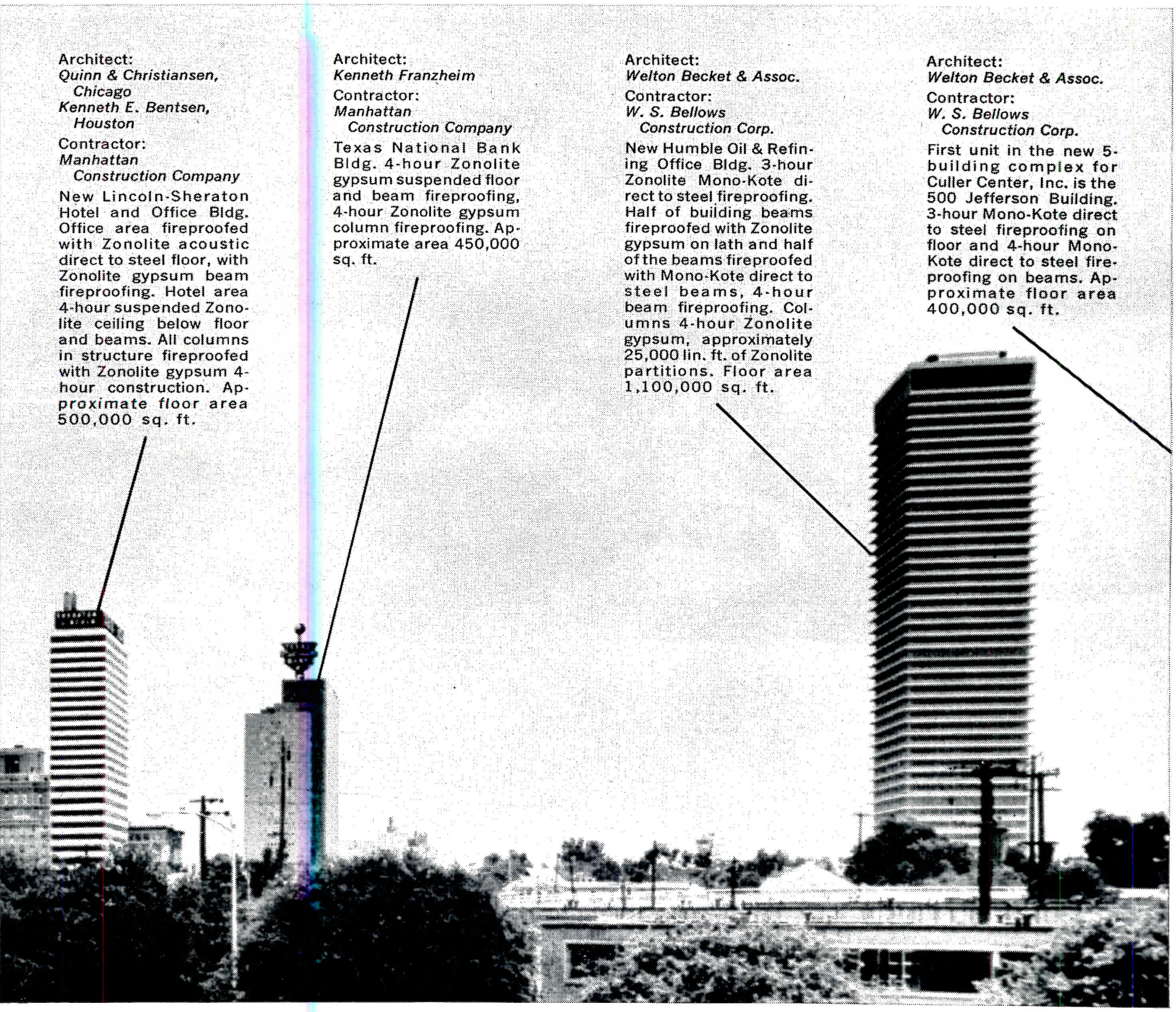
Architect:
Skidmore, Owings & Merrill
Contractor:
W. S. Bellows Construction Corp.
New Tennessee Gas Office Building. It has 3-hour Mono-Kote floor fireproofing with 4-hour beam Mono-Kote fireproofing. Floor area 1,300,000 sq. ft.

Architect:
A. C. Finn
Contractor:
W. S. Bellows Construction Corp.
Old First City National Bank. 4-hour Zonolite gypsum suspended floor and beam fireproofing and 4-hour Zonolite gypsum column fireproofing. Approximate floor area 500,000 sq. ft.

Architect:
Skidmore, Owings & Merrill
Contractor:
W. S. Bellows Construction Corp.
New First City National Bank. 4-hour Zonolite direct to steel acoustic fireproofing, 4-hour Zonolite gypsum columns, 4-hour Zonolite gypsum beams. Approximate floor area 751,000 sq. ft.



Newest product appearing in Housto



"Zonolite Row:" Mono-Kote fireproofing

A few of the older buildings of Houston's skyline do not have Zonolite products built into them. However, it is doubtful whether many of the future structures will exclude new Mono-Kote, the direct-to-steel, spray-on fireproofing for floors and beams.

Mono-Kote just makes good sense.

To begin with, the material cost is low. And you need less of it than comparable materials to get the same fire ratings. For example, to get a 3 hour fire rating on beams with other materials, they must be built up from 1$\frac{1}{16}$" to 1$\frac{3}{4}$" thick. But Zonolite Mono-Kote need be only 1" thick to get the same rating.

Application is faster, too. Mono-Kote builds up thick on the first pass, without drop outs or slides. In minutes it's dry enough for the second pass. And when the job is finished, you'll find that Mono-Kote has dried hard, not punky.

Specifying Mono-Kote just makes sense.

For complete information write us for Bulletin PA-53. *Zonolite® Company, 135 S. LaSalle Street, Chicago 3, Illinois.*

ZONOLIT

For more data, circle 118 on Inquiry Card

Product Reports

continued from page 250

MOVABLE PARTITIONS NEED NO TOOLS TO ASSEMBLE

Office enclosures can be erected rapidly with movable partitions featuring precut panels and posts attached by a speed latch. Called *Mowalco Speed-Set Glazed Rails,* the partition system is assembled by screwing extruded aluminum channels to the ceiling and floor and by sliding posts and panels into the channels and fastening them together. Doors and windows may be incorporated at any point in the assembled wall. *Movable Walls Corp., 565 E. Edna Place, Covina, Calif.*

CIRCLE 316 ON INQUIRY CARD

PRODUCT BRIEFS

Durable coating, *called Aroflint 505,* forms plastic film which adheres to masonry, metal, wood and other surfaces. *Archer Daniels Midland Co., 733 Marquette Ave., Minneapolis 40, Minn.*

CIRCLE 317 ON INQUIRY CARD

Residential intercom system can carry six remote units. Lower half of station face plate is a pressure switch. *General Dynamics Corp., One Rockefeller Plaza, New York 20, N.Y.*

CIRCLE 318 ON INQUIRY CARD

Beam-controlled mercury vapor lamps have their own metallic reflectors built into the bulb, are available in 400-watt R60 bulb and 1000-watt R80 bulb sizes. *Westinghouse Electric Corp., Bloomfield, N.J.*

CIRCLE 319 ON INQUIRY CARD

Sheet vinyl flooring material, called *Tracino Vinyl Corlon,* has moisture resistant backing to permit installation below grade. *Armstrong Cork Company, Lancaster, Pa.*

CIRCLE 320 ON INQUIRY CARD

Aluminum fencing system 8-ft-high encloses residential-area electrical substations. *Reynolds Metals Co., Richmond, Va.*

CIRCLE 321 ON INQUIRY CARD

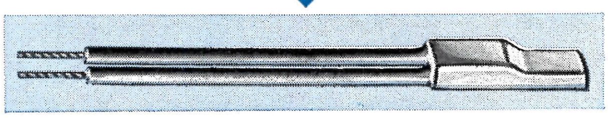
Electric baseboard convector has beveled shape which prevents drapes or furniture from blocking air intake or discharge. *Circle-Air Industries, Inc., 244 Herkimer St., Brooklyn 17, N.Y.*

CIRCLE 322 ON INQUIRY CARD

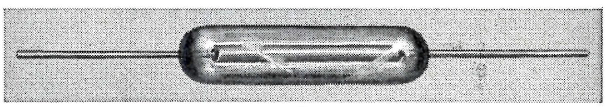
ADVAN-guard® is a thermally actuated automatic reclosing protective device sealed in the ballast housing. It is sensitive to voltage and current as well as temperature and protects against excessive voltage supply . . . internal ballast short circuiting . . . inadequate lamp maintenance . . . improper fixture application and eliminates the need for individual fixture fusing.

ADVAN-guard® is preset to trip out automatically whenever the Fluorescent Lamp Ballast operates at abnormal temperatures. When heat decreases to normal operating temperatures, ADVAN-guard® resets automatically and the ballast resumes normal operation. Through this continuous protection the full life of ADVAN-guard® Fluorescent Lamp Ballasts is realized. Only ADVAN-guard® ends premature destruction and unnecessary replacement labor costs.

AUTOMATIC RE-SETTING
ADVAN guard®
THERMAL PROTECTION



A /ANCE OFFERS A CHOICE OF BALLAST PROTECTIO



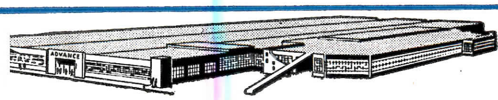
EQUIPPED WITH NON-RESET
FUSE LINK
THERMAL PROTECTOR

Advance FUSE-LINK is a temperature sensitive nonresetting protector built into the fluorescent lamp ballast. It is sensitive to heat and designed to open when the ballast is subjected to high temperature from any internal or external cause. The capacitor utilized in the FUSE-LINK ballast line also incorporates a thermal link which will open whenever the capacitor is subjected to abnormally high temperatures.

FUSE-LINK Fluorescent Lamp Ballasts protect against ballast leakage and end-of-life hazards. When a condition occurs that causes either or both links to open . . . the ballast is destroyed and must be replaced.

That's the protection story, ADVANCE offers a choice! Your ADVANCE Sales Engineer will be happy to help you make that choice. Call him or write today.

"The Heart of the Lighting Industry"®



ADVANCE® TRANSFORMER CO.

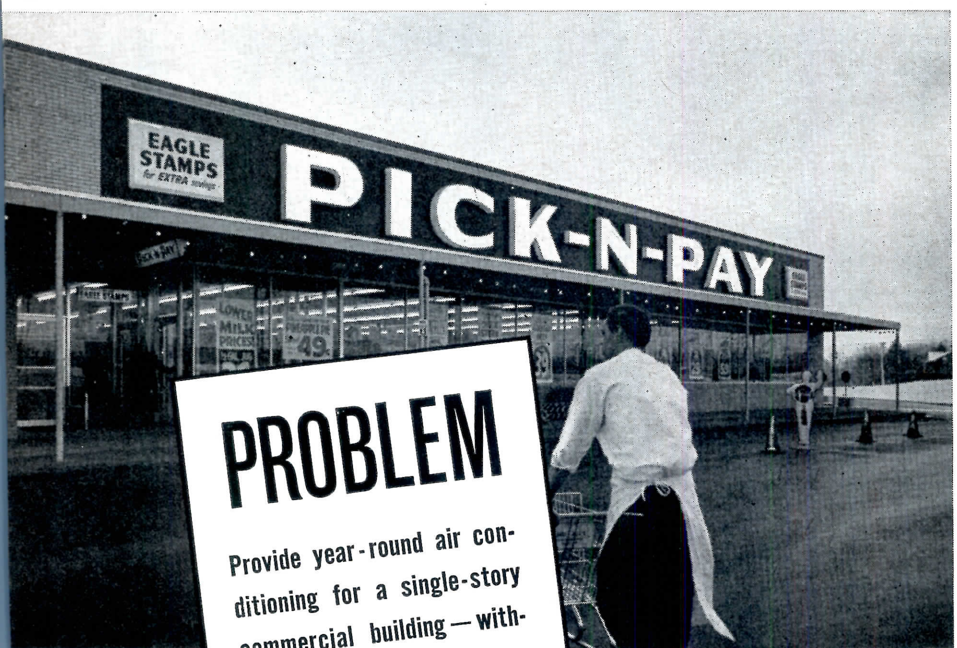
CBM CERTIFIED by ETL

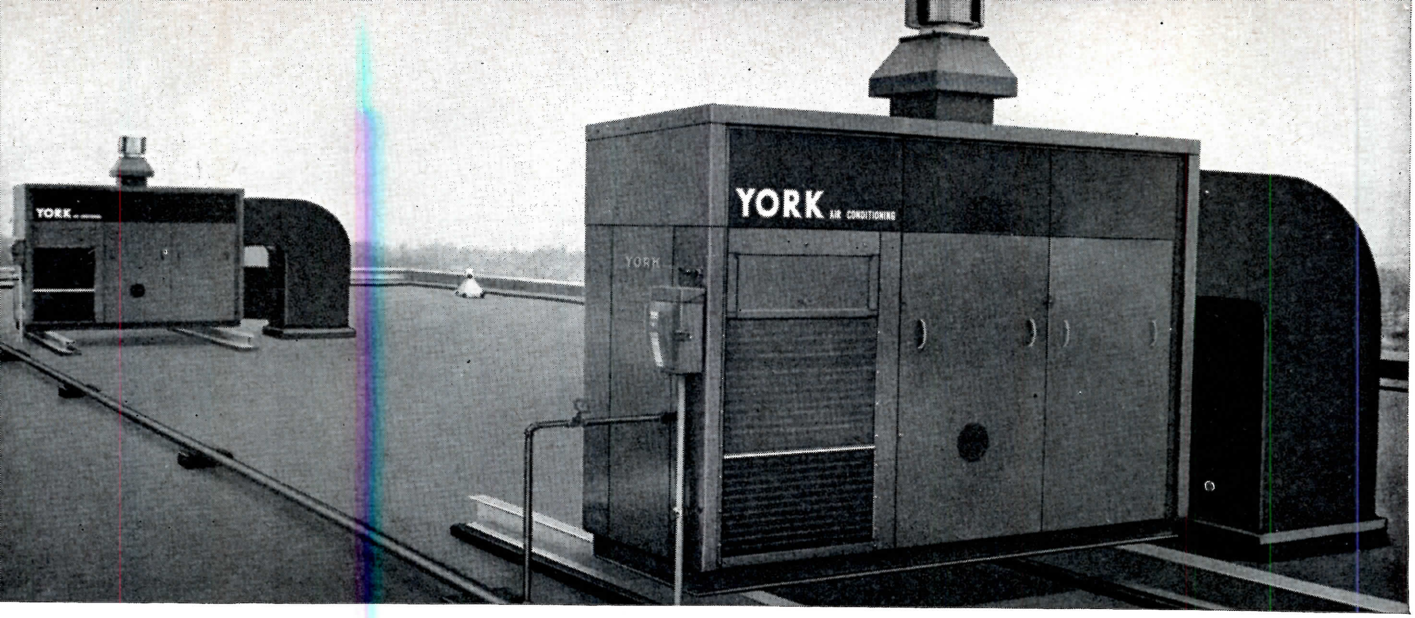
WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF FLUORESCENT LAMP BALLASTS

2950 NO. WESTERN AVE. CHICAGO 18, ILL. U.S.A.

For more data, circle 120 on Inquiry Card


GRANTS
EAGLE STAMPS


EAGLE STAMPS
PICK-N-PAY



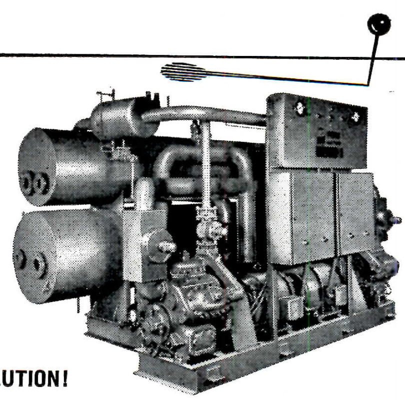
op Air Conditioner that heats, cools, omplete design freedom!

re of the York SUNLINE *unit is* low ambient cooling: it will provide ng even when the outside temperature is as low as zero—to compen- for heavy occupancy during peak business hours.

ahead with York when you plan air conditioning for any type of ing. For over 75 years, York has pioneered major advances in con- ning air for comfort and process. For complete facts on the York LINE Roof Top Air Conditioner, see your York Representative; or York Corporation, York, Pennsylvania.

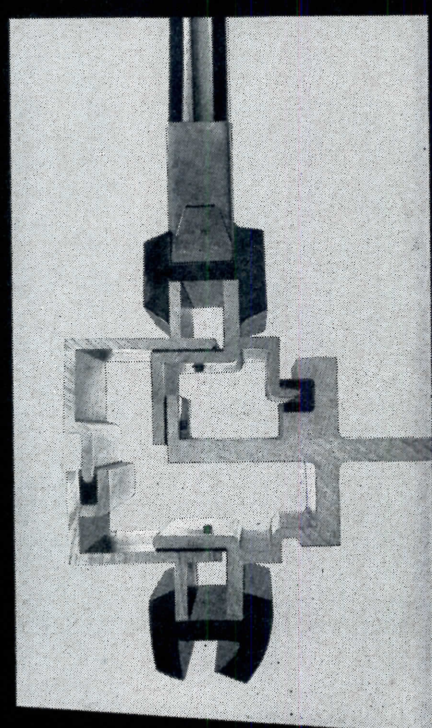
ORK CORPORATION
Subsidiary of Borg-Warner Corp.
YORK, PENNSYLVANIA

QUALITY NAME IN AIR CONDITIONING AND REFRIGERATION



ANOTHER YORK SOLUTION!

A York Heat Pump uses only electricity and air to heat and cool any type of building. May be located almost anywhere, from basement to rooftop; no space-taking fuel storage.



RELIABLE NEOPRENE GASKETS STAY WEATHERTIGHT IN ANY WEATHER

However new your curtain wall design, Du Pont Neoprene gasketing will add an element of dependability you can get with no other material. A generation of use under the most violent weather conditions has been carefully observed and recorded by Du Pont technical men.

These records prove Neoprene's permanence. A case in point: the six trouble-free winters sealing doors, windows and exterior joints on the world's most windswept permanent weather station atop Mt. Washington in New Hampshire.

Du Pont records over 25 years build an even stronger case for Neoprene. Some outdoor applications of Neoprene have been performing so well so long that we're not even sure what their durability limit is.

What about cost? Preformed Neoprene gasketing is quite competitive in terms of installed costs. Job-site labor is reduced to a minimum. Requires no special skills. For additional information and a list of reliable manufacturers of Neoprene gaskets, write E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Department AR-9-NB, Wilmington 98, Delaware.

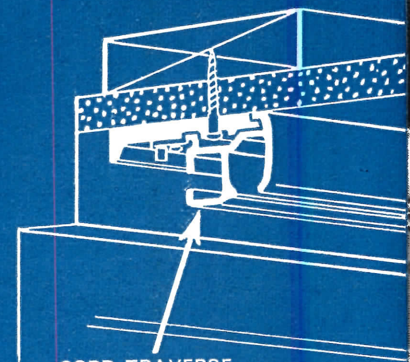
NEOPRENE
ANOTHER RELIABLE
DU PONT
REG. U. S. PAT. OFF.
ELASTOMER
BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

← For more data, circle 121 on Inquiry Card

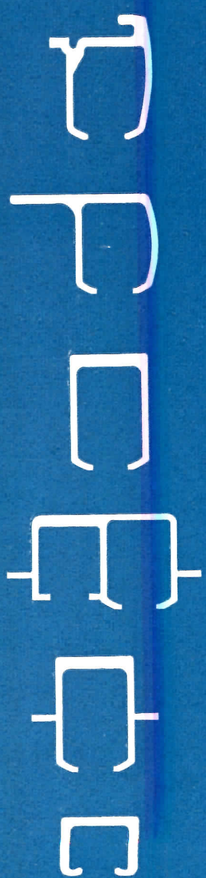
For more data, circle 122 on Inquiry Card

ARCHITRAC

NEW! PROFESSIONAL GRADE DRAPERY HARDWARE—FOR ANY BUILDING WITH WINDOWS

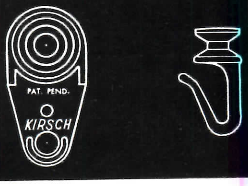


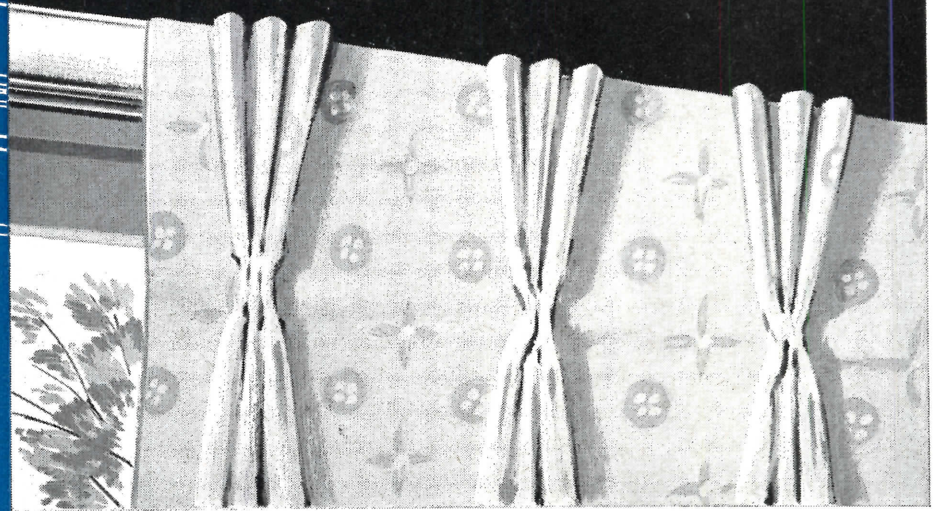
CORD TRAVERSE
NO. 9041



NYLON CARRIERS

BALL BEARING CUBICLE HOOK





Six designs of rugged extruded anodized aluminum track and parts, for bracket, surface or recessed mounting in residential and non-residential structures.

Beauty of profile and extreme flexibility of application are keynotes of this completely *new* line of drapery hardware. Kirsch ARCHITRAC was developed for, and in collaboration with, registered architects. Now it is easy—and logical—to include drapery hardware in planning 'most any structure having windows.

Scores of prestige installations in apartment houses, office buildings, hospitals, laboratories, dormitories and fine custom-built homes attest the sweeping acceptance now being given Kirsch ARCHITRAC after three years' development.

- Nylon-encased ball bearing pulleys and carriers ensure years of smooth operation, even under humid and salt-air conditions.
- Full range of types—for draw-cord or cordless operation—for bracket, surface, or recessed mounting.
- Clean, simple profile and satin-finished beauty compatible with modern aluminum windows and sliding glass doors. Designed for widespread use in commercial, institutional and residential structures.
- Made in America—to highest standards—for professional use—by Kirsch Company, the long-established world leader in the manufacture of high grade drapery hardware.

Nationwide consultation service and product availability

Special illustrated catalog in Sweet's; see it, or write for a copy. Ask for architect's price-estimating information, too.

Kirsch

KIRSCH COMPANY, 737 PROSPECT ST., STURGIS, MICHIGAN

For more data, circle 123 on Inquiry Card

DESIGN
DISTINGUISHED
ENTRANCES
IN ANY CONTEMPORARY STYL

Marshall Savings & Loan Association, Riverside, Ill. B. T. Moravec, Architect

Heavy-duty all-glass HERCULITE Doors are made of shock-resisting PPG Tempered Polished Plate Glass to give strength and durability. They are available in a wide range of standard sizes, in thicknesses of ½ in. and ¾ in.

S&W Professional Building, Coral Gables, Florida. Leroy K. Albert, Ar

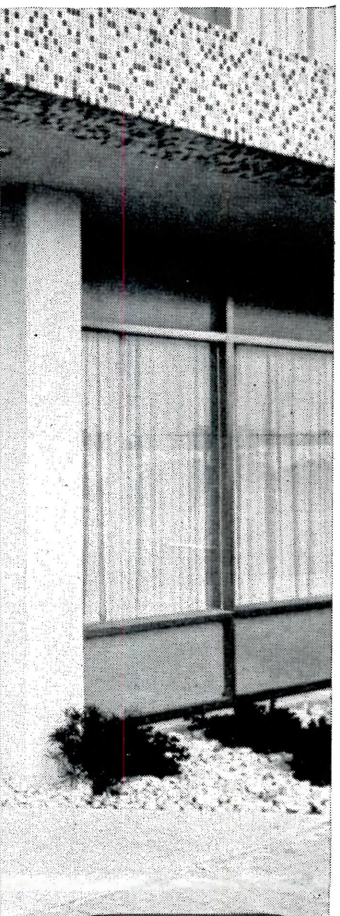
Stylish, aluminum-framed TUBELITE Doors h
an exclusive interlocking feature to assure ri
ity. Exposed seams and fastenings are elimina
by dovetailed, hollow construction. A reinforc
structural channel is available when require

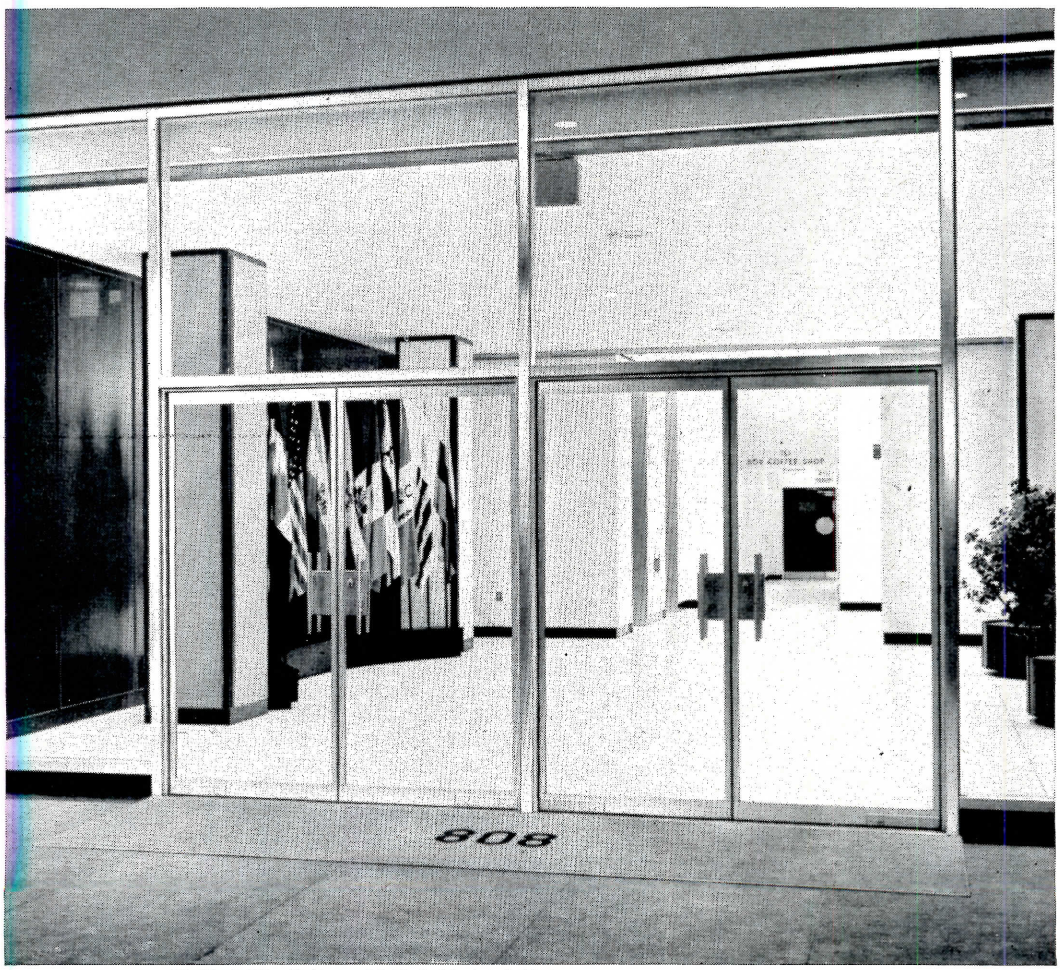
nplicity of line and appealing design give Modern Doorways by G the look of distinction and elegance that naturally fits in with ay's varied architectural requirements. An extensive range of sizes styles gives you almost limitless design flexibility.

G offers three basic doorway units—HERCULITE®, WEST and ELITE®—each with distinctive characteristics. A complete PPG orway Package includes frame, all hardware required for installation, —when desired—the PITTCOMATIC® automatic door operator.

complete information, contact your PPG Architectural presentative. Also, see Sweet's Architectural File, Section 16e.

VITH MODERN DOORWAYS BY PPG





808 Office Building, Washington, D.C. Vlastimil Koubek, Architect

Elegant, slender-framed WEST Tension Doors have 1/2 in. glass held under tension within the metal frame. Result: a strong, serviceable unit that does not sag, rack, or get out of alignment. Available in aluminum, bronze, and stainless steel.

Pittsburgh Plate Glass Company

Paints • Glass • Chemicals • Fiber Glass   In Canada: Canadian Pittsburgh Industries Limited

For more data, circle 124 on Inquiry Card

Office Literature

continued from page 218

RESIDENTIAL LIGHTING

(A.I.A. 31-F) Recessed and wall-mounted residential lighting fixtures are described in a 12-page booklet which includes typical installation pictures as well as complete specifications. *Marvin Electric Mfg. Co., 6100 Wilmington Ave., Los Angeles 1, Calif.*

CIRCLE 415 ON INQUIRY CARD

REVOLVING DOORS

"The Controlled Air Entrance" has 54 pages on advantages of revolving doors. Included are pictures of installations. *International Steel Co., Evansville 7, Ind.**

CIRCLE 416 ON INQUIRY CARD

ANTI-RUST PAINT

Anti-rust paint for use on all metal surfaces can be applied with a minimum of surface preparation. Bulletin 58262-R gives all technical data. *Speco, Inc., 3708 Associate Ave., Cleveland 9, Ohio*

CIRCLE 417 ON INQUIRY CARD

FORGED IRON HARDWARE

(A.I.A. 27-B) Forged iron hardware for residential interiors and exteriors are displayed in Catalog 13A. *McKinney Mfg. Co., Pittsburgh 33, Pa.*

CIRCLE 418 ON INQUIRY CARD

FOLDING PARTITIONS

Electric and manual folding partitions including the new electric, vertically operated *LeadX* acoustical curtains for school partitioning are shown in a loose-leaf reference file which includes architectural layout sheets, detailed planning data, scale drawings, specifications and color installation pictures. *Torjesen, Inc., 213-25th St., Brooklyn 32, N. Y.**

CIRCLE 419 ON INQUIRY CARD

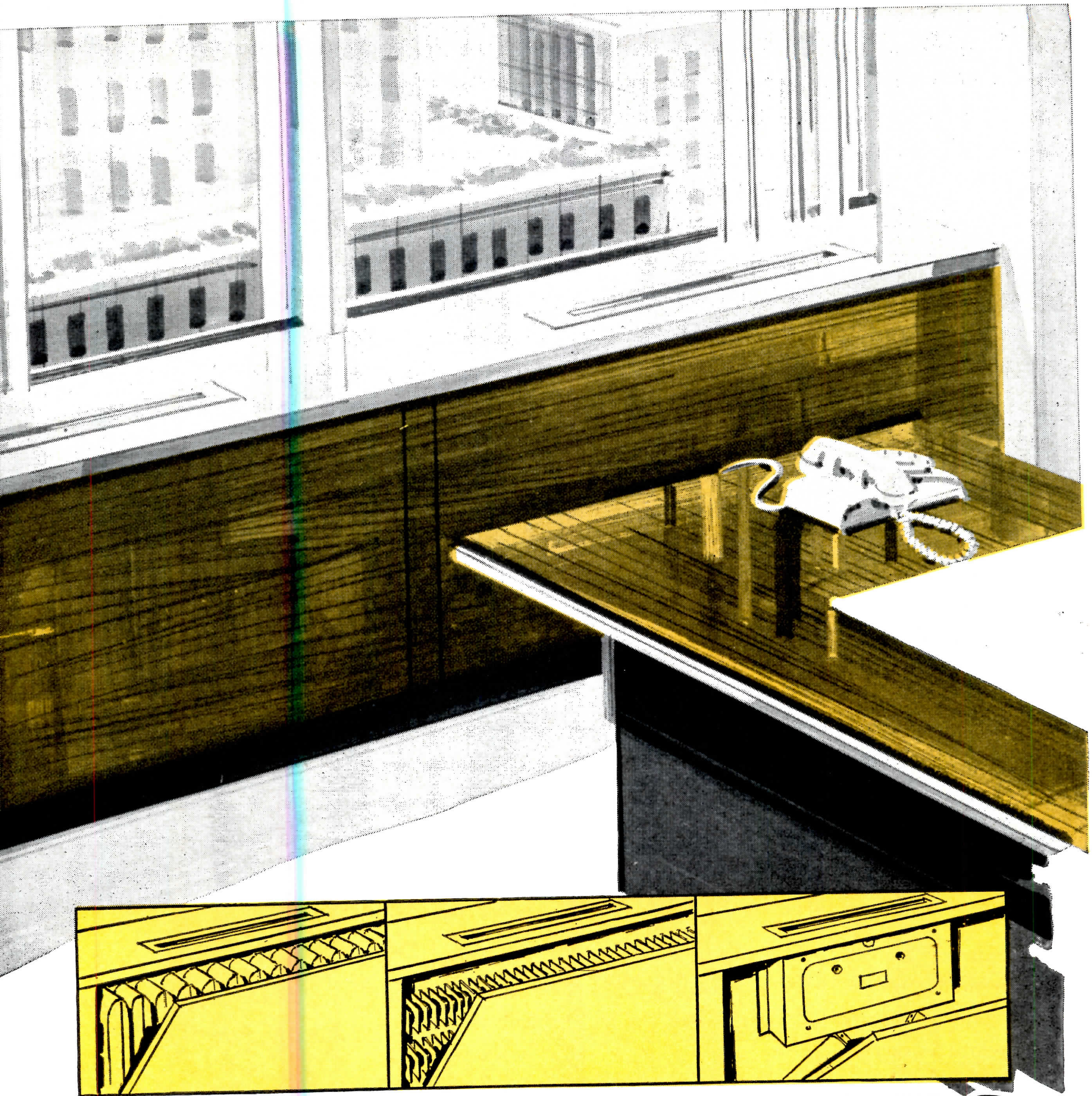
LOUVERS, VENTILATORS

Louvers, ventilators and other metal building products are described in a 20-page catalog. *Leslie Welding Co. Inc., 11241 W. Melrose St., Franklin Park, Ill.*

CIRCLE 420 ON INQUIRY CARD

**Additional product information in Sweet's Architectural File*

more literature on page 27



new BUENSOD DUAL PANELS

...UNIVERSAL UNDER-WINDOW ENCLOSURE PANELS AND SILLS

Dual Panels, Buensod's unique approach to under-window enclosure design, have set a fast sales and installation pace. A major reason that these rigid, lightweight panels and sills have been so readily accepted is their universal nature. Dual Panels quickly, and handsomely, enclose *convectors, radiators, unit ventilators, fan coil units, induction units* and, of course, our own *Dual Duct air mixing units.* Add to this the flexibility of size, shape, color and finish, plus fast field installation, and you can see what makes Dual Panels "tick." How about your next job? *Write for free, colorful brochure, #MP10.*

BUENSOD-STACEY CORP. Manufactured Products Division
45 West 18th St., New York 11, N. Y. Subsidiary of Aeronca Manufacturing Corporation

BUENSOD-STACEY

For more data, circle 126 on Inquiry Card

How much automation is practical for your next building?

Central control helped this school to air condition with 40% less cooling capacity

"Centralized controls will make it easy to shift cooling where it's needed, as it's needed—so our high school requires only a 600-ton plant instead of 1,000 tons. We are using Honeywell Controls in our school."—Dr. Jordan L. Larson, Superintendent of Schools, Mount Vernon, N.Y.

Next time you discuss school air conditioning with a client, it may be useful to know about the experience of Mount Vernon, N.Y., with this problem—and its happy solution.

New Mount Vernon High School, with 320,000 sq. ft. of floor space, is the largest ever built in the U.S. with year-round air conditioning.

Many in Mount Vernon, including Dr. Jordan L. Larson, Superintendent, felt that if air conditioning improves efficiency in industry, it should do so in schools—even in the northern U.S.

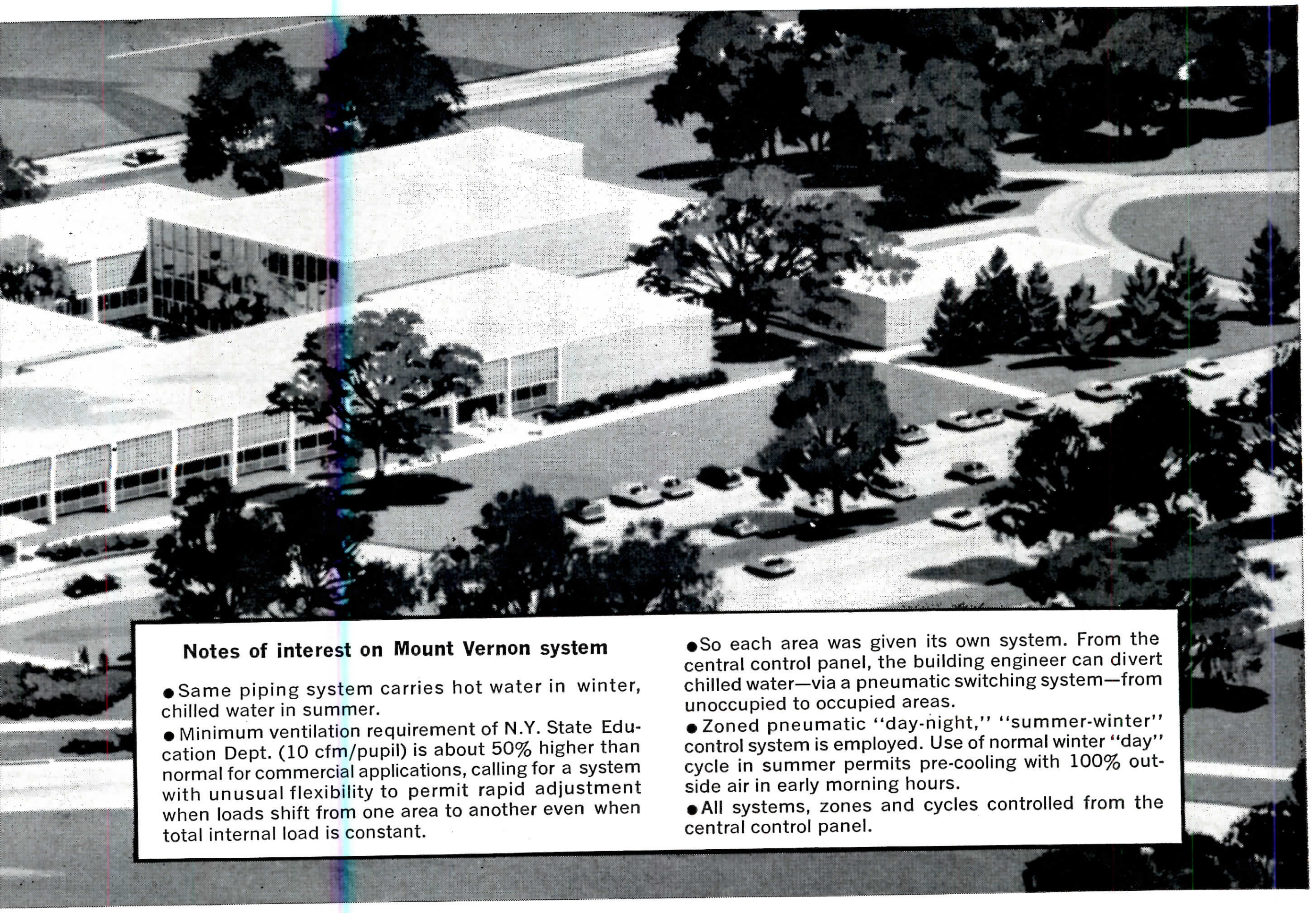
And the architects and engineers developed plans that satisfied even the skeptics that air conditioning the new school would be sound *and economical.*

Instead of long-perimeter spread-out construction common to so many non-air-conditioned schools, Architects Sherwood, Mills & Smith, of Stamford, Conn., utilized a compact design that helped to lower building costs and also reduced size of the air conditioning equipment required.

A Honeywell central control panel was used by Engineers Abrams & Moses, of New Rochelle, N.Y., to make an asset, instead of a handicap, out of the constantly shifting loads common to high schools.

If all the conditioned space were occupied at one time, it would need about 1,000 tons of refrigeration. But the Honeywell controls are tied to one main panel, making it easy to shift cooling *where* it's needed, *when* it's needed—so the building requires only a 600-ton cooling plant.

So helpful in this instance, central control is a basic step in automating *any* building's mechanical-electrical systems to wring maximum efficiency from equipment, cut a surprising waste in manhours, and plug needless leaks in fuel and power costs.



Notes of interest on Mount Vernon system

- Same piping system carries hot water in winter, chilled water in summer.
- Minimum ventilation requirement of N.Y. State Education Dept. (10 cfm/pupil) is about 50% higher than normal for commercial applications, calling for a system with unusual flexibility to permit rapid adjustment when loads shift from one area to another even when total internal load is constant.
- So each area was given its own system. From the central control panel, the building engineer can divert chilled water—via a pneumatic switching system—from unoccupied to occupied areas.
- Zoned pneumatic "day-night," "summer-winter" control system is employed. Use of normal winter "day" cycle in summer permits pre-cooling with 100% outside air in early morning hours.
- All systems, zones and cycles controlled from the central control panel.

Today, however, central control is ly the *beginning* of automation—nging up to computer-guided robots at digest scores of variables, then tantly allocate the load to equipent for optimum results at miniim cost.

You'll want to keep abreast of the west Honeywell developments, any of them offering your clients erational savings through concepts that were unavailable a few years ago.

Honeywell automation specialists will gladly discuss them with you, or work with you to make an automation analysis of any building on your boards.

Phone your nearest Honeywell office, check coupon or write W. N. Wray, Honeywell, Dept. AR9-90, Minneapolis 8, Minn. In Canada, write Honeywell Controls Ltd., Toronto 17, Ont.

Honeywell

H HONEYWELL *First in Control*

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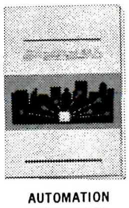
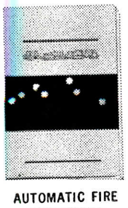
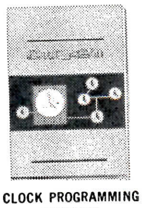
uthoritative. Latest levelopments n automation. 'aluable data.



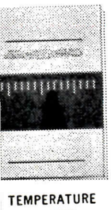
AUTOMATION TECHNIQUES



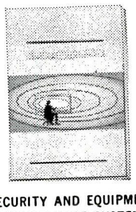
AUTOMATIC FIRE PROTECTION



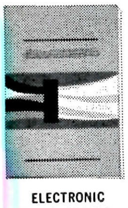
CLOCK PROGRAMMING SYSTEMS



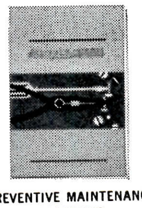
TEMPERATURE CONTROL



SECURITY AND EQUIPMENT SURVEILLANCE SYSTEMS



ELECTRONIC AIR CLEANING



PREVENTIVE MAINTENANCE PROGRAMS

Honeywell, Dept. AR9-90
Minneapolis 8, Minn.

Without obligation, please send Honeywell Planning Guides checked.

- ☐ Automation Techniques
- ☐ Automatic Fire Protection
- ☐ Clock Programming Systems
- ☐ Temperature Control
- ☐ Security and Surveillance
- ☐ Electronic Air Cleaning
- ☐ Preventive Maintenance Programs
- ☐ I'm interested in an AUTOMATION ANALYSIS of my buildings.

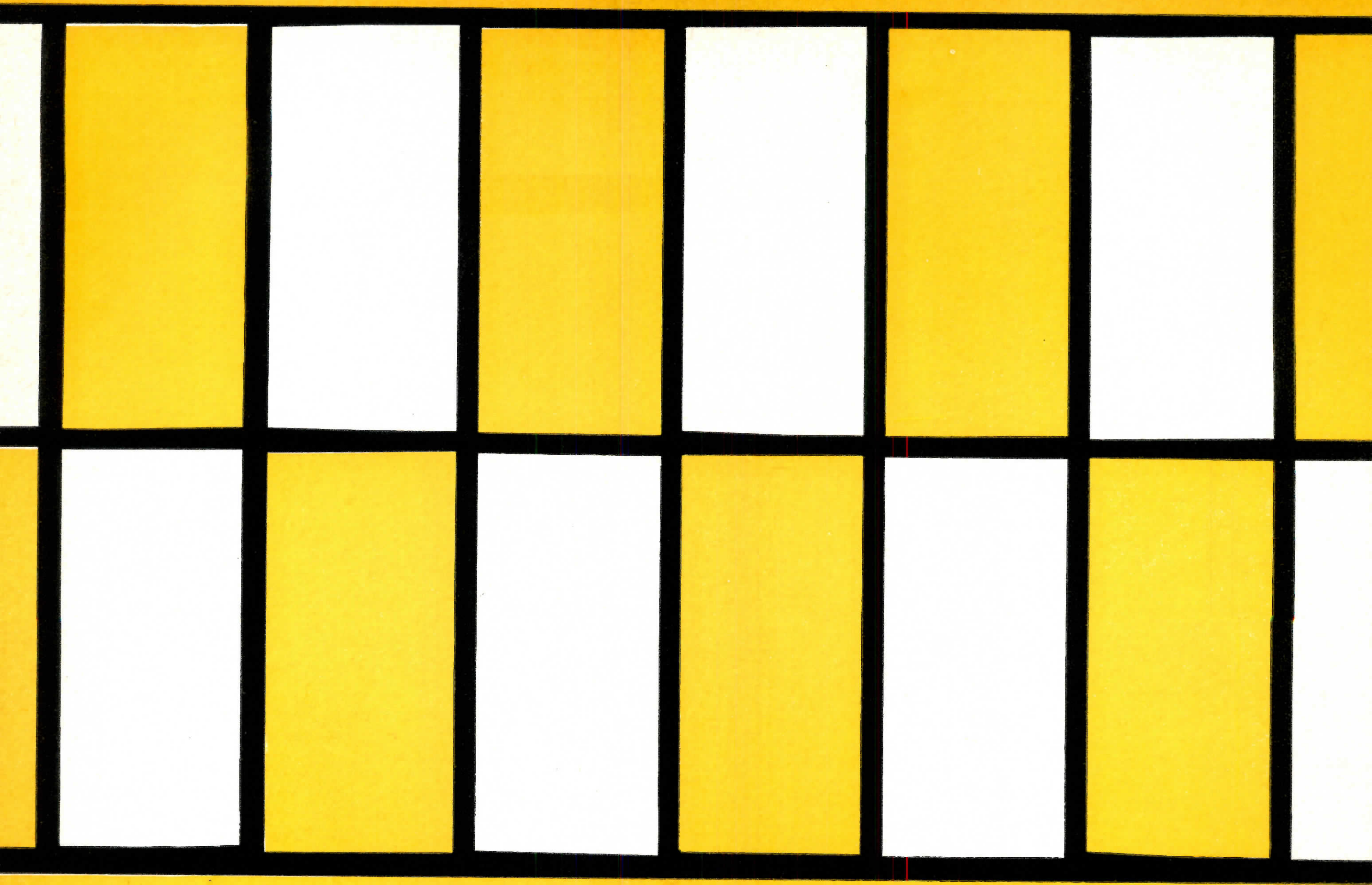
NAME__________

TITLE, COMPANY__________

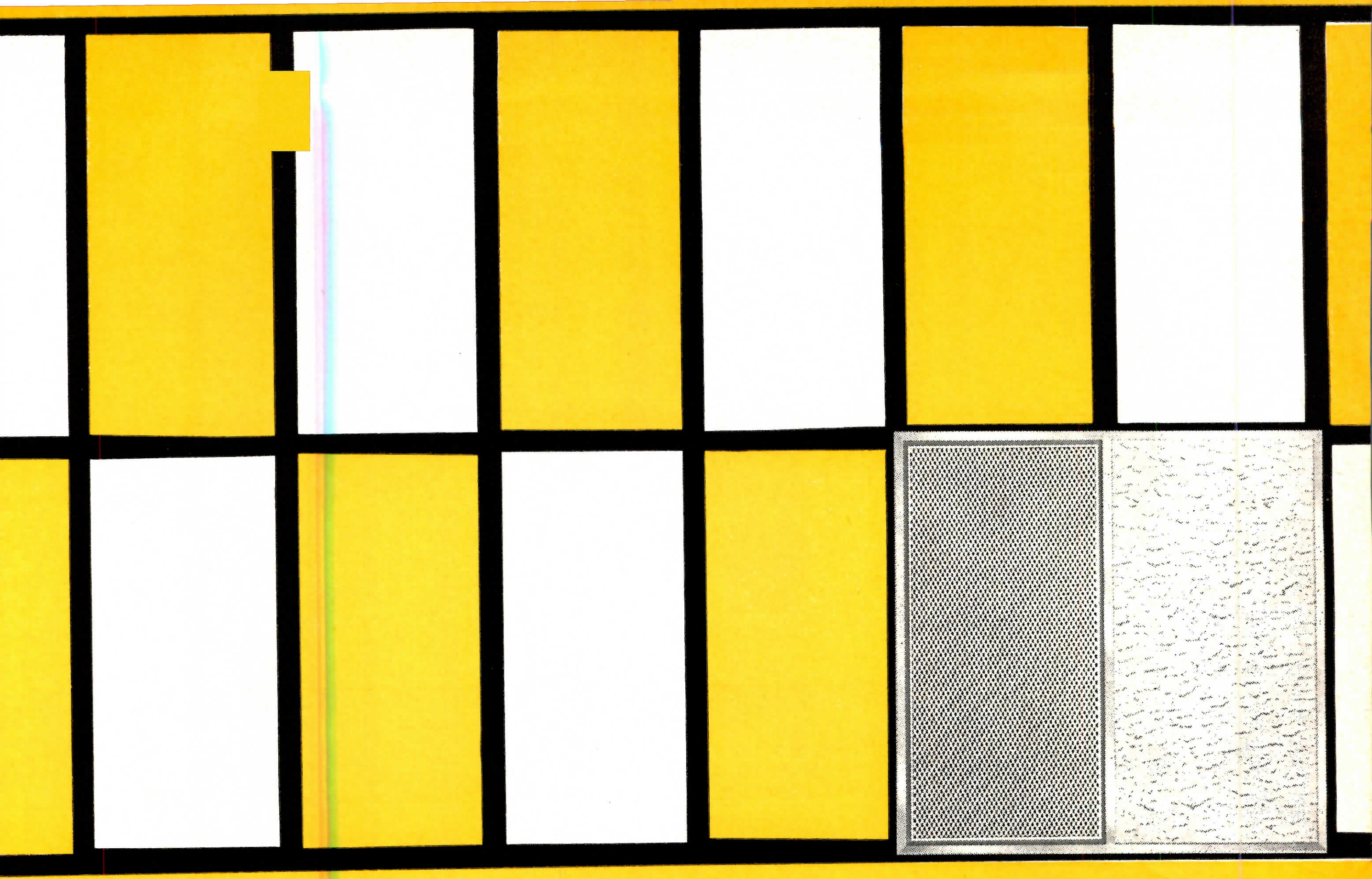
ADDRESS__________

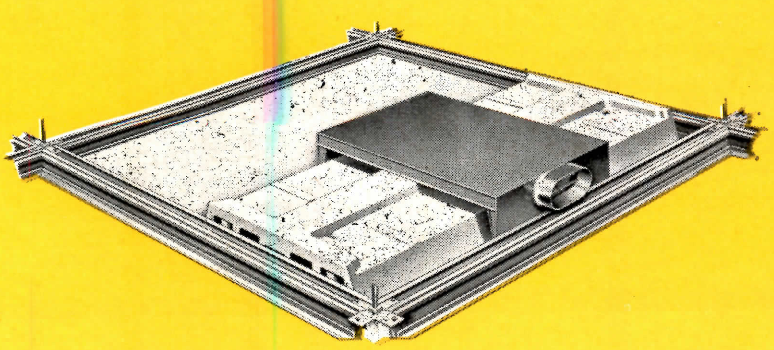
CITY, ZONE, STATE__________

For more data, circle 127 on Inquiry Card



New ideas in lighting systems from Westinghouse





ng ...a popular misconception

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When some people see beautiful, modern buildings with friendly, open expanses of clear glass, they jump to false conclusions. Somehow they confuse expansiveness with expensiveness.

You, of course, know better. Glass is not expensive, just looks it. In fact, with glass you are getting the *one* wall construction material that has been least affected by spiraling building costs. See chart at left.

When you consider building costs, consider also operating costs. Nothing brings in more *free* illumination (daylight) than clear glass.

And glass can contribute to heating and air-conditioning economies:

Thermopane® insulating glass cuts heat loss through windows to about half that lost through single glazing to reduce heating costs.

L·O·F Grey Plate Glass (there are several thicknesses) greatly reduces solar heat gain in buildings to reduce air-conditioning equipment requirements and operating expense. It also subdues glare.

Engineering studies conducted at Southern Methodist University by Prof. J. W. Griffith, international authority on daylighting, show that heat generated by abnormal wattage needed for lighting a windowless school usually creates a need for more expensive air-conditioning equipment—and makes it more costly to operate—than in a school where daylighting supplements normal artificial illumination.

For technical information on glass, call your L·O·F distributor or dealer, listed under "Glass" in the Yellow Pages. Or write to L·O·F, 2102 Libbey·Owens·Ford Building, Toledo 2, Ohio.

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a Great Name in Glass

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Office Literature

continued from page 266

VISUAL COMMUNICATIONS
Visual communication equipment and materials including overhead projectors, transparency-making material, photo-copying and diazo-copying equipment, and art and letter materials are illustrated in a 48-page catalog. *Tecnifax Corp., 195 Appleton St., Holyoke, Mass.*
CIRCLE 421 ON INQUIRY CARD

OUTDOOR LIGHTING
Delta 7 exterior wall bracket of cast aluminum can be used for commercial and residential outdoor lighting. *mcPhilben Mfg. Co., Inc., 1329 Willoughby Ave., Brooklyn 37, N. Y.**
CIRCLE 422 ON INQUIRY CARD

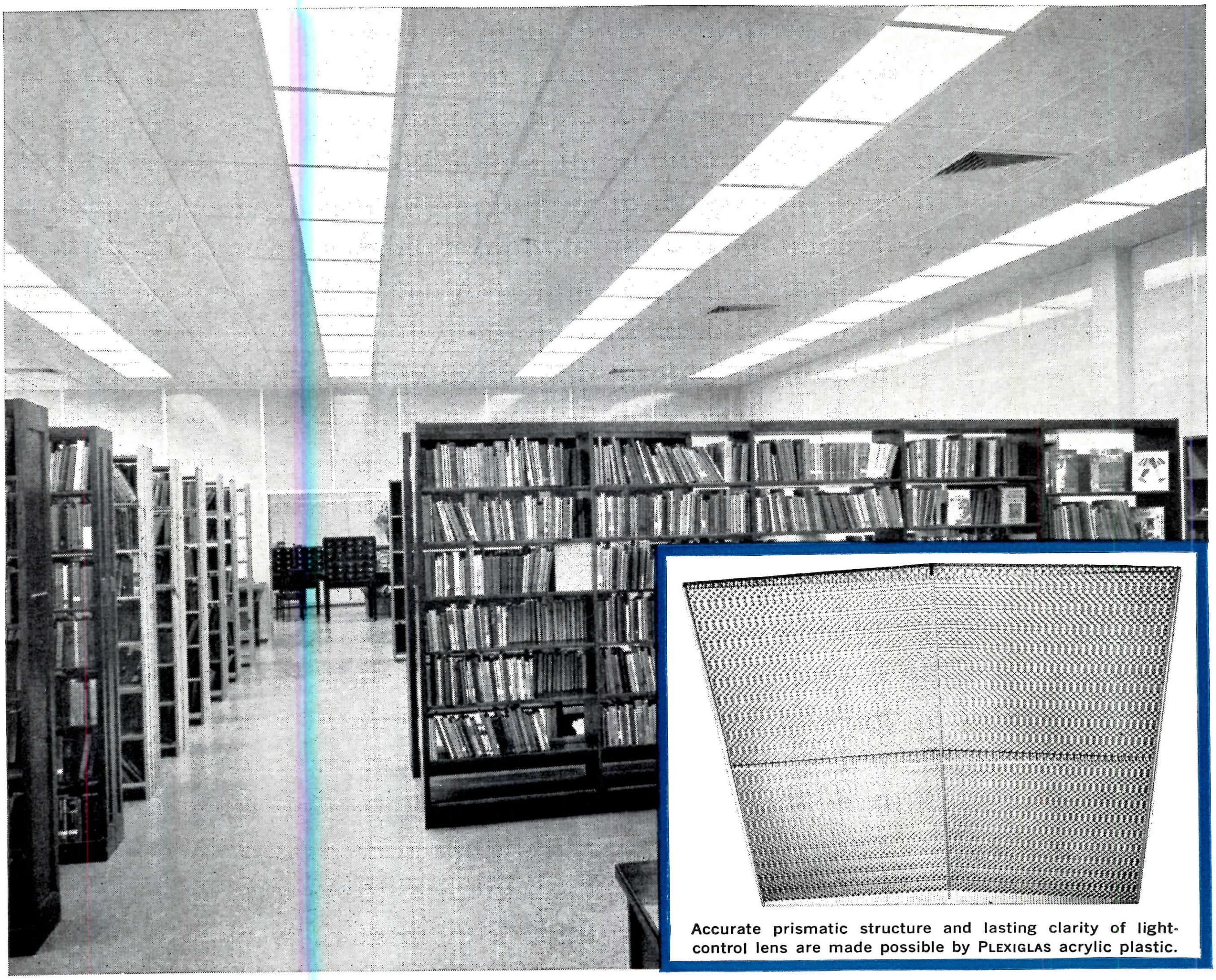
ROOM HEAT CONTROL
(A.I.A. 30-C) *SelecTemp* heating for new and existing buildings where inexpensive individual room temperature control is desired, such as motels, apartment houses, colleges and institutions. *Iron Fireman Div., Electronic Specialty Co., 3299 W. 106th St., Cleveland 11, Ohio*
CIRCLE 423 ON INQUIRY CARD

STEEL DOORS
Complete product information and application suggestions on standard steel doors and frames are available in a four-page brochure. *Amweld Building Products, 100 Plant St., Niles, Ohio.**
CIRCLE 424 ON INQUIRY CARD

COLORED GRAVEL STOP
Embossed aluminum sheet gravel stop is available in three anodized finishes and 12 color coatings. A complete line of door louvers is furnished in the same color coatings. *Construction Specialties, Inc., 55 Winans Ave., Cranford, N. J.**
CIRCLE 425 ON INQUIRY CARD

HYDROGEN-PROOF LIGHTING
Quartz-iodine floodlighting equipment which is safe for use in hazardous locations containing hydrogen is illustrated in Bulletin 659. *The Pyle-National Co., 1334 N. Kosner Avenue, Chicago 51, Ill.*
CIRCLE 426 ON INQUIRY CARD

**Additional product information in Sweet's Architectural File*



Accurate prismatic structure and lasting clarity of light-control lens are made possible by PLEXIGLAS acrylic plastic.

Control lenses molded of PLEXIGLAS mounted in continuous rows in library of County of Sonoma school administration building, Santa Rosa, California. Architects: Steel & Van Dyke, Santa Rosa.

Plexiglas...for lighting that stands out and stands up

When lighting equipment includes control lenses molded of PLEXIGLAS® acrylic plastic, the result is illumination of the highest quality. This is because PLEXIGLAS makes possible a precisely designed optical element that directs light to the area where it is required and, at the same time, minimizes the surface brightness of the lens as seen from normal viewing angles.

In addition, lenses of PLEXIGLAS remain free of discoloration even after years of exposure to fluorescent light. They are strong and rigid yet light in weight, resulting in safety overhead and ease of maintenance. And the crystal clarity of PLEXIGLAS assures full utilization of light.

Full details on the use of PLEXIGLAS as a lighting material are contained in our 40-page technical bulletin "PLEXIGLAS for Lighting". We will be glad to send you a copy.

ROHM & HAAS

PHILADELPHIA 5, PA.

In Canada: *Rohm & Haas Co. of Canada, Ltd., West Hill, Ontario*

PLEXIGLAS

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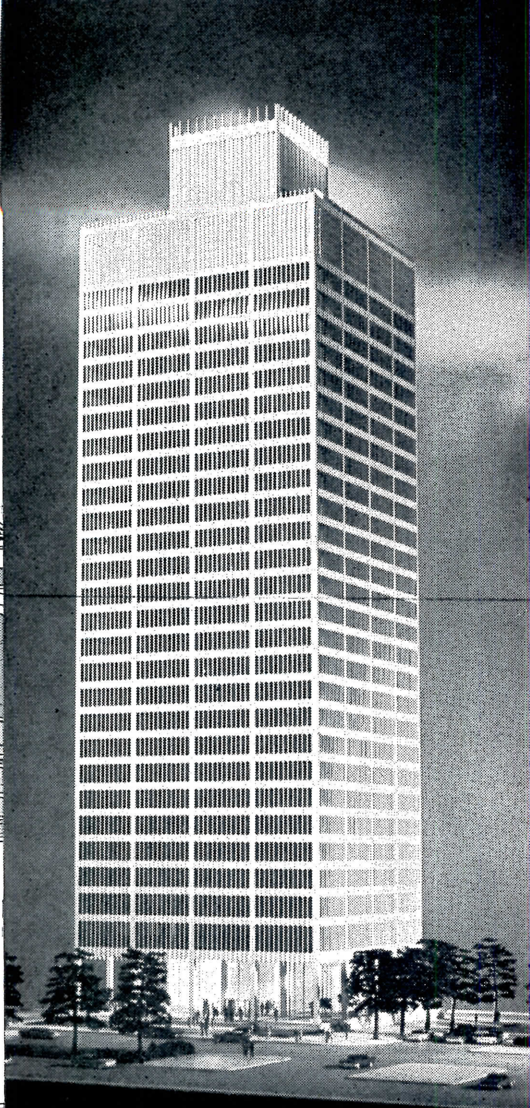


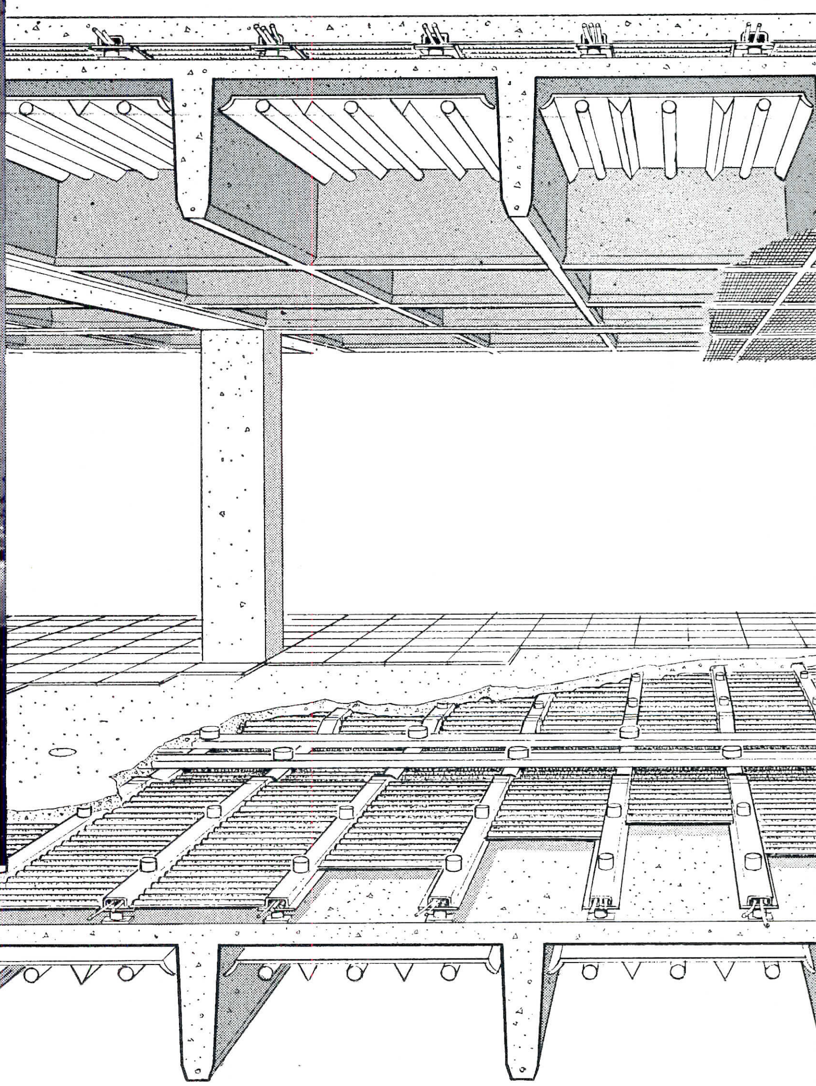
Owner: Michigan Consolidated Gas Company

Associated Architects & Engineers:
Minoru Yamasaki—Smith, Hinchman & Grylls

General Contractor: Bryant & Detweiler

How to put [illegible] sto
a 26-story buildi

Granco A-E Floor combines air and electrical se
depth 25% in the new Michigan Consolidate



One of the *hardest-working, compact* floor systems now available is incorporated into the new headquarters office building of the Michigan Consolidated Gas Company in Detroit—GRANCO A-E (Air-Electric) FLOOR.

Hard-working because it combines architectural objectives with the needs of the mechanical, electrical and structural engineer:

1. Distributes conditioned air to interior and exterior zones through a 3-inch plenum, thereby eliminating a considerable amount of horizontal ductwork.

2. Provides horizontal and vertical wiring flexibility through large capacity cells fed by headers originating at the central electrical shaft.

Compact because it helped reduce total floor depth to only 3 fe compared to 4 feet or more in most office buildings—saved a estimated two stories in the 28-story building.

A Floor System That Doesn't Grow Old—Granco A-E Floor provide a "tool" for achieving the highest-quality combination mechanic and electrical system—has built-in assurance against obsole cence by facilitating easy expansion of these comfort, power ar communications services as required. A-E Floor can be used wi any type construction—remodeling or new.

Optimum Air Capacity and Control—Basically, the A-E syste consists of a finish floor supported by the main structural sla This floor rests on adjustable steel supports, creating a plenu for conditioned air to be carried to floor and ceiling diffuser

Steel

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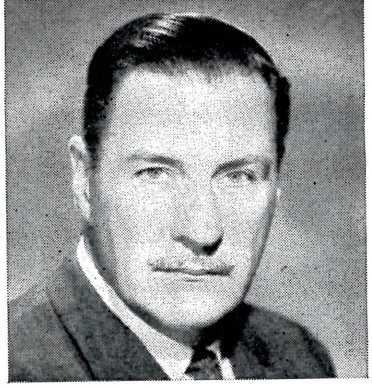
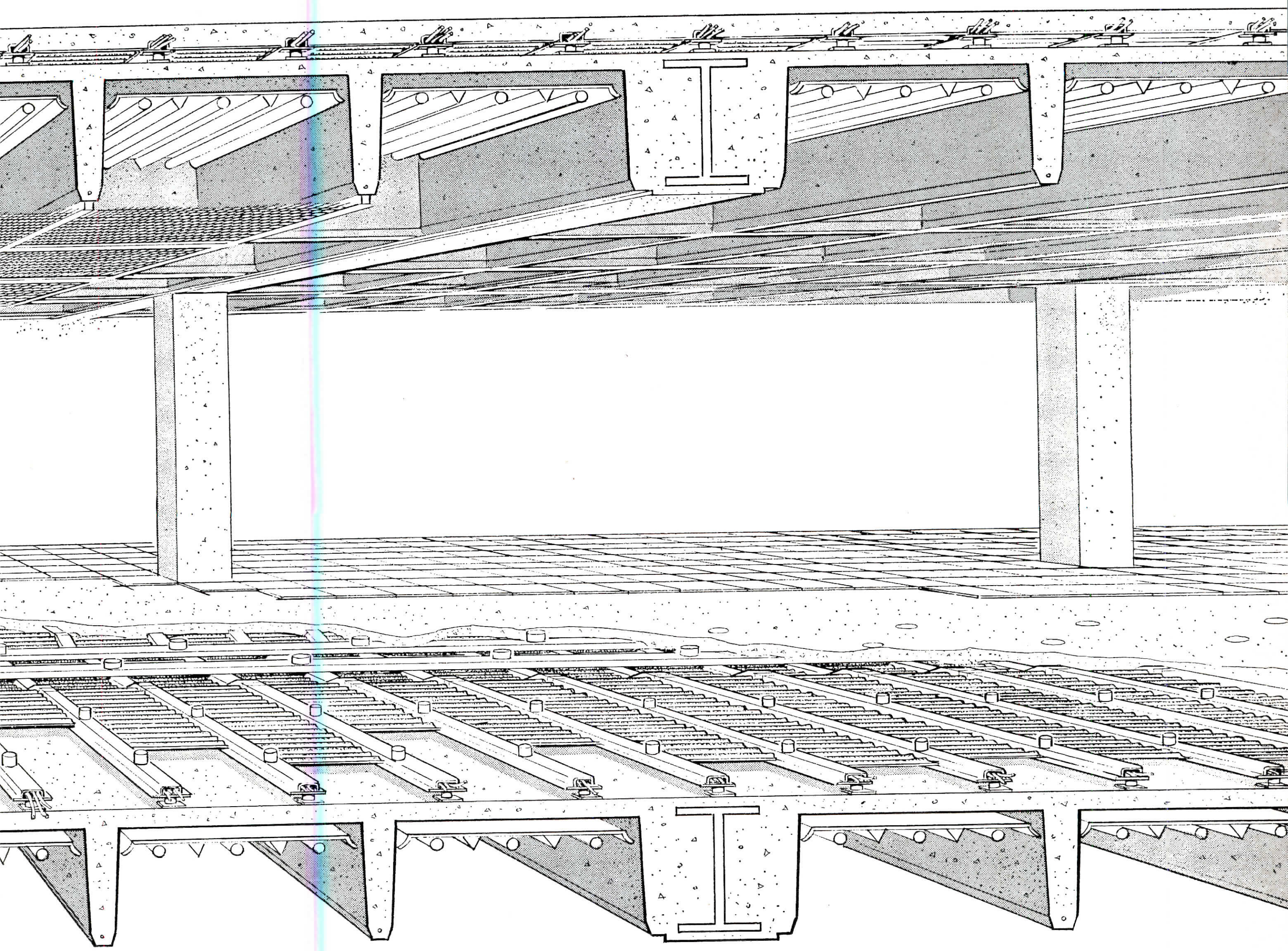


"Granco A-E Floor, in conjunction with structural all-welded frame and waffle slab system, permitted us to achieve a luminous ceiling, underfloor air distribution and ideal electrical flexibility in a floor depth of only three feet. The reduced building height led to a considerable saving in structural steel and other materials." Frederick J. B. Sevald, Vice President, Smith, Hinchman & Grylls and Administrator for the Joint Venture.



The plenum can be varied in height to meet any capacity requirement. Baffles zone air to desired areas. Adjustable supports assure level finish floor, compensating for dead load deflection and irregularities in structural slab.

Electrical Flexibility—Conventional header ducts feed large capacity cells that carry wiring to factory-installed pre-set inserts and standard electrical fittings. Pre-set inserts provide ready access for adding telephones, intercoms, lighting, and electrical service. No costly drilling is required to expand future service.

For additional information, see our catalog in Sweet's or write for A-E Floor catalog No. 99-B62 (A.I.A. File No. 4-E-6). GRANCO STEEL PRODUCTS CO., 6506 N. Broadway, St. Louis 15, Mo. A Subsidiary of Granite City Steel Company.

A·E FLOOR

a floor system providing air and electrical distribution

GRANCO

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GRANCO

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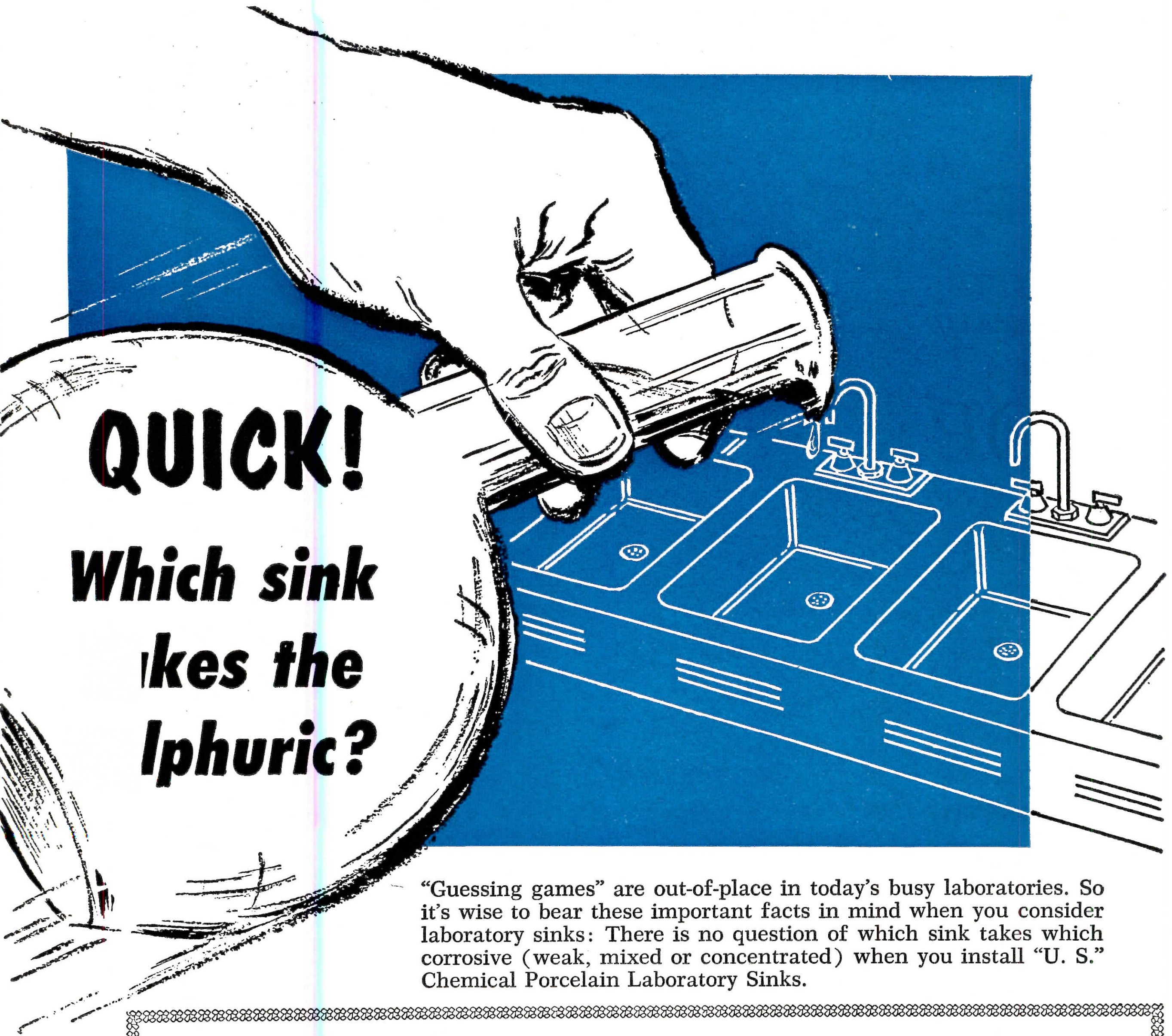
FELLOWSHIPS AVAILABLE FOR STUDY ABROAD

Students of architecture and city planning may apply for U.S. Government grants for advanced study abroad during the 1963-64 academic year. Eligible are U.S. citizens having a Bachelor's degree, working knowledge of the language of the host country, good health, a good academic record and demonstrated capacity for independent study or research. Preference is given applicants under 35 who have not previously lived or studied abroad. Requests for application forms must be postmarked by Oct. 15, 1962. For information, students should consult their campus Fulbright Program Advisers; at-large applicants should write: Counseling Division, Institute of International Education, 800 Second Ave., New York 17.

U.S. Government grants under the Fulbright-Hays Act are available to fine arts graduate students during the academic year 1963-64. Qualified painters, sculptors and graphic artists may enter competitions for awards in 13 countries. Eligibility requirements are the same as those for U.S. Government grants for advanced study abroad for architecture and city planning students (see above). Students should consult their campus Fulbright Program Advisers for information; at-large applicants, the Counseling Division, Institute of International Education, 800 Second Ave., New York 17. (Deadline to request application: Oct. 15, 1962.)

A limited number of fellowships for mature students and artists capable of independent work in architecture, landscape architecture, painting, sculpture, history of art are being offered by the American Academy in Rome. Fellowships will be awarded on evidence of ability and achievement and are open to U.S. citizens for one year beginning Oct. 1, 1963. Applications and submission of work, in the form prescribed, must be received at the Academy's New York office by Dec. 31, 1962. Details may be had by writing the Executive Secretary, American Academy in Rome, 101 Park Ave., New York 17.



"Guessing games" are out-of-place in today's busy laboratories. So it's wise to bear these important facts in mind when you consider laboratory sinks: There is no question of which sink takes which corrosive (weak, mixed or concentrated) when you install "U. S." Chemical Porcelain Laboratory Sinks.

GUARANTEE

The laboratory sinks which we manufacture from chemical porcelain are completely impervious and corrosion-proof. Their resistance to all corrosive agents (except hydrofluoric acid) is not limited to the glazed surfaces. Both the glaze, and the sink body itself, are made of the same basic corrosion-proof materials. Thus, there is practically no difference between the corrosion resistance of the glaze and that of the sink body.

We, therefore, make the following guarantee:

We guarantee, for the life of the building in which it is installed, that this sink will not be destroyed by the action of corrosive agents, regardless of whether glazed or unglazed surfaces are exposed to corrosion.

We also guarantee that this sink will not be damaged or destroyed by temperature changes or mechanical stresses encountered in normal laboratory usage.

(This guarantee does not include mechanical damage due to gross carelessness during installation or due to heavy impact, nor does it include etching of the sink surface by hydrofluoric acid. Natural and artificial silicates are attacked by hydrofluoric acid, and if such acid is emptied into sinks, the sinks should be flushed with water immediately to prevent damage to the glaze.)

Under the terms of this guarantee we will replace without charge, freight prepaid, any sink which fails to meet the service warranty above. We reserve the right to request the return of the defective sink, freight collect.

319-H

CHEMICAL
CERAMICS
DIVISION

U. S. STONEWARE
AKRON 9, OHIO

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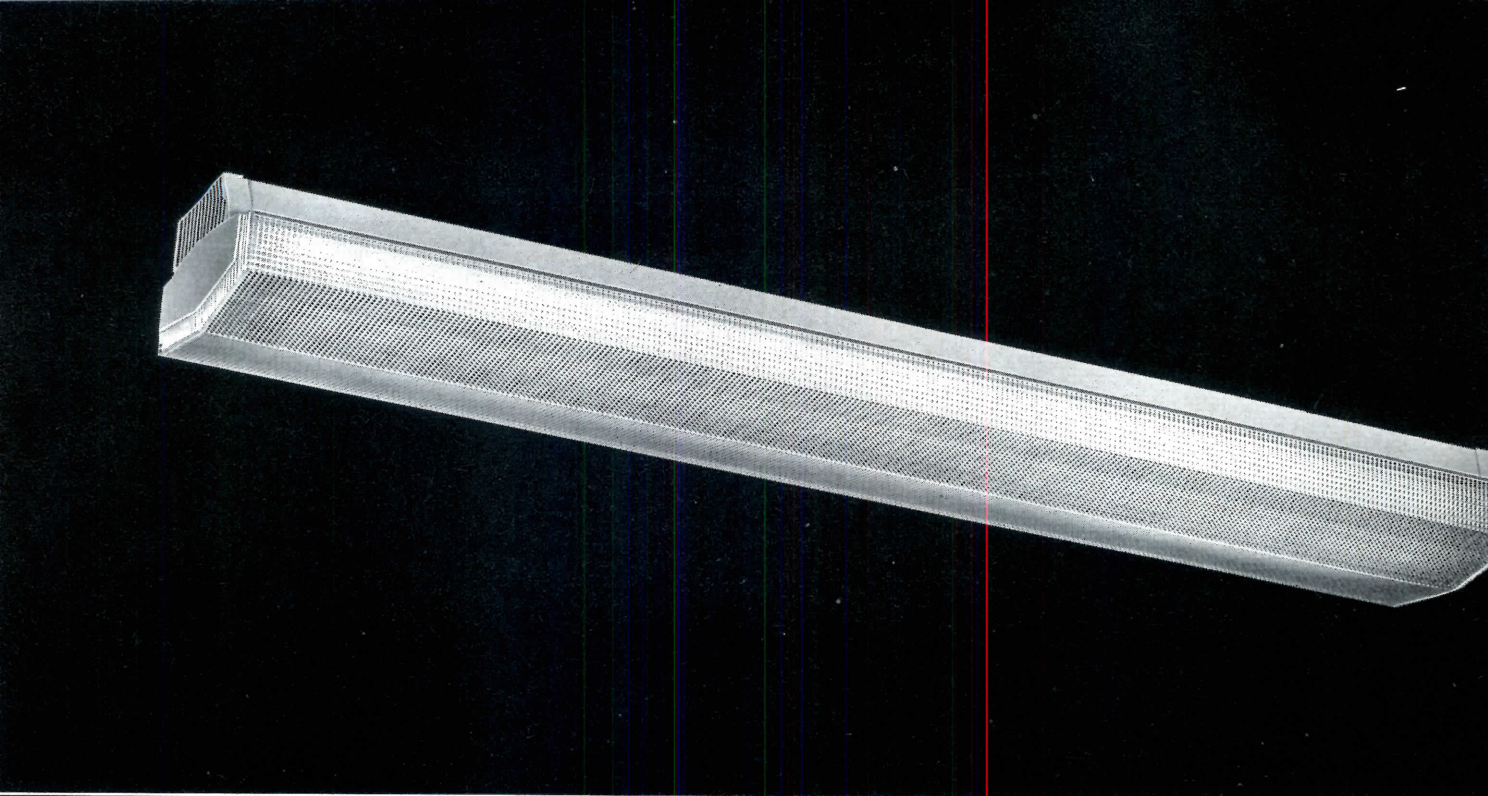
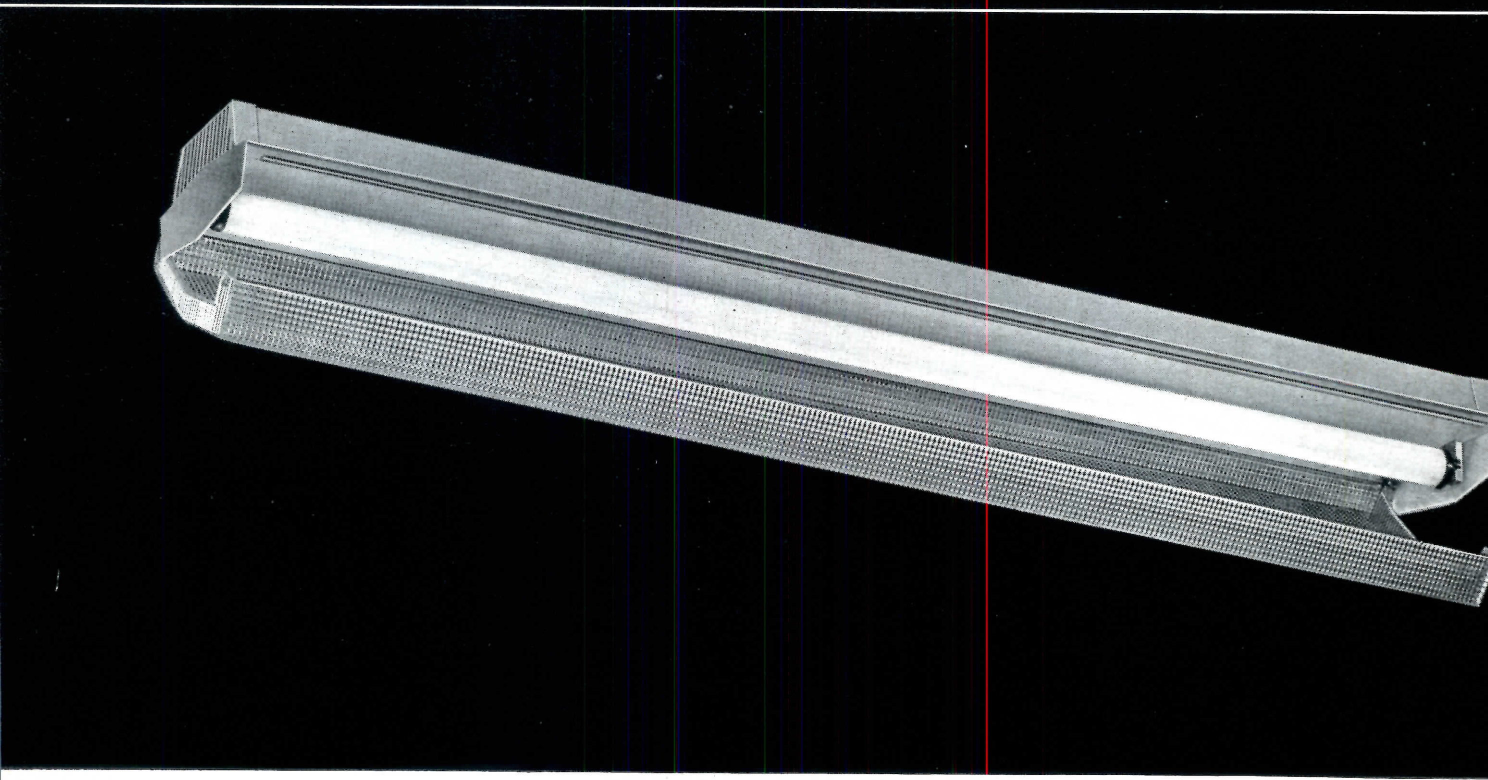
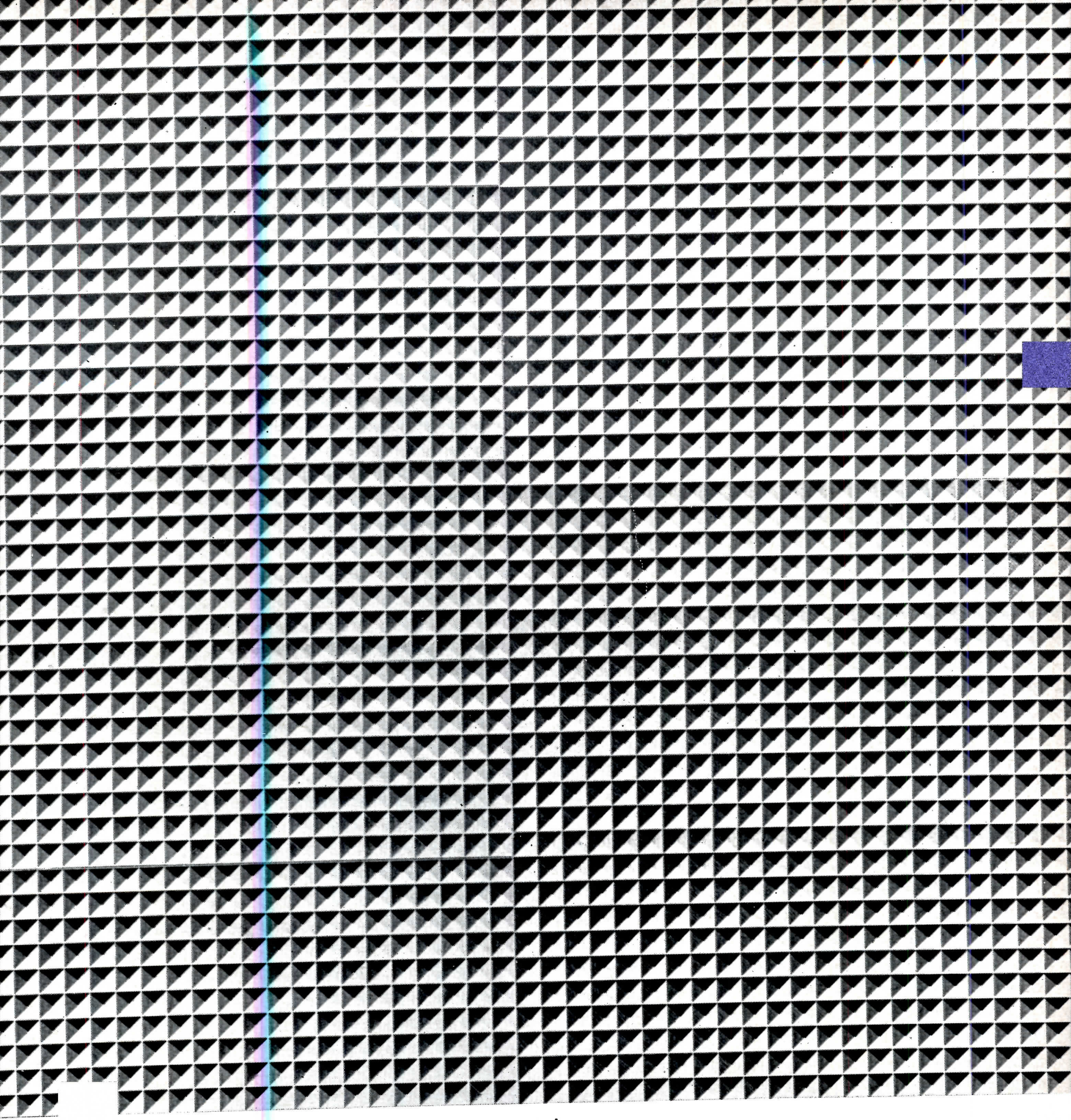




1 good reason to look into Opticon...



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low brightness contrast.

Equally important is Lightolier's ability to design and produce this fixture at a low budget price while maintaining its respected standards of performance, aesthetics, and quality construction.

There are two catches to it (on each side). Press either side and the entire lens swings away on safety hinges for swift relamping without tools.

Other Lightolier touches: interlocking ends for straight, continuous runs (without dark joiner straps), slim 4½" depth, completely enclosed construction to keep fixture clean longer. Opticon is available in one- or two-lamp models, 48" or 96" length, stem or surface mounted. For more information on Opticon, write today to Lightolier, Jersey City 5, N.J., for Dept. AR 9-33.

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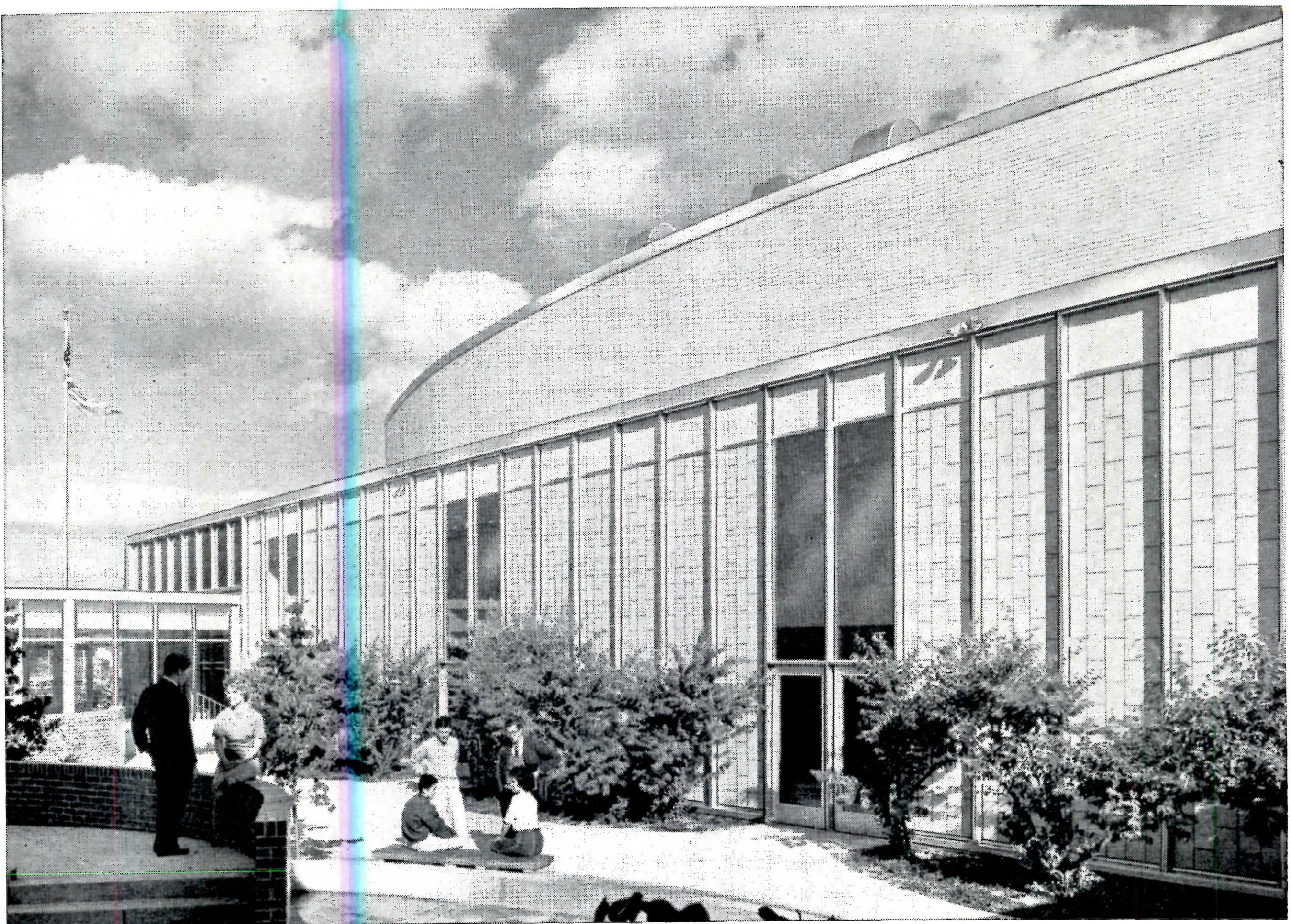
Showrooms: New York, Chicago, Dallas, Los Angeles.

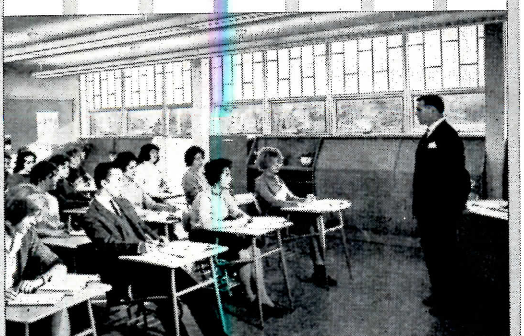
Opticon is stocked by the Authorized Lightolier Distributors listed on page 282 ►



MORE THAN JUST A WALL...

This Translucent Paneling System By SANPAN

Provides Glare-Proof Natural Lighting



Striking . . . the word for the new Rippowam Senior High School in Stanford, Conn., a brilliant concept of modern design conceived by Architects Urbahn, Brayton and Burrows. Its clean, classic lines are enhanced by 1,200 Sanpan translucent panels forming the basic structural walls . . . the largest installation of its kind to-date.

Before installation, the amount of translucency in each Sanpan structural plastic panel is predetermined by increasing or decreasing the pigment in the translucent skin. As a result, harsh glare and excessive light transmission are effectively reduced, facilitating maximum indoor natural lighting. Sanpan panels boast exceptional insulating qualities equivalent to that of a 12″ masonry wall, providing protection against moisture penetration from the outside and heat loss on the inside. Sanpan panels also permit significant economies in construction and maintenance. Extremely lightweight, they are designed for simple screw connection.

Investigate the potential of Sanpan in New Construction and Modernization projects. For further specifications and descriptive literature, write:

Panel Structures INCORPORATED

45 Greenwood Avenue, East Orange, New Jersey

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air mixing units*

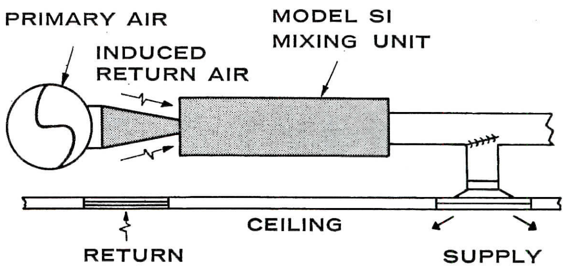
interior zone conditioning

and less expensive with single inlet mixing units. Less space is required because units eliminate hot air ductwork or reheat coils with their piping. Less sheet metal and insulation are needed throughout the system. Terminal units are less expensive.

Single inlet mixing units also simplify adding air conditioning to existing buildings . . . can be used with any type of properly controlled perimeter heating system.

Six Model SI single inlet mixing units are available with capacities from 100 to 3200 cfm. All are controlled by a single operator and are adaptable to any control system — electric, electronic, or pneumatic.

Get the facts — call your Barber-Colman Air Distribution field office for complete details or write to:



SIZE AND CAPACITIES
CFM RANGE

SI-4	SI-6	SI-8	SI-10	SI-12	SI-14
100	250	550	850	1400	2200
250	550	850	1400	2200	3200

BARBER COLMAN

BARBER-COLMAN COMPANY

Dept. I, 1104 Rock Street, Rockford, Illinois

...where originality works for you

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FORD GRANTS AWARD CREATIVE ARTS STUDIES

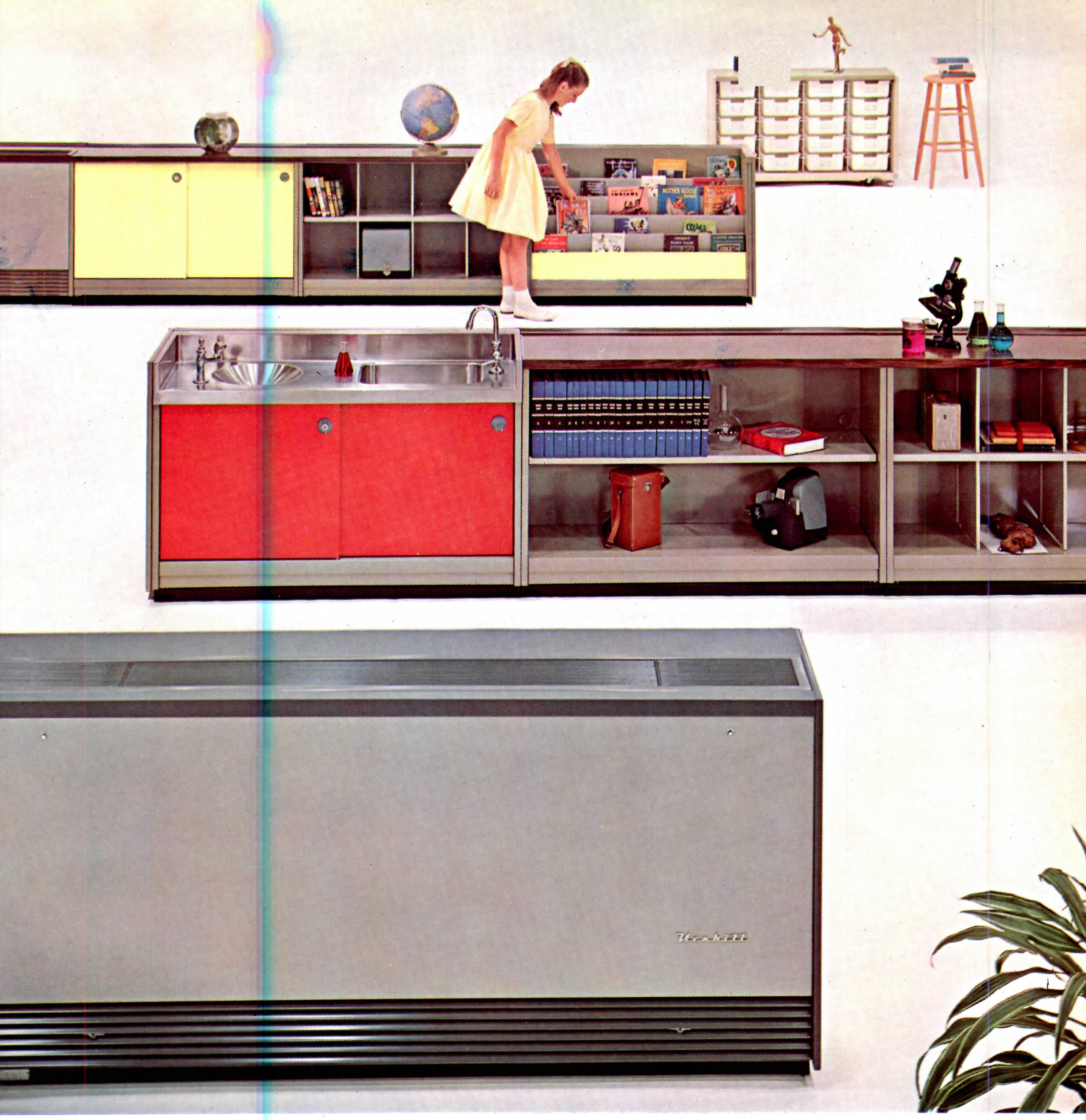
The Ford Foundation is offering a limited number of fellowships, the fourth group of awards since June, 1960, to assist persons not regularly associated with academic institutions to undertake or complete studies in the creative arts. Letters of application should be submitted before Oct. 31, 1962 to the Ford Foundation, Fellowship Program for Studies in the Creative Arts, 477 Madison Ave., New York 22.

Fellowships are for research and study involving any one of the creative arts, not designed to support study or training for an academic degree nor to support the artist in his capacity as painter, novelist, poet, etc.

TILE COUNCIL GIVES GRANTS TO 15 SCHOOLS

The Tile Council of America, trade association of 25 domestic manufacturers, has recently set aside $33,750 in new funds for architectural education. Aimed at aiding talented and needy students and encouraging high standards in the teaching of courses in building materials, the program makes available $750-a-year, three-year grants to 15 accredited architectural schools. Of the $750, $500 is used for student grants or loans; $250 to improve courses in building materials.

Schools selected for the grants this year, bringing to 42 the number of institutions benefitted since the program's inception several years ago, are: the Catholic University of America, University of Cincinnati, Harvard University, University of Kansas, Massachusetts Institute of Technology, Miami University, Montana State College, University of Oregon, University of Pennsylvania, Rensselaer Polytechnic Institute, Rhode Island School of Design, Texas Technological College, Tulane University, University of Virginia and Washington University (St. Louis).



For year-round learning comfort
and creative teaching help . . .

Nesbitt 600 Line

. . . contemporary lines and colors
by Designer Paul McCobb

The most practical system for the control of all the thermal factors in a classroom is the fully automatic Nesbitt Unit System

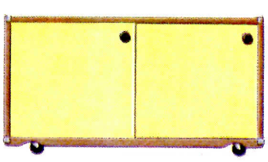
Beauty and utility are important adjuncts of year-round comfort with the Nesbitt 600 Series of Classroom Unit Ventilators and Storage Cabinets

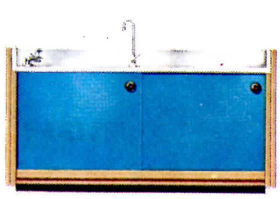
The comfort conditioning of school and college buildings is, as you know, a singular assignment, with uncommon demands. The buildings may be used part of the day, or day and night; part of the year, or all year round. Some classrooms will be occupied, others not; the number and activities of the occupants will vary greatly. There will be need for heating many days of the year, more in some localities, less in others; but at least for morning warm-up, during recesses, overnight, and week-ends. Rooms with certain exposures or large windows may need independent cold surface and downdraft radiation. At the same time, most occupied classrooms will need cooling; and when the outside temperature is below 60°F this can be had for the low cost of introducing outdoor air. But in the spring and fall—and most certainly in the summer—mechanical cooling and dehumidification will be needed. And always, of course, the control of heating, ventilating and cooling must be on an individual room basis—learning productivity depends on the proper thermal environment.

Thus, everything about a school's thermal comfort requirements calls for a unit system. More unit systems are used in schools than all other kinds; and more of the units have been made by Nesbitt than by any other manufacturer.

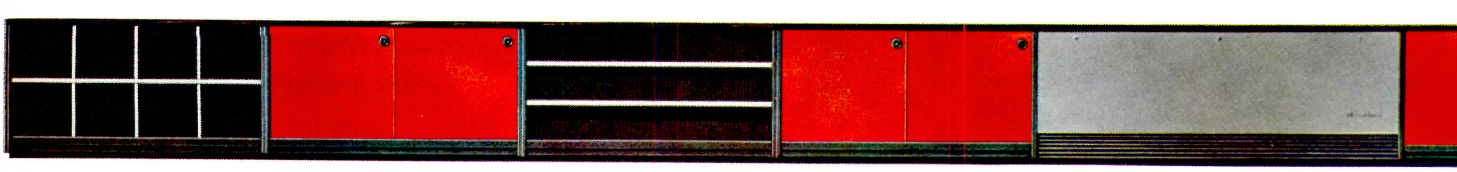
Plan to use Nesbitt Year-Round Syncretizers in your next school. They will do what you want—winter and summer—and for the life of the building! The Nesbitt record over the last 45 years attests to that. Will you let us prove it?

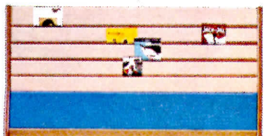
SEND FOR PUBLICATION 11-3





Nesbitt





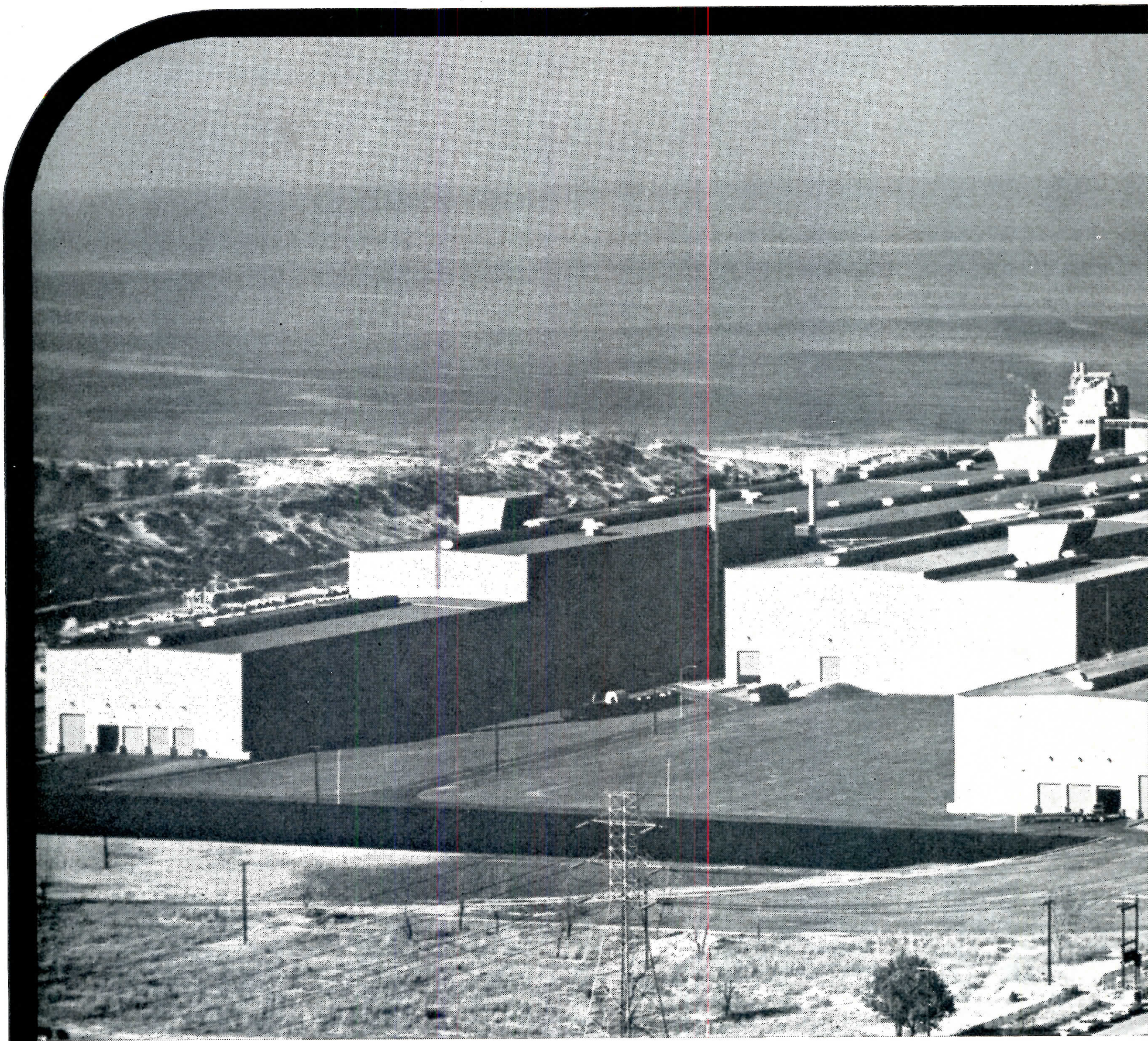
UNIT SYSTEM

HEATING, VENTILATING AND AIR CONDITIONING

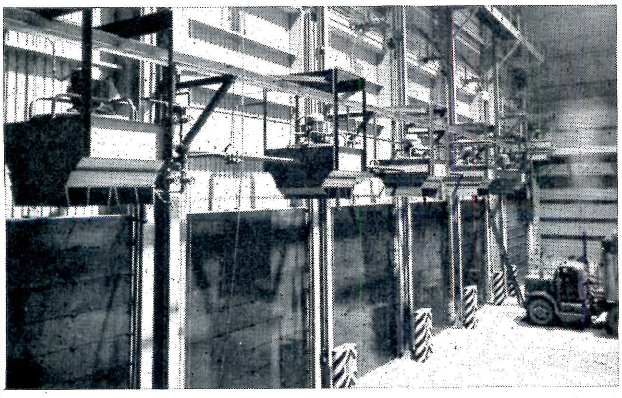
Made and sold by John J. Nesbitt, Inc., Philadelphia 36, Pa. Offices in Principal Cities

r more data, circle 143 on Inquiry Card

For more data, circle 144 on Inquiry Card



How to save more man-hours wit



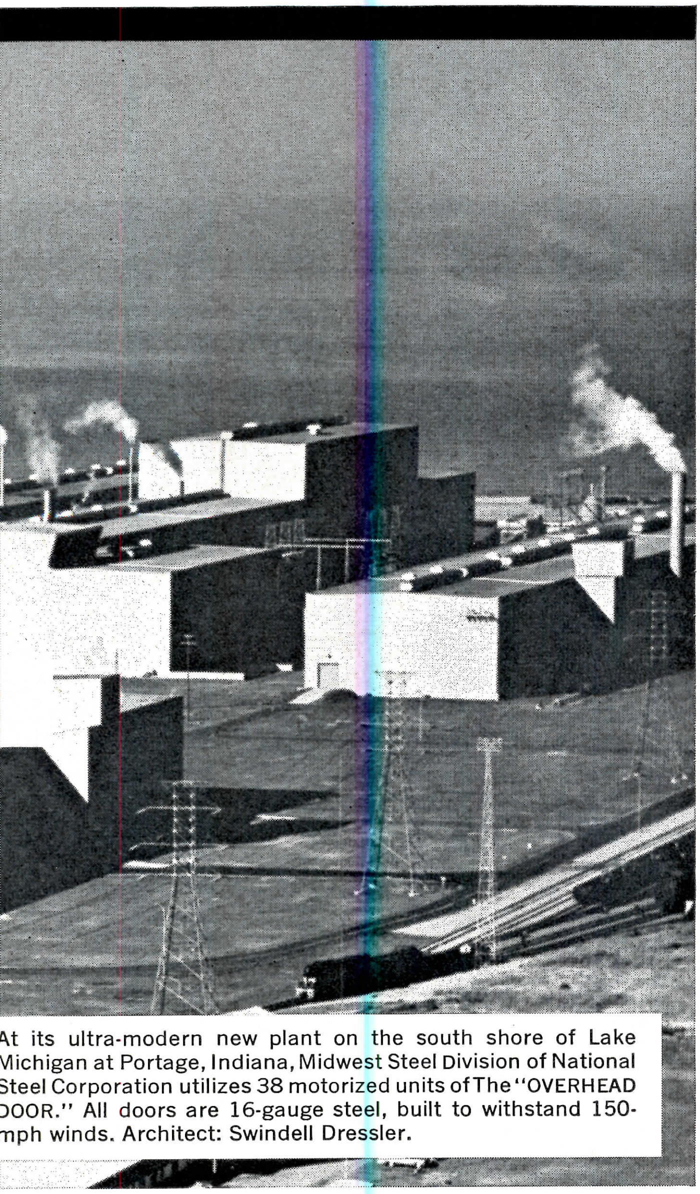
Bank of five steel "OVERHEAD DOOR" installations at Midwest Steel Division plant converts factory sidewall into a "movable wall," and provides control of traffic, time, space and climate.

The saving of man-hours can be a function of T "OVERHEAD DOOR," just as surely as it helps cont traffic, space and climate through its "movable wa function.

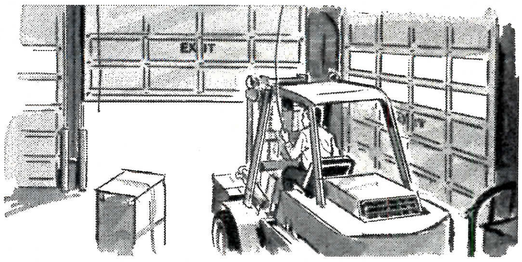
Motorized, push-button doors contribute importar to this time-saving. And completely automated do operated electronically, can contribute even more. example, a fork-lift driver may take 75 seconds to o and close an industrial door. At an average of opening-and-closing per half-hour, 16 cycles per day door, and a $2.25 wage rate, driver downtime alone cost industry $183 per door per year!

When you multiply $183 by many doors, you see the yearly savings possible with the automa "OVERHEAD DOOR."

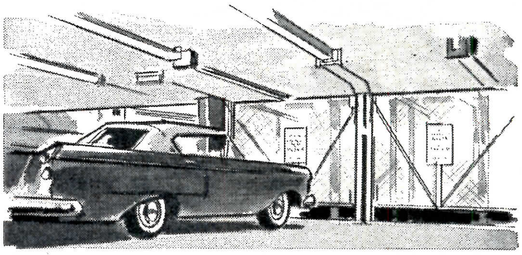
Besides man-hour savings and weather protect both motorized and electronic "OVERHEAD DOOR"



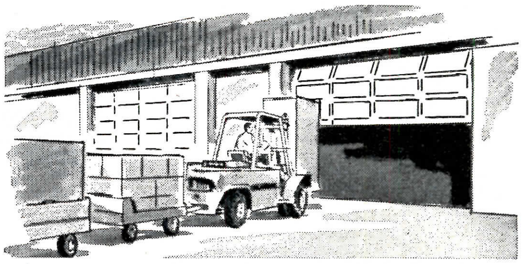
At its ultra-modern new plant on the south shore of Lake Michigan at Portage, Indiana, Midwest Steel Division of National Steel Corporation utilizes 38 motorized units of The "OVERHEAD DOOR." All doors are 16-gauge steel, built to withstand 150-mph winds. Architect: Swindell Dressler.



Driver has pulled cord, and "OVERHEAD DOOR" is moving up in Air Express building at Atlanta's new airport. Immediate door operation permits tractors to pull package-laden carts into and out of building, quickly and efficiently, saving many man-hours.



Automatically-operated, upward-acting, expanded-metal gates by "OVERHEAD DOOR" are used in this pigeon-hole parking structure at Columbus, Ohio. Representing the newest in car-park automation, this driverless "file system" depends on The "OVERHEAD DOOR" for swift, automatic handling.



Industrial truck and fork-lift operators need never leave their vehicles as they approach an automated "OVERHEAD DOOR" installation. At the touch of a dash-mounted electronic button, powerful lift mechanism raises the door, or outer gate, speeds traffic flow, eliminates stop-and-go man-hours.

h motorized "OVERHEAD DOOR"

allations can provide unlimited ingress and egress at affic-flow arteries; control strategic expansion or con- ement of given shop areas and functions; and safe- ard the welfare of employees by closing to preserve rmth in winter, opening to provide full ventilation summer.

GET THE COMPLETE STORY NOW

For detailed information, call your local distributor, ted in the white pages. Or write Overhead Door rporation, the company that engineered and pioneered or automation—and originated upward-acting sec- nal doors for industry, commerce and residential ilding. *General Office and Manufacturing Division:* artford City, Ind. *Manufacturing Distributors:* Dallas, ex.; Portland, Ore.; Cortland, N.Y.; llside, N.J.; Lewistown, Pa.; Nashua, H. *In Canada:* Oakville, Ontario.

16j
Ove

THE "OVERHEAD DOOR" TRADE MARK

the original upward-acting sectional door, made only by

OVERHEAD DOOR CORPORATION

INDUSTRIAL • COMMERCIAL • RESIDENTIAL
WOOD • STEEL • ALUMINUM

For more data, circle 145 on Inquiry Card

hospital is more than just a buildi

. . . an efficient machine of doctors, nurses and technicians backed by modern functional equipment. More than 40 hospital projects being completed in 1962 chose **Remco Hospital Casework** as an integral part of this vital equipment . . . standard and customed designed units sensible prices.

Write for Remco's new Hospital Casework Manual #6

. . . just what the doctor ordered.

Remco

HOSPITAL CASEWORK
101 New Laredo Highway, San Antonio 11, Texas

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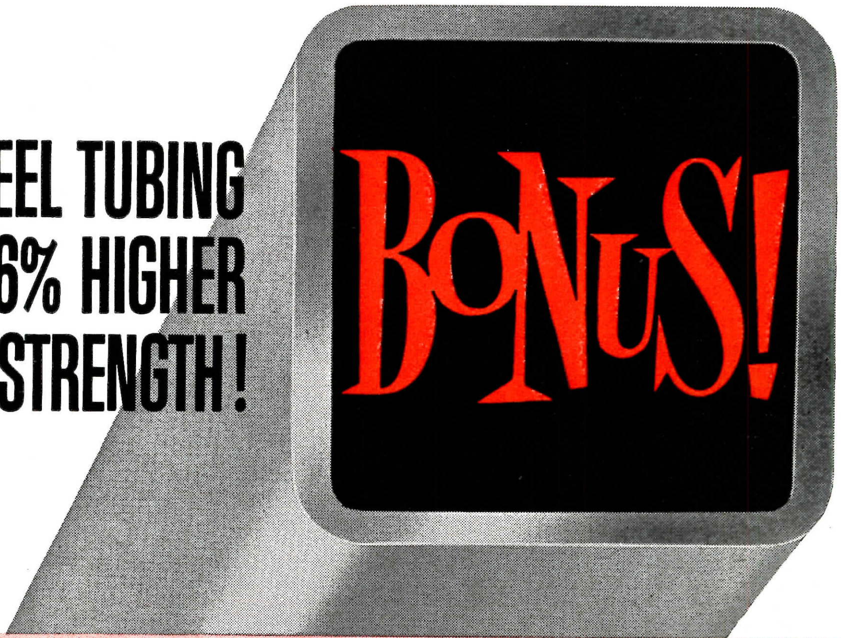
STRUCTURAL STEEL TUBING AVAILABLE WITH 36% HIGHER MINIMUM YIELD STRENGTH!



ASTM A-7	
ile strength, psi. shapes of all cknesses	60,000 to 75,000
point, min. psi.	**33,000**
gation in 2 in., n. per cent	24

ASTM A-36	
Tensile strength, psi.	60,000 to 80,000
Yield point, min. psi.	**36,000**
Elongation in 2 in., min. per cent	23

NEW REPUBLIC SPECIFICATION ST-101

		Grade A	Grade B	Grade C
ROUNDS	Tensile strength, min., psi.	45,000	52,000	60,000
	Yield strength (.2% offset), min., psi.	**33,000**	**42,000**	**50,000**
	Elongation in 2″, min., per cent	25	25	20
SHAPES	Tensile strength, min., psi.	60,000	60,000	70,000
	Yield strength (.2% offset), min., psi.	**33,000**	**45,000**	**60,000**
	Elongation in 2″, min., per cent	25	25	10

Use this Bonus Strength to cut material requirements!

With Republic's new, high strength structural steel tubing, you spend less money to get needed strength in columns, posts, lintels, spandrels, and other structurals.

Republic has increased guaranteed minimum yield strength of square and rectangular structural steel tubing shapes by 36 per cent over ASTM Specifications A-7 or A-36 without increasing cost.

(Continued next page)

Strong
Modern
Dependable

STRUCTURAL STEEL TUBING AVAILABLE WITH 36% HIGHER MINIMUM YIELD STRENGTH!

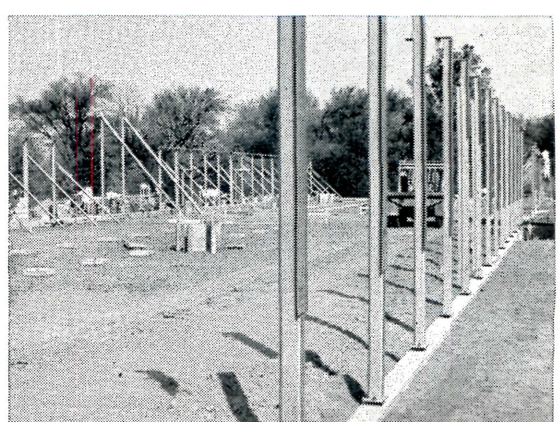
(From preceding page)

Detailed in Republic's new ST-101 Specification, the higher strengths can bring about significant savings in overall material requirements and costs. ST-101 is the first specification ever written for structural steel tubing.

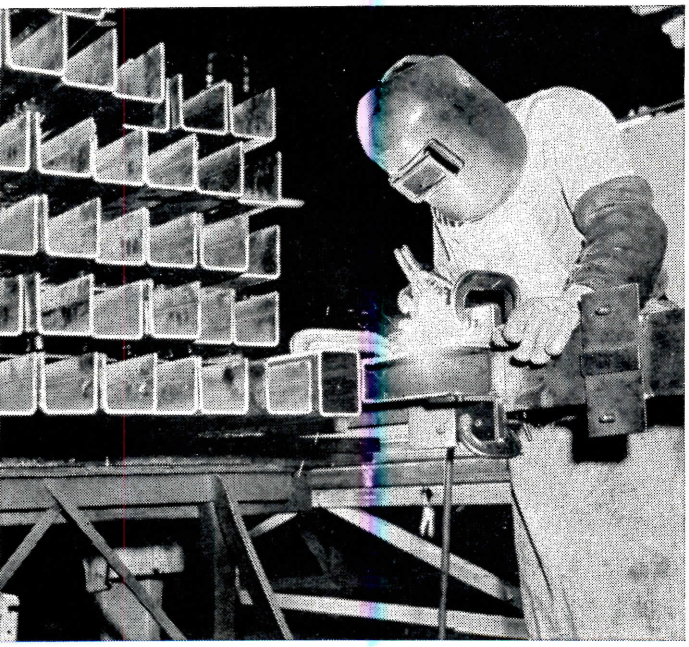
In replacing other materials, steel tubing combines the efficiency of hollow, thin-wall sections with a trimness of line that integrates with other elements and materials. Tubing cuts weight of structures. Easily joined by mechanical methods or by any of the conventional welding processes, structural tubing is ideally suited to off-site fabrication.

Republic ELECTRUNITE® Structural Steel Tubing is available in rounds to 6 inches O.D., squares and rectangulars in peripheries to 20 inches and wall thicknesses including .250″. A new Republic booklet contains complete information including elements of sections for structural steel tubing. Mail the coupon.

SUPPORTING EXTERNAL CURTAIN WALL SIDING: 1,300 pieces of Republic's Rectangular Tubing, 4″ x 3″, in lengths from 10′ 4″ to 15′ 11½″. Building is New York Life Insurance Company's new headquarters in New York City. Architects: Carson, Lundin & Shaw. Structural engineers: Edwards and Hjorth.



EFFICIENT COLUMNS: The light weight and ease of fastening structural steel tubing simplifies erection. Photo shows preliminary column work at the Otter Creek Elementary School in North Terre Haute, Indiana.



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On the Calendar

September

2-9 Biennial Congress of the International Federation for Housing and Town Planning; theme, "Habitat et Civilisation"—Paris, France

6-11 World Congress, International Council for Building Research Studies and Documentation; theme, "The Influence of Changing Requirements and Developments in Materials and Components on Design and Construction"—Cambridge, England

9-14 National Technical Conference, Illuminating Engineering Society—Statler Hilton Hotel, Dallas

10-14 Industry conference on building codes, National Association of Home Builders—National Housing Center, Washington, D.C.

10-17 Third congress meeting, Inter-American Federation of the Construction Industry—Rio de Janeiro, Brazil

17-20 64th annual meeting, American Hospital Association; feature, architectural exhibition of nursing homes and long-term units—McCormick Place, Chicago

19-21 Annual convention and Chapter President's conference, Producers' Council, Inc.—Commodore Hotel, New York

19-22 Institute on Information Retrieval, sponsored by the University of Minnesota Library School and Center for Continuation Study—Univ. of Minnesota, Minneapolis

23-26 National Planning Conference, sponsored by the Community Planning Association of Canada—Hotel MacDonald, Edmonton

23-28 Eighth annual national convention, Prestressed Concrete Institute—Roosevelt Hotel, New Orleans

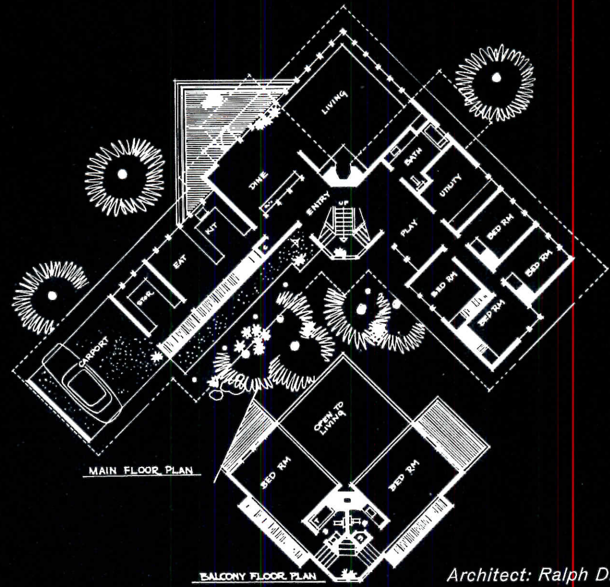
24-26 Midyear meeting, Associated General Contractors of America Governing and Advisory Board—Denver

27-29 Western Mountain A.I.A. Regional Conference—Sun Valley, Idaho

27-29 National annual meeting and Second National Symposium, Industrial Designers Institute; theme, "U.S. Design for the Competitive Market"—Detroit

28-29 14th fall convention, American Concrete Institute; theme, "Concrete Construction in Aqueous Environments"—Seattle, Wash.

continued on page 303



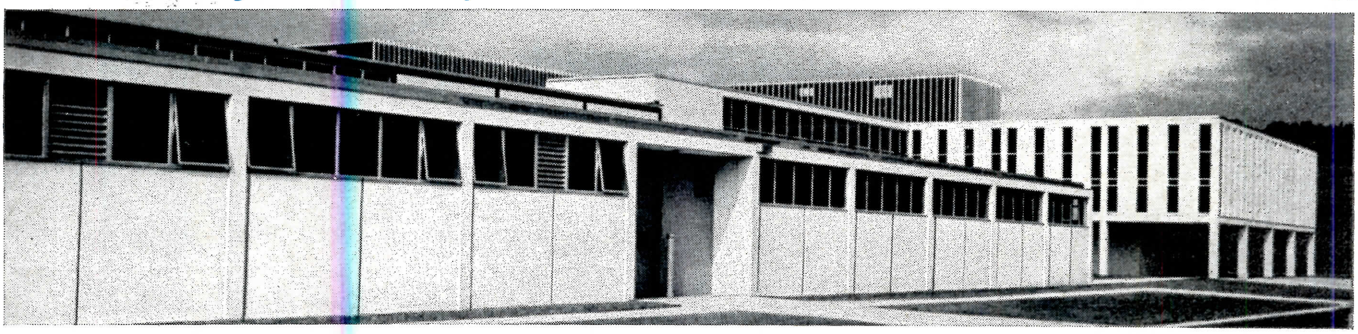
Architect: Ralph D. Anderson

Red Cedar Shingles age gracefully

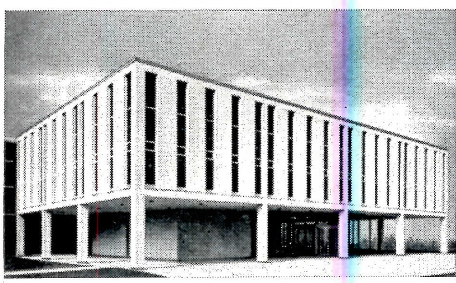
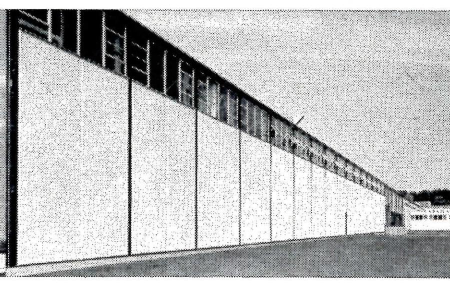
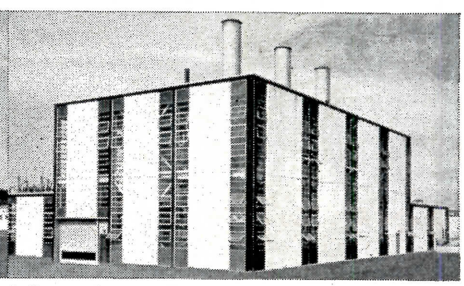
The roof above is 5 years old. It will continue to gain beauty and character for years to come. Rugged, durable, storm and wind-resistant, a Red Cedar Shingle roof weathers beautifully and lasts well over 20 years. For detailed information about specifications or application of this classic material: write, wire or call: Red Cedar Shingle Bureau, 5510 White Building, Seattle 1, Washington. (In Canada: 550 Burrard Street, Vancouver 1, British Columbia) **RED CEDAR SHINGLES**

GIFFELS & ROSSETTI, INC., specified precast white concre

nels for the curtain walls of the plant, administration building, employees' facilities building and boiler house in this Maryland manufacturing complex. Made of ATLAS WHITE portland cement and exposed quartz aggregate with a lightweight aggregate back-up, some 75,000 square feet of paneling was anchored to the steel framework by clips, angles and bolts. Installation was fast. For example, 400 panels were anchored on the manufacturing building in 20 working days. The interior side of the units was troweled and left exposed. □ Today, more architects are taking advantage of the design versatility and construction economy of precast concrete. It can be cast in a great variety of sizes, shapes, colors and textures. Ask your local precast concrete manufacturer for details.



For a 32-page brochure titled "White Concrete in Architecture," write Universal Atlas, 100 Park Avenue, New York 17, New York.

Offices and plant, Mack Trucks, Inc., Hagerstown, Md. **Architects and Engineers:** Giffels & Rossetti, Inc., Detroit. **Contractor:** Darin & Armstrong, Inc., Detroit. ***Precast Concrete Panels:*** "Marzaic," by Marietta Concrete Division, Martin Marietta Corporation, Marietta, Ohio.

Universal Atlas Cement
Division of
United States Steel

"USS" and "ATLAS" are registered trademarks. WF-58

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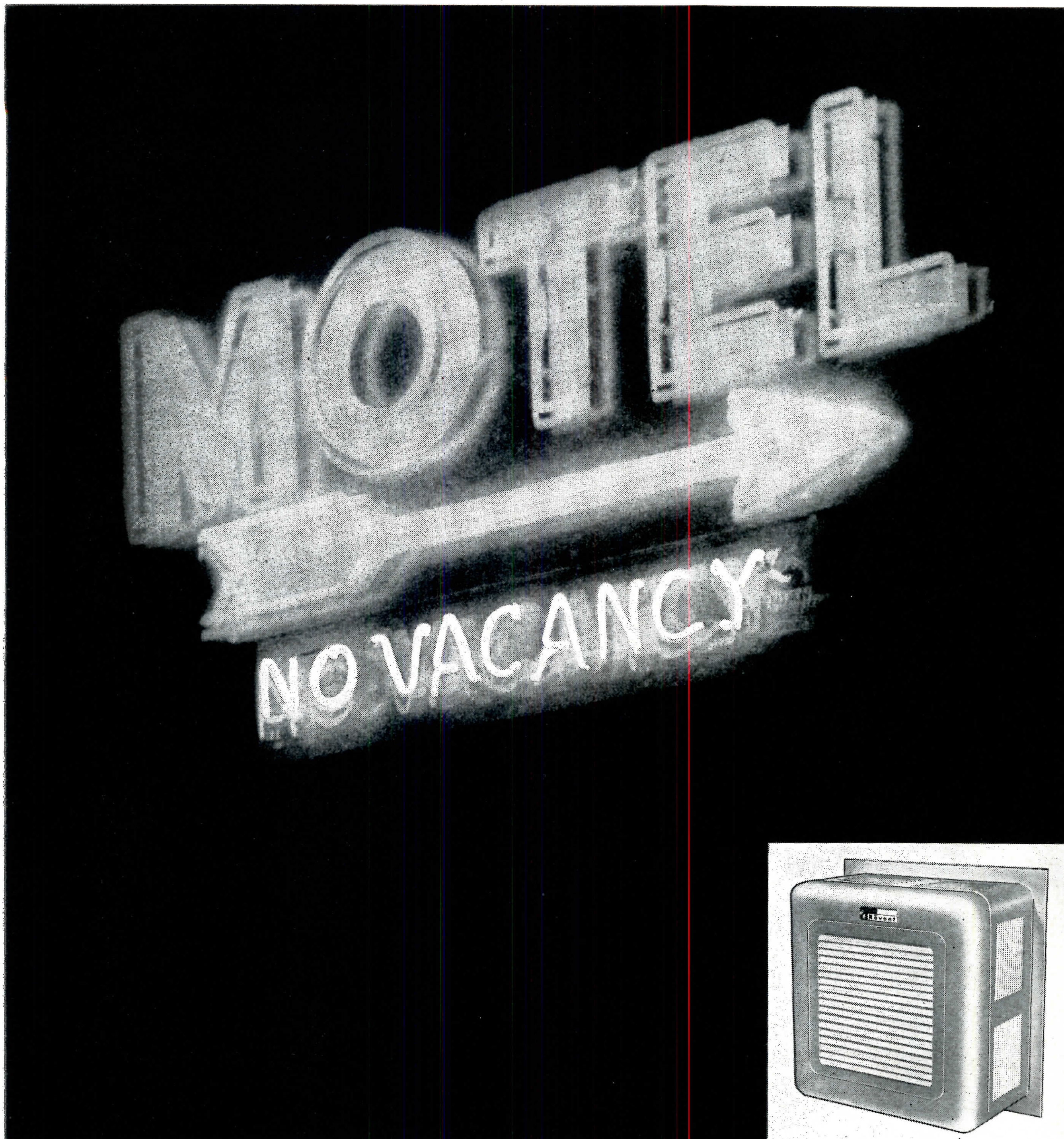
For more data, circle 151 on Inquiry Card



Visit the spectacular Gas Pavilion at the Seattle World's Fair.

one sign of a profitable motel business

Another sign: Suburban Novent-Dynavent Gas Heaters. *And they are profitable! These compact gas units give you the comfort of central heating at a fraction of the cost. You save on installation—no flue, no chimney, no ducts needed—adaptable to just about any location. You save about 30% on already low gas fuel costs . . . because no heat is wasted. A powerful blower circulates gentle, gas heat from the floor to the ceiling. Uses outside air . . . burns no room oxygen. Want to heat almost any building at lowest cost? Call your Gas Company. Or write Suburban Appliance Co., Dept. AR-962, Morristown, N. J.* **For heating . . . Gas is good business**

AMERICAN GAS ASSOCIATION

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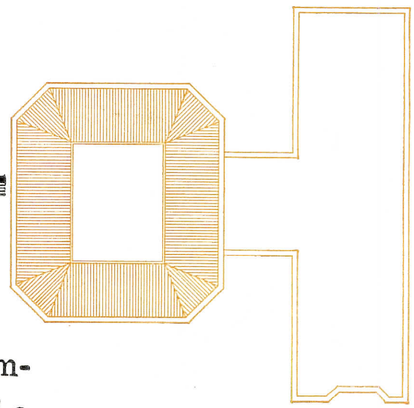
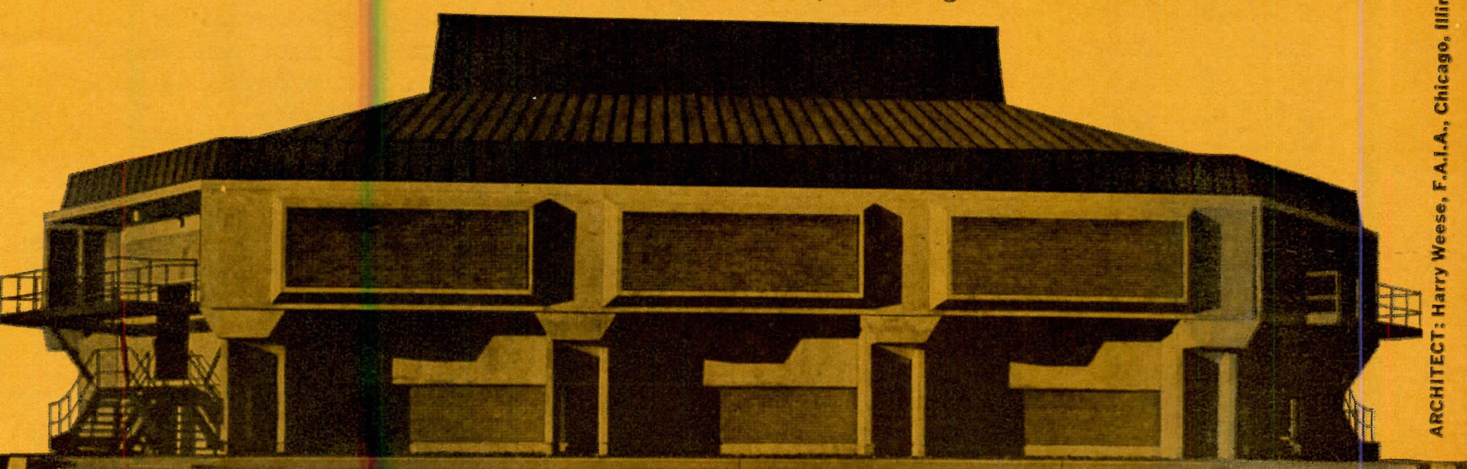


MAGIC UNDER THE ROOF

AND IN IT

In his Arena Stage, as one critic commented, Harry Weese "has produced a handsome structure, both simple and spare, creating an ambiance which suggests . . . that magic is made, after all, in a working place." We wholeheartedly agree, and are indeed proud that this distinguished architect should have chosen terne roofing for so notably distinguished a building, merely adding (however diffidently) our not unselfish belief that there is also some slight element of magic in a material which can provide so much—form, color, function—at such relatively modest cost. Whether architect or prospective builder, we will be very happy to send you detailed information on Terne.

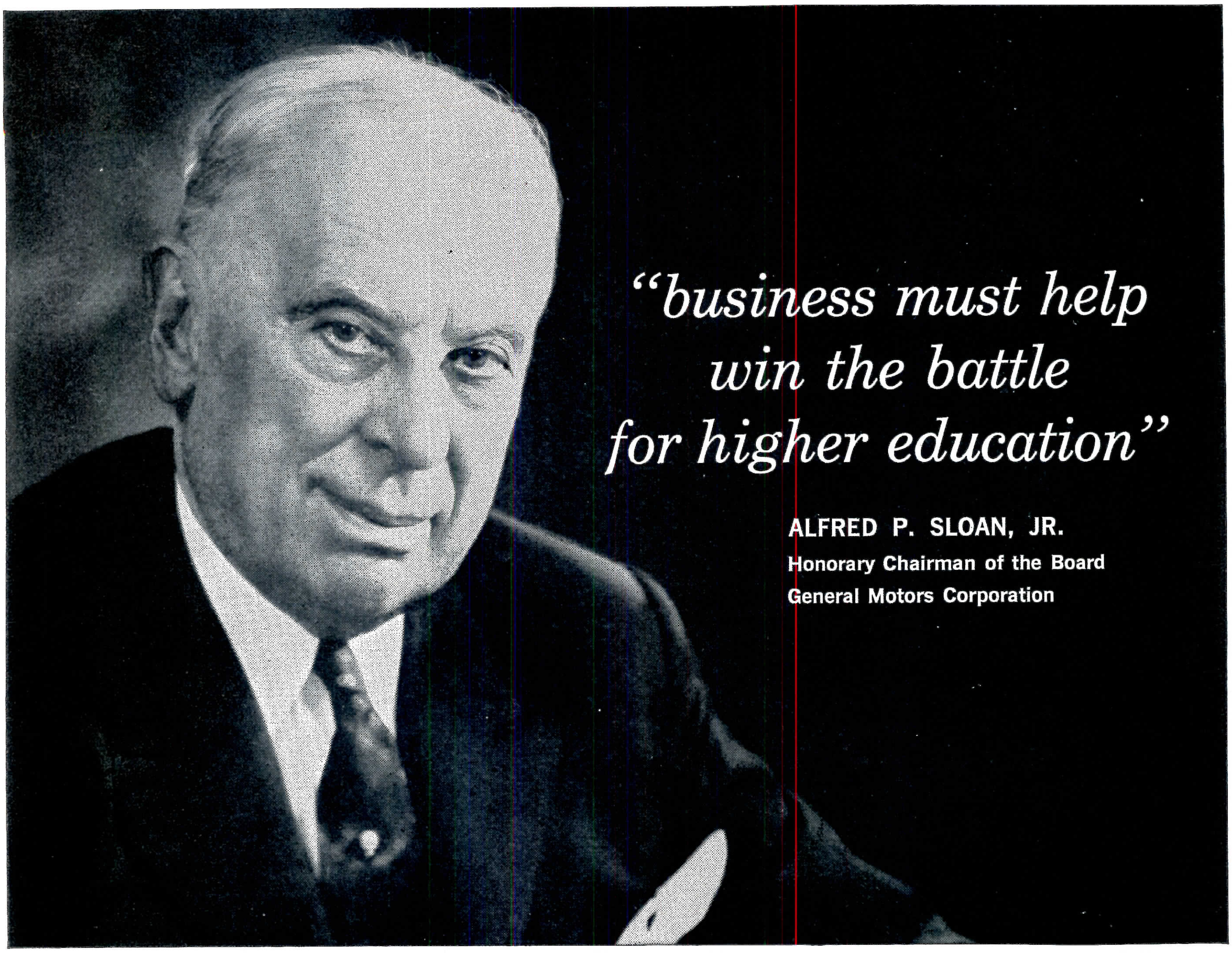
FOLLANSBEE STEEL CORPORATION
Follansbee, West Virginia



ARCHITECT: Harry Weese, F.A.I.A., Chicago, Illinois

Arena Stage, Washington, D.C.

Follansbee is the world's pioneer producer of seamless terne roofing



"Regardless of the strengths and attributes our nation possesses, if we fall behind in the field of education, we will fall behind as a world power.

"Our scientific, cultural and economic growth—and our political strength—will depend largely upon the educational facilities we make available to our youth. We owe it to ourselves as a nation; we owe it to our young people who will inherit this nation to provide the financial aid that will make our institutions of higher learning second to none in the world. This is of vital importance to our business community.

"Business must put its support on the line to help win the battle for higher education."

Today many of our colleges are overcrowded. In ten years, applications will have doubled and we will be faced with an even more serious crisis in our institutions of higher learning. We will need more and better college classrooms, many more well-equipped college laboratories and thousands more of the most dedicated and well-trained professors.

Only increased financial aid will provide our young people with the best college facilities. Only increased financial aid will keep our finest minds from leaving the teaching profession.

For additional information on the crisis faced by higher education write to: Higher Education, Box 36, Times Square Station, New York 36, N. Y.

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HIGHER EDUCATION KEEP IT BRIGHT

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On the Calendar

continued from page 296

ctober

4 World Conference on Shell ructures, presented by University California, Berkeley; Building Re-arch Advisory Board—National cademy of Sciences—National Re-arch Council; and International ssociation for Shell Structures—heraton-Palace, San Francisco. Con-rence opens September 30

4 National fall meeting, American 'elding Society—Hotel Schroeder, ilwaukee, Wis.

Office Notes

ffices Opened

Yau Chun Wong has opened a ew office for the practice of ar-hitecture at 116 South Michigan ve., Chicago 3.

Welton Becket and Associates, rchitects, have opened new offices 300 Park Ave., New York 22.

Offices have been opened for **hancy Miles Lott** at 7188 Sunset lvd., Altavista, Calif. The new of-ces are located in the Burroughs-ckerman building, planned and esigned by Mr. Lott while associ-ted with Richard Dorman and ssociates.

Reynolds, Smith and Hills, Archi-ects and Engineers, Jacksonville nd Tampa, Fla., announce the pening of an office in Orlando at West Gore Ave.

R. A. Pierce Associates have pened new architectural offices Craig-Forbes Officenter, 4535 orbes St., Pittsburgh 13, Pa.

'ew Firms, Firm Changes

The firm name of Fridy-Gauker-'ruscott & Fridy, Inc., Engineers as been changed to **Fridy-Gauker & 'ridy, Inc., Engineers.** Offices are at 321 Arch St., Philadelphia, Pa.

Donald E. Harmony has been ap-ointed general manager with Jo-eph E. Biro & Associates, Consult-ng Engineers, Easton, Pa.

Jerry F. Weiss, formerly a partner Hart and Weiss, Architects, has ormed a new firm, **Jerry F. Weiss nd Associate, Architects,** 2485 Fair-nount Blvd., Cleveland Heights,)hio. Robert W. Blatchford is asso-iate.

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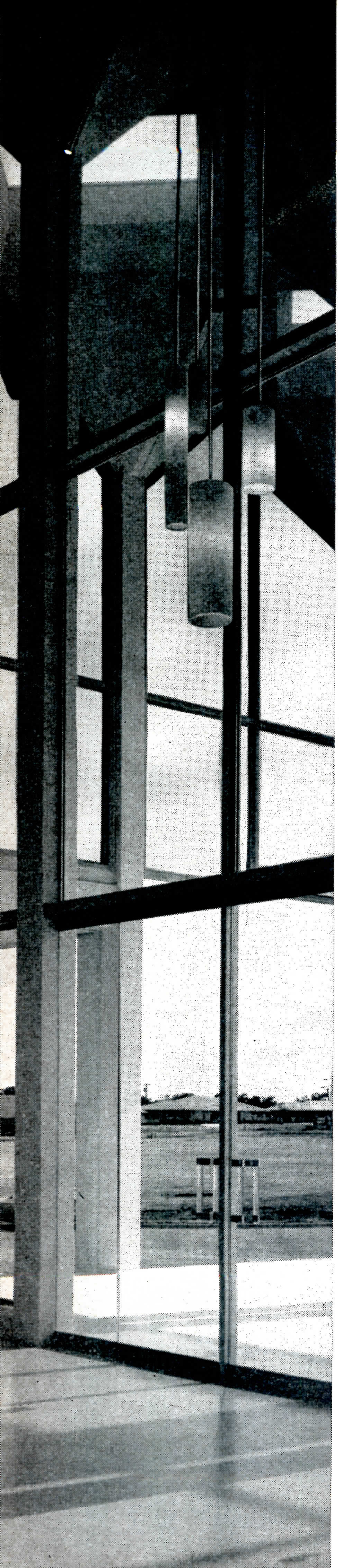


Milton C. Elms, Jr., Devoe Architectural Representative in Dallas, Texas . . . "on call" to architects in the Dallas- Ft. Worth area.

MAN TAKES COLORING BOOKS TO SCHOOL!

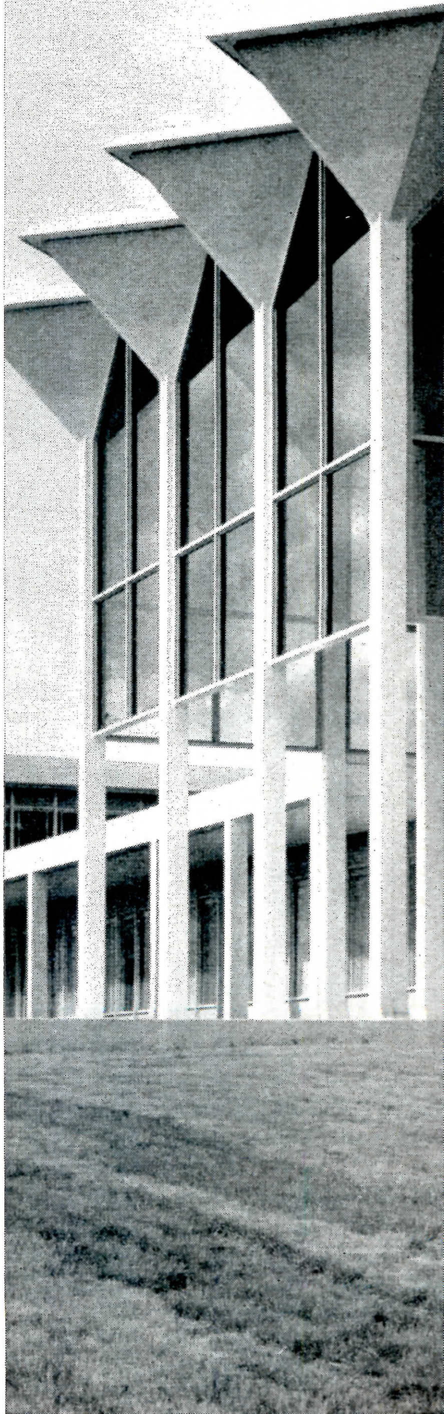
This was a very important school, beautifully planned to the last detail. It was the Hockaday School in Dallas, one of the country's finest preparatory schools for girls . . . now completing a vast new center on a 100-acre site.

The man was important, too. He was the Man from Devoe, whose main responsibility is personal assistance to architects on any problem involving paint. The books were the seven volumes of our Modern Color Classics,® covering over 1,000 interior and exterior color selections in the Devoe Library of Colors® system. In this case, the Devoe Library of Colors helped the architect and his color consultants decide on 1,768 gallons of interior and exterior paints, matched to a complex range of color requirements for nine new buildings. Selections included Devoe vinyl wall paint, alkyd flat enamel, semi-gloss enamel and Mirro-lac enamel.

Tomorrow, the Man from Devoe can be helping you . . . just as willingly and easily. With information on paint formulae and maintenance costs, or technical help in color selection, for example. With capable supervision of paint deliveries to your job site. Or with tips on cutting costs. It all depends on what *you* need.

Wherever you are, the Man from Devoe is at your service . . . without obligation. To reach him, simply write or phone the Devoe Color Consultation Service at your nearest Devoe office.

Photos show main entrance Administration Wing, The Hockaday School, Dallas, Texas. Architect: Harwood K. Smith & Partners, Dallas; General Contractor: Robert E. McKee General Contractors, Inc., Dallas; Painting Contractor: Eddie H. Shahan, Inc., Dallas.



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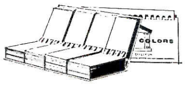
Please send me the free RAINBOW SELECTION of 300 "thought-starter" colors chosen from the Devoe complete Library of Colors®.



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Company____________________

Address____________________

City__________Zone____State______

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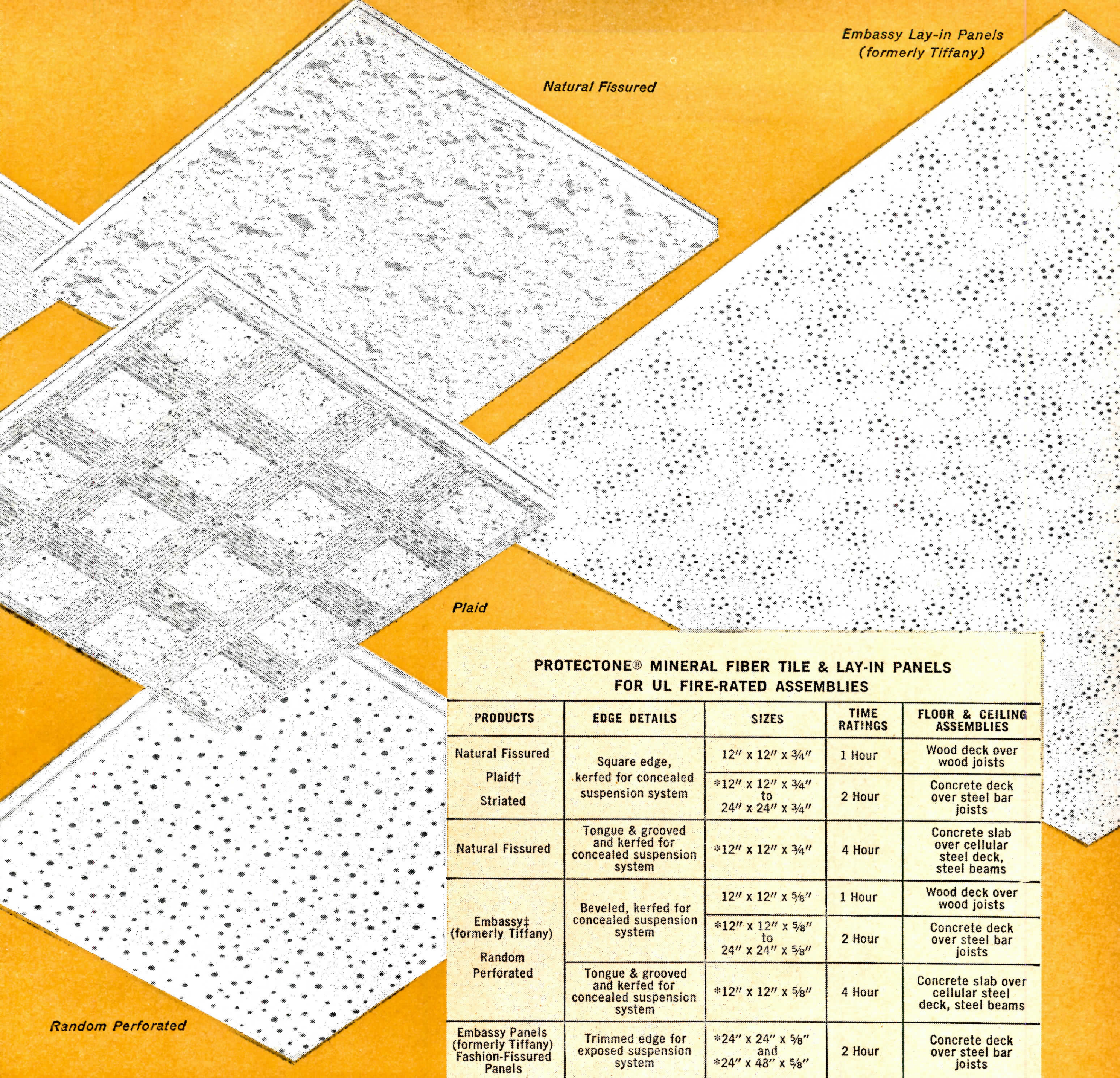
MOST COMPLETE RANGE OF FIRE-RATED CEILINGS!



PROTECTONE® MINERAL FIBER TILE & LAY-IN PANELS FOR UL FIRE-RATED ASSEMBLIES

PRODUCTS	EDGE DETAILS	SIZES	TIME RATINGS	FLOOR & CEILING ASSEMBLIES
Natural Fissured Plaid† Striated	Square edge, kerfed for concealed suspension system	12″ x 12″ x ¾″	1 Hour	Wood deck over wood joists
		*12″ x 12″ x ¾″ to 24″ x 24″ x ¾″	2 Hour	Concrete deck over steel bar joists
Natural Fissured	Tongue & grooved and kerfed for concealed suspension system	*12″ x 12″ x ¾″	4 Hour	Concrete slab over cellular steel deck, steel beams
Embassy‡ (formerly Tiffany) Random Perforated	Beveled, kerfed for concealed suspension system	12″ x 12″ x ⅝″	1 Hour	Wood deck over wood joists
		*12″ x 12″ x ⅝″ to 24″ x 24″ x ⅝″	2 Hour	Concrete deck over steel bar joists
	Tongue & grooved and kerfed for concealed suspension system	*12″ x 12″ x ⅝″	4 Hour	Concrete slab over cellular steel deck, steel beams
Embassy Panels (formerly Tiffany) Fashion-Fissured Panels	Trimmed edge for exposed suspension system	*24″ x 24″ x ⅝″ and *24″ x 48″ x ⅝″	2 Hour	Concrete deck over steel bar joists

*Includes penetrations (recessed light fixtures and air diffusers)
†U. S. Pat. No. D 191,744 ‡U. S. Pat. No. D 191,203

All patterns also available in non-rated incombustible products.

The Acousti-Celotex family of PROTECTONE® fire-retardant mineral fiber tile and lay-in panels offers you the widest choice of patterns and textures for UL time-rated ceiling assemblies. Celotex Protectone products meet every design challenge, the most demanding building codes. No spray or membrane fire protection required. Dry installation speeds construction. Building owners save money ... benefit from earlier occupancy, reduced insurance premiums. Your Acousti-Celotex Distributor, listed in the Yellow Pages, is a member of the world's most experienced acoustical organization. He offers valuable Ceiling Consultation Service, without obligation.

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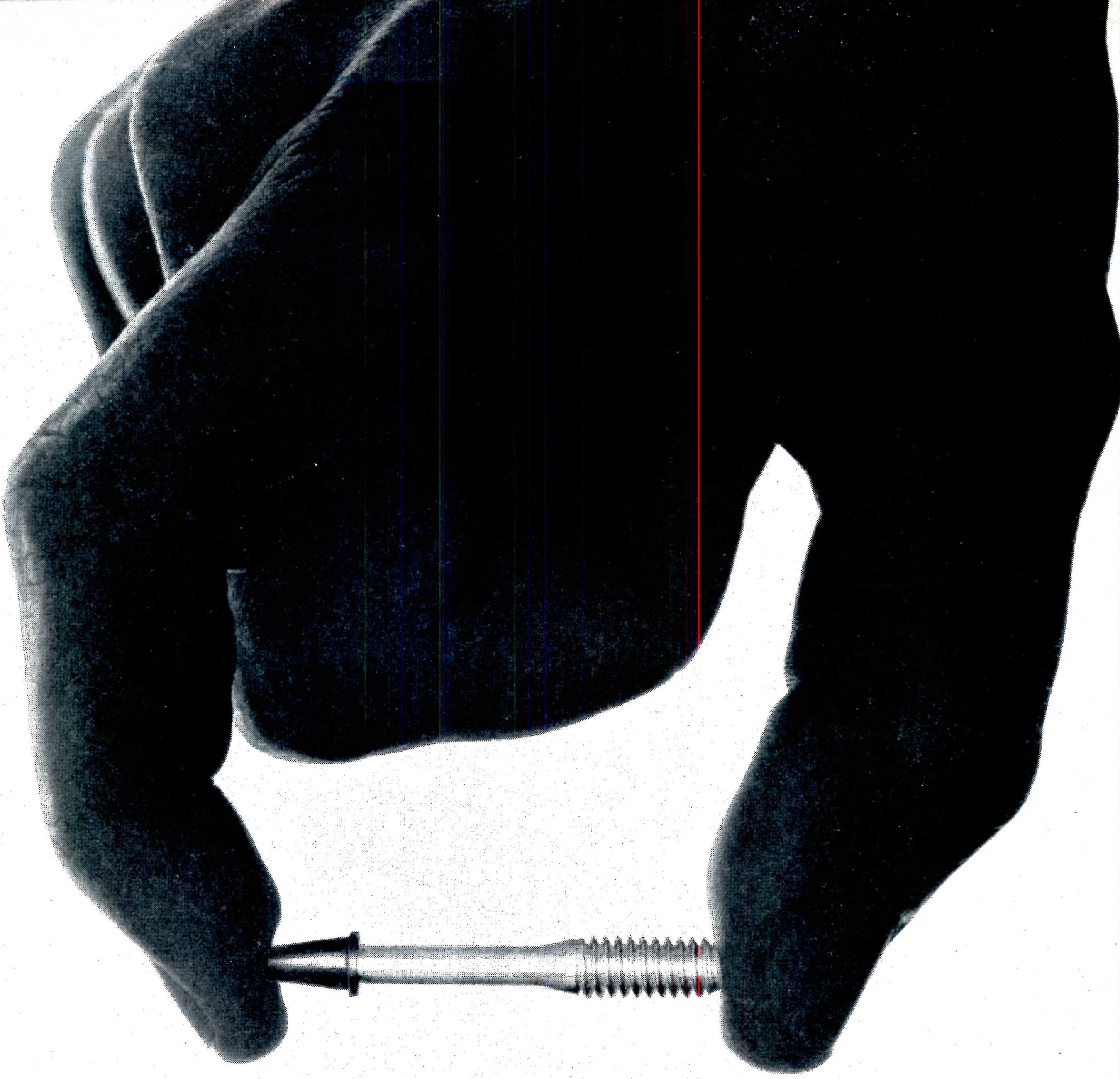
PRODUCTS

THE CELOTEX CORPORATION, 120 S. LA SALLE ST., CHICAGO 3, ILLINOIS
IN CANADA: DOMINION SOUND EQUIPMENTS, LIMITED, MONTREAL, QUEBEC



This 1/5 ounce fastener holds 2,000 pounds

(Either we're frauds, or that's one helluva powerful fastener)

It's easy to be skeptical.

Nevertheless, a Ramset #2428 powder-actuated fastener, set in 4,500 p.s.i. concrete, withstands a sheer load of 2,000 pounds, a tension load of 1,800 pounds.

Humbug, you say?

We'll set up any test you want. Anywhere. And we'll bring along the flimsy little fasteners.

We're pretty confident.

First of all, any powder-actuated fastener—with the proper tip shape—forms a compressive bond with concrete.

Secondly, our Ramset fasteners are austempered. Austempering is a special, two-stage, heat treating process. Increases holding power a full ¼ over conventional heat treating methods.

Thirdly, some of our biggest boosters were once outrageously skeptical.

You can take the easy way out and send for a report by an independent testing lab. Shows the recommended load for each of our fasteners by hardness of concrete and by depth of penetration.

Or you can call our bluff on the tests.

You really can't lose. Once we've proved our case on holding power, we'll also show you how our little Ramset fasteners cut costs. Just write us on your letterhead.

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some make **1**

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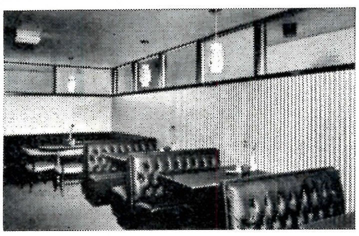

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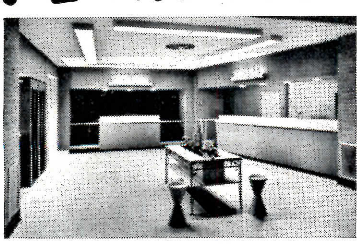

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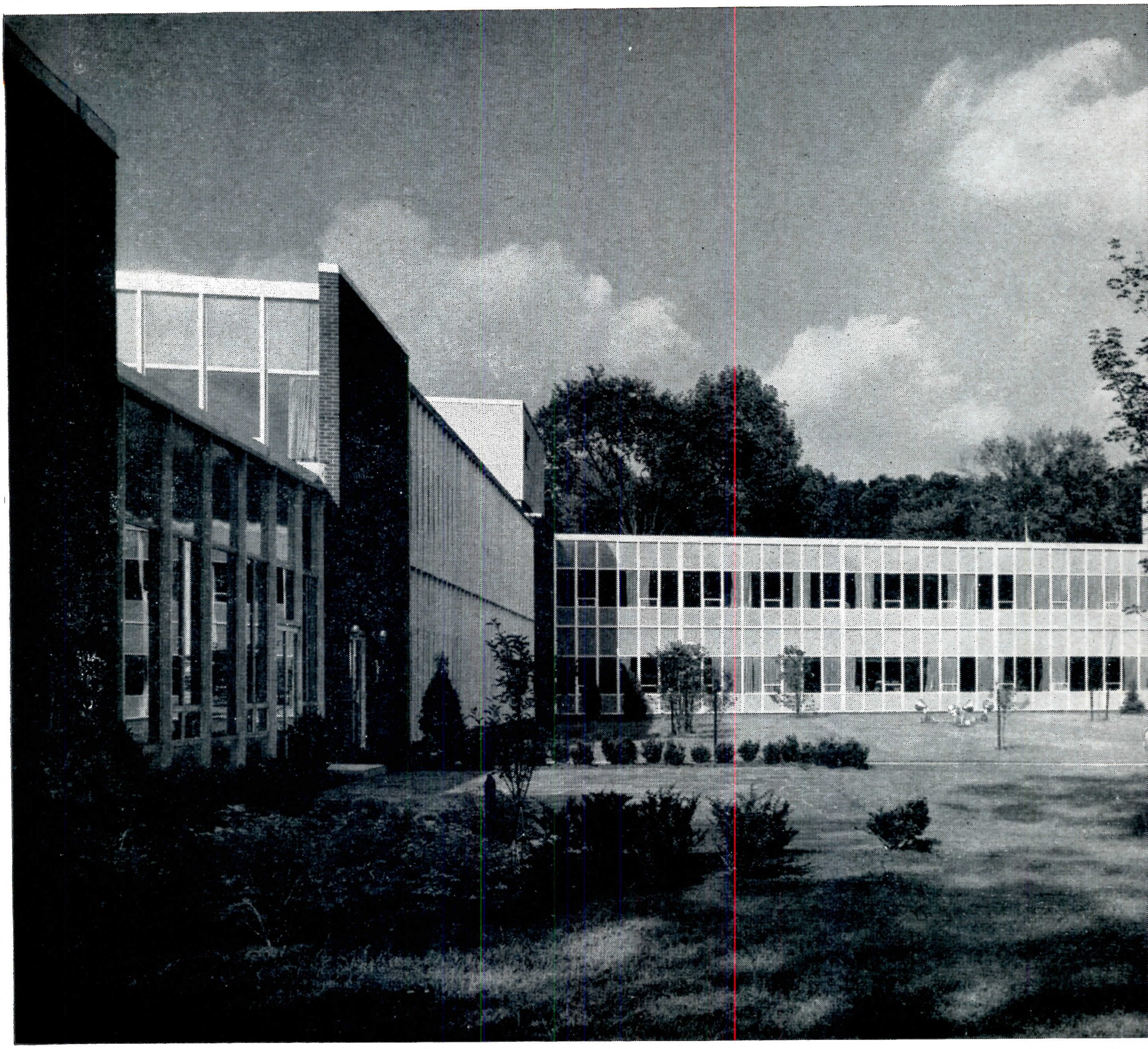

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Sylvania's new headquarters provide another shining example of how LUPTON handles the complete job, from architect's design to final installation. Make your creative demands as exacting as you like . . . LUPTON single-source responsibility makes certain that your most imaginative uses of aluminum curtain wall systems are fully realized.

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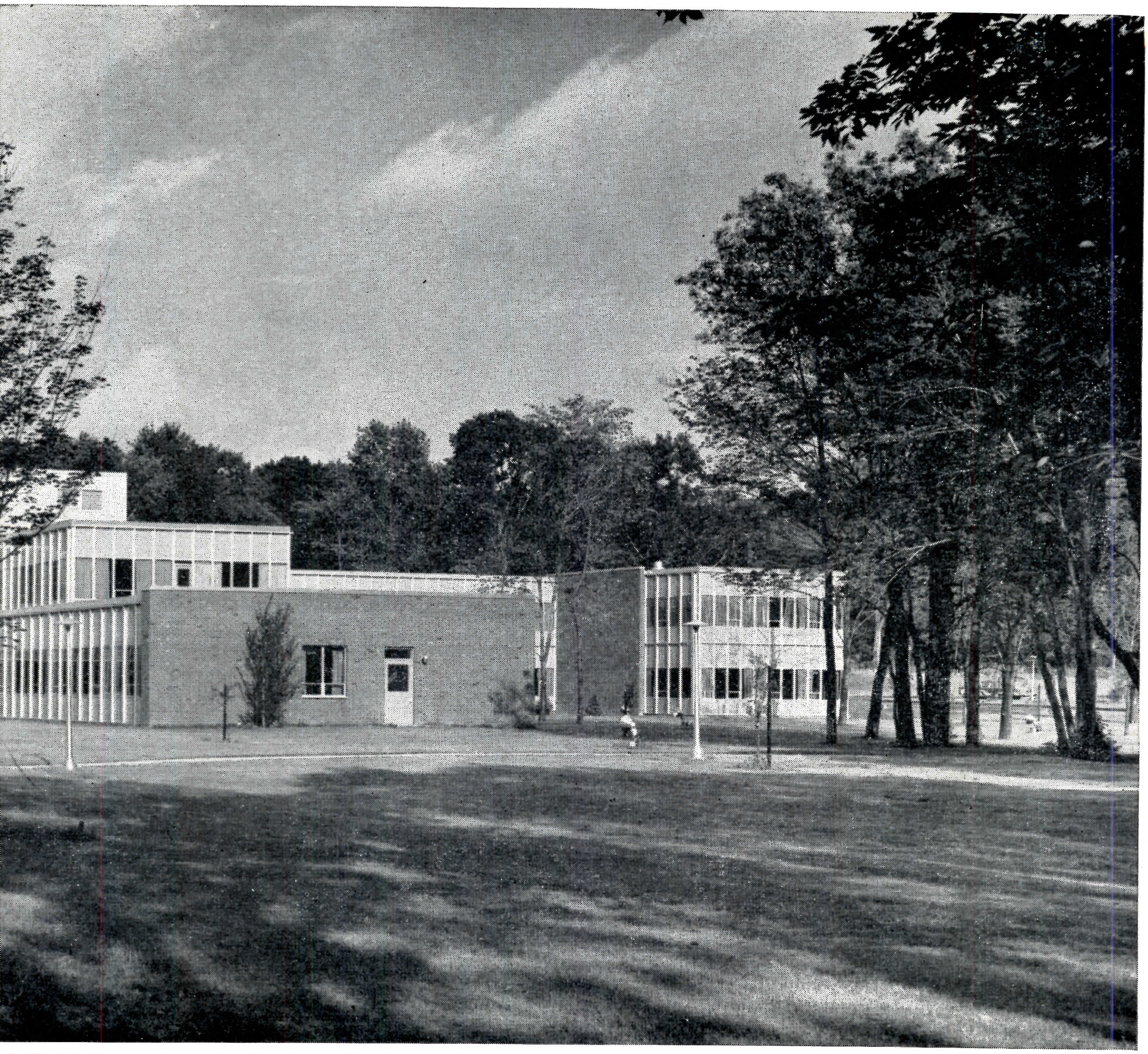

nia Electric Company's new headquarters and engineering build- Waltham, Mass., feature 2666 Lupton curtain wall units. Light matte finish porcelain enamel panels are laminated to urethane foam cores. Architect: Cabot, Cabot & Forbes Co., Boston, Mass. Associate architect: Paul Van West, Williamsport, Pa. Contractor: Gilbane Building Co., Providence, R. I. Photo by Cortlandt V. D. Hubbard.

ivided responsibility on curtain wall projects

responsibility. Ours is a solidly established company that backs up all jobs with a reputation for reliability of 25 years' standing.

In short, you can confidently rely on LUPTON total services and ability to turn your ideas into fully achieved realities. Why not investigate every advantage we can offer for your present or future projects? See Sweet's Architectural File (sections 3 and 17) for the Michael Flynn Aluminum Curtain Wall and Window catalogs. A call to the nearest LUPTON representative (see Yellow Pages under "Windows—Metal") will bring fast action without obligation.

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Main Office and Plant: 700 East Godfrey Avenue, Philadelphia 24, Pa. West Coast Office and Plant: City of Industry (Los Angeles County), California. SALES OFFICES: San Leandro, California; Chicago, Illinois; New York City; Cleveland, Ohio; Dallas, Texas. Representatives in other principal cities.

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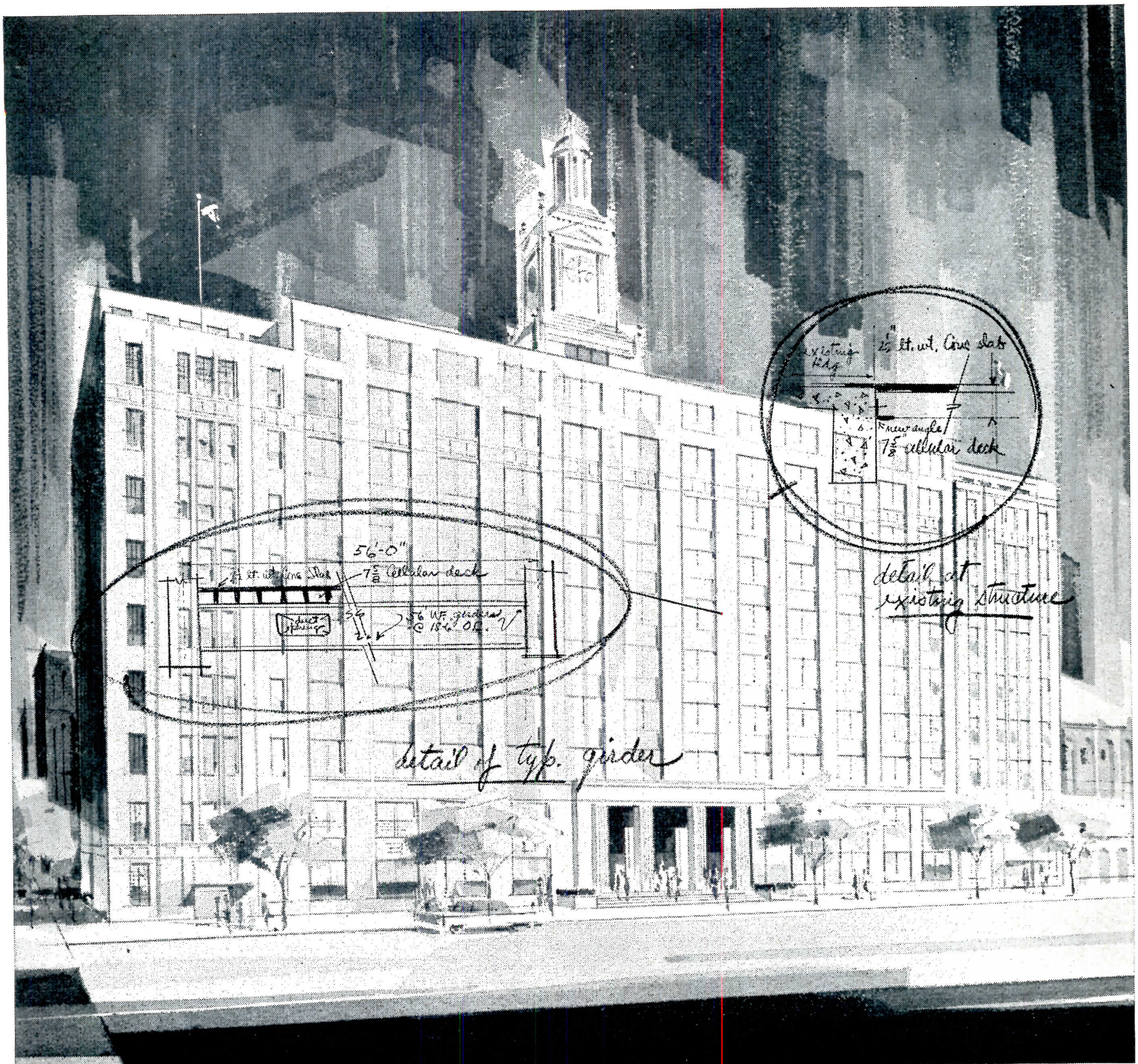

Hoyle, Doran & Berry—Architects

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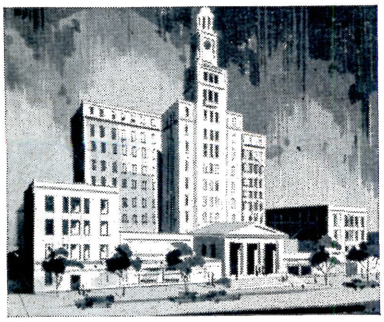

When plans called for doubling the size of the New England Mutual Life Insurance building in Boston, certain very definite considerations made steel construction the logical choice. For example a prime requisite was that tenancy and operation of the building was to be uninterrupted. That meant speedy construction and that in turn meant steel. Another was clear spans allowing for maximum flexibility in the use of office space and for this, 56′ spans framed with steel girders and columns were provided. Complete electrical and telephone flexibility was still another requirement, and the answer was cellular steel floor decks. By the time this handsome building is completed, 6,000 tons of structural steel will have gone quietly into its construction. We say "quietly" for out of consideration for the neighbors, bolting will be used instead of riveting.

STEEL IS FLEXIBILITY

Office Notes

continued from page 303

Fred Bassetti and John M. Morse, former partners in Bassetti & Morse, Seattle, Wash., have established independent architectural practices. **Fred Bassetti and Company** are to be temporarily located at 1602 Tower Bldg., Seattle. **John M. Morse and Associates** have permanent offices at 1610 Tower Bldg., Seattle.

Louis M. S. Beal and **Kenneth E. Johnson** have been elected vice presidents of I.S.D., Inc., the interior space design division of Perkins & Will, architects. Mr. Beal directs the activities of the New York City office; Mr. Johnson heads the Chicago office.

Philip C. Patterson and **Robert P. Meyerhof** have become full partners in the firm of Smith and Williams, Architects and Engineers, 1414 Fair Oaks Ave., South Pasadena, Calif.

Joseph M. Brandstetter, chief engineer, **Joseph A. Vedra** and **S. Ernest Pepe,** senior project engineers, have been promoted to associates with the firm of A. Epstein and Sons, Inc., Engineers and Architects, Chicago. **Milton Herman,** after an absence of 17 years during which he was a partner in the firm of Herman & Salzman, Chicago, has rejoined A. Epstein and Sons, Inc. as an associate.

The name of Bellman, Gillett & Richards, Toledo architectural and engineering firm, has been changed to **Richards, Bauer & Moorhead.** Architect Robert M. Lutz has been advanced to senior associate and engineer Robert W. McMahon has been named an associate.

Norman M. Klein is now an associate partner with Whittlesey Conklin & Echeverria and Whittlesey & Conklin, 31 Union Square W., New York.

New Addresses

J. D. Guillemette, Consulting Engineers, 728 Industrial Bank Bldg., Providence, R.I.

Ricciuti Associates—Architects—Engineers, 328 Chartres, New Orleans, La.

Richard Boone Rogers, A.I.A., 511 North Mills St., Orlando, Fla.

Howard Schroder, Architect, 1284 Wishon Ave., Fresno, Calif.

Ralph Stone and Company, Inc., Engineers, 10960 Santa Monica Blvd., Los Angeles, Calif.

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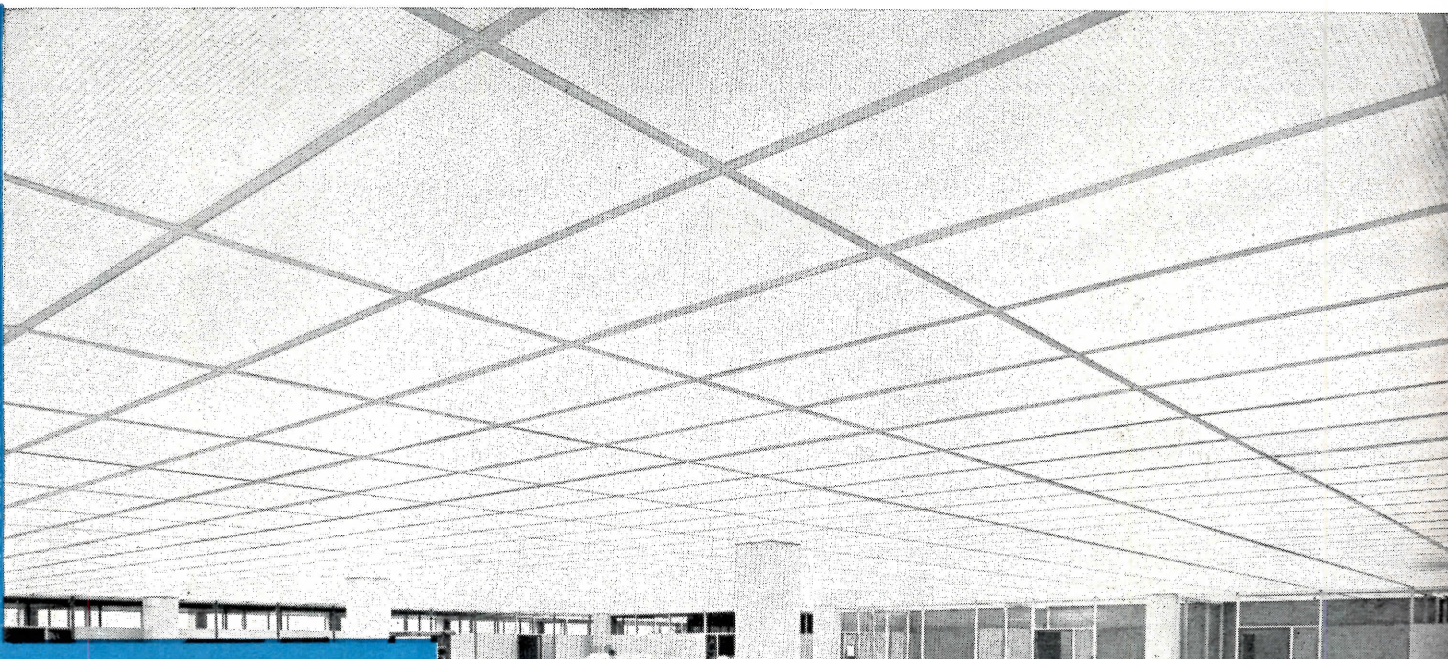
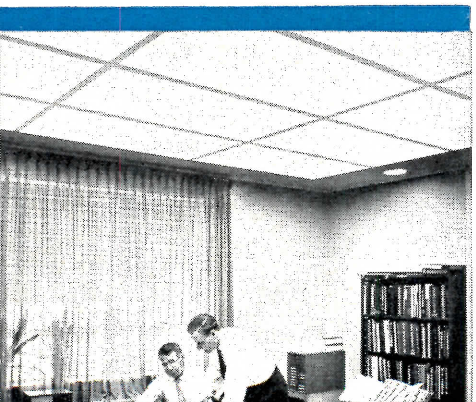


ARCHITECTS: Argonaut Realty, Div. General Motors

TS: ELECTRICAL CONTRACTOR: Harlan Electric Co., Detroit, Mich.

CEILINGS: Custom Ceilings, Inc. Detroit, Mich.



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LUMINOUS CEILING: Completely covers the office and working areas. The new 2½ x 5 ft. plastic open cell 45° shielding louver ceiling, suspended below two-lamp high out-put slimline strips on 30″ centers, designed for 120 to 175 foot-candles.

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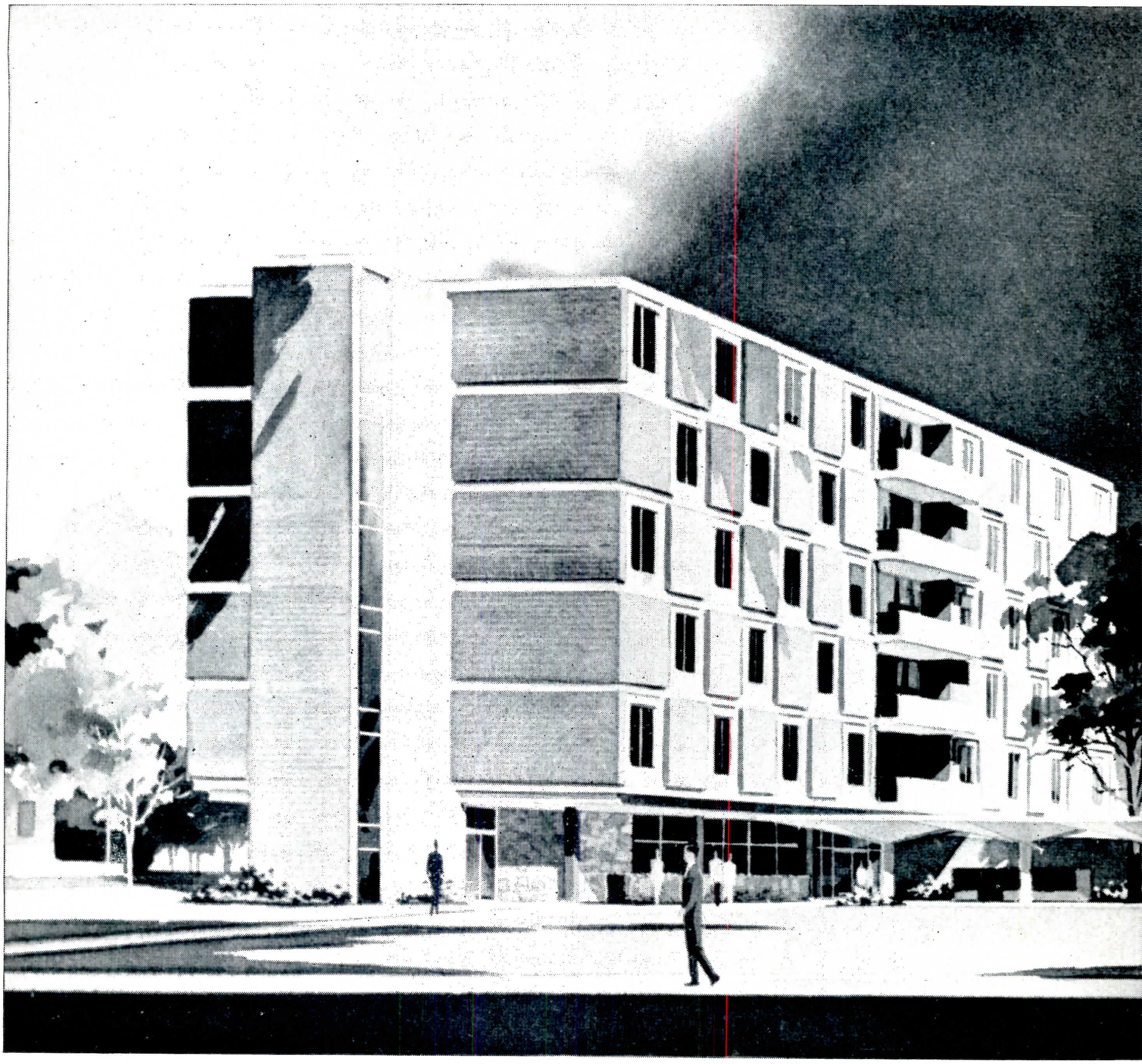
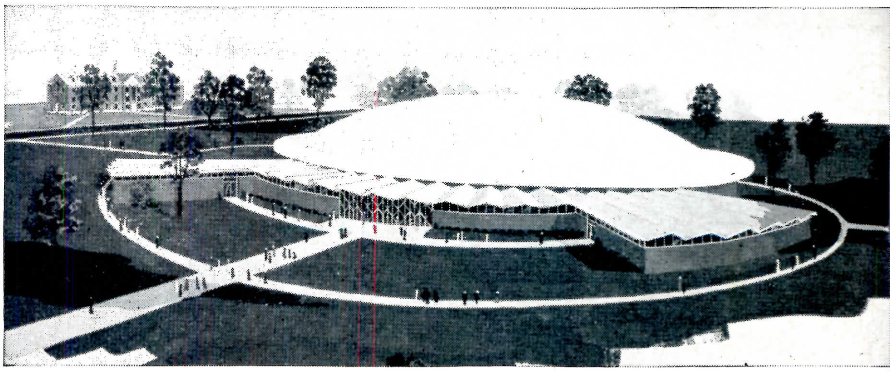


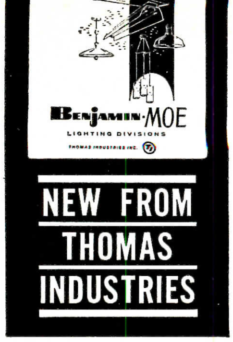
AMERICAN LUTHERAN RETIREMENT HOME, Fargo, North Dakota—the state's first prestressed lift-slab building. Each of six post-tensioned slabs measures 103′ x 47′. Maximum column spacing—24′ x 15′11″. Architect: Foss & Co., Fargo-Moorhead. **General Contractor:** J. E. Kreig & Sons, Inc., Fargo. **Consulting Engineer:** Kolbjorn Saether & Assoc., Chicago. **Lifting Contractor:** Northwest Lift Slab Co., Portland, Oregon.

THREE MORE SUCCESSFUL COLLABORATIONS

Lift-slab jobs post-tensioned by Ryerson



300-FT. CONCRETE DOME highlights auditorium of the General Ministerial Assembly of the Church of God, Anderson, Ind. Dome was cast over a mound of earth and lifted into place. Dome ring is post-tensioned with BBRV tendons supplied by Ryerson. Architect: Johnson, Ritchhart & Assoc., Anderson. Gen. Contractor: Lewis Construction Co., Anderson. Lifting: Great Lakes Lift-Slab, Chicago; Sky Hook Lift-Slab, Overland Park, Kansas.



This brief demonstration could make your next recessed lighting installation 20% more efficient

The test is simple and accurate and will take less than twenty minutes of your time.

The test apparatus consists of a precision light meter which is mounted to swing in an arc above an inverted recessed fixture. The purpose of the test is to show you the lighting efficiency and distribution of a recessed fixture.

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In an installation where recessed lighting must provide general as well as decorative illumination, a 20% improvement in efficiency would permit you to:

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B) reduce the number of fixtures required and effect an important reduction in cost of fixtures, wiring and installation.

The architects and engineers who have seen this demonstration have found it accurate, interesting and useful. We keep the test as relatively non-commercial as possible, but we obviously would not offer to conduct such demonstrations if we didn't have a recessed fixture which is an excellent performer.

The fact is that the one fixture which consistently leads all others in efficiency is manufactured by the Moe Light Division of Thomas Industries.

It's no accident. Among all competitively priced recessed fixtures, the Moe Light housing is the only one with a full parabolic reflector. This efficient reflector directs virtually all light out of the fixture and distributes it evenly.

We could easily diagram and publish the test data, but we'd prefer to show you the demonstration in your own offices and let you draw your own conclusions. Why don't you fill in the coupon below and send it today!

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Moe Light Division, Thomas Industries Inc., 207 E. Broadway, Louisville 2, Kentucky

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Please have your lighting engineer contact me to arrange a recessed lighting demonstration in my offices.

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POSITION____________________

FIRM____________________

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Architect: Bertram S. Koslen, Cleveland, Ohio. Apartment building at left is part of the Fodor Realty Co. Floridian development, which consists of 11 buildings for a total of 112 one-bedroom suites.

SelecTemp room or individual units are recessed in wall. Each unit has thermostat, air filter and quiet centrifugal blower circulating warm air. Flexible small pipe distribution system uses heat from a central boiler. Non-electric, no wiring. Available as heating-cooling units in single wall panel, or can be used with separate cooling systems.

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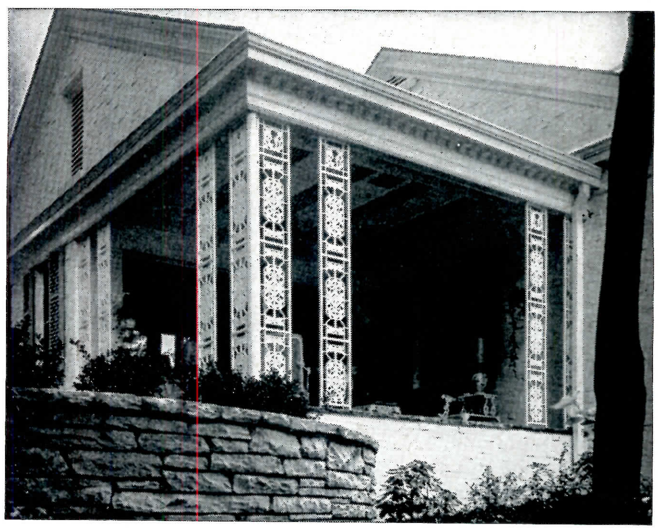

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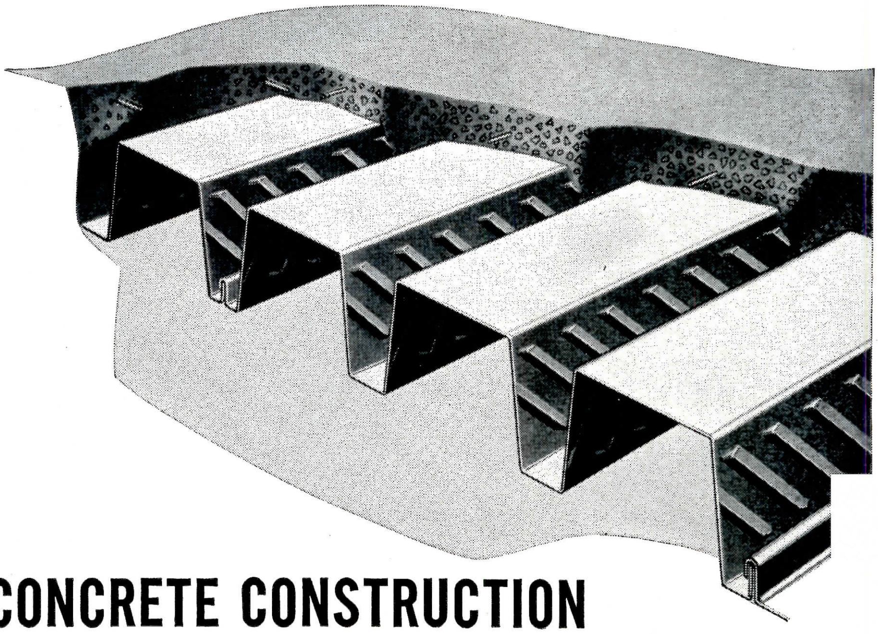

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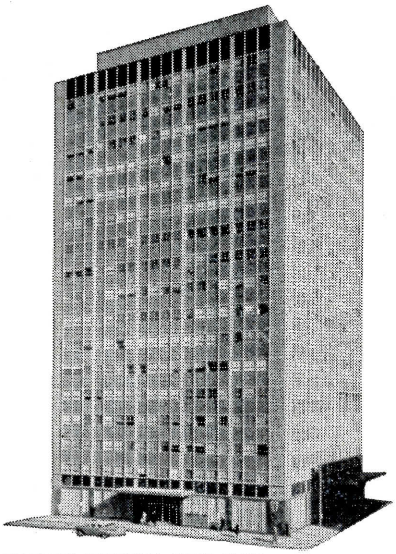

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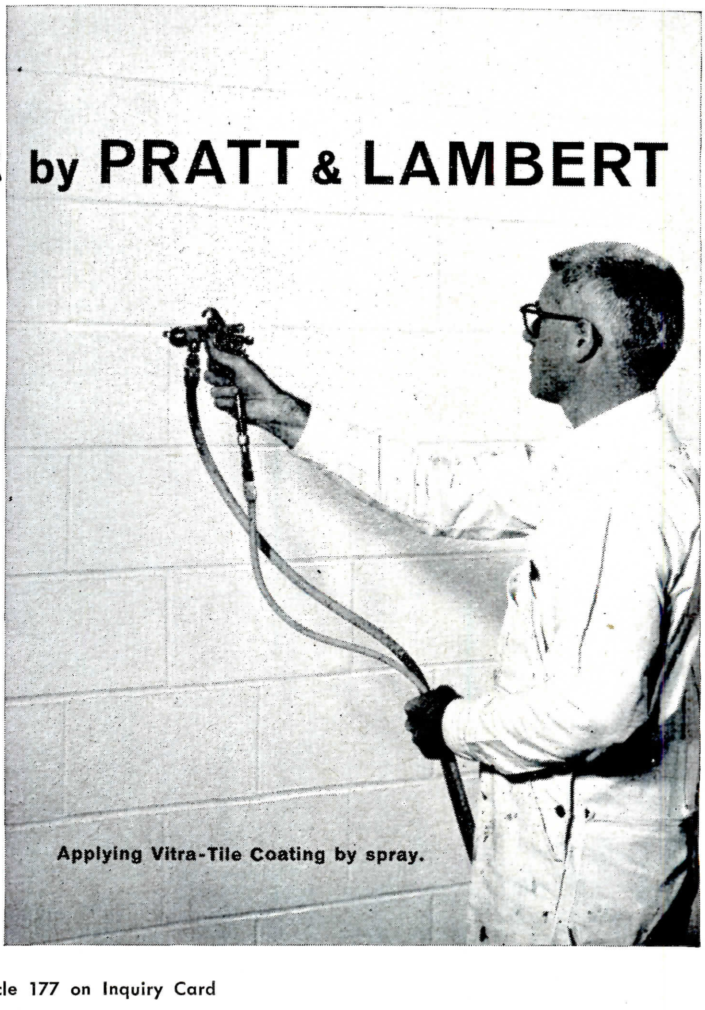

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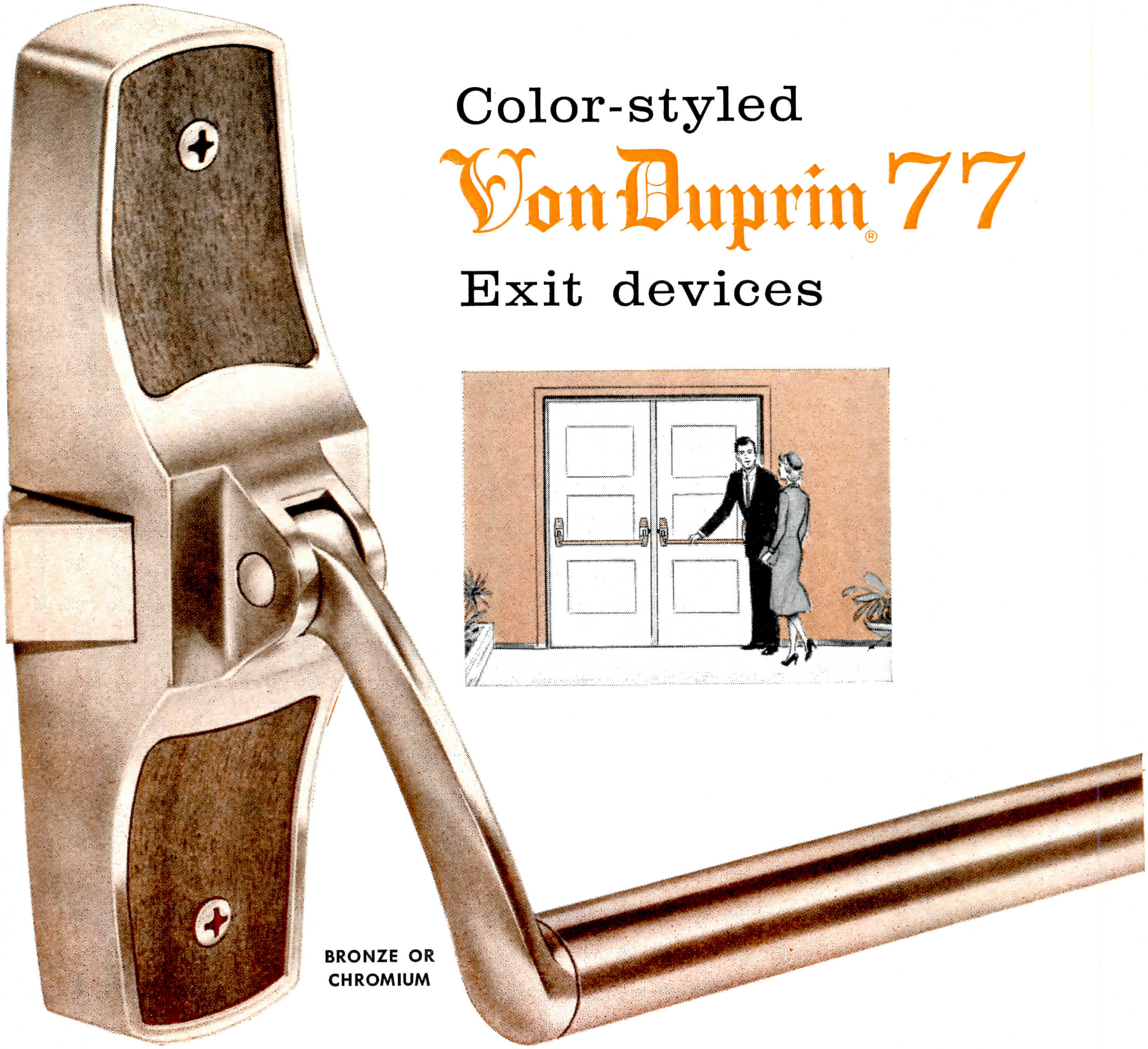

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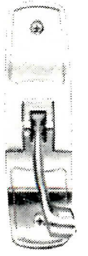

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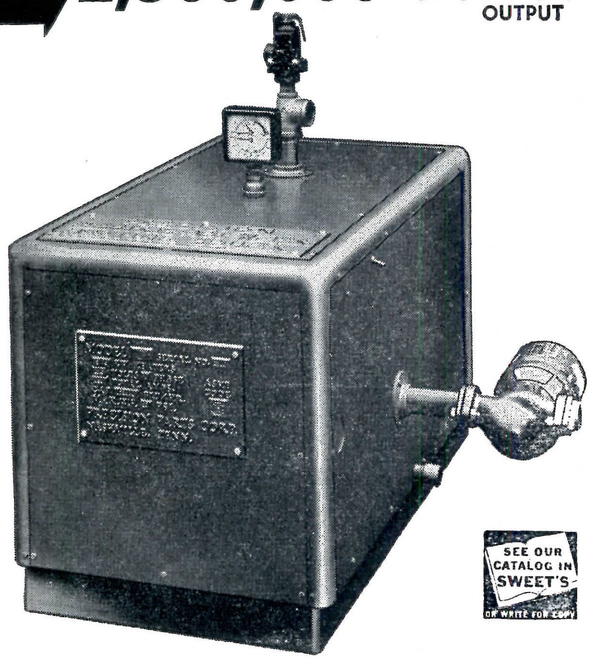

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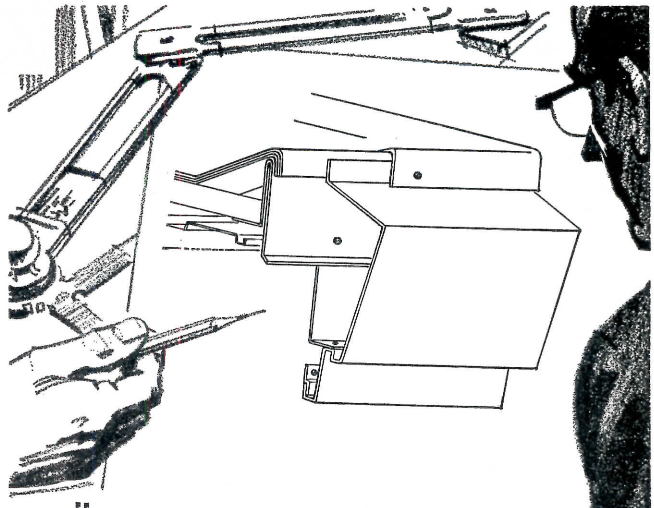

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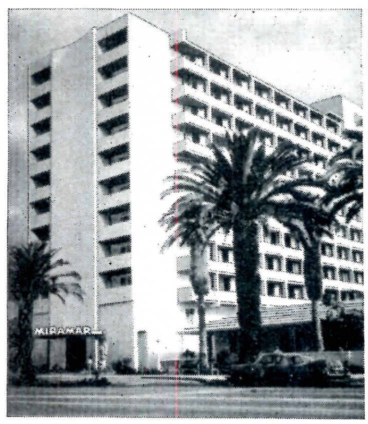

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To an ever-increasing degree in homes, apartments, motels, hotels, and commercial building, *the quality of the sliding glass doors symbolizes the quality of the entire structure.* For this reason, more and more architects and builders are selecting Miller quality sliding glass doors. Visually, a beautiful focal point; structurally, there's durability and quality in every detail. For single and/or dual glazing.

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Nobody has to worry about remembering to turn lights OFF in this building. Clock-controlled G-E Remote-Control Wiring system does the job.

At 5:30 P.M. in this office – 12,000 lamps go off automatically

Clock-controlled G-E Remote-Control Wiring makes building more efficient – saves $30,000 a year!

Inconvenient lighting control used to cost a pretty penny in this large office area.

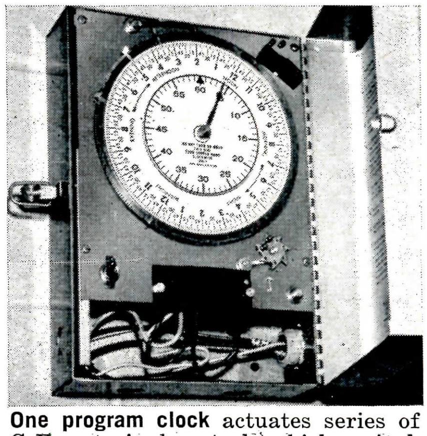
The confusion caused by hard-to-find switch panels wasted employee time. The overtime operation of "forgotten" lamps wasted money in unnecessary power consumption, lamp replacement labor, and air-conditioning costs.

The problem was solved neatly with General Electric Remote-Control Wiring and a program clock. Estimated savings: $30,000 a year!

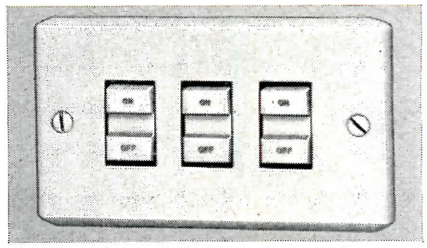
With the new G-E system, 12,000 lamps are turned OFF automatically at 5:30 P.M. 1,000 "night lamps" are left ON.

Late workers who need light simply step to convenient wall switches, to turn lamps over their own areas back ON. The system repeats its turn-OFF job at 7:30, 9:30 and 12:00.

If *you* want to provide modern programed lighting control in any building—new or old—write for details about G-E Remote-Control Wiring. General Electric Company, Wiring Device Department, Providence 7, Rhode Island.



One program clock actuates series of G-E motorized controls which switch thousands of lamps ON or OFF, through low-voltage circuits and relays.



Any number of G-E wall switches can be added, for convenient local use. Remote control through lightweight, inexpensive 24-volt wiring lowers costs.

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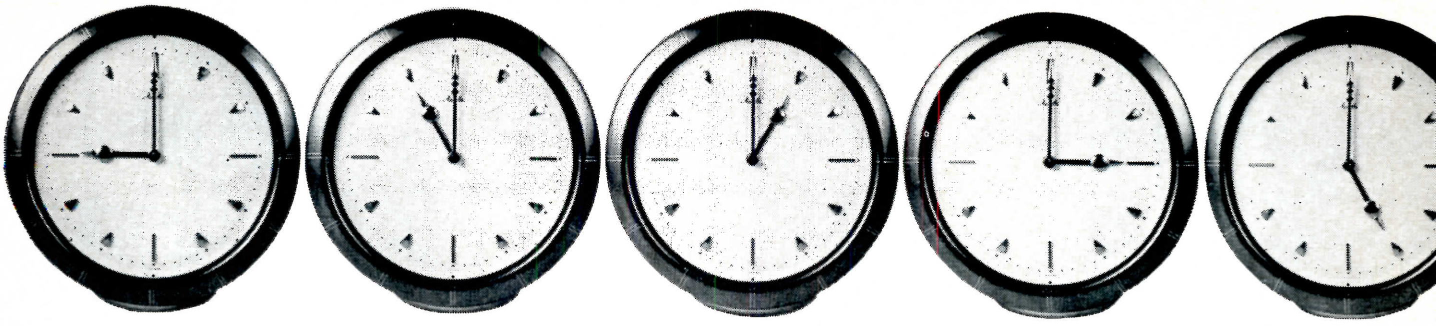

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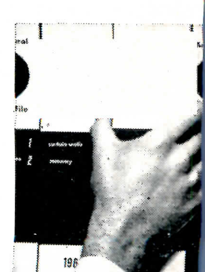

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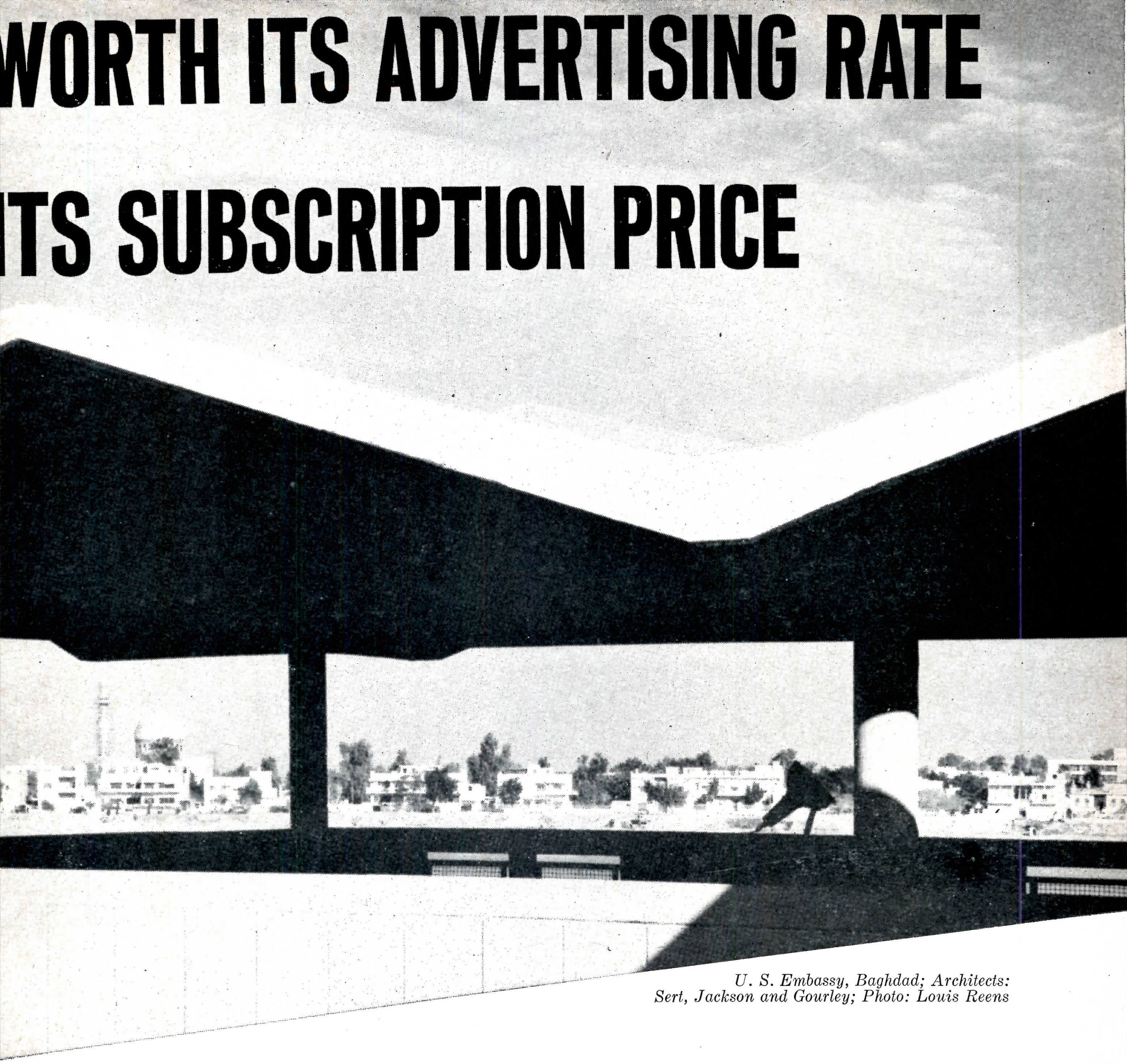

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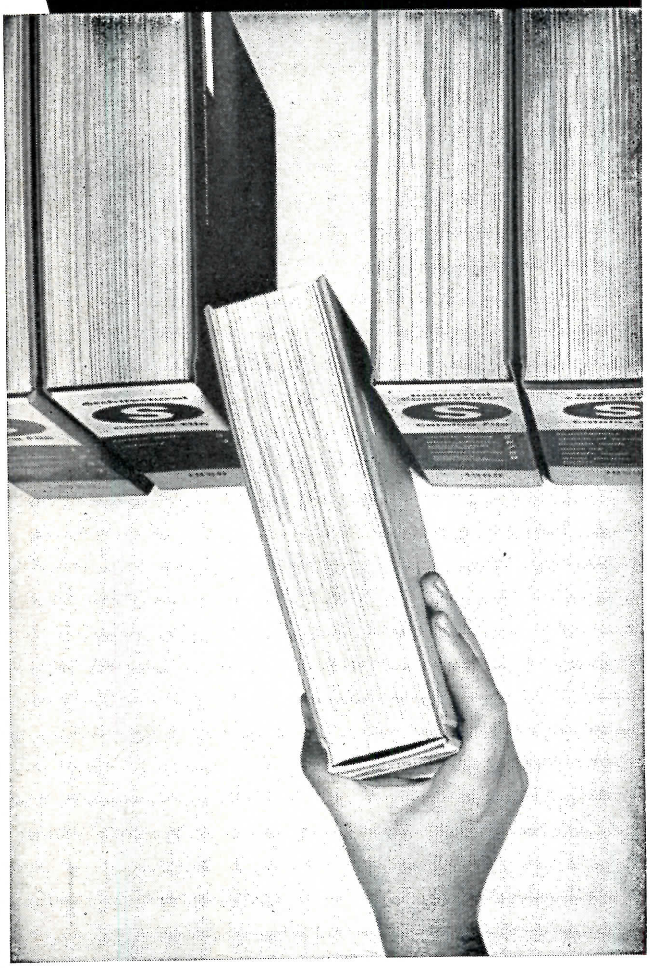

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on special-purpose electrical wiring devices

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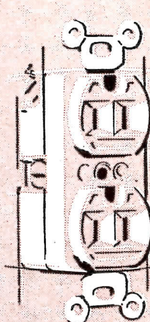
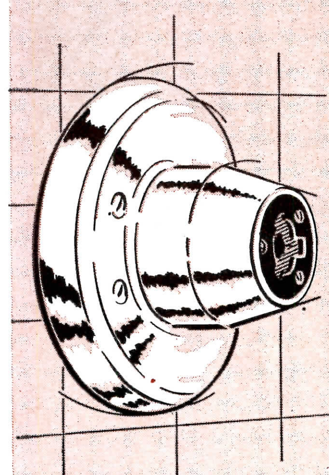


"TWINSAFE" PROTECTIVE OUTLET

SG-62

Protects children or irresponsible adults from shock if they push metal objects into slots because it shunts current away from inserted object. Power flows only when plug is in place. Also grounds 3-wire cords from appliances and tools. UL listed. 15 A., 125 V., brown or ivorine. See Page 126-T in our Catalog 29.



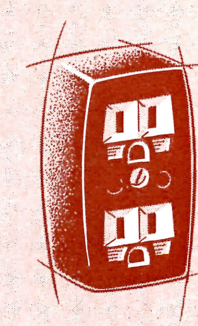
EXPLOSION-PROOF OUTLET AND PLUG

No. 24303 et al

For all Class I, Group C or D, atmospheres in operating, delivery, anesthesia, or incubator rooms or industrial areas. UL listed and described in NFPA Bulletin 56.

Safety-chambered Hubbellock® outlet cannot arc while plug is being inserted or removed, Mechanically actuated micro-switches remain electrically dead until a specially keyed Hubbellock® plug is seated and rotated clockwise. Can't be energized by other plugs.

Special epoxy-filled, grounding plug No. 24312 for 3-wire cords is washable and contains no air spaces where explosive gases can accumulate. For new work or remodeling. 20 A., 125 V., 60-cycle AC only. See Page 32-A in our Catalog 29.



DUPLEX OUTLET GROUNDING ADAPTER

No. 5291

Plugs and screws into parallel or T-slot duplex outlets and converts them to 3-wire grounding outlets for plugs with U-shaped grounding blades. Useful in remodeling when occupancy can't be delayed for rewiring. Nothing in existing system is removed except outlet's cover plate screw. No rewiring needed with grounded systems. Also usable with ungrounded systems. UL listed. Brown or ivorine. 15 A., 125 V. See Page 127-I in our Catalog 29.

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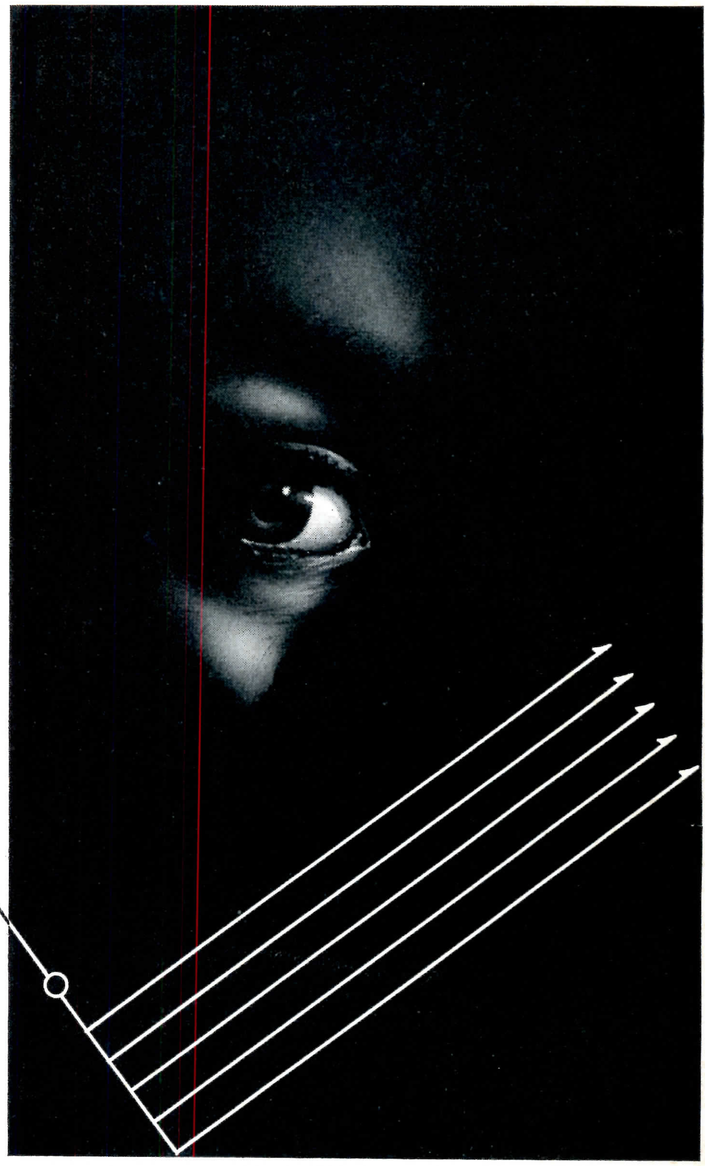
specify **SYLVANIA LIGHTING FIXTURES**



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Over two years of scientific research** have indicated that Multi-Layer POLRIZED Panels improve Visual Effectiveness by reducing reflected glare and sharpening contrasts. These are the same shielding panels that are available with Sylvania Lighting Fixtures.

Test results are now available showing the performance of POLRIZED lighting panels in Sylvania recessed equipment. Ask to see the complete photometric data for your next installation where Polarized Light will benefit the overall lighting design.

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**Conducted by H. Richard Blackwell, Ph. D., Professor and Director, Institute for Research in Vision, The Ohio State University, Columbus, Ohio.

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