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O.

10

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Cover: Laclede's Landing, St. Louis, Mo. Rendering: Carlos Diniz Associates





Architect Edward L. Barnes builds his first office tower — the 40-story New England Merchants National Bank Building in Boston — and the first of that city's thin-skin towers. In changing his original plan for a coffered facade, Barnes conceived the resulting flush façade, creating a functional space increase in a structure that is technically simple and direct. Edward Larrabee Barnes, FAIA, and Emery Roth & Sons, Architects. 64

THIS MONTH PROGRESSIVE ARCHITECTURE[®] MAY 1970



Sign as Space

A three-dimensional sign not only provides illumination for a new bank, but also creates and defines the space as well. A small tenant space in a shopping center is transformed through this combination of fluorescent tubes, fabricated acrylic panels, and a white-painted I-beam structure. The remainder of the interior design is composed of white cubistic furniture and a bold scheme of painted stripes. *Daniel Solomon*, *David Reichel, and Barbara Stauffacher Solomon, Designers.* 74







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Financing the Project

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Fit for a King

At the request of the Government of Saudi Arabia, Architect Paul Rudolph has designed a stadium for international sports competitions. The project will be built of poured-in-place concrete with an immense shade roof of air-inflated canvas stretched between suspension cables. With the emphasis of the design on symbolism, the sheltering roof represents the kings' traditional headdress — symbolic of his protection. *Paul Rudolph, Architect.* 104

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Subscriptions payable in advance. Publisher reserves right to refuse unqualified subscriptions. Subscription prices to those who, by title, are architects, engineers, specifications writers, estimators, designers, or draftsmen, and to government departments, trade associations, above title groups on temporary military service, architectural schools, architectural students, advertisers and their employees: \$5 for one year; \$8 for two years; \$10 for three years. All others: \$10 a year. Above prices are applicable in U.S., U.S. Possessions, and Canada. All practicing architects and engineers outside these areas: \$10 for one year; \$16 for two years; \$20 for three years. All others: \$20 a year. Single copy \$2, payable in advance. Indexed in Art Index, Architectural Index. Second-class postage paid at Stamford, Conn., and at additional office. Volume LI, No. 5, Printed in U.S.A.



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YOUR POINT OF VIEW

Design Award Debate

(Of course, P/A is pleased that our January Design Awards issue was so provocative that letters continue to pour in. However, we must stress that it is the jury and not the editors who determine the winning awards, and whose comments are quoted. This is one time of the year when P/A provides the platform — and just reports — however much we may want to get into the act editorially. Ed.)

Dear Editor: I have read the 1970 Design Awards issue with great interest, and have noticed that once again this year, former P/A award winners were included on the jury. On the surface this practice seems sound enough, but the winning designs would indicate that the other members of the jury were either intimidated or completely expendable.

I am reminded from biology that repeated inbreeding normally gives rise to undesirable recessive traits, and often produces mutations, a term that adequately describes this year's set of award winners. It also seems apparent that the 1970 mutations are strikingly similar to those of 1969, and of 1968, etc., and that they reflect only one inbred facet of current architectural thought.

I realize the problems of an awards program of this type, and I congratulate you for continuing it. However, I would seriously question that the award winners of recent years have been representative of the best contemporary design thinking and talent.

L. David Godbey, Associate Houston, Texas

Dear Editor: With all due respects to the jury, the Design Awards read like American Middle Class Mediocrity patting itself on the back. The idea that American architects are shouldering the burden of social responsibility on an international scale is not only arrogant but inconsistent with the jury's mostly unsuccessful search for banal epitomes of nonbuildings. I say unsuccessful because the exceptions that are really good are so because, and not in spite of the "aesthetic niceties."

To ignore the fundamental aspects of space articulation and eloquence is simply to reject the responsibility of the architect to the integrity of his client and himself. If this is truly the present state of the art then it is merely a helpless image and slave of our other social indices, i.e. advertising media, consumer products, mass transit, etc.

You, gentlemen, are in a position of relative leadership — for your country's sake, wake up!

Peter Saitta, Cooper Union School of Architecture Class of '75

Dear Editor: We who have always assumed P/A to be unbiased in terms of the Annual Awards were shocked to see the First Design Award given to Moore, Lyndon, Turnbull for their Dorms at Providence, R.I. We consider the Jurors have not devoted their precious time in thoroughly analyzing the design solution.

Being constantly aware of the recent trends in American Architecture, one fails to see how a drab and undisciplined design can bag any Architectural award. We certainly hope to see more creative efforts rewarded in your future awards.

> Prem Kumar K., AIIA Bombay, India

Dear Editor: Some readers of the P/A January issue must have been puzzled by the discussion remarks of the jury which seemed to have been apologies for the first design award selection.

We understand the complexity of contemporary architecture which is searching for a new symbolism, an anti-heroic, anti-technological, people oriented form in an ambience of industrialization and automation never before attempted.

A protest against pre-directed, established and formal relationship of buildings and open spaces may be apparent in the MLTW project for the Pembroke College dormitories. Students everywhere have demonstrated against the institutional housing generally provided by colleges in preference to apartment house living, even under slum conditions. Opposed against administrative supervision and dismayed by their political impotence, our students wish to create their own private space, however primitive, but at least of their own doing.

Many of our inner cities with their haphazard buildings and spaces provide such opportunities. But while such obsolete housing may have its own romanticism, it seems to me hypocrisy to create on the drafting board a chaotic stage setting with simulated ruins, false fronts, empty window walls, in short, "accidental architecture."

Since MLTW has amply demonstrated that their inventiveness is no deterrent to an orderly and "beautiful" design (see their citation award in the same issue of P/A for the Santa Cruz campus for U.C.), it seems a hoax perpetrated on the jurors, if not the profession as a whole, to submit their false front appliqué affixed to a workable plan elevated to a new "accidental" quality.

A very sophisticated architect talks to us in inarticulate terms and conventional symbols — and I don't believe a word of it.

> J. H. Ostwald Berkeley, Calif.

P/A Interferes

Dear Editor: The Systems Study article was beautiful — our sincere thanks. There is one apparently Freudian typographical error; in the final paragraph "interface" came out "interfere." I trust this is simply typographical and not an editoral comment.

> Robert Douglass, AIA Caudill Rowlett Scott Houston, Tex.

Help Wanted

Dear Editor: We are a group of high school students interested in rebuilding our old community. Drawings of buildings, such as garden and high rise apartments, condominiums, school-apartments, and other urban structures, would be of immeasurable aid, as well as information concerning the laws involved, the financing, the proper way to go about it, etc. We are particularly interested in living quarters that would be owned by the inhabitants as opposed to strictly rental housing.

If you can help us, please contact Samuel L. Roskos, Garfield High School, Garfield, New Jersey 07026.

> John D. Karch, Jr. Garfield, N. J. (More views on page 16)

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On Readers' Service Card, Circle No. 369

(Continued from page 6) Operation Breakthrough

Dear Editor: The difficulty with Operation Breakthrough is that it addresses itself to one problem and attacks an entirely different one. The problem which is addressed is the provision of better housing in the USA. The problem that is attacked is the reduction of labor input in the housing industry. Unfortunately the two are only vaguely related.

It is only necessary to look at Eu-

rope to see that the application of the most advanced building technology has only a marginal effect on the price and quality of housing.

The reason building technology has limited impact on prices is land. Housing is made up of two components, site and site improvements. The site improvements can be produced. The site cannot. The combined value of the site and site improvements is determined (in an over-



simplified way) by the actual or potential income-generating capacity of the total package. Example: a site and site improvements generate sufficient income (including tax gimmicks) to give the package a market value of \$1,000,000. The cost of the site improvements was \$750,000. Therefore the sale price of the site was very nearly \$250,000. No real estate broker who foresaw the future use of the site would have parted with it for less. Repeat the same condition using an advanced building technology that reduces the cost of site improvements. The package still has a market value of \$1,000,000 and the land speculator keeps the difference. In brief, living space has a market value and price structure which is practically independent of building technology parameters.

Industrialization tends to have little positive impact on the quality of housing because there is no labor force that is emancipated by the labor saving schemes. The idea that the potential lack of skilled tradesmen in the construction industry necessitates the development of labor saving industrialized production techniques belies the fact that there tends to be considerable unemployment in the areas which require housing most and that construction trades can be, and are, learned in less than a month for most classifications of work.

It seems that in Operation Breakthrough, HUD is extending the labor-materials-merchandising concept of the automobile and aerospace industry to an aspect of the economy that is far more complex and operates with an entirely different set of parameters.

Instead, HUD should be spending its limited resources on the development of a real National Housing Program. It would seem that the first step in developing a National Housing Program would be to take stock of what the existing physical plant is. It might turn out that some of the technology developed by Breakthrough is not so necessary, but we don't hear much about the participation of HUD in the upcoming National Census.

Alexander Maxton San Francisco, Calif.

(It must be noted that Mr. Maxton's letter, which related to a major article in the May issue of P/A (Operation Breakthrough, p. 120), was received before that issue went to press. Ed.)



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P/A NEWS REPORT

Community the Client in West Bronx Facelifting

Another example of the efficacy of community-government cooperation is entering its construction phase in the Grand Concourse section of the West Bronx. Little more than a year after initial community action, an advocacy design project to provide public amenities for the area has reached its final stages. Street treatment, traffic routing, and several existing parks have been redesigned; a vest-pocket park added and numerous trees planted; safety provisions and housing and sanitation inspection programs instituted for this 55,000-person, 384-acre neighborhood.

Faced with growing ethnic differences and the spiral of deterioration threatened by the influx of lower-income families, community members sat down with members of the Bronx City Planning Commission in the winter of 1968 to discuss a series of loosely-defined complaints about the condition of the neighborhood. Through this dialogue, specific priorities were established, subcommittees formed, and programs hammered out for each of the desired improvements. City Planning agreed to put together a design team of architect, urban designer, city planner, lawyer, community organizer, and city agency administrator. Efforts were made to bring every reachable element within the community into the process of formulating goals and structuring what became known as the Concourse Action Program.

The winter of 1969 was devoted to finding and defining available resources and initiating immediate action. The Safety Committee arranged for increased lighting intensity and police scooter patrols. The Housing and Sanitation Committees began their inspection programs. The Parks Committee developed a design program for Franz Sigel Park, Joyce Kilmer Park, and the new St. Simeon vest-pocket park. A special street treatment was planned for East 163rd St., between Grant and Morris Avenues, a block containing two schools and a church.



In one application of modular unit design, a street is closed to traffic and provided with plantings, game and conversation areas, and bookmobile.

This block will be closed to traffic, the sidewalks extended out over the center, trees planted, and a variety of recreational facilities installed. The Committee also designated traffic limiters (diagonal extensions of the sidewalk which block through-traffic) for two intersections along Walton Ave., (Marcey Place and East Clarke).

The summer of 1970 will witness final review by the various committees and final working drawings and design, with construction scheduled for next winter. The mainstay of planned construction is a group of precast concrete recreation modules to be installed in all the parks, on the closed-off block of East 163rd, and on the triangular traffic limiters. Five basic units can be interlocked to form play platforms and climbing towers, conversation nooks, sun screens, and fittings for standard benches and lamps. The modular units, which can be plugged in anywhere and removed as recreational needs dictate, are especially suited to fulfilling the program goal of capitalizing on existing structures, draining surfaces, grades and planting.

Plans for completely redesigned (Continued on page 33) Henrietta Pringle is a Teacher. She'll never give a damn about hinges...



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NEWS REPORT

(Continued from page 31)

bookmobiles will incorporate story telling areas, outdoor stages, and screens for motion picture or slide presentations with standard library services. Specific sites within the improved parks, as well as on 163rd St., have been set up as bookmobile stops.

As the project evolved, the community, in effect, became the client of the city's design team, turning the Concourse Action Program into an advocacy design project guaranteed, through neighborhood participation, to give a definitive response to neighborhood needs. The bureaucratic shortcuts of such a marriage — coordination with city agencies and provision of design elements by the design team — will lop two years off the normal construction time for comparable projects.

The speedy implementation of the Concourse program has provided a faltering community with an immediate psychological boost. The new street and park treatments enliven the possibilities of intercommunity communication and offer a needed interruption of the cityscape. Most important, the improvements have given residents quick visual proof of change. Perhaps the altered attitude of the community is best exemplified in the fact that 80 to 90 percent of its members complied voluntarily in rectifying building violations discovered under an inspection program initiated by themselves.



Foam Home

A house built of burlap, fiberglass and polyurethane foam nestled in the hills near Minnetrista, Minnesota is architect Winslow Wedin's first fullsize project in environments sculpted in plastic.

The tent-shaped storybook structure, dubbed Ensculptic, was constructed last summer by Wedin and eight of his students from Auburn University.

Ensculptic's method of construction was as unusual as the materials used. Wedin began by pouring a steel-reinforced concrete mast rising 22 ft above the footings. Six ¾-in. nylon cables were then extended from the mast and anchored in the ground to form the skeleton of the structure. Burlap stretched over and sewed to the cables provided a backing for a three-in. insulating layer of polyurethane foam. The liquid foam, which adheres particularly well to burlap, is sprayed from a gun, increasing to 30 times its original volume and hardening completely within one minute. Over the foam layer, Wedin applied a fiberglass surface, and covered it, in turn, with a gel coat of raw earth-colored pigment, giving the completed roof a ceramic look.

Ensculptic's interior is equally unconventional. Beneath the sloping, contoured roof, the cavelike inner and outer walls were formed by placing 2x2s and metal lathe between earth and ceiling, spraying them first with foam, and then with a covering layer of fiberglass or nylon. Floors are foam over the dirt base, covered with a layer of concrete, and a finish of seamless plastic. Plastic plumbing pipes and electrical wiring are buried in the ground and within the foam walls.

Burlap serves as a base for sculptured foam construction such as a demi-wall surrounding a conversation pit in front of the fireplace. The fireplace flue is the hollow core of the 10-in.-thick concrete mast. Rooms are arranged around this central area, each on a separate level, and connected by stairs and ramps. The interior is finished in off-white.

Additional foam applications include the pivoting-style hollow core front door, a pear-shaped planter in the entry, several built-in benches, demi-walls, and a built-in sleep shelf in one of the bedrooms. Many light fixtures have also been built in as extensions of the wall treatment.

Ensculptic was originally planned for \$35,000, but the final figure came closer to \$60,000. The finished product, which looks as though it sprouted from the ground, will be the home of Mr. and Mrs. James Littlejohn, friends of the architect.

Archimedia Conference at Berkeley

"New developments in media: Can they help to improve design?" was the question a conference given by the University of California's Department of Architecture, Berkeley, (UCB) addressed itself to in early May. Presentations were given by those who have been exploring the use of communication in environmental design including Ron Herron (formerly of Archigram), UCLA; Nicholas Negroponte, MIT; Peter Kamnitzer, UCLA; and Christopher Alexander, UCB. Workshop topics indicated a range of important interests: "Media in Urban Gaming," "Cognitive Structure and Heuristics," "Visual Means of Structural Simulation," "Methods of Movement Simulation," and "Lasers and Holography." In addition a film competition was held for entries that related to the conference topic. Since P/A was unable to attend, it has asked one of the conference's organizers and participants, Marc Treib, to comment in a forthcoming issue.



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NEWS REPORT



Student Boom Town

In discussing the causes of student unrest, some architects such as Donlyn Lyndon at P/A's Seventeenth Annual Design Award's Luncheon (P/A, Mar. 1970, p. 31) cite the physical environment of the campus as a common focus for student rebellion. The indifference with which a university may house its students may have ramifications rarely analyzed by the administration. Following the student uprisings at University of California, Santa Barbara, P/A's West Coast editor, Esther McCoy, who was teaching on the campus at the time, sent in the following report on the student housing conditions.

Isla Vista, the 1.6 square mile bedroom for 9000 University of California at Santa Barbara students and 2000 nonstudents, is compared by a Santa Barbara architect to a gold mining boom town. It was also the scene of student riots on Feb. 26 in which the Bank of America branch building was burned and the windows of seven real estate offices shattered.

Isla Vista adjoins the campus but UCSB has no legal control over zoning, planning, or how the students are housed. The property owners have successfully opposed all efforts to control the growth. The area is an unincorporated community that got its start in 1925 when the idea of onshore drilling was abandoned by its owners — oil companies — and it was subdivided and put up for sale. The 25-ft and 50-ft lots, zoned R 1, fetched up to \$500, but they were bought for oil rights rather than home sites. In 1953, a year before UCSB opened, the zoning was changed to R 4; the cost of a 50-ft front lot jumped overnight from \$500 to \$10,000.

Soon package builders began to buy up small lots for student housing; plans were prepared in a back room, a drafting service was called in to draw them up and sometimes a

Variances liberally granted permit blacktopping of most of the land not covered by buildings.



civil engineer was hired to calculate a beam or a footing. The California State colleges and universities have a tradition of providing no housing on campus and depend on the adjacent community to meet the need. With the rapid growth of the new UCSB campus and the absence at that time of public money for dormitories, the field was thrown open to private industry. At UCSB the developers did meet the need quantitatively; qualitatively, Isla Vista is one big sevenyear tax write-off bonanza.

The apartment houses are no worse than tens of thousands of units of Type 5 construction littering Southern California - all with a health expectancy of seven years before settling into high maintenance slums. But the decline of Isla Vista was speeded up in 1967 with the creation of a new type of zoning - SR 4 — which applies just to student housing and was aimed to ease the burden of the developer as to setbacks, number of parking spaces required, and overhangs. Variances, liberally granted, permit black-topping of most of the land not covered with buildings, double parking of cars, etc.

The only two buildings for student housing that do not carry in them the seeds of their own destruction are College Inn, a tough barrackslike structure (282 rooms) built by developers from a Midwest stock plan in 1967, and the two Francisco Torres towers (672 rooms) built by an insurance company from a Texas stock plan but offering some built-in recreational facilities for those who can afford \$118 to \$142 a month rent.

Other apartments on the edge of the bluff overlooking the ocean take advantage of the leniency of the SR 4 zoning and rents reflect the built-in amenity of the view. On one 50-ft wide lot are two identical two-story buildings; 15' x 98' with a 20-ft wide concrete paved patio at the edge of the bluff and entirely black-topped on the street side. The buildings are occupied by 20 students paying \$82.50 each — plus about \$6 a month as a share of the electrical bill and heating for the building. For this rent, the student gets a 110-sq ft bedroom, a share of the 15'x20' living room, and the paved patio. His only storage space is a 4-ft. wardrobe (Continued on page 36)

NEWS REPORT

(Continued from page 35)

closet; walls are without sound insulation. There is, however, one kitchenette and two bathrooms to a floor.

The cost of the lot was \$15,000 and the going price for minimal construction in 1967 was between \$8.75 and \$9.25 a sq ft. (Inflation has now brought this up to \$10-\$12 a sq ft.) Even 6000 sq ft at \$10 a foot plus land, is only a \$75,000 investment. The income from the 10-month lease of the 20 rooms is \$16,500. Rents are reduced in the summer and there are numerous vacancies—certainly summer rentals bring in no more than enough to pay for the insurance and the financing on the loan.

Most of the buildings are managed by one of the numerous real estate agents in Isla Vista, who stress the damage done to the buildings by students. The agents' attitude generally, is that the owner is providing a service that is unappreciated by the students. It seems unlikely, however, that the damage to a building exceeds the \$20 cleaning fee collected (and almost never returned) from each student - especially with student help doing the painting and carpentry at \$1.65 to \$2.50 an hour. The staple gun takes care of quite a bit of the furniture repair.

A more typical example of housing is that of a 20-unit apartment house for graduate students: a 468-sq ft apartment with two bedrooms, kitchen, and bath for two students paying \$67.50 each. The rental income totals \$27,000 for the ten-month leases. There is an amenity — a small swimming pool.

The budget for commercial buildings in Isla Vista is as meager as for the housing. "Don't do anything fancy, the students will resent it," a client warned an architect who was designing a one-story office building for him. The merchants, like the landlords, tend to look upon themselves as benefactors to the students.

Roger Phillips, a Santa Barbara architect, said, "Even blocks of stucco buildings don't have to look that bad. Isla Vista is all too largely one giant shortcut; with few exceptions, the lowest common denominator is used throughout. The quality of life has never been dealt with there. The place is like a tent community thrown up after a major earthquake."

North Harvard: A Neighborhood Approach to Urban Renewal

Construction is finally underway on Boston's controversial North Harvard Urban Renewal Project, marking the successful end of a six-year community fight for a controlling voice in the plan. Planned and designed by Pard Team, Inc., an office of planners and architects hired by the community, the project consists of 212 units of duplexed row housing for low- and middle-income families.

High-rise, high-rent apartments had originally been slated for the site by the Boston Redevelopment Authority. Bitter local protests at a public hearing in 1964 focused national attention on community needs in urban renewal, and led Mayor John F. Collins and Edward Logue to form a "Blue Ribbon Committee" to investigate appropriate land use for the area. Ceding to continued community pressure, the committee called for construction of low-rent housing under the newly-instituted FHA 221 (d) 3 mortgage program.

Following this lead, the people from the Allston-Brighton area of Boston organized around sponsoring church groups and civic associations for the purpose of controlling the development of the project. Rather than delegate the responsibilities of development to private outfits, these community groups formed a nonprofit housing corporation which set up a development team directly responsible to its board of directors. The BRA chose the community-sponsored corporation over competing private developers, and local citizens began working with the Pard Team and the Vappi Building Company on producing, discussing, and evaluating alternative plans.

The final form for the triangularshaped, 5.7-acre site calls for closure on the three sides of the triangle with a major space in the center. Each of the 72 one-bedroom, 40 twobedroom, 60 three-bedroom, and 40 four-bedroom units will have a private entrance hall and outdoor living space.

While repetition of unit types and modules was essential under the economic limitations of the FHA program, variety was achieved by pull-



Model of typical housing units in project

ing out stair towers and by a staggering of bearing walls at the 32-ft module. Walls, floors, stairs, and stair towers are all of precast concrete.

In addition to the desperately needed low-income units, the project provides complete parking space, a health clinic, and a day care center.

Personalities

William Wesley Peters, architect and vice president of the Frank Lloyd Wright Foundation was married to Svetlana Alliluyeva, daughter of Stalin, at Taliesin West, April 7. The couple had met about three weeks earlier when Miss Alliluyeva came to Taliesin at the invitation of Frank Lloyd Wright's daughter Iovanna Lloyd Wright, an admirer of Miss Alliluyeva's books. Mr. Peters' first wife, another Wright daughter who was killed in a car crash in 1946, was also named Svetlana.... The National Institute of Arts and Letters presented its annual Arnold W. Brunner Award for architecture to Charles Gwathmey and Richard Henderson of the firm of Gwathmey, Henderson, Siegel. . . . Seven persons "who have rendered distinguished service to the architectural profession or to allied arts and sciences" have been elected honorary members of The American Institute of Architects. They are Samuel Chamberlain, Luis A. Ferré, Thomas Griffith, Benton MacKaye, R.S. Reynolds, Jr., Samuel Spencer and Walter Muir Whitehill. . . . Charles Eames, designer and film maker, has been appointed the Charles Eliot Norton Professor of Poetry at Harvard University for 1970-71.



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NEWS REPORT

Design School Part of CIA

While architectural schools continue to examine the relevance of current curricula and teaching methods to today's problems, some schools are fortunate enough to be able to start from scratch. Such a one is the new California Institute of the Arts, risen out of the ashes of the former school of the same name. The Institute will comprise six schools: a School of Design, Critical Studies, Film, Music, Theater and Dance, and Art. There will be no fixed curricula; (and, of course, no grades); students come together as a community of artists to work on projects jointly or individually. The emphasis of the educational process is on doing; training comes from the experience of solving actual problems. Thus, interaction with the community at large is emphasized as well as interaction and sharing of facilities between schools themselves.

The School of Design is to be headed by a nonarchitect, Richard Farson, who founded and directed the Western Behavioral Sciences Institute in La Jolla for nine years. Associate deans are Craig Hodgetts (of the firm Walker and Hodgetts, which was awarded P/A's top Design Award for 1969), and Peter Pearce (of Pearce Research and Design, and author of Structure in Nature as a Strategy for Design). The main approach of the school will be "ecological, with a stress upon total environments and social architecture." Areas of study will include, among other things, morphology and structure in nature, production process and technology, principles of ecological design, computer-assisted design, economics and distribution strategies, human factor engineering, environmental shells, visual communications, learning environments, community planning, simulation and gaming, photographic communications, product design. Is that enough? Other faculty members will include Allan Schoen, a physicist from NASA, Edward Schlossberg, a games theorist, Benjamin Lifson, photographer, and architect Peter de Bretteville who was editor of Yale's Perspecta 11.

The origins of the CIA go back about 40 years when the Chouinard Arts School for fine and commercial arts was founded. The school later merged with the Los Angeles Conservatory of Music becoming the California Institute of the Arts and financially backed by Walt Disney. In 1968, Robert W. Corrigan, then dean of the School of the Arts at New York University, was hired as president. He desired nothing less than to completely disband the old school and bring in a new faculty and a new program. This he did, with the help of Irving Blau, former co-director of Lincoln Center Repertory Theater in New York and cofounder and director of Actor's Workshop in San Francisco, who is now provost of the Institute and dean of the School of Theater and Dance.

The school officially opens in the fall of 1970, but won't move into permanent new quarters until the following year. The new school campus will be located in Valencia, outside Los Angeles, in a complex designed by Thornton Ladd of Ladd and Kelsey, former member of the board of trustees for the Institute.



New Scheme for Air Force Museum Announced

Roche and Dinkeloo's widely acclaimed project for an Air Force Museum at the Wright-Patterson Air Force base in Dayton, Ohio, has unfortunately been scrapped. This scheme (P/A, Dec. 1964) was a unique canopy structure that spread out over eight acres (with a forecourt of another 12 acres) to house the largest collection of Air Force hardware in existence. The steel cable roof structure, covered and interlaced with a steel deck, was suspended from four corners where massive pylons supported the canopy. Truss struts anchored the network at these points, and, in turn, were braced by steel cables spanning the canopy's perimeter.

This engineering feat would have been an exciting awe-inspiring setting for viewing everything from the latest Air Force rocketry to the earliest flying machines (housed in a protected underground exhibit area at the rear of the canopy). But the Air Force Museum Foundation balked at the original scheme as prices began to rise, and what at first seemed like a \$10 million budget soared to \$15 million. So after raising \$4 million, the Foundation threw out the Roche plan and sliced the budget to \$6 million. From a selection of submitted modular prefab component systems, they settled on a proposal prepared by Pascoe Steel Corp. of Pomona, Calif. and Dalton-Dalton-Little, Architects of Cleveland. (The Air Force Museum Foundation states that the selection of an Ohio architect is coincidental.) The new structure, described as "preengineered" rather than "prefabricated," will be 240 ft wide, 80 ft high and 800 ft long - large enough for most of the exhibits to be enclosed. About a hundred planes can be contained in the building's clearspan arched truss structure, doubling the amount of planes now shown in the old museum, a converted airplane overhaul hangar. Yet the exhibition space will only be 160,000 sq ft as compared with the 350,000 sq ft provided by Roche's scheme. Exhibit areas will be located at either end of the building flanking a central entrance section that will also contain theater, restaurant, library, and other facilities. Work began last month and will be completed by summer 1971.


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Buildings on the Way Up



Private Residence Englewood, New Jersey Hobart D. Betts, Architect

Site conditions for this hillside house prompted a scheme where most of the living spaces are compactly grouped in a cluster of towers, while ancillary service spaces extend out horizontally against the hill's gradient. The three-level assemblage of cutout cylinders consists of two rounded towers, one containing living area and sundeck, the other, three bedrooms, stacked vertically. A third element, a two-level cube, contains the dining

room and a second-level master bedroom. The three masses are organized around a circular central stair and rectangular chimney block that slices into the circular living room. Clerestory windows, changes in ceiling height, and numerous openings of various shapes introduce a variety of views and lighting. Pantry, breakfast room, kitchen, laundry, and outside drying yard are arranged along the horizontal arm of the brick masonry bearing wall structure. The entire complex adjoins a garage and square courtyard for parking, which is set at an angle to the road to conceal the garage from view.



Union County Nature and Science Museum

Mountainside, New Jersey Michael Graves, Architect

Visitors to this northern New Jersey Nature and Science Museum will move through three levels in a sequence of activities. Situated on a gentle incline, the concrete and glass structure is entered at the top of the slope (rear), on the middle level. The entrance hallway extends into a mezzanine containing temporary exhibits that overlooks a double-height permanent exhibit area on the level below. An open-air amphitheatre adjoins the permanent displays on the north side (lower left), and a threestory auditorium flanks the exhibit area on the south side (right), its seating area sloping with the hill toward the lower-level stage. The top level of the museum contains a roof terrace, greenhouse, projection booth for the auditorium, and staff offices.

A reinforced columnar grid supports the structure, with one-way metal pans forming above-ground reinforced concrete floor slabs, beams, and joists. Interior partitions will be constructed of concrete and plaster, and the floors and roof terrace laid with quarry tile. Lighting consists of spot and flood sources integrated with the ceiling pan system.



Government Center

Prince George's County, Md. John Carl Warnecke and Associates, Architect.

Four structures grouped around a central plaza will rise on a 214-acre site to house a government center for Prince George's County, Md. A 20story precast concrete office building dominates the center, which is linked to a 2800-car parking field by a fourlevel bridge for vehicular and pedestrian traffic. Underground levels beneath the plaza provide space for executive parking and service facilities.



Office Building South Coventry, Connecticut Frank Schlesinger, Architect

A stone and wood frame office for Fountains, Inc., will rise on a sloping site abutting a lakeside dike. The wood shingled structure has three levels separated at half-level increments following the slope of the hill. An upper level observation deck juts out from the side of the building to overlook the lake, where fountain equipment will be displayed. Offices occupy the second level, and entry and reception the lowest level (beneath the lake's water line). Access to the building is across a bridge spanning a creek fed through the dike wall.

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Washington Outlook Brighter

By E. E. Halmos

Legislation Affecting Profession Being Considered

Professional societies have a great interest in an obscure House bill (HR 16443) that simply nails into law the long-standing practice of negotiating Architect-Engineer contracts as followed by most federal construction agencies.

The bill would be a flat answer to an attempt, nearly three years ago, by the General Accounting Office to force government agencies to award A-E contracts on a price-negotiation basis. This GAO ruling has been under steady attack by professionals as a virtual call for bidding on such contracts.

Although A-E contracts long have been awarded on a normal negotiated basis, the only "law" governing them are the various "regulations" of federal agencies such as the "Armed Forces Procurement Regulations" (ASPR) and similar guidelines published by the General Services Administration. Although such regulations have the force of law, they can be changed very easily by simple administrative actions.

It was this point that GAO hit some years ago — Congress, said the fiscal watchdog agency, has never spelled out handling of procurement of professional services, hence it should be treated as any other procurement: award to the low bidder.

The new House bill, introduced at the behest of professional societies by Texas' Rep. Jack Brooks, would instruct government agencies requiring A-E services to invite all interested firms to submit qualification and performance data. Assuming that a "fair and reasonable" price could be negotiated, the agency then would award the contract to the best qualified firm.

The professional societies are just a little fearful of what might happen when the bill comes up for debate — many Congressmen who leaped on the GAO report a few years ago as a way of demonstrating to home voters that they were in favor of economy (thus the low-bid idea) might be tempted to jump again, in view of the upcoming elections.

There is reason for this concern: Several federal agencies have attempted to follow the GAO's lead over the past few years. One example of agency thinking, although not directly connected to procurement of A-E services, was a recent ruling by the Department of Transportation's Board of Contract Appeals that denied an A-E's claim for extra compensation because of additional design work when bids exceeded estimates on a project. "To fix the fee as a percentage of the ... bid ... would build into the contract an incentive to overdesign . . . and inflate the fee," said the Board.

Bills Introduced for Pollution, Housing

Pollution, housing, urban development, and racial matters, in about that order, continued to occupy center stage in Washington.

On pollution, bills ranging from one that would prohibit government agencies from doing business with firms violating control laws, to several that would take virtually all offshore lands out of use for oil production or other exploitation continued to pour into the legislative hoppers. And Congress finally passed the first of the flood — HR4148, which puts virtually all the cost of an oil spill on the back of the owners or operators of offending vessels or facilities of any kind (up to \$14 million damage).

On housing, the lawmakers (and the Administration) were most concerned with high costs of borrowing. Bills introduced included one (S. 3607) to create a "Rural Community Development Bank" to make loans to individuals or governments to enhance small-town attractions for residents. Another (S. 3503) would make 61/2 percent mortgages available to families with incomes of \$10,000 a year or less. The Department of Housing and Urban Development sought a package of legislation aimed at making low-cost housing available to low-income families (by reducing down payments and the like) and to pull some 51 separate

HUD programs down to about eight for easier administration.

AIA Involved in Minority Hiring

On racial matters — over the clamor for more jobs for minority workers in the construction industry — the American Institute of Architects took a positive hand. AIA will match a \$500,000 Ford Foundation scholarship grant for minority people otherwise unable to enter architectural schools. Program will be headed by Grady E. Poulard, new head of AIA's Disadvantaged Scholarship Program. Local chapters, students, other sources will be used to search out likely candidates.

Ease Seen on Construction Cut-backs

Biggest industry news was in the financial area, as Washington moved to ease some of the restraints on the construction industry to guard against too great a slide downward.

With this sort of spur, the President announced that he would end the 75 percent cutback in outright federal construction he had imposed last September (the ban ends in June), and rescind his request that states curtail their own work as well.

Actual effect is more important from a psychological than a dollar viewpoint: Nixon's order never affected more than about \$300 million worth of work, but carried the implied threat of application to all federally-aided construction, which is a respectable \$24 billion item.

Calendar

The European Cultural Foundation will hold a Congress on Urban Environment in May 1970 in Rotterdam . . . Carnegie-Mellon University, in cooperation with the United States Department of Transportation, is holding an on-campus conference on Advanced Urban Transportation Systems in Pittsburgh, May 25-27... Environment by Design will be the theme of the International Design Conference in Aspen, Colorado this year, June 14-19. Guest speakers: Ian McHarg, Peter Hall, Carl Koch, M. Paul Friedberg, Chloethiel Woodward Smith, Richard Farson, Roy Lichtenstein, Sim Van der Ryn, Alan Levy and Richard Saul Wurman. Keynote speaker: Stewart L. Udall, former Secretary of the Interior.

'PMT'' is now the big news in drafting rooms!

"PMT"

PMT in use at Western Electric Company drafting operations.

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See your Koh-I-Noor dealer, or write for descriptive literature. Koh-I-Noor, Inc., 107 North St., Bloomsbury, N.J. 08804. In Canada: Koh-I-Noor/Canada/Ltd., 4180 Ave. de Courtrai, Montreal 249, Quebec.

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3069 USC2 5" x 5" x 5" cast aluminum housing. Stainless steel tank. Completely transistorized solid state circuitry. No moving parts. Suggested retail price \$60.00, including 3/4 oz. plastic bottle of cleaning concentrate and small-parts cup with strainer.

MAY 1970 P/A

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PRODUCTS & LITERATURE



Carefree Floors

The Monsanto Co. is distributing an eight-page four-color brochure on its Tytron floors. Tytron is said to be several times more abrasion resistant than either epoxy or cement terrazzo. It requires no sealing, waxing, or stripping, and is impervious to every type of stain. Included with the brochure is a sample of Tytron. Circle 100 on Readers' Service Card



Self-Ventilating Windows

The Kawneer Co. has introduced Ventrow, a self-ventilating window that has the same appearance open or closed. The window has no locking hardware, can be left open during a rainstorm, and virtually has no air infiltration even in high wind pressure. Literature is available on Ventrow, which will be ready for June delivery.

Circle 101 on Readers' Service Card

Modular Sound Control

Eckel Industries is distributing its Eckoustic Modular Panels brochure illustrating a new system of sound control. The Eckoustic system utilizes modular panels which are in themselves accoustical units that can be fabricated into sound environments.

Circle 102 on Readers' Service Card



Apartment Dairy Locker

The Cool-Safe Corp. has apparently solved the problem of milk delivery to apartment buildings. Tenants have individual access to the Cool-Safe Dairy Locker — a large, wood, stainless steel and glass cooler, which is stocked daily by the milkman. Circle 103 on Readers' Service Card

Flexicore Precast Concrete

The Flexicore Co.'s eight-page brochure illustrates the use of precast decks and masonry walls in a 64 unit apartment. The Flexicore system allows for a striking appearance at a favorable unit cost.

Circle 104 on Readers' Service Card

Acrylic Concrete Sealer

The Coatings and Adhesives Corp. has made available a new specification and procedure guide describing White Roc M650, a clear acrylic concrete and masonry sealer. White Roc M650 is said to provide effective and durable protection against moisture penetration and surface staining.

Circle 105 on Readers' Service Card



Tyler Pipe Data

Tyler Pipe Industries, one of the world's largest producers of cast iron pipe and pipe products, is distributing information on its complete line of commercial products. Included is a marketing fact sheet, information on Tyler hydrants and pipe seals, a spec sheet on the No-Hub joint system, and a series of specs on the Wade line.

Circle 106 on Readers' Service Card



Imperial Contract Wallcovering

The Imperial Wallpaper Mill has entered the contract market with its Dimensions I wallpaper series. Dimensions I is a vinyl wallcovering produced in a variety of strong colors and patterns, yet oriented toward the usually bland contract market. Circle 107 on Readers' Service Card

Majestic Fireplaces

The Majestic Co. has just released three brochures on its wood burning and gas fired fireplaces. Brochures include specifications, illustrations, and typical installations.

Circle 108 on Readers' Service Card (More products on page 53)

HILLYARD FLOOR TREATMENTS Used in America's Newest, Most Modern Buildings

34 0.1

Onan, Division of Studebaker Corp. Minneapolis, Minnesota Designers-Engineers: Walter Kidde Constructors., Inc. of New York City

·······

Hillyard floor seals, waxes and cleaners were chosen for use in the huge new \$15 million plant occupied early in 1969 by Onan Division of Studebaker Corporation, one of the world's leading builders of electric power plants, air cooled engines, separate generators and automatic controls.

The Onan complex consists of a one-story manufacturing building with 456,200 square feet of floor space; a one-story engineering building with a floor area of 57,640 square feet; and a three-story office building with a total of 85,000 square feet.

HILLYARD SPECIFICATIONS MANUAL

Write for your copy today. There's a Spec File for the treatment of every type floor. Spec-Data sheets are also included. Each file will be kept up to date for you in a three ring binder.

Also ask, at no obligation, for the services of a Hillyard architectural consultant. He's trained to recommend proper, approved treatments for the floors you specify, and also to supervise application at the job site.



The most widely recommended and approved treatments for every surface On Readers' Service Card, Circle No. 350





VOGEL-PETERSON Vara Plan SPACE DIVIDERS designed to meet the needs

designed to meet the needs of today's schools

Basic components of Vara-Plan are sturdy panels joined by anodized aluminum posts fitted with concentric receptacles which allow the panel to move through a variety of angles. Concave vertical edge extrusions conform to the post radius and allow no sight gaps. As many as 4 panels may radiate from a single post.



Efficient long length, straight line division of space is provided by wide-stance RDF units in basic lengths of 6' and 8'. Concealed panel to frame assembly is completely tamper proof. Vara-Plan is at the very heart of the Open Plan concept which is revolutionizing the school field today. Designed specifically for dividing classrooms and partitioning off special projects and work areas, they offer quick and easy rearrangement into any desired configuration to suit any teaching situation.

Sturdily made, beautifully detailed and furnished in colors that complement the most modern decor . . . they are available in any combination of tackboard and chalkboard facings you may wish and can be accessorized with wardrobe racks and book or boot shelves.

School planners welcome their efficiency and durability . . . teachers appreciate their compatibility with any learning atmosphere.

Look into these versatile units—they're designed with you in mind. For complete information write for catalog VA-510



VOGEL-PETERSON CO. "The Coat Rack People" ELMHURST, ILLINOIS

XYNETICS 1000 TAKES THE PLOD OUT OF PLOTTING

Ten years ago plotters started to improve the graphics bottleneck. Today *they* are the bottleneck. Plotters have not matched advancements made in computer arts — they still use archaic contrivances of gears, pulleys, cables, and lead screws in a futile attempt to keep pace with increasing efficiencies of second and third generation computers.

Now you can have an automated drafting system that keeps pace with third generation computers. The XYNETICS 1000 with its unique drive technique provides high acceleration and

velocities reducing throughput time — *finish your drawings faster* — by as much as an order of magnitude with no loss of drawing accuracy. The absence of moving "wear" parts provides 100% up time with year to year repeatability.

Put us to the test, you may be able to retire a dozen "Plodders." **XYNETICS, INC.** 6710 VARIEL AVENUE, CANOGA PARK, CALIF. 91303 (213) 887-1022







On Readers' Service Card; Circle No. 385

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It is pre-engineered, pre-assembled, fully insulated, lightweight, shatterproof, low cost, quickly



installed, vandal resistant, light controlled, practically maintenance-free and PROVEN! And, its design freedom is fabulous.

Blue sky thinking — virtually unlimited in scope — can be easily translated into reality!

Bulletin KW-70 has ideas and complete details. Write or phone (collect) Bruce Keller for a copy. Kalwall Corporation, 88 Pine Street, Manchester, N. H. 03103. Phone 603/627-3861.



TRANSLUCENT WALL, ROOF AND SKYLIGHT SYSTEMS On Readers' Service Card, Circle No. 401

Patented

Harmonic lighting, second movement



1967. It was Customlens, a frameless diffuser engineered on the same principles as the modern concert hall. As baffles do with sound, its many recessed prisms interplay light to produce mellow, harmonic illumination.

Now, American Louver Company presents a second frameless lens, consistent in concept with our earlier Customlens but distinguished by a conical, rather than recessed, prism pattern. Each of its crystal-like prisms is of brilliant clarity, formed with optical precision and reproduced with superb fidelity by the injection molding process. Available in virgin acrylic, in better fluorescent fixtures. Please write for a sample of our Type 45 Series: 7700 Austin Avenue, Skokie, Ill. 60076.

Customlens by

American Louver Company

PRODUCTS & LITERATURE

(Continued from page 47)



Professional Pool Portfolio

The Paragon Swimming Pool Co. is distributing an expanded and revised version of the Professional Pool Portfolio. Included in the brochure is the Aquadome Mark II by Cascade, a vinyl covered tubular steel frame which slides back and forth within itself to either enclose or expose the pool. Relatively low in cost, the Aquadome is easily installed and easily maintained.

Circle 109 on Readers' Service Card



Synthetic Athletic Play Areas

Plaskolite, Inc. is distributing literature on their Dynaturf synthetic surfacing for all indoor-outdoor recreation areas. Dynaturf is applied in thin layers to achieve the $\frac{1}{4}$ "- $\frac{3}{}$ " thickness required for various activities. Once applied and cured, Dynaturf forms a permanent bond with the underlying concrete or macadam base.

Circle 110 on Readers' Service Card

Floor Water Coolers

The Elkay Manufacturing Co. is distributing literature on its line of floor mounted water coolers. The Elkay line includes nine models that provide chilled water at the rate of 4-20 gph.

Circle 111 on Readers' Service Card

Holophane Vista III Postop Lighting

A ten-page, four-color catalog illustrates the recently created line of Postop Lighting by the Holophane Co. including a variety of refractor shapes, lamp wattages, and line voltages. Vista III is said to be suitable for any exterior lighting situation from airline terminal to playground. *Circle 112 on Readers' Service Card*

Durable "Parsons Oak" Furniture

Buckstaff is now distributing full color brochures illustrating its Square Line Library Group and Contract Furniture Collection. The extensive use of oak, and in Parsons styling exemplify the Buckstaff designs.

Circle 113 on Readers' Service Card

Guide to Steel Decking

The Steel Deck Institute has compiled a twelve-page brochure illustrating the contemporary use of corrugated steel decking. Included are specifications, details, and typical applications.

Circle 114 on Readers' Service Card



Computergraphics for Industry

The Computervision Corp. is offering its INTERACT graphic I software system to the industrial market. The INTERACT graphic system, through the use of higher level data base language, permits the use to create specific graphic drawings, name them, store them, and later build with them or modify them to construct improved or high level graphic drawings.

Circle 115 on Readers' Service Card



Complete Rendering Service

Stephen W. Kinsey of Kinsey Architectural Arts is offering a brochure illustrating the scope of his architectural rendering service: full color renderings, vignettes, and toned pencil presentations. A complete photographic service is also available for full sized reproductions of renderings.

Circle 116 on Readers' Service Card



Paperboard House

Pittsburgh Plate Glass Industries combines a new paperboard material with glass fiber reinforced plastic resin and fire retardant paint to create a low cost prefabricated house said to last 20 years. The Papertech house is manufactured by the Universal Papertech Corp. on an experimental basis.

Circle 117 on Readers' Service Card

Acid-Waste Drainlines

The Corning Glass Works has published a 20-page brochure illustrating their Pyrex acid-waste drainline. Included are couplings, pipe sections, specifications, diagrams, and installation procedure.

Circle 118 on Readers' Service Card (More products on page 54)



(Continued from page 53)

The Carda Window

Wrand Industries, Inc. is offering a press kit featuring its Carda Windows, Viking Blinds, and Wrand-rac plan filing system. The Carda Window is now available in teak, stainless steel, copper, and various aluminum treatments.

Circle 119 on Readers' Service Card

Cast Glass

The Glaverbel Co. offers over 60 patterns of cast glass for architectural and decorative use in commercial, residential, and industrial buildings. The entire range of Glaverbel cast glass products is illustrated in a 32page catalog.

Circle 120 on Readers' Service Card



On Readers' Service Card, Circle No. 407



Microwave Intruder Detector

Advanced Devices Laboratory Inc. is offering a microwave burglar alarm small enough to be concealed in a small loudspeaker box yet capable of detecting the movement of anything larger than a cat. The alarm can be adjusted to scan a broad warehouse or a long narrow corridor. Circle 121 on Readers' Service Card



New Office Seating

Krueger Metal Products Co., long known for its institutional seating, has introduced its new AFKA line of office seating. The AFKA group is constructed of a heavy duty glass fiber shell supported by either a pedestal type base or a tubular steel frame and upholstered in a choice of colors.

Circle 122 on Readers' Service Card

Washroom Equipment

Bradley Washfountain Co. has issued a new full color, condensed catalog of its washroom equipment. The 12page catalog describes and illustrates the complete line of Bradley washroom fixtures including washfountains, column and stall showers, soap spray systems, and an assortment of accessories.

Circle 123 on Readers' Service Card

Reflections

More than 35,000 times a day someone may enter or exit from these back-to-back doors. Safe, reliable door control is essential. So is the unblemished contemporary design of this magnificent exhibition center. Here, no compromise has been made. Door control is by Rixson*, of course.

*More than 160 Rixson fully concealed floor closers; The Rivergate, Port of New Orleans Exhibition Center.

RIXSON CLOSERS

Rixson's No. 28 Series; center hung, with exclusive full control panel adjustments and a reputation unsurpassed. Details? Just ask.

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A Division of Rixson Inc., Franklin Park, Illinois 60131, In Canada: Rixson of Canada, Ltd.

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GRUZEN AND PARTNERS, Architects

VALRIDGE CONSTRUCTION CORP., Builders

In designing this modern building for senior citizens, the architects' goals were beauty, comfort and cheerful environment. To assist in achieving these goals, a substantial number of heavy intermediate steel windows were furnished to the architects' specifications and installed by Hope's own workmen. These custom-built windows, important elements in the over-all design, contribute much to the success and efficiency for which the structure has won recognition.

HOPE'S WINDOWS, Jamestown, N.Y.

THE FINEST BUILDINGS THROUGHOUT THE WORLD ARE FITTED WITH HOPE'S WINDOWS

A DIVISION OF ROBLIN HOPE'S INDUSTRIES, INC.



Kaiser KW-500 the new instant movable wall for offices and schools

Simple as a, b, c-

a—Lift hooks to 90-degree angle.

- **b**-Twist stud into place.
- c—Engage panel hooks into slotted studs.

plus—Any panel can be independently removed and replaced in less than 60 seconds. True accessibility!

It's the newest and most flexible movable partition system. It has a one-hour fire rating, excellent sound control-up to 46 STC-and is based on a unique "hook-on" concept of construction that permits faster installation and rapid interchangeability of gypsum panels, tackboard panels and chalkboards. KW-500 can be erected to bank-rail, cornice or ceiling height-up to 12 feet; handsome aluminum components including door frames, borrowed-light frames and trims for floor and ceiling complement the system. Your choice of beautiful vinyl colors and textures in durable, woodgrain, linen, stipple and tackable finishes. For complete information write for illustrated brochure and architectural specifications. Five minute film demonstration arranged on request.

Visit the KW-500 exhibit at the A.I.A. Convention, Boston and B.O.M.A. Convention, St. Louis.



KAISER GYPSUM COMPANY, INC., Kaiser Center, 300 Lakeside Drive Oakland, California 94604 The Von Duprin 66-the original stainless steel exit device, set a standard in quality for the industry that has yet to be matched. And we've been setting other stainless steel standards since the introduction of the 66. \Box The Von Duprin 55 devices. Slim. Compact. Designed to take it on narrow stiles or wide stiles. And, of course, the popular 88 series devices. A multitude of applications, functions and operations. The next time you're originating a new building project, think of Von Duprin, the originator of the safe way out in stainless steel.

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On Readers' Service Card, Circle No. 383

Stainless steel from the originator

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Von Buprin.

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May 1970

A hundred years ago, a professional had confidence in what he was doing. An architect detailing the orders for cast iron columns was as sure of himself ethically and professionally, as a doctor administering tar water to cure psychosis.

Not so today. The architectural profession is struggling against the prevailing syndrome of our time — the virulant crisis of identity — a disease that indiscriminately infects all of today's professionals.

The question now under discussion concerning the morality of the architectural profession engaging in land development, construction management, and real estate investment is without precedent in terms of traditional architectural practice.

A century ago, the architect was hired to surround his clients with the trappings of culture and to sheathe public buildings with cultivated ornament. His skills were employed to provide a form of aesthetic philanthropy to infuse the lower classes with culture. Architecture functioned within the status quo — a great deal of status with a very small quotient of what we consider architecture.

Design, today, is not a question of status. It is a vital necessity upon which our urban health depends. Although the creation of architectural monuments remains a very special art, the solving of environmental problems is the major concern of architectural professionals. Traditional design talent does not necessarily carry with it ability in economic and managerial areas that enables the architect to effectively engage in solving environmental problems.

The present overlap and melding of activities and professions, with the attendant redefinition of responsibilities, has produced a climate too complex to permit the exact definition of the parameters of most professional responsibilities. This condition does not necessarily pose a threat to the architect, although, understandably, it causes him to seek to define his professional identity.

The question is not whether the architect should involve himself in all the facets of his profession, from finance to construction management; he cannot avoid this involvement. The very enormity of today's urban affliction forces him to assume a new set of responsibilities having little or nothing to do with his basic professional training in the art of building.

The danger, at this time, lies in the architect losing his identity as he seeks his role in the market place. The architect is, by definition, a professional. As Phil Will said seven or eight years ago, "Our pro-



fession has an obligation for that part of the public welfare for which it is trained, just as the medical profession bears responsibility for the nation's health and as lawyers are responsible for justice and the rule of law."

It is this ethic of public responsibility that justifies the architect's title as a professional. Land development, construction management, and finance are not professions because their practitioners do not have an ethical code they must obey — although they may very well be ethical men. These are investment activities that doctors could and do engage in, for example, without endangering their medical ethics. The architect, on the other hand, in broadening the scope of his responsibility to include these areas of business and management, becomes liable ethically, by the very nature of the definition of his profession.

Forest Wilson





Barnes' Thin-Skin Tower

Loward Larrabee Barnes has contributed an unusual 40-story office tower, the New England Merchants National Bank Building, to the new Boston skyline. It's the first tower for Barnes and the first thin-skin tower for Boston. It takes its place along with the new 40-story office buildings designed by Marcel Breuer and Pietro Belluschi. The site is a historic one. On every side, past and future are juxtaposed; the narrow colonial streets against the open space of the City Hall Plaza, the delicate detail of Faneuil Hall and the Old State House against the sculptured façade of the New City Hall, the low scale of 18th and 19th Century Boston past against the 40-story height of Boston future.

The Boston Redevelopment Authority held a competition in 1964 to determine the developer of the parcel of land upon which the new bank building rises. The winner of this competition was Cabot, Cabot & Forbes with a design by Edward Barnes.

Besides Faneuil Hall and the Old State House,

Barnes' new office building is a neighbor of the Ames Building. This 16-story building, designed by Shepley, Rutan and Coolidge, H.H. Richardson's successors, and once one of Boston's tallest, has bearing walls of solid masonry. The infilling of Barnes steelframe building is a flush skin of reinforced concrete spandrel panels faced with a medium reddish gray granite. This is designed to harmonize with the brick of the plaza and the gray of nearby stone and concrete. Glass is solar gray and window frames are black.

Originally, Barnes had designed a coffered façade with windows recessed 18 in. Then, as he worked on the plans, he became convinced such a façade was phony, that by designing the building in that way, he was distorting the technical logic of the skin to make the surface more "interesting." As a result, very early in the design process, he asked his client to let him redesign the façade. At first, because the change entailed engineering expense, the request was turned



down. But, later, all the data, including the gain in floor space, was given a computer analysis, after which the client authorized the change. The analysis showed that the rental return from the extra 18 in. on each floor all the way around the building far outweighed the cost of the design change. But the fact is, Barnes arrived at this functional space increase and added technical refinement through an intuitive insight about the aesthetic of the thin skin. A study of the two building sections — the coffered façade versus the flush façade — will show the technical simplicity and directness of the final design. (See details.)

Barnes says, "The magic of a steel office tower is that it is a shell, a very lightweight container. You cannot make it look medieval or massive no matter how hard you try. Look at a city at twilight when the lights are going on. Then all the office buildings shine through to show what they really are — delicate volumes. Too many architects are afraid to express the skin of a building for what it is, a taut technological membrane. As for the contrast between our building and the Boston City Hall, I like it. The heavy sculpturing of Kallmann's cantilevered concrete would make an 18 in. coffered façade look silly. As it is, the two buildings are strong foils to each other."

At first glance, the building may seem entirely too plain, but a second look, considering the factors that persuaded architect Barnes to modify his original waffle façade, brings up the old question about form following function. The primary purpose of the office tower today is to provide as much usable space as possible within the possible zoning envelope. This building does that — the earlier version did not. For-



View of the bank in the midst of Old Boston and the New City Hall (left). A plaza to the left will be landscaped as shown in the site plan, (following page). Section drawing (above) showing how building is entered on two levels.

ty-story towers make yesterday's 16-story skyscrapers look like delicately conceived little toy buildings. Perhaps it is better that today's buildings, and the ever-taller ones that seem our lot for the future, be conceived as simply and directly as this one.

The building has three clearly designed zones: the base, the center, and the crown. The base and the crown have specialized functions with strong architectural expression. The central 33 floors are the commercial raison d'etre of the building. The arcade and the three-story-high banking hall run the full length of the building at the base, and the restaurant-club and roof garden at the crown also are simple spaces that run the length of the building. In addition, the crown carries large mechanical spaces, fan rooms, and cooling towers that do not require windows. Air intake openings are merely slots. Thus



The Barnes' tower looms behind old Faneuil Hall.





Entrance as seen from Old State House. The Old State House is seen through the entrance arcade leading to the New City Hall at the other end (opposite page).



Plan — Typical rental office floor



Plan - Arcade and upper Banking hall

the top and bottom of the building consist mostly of great planes with bold, deeply recessed openings.

The north and south lobbies of the building open directly onto a balcony that overlooks the banking hall and leads to the elevators. The banking hall, with tellers ranged under the balcony and executive desks under the high east windows, is entirely faced with granite. At each end are huge historical murals by Larry Rivers — the Ride of Paul Revere and the Boston Massacre. The cross light on the end walls makes one aware of the whole volume of the base.

The restaurant-club is a terraced room with tables on separate levels all having a view down to Boston Harbor. It is a cavelike space behind a deep portico that softens the glare of the sky. Curtains are unnecessary. Barnes feels that ". . . the all too obvious panoramic rooftop restaurant should be avoided. In fact, on a rooftop more than anywhere, one welcomes a sense of enclosure and framed view."

The roof garden above the restaurant serves two private duplex floors which are the executive offices

68 Barnes' Tower

of the bank. The asymmetrical top of the building, with the cooling towers on one side, provides sheltering granite walls and gives the garden and the entire building a sense of orientation toward the harbor.

The building contributes variety to the pedestrian ways of Government Center. It is sited to provide a little square in front of the Old State House and to expose the Richardsonian façade of the Ames Building. The high arcade at the base is not placed facing the Old State House in an obviously dominating way but along one side of the building flanking Washington Street, which the Boston Redevelopment Authority has designated as a pedestrian way. Thus, the arcade becomes a monumental passage from the old neighborhood to the new City Hall Plaza.

Instead of setting the building on a podium, architect Barnes accepted and exploited the site, which slopes down to the underpass under the City Hall Plaza on the City Hall and Washington Street sides. On these two sides, the solid base of the building is a pivot; the heavy vehicular traffic of Congress Street







sloping down along the east side, and pedestrian traffic circulating on the west through the arcade from the new City Hall Plaza to the Old State House Square.

Barnes says, "The formula of placing office towers on podiums too often isolates a building from its surroundings, lifting precious open space out of reach of the pedestrian. San Francisco and Hartford have examples of this kind of inhospitable podium. If one is concerned about changing scale in a city, what happens at the ground plane is more important than what happens up in the sky. The entrance and approach to a building are what link it to a neighborhood."

Sensitive architects have ever been aware of the way their buildings relate to the community as a whole. When Richardson designed the Ames building, he must have been as aware of its effect upon the skyline of the city, as he was of the impression it made from the ground. So today, Edward Barnes considered carefully and well the place his New England Merchants National Bank Building takes, both at the ground level and on the skyline of Boston.

By William Wilson Atkin



Two-story main banking room extends the length of the building.





Plan of the main banking floor.







Plan of the rooftop restaurant.

NEW ENGLAND MERCHANTS NATIONAL BANK BUILDING, Boston, Mass. Architect: Edward Larrabee Barnes, FAIA; Emery Roth & Sons. Structural Engineer: James Ruderman. Mechanical Engineer: Joseph R. Loring & Associates. Bank Paintings: Larry Rivers. Interiors: The Bay Club, ISD, Inc.; Offices of Cabot, Cabot & Forbes Co., Rodgers Associates; Offices of New England Merchants National Bank, Theodore Hofstatter. Developers: Cabot, Cabot & Forbes Co. Contractor: Aberthaw-Turner Construction Co. Photography: Gorchev and Gorchev pp. 65, 66, 67, 69, 72, 73, Michael Proulx pp. 64, 68.



f you ever wondered where all that "corporate image" and "logo" design of the fifties and sixties would lead, this is it. In the Concord, California, branch bank of the Thrift Federal Savings & Loan Association, the bankfront window sign is the lighting and partitioning system. Literally, then, light creates and defines the space.

"Most of the small branch," says designer Daniel Solomon who, in association with architect David Reichel and graphics designer Barbara Stauffacher Solomon, designed the space, "was built in the shops of Federal Sign and Signal Company — Tom Wolfe's favorite neon maker. The site is a tenant space in Sun Valley Shopping Center in Concord, one of the Taubman Company's huge projects. We had the Taubman Company simply sheetrock the area, and then the neon people brought in what is really a three-dimensional, space-enclosing sign, which houses the main banking activities." It is truly a case of using roadside Las Vegas's popular art to create the spatial essence of architecture.

The luminous sign is composed of fluorescent tubes behind fabricated acrylic panels (see details) supported on a white-painted steel I-beam structure. This sign unit forms a red and white striped background for the bank's logo display in its front show

THRIFT FEDERAL SAVINGS



Designer Daniel Solomon with architect David Reichel and graphics designer Barbara Stauffacher Solomon call in a roadside sign company to form a bank interior. The concept is a bright and youthful interpretation of the old dictum that light, literally, is space.





window; it also continues on to provide a luminous ceiling for the principal work areas; further, it partitions off the rear work area with diagonal panels.

The remainder of the interior design is composed of a bold scheme of painted black and white stripes — on the rear wall, on an intermediate partition, and on the ceiling. Also, there are several ranks of white cubistic desks and counters that rest on a gray carpet.

The small branch is planned for expansion from its first-year operation as an office for opening new accounts to later-year activity as a normal branch bank. The design will accommodate this change without major alteration. "At the first phase," designer Solomon explains, "there are two new-accounts desks, a double teller desk, and the cubes that can also function as new-accounts desks in a pinch. At the later phase, there will be a second two-teller station and the original one will be moved over. One of the new-accounts desks will be put in the middle as a reception desk and the other will be thrown away."

Daniel Solomon has been interested in the use of exhibition and display materials in tenant work spaces and, after the Thrift Federal Savings branch was finished late last summer, he taught a course on the subject at Berkeley. His students examined tenant commercial spaces and the application of exhibition materials to tenant architecture in a laboratory of such materials, which were donated — some by the Federal Sign and Signal Company — for students' experimentation.

Designer Solomon believes, then, in the theory of temporary furnishings in tenant spaces, even though he admits that the bank, as a prototype, is "more permanent and more precious" than that theory proposes. With the current state of electrical codes, he observes in addition, the discovery of the sign maker's potential as a package dealer — "their expertise and their automatic underwriter's approval" — is an architectural development of considerable practical value as well as aesthetic interest.

Photos: Joshua Freiwald



The acrylic illuminated sign, which is supported by whitepainted steel I-beams (details opposite page), serves as the lighting and partitioning system (above, left) and as the storefront logo of the bank (above).





CROSS SECTION THRU TYPICAL LUMINOUS PLEX PANEL



SECTION A





PARTIAL SECTION THRU PARTITION



PHASE ONE FLOOR PLAN



PHASE TWO FLOOR PLAN

The tellers desk counter (above) is phased for expansion (plans below and sketches facing page): The two-teller counter will be moved over and a second one added; one of the new accounts desk will be moved to the center to serve as a reception desk. Legend for plans: (1) waiting, (2) manager's desk, (3) secre-tary's desk, (4) teller coun-ter unit, (5,6) teller service equipment, (7) jointly used equipment, (8) mail area.

The Architect...

Consulting editor Paul B. Farrell, Jr. developed this article with associate editor Don Raney and members of the P/A staff. Mr. Farrell, a mortgage banker with Sonnenblick-Goldman Corp., Detroit, Michigan, is an attorney, urban planner, and architect. He acted as consulting editor for the May, 1969 issue of P/A, "The New Environmental Professionals."

The newest frontier in the business of architecture is land development. Although considered unprofessional by some architects, getting "a piece of the action" does not conflict with present AIA ethical standards. Yet, obtaining equity in land development and building projects in lieu of, or in addition to, the usual professional fee is becoming common practice among many architects, while others, intent on preserving the architect's traditional image, challenge the professionalism of such ventures.

Those architects already involved in development find that their equity position in a project allows them more design freedom, primarily because they are in control from the project's inception. Others say that assuming the client's role is an objective education for the architect, and a necessary one that could possibly change his image as someone to avoid in money matters. Whatever the changes, changes are called for by the increasing commercialism of American building. This trend appears to be irreversible. Thus, architects may wish to join it and work from inside the system, rather than poke at it ineffectively from the outside, often without work. However, it remains up to the individual to decide at what point the architect-developer becomes a developer who does some architecture.

Some architects seem confused about the ethics of development-involvement. Although no conflict-ofinterest exists when an architect is also a developer on a particular project, some architects may be confused because of proposed changes in the AIA's ethical standards. The most important of these changes deals with the architect as contractor; rules on development remain about the same. Speaking before an AIA meeting in February, Preston Bolton, AIA secretary said, "We are not allowing the architect to become a contractor. We are allowing him to become a contract-manager. It's necessary for the architect to offer broader services and to participate in the complete construction process." (If exact wording can be worked out in committee, the new ethics will be presented to the national convention next month.)

In order to survive, architects must be willing to take responsibility from project initiation to completion. And, as developers, they will be in the best position to do so. Especially in view of "The New Professionals," (P/A, May, 1969) who are produc-



the Business
of Developing



St. Louis Firm Invests in Redevelopment

Hellmuth, Obata, and Kassabaum's (HOK) first venture as a developer is the nine block square Laclede's Landing project in downtown St. Louis, Missouri. In 1965, a local group interested in the preservation and redevelopment of the waterfront area north of the Gateway Arch Memorial invited HOK to provide architectural services and invest in the Laclede Landing Redevelopment Corporation. The firm took a minority interest, participating as architect and master planner, but leaving negotiations for the purchase and post-planning development of specific parcels of the land to the majority stockholders.

Last fall, after a long battle with an opposing plan, the city gave the green light to the Laclede's Landing concept. The redevelopment plan for the 18acre site aims for a mixture of commercial and limited residential activities. About half the existing buildings are scheduled for rehabilitation or reconstruction. Compatible new construction is planned for vacant sites and for parcels containing structures too decayed for rebuilding.

HOK is now pursuing an interest in sections of the Laclede's Landing site still in the hands of the original owners. The Redevelopment Corporation will purchase the land outright, or bring these owners into the deal with their property as investment. HOK then hopes to reinvest more heavily in those particular sites, and proceed as a subdeveloper with design and construction. Other subdevelopers will be involved with other parcels of land. According to HOK, there is nothing to keep any interested party out of the deal, although the firm will exercise architectural control in accordance with the master plan. The firm describes its attitude toward architectdevelopers as follows: "We suppose the argument against it is that if an architect has money invested, he won't be as concerned with doing a good job architecturally. On the contrary, we feel that a financial investment should increase the interest of a good firm in doing a good job. It gives the architect a more complete stake in the success of the project."

ing such a high percentage of building in this country, the architect-developer may become the architect-savior, eventually creating more good architecture for Americans.

Overcoming the Profit-Fee Hang Up

It is traditional for professionals to think of themselves as working for fees and not for profit. However, since the end of World War II many architects have come to view this more as a semantic problem than an ethical one. One of the first architects to receive widespread attention for his role as a developer was Atlanta's John Portman who began his career with the development and design of the Atlanta Merchandise Mart in 1959. Portman feels that the architect should be an initiator; "He shouldn't wait to come in at the end of a project, let things happen to him, and then blame the client." Since 1959, Portman has been involved in many development deals, including the new Regency-Hyatt House hotel in Atlanta.

Another architect quick to enter the development business, and equally quick to point out that development is an adjunct to his architectural practice, is Ronald Senseman of Washington, D.C. (Like Portman, much of Senseman's practice has been based on his development entrepreneurship.) Senseman began by developing and designing a motel for Silver Springs, Maryland that he parlayed into a major ininterest in Quality Motels (p. 89).

Inadvertently, the Department of Housing and Urban Development has become a positive influence in the trend toward the architect-developer. In the Turnkey Housing Program, HUD learned that architects who act as developers on Turnkey projects turn out "better-than-average" housing. Consequently, HUD has urged its district offices to use architects as developers whenever possible. Designs produced by firms working as Turnkey developers are shown later in this article.

Reasonable Approaches to Development

In the past, architects have acted as developers for many reasons, including profit. Minoru Yamasaki, wishing to have complete control over the space in which his office is contained, developed and designed an office building in Birmingham, Michigan. Because he wanted to create a quasi-urban atmosphere to suit his own life style, Preston Bolton developed and designed a garden apartment complex in Houston. On Long Island, it is not uncommon for younger archi-

Affiliate Builds Large-Scale Renewal Projects

Multimillion dollar projects by Charles Luckman Associates (CLA) and its affiliate, Ogden Development Corporation (ODC), are now underway in Los Angeles, California and El Paso, Texas: for El Paso, a \$13 million, 22-story building, the city's tallest; and for downtown Los Angeles, a \$70 million self-contained commercial center.

CLA currently does about 11 percent of its work on projects developed by ODC. A client-architect relationship is maintained between the two firms, making it the only major development company to be headed by

an architect. CLA offers complete architectural and engineering services on all joint ventures, with ODC handling economic, ecological, and sociological research, site acquisition, construction supervision, equity and permanent financing, leasing and management. ODC now has more than \$500 million under development.

According to CLA, "a number of significant advantages" have resulted from its association with the development company, although "it is still a bit too early to tell what the long range benefits will be to both firms." The Los Angeles architects have found that "the direct relationship of working together on largescale urban renewal projects gives us a much more rounded view of the profession in that we are fully aware of the costs involved in projects where ODC is the client." CLA has also been able to draw on ODC's special talents in dealings with its other clients. And, in the area of research, the development company's financial resources have made possible the study and solution of special problems, such as a recent investigation of modular college housing.

El Paso's State National Bank

Plaza will consist of a commercial banking pavilion, an eight-level parking structure, a landscaped plaza, and the 296-ft tower. The State National Bank of El Paso will develop and operate the complex jointly with Ogden Development. Completion is scheduled for 1971.

Broadway Plaza in Los Angeles was "designed as a prototype for revitalizing the nation's deteriorating central city business districts." Its 4.5 acres include: a 250,000-sq ft department store; parking facilities for nearly 2000 cars; a 500-room hotel and 32-story office building; an air conditioned, multilevel shopping mall; and extensive underground transportation and service areas. Ogden Development's Charles Luckman expects the urban center to have "a strong economic impact on downtown Los Angeles."

Other ODC projects, in various stages of planning, are: a 104-acre, \$1 billion development along Lake Michigan in downtown Chicago in partnership with Illinois Central Industries and other Chicago interests; a \$35 million modular office campus in Livingston, New Jersey; and a \$35 million condominium apartment project north of Sarasota, Florida. tects to build beach houses, perhaps live in them for one summer, and then sell for a good profit. In the case of John Portman, the architect has actually done much to shape the redevelopment of downtown Atlanta. Other architects have done work on motels, shopping centers, and, as already mentioned, Turnkey housing.

An architect who possesses the entrepreneur's skills must decide for himself at what level he wishes to play the development game. Always it is an intangible — timing or luck — that makes for success.

Boston architect Frederick A. Stahl, whose firm is just getting into land development, warns that in today's highly competitive market it is very difficult for the architect, untrained in business techniques, to compete with the professional developer. Yet Stahl is quite emphatic in expressing his belief that architects should begin at major scale where they can have a positive effect on their environment. "Architects should merge with those at the forefront in building new communities, not just shopping centers," says Stahl. He stresses, also, that one of the architect's major functions can be in defining community needs, then taking the lead and creating a composite client to fill the need. In the process, the architect becomes part of the client, and therefore maintains a strong voice throughout all stages of project development. In keeping with his beliefs, Stahl is now in the process of initiating a large scale development in the Boston area.

P/A is convinced that this trend toward the architect-developer will become more widespread as the profession gains confidence in its superior ability to control the many inputs which are necessary to make a given project work. It has been a lack of knowledge, rather than a lack of ability or interest, which has kept many architects from venturing into the development process.

In addition to examples of work done by architects already involved in development, this article contains a "primer" prepared for architects interested in the basics of real estate development. The "primer" is divided into the following seven essential areas:

- 1. Economic study types
- 2. Preliminary decisions
- 3. Organizing the deal
- 4. Acquiring the land
- 5. Financing the project
- 6. Marketing and investment management
- 7. Liquidation of investment



Economic Study Types

Land development is a broad term that includes various services: legal, accounting, engineering, financial, construction, and many more. It also covers a broad range of projects from shopping centers and public housing to industrial facilities and vacation resorts. In spite of the complexity of issues involved in land development, certain steps recur with sufficient frequency so that any developer should be familiar with them.

A developer may have a piece of property that he thinks is ripe for development; he may even have a tentative plan for its improvement. On the other hand, he may not have the property but may want to purchase land for his next apartment complex or shopping center. There are a number of studies that may help him in his decision.

In an article in the July, 1966 Appraisal Journal, Anthony Downs of the Real Estate Research Corporation defined the characteristics of the principal types of economic studies. His descriptions are helpful in understanding the kinds of techniques and information used by developers in the early stages of a project:

Appraisal: An appraisal is an estimate of value on a specific piece of property. The value may be based on specific land uses, which may already exist on developed property, or on projected land uses in the case of undeveloped property. Appraisals of large properties require detailed market studies and "highest and

best use" studies, along with estimates of the absorption rates likely in marketing the developed property.

To the land developer, the only reasonable method of appraising a land development project, which is supposed to result in an income-producing investment, is the income approach. This requires an estimate of the net income of the project, which is then divided by the capitalization rate, to arrive at the economic value of the project. Thus, an apartment building with a net income of \$100,000 annually would be worth \$1,250,000 if the capitalization rate is 8 percent. Capitalization rates may vary from 7 to 12 percent, with the lower rates assigned to the riskier types of investments (that is, a local motel might have a higher rate than an industrial plant leased to General Motors). Moreover, since appraisals are often used as a basis for lending mortgage money, two lenders are likely to assign different "cap" rates to the same project because of their individual preferences of investments. When a mortgage money lender uses an appraisal, he is likely to compare the results of the income approach with the projected cost and perhaps use the lower of the two in determining value.

Economic Feasibility Study: This type of study requires an analysis of the potential success of a specific project and is of major importance to the developer. Thus, a feasibility study requires a particular development plan for a specific site. "Success" is measured by the likely rate of return on investment of the project. A feasibility study requires a marketability study that must have been done to determine the land use and probable revenues of the proposed project. It also requires an estimate of the total project cost and time to completion. The future income and investment costs are then compared to determine the rate of return.



Highest and Best Use Study: A study of this type is intended to identify that specific land use which will produce the maximum return on investment within existing constraints such as zoning and topography. A highest and best use study always involves a specific piece of property but requires more than one concept of land development. The analyst usually rejects many potential land uses for relatively obvious reasons, which he states. Then, several potential uses may be screened to determine their marketability, and finally detailed feasibility studies are made on the remaining possibilities. According to Downs, the highest and best use study is one of the most complicated of economic studies.

Land Use Study: This type of study is a complete *inventory* of the land use of all parcels in a defined area such as a city. Marketability and feasibility considerations are excluded; thus, this study should not be confused with highest and best use study.

Market Study: Any generalized study of the present and future supply and demand for a particular land use is a market study. It is an analysis of more than one piece of property in a specified geographic area. A market study may also analyze the rates at which supply and demand will change, but this study does not require a calculation of return on investment.

Marketability Study: A study of this type analyzes a particular property to determine its present and future and the supply of competitive properties. Three conclusions must be made: (1) sales or rental prices; (2) quantity likely to be sold or rented per year; and (3) special factors such as financing, sales techniques, and amenities that will affect marketing. A marketability study includes a market study of similar land uses in the same area. Since it does not require the calculation of a return on investment it is not as complicated as a feasibility study.

SELECTED LAND DEVELOPMENT REFERENCES

Casey	REAL ESTATE DESK BOOK (Insti- tute for Business Planning, 1968)		
Downs	PRINCIPLES OF REAL ESTATE MANAGEMENT: HOMES ASSOCIA- TION HANDBOOK (Urban Land Institute)		
	COMMUNITY BUILDERS' HAND- BOOK (Urban Land Institute)		
Fri <mark>edman (ed.)</mark>	ENCYCLOPEDIA OF REAL ESTATE APPRAISING (Prentice-Hall, 1968)		
	REAL ESTATE FORMS (Prentice- Hall)		
Hoagland & Stone	REAL ESTATE FINANCE (Richard Irwin, 1969)		
Hussander	REAL ESTATE SYNDICATOR'S MANUAL		
Kinnard	INDUSTRIAL REAL ESTATE (So- ciety of Industrial Realtors, 1967)		
Kratovil	REAL ESTATE LAW (Prentice-Hall, 1962)		
Pease & Kerwood	MORTGAGE BANKING (McGraw Hill 1965)		
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A–E Firm Owns Part of Pittsburgh Complex

Deeter, Ritchey, Sippel took its initial step into development by bringing together a real estate company a finance company, and a group of smaller investors interested in its Mon Plaza Complex plan for a tract of land along the Monongahela River in Pittsburgh.

Mon Plaza, Inc. was established, with the architects owning 20 percent, and Freehold Real Estate Company and Foremost Financial Consultants, Inc., owning 40 percent. Land purchase agreements were developed with the Pittsburgh and Lake Erie Railroad, owners of the property. Freehold Real Estate served as a "front" for the purchase of the land, but the architects were involved in all negotiations.

Present plans for the 48-acre com-

plex include two office buildings, three apartment buildings, a motel, merchandise mart, marina, heliport, warehouse, and rapid transit station facilities, and parking for 12,400 automobiles. A mechanical walkway spanning the river on a double-tiered pedestrian bridge will link Mon Plaza with the Gateway Center. The Pittsburgh and Lake Erie Railroad will maintain its right-of-way, with the structure rising above

The architects/planners/engineers fold an AIA B-131 contract for complete architectural engineering and construction management services (the B-131 is a standard form of agreement between owner and architect in which compensation is based on a percentage of the construction post). Freehold Real Estate and Foremost Financial will manage the total project, including financing.

for the purpose of future development projects. The firm feels that development is "a natural activity for architect involvement. It behooves the architect to become more involved by seeking out and developing with compatible joint ventures. We have worked in the past for other developers. They provided nothing but money, and often lacked respect for our judgement. Under the present system, we still get our fee and provide our professional activities, but, in addition, have the opportunity to make decisions on design. construction, and finance feasibility. We have greater control over our own work."

Preliminary Decisions

If a developer is building on speculation, the market, marketability, and feasibility studies are his most important tools. The market study will assist in identifying areas of potential opportunity, but within these market areas available sites must be tested for both marketability and feasibility.

At some point the developer will be ready to test the development plan's feasibility. Is it going to make a reasonable return on the investment? Should this development plan be revised, or should the idea of developing this site be dropped?

Many people interested in development have difficulty grasping the basic concepts underlying a feasibility study. Actually, calculating the return on investment is relatively easy if the analyst follows certain basic steps:

Step One: Determine the per square foot rental to be charged for net leasable space (for example, \$7.50).

Step Two: Multiply the rental rate by the total leasable area to determine gross income (\$7.50 times an assumed 15,000 net square feet is \$112,500).

Step Three: Subtract the annual operating expenses including a vacancy allowance from the gross income to determine the net income, i.e., the amount available for debt service and return to equity (\$112,500

Sample Market Analysis for Housing

- Background data on population and housing in the city and metropolitan area
 - A. Analysis of population trends in the city and metropolitan area
 - B. Check of last two housing census inventories, noting median value, contract rent, occupancy, year built, and condition
 - C. Comparison of existing housing in the project area and surrounding neighborhood with the general housing in the city
- Recent trends in residential construction in the city and metropolitan area
 - A. Bureau of Census construction reports
 - B. Local FHA office
 - C. Local real estate board and home builders associations
- III. Analysis of existing rental housing market in the city
 - A. Rent levels for apartments by size and quality
 - B. Occupancy levels for apartments by size and quality
 - C. Recent trends in apartment construction, noting type of building and size of apartment unit
 - D. Estimate of over-all de-

mand for rental housing by type

- High-rise dwelling units
 Low-rise dwelling units
- 3. Efficiency, one-bedroom,
- two- and three-bedroom units
- V. Existing single family sales housing in the city
 - A. Types of single family housing being developed
 - B. Price range and financing available for new single family residences
 - C. Social and economic characteristics of persons purchasing housing in the various areas
 - D. Areas of new growth
- V. Estimate of annual absorption of dwelling units by type
 A. Single family sales housing
 B. Multifamily rental units
- VI. Relative amounts of sales or rental housing suitable for project area
- VII. For single family sales housing A. Price range for housing acceptable to local public agency
 - B. Types of houses which can be sold at recommended prices
 - C. Size of site

- D. Types of amenities to be included in sales price
- VIII. For rental housing units
 - A. Income level of prospective tenants
 - **B.** Appropriate rental range for apartments by size and type
 - C. Amenities to be included in each unit
 - D. Apartment mix for multifamily units based on market demand
 - E. Rents charged in comparable housing throughout the city
 - IX. Quantity of housing by type suitable for project area
 - A. Amount of public space required for schools, streets, and municipal services
 - B. Desired density
 - X. Estimate of absorption period for dwelling units
 - XI. Financial feasibility housing project
- XII. Locational and land area recommendation for the various uses within the project

This outline was suggested in an excellent reference source on appraising and market research by Friedman (ed.) Encyclopedia of Real Estate Appraising (Prentice-Hall, 1968) p. 342.



Builders Join Architects In Turnkey Package

Investigation of development possibilities brought Spitznagel Partners of Sioux Falls, South Dakota, into contact with Housing Authority officials contemplating Turnkey units for the elderly. CWS Development Company was created, with the architects and contractors, Christenson Company and Welfl Company each holding a one-third interest.

Two approaches in design concept were submitted as package deals under the HUD format. The first called for apartments grouped tightly around a minimum central core, with the emphasis on over-all height. The second grouped apartments around an enclosed atrium, with emphasis on year-round communal living.

Both proposals were initially rejected but Spitznagel Partners, stuck with its designs, finally landing a \$1 million contract for a seven-story, 76-unit building in Luverne, Minnesota. The contract included architectural-engineering services, land, site improvement, landscaping, construction cost, interim financing, and the developer's fee and overhead. Options were taken on property preselected by the Housing Authority.

When Pipestone, Minnesota invited proposals, CWS offered its other approach, this time for an 82-unit, 12story building. HUD approved the final plans, set the contract price at \$1.5 million, and provided a list of acceptable locations.

Spitznagel Partners express mixed feelings on the subject of development, but feel that the AIA is now "encouraging this sort of activity" among architects: "We enjoyed close cooperation with the contractor in determining the structural system. Our partners in this venture both participated in design critique sessions and contributed greatly to the control of the building costs. However, architects should be careful in choosing associates on development ventures. We have some misgivings about conflict of interest, and intend to be cautious in soliciting more of this work at the moment."

minus an assumed \$40,000 equals \$72,500). Initially, expenses can be calculated as a percentage of gross rents.

Step Four: Divide the result of step three by a number between 1.2 and 1.5 to determine the amount available for debt service (let's assume the result is \$60,000). Mortgage money lenders will expect that the net income be 1.2 to 1.5 times the debt service: the greater the risk the higher the ratio.

In order to compute the annual debt service, obtain a set of compound interest tables from a book store, then estimate the interest rate and term (number of years) of the mortgage. Assume the interest is 9 percent for 25 years. Now look in the "installment to amortize" column and read the debt service constant, which is 0.1018 for a 9 percent 25 year loan. The amount of the mortgage (assume a million dollars) is then multiplied by this constant and the result is the debt service which must be paid back annually to the mortgage money lender. The total debt service is the same each year although the interest portion will be higher in the earlier years. Thus, in the first year the interest is 9 percent of \$1,000,000 or \$90,000 of the \$101,800 debt service payment. The interest is tax deductible, while the \$11,800 remainder which reduces the outstanding balance of the mortgage is not tax deductible. This is the "amortization" payment. The second year the interest would be 9 percent of \$988,200 (\$1,000,000 minus \$11,800) and so on for later years.

Step Five: Multiply the reciprocal of the debt service constant by the amount of cash available to pay off the mortgage as determined in step four (1.0 divided by 0.1018 times \$60,000 equals about \$600,000). This is the amount of the loan. The constant 0.1018 assumes a 9 percent loan for 25 years.

Step Six: Finally, add the equity investment to the loan amount to calculate the maximum project budget. The equity may be determined by multiplying the reciprocal of the desired rate of return (say 12 percent before taxes) by the cash left for the equity investors (the difference between the results of steps 3 and 4 above; \$72,500 less \$60,000 equals \$12,500). Thus, equity invested in this project should be roughly \$100,000, and the total project budget should be no greater than \$700,000.

In brief then, the feasibility study shows a developer (1) the rents he must charge if his costs are as projected, and (2) his maximum project costs (i.e. his budget) for a given rent structure. In either case, future rents and current costs are tied together by the rate of return on investment.

The biggest problem in any feasibility study is the reliability of information. A few generalized sources of data may be helpful.

Office Buildings: National Association of Building Owners and Managers, 134 South LaSalle St., Chicago, Ill.

Shopping Centers: "The Dollars & Cents of Shopping Centers," Urban Land Institute, 1200 Eighteenth St., N.W., Washington, D.C.



Apartments: "Income and Expense Analysis for Apartment Buildings," Institute of Real Estate Management, 155 East Superior St., Chicago, Ill.

Other data sources are available through the various trade associations and their journals. In addition, local mortgage bankers, real estate brokers, property managers, and market analysts should be able to direct you to information sources. The mortgage banker can also provide current data on financing. Of course, the best information is the developer's own data about existing projects owned by him and his competitors.

Project cost information should include all costs. Presumably an architect expanding into land devel-



opment will be familiar with site and building cost data, but he should also include all other project costs in preparing his project budget:

Structures	Landscaping	
Demolition	Personalty	
Grading	Property taxes	
Utilities	Financing fees	
Parking-roads	Construction interest	
Lighting	Insurance	
Professional fees	Land cost	

If the project is being built for sale rather than lease, such as a condominium office building, the feasibility study would involve a market determination of the probable price purchasers are willing to pay. The maximum project budget, including direct costs to the developer, should not exceed 80 percent of the sales price.

Whether the project is intended for lease or sale, the feasibility studies will result in an initial decision to proceed into the later phases of land development if it will produce a reasonable rate of return. Moreover, the feasibility study will also provide a sales price or rental structure for the marketing effort, and a budget to guide the developer.

Organizing the Deal

Once the developer has determined the feasibility of his project, he will begin an intense effort to (1) bring together the equity investors and his development team, (2) assemble the necessary land if he does not own it, and (3) arrange the financing. One very early decision the developer must make is the choice of legal vehicle under which he will develop the project.

The mortgage loan normally does not cover all project costs. The difference, therefore, will have to be supplied by equity investors who will own the project, subject to the prior rights of the mortgage money lender. The various investors may contribute land, services, cash, or credit in return for an interest in the project. Their ownership interest can be created through the following legal entities:

The Corporation: There are several advantages to the corporate form as an investment vehicle: (1) the law will view it as a separate person, apart from its stockholders, thus limiting their liability to their stock interest in the corporation; (2) management of the development and ownership group can be centralized in a team of officers; (3) stock can be readily transferred to any willing purchasers; (4) the corporation can be used to diversify investment holding in more than one project, again reducing the risks of the stockholders.

Perhaps the main disadvantage of the corporation is the fact that its income is subject to double taxation; first when it is received, and again when it is distributed to the shareholders. However, this disadvantage is often minimized where the depreciation deductions result in tax-sheltered cash returns which can be distributed to stockholders without being taxed. Tax-sheltered cash returns are greater in the early years of projects where accelerated depreciation is permitted.

Corporations are also used as title holding agents of partnerships. This is a means of insuring the partners against personal liability or avoiding usury laws. When they are used in this way, care should be exercised to avoid double taxation.

Partnerships: Perhaps the most common business entity in land development deals is the partnership. A partnership is not a taxable entity — one of its chief advantages. Income is taxed to the individual partners when received, and all tax advantages from depreciation or interest deductions, for example, are passed on directly to the partners. There are three types of partnerships: the general partnership, the limited partnership, and joint venture.

General Partnership: In the general partnership, each partner has the authority to act for the partnership in its business activities and each has a direct voice in its management decisions. The general partners are also personally liable for the liabilities of the partnership's business. Frequently, there are restrictions on the transfer of the partner's interests in order to control the membership of the group. Particular care must be taken to avoid having the Internal Revenue Service treat a partnership like a corporation for tax purposes.

Limited Partnerships: The limited partnership is probably the most useful and flexible partnership vehicle. It has general partners whose responsibilities are identical to those in a general partnership. In addition, there are provisions for passive investors who do not wish to take an active role in the management of the partnership's business. The liability of these passive investors is limited to the amount of their capital contribution, much like a corporate stockholder, yet without the greater risks of the general partners. Moreover, the general partners are assured of management control of the property without interference by the limited partners. Finally, a general partner may also have limited partnership interests which may (1) make it easier for an individual general partner to "cash out" part of his investment once the project is near completion, or (2) permit him to limit his liability by giving the limited interest to a relative.

Joint Ventures: Notwithstanding the technical and legal distinctions between joint ventures and partnerships, the joint venture is taxed as a partnership. Normally, a joint venture's business activities are thought of as more limited in duration and confined to a specific project. An example might be a joint venture by a realtor and mortgage banker to develop and market a subdivision. For all practical purposes, a joint venture agreement will resemble one or the other partnership agreements in basic content.

Real Estate Investment Trusts: In recent years the trust has become a major form of investing in real estate. Like partnerships they are not a taxable entity (if their income is properly distributed to investors). The Internal Revenue Code has numerous complex rules which govern the kinds of assets, number of investors (no less than 100), source of income, amount of annual income distribution to shareholders, and other business operations of the trusts. The trusts are more commonly used by large land developers, owners, or mortgage money lenders as a means of diversifying risks among many projects and many investors.

In summary then, a developer is likely to select the corporate form as a legal vehicle for his business

Architect-Entrepreneur Urges Others to Develop

A veteran on the development scene, Ron Senseman completed his first project just after World War II — a group of six-family apartment houses built on land purchased by the architect and later resold. A largescale involvement in the motel business followed, starting with a venture in Silver Spring, Maryland, which Senseman and his original partners have parlayed into a controlling interest in Quality Motels.

Of the many architects with whom P/A spoke, Senseman was the most vocal on the subject of development activities: "Very early in the practice of architecture, I realized that there were many opportunities for an architect in the allied fields of development and construction. I would find a site, decide what to put on it, bring in some other people and develop it, and then take a share out of it. Along the way we picked up additional partners since we did not have all the money we needed. The way we worked it out financially, ownership in any project was based on the gap. If we could borrow \$800,000 on a million dollar motel, that would be a \$200,000 gap plus the price of the land. Every dollar you put up toward that was your degree of ownership — no free ride for anyone.

"It is very important to know with whom you are going into a project — most of the people who have money to put up, want control — the minute they have control they can maneuver you any way they choose. Be sure that your partners are reliable.

"Of course, it's always nice to control the whole thing by owning the majority of interest, but then you are out of the practice of architecture. I maintained all along that my principal business was architecture and these were side ventures, and I purposely kept my name in the background as far as being any part of the development was concerned. Most of the people who knew me knew that I had interests in the development. I just didn't make a big issue of it, because I didn't want anybody to feel I was more interested in development than architecture.

"I avoid projects that are not architecturally oriented because they do not bring work into the office, and it is never good business to invest in areas with which you are not familiar. You also have to be sure of conflicts of interest, in relation to the AIA code of ethics."

Motels in Towson and College Park, Maryland, and Arlington, Virginia, followed the Silver Spring venture, all of them built on land owned by the partners. More recently, Senseman has entered the field of nursing homes, taking his fee in development corporation stock. Defending his role as a developer, Senseman finds his involvement "the only answer to architects being bought so cheaply by builder entrepreneurs. I sincerely feel that if an architect doesn't in some way get into this type of venture, he's got a real tough row to hoe ahead of him. An architect has to have some extra function in the community to survive."

operations (*i.e.*, brokerage, design, construction, leasing) primarily because of the protection against personal liability. On the other hand, because of the tax advantages, he'll probably choose limited partnerships as a method of owning and financing each separate development project.

The Development Team

At about the same time the developer is organizing his equity investors on a specific deal he'll also be assembling his development team. There are several key men on the team:

Market Analyst: the economist, appraiser, or real estate broker preparing the marketability and feasibility studies.

Attorney: responsible for drafting, reviewing, and negotiating legal papers for construction, partnerships, debt financing, consultants' services, land purchases, sales and leases, corporations, and zoning changes. Accountant: general advisors on tax, financial, and business matters, and controllers of income and expense of the developer.

Real Estate Broker: assists in testing the market, assembling the land, and marketing or managing the developed project.

Mortgage Banker: the broker who can arrange the permanent mortgage financing and interim construction financing.

Construction Manager: the building contractor who can provide effective cost control during planning and design.

Planners: the architects, landscape architects, engineers, and urban planners.

There may be other men on the team, such as the insurance broker, public relations specialist, and property manager, but the above list includes the seven main categories of talent that should be assembled and involved in the development project as early as possible.

Acquiring the Land

If the developer does not own the property (or hold an option to purchase it) he must next consider the best method of acquisition, with a minimum cash payment. As a rule he will want to defer any cash outlays as long as possible, so that he has a minimum amount of cash in the development. There are various ways to acquire the property; a few of the more common ones are:

Deed and Purchase Money Mortgage: The owner may be willing to transfer his complete interest in the land and accept a down payment of, perhaps, 25 percent, with the balance due within five years. In return, the developer will give the owner a "purchase money mortgage" on the property and pay interest on the balance. This type of deal might also provide that the mortgage may be paid off earlier in the event other financing or income is generated by sales or leasing.

Land Contracts: In many states, the seller retains ownership until the developer completes his payments (plus interest) on the purchase price of the land. The developer, however, gets full use of the land and the actual payments may resemble the deed and purchase money mortgage situation. In both of these situations, if the property is to be developed in sections, the agreement will probably provide that the seller will release sections of the land as required by the developer. The developer will then pay a specified sum for the sections released. Frequently, land contract payments will be structured so that they are not constant. That is, a \$100,000 purchase price may be paid at the rate of \$15,000 down and \$15,000 annually for four years with the balance (a "balloon" payment) due on the fifth year.

Options: The developer might also secure a long term option to purchase or a series of successive options in order to give him time to raise required cash and market the development. Where successive options are given, the purchase price per acre will likely be greater for later options. That is, the land may be purchased for \$10,000 per acre the first year and perhaps \$11,000 per acre the second. Thus the developer is encouraged to develop earlier.

Ground Leases: Often, the developer will be satisfied to lease prime land from an owner who will not sell. The developer then pays the annual rent of about 9–12 percent of its value and owns the improvements at the end of the lease. Often, the developer will secure such leases with extensions running several decades, and enjoy the benefits of the return on the investment in the improvements for a sufficiently long period. Thus, he will not be concerned that the owner



of the land will ultimately also own the improvements.

Joint Venture: The owner of the property might be willing to contribute his land into a partnership that will develop it, thus eliminating any land purchase payments. The developer may then pay only the property taxes on the land.

Exchanges: In some cases a land owner may not want to sell the land because of the tax consequences to him. In this case it may be possible to exchange or trade the property for other of like quality without incurring a tax.

The method of acquiring the property to be developed depends on many factors: the idiosyncrasies and tax status of the seller, and the customs in a particular state or city. From the developer's point of view, one of his main concerns is to minimize his cash needed to acquire the land and effectively execute his particular development plan. Once he has the land, he's ready to talk seriously with the mortgage banker about financing the project.



Architect Develops His Own Environment



live might design and build his own house. Houston's Preston Bolton went a step further. He bought and developed Longmont Lane, where he created an environment around him that he then sold to would-be neighbors. Bolton designed several houses himself and retained architectural control over the others — all of them modified townhouses focusing on private courtyards and skylighted interiors.

A similar project in development planning is 3.5-acre Bolton Place. Again, the land was bought by the architect and a unified section of homes planned. Houses were built on three of the 27 sites. When these were sold, the architect's financial interest ended, although here too he kept architectural control, protecting the quality of the project. Like the Longmont Lane development, the 40' x 82' Bolton Place houses are oriented inward, maximizing privacy and security. The project also contains a swimming pool and recreational pavilion for residents.

Bolton believes that involvement in this kind of development "affords the architect a chance to create an environment that would not otherwise be possible."

Financing the Project

The mortgage banker is an essential link in the land development process. His function is to provide quick, effective contacts between investors, owners, and developers who do not have direct access to the many sources of investment capital. A developer should make use of the mortgage banker's services from his project's inception. The banker's extensive knowledge and experience make him a ready source of information on the availability and terms of financing. In addition, he is frequently called on to review the feasibility of the project. When the developer is ready, he will negotiate an agreement specifying minimum loan amount and terms with the mortgage banker. This agreement provides that the developer will pay a fee, usually $1-1\frac{1}{2}$ percent, when a lender issues a commitment to advance permanent funds upon completion of construction. Typically, it will take about two months to prepare the application, negotiate with various lenders, and await their decision before a commitment letter is issued by a lending institution.

Once the commitment for permanent funds is issued, the mortgage banker may assist the developer in borrowing the short term or interim construction financing normally supplied by commercial banks, real estate investment trusts, and other private lenders. These funds are lent under the assumption that they will be repaid directly from money which will later be advanced under the permanent lending commitment. A construction loan is normally for about 90 percent of the amount of the permanent loan commitment unless the developer has recognized experience and credit. Moreover, a lender may often discount the loan a few "points" (that is, for example, lend \$980,000 in return for an agreement to pay back one million dollars) and require that the developer put his equity cash into the development before he draws funds on the construction loan.

A few other points must be emphasized in the context of debt financing. Frequently lenders will combine the interim and permanent loans, advance the money during construction and, on completion, make the permanent loan. This is a "buy-sell" agreement. In this situation, the developer will probably reduce his financial carrying costs (service fees and points) and minimize the problems of dealing with more than one lender.

The developer should also be aware of "stand by" and "gap" financing. Since lenders of permanent loans usually lend more money on a completed and rented building, they may "hold back" 15–20 percent of the permanent loan commitment until a specified occupancy level is reached. In this case, a construction lender will supply interim financing only in the "floor" amount of the permanent loan. The developer may then close the "gap" between the floor and ceiling amounts through a second mortgage at a higher interest rate and shorter term, or, for an additional fee, a lender will extend his credit to cover the "gap." That is, he will "stand by" to take up the gap if the occupancy level is not reached. Now the construction lender will lend the "ceiling" amount of the permanent mortgage.

In other cases, (usually where money is tight and the developer is gambling that it will be better when construction is completed) some lenders, such as the real estate investment trusts, will extend permanent mortgage commitments with intentionally stiff terms that will force a developer to seek other financing when the time comes to "take out" the permanent loan. This technique, however, does give the developer a permanent commitment with which to secure interim financing and begin construction. Later, he hopes, the money market will be better, rents may be higher than expected, and, of course, lenders will commit more funds on the completed building.

There are two primary financing requirements for real estate development: debt and equity. Debt capital is borrowed at a fixed rate of return for a fixed number of years and its lenders have a first claim to any net income from annual operations (or from any proceeds in case of bankruptcy). Equity capital is the investment of the owners and is the difference between the borrowed debt and the total project cost.

Debt capital is supplied by various sources: Savings and Loan Associations: These institutions are the primary source of individual home mortgages and other residential construction. They are typically restricted to operating within one hundred miles of their offices. Loans may be made for as much as 90 percent of cost, although 75 percent may be the maximum for projects of five or more dwellings. For commercial uses the loan may be restricted to 60 percent of value.

Life Insurance Companies: These institutions are the principal source of nonresidential construction. Usually they are not restricted to investments in particular geographic areas, although specific institutions may, at various times, limit themselves to investments in certain regions. They may also have constantly changing preferences as to the type of investments (shopping centers, nursing homes, etc.). Their usual loan-to-value ratio is approximately 70 percent although it may vary considerably with the project.

Mutual Savings Banks: These banks exist in only eighteen states, primarily in the northeastern United States. Like the savings and loan associations, most of their loans are made on conventional and government insured one- and two-family houses. Their loan ratios vary from 60 to 90 percent.

Commercial Banks: Until recently these institutions were the primary source of all interim construction loans. Their activities are locally oriented, giving



Equity Return on Investment After Taxes

While the mortgage money lender will evaluate a project by looking for one where net income is between 1.2 and 1.5 times the annual debt service, the equity investor will be more interested in the cash flow (i.e., gross income minus operating expenses, debt service, and taxes) and other benefits such as appreciation in project value and equity increases created by reduction of the mortgage balance. This diagram is a simplified illustration of the procedure for calculating the investment return to the equity owners of the project.

(1) The net income is determined by subtracting operating expenses from gross rents. (2) The annual debt service (a constant payment of interest and amortization) is subtracted from net income to arrive at the cash flow before taxes. (Note: It is often sufficient to stop here where several owners are involved, each with a different tax rate, in which case the rate of return can be determined by calculating the ratio of cash flow before taxes to equity invested.) (3) The depreciation and interest deductions are subtracted from the net income to compute the taxable income. (4) The taxable income is multiplied by the tax rate and the result is a tax benefit if the taxable income is negative, and a tax if the taxable income is positive. (5) The cash flow is calculated by either subtracting the taxes or adding the tax benefit from the cash flow before taxes. (6) The cash flow after taxes is compared to the equity investment to determine the annual rate of cash return to the owners. (7) The amortization part of the annual debt service payment and the estimated appreciation in value are added to the cash flow after taxes to determine the total (cash and noncash) return to the owners. (For a more complete example see Farrell, "Financial Analysis of Real Estate," Journal of the American Institute of Architects, Aug. 1968 p. 74.)

them the ability to monitor the development process. **Real Estate Investment Trust:** The tight money market has seriously restricted the construction lending capabilities of commercial banks. As a result, the real estate investment trusts have expanded rapidly as a source of interim financing.

Pension Funds: The public and private pension funds are another rapidly expanding source of permanent mortgage money for all types of construction.

Within these main classifications of debt capital sources there are thousands of lenders who are looking for good opportunities to invest their capital resources. In recent years, however, the commercial banker and the investment banker are becoming more interested in expanding into real estate financing and have started their own mortgage banking divisions. One of the characteristics of these newer divisions is their tendency to take a more active role in the development process because they have been lending in loan ratios, often up to 100 percent, while also taking a percent of the equity in the project.

Equity capital sources are much more diverse and less organized than sources of debt capital: A few are:

1. Land sellers, who take equity interest or deferred installment payments.

2. Development team members — architects, lawyers, contractors, real estate brokers. The fees of these professionals and the cost of the land will often equal the total equity on a development project.

3. Clients, business associates, and friends.

4. Bankers, including investment, commercial, and mortgage bankers often have individual and corporate investors looking for attractive opportunities.

5. Mortgage money lenders are granting a greater number of 100 percent financing deals and taking an equity interest along with the developer.

6. Earnings from the developer's other projects or business activities.

7. Corporations, as well as their investment bankers, are now expanding into real estate investments, using their capacity to raise money in the stock market as a source of equity *and* debt capital.

Most architects who want to expand into real estate development will have to accept the fact that it is difficult to raise the equity capital necessary to finance their first few projects. It is often said that investors are quick to lend to anyone who doesn't need their money (such as a recognized developer with an excellent credit rating). A new entrant into land development is a greater risk because he doesn't have a "track record"; he has to sell harder to put together the financing on his initial developments.

Market and Investment Management

In common practice, the developer will make all efforts to lease space during construction and probably even before construction begins, since the greater the percentage of the project that is preleased, the more favorable the financing will be. Marketing campaigns for sales properties, such as condominiums, are initiated during or before the construction phases. Let's examine some of the basics of property management and leasing, sales, and exchanges.

Rental Property: If the property is a rental property, the developer will want to select an experienced property manager to lease and operate his building. Typically, an independent management company will contract to handle the property for a minimum one-year period. Their contracts usually cover several important areas of concern to the developer since the value of income producing property depends on active management control of income and expenses over extended periods. A property manager's responsibilities include the following:

- 1. Provide periodic reports on changes in local rental markets, including rent levels and practices of competition.
- 2. Advise owner on unit rent schedules.
- 3. Advertise for and locate tenants.
- 4. Check credit of potential tenants.
- 5. Prepare and execute leases.
- 6. Employ, train, and manage competent personnel as resident staff.
- 7. Contact for utilities and services.
- 8. Purchase all materials and supplies necessary for operations of buildings and grounds.
- 9. Specify and supervise repairs, contract for maintenance.
- 10. Pay all expenses, including wages of employees.
- 11. Maintain separate bank account for project and notify owner, monthly, of balance.
- 12. Provide monthly reports summarizing income and expenses and the projected budget for the next quarter.
- 13. Maintain adequate insurance.
- 14. Review local tax assessments and advise when appeals should be taken.

For these services, a property management firm is usually paid about 3-4 percent of gross rents. The fee may be higher if the manager employs his own staff for all billing and accounting. In any event, the owner will have other expenses (for example, perhaps 35 percent of gross income from an apartment complex will be spent on operating expenses) and it is advisable to clearly define in the manager's contract whether the owner or manager is responsible for individual expenditures made by the manager in connection with the property.

Sales: Most states have strict licensing laws controlling the sale of real estate. In particular, only licensed brokers or salesmen can sell real estate and their contracts must be in writing. Commissions will vary depending on the size of the sale, type of real estate, and other factors. There are five basic methods of employing a real estate broker to sell the completed land development:

Open Listing: A listing, usually not in writing, available to more than one broker. The first broker to produce a "ready, willing, and able buyer" for the price and terms of the listing is entitled to the commission. The owner may also sell the property himself.

Exclusive Agency: An agreement, generally in writing, employing a broker for a specified period to the exclusion of all other brokers. During the term of the listing the owner may sell the property himself and no commission is due.

Exclusive Right To Sell: An agreement employing a broker for a specified period of time to the exclusion of all others. In this form of listing not only is the broker protected in the event of a sale by another broker, but he is also entitled to a commission if the owner sells the property himself.

Conditional Agency: Real estate brokerage contracts drafted by sophisticated developers will probably condition the broker's commission to particular events such as the complete transfer of the property in order to avoid paying a broker a commission for work done by others.

Multiple Listings: This is an exclusive listing with one broker for distribution to other brokers. When the property is sold the commission is split between the listing broker and the selling broker.

When the developer hires an independent real estate agent to assist him he is interested in results and would like to negotiate a conditional agreement. In addition, if, for example, the broker is engaged in a large-scale effort to market many individual sales, as with a large planned community, the developer will be equally interested in preparing an over-all plan to market the entire project rather than individual units. Therefore, it is likely that he will consult with marketing and public relations consultants familiar with promoting the sale of large numbers of properties. Obviously, the marketing campaign should be planned early in the development process (probably during the planning and design activities).

Exchanges: The basic reason for "trading" or exchanging property is to defer payment of a capital gains tax. Thus, while it is not a common method of disposing of property immediately after completion of construction, later, when a sale would produce taxable income if the property has appreciated in economic value and has been depreciated for tax purposes, it becomes increasingly attractive. The federal tax laws provide that if "like kind" properties held for productive use in a business or for investment purposes are exchanged, no tax gain or loss is recognized. Frequently this is called a "tax-free" exchange, but actually the tax is only postponed.

There are two main types of trades. Two owners may exchange properties between them. For example, the owner of an apartment complex may exchange his equity in it for the equity ownership of an investment firm of equal value. The definitions of "like-kind" properties are relatively broad and may include leases and partnership interests. Also, there are some special rules governing (1) the transfer of mortgage liabilities, (2) exchanges where cash is used to make up small differences in value, and (3) depreciation deductions on the properties. Nevertheless, this technique may be useful to a developer on subsequent projects.

A three-way exchange is a sophisticated extension of the two-way exchange and is a solution where one owner (A) wants to sell his property (X) for cash while the other owner (B) wants that property (X) and is willing to trade other property (Y) for it. The deal can work either of two ways if a third owner (C) wants to end up with the (Y) property. So either A and B trade and then A sells to C, or C buys A's property and then exchanges it with B. The result is a satisfaction of the economic goals of all parties. However, no deal of this type should be executed without the counseling of competent tax attorneys and real estate brokers, because, even though the capital gains tax is deferred, there are other, perhaps undesirable, tax consequences.

Managing the Project

In land development the techniques of market research, financing, and property management are less familiar to the architect than the processes of planning, programing, design, engineering, cost control, and construction contracting. Therefore, it would be inappropriate to devote much attention to these familiar areas except to emphasize some of the economic consequences of a lack of adequate control of time schedules and costs of the project.

Lost Rents: A developer's major objective is to start producing income as soon as possible: every month's delayed occupancy is a month of lost income. In some cases, of course, the developer may lose tenants who must vacate currently occupied space and cannot wait for project completion.

More Equity: When construction costs increase beyond the established budget it is unlikely that the lender will increase the loan amount. As a result, all increased costs must be met by the developers and owners. If, for example, the total project costs go up 5 percent, then the equity investment will be increased to a big 25 percent (if the mortgage ratio is 80 percent of total value). A similar result occurs where the project is delayed. Not only is rent lost, but the investors must continue paying interest out of their pockets on the construction loan. In "The High Cost of Construction Delays" (P/A, Nov. 1969, p. 116) the author shows that a construction period of 18 rather than 12 months will result in the required equity investment increasing 75 percent from \$200,000 to \$350,000, in which case the rate of return on equity would decrease by one-half, a condition guaranteed to create dissatisfied equity investors.

Loan Premiums: The permanent mortgage money lenders may also require a developer to pay premiums for delays in "taking out" the permanent loan because it disrupts their investment planning. These premiums can equal as much as 3 or 4 percent annually of the loan amount.

Miscellaneous Losses: Delays may cause increased operating costs for storage of delivered but unused equipment and losses of operating labor and management time due to late occupancy.

In summary then, rigid control of costs and time schedules are essential to successful land development since laxity can have a direct economic effect in both decreasing income from the project and increasing the required investment.

Liquidation of Investment

The exchange of property is one method of liquidating an investment — by substituting another for it. Most other methods will produce cash (which the owners will want distributed according to the terms of their agreement) and possibly taxable income (on which taxes must be paid to the government). Normally, the sale of an investment will be taxed at a capital gains rate of 30 percent maximum which is lower than the ordinary income tax rates, particularly where there is a large amount of income. In liquidating his investment, the developer or owner should keep in mind several important financing and tax considerations.

Installment Sales: In order to avoid a large taxable gain in one year, an owner can sell his property on an installment contract and spread the purchase price over several years. This method of sale may also result in a better price. The Internal Revenue Code permits an installment sale if less than 30 percent of the purchase price is received the first year. There are many detailed tax rules regarding installment sales; however, a competent tax attorney should be able to set up the deal to the best advantage of the seller.

Depreciation Recapture: In certain real estate investments, the federal tax laws permit accelerated depreciation. This allows the developers and owners to reduce their taxable income from the project while increasing their cash flow (a phenomenon otherwise known as creating "tax sheltered income"). However, on sale of the real estate, the Internal Revenue Code rules may result in a portion of the "recaptured" depreciation to be considered as ordinary income even if the sale otherwise results in capital gain. Again, the advice of tax lawyers should be sought.

Dealer Status: Investors in real estate may enjoy capital gains on the sale of property. However, a "dealer" must pay a tax on sales at ordinary income rates. Since each investment is treated on its own merit, a developer may be a "dealer" on some projects and an investor on others. The rules governing this problem are adequately outlined in the *Real Estate Desk Book* by Casey, which advises that any



Minneapolis Firm Controls Turnkey Ventures

Four Turnkey projects for the elderly — three in Minnesota and one in Wisconsin — were developed by Miller & Melby Architects, Inc. For three of the Turnkey ventures, Miller & Melby formed a separate development company. The two partners each own 25 percent, their employees hold the rest. Proposals for 104 units



in Worthington, Minnesota, 71 units in St. Peter, Minnesota and 21 units in Frederic, Wisconsin, won approval from the local housing authorities, in each case beating competing developers because of design. For all of the projects, the developer received the regular architect's fee plus whatever profit was earned on investment. According to Frederick Melby, the projects could not have been done under conventional housing programs, where the architect is unable to make all the decisions and control all facets of development. "We were really both client and architect in these development deals. This helped us understand the client's problems better." developer or investor should begin thinking about minimizing the risk of falling into a "dealer" status when he acquires his interest in each piece of property and not wait until he sells it. Again, legal counsel should be retained to advise on such matters.

Corporations: If the real estate is held by a corporation in which the developer or investor has stock he may preserve his capital gain and avoid the double tax (on corporate income and then dividends to shareholders) by one of several methods: he can sell the stock to the new owner, or liquidate the corporation, pay a capital gains tax, and sell the property for the value determined in paying the capital gains tax (thus there is no second tax because the property is sold at its value). If the IRS finds that the corporation is "collapsible" (primarily those liquidated within three years) there will be no capital gains possibility.

Sale-Leasebacks: In a sale-leaseback, the user of the real estate ends up leasing rather than owning the property. For example, a developer may agree to build-to-suit for a manufacturer on his own land.

The manufacturer will then sell the building to the developer who will lease the property to the manufacturer. The manufacturer thus avoids tying up his capital and he has a tax deduction for the entire amount of his rent, including the rental value of the land that would not be a depreciable item for tax purposes. His credit is not tied up in a mortgage, and maximum financing is available to the owner-lessor. Hence, the rental terms may be more favorable. In addition, the developer-lessor probably will negotiate a lease of fifteen or more years that will permit 100 percent financing of the costs. The developer will also own the facility at the end of the lease and is entitled to depreciation on his investment (exclusive of the land). Most rents on lease-back will range from 8–12 percent depending on the risk involved. The greater the risk, the higher the rent.

There are many other economic considerations that the developer and owner must bear in mind when selecting the best method of liquidating an investment in a project; however, these are among the more important.

Firm Forms Corporation for HUD Projects



Many architects interested in development find the guaranteed cost and occupany schedule of "Turnkey" housing appealing. Several years ago, Trossen, Wright, and Prokasky, (TWP) of St. Paul, Minnesota, "recognized the increasing demands for procedural changes in the practice of architecture." The firm subsequently formed the Ithaca Corporation with Lovering Construction Co. to plan, design, and build low-cost housing for the elderly in Fargo, North Dakota, and Madison, South Dakota. Both buildings are on contract with the local Housing Authority.

TWP maintains a majority interest in the corporation "to assure its professional design and client service-oriented character." Projects are initially planned and designed by the architectural staff. Upon establishment of a planning concept, the estimating and construction staff determine costs, construction materials, and techniques. Typical building sections and an outline specification are developed, the final price is itemized, and the proposal submitted to the client. A principal architect remains the arbitrator and executor throughout the evolution of the project.

TWP considers the architect an ideal developer. "In addition to a comprehensive and varied background, the developer must have architectural training to assure a level of quality in the design and function of his buildings. In view of the fact that there are now no professional standards required of a developer, the architects' established ethical relationship to the client is the type of professional ethic that should be expected of all who have such a great influence on our physical environment."

The total cost of the two projects will be about \$5 million. Both structures will contain large one-bedroom apartments and one-bedroom efficiencies, with 250 units planned for the Fargo complex and 94 units for Madison. The 22-story Fargo highrise will be constructed by the liftslab method.

evbertecture

In this discussion of Cybertecture (CYBERnetics + archiTECTURE), an attempt is made to formulate a conceptual framework for an evolutionary environmental system.

By Wolf Hilbertz

Associate Professor of Architecture, Southern University, Baton Rouge, La., and Director, Responsive Environment Laboratory.

Man's unique position in nature makes him increasingly capable of diverting the forces of nature to his own purposes even as he is subject to its forces.

A very optimistic statement which even might be true, but designers and engineers are still struggling to employ the principles and mechanisms of the first industrial revolution to a significant extent. One hundred and twenty years after Paxton's Crystal Palace and 50 years after Ford's Model T, we still cannot refer to a large-scale building system based on massproduced industrial components. The criteria governing present-day buildings are still paralyzed by the influence of linear thought processes, the concepts of "cause and effect," "energy and matter," the paradigm of Newtonian physics, and the first industrial revolution. The fact that buildings which require a longer planning period are often partially obsolete when "completed" proves the inadequacy of traditional architectural philosophy.

Meanwhile, the second industrial revolution is in process. Computer systems have begun to supplement and replace the human nervous system. This facilitates radically new forms of man-machine symbiosis. The generating force is man's renewed and increased awareness and scientific exploration into the phenomena of organization. This principle is not derived from categories like "energy" and "matter"; it is a value expressed by the structured manner in which a system, using control and communication (cybernetics), functions.

Life is a self-regulating process. All living systems tend to adapt themselves to a set of specific purposes by evolution which results from internal and external selective forces. Organizational patterns and mechanisms created by evolution, in turn, make the evolutionary process possible. They have been at work and subject to continuous "improvement" for six or seven hundred million years. Thus all existing forms of life constitute an enormous wealth of experience from which we can draw. If we examine and consciously integrate the principles and mechanisms of evolutionary processes into technology, we will discover man-machine and machine-made environments with new unheard-of capabilities. We can no longer analyze, conceive, and create isolated elements and processes. We must examine the effects of elements upon each other and properties of entire systems, their performance depending on various degrees of complexity. Cybertecture (CYBERnetics + archiTECTURE), abbreviated CT, is an attempt to formulate a conceptual framework for an evolutionary environmental system. The space-time continuum is organized ecosystematically, i.e. as it relates to a complex of ecological community and environment, forming a functioning whole in nature. The effort is to explore an alternative to the wealth of romanticisms and piecemeal operations which are the generators of the ever increasing chaos of our habitat. All components of nature are in flux, subject to continuous change. The capacity of living systems to organize materials in a complex and determined manner is the characteristic feature of life.

CT is structured and performs in a manner analogous to open living systems. Its "organized complexity" does not depend so much upon the number of elements within it but rather upon the number, or richness, of relations among its elements. The physical components of CT consist of three subsystems (1):

A. The computer which compares essentially to the brain.



1. The Cybertecture structure and the interrelated subsystems governing form and function.

- B. The material distribution and reclamation which compares to the mechanisms that facilitate metabolism.
- C. The sensing structure which compares to the body of a living organism.

A. The computer subsystem is the highest coordination center of CT, communicating with and controlling the sensing structure and the material distribution and reclamation subsystems. It-serves as a pattern recognizing, analyzing, synthesizing, and decision making tool. It emits impulses that cause immediate or delayed physical or organizational change of the environment in accordance with criteria designed to provide optimal environmental solutions and to determine the frequency of change.

B. The material distribution and reclamation subsystem is the metabolic mechanism, manipulating the sensing structure. It adjusts the physical environment to immediate, desired or projected needs of the user. It can transform the material into different states to make it suitable for any desired purpose. Certain qualities can be achieved by changing material properties during any phase of the existence of the material within the system by chemical reaction, radiation, heating and cooling, mixing, and the like. The sensing structure is constituted of materials, the properties of which allow it to be transported, distributed, shaped, and reclaimed by means of gases, fluids, gravity, electromagnetic or electrostatic energy, mechanics, or any combination thereof. We can think of a host of possible material distribution and reclamation methods. The most widely used by nature takes advantage of the fact that chemical



2. The spider web is formed from a glandular secretion which varies according to direction, speed, and quantity of building material needed.



3. The time-lapse photograph of a light bulb produces an intangible analogy to the biological spider web example.

changes meet the most favorable conditions once they take place in liquids. For instance, approximately three-fourths of the tissue in a human adult consists of water. Although we can speculate the employment of colloidal solutions, it seems more feasible at present to investigate the mechanical aspects of this subsystem.

A spider in its web (2). The thread, a glandular secretion, is composed of thousands of elementary threads issuing from an equal number of nozzles. To build the structure, the generating body constantly has to control and change direction, speed, and the quantity and quality of the issuing material.

This time-exposed film recorded the controlled movement of a light bulb (3). It was produced in analogy to the foregoing biological example.

It is possible to simulate 3-dimensional structures utilizing light tracks and employing techniques known in fabric production such as plain, satin, crepe, basket, twill, leno, pile, as well as knitting and weaving techniques. Replacing the bulbs with material distributing and reclaiming devices, we can visualize a new breed of building processes and structures.

Here a longitudinal section through a nozzle moving in space and generating a structural element (4). The raw material A and D is pressed through the nozzle. B is a rotating device which places linear reinforcement within the material. C is a curing chamber, employing heat, radiation, or chemical reaction to harden the issuing material. D is a rotating hollow axle through which material is pressed to the revolving distributing head E. H is an adjustable



4. Longitudinal nozzle section, hypothetically moving through space and generating a structural element.

A The basic building system consists of three rods of filler

4a. The basic building system consists of three rods of filler material and a continuous coil of a structural element.

forming wall. F and G is the issued structural material.

Various moving nozzles to provide other basic forming possibilities (5). The structured material issues to the right in each diagram.

Methods to reclaim material include: melting, cooling and breaking, grinding, chemical dissolving, application of ultrasonic vibrations, decomposing by radiation. Controlled devices such as those described have the capability to build, change, and reclaim structural or nonstructural material without traditional formwork.

A schematic side view of the basic organization of material distribution and reclamation hardware (6). This is a subsystem using a mobile mechanical device (7). A are all-directional powered joints with rheostats. B are adjustable hydraulic arms. C is the sensing structure material being distributed or reclaimed by the device D. The sensors E and the roentgenologic camera F provide data about the exact location of every part of the mechanism in space. All sensors and steering devices in the powered joints, arms, and nozzle are connected to the computer G, through H, which might contain accessory machinery, material, etc. The computer directs and controls the technical operations of material distribution and reclamation, communicating with a larger computer subsystem.

Several distribution and/or reclamation devices could be teamed up on a project and operated simultaneously. Data relevant to the performance of CT about time, space, and material such as quantity and location of material and sensors in space, the mode and time of distribution and reclamation, molecular change, etc. are processed and stored in the computer memory for later retrieval (8).

C. The sensing structure subsystem constitutes the physical environment in which human activities take place. It provides a constant flow of information about changing internal and external conditions which is processed by the computer subsystem. Internal and external sensors are part of the structure, operating in analogy to nerve cell receptors. The sense modalities are: vision, hearing, taste, smell, sensibility for balance, warmth and cold, compression and tension, and kinesthesis, giving information of all parts of CT in space. The threshold sensitivity can be determined by the computer subsystem.

The material constituting the sensing environment has to have quite different characteristics than those of present-day building materials. Once these leave the generating machinery they no longer are subject to controlling and forming processes and assume a specialized one-way character. This does not allow for change or economical reuse. Designed for special purposes only, the performance potential of such "linear" materials is very limited. The underlying concept here stems from analytic technology which isolates functions as a result of abstraction.

Living systems use a very few basic materials yet highly complex organizations of all kinds are built and these have the capacity to adapt themselves to a vast variety of functions. Bone is a good example to illustrate this concept. It consists of collagen and deposits of tricalcium phosphate, and calcium carbonates. Here a section through a bird bone, an outstanding minimal structure with optimal performance. Always using the same basic materials and construction methods, bone systems achieve the utmost flexibility. The wide adaptive range is clearly reflected by the contrast of the massive bone of a dinosaur alongside the delicate filigree of a hummingbird's skeleton (9, 10).

Some groups of modern materials seem to promise to meet the requirements of flexibility and versatility. Among these are alloys, ceramic compounds, and organic as well as inorganic plastics. The latter can



5. A variety of nozzles that could be used to generate alternate shapes.



7. Several distribution and reclamation devices could be used simultaneously.



 $\mathbf{8.}$ Data relevant to the performance of CT would be processed and stored in a computer for further reference.

6. A schematic side view of the basic organization of material and distribution hardware.

be engineered for a variety of functions which brings them closest to the requirements of the ideal material.

The circulation of material in CT is illustrated here (11). Material which is no longer needed goes through the phases of reclamation, regeneration, and redistribution to perform another function.

Entire structures of CT may consist of plantlife supporting material with built-in chemical, water, gas, heat, and light dispensing systems. These can control, initiate, and end plant growth. Seeds or seedlings can be mixed into the structural or nonstructural plantlife supporting material during the process of distribution or implanted afterwards. Certain seeds can have a plastic coat that will dissolve after a calculated time interval and permit the access of water for germination. Thus time sequences of plant growth can be planned in fixed programs by employing such techniques as seed coating, or planned with flexible programs through such systems as electronic or chemical actuation or stimulation.

The subsystems A, B, and C constitute Cybertecture. This is a process-oriented entity characterized by the principles employed by multivariant systems: a. Feedback; b. Ultrastability; c. Multistability.

The trial-and-error method, depending upon the selection of new parameters by mere chance, and used by all living organisms, is an important factor of CT.

CT performs as illustrated : Internal and external forces render CT unstable (12). The change in state is perceived and forms a pattern which is the model of internal and external conditions. The decision making stage can be reached by the shortcut A, or by the problem solving and planning routine B, resulting in a predictive model. The decision making process takes into account former models and subroutines retrieved from the computer memory bank. The predictive model is manipulated until it evolves the optimal solution. The material distribution and reclamation subsystem is activated and adjusts the environment. The stable state is reestablished until new forces disturb the system again, originating its further adaptation.

Change in state is perceived by the sensing structure subsystem of CT 1 (13). The sensory input is processed and becomes the effector output activating the material distribution and reclamation subsystem. Its manipulation results in CT 2. If CT 2 is disturbed, it evolves into CT 3 and so forth.

In case a mechanical material distribution and reclamation subsystem is employed, CT, to begin with, can be organized as shown here where the black skeleton represents the superstructure and the white represents infrastructure (14). A moving nozzle generates or reclaims the superstructure; another device, running on and operating from the superstructure, generates and adjusts the infrastructure (15, 16).

Such a structural system offers a lower degree of

9. The same basic material was biologically used by nature to form a massive dinosaur bone and a hummingbird skeleton.







11. The diagram shows the circulation of CT as it is reclaimed, regenerated, and redistributed.





12. Internal and external forces render CT unstable. The change in state is perceived and forms a pattern which is the model of external and internal conditions.

13. Change in state is perceived by the sensing structure subsystem of CT 1.



flexibility than less rigidly conceived environments which integrate both the sensing superstructures and infrastructures (17). The system does, however, have the advantage of relatively uncomplicated control and communication which facilitates an easier start into its dynamic existence.

CT can be initiated in any kind of environment: above or under earth, under water, or in outer space. But it is evident that CT calls for socio-political and economic systems radically different from those presently existent (18).

Change more and more is becoming the essence of human culture. The increasing frequency of change in all dimensions will document itself in CT.

Being a teleological system that employs self-improving software and hardware, it can draw "unorganized" matter into its system like a seed which becomes a plant. Constantly learning how to adapt itself to changing conditions, CT gradually can enrich its wealth of characteristics of living systems. Then it is only logical that CT can incorporate the total space-time continuum and evolve to higher and higher levels of organization. Finally, there is no reason to believe that its artificial intelligence will not surpass the capacity of the human brain, bringing forth unknown consequences. But apart from these speculations, CT can serve this, its main purpose: It will create a habitat which, being the result and generator of human activities, is highly responsive to changing needs of the individual as well as society.

During the greater part of his evolution, man has had to adapt himself to his environment in order to survive. Cybertecture is a concept to reverse a historical process radically.





14. Here the black skeleton represents the superstructure and the white structure represents the infrastructure.



15, 16. A moving nozzle generates or reclaims the superstructure, another device running on and operating from the superstructure generates the infrastructure.



17. The degree of flexibility is limited when CT is generated as indicated in the two preceding photographs but has the advantage of relatively uncomplicated controls.

18. Cybertecture initiated in an underwater environment allows free movement in three dimensions, as it would in outer space, generating and regenerating itself to meet almost instantaneous requirements.



A royal box is provided at the base of the two pylons for Saudi Arabia's King Faisal, who symbolically protects his people by an enlarged headdress, represented in the structure by the great sheltering roof. A double water tank suspended overhead between the pylons provides water for drinking and for irrigating grass areas and a garden.



FIT FOR A KING

Architect Paul Rudolph, inspired by the protective symbolism of Saudi Arabia's royal regalia, designs a superscaled Bedouin tent to shelter international sports events.



When Saudi Arabia determined to change its isolationist, oil-rich image by sponsoring international cultural events, the government invited Japanese architect Kenzo Tange (who had just built the Olympic Stadium in Tokyo) to design one sports stadium and to suggest architects for two others. Tange suggested Danish architect Jorn Utzon, controversial designer of the Sydney Opera House, and American architect Paul Rudolph.

Architect Rudolph, at the government's request, has presented his plans for a giant tentlike structure designed to reflect the symbolism of ancient traditions, yet constructed with the most contemporary methods using the principles of tension and inflation. (It is his first major tension-structure as well as his first stadium.) Built of poured-in-place concrete with an immense shade roof of air-inflated canvas stretched between a series of suspension cables, the stadium will stand in rolling desert terrain not far from the east coast city of Dammam. Two massive concrete pylons provide the central mast for the roof, and rise 264 ft from the east side of the stadium, visually dominating the structure.

With the emphasis of the design concept on ceremony, architect Rudolph has provided a royal entrance ramp and an elaborate king's box — complete with dining, reception, and retiring rooms — for Saudi Arabia's royal family. As Paul Rudolph notes,

"Since the stadium is designed for the government, it is very important to point up its monumental and symbolic aspects." To that end, he has situated the royal box between the bases of the two pylons. According to Rudolph, "The king sits between the pylons and symbolically protects his people by an enlarged headdress, which is derived from his traditional costume and represented in the stadium by the great sheltering roof." He also explains that in relation to the stadium, the royal box is positioned off center "partially because the composition of the existing site and the way in which the site is approached is asymmetrical, but also because the complex would be lacking in subtlety and mystery if the king were centered as one would expect." Seating is determined by a social hierarchy: while galleries accommodate one-hundred-odd guests of the king on each side of his box, the first class is grouped together in the center, and descending classes are arranged on either side of the center.

Despite their attempt to express a new, enlightened cultural attitude — emphasized by inviting three internationally prominent architects to design the stadiums — it is ironic that the government has carefully maintained a feudal seating arrangement. Nonetheless, within the confines of a restrictive program, Paul Rudolph has created a dramatic and unique structure that will accommodate 25,000 spectators, yet is truly fit for a king.

The stadium is designed for a capacity of 25,000 spectators who will watch soccer, football, and a variety of track events. Tucked below the seating at the first two levels will be health facilities, administrative offices, shops, galleries, and first, second, and third class restaurants. The upper level will contain a promenade.



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The roof is constructed of a series of 38 suspension cables that support an infill of impregnated nylon (detail, below). The nylon is fabricated in two layers and will be air-inflated to give the roof rigidity and provide insulation from the sun's intensity. To eliminate flutter caused by high desert winds, additional cables tie the roof to the outside perimeter of the stadium, so that the stadium itself acts as a mooring. The roof will be prefabricated and assembled on site. Structural engineer for the project is Frank E. Basil, Inc., Athens, Greece.

The two concrete pylons provide the central mast for the roof structure (below, right). The pylons fan out at the top, and suspension cables are secured to the ribs of the fan. The cables consist of from one to three steel strands, depending upon required strength. The cables then radiate downward and are secured at ground level to concrete guy anchors.









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BOOK REVIEWS

Streets for People: a Primer for Americans

By Bernard Rudofsky.

Doubleday & Company, Inc., Garden City, N.Y. 1969. 351 pp., illus. \$14.95.

Reviewed by Ellen L. Marsh. The reviewer is a member of the Department of Architecture and Design at the Museum of Modern Art, and has trod some of the same streets as the author.

Bernard Rudofsky's handsome book provides a rewarding adventure. It may enrage some architects and planners, but it will delight the general public. The 16 essays comprising this volume treat a number of this architect/social critic's favorite subjects: the behavior and mentality of Americans; the delights encountered abroad in walking up and down stairs, under portici, through canopied markets; and noting, everywhere, features not incorporated in our own town and city building. The text is accompanied by an admirable collection of photographs, reproductions of cartoons, paintings, and engravings, culled from numerous sources. Most of the photographs, and certainly the most spectacular ones, were taken by Rudofsky himself.

If you've picked up this book because it's by Bernard Rudofsky and you know, therefore, that it's going to be provocative, rewarding, and occasionally hilarious, you won't be disappointed. A random chapter at a time is recommended for beginners; a straight voyage through is run at one's peril, even for the seasoned reader. I recommend reading it in fragments to obtain the major benefits of prose style, information, and challenge, and to avoid the apoplexy induced by some overbearing and tedious criticism of Americans and Americanisms. You will find Rudofsky acute and at his swinging best in this book.

Since the author has little to say in our — Manhattanites in particular — praise ("Site, topography, and latitude would have destined it [Manhattan] for true greatness had it been shaped by people with better instincts and a flair for living."), one is tempted to offer the subtitle "Manhattan, Stadt du meines Traumas" in place of "a Primer for Americans."

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Beginning with a description of the canals and abundant vegetation that once were features of Manhattan Island, he takes us rapidly through the unpleasant history that rendered the city "a tracery of traffic arteries, too impractical to be considered highways, too dismal to be called streets" and provides us with some illuminating remarks on garbage disposal in the streets of early New Amsterdam and Boston in a chapter titled "Streets for Pigs."

In "Testimonials" we are treated to excerpts from writings by Stendahl, John Evelyn, and James Fenimore Cooper in praise of Italian streets and towns. It is worth noting that he compares Stendahl's and Hawthorne's reactions to Italian streets. The latter didn't like them at all. Similar comparisons are made throughout the book: the Continental likes what he sees, the American usually doesn't. In "The Canopied Street" there is considerable description of Milan's Galleria Vittorio Emanuele, beloved of Mark Twain, Ernest Hemingway, and scores of others. And in an effort to provide a visual record of this great spatial experience, he surely risked his life by climbing up to the Galleria's cupola. The color photograph on the book's dust jacket bears tribute to this gymnastic feat.

On the subject of walking are chapters titled "Peripatetics" and "In Praise of Stairs" in which he comments on our habit of going straight home after work instead of taking a stroll, and praises all schemes for traffic-free streets, citing examples in Milan and Perugia. Rudofsky is convinced that we can barely use our feet: "So much for the American's congenital disaffection for walking." (What say you, Ada Louise Huxtable, Ira Bach, Margot Patterson Doss?) And that when we do, it's a terrible effort: "Flat-footed, down-to-asphalt industrial man is loath to assault as much as a single flight of steps." He discourses on the Italians' propensity for using their

streets as a stage and notes that, following two men down Rome's Scala di Spagna, "The change of scenery . . brought a change to the men's mod. The grandiose setting . . . metamorphosed them into protagonists in a play. . . ." "The Street is Where the Action is" contains a memorable discourse on street noises, vocal and vehicular: street vendors' calls in Naples and Paris — and a musical notation describing the sound of the garbage truck in New York.

Set before us as models worthy of emulation in our own cities are building-lined bridges, elevated streets, and the "floating flats" (interbuilding buttresses whose substructures are used as additional floor space for the buildings they join) of Umbria and Tuscany. He claims that elevated streets are unwelcome to Americans. Martina Franca in Apulia, a region revered by Rudofsky for its "nonpedigreed architecture," appeals to him as an ideal town: trafficless, disorienting in plan, sidewalkless, and whitewashed to perfection. It is "unplanned," mazelike, and composed of buildings whose heights do not exceed three stories. We're told that it also suits Alberti's description of the ideal urban street as set forth in his Ten Books on Architecture.

The frustrating and deadening effects of our city environments on children are described in "Crime Does Pay." He comments that we're so adversely affected by the urban environment that even lengthy periods of exposure to the natural environment have no redeeming effect on us. Since this is the penultimate chapter, its placement before the final "Prospects" lets us in on his conclusion: "Architects probably have known all along that the demise of American cities is inevitable, and content themselves with practicing urban euthanasia."

I am not altogether sure that I understand Rudofsky's role as critic. When one tries to get to the pith of *(Continued on page 128)*



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(Continued from page 114)

what he is about, he skips away, never wanting to be pinned down, and invariably accuses us of either not having the wit to understand him or lacking an "in" on his sense of humor. Whichever it is, we are always the lesser men. At times he is so busy dazzling us with his erudition that he fails to exhort us to specific action, only to tempt us with views and descriptions of places and experiences either fading fast or long disappeared. We are all at our most articulate in our anger, when the blood really starts pounding. This regrettably, is Rudofsky's stock-in-trade and his finest hour; he waxes absolutely lyrical. He never really commits himself to any solutions, viable or otherwise, and that is a shame and a genuine cop-out.

The pressures unknown prior to our days (staggering rate of population increase, affluence, technological advance) are felt on other continents. New buildings, densely packed, unlovely, poorly constructed, are everywhere. Where *is* the impervious culture preservative? The *rumore* of the motorcycle has also invaded Perugia and drowned out the gentle babble of the multitudes.

Rudofsky goes hiking through the U.S. in spiritual shoes three sizes too small, and barefoot in Europe (all spiritual meadow). Wonders he then at the pinch? He happens to have been privileged to be born in a more "civilized" era, to have known a pre-World War II Italy, to have traveled extensively. He now suffers the same deprivations we do and cries more passionately and eloquently for what has been lost to us all.

The Nursery Schools

By Le Corbusier.

Notebook No. 3. New York, The Orion Press, 1968. Distributed by Grossman Publishers, Inc., N.Y.

Reviewed by Ronald W. Haase, AIA. The reviewer, partner-in-charge of Hammel Green and Abrahamson's New York office, is the author of Designing The Child Development Center published by the Head Start division of the Office of Economic Opportunity.

Le Corbusier's use of words was always as sparse and direct as his use of materials. His architecture speaks (Continued on page 136)



Seaman's Church Institute of New York Port Newark, New Jersey Architect: George Clark New York, New York

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On Readers' Service Card, Circle No. 378

(Continued from page 128)

for itself, requiring little explanation and no apology, and the messages within his published writings are intended more to be viewed and absorbed than to be "read."

This little book, the third in a series of "notebooks," is Le Corbusier's last published work.

Before his death in 1965, the first two notebooks — Creation is a Patient Search and Ronchamp - were published separately. In The Nursery Schools Corbu concentrated on the roofscapes of his most successful Unités d'Habitation in Marseilles and Nantes-Rezé. While the book's overt concern is the early learning environment, Corbu's real intent is to make one more thrust, sadly his last, at the windmills that plagued him for nearly 78 years. The three great virtues of his work (sun, space, and greenery), and his imaginative means of achieving them, were not easily accepted by conventional officials and planners. His vision is presented here in a kaleidoscope of photographs, sketches, diagrams, and land-use statistics.

Much of the book reviews Corbu's concept of the Radiant City, "A coherent form of structure that could give a machine-age civilization room to stretch." In the first few pages he casts himself as "the inventor" in a dramatization of his struggle to build Marseilles-Michelet against an array of protagonists identified as Mr. "No," Mr. "They Say," and "Fear." This commedia dell'arte of our age, as he calls it, reads like the script for an antismoking commercial, bringing home the message that we've all been fools long enough and we'd better kick the old habits and get on with properly solving the problems of our complex urban environment. The mass housing in our great cities is a dreary testament that Le Corbusier's message has fallen on many deaf ears. Yet his philosophy was always one of "utter optimism." He writes of his breakthrough at Marseilles as "The Miracle," "The metamorphosis which changes everything in a single occurrence "

Using development techniques that did not rape the urban landscape, Corbu's primary purpose was to solve the binomial — individualcollectivity. In his Radiant City, raised high in pilotis, the natural landscape remains a communal back (Continued on page 148)

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These words clearly indicate the philosophy and functional thinking of Paul Skiles, Chief Designer for the new Home Office of the Preferred Risk Insurance Companies in West Des Moines, Iowa. The architect conceived a structure with open interior space combined with large expanses of glass permitting the occupants visual contact with the grounds and weather. The building is not only decorative and aesthetically pleasing, but it 'works'—incorporating modern communication facilities, efficient use of space and built-in flexibility for future changes.

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On Readers' Service Card, Circle No. 380

(Continued from page 136)

yard for each apartment dweller. Skip-stop elevators open on to alternate floors as interior streets serving each vertically stacked "hamlet." His architecture offers 1600 residents in the Unité d' Habitation at Marseilles the privacy of their own bi-level homes, recreation at their doorsteps, marketing within the building, and a nursery school on reclaimed open space at the roof. His concepts were praised by many architects and city planners. Local authorities reacted with incomprehension and outright hostility. A prominent psychiatrist commented to the press that "because of Le Corbusier there will be ten times more loonies ('fadas') in Marseilles." And Camille Mauclair, reporting in Figaro, responded to the massive superblocks for living with the question: "Will architecture die?"

Quite to the contrary, The Nursery Schools shows Corbu's "Habitats" to be very much alive. An 18page photo essay presents the day of a typical dweller-family, with emphasis on the exuberant outdoor play that takes place 56 meters above the ground. The photos are familiar to anyone who has used Corbu's earlier books, but the irregular shifting of subject from Marseilles to Nantes Rezé and back again is disorienting. Floor plans, when they are used, are inadequately labeled and provide little assistance. The principal effect, however, is to convey to the readerviewer an image of sheer delight. The camera follows the children through a fantastic variety of spatial experiences. Classroom ceilings are low and intimate (7 ft at Marscaled to quiet indusseilles). triousness with a paint brush, or to gathering close in for story time. Pass through a door or up a ramp and the sky opens endlessly above. The children respond enthusiastically, bubbling over with boundless energy. Sun and space of course, and a little bit of greenery where, here and there, the children have planted lavender.

Mr. "No" and Mr. "They Say" have found fault, as usual, but Corbu simply records their remarks under the heading "Stupid things visitors have said." In contrast, the reactions of students, parents and teaching staff who live, work, and play in the roof-top nursery schools are positive and perceptive. When a visitor

(Continued on page 152)

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On Readers' Service Card, Circle No. 376

(Continued from page 148)

studies Corbu's wonderfully erratic fenestration patterns and quizzes "What's that for?" little Dominique, only six but so much wiser, responds "to look pretty." "This is too perfect a school" comes as the handsomest of compliments to its architect, but this parent's comment reveals concern that "when the child leaves this school, the one he goes to will be more or less shabby."

Corbu has been strangely timid in the use of color photographs in his published works. This omission in print is unfortunate since he employed color with such smashing impact in his architecture. Even so, "the bareness of the concrete" often confounds the visitor, blind to the contrast of light and shadow, the rapidly changing spatial scale, the delight of cool water and rough stone, the vivid joyous color, for the color is surely there. The Unité at Marseilles has taken on a very personal identity. It is called "Le Corbusier," perhaps the only time in history that the creating artist's personality has so merged with his architecture that they are identified by the same name. A visitor once asked a child absorbed in covering his sheet of paper with fine splotches of different colors, "What are you painting?" The response was a very impatient "Don't you understand anything? This is my Corbusier!"

Corbu's communications with friends and clients reflect much the same style as do his writings. He frequently resorted to the conciseness of the telegram or to a hand scrawled note attached to a diagram or two that reinforced a point. For several years after the opening of Marseilles' roof-top nursery school he kept in touch with its director, Madame L. Ougier, just this way. Her warm response on one of these occasions must be shared by all who admired Le Corbusier: "The kids and I were very happy to receive your telegram and thought of you very often."

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KENNETH BALK & ASSOCIATES CON-SULTING ENGINEERS, INC., 9362 Dielman Industrial Dr., St. Louis, Mo. 63132.

(Continued on page 156)



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(Continued from page 152)

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Because he's a specialist! Only he, in your area, has the experience and the specialized equipment necessary to install this multi-functional insulation on roof decks as well as plaza systems. He is a highly specialized contractor trained and licensed by Silbrico Corporation to apply All-weather Crete insulation under strictest quality control. This skill and selective licensing protects designers and owners alike.

Contact your local AWC specialist. He can supply you with detail drawings illustrating different membrane systems, wearing surfaces and drainage patterns. If you don't know his name, write us — we'll send it to you along with illustrated literature of roof deck types and plaza systems used by many of the nation's most successful architectural firms. (No obligation.) Just write Silbrico Corporation, 6300 River Road, Hodgkins, Illinois 60525 or call (312) 735-3322.



AWC

AWC

PLAZA DECKS AWC is available in eight different insulated plaza systems. Write Silbrico. ROOF DECKS AWC provides seamless insulation slope-to-drains and dry application over concrete, metal and pre-stressed decks. See Sweets.

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Series 4000

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