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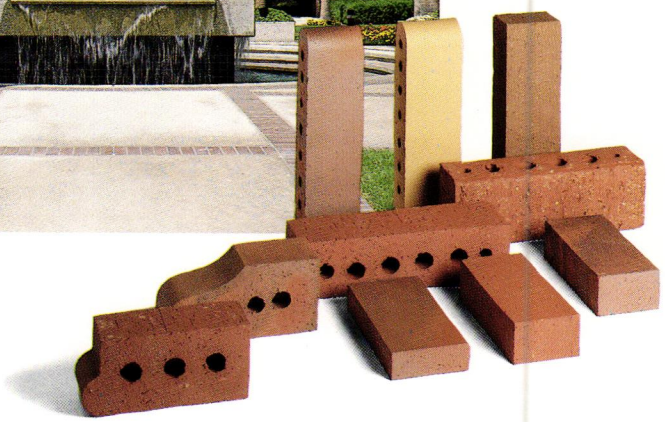

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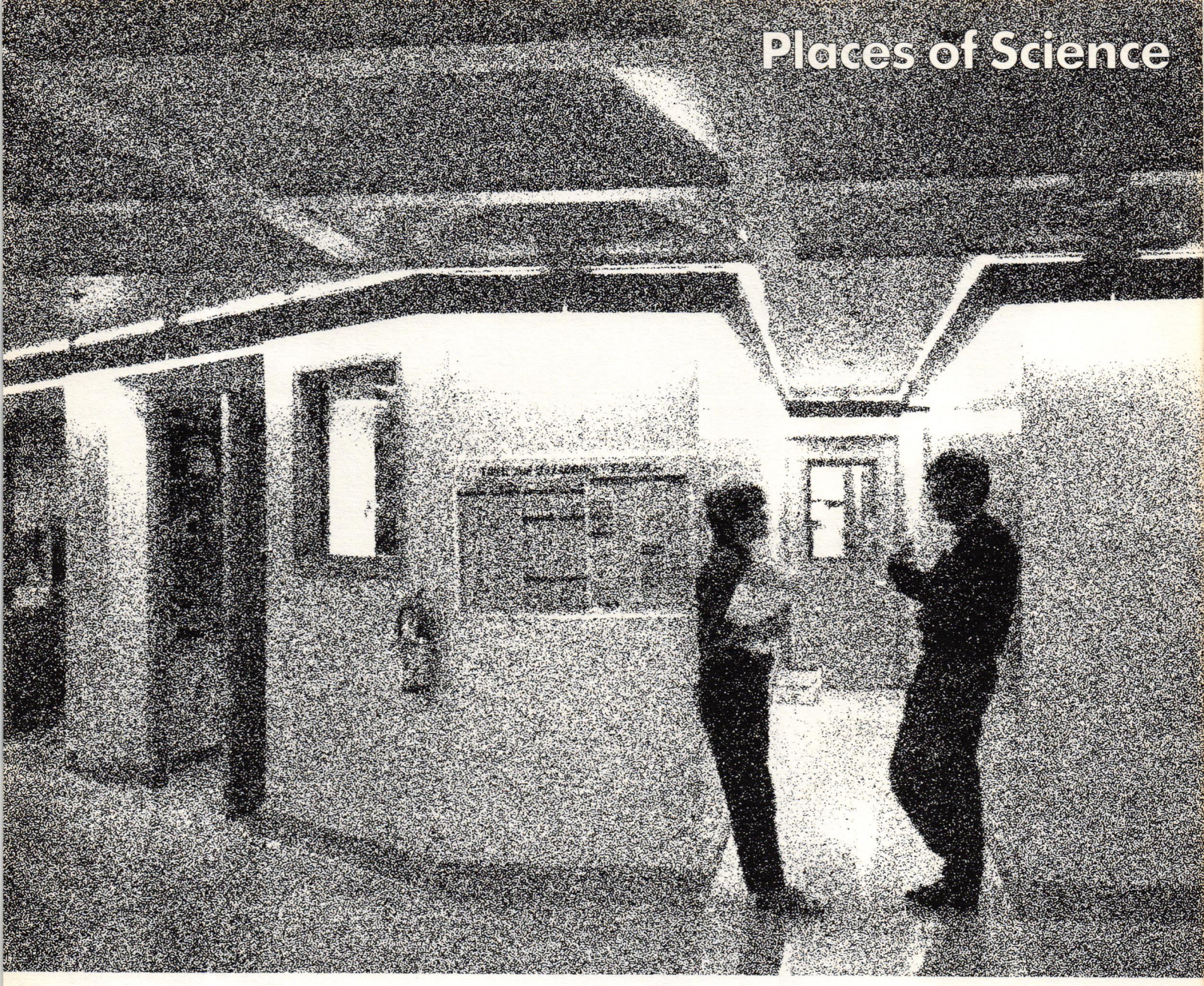

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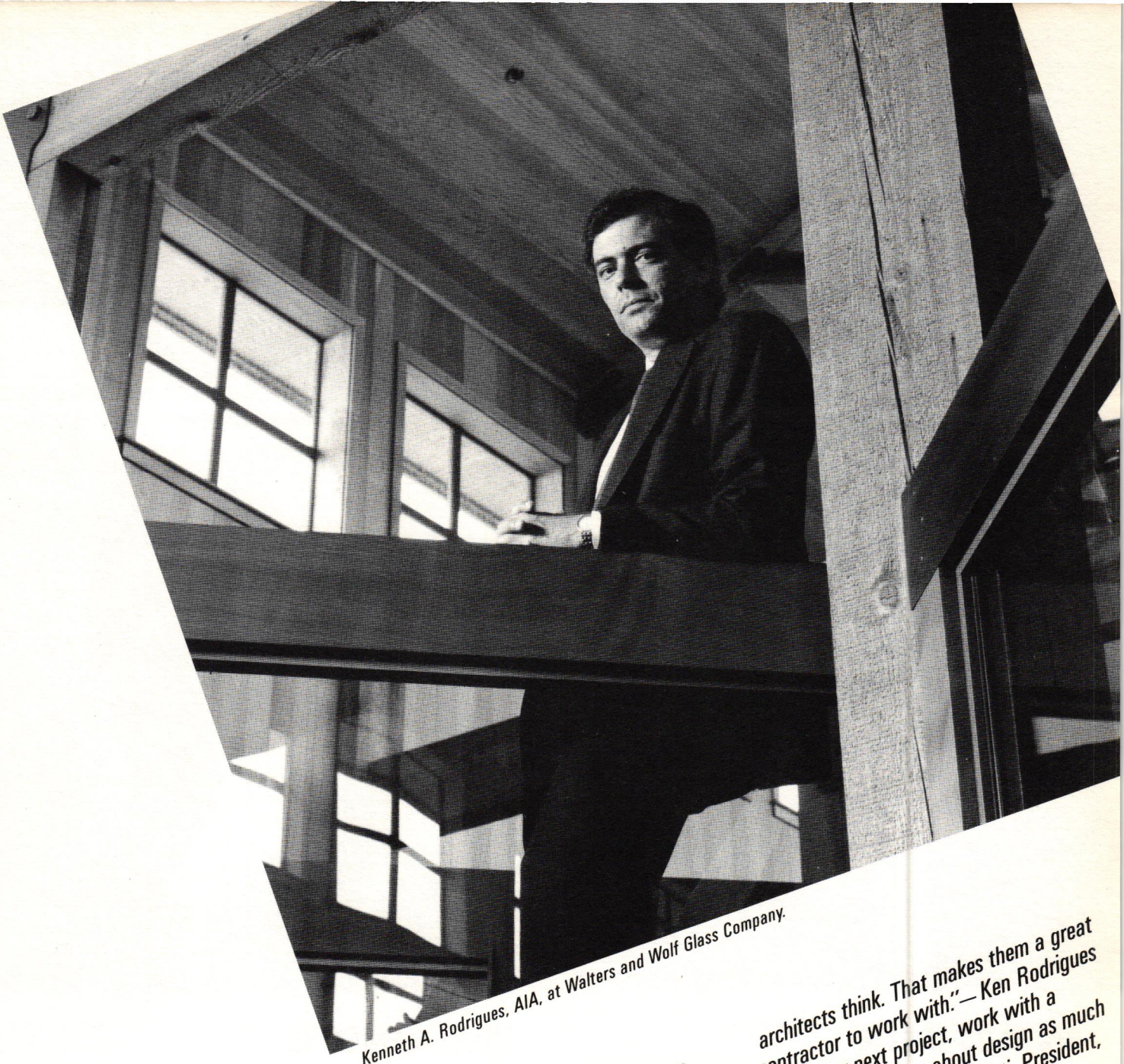

Kenneth A. Rodrigues, AIA, at Walters and Wolf Glass Company.

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Kenneth A. Rodrigues, AIA

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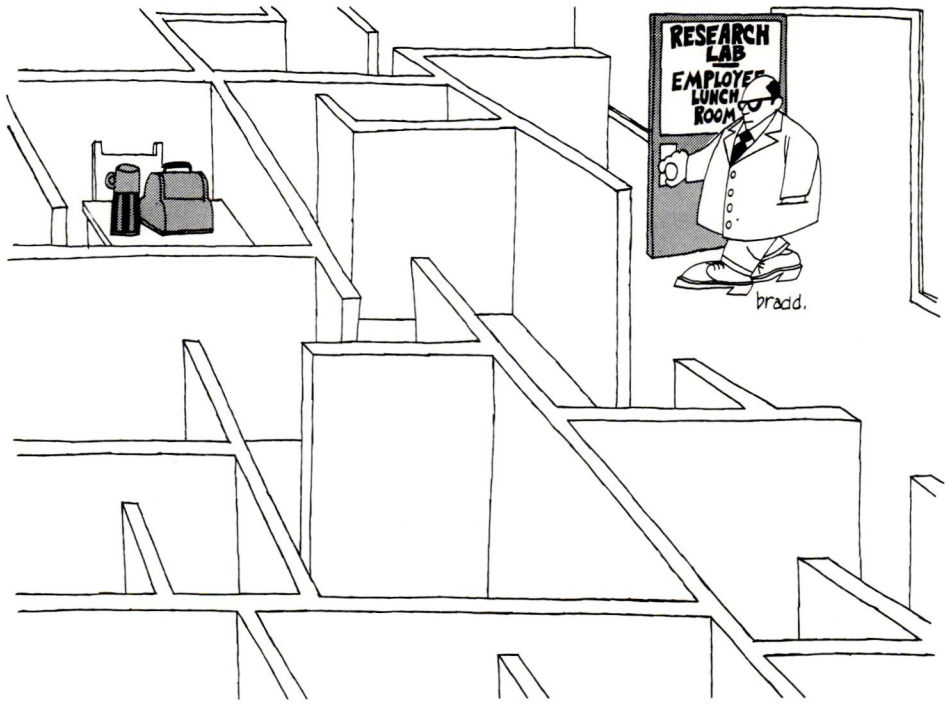
Architecture And The Spirit Of Science



Science usually is considered a rational study. But the motivation behind empirical research is a faith that the elements which comprise existence, once understood, can be manipulated to improve life.

The spirit of science is visionary. As Albert Einstein observes, "Imagination is more important than knowledge."

The design of the scientific work place raises a question with far-reaching implications: what sort of an environment stimulates creativity and supports productivity?

The answer should be of particular interest to California architects, since our state is home of the largest research and development industry in the country.

Around one-fifth of the nation's physicists and engineers in the disciplines of aerospace, electronic, systems design, computer science and mechanics are employed in California, as are over 10 percent of the nation's environmental and life scientists.

Almost half of the $132 billion the federal government will spend on R&D this year will be spent in California, as will 24 percent of funds invested in R&D by private enterprise.

New construction and the remodel of existing facilities to shelter this enormous industry are lucrative markets for California architects, but many architects are intimidated by the complex programmatic requirements associated with the building type.

The feature article in this issue is written by Ken Kornberg, AIA, who was born into the world of science and now focuses his practice on the design of humanistic research and development facilities. Ken offers an insider's view that de-mystifies a complex building type and shows why an architect's special training and talents are needed to create these environments.

The tendency of architects to turn over the design of scientific facilities to systems engineers has led to a generation of scientific work places designed for process rather than people. In a delightfully illustrated article, James Morrison Leefe, FAIA provides a reminder that, even in the techno-industrial environment, the most important design factor is the human factor.

Since burning off my chemistry partner's eyebrows while lighting a Bunsen burner, my interest in science has been that of a spectator. Yet even from that limited vantage point, it seems obvious that we humans are an amazing combination of chemicals, raised to consciousness.

Imagination, the catalyst of creativity, is the kernel of that consciousness. By fashioning environments that allow the creative mind to expand, architecture can make a unique contribution to the pursuit of scientific knowledge.

—Janice Fillip

EZRA STOLLER/ESTO

Setting The Record Straight

The September/October issue of *Architecture California* with its tribute to Skidmore, Owings and Merrill and the well-deserved winning of the CCAIA Firm Award, has on the cover a photograph of the south facade of the Bank of America World Headquarters. This is perhaps an unfortunate choice.

Whenever two firms are involved in the design development of a major structure, the authorship can become confused. This is especially true in this somewhat special situation. I feel that the design sequence needs to be clarified.

Wurster, Bernardi and Emmons was selected by the Bank to design the headquarters building. Pietro Belluschi was brought in as a design consultant. Because of WBE's lack of experience in highrise structure of this magnitude and importance, a New York firm of vast experience was selected to fill this need. As preliminary studies proceeded, it was decided that the New York firm lacked the commitment to quality that this building obviously required.

SOM was then invited to form a joint venture with us with responsibility for the final result to be shared equally. SOM agreed to accept certain already-established design decisions as fixed. These included the placement of the various elements, the form of the tower with the triangular bay windows, the articulated setbacks of the upper stories and the dark color, much as it appears on your cover.

From here on the contribution by the members of the SOM firm was all important in refining the form and details. All this was done to their usual high standards. We could not have done it without them. The design of the banking room on the corner of California and Montgomery was completely changed and is largely the work of their distinguished design partner, Edward Charles Basset.

Skidmore, Owings and Merrill is one of the leading U.S. firms in the design of highrise structures, and I think that the Bank of America building reflects this.

—Donn Emmons, FAIA
Wurster, Bernardi and Emmons, Inc.

UCSD School Of Architecture

The University of California Board of Regents recently approved the establishment of a School of Architecture at the University of California, San Diego. "The search for a dean will begin promptly and we expect to recruit a faculty that will make this one of the top architectural schools in the world," said Chancellor Richard C. Atkinson.

The planned curriculum includes four components: undergraduate course work providing a liberal arts education leading to a bachelor's degree; a professional master's degree program; a small doctoral program; and a continuing education program for practicing professionals.

The school will have a strong research component, according to Vice Chancellor for Academic Affairs Harold Ticho, who spearheaded the effort to create the school. Promising lines of research will include planning in coastal communities; design issues related to new building materials and the integrity of structures subject to seismic stress; computer-aided design; providing for the homeless; and the design of developing urban communities, including those that cross international boundaries such as San Diego-Tijuana.

The school will accept bachelor's and professional master's degree students in the fall of 1991; the doctoral program will begin in the fall of 1992.

Freeway As Art Competition

A single-phase national competition for design/visual arts collaborative teams to design a highway landscape is being sponsored by the Texas State Department of Highways and Public Transportation and Texas A&M University.

The focus of the competition is to use elements of the existing freeway interchange as a basis for the expression of the highway as art. The nature of the driving experience must be acknowledged as one of motion and sequence in time, and practical matters of

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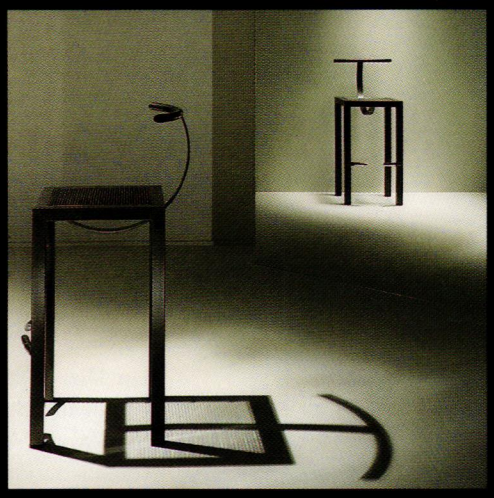

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San Diego County Administration Center dedication 1938.

Landmark Status For WPA Project

San Diego County Administration Center, built in 1936-1938 under the federal Public Works Administration during the Administration of Franklin D. Roosevelt, recently achieved national landmark status.

A complex steel and reinforced-concrete structure designed to withstand the lateral stress of severe earthquakes

safety and utility must be considered.

Cash prizes are $10,000 for first place, $5,000 for second and $2,000 for third. An additional $15,000 will compensate the winning team for the preparation of construction documents. Entry fee is $45; registration deadline is December 15, 1988. Contact Freeway As Art Competition, Department of Landscape Architecture, 321 Langford Architecture Building, Texas A&M University, College Station, TX 77843-3137, (409) 845-1019.

Land Use Patterns Worsen Effects Of Wild Fires

The migration of people to the fringes of urban areas is causing more wild fires which are burning more acreage than ever before. From 90 to 95 percent of wild fires are caused by people. In 1988, 166,000 acres were lost in wild fires. Although fewer incidents occurred from 1987 to 1988, three times as many acres were burned. (Fires on National Forest land have scorched an additional 700,000 acres this year.)

The California Department of Forestry (CDF) predicts that land settlement patterns will make fires even more devastat-

SAN DIEGO COUNTY PHOTO

made the building an engineering feat for its time.

Principal designer of the County Administration Center was Samuel W. Hamill, who was active in the planning and development of San Diego for over four decades. Hamill used a modified Spanish Colonial style with ornamentation of gold and azure tiles. Much of the tile work was designed by Chicago architect Jesse Stanton.

ing in the future. Protecting houses in wild areas interferes with the most efficient methods of fire fighting, resulting in greater loss of acreage, according to Jerald Partain, CDF's Director and Fire Marshall.

Architects and developers can help the situation by designing houses and subdivisions that impede the spread of fire. Partain suggests that wood be eliminated as a roofing material; that stucco, brick and stone become primary cladding materials; that at least 2,500 gallons of emergency water storage be provided per house; and that designers work in collaboration with a landscape architect who understands fire-resistant plants. Sprinklers within a house and on the roof can help a house protect itself from fire.

Eave overhang, decks with a lot of air space underneath them, and single pane windows are main factors in drawing heat into a house from an outside fire. Although it is trendy for rural developments not to have road signs, signage is essential for fire fighters trying to find their way around an area in an emergency situation.

Wild fires are costly to protect against. In 1987, the CDF alone spent $50 million to fight fires. But the greatest cost is paid in land, as thousands of acres go up in smoke because of human thoughtlessness.

MELTON FERRIS, HON. AIA

Melton Ferris, Hon. AIA died September 6, in Keri Keri, New Zealand of heart failure at age 72.

Mel was CCAIA's Executive Vice President from 1954 through 1978. He was a consultant to the CCAIA Insurance Trustees until 1984, as well as a Senior Vice President of Design Professionals Insurance Company. Mel and his wife Mary Jane moved to New Zealand in 1984 to indulge a passion for sailing and a lifelong fascination with that country.

Mel's contributions to the architectural profession, both in California and nationally, were exceptional. Instrumental in the formation of the CCAIA Insurance Trustees and the Design Professionals Insurance Company, Mel also is credited with founding the Council of Architectural Component Executives. With the late Gordon Fleury, Hon. AIA, Mel developed AIA's extremely effective legislative "Minutemen" program. Beyond his duties as Executive Vice President, Mel served on numerous national AIA committees. His counsel was often sought by other states and AIA components.

Mel was made an Honorary Member of AIA in 1965 for his "distinguished service to the advancement of architecture" and was given a special award by CCAIA in 1974. He also was cited by the Insurance Trustees.

Mel's private life was divided between his fierce concern for the environment and his love of sailing and photography. He was a past Chairman of the Marin County Parks and Recreation Commission, a Vice President of the Marin Conservation League, and a Director of Bolinas Community, Inc. and the California Roadside Council.

Mel admired the profession of architecture and its practitioners and worked tirelessly and effectively in our behalf. The profession is measurably better because of Melton Ferris. His presence will be missed.

—Whitson W. Cox, FAIA

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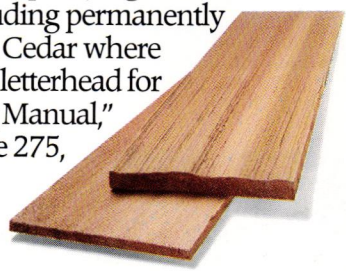

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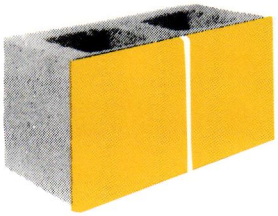

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Ray Eames

Artist and designer Ray Eames died last August on the tenth anniversary of the death of her husband and collaborator Charles Eames.

Over the past 40 years, the Office of Charles and Ray Eames produced a remarkable range of innovative designs in furniture, film, toys, museum exhibitions and architecture. The Eames' efforts in developing low cost techniques for wood lamination and molding resulted in a contract with the Navy Department during World War II to produce molded plywood splints and stretchers and an experimental glider shell.

By 1946, the molded plywood techniques and models were completed and the Museum of Modern Art mounted a show of Eames furniture. Herman Miller, Inc. began to manufacture a line of plywood chairs, some of which still are produced today.

The collaborative team of Ray and Charles Eames next introduced the fiberglass shell chair, the first use of reinforced plastic in a consumer product. By 1956, the leather lounge chair and ottoman began to replace the molded plywood as the "classic" Eames Chair.

In the Eames House, designed by Charles and Ray in 1949, a vocabulary of materials and techniques typical to industrial architecture of the time was first adapted to residential architecture. The steel-frame house, originally featured as a case study in *Arts & Architecture*, received the 25 Year Award from The American Institute of Architects in 1978. The jury described the house as "a merger of technology and art, transcending mere construction and avoiding sterility by combining elegance and utility."

The Eames Office produced a range of multi-media and multiple image shows and films for clients as diverse as IBM, the US State Department and the government of India. Perhaps their best-known film is "Powers of 10," based on an Eames exhibit

that dealt with the scales of the universe.

Writing about her painting in *Arts & Architecture* (1943), Ray Eames said:

> in spite of prejudice and confusion
> we are becoming aware slowly
> of true and good and vital and
> therefore beautiful form.
> my interest in painting is the
> rediscovery of form through
> movement and balance and
> depth and light
> using this medium to recreate in
> satisfying order my experience of
> this world
> with a desire to increase our pleasure
> expand our perceptions
> enrich our lives.

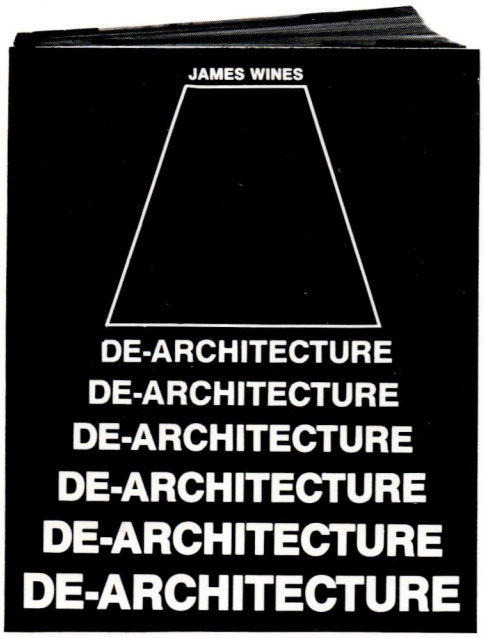
Through both her brilliant work and her kind and generous spirit, Ray Eames did indeed expand our perceptions and enrich our lives. Her contributions to art and to architecture will continue to increase the pleasure of all those who appreciate beautiful form.

—Janice Fillip

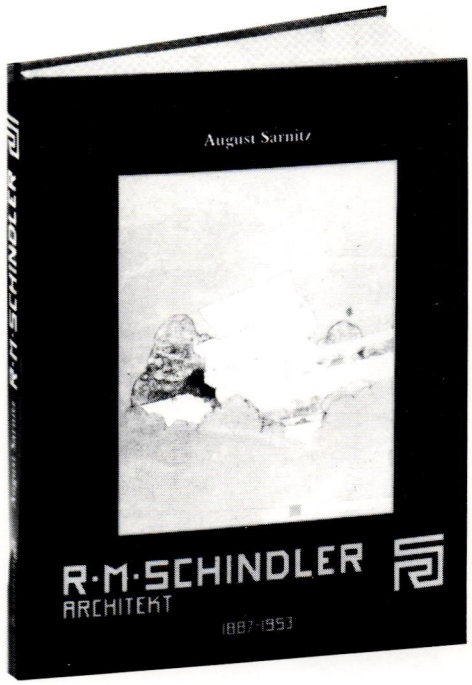
Law Office Design

Gensler and Associates/Architects was the only California firm recognized in the Fourth Annual *ABA Journal* Law Office Design Competition.

A striking internal stairway connects five floors of the McKenna, Connor & Cuneo law office in Los Angeles. The basic plan for the 106,000 square foot office included a perimeter of classically-designed private suites, a central band for circulation and secretarial work stations, and an internal zone for paralegal offices, conference and support rooms.



Architecture in Europe, Japan, India, and Southern California



DE-ARCHITECTURE

James Wines. A controversial book of theory, opinion, and critical history on the subjects of architecture, public art, and community spaces by James Wines, the founder of SITE and Chairman of Environmental Design at Parsons School of Design. "An invitation to broaden the boundaries of architectural thought. *De-Architecture* is as thought provoking as the firm's mind-bending designs. Erudite and entertaining, it is an impassioned polemic from a man who continues to make design history."—*Interiors.* "A 1980's manifesto."—*Print Collector's Newsletter.* 208 pages. 8½″ × 11″. 30 illus. Hardcover: $40. Paperback: $25

KISHO KUROKAWA

Essays by Kisho Kurokawa and François Chaslin. The first monograph in English on the leader of the renowned Japanese Metabolist movement in architecture, with remarkable examples of his works and projects from 1979–1987. 136 pages. 8½″ × 9½″. 195 illus. Paperback: $25

R.M. SCHINDLER: Architect 1887–1953

August Sarnitz. Photographs by Julius Shulman. This comprehensive study is the most up-to-date on the influential Austrian architect, most famous for his California houses. It includes extracts of his correspondence with Frank Lloyd Wright, Louis Sullivan, and Philip Johnson, and gives a detailed account of his life with thorough catalogues of his buildings, projects, plans and photographs. The book has been compiled by Sarnitz in close collaboration with the Academy of Fine Arts in Vienna where Schindler attended the famous Wagnerschule in 1912–1914 as one of the most outstanding students of Otto Wagner. 216 pages. 7″ × 10″. Over 200 illus. $35

AMANCIO WILLIAMS

Jorge Silvetti. Published in conjunction with a retrospective exhibition of Williams' architecture at Harvard University Graduate School of Design last year, this catalogue documents his projects and built works. 64 pages. 8½″ × 11″. 120 illus. Paperback: $15

BALKRISHNA DOSHI: Architect for India

William J.R. Curtis. A highly respected architectural historian offers this first monograph on an internationally acclaimed architect (awarded the 1988 Gold Medal by the French Academy of Architecture). It documents Doshi's concern for building in harmony with the climate, culture, and traditions of India. 192 pages. 11″ × 8½″. 320 illus., 150 duotone, 50 in color. $40

EMERGING EUROPEAN ARCHITECTS

Edited by Wilfried Wang and Margaret Reeve. This fully illustrated catalogue accompanies the October 1988 exhibition at Harvard University on the work of 13 architects, such as Eduardo Bru of Spain, Jacques Lucan of France, and Richard Burdett of England. 76 pages. 8½″ × 11″. 200 illus. Paperback: $20

FUMIHIKO MAKI

Serge Salat with Francoise Labbe. This well-illustrated monograph is the first on the internationally recognized Japanese architect, whose projects include the Danish Embassy and the Museum of Science, both in Tokyo. 144 pages. 8½″ × 9½″. 214 illus, 22 in color. Paperback: $25

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SANDRA WILLIAMS

Eli Lilly Laboratory, San Diego

The Scientific Workplace

HUMANIST ARCHITECTURE
IN RESEARCH FACILITIES

BY KENNETH A. KORNBERG, AIA

Architects have abdicated the design of research laboratories to interior designers and industrial engineers. Although architects are trained and expert at converting detailed programs for space functions into exciting, attractive and effective structures, in the United States the major building systems, the basic organization of functions, and often even the schematic design of laboratories are produced by engineers. Architects are engaged more in a consultant capacity to guide in the development of research space.

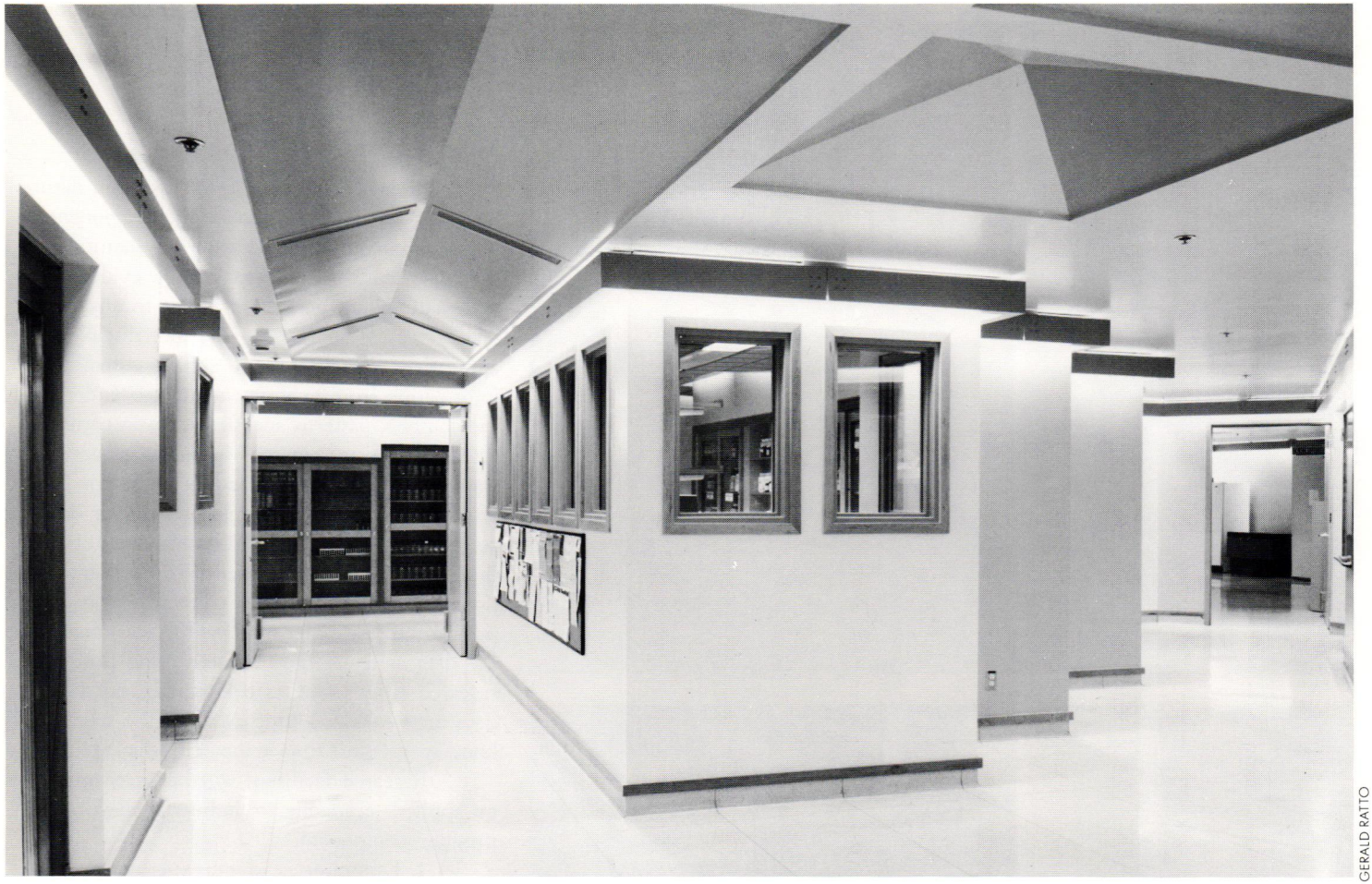
Most people characterize research facilities as smelly, noisy, unattractive and unpleasant. Since that image is considered normal, there is little concern or effort to provide a different type of space. In fact, it is generally accepted that, because of the procedures, materials and protocols of lab work, scientists require a "skunk-works" atmosphere. But research facilities have developed this way because the backward relationship of architects and engineers has generated inappropriate models that the design professions now copy.

My parents and my two brothers are basic research scientists, and I spent many hours in chemistry laboratories before switching my education to architecture. When I got my first lab to design, I was familiar with the terminology, the environment and the people's needs and ambitions. Most architects, lacking this background, shy away from the special nature of the laboratory facility or retain a lab designer to take care of the special requirements. The large number of unfamiliar program determinants and the unusually large functional program provided by the specialist overwhelm and obscure the basic principles of architectural form and space.

This is not necessary. The standard architectural training and the basic drives that inspire architects are as adequate for the design of research buildings as they are for the design of homes and stores. An architect who learns about the research industry can prosper in its rich and exciting development.

CLIENTELE

Typically, basic research has been associated with colleges, universities and government-financed institutions. Large corporations able to capitalize facility design and construction and to finance their own research staffs use science discoveries to open new product lines or to improve on their existing technologies. Academic or basic research is generally associated with the institutional sector and applied research with the private



GERALD RATTO

corporate sector. Medical research never has fit conveniently into either category. The most important discoveries in medical history came from basic research.

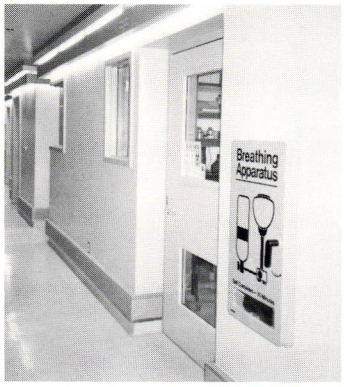
Research science facilities now are being developed for a much wider group. When Stanford University and the University of California, San Francisco hatched the biotechnology sciences in the late 1970s, they were ideally located to benefit from the venture capital groups spawned by Silicon Valley. Two major distinctions between the development of biotechnology and the computer industry are important for architects venturing into this design field to understand.

First, biotechnology emerged from the most technical levels of academia, without a known purpose or an established path of usefulness. The language and methods were neither appreciated nor understood by industrial or financial entrepreneurs. Most people understanding recombinant DNA, cloning genes and hybridomas realized they had a powerful tool, but they could not explain it well to those who could finance the exploration of its value. The private sector interested in exploiting biotechnology had to purchase academic researchers and place them in private academic environments where they could show their wares. In comparison, the transistor was developed by Bell Labs, with its purpose and value clearly understood.

The laboratory invariably determines the success of research companies. Good environments are essential to recruit and keep scientists in a highly competitive market.

Second, when venture capital started to fund computer development, California was ready to build. The building climate 20 years later, as every architect in the state knows, is reversed. Land development is not easy around UCSF, Berkeley, Stanford, UCLA, UCSD, UC Davis and UC Irvine where the brain trust is available in this new field. As a result, at a time when planning departments, zoning boards and city councils are concerned about growth, architects are trying to

GERALD RATTO



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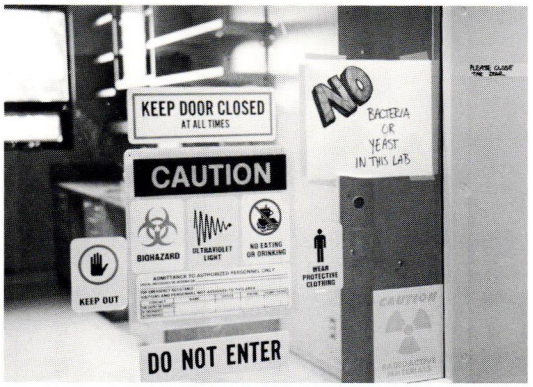
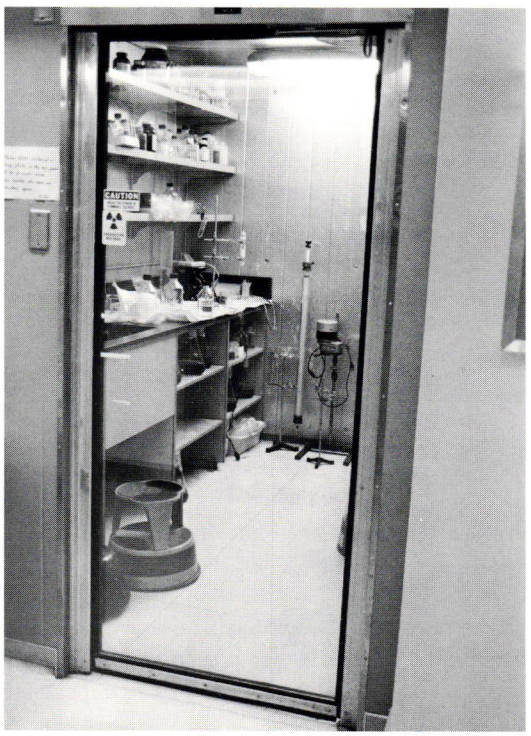


Safety is a primary concern in research facilities. Potentially dangerous protocols are conducted in the laboratory shown above. The doors of this lab automatically close in the event of an explosion to contain resulting fire or contamination. By isolating these fire-rated laboratories, other laboratory areas could have large windows to increase the sense of openness and provide an amenity for the scientists.

Emergency showers are in many work areas and hallways have emergency systems that enable people to breathe for 30 minutes in contaminated conditions.

Some experiments require lengthy incubation in constant temperature rooms. By substituting glass refrigerator doors used in restaurants for the solid doors usually specified in laboratories, scientists are able to monitor the progress of an experiment without entering the controlled temperature room.



TOM GLASS

convert under-used warehouses, R&D buildings and office buildings into active, productive scientific research facilities.

The Scientist's Interests And Needs

Basic researchers are interested in nature: how and why simple aspects of the components of the environment work. They are, by nature, curious. Their curiosity is fueled by new evidence and information that gets them closer to answers. It takes creativity, organization and discipline to apply their knowledge, and skill to assemble the information from experiments and to understand the complex patterns and structures in nature.

Scientists emerge from their academic training knowing that research is not an 8-to-5 job. Experiments often take most of a day or days to set up and may need continuous monitoring as they happen. Since the results may give information that explains another piece to a consuming puzzle, the researcher may want to start analyzing the data as it emerges. In active and productive research labs, scientists commonly work 16 hour days for weeks at a time. Most of the scientists I know spend more time in their labs than at home.

Research facilities, whether they are basic or applied, academic or industrial, have similar program components:

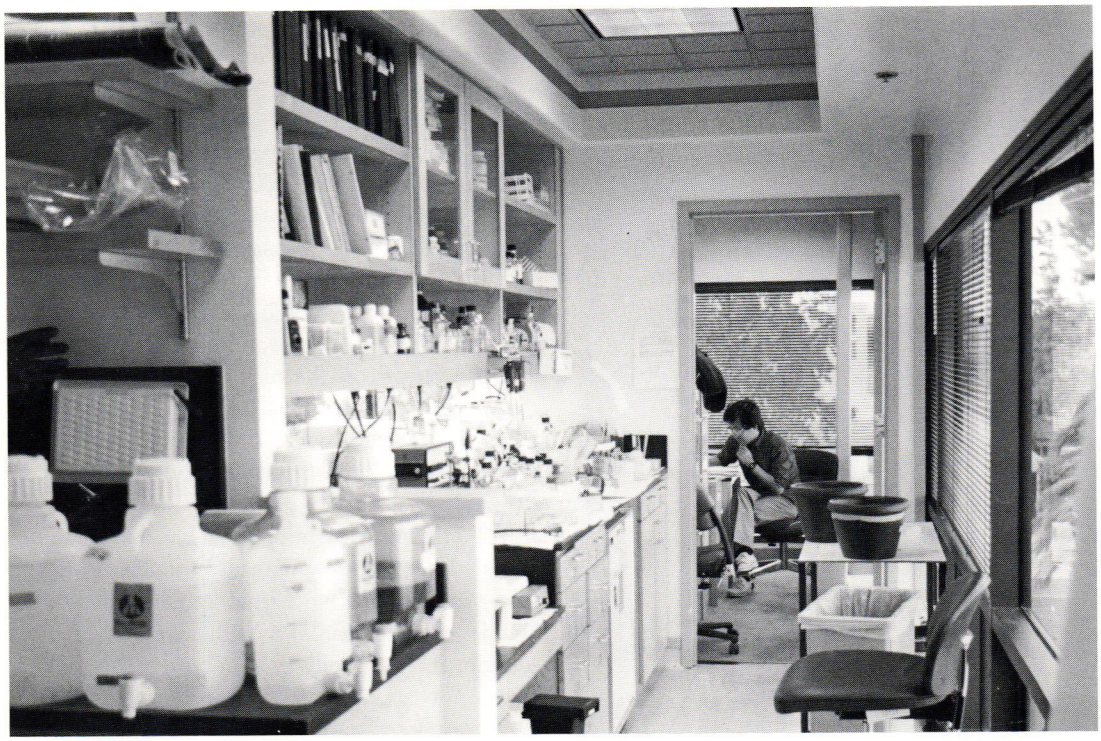
1. Laboratories where experiments are set up and carried out. (The parallel for architects would be the drafting areas.)

2. Support areas where equipment and setups used by researchers in different labs are located, and where specialized or dangerous activities are located to avoid disruption of normal lab functions. These areas often include animal facilities, constant temperature rooms and analytical equipment rooms. (The parallel for architects is the print room, model-making area, sample or catalogue rooms.)

3. Administration areas where finance, fundraising, personnel management and clerical support are located.

4. General support areas comprised of receiving and storage facilities, conference rooms shared by administration and research personnel, seminar rooms and library, supply rooms and lunch room.

The architect need not understand the research being conducted at a facility in order to design the space. But the architect should appreciate how fashioning the workplace will affect the researcher's ability to function. The research lab is the most multi-functional space in the research facility. The procedures, protocols, apparatus and equipment the facility will house over the years may vary. But the people do not and their sensitivities do not. Research labs which are noisy, dismal, messy and difficult to work in are simply



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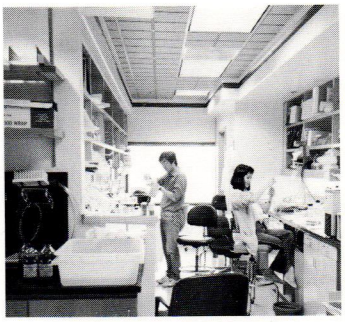

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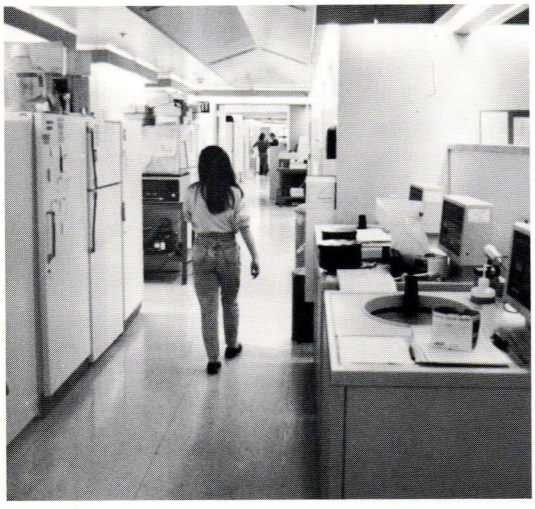
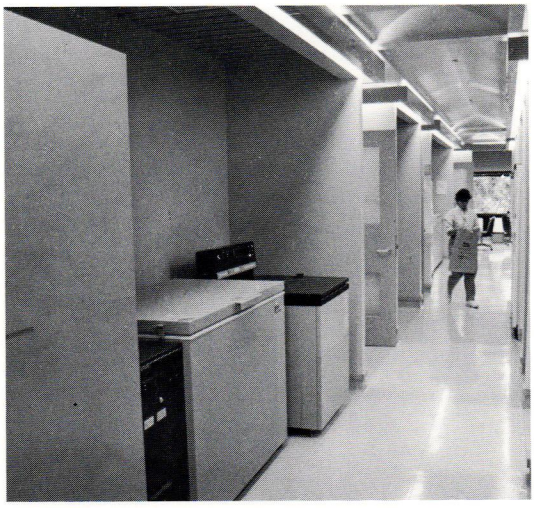
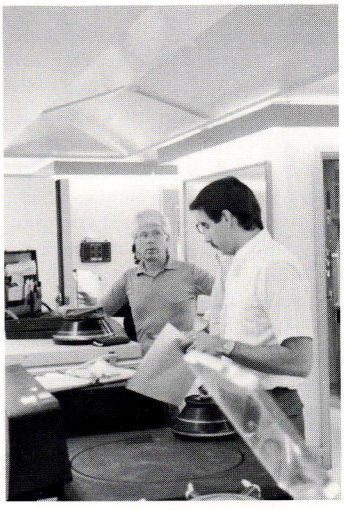






that. They are not as conducive to productive research work as spaces in which the scientists are comfortable and undisturbed.

The laboratory where the work is done invariably determines the success of most research companies. Smart companies create good environments to attract and keep scientists in a highly competitive market. Almost everybody wants a window in the workplace to enjoy the change, variety, drama or beauty that the view provides. Whatever site or shell we work with, our first effort is to provide windows in the spaces where people spend the most time.

To concentrate on an activity, scientists need to be free from distractions. At other times communication with others helps to reflect and refocus on activities. In the labs, concentration and minimal distraction are imperative. The private work space is usually the only place where the researcher can concentrate to develop and analyze experiments. The space should be treated as a private domain and should have no other function.

Research support areas do not require the same control. The support space which the scientist visits for short intervals can be located in interior zones. Less time is spent in these areas and if they have no windows or house noisy equipment, the disturbance is less. The specific location of support space within the interior zone is determined by the priority of use. Frequently used equipment or areas are located closest to the labs. The support areas and circulation space between labs can, if properly designed, become interaction zones. Interaction is an important factor in most research organizations.

Designing The Wet Laboratory

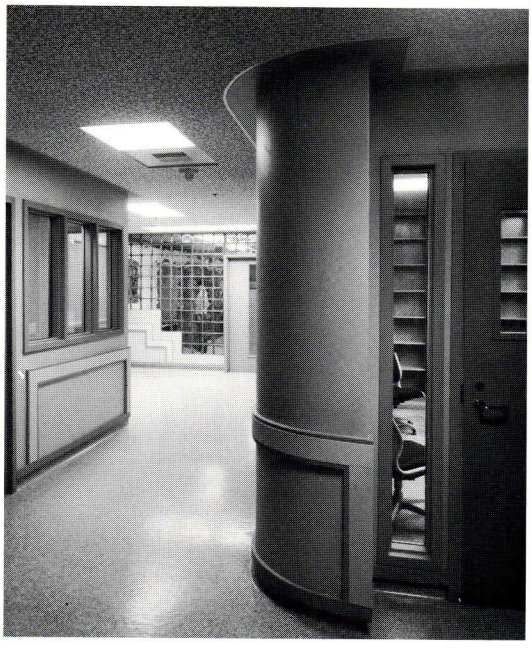
Science facilities designed in the last 10 years frequently combine what used to be consid-

Laboratory environments require a variety of interaction spaces. The private work space is the only place where the researcher can concentrate to develop and analyze experiments. The circulation system is where people are most likely to meet for a spontaneous exchange of ideas at a time when they are not consumed with a protocol or calculation.

Architecture can enhance communication among scientists. At DNAX we put commonly-used equipment in the corridors outside the labs to enable scientists to meet colleagues and talk about the results indicated by the analytical instruments. On the second floor, the equipment was enclosed in alcoves to provide a more orderly atmosphere.

GERALD RATTO

DNAX Research Institute applies advanced techniques and strategies of molecular and cellular biology toward understanding the immune system. The design objectives for DNAX's 54,000 square foot, two story laboratory were to discourage the spatial separation of disciplines usually found in multi-disciplinary laboratories; achieve an open atmosphere to encourage open scientific discussion and disclosure; and create a noninstitutional ambience to sustain close interactions among 100 scientists. This program was tailored into an existing shell warehouse building. Construction cost—including all site work, interior and shell modifications, new electrical and mechanical service and systems—was $143 per gross square foot.



ered discrete disciplines. (In other words, we have been designing mostly for the life sciences.) This includes companies and academic departments studying medical and agricultural interests, doing EPA environmental analyses, and manufacturing products for industry. The fields involved are anatomy, biology, molecular biology, genetics, biochemistry, botany, mycology, pathology, virology, chemistry, immunology, psychiatry, neuro-chemistry and microbiology. Astonishingly, the labs for these varied disciplines are very similar.

The Medical Research Council Labs in Cambridge, England are the best model for this type of facility. They were built about 50 years ago. Each lab accommodates two to six scientists. The labs have strong countertops supported by well-made wood cabinets. These facilities have served more Nobel Laureate scientists than any other institution in the world. Scientists from around the world visit these labs on sabbatical years to work with colleagues who share similar interests. These scientists come from labs of different disciplines, yet in a day they can set up shop and work productively at MRC without renovation or changes.

This is a vital lesson in this design field where flexibility is advertised as the most important attribute. Flexibility is defined as the ability to conform to the changing needs of the profession. The architect frequently assumes this means that *the systems* in the facility must be made to change. But well-designed labs do not change because they accommodate simple preparative and analytical functions that basically have not changed.

The labs with the shortest lifespan are those designed to be flexible. To accommodate "change" they sacrifice the most vital requirements of a functional lab: cleanliness, efficiency, sturdiness, comfort and simplicity.

The preparative and analytical functions that a lab accommodates are not unlike those an architect encounters when designing a kitchen. The scientist usually starts at the desk figuring out what to do that day. After appropriate calculations and procedural determinations, chemicals are taken from the refrigerator, shelves and nearby rooms. They are mixed at the countertops with precise measuring vessels or scales. In the life sciences, a biological system often is studied and some living organism is introduced.

The experiment usually requires an incubation period, time for the ingredients to react. The experiment must be maintained at a constant temperature to make sure the result can be repeated. Water baths, cold or warm rooms, or refrigerator-size constant temperature boxes are used to maintain the temperature.

When incubation is complete, the scientist tries to purify the compound in its new combined or modified state to learn how the compound was absorbed and how it was transformed as it passed through the development of the organism's growth. Expensive and elaborate equipment greatly speeds up this part of the work. After the compound has been traced and analyzed at the molecular level, something more is known about the biological system.

Most kitchens are shared by a family or several roommates; they share the sink, refrigerator and other appliances. Scientists similarly share lab facilities. A standard residential kitchen is about the right size for two scientists. Typically about 100 square feet per scientist is provided in each wet lab and a lab is shared by four to six scientists. Up to six scientists can share a sink and refrigerator.

The most difficult part of designing the wet lab is providing a quiet, private and comfortable

space for the researcher. The architect armed with years of experience designing exciting and attractive space must use his or her complete arsenal of tools—color, light, form and texture—to mold the spaces. Nothing about the lab environment deprives the designer of this opportunity.

Facility Planning To Foster Communication

Interaction is as important as flexibility to most lab environments and is more difficult to achieve. The personnel and the management style are important components. The architecture can enhance or discourage its occurrence. We work with four levels of interaction in the research facility.

The first is in the lab, where the individual's work space is designated as sacred and private. In the zone where support activities are located, intra-lab communication is simple and frequent.

Outside the lab, careful three-dimensional and two-dimensional planning of the circulation system for a research floor layout can foster communication among researchers. The fire corridor is purposefully void of activity by demand of the building codes. People in the corridor usually are self-conscious about being perceived as not accomplishing anything. They are concerned about being seen chatting, so they whisk through to their destination avoiding colleagues they may encounter in the hallway. Yet this road system is where people are most likely to meet at a time when they are not consumed with a protocol or calculation.

One of the first steps in our design process is to examine the corridor circulation system and work with building officials to produce a scheme that meets the safety requirements yet avoids the inactive barriers to good communication. At the DNAX Research Institute facility at the Stanford Industrial Park in Palo Alto, we provided extra exit doors and were allowed to create in the corridors a number of occupancy areas, each with less than 30 occupants. We eliminated the fire-rated corridor outside the labs and put into the circulation space the equipment frequently used in common by the researchers.

Emerging from the lab, scientists meet colleagues and talk about results indicated by the analytical instruments. Because of the placement of equipment in this area, the researchers have little concern that a supervisor will think they are wasting time. In short, the most successful spaces for interaction are active spaces away from the private zones.

The third type of interaction involves interdisciplinary relationships. At DNAX, for example, by accumulating the common activities of the immunology, molecular biology and protein chemistry research groups, we were able to bring the different disciplines together. Traditionally, these disciplines are segregated. DNAX, which has a multifaceted attack in its human immunologic research program, thrives on the cross-fertilization of its scientists' efforts.

The final form of interaction is recreational. The Medical Research Council, for example, has high tea every afternoon in a grand room with communal tables. The building practically closes its research operations for a half-hour, while people gather informally to discuss what is on their minds. This type of distraction occurs away from the private workplace where concentration and undisturbed activity are essential. The American corollary is to subsidize meal programs to make communal lunches attractive and to provide recreational amenities.

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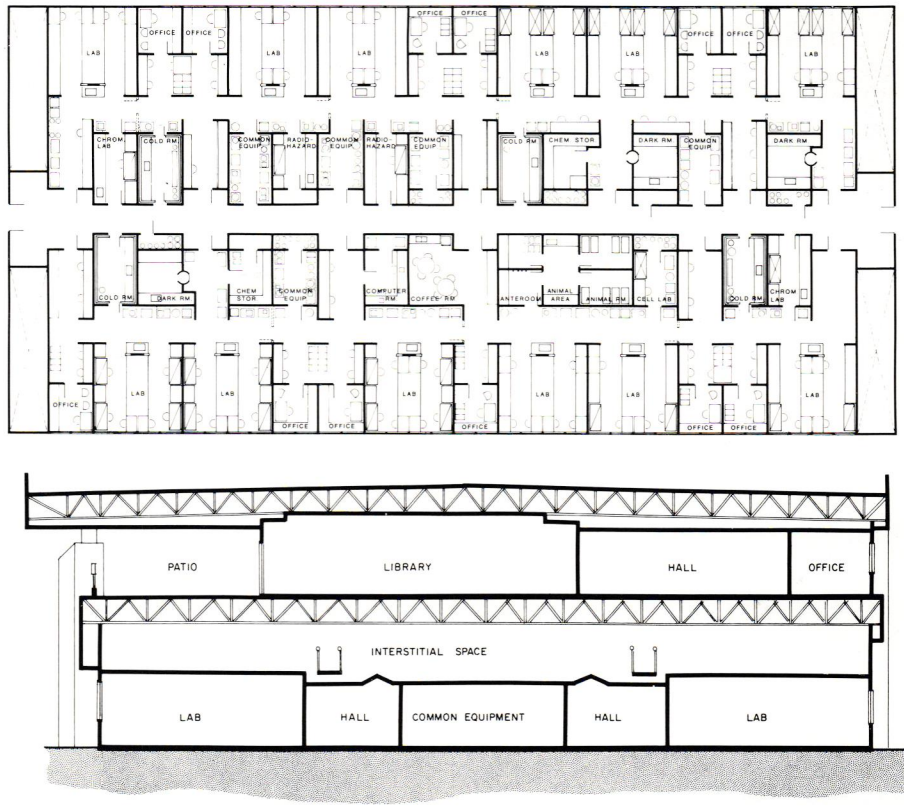


GERALD RATTO

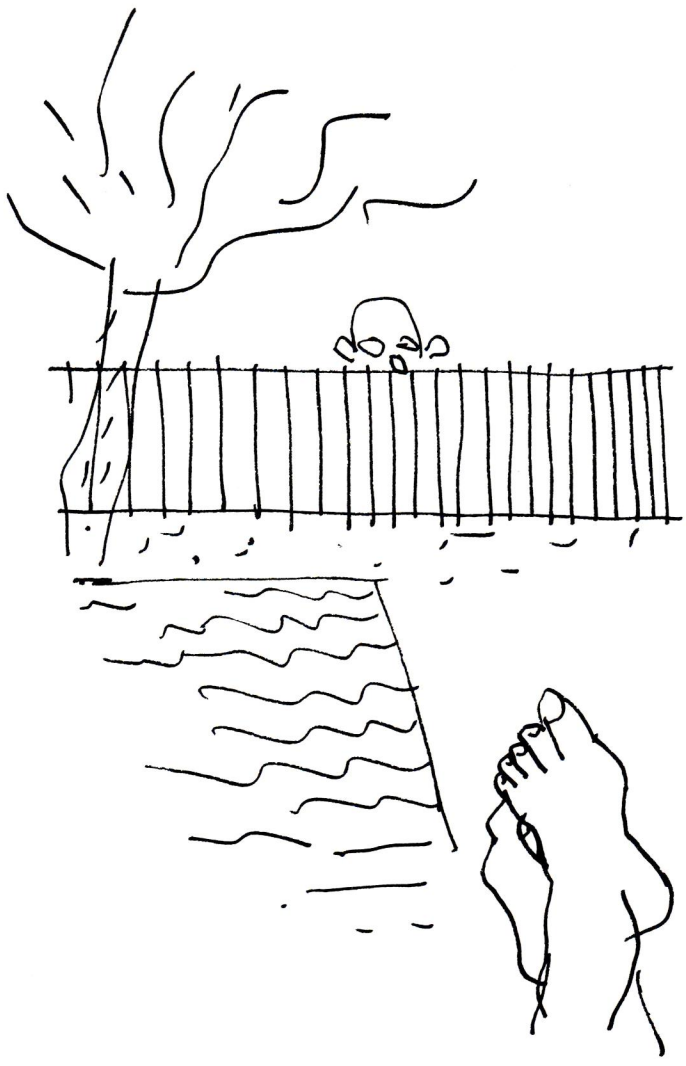
All research facilities have similar program components. The prototype floor plan for 1 million square feet of laboratory space for Schering-Plough Corporation (top) incorporates four functionally different modules for animal research, organic chemistry, molecular biology and immunology laboratories.

The complex systems required by laboratories often intimidate architects into turning laboratory design over to industrial engineers who are better-qualified to serve as consultants than as designers. At DNAX, the laboratories are equipped with custom-made, modular casework piped natural gas, vacuum, compressed air, carbon dioxide gas, industrial hot and cold water, de-ionized water and liquid nitrogen. The mechanical, electrical and plumbing systems have standby generators, backup pumps and motors and chillers. Computer and equipment rooms have halon fire-suppression systems.

An interstitial zone offers access to existing services and rights-of-way for future expansion. The interstitial space allowed the first floor labs to continue operations while an entire second floor was constructed.

Humans In The Industrial Environment

Clearly marked land use boundaries



JAMES LEEFE, FAIA

DESIGN FOR PEOPLE

BY JAMES LEEFE, FAIA

Buildings and their sites structure human relationships and influence behavior. Architects must make a conscious effort to create a workplace that helps rather than hinders people as they go about their daily tasks. The goal is to create environments that satisfy rather than frustrate, and to avoid making environments that generate stress or distraction. It costs no more to create a work environment responsive to human needs than to create one that ignores these values.

Our concern that users' needs for an effective and efficient work environment were not being met, led us to develop a human factors checklist. The checklist establishes a framework for site planning and building design based on how people respond to various conditions in the work environment. Broadly, these responses fall into three categories: orientation, comfort and convenience. The guidelines are based on these rather simple premises:

—satisfaction at work significantly affects one's mental and physical well-being which, in turn, affects one's ability to perform;

—active participation in planning one's own workplace is an important contribution to work satisfaction; and

—behind every design decision is an idea that can be expressed in plain English. A full understanding of this idea by the client, user and architect is essential to making the right design decision.

ORIENTATION

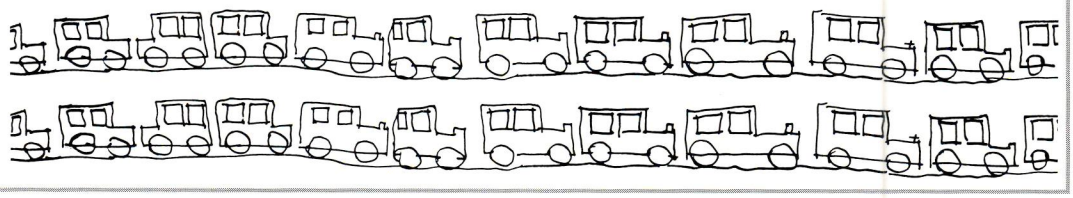
Orientation means knowing where you are in space and in time. Disorientation causes stress. Even a familiar place generates stress if that place is so poorly organized that it demands an effort for people to find their way. In site organization, logical order and clarity support human activity. Identifiable function areas should be placed near each other so that plant operation is readily achieved and the organization of the site is easily understood. For reasons of orientation, group identity, territory and maintenance, boundaries between functional areas of land use should be clearly marked.

The main entrance to the site is the crossing point from public space into a controlled environment where certain rules of behavior are implied. The entrance should be clearly recognized and have an appropriate image to introduce the facility. Circulation routes should be placed where they are expected to be.

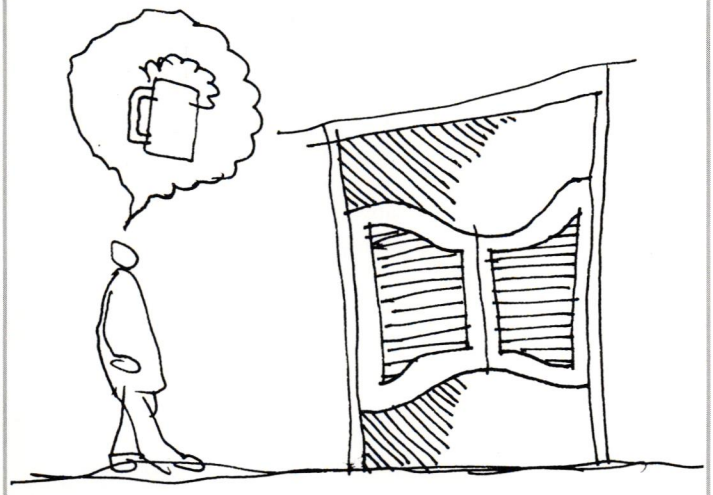
The parking lot is both a destination and a critical element in site orientation. Large, uninterrupted parking lots give an impression of a sea of cars overwhelming the landscape. A number of smaller lots directly related to the facilities they service is a far better solution.

Orientation in time refers to the fact that human beings need daylight to maintain their body rhythms. In extreme cases, the extended absence of daylight brings on a form of clinical depression causing, among other symptoms, sleeplessness, low self-esteem and a declining ability to think. Distance from a window seems not to be the critical factor. Workers able to see a window even part of the time consistently overestimate the amount of daylight that falls on their desks.

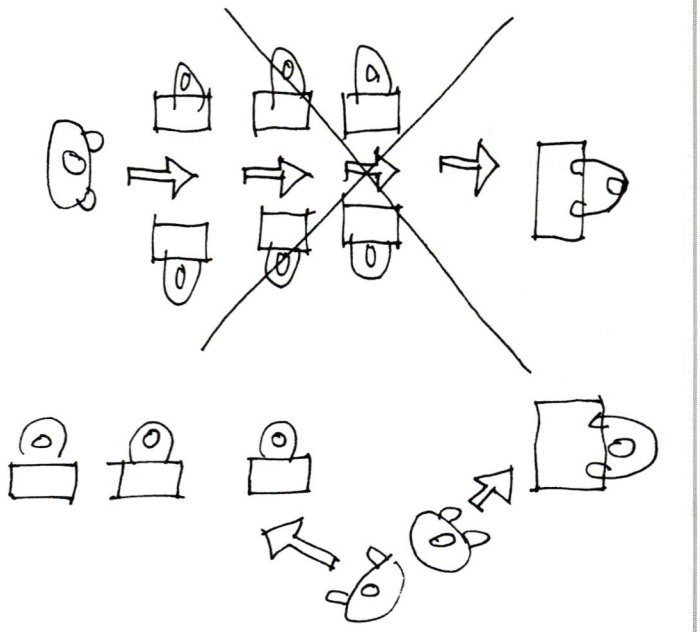
The parking lot as destination



Different environments raise different expectations



Be reachable



Comfort

Comfort in the environment is both physical and psychological. Physical comfort deals with essential requirements such as light, temperature and sound control. Buildings designed for passive energy conservation tend to be well used. Sealed environments mechanically ventilated and artificially lit only alienate us from the natural world that nourishes us.

Psychological comfort concerns matters such as status, the fit between the worker and the workplace, and the correct ambience. Environments raise different behavior expectations in different people. This is particularly important in the industrial environment where the mix of blue-collar and white-collar workers tends to sharpen social distinctions. As an obvious illustration, a worker's lunch room suggests one kind of behavior, an executive dining room another.

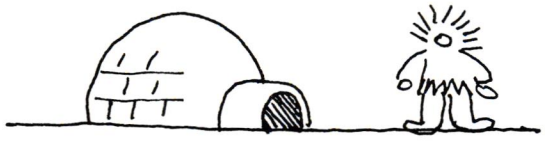
Familiarity in design relates to expectations. Since the "unusual" makes people feel uncomfortable, architects should avoid unfamiliar designs. This is not the place for architectural tricks. Instead, express the elements that make up the building—circulation patterns; major and minor spaces; the structural, mechanical and electrical systems—so that the organization of the essential parts is understood. Take a structural approach rather than a drywall approach in which the reality of the building is never made clear.

The typical office building with modular plan and modular facade is an abstraction that is outside of normal human experience. People simply do not relate to large, undifferentiated, multi-story buildings. Once a building rises above four floors, the connection to the ground is broken and the building becomes a world of its own, out of touch with the environment in which it exists.

A vocabulary sympathetic to the industrial site maintains the environment as a coherent whole. The administration building, for example, should look as if it belongs with the plant, not like a refuge from a suburban office park.

A vocabulary of industrial materials used selectively and expressively creates a fit between the building and its occupants. The positive effects of a pleasing environment on performance and on feelings of personal status cannot be overlooked.

Familiar forms make people feel comfortable



Convenience

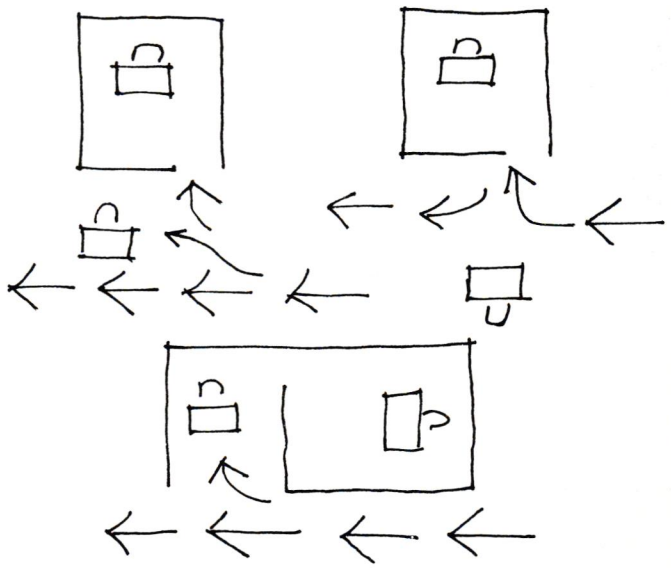
Convenience deals with obvious aspects such as adequate space and proper location. It also deals with the less obvious topic of how a building is organized to structure relationships and influence behavior.

Counseling is an important part of industrial training. Given the opportunity to do so, trainees voluntarily seek out instructors for guidance. In some circumstances, a trainee will bypass the instructor and go directly to the supervisor with a particular problem. But trainees are reluctant to go "over the head" of an instructor unless they can do so with a degree of privacy. Locating the supervisor's office where trainees can reach it without being obvious to instructors encourages direct vertical communication.

Some simple rules about office doors, secretaries and corridors pertain to privacy. When the secretary sits between an office and the corridor, people tend to bypass the office unless they have good reason to do otherwise. When the secretary is placed across the corridor, anyone who walks past feels free to pop into the office. If an office is buried behind the secretary, no one will come in unless they absolutely have to.

James Leefe, FAIA is manager of facility planning for the Power Division of Bechtel Corporation in San Francisco.

Simple rules of privacy



Federal Building, San Francisco.
Architect: Bay Architects Associates, Inc.

BUILDING A BETTER FUTURE

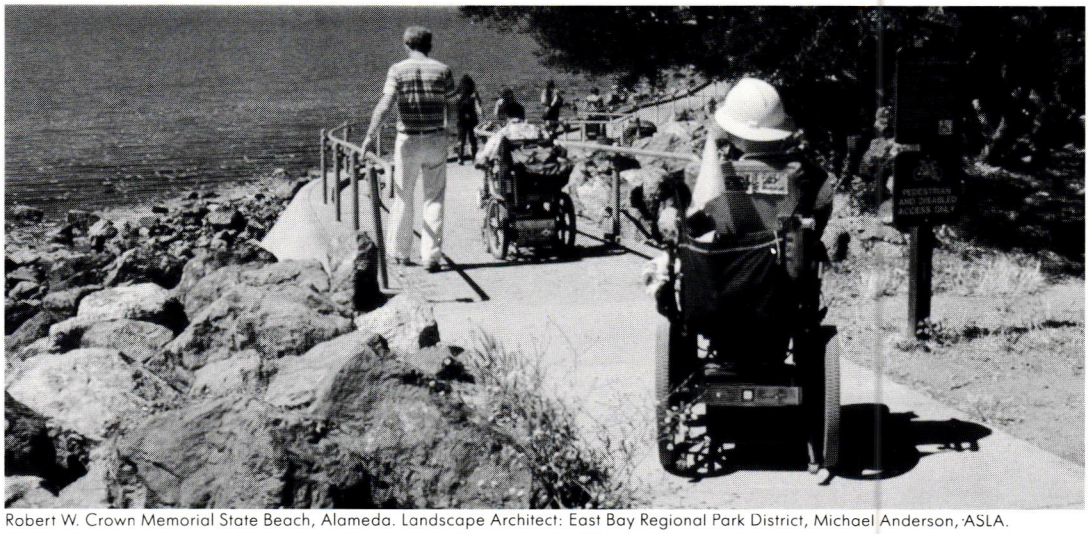
Four architecture and landscape architecture projects that successfully integrate usable handicapped accessibility solutions with overall design excellence were recognized in the Building A Better Future program, sponsored by the California Department of Rehabilitation, the California Council of Landscape Architects and the California Council, The American Institute of Architects. Dr. P. Cecie Fontanoza, Director of the Department of Rehabilitation, praised the award-winning projects for providing "unobtrusive access through the community."

The Honor Award was presented to Bay Architects Associates for an accessibility ramp compatible with the landmark interior of the Federal Building in San Francisco. Client for the project was the U.S. General Services Administration.

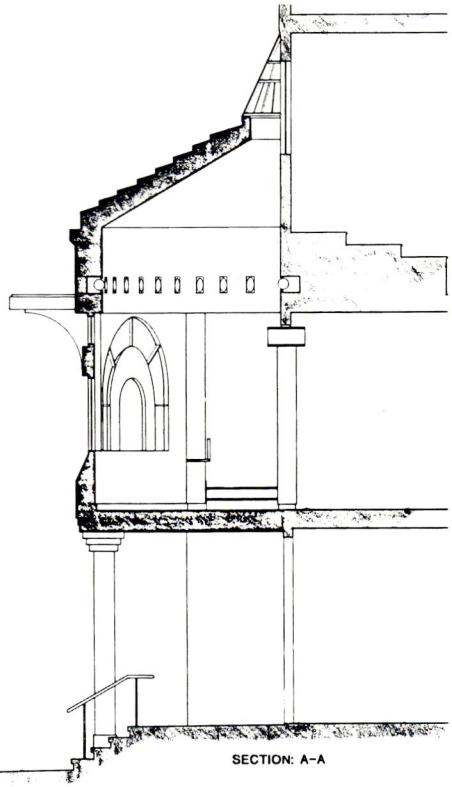
Three Merit Awards were given. The East Bay Regional Park District and its chief of design, Michael Anderson, ASLA, were recognized for the Barrier-Free Access Project that allows people in wheelchairs to enjoy over-the-water experiences at the Robert Crown Memorial State Beach, Alameda. Jerry Kler & Associates received an award for an elevator addition and remodel of Congregation Beth Sholom, San Francisco. And Heimberger-Hirsch Landscape Architects were recognized for the design of Rosewood Park in Cerritos, which includes a playground accessible to children in wheelchairs.

Jurors were Eldon Beck, FASLA; Emily J. Gabel, ASLA; George J. Hasslein, FAIA; James D. Lewis; and Herbert P. McLaughlin, AIA.

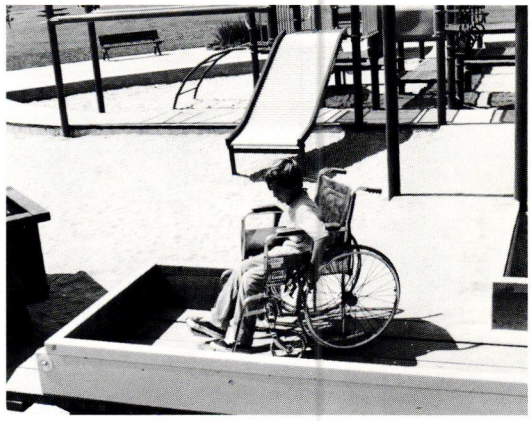
Building A Better Future will expand in 1989 to honor communities whose policies incorporate access for people with disabilities into the design of their systems.



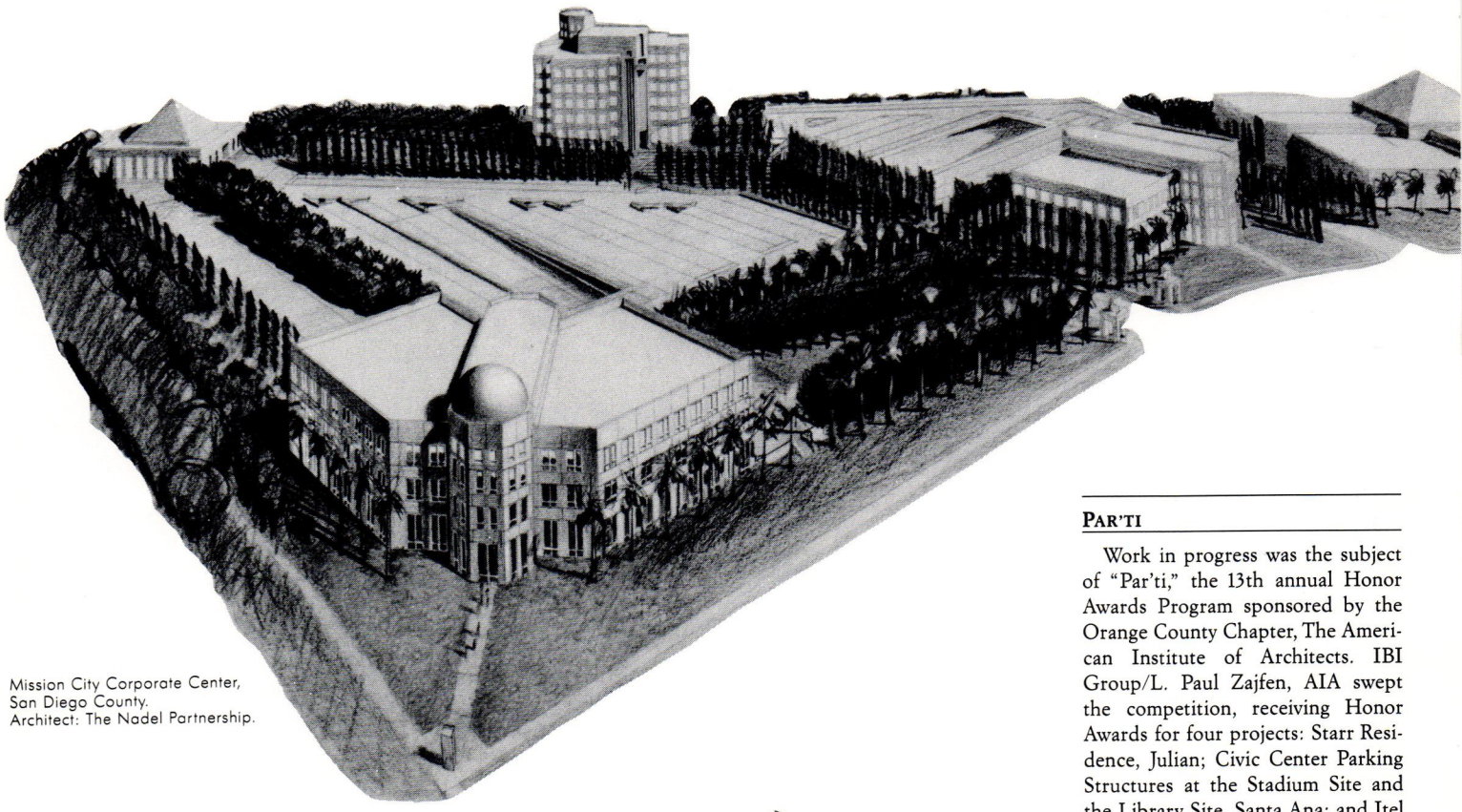
Robert W. Crown Memorial State Beach, Alameda. Landscape Architect: East Bay Regional Park District, Michael Anderson, ASLA.



Congregation Beth Sholom, San Francisco.
Architect: Jerry Kler & Associates.



Rosewood Park, City of Cerritos.
Landscape Architect:
Heimberger-Hirsch Landscape Architects.



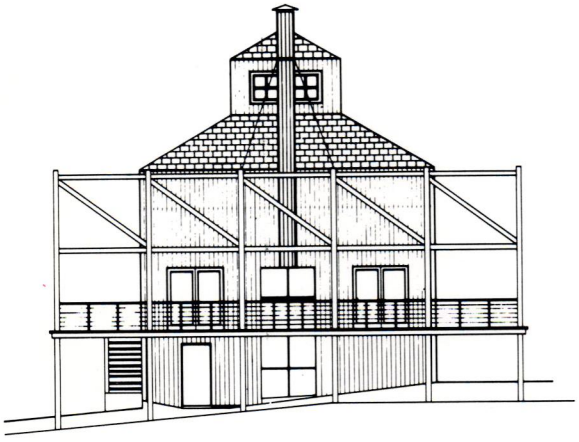
Mission City Corporate Center,
San Diego County.
Architect: The Nadel Partnership.

PAR'TI

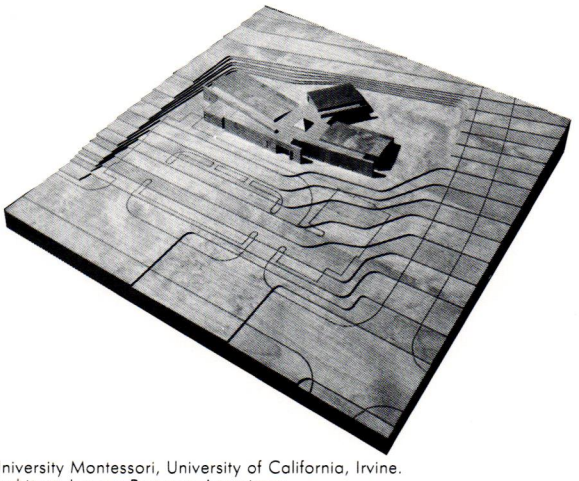
Work in progress was the subject of "Par'ti," the 13th annual Honor Awards Program sponsored by the Orange County Chapter, The American Institute of Architects. IBI Group/L. Paul Zajfen, AIA swept the competition, receiving Honor Awards for four projects: Starr Residence, Julian; Civic Center Parking Structures at the Stadium Site and the Library Site, Santa Ana; and Itel Apartments, San Francisco.

Leason Pomeroy Associates received two Honor Awards for University Montessori, University of California, Irvine and Galasso's Bakery, Corona. An Honor Award went to The Nadel Partnership for Mission City Corporate Center, San Diego County.

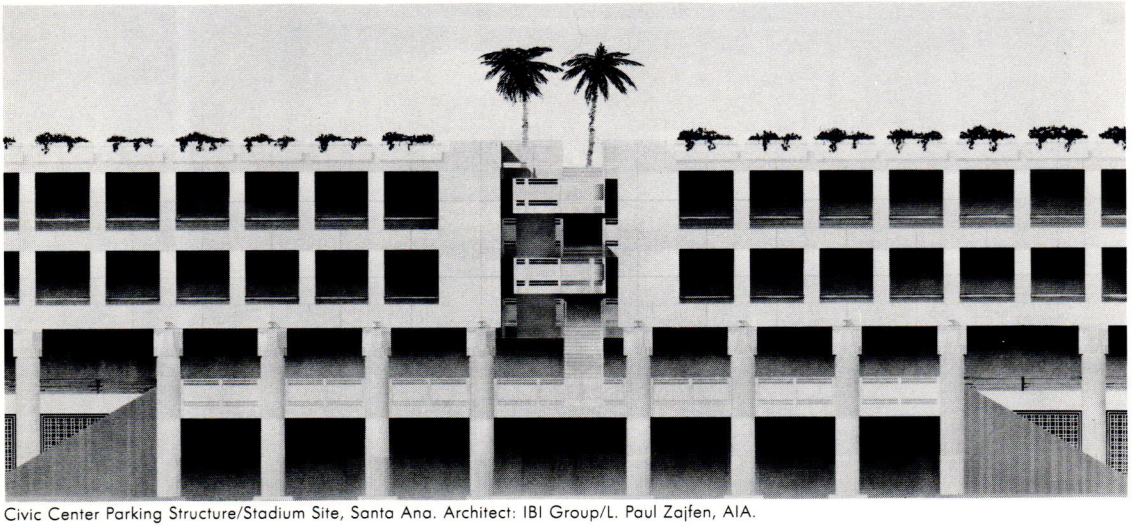
Jurors were Rebecca L. Binder, AIA; Robert Campbell, AIA; Joseph Esherick, FAIA; and architect Thom Mayne.



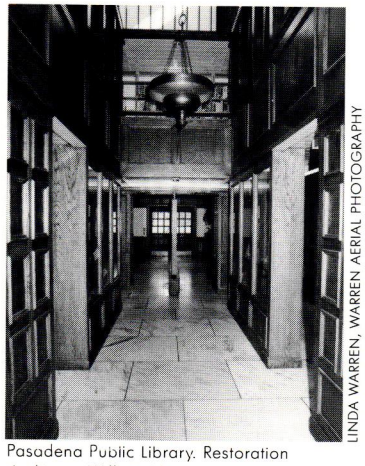
Starr Residence, Julian.
Architect: IBI Group/L. Paul Zajfen, AIA.



University Montessori, University of California, Irvine.
Architect: Leason Pomeroy Associates.



Civic Center Parking Structure/Stadium Site, Santa Ana. Architect: IBI Group/L. Paul Zajfen, AIA.



LINDA WARREN, WARREN AERIAL PHOTOGRAPHY

Pasadena Public Library. Restoration Architect: William Henry Taylor, AIA.

Pasadena & Foothill Chapter

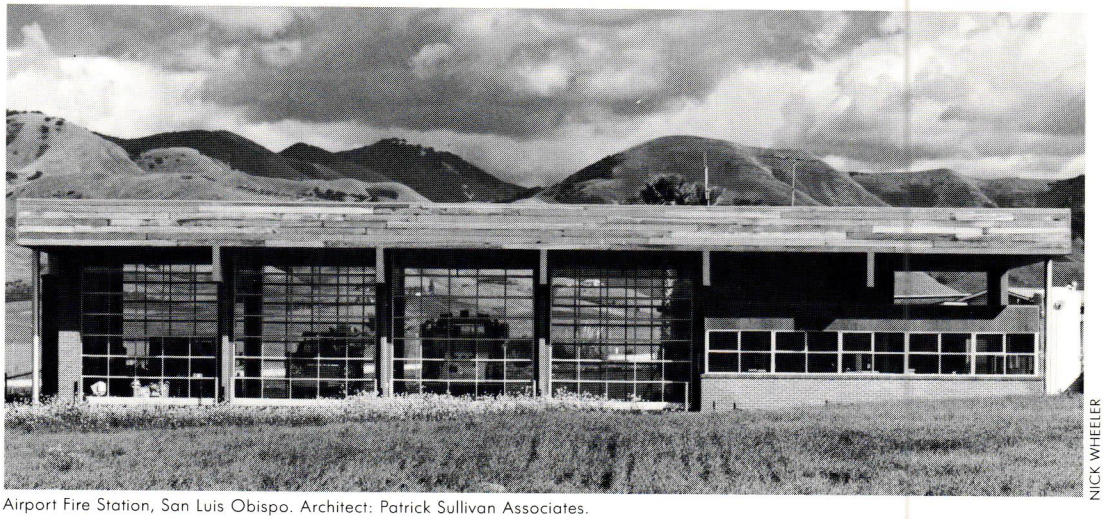
The bi-annual Architectural Awards for Design Excellence, sponsored by the Pasadena & Foothill Chapter/AIA, recognized four projects with Honor Awards: Pulliam, Matthews & Associates for the Yager Residence, Santa Monica; Patrick Sullivan Associates for the Airport Fire Station, San Luis Obispo; William Henry Taylor, AIA & Associates for the remodel and restoration of the Pasadena Public Library; and Charles Walton Associates, AIA, Inc. for the remodel and addition of the Cerritos Public Library.

Neptune & Thomas Associates received an Award of Merit for Allstate Plaza, Glendale and an Honorable Mention for the Auditorium and Educational Center of the Hospital of the Good Samaritan, Los Angeles. Wolff/Lang/Christopher, Architects, Inc. received Honorable Mention for the Deer Creek Car Wash, Rancho Cucamonga. A Citation of Design went to Barasch Architects & Associates, Inc. for Lake Avenue Congregational Church, Pasadena.

Jurors included Edward Killingsworth, FAIA; Fred Rachlin, FAIA; Gin Wong, FAIA; Alice Fong; and Wayne Hunt.

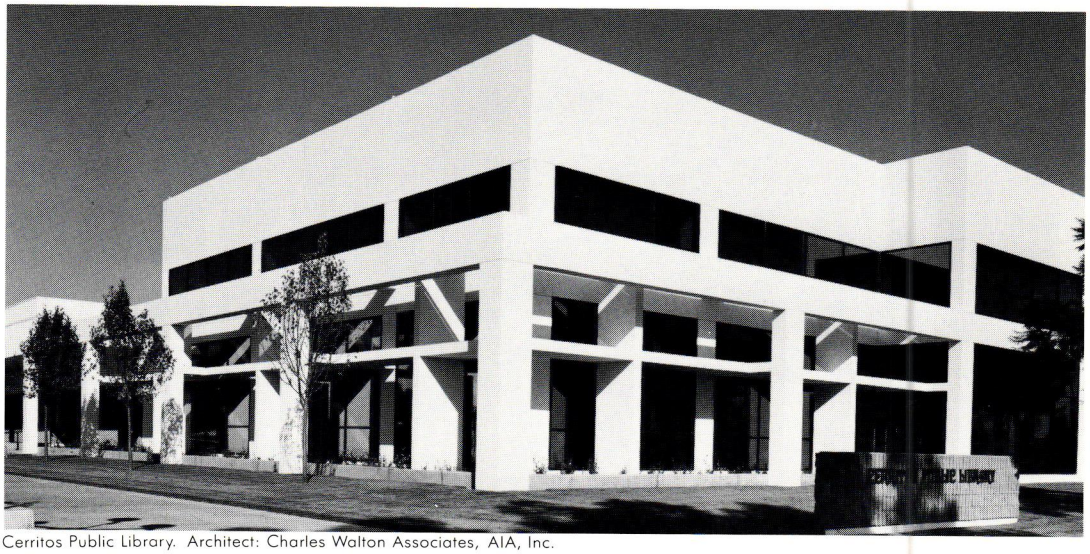
JULIUS SHULMAN

Yager Residence, Santa Monica. Architect: Pulliam, Matthews & Associates.



NICK WHEELER

Airport Fire Station, San Luis Obispo. Architect: Patrick Sullivan Associates.



Cerritos Public Library. Architect: Charles Walton Associates, AIA, Inc.

I M A G E (S)

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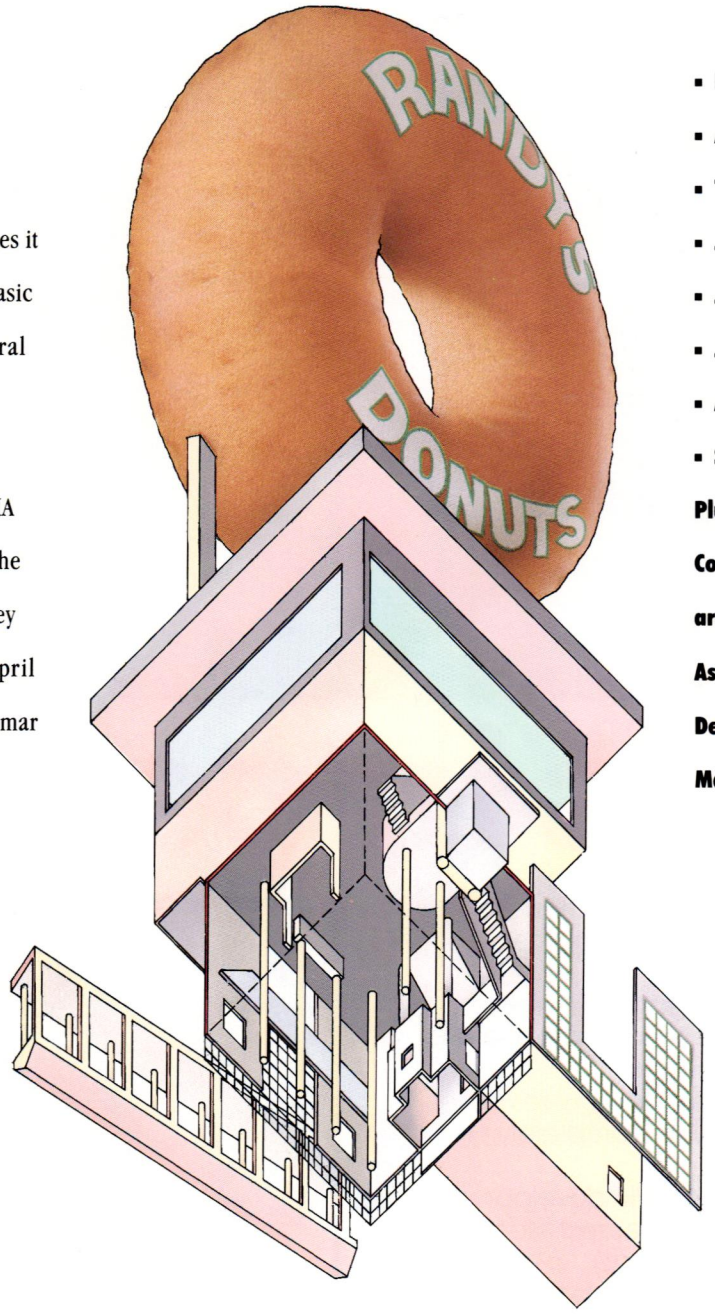

- **Hugh Hardy, FAIA**
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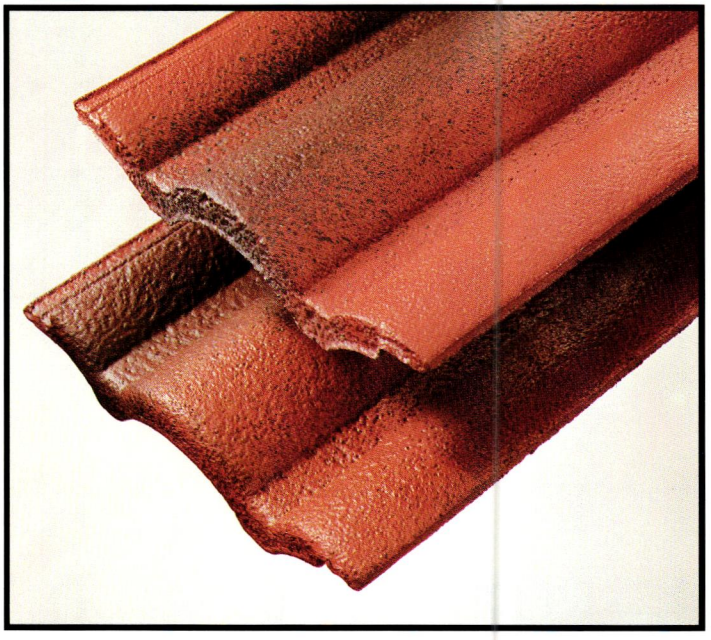
As for others in our field, well—sorry about that. For them, it's still impossible.



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continued from page 23

The final fundamental principal in research planning is to design for functional, not individual needs. Personnel turnover is the nature of the academic and biotech industries. The architect therefore must be extremely careful to understand how a program is developed and who it serves.

Most scientists do not know what it is about their lab that really helps them and what they have simply learned to work with. They have learned to adjust to conditions previously existing in other labs, regardless of how poorly designed those facilities actually were. Scientists who are acutely aware of what makes their lab work and are capable of explaining this are great assets to the architect. They can differentiate between long-range changes demanded of the lab and the elements that stay the same over time and become true design parameters.

Conclusion

The standard lab is unattractive, noisy, and smelly. Yet scientists working in these spaces manage to achieve very difficult and elusive results. That does not mean that they could not be better served by more attractive and effective work spaces. Many people in this country live in dull, poorly insulated, cramped space and they carry on productive lives. That does not mean architects with special training, insight and talent should not continue to strive to make their homes better.

From a simple business point of view, research organizations in both the private and public sectors have learned that attracting the best personnel is considerably easier with an attractive, comfortable atmosphere. We have tried in our work to avoid Modernist, High-Tech design, which works well with equipment and services, but not with people. The 100 labs we have designed in the 1980s concentrate on combining the goals of plain old-fashioned humanism with the sensual aspects of the scientist's environment.

Many scientists have told me that they had narrowed their vocational choices to science and architecture. Both disciplines emphasize a confluence of creativity and technology. Imaginative, inspirational spaces created by architects can excite scientists and challenge them to do their best work.

Kenneth A. Kornberg, AIA is principal of Kornberg Associates, with offices in Menlo Park and Del Mar.

J • O • B • S

University of California, Davis Medical Center, located in Sacramento, serves as the regional medical referral center for Northern California and the principal clinical teaching and research site for the University of California, Davis School of Medicine. Presently consisting of 60 acres and over one million gross square feet of facilities, UCDMC is undertaking a major long-range capital development program and invites applications for Associate Architect and Senior Facilities Requirements Analyst positions.

ASSOCIATE ARCHITECT. Duties and responsibilities include project management for a wide variety of new and renovation capital improvements projects through all phases (from concept through move-in), as well as the supervision of a small staff of non-licensed project managers.

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Starting salary is commensurate with experience (current range is $37,291 to $46,604).

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Starting salary is commensurate with experience (current range is $33,909 to $40,402 annually).

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EDITORIAL TRIVIALIZES WOMEN

It was a welcome surprise to see the July/August issue devoted to housing the elderly. The table of contents showed that the subject had been approached thoughtfully. So far so good. Then we read the editorial. The theme: Architects have a role in helping society age with dignity. Can't argue with that. Inexplicably, the last paragraph begins: *"An architect interviewed in the course of this issue observed, 'You're only as old as the women you feel'."*

Was this supposed to be funny? No one we showed it to laughed. Could it have been a misprint? Not likely. Why, then, would the editor quote a sexist remark without comment? Especially when it undermines the theme of her article, respect for the aging?

The situation increasing numbers of elderly women face—lack of safe, affordable housing—is not controversial. It is frightening and often devastating. Comments which stereotype or trivialize women and their experience have no place in a professional journal.

—Mary Fishman and
Barbara Flammang, AIA
Carde Killefer Flammang Architects

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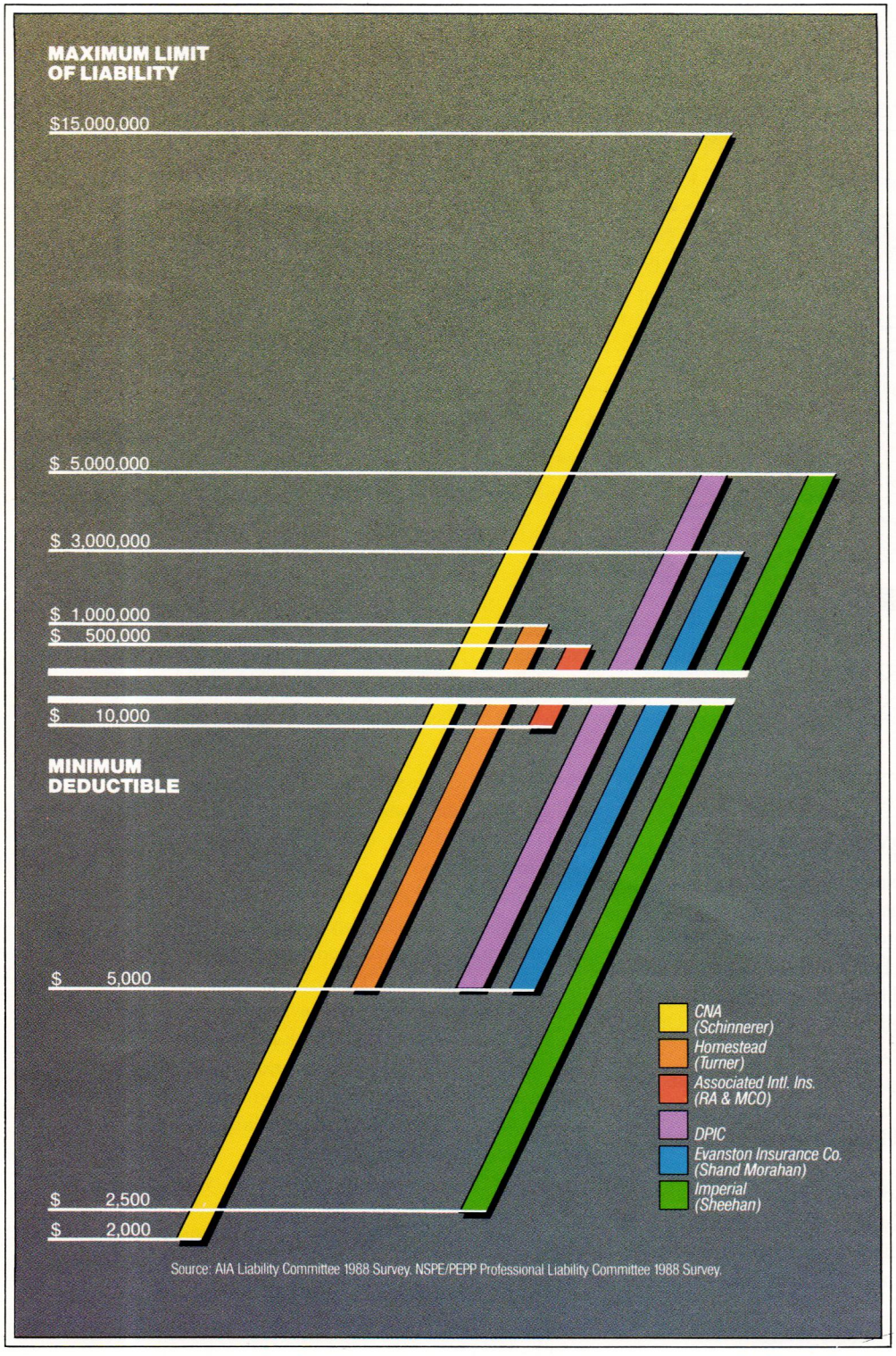

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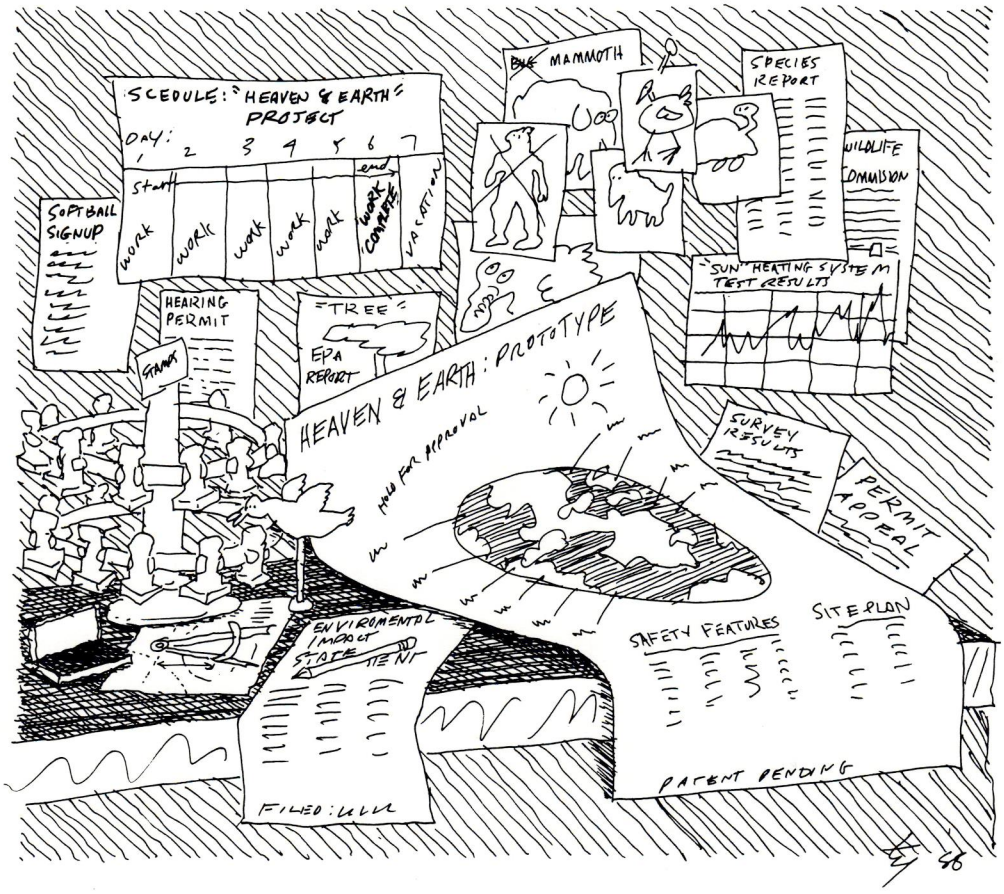
If Heaven Had Design Review



IN THE BEGINNING, THERE WAS PROCESS

FROM THE *CONGRESSIONAL RECORD*

God created Heaven and Earth. Quickly He was faced with a class action suit for failure to file an environmental impact statement. He was granted a temporary permit for the Heavenly part of the project, but was stymied with a Cease and Desist Order for the Earthly part.

Appearing at the hearing, God was asked why He began his earthly project in the first place. He replied that He just liked to be creative.

Then God said, "Let there be light," and immediately the officials demanded to know how the light would be made. Would there be strip mining? What about thermal pollution? God explained that light would come from a huge ball of fire.

God was granted provisional permission to make light, assuming that no smoke would result from the ball of fire, that He would obtain a building permit and, to conserve energy, would have the light out half the time. God agreed and said He would call the light "day" and the darkness "night." Officials replied that they were not interested in semantics.

God said, "Let the Earth bring forth green herb and such as may seed." The EPA agreed so long as native seed was used.

Then God said, "Let the waters bring forth the creeping creatures having life; and the fowl that may fly over the Earth." Officials pointed out that this would require approval of the Game and Fish Commission coordinated with the Heavenly Wildlife Federation and Audobongelic Society.

Everything was O.K. until God said He wanted to complete the project in six days. Officials said it would take at least 100 days to review the application and impact statement. After that there would be public hearings. Then there would be 10 to 12 months before . . .

And God said, "The hell with it!"

Read into the Congressional Record *by the Honorable Andrew Jacobs Jr., of Indiana at the suggestion of attorney Raymond W. Hilgedag of Indianapolis.*

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