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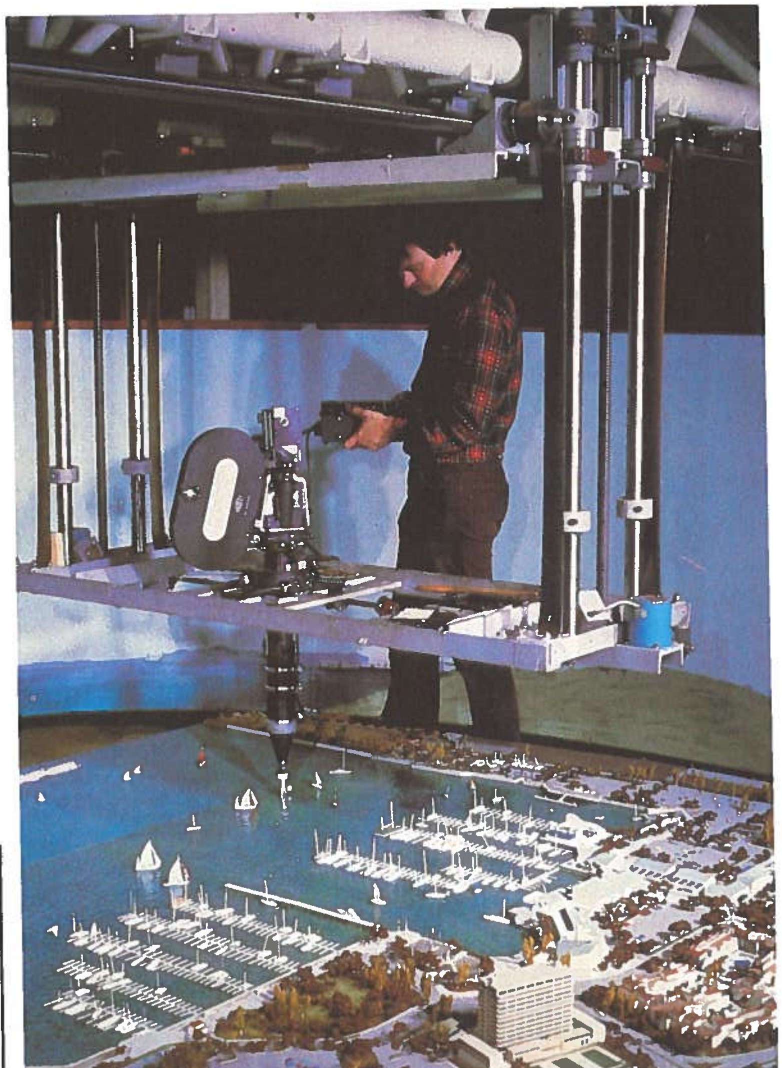
Periscoping Future Scenes

How to Use an Environmental Simulation Lab

By DONALD APPLEYARD, PETER BOSSELMANN,
RANDY KLOCK, and ALEXANDER SCHMIDT



At Berkeley's Environmental Simulation Lab a periscope-type lens permits scale model to be photographed at eye level. Here color video camera produces 16 mm film (left) of waterfront model in Richmond, California.

"I want a flower garden which is surrounded by low hedges and other low-profile planting so that people cannot walk through.. .."

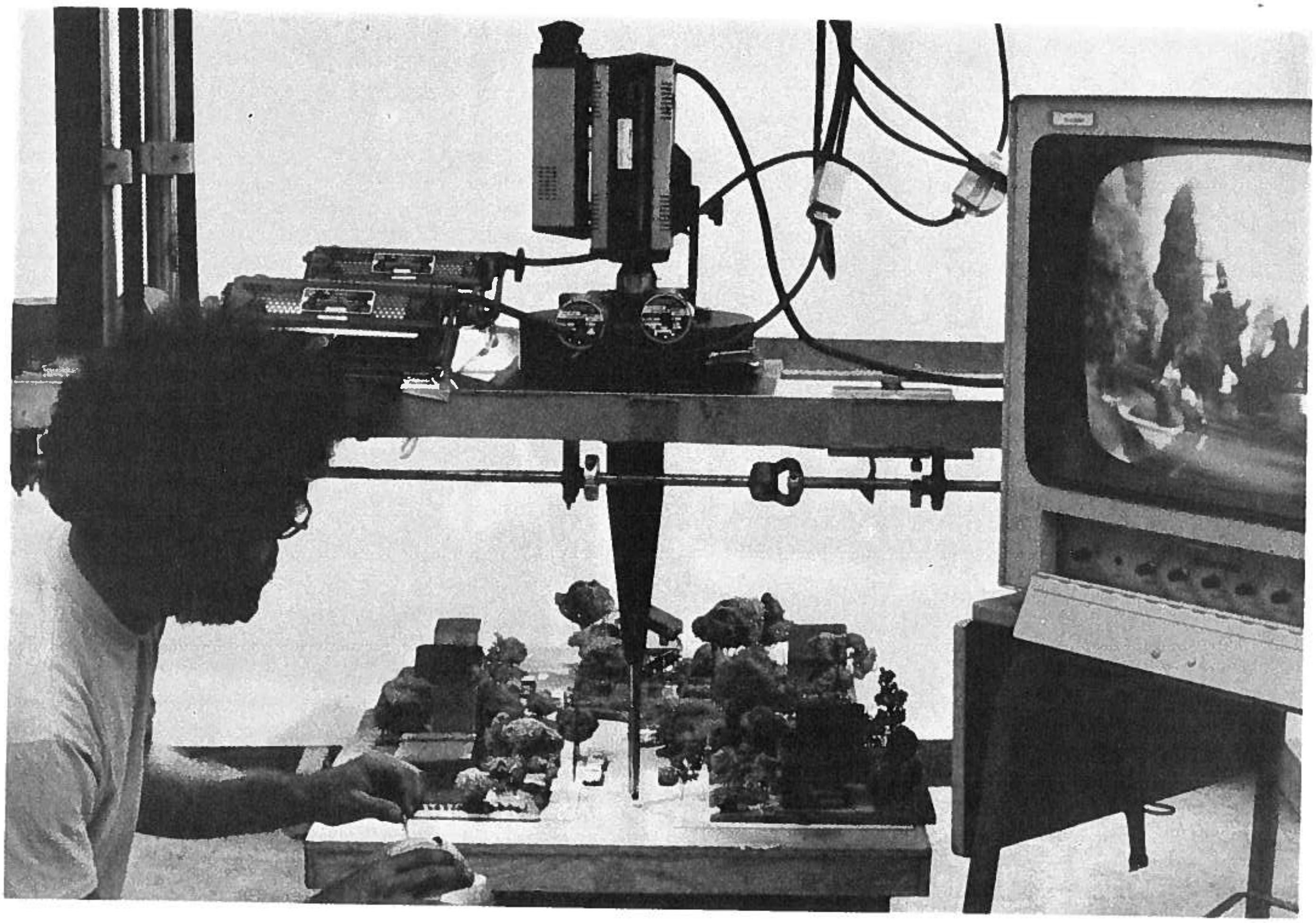
"We want flowering trees in our mini-street-park, especially white and red blossoming cherry and plum trees. This would give seasonal openness to the site...."

"I don't like too many trees in the mini-park across the street, because we need to increase safety and sunlight...."

These remarks from residents in a Berkeley, California, neighborhood were generated by a workshop on two proposed mini-street-parks, which evolved from a controversial scheme to divert traffic out of residential neighborhoods.

The city of Berkeley put up a number of bollard-and-board diverters to close off streets, or to let one-way traffic enter or exit, but some citizens were annoyed and tried to tear down the "barricades" on two ballots. Others claimed the diverters worked and kept the street quieter. But most agreed that the diverters were unsightly and unpleasant, and that the space could better be used for people.

Residents in Elmwood, at the



Eye level image of the mini-park model used in the participatory design project was videotaped and projected onto monitor for neighborhood residents to review.

southeast corner of Berkeley, a medium-density area of one- and two-family houses, set out to convert some streets into mini-parks, which would also make street closings more acceptable to those fighting the diverters. They worked with a landscape architect who voluntarily designed preliminary proposals for conversion of the traffic diverters into playgrounds, walking-spaces with winding paths, mini-forests, and wisteria-trellised picnic areas.

Neighbors were satisfied at first, but then disappointed when they found they could not change the proposals which seemed to be rigid and too perfect. And they could not really understand two-dimensional plans. *But how to translate this into a design proposal of their own?*

As devices for relegating the public to a passive role in design, the professional landscape architect's usual media — maps and perspective sketches — are most effective. The public may be enchanted by the images, but uncertain about the outcome. Confronted by these maps and sketches, they are certain they cannot take part in the "creation" of landscape designs, even when it drastically affects their own neighborhood.

Thus a profession, seeking to find ways to communicate with neighborhood groups, is held captive by its traditional media. Unlike architects, whose straight-line drawings encourage precision, conviction and abstraction, landscape architects use the sketchier freehand style, less conventional symbols for trees, more liberal color. Their images are pleasant and rather romantic. But they are hardly realistic for showing changes of level and growth of vegetation — the elusive outdoor environment. Models, too, have their problems. In one of our classes the difference between overhead views of models and eye-level views was brought out rather clearly: several students were unable to recognize eye-level slides of their own design models.

All the foregoing has pointed up the need for improvements in linking designers with their clients, and with the public; the need for processes, as well as techniques.

To increase design communication with the public, the National Science Foundation originally funded the Environmental Simulation Laboratory at the University of California, Berkeley. The laboratory consists of three groups of equipment: a *periscope-type lens* which allows photography of scale models at eye-level. This periscope lens is "driven" through the model by an *automated support structure* or *gantry* which weaves the lens through the model at any direction or height. The resulting image appears as though the viewer is walking or driving through the model. *Camera equipment* records these images onto 16 mm film or videotape which can then be projected onto a television monitor.

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TECHNIK (Continued from page 488)

A Videotape as an Outreach Strategy
During a four week period in the fall of 1977 a group of environmental design students produced a video film which addressed Berkeley neighborhood groups in general. It dealt with the ineffectiveness of urban neighborhood streets and the necessity for improvements via active participation of the residents. It showed how a flexible scale model could be used and modified in a participatory process; indicated alternative possibilities for improvements; and encouraged citizen redesign of residential streets.

The project has an emancipating effect. Both the film and the Elmwood neighbors were the starting point for a sequence of participatory design workshops.

Design Workshops — Gaming
Workshop One took place at a home near the site of the proposed mini-park. A game was designed to be played around a flexible "model kit" showing the surrounding homes whose facades were simulated with scale photographs from typical residences in the area. They contained two models of the proposed site with front yards, existing trees, fences, shrubs, telephone poles, etc. In addition, a large selection of model components were available: flower beds, fences, gates, play equipment, people and other items that the residents could select and play with.

Eleven neighborhood homeowners arrived; the meeting began with a videotape showing views of Berkeley streets, then three alternative ways of restricting traffic.

The game had three phases. The first was brainstorming. The neighbors picked a site they were most concerned about and started individually or in teams to design the street park. They used all the different model components and made their own out of paper as needed. Each resident designed his or her park on a small polyurethane base plate which fit into the model at the site for the proposed park. One after the other, each player placed the finished model into the model kit and spent five minutes explaining the design. Their initial hesitancy in describing their design objectives quickly disappeared with the encouragement of the other players and the students. After this, many modified their design, added trees, pulled out

Flexible model of an existing Berkeley neighborhood intersection, above, was modified by local residents to include mini-park, below.

Design Alternatives

Selection of lamp type: HPS could be used where high visibility on streets and freeways is required and where only light-tolerant plants would be used. Although less efficient than HPS lamps, metal halide lamps would be preferred in malls, parks, and residential areas where dense plantings are made and where color rendering of plants, people, and buildings is desired.

Shielding: The least expensive luminaires often emit light in 180° radiance under the lamp. Covering lenses or shields can sometimes be used to direct the light to the street or pavement and away from plants. More elaborate fixtures have additional built-in shielding to focus or direct light in specific luminance patterns.

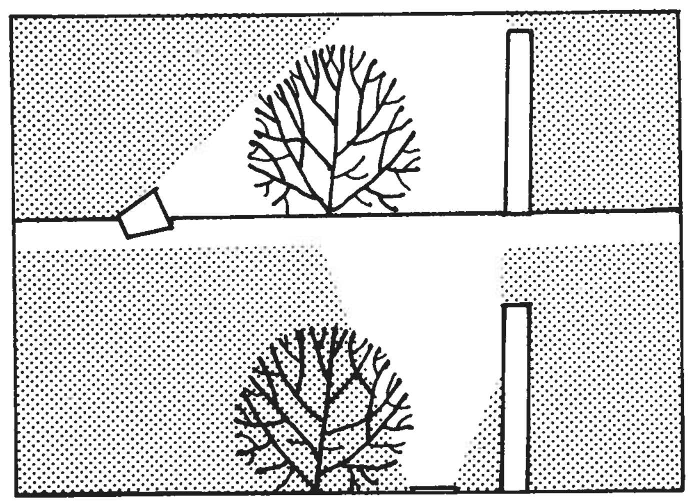
Selection of plants: Cooperative work of urban planners, landscape architects, and horticulturists should be started to identify plants which are suited to the environment of security and other regular intense lighting. Some commonly used street trees such as elm and sycamore may have to be avoided in some future plantings. With the great variety of plant material available and often not considered, environmentally adapted plantings can be designed.

Installation and maintenance programs: New plantings should be installed in the fall months to permit an almost full-year cycle of growth and adjustment prior to the following summer and fall, when the major impact of the lighting is expected to occur. To slow growth during this period and during subsequent years, the frequency of watering and the level of fertilization should be reduced. Maintenance programs during the first years of growth can greatly help to reduce the sensitivity of the plants to lighting, as well as to heat, cold, drought, air pollution, and salt injury.

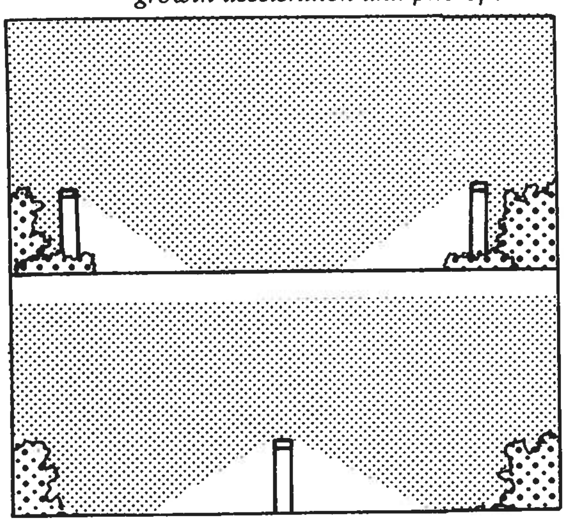
Careful placement of streets, paths, and floodlights can, of course, minimize lighting effects on all but the most sensitive species. Where foliage interferes with good light distribution and optimum visibility, lamps are almost certainly misplaced. Minimum canopy height for street trees is regulated by ordinance in many municipalities. From almost every point of view, in suburban lighting, it is best to locate street trees on the lot line rather than close to the curb, where light standards are placed.

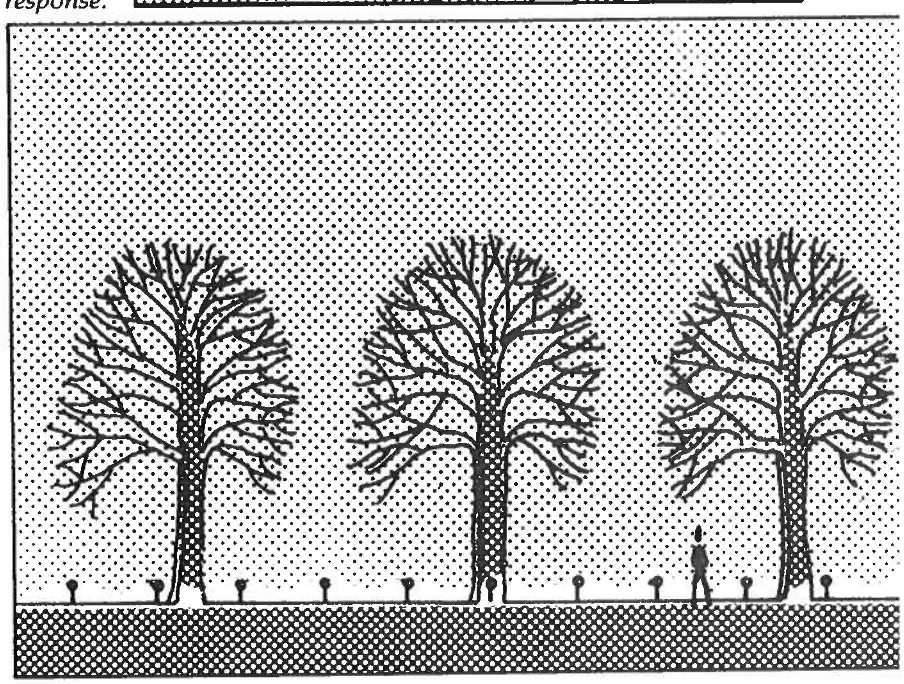
It is clear, then, that the landscape architect involved with lighting design must be aware of these biological phenomena, which will affect not only lighting choices but plant choices as well. The relative importance of these considerations increases with the harshness of the climate: Continental climates with wide variations in temperature and weather are more likely to be hazardous to imported species whose photoperiodic controls are not indigenous to their new locations. A design compromise must be reached between the desired plantings and the amount and quality of light necessary for a particular site.

(REFERENCES continued on page 514)



Backlighting of shrubs, right, is often more visually effective than floodlighting, while reducing the danger of growth acceleration and photoperiodic response.





Light bollards along the centerline of paths, above, provide better orientation with minimum effect on plantings. Right, pleasing patterns created by low, frequent walk lights have no effect on trees.

Residents agreed to a compromise design, above, which included one-way traffic pattern diverted by park at the end of the block.

Students met with residents at site to vote on final design solution.

In another study, Berkeley student Richard Titus used this sharply detailed model of a low income housing development to test predicted behavior.

bushes, shifted paths and changed walls.

Next came an informal discussion of the value of the mini-parks to the neighborhood, their maintenance, privacy in the front yards of homes adjacent to the park, intrusion, crime increase, traffic control, and design feasibility. This was followed by an attempt to choose the most convincing street park design. The participants reached a general consensus about the design features and objectives, but were not able to come to a final decision.

Workshop Two was held at the Environmental Simulation Laboratory. Its goal was to come up with a final design solution which could be simulated realistically. After reviewing the previous design solutions, residents described common characteristics and features to be used in the composite design. With more time for compromise and debate, they arrived at a consensual design. The periscope lens was then driven through the model and displayed on closed-circuit color television. The participants made a number of significant changes as a result of their new perceptions. Trees were regrouped to allow pleasant views through the park; hedges were planted on low berms to create more spatial enclosure and visual separation for a parking lot.

At Workshop Three the students presented a video recording of the design to the neighborhood residents at the site. Chalk marks on the streets indicated the area and the main features of the park. A vote on the final design concluded the meeting.

Later, several meetings took place to organize proposals to the city and funding agencies to allocate resources for the park. The media have been instrumental in catalyzing the neighborhood by changing their role from a passive to an active one, first through the videotape, which provocatively showed some alternative possibilities for their street, then through the changeable model, which gave them a vehicle to express their own ideas, and finally through the videotape they made with our help, which effectively presented their design.

Other Projects: Richmond's Waterfront
The Environmental Simulation Laboratory has been involved in a number of other planning and design projects involving citizens on a larger scale. It produced for the city of Richmond, California, an animated film which explains the city's proposals for a new waterfront

community with over 2000 housing units, a large marina and commercial development. The movie was made from a 30 ft. = 1 in. model constructed for the Community Development Agency. Starting with aerial views of the existing site, the famous Kaiser shipbuilding yards of World War Two, the film fades into an aerial view of the model in which a car is seen driving along the entry route. The car is followed at ground level to the center of the development, where the viewer "alights" and takes a "stroll" along the shopping promenade (shots taken within a 10 ft. = 1 in. model). At the end of the stroll a car drives up towing a boat, the boat is followed to a launching ramp, and soon the viewer is taking a sailing trip through the marina. The movie finishes with an overview of the development in its Bayside setting. Thus the movie extends the impact of the large site model, which is difficult to move, and conveys to the public and citizens' committees and developers what this marina will be like. Since the area currently has a very poor image as an industrial wasteland, the film becomes a crucial communications device.

But the very making of the film had some profound effects on the design. First, the construction of the model raised many new questions about the preliminary designs of the marina which had been on two-dimensional plans. A colored videotape was then made which showed that the entry to the development was overly complicated and rather confusing. This videotape was shown to the staff and citizens' committee of the agency, which allowed them to make changes in the design of the final film. The design of the whole development is now going into a detailed final phase.

San Francisco's Great Highway

San Francisco will have to uproot its Great Highway, which runs down the ocean front, to construct a major sewer line — an enormous public works project. Michael Painter and Associates has designed a curving highway* to replace it which attempts the difficult task of keeping the highway away from frontage housing, giving access to the beach, minimizing sand erosion, and providing an exciting and varied sequence of views of the ocean to visitors. The issue of what views one would see, however, was impossible to discern from the drawings. The project has been controversial from the beginning, and is still in process. A prototypical length of the highway (1/4 mi.) was modelled at 30 ft.-to-one in. Slides have been made at a number of points on the model to check the exact kinds of views that will be obtained at different points on the route, as well as from bordering homes. A film will next be made, which is the only realistic way to simulate what this massive project will actually be like for those visiting it.

Current Research

In the last few years the laboratory has made a number of films, videotapes, and sets of slides for various clients. Slides were made for the Sea Ranch development on the California coast to test the impact of new houses on the view from the highway and other homes. Professor Joachim Wohlwill spent a year in the laboratory testing the impact of different building types and attributes (size, color, land use, signage, etc.) on their compatability with two coastal landscapes, Big Sur (Type A) and Santa Barbara (Type B). As the buildings were systematically varied, slides were taken and shown to panels of subjects. A videotape of a model of a typical portion of Los Angeles was made for Victor Regnier of the Andrus Gerontology Institute at the University of Southern California, to show to elderly residents in a study aimed at learning how old people find their way around cities. Currently, different simulations of housing projects are being systematically compared by Dr. Richard Titus from the Law Enforcement Administration.

Financing

The use of periscopes and videotapes is spreading, and equipment (modelscope, video cameras, recorders, and monitors) can now be purchased for about $5000. We have two custom-designed modelscopes which have 1/5 in. diameter lenses at floor level. The cheaper modelscope ($3000) has fixed lenses; the more sophisticated one has movable prisms which allow pitch, roll and yaw movements. The support system for the periscope, such as our simulator at Berkeley, is expensive, but respectable videotapes can be made with hand-held cameras. (The Dutch were marketing simulators in 1976 for about $30,000, and these are being used in architectural schools and public agencies in Sweden, England, Holland, France, Germany, Israel, and Australia.) Some schools have made their own support system for as little as $5000.

This lab is supported through the Institute of Urban and Regional Development and the Institute of Transportation Studies, University of California at Berkeley, for about $5000 per year. The Department of Landscape Architecture budgets for materials and occasionally for teaching assistants, and the rest of the income comes from projects. An eight-minute film was recently made for a community development agency at a cost of $3200; they provided the model. Videotapes cost $20 to $75 per minute, varying with editing, animation, and commentary. A roll of 36 slides for video costs from $80 to $150. (For further information contact Donald Appleyard, Department of Landscape Architecture, Wurster Hall, University of California, Berkeley, or telephone 415: 642-4022.)

*Calio, Suzanne, "Corrective Surgery for the Great Highway," (LA Sept. '78). Author Calio says of the current situation: On June 5, 1979, the California Coastal Commission approved a permit for the construction of the transport/storage sewer box and the reconstruction of the Great Highway, subject to a number of conditions. The design illustrated in the published model was approved in concept but must be modified to keep the roadway entirely east (inshore) of the transport's west wall.