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Cover: Drawing of the California coastline by Johnny Lee, AIA, based on a portion of the *Carta Reducida* by Miguel Costano, 1771.

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Volume 15 Number 1 May 1993

The California Coast

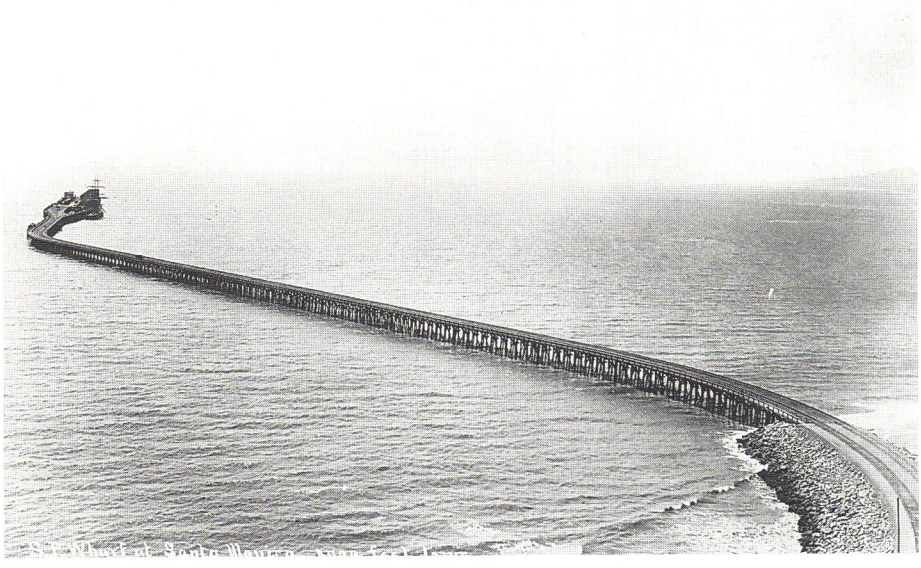
etcetera

From the Editor: Living on the Edge

The book *Living with the California Coast* offers a blueprint for seacoast conservation based on the "dynamic nature of the coast and the physical processes that continue to shape it." Authors Gary Griggs and Lauret Savoy draw a stark picture of the contradiction between the organic processes of coastal geology and the technological properties of the built environment. Their punch line: "history indicates that most structures [on the ocean's edge] should be considered temporary." With 80 percent of Californians concentrated within thirty miles of its coastline, the attitude of the state and its population toward coastal development is critical.

Together, Pilkey and Wallace, Burke, Stanton, and Grenell walk us across the contemporary terrain of coastal development. In 1972 the California voters expressed sufficient concern about the future of the waterfront to pass Proposition 20, the Coastal Zone Conservation Act, which stated that the California coast "is a distinct and valuable natural resource of vital and enduring interest to all people." The broad impact of coastal regulation on property owners, planning agencies, and governmental institutions from the local to the national level (as well as on those professions whose charge it is to build) has led to a commonly held view that counterposes the Act's dual objectives: *resource conservation* and *development for use.*

This has not always been the view of California's seacoast inhabitants. Gebhard, Tillner and Flusty, and Smith each recount different aspects of the historical narrative of building along the coast: the ecological habitation of the water's edge by American Indian peoples; the colonization of that edge for purposes of trade by the Europeans;



W. H. Fletcher, *One mile long!* The Southern Pacific Wharf at Santa Monica. California State Library.

the architectural enactments of the dream of residing at land's end; the role of 'the beach' as a shared public realm for a disparate population.

Takigawa and Sekula, through the medium of photography, document the coast as a site of work, reminding us that the picturesque images held dear in the popular imagination exclude significant commercial practices—fishing and lumbering industries, oil refining operations, shipbuilding, cargo exchange—all essential to maintaining the ocean as an *economic* resource.

Consideration of the achievable 'balance' between conservation and use thus forces us to inquire: *development of what uses for whom and conservation of what resources toward what ends*? As we labor to determine responsible state policy, let us note Griggs and Savoy's axiom, "always keep in mind that the Pacific Ocean is a very powerful force to oppose." In relation to 'shifting plate' theories of coastal dynamics, both of the state's seemingly contradictory goals miss a key point—no habitat, natural or artificial, is stable. The key issue surfaces: what can be the character of living on the edge that facilitates a dynamic natural and social coastal ecology?

Perhaps Smith's notion of the symbolic *stitch* (an artificial means of joining; a technique for healing wounds) can be reconceptualized as a *handshake* (a treaty between warring parties that holds for the moment). This relation would not have the pretense of being harmonic or 'natural'; rather it would articulate a temporal zone of peaceful coexistence between the driving forces of civilization and the ultimate power of nature. Then Sea Ranch could be seen not as a healing stitch, that is, an aesthetic symbol of the north coast "California Lifestyle," but as a momentary handshake for which *ecology* provided the sustaining principle—until the treaty was broken.

Edward S. Curtis, *On the Shores of the Pacific—Tolowa* from *The North American Indian.*

Herewith, the Editorial Board launches *etcetera*, the new supplement not bound by the chosen theme: an appendix of heterogeneous, distinctive *odds and ends. etcetera* then initiates a new feature "California Sketches" and, in memory of Allen Siple, FAIA, invites you to "whip out a sketch." "By sketching, I enhance my ability to see and feel the spaces—and this is what architecture is all about," wrote A. Quincy Jones, FAIA, in *The Sheer Joy of Sketching*. With the publication of Kurt Forster's essay, based on a lecture which concluded a series of talks and panel discussions he organized recently as Regents' Lecturer at UC, Riverside, *Architecture California* joins the exchange among architects, scholars, and campus planners regarding the future of the university campus. "Letters" engages the debate over the social practice of architecture in Los Angeles and continues the dialogue on the *time/place* relation in architecture.

Lian Hurst Mann, AIA

Don't Build on Fifth Street

Orrin H. Pilkey, Jr.
Wallace Kaufman

"Some things never change!" So said Orrin Pilkey in contributing to Architecture California *this essay written with Wallace Kaufman in 1979 as part of the 'earth-shaking' book* The Beaches Are Moving: The Drowning of America's Shoreline *(Durham: Duke University Press, 1992). Pilkey and Kaufman establish the overarching geological context for development at the coastal edge.*

No one living today remembers Sixth Street in the town of Encinitas north of San Diego, yet a subdivision map filed in 1882 shows it clearly. The developer expected Easterners to buy prime lots where they could build between the road and the edge of the cliffs overlooking the Pacific Ocean. Some residents now perched between Fourth Street and the cliffs say the map is fiction. A few longtime residents, however, remember a Fifth Street. In 1946 officials closed it. Today it has disappeared.

All along the California coast, but most spectacularly in the south, the ocean is reclaiming the land. Not claiming but *reclaiming*, because the materials of these cliffs were underwater once before. A higher sea level between glaciers tells only a minor part of the story. The other part is told by the cause of California's earthquakes. As one great plate of the earth's crust meets another, the southern California coast is bending upward. While sea level may gain on the cliffs between episodes of bending, over the past forty to fifty million years the coast has been rising. If the mind's eye could see history as a film unreeling at the rate of several thousand years a second, we would see this hilly coast rising jerkily out of the ocean. For brief seconds the old ocean floor would lie exposed to the air. Then the sea would cut its way forward, creating a new cliff in the sloping terrain. In many places the coast falls in a series of terraces, each terrace an old seafloor. The coast which resulted from this hesitant emerging of seafloor is built by layers of hardened sediment, with here and there some lava from an ancient volcano.

Fifth and Sixth Streets in Encinitas did not disappear because the ground on which they sat was ancient, but because it was seafloor. Most of the coastal hills and cliffs of California are made of sandstone, shale, and siltstone. The durability of these rocks varies, but in most cases, at least near cliffs, developers should heed the biblical warning about houses built on sand. Under the assault of the ocean these sedimentary cliffs are more like loose sand than rock.

Streets were not the only thing to disappear in Encinitas. In 1938, some nine years before the disappearance of Fifth Street, the Self-Realization Fellowship built what was said to be the largest building on the southern California coast. The four-story-high temple on the bluffs overlooking the ocean cost $40,000 to build in the midst of the Depression and was complemented by two large pools. Leakage from the pools lubricated the loosely layered rock beneath the foundations. Then in the winter of 1941 a heavy rain soaked the ground and large waves cut into the

base of the cliff. The proud temple and its towers bowed toward the ocean and pitched forward. These cliff collapses are so sudden and unpredictable that that same winter two children playing on the beach were crushed to death, and further south at Del Mar a freight train on the coastal route suddenly found itself in midair. Cliff erosion had undermined the tracks. Fortunately, three crew members were the only fatalities.

The train wreck, Fifth Street, and the Self-Realization Fellowship Building are hardly remembered. Even railroad officials do not remember or know of the old track, and geologists had a hard time in 1977 persuading them that erosion was about to dump another train. That year storms removed protective rubble from the base of the cliff, clearing the way for later storms to attack the cliffs themselves. Storms caused miles of cliff failures. When the trains were finally stopped, only seven feet separated the tracks from the cliff and the ocean, and ominous fissures were already opening in this thin margin.

Rubble at the base of a cliff, even if it does not contain bits of houses and railroads (as it often does), should tell any amateur geologist that danger lies above. As soon as one storm clears the rubble, the next could bring down the cliffs. In addition to this obvious clue, geologists note three conditions conducive to landslides: first, landslides often happen when a rainy season lubricates layers of rock; second, shale and other rocks which are bedded in smooth, thin, flat layers are most likely to slip; third, layers which dip toward the beach are most likely to give. The actual mechanism is a little more complicated. Under normal conditions, debris collects at the base of the cliff, shielding it from normal waves. Meanwhile the upper edge of the cliff retreats as drainage erodes it or small sections slump. Sooner or later the face of the cliff reaches an "angle of repose" which is more or less stable until storm waves remove the protective rubble with caves, cracks, and rock joints which collapse and accelerate cliff erosion. Ideal conditions of cliff collapse

David Schrader, *Pacific Edge.*

occur when a permeable layer of rock tilts toward the sea and lies on top of an impermeable layer. Water percolating down settles on the impermeable rock and greases the skids. This is the condition at Del Mar just north of San Diego.

Developers of a large cliff-top condominium (called "the Great Wall" by the vice-president of the town council) say fears of disaster are alarmist. Using recent measurements of erosion, they can show that the cliffs are retreating only a half inch per year. The town councilman says the Great Wall has not only walled citizens away from the beach but has walled the developers away from reality. He and geologists at the nearby Scripps Institution of Oceanography say this is a case of how to lie with statistics. They point out that average rates of cliff retreat are meaningless, since the cliffs slump suddenly, in large blocks, and more in one place than another. Developers can support their claim of a half inch a year by taking a large section of coastline and averaging the cliff retreat over the past ten or twenty years when the coast has been free of major storms and big waves. But each locale has its own history and geology. Gerry Kuhn, a La Jolla geologist, used old tax maps and railroad and land surveys to show up to eight hundred feet of shoreline retreat in Encinitas. Half of this loss followed severe storms and floods between 1883 and 1889. Stories of cliff retreat are reflected in the regular disappearance of certain maps from the official file. Kuhn says the shoreline retreat also shows up in tax assessments. As a lot begins to fall in, its value goes down. When it is no longer a viable cliff-edge lot, the records show a dramatic rise in assessment for the lot behind it. A study done by the Southern California Testing Laboratory for the Del Mar Beach Club development in 1976, Solano Beach, concluded that within no more than three to five years cliff failure, unless stopped, would destroy the clubhouse and a residence.

Even the National Museum Fisheries Building, built in 1963 on the Scripps Institute campus, is disastrously located. The "Tuna Hilton" rests partially on a piece of bluff known as a slump block. Designers say the building is articulated so that it should stay intact as the bluff falls from underneath it.

Laguna Beach Central Bluffs.