

Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

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Broken bridges and fallen arches



Arch at Steamer Lane in the before collapse in 1888.

The coastline of Santa Cruz has undergone some dramatic changes over the past century or so, and watching the waves batter the cliffs this past month it's easy to understand why. As coastal geologists we often take measurements from old aerial photographs to see how much retreat has taken place over time and then calculate cliff retreat rates. For the much of the Santa Cruz coastline the average annual erosion rates typically range from a few inches to about a foot/year. Cliff failure doesn't occur in simple six inch or one-foot increments every year, however. Instead we see arches collapse catastrophically, or as happened in Depot Hill two weeks ago, slabs four to six feet wide fail instantaneously, removing a few more fragments of the former Grand Avenue and encroaching a little closer to the cliff top homes.

Several years ago we published a book comparing old photographs of the Santa Cruz coast, many taken 75 to 100 years ago, with photographs we took from the same locations in 2006 (*The Santa Cruz Coast-Then and Now*). The arches of West Cliff Drive fascinated early visitors as they do today, but the same rock weaknesses that allowed the waves to erode those arches, have also led to their demise. Natural Bridges (previously known as Moore's Beach, Halls's Beach, and Swanton Beach) has probably been the most widely visited and photographed. Richard Hall, who came from Vermont to Santa Cruz in 1853, bought 300 acres on the Cliff Road, which included the beach and three natural bridges. Historical photographs of Natural Bridges indicate that the outermost arch was intact in the fall of 1905 but collapsed shortly thereafter. The inner arch lasted for at least 125 years but failed during a storm on the night of January 10, 1980. Today only a single arch remains

Interestingly, a half-mile to the west, directly in front of the Seymour Marine Discovery Center at Long Marine Laboratory, the mast of a coastal vessel (the *La Feliz*) leans up against the cliff. The *La Feliz* was washed onto the rocks here during a severe storm on October 1, 1924, and eighty-five years later, the mast and cliff are virtually unchanged.

Further east at the end of Woodrow Avenue (formerly Garfield) there was a triple arch for a while, which was a popular site for photographs in the late 1800's and early 1900's. Part of this arch ultimately collapsed, leaving the famous Vue de L'eau, a picturesque single arch memorialized on many old postcards. Bird Rock, a safe haven today for countless cormorants and pelicans, was connected to the coast by an arch that collapsed sometime in the 1920's.

The east side of Lighthouse Point was the site of another arch where photographs of ladies in long Victorian dresses and strange hats were often taken. A large storm in the winter of 1888 finally brought down the arch, but its base still stands in shallow water today, directly in front of the stairway where surfers heading to Steamer Lane enter the water. Lighthouse Point is now partially undermined by two separate caves, which in time will collapse, perhaps leaving new arches for the photographers of the future.