

American Society of Civil Engineers, San Diego Section
Historic Civil Engineering Landmark
SWEETWATER DAM



Story by Phil Kern, Photos Courtesy Phil Kern and San Diego Section ASCE



After relocating first to San Francisco, then to San Diego from New Hampshire, Frank Augustus Kimball acquired the former Mexican land grant known as Rancho de la Nacion in 1868 for the princely sum of \$30,000. “National Ranch” covered 26,632 acres including parts of today’s National City, Bonita, and Chula Vista; and Kimball set to offering real estate in the area for home

building, ranching and farming. By 1869 he had acquired all water rights to the Sweetwater River and established the Kimball Brothers Water Company, which was selling water by the barrel from artesian wells in the Sweetwater Valley. About this time Frank Kimball had recognized the Sweetwater Gorge as “the finest water power site that I ever saw”, but the Kimball Bros. lacked the financial resources to take advantage of it. By 1879 he had also acquired Rancho Janal and scouted reservoir sites near what is now the Otay Reservoirs. In partnership with Elisha Babcock (developer of Coronado) and the Coronado Water Company, Janal Dam was completed in June 1893, impounding Upper Otay Lake.

Kimball recognized that, in addition to water, a connection to the transcontinental railroad was needed to bring investment to the area. In return for 10,000 acres of the Rancho, Santa Fe Railroad agreed to extend a branch line to San Diego via a subsidiary set up by Kimball, the California Southern Railroad. As state law prevented railroads from engaging in land speculation, the San Diego Land and Town Company was created to develop the asset and the Company committed the \$200,000 to have the dam constructed.

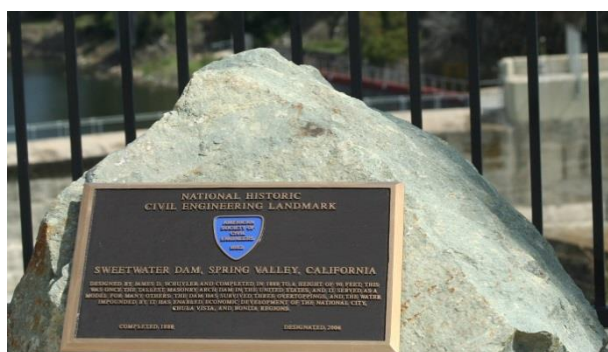
The original engineer for the dam and waterworks was F.E. Brown. Poor planning, quality and design quickly became apparent to Kimball and Company managers, and Brown received his walking papers shortly after construction started. Following Brown’s dismissal the Company retained the services of James D. Schuyler as Chief Engineer. Where Brown’s original design was a thin wall of masonry 50 feet high and only 10 feet thick at the base with an earth embankment on the upstream side, Schuyler’s was a massive stone and concrete structure over 35 thick at the base and 60 feet high. When

studies showed that 30 feet of additional height would impound three times the amount of water, Schuyler was prepared and in short order the dam was raised to 90 feet.

Schuyler was a well-traveled railroad engineer and had provided oversight for a number of major water supply projects. He was Chief Engineer for railroads in Kansas, Colorado, and Durango, Mexico. He also oversaw several domestic and irrigation water systems, just prior to the Sweetwater engagement he was the Chief Assitant State Engineer in charge of irrigation investigations in California.



Excavation for the foundation was started in November 17, 1886 by contractors Hamilton & Burkhart. Dark blue meta-volcanic rock was quarried just downstream of the dam and transported to the site by horse and mule drawn wagons. The locally produced cement used initially proved to be of inferior quality, and later better quality cement was imported from Belgium in barrels. The dam was completed on April 7, 1888 and the laying of the final stone was marked by raising the stars and stripes above the outlet tower and three cheers from the workers. When originally completed the dam was the highest masonry arch structure in the United States at 90 feet, measured 396 feet along the crest and the thickness varied from 12 feet at the crest to 46 feet at the base.



The Sweetwater Dam can be considered a solid design by any standards, having been modified no less than five times in the last 125 years and having withstood cresting by at least two floods. Schuyler raised the dam twice, in 1888 and 1911, the second time with a concrete facing raising the dam to a height of 127 feet. The 1916 Hatfield floods washed out the earth and stone abutments

at each end, but the central portion of the dam remained in place as a foundation for repairing the dam. Today the dam impounds more than 27,000 acre-feet, serves almost 200,000 residents and contains enough water to supply them all for a year.

Sweetwater Dam was recognized as a National Historic Civil Engineering Landmark in 2006 by the American Society of Civil Engineers.