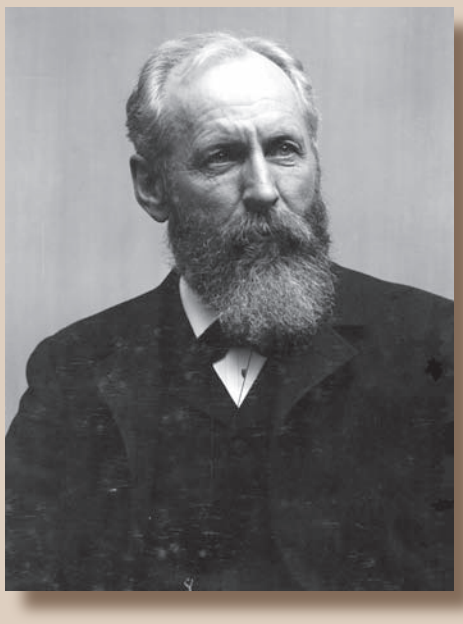


USGS Photo Library 1898

Grove Karl Gilbert (1843 - 1918) remains one of the most famous geologists to explore the American West. Many of Gilbert's personal photographs depicting earthquake damage in West Marin following the 1906 earthquake can be found throughout this publication. His many credits include serving as a prominent member of the Earthquake Investigation Commission headed by A.C. Lawson. Gilbert's early insights into earthquake processes are the foundation upon which our modern-day understanding of earthquakes has been built. His work was later expanded upon by H.F. Reid in the theory of elastic rebound.

The Birth of Earthquake Science

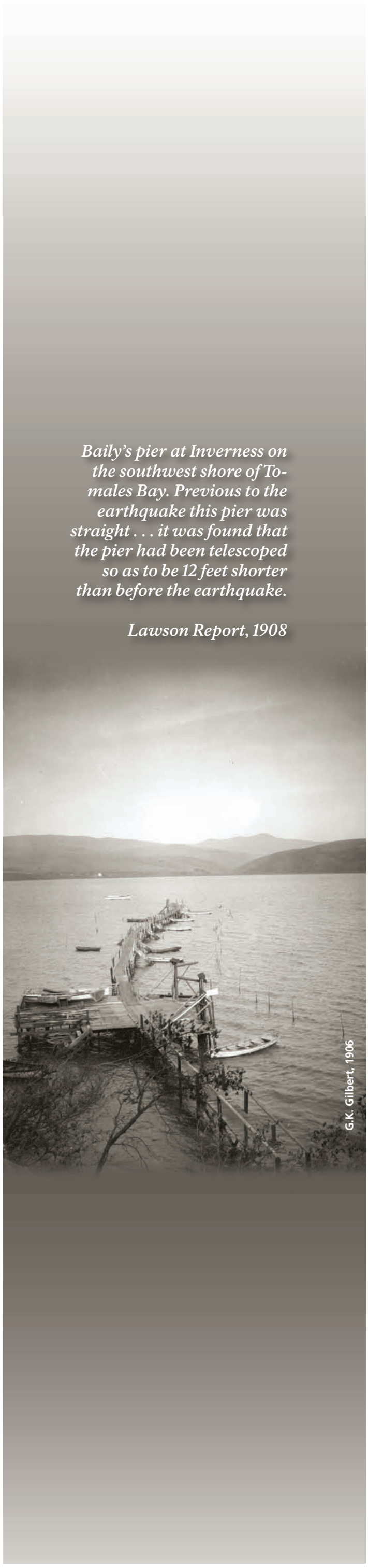
From the comprehensive scientific study of 1906, much of our modern-day understanding of earthquakes and their effects was born. Damage reports showed that destruction to buildings was strongly related to design and construction, as well as the type of ground upon which structures were built. Maps showed that shaking was most intense in areas where the ground was comprised of soft sedimentary soils, as was proven again in the San Francisco's Marina District following the 1989 Loma Prieta earthquake. Triangulation surveys revealed that displacement was greatest at the fault and decreased with distance from it. In 1910, Prof. H.F. Reid of Johns Hopkins University expanded this information in his "theory of elastic rebound" to explain the process that leads up to an earthquake event. Over time, pressure builds up along a fault. Eventually that pressure becomes so great that a breaking point is reached. All of the accumulated strain is released, generating seismic waves that radiate out from that breaking point like ripples on a pound. Those waves are what produce the shaking that occurs during an earthquake. This concept plays a key role in making predictions about how much and when the San Adreas fault is expected to slip in the future.

Predictions and Probabilities

Today, advanced monitoring has expanded research opportunities and preparedness even further. Seismographs measure shaking activity at over 1000 sites in California. Specialized equipment such as geodetic instruments track plate motion and related stressing and distortion of the Earth's crust. High powered computers help scientists track and analyze data. Because of this additional technology, scientists now know that there are hundreds of faults that make up the San Andreas Fault System. This information allows scientists to make skilled predictions about the probability, strength and intensity of potential earthquakes. From these predictions, scientists create maps indicating shaking intensity, which helps guide zoning and land-use decisions. Based on all this information, engineers develop building codes and plans for structures that can withstand shaking, while insurance companies rely on this data to create actuarial tables.

Questions Persist

When we assess all that has been learned since 1906, it is clear that tremendous strides have been made because of the foresight of those early scientists. Still, there are a number of questions that remain unanswered. Most notably, we are still unable to predict exactly when earthquakes will occur. Although we may be more prepared today, the forces at work beneath the earth's surface still hold the potential to change our lives. Perhaps it is that fate that ties us inextricably to the lives and times of those people who endured the great earthquake over a century ago.



Baily's pier at Inverness on the southwest shore of Tomales Bay. Previous to the earthquake this pier was straight . . . it was found that the pier had been telescoped so as to be 12 feet shorter than before the earthquake.

Lawson Report, 1908

G.K. Gilbert, 1906