Evaluation Of 1886 Earthquake A Scientific Step

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An extremely destructive earthquake hit lowcountry South Carolina on Aug. 31, 1886. Immediately following the quake, Capt. Clarence E. Dutton of the United States Ordnance Corps directed his office to make diligent efforts to collect data on the nature of the disturbance. Dutton wanted to know how far away the tremors were felt, their intensity, the precise time the vibrations were felt, and the duration of the shocks.

In the 1880s little was known about the transmission of shockwaves. Dutton set up a questionnaire so that his correspondents' answers could be compared with each other as well as the data he collected.

Dutton found that the Charleston earthquake was felt as far north as Boston, Mass. and Ontario, Canada; over to the shores of Lake Michigan; to Green Bay and Milwaukee in Wisconsin; to Dubuque, Iowa; to Eastern Arkansas; and down to New Orleans.

Outside of the United States there were reports affirming the shocks from Cuba and Bermuda.

A New York "Herald" correspondent gave a vivid account of the effects of the shock waves on the upper floors of New York skyscrapers. At the same time, people on the lower floors felt nothing.

Dutton and his staff were able to plot the intensity of the quake using lines to show isoseismals on a map of the United States. Charleston, the most damaged of all areas, rated a 10, while all of South Carolina fell within a range between 7 and 10. The same was true for considerable areas of Eastern Georgia and most of North Carolina. On this scale, New York and Chicago each were 3, while Richmond, Va. and Jacksonville, Fla. each were rated 6.

The earthquake stopped clocks. Dutton considered the reported times of three area railway clocks, the Charleston Western Union office clock, and the clock at James Allen & Co., before settling on Charleston's "official earthquake time" as 9 hours, 51 minutes and 12 seconds.

Next, Dutton carefully compared the Charleston time with reported times acorss the country. More than 250 cities and towns submitted the times at which they recorded the tremors. After eliminating those reportings he considered inaccurate for some reason, Dutton was satisfied that he had established accurate times that allowed him to compare those times along with the towns' measured distances from Charleston.

Besides his questionnaires, Dutton had other sources to draw upon. The Geological Survey Office in Washington sent W.J. McGee to Charleston immediately after the earthquake. There McGee found Earle Sloan, who studied the quake for two months before turning out a candid and impartial account of the earthquake.

Dr. G.E. Manigault, a professor at Charleston College, wrote an account of the damages to buildings and streets that proved to be very helpful. Carl McKinley, the assistant editor of the Charleston "News and Courier," prepared an account for the "Charleston Yearbook" that contained much valuable information.

Within a few months Dutton had accumulated nearly 4,000 reports from more than 1,700 sites.

Assembling all of the information he gained from his questionnaires and other sources, Dutton was able to conclude that the Charleston earthquake's waves traveled at a speed of from 15,500 to 18,000 feet per second. He thought the variation in speed was due to the nature of rock formations under the earth's crust.

Never before had scientists been able to calculate how fast earthquake waves travel. Clarence E. Dutton's scientific measurement of earthquakes was a giant step forward. At the same time, Dutton's report expresses a deep frustration because he was not able, with all of his detailed data, to express a single conclusion as to the cause, or causes, of the 1886 Charleston earthquake.