

Not My Fault: Of time, perception and prime meridians

Lori Dengler/For the Times-Standard
Posted June 7, 2020

A few days ago, I posted information about a recent earthquake on the Redwood Coast Tsunami Work Group's Facebook page (<https://www.facebook.com/RCTWG/>). A magnitude 5.5 earthquake occurred on June 3rd near Ridgecrest in South Central California. It was felt widely in the central and southern parts of the state and was located in the aftershock zone of the July 5th magnitude 7.1 Ridgecrest earthquake. I'm very interested in this region since the more recent 5.2 near Mono Lake and the 6.5 in Western Nevada. My post included an image with locations and dates of the three earthquakes and their aftershock sequences.

I received a polite but firm comment that I had made an error. A woman told me the Ridgecrest earthquake occurred on the 4th, not the 5th. This started a dialog. I explained that the magnitude 6.4 foreshock occurred on the 4th and perhaps she was confusing the two. Oh no she said and gave me a detailed description of what she experienced. I sent her the Wikipedia link with all the info on the earthquakes. "I don't need a link," was her response, "I went through it."

Memory can be tricky, especially with profound experiences like an earthquake, car accident, or other event that makes your adrenalin rush. Where we were, what we were wearing colors and smells may all seem etched in the mind. But your brain is selective about the information it collects and memories may be modified by what others say, what you read, and your own rethinking of it.

There are many studies about the unreliability of memory. It is of particular importance in regard to the legal system and the reliability of eyewitness accounts. A 2010 Scientific American article reviewed studies of how memory may lead to bias (<https://www.scientificamerican.com/article/do-the-eyes-have-it/>). Jurors tend to weigh eyewitness reports heavily, especially when the witness is very sure of what they saw. But what you remember is not an absolute and, according to the article, "psychologists have found that memories are reconstructed rather than played back each time we recall them."

I made one more attempt to clarify the Ridgecrest earthquake sequence with my Facebook commenter. I took a screenshot of the USGS earthquake list of the largest earthquakes in the sequence with the clarification that the dates/times were in Universal time and to get local California times she needed to subtract seven hours. The 6.4 was listed as 2019-07-04 17:33:49 (UTC) and the 7.1 as 2019-07-06 03:19:53 (UTC). Conclusion – the 6.4 occurred on July 4th at 10:33 am PDT and the 7.1 on July 5th at 8:19 pm.

This only opened a whole new discussion and made me realize that time can be confusing in more ways than one. "You mean the earthquake I experienced actually occurred the next day?" Every morning I make an audio recording of daily earthquake activity from USGS data. For earthquakes in the US I use the local time and outside the US, Greenwich Mean Time (GMT). It's not really GMT, the USGS and scientists worldwide actually use Universal Coordinated Time (UTC). But for all practical purposes it's the same as GMT or Zulu (military) time and more people are familiar with GMT as a term.

How did the time in Greenwich, England become the standard reference for the world? It's a long story and begins several centuries before the birth of Christ. Greek, Egyptian and other early scholars needed a coordinate system for locations on earth. Latitude was straightforward as the earth's rotation makes for an easy reference system with the equator and the poles. Longitude is a much tougher nut to crack.

The concept of longitude, the great circles running through the poles and around the earth like sections of an orange, goes back at least as far as the Greek scholar Eratosthenes in the third century BCE. For centuries, explorers and scholars looked for but never found an obvious marker or prime meridian on the planet where the longitude lines should begin. Ptolemy in the first second century AD adopted a prime meridian running roughly through the Canary Islands. His Geographia is arguably the first to apply the prime meridian concept to maps of the known world. There was a reason for choosing the offshore Africa location. The concept of negative numbers had yet to be invented.

As the age of exploration exploded in the 16th – 18th centuries, longitude became a political as well as an academic issue. Nearly every country wanted the world to begin in their own territory. There were more than thirty prime meridians in use - in Paris, Brussels, Antwerp, several in Italy, Spain, and Portugal and in Scandinavian

countries. Even religious groups got into the fray with a Jesuit meridian and one associated with the Vatican.

Our daughter did her undergraduate studies at a music conservatory on the site of the Royal Naval College in Greenwich. It was a wonderful place to visit and we made a number of visits to the Royal Observatory on the hill overlooking the College. On one trip we caught up with a tour group in the chronometer room where John Harrison's famous clocks are on display and were treated to a lecture on meridians, longitude and the role of the Royal Observatory. If you can't make it to Greenwich, I highly recommend David Sobel's book "Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time."

By the mid-19th century, the plethora of maps and meridians was creating confusion. An international conference was held in Washington D.C. in 1884 attended by representatives from 21 countries. As many of these countries had ties to the British Empire, it's not too surprising that the Greenwich meridian was the winner when the vote was taken.

The modern prime meridian is very close to that established nearly 170 years ago by the Astronomer Royal Sir George Airy. When we visited, throngs of tourists lined up to stand one foot on each side of Airy's line. At nighttime the meridian has a more modern presence as a laser beam arcs across the sky.

I doubt if I convinced my Facebook visitor. But it did get me thinking about time and why it's not so simple.

Note: Listen to the daily earthquake update at (707) 826-6020 or click the audio link at

<https://www2.humboldt.edu/kamome/resources>

Lori Dengler is an emeritus professor of geology at Humboldt State University, an expert in tsunami and earthquake hazards. All Not My Fault columns are archived at <https://www2.humboldt.edu/kamome/resources> and may be reused for educational purposes. Leave a message at (707) 826-6019 or email Kamome@humboldt.edu for questions/comments about this column, or to request a free copy of the North Coast preparedness magazine "Living on Shaky Ground."

<https://www.times-standard.com/2020/06/06/lori-dengler-of-time-perception-and-prime-meridians/>