

The recent earthquakes in Turkey and in Greece have left massive devastation in their wake: thousands are dead, many more thousands injured, and even more left homeless with winter about to descend. Unfortunately, this is not the first time that earthquakes have created such destruction and misery, for the Eastern Mediterranean is a seismically active region, and earthquakes have been a constant companion for those who live there. Today we know what causes these deadly events: the movement of the earth's various tectonic plates as they slide by or crash into each other. In the ancient world, however, the cause of an earthquake was a subject of much speculation, some of which has come down to us in the ancient writings of Greece and Rome.

For many ancient peoples, the cause of an earthquake was obvious: the gods, especially Poseidon, were angry and had vented their wrath on human beings. For these people, it was important to determine what had caused the divine wrath, make appropriate atonement, and pray that the ground would never move again. For others, however, blaming the gods was unsatisfactory: they wanted to understand what we today would call the scientific reason for earthquakes. Theorizing about the non-divine causes of earthquakes seems to have begun in Greece as early as the 6th century BC, when the philosopher Anaximenes postulated that earthquakes were created by "heat and cold". By the fifth and fourth centuries, there were other theories: Plato, for example, stated that the reverse rotation of the earth caused the ground to shudder (as indeed it would, if the earth ever did decide to reverse its spin!). Aristotle, the most famous pupil of Plato, developed his own theory: wind that blows within caverns inside the earth cannot find an exit, and thus cause violent shaking of the ground. Aristotle went on to explain that there were different kinds of earthquakes, which he labelled "horizontal, heaving, sinking, splitting, thrusting and oscillating". By the first century BC, Aristotle's windy explanation had become entrenched: for example, Dionysius of Halicarnassus wrote that wind in channels beneath the ground of Rome caused many earthquakes, while the geographer Strabo was convinced that wind, along with fire, beneath the earth produced violent earthquakes because they could not escape through blocked up vents. Strabo clearly followed Aristotle in believing that the interior of the earth was full of

cavities, holes and vents. Even in the third century AD the influence of Aristotle continued: Diogenes Laertius also put the blame for earthquake on wind, stating that quakes took place when wind became imprisoned in hollows inside the earth.

While such speculation may seem quaint to those of us familiar with the plate tectonics of modern geology, ancient writers did leave us an intriguing record of many devastating earthquakes in the ancient Mediterranean. One of the most famous was the earthquake at Sparta in 464 BC. Indeed, Sparta was in such distress after this disaster that its subject "helots" (state slaves) rose in rebellion. As Plutarch tells the tale, only five houses were left standing after the quake, and youths who had been exercising in a gymnasium were buried when it collapsed; he adds that only an immediate call to arms (and the arrival of help from other states) put down the ensuing helot rebellion. Cicero tells us that this disaster had in fact been predicted by the scientist/philosopher Anaximander, who had urged the Spartans to leave their city, but to no avail: it has been estimated that as many as 20,000 people died in this earthquake. Sparta, however, recovered from this blow and resumed its role as one of the most powerful of the Greek city-states, even defeating Athens in the famous Peloponnesian War.

Unlike Sparta, the city of Helike, located on the Gulf of Corinth, would not recover from the earthquake that struck it in 373 BC. A number of ancient sources recount that the quake rocked the city at night, and that Helike then disappeared under the sea, its entire population wiped out. It would appear that a seismic sea wave (a tsunami) thrown up by the earthquake struck the city its death blow. Interestingly, some sources claim that animals in the area gave a warning of the impending disaster by leaving the city five days earlier, and there is indeed some modern evidence that animals do behave unusually prior to an earthquake. The same quake also destroyed the city of Boura, which was located on a hill near the sea. It was said to have disappeared into a chasm of the earth, and the only inhabitants to survive were those who were lucky enough to be out of town when the disaster struck.

The Roman world also suffered its share of earthquake trauma. Pliny recounts that in the year 217 BC alone (during the war with Carthage) there were 57 earthquakes in Italy – surely a year for the record books! Rome itself was struck by small earthquakes in 56 BC, 49 BC, 48 BC,

and 43 BC. We really don't know a great deal about these events because the sources are more concerned with earthquakes as omens rather than as phenomena in themselves; thus we hear about these quakes being accompanied by strange blazes of light, unnatural animal behaviour (including beasts giving birth to young of different species!), lightning strikes on temples and cult statues, eclipses of the sun, blood running from a bakery to a temple, the escape of a bull about to be sacrificed, the sighting of a new star, etc. There is one Italian earthquake, however, about which we know a fair amount: that which struck Campania, to the south of Rome, in 62 AD.

According to Seneca, this disaster took place in February and wrought much devastation to the cities of Pompeii, Herculaneum and Naples (the same cities that would feel the wrath of Mount Vesuvius in 79 AD). He adds that the quake lasted several days and gradually became weaker; this would seem to describe one major shock followed by numerous but smaller after-shocks, as is quite common in large-scale earthquakes. The destruction was so bad that a plague broke out in the aftermath, most likely due to unhygienic conditions. Modern scientists have hypothesized that this quake was actually connected to the awakening of volcanism in Mount Vesuvius, but the inhabitants of the region would not have known this and so they simply rebuilt their shattered towns and met their doom 17 years later.

The most famous (or perhaps infamous) earthquake of the ancient world, however, never took place! According to Plato, the island of Atlantis, bigger than Libya and Asia put together, was destroyed in a single day and night by earthquakes and floods because the gods had become angry with its inhabitants. In reality, there is no evidence that an actual Atlantis ever existed, and it is likely that Plato was writing an early form of science fiction. However, it remains remotely possible that there was a real "prototype" for Plato's account of the destruction of Atlantis: back in the Aegean Bronze Age, perhaps in the seventeenth century BC, an earthquake seriously damaged the city of Akrotiri on the Cycladic island of Thera (also known today as Santorini). Like the future inhabitants of Pompeii, the people of Akrotiri returned to their town and rebuilt it on a grand scale – only to see it engulfed by a volcanic eruption some years later. Indeed, the parallels between what took place at Akrotiri and at Pompeii are so close that some have come to call Akrotiri "the Bronze Age Pompeii".

Clearly, while the ancient inhabitants of the Mediterranean did not really understand the forces that created earthquakes, they surely endured more than their fair share of them. It is a testament to their resiliency that so many cities and towns were reclaimed and rebuilt, except, of course, for the ill-fated Helike and Boura, never to be seen again (unless underwater archaeology can come to the rescue in the case of the former). Let's all hope that whatever angry gods or natural processes lie behind earthquakes will now give the people of the Mediterranean a respite in the wake of these recent disasters.