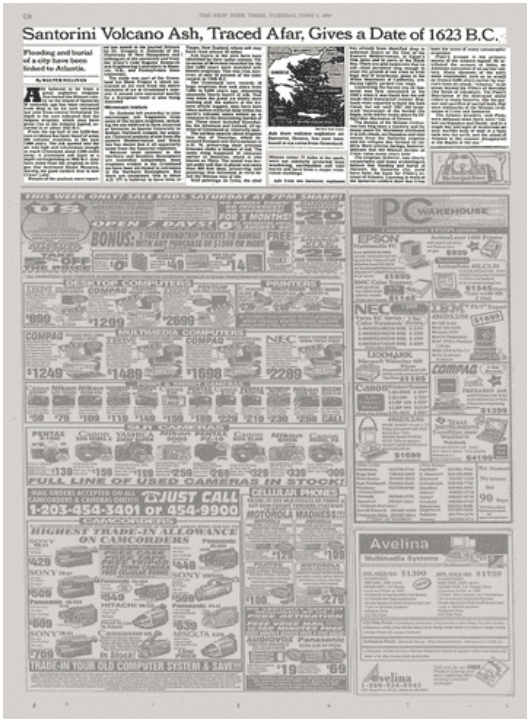


Santorini Volcano Ash, Traced Afar, Gives a Date of 1623 B.C.

By Walter Sullivan

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ASH believed to be from a great explosive eruption that buried the Minoan colony on the island of Santorini 36 centuries ago has been extracted from deep in an ice core retrieved last year from central Greenland. Its depth in the core indicated that the Aegean eruption, which may have given rise to the Atlantis legend, occurred in or about 1623 B.C.

From the top half of the 9,000-foot core evidence has been found of some 400 volcanic eruptions in the past 7,000 years. The ash spewed into the air was high and voluminous enough to reach Greenland, about 3,500 miles away. A prominent ash layer at a depth corresponding to 4803 B.C. may have come from the eruption in Oregon that destroyed Mount Mazama, leaving the giant caldera that is now Crater Lake.

Results of the analysis were reported last month in the journal *Science* by Dr. Gregory A. Zielinski of the University of New Hampshire and colleagues at the university and from the Army's Cold Regions Research and Engineering Laboratory in Hanover, N.H., and Pennsylvania State University.

The study was part of the Greenland Ice Sheet Project 2, which extracted an ice core from the entire thickness of ice at Greenland's summit. A second core extracted nearby by a European team is also being analyzed. Microscopic Analysis

Dr. Zielinski left yesterday to take microscopic ash fragments from some of the largest eruptions, including the one believed to have occurred at Santorini, to Queens University in Belfast, Northern Ireland, for analysis. Chemical analysis of ash from the eastern Mediterranean and Black Sea has shown that it all apparently came from the Santorini explosion.

Because wind systems in the Northern and Southern Hemisphere are somewhat independent, most eruptions evident in the Greenland ice have been attributed to volcanoes in the Northern Hemisphere. But there are exceptions. One in about A.D. 177 is believed to have been at Taupo, New Zealand, whose ash may have risen almost 40 miles.

Ash layers in the core have been identified by their sulfur content. Fifty-seven of 69 events recorded for the last 2,000 years were matched with known eruptions. This was true, however, of only 30 percent of the older record, to 7,000 B.C.

The Greenland core records 18 huge eruptions that took place from 7,000 to 9,000 years ago, depositing unusually heavy layers of ash. That was when the great ice sheets were melting and, the authors of the Science article suggest, may have been when molten material deep within the earth's volcanic zones welled up in response to the diminishing burden of ice. Those zones included Kamchatka, the Aleutians and Iceland, all upwind of Greenland or relatively near.

The earliest exactly dated eruption was that of Vesuvius, which destroyed Pompeii and Herculaneum in A.D. 79, preserving their precious frescoes under a blanket of ash. The same thing happened 16 centuries earlier at Santorini, which is also known as Thira. The island was buried under ash that in places was more than 900 feet deep, preserving wall paintings that document in vivid detail the Minoan way of life.

Wall paintings on Crete, the chief Minoan center 75 miles to the south, were not similarly protected from weathering, earthquakes and tidal waves and have been a major restoration challenge. Wide Area of Fallen Ash

Ash from the Santorini explosion has already been identified deep in sediment layers on the floor of the Eastern Mediterranean, in Egypt's Nile delta and in parts of the Black Sea. There are also suspicions that its ash cloud persisted long enough to stunt the growth of oak trees in Irish bogs and of bristlecone pines in the White Mountains of California, producing tightly packed tree rings.

Uncovering the buried city on Santorini was first stimulated in the 1860's when it was found that the ash made ideal waterproof cement. Shiploads were exported to build the Suez Canal, but not until 1967 did large-scale excavation of the buried city begin, to be led for many years by Dr. Spyridon Marinatos of Greece.

The demise of the Minoan civilization has long been a mystery and for many years Dr. Marinatos attributed it to ash clouds, earthquakes and tidal waves from the Santorini eruption and the collapse that formed its caldera. More precise datings, however, indicate that the Minoan decline on Crete came many years later.

The eruption, however, was clearly catastrophic and many archeologists believe that flooding and burial of Akrotiri, the Santorini city, could have been the basis for Plato's account of Atlantis. Layering in walls of the Santorini caldera show that it has been the scene of many catastrophic eruptions.

Plato's account is the primary source of the Atlantis legend. He attributed the account to Solon, an Athenian statesman of an earlier century. Many elements of the story seem improbable, such as an attack on Greece 9,000 years earlier by warriors from an island,

"Atlantis," in an ocean beyond the Pillars of Hercules (the Strait of Gibraltar). Yet Plato's description of the destroyed island refers to many features, like the pursuit and sacrifice of sacred bulls, that were hallmarks of the Minoan civilization of Crete and Santorini.

The Atlantis invaders, said Plato, were defeated when there were "violent earthquakes and floods; and in a single day and night of misfortune all your warlike body of men in a body sank into the earth, and the island of Atlantis in like manner disappeared in the depths of the sea."

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