

Volcanoes in Human History. Jelle Zeilinga de Boer and Donald Theodore Sanders. Princeton University Press, 41 William Street, Princeton, New Jersey, USA. 2002. 295 pp. Price US\$ 16.00 (paperback); US \$: 29.00 (cloth edition).

I read this book while travelling from Santiago, the capital of Chile, to a sleepy village of Moullin, situated thousand kilometres away, where the giant tsunami in 1960 wrought havoc. As the jeep sped away along the highway, I could see the gleaming ice-capped volcano of Ozorno looming in the faraway horizon. This volcano, currently quiescent, is a much sought-after tourist centre in Chile. Geological inspection conducted in some sites later convinced me of the unmistakable evidence of volcanic activities in the vicinity. I had the same intuitive feeling while scaling the heights of the Barren Island Volcano in the Andaman Sea, some years ago, and also the now-dormant Narcondum Volcano to its north. In spite of their present benign demeanours, both these volcanoes have the potential to create disasters in the Indian coast and Myanmar or other littoral countries depending upon the prevailing direction of the wind and their explosivity indices. This book is meant to give the readers a suitable background to appreciate the awesome potential of such volcanoes, masked by a deceptive tranquillity.

Volcanoes can cause destruction and death as well as regeneration of life – a definitive attribute of the gods in various cultures. The book focuses on this dual nature of volcanism by exploring nine cataclysmic eruptions in human history, their impact on the development of mythology and culture, and narrates the consequence of those events in society at large. As Susan Sontag (though little known in India, her death was widely covered, rather surprisingly in Indian newspapers in English) wrote in her novel, *The Volcano Lover*, which is aptly quoted in this book, ‘The Mountain is an emblem of all the forms of wholesale death; the deluge, the great conflagration, but also of survival, of human persistence. In this instance, nature run amok also makes culture, makes artifacts, by... petrifying history. In such disasters, there is so much to appreciate’. The book tells how man (and woman!) endured it all and survived. The avowed objective of the authors is to demonstrate that such contingent geological events do

indeed influence the historical progression of the human society (among other factors, I suppose).

The book begins by discussing how the volcanoes originate and go through various cycles until they die. There is also a discussion on the plate tectonic theory that explains the spatial occurrences of volcanoes around the globe and their relation to the overall geodynamics. The authors like to compare the volcanic eruption and its after-effects to a vibrating string – a recurring metaphor in the book – that keep resonating in human affairs even after the eruption, for decades to millennia. The authors cite the example of the Indonesian volcano of Tambora that exploded in 1815, in the greatest eruption known to written history. It killed about 70,000 people and destroyed forests and agricultural land. But its long-term effects consisted of lingering dust and aerosols that travelled around the globe through the atmosphere, producing prolonged winter. This inclement weather caused human misery and hunger (even riots) in many parts of the world. This gloomy world inspired writers like Mary Shelley to create immortal novels like *Frankenstein*.

The reader is first taken to the Hawaiian Islands, where the people have learned to live with volcanism and tsunamis (in fact the Hawaiian volcanoes flow rather than explode and pose little danger to people, but can be highly destructive to cultivated areas). The narration seemed to linger extensively on the Hawaiian mythology, although a reader outside the North American continent would find this overdose, a trifle boring. The mythology often represents the collective memory of the community and the stories therein may symbolize the metaphorical descriptions of some actual events. Like Hawaiians, many societies believe in catastrophic deluges and earthquakes as a punishment for human sins. Our forefathers wondered at these phenomena and considered them supernatural. They wanted to gratify those powers through offerings and personify them through magic and occult. These myths are still alive in places like Hawaii, and the islanders try to please the fire goddess called Pele by placing offerings like food, bottles of brandy, and items of clothing. For the scientific community, however, it was a bonanza, for it was in Hawaii that they were able to gain many insights into mantle plumes and associated geodynamic issues, besides the islands

being a natural laboratory for volcanic phenomena. In fact, these islands have a major role in the development of the plate tectonics – the grand unifying theory in earth sciences. The authors should have dwelled more on such inspiring and intellectually uplifting stories.

The authors then turn to the eruption of Thera during the Bronze Age (3500 years ago) in the eastern Mediterranean Sea, about 110 km north of Crete. It is considered to be the most devastating natural catastrophe in all of human history, which destroyed the Bronze Age Minoan civilization, the cultural ancestors of classical Greece. Since there was no script, no written records of the event were preserved. However, the myths that have been passed down include memories of the catastrophe – the most famous being the story of the ‘lost continent’ of Atlantis. This may be interpreted in terms of the violent destruction of the island of Santorini (Thera) and the deaths in nearby Crete. It may not be a coincidence that the Greek philosopher Plato reported this as hearsay, coming down to him from remote ages. Several books in the past have indicated the relation between volcanic eruption in the Mediterranean region and the Atlantis legend, such as Dorothy Vitaliano’s *Legends of the Earth*.

The eruption of Vesuvius (in southern Naples) in AD 79 marks an important period in the science of volcanology, and it also helped to develop the science of archaeology. It also earned the notoriety for destroying the then flourishing Roman towns of Pompeii and Herculaneum. Pyroclastic flows and ash smothered these towns, but it may be better described as ‘entombed’. The buildings and the dead are still preserved under the volcanic ashes like flies within amber, for posterity to study and document. Excavations revealed the way the Romans lived in those times. Vesuvius was widely represented in Western art and the authors believe that it led to the rise of neoclassicism (reflecting the Pompeian motifs) in the decorative arts, replacing the elaborate ornamentation of the earlier ‘rocaille’ style.

Iceland offers yet another live example of volcanism, where the mantle plume associates with a mid-ocean ridge that sustains a huge volcanic factory. Like Hawaii, it offers a fertile ground for mythology inspired by volcanic cataclysms. The authors argue that the literature and music of Scandinavia and Germany have been influenced by the Icelandic mythology,

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which often refers to the final battle between gods and the giants. It seems probable that the great German composer Richard Wagner (particularly his monumental work *Götterdämmerung* – Twilight of the gods) may have been inspired by the Icelandic stories. The eruption of 1783 (Laki) in Iceland is said to have affected the environment in the Northern hemisphere. It also coincided with the changing climatic conditions known as little ice age.

The eruption of Tambora (Indonesia) in 1815 is another cataclysmic event in modern history (volcanic explosivity index of 7, which volcanologists term as 'colossal'). It obliterated entire populations – more than 70,000 people died. Worldwide temperatures dropped and patterns of rainfall changed dramatically. This was an order of magnitude greater than that of the Krakatau eruption in 1883. Both Tambora and Krakatau eruptions also caused giant sea waves called tsunamis destroying the nearby coastal towns (during eruptions, flanks fall into the sea causing tsunamis).

Authors indicate that these activities resulted in worldwide climatic variability. One might raise a question now: how strong is this correlation between weather extremes and volcanic eruptions? A global cooling trend had already set in much before the eruptions of Tabora or Laki. Would it not be safer to say therefore that volcanic activity only accelerated the trend, and it was not the primary agent of the climatic change?

The book also discusses the 1902 eruption of Mount Pelée at the northern end of the Caribbean Islands, and the 1961 eruption of the South Atlantic island of Tristan da Cunha. Both these eruptions had precipitated political crises in their respective regions. The book squares-off the narration with the eruption of Mount St. Helens (British Columbia) in 1980 – a most closely studied and highly publicized example of a geological event. The book gives snapshots of seven specific eruptions. Starting from the blast of Thera during the Bronze Age and ending in the more

recent explosion of Mount St. Helens, the readers are taken on a field tour to show how human destiny is linked to geological events and how they led to consequences ranging from societal disruption to mass destruction, besides inspiring ancient myths, modern novels and movies. The book is presumably intended for general reading. But the authors seem to be addressing only the readers of the United States, when they compare the size of Iceland to the size of the state of Virginia (page 108). The book contains much information and many tidbits that may interest the non-specialists, but for those who like drama and verve, I would suggest books like Simon Winchester's *Krakatoa*.

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