

GEOPHYSICS

Volcano Related to Sunset

Whether the eruption of an Indonesian volcano flung enough dust into the atmosphere to cause beautiful autumn sunsets is being debated by astronomers—By Barbara Tufty

► DID THE VIOLENCE of a volcano cause extra beautiful sunsets half a world away?

This question is still being debated these days and nights as sunset colors have been observed unusually bright and long.

The eruption of the Indonesian volcano Agung on Bali last March 17 flung enough dust into the atmosphere to bring brilliant sunsets to this hemisphere, in the opinion of Dr. Aden B. Meinel of Steward Observatory, University of Arizona, Tucson.

His hypothesis is backed by reports from the Inter-American Observatory at Cerro Tololo, Chile, and the Mount Stromlo Observatory of the Australian National University at Canberra, both of which have observed "extremely dusty skies" in the Southern Hemisphere for six months.

Since early September bright colorful sunsets and sunrises have been observed and analyzed by Marjorie Pettit Meinel and Dr. Meinel, in the 30 degree north latitude zone, an area extending south of Tucson, Ariz.

Height of the brighter glow reaches about 73,000 feet, and that of the fainter glow extends about 173,000 feet, they reported. The intensity and appearance of the sunset glow change from day to day, reflecting the diffusion of the volcano dust into this hemisphere.

Other scientists recognize the phenomena of brighter sunsets, but are more cautious about crediting the beauty to the Bali volcano.

"There is no quantitative information that the sunsets are caused by dust from the Agung volcano," states Dr. Gordon Newkirk of the High Altitude Observatory in Boulder, Colo. He reported bright sunsets in Arizona at the end of September, and unusual mother-of-pearl cloud formations in Colorado on September 25.

Sunsets were a bit brighter around the High Altitude Observatory, he observed, and glows have remained in the sky long after the sun has set. For several weeks after the volcano erupted, unusual sunsets attributed to the explosion were reported from Africa.

To place dust 80,000 to 100,000 feet into the atmosphere, a very violent explosion must take place with enough heat to propel the fine particles to the height necessary for them to be carried around the world, stated Dr. Murray Mitchell of the U.S. Weather Bureau in Washington, D. C. Existing reports on the Agung eruption, he said, did not indicate that it was intense enough to throw dust that high into the atmosphere. However, he believes that Dr. Meinel is probably correct in attributing the sunsets to the volcanic dust.

"It seems that no one was really check-

ing the volcano for specific data needed for this question," he said. Even the weather satellite Tiros gave no information, he pointed out. In another few months an analysis of solar radiation from stations around the world will give data on the decrease of sunlight on earth and show the density of the spreading dust.

Intensity of a volcano is only one of the factors contributing to throwing dust high into the air, according to an official at the U.S. Geological Survey in Washington, D. C. The dust may be funneled high enough in the air, or it may be scattered relatively close to earth.

In answer to possible other theories causing the unusual light, Dr. Meinel points out that there has been no large atmospheric nuclear explosion since the Agung eruption.

"There has been no meteor shower in all of recorded history that could spread dust over the entire globe with detectable intensity," he said. Tropospheric dust from the drought inflicted over parts of the United States could not rise to the high levels observed for the volcanic dust, he added.

A report from Dr. M. T. Zen at the Institute of Technology at Bandung, Indonesia, states that the volcano Agung was dormant for 120 years before its activity began to increase on Feb. 18. The eruption of March 17 produced hot fragments of ash, cinders and fluid particles that flowed down the slopes to kill 1,500 people. A heavy rainfall immediately after the eruption caused mud-like flows that destroyed more villages and killed 200 more persons.

The largest volcanic explosion in modern times occurred when the volcano called Krakatoa, on a small island in Sunda Strait, Indonesia, in 1883 propelled enough fine particles high in the atmosphere to cause brilliant sunsets and afterglows for several years, even in the Northern Hemisphere. Other violent volcanoes include Bezymyannaya in Russia in 1956, Mt. Spurr in Alaska in 1953 and Mt. Katmai in the eastern Aleutian Islands in 1912.

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GEOLOGY

Land of Fire and Ice Continues to Rise

► A FIERY VOLCANO is boiling out of an empty sea near an icy land of volcanoes—Iceland.

The five-week-old volcano island off the southern shores of Iceland now stands about 100 yards high and 1,000 yards in diameter.

Still erupting at erratic intervals, the smoking chunk of land has been building up since Nov. 14, when the first eruption broke through the sea about 12 to 18 miles southwest of the Vestmannaeyjar or Westmann Islands.

Iceland, about the size of Georgia, is composed entirely of volcanic rock which suddenly sprang out of the open sea between Britain and Greenland about 50 million years ago. At that time, geologists believe now, great floods of basalt rock poured up from undersea volcanoes and piled up to thicknesses more than 10,000 feet high.

During the following ages, this volcanic mass went through stages of sinking, being added to by other volcanoes, and ground down by great sheets of ice to form Iceland as we know it today.

About 150 to 200 volcanoes exist on this island, 30 of which have been active since the beginning of Icelandic settlement nearly 1,100 years ago.

Geologists believe that about 500 active volcanoes exist in the world, 300 of which lie in the "ring of fire" around the Pacific Ocean area.

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