

EVENING MEETING NOV. 8, 1976

FRED M. BULLARD—Biographical Sketch



Dr. Fred M. Bullard is Professor Emeritus of Geology at the University of Texas at Austin where he has been a member of the faculty since 1924. From 1929-1937, he was Chairman of the Department of Geology. In 1945 and again in 1954, he was a Distinguished Lecturer for AAPG and he was in the Visiting Scientist program of the American Geophysical Union in the spring of 1966 and in 1968-69. He is a

Fellow, Geological Society of America and Mineralogical Society of America and a member of AAPG, Phi Beta Kappa, Sigma Xi, and Sigma Gamma Epsilon. While on a U.S. Geological Survey expedition to Alaska in 1929 Dr. Bullard saw, for the first time, an active volcano and became interested. Since that time, he has studied volcanoes in many areas of the world and is a recognized authority on volcanoes. He has published numerous scientific papers and bulletins. In 1962, he authored a book entitled *Volcanoes, in Theory, in History, in Eruption*. A revision and enlargement of this book, under the title *Volcanoes of the Earth*, published by the Univ. of Texas Press, is scheduled for release in November 1976.

Beginning in the 1880s, a world-wide warming trend set in, which reached a climax in the 1940s, and since that time has reversed. The role of volcanic dust was examined in an effort to account for these world-wide temperature changes, and it was concluded that major volcanic eruptions were responsible for lowering global temperature. The study was expanded to include pollution of the atmosphere by carbon dioxide, smoke, dust particles, etc., largely derived from the combustion of fossil fuels, petroleum and gas. The results showed that pollution by human activities was minor compared to the contribution by volcanoes and that volcanic dust is an important factor in world-wide temperature changes.

Periodic ash falls from volcanic eruptions maintains the fertility of the soil. A study in Indonesia shows a direct relationship between soil fertility, density of population, and the location of active volcanoes.

VOLCANOES AND THE ENVIRONMENT (Abstract)

by: Fred M. Bullard

The environmental impact of volcanoes is far reaching and while the destructive effects are the ones commonly associated with volcanoes, the overall impact is certainly beneficial. The destructive effects of volcanic eruptions, such as lava flows, ash falls, hot avalanches, and mudflows are briefly reviewed. The most dangerous and least predictable are mudflows, such as the one that destroyed Herculaneum in the 79 A.D. eruption of Vesuvius. Mt. Rainer and other volcanoes of the Cascades are potential sites for destructive mudflows. The possible extent of such flows, based on past history, is considered.

The major environmental impact of volcanoes is in their effect on climate and soils. The huge quantity of ash ejected into the atmosphere in a major eruption results in a decrease in the solar radiation and a lowering of the temperature. The unusually cold weather throughout the world in 1816, commonly known as the "year without a summer", coincided with the eruption of Tambora Volcano in Indonesia. The eruption of Krakatoa in 1883 had a noticeable effect on the climate. Measurements of solar radiation being conducted at the time of the 1912 eruption of Katmai Volcano proved the effectiveness of volcanic ash to lower the temperature.