

## UCSD Professor leaves to study Central American Volcanoes

**May 11, 1963**

A University of California geologist leaves San Diego in June to study how Mother Earth makes her mountains.

His Central American laboratory-- one of the most active volcanic regions of the world-- is the scene of some of the earth's greatest upheavals.

Dr. Alexander R. McBirney, Assistant Professor of Geology at UCSD, will be continuing an investigation he began ten years ago in an effort to define and interpret the geologic history of the Central American Volcanic Province.

Extending southward from Mexico along the Pacific coast of Central America as far as northern Costa Rica, the region today harbors more than 50 known active volcanoes. It also constitutes one of the best examples of an active mountain-building system on the American continent, Dr. McBirney believes.

If the study lives up to its promise, geologists will have a new insight into the tumultuous processes that have been going on in the earth's interior for millions of years and have constructed the landscapes we view today. And it is volcanism which plays a leading role in these processes.

"Volcanoes," Dr. McBirney says, "are trying to tell us something about what happens within the earth, but unfortunately we can't yet understand their message. Right now, we have more data from them than we are able to interpret. Some day we hope to use volcanoes to learn much about the composition and structure of the earth and the forces at work beneath, the crust."

The Central American Volcanic Province is an exceptional region for geologic study, he explains. By studying the nature of the volcanic rocks in different parts of the region we hope to learn more about their ultimate origin and how they are related to the great structural changes presently in progress.

Other volcanic areas, such as the Cascade Range of the Pacific Northwest, have undergone such extensive deformation during their long and complex history that they are now difficult to interpret. This is not the case in Central America where we can still see a mountain-building system in its early states of development.

"We'd like to put together a coherent picture of the geology of all Central America," Dr. McBirney says. "Our opportunity to do this is unique. Rarely does one find a situation in which the geologists who have mapped a complete system, such as this, and have studied the rocks in their natural setting, can carry through a comprehensive laboratory study of the chemistry and mineralogy of all the rocks and view the entire problem in all its important aspects."

Dr. McBirney's associate in the study will be Dr. Howel Williams, Professor of Geology at the UC Berkeley campus, who has already devoted over a decade to his Central American studies. Dr. Ken-ichiro Aoki, who is coming to UCSD from Tohoku University, Japan, will analyze chemically large numbers of the rocks and join in the interpretation of the data obtained through laboratory studies. In addition to a common interest in the geology of Central America, the three geologists share a fascination for volcanoes and the rocks they erupt.

Volcanology-- the study of volcanoes-- offers an insight into Many intriguing geological, chemical, and geophysical problems. Dr. McBirney's work-and the current research of many volcanologists-- seeks to answer several fundamental questions:

How is magma (the fluid rock which is erupted at the surface as lava or ash) generated in the earth, and what are the forces responsible for propelling it to the surface?

Why do the eruptive processes of volcanoes differ so dramatically? What are the mechanisms which provoke a sudden, violent explosion in one volcano and only a quiet effusion of lava in another? Why do the rocks often differ so widely in their chemical and mineral composition?

Molten rock brought from tens of miles within the earth's interior provides geologists with valuable evidence of what lies below the thin veneer of rocks visible on the surface. And an understanding of the mechanisms which enable lava to rise through the crust of the earth would also reveal much about the forces involved in mountain-building.

Can volcanologists accurately predict an eruption? The answer, Dr. McBirney says, is yes-- with many qualifications.

The common conception of a volcano is a towering, cone-shaped mountain (such as Fuji in Japan) with a fuming crater at its peak from which is periodically spewn a torrent of flaming rock and lava. Actually, no two volcanoes are alike, and, like people, each has its individual personality, Dr. McBirney explains. Scientific methods designed to study one type may have to be revised in the study of another.

Hawaiian volcanoes, such as Kilauea and Mauna Loa, are among the most active in the world, Dr. McBirney says, yet their eruptions are usually so quiet and their lava flows so gentle that rarely is there danger to life on the islands. In contrast, Mt. Pelee, on the Caribbean island of Martinique, expelled such a devastating cloud of hot gases on the morning of May 8, 1902, that the entire seaport with its 36,000 inhabitants was wiped out in seconds after the initial explosion.

Accurate prediction of eruptions requires not only a great amount of study, but also many costly measurements.

"Because of the expense of maintaining observatories it is impossible to watch every volcano," says Dr. McBirney, "Except in densely populated regions we can only hope to observe those which are known to be especially dangerous or of special scientific interest.

One which has been dormant for centuries, as was Vesuvius before the eruption of 79 A.D. which destroyed Pompeii, may not be watched at all, and it is these which sometimes cause the greatest devastation. Given enough data, however, we can usually tell when something suspicious is taking place."

One signal of impending activity may be the number of earthquakes and small tremors which become more numerous and shallower before an eruption. Changes in the earth's magnetic field near the site of the volcano, fluctuation in temperature and chemical content of nearby springs, or tilting of sensitive leveling-instruments designed to detect swelling of the mountain are other means utilized in predicting eruptions.

Judged by any standard, volcanoes are among the most imposing and mysterious natural phenomena on earth. Geologists who know them intimately-- as Dr. McBirney does-- are justly engrossed in the attempt to understand their behavior and interpret their meaning as part of great geologic processes that shape the face of the earth.