

VULCANOLOGY

Old Volcanoes Still Erupt

Ancient volcanoes are still causing devastation in today's world, but how to foretell when an inactive volcano is about to erupt remains a mystery—By Barbara Tufty

► MOTHER EARTH still presents us with grim evidence of what she was like billions of years ago.

Huge mile-high slabs of rock shake and heave; liquid rock as hot as 2,500 degrees Fahrenheit pours over the land; and tons of ash, gas and steam belch high into the air, causing terror and destruction.

This violent activity of a volcano shows in miniature what may have gone on while the earth was still forming.

More than 500 of these volcanoes are still active today on earth, and several thousand volcanoes are either extinct or lie dormant.

A volcano is a conical heap of congealed lava and ash, ranging in size from a small mount to such majestic volcanoes as Mt. Fuji and Etna. Through the center of this cone is the vent or chimney that connects to a reservoir of molten rock lying about 25 to 30 miles below the surface of the earth.

Pressures build up in the layer of molten rock from large earth movements or shifts in rock masses, or from the water vapor or carbon dioxide gas in the molten rock. The fluid rock, called magma, is forced through cracks, crevices or outlets in the earth's surface where it spills out and is called lava. Lava may flow anywhere—on mountain slope, on a flat plain or on the ocean floor.

There are two main types of volcanoes, geologists explain.

The first is an effusive eruption, with a gentle outflow of cool dark-colored lava

that pours out at a relatively slow rate of 50 to a few hundred yards an hour. When volcanoes erupt frequently, explained geologist Dr. Robert L. Smith, U.S. Geological Survey, Washington, D. C., the pressure is tapped, and they do not erupt so violently. This type of "gentle" volcano is dangerous to crops and human habitations, but seldom does it threaten the lives of the people who are given ample warning to flee from danger.

The second is the formidable explosive eruption that comes without warning and causes widespread devastation. Such explosions occur when a volcano has been inactive for many years and the chimney has been plugged by lava solidified from the last eruption. The gases trapped up in the heart of the crater generate tremendous pressures until suddenly the top of the crater is literally blown off, and lava, steam, rocks, ash pour out.

Many historic volcanoes have caused untold devastation: Vesuvius in 79 A.D. buried the towns of Herculaneum and Pompeii; in 1815 the Tambora volcano on Sumbawa Island claimed 50,000 victims and took almost a mile-high cut from the mountain; Krakatoa had a cloud of volcanic ash that caused red sunsets around the world for two years; and the recent disastrous eruption of the Gunung Agung volcano in Bali took hundreds of lives.

Some parts of the world such as Australia and most parts of Europe and Asia have

no active volcanoes, Dr. Smith said. But a ring of extinct volcanoes surrounds the Pacific Ocean—lying along the west coast of the two Americas, across the Aleutian Islands, down Siberia, Japan, into Indonesia and New Zealand.

No one really can tell when an inactive volcano is about to erupt, Dr. Smith told SCIENCE SERVICE. Only observatories placed on the volcanoes themselves could give fair warning.

• Science News Letter, 83:211 April 6, 1963

CHEMISTRY

Petroleum May Be Partly Non-Living in Origin

► PETROLEUM, essential to modern living, may have originated from non-living chemicals that later mixed with the remains of plant and animal life. Most scientists today believe that petroleum comes from plant and animal materials only.

The so-called primeval oils could have formed by a process such as used in the laboratory to combine carbon monoxide and hydrogen gas. Some of the hydrocarbons found in crude oil and the products of the laboratory process are similar, Drs. R. A. Friedel and A. G. Sharkey Jr. of the Pittsburgh Coal Research Center, U. S. Bureau of Mines, found. This would indicate the synthesis of simple non-living chemicals could have helped form petroleum.

The scientists suggest that primeval oils could have formed at the start of the petroleum beds, with the organic materials from plants and animals gradually accumulating later. Such a petroleum bed would thus have contained from the beginning a full range of the same petroleum products now found in crude oils, they reported in Science, 139:1203, 1963.

• Science News Letter, 83:211 April 6, 1963

ARCHAEOLOGY

Ancient Africa Was Evolution Laboratory

► ANCIENT AFRICA was an animal laboratory. On the Dark Continent, 14 million years ago, animal life was developing into modern forms.

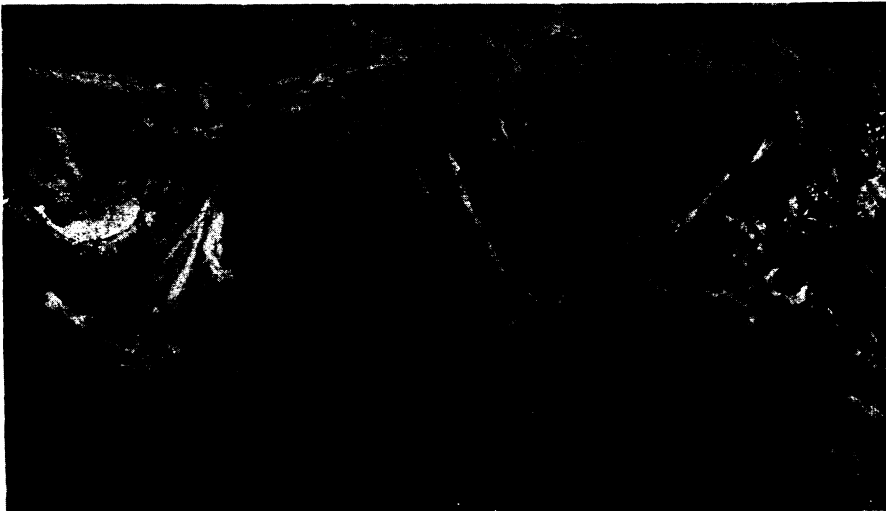
Discovery of an enormous bed of ancient animal bones, 12 million to 14 million years old, indicates the evolution of African wildlife took place on home territory, Dr. Louis S. B. Leakey, curator of the Coryndon Museum, Nairobi, Kenya, reported in Washington, D. C.

Lacking fossil evidence from African soil, scientists have often assumed that African wildlife originated in Europe and Asia.

The fossils at Fort Ternan in Kenya and Olduvai in Tanganyika are from extinct species as well as from survivors that gave rise to modern forms of animal life. They include the ancestral forms of the giraffe, elephant, rhino, antelope and ostrich.

Dr. Leakey's earlier human finds have done much to establish Africa as the home of mankind. The 1,750,000-year-old skull of *Zinjanthropus* filled a gap in human evolution. Other fossils helped trace the development of man from earlier primate forms.

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Louis S. B. Leakey

KENYA FOSSIL FIND—Embedded in hard volcanic stone are the bones of five different prehistoric antelopes and an unidentified carnivore. The concentration of fossils of many kinds at this site suggests that the animals may have been felled by sudden bursts of deadly volcanic gases. The excavation under the direction of Dr. Louis S. B. Leakey is supported by the National Geographic Society.