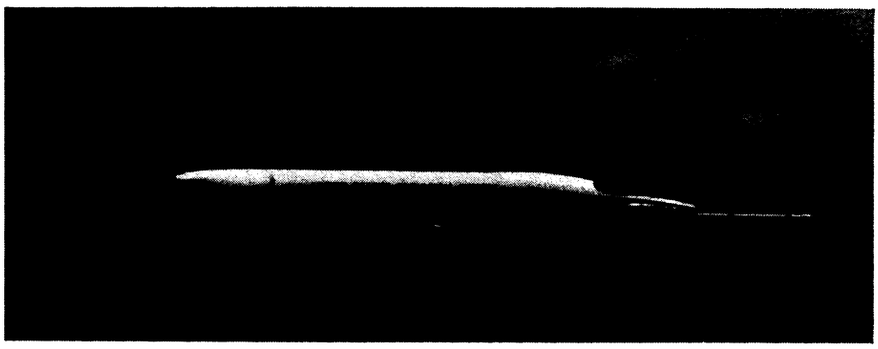

U. S. Geological Survey

MAGNETIC FIELD SCANNER—The magnetic fields of the earth are scanned with a magnetometer, shown housed in a retractable "boom" extending from a Convair 240. Magnetometers may prove valuable tools for predicting volcano eruptions by recording changes in a volcano's magnetic field as molten rock rises.

GEOLOGY

# Volcano Watch Proposed

➤ NEEDLESS DESTRUCTION of lives and property from erupting volcanoes could be prevented if governments would spend more money and take heed of geologists' research.

Many chains of seemingly inactive but potentially dangerous volcanoes could be guarded by a few men and inexpensive equipment, Dr. Alexander R. McBirney, director of the Center for Volcanology at the Univeristy of Oregon, Eugene, said.

This constant watch would greatly reduce the possibility of unforeseen eruptions of "sleeping" volcanoes, commonly the most violent and destructive kind, Dr. McBirney reported in Discovery, April 1966.

Volcanoes with no recent record of activity are difficult to study. Because they seem so quiet, they are considered harmless by people living nearby and by governments who do not wish to spend money to keep watch.

For days, months, sometimes years before a volcano erupts, shock waves may jolt the area, the volcano's magnetic field may grow stronger or weaker, and the ground may swell and tilt in preparation for the "big blow-up."

These warning signals emitted by the rumbling volcano could be interpreted as indications of the volcano's next eruption, and thousands of people could be saved from death.

Three instruments are especially useful for keeping a lookout on volcanic activities, said Dr. McBirney. They are seismographs for measuring shifting rocks, magnetometers for measuring changes in magnetic fields and tiltmeters for measuring any changes around the crater as the rising magma or molten rock pushes out the volcano's sides.

The seismograph is by far the most reliable and widely used tool for forecasting eruptions, said Dr. McBirney. Nearly all volcanic eruptions are preceded by seismic shocks or earthquakes. If the pattern of such earthquakes could be determined for each volcano, geologists might be able to estimate accurately when a volcano is ready to erupt.

Each volcano has a different eruptive cycle or pattern. For instance, months before the Hawaiian volcano, Kilauea, erupts, shocks are recorded at depths of 30 or 36 miles beneath the volcano. These shocks increase in frequency over a period of months as their focal depths rise to shallower and shallower levels. These quakes probably occur as the magma rises from chambers lying deep beneath the volcano.

For keeping tabs on volcanoes that do not have a predictable pattern of earthquakes, Dr. McBirney recommended the use of magnetometers for detecting the changes in magnetism because volcanoes become hotter with the rising magma. Most volcanoes have strong magnetic fields which change with changing temperatures. Continuous recording of the magnetic field of the Japanese volcano, Oshima, for instance, showed a dip in the magnetic field during the first two months of increasing volcanic activity.

As magma flows upward, the sides of the volcano swell outward, somewhat like an expanding balloon. By recording the amount of this swelling or tilt, geologists can obtain an idea of the volcano's activity. Tiltmeters recorded a gradual but steady swelling for at least two years before one of Kilauea's eruptions.

In the past, warnings by geologists about potential eruptions have been ignored.

Governments, however, will be forced to ask more help from volcano researchers as the need becomes more dramatized by disasters in politically important regions.

• Science News, 89:311 April 30, 1966

GEOPHYSICS

# World Seas Rising From Melting Ice

➤ THE SEAS around us are slowly rising at the rate of four to six one-hundredths of an inch a year, reported L. A. Kivioja of Purdue University, Lafayette, Ind.

These measurements of the rising waters are based on observations over the last half-century, Dr. Kivioja told members of the 47th annual meeting of the American Geophysical Union, Washington, D.C.

The slow conversion of masses of ice into water—or at times of colder climate, of water into ice—causes slight changes in the shape of the earth. It makes the mantle of the earth a little thinner under the oceans and a little thicker under the continents. Yet the water transfer does not change either the volume inside the earth's crust or the thickness of the crust, Dr. Kivioja found.

The crust or outer layer of the earth is from three to 40 miles thick, the thickest part being under the continents.

To obtain a rise of a fraction of an inch in the oceans of the world, said Dr. Kivioja, a water layer about five times as thick would be necessary. The rise would involve the combined heat expansion of the earth and ocean waters.

If all the land-supported ice caps melted, he said, the ocean waters would rise about 30 to 60 feet—not the 150 to 300 feet formerly calculated.

• Science News, 89:311 April 30, 1966

METEOROLOGY

# Expanding Air Opens New Army Parachute

➤ A NEW KIND of parachute that is pulled open by expanding air in its airtight seams may soon be saving the U.S. Army $400,000 a year—without being used by a single man.

The chute is designed for approximately 200,000 radiosondes, balloon-borne atmospheric measuring devices, that the Army sends aloft every year.

It will replace a paper parachute with a rigid circular opener. As the balloon carrying a radiosonde rises, the gas inside it expands in the falling atmospheric pressure. When the balloon bursts, the equipment package starts to descend and the parachute opens.

In the new chute, which is made of plastic, air trapped in the seams expands as the balloon rises, forcing a network of rigid tubes to open the parachute before the balloon bursts.

The new, less costly parachute was developed by Arthur V. Carlson, a meteorologist at the Army's Electronic Proving Ground, Fort Huachuca, Ariz.

• Science News, 89:311 April 30, 1966