



**SHAKY TERRITORY**—The speckled gray area of this map shows the earthquake belts of the world within which two earthquakes recently occurred during a single week.

## SEISMOLOGY

## Quakes Hit Chile, Greece

Within five days two destructive earthquakes shook the earth, in Chile and Greece, within two of the world's major earthquake belts—By Barbara Tufty

► THE TWO EARTHQUAKES that recently rocked across central Chile and Greece lie on two of the major earthquake belts of the world.

The Chile earthquake is part of the large belt that edges the Pacific Ocean, extending along the western coasts of South and North America, across the Aleutian Islands, Kuril Islands and Japan into Indonesia, New Guinea and other Pacific Ocean islands, said James Lander, geophysicist with the earthquake investigation branch of the U.S. Coast and Geodetic Survey, Washington, D.C.

The Chile earthquake, which began at 11:33 a.m. EST March 28 at a point about 80 miles north of Santiago, is termed a major earthquake of about 7 magnitude by seismologists. The quake broke a 230-foot-high dam, drowning about 400 persons near La Calera. It caused scores of fires in central Chile and jolted seismology stations around the world.

The Greece earthquake, which was almost as large in magnitude, occurred close to Athens at 4:47 a.m. EST, March 31, in the earthquake belt that includes the Mediterranean basin.

Earthquakes are described in two ways—in terms of magnitude and intensity. The magnitude, or motion of the quake, is measured by means of seismographic instruments and described on a scale devised by Dr. Charles F. Richter, seismologist at the California Institute of Technology at Pasadena. In essence, this Richter scale uses numbers ranging from one to nine to indicate how large the earthquake is. The greater the magnitude, the greater the number on the scale.

About five million earthquakes throughout the world occur each year, Mr. Lander said. The larger they are, the fewer they are. For instance, great earthquakes of Richter scale eight or larger occur only about once a year.

The Good Friday Alaskan quake that hit March 27, a year and a day before the Chile quake, was 8.5 magnitude.

About 18 major earthquakes occur each year with magnitudes of seven to eight; 120 destructive quakes of six to seven magnitude; 800 damaging quakes of five to six magnitude; 6,200 minor quakes, strong enough for people to notice; 49,000 that can be generally felt, and 300,000 that are perceptible on the spot where they break through the earth's crust. Lesser tremors number in the millions.

Intensity is a measure of the violence of the quake and its damaging effect on people and buildings.

An earthquake starts when rocks deep inside the earth are strained beyond their limit and suddenly fracture or shift. From this initial fracture, called the focus, shock energy waves spread in all directions.

Geologists have been able to construct the structure of the earth by studying the type of waves sent out and the time they take to travel through various layers of the earth.

As reports are sent in from all parts of the world, they are recorded and analyzed at the Coast and Geodetic Survey, clearing house for these tremblings.

Although earthquakes are carefully measured and recorded, Mr. Lander said, they still cannot be accurately predicted or prevented.

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## GEOLOGY

## Alaskan Quake Taught Lesson in Preparedness

► THE ALASKAN EARTHQUAKE, which shook much of our largest state into a shambles slightly more than one year ago, has also shaken many scientists and Government officials into preparedness for any future giant tremor.

Possibly the most studied natural disaster in history, the quake yielded geological data that may help lead to more quake-resistant buildings and better predictions of future tremors.

In addition, a movement toward increased research on earthquakes and other natural disasters has been started in many states and universities, especially on the Pacific Coast.

"The Alaskan disaster has indeed made people more aware of the hazards of living in an earthquake area," reported a geologist at the U.S. Geological Survey, "And they are doing something about it."

Included in President Lyndon B. Johnson's 1966 budget is a request for \$600,000 for the establishment of an Alaska sea wave warning system and \$100,000 for new-earthquake prediction research. Both of these tasks are to be carried out by the Coast and Geodetic Survey.

In addition, \$1.5 million has been requested to enable the Coast and Geodetic Survey and Geological Survey to conduct earthquake hazard and other engineering and geological studies.

The Advanced Research Projects Agency of the Department of Defense is also conducting programs for developing improved seismic instruments, while the Army Corps of Engineers is studying improvements in the design of military construction to make more quake-resistant facilities.

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## METEOROLOGY

## Air Gets Double Energy From Sea in Hurricane

► THE WARM WATERS of the subtropical oceans feed twice as much energy into the atmosphere when hurricanes are developing as they normally do.

This is the conclusion of Dr. Michael Garstang of Florida State University's Oceanographic Institute, Tallahassee. Dr. Garstang analyzed hour-by-hour weather observations over 66,000 square miles of subtropical ocean during 24 days of the hurricane season.

Using a powerful computer, he then devised a mathematical formula describing the energy transfer in storm systems. The formula describing the energy transfer in storm systems.

The formula could enable a meteorologist to calculate fairly accurately the energy input at the surface for certain types of tropical storms.

It could lead the way to predictions concerning how intense a specific tropical storm will become.

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