

GEOPHYSICS

Turmoil in Earth

Interior is slowly turning over in giant blocks at rate of one mile in hundred thousand years. Caused by radioactive heating at great depths.

► THE EARTH'S interior is slowly churning over in giant blocks hundreds or thousands of miles in size, a scientist has suggested.

Dr. Roger Revelle, director of the Scripps Institution of Oceanography, La Jolla, Calif., likened the snail-paced over-turning to tar mixing in a barrel heated from below. The motion is "incredibly small," he told the American Physical Society meeting, about one mile in 100,000 years.

Radioactive heating at great depths is thought to cause rocks deep beneath the surface to flow upward in some places and downward in others, he said.

This internal heat is of "fundamental importance in shaping the earth's surface." Volcanoes, earthquakes, mountain ranges and deep-sea trenches all result from slow convulsions within the earth produced by the heat's escape.

The total amount of heat coming from the earth's interior is only about a ten-thousandth of that falling on the earth's surface from the sun.

A search is being made, Dr. Revelle said, to see if a pattern exists in the quantity of heat flowing outward from different areas.

One pattern may have been found near the Great Acapulco Trench off Central America, where the heat flow is very low. Yet 500 miles to the west, where there is a great ridge on the sea floor, the heat flow is twice the average value.

Cold rocks may be moving downward under the trench and warm rocks moving upward under the ridge, Dr. Revelle told the physicists, who met at the University of Southern California, Los Angeles, in connection with the 75th anniversary of the University's founding.

It is possible that, even though heat is being generated within the earth, the outer layers have cooled since the earth's formation, Dr. Revelle said.

In doing so, they have contracted or shrunk, something like the skin of an apple when it dries. On this theory, mountain ranges and deep trenches are wrinkles produced by shrinking.

The radioactive elements, uranium, thorium and their disintegration products, as well as an isotope of potassium, are the heat sources within the earth.

Under the continents, most of the heat is probably generated in the outer 20 miles of the earth's rocky crust, since rocks in this outer layer are relatively high in radioactivity.

Rock samples from oceanic islands and rocks dredged from the deep-sea floor are low in radioactivity. Recent measurements have shown that heat flow through the sea

bottom from the earth's interior is much higher than had once been thought.

The undersea floor radioactive materials are believed to be spread out over a much greater depth than those under continents because the measured amounts of radioactivity per unit volume in rocks collected from oceanic areas are quite small.

Science News Letter, January 14, 1956

BIOCHEMISTRY

Find Extra Sugar Basis of Mutation

► DISCOVERY of a sugary difference in chemicals within the nucleus of virus mutants has won the \$1000 Newcomb Cleveland prize of the American Association for the Advancement of Science for Dr. Seymour S. Cohen of the University of Pennsylvania and Children's Hospital, Philadelphia.

The sugary difference comes from the addition of extra glucose to an acid in the virus nucleus. This seems to be the molecular basis of the mutational differences among viruses that prey on bacteria found in human intestinal tracts.

Discovery of the difference is, Dr. Cohen

said, the "first demonstration that DNA molecules of mutant organisms can be distinguished chemically."

The letters DNA stand for the acid in the virus nucleus which has the full name of deoxyribonucleic acid.

Virus DNA, Dr. Cohen and his group have found, contains a chemical not found in the nucleic acids of the host cells the viruses prey on. When a virus infects a host cell, it compels the conversion of a host cell chemical, cytosine, to the virus chemical 5-hydroxymethyl cytosine, which Dr. Cohen calls HMC for short.

As a result, the host cell has to switch its chemistry to production of virus. Sugar (glucose) derivatives of the virus HMC chemical control the dissolution of the host cell. Some virus mutants have two or more parts of glucose per HMC chemical while other virus mutants have only one part of glucose per HMC chemical. This is the sugary difference between the mutants.

The importance of the HMC chemical was given by Dr. Cohen in the following statement:

"The mechanism of parasitism, the survival of the reproducing unit, and the basis of mutational difference in these bacterial viruses are all associated with the formation and structural relations of a single new pyrimidine base, 5-hydroxymethyl cytosine."

Science News Letter, January 14, 1956

Rheumatoid arthritis is a seasonal disease that is likely to begin or grow worse in the colder months.

Experts expect a winter wheat crop in 1956 of 735,000,000 bushels for the United States.



1956 TRAIN—This light-weight, fast train is the 1956 new look in rail transportation. The Aerotrain, as it is called, is built by Electromotive Division of General Motors and will go into regular service next spring. Using light-weight aluminum generously, it weighs only 1,000 pounds per passenger compared to the 2,500 in present equipment. It will cruise at about 100 miles per hour. Its low center of gravity makes the Aerotrain take curves at high speed without throwing passengers toward the outer side.