GEOLOGY

Scientists Determine New Figure For Age of Earth

In Strife-Torn Austria, Analysis of Canadian Rock Is Basis for Estimate of 1,725,000,000 Years

By DR. ALFRED C. LANE, Tufts College.

FROM strife-torn Austria comes new scientific evidence that the age of the earth is not less than 1,725,000,000 years. Thus does the city of Vienna maintain the heritage which has made it a great scientific center in the past.

From correspondence with scientists in Austria I have just learned that while troops roamed the streets outside, investigators at the University of Vienna have completed an analysis of radioactive rocks from near Winnipeg, Canada, which provides the new insight into the age of the earth.

The method of determining the age of rocks and mineral from the amount of radioactive material they contain, and the ratio of such material to the amount of lead present has been frequently described. The process (often referred to as the radioactive "timeclock" method) is in many ways like finding out how long a popcorn machine has been running by determining the proportion of popped to unpopped corn in it.

By analogy, the unpopped corn would be the radioactive material present in the rock which has not, as yet, disintegrated. The popped corn would correspond to the products of disintegration, principally radioactive lead.

Some time ago, Dr. H. V. Ellsworth, the expert of the Canadian Geological Survey in such matters, analyzed a sample of the mineral uraninite from near Winnipeg, Canada. He found a large proportion of lead present compared with the radioactive element uranium.

The ratio, in fact, was so large that he suspected some of the lead might not be of radioactive origin; or that despite its fresh appearance some uranium might have been removed from the rock during the billion and more years it had remained in its location. Either happening would have produced the surprisingly large ratio of lead to uranium.

During the last few years in the laboratory of Prof. A. Franke at Vienna,

SHE KNOWS EARTH'S AGE

While revolution upset Vienna, Miss Edith Kroupa, research chemist working with a new method of microchemical analysis in the laboratory of Prof. A. Franke at the University of Vienna, analyzed a sample of radioactive rock from near Winnipeg, Canada. From her determinations Prof. Alfred C. Lane of Tufts College, chairman of National Research Council Committee on Determination of Geological Time, estimates that the rock is 1,725,000,000 years old.

Dr. F. Hecht and his assistant, Miss Edith Kroupa, have been making a special study of the use of chemical microanalysis. This is simply a method of obtaining an accurate determination of the amounts of materials in a substance when the total amount of sample is very small.

It was believed that the Viennese micro-methods would prove useful in checking the findings of Dr. Ellsworth. Accordingly the Canadian investigator sent to Vienna four-tenths of a gram (about a hundredth of an ounce) of monazite which was associated with the uraninite sample. Monazite contains thorium, another radioactive material which ultimately, if given long enough, changes into a form of lead.

Working with this almost microscopic speck of material Miss Kroupa, guided by Dr. Hecht, made the microanalysis. Using their results one can compute that the rock from Winnipeg is beginning to approach two billion years of age. A fair estimate of its antiquity is probably some 1,725,000,000 years. Other data as to the rate of disintegration of thorium into lead might make the result as high as 1,820,000,000 years.

One can not be too fussy about a few million years when a minute error in weighing will produce such a difference. Miss Kroupa's data essentially substantiate the findings for the age of rocks elsewhere in the world. Minerals obtained at Sinyaya Pala in North Carelia, Russia, have been assigned the age of 1,850,000,000 years, for example.

The Viennese work, therefore, makes it highly probable that the Winnipeg minerals are the oldest yet known, at least on the North American continent.

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PHYSICS

Compass Needle Swings Aside During Eclipse

ONE of the less-known but strange experiments performed by the Japanese scientists during the total eclipse of the sun in the Pacific Ocean last February was to determine if the cutting off of the sun's rays by the moon would change the magnetic field of the earth.

Commander Akiyosi of the Japanese Naval Hydrographic Office found such an effect, reports Dr. Josef J. Johnson of California Institute of Technology, who was one of two Americans accompanying the expedition to the Pacific. Dr. Johnson describes the magnetic experiments in the journal, *Popular Astronomy*.

"Commander Akiyosi's apparatus," Dr. Johnson relates, "in principle at least, consisted of a small mirror attached to the needle of a compass. A narrow beam of light was directed upon this mirror, from which it was reflected to a sensitized paper slowly moving over a revolving drum. Any changes in position of the needle were easily detectable. During the eclipse the needle rotated slightly, the north end coming to the east by about one minute of arc, then going back to its original position at the end of totality. It seems strange that an eclipse should affect the compass but such was actually the case."

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