

CHEMISTRY

Tritium Found in Air

Although tritium, the world's rarest natural chemical element, has been found in the moisture of the air, it will not be extracted from air in securing material for H-bombs.

► MATERIAL for making hydrogen bombs will not be extracted from the air even though one of the H-bomb ingredients, tritium (triple-weight hydrogen) has been discovered in very small amounts in the moisture of the air.

It is found as one part of tritium in a million times a million times a million (1,000,000,000,000,000) parts of the water's hydrogen.

The real importance of the identification of this natural tritium made by cosmic rays is the fact that it is the world's rarest natural chemical element.

Recognition of naturally occurring tritium, announced by Dr. Aristid V. Grosse of Temple University's new Research Institute, as a result of his studies with Dr. W. F. Libby of the University of Chicago, climaxes a 15-year-old scientific dispute as to whether the short-lived isotope exists only when man-made. The team of atomic scientists find that it is constantly being made in nature by action of cosmic rays on the nitrogen of the air.

Discovered as the result of atomic bombardment by the British scientist, Lord Rutherford, tritium was believed to exist only as a man-made particle until 1935, when Dr. Hugh S. Taylor, of Princeton University, discovered indications of tritium in water concentrated electrolytically in his laboratory. Dr. Taylor and his associates were at the time studying the then newly discovered deuterium, the heavy hydrogen which is not radioactive. They based their claim to finding tritium on determination of the weight of the hydrogen in water from various parts of the United States. In this study they had found that water in the clouds crossing the Rocky Mountains is separated according to the weight of the isotopes of hydrogen which compose it.

Taking a sample of water containing tritium with him, Dr. Taylor in 1935 went to London to visit Lord Rutherford, and was roundly denounced by the scientific leader for claiming an impossibility. Rutherford then gave Dr. Taylor one cubic centimeter of concentrated water and challenged him to find tritium in it. Today's techniques, with much greater accuracy in measuring radioactive strength, have proved that the sample to which Rutherford pinned his faith was giving off radioactive disintegration products of tritium all the while.

Besides the sample from Rutherford's laboratory, sent to Dr. Grosse and Dr. Libby for analysis by Dr. Taylor, other samples of water concentrated by electro-

lytic action have been analyzed by the research team. One sample was furnished by the Norsk hydroelectric plant, for which Norway has received scientific thanks. This sample came from the surface waters of the ocean. Its tritium content is to be compared with other samples from equatorial regions and from the depths of the sea. Cosmic rays, which are believed to be the source of tritium in nature, are more plentiful in the northern regions of the earth, and have more effect near the surface than at great depths in the ocean. Turbulence of the ocean waves mixes the surface waters, but is believed not to disturb layers of water below about 300 feet.

There should be more tritium at the north pole than at the equator because there is more cosmic ray bombardment in the northern latitudes due to the focusing of the cosmic radiation by the magnetic field of the earth.

There should be more tritium, just as there is more deuterium (double-weight hydrogen), in the water of rain on one side of the Rocky Mountains than the other side to which the storm travels.

There is little practical use of naturally

occurring tritium just now. The extremely accurate methods of detection of its radioactivity would hardly be useful for childish snooping to see who is making tritium for bombs behind our backs.

Three years ago Drs. Grosse and Libby discovered that cosmic rays produce radioactive carbon 14 in living matter. This has provided a reliable radioactive method for determining the age of archaeological samples.

Science News Letter, September 23, 1950

MEDICINE

Federal Funds to Aid Attack on Artery Disease

► THE ATTACK, via fat, on one kind of artery disease which causes many heart deaths will be intensified with a war fund totalling \$230,773 just granted by the U.S. National Heart Institute to four non-federal research institutions.

The artery disease is known as atherosclerosis. Its consequences are responsible for 40% of the 750,000 heart and artery disease deaths each year in the United States. It can affect younger as well as older persons.

Fat molecules in the blood have been implicated as the cause of this artery disease. Further research on this point will be pursued under the grants made to the University of California, Harvard School of Public Health, Cleveland Clinic and the University of Pittsburgh.

Science News Letter, September 23, 1950



"FINAL INSPECTION"—The above photograph by Robert A. Buchanan, United States Steel Research Laboratory, won first prize in the General Section, Black and White Prints, in the Seventh American Society Testing Materials Photographic Exhibit.