

PHYSICS

Early Stages of Universe

Creation of chemical elements took only one hour, new theory indicates, because as the material expanded the opportunity for particles to collide decreased.

➤ AT almost the beginning of things, the universe and all creation was a highly compressed neutron gas.

That is science's latest view of the primordial matter, just about two billion years ago when the universe started expanding.

At the very beginning of everything, the universe had infinite density concentrated in a single zero point. Then just 300 seconds—five minutes—after the start of everything, there was a rapid expansion and cooling of the primordial matter.

The neutrons—those are the particles that trigger the atomic bomb—started decaying into protons and electrons and building up the heavier chemical elements. This went on for just about one hour. Lo, the stuff of the universe was almost completed.

This picture of the early stages of the whole universe has been worked out by a young physicist, R. A. Alpher, on the staff of the Applied Physics Laboratory of the Johns Hopkins University, located at Silver Spring, Md., near Washington. His research on "The Origin of the Chemical Elements," as it is titled in the *Physical Review* (April 1), was done for his Ph.D. thesis at George Washington University. Two distinguished physicists, Dr. G. Gamow of George Washington and Dr. H. Bethe of Cornell, are his collaborators.

This act of the creation of the chemical elements took the surprisingly short time of an hour. (The Bible story said something about six days for the act of creation.) The reason for this hour's time is that as the material expanded the opportunity for collisions among the particles decreased. The building blocks of the elements got out of touch with each other.

This is just what happened as visualized by Mr. Alpher:

The early stage of matter was an overheated neutral nuclear fluid. It had a density about that of iron, eight grams per cubic centimeter or about 500 pounds per cubic foot. When the universe began expanding, the gas pressure fell. Protons (hearts of hydrogen atoms) and electrons (particles of electricity) were

formed. First hearts of heavy hydrogen (deuterium) atoms were formed. Then by subsequent captures of neutrons by the newly formed protons heavier and

MEDICINE

New Vitamin from Liver

A single shot of B₁₂, chemical extracted from liver, promptly started formation of new red blood cells in patients with pernicious anemia.

➤ A FEW small, red, needle-shaped crystals injected by hypodermic needle once in a while instead of half a pound of liver to be eaten every day or liver extract injections every week for life—that is the pleasing new prospect for pernicious anemia patients.

It results from the discovery of a new vitamin, which has been named B₁₂. The red vitamin crystals seem to be the chemical in liver which does the job of checking or controlling pernicious anemia, much as insulin controls diabetes.

The new vitamin was isolated from liver by Edward L. Rickes, Dr. Norman G. Brink, Frank R. Koniuszy, and Drs. Thomas R. Wood and Karl Folkers of Merck and Co. research laboratories at Rahway, N. J. The scientific world which for months had been agog over rumors about the new vitamin, read about it in the journal, *Science* (April 16).

Three patients have been given the new vitamin under the direction of Dr. Randolph West of Columbia University's College of Physicians and Surgeons. A single shot of a very tiny amount of the vitamin promptly started formation of new red blood cells and brought about an increase in number of red blood cells and hemoglobin.

It is still too early to say whether the blood will return to normal without further doses of the vitamin, Dr. West cautions. But it may be possible by giving a sufficiently large dose to produce a prolonged period of freedom from symptoms. This would free the patient from the annoyance and expense of the more frequent injections now required.

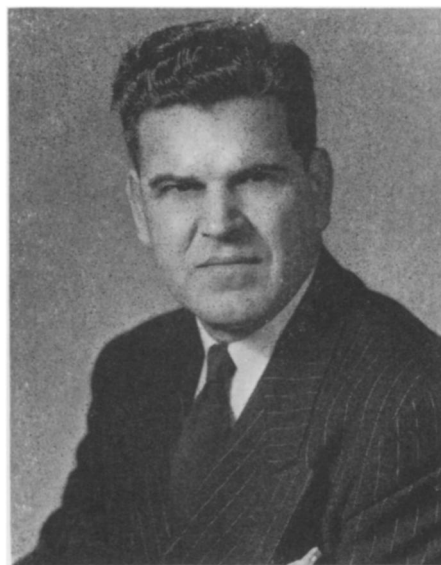
heavier hearts of atoms were built up. Most of this happened in about the first hour. The present spread of various kinds of chemical elements was attained somewhat later by the atoms formed adjusting their electric charges by giving off electrons.

That is the latest story of creation as worked out by the latest theories of physics and it began to happen just about two billion years ago, minus those 300 seconds needed to get the process started.

Science News Letter, April 24, 1948

The vitamin is so powerful that the single dose which brought improvement in anemia patients weighs only about as much as one two-hundredth of an inch of a human hair.

Patients will not be able to get the new vitamin for some time. There is so little of it that it cannot even be supplied to research workers in other institutions for study. It took tons of liver to get two or three milligrams of the vitamin, and



NEW DIRECTOR—Dr. John R. Heller of Bethesda, Md., recently appointed Director of the National Cancer Institute of the Public Health Service, is expected to assume his new duties on May 15. He will replace Dr. Leonard A. Scheele.