

NUCLEAR PHYSICS

Atomic Frontier Advanced

Cyclotron at Berkeley has knocked 22 and possibly 30 particles out of atomic nuclei. Over a hundred radioisotopes have been discovered.

► THE STUFFING literally has been knocked out of the atom, and the atomic research frontier has been advanced far beyond the knowledge from which the atomic bomb was fashioned.

Breathtaking results of ultra high frequency bombardments with the giant University of California cyclotron at Berkeley were disclosed for the first time to the Pacific coast section of the American Physical Society.

The 4,000-ton nuclear destroyer has knocked 22 and possibly as many as 30 particles out of the atomic heart or nucleus. A hundred or more new radioisotopes are in prospect, elements have been transmuted 16 steps down the periodic table and a host of new highly complex problems posed for scientists.

Research sponsored by Atomic Energy Commission as part of its peacetime program was reported by Drs. Glenn T. Seaborg and Isadore Perlman, who were aided by Drs. B. B. Cunningham, H. H. Hopkins, Manfred Lindner, D. R. Miller, P. R. O'Conner, and R. C. Thompson.

Two or three particles are the usual number knocked out by prewar cyclotrons. In sample bombardment, arsenic, which is element number 75, was transmuted down to cobalt 54. When results can be studied more closely, the scientists may find 30 particles dislodged.

New Radioisotope Series

An entirely new series of one hundred or more radioisotopes of common elements which are lighter than stable isotopes is opened up by these bombardments. This is a greater number than resulted from the fission in the atomic bomb, which produced mostly isotopes heavier than the stable isotope of elements. In fission, nuclei are overbalanced with neutrons and such nuclei tend to decay up from the stable isotope. Iodine fission isotopes included iodine 131 and higher, while stable iodine is 127.

Few lighter isotopes were produced before ultra high frequency bombardments, which create transmutation products tending to be overbalanced with protons after removal of many neutrons.

Such nuclei stabilize by converting protons into neutrons and in losing charge decay downward. For example: a new light isotope is iron 52 produced from the bombardment of copper. Previously no isotope of iron lighter than the stable isotope 54 had been produced.

Drs. Seaborg and Perlman said that many new isotopes useful for tracers for uses not now existing may now result.

As many as 30 different radioisotopes were created in one bombardment, some new, some familiar. Different rates of decay make identification highly complex.

In one case arsenic bombarded by alpha particles or helium hearts produced chlorine, 16 steps down the periodic table. Prewar cyclotrons transmuted elements up or down one or two elements.

With simpler patterns of lower energy range, transmutation routes almost always can be predicted. But the new leap down the periodic table opens up alternative routes, primarily because several charged particles are knocked out. Scientists must now set to work on a new set of principles to predict new phenomena.

The fission of uranium with deuterons and alphas was also reported. This resulted in wider spread of fission products than with slow neutrons, and more symmetrical splitting with fission products bunched in center of periodic table.

Cloud chamber photos made by Dr. Wilson M. Powell of nuclei disintegrating under impact of 100,000,000 electron volt neutrons from cyclotron were also shown. Five-pointed stars resulted, similar to cosmic ray phenomena. These stars represent most complete man-made disintegration of atom ever achieved.

Science News Letter, July 19, 1947

EDUCATION

Chemist To Head UNESCO Science Regional Offices

► AN AUSTRALIAN chemical engineer who was born in Memphis, Tenn., will supervise the three science cooperation offices of UNESCO being set up this year in Rio de Janeiro, Cairo and China.



TIMING CAMERAS—Electrically operated, this camera that timed the speed-champion Lockheed P-80R is accurate to 1/1000 of a second.

He is William E. Purnell of Sydney, who has specialized in rubber chemistry.

Science News Letter, July 19, 1947

GENERAL SCIENCE

Six American Scientists Join MacArthur's Staff

► THE NAMES of six leading American scientists who just departed for Japan have been revealed by the War Department. They went as expert advisors to General MacArthur's staff.

They will spend a month in that country, under the sponsorship of the National Academy of Sciences, evaluating plans submitted by Japanese scientific bodies for the democratization of scientific research in Japan. Each will report in his own field to the Economic and Scientific Section of the Army staff in Tokyo.

The members of the group are Dr. Roger Adams, head of the chemistry department of the University of Illinois; Dr. Merrill Kelley Bennett of Food Research Institute, Leland Stanford University; Dr. William D. Coolidge, director emeritus of research, General Electric Company; Dr. William V. Houston, president of Rice Institute; Dr. William J. Robbins of New York Botanical Garden; and Dr. Royal W. Sorensen, electrical engineer, California Institute of Technology.

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