



NO ELONGATION HERE

High speed photographic proof that a falling drop of water does not elongate into the conventional "raindrop" shape, but instead tends to maintain a spherical form, is contained in these photographs showing a drop of inky water falling from a wet electric light bulb. The pictures were taken at the rate of 500 per second with the fast stroboscopic motion picture camera developed at Massachusetts Institute of Technology.

combine to form heavyweight hydrogen. That combination would result in the emission of energy in the form of gamma rays, equal to the loss of weight experienced in the transmutation. This conversion of mass into energy should give rise to million volt gamma rays and this would require the attacking neutrons to have two to six million volt energies, which is about what they have.

Science News Letter, January 27, 1934

PHYSICS

Atomic Bullets Aimed At Secrets of Matter

Preparations Being Made for New Attacks With Powerful Weapons and Recently Discovered Projectiles

CONCENTRATED streams of atomic bullets are being made ready in experimental laboratories for attacking non-living and living matter.

There will be:

1. Attacks upon atoms, investigations of the constitution of matter and transmutations of energy and matter.

2. Explorations of the effect of the newer radiations upon living matter, specifically in the treatment of cancer and upon germplasm with consequent changes in heredity.

The atomic projectiles used are:

Electrons—Units of negative electricity, given off when anything becomes hot, propelled from disintegrating radioactive substances with high speed they are called beta rays, propelled by high voltage they are called cathode rays.

Protons—Nuclei or kernels of hydrogen atoms, units of positive electricity, about 1800 times as heavy as electrons.

Neutrons—Electrically neutral particles, close combinations of proton and electron, discovered 1932.

Deutons—Nuclei or kernels of deuterium or heavy hydrogen atoms, constituted of two protons and one electron. Deuterium discovered 1931.

Alpha particles—Nuclei or kernels of helium atoms, disintegration product of radioactive substances.

Canal Rays

Positive ions—Nuclei or kernels of the various chemical elements. Protons and alpha particles are special kinds of positive ions. Streams of positive ions, propelled by high voltage, are called positive or canal rays.

High-voltage electrical machines constituting "atom guns" of great power are being perfected to speed the atomic particles and make them hit harder and perhaps more effectively.

Most common are the conventional evacuated tubes for producing cathode rays, X-rays, positive or canal rays, etc. They range from a few thousand up to hundreds of thousands of volts. One of the largest of X-ray tubes of more

or less conventional type, rating a million volts, is at the California Institute of Technology, Pasadena, Calif.

A whirling electrical machine, in which reversing magnetic polarity of 85-ton magnets accelerates particles until they obtain speeds equivalent to as much as 3,000,000 volts, has been developed by Prof. E. O. Lawrence and associates of the University of California.

In an airship hangar at Round Hill, Mass., there is a giant electrostatic direct current generator of the Massachusetts Institute of Technology, designed by Dr. Robert J. Van de Graaff, which has generated 7,000,000 volts potential and is capable of 10,000,000.

Atomic Energy Tapped

In addition to these man-made atom guns for speeding atomic particles, the scientists have learned how to tap energies within the atom so as to augment the electrically induced energies.

Most striking are the streams of neutrons produced when the light metal beryllium is bombarded with deuterons. Here is an atomic particle unknown a relatively few months ago that can be used to produce unusual streams of another atomic particle also unknown a few months ago.

The research group consisting of H. R. Crane, a graduate student, Dr. C. C. Lauritsen, who developed the C. I. T. million volt X-ray tube, and Dr. A. Soltan, an international research fellow from Poland, working at the Pasadena laboratory, were astonished to find that deuterons flung at beryllium metal released many more neutrons than alpha particles (helium nuclei) either artificially speeded or produced by radioactivity. At Berkeley, Calif., Prof. E. O. Lawrence and his colleagues, Drs. M. Stanley Livingston and Malcolm C. Henderson, discovered the same effect.

Both sets of scientists realized that here is a case of transmutation. Dr. G. N. Lewis of the University of California furnished both groups of physicists with some of his very pure heavy water containing deuterium or heavy hy-