



Art and Archaeology

VOTE AGAINST ARISTIDES

This pottery ballot was cast by an Athenian to record his vote in the balloting that banished Aristides the Just from Athens.

Classical Studies at Athens, with cooperation of Greek archaeologists.

The archaeologists have unearthed and held in their hands four ostraka, ballots made of pottery scraps, marked with the name of Aristides. These are relics of the voting that banished Aristides the Just from Athens, a story familiar to every school child through the anecdote of Aristides being asked to write his own name on a ballot for an illiterate stranger.

Ostraka from other voting days have also been found, including one historic relic bearing the name of Hipparchos. He was the first of the influential Pisistratid family against whom the law of ostracism was invoked. He was banished by popular vote in January 487 B.C. Eleven clay ballots with names important in Greek history were found in one rectangular rock shaft.

In public buildings in the Agora were deposited stone tablets bearing permanent copies of laws, treaties, and official decrees. The archaeological expedition has unearthed some of these documents of Greek government, some bearing important information in Greek history and chronology. It is inevitable that many more important public documents will be brought to light, as excavations progress, Prof. Shear hopefully says.

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PHYSICS

Energy Turned Into Mass For First Time in History

Atom Disintegration Experiments Confirm Einstein's Theory of Mass-Energy Equivalence

FOR THE FIRST TIME in all history, physicists seem to have discovered a case of energy turning into mass, that is, non-material "push and shove" being converted into something material that can be weighed, as it were.

Dr. Kenneth T. Bainbridge, fellow of the Franklin Institute's Bartol Research Foundation and authority on the masses of atoms, explains that when lithium is bombarded with the heart of a helium atom, energy may be converted into mass.

The experiments were made by Mme. Irene Curie-Joliot, daughter of the discoverers of radium, her husband, Dr. F. Joliot, and P. Savel at the Institut de Radium in Paris last year.

When a lithium atom of mass seven is hit by and captures an alpha particle, or helium atom heart, there is strong indication of the transfer of kinetic energy of the impinging alpha particle into what the physicists call "inertial mass." This creates an atom of boron of mass ten. This isotope of boron is one of the experimental products of lithium's disintegration.

The mass of lithium seven, measured in 1925 by J. L. Costa, was essential in determining the apparent change of energy into mass.

Caution Suggested

"Change of energy into inertial mass must be viewed with caution," Dr. Bainbridge said in a Franklin Institute lecture, "but available experimental data makes the suggestion the most plausible of four possible explanations."

While this is the first apparent case of energy being converted into mass, many cases of the changing of mass into energy are known. The transforming of mass of atoms into heat and light is a favorite mechanism for explaining how the sun and stars keep shining for billions upon billions of years.

The scientific value of disintegration and other nuclear experiments far sur-

passes the highly speculative economic values of release of energy from the atom, in Dr. Bainbridge's opinion. Following in the footsteps of Dr. F. W. Aston, the British physicist, who developed the mass-spectrograph to separate chemically identical isotopes and deal with them individually, Dr. Bainbridge has carried on mass-spectrograph studies at the Bartol Research Foundation. He has studied the isotopes of helium, lithium, chlorine, selenium, bromine, cadmium, caesium, zinc, germanium and he has measured the masses of the light and heavy helium isotopes and of beryllium.

Spectrograph Reveals Types

"The spectrograph permits the investigator to determine what nuclear types exist," Dr. Bainbridge explained. "It is possible to determine the relative abundance of the isotopes of specific elements and so indirectly the chemical atomic weights and finally to make measurements of the masses of atoms to an accuracy of one part in 30,000. These measurements are important in connection with studies of the disintegration of atomic nuclei.

"The results of atomic mass measurements in cooperation with disintegration experiments furnish an experimental proof of the equivalence of mass and energy deduced theoretically by Einstein. The best example of this is given by the experiments of Cockcroft and Walton on the disintegration of the lithium seven nucleus by the capture of an incident proton resulting in the release of two helium nuclei with a combined energy of about 17,000,000 electron volts, which energy must be the result of a transformation of mass into energy."

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Whether water is hard may be tested by adding a little soap solution to a sample of the water in a small bottle and shaking it; if an insoluble, sticky, curd-like substance forms, the water is hard, but if it lathers well, it is soft.