

bureau's metallurgical division before being made director.

Dr. Briggs is a leading physicist and former chief of the bureau's division of mechanics and sound. He is the co-inventor, with Dr. Paul R. Heyl, of the earth inductor compass that is now widely used on aircraft. This invention was recognized by the award of the

Magellan medal. During the World War, Dr. Briggs developed with J. F. Hayford a gyroscopic instrument for maintaining an artificial horizon below decks as an aid in directing gun-fire from battleships. These instruments are now installed on many battleships of the Navy.

Science News Letter, April 8, 1933

PSYCHOLOGY

Chimpanzees Use Earphones In Tests of Hearing

TESTING the hearing of chimpanzees was the rather novel task of a psychologist, described by J. H. Elder, of Yale University, to the meeting of the New York Branch of the American Psychological Association.

Chimpanzees are no harder to test accurately than are human children, Mr. Elder reported. His method was to train the apes to press a key when the signal was given and not to press it when they heard nothing. Standard earphones were used and the apes were then allowed to listen to sounds of known frequency from an audiometer.

The frequencies heard by the chimpanzees are within the range audible to human beings, although several of the apes could hear frequencies lower than those heard by the average human.

Mr. Elder believes his method of testing would work well with very young children.

Reaching Quickly Learned

By the time he is 60 weeks old, an infant has built up a skill in reaching for objects which compares very favorably with that of an adult, Dr. H. M. Halverson, of Yale University, told the meeting of the Psychological Association.

This skill has been built up, too, with the initial handicap of having no repertoire of already learned movements on which to build. The first steps toward building of the reaching skill by the very young infant are reflexes or simple automatic movements without direction from the mind. The next stage is the period of slowly acquired voluntary movements which range from crude groping to direct reaching.

In the final stage the movements become largely automatic again. Practice has made the reaching a more or less

fixed habit on the part of the reacher.

Progress of infants in reaching has been studied by Dr. Halverson through the use of motion pictures taken of a group of babies at regular four-week intervals.

Science News Letter, April 8, 1933

PHARMACOLOGY

New Sleeping Potion Test May Aid in Poison Cases

A NEW TEST for some of the modern sleeping potions, which may aid in solving the mysteries of murders and suicides, has been developed by Dr. Theodore Koppanyi, Dr. William S. Murphy and Stephen Krop of Georgetown University School of Medicine, Washington.

The sleeping potions in question are of the type known to the public as veronal and known to scientists as barbital and derivatives of barbituric acid. Only a few chemical tests for them have previously been described, and these were not very satisfactory or reliable.

In the new procedure, the development of a blue color indicates the presence of barbital or other barbituric acid compounds. The amount of barbital in the blood or other body fluid being tested is determined by comparing the depth of this blue color with that of a solution containing a known amount of barbital. By this method the Georgetown investigators were able to detect the presence of barbital in body fluids or organs in such small amounts as five hundredths of a milligram, or about the amount that would cover the head of a pin, in one cubic centimeter of the fluid being tested.

Science News Letter, April 8, 1933

CHEMISTRY

Standard Proposed For Scurvy-Preventing Vitamin

AN INTERNATIONAL standard of the scurvy-preventing power of hexuronic acid, which is now almost positively known to be vitamin C, is proposed by T. W. Birch, Leslie J. Harris and S. N. Ray of the Nutritional Laboratory at Cambridge.

In a communication to the scientific publication, *Nature*, they suggest as the international standard an amount of orange juice equal to about four drops or 1 cubic centimeter, which is equivalent to about one-half a milligram of the hexuronic acid.

If this international standard is adopted, as has been done for other vitamins, a physician can prescribe a certain number of units of vitamin C or a certain amount by weight of hexuronic acid. Likewise, research scientists will have a better measure for the vitamin C activity of foods.

Little doubt remains that vitamin C and hexuronic acid are the same, the Cambridge investigators reported. They also described a rapid micro-chemical method by which the chemist in the laboratory can estimate the amount of hexuronic acid or vitamin C in foods. It will thus be possible to test for vitamin C nearly as easily as the fat content of milk is determined by the Babcock test, for instance. Ordinarily the determination of the vitamin content of foods must be done by the tedious process of feeding experiments.

Science News Letter, April 8, 1933

ARCHAEOLOGY

Relics of Famous Greeks Coming to Light in Athens

ARCHAEOLOGISTS excavating the famous Agora in Athens are finding this market place a veritable mine of relics associated with the great men of Greece, and further discoveries are expected.

Describing the most recent finds, Prof. T. Leslie Shear of Princeton, field director, says in a report:

"These discoveries prove that this area, where Athenian leaders planned and wrought events which have moulded history, will continually yield relics associated with those men and their deeds."

The Athenian Agora is being excavated by the American School of



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.

Science News Letter, April 8, 1933

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.