

CHEMISTRY

Last Missing Element Detected By New Method of Analysis

Four Alabama Scientists Find Element Number 85 With Analysis That Recognizes One Part in Hundred Billion

THE ONE remaining unknown chemical element, number 85, has been detected for a first time in seawater, in potassium bromide, a common headache drug, and in a number of well-known minerals by a method of super chemical analysis so delicate that it can recognize one part in a hundred billion of water.

The discovery is announced by Dr. Fred Allison, Edgar J. Murphy, Prof. Edna R. Bishop and Anna L. Sommer, working at the Alabama Polytechnic Institute, Auburn. Two of these, Dr. Allison and Mr. Murphy, are the same scientists who a year ago discovered the next to the last unknown element, number 87, next door neighbor to radium in the chemist's table of the ultimate building blocks of matter.

Ninety-two elements now form the completed list.

The new element, eighty-fifth when the elements are arranged in the order of the weights of their atoms, is a family relative of iodine, long popular as an antiseptic. It has not yet been separated, for only one part in a billion is present in the substances examined.

However, in their letter to the *Physical Review*, in which the announcement is made, the discoverers say that concentration of a purer form of the element from monazite sand is being attempted and is making good progress. The "eka-iodine," as Mendeleeff would have called it in his original periodic table, is being separated as the "85-ite" of lithium. Monazite sand is well known as the source of the cerium and thorium used for the mantles of Welsbach gas burners.

Other materials in which number 85 has been found are: kainite, a potassium magnesium sulphate found in the famous German Stassfurt salt deposits, apatite, which is a fluoride and phosphate of calcium and barium, and fluorite, or calcium fluoride, as well as in the laboratory reagents hydrofluoric and hydrobromic acids.

The new method of analysis depends on a strange phenomenon discovered a

long time ago by Michael Faraday, one of the greatest scientists of all time. The Faraday effect has to do with what happens to a beam of light passing through a transparent substance placed between the north and south poles of a powerful magnet. The vibrations of the light beam, if polarised, that is, confined to one direction to start with, are found to have rotated on passing through the magnetised liquid.

About a billionth of a second elapses after switching on the magnet before the influence on the light vibrations is observed in the liquid. This lag is found by Dr. Allison and his associates to be different for different substances. It is this delay that gives a means of identifying extremely small amounts of substances and in particular the first traces of the new chemical element 85. Because of its small amount the lag was not discovered until a year or two ago when Dr. Allison invented his new method of measuring it.

America seems to be making up for

lost time in discovering the missing members of the chemical family. Until the discovery of illinium by Prof. B. S. Hopkins at the University of Illinois in 1926 no element had first shown itself to an American investigator. Illinium's discovery left only two more elements to be discovered in order to complete the chemical periodic table.

If the discovery of element 85 is confirmed by other investigators, the United States will have the distinction of having found the three last and therefore the most inaccessible of all the elements.

Six elements have been discovered in the last seven years. Number 72, called hafnium after the city of Copenhagen, was discovered in 1923 by Prof. D. Coster and Dr. Georg Hevesy. Numbers 43 and 75 were isolated in 1925 and 1926 at the University of Berlin by Dr. Walter Noddack and his collaborators and named masurium and rhenium.

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CONSERVATION-ZOOLOGY

Australia Aroused to Preserve Wild Life

AUSTRALIA, which has had a development more or less analogous to that of the American West, is now passing through a phase also experienced in America—the realization that reckless slaughter is threatening extermination of many of its unique animal



ALMOST UNKNOWN IN ZOOS

The Thylacine, or "marsupial wolf", was formerly represented in the U. S. Zoological Park in Washington by two specimens. This animal, though a beast of prey, is now protected by the government of Tasmania.

species. This is resulting in activities looking toward their protection and preservation.

The koala or "native bear," an animal looking more or less like a bear but really a marsupial related to the kangaroo and the opossum, is an object of special solicitude. In New South Wales and other regions where it has been exterminated, efforts are being made to reintroduce it.

The so-called marsupial wolf or thylacine, not so harmless and good-natured as the koala, has been mercilessly hunted and now survives only in northwest Tasmania. The government of Tasmania has lately taken steps to protect the survivors of the species, and now forbids the exportation of thylacine pelts.

The Australian opossum is another animal that is being over-hunted. In the state of Victoria alone, which has a three-month open season, at least one million are killed annually, and conservationists are becoming concerned lest the fur trade destroy itself through its own over-eagerness for profits. New South Wales is the only state where the opossum is given official protection.

Although there are laws on the books to protect the native animal and plant life of Australia and Tasmania, there are not enough rangers in service to secure proper enforcement. However, voluntary assistance of interested persons is now being enlisted; and there is a movement on foot to establish nature sanctuaries and parks.

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GENETICS

Two-Sexed Corn Strain Obtained By Breeding

CORN PLANTS with male and female flowers on separate individuals instead of in tassel and ear on the same stalk, as in ordinary corn, have been obtained as the result of breeding experiments by Dr. Donald F. Jones of the Connecticut Agricultural Experiment Station. Dr. Jones started with two strains of corn, one of them with silkless, and therefore sterile ears, where the female flowers are borne; the other with the tassels unable to produce the fertilizing pollen. By means of breeding procedure he has been able to make these characters permanent, changing an hermaphrodite or double-sexed organism into a dioecious or single-sexed organism.

Dr. Jones' report appeared in *Science*.

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AERONAUTICS

Four Mile Per Minute Wind Possible in New Tunnel

Air Speed in New Apparatus at Guggenheim Aeronautical Laboratory, Pasadena, Exceeds Hope of Designers

AN ARTIFICIAL windstorm blowing 240 miles per hour has been found possible in the remarkable wind tunnel recently constructed at Pasadena for the California Institute of Technology. The outfit is a feature of the new Guggenheim Aeronautical Laboratory. This velocity exceeds the original hopes of the designers.

A wind tunnel enables airplane investigators to reverse the conditions of normal flying with obvious experimental convenience. One simply runs the air past a stationary plane instead of running the plane through stationary air.

The Pasadena tunnel might be likened to a huge reinforced concrete doughnut, flattened to an oval contour and set on edge. The aeronautical laboratory itself is built around the tunnel. The "doughnut" is of course hollow, and varies from ten to twenty feet in cross section. A striking view of the interior of the tunnel and of the huge fan that drives air through it is shown on the front cover. At this point the tunnel is fifteen feet in diameter.

A large direct current motor, mounted in the lower run of the tunnel, delivers 750 horsepower to a propeller. Air is driven in an endless circle to the upper level, where tests are made, and return. A section about thirty-five feet in length along the upper level is accessible to airplane parts and instruments. The investigator watches the hurricane through a curved window.

The apparatus was designed by Prof. Harry Bateman and Prof. Clark Millikan, in consultation with the European expert, Theodor von Karman. The latter has become director of aeronautical research activities at the Institute.

The air in motion is not seriously retarded by the tunnel walls. Upon its return to the motor after the first round trip it is again accelerated, and its velocity mounts until 200 miles is reached or even exceeded. The smooth interior finish, and polished curved steel baffles on the corners, permit the air to sneak around turns like a snake, without getting stirred up.

In practice the speed is held down to 200 miles to avoid undue strain. Even then the air becomes hot from friction without thermal relief. Velocity tests at numerous places show that the rate is uniform, not varying as much as two per cent. from place to place across the stream. This permits accurate tests of air pressure against airplane wings, fuselages, etc.

Since 200 miles per hour exceeds common flying speeds, the Pasadena experts are enabled to work with small models which can be gotten into the tunnel. It is then practicable to calculate reasonably what a real airplane, which is larger, will do with a proportionally smaller velocity.

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PUBLIC HEALTH

Fluorine in Water Causes Spotted Teeth

WHAT IS believed to be definite proof that mottled and corroded teeth in Arizona are caused by the existence of fluorine in drinking water has been announced by Dr. Margaret Cammack Smith, nutrition chemist of the University of Arizona.

Mottled teeth, an endemic developmental imperfection of the enamel of the teeth, first came to the attention of leading dentists in America in 1906. The existence of communities suffering from a disease of the teeth has long been known but a thorough study was not made until 1916.

Dr. Smith has worked out experiments with white rats and dogs in securing her results. Samples of water from the affected areas revealed abnormal amounts of fluorine in combination with some other substance, usually calcium. This calcium fluoride was found to act on the teeth of children before the teeth erupt. The sulphuric acid test revealed hydrofluoric acid in all of the tests and successfully etched glass.

However, in Dr. Smith's opinion not all of the disease is traced directly to