SCIENCE NEWS

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THE LAST MISSING CHEMICAL ELEMENT

IT is claimed that the one remaining unknown chemical element, number 85, has been detected for a first time in sea-water, potassium bromide, 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, Professor Edna R. Bishop and Anna L. Sommer, working at the Alabama Polytechnic Institute. 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 chemists' table of the ultimate building blocks of matter. Ninety-two elements now form the completed list. The new element, the 85th 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.

An unexpected fact is noted that the acid formed from the new element, "85-ic" acid, does not show itself when nitric and hydrochloric acids, bromine and iodine are added to the solution, but reappears when so-called reducing agents such as the dioxide of sulphur are present.

The new method of analysis depends on a strange phenomenon discovered a long time ago by Michael Farady. The Farady 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 polarized, 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. No satisfactory explanation of the phenomenon can be given on present theories, a fact which adds still further to the scientific interest of the work.

America seems to be making up for lost time in discovering the missing members of the chemical family. Until the discovery of illinium by Professor 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, that great generalization first discovered by the Russian chemist Mendeleeff in the 1870's.

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 Professor 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.

STATIONS FOR THE STUDY OF METEORS

SPECIAL observing stations will be established by the Harvard College Observatory near the site of the Lowell Observatory at Flagstaff, Ariz., and two astronomers will continually watch the sky throughout the nights in order to record for science the meteors that constantly bombard the earth's atmosphere from outer space. Plans for this expansion of the Harvard College Observatory's work were announced by Dr. Harlow Shapley, director. The actual observations will begin about October 1.

Dr. Ernst Öpik, astrophysicist at Harvard, this year on leave of absence from the University of Tartu in Estonia, and Professor S. L. Boothroyd, of Cornell University, will join with Dr. Shapley in the research.

"One of the principal aims of the expedition is to determine the frequency of meteors throughout the year, and a second important aim is to determine their altitude in the earth's atmosphere," Dr. Shapley said. "In order to measure the height it will be necessary to work at two stations, separated by approximately twenty-five miles. At each station two observers will continually watch the sky throughout all the hours of darkness except when the weather and strong moonlight interfere. At each station one observer will observe the northern sky and the second the southern sky. In my opinion the meteors, which have been much too neglected by astronomers, are of high importance in problems of the upper atmosphere of the earth, the relation of meteors to comets, the nature and abundance of interstellar material, and in other problems of cosmic significance."

In addition to the naked eye observations of meteors for numbers and distribution through the night and throughout the year, and for measures of the height, an attempt will be made to determine the velocities of some of the meteors and to develop further the photography of such objects.

Meteors, or shooting stars, are small pebbles or dust grains speeding at twenty to thirty miles per second in the Earth's atmosphere at an altitude of forty to eighty miles. Only those of great brightness are recorded on photographic plates and the human eye can see those nearly one hundred times fainter.

Dr. Shapley predicts that in a year there will be accumulated more satisfactory material on meteors than has ever been collected before.

ADVANCES IN METEOROLOGY

CHASING clouds in an airplane, to learn how fast they grow and to obtain other intimate secrets, is the new kind of meteorology that was described before the Washington meeting of the American Meteorological Society, by Dr. J. B. Anderson, of the Naval Air Station at Anacostia, D. C.

Dr. Anderson wanted to learn something about the birth and growth of clouds in the more or less permanent layer that hangs over the Pacific coast of the United States. He was especially curious to find out the rate at which they piled themselves up into the air. He found that to keep his plane even with the top of one cloud he was studying he had to climb two or three hundred feet in a minute.

How to get other weather data from the upper air without the expense of going up after it in an airplane was described by Dr. J. Patterson, of the Canadian Meteorological Service, Toronto. He has devised an apparatus that will flash back signals of temperature and pressure from an ascending small balloon as long as the observers can keep it in sight through a telescope.

Hitherto, similar apparatus has been carried up arranged to record its experiences with a pen on a slowly moving strip of paper. But to get the story it is necessary to wait until the balloon comes down again and then depend on the chance of the apparatus being found and sent back by some farmer or woodman. The new device is equipped with red and white electric lights fed by a flashlight battery. The mechanism is arranged in such a way that the order of flashing of the lights will tell the observer on the ground whether the balloon is passing from warm air to cold or *vice versa*. Similarly, another light signals by its flashings how much the barometric pressure is changing as the balloon rises.

Dr. Patterson pointed out that this device should be especially useful to meteorologists in polar regions or other unpopulated parts of the world, where the ordinary registering instruments are useless through the impossibility of getting them back again.

Gravedigging, an occupation as far removed from airplanes and balloons as can well be imagined, can also be made to yield data of value to the meteorologist, Dr. C. L. Fassig, of the U. S. Weather Bureau, told his hearers. In making a study of how deep frost gets into the ground in winter, he had recourse to engineers and contractors, and also to those melancholy laborers who prepare for each of us his last house. The data thus gathered are expected to be of value to roadbuilders, construction firms and all whose business has to do with making holes in earth that may get frozen.

A vivid report of weather in a region where there is never any question whether the ground is frozen was made by Dr. W. C. Haines, of the U. S. Weather Bureau, who was with Byrd in Antarctica. He told tales of taking observations in forty-mile blizzards with frost so thick on the lens of his instrument that it had to be scraped off with a stick; of powdery snow driven in through minute crevices jamming the clockwork of automatic recording devices; of "freeze-proof" ink frozen solid until it was diluted with alcohol and glycerin. The lowest temperature experienced during the year in Little America was 72.4 degrees below zero Fahrenheit; the highest, 35 above; an average for the whole year, 12.7 degrees below.

In spite of all these difficulties, however, the meteorological work was carried on successfully. Observations were taken daily at the base camp and on the over-ice expeditions. Over 400 sounding balloons were released and watched with instruments that made height and drift computations possible. Some of them were seen to ascend to as much as 30,000 feet. Kites and airplanes were used for capturing recorded data from aloft. A great mass of meteorologic data, the most complete ever compiled at "the bottom of the world," came back from Antarctica with the triumphant return of the Byrd expedition.

THE LABRADOR CURRENT AND ICEBERGS

THE Labrador current is weak this spring, and brings few icebergs. The warm Gulf Stream is taking advantage of this weakness to invade northern waters more deeply than usual.

These are among the first results of the exploratory trip of the U. S. Coast Guard vessel *General Greene*, under the scientific direction of Dr. Olav Mosby, a young Norwegian oceanographer who is making a study of ice movements and their causes in the waters off Labrador and Newfoundland.

Only one berg has been sighted so far, Dr. Mosby stated in a report to *Science Service*. This was picked up in latitude 47 degrees 2 minutes north, longitude 52 degrees 39 minutes west, and followed until it grounded, in latitude 46 degrees 36 minutes north, longitude 52 degrees 53 minutes west. Its drift was very slow and irregular, evidently mainly the work of winds and tide currents, indicating great weakness of the Labrador current, the usual highway of icebergs.

Temperature reports from ships in the North Atlantic indicate unusually warm water for this time of year, and a notable extension of the Gulf Stream toward the north. Temperatures from 50 to 60 degrees Fahrenheit have been reported from the latitude of the Grand Banks. These are ten or twenty degrees higher than those of

1924, the "poorest" iceberg year so far on record, when the ocean temperature stood at about 40 degrees at the same latitude. In 1929, the "richest" iceberg year, the readings were from 40 down to 34 degrees. During 1929, 1,351 icebergs were sighted south of Newfoundland; 322 of them in April alone, as against a solitary one during the month just past.

The mildest winter on record is reported from Newfoundland. St. Johns harbor, usually frozen from late December until March, was ice-free this year, and no pack-ice drifted down from the North. Atlantic salmon were offered in the St. Johns market in January and February; these fish are not usually caught until May or June.

STUDY OF OBESITY

OVERWEIGHT is dangerous to the human body, but improper means of reducing weight may be even more so. Of the many women who in recent years have adopted ridiculous dietary measures on their own initiative, some have suffered from extreme under-nutrition or ill health, and some even have died. The so-called eighteen-day diet is deficient from every standpoint. These matters were recently discussed by Dr. Clifford J. Barborka, of the Mayo Clinic.

It has been found that 70 to 85 per cent. of persons with diabetes are or have been obese, and that 50 per cent. of persons with high blood pressure are overweight. Many of those with gallstones, abnormalities of the heart, varicose veins, excessive perspiration and eczema are fat, and the surgeon knows that overweight adds to the risk if patients must undergo operation.

However, the condition seems to run in certain families. Then there are certain physiologic causes of increase in weight. The nursing mother tends to grow heavier; so does the patient who is convalescing from an operation or a prolonged illness. Increases in flesh are frequently seen at puberty, in pregnancy and after the change of life in women.

It is an apparent paradox that certain persons get fat and that others do not on what appears to be equivalent diets. There can be no doubt that obesity is often the result of over-indulgence in food and lack of exercise, but certain persons gain weight on what appears to be a moderate intake of food, or even a restricted diet, and who take considerable exercise.

What type of obesity is troubling a given patient may require a great deal of study by a physician. If dietary restriction is deemed necessary, the highly technical plan devised by Dr. Barborka can be applied under trained supervision. It is worth while, by annual physical examination, to keep track of changes in weight, and thus to learn whether an increase means the physiologic plumpness of good health, or whether it means danger to physical well being. Even if it is nothing to worry about, that is worth knowing.

ITEMS

THE lofty peak of Indrapoera, a volcano in Sumatra, has been set aside as a nature preserve by the Dutch Government. Cultivation on its slopes runs up to an altitude of about 5,600 feet, but above this the land has been barred to plantations and lumbering. The new preserve contains about 25,000 acres, and reaches an altitude, at the summit of the mountain, of about 11,800 feet. Elephants roam in its forests. On its summit grows an exceedingly rare species of primrose, known as *Primula imperialis*. This flower is found on the highest mountains in Java and Sumatra and on the mainland of Asia only in the Himalayas.

THE University of Illinois has obtained a permit to excavate the Indian cemetery near East St. Louis, where a contractor has reported uncovering four skeletons in good condition, and traces of other skeletons remaining in place. Excavation at the site will begin at once, according to Dr. A. R. Kelly, archeologist of the University of Illinois. The graves are on bluffs overlooking French Village near East St. Louis, Dr. Kelly said. Men who have dug and carted dirt away from the locality in the past two or three years have occasionally found human bones. How much of the cemetery remains is not known.

THE heaviest and strongest railroad rail ever built for regular service will be rolled this month, according to Elisha Lee, vice-president, and W. S. Franklin, assistant to the vice-president, of the Pennsylvania Railroad, in a report to the American Society of Civil Engineers. The new rail section weighs 152 pounds per yard as compared with the former 130 pounds and is the result of two years' intensive study by engineers of the Pennsylvania Railroad and of the United States and the Bethlehem Steel Companies. It will be rolled by the two steel companies. Although the new rail is only 22 pounds heavier than the present 130 pounds standard, it is 75 per cent. stronger. It will be used where traffic is heaviest. The rail that will be used on the greater part of the road is a second new type which is only one pound heavier than the present standard, but 22 per cent. stronger.

A SEA eagle that does not eat fish is the anomaly reported by Professor I. Aharoni, of the Hebrew University in Palestine, in a communication received by the New York office of the university. Professor Aharoni captured several specimens of this eagle on a recent zoological collecting trip to the Lake of Antioch in Syria, a body of water known from antiquity but little explored by scientists. On examining their stomach contents he found the bones of mice and birds in considerable quantity, but no traces of fish, in spite of the fact that this species is never found far from large bodies of water. Another very peculiar bird found on this trip was the Syrian darter, known locally as the oustalet. This is a waterfowl, nesting among the high reeds that cover the wide lake flats. Its nesting season is governed by the height of the lake, for it can not build until the water has got low enough for it to break down the reeds. Then it piles up a criss-cross structure of stems with their sharp ends pointing outward, forming a formidable defense against many of its enemies.