

CHEMISTRY

Element 93 Discovery Is Now Confirmed by American

Two Super-Heavy Elements Lie Beyond the 92 Known To Science and Shown in Familiar Periodic Table

TWO super-heavy chemical elements creatable by science in the laboratory almost certainly lie beyond the confines of the 92 elements in the familiar periodic table, Dr. Aristid V. Grosse, physical chemist of the University of Chicago, indicated in an interview with a Science Service representative while present at the meeting of the American Philosophical Society in Philadelphia.

First definite proof for the existence of these two new elements has just been reported from Italy and Germany, Dr. Grosse said, and convinces him that the earlier preliminary claims for the discovery of element 93, in particular, can now be accepted as fact. (*SNL*, June 16, 1934, and June 23, 1934. See also Prof. Fermi's prediction, *SNL*, Oct. 20, 1934) Dr. Grosse had previously contended that Prof. Enrico Fermi in claiming the production of element 93 was really working with element 91—protactinium—already isolated by Dr. Grosse. (*SNL*, Aug. 18, 1934)

Revision of tests by Prof. Fermi along unchallengable lines settles the controversy, Dr. Grosse said. It developed that Prof. Fermi's first reports were in error. Dr. Grosse's challenging of this work led to the new tests which substantiate the early claims previously based on erroneous experiments.

Moreover, Dr. Grosse indicated, Drs. O. Hahn and L. Meitner in the Kaiser Wilhelm Institute, Berlin, have independently substantiated the Italian work and the way now seems clear for the creation of at least two and perhaps a whole series of artificially-created elements previously unknown to man.

The super-heavy elements are created by bombarding the heaviest naturally-occurring element, uranium, with neutrons. The neutrons pierce the cores of the uranium, stick there and thus increase the weights of the atoms.

Although neither elements 93 nor 94 have been isolated in pure form, Dr. Grosse, from a study of the chemical properties of the known atoms, predicts

that they will have characteristics associated with the two rare metals, rhenium and osmium. This means they will be extremely hard and heavy metals.

Rhenium has only recently been applied to industry with the discovery of how to electroplate it on to other metals. Highly resistant to sulphuric acid, rhenium is expected to find wide use in lining tank cars and other containers for shipping this acid which formerly was transported in glass bottles.

Protactinium, which Dr. Grosse described in a report to the Society, is rarer than radium. It is obtained from five tons of residue ore from the radium factory at Joachimsthal, Czechoslovakia, being worked over in laboratories at Chicago. From two tons of this ore one-half milligram of pure protactinium has been obtained. So far the concentration necessary, Dr. Grosse said, was equivalent to saving only one part out of four million of the original material.

Like radium, protactinium gives off alpha, beta and gamma rays, but the possible therapeutic value of the rays is yet untested. Only recently has a sufficient

quantity been available to allow its distribution to medical laboratories.

The alpha rays or nuclei of helium atoms which protactinium shoots off in disintegrating have energies equal to 2,540,000 electron volts—higher than those of radium. And it is much more lasting than radium, for its life period is 46,000 years where radium is only 2,500 years.

Science News Letter, May 4, 1935

ARCHAEOLOGY

Oldest Americans Trailed By Tools Found on Campus

BROKEN stone tools, discovered through a chance bit of digging on a college campus at Fairbanks, Alaska, may convince still skeptical archaeologists that America is no recently discovered New World, but has been inhabited since the Old Stone Age.

The stone tools unearthed in Alaska are pronounced at the American Museum of Natural History, in New York City: "The first clear archaeological evidence of early migration to the American continent."

American antiquity is demonstrated to archaeological satisfaction by discovery that the Alaskan tools match Asiatic tools of the Gobi Desert's Paleolithic or Old Stone Age. The matched tools point a trail of ancient men from Asia to America, and indicate that the immigrants moving across Bering Strait were people not yet advanced out of Asia's Old Stone Age. (Turn to Page 284)



CLASSES IN THE AIR

Aeronautics is taught in the air as well as on the ground at Purdue University's airport. Purdue is said to be the only college to have an airport in connection with its aeronautical courses, which are headed by Capt. G. W. Haskins. The flying Purdue students got an unexpected lesson in stratosphere flying when Wiley Post made his unexpected landing of the Winnie Mae at this airport.

Dr. N. C. Nelson, curator of prehistoric archaeology at the American Museum, announced this new evidence for early Americans in an initialed note in the Museum's publication, *Natural History*. (May-June) Examining the Alaskan tools he found two kinds, consisting of small semi-conical flint cores and small endscrapers to be "identical in several respects with thousands of specimens found in the Gobi Desert by the Central Asiatic Expedition in 1925-1928."

"The specimens," continued Dr. Nelson, "furnish the first clear archaeological evidence we have of early migration to the American continent, apparent-

ly during the final or Azilian-Tardenoisian stage of the Paleolithic culture horizon possibly 7,000 to 10,000 B.C."

First of the Alaskan stone tools came to light when a posthole was dug on the campus of the Alaska Agricultural College and School of Mines at Fairbanks, in 1933. Stimulated by this discovery relating to prehistoric man, Jack Dorsch, working under direction of Dr. C. E. Bunnell, College president, dug a trench across the campus last summer. His excavations revealed about 400 hammerstones, projectile points, rejected flakes, cores, and endscrapers, most of the ancient tools being fragmentary.

Science News Letter, May 4, 1935

GENERAL SCIENCE

Dr. Frank R. Lillie Heads Both Academy and N. R. C.

Science Aid to Government and People Pledged Anew By Biologist of Chicago and Woods Hole

See Front Cover

DOCTOR Frank R. Lillie was elected president of the National Academy of Sciences for a four-year term, an office considered the highest within the gift of American science. He is Canadian born and has been serving both as dean of the division of biological sciences at the University of Chicago and as president of the Woods Hole, Mass., Marine Biological Laboratory.

Dr. Lillie succeeds Dr. W. W. Campbell, astronomer and former president of the University of California.

Dr. Lillie was also elected to the chairmanship of the National Research Council. He is thus placed in a key position as a leader of American science. Heretofore the two positions have not been held by the same person and a coordination of the scientific activities of the academy and the council is expected to result from Dr. Lillie's election to both positions.

Science is pledged anew to serve the nation in a statement made by Dr. Lillie:

"The National Academy of Sciences established by President Lincoln under Congressional charter in 1863 stands for the world-wide advancement and promotion of science and for the application of its results to the industrial, social, educational and governmental activities of the American people. It knows no politics and it is at the service of the elected rep-

resentatives of the people. Through its National Research Council and the Science Advisory Board it maintains relations with all national scientific organizations and endeavors to focus the resources of their knowledge upon the problems that confront us."

The front cover of this week's SCIENCE NEWS LETTER carries the picture of Dr. Lillie standing at the entrance of the National Academy building.

Youth was served in the elections of new members of the National Academy of Sciences. Outstanding on the list of new Academicians is Dr. Harold C. Urey, age 42 and last year's Nobel prizeman in chemistry for his discovery of "heavy water." He is professor of chemistry at Columbia University.

Even younger than Dr. Urey is a Harvard physicist, Dr. J. H. Van Vleck, one of the "boys" who has turned classic science upside down with brilliant new investigations in quantum mechanics. Dr. Van Vleck just escaped being a child of the present century; he was born in 1899.

Of the fourteen men elected, eight are under fifty years of age. Arranged by decades, two of the new members were born in the late 1860's, two during the 70's, eight in the 80's and two in the 90's.

So far as professional type is concerned, there was an even division between the so-called exact sciences of the physics-

chemistry group and natural sciences, with seven of the fourteen new members falling in either division.

The full list of new members follows: Dr. N. L. Bowen, Carnegie Institution of Washington, geologist; Dr. C. M. Child, University of Chicago, zoologist; Dr. G. E. Coghill, Wistar Institute, Philadelphia, chemist; Dr. James Ewing, Memorial Hospital, New York City, pathologist; Dr. M. L. Fernald, Gray Herbarium, Cambridge, Mass., botanist; Dr. Harvey Fletcher, Bell Telephone Laboratories, New York City, physicist; Dr. Ross Aiken Gortner, University of Minnesota, chemist; Dr. E. A. Hooten, Harvard University, anthropologist; Dr. J. C. Hunsaker, Massachusetts Institute of Technology, aerodynamist; Dr. Walter S. Hunter, Clark University, psychologist; Dr. Dunham Jackson, University of Minnesota, mathematician; Dr. Chester R. Longwell, Yale University, geologist; Dr. H. C. Urey, Columbia University, chemist; Dr. J. H. Van Vleck, Harvard University, physicist.

New Foreign Associates of the Academy are: Dr. J. S. Haldane, physiologist of Oxford University, England, and Dr. Jules Bordet, bacteriologist and director of Pasteur Institute, Brussels, Belgium.

Science's aid in the present war on crime was recognized by the National Academy in the award of its Public Welfare medal to August Vollmer, University of California expert in police administration and former Berkeley police chief. Illness prevented Prof. Vollmer's attendance at the presentation.

Dr. James P. Chapin of the American Museum of Natural History received the Daniel Giraud Elliot medal for his researches on Belgian Congo birds. In their absence, the Henry Draper medal for astronomy was conferred upon Dr. J. S. Plaskett, director of Canada's Dominion Astrophysical Observatory at Victoria, and the famous Agassiz medal for oceanography was awarded Prof. Haakon Rasberg Gran of Oslo.

Science News Letter, May 4, 1935

Science Preserves an Ideal

"It is a matter for thankfulness that among the many sources of world distrust and jealousies, science preserves an ideal of purity, truthfulness and mutual good will toward all nations. Not only do cooperative international scientific projects flourish, but the publications of scientists are received at face value in all lands, even though they be politically at variance."—President Franklin D. Roosevelt in a letter of welcome to the National Academy of Sciences.
