

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 unchallengeable 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.

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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.