

PHYSICS

Superheavy Element 94 Discovered in New Research

Confirmation of Fermi's Nobel Prize Research Begins Discovery of Whole New Group Heavier Than Uranium

DISCOVERY of a whole new group of chemical elements heavier than number 92, uranium, which the textbooks now list as the universe's heaviest, has begun through the positive identification of element 93 and the probable discovery of element 94 at Berkeley, Calif.

The element-adding research, done by Dr. Edwin M. McMillan of the University of California and Dr. Philip Hauge Abelson of the Carnegie Institution of Washington, confirms the discovery made several years ago by Prof. Enrico Fermi, Italian Nobelist now working at Columbia University, of element 93.

When in January, 1939, the sensational splitting of uranium atoms with release of power was discovered, the existence of element 93 was called into question. Dramatically this happened at about the time that Prof. Fermi received the Nobel prize for his researches. Now Prof. Fermi's discovery is vindicated and the discovery at Berkeley of still another super-heavy element is indicated.

It is expected that the discovery of element 94 of atomic weight 239 will be reported in an early issue of the *Physical Review*.

Theoretically this new element 94 might be converted by self-destruction or radioactive emission of a helium nucleus into the uranium of atomic weight 235 which is sought as source of atomic power, but, surprisingly, this new element 93 is very stable. There is no likelihood that it can be used in the manufacture of the power-producing uranium.

Here is the train of events in the sub-microscopic world of the atom that gives rise to the new heavy-weight elements:

Starting with the common sort of uranium 92 of 238 atomic weight, this element is bombarded with relatively feeble neutrons of 25-volt energy. One of these is captured by resonance and the ordinary uranium becomes radioactive, with a half-life of 23 minutes. This produces element 93 of atomic weight 239. This is the element discovered by Prof. Fermi.

The new element 93 is itself unstable and is radioactive, half of it disintegrating every 2.3 days. The existence of this

reaction was first noted but not identified last year by Dr. E. Segre, a former colleague of Prof. Fermi's at Rome, working at the University of California.

Now the McMillan-Abelson research indicates that with emission of electrons the element 93 changes to element 94 of atomic weight 239.

Thus two elements heavier than uranium are added to the periodic table of the fundamental building blocks of the matter of the universe.

The discovery of other heavier elements may be expected as research progresses. For example, element 95 is being sought. The relative stability of element 94 among elements that are all radioac-

tive brings hope that the others will be identified.

If the element 94 of 239 atomic weight gave off an alpha particle or helium atomic nucleus of weight 4, it would be converted into the power-emitting uranium 235. But preliminary explorations are understood to have indicated a very long lifetime for element 94, perhaps many thousands of years, making highly improbable any possible production of uranium 235 by this means.

Science News Letter, June 22, 1940

ENGINEERING

Dancing Light Beam Gives More Faithful Sound

SNATCHING from the laboratory a dancing mirror to render more faithful reproductions of phonographically recorded sound, a new sound system for home and commercial phonographs was introduced by David Grimes, chief engineer of the Philco Corporation.

Instead of the conventional needle of the ordinary phonograph, a feather-weight sapphire floats along the groove of the record. The recorded sound is



BIGGEST DINOSAUR FOOTPRINT

That is the claim made for this 54-inch depression in a rock stratum near Glen Rose, Texas, uncovered by a University of Texas paleontological survey, aided by the WPA, Dr. E. H. Sellards directing. When the 50-ton, 80-foot-long Brachiosaurus set his yard-and-a-half foot down here in Cretaceous times, about 130,000,000 years ago, what is now rock was soft seashore mud. Now, three-year-old Tommy Pendley from a nearby farm finds the footprint a nice wading pool.