PHYSICS

Italian Discovery May Be First of Super-Elements

No. 93, Reported by Fermi, May Be Unstable Element Thought Impossible Only a Few Years Ago

HAS a super-uranium, the first of a series of elements heavier than the recognized 92 chemical building blocks, been discovered?

Scientists are wondering as a result of the report that Dr. Enrico Fermi, brilliant 32-year-old physicist of Rome's Royal University, by atomic bombardment has created artificially a new element, No. 93. He bombarded uranium, heaviest of elements, with the non-electrical particles known as neutrons.

Element No. 93 makes a bid for recognition as the result of this year's fast-moving development in knowledge of the atom's interior which began with the discovery of artificial radioactivity.

Uranium is the heaviest element found in nature, being 238 times as dense as hydrogen, the lightest. For many years it was thought to be the limit of all the possible elements but recently Sir Arthur Eddington and other theoretical scientists have calculated the maximum number of possible elements as 136. Element No. 93 of Dr. Fermi, if its reality is substantiated by competent investigators working independently, may be the first of the super-heavy substances lying beyond uranium in the gamut of chemical elements.

Opinion among American physicists regarding Dr. Fermi's discovery indicates that if still heavier elements are found they will be transitory substances breaking down like the naturally radioactive elements such as radium but probably much faster. For the provisional element No. 93 it is reported to take only 13½ minutes for the initial quantity of the element to "decay," or disintegrate, to half the amount.

Differs From Earlier Research

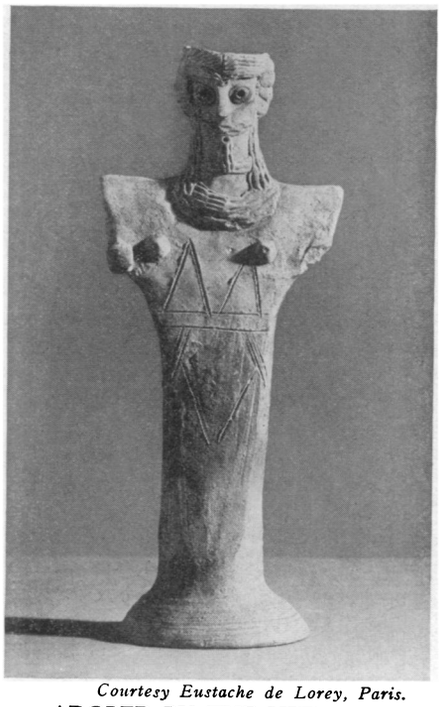
On what proof Dr. Fermi bases his report on the actuality of element No. 93 is still unannounced. In his recent communication to the British scientific journal, *Nature,* however, he cites twenty-three cases where he had been able to produce artificial radioactivity in a variety of elements with the same apparatus he employed for creating element No. 93. In recounting his work Dr. Fermi told of observing negative charges of electricity—electrons—being giving off as the man-made radioactive substances decayed away. Thus he differed with the earlier research of Irene Curie and Prof. F. Joliot of Paris who have observed particles of positive electricity—positrons—being omitted in the process.

The atomic happenings which might account for the creation of the new element out of uranium are still a subject of debate and conjecture among scientists. One possible occurrence might be that the neutrons used by Dr. Fermi (consisting, if they do, of a positive particle, the proton, and a negative charge, the electron) might break into two parts on impact with the nuclei of the uranium atoms. The proton might embed itself within the uranium nucleus and so increase the weight of the atom to No. 93 while the electron part of the neutron would be given off in the process and be detectable either with electrical instruments known as Geiger counters or by photographing the electron tracks in a Wilson cloud chamber.

Not Verified With Spectrograph

The best way to determine whether the new element No. 93 really exists would be to weigh it on the atomic "scales"—the mass spectrograph. It does not appear that this crucial test has been applied in Dr. Fermi's work for no mention was made of the method.

What amazes American scientists regarding Dr. Fermi's experiments is that his source of bombarding neutrons is comparatively weak. In a small glass tube the Italian scientist placed beryllium and the radioactive gas, radon, given off by radium as it breaks up. The action of the radon on the beryllium caused swift-moving neutrons to come off which struck a nearby bit of uranium. About 100,000 neutrons were liberated in this (*Turn to Next Page*)



Courtesy Eustache de Lorey, Paris.

ADORED BY THE HITTITES

A rare figure of a goddess of the Hittites —or so she is believed to be—shows us in person the sort of divinity that so distressed Hebrew prophets of the Bible. Once worshipped by adoring eyes, the goddess is now gazed at critically by visitors in the Worcester Art Museum, where she is an important "loan" from Paris.

ARCHAEOLOGY

Hittite Goddess Shows No Classic Beauty

A PLAIN little figure is a goddess who has sailed across the seas to show Americans the sort of divinity worshipped by the Hittites, 1400 B. C.

The sculptor who made her thought arms and legs unimportant. He merely sketched in a suggestion of a robe or dress. But he gave careful attention to a coiffure, with hair parted in the middle and rolling down ending in long locks on either side of the head. Around the neck, bands placed high and low, resemble the curls in technique, but may be ornaments. The staring hollow eyes probably shone with jewels, once, but even bejeweled the goddess has little of the alluring charm that our imaginations might conjure up when we think of the heathen gods of the Bible lands.

Not so long ago, the Hittites were thought of vaguely as one of the enemies of the Children of Israel, named in the Bible. They are now known as important people of northern Syria and Asia Minor.

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