

CHEMISTRY-MATHEMATICS

Group Of Elements Beyond Uranium Is Found Possible

Mathematical Researches Show That Group of Elements Similar to Rare Earths May Exist Near Uranic Atom

THE POSSIBILITY of a group of elements resembling the rare earths beyond uranium or element No. 92, once considered the uttermost outpost of the atomic system, has been demonstrated mathematically by Dr. M. Goeppert Mayer of Columbia University. (*Physical Review*, August)

The uranium outpost was passed some years ago by Prof. Enrico Fermi, Nobelist now working at Columbia University but then in Italy, with his discovery of the radioactive element No. 93, now called neptunium. Other "transuranic" elements supposedly discovered are short-lived and their existence has been doubted.

The chemical behavior of element No. 93 was determined in 1939 and 1940 by Dr. E. McMillan and Dr. P. H. Abelson at the University of California, who came to the conclusion that it was a rare earth and suggested that a second rare earth group might start at uranium. This is precisely what Dr. Mayer has proved to be mathematically possible. The problem had been previously discussed by Dr. H. C. Urey, Nobelist of Columbia University and Dr. Y. Sugiyama, Danish chemist, on the basis of the old quantum theory. Dr. Mayer, using the newest quantum theory, has come to more definite results.

The group of rare earths occupies a quite anomalous position in the chemist's "periodic table" of the elements. This table classifies the elements into families having similar chemical properties, but also individual differences from the type, i.e., family resemblances and differences. Each element, except those belonging to the rare earth group, occupies a separate box to which belongs a certain group of chemical properties.

The rare earths consists of 15 elements belonging to the aluminum family. Their chemical properties are so similar that it is extremely difficult and sometimes impossible to separate them by chemical means. It is as though in a family, after a number of single births, suddenly a

litter of 15 almost identical sons appeared. In the periodic table there is only one box reserved for the particular set of chemical properties shared by these 15 elements. So, all of them had to be crowded into this one box.

This curious situation is fully accounted for by Dr. Mayer's formulas. Her researches also show that the same conditions that cause it recur in the neighborhood of the uranium atom. Hence it is quite possible that a similar series of elements, almost identical in their chemical properties, exists in the transuranic region.

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ENGINEERING

Shortage of Airplane and Engine Mechanics Looms

WITH 74,000 military airplanes on order today, and 8 to 10 mechanics needed per airplane, the shortage of mechanics will run into the hundreds of thousands within two years unless something is done about it. This is the verdict of two surveys, one conducted by a government agency, the other by a committee of the Aeronautical Chamber of Commerce.

The surveys reveal that the private mechanics schools are operating at 50% capacity, and many are facing bankruptcy and their facilities are idle for lack of business.

Three reasons are cited by the school men for the low level of their business:

(1) Young men who would have gone to a mechanic's school, find that they can now get jobs without training because of the defense program.

(2) Selective Service has taken many young men who either were in school or would have gone to school.

(3) The Government is offering free vocational training which does not equip men to service airplanes, and this lures many men away from more expensive training.

Just how to utilize the private schools



SELF-CONTAINED

This sunlamp gives a wealth of ultraviolet and infrared radiation similar to that in summer sunshine. Unlike its numerous predecessors, it does not require special external control devices to operate. The ballast control, reflector, tungsten filament for infrared rays and the mercury arc for ultraviolet, are all built into a single, self-contained, sealed unit. The special glass of which it is made filters out harmful rays, so it does not require the user to wear goggles. Drawing 275 watts on 110-125 volt A. C. circuit, it gives at a distance of 30 inches biologically effective radiation two to three times as powerful as noon mid-summer sunshine in the United States. (General Electric)

is a problem in Washington today, since the civilian government agencies are not as yet empowered to contract with them. Efforts are now being made to obtain a broader interpretation of the law so that this can be done.

The surveys suggest also that the schools stage an educational advertising campaign.

All Washington officials, they state, are agreed that unless the training of airplane and engine mechanics is speeded up, the shortage will soon become a major crisis of the defense program.

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