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NEW ELEMENTS DISCOVERED BY USE OF X-RAYS

Use of spectra obtained by passing a beam of x-rays through concentrated solutions of rare minerals has enabled Dr. Walter Noddack, of the University of Berlin, assisted by Otto Berg and Ida Tacke, to discover the missing chemical elements number 43 and 75, in the group with manganese in the periodic table. Traces of them have been detected in the concentrated solutions of platinum ores and of the minerals gadolinite and columbite, and it is estimated that they form a billionth of the earth's crust. Dr. Noddack has named them masurium and rhenium after the territories lost by Germany as a result of the peace treaty, the Masurian region of East Prussia on the east and the Rhine provinces on the West.

These new elements, were brought to light as a result of a law discovered by Henry G. J. Moseley, a young British scientist who lost his life in Gallipoli during the war. When a beam of x-rays is reflected by a crystal or powdered crystals it is spread out into a band, after the manner of a beam of light passing through a glass prism. If this band is allowed to fall on a photographic plate, a series of light and dark lines is obtained, which is called the x-ray spectrum. The x-rays have very short wave lengths and therefore come at the extreme end of the spectrum, beyond the ultra-violet waves.

After a study of the x-ray spectra of many elements, Moseley formulated a law which now bears his name, by means of which, if the atomic number of an element, or its position in the periodic table, is known, the character of its x-ray spectrum may be obtained. A few vacancies still exist in the 92 spaces of the table, but the characteristic spectra of the unknown elements can be calculated in advance, and when a substance is found to give this spectrum, there is no doubt of its identity.

Similar methods were used in 1922 by G. Hevesy and D. Coster at the Institute for Theoretical Physics at Copenhagen, to discover the missing element number 72, which was named Hafnium, after the Latin name for Copenhagen.

With the discovery of the new elements, there are only three vacant places left in the periodic system, which have the numbers 61, 85, and 87. These, like masurium and rhenium, which are numbers 43 and 75, are odd numbers, as it is a curious fact, pointed out by Professor Harkins of the University of Chicago, that in the case of elements of high atomic weights, those of even number are more common.

Noddack was trained under Nernst, the famous physical chemist of the University of Berlin.
