

SCIENCE

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RADIO-ACTIVITY AND THE PERIODIC SYSTEM¹

THE periodic system of the elements has for nearly half a century proved a most puzzling and absorbing problem to chemists. It has been called a law, but while there is undoubtedly an underlying law or laws, I doubt whether we have as yet any very clear conception of them. Certainly, the usual statement that the properties of the elements are periodic functions of their atomic weights was never strictly true, even in days of partial knowledge, and is much less true now. It was neither the periodicity "of the geometers," as Mendeleef himself said, nor the function of the mathematician. Indeed, we have now come to a view where, apparently, we must abandon the atomic weight as the only or even the chief determining variable.

The truth is that for many years after its announcement it was more truly a working hypothesis, and a great deal of work had to be and still has to be done before it can attain to its completed form. It contains much that is true, has been most useful as a guiding principle, and has shown a wonderful power of adjustment to new facts and increasing knowledge.

It was in 1895 that the system had to adjust itself to the first severe jolt which it received through the discovery of argon and helium, and three years later, of other inactive, monatomic elements. The necessity for readjustment here had been in part foreseen. The abrupt change in the progression of the elements from strongly electro-negative fluorine to strongly electro-

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¹ Read before the Elisha Mitchell Scientific Society, March 9, 1915.