SCIENCE

VOL. 82 FRIDAY, SEPTEMBER 13, 1935 No. 2124

SCIENCE: A Weekly Journal devoted to the Advancement of Science, edited by J. MCKEEN CATTELL and published every Friday by

THE SCIENCE PRESS

New York City: Grand Central Terminal
Lancaster, Pa. Garrison, N. Y.
Annual Subscription, $6.00 Single Copies, 15 Cts.

SCIENCE is the official organ of the American Association for the Advancement of Science. Information regarding membership in the Association may be secured from the office of the permanent secretary, in the Smithsonian Institution Building, Washington, D. C.

THE STORY OF ISOTOPES[1]

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THIS chapter in the history of science contains much to interest the philosopher and offers many illustrations of that interplay of theory and experiment by which advance takes place. Theory is the scaffolding of science, and just as in ordinary building operations, though some parts of it may only be used for a short time before removal, others may function for so long a period that they may well be mistaken for the permanent structure itself. The postulate of Dalton (1803) that atoms of the same element are equal in weight is a good example of very permanent scaffolding. For over a hundred years it was practically undisputed and on it was founded the major part of atomic chemistry.

About ten years later Prout made the more speculative suggestion that all atoms were made up of primordial particles which he thought might be atoms of hydrogen. On this view the weights of all atoms must be expressed as whole numbers, and if, as Dalton postulated, the atoms of any particular element were all equal in weight, the atomic weights and combining ratios of all elements must be whole numbers also. Chemists soon found that this was certainly not in agreement with experiment; the more results they obtained the more impossible it was to express the atomic weights of *all* the elements as whole numbers, and of the two theories Prout's was the one to be abandoned. In this decision they were perfectly justified for, as it can not be too often emphasized, it is more important for a scientific theory to be simple than for it to be true. Besides it was of little practical importance to chemists if atoms were not equal in weight so long as in all the ordinary operations of chemistry they behaved as though they were.

[1] Address of the president of the Section of Mathematical and Physical Sciences, British Association for the Advancement of Science, Norwich, September, 1935.