

X-rays and Atomic Structure at the Early Stage of the Old Quantum Theory

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I. Introduction

In the previous paper¹⁾ we concluded that at the earlier stage of the development of the theory of atomic constitution, namely in the decade of 1910's, chemical considerations have played the cardinal part. Atomic models capable of explaining the chemical properties, which were proposed and developed by Kossel, Lewis, and others, exhibited right properties as far as the general features were concerned. Especially they gave the correct number of electrons in each ring- or shell-grouping of electrons inside atom.

In the course of this investigation, we were compelled to trace the development of the theories of characteristic X-ray spectra and to assess properly the role played by these theories in the history of the theory of atomic constitution in the same period (in the 1910's). We indeed found that although works on X-ray spectra made some contributions which could not be looked over, they were subordinate to the chemical approach.

The following is the result that we have obtained concerning the part played by the studies of characteristic X-rays in elucidating the structure of the Bohr atom. **)

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**) After the author finished the preliminary note²⁾ on this subject, she received the issue of *ISIS*³⁾ in which J. L. Heibron published a paper on the theory of X-rays and the structure of atom in the same period as hers. Making use of, in addition to the published papers, unpublished various documents, he traced in detail the process of the rise and fall of the ring atom model mainly in consequence of the evolution of the theories of X-ray spectra. The author, however, considers the cause of the decline of ring atom model not only in X-ray spectra but also in the chemical properties of atom. It should be noticed that the relation of the X-ray investigations with the chemical considerations is outside the scope of Heibron's paper.