

SCIENCE

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CONTENTS

<i>The Static Atom:</i> PROFESSOR GILBERT N. LEWIS	297
<i>Zoological Research:</i> PROFESSOR C. H. EIGENMANN	302
<i>Scientific Events:—</i>	
<i>Reconstruction Hospitals and Orthopedic Surgery; Forest Battalions for Service in France; Occupational Census of the Army; Opportunity for Physiologists and Biochemists; Physiological Examination of Recruits; Section of Zoology of the American Association</i>	306
<i>Scientific Notes and News</i>	308
<i>University and Educational News</i>	311
<i>Discussion and Correspondence:—</i>	
<i>The Colors of Letters:</i> DR. DAVID STARR JORDAN. <i>A Simple Demonstration for Euler's Dynamical Equations:</i> ARTHUR TABER JONES. <i>A Unique Hornet's Nest:</i> H. A. ALLARD. <i>Synchronism in the Flashing of Fireflies:</i> FRANK C. GATES. <i>Uredinia of Chronartium ribicola on Ribes Stems:</i> G. B. POSEY, G. F. GRAVATT, R. H. COLLEY	311
<i>Scientific Books:—</i>	
<i>Australian Aboriginal Crania:</i> DR. ALEŠ HRDLIČKA. <i>Taubenhaus on the Culture and Diseases of the Sweet Pea:</i> F. A. WOLF	315
<i>Field Conference of Cereal Pathologists:</i> C. W. HUNGERFORD	316
<i>Special Articles:—</i>	
<i>The Possible Origin of the Toxicity of Ultraviolet Light:</i> DRS. F. I. HARRIS AND H. S. HOYT	318

THE STATIC ATOM¹

I HAVE been asked to present in this symposium the relation between atomic structure and the "valence bonds" by which the atoms are regarded as tied together, to form the more complicated structure of the molecule. Now the whole theory of molecular constitution which I have developed rests upon the fundamental postulate that the atom is internally at rest or nearly so. On the other hand, Bohr, who has given special attention to the phenomena of spectral series, has been led to the view that the electrons in the atom are revolving rapidly about a central positive nucleus. Because of the wide acceptance by physicists of Bohr's theory of the atom and its orbital electrons, and especially in view of the very lucid arguments in favor of this theory which Professor Millikan has just presented to us, I am going to ask your permission to modify the subject of my paper, and to discuss not the specific methods of combination among the atoms, but rather the question as to whether the electrons in the atom and the molecule are in rapid motion or are essentially at rest; for upon our answer to this question any theory of molecular structure must depend.

Now assuming that the electron plays some kind of essential rôle in the linking together of the atoms within the molecule, and, as far as I am aware, no one conversant with the main facts of chemistry

¹ Presented at the symposium on "The Structure of Matter" at a joint meeting of the Sections of Physics and Chemistry of the American Association for the Advancement of Science, The American Physical Society and the American Chemical Society, New York, December 27, 1916.