Immunochemistry. The Application of the Principles of Physical Chemistry to the Study of the Biological Antibodies. By SVANTE ARRHENIUS. New York, The Macmillan Company. Pp. 309. $1.60.

During the last year Arrhenius has published three books which, in the opinion of the reviewer, embody the most advanced results and conceptions of modern science in a classical form. Those who are interested in the methodology of science and the theory of cognition will learn by what methods those scientists, of whom Arrhenius is a representative, are able to build on certainty instead of upon the vague basis of hypothesis; and those who doubt whether or not we have reached any definite conception of the nature of matter will find authoritative information in the books of Arrhenius. These books are: (1) "The Theories of Chemistry," (2) "Das Werden der Welten," (3) "Immunochemistry." The English edition of the latter has just appeared and it is to this that we wish to call special attention.

After Metchnikoff had made the attempt to explain the phenomena of immunity by phagocytosis Ehrlich showed that immunity is due to a chemical reaction between toxin and antitoxin. With the clear foresight which has characterized the scientific career of this brilliant investigator he saw that the ultimate proof for the correctness of the purely chemical conception of the phenomena of immunity could only be furnished by the physical chemist. Through the influence of Madsen, Arrhenius was induced to undertake this task. Partly alone, partly in collaboration with Madsen and his school, he solved the problem in the only way on which it could be solved—namely, by showing that the action of the antitoxin upon the toxin followed the law of Guldberg and Waage. In the execution of this task he adopted the principles of eliminating the unnecessary and disturbing variables and presenting the results as the function of the minimal number of independent variables. The fact that this principle is not sufficiently appreciated by biologists has led here, as in all similar cases, to some opposition. It is, however, obvious that if a variable has been overlooked its effects can easily be added to the results; while without an attempt at the utmost simplification in the beginning no start and no progress would have been possible.

The writer of this review would especially call the attention of the younger biologists to the importance of a study of Arrhenius's books.

JACQUES LOEB

The Electrical Conductivity of Aqueous Solutions. A Report presented by ARTHUR A. NOYES, W. D. COOLIDGE, A. C. MELCHER, H. C. COOPER, YOGORO KATO, R. B. SOSMAN, G. W. EASTMAN, C. W. KANOLT and W. BÖTTGER. Contribution from the Research Laboratory of Physical Chemistry of the Massachusetts Institute of Technology No. 19. Carnegie Institution of Washington, Publication No. 63. Pp. vi + 352.

This volume is a report on a monumental series of investigations which have been in progress in Professor Noyes's laboratory during the past five years upon the electrical conductivity of aqueous solutions of certain salts, acids and bases through a wide range of temperatures extending from 18° to 306°. The work was undertaken with the expectation of studying the properties of aqueous solutions at temperatures up to the critical temperature and beyond, a task burdened with very serious difficulties, as will be realized when one recalls that the critical temperature of water is in the neighborhood of 360°, and that at this temperature the conductivity cell must not only safely withstand a pressure of something like 200 atmospheres without leaking and without contaminating the dilute solutions employed, but must also do this under such conditions as will permit accurate control of the temperature, volume and conductivity of the solutions.

Up to the present time the highest temperature reached is 306°, but to one who studies the ingenious manner in which the experimental difficulties have so far been overcome there can be no doubt that the original plan will be ultimately realized.

Among the important results presented in this volume are data showing the effects of