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ON THE Hr FACTOR AND THE Rh GENETIC THEORY

By Dr. PHILIP LEVINE

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IN the recent discussions on the genetics of the Rh multiple alleles, no provision is, as yet, made for the role of a gene determining the Hr factor.[1,2] This agglutinable property was described very early in the course of the studies on the pathogenesis of erythroblastosis fetalis.[3] It was advisedly designated by Levine[4] as Hr (reversal of the letters Rh) because of peculiar relationship to a special variety of anti-Rh sera, now designated anti-Rh′. This is indicated in Table 1, which gives, at the same time, the four subtypes of Rh and their frequencies resulting from the reactions of anti-Rh_0 and anti-Rh′ sera.

From the beginning of the studies on erythroblastosis fetalis, Levine has held to the view that the relationship of the anti-Hr and anti-Rh′ sera is analogous to that of anti-M and anti-N sera. In other words, only three types of reactions are observed, and in both systems bloods failing to react with both anti-sera were never found. It was only after hundreds of bloods were tested that the term Hr and anti-Hr were designated. These results were not published more fully because it was clear that the first anti-Hr serum was of weak activity and gave too many negative reactions.

Subsequently, Race and Taylor described a similar

[1] R. R. Race, G. L. Taylor, K. E. Boorman and B. E. Dodd, *Nature*, 152: 563, 1943.

[2] A. S. Wiener, SCIENCE, 100: 595, 1944.

[3] P. Levine, L. Burnham, E. M. Katzin and P. Vogel, *Am. Jour. Obstet. and Gynec.*, 49: 925, 1941.

[4] P. Levine, Yearbook of Path. and Immunol., 508, 1941.

hundred pages of interesting condensed discussion, the most satisfactory brief characterization we have seen. Other writers have found this task baffling, leading the reader into hopeless confusion. Possibly one secret in the author's art is that he combines time perspective with plain geographical distribution, thus giving sketches of modern man which can be sensed in terms of the cardinal points—and a fifth dimension, called time. It follows that no one could achieve such a literary triumph without a profound knowledge of the facts of distribution in all these dimensions, in research and years of experience in skilful teaching. Further, limitations of space may have led the author to change his method; whereas in the other two sections of the book he has clearly stated the divergent theories of the leading writers, in this he ignores such contributions as are not easily classified or reduced to simple statements, giving instead his own views of race origins and migrations. A good example of this is the treatment of the Negro and Negroid problems. Whereas in the case of the American Indian, he accepts and follows the traditional American interpretation of an Asiatic origin, he treats the Negro by some bold generalizations, without hinting that many more definite yet often ill-grounded theories are entertained by recognized anthropologists, but begins with a unique diagrammatic ethnographic map of Africa which, for clearness, leaves little to be desired. He then turns to the African Whites, whose restricted habitat seems to be North Africa, an ancient physiographic part of Europe. He sees these White people streaming into Africa by way of the Suez "bottle-neck," but ignores the question as to how the Negro came to be in the Central African forests to assist in forming the intervening Sudan by mixing with the White intruders from the north. The Bushmen of South Africa are accepted as the traditional early inhabitants, while the Pygmies are passed over as a hopeless puzzle as are certain of the Negroids and Negritoes in eastern Asia, startling the reader with the suggestion that both Pygmies and Negroes may be foreigners in Africa.

Nevertheless, a perusal of these hundred pages leaves one with a clear lively picture of where the many varieties of the world's peoples were settled when European navigators "unrolled the map of the world about 1500," and formulates the most pertinent questions that can be asked concerning them even though satisfactory answers are not forthcoming. Whatever weaknesses the book may have are justifiable omissions rather than mis-statements of fact. The appearance of so readable and reliable a book dealing with the races of man is an important scientific achievement.

CLARK WISSLER

GENERAL CHEMISTRY

Introductory General Chemistry. Third edition. By STUART R. BRINKLEY. x + 645 pp. 135 figs. New York: The Macmillan Company, 1945. $4.00.

THIS book is shorter by 32,000 words, or the equivalent space (86 pages) than the preceding revised edition of 1938. It has been extensively rewritten with some changes in the order of presentation and considerable modernization of the factual and theoretical content. The general style is the same: basic considerations, fundamental laws and theory are compressed into the first 30 pages, plus 10 pages later on molecular and atomic weights; the description of chemical substances, reactions and processes is adequate and modern, though brief; the book is built around the presentation of principles and theory with a definite effort to keep illustrative material adequate but at a minimum. Although entitled "Introductory" its use should presuppose a good course in secondary school chemistry or a selected group of students.

A great deal of space is devoted to applications of the modern theories of aqueous solutions. This includes emphasis on the ionic nature of reactions, the ion-electron treatment of oxidation-reduction reactions with many detailed illustrations, and extensive application of the Brönsted point of view to acidic and basic molecules and ions. The revision with respect to the acid-base theory is an outstanding feature of this edition. The difference between the dispersal of salt ions in water and the formation of ions from molecular acids is made clear. Anion and cation acids, molecular and ionic bases are discussed. The hydrolysis of salts is presented in terms of the acidic and basic properties of their ions. Throughout the chapters on the metals the hydration of metal ions and hydroxides is emphasized. This unfortunately leads to cumbersome formulas and equations, and sometimes alternate equations are given, omitting water of hydration.

This will not be an easy book to study; it is a serious, technical book, and for the serious chemistry major it will give an excellent background for subsequent courses.

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BOOKS RECEIVED

BINGHAM, MARJORIE T. *Flora of Oakland County, Michigan.* Illustrated. Pp. 155. Cranbrook Institute of Science. $1.00. 1945.

CANNON, WALTER B. *The Way of an Investigator; A Scientist's Experiences in Medical Research.* Pp. 229. W. W. Norton & Company. $3.00. 1945.

DUBOS, RENÉ J. *The Bacterial Cell.* Illustrated. Pp. xix + 460. Harvard University Press. $5.00.

GRINKER, ROY R. and JOHN P. SPIEGEL. *Men under Stress.* Pp. xii + 484. The Blakiston Company. 1945.

HENNEY, KEITH. *Principles of Radio.* Fifth edition, revised. Illustrated. Pp. viii + 534. $3.50. 1945.