to others I suggest this. "Which is the worse, the English of scientists or of politicians?" *Will* and *shall* barred.

Arthur Gordon Webster
Worcester, Mass.,
August 4, 1911

SCIENTIFIC BOOKS

A History of the Theories of Æther and Electricity from the Age of Descartes to the Close of the Nineteenth Century. By E. T. Whittaker. London, Longmans, Green & Co.; Dublin, Hodges, Figgis & Co., Ltd. 1910. Pp. xiv + 475.

In this excellent volume, the Royal Astronomer of Ireland traces the development of our ideas concerning the nature of the ether and of electricity, as expressed by the various theories which have been proposed from time to time about these entities.

The treatment includes an account of those discoveries in light, electricity and magnetism which have been influential in shaping and supporting theory, and these facts are interwoven with the discussion of the theories themselves in such a way that a historically continuous narrative results. Everything is made subservient, however, to the explanation of the theories themselves. These are discussed at sufficient length to bring out their chief features, and often too their limitations are noted. The discussions are not confined to verbal description, but preference is given rather to a deeper treatment from the mathematical side. The book is intended, therefore, mainly for the advanced student who alone is in a position to go into the details of the subject.

The work opens with a chapter on the theory of the ether in the seventeenth century, covering a period in which the wave theory of light had but begun to receive attention. The next two chapters deal with the fundamental discoveries in electrostatics and about steady currents in conductors, and with the earlier electrical theories. Then come two chapters on the ether in that period when the wave theory of light had its greatest development, although light was still not associated with electrical action.

The following five chapters, beginning with one on Faraday, cover a half century in which attention was directed more and more upon the action in the dielectric surrounding a conductor, which finally resulted in the electromagnetic theory of light. The two closing chapters deal chiefly with the rise of the theory of electrons and the part they play in optical and electrical phenomena.

The book will be welcomed by all physicists as a valuable contribution. J. Z.

The Social Direction of Human Evolution: An outline of the science of Eugenics. By William E. Kellicott. New York, D. Appleton & Company. 1911.

William Morris once said that a cause, in winning its way to acceptance, had to pass through three stages: first, all men ignored it; second, all men opposed it; third, all men accepted it. The cause of eugenics has survived the first stage without really entering upon the second. It even seems possible that it may contrive to skip a considerable part of the second stage of the metamorphosis, and enter into its heritage with little opposition. It is much too early, however, to confidently predict anything of the sort, and it may be necessary to go through troublous times, if only to arrest the attention of an easy-going and unscientific public.

Just now, the time is not ripe for an extended work on eugenics, but, on the other hand, the moment is opportune for the appearance of a little book such as that of Professor Kellicott. Not long ago, Dr. C. B. Davenport issued a very convenient little pamphlet, which has been widely read. Professor Kellicott's book is larger, but has a similar aim, both being admittedly ephemeral works intended to inform the general public. Now that interest has been aroused in several quarters, and important investigations bearing upon the subject are being made, a new book, or a new edition of an old one, will be needed perhaps nearly every year for some time to come. The volume before us will excellently serve present needs, and perhaps as the necessity arises its author will prepare

other editions, keeping it abreast with the times. From the brevity of the treatment and the propagandist aim, it results that the statements given are in some cases rather more confident or dogmatic than the facts known to us may warrant. In particular, I should have wished to look a little more cautiously over some of Karl Pearson's results, such as those on the inheritance of mental traits and on the greater susceptibility to disease of the first born in a family. Broadly speaking, however, the arguments are sound and well presented, and any non-scientific person reading and accepting them as they stand will not go far astray.

The first chapter, on "the sources and aims of the science of eugenics" begins with a summary of the history of the subject, and goes on to discuss the relations of biology to sociology, giving some of the sociological data which are important for the "eugenist." The second goes into the biological foundations of eugenics, and gives a condensed account of the main facts concerning variation, heredity and kindred matters. In the description of the Mendelian phenomena, the first case given is one (the Andalusian fowl) in which the heterozygous form is unlike either of the homozygous ones. This reverses the usual order, with I think distinct advantage, making the matter clearer and showing from the start that dominance is not essential to Mendelism. The third and final chapter is a long one on human heredity and the eugenic program. In it are given many striking human pedigrees, and much other information likely to astonish many readers. On page 200, in discussing the inheritance of acquired characters, the "giraffe's neck and the fox's cunning" are classed among these, by some slip or ambiguity. In connection with this matter we may perhaps question the practical limitation of the concern of the eugenist (pp. 42–43) to "conditions which affect the innate characteristics of the race," as it is obvious that improved social conditions will tend to bring out or make visible desirable innate qualities, which may then be considered successfully from the standpoint of eugenics.

The author rightly insists that a large part of the present eugenic program is educational. Scientific men who are of this opinion can do something for the cause if they will help to circulate Professor Kellicott's book.

T. D. A. COCKERELL

Animal Intelligence. By Professor E. L. THORNDIKE, Columbia University. New York, The Macmillan Co. 1911. Pp. viii + 297. $1.60 net.

Students of behavior, biologists and experimental psychologists, alike, welcome the volume containing the collected papers on animal psychology of Professor E. L. Thorndike which has just been published in the Animal Behavior Series.

For some years the most important two of the papers, "Animal Intelligence" and "The Mental Life of Monkeys," published originally as Monograph Supplements to the *Psychological Review,* have been out of print. Since Thorndike's studies marked the dawn of the experimental era in animal psychology it is distinctly worth while to have this material in convenient form and available for students for years to come. The historical value of the work, however, is not the chief reason for the publication of the volume. However much the technique and scope of animal psychology may have advanced since the first appearance of Thorndike's work, his penetrating discussions of the general nature of animal mind have by no means been outgrown. In looking back upon his work one is struck by the boldness and apparent rashness of his general conclusions, especially in view of the fact that his experimental material was limited; and yet those conclusions in the most essential points have stood the test of twelve active years.

J. B. WATSON

QUOTATIONS

SEVEN YEARS' PROGRESS IN MEDICAL EDUCATION

THOSE who have been watching the development of medical education in this country have noted with no little astonishment and gratification the remarkable progress that has been made in recent years and particularly