another, while in another case a species may be constant in one locality and variable in another. Intermediates or overlapping forms may exist in intermediate areas, but there is no evidence to show how the local forms diverged, nor, what the parent form was like. In some cases the differences between local races are due to Mendelian factors, but there is no evidence to show why a factor exists in one, and is absent from the other.

The chapters on Adaptation and the Causes of Variation emphasize our ignorance even more strongly. The evidence adduced for adaptation or mutation by the inheritance of acquired characters whether by direct influence of conditions on the germ or by somatic induction, is criticized in a way which some will regard as unduly severe. But the grounds of criticism are always given, and it is well to remember that an attitude of scepticism towards observations which have as yet no independent confirmation is much more likely to lead to knowledge than the uncritical acceptance of supposed facts which may be mistaken. The last chapter deals with interspecific sterility, and is in some ways disappointing It gives a lucid exposition of the experimental results, and shows how little we know of the physiological basis of fertility or sterility, but no reference is made to the considerable body of facts which have been accumulated on the cytological side. These, of course, tell us little of the 'why' of sterility, but they do add considerably to our knowledge of how it is brought about. Taken as a whole, the book is one which every student of genetics should read carefully, not only to impress him with the limitations of our present knowledge, but because it indicates in every chapter lines on which advance may be made. L. DONCASTER.

Castle, W. E., Coulter, J. M., Davenport, C. B., East, E. M., and **Tower, W. L. Heredity and Eugenics.** A course of lectures summarizing recent advances in knowledge of variation, heredity, and evolution and its relation to plant, animal, and human improvement and welfare. University of Chicago Press, 1912. (London: Cambridge University Press.) Price 10 sh net.

The preface tells us that the lectures published together under the title 'Heredity and Eugenics' were given at Chicago in 1911, and were intended for a general university audience rather than for those trained in biology. The lectures are ananged as follows: (1) General Introduction, and (2) The physical basis of heredity from the cytological stand point, by Prof. COULTER; (3) The method of evolution, and (4) Heredity and Sex, by Prof. CASTLE; (5) Inheritance in the higher plants and (6) The application of biological principles to plant breeding, by Prof. EAST; (7) Modification of the germinal constitution by experimental processes, by Prof. TOWER; (8) Inheritance of physical and mental traits in man and (9) Geography of Man in relation to Eugenics, by Dr DAVENPORT.

All the lecturers have written their sections clearly, and the whole book is illustrated with admirable figures, so that the class of readers for whom it is intended will find in it a simple and in general easily comprehensible account of the present position of the problems dealt with. The cases chosen are in nearly all cases already well known, so that for the more serious student the book will provide a useful summary, but little that is really new. Many, however, will welcome the fresh presentation of some of the facts in a readily accessible form. In this respect Prof. TOWER's account of his experiments in the production of variation in Chrysomelid

beetles is especially valuable, but it is disappointing that he gives no adequate discussion of difficulties to which several critics have referred; for example, that of the absence of heterozygotes among his mutants in *Leptinotarsa*. The book as a whole has one serious defect, which arises from the fact that its chapters are popular lectures which have undergone little or no revision for publication. This defect is the very definite and dogmatic style in which problems still under dispute are treated. In a popular lecture such definiteness is almost unavoidable, but with a little revision, or by the addition of footnotes, the authors could easily have indicated which statements are still open to question, and which are recognised as established facts. All the writers err more or less in this respect, though the fault is more conspicuous in some chapters than in others. Any one untrained in the subject, after reading the chapter on Inheritance in Man, might be excused for supposing that nothing remains to be discovered about either sex-limited transmission or practical eugenics. In a book intended chiefly for non-scientific readers, some indication showed be given of the distinction between proved facts and unproved inferences, however probable the latter may appear to the writer. Apart from this attitude of dogmatism, and from two or three slips which the reader will probably be able to correct for himself, the book is a useful summary of the present position of genetic study in several rather distinct fields.

L. DONCASTER.

Weismann, August. Vorträge über Deszendenztheorie. Dritte umgearbeitete Auflage. Jena 1913.

Weismanns Vorträge über Deszendenztheorie sind in dritter Auflage erschienen, und man kann mit Freude und Bewunderung konstatieren, daß der Autor nach wie vor bestrebt ist, seine Theorie an den bemerkenswerten Resultaten der neueren Forschungen zu prüfen und, wo es ihm notwendig erscheint, mit ihnen in Einklang zu bringen. Infolge der Berücksichtigung zahlreicher neuerer Arbeiten haben eine ganze Anzahl Kapitel wesentliche Erweiterungen gegenüber der früheren Ausgabe erfahren; außerdem ist ein völlig neues Kapitel (Kap. 22) eingeschoben worden, das sich mit den Forderungen und Resultaten der modernen Vererbungslehre beschäftigt. Diese Resultate im Zusammenhang mit den Ergebnissen der Chromosomenforschung sind es nun im besonderen, die Weismann zu einer Revision seiner Meinung über die Beschaffenheit der Ide veranlassen; früher nahm er an, daß jedes Id die Erbmasse für den ganzen Organismus enthält; jetzt hält er es, auf Grund der Mendelschen Spaltungsregeln, für wahrscheinlicher, daß im allgemeinen ein Id nur die Determinanten für einen Teil des Organismus enthält. Als Stütze für diese Annahme führt er den Nachweis von der Ungleichheit der Chromosomen (akzessorische Chromosomen, Chromosomenpaare usw.) an, die er ja schon früher mit den Iden identifiziert hat. Demnach unterscheidet er nun Vollide, die die gesamte, und Teilide, die nur einen Teil der Erbmasse enthalten; daß auch die ersteren existieren müssen, zeigen u. a. die Radiolarien, die Tausende von gleichartigen Chromosomen besitzen; nur ein einziges von diesen erhält aber jede ihrer Schwärmsporen, aus der gleichwohl wieder der ganze Organismus hervorgeht. Die neue, erweiterte Definition des Id lautet demnach: eine selbständige, in sich geschlossene Determinantengruppe, die entweder die ganze Erbmasse der Art oder nur einen Teil davon in sich einschließt.

Weismann deutet auch auf die Schwierigkeiten hin, die gerade die neuere Vererbungswissenschaft dieser Auffassung bereiten kann; eine solche