

subject, and the biological side of the question as regards colour mimicry in animals. It is illustrated with three plates in colours.

The author first discusses the nature of white light, its decomposition and recombination, the nature of the colours shown by coloured objects, pigments, dyes, &c., and their effects on the reflection, absorption, and transmission of white light, with special reference to the coloured glasses to be used as filters in three-colour photography. Then the various processes by Ducos du Hauron, Ives, Sanger Shepherd, Joly, Miethe, Lumière, and others for producing coloured photographs by the additive and subtractive methods of colour mixtures, dependent on the theory of triple-colour sensations enounced by Young, Helmholtz, and Clerk Maxwell.

The discussion of the Becquerel and Lippmann direct methods of colour photography, founded on Zenker's theory (1868) of interference and stationary waves producing an alteration of the structure of the sensitive film by reflection, corresponding to the wavelength of the light acting on it, is interesting, because of the author's confirmation of the theory in 1890, and its practical adaptation by Lippmann in 1891. The other direct methods, dependent on changes of colour in sensitive films of silver chloride and subchloride, discovered by Seebeck and worked out by Becquerel, Poitevin, and Niépce de St. Victor, also the "bleach-out" methods of Worel, Neuhaus, Smith, and others are explained. After a short notice of the theories of colour perception, the discourse concludes with some very interesting remarks regarding the protective colour adaptation of animals, and the researches of Poulton, Standfüss, Weismann, Herbert Spencer, and others, illustrated by a coloured plate showing protective mimicry in insects.

Though the subject is dealt with briefly and theoretically, the book will be useful as a summary of results already achieved, and particularly for the literary and other information given in the notes. We note one omission in the list of books at p. 49—Dr. H. W. Vogel's "Die Photographie farbige Gegenstände," 1885. Those interested will find further information in Prof. Wiener's papers in *Wiedemann's Annalen*, xxxi., 1887, p. 619; xl., 1890, p. 203; lv., 1895, p. 225; and Eder's "Jahrbuch für Photographie," 1896, p. 55.

J. W.

OUR BOOK SHELF.

Outlines of Chemistry, with Practical Work. By Dr. H. J. H. Fenton, F.R.S. First part. Pp. xvi + 365. (Cambridge: The University Press, 1909.) Price 9s. net.

THIS book embodies the substance of a course, or part of a course, of lectures which the author gives to candidates for the Natural Science Tripos at Cambridge. Supplemented in practice by experiments appropriate to the topics of each lecture, it is intended to give the student a lead to the study of standard chemical literature. Mr. Fenton explains the difficulty of the circumstances under which the teaching has to be done, and he appears rather as one who has to comply with an established system than the exponent of a system that he thinks the best, or even very good. No one, of any modesty, who is engaged in teaching

chemistry to university students at the present day will be very dogmatic about the details of the course that should be followed. The subject has become so vast and so varied that personal predilections and capacities may lead to courses very different from one another and yet of no very different merit. Two extremes may be found in the tendency of one kind of teacher to produce a chemist well informed about substances and another kind to produce a chemist well informed about principles; the first would ordinarily be the better craftsman, the second the clearer thinker.

The tendency of the Cambridge Tripos system is not unnaturally towards making chemistry as much like physics as possible, and accordingly the Tripos candidates are led to concern themselves with theoretical and physical chemistry to an extent which seriously limits their chances of acquiring that personal familiarity and facility with individual chemical substances which in earlier days was one good outcome of the *régime* of analysis. It leads also to a subordination of chemistry in relation to industrial and practical problems. It is possible that some readjustment might be worth considering, having regard to the increasing importance of the Cambridge school and especially to the influence which Cambridge graduates exercise in the secondary schools.

However this may be, Mr. Fenton, on the lines he had adopted, has written a book that must be rated very highly. It is marked throughout by the lucidity and scientific restraint to which we have been accustomed in all his writings; it is very thorough and comprehensive, and it shows a real grasp of the inwardness of a good many things about which there has been a good deal of loose writing and, presumably, loose thinking. It is a book that may be read with profit by every student of chemistry at some stage of his career—perhaps for most at some late stage, when reviews are so valuable, especially if they are free from special pleading. As an example of the excellent substance and form of the book, the chapters on acids, bases and salts may be specially cited, but there is, in fact, little departure from a high level of exposition throughout the work. It seems very likely that the second volume, which is promised, should the first prove acceptable, will be clearly called for.

A. SMITHELLS.

The Kea: a New Zealand Problem. By G. R. Marriner. Pp. 151. (London: Williams and Norgate, 1909.) Price 7s. 6d. net.

Few birds have attained to greater notoriety than the New Zealand kea, and every naturalist has long been familiar with the strange story of its sheep-killing propensities. The change of habit which it is supposed to have undergone since the introduction of sheep into New Zealand has formed the subject of much discussion by writers on evolution, but it appears that a great deal of theorising has been based upon a singularly small amount of trustworthy evidence. Serious doubt having been cast upon the generally accepted stories, Mr. G. R. Marriner, the curator of the public museum at Wanganui, set himself the task of collecting all the evidence available and personally investigating the habits of this remarkable bird, and the results of his inquiry have been published in a very valuable and readable book. The case has been fairly tried, and the kea stands condemned on abundant evidence. The executioners have long been at work. They did not think it necessary to wait for the result of the trial, and the large sums of blood-money paid for kea heads must have done a good deal to keep the birds in check, though their haunts in the remote mountain regions of the South Island are often so inaccessible that it may well be doubted whether they will ever be exterminated. Those who