

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 recomposition, 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, Neuhauss, 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

love bird-life better than mutton will probably hope not.

The natural food of this extraordinary parrot consists of fruits, roots, honey, worms, insects, and grubs. It is gifted with an inordinate curiosity, and seems ever ready to experiment and investigate novelties. Mr. Marriner believes that this inquiring spirit is responsible for its predilection for fresh meat; that it first began by experimenting with sheepskins and dead carcasses, and later on took to killing on its own account. The idea that the kidneys are its especial tit-bits seems to be based entirely upon the fact that the sheep is generally attacked in their neighbourhood; this, however, is the only part upon which the kea can maintain a footing while the sheep is racing about and trying to throw off its torturer. The cruelty of the whole proceeding is horrible in the extreme, and the annual loss to the run-holders is estimated by the author at 5 per cent. of the flocks. The birds appear to enjoy their sport exceedingly, but they have not yet learnt wisdom, and fall an easy prey to the avenger. When the kea hunter has exhausted his cartridges, he sometimes, we are told, allows the birds to see him disappear behind an overhanging ledge of rock. Their curiosity induces them to try and find out what has become of him, and one by one they walk to the edge and look over, only to be knocked on the head by his stick. If so, why waste cartridges? Perhaps there is not always a suitable rock handy.

The book is brightly written, and contains some good illustrations, and we recommend it to all lovers of nature. Considering its size, however, the price seems to be rather high. A. D.

(1) *How to Study the Stars*. By L. Rudaux; translated by Dr. A. H. Keane. Pp. 360. (London: T. Fisher Unwin, 1909.) Price 5s. net.

(2) *How to Identify the Stars*. By Dr. Willis I. Millham. Pp. v+38+plates. (New York: The Macmillan Company; London: Macmillan and Co., Ltd., 1909.) Price 3s. net.

(1) BOTH the means and methods of observation dealt with in this book are eminently practical, being founded for the greater part on the progressive astronomical equipment of the author and the methods which, in actual use, he has found effective. The needs of the amateur are all along kept in mind. The interested and intelligent user of a pair of opera glasses is led to make for himself apparatus more ambitious. As the possessor of a telescope he is shown practical, and often home-made, mountings for the smaller sizes, while for the amateur of means, to whom a medium-sized equatorial reflector or refractor is possible, the question of a suitable house for his instrument is dealt with. Here the varied experience of the author is called in, the important question of cost not being forgotten.

Part ii. is concerned mainly with methods of observation and results. The study of sun, moon, and planets is undertaken, often with apparatus by no means extravagant, and the kind of results which may be expected are indicated, by reference to the author's own work, and by actual photographs reproduced.

For the purpose of progressively instructing amateur astronomers, the book should prove successful. The translation seems, on the whole, well done, and a readable work has been produced.

(2) The title of this book suggests at once its elementary nature. The appeal both of the text and the charts is to beginners in astronomy. The thirty-eight pages of letterpress deal in a sketchy way with such subjects as the history of the constellations, stellar magnitudes, and colours and methods of study. So many subjects in so few pages obviously precludes any

fulness of treatment. The "history" consists chiefly of a list of constellation names, with genitives and meanings, together with the names of their proposers, and the section devoted to "star colours" occupies less than a page. The list of the twenty brightest stars, giving magnitudes and colours, is useful, while the division of the eighty-eight constellations into four distinctive groups should prove helpful in memorising.

Four small charts, showing the stars visible at convenient hours during the various months of the year, and twenty-four constellation tracings are appended.

An excellent feature of the publication is the list, at the end of each section, of books and papers suggested for further study.

The general method followed and material presented is stated to be essentially the same as that used in the course on descriptive astronomy in Williams College. Within its limitations the work is accurate and serviceable, and may be recommended as a convenient epitome of the subject.

Scientific Nutrition Simplified. By Goodwin Brown. With a Supplementary Chapter by Dr. J. Sven. Pp. xi+271. (London: William Heinemann, 1909.) Price 2s. 6d. net.

THIS little book is one of the simple-life series. It puts in popular language the information for the practical application of the principles of nutrition advanced by Mr. Horace Fletcher and Prof. Chittenden. The main principle involved is the reduction of the protein intake to about half the amount usually accepted by physiologists as the normal. In reviews of similar books which the present writer has contributed to NATURE during the last few years, it has been pointed out that the Chittenden régime is not free from danger, and it is unnecessary to traverse the same ground again. The general tenor of the present work contrasts very forcibly with the scientific exposition of the subject in the work of Max Rubner recently reviewed (November 4, p. 2). The enthusiast sees only the *pros* and does not pause to consider the *cons*, in a subject which really bristles with difficulties. No one wishes to advocate over-eating, but to preach a doctrine of under-feeding as a permanent and universal practice is a very different thing from the temperance and moderation which is the ideal. The majority of physiologists have condemned the Chittenden diet as insufficient, and those with knowledge are more likely to be correct than the faddists, even if they can count one or two disciples drawn from the scientific world in their ranks.

A great point is made in the present work of Mr. Fletcher's advocacy of thorough mastication. Nobody denies the importance of the saliva and of the process of chewing, but to advocate the supreme importance of the least important of the digestive juices, and to elevate the action of the jaws into what seems to be regarded almost as a religious exercise, is not only unscientific, but ridiculous. W. D. H.

A Barometer Manual for the Use of Seamen; with an Appendix on the Thermometer, Hygrometer, and Hydrometer. Issued by the authority of the Meteorological Committee. Sixth edition, extensively revised. Pp. 67. (London: H.M. Stationery Office, 1909.) Price 3d.

ALTHOUGH chiefly intended for the use of seamen, this manual will be found of much service by anyone desirous of obtaining accurate information relating to the use of the barometer, and its connection with weather conditions and storms experienced in all parts of the globe. It is a revised edition of the Barometer Manual prepared by the late Admiral FitzRoy, formerly chief of the Meteorological Department of the Board