blood to the cells which is required." In many places the sense is seriously interfered with by faulty punctuation, and we note a rather plentiful crop of misprints, especially towards the end of the book. Such are "centre nervous system," "tircuspid," "vertebræ," (for "vertebrata"), "cauda equinæ," "straining" (for "staining"), "Weber-Feehner law," "fenestra rotundis," (several times repeated), "scala tampani," "selerotic," "viteous humour." Nor do we care for the form "oculimotor." It is to be hoped that a future edition will be more carefully revised. The author has been fortunate in securing the use of the well-known and admirable figures from Quain's "Anatomy" and Schäfer's "Essentials of Histology." They add materially to the value of the work.

The Dawn of Reason. By James Weir, jun., M.D. Pp. xiii + 234. (New York: The Macmillan Company, London: Macmillan and Co., Ltd., 1899.)

THIS book on the mental processes of animals is the fruit of much original observation, and in many cases this observation has been supplemented by experiment; but, unfortunately, all the author's results are vitiated by his uncritical and biased attitude in favour of an extreme view of the mental life of animals, and there are few of his facts which the comparative psychologist would be justified in using without ample corroboration by other observers. Instinct is regarded as the great bane of psychology, and it almost seems as if the author believed it to be a special invention of those whom he calls "creationists." He poses as an ardent evolutionist, but is so blind to the most elementary principles of the evolution of mind that when a water-louse frightens some rhizopods, he can only conclude either that the latter have eyes and ears so small that lenses of the highest power cannot make them visible, or that these creatures are the possessors of senses utterly unknown to and incapable of being appreciated by man. He makes observations on spiders which show that they are differently affected by loud and soft vibrations of an organ—observations which do not even demonstrate the existence of hearing—and concludes that these animals have attained a very high degree of æsthetic musical discrimination. He has also seen a spider "intentionally beautifying" its web with flakes of logwood, and he has watched rhizopods employing their time in "simple amusement" resembling a game of tag. Nevertheless, among these extravagances, one meets with observations which would be of distinct value and interest if one had confidence in the observer.

The Arithmetic of Chemistry. By John Waddell, B.Sc. D.Sc. Pp. viii + 133. (New York: The Macmillan Company. London: Macmillan and Co., Ltd., 1899.)

THE volume does not differ essentially from other books on chemical arithmetic. Every teacher has his own method of presenting an arithmetical problem, which he often feels impelled to share with others. The author's methods seem thoroughly sound and logical, and no exception can be taken to them. There is a good deal to be said, too, for the plan of treating the calculations on a purely experimental basis independently of theories; but it is not always advisable to hold to it too rigidly. A good illustration is offered by the following example.

The author begins by showing that the combining weight of oxygen taken as 8 is thoroughly satisfactory, not only in its relation to hydrogen (1) in water, but to carbon (6) in its two oxides. It then becomes necessary to explain that this number for oxygen does not fulfil the expectations which it first raised, and that the formula for water HO(9) must be discarded in favour of H_2O(18). "It is found that while by electrolysis of water all of the hydrogen that is in the water is set free as a gas, and $\frac{1}{9}$ of the water decomposed is hydrogen; on the other hand, when sodium acts on water, only one-half as much hydrogen is set free, that is $\frac{1}{18}$ of the weight of water acted upon." It is questionable whether this explanation would carry conviction to the beginner. A plain dogmatic statement would surely serve the purpose better, until the student had advanced to a stage when he could grasp the whole question involved. The author has collected together an excellent set of examples from a variety of sources, which should be useful to teachers in elementary classes. J. B. C.

The Flora of Cheshire. By the late Lord de Tabley (Hon. J. Byrne Leicester Warren), edited by Spencer Moore; with a Biographical Notice of the Author by Sir Mountstuart Grant Duff. Pp. cxiv + 399, with a portrait of the author and a map of the county. (London: Longmans, Green, and Co., 1899.)

THE manuscript of this "Flora," we are told, was completed a quarter of a century ago. Those who knew the sensitive, retiring disposition of the late Lord de Tabley will not be surprised that he laid it aside as not ready for press; nor will they be surprised at the excellence of what was done. There is little beyond an enumeration of the plants of the county, but made with extreme care and with conscientious acknowledgment of doubts and difficulties in dealing with critical plants.

Two classes of vegetation seem particularly to have attracted the author's notice, and both in a decidedly historical aspect. The one class is that of the alien plants, whose spread from ballast-heaps, &c., is traced; the other is the shore vegetation of a coast which has been much changed both by man and by tidal denudation. There probably exists no "Flora" of any county in Britain which approaches it in interest in either respect, unless it be that of Middlesex by Trimen and Thiselton-Dyer, published in 1869 at the time when Lord de Tabley was at work on what has just been printed.

To the matter which was put into his hands, the editor has wisely added enough to bring the work into line with our present knowledge of Cheshire botany. The biographical notice in its want of facts is a little disappointing; and the attempt to give each plant a binomial English name leads one to a curious and not altogether happy result. These, however, are small matters.

I. H. B.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Fourier's Series.

THE statement of Fourier's theorem for the special case which has intermittently for some months past been a subject of discussion in NATURE, is as follows:—The function whose value is $\frac{1}{2}(\pi - x)$, when x lies between 0 and π, and $-\frac{1}{2}(\pi + x)$, when x lies between 0 and $-\pi$, can be expressed by the series $\sum_{k=}^{k=\infty} \frac{\sin kx}{k}$ for values of x which lie between π and $-\pi$.

The proof of the theorem, whether in this special case or in more general cases, consists in summing the series; and the result obtained in this special case is that the sum of the series is

$\frac{1}{2}(\pi - x)$, when x lies between 0 and π,
$-\frac{1}{2}(\pi + x)$, when x lies between 0 and $-\pi$,
0 , when $= 0$.

Prof. Michelson has found a difficulty in this result in that, whereas the sum of any number of terms of the series is a continuous function of x, the sum of the series is a discontinuous function of x. If I have not misunderstood him, he contends that for extremely small positive values of x the sum of the series should be regarded as indeterminate and as having any value between 0 and $\frac{1}{2}\pi$, and I understand him to support this contention by the consideration that when n terms of the series are taken, so that x being extremely small nx is finite, such an indeterminateness is found.

Such a position involves a misconception of the meaning of