

they are in contradiction to the best experiments we have on the subject (Sir William Thomson's). A teacher ought to be spared as much as possible from having to tell his students that he does not agree with the writer of a text-book.

The parts of Mr. Cumming's book which we have ventured to criticise refer chiefly to matters of taste. There is no doubt that in the hands of a good teacher the book will prove very useful. We hope that it will have a wide circulation, and that a second edition will soon enable Mr. Cumming to introduce such improvements as on a reperusal of his own book may occur to him.

ARTHUR SCHUSTER

OUR BOOK SHELF

Proceedings of the London Mathematical Society, vol. vii. November, 1875, to November, 1876. (London: Messrs. Hodgson and Son, Gough Square.)

IN the present volume we have about thirty communications made by eighteen writers. Prof. Cayley writes on Three-bar Motion (treating the matter in a different way from that in which it is handled in this same volume by Mr. S. Roberts, the priority of whose results is conceded by Mr. Cayley) on the Bicursal Sextic; Prof. H. J. S. Smith contributes short papers on the value of a certain Arithmetical Determinant and a Note on the Theory of the Pellian Equation; Lord Rayleigh has a note on the Approximate Solution of certain Potential Problems; Mr. Spottiswoode writes on Determinants of Alternate Numbers, working out some suggestions of Prof. Clifford. This last-named gentleman contributes the transformation of Elliptic Functions with a Note, and Free Motion under no Forces of a Rigid System in an n -fold Homaloid.

In Analysis, there are further papers by Mr. J. W. L. Glaisher on an Elliptic Function Identity, and the Summation of the Geometrical Series of the n th Order as a Definite Integral; Prof. Lloyd Tanner on the Solution of Certain Partial Differential Equations of the Second Order (two papers); Mr. J. Hammond on the Relation between Bernoulli's Numbers and the Binomial Coefficients, and on the Mean of the Products of the Different Terms of a Series; Mr. T. Muir on the Transformation of Gauss's Hypergeometric Series into a Continued Fraction; Mr. S. Roberts a Further Note on the Motion of a Plane under Certain Conditions; Mr. Hewitt on a Theorem of Eisenstein's.

Under the heading of Geometry we may class Prof. Rudolf Sturm's paper on Correlative Pencils; Mr. A. B. Kempe's General Method of describing Plane Curves of the n th Degree by Linkwork; Prof. Wolstenholme's Loci Connected with the Rectangular Hyperbola.

There are a few shorter communications. We have said enough to give our mathematical readers an idea of the range of subjects treated in this volume. The names of the authors are a sufficient guarantee that the subjects are ably treated and brought down to the latest accepted results.

A Primer of Chemistry, including Analysis. By Arthur Vacher. (London: J. and A. Churchill, 1877.)

THIS little book attempts to present within the limits of a hundred pages "a general view of the elements of inorganic chemistry." It embodies the experience gained by the author during ten years in which he has been engaged in teaching the subject, and the result is that many points are treated in somewhat novel fashion. The subject is considered as fully as could be expected within the narrow limits mentioned, and the amount of information conveyed is really considerable and generally accurate.

The first sixty-seven pages contain chapters on "Ex-

periments with some of the Elements," "The Use of Symbols" in formulæ, equations, and calculations, "Experiments with some Compounds," "Weights and Measures," "Classification of Compounds," and "List of Substances." The remaining thirty pages or so are devoted to Qualitative Analysis.

Perhaps the greatest novelty introduced is the use of the term *unit* instead of atomic or combining weight, so as to avoid using the terms *atom* and *molecule*, which the author thinks are "unsuitable for ordinary use among beginners;" and of *antimetal* instead of *radicle* (which latter by the way he incorrectly writes "radical"). It may be questioned whether the use of the term "unit" may not interfere with the conception of the meanings to be attached to "atom" and "molecule," which the pupil must gain afterwards. "Antimetal" is objectionable since all radicles are not antimetals; ammonium, for example, is a radicle which plays the part of a metal. Clearly the term is intended as equivalent to "acid radicle," or acid minus its basic hydrogen; it is never used in any other sense in the book, and its use with this restricted meaning may be advantageous, or at least free from objection.

Several items may be pointed out as requiring alteration or improvement; notably the following: that "a compound" is any substance which is not an element" (p. 11); that chlorine has a "pale green colour" (pp. 6 and 61); that oxygen is *insoluble* in water (pp. 39 and 56); and that KMnO_4 gives a *red* solution (p. 64). In working with test-tubes the student is several times directed to add "half an inch" of acid or water as the case may be. Of course it is evident what is meant, but test-tubes are of various sizes, and a large excess of acid or other liquid would be used if the directions were followed exactly with large tubes. On p. 77, "take the charcoal quickly to your nose" is another rather curious direction.

The analytical part of the book is the best; the tables throughout being reliable. The detection and separation of cobalt and nickel (Table-III., p. 95) might be effected more quickly and easily by other methods than that given; and on p. 87, NO_3 as well as CrO_4 and Fe''' should be mentioned as decomposing H_2S . If these and several other minor improvements be made the "primer" will not be without value in imparting the rudiments of education in chemistry; and in these days when elementary text-books are becoming so numerous, may fairly count on being appreciated as it deserves by the class of students for whom it is intended.

W. H. W.

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. No notice is taken of anonymous communications.]

Hibernation of Birds

IN NATURE (vol. xv., p. 465) there is a review of "Palmen on the Migration of Birds," and in the course of it the reviewer takes occasion to refer to what he calls the "hibernation mania" as one that is now and again revived, in spite of the fact that the migration of birds is fully proved, and that no evidence at first hand has ever been produced in favour of the supposition that birds ever lie dormant.

Having frequently heard my brother-in-law, Sir John McNeill, relate a circumstance which occurred to himself proving that swallows do occasionally lie dormant, I wrote to him asking him for the particulars. I now inclose his reply, which perhaps you will publish, as it may possibly elicit other evidence on the same matter.

Gilbert White's conviction that swallows do occasionally lie dormant in this country, was mainly founded on the fact that instances are not uncommon of swallows appearing suddenly

* A chemical compound being meant as is evident from the context.