The book is illustrated by a series of thirty-one plates, eight of them in colour and devoted to figures of the protected species, while the rest are black-and-white figures showing the differences between the various species of chats, and certain warblers and wagtails, occurring in the country.

Investigations in the Theory of Hyperion. By Dr. J. Woltjer, jun. Pp. iii+71. (Leyden: E. J. Brill, 1918.)

THE motion of Hyperion, the seventh satellite of Saturn, is of special interest from the commensurability of its period with that of Titan, the two being in the ratio of 4 to 3. The late Prof. Newcomb wrote an important paper, "On the Motion of Hyperion: a New Case in Celestial Mechanics." The present work carries the investigation some steps further. The differential equations are broken up into partial systems, giving the inequalities proportional to the successive powers of e' the eccentricity of Titan's orbit. Newcomb had regarded this development as impracticable, but the present work demonstrates the contrary. The development is at present carried only to the first power of e' , which suffices to give a close approximation to the observed inequalities. For example, the ratio of masses of Saturn and Titan is deduced as 3986, which is close to the values 4172, 4125 found by Eichelberger and Santer respectively. Incidentally, we may note that the mass of Titan is about twice that of the moon, and two-thirds that of Mercury. Also the coefficient of the large inequality that depends on Titan's eccentricity is found as 12.96° , not differing much from the value 14.0° found by H. Struve from observation.

The researches made by Dr. Woltjer form a useful step in the attainment of a complete theory of Hyperion's motion, and it is to be hoped that he will himself continue the work, carrying it far enough to include all sensible terms.

A. C. D. CROMMELIN.

A Field and Laboratory Guide in Physical Nature-study. By Prof. Elliot R. Downing. (The University of Chicago Nature-study Series.) Pp. 109. (Chicago, Illinois: The University of Chicago Press; London: The Cambridge University Press, 1920.) Price 1 dollar net.

At first sight it is difficult to decide whether the book was written for children or for adults—in its assumption of previous knowledge it is hopelessly above the one; in its treatment it is far beneath the other. The preface explains that it is meant for pupil teachers. Directions are given for the making of model aeroplanes, the spinning of tops, etc. But if a youth has missed these delights in his childhood, it is of little use for him to try to find them later on. In training a student to teach children there is no need to treat him as a child himself. Nevertheless, the book is full of good ideas, and many who would find it almost intolerable to use as a laboratory manual would be well repaid for time spent in reading it through.

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Letters to the Editor.

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Genera and Species.

WHEN Linné introduced the practice of giving a generic and specific name to each living organism he probably did not anticipate that the number of names required would run into millions, and with the multiplication of genera and species now encouraged by naturalists some other system of distinction seems desirable.

Of the five or six thousand stars visible to the naked eye only a few have been named, and the rest have to be content with identification by their constellations and by a letter or number.

Something of the same sort might be done for the organic world. The conspicuous and typical examples might retain their names, while both to these and to the remainder a letter or number might be allotted.

If the numbers followed the chronological order in which the species were discovered or first properly described, a catalogue formed on these lines would in itself convey valuable information.

Identification by number or symbol would act as a check to the coining of many barbarous words, and also to the annoying repetition of the same specific names in different genera. All true classification should be genealogical—that is, it should depend on the ancestry of the organism classified. Existing knowledge is insufficient to achieve such an ideal result, but any system not founded on pedigree is open to the objection of not being "natural."

There are often great doubts as to where varieties end and species begin, and where such doubt exists it would, in general, be safer to assume that differences are varietal until it has been found by trial that continued interbreeding tends to produce sterility.

I am informed by authorities well acquainted with the West Indies that this is what happens when half-breed is crossed with half-breed, but not when half-breed mates with white (or better, with black). So far as this evidence goes, it points to something approaching a specific difference between the white and the negro, and many species have been determined on a worse foundation.

Books on special branches of natural history, while giving some sort of description of the various genera and species, do not (there are a few honourable exceptions) indicate, or indicate very imperfectly, the grounds on which the generic or other distinctions rest, and it is not uncommon to find differences between admitted varieties of the same species exceeding those between species reputed to be separate.

To find the reasons for these apparent anomalies by consulting the original papers involves the expenditure of much time and trouble, but the information might be compressed into a small space if properly tabulated.

A. MALLOCK.

9 Baring Crescent, Exeter, July 17.

The Cluster Pine.

Pinus pinaster was probably introduced into Madeira about thirty years before the beginning of the nineteenth century—a hundred years too late to save from wanton extinction the forests of mountain laurel, *Cerasus*, *Persea*, juniper, and many a species exclusively Madeiran.

There is a settled method of cultivation. The steep hillsides, ridge, and valley, after the yearly autumn