

As every student of astronomy now knows, the satellites were not discovered until 1877, and one of them actually does revolve round Mars three times while the planet makes a rotation. The coincidence is remarkable; but it is to be hoped, for the sake of the peace of mind of terrestrial inhabitants, that Mr. Wells does not possess the prophetic insight vouchsafed to Swift.

In conclusion, it is worth remark that scientific romances are not without a value in furthering scientific interests; they attract attention to work that is being done in the realm of natural knowledge, and so create sympathy with the aims and observations of men of science.

R. A. G.

OUR BOOK SHELF.

Introductory Course in Differential Equations. By D. A. Murray, B.A., Ph.D. Crown 8vo. Pp. xv + 234. (New York and London: Longmans, Green, and Co., 1897.)

Ordinary Differential Equations; with an Introduction to Lie's Theory of the Group of One Parameter. By James Morris Page. Crown 8vo. Pp. 226 + xviii. (London: Macmillan and Co., 1897.)

MR MURRAY'S book is adapted to provide for students that knowledge of the subject of differential equations which they are likely to want in applications of mathematics to physics, and in the general courses in arts and science in "classical" colleges. The author is chiefly occupied with giving expositions of the devices usually employed in the solution of the simple differential equations which such students meet with, and he will be found a safe guide in these matters. He follows the plan, which most recommends itself to teachers, of omitting theoretical considerations, or postponing them until the student has had practice in carrying out the processes with which he must be acquainted before the theory can be understood. But he does not leave the reader altogether in the dark as to the underlying theory and the modern developments. These are considered near the end of the book in a series of notes, which ought to prove very useful to those who wish to know more about the subject than can be learned from the text. In one case, that of the integration of linear equations in series, the author has departed from his general practice of giving an account of the simple and particular rather than of the difficult and general. It seems unfortunate that he did not choose for discussion the forms of the series which satisfy such equations in the neighbourhood of ordinary points. When a second edition is called for he will do well to alter this, and to avoid such expressions as "concentric cylinders" and "consecutive curves." The book is well printed, and is adequately supplied with well-chosen examples, some of them relating to physical subjects; and it ought to prove of service both to those for whom it is primarily intended, and also to British students who have not time to master Forsyth's treatise, but wish to learn rather more about the subject than is to be found in Lamb's "Infinitesimal Calculus."

In several important respects Mr. Page's book differs considerably from most existing text-books on differential equations. It is not sufficiently elementary for students reading the subject for the first time, since it makes no attempt to supply that thorough drilling in the solution of linear equations with constant coefficients and other simple forms, which our Universities insist on as a preliminary test of proficiency. Those, however, who have passed beyond the threshold of the subject, and who wish to study the general machinery underlying the methods they have learnt, will find in Mr. Page's work

the first attempt to present to English readers a concise account of some of Prof. Lie's important developments of the theory of transformation groups, by which he has shown that the usual methods are only applicable to such differential equations as admit of known infinitesimal transformations. A great many of the methods here described are due exclusively to Prof. Lie; the examples at the end of each chapter are, however, largely taken from existing text-books. A feature which strikes us as distinctly good, is the treatment together of simultaneous systems and the equivalent linear partial equation.

The two books before us are thus, to a great extent, complementary in scope. Starting with no knowledge of differential equations, a course of study first under Mr. Murray's and then under Mr. Page's guidance will lead the student by easy stages up to an insight into the Theory of Groups.

Nature Study in Elementary Schools; a Manual for Teachers. By Mrs. L. L. W. Wilson. Pp. xix + 262. Woodcuts. (New York: The Macmillan Company. London: Macmillan and Co., Ltd., 1897.)

THERE is a notion in this book—a sensible, practicable notion; and this is enough to distinguish Mrs. Wilson's lessons from the common run of school natural histories. Her aim is to stimulate the children to work for themselves; and now and then she succeeds in laying out really interesting work for them, as in the lessons on seedlings and on some common American trees. We recommend the book to the notice of enterprising teachers. In spite of very obvious defects, it may be a guide to better methods than those which prevail at this time. The great fault of the book is the feeble execution of an excellent idea. Many of the lessons do no sort of justice to the objects, and pass over without remark features which ought to arouse the curiosity of the children. We can hardly understand how any teacher could work through the thorn-apple with a class, and then write down so poor a description as that on p. 19. Many of the drawings, particularly those of insects, are too crude and hasty to be produced as examples even of what can be done in school. In the present writer's opinion the mythology and the poetical pieces are overdone. These things may be allowed to come in as extempore illustrations; but when they are laboured, they simply distract the attention and prevent the children from focussing their minds upon the objects.

A word as to the use of printed lessons. On no account should the book be produced in class; that would be to give the solution of the problems in advance. Nor should the teacher reproduce the very lessons given in the book, but devise lessons of his own upon the same lines. In this way the book now before us can be turned to excellent account.

L. C. M.

Botanical Microtechnique: a Handbook of Methods of Preparation, Staining, and of Microscopical Investigation of Vegetable Structures. By Dr. A. Zimmermann, Privat-docent in the University at Tübingen. Translated from the German by James Ellis Humphrey, S.D. Pp. xii + 296. (Westminster: Archibald Constable and Co., 1896.)

MODERN advanced work in vegetable, as in animal, histology requires the aid of a refined and often complicated technique in order to render apparent the more difficult details of structure. The zoologist possesses at least one good treatise on methods; but until the appearance, in its English form, at the hands of Dr. Humphrey, of Zimmermann's excellent work, there was no advanced handbook available to a student unacquainted with German. The scope of the book is sufficiently indicated by the title, and under its new form can be confidently recommended to English-speaking students.