The Natural History of Aquatic Insects. By PROFESSOR L. C. MIALL, F. R. S., with illustrations by A. R. HAMMOND, F. L. S. London, Macmillan. 1895. 8°.

Professor Miall has given us an excellent book. He has passed in review the life histories and particularly the larval life of most of the commoner and many of the rarer forms of aquatic insects of Great Britain, and supplemented his own story of their structure, contrivances and mode of life by liberal extracts from the renowned but too neglected works of Réaumur, Lyonnet, DeGeer and Swammerdam, reviving a genuine interest in their virgin discoveries, often since repeated. He has brought to bear upon his study the equipment of a naturalist well trained in all the modern appliances for investigation, and has thereby been able to explain better than has been done before the operation of the varied mechanisms by which insects properly and originally terrestrial (as he insists) have become fitted for a more or less prolonged subaqueous life.

The work is written in a very simple and clear style, which he seems to have caught, as it were, from the older and now classical writers upon these topics. By the aid of the excellent and abundant illustrations, the most abstruse parts (if there may be said to be any such) are made comprehensible to any bright boy's intelligence, and will make him wish to set up an aquarium forthwith.

There is the meagrest possible reference to American insects, and the way is therefore open to one of our own entomologists to follow Mr. Miall's example and give us something of personal study in the same ample field, supplemented by the scattered accounts that already exist; unless, however, he follows our author's example and familiarizes himself at first hand with a large number of varied forms, he will produce but an indifferent work. Meanwhile the present volume will admirably serve as a guide to any young entomologist, for it deals with forms almost all of which have their close counterpart in the life of our ponds and streams.

The book is excellently printed; in reading it through we have noticed but a single typographical error, where (p. 347) Heteroptera is printed Heteropoda.

S. H. S.

The Butterflies and Moths of Teneriffe. MRS HOLT WHITE. London, L. Reeve & Co. 1894. pp. 9 + 107, 4 colored plates.

Mrs. Holt White, a connection by marriage of Gilbert White, of Selborne, spent the winter of 1892–93 in Teneriffe, and has published the result of her observations on the lepidopterous fauna of the island in a popular and unpretending volume.

The introductory chapter sketching briefly the characters and life histories of the Lepidoptera, though the least satisfactory part of the book, is not likely to mislead, and may readily be improved in a future edition, which will surely be called for; the hints and suggestions, and the directions for the killing, setting and relaxing of specimens are generally good, though here the main point to be gained is always experience.

Twenty-nine butterflies and thirty-four moths are briefly characterized, and there are frequent notes on their comparative abundance, habits, early stages and food-plants. In addition to the above, there is a list of twenty-eight moths, most of them recorded on the authority of Alphéraky in his paper, 'Zur Lepidopteren-Fauna von Teneriffa,' in the fifth volume of Romanoff's magnificent Mémoires sur les Lépidoptères; these, principally microlepidoptera, are considered by Mrs. Holt White as of little interest to the ordinary collector.

The four plates give good, recognizable figures of twenty butterflies and eleven moths; the coloring, though in some cases somewhat rough, is always effective.

The object of the book, to give an account of the Lepidoptera of Teneriffe which will enable students to identify their specimens, is certainly accomplished. Another edition should be enlarged to include brief descriptions and, if possible, figures of all the moths known to occur in Teneriffe. The systematic arrangement of the moths in the text should also be revised to correspond with that of the list.

Samuel Henshaw.

A Treatise on the Morphology of Crystals. By N. Story-Maskelyne, M. A., F. R. S., Professor of Mineralogy, Oxford. Octavo xii.+521. New York, Macmillan & Co. 1895. $3.50.

Although the constancy of angle between like planes of crystals furnishes the basis for a purely mathematical treatment, students in mineralogy, chemistry and petrology, to whom some knowledge of crystallography is essential, have rarely had the high mathematical training essential to the understanding of works like those of Liebisch, Mallard or Klein, and they will appreciate this treatise of the veteran Oxford professor, in which the principles and problems of crystallography are designedly treated in the 'simplest form compatible with strict geometrical methods.'

The work deals solely with the morphology of crystals, and is to be followed by a volume treating, in a similar manner, the physical problems necessary to a thorough knowledge of crystallography. After a brief statement of the general properties of crystals, especially the physical characters, the author proceeds to the logical development of his subject. The expressions for the position of a plane and of an origin-edge or zone axis are first deduced and the principles of stereographic projection clearly and simply stated. The practical application of the stereographic projection is then made possible by the solving of certain problems, such as: 'Given the projection of a great circle, to find that of its pole;' 'To determine the magnitude of an arc of a great circle from the projection of that arc;' 'To draw the projection of a great circle in which two points are given,' etc.

The properties of zones, the relation connecting tautozonal planes and the relations between edges and normals are examined, and the necessary expressions deduced by purely geometrical methods and also by the methods of analytical geometry. Preliminary to a discussion of symmetry, it is clearly brought out that the only angles possible between consecutive normals in isogonal zones are 90°, 60°, 45° and 30°.

Chapter IV. deduces expressions for changing parametal planes and axes, and proves that axes are not arbitrary diametral lines but are necessarily origin edges or face normals.

The possible varieties of symmetry, holo and mero, and composite and twin crystals, are elaborately treated. The author's wording of the law of symmetry or second fundamental law of crystallography is new and very thorough. "On a crystal the extant or absent features of a form must be extant or absent in the same way in respect to equivalent systematic* planes." The six systems are separately considered each under the headings: holosymmetrical forms, hemisymmetrical forms, combinations of forms, and twinned forms. The balance of the book is taken up with methods of measurement, calculation and representation.

The work is clearly printed and the diagrams are well conceived. The mathematical deductions can usually be followed by any one with a working knowledge of geometry and analytical geometry. The statements and definitions are very exact but not always concise. For instance, the definitions of a crystalloid system of planes

*Planes of symmetry.