and blurred in outline. Indeed, we venture to think that if a second edition be called for it would be a decided improvement if the plates were photographed down to octavo size, while at the same time the text might be printed in larger type.

As it is, however, the book is decidedly attractive, and ought to prove indispensable to all breeders of ornamental water-fowl. R. L.

Catalogue of Eastern and Australian Lepidoptera Heterocera in the Collection of the Oxford University Museum. Part ii. Noctuina, Geometrina and Pyralidina. By Col. C. Swinhoe. Pterophoridæ and Tineina. By the Right Hon. Lord Walsingham and John Hartley Durrant. Pp. vi + 630; with 8 plates. (Oxford: Clarendon Press, 1900.)

THE first volume of this important work was published as long ago as 1892; it included the Sphinges and Bombyces; and the second and concluding volume, which is nearly twice as thick as the first, has at length been issued.

A great number of *Lepidoptera Heterocera* (moths) were described by the late Francis Walker, not only from the British Museum, but from various private collections, chiefly from that of W. Wilson Saunders. After the death of the latter, large portions of his collection found their way into the Oxford Museum, and the types have now been carefully identified, and a considerable number figured. This is extremely important, as it will enable lepidopterists at a distance to identify species with more certainty than by descriptions alone; and a figure also helps to fix the identity of a species in case the type should be lost or destroyed.

About 2340 species of moths are enumerated in the present volume, and we note that in addition to Walker's types many described by Mr. F. Moore and other entomologists are likewise contained in the Oxford Museum; nor must we omit to mention that several new genera and species are described and figured by the authors of the Catalogue for the first time. However, the work is one which, notwithstanding its importance, appeals so exclusively to specialists that a more lengthy notice is hardly required in the columns of NATURE.

W. F. K.

Sir Stamford Raffles: England in the Far East. By H. E. Egerton, M.A. Pp. xx + 290. (London: Unwin, 1900.)

THIS volume, which is one of a series, entitled "Builders of Greater Britain," and edited by Mr. H. F. Wilson, does not call for much comment in a journal devoted to science. The author of the biography naturally deals mainly with Sir Stamford Raffles as an administrator in the Straits Settlements and the Malay Archipelago, and only incidentally, and that very briefly, refers to him as a zoologist. Raffles was, as everybody knows, one of the founders, and the first president, of the Zoological Society of London; and his bust adorns the lion house of that society. Mr. Egerton, in narrating this fact, is chiefly impressed by "how much innocent pleasure this distinguished child-lover has given to countless thousands of children" by his successful efforts in this direction. He mentions, however, the collections which he took care to make, and which were largely reported upon by Dr. Horsfield. In those days much that was brought back from the East in the way of zoological specimens was quite new to science, and the animals had to have names given to them; it is not such a great compliment as Mr. Egerton seems to think to name a species *Gymnura rafflesii*, after Sir Stamford. This compliment is usually paid to the capturer of a new form, and it is ridiculous to say that "Raffles' reputation in the scientific world is attested by the fact that the great French naturalist, M. Geoffroy St. Hilaire, described a new variety of animal under the specific name 'Rafflesii.'"

LETTERS TO THE EDITOR.

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The Teaching of Mathematics.

PROF. JOHN PERRY has asked me to write something in criticism of the views he has lately expressed about the teaching of mathematics. I am inclined to ask, What is the use? He knows my views pretty well, and others too; and those who don't can learn them if they want to by buying my books. That is the best way, as it brings in one-and-threepences, and so does some good. I think there is a great deal to be said on both sides, and that if you are a born logic-chopper you will think differently from Faraday. The subject is too large, and I will only offer a few remarks about the teaching of geometry, based upon my own experience and observations. Euclid is the worst. It is shocking that young people should be addling their brains over mere logical subtleties, trying to understand the proof of one obvious fact in terms of something equally, or, it may be, not quite so obvious, and conceiving a profound dislike for mathematics, when they might be learning geometry, a most important fundamental subject, which can be made very interesting and instructive. I hold the view that it is essentially an experimental science, like any other, and should be taught observationally, descriptively and experimentally in the first place. The teaching should be a natural continuation of that education in geometry which every child undergoes by contact with his surroundings, only, of course, made definite and purposeful. It should be a teaching of the broad facts of geometry as they really exist, so as to impart an all-round knowledge of the subject. It should be Solid as well as Plane; the sphere and cube, &c., as well as the usual circle and square; models, sections, diagrams, compasses, rulers, &c., every aid that is useful and practical should be given. And it should be quantitative as well. The value of π should be *measured*; it may be done to a high degree of accuracy. So with the area of the circle, ellipse and all sorts of other things. The famous 47th. The boy who really measures and finds it true will have grasped the fact far better than by a logical demonstration without adequate experimental knowledge; for it happens that boys, who are generally very stupid in abstract ideas, learn a demonstration without knowing what it is all about in an intelligent manner. It may be said by logicians that you do not *prove* anything in this way. I differ. It might equally well be said that you prove nothing by *any* physical measurements. You have really proved the most important part. What a so-called rigorous proof amounts to is only this, that by limitation and substitution, arguing about abstract perfect circles, &c., replacing the practical ones, you can be as precise as you please. Now when a boy has learnt geometry, and has become competent to reason about its connections, he may pass on to the theory of the subject. Even then it should not be in Euclidean style; let the invaluable assistance of arithmetic and algebra be invoked, and the most useful idea of the vector be made prominent. I feel quite certain that I am right in this question of the teaching of geometry, having gone through it at school, where I made the closest observations on the effect of Euclid upon the rest of them. It was a sad farce, though conducted by a conscientious, hard-working teacher. Two or three followed, and were made temporarily into conceited logic-choppers, contradicting their parents; the effect upon most of the rest was disheartening and demoralising. I also feel quite certain about the experiential and experimental basis of space geometry, though that opinion has been of slow growth. If I understand them rightly, it is generally believed by mathematicians that geometry is pre-existent in the human mind, and that all we do is to look at nature and observe an approximate resemblance to the properties of the ideal space. You might assert the same pre-existence of dynamics or chemistry. I think it is a complete reversal of the natural order of ideas. It seems to me that geometry is only pre-existent in this limited sense; that since we are the children of many fathers and mothers, all of whom grew up and developed their minds (so far as they went) in contact with nature, of which they were a part, so our brains have grown to suit. So the child takes in the facts of space geometry