BOOK NOTICES.

Dr. Skinner's Catalogue of North American Butterflies.

It is now nearly fifteen years since Mr. W. H. Edwards issued his "Revised Catalogue of the Diurnal Lepidoptera of America north of Mexico," and it cannot therefore be said that the new "Synonymic Catalogue of the North American Rhopalocera," issued on 15th December last by Dr. Henry Skinner, appeared prematurely. In this catalogue, Dr. Skinner has followed very closely on the lines laid down by Mr. Edwards in his lists, so far as the species are concerned, and with a conservatism which is striking when compared with his rather sweeping radicalism as expressed in his article, "Impressions Received from a Study of our North American Rhopalocera," in Jour. N.Y. Ent. Soc., IV., 107. A few, probably too few, species have been placed in the synonymy, but it seems strange, in view of what the author has written elsewhere, to see Argynnis Artonis, Clio, Opis, Bischoffii, Arge and Eurynome, all standing as distinct species. The order of the families and subfamilies has, however, been entirely changed, following that adopted by the same author in the Check List of 1891, beginning with the Danainae, and the other Nymphalid subfamilies following in order the Satyrinae and Libytheinae closing the series, the Erycinidae, Lycaenidae, Papilionidae and Hesperidae following in the order given.

This grouping of the families, if not altogether satisfactory, and it is not so to the reviewer, seems certainly much more reasonable than that which places at the head as the highest type of butterfly the Satyrinae, some of the species of which pupate in rudimentary cocoons.

One very excellent feature of the work is the giving a separate line to each reference, which greatly aids the eye in finding what is wanted, but more care might have been exercised in giving the references, as quite a number of errors in the volumes or pages occur. One such error, which may be cites as a sample, occurs on page 52 under Chrysophanus Dorcas, where Scud. But. 3, 1380, should be 1830.

Other misprints occur, at least it seems probable that spelling Phaeton Phaeton is chargeable to the printer rather than to the author.

In a few cases references are given which are of less interest than some which have apparently been overlooked, but the citations are so very full that really very little of interest seems to have been omitted.

It will be noticed that under Colias Palaeno is placed Var. Werdandi,

Herr.-Schaff. This is following the supplement of Kirby's Catalogue, but Dr. Staudinger and Mr. Elwes give Var. Werdandi, Zett., as a variety of Colias Nastes, Boisd.

The lists of authors and of works quoted are very complete, and the index giving both species and genera, the latter in heavy type, is very satisfactory. Altogether it is a most useful work and really indispensable to every worker on the North American Rhopalocera. It is issued by the American Entomological Society as part of their Transactions, but may be obtained separately from the author for $1.00. H. H. L.

CONTRIBUTIONS TO THE THEORY OF WARNING COLOURS AND MIMICRY —By Frank Finn, B. A., F. Z. S., Deputy Superintendent of the Indian Museum, Calcutta. (Reprint from the Journal, Asiatic Society of Bengal.) Vols. LXIV., LXV., LXVI., LXVII., Part II., 1895-97.

In this little book of 84 pages, Mr. Finn has brought together a number of separates of his papers, printed in the Journal of the Asiatic Society of Bengal, on this very interesting subject. The experiments were made, largely, with birds, but a lizard, *Calotes versicolor,* was used in one series, and a frog, *Rana tigrina,* and a Tree-Shrew, *Tupaia ferruginea,* in another series; in this last only a single individual of each species being used. The insects experimented upon were mainly butterflies, including largely, of course, such as are supposed to be distasteful or warningly or protectively coloured.

It is obviously impossible to go into the details of the many experiments carried out by Mr. Finn, and, therefore, only a synopsis of the results obtained are included here. As regarding the, in some instances, somewhat unsystematic experiments in the case of birds, Mr. Finn explains that "experimenting on this subject was not always his main object in keeping the birds at all," which leads us to suppose that, sometimes at least, the results given are what might be termed bi-products, which, instead of detracting from their value, might be regarded as adding thereto, as he would certainly be free from all mental bias, so difficult to avoid in cases where one has laboured long and intensely on a very interesting problem.

In regard to the lizard, *Calotes,* he states that "the behaviour of these certainly does not appear to afford support to the belief that the *butterflies,* at any rate, usually considered nauseous, are distasteful to them."

In regard to the *Tupaia,* Mr. Finn states that this animal has a very strong objection to the "protected" *Danainae* and *Papilio aristolochiae,* as it so constantly refused them, and in case of the former, absolutely, and not, as with the birds, merely showing dislike by preferring other species. Of the tastes of the frog, sufficient data was not obtained to warrant any conclusions.

Regarding birds (the Babblers especially) the author concludes as follows:

"1. That there is a general appetite for butterflies among insectivorous birds, even though they are rarely seen when wild to attack them."

"2. That many, probably most species, dislike, if not intensely, at any rate in comparison with other butterflies, the 'warningly-coloured' *Danainae, Acraea violae, eucharis,* and *Papilio aristolochiae;* of these the last being the most distasteful, and the *Danainae* the least so."

"3. That the mimics of these are at any rate relatively palatable, and that the mimicry is commonly effectual under natural conditions."

"4. That each bird has to separately acquire its experience, and well remembers what it has learned."

"That therefore on the whole, the theory of Wallace and Bates is supported by the facts detailed," in these papers, "so far as they deal with birds (and the one mammal used)." "Professor Poulton's suggestion that animals may be forced by hunger to eat unpalatable forms is also more than confirmed, as the unpalatable forms were commonly eaten without the stimulus of actual hunger—generally," he adds, "without signs of dislike," which shows that, under the stress of hunger, they would likely exhibit even less nicety of selection.

To future experimenters, Mr. Finn offers the following hints, derived from his own experiments:

"1. Use animals at liberty for experimenting with if possible."

"2. If these are not available, confine your subjects singly, and feed them well and *naturally,* letting them be neither hungry nor pampered. Cages should be of portable size (about two feet every way) and made (for birds) of half-inch mesh wire netting with plain wooden floor without a tray. This is to prevent insects from getting out or being concealed."

"3. Use wild-caught specimens in preference to hand-reared ones."

"4. *Remember that the best and often the only way to determine an animal's tastes is to offer it a choice.*"

F. M. WEBSTER.