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cases to obtain a firm union, and in due time a compound imago would emerge, generally with the help of the operator, however.

All attempts to join lateral halves of two different pupæ were unsuccessful, and the proportion of failures was large in all the series, but there were enough successful cases to give some interesting results.

It was found to be a little more difficult to unite pupæ belonging to different species or genera, than where the two components belong to the same species. Thus, of the former category only 7 cases out of 62 resulted favorably, while 14 out of 95 were successful of the latter. In regard to the way in which the parts were united, — in cases of union in normal proportion the successes were 4 out of 61, in “tandems” they were 3 out of 27, and in twins, *i.e.*, union of homologous parts, back to back, etc., they were 14 out of 69, over 20 per cent.

The results in regard to reciprocal color effects were inconclusive, and we still await the histological details.

R. P. B.

ZOOLOGY.

The Fresh-Water Fauna of Ceylon.¹— Seven collections in five localities in the swamps and lakes of Ceylon have afforded Dr. E. von Daday the opportunity of increasing the list of the known micro-fauna of this island from 42 to 170 species, 39 of which he describes as new. The 31 Protozoa observed in the collections or raised from dried moss are mainly cosmopolites, as are also the 42 species of Rotifera. Among the Entomostraca the Cyclopidæ alone are represented by cosmopolitan species, while the Cladocera have a smaller ratio of such forms mingled with others having an Oriental, Ethiopian, or Australian distribution. The Centropagidæ and Ostracoda are represented exclusively by species confined to the three regions named. This examination of the micro-fauna indicates that Ceylon is a meeting ground for the Palæarctic, Oriental, Ethiopian, and Australian types of minute life.

C. A. K.

Butler's Birds of Indiana. — For a number of years Mr. Amos W. Butler has been a diligent and intelligent student of the higher verte-

¹ Daday, E. Von. Mikroskopische Süßwasserthiere aus Ceylon, *Termes. Füzetek*, Bd. xxi, Anhangsheft. Budapest, 1898. 123 pp., 85 illustrations.

brates of Indiana, his first paper upon the birds dating from 1882. In 1890 he published an annotated catalogue (135 pages) of the birds of the state, and now we have a more pretentious paper from him,¹ enumerating 321 species actually known from the state, and in a supplementary list 81 additional species, which, while occurring in adjacent states, have never been reported from Indiana. The present volume is more than a catalogue; it is a manual of the ornithology of the state, with analytical keys, descriptions of the species, and bits of bird biography, some copied, but many original and showing a familiarity with the birds in the field. A greater value to the agriculturist is found in the accounts of the economic importance of many species, especial stress being laid upon the food and upon the agency which many birds perform in the distribution of the seeds of useless and noxious plants. The *American Naturalist* has often had occasion to speak in high terms of the zoological work done in Indiana, and this work by Mr. Butler is but another instance in the same line.

Fishes of the Canary Islands. — In the *Proceedings of the Academy of Natural Sciences of Philadelphia* is a list of fishes collected by O. F. Cook, at the Canary Islands. Fifty-four species are enumerated, four of them new. The fauna of these islands is essentially that of the Mediterranean, showing little in common with the West Indies. There are, however, some differences from the Mediterranean fauna, appearing in the fact that some of the common types of the latter are replaced by closely allied but distinct species. There is no evidence of difference between the Canary fish fauna and that of the Madeiras.

Development of Chilopods. — All facts concerning the development of the Chilopoda are of interest, and this short paper by Dr. Heymons² contains much of importance. A complete paper is promised later. The egg contains a central unsegmented yolk with segmentation nuclei. Some of the segmentation cells migrate to the surface and from the blastoderm. The yolk-cells arise in part from the nuclei which remain in the yolk, in part from elements which arise from the blastoderm. These immigrant yolk-cells cannot be distinguished from the entoderm cells, which arise in the same manner from all parts of the ectoderm. A gastrular groove does not exist.

¹ The Birds of Indiana. Ext. 22d Report of the Department of Geology and Natural Resources of Indiana, 1897. pp. 515-1187. (Published 1898.)

² *Sitzungsber. k. preuss. Akad. Wissensch.*, Bd. xviii (1898).