1110 (1). *Eucosma fessana*, Mn.

Grapholitha fessana, Mn. Verh. ZB. Ges. Wien, XXIII. (1873) Abh. 573 (1873) [1]; Stgr. Hor. Soc. Ent. Ross. XV. 257–8 (1879) [2].

Hab. ASIATIC TURKEY—*KARAMANIA*—Külek [2] (=Gülek [1]); *SIVAS*—Jenikeui-Hochebene, 15 VI. [2]; Maidan 11, V. [2]; *ARMENIA*—Manglis [2]; *HALEB*—Shar Devesy, 25 VII. 1890 (*Native Coll.*).

Larva in stems of *Salvia candelabrum* [2].

A small specimen from Shar Devesy with rather darker hind wings cannot be described as distinct.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

A Treatise on Zoology. Edited by E. RAY LANKESTER, M.A., LL.D., F.R.S.—Part III. *The Echinoderma.* By F. A. BATHER, M.A., assisted by J. W. GREGORY, D.Sc., and E. S. GOODRICH, M.A. London: Adam & Charles Black, 1900.

THE present volume, on the Echinoderma, is the first published, but third in order of a Comprehensive Treatise on Zoology, which has been for some time past in preparation under the guidance of Prof. E. Ray Lankester.

Rather more than half of this volume has been written by Mr. F. A. Bather. Mr. E. S. Goodrich is responsible for the section on the Holothuroidea, and Dr. J. W. Gregory for that on the Stelleroidea and Echinoidea.

This is essentially a student's book. Its aim is to be a systematic rather than an anatomical work, hence facts that are of purely anatomical interest find no place here. This is well, for they have recently been dealt with in Prof. Lang's excellent compendium, and would only crowd out matter more germane to the purpose. Already this book has been much compressed and any further condensation would seriously threaten the usefulness of the whole.

This work is reared upon the foundation of phylogeny and ontogeny; and if it be objected that this is a somewhat insecure foundation, it must at least be admitted it is the ideal aim of every post-Darwinian taxonomist. It may be claimed for this book that it is unique, in that fossil and living forms are regarded as common material for the building thereof. The former are not regarded as merely decorative elements. So well has the piecing together of these fragments been done, that their true relationships to the living forms can be grasped with something more like certitude than ever

before. As a result, we have for the first time a real insight into the inter-relationships of this most difficult group.

The calycinal system is no longer the governing factor in our reckoning of the morphological level of the Echinoderma, as in the systems of Lovén, Carpenter, and Sladen. The plates taking part in the apical system of the Echinoidea and Stelleroidea cannot, Mr. Bather shows, now be regarded as merely homogenetic with those of the Crinoidea. The evidence of the fossils is fatal to this conclusion, inasmuch as the Eleutherozoa "if they arose from stalked forms at all, indubitably did so ages before the calycinal system had been evolved."

The most primitive Echinoderms which we know at present appear to be the Cystidea Amphoridea. From this stock probably branched the Cystidea Rhombifera, Cystidea Diploporita, Blastoidea, and Crinoidea on the one hand, and the Edrioasteroidea and Eleutherozoa on the other, these last being derivable possibly from the Edrioasteroidea.

The account of the larval forms, which is absolutely indispensable, is lucidly, if briefly, sketched. Herein the complex coilings of the gut, the changes in the development of the cœlom, following the changes from a free-moving to a fixed habit, and the gradual evolution into the characteristic radial symmetry are made as clear as such a difficult matter can possibly be made. Most of the figures illustrating this section are new. That showing the change from the Pentactea to the Eleutherozoic Stelleroid type is very instructive.

Mr. Bather supports the view held by many that the simplicity of structure of the Synaptidæ is a secondary feature, and that therefore this form cannot be regarded as the simplest and most ancestral of the Echinoderms. The class he regards as a probable early offshoot from the Edrioasteroidea.

Mr. E. S. Goodrich's summary of the Holothuroidea is admirable and well illustrated. We venture to think he missed an opportunity in not directing attention to the fact that Ludwig's classification does not agree with his phylogenetic tree ; and that whilst the latter may be taken as a more or less probable expression of the relationships of the forms included, one to another, the former is artificial, and savours rather too much of a "Key."

Dr. Gregory has certainly sustained the high standard which characterizes this work. He insists on the close relationship of the Stelleroidea and Ophiuroidea, wherein most will agree with him. It is incorrect, however, to state that *Ophioteresis* agrees with the Stelleroidea in having an ambulacral furrow. This is an important point, for Dr. Gregory uses it as an instance showing the unreliability of this character as a taxonomic factor for the division of the Ophiuroidea from the Stelleroidea. Again, the supposed pore-plates of *Bothriocidaris* are really tubercles. But these are to be regarded as slips which will creep into every work in spite of the most zealous precautions.

Prof. Lankester's choice of authors for this work has been in

every sense justified, and both Editor and Authors have placed zoological students under a great obligation by bringing within easy reach, and with marvellous completeness, all the essential facts concerning a group which has always ranked as one of the most difficult of comprehension. This book, we may safely say, as yet knows no rival.

It is beautifully and profusely illustrated and remarkably free from misprints. The only one which we have detected, so far, is on page 9, where constructed appears for constricted.

W. P. Pycraft.

A Monograph of Christmas Island. Physical Features and Geology by Charles W. Andrews, B.A.; with Descriptions of the Fauna and Flora by numerous Contributors. Printed for the Trustees of the British Museum. London, 1900.

This is a book of remarkable interest, and one of more than ordinary scientific value. It is an embodiment of the results of a ten-months' stay on Christmas Island by Mr. Andrews during 1897–98; and the Trustees of the British Museum, in publishing these results, have conferred a great and lasting benefit upon students of natural science.

Our thanks, however, are not alone due to the Trustees. "It seemed highly desirable," writes Sir John Murray in an Introductory Preface, "that this interesting island—which was evidently an upraised coral atoll—should be carefully examined and described by a competent naturalist and geologist before being opened up by Europeans for agricultural and commercial purposes. Accordingly it was arranged with the Trustees of the British Museum that Mr. C. W. Andrews, B.Sc., F.G.S., of the Geological Department, should be granted leave to carry out this exploration. I undertook to pay all the expenses and to present a complete set of all specimens procured to the National Collection."

The physical features and geology have been written by Mr. Andrews. The zoology has been worked out by various specialists, most of whom are members of the Museum staff. Their work has been well done. Comparisons are odious, so we refrain from comment in this direction. Field-notes by Mr. Andrews are often appended to the descriptions of species, and some of these notes are of extreme interest. Perhaps one of the most vivid of these descriptions is that of the frigate-bird. "About the beginning of January," he writes, "the adult males begin to acquire the remarkable pouch of scarlet skin beneath their throat. This they can inflate till it is nearly as large as the rest of the body, and a dozen or more of these birds sitting in a tree with outstretched drooping wings and this great scarlet bladder under their heads are a most remarkable sight. When a hen bird approaches the tree the males utter a peculiar cry, a sort of 'wow-wow-wow-wow,' and clatter their beaks like castanets, at the same time shaking the wings. When they take to flight