

papers by others than the actual or honorary members of its staff.

In the matter of attendance the American Museum of Natural History had 461,026 visitors, the U. S. National Museum 358,587, and the Field Columbian Museum 248,408, this being a falling off from the previous year. The Field Columbian Museum is the most difficult of access locally, the National Museum is the easiest, while the American Museum has the largest adjacent population to draw from.

The expenses of the Field Columbian Museum were \$160,545, of the American Museum, \$191,584, and of the National Museum, \$243,540. But \$17,000 of this last was for publication and \$28,040 for additions, rent and repairs, so that the actual cost of administration was not so great as it might seem.

NOTES ON ENTOMOLOGY.

For a number of years Dr. J. L. Hancock, of Chicago, has been studying that difficult family of grasshoppers, the Tettigidæ. He has now summarized his studies in an elegant volume.*

The work opens with an excellent general account of the family, including much interesting matter on habits, variation, protective coloring, etc. The generic and specific descriptions appear to be good, but the synoptic tables seem to be badly arranged. In fact something appears to have been omitted from several of them, so that they are of little value. The author has apparently no definite idea as to his species and varieties, for what are treated as varieties in one place are elsewhere called species. Altogether the author describes about 85 species, about 48 of which occur in the United States. Unfortunately Dr. Hancock did not see the National Museum collection in time to include two new species and one new variety that are added in an appendix. It seems probable that future study will reduce the number of species in our country.

* 'The Tettigidæ of North America,' published by special grant of Mrs. Frank G. Logan. Chicago. 1902. 188 pages; 11 plates.

Ch. Ferton, well known for his interesting ethological studies on predaceous Hymenoptera, has added another* to his long list of papers on this subject. It includes a great amount of matter of general biologic interest arranged in a number of chapters. There are notes on the variability of instinct in Hymenoptera; on the odor emitted by certain species; lists of Hemiptera, Diptera, and Arachnida gathered by various species as food for their young; on the position of the egg upon the host-insect; on the habit of *Odynerus* and *Eumenes* of suspending the egg to the end of a thread; on the means of protection of certain caterpillars against these Hymenoptera; and finally on intelligence and instinct.

Ferton attributes the curious acts of these insects chiefly to instinct, and declares that acts of intelligence are exceptional with Hymenoptera. Many that appear as such are only habits that one rarely has the opportunity to observe. To the paper are added two plates illustrative of the nesting habits of certain species.

It has long been known that the larva of *Clythra 4-punctata*, a case-inhabiting Chrysomelid beetle, lives in the nests of an ant—*Formica rufa*. But it was not known upon what they fed or how they got into the ant-nest. Mr. Donisthorpe has now settled these points, and in a very interesting article† he gives an account of the entire life history of this insect. The adult beetles escape cautiously from the ant-nest, and feed on the tender foliage of birch. The female then seeks a shrub overhanging an ant-nest and begins oviposition. She covers the egg with a case made of her own excrement, which, when dried, has much resemblance to a birch bud. The eggs are dropped upon the ant-nest and the ants carry them into their galleries. Here the larva hatches and uses the egg-case for its first protection. It feeds upon the de-

* 'Notes détachées sur l'instinct des Hyménoptères mellifères et ravisseurs, avec la description de quelques espèces,' *Ann. Soc. Ent. France*, LXX., pp. 83-148, 1901.

† 'The Life History of *Clythra 4-punctata*,' *Trans. Entom. Soc. London*, 1902, pp. 11-24, 1 pl., by H. St. John K. Donisthorpe.

caying vegetable matter that it finds in the nest, and enlarges its case by using its excrement to solder bits of dirt together. When ready to pupate, it fastens the case to a piece of wood or twig, and turns completely around, end for end. The beetle escapes by biting a circular cap from the case. The ants are apt to attack and kill the beetle, so that it has to be careful in getting out of the nest.

In the new publication—*Fauna Arctica*—edited by Drs. F. Römer and F. Schaudinn, there have appeared two papers on arctic insects. One, on the Collembola,* is by C. Schaeffer, and the other, on the Lepidoptera,† is by A. Pagenstecher.

In the former there is a complete bibliography, and then an annotated catalogue of the 61 species of spring-tails known from the arctic and subarctic regions. This is followed by a tabulated statement of the distribution of the species. Schaeffer records several species from the United States not previously known to occur here; these are *Achorutes tullbergi* var. *concolor*, *Isotoma cinerea* and *Tomocerus vulgaris* var. *siberica*, all from Massachusetts.

In the two hundred quarto pages of Dr. Pagenstecher's work there are catalogued nearly 1,000 butterflies and moths from the arctic and nearby regions. The full synonymy is given, and many notes on distribution. The catalogue is preceded by an annotated bibliography, containing much interesting matter.

Catalogues seem to be the order of the day, and Darboux and Houard have written one that will be as useful as any. It is a descriptive catalogue‡ of the European galls, or plant deformations caused by animals. It is arranged alphabetically according to the host plant. Under each plant is a tabular synopsis of the species found on that plant. This syn-

opsis is based on the nature and shape of the deformation, and not on the characters of the animals. The great majority belong to three groups, the Cecidomyiidae of the Diptera, the Eriophyidae (Phytoptidae) of the Acarina, and the Cynipidae of the Hymenoptera. Over 4,000 kinds of galls or deformations are thus treated. This volume is to be followed by another containing a supplement, references to all the described species and descriptions of new forms.

Dr. M. Régimbart has published a monograph of the large beetles formerly placed in the genus *Hydrophilus*.* We have two of these species in the United States; one of them is very commonly found under electric lights in the cities. This is now known as *Stethoxus triangularis* Say, while the rarer species (*ovalis* Ziegler) is placed in the new genus *Dibolocelus*.

Dr. F. Meinert has completed a study of the larvæ of the coleopterous family Dytiscidae.† Unfortunately it is published in Danish, but there is a French résumé, from which one may gather the main facts of the article. However the larval characters of the genera and species are in Latin. The larvæ of 49 species are described, and, in many cases, figured. Upon a study of these larvæ he bases a new classification of this and allied families included in the Caraboidea of Ganglbauer. The six families he reduces to four. The Carabidae includes the Carabinae, and the Cicindelinae; the Dytiscidae includes the Dytiscinae, Pelobiinae, Noterinae and Amphizoinae. The Halipidae and Gyrinidae stand as usual.

In the *Journal of the Hungarian Department of Agriculture* Joseph Lósy has published a very full account of the bee-louse, *Braula cæca*.‡ The text is in Magyar, but one may gain much information from the many large and excellent figures. The article deals chiefly

* *Fauna Arctica*, Vol. I., 2d part, Article No. VII., 1900.

† *Fauna Arctica*, Vol. II., 2d part, Article No. VI., 1901.

‡ 'Catalogue systématique des Zoocécidies de l'Europe et du bassin méditerranéen,' by G. Darboux and C. Houard. Paris, 1901, 543 pp., 863 figs. Volume supplémentaire du *Bulletin Scientifique de la France et de la Belgique*.

* 'Revision des grands Hydrophiles,' *Ann. Soc. Ent. France*, LXX., pp. 188-230, 1902.

† 'Vandkalvelarverne (Larvæ Dytiscidarum),' *Kgl. Danske. Vidensk. Selsk. Skr.* (6), Vol. IX., No. 8, 1901, pp. 341-440, 6 plates.

‡ 'A méh és a méhtetű együttélése,' *Kísérletügyi Közlemények*, Vol. V., Part 2 (1902), pp. 163-203, 3 plates, 6 figures.

with the external anatomy of *Braula*, especially with the structure of the mouth-parts; but there is an historical account of the insect and a consideration of its relations to the bee.

An interesting little book has been written by L. C. Miall as an introduction* to the study of economic entomology. The work is divided into four portions; I., Preliminary lessons; II., Lessons on common insects, chiefly such as are either injurious or useful to man; III., Descriptive account of the larger orders of insects, with short notices of remarkable forms; IV., The destruction or mitigation of insect pests. The book is devised especially for English students, but the introductory structural and biological features would be of much help to Americans. Indeed on these points it is plainly superior to most of our works on economic entomology, and indicates the lines along which our text-book could be improved. The economic accounts of the various species treated are frequently of interest to us, and the chapter on insecticides is largely drawn from American sources. The outline figures are good; and the book will undoubtedly do much to broaden the knowledge of economic entomology in England.

NATHAN BANKS.

BOTANICAL NOTES.

TWO TEXT-BOOKS OF BOTANY.

AMONG recent books designed for the use of students is Professor Heald's 'Laboratory Manual of Elementary Biology' (Clute & Co.), Part I. of which interests us here, as it alone is devoted to plants. This book is interesting as coming from a teacher who has had to solve the problem of the best method of presenting the subject to beginning classes. The method adopted is described by the author as a mean between the 'verification method' and the 'question method,' neither of which he fully approves. Directions are given for making particular observations, and some questions are asked, but at the same time much information is given in the text. Apparently the author has succeeded in quite

* 'Injurious and Useful Insects,' London, 1902, 8vo, pp. 256, figs. 103.

successfully steering the middle course which he approves. In taking up the subject he begins at once with the lower plants, and makes this excellent contribution to the pedagogics of botany in his preface: "No excuse need be offered for beginning with the simple forms and ending with the complex. Experience has shown that the logical order can be carried out with even more satisfactory results than the illogical order of complex first and simple forms later." The book is remarkable in containing no illustrations whatever, and may thus be regarded as a protest against the excess of illustrations found in so many recent books. Professor MacDougal's little book, 'Elementary Plant Physiology' (Longmans, Green & Co.), reminds us of his earlier work, 'Experimental Plant Physiology,' which in fact it is intended to replace. The sequence of topics is quite different, however, in the new book, and many new illustrations have been added. After a useful introductory chapter devoted to material, measurements, etc., the author takes up 'Growth,' following this with 'Reproduction and Germination.' Then follow chapters on 'Exchange and Movements of Gases and Liquids,' 'Nutrition,' 'Respiration, Digestion and Fermentation' and 'Stimulation and Correlation.' The physical aspects of physiology are thus first taken up, and then the chemical aspects, followed by what may be called the vital aspects. Here again we detect a suggestion as to the proper sequence of topics in the study of plants and their activities. The book will no doubt become popular.

FURTHER STUDIES OF CELLULOSE.

SEVERAL years ago a notable work appeared from the hands of C. F. Cross and E. J. Bevan under the simple title of 'Cellulose' (Longmans), which at once took place as a standard reference book in botanical laboratories. Recently the same authors have prepared another book, 'Researches on Cellulose,' brought out by the same publishers, which is intended to supplement the former work. It gives a brief account of the researches published since the issue of the earlier book,