illustrate, at a cost of about $10,000 it has been demonstrated experimentally how belladonna can be grown commercially in California. There is no plausible reason why California should not supply all or nearly all of the belladonna required in the United States, which may be estimated at about 1,000,000 pounds annually valued at $150,000. This is merely one example which will however serve to explain the practical purpose of a botanical garden as above outlined. The probabilities are that from five to twenty-five practical tests would be carried on at one time and perhaps two or three tests would be concluded each year. From what has been said it is evident that the gardens should devote the major effort to establishing new plant industries and developing them. No time and effort should be wasted on useless things, as botanical freaks, botanical curios, purely technical research without practical significance, theoretical research and experiments, etc. Neither should time and effort be wasted on simple experiments which can be done by any agriculturist in any field or garden. Also, such gardens must be in charge of competent directors, men who by technical training and practical experience are qualified to direct such experiments as will bring practical net results in the shortest time possible.

Albert Schneider

CLASSIFICATION OF THE EDENTATES

Dr. E. H. Lane, in "A Corrected Classification of the Edentates,"[1] has proposed the new ordinal name Lepidota for the Manidæ. That, like Squamata and Pholidota, was however long ago preoccupied (by Vogt in 1851), as was also Cataphracta, another designation proposed by J. E. Gray. Squamigera, having the same meaning, might be taken as a substitute, but such is scarcely necessary, as Nomarthra may be restricted to the suborder (or order) represented by Manids alone. I concur now with Weber, G. Elliot Smith, Gregory and Lane in thinking it inadvisable to combine the Manids and Orycteropodids in a group contrasted with the Xenarthra.

I can not consider the combination of sloths and anteaters in a group distinct from the armadillos as an improvement in the taxonomy of the Xenarthra, and therefore the name Pilosa appears to me to be superfluous. Flower himself virtually confesses as much. The suborders Tardigrada and Vermilinguia, recognized by me in 1872, appear to be at least as distinct as are the "Loricata" from the Tardigrada.

If we are to apply the same rigorous rules to the nomenclature of the higher groups as to genera and species, "Loricata Flower" is another preoccupied name (unless accepted from Vicq d'Azyr) unusable for the armadillos and their relatives. Instead, Cingulata of Illiger (1811) might be revived as a subordinal term.

Vermilinguia of Illiger was long ago (1872) accepted as a subordinal designation for the anteaters.

Structural differences among the "Loricata" or Cingulata appear to be as great as (or greater than) those which have been used to distinguish families among the better-known carnivores, ungulates and rodents, and consequently have been recognized under the family names Tatusiidæ, Dasypodidæ and Chlamyphoridæ. These have been indicated in the "Standard (or Riverside) Natural History."

Hoplophoridæ (Huxley), 1864, appears to be retainable, Glyptodontidæ not having been given till years after (1879). *Hoplophorus* (Lund, 1838) is not preoccupied, in the opinion of many, by *Hoplophora* (Perty, 1830).

There are other complications in the classification and nomenclature of the edentates which need not be considered at this time.

Theo. Gill

[1] Science, June 10, 1910, 913–914.

SCIENTIFIC BOOKS

Fungous Diseases of Plants. With Chapters on Physiology, Culture Methods and Technique. By Benjamin Minge Duggar. Boston, New York, Chicago and London, Ginn & Co. 1909. Price $2.00.

The appearance of an American book on plant pathology is a matter of great interest to a considerable circle of readers. For the

last twenty-five years the study of plant pathology has been prosecuted in this country as it has been perhaps in no other country in the world, owing to the simultaneous founding of agricultural experiment stations in all of the states, and the devotion of a good deal of time and energy to the same subject in the U. S. Department of Agriculture. This is the first book on the subject that has appeared in the United States, if we except a little brochure by Professor Scribner, now many years old, and the recent book on "Minnesota Plant Diseases" by Freeman, which contains many good illustrations but a somewhat slighter framework of text. The study of plant pathology being older in Europe, they have a correspondingly larger literature and this includes a number of well-recognized and useful manuals. The appearance of Dr. Duggar's book invites comparison with these standard works, *e. g.*, those of Marshall Ward in England; Tubeuf, Sorauer, Kirchner and Frank in Germany; Prillieux and Delacroix in France, and of Comes in Italy. The book stands such a comparison very well indeed. It is less voluminous than the continental works cited, but what it lacks in volume it more than makes up in general accuracy of statement. It is also a matter of unfeigned pleasure that the book deals chiefly with American diseases, and is illustrated almost altogether with photographs and drawings from American material. The illustrations and the letter-press are almost all that could be desired. Indeed, considering the technical character of the book, it is remarkably free from typographical errors. Rarely is there any obscurity. On the other hand, there is usually great perspicacity of statement and freedom from speculation. The relative amount of space devoted to the various diseases also seems on the whole good. The introductory chapters dealing with technic appear to be in the main sufficient, there is a useful host index as well as a general index, and the first impression that one gets of the book outside and in is one of delight. How well the book will wear can be told only by those who have occasion to use it daily in the class room and elsewhere. The writer has read it entirely through without finding many serious errors. There are occasional slips in statement, and omissions in bibliography which will naturally be corrected in a second edition. One looks here and there in vain for reference to certain diseases, and an account of these might also well appear in such a second edition, where more space should be devoted to diseases of forest trees. With addition of a hundred more diseases having special reference to the needs of the British colonies, the book might answer very well as a hand-book of plant pathology for the whole English-speaking world. The book is designed not only for the special student, but also for the intelligent layman whose curiosity has been excited, or whose financial losses lead him to desire information on plant diseases. To the writer the book appears to be not quite encyclopædic enough, *i. e.*, whoever consults such a book would be glad to find at least a little about the particular disease he searches for, and in this book he will sometimes be disappointed. If the reader is also a physiologist he might be led to wonder why Dr. Duggar, who holds the chair of physiology in one of our leading universities, should write a text-book of plant pathology dealing with the subject chiefly from the standpoint of the parasite, and only incidentally from that of the host plant. This is the older view of the whole subject, and this aspect has received more consideration than the physiological one. The explanation may be that Dr. Duggar preferred to reserve the physiological side of the question for a second text-book, or that he felt incompetent to deal with the multitude of problems, many of them unsettled, which one has to face when plant diseases are regarded from the aspect of the plant rather than from the aspect of the parasite. The newness of this latter view and the impossibility of finding at the present time any man anywhere in the world who is competent to write such a book seem to me sufficiently valid excuses if any need be offered. In what I have said I do not mean it to be understood that somebody could not be found who might be able to treat a particular disease or a little group of diseases from a purely physiological stand-

point, but I think the statement I have just made for plant diseases as a whole is quite true. The late Marshall Ward came the nearest perhaps to being such a man, and yet to the writer Dr. Duggar's book shows a better grasp of the whole subject and is more interesting than either one of the books which Marshall Ward published. All criticisms of this sort would have been forestalled by the use of a slightly different title.

In conclusion the writer feels like recommending this book heartily and hopes that it may have so prompt and wide a circulation in this country that a new edition may be called for soon. Meanwhile for the digestion of the physiological critics, it may be suggested that it is a good deal easier to point out the defects in a good book than it is to write a better one. Undoubtedly the ideal plant pathology would be one in which a just balance is kept between the activities of the parasite on the one hand and the reactions of the host plant on the other, and when we know enough about these two subjects, then it will be very easy to write such a book, but the time is not yet. Meanwhile, let us take what we can get and be thankful, particularly when it is as good as the volume in question.

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Zoology of the Indian Ocean

The Percy Sladen Trust Expedition to the Indian Ocean in 1905. Reports 22–33. (Trans. Linnean Soc. London, 2d Ser., Zoology. Vol. XIII., Pts. 1 and 2, October, 1909, February, 1910.)

The important collections brought back from the islands of the Indian Ocean by the expedition under the leadership of Mr. J. Stanley Gardiner continue to furnish material for reports by different specialists. Reports 22 to 33, now before us, are the following: Nemerteans, by R. C. Punnett and C. Forster Cooper; Echinoderma (exclusive of Holothurians), by F. Jeffrey Bell; Cirripedes, by A. Gruvel; Rhynchota, by W. L. Distant; Amphipoda Hyperiidea, by A. O. Walker; Land and Freshwater Mollusca, by E. R. Sykes; Marine Mollusca, by J. Cosmo Melvill; Alcyonarians, by J. Arthur Thomson, E. S. Russell and D. L. Mackinnon; Cephalochorda, by H. O. S. Gibson; Crustacea (Penæidea, Stenopidea and Reptantia), by L. A. Borradaile; Lepidoptera (exclusive of Tortricidæ and Tineidæ), by T. Bainbrigge Fletcher; Polychæta, part 2, by F. A. Potts. Perhaps the most interesting is that of Mr. H. O. S. Gibson, on the so-called genus *Amphioxides,* which appears to consist of larval forms of Branchiostomids. The expedition brought back abundant material, representing Goldschmidt's species *A. pelagicus* and *A. valdiviæ,* which are believed to belong to *Asymmetron* and *Heteropleuron,* respectively. Mr. Gibson gives a very elaborate discussion of their structure and affinities, but shows that more material and observations are needed to complete the chain of evidence.

The land fauna of the Seychelles is of great interest, owing to the position of the islands between Africa (and especially Madagascar) and India. There are rather numerous precinctive birds and reptiles, and one would expect the various groups of invertebrates, when thoroughly collected, to yield many remarkable species. Mr. Sykes gives us a list of the Mollusca, describing three as new. He remarks: "Very little can be at present stated as to the origin of the fauna: *Streptaxis* shows African influence, *Stylodonta* that of Madagascar, while *Cyathopoma* is mainly Indian. The connection with any mainland must have been at a very remote period, from the well-marked forms (*Acanthennea, Priodiscus,* etc.) now found." The list given is incomplete, from the omission of five species of *Veronicella.* Mr. Distant lists the Rhynchota or Hemiptera of the Seychelles, which so far include 51 Heteroptera and 12 Homoptera (not counting Coccidæ).[1] Of all these, it appears that five genera and 28 species are ostensibly precinctive, but as the Hemiptera of Madagascar are still very imperfectly known, no particular significance can attach to these

[1] This enumeration includes not only the Seychelles, but the Farquhar, Amirante and Coetivy groups.