the case of fresh-water fishes, but with marine fishes there is greater freedom of migration, the species are perhaps largely of more ancient origin and intergrading forms are much more rarely recognized.

The degree of fulness and accuracy in the recognition of subspecies marks the degree of progress in any branch of systematic or of faunal zoology and botany. It is the tyro who, as Linnæus[2] suggests, sees the problems of geographical distribution in the large. It is the master who follows step by step the footprints of the Creator in the molding and distribution of life.

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SCIENTIFIC BOOKS.

The Waterlilies: A Monograph of the Genus Nymphaea. By HENRY S. CONARD, Senior Harrison Fellow in Botany, University of Pennsylvania. Published by the Carnegie Institution of Washington. 1905. Pp. xiii + 279. 4to, 30 plates and 82 figures in the text.

This thick volume, which is listed as 'Publication No. 4' of the Carnegie Institution of Washington, appeared several months ago, and attracted immediate attention on account of its excellence of paper, type, presswork and plates. In the style of its publications the institution is setting a high standard which can not but favorably affect scientific publication throughout the country. The plates are from drawings (some colored) and photographs, which have been very faithfully reproduced. The text-figures, while largely outlines, are also well done, adding greatly to the value of the work.

Turning now to the text, we find a chapter given to a historical sketch, followed by another devoted to structure, still another to development, one to physiology. The central chapter devoted to taxonomy is the longest and most important, and this is followed by brief discussions of distribution, hybrids and garden varieties, culture and uses and an extended bibliography. From the preface we learn that 'nothing like a complete synopsis of the waterlilies has hitherto been put before the English-speaking world,' and indeed it appears that it is more than eighty years since the last complete treatment in any language, *i. e.*, De Candolle's in the 'Prodromus' (1824). The present work is the result of studies undertaken by the author in the botanical garden and laboratories of the University of Pennsylvania, supplemented by living and preserved specimens and material from many sources, including that in the herbaria in Kew, British Museum, Linnean Society, Berlin, Munich, etc.

It would be pleasant to summarize, or quote from the historical chapter in which many interesting facts are brought together in very readable form. Likewise there is much of interest and importance in the chapter on structure, which includes gross and minute anatomy, and in the next chapter on the physiology of the plants (including a discussion of the cause of the opening and closing of the flowers), but there is no space here for this. The reader is recommended to peruse the interesting chapters for himself.

The chapter on taxonomy is the one of most general interest to the ordinary reader. The author prefers the name *Nymphaea* to *Castalia* for the genus, reserving the latter for one of the subgenera. The species are arranged under two principal groups, viz., (I.) *Nymphaeae Aprocarpiae* (with carpels free from one another at the sides) and (II.) *Nymphaeae Syncarpiae* (with carpels completely fused with one another at the sides). Two subgenera are recognized in the first group, *Anecphya,* with but one species, *N. gigantea* (Australian), and *Brachyceras,* with twelve species, *N. elegans* (Texas and Mexico), *N. ampla* (tropical and subtropical America) *N. flavo-virens* (probably Mexican), *N. stellata* (southeast Asia), *N. coerulea* (Africa), *N. micrantha* (West Africa), *N. heudelotii* (Africa), *N. ovalifolia* (East Africa), *N. calliantha* (Africa), *N. capensis* (South Africa), *N. sulfurea* (Africa), and *N. stahlmannii* (Africa). In the second group the subgenus *Castalia* in-

[2] "Tyro fit classes: magister fit species."

cludes seven species, *N. mexicana* (Florida, Texas, Mexico), *N. tetragona* (eastern Europe, Asia, North America to Australia), *N. fennica* (Finland), *N. candida* (northern Europe and Asia), *N. alba* (Europe and North Africa), *N. odorata* (eastern United States), and *N. tuberosa* (central United States); the subgenus *Lotos,* four species, *N. lotus* (Egypt), *N. zenkeri* (Africa), *N. pubescens* (East Indies), and *N. rubra* (East Indies); the subgenus *Hydrocallis,* ten species, *N. amazonum* (tropical America), *N. rudgeana* (tropical America), *N. blanda* (Guatemala), *N. lasiophylla* (Brazil), *N. gardneriana* (Brazil), *N. jamesoniana* (western South America and Porto Rico), *N. stenaspidota* (Brazil), *N. tenerinerva* (Brazil), *N. oxypetala* (Equador) and *N. gibertii* (Paraguay). It is noteworthy in this day when almost every monographer finds a lot of new species in his material, as a matter of course, that Doctor Conard describes but one new species, viz., *N. ovalifolia,* and a few new varieties. A second new species, *N. zenkeri,* by Professor Gilg, of Berlin, is here printed for the first time, although the name has been used for some time in European herbaria.

The closing chapter, mostly devoted to cultural directions, can scarcely be read without making one want to undertake the growth of some of these interesting plants. Beginning with such suggestions as 'the care of them is very simple; the pond or tank may be only a large bucket or a half barrel,' Doctor Conard proceeds to more and more elaborate suggestions, some of which can not fail to tempt his readers to make a beginning in their cultivation.

The author is to be congratulated upon having made such a notable contribution to botanical science.

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American Insects. By VERNON L. KELLOGG, Professor of Entomology and Lecturer on Bionomics in the Leland Stanford Jr. University. New York, Henry Holt & Co. 1905. Pp. 674.

In recent years a good many text-books or general works on the insects of America have been published. Several of these have been limited to special fields, such as 'The Butterfly Book' and 'The Moth Book,' by Dr. Holland, and 'The Insect Book,' by Dr. Howard, the latter a companion book to Dr. Holland's volumes, covering the other orders of insects excepting the Coleoptera. Several text-books have, however, included the whole subject, among which may be mentioned Comstock's 'Manual for the Study of Insects,' Packard's 'Text-book of Entomology,' and volumes relating to insects more particularly in economic relations, such as Smith's 'Economic Entomology,' and Sanderson's 'Insects Affecting Staple Crops.' The best foreign work in English covering the general subject is Dr. Sharp's two volumes on insects in the Cambridge Natural History series, which remains the best work of its kind so far produced. Dr. Sharp's work, however, applies to the insects of the world. The volume prepared by Professor Kellogg, as indicated in the title, is limited practically to American insects, and is somewhat broader in scope than any of the American text-books so far published. The insect field in all its relations is so vast that it becomes a very difficult problem to include it even in a general way in a single volume, but Professor Kellogg has accomplished this very satisfactorily, on the whole.

As indicated in his preface:

> This book is written in the endeavor to foster an interest in insect biology on the part of students of natural history, of nature observers and of general readers; it provides in a single volume a general systematic account of all the principal groups of insects as they occur in America, together with special accounts of the structure, physiology, development and metamorphoses, and of certain particularly interesting and important ecological relations of insects with the world around them. Systematic entomology, economic entomology, and what many be called the bionomics of insects are the special subjects of the matter and illustration of the book.

The structure and physiology of insects is gone into in considerable detail in the opening chapter. Metamorphosis and systematic classification of insects are rather briefly considered. The different orders and families of insects are then taken up seriatim, from the