therefore, not only do the two types of response occur, but prolonged exposure to light eliminates the possibility of one without interfering with the other. It is difficult to see how responses that are not different in kind could be distinguished in this manner.

In closing, it will not be necessary to summarize again the elements of the schema that Jennings has proposed for the interpretation of the behavior of organisms nor the objections which it has seemed to me could be urged against it. There is no doubt that by his very serious discussion of the problems of behavior, Professor Jennings has done the great service of focusing attention upon the essentials and the unessentials, understandings and misunderstandings in this field of investigation. And I offer the foregoing discussion, originally prepared for a non-biological audience of scientific men, in response to the invitation which is implied on many pages of his book.

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April 8, 1907

BOTANICAL NOTES

WOOD-STAINING FUNGI

IN the September number of the *Journal of Mycology* George G. Hedgcock publishes a descriptive list of twenty fungi which stain different kinds of woods, in some cases so injuring the appearance as to cause much damage. Eight species of *Ceratostomella,* seven of *Graphium,* one of *Fusarium,* two of *Hormodendron,* one of *Hormiscium* and one of *Penicillium* are listed and described. The woods are species of pines, beech, sweet gum, oak, *Rubus* and elm, and in large part the staining takes place in the lumber piles after the trees have been sawn into boards, planks, etc.

NEW METHOD OF MOUNTING FUNGI

A NEW method of mounting culture-grown fungi for preservation in the herbarium is described in the July number (1906) of the *Journal of Mycology* by George G. Hedgcock and Perley Spaulding. Pure cultures on rather stiff agar supply the specimens, which are taken out in little blocks with a layer of agar adhering, dried on stiff cards, and then protected by pasting on perforated pieces of thick cardboard of the proper size, the specimens occupying the opening. These cards may be attached to herbarium sheets, and preserved in the usual way, or they may be kept for easy reference in the manner of library cards in ordinary card cases.

ELEMENTARY BOTANY OF FLOWERING PLANTS

PROFESSOR MAST has published in a booklet of 54 pages a series of "experiments" intended to cover the essentials as to the structure and physiology of flowering plants in an elementary course in high schools and colleges. Dr. Mast having had "unsatisfactory results in beginning the study of plants and animals with such forms as *Amoeba, Paramecium* and *Spirogyra,*" he prepared a set of directions for his students (in Hope College), beginning the work with the flowering plants, and taking up in succession, seeds, stems, roots, protoplasm, leaves, modified plant structures (tubers, tendrils, spines, aerial roots, etc.) and flowers. The subjects for these studies are well selected, and the directions are clear. For those who believe in beginning with the higher plants (which we do not) the book must prove helpful, as indeed it will be suggestive to those who prefer the more natural sequence from the simple structures to the more complex.

FOREST TREES OF NEW JERSEY

DR. B. D. HALSTED in a recent bulletin (No. 202) of the New Jersey Experiment Station publishes a useful annotated list of the forest trees of New Jersey. He enumerates 104 species, of which 98 are natives, the others being exotics which have become pretty well established. Of the native species 13 are conifers, leaving 85 broad-leaved species. The largest genus is *Quercus,* the oaks, with 16 species, followed by *Pinus* (pines), *Acer* (maples) and *Salix* (willows) with 6 each, *Populus* (poplars) with 5 native and 2 adventive. Of the ashes (*Fraxinus*) and hickories (*Hicoria*) there are 4 species each. It

is significant that the author entirely omitted all of the hawthorns (*Crataegus*), apparently regarding the task of disentangling them as quite hopeless. Localities are given, and many notes are quoted from various state reports. Twenty-five of the species are illustrated by cuts borrowed from Sargent's "Manual of the Trees of North America."

THE GENUS CRATAEGUS IN AMERICA

Under this title, in the August number of the *Journal of Botany,* Professor Sargent publishes an interesting statement in regard to the new species of *Crataegus* (hawthorns), in which he refers to the small number known to Torrey and Gray (about fourteen), and says that some years ago it was noticed that trees grown from seeds from different parts of the country differed from the recorded descriptions in certain particulars. From this came a careful study of the genus in several states, the result being that about "five hundred species" have been described in the last eight years. "It is not surprising," he says, "that botanists, looking at the genus through the eyes of Torrey and Gray, or reaching their conclusions from the study of the scanty and generally incomplete material found in herbaria, have regarded the makers of all these species with pity, and have tried to throw ridicule on this investigation and its results." We are assured, however, that to those persons who engage in a study of these plants in the field "the fact is soon apparent that the genus contains many very distinct forms, whether these are to be called species or not."

Following this is a discussion of the groups (20) into which the species naturally fall, with notes on their geographical distribution. The study of the genus, as every one knows who has done anything with the species, is beset by many difficulties. Flowering specimens must be collected in the spring and fruiting specimens in the autumn, and since in many cases the trees look much alike, they must be marked carefully in order to avoid mistakes. After this must come the test through cultivation, of which a beginning has been made. On the grounds of the Arnold Arboretum nearly twenty-five hundred lots of *Crataegus* seeds have been planted, so that comparisons may be made of the seedlings with the trees from which they were derived in order "to determine the value of the field-work which has been done in this genus."

That the end is not yet in the matter of new species is evident from this sentence: "In every township of half a dozen states it is more than probable that forms exist which differ from those that have already been described, and many years will be needed to elucidate the characters and distribution of the genus in this country."

PHILIPPINE BOTANY

In the *Philippine Journal of Science,* under its new management, whereby the botanical articles constitute a separate series, there have appeared three numbers, namely, those for January, April and June. These have included articles as follows: "The Comparative Ecology of the San Ramon *Polypodiaceae,*" by E. B. Copeland; "The *Cyperaceae* of the Philippines," by C. B. Clarke; "The Occurrence of *Antiaris* in the Philippines," by E. D. Merrill; "Philippine Myxogastres," by George Massee; "*Cibotium baranetz* and related Forms," by H. Christ; "Pteridophyta Halconenses," by E. B. Copeland; "Spiciligium filicum Philippinensium," by H. Christ; "The Philippine Species of *Dryopteris,*" by H. Christ; "Notes on Philippine Palms, I.," by O. Beccari; "Index to Philippine Botanical Literature," by E. D. Merrill. The last-named paper is mainly an index to *recent* literature, and is quite evidently supplementary to Tavera's "Biblioteca Filipina," published in 1903 by the Library of Congress.

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EXPEDITIONS OF THE BERLIN ETHNOGRAPHICAL MUSEUM

The Ethnographical Museum of Berlin is organizing a number of important expeditions. Dr. Czekanowsky is going to visit the region of the Victoria Nyanza for the purpose of investigating the pygmy tribes of that area,