Species of the Genus *Amygdalus*," by W. F. Wight. The volume constitutes a fitting tribute to the botanist whose life it commemorates.

Burman's "Flora of Manitoba," which was printed two years ago, contains in a small 30-page pamphlet a general discussion of the vegetation of the province of Manitoba followed by a list of the species of flowering plants and ferns. It is the only available guide to the plants of that part of Canada.

Stone's "List of Plants Growing without Cultivation in Franklin, Hampshire and Hampden Counties, Massachusetts" (1913), reminds one of the previous classical lists by Hitchcock and Tuckerman which appeared many years ago under similar titles, and dealing with the flora of the Connecticut Valley. It contains 1,493 species of ferns and flowering plants, 1,190 of which are native, the remaining 303 being naturalized.

Meier's "School and Home Gardens," while dealing with plants, is not botanical, though of interest to many botanists. It is designed primarily to help in the commendable effort to interest children in the planting of seeds and the growing of such plants as may be grown in the windows of school buildings or out of doors, under ordinary care. It can be commended most heartily.

Allied to the last is E. Benjamin Andrews's "The Call of the Land" (Judd) dealing largely with out-of-doors, and the things that grow there. While not botanical, it breathes of flowers, and grasses and growing crops, and of the shrubs and trees that make for comfort and beauty and happiness. It is a book distinctly worth while.

A recent number of the *Missouri Botanical Garden Bulletin* includes descriptions of the laboratories in the garden, accompanied by four half-tone plates from photographs. Accompanying the descriptions is a general discussion containing many suggestive sentences, as "Botanical laboratories are the workshops of those who study plants scientifically." "It is to be remembered that the important botanical gardens of the world are educational institutions." "In the broadest sense these laboratories must represent the possibility of using apparatus and chemicals, books and herbarium specimens, live material from garden or field, and cultures of microscopic organisms."

A recent circular (113) of the Bureau of Plant Industry contains a suggestive paper on soil bacteriology, by K. F. Kellerman, in which he shows that it is "a subject of almost bewildering complexity, but very intimately associated with the normal physiology of all crop plants." In a later circular (120) the same author has a short paper on nodule-forming bacteria (*Bacillus radicicola*) which should be helpful to those attempting to inoculate the soil with these organisms.

Recent numbers of the *Botanical Magazine* (Tokyo) contain Makino's "Observations on the Flora of Japan," Matsuda's "List of Plants Collected in Hang-chou" (both in English), and Koidzuma's "Morphology, Systematik and Phytogeography of Cupuliferæ" (in Japanese), with other shorter articles.

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SPECIAL ARTICLES

PRELIMINARY NOTE ON THE RELATIVE PREVALENCE OF PYCNOSPORES AND ASCOSPORES OF THE CHESTNUT-BLIGHT FUNGUS DURING THE WINTER[1]

In studying the dissemination of the chestnut-blight fungus during the past winter the writers obtained some results that showed that, contrary to the generally accepted opinion, pycnospores are produced in enormous numbers and washed down the diseased trees during every winter rain.

The production of pycnospores was tested by what we have termed pycnospore traps. A part of the rainwater flowing over a canker was conducted down a glass slide and through a mass of absorbent cotton. After each rain the cotton of the traps was brought to the laboratory and a quantitative determination

[1] Investigations conducted in cooperation with Office of Forest Pathology, U. S. Department of Agriculture.

made of the number of viable spores of the blight fungus which were retained by each trap. Traps were set at six different locations at West Chester, Pa., and analyses have been made after each rain period for the months of January to April, inclusive.

There were seven rain periods in January with precipitation varying from 0.13 to 0.88 inch. The number of viable pycnospores obtained from each trap varied from 55,000 to 61,255,000 for each analysis. During February there were four rain periods with precipitation varying from 0.07 to 0.78 inch. After each rain the number of viable pycnospores obtained from each trap varied from a few thousand to 92,000,000. Similar results have been obtained for the months of March and April.

The cotton for the traps was transported to the laboratory in sterile Petri dishes and the number of viable spores determined by the poured plate method, using 3 per cent. dextrose agar, plus 10.

One of the noteworthy facts is that ascospores do not appear to be washed down the tree during the winter rains, although they are present in abundance in the pustules. That all the colonies appearing in the poured plates made from the cotton traps came from pycnospores was demonstrated in two different ways: first, by their time of appearance; second, by the absence of ascospores in the centrifuged sediment as determined by microscopic examination.

The effectiveness of the cotton traps in retaining the spores washed down has also been determined by cultures. In many cases only about two per cent. of the spores passing into the cotton was retained. This being true, the figures given above are but a meager expression of the enormous numbers of pycnospores produced. Considering the fact that we have also demonstrated that pycnospores can be subjected to freezing temperatures for considerable periods without losing their vitality, they must play a very important part in the dissemination of the blight fungus.

The forcible expulsion of the ascospores of the blight fungus has been reported by Rankin[2] and Anderson[3] and the influence of moisture upon this phenomenon has been demonstrated by both writers. They have not, however, taken temperature conditions into account. The expulsion of ascospores depends not only upon the presence of sufficient moisture, but also upon the temperature to which the lesion has been subjected. The influence of temperature upon the expulsion of ascospores has been determined during the past winter by means of laboratory and field tests. Laboratory tests have shown that bark bearing perithecial pustules, if subjected to low temperatures (42 to 46° F.) for a period would not begin the expulsion of ascospores until exposed to favorable temperatures for three or four days, even though supplied with an abundance of moisture. The minimum temperatures at which spore expulsion takes place vary from 52 to 60° F.

On November 26, 1912, a large number of ascospore traps (49) were placed upon lesions of the blight fungus in a badly diseased coppice growth at West Chester, Pa. These have been under continuous observation since that time and accurate rainfall and temperature records kept at that station. There was practically no expulsion of ascospores until March 21, although there had been many rain periods (21) with precipitation varying from 0.01 to 1.64 inch. The above records show that ascospores were not washed down from the lesions during any of the winter rains and that there was practically no expulsion of ascospores during the period from November 26 to March 21.

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A STRIKING CORRELATION IN THE PEACH

THE importance of correlations in the characters of plants from the standpoint of either research or practise is so well known as to

[2] Rankin, W. H., Report Penna. Chestnut Blight Conference, p. 46, 1912. *Phytopathology*, 3: 73, 1913.

[3] Anderson, P. J., *Phytopathology*, 3: 68, 1913.