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THE TEACHING OF PLANT PATHOLOGY

L. H. PAMMEL

Mr. Chairman:

I am sorry that Doctor Melhus because of sickness is unable to be with you to present the subject of plant pathology from the standpoint of a special teacher. I have not had time to get a paper ready for you and what I shall say will be entirely informal and not necessarily a connected discourse.

In recent years I have given little attention to the subject of plant pathology at Ames, feeling it is in good hands. During my early career at Ames I had some experience in giving some training to students in this subject.

Let me say first of all that no one should take up the subject of plant pathology unless there is first of all a good fundamental training in general botany and related sciences. Opinions may differ as to how much of this fundamental work should be given. I am inclined to think there should be at least one year's work of five hours per week. This will enable the student to take up the general morphology of flowering plants, histology and a brief study of lower forms like the algae and fungi. I wish there might be added to this general one year course in botany a course dealing with the taxonomy of the flowering plants. The student of plant pathology should know the common seed plants so that these can be identified for the purpose of having a knowledge of the parasitic fungi of our wild plants. It requires a good keen sense of wild plants to be able to recognize plants in their juvenile stage and many parasitic fungi occur on the young plants. Can courses in plant pathology be given in a pedagogical way? I think they can. The beginner should learn how to use his material in the best way. First of all it is important to learn something about the general character of fungi. A hand lens is indispensable for the work. Let us say the student has the downy mildew of the grape (*Plasmopara viticola*). The macroscopic characters are so evident that the student cannot be led astray. The peculiar yellow spot on the upper surface of the leaf and the frosty mildew on the lower surface are characteristic. With a little practice the student soon will be able to recognize the downy mildews. If now the student is familiar with the host plant he will have no trouble in placing the fungus in the genus and

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species. Of course this cursory examination should be followed by placing some of the material under the compound microscope. The student can then make a further study, if he has fresh material, of the germination of the conidia and if the proper material is at hand inoculation experiments can be made in the greenhouse producing the disease on the wild uncultivated grape. It goes without saying that every well regulated laboratory in plant pathology should have a greenhouse, though this is not absolutely necessary. Seedlings of radish and mustard can be grown in pots, covered with bell jars to get the proper moisture relations and then one can produce the downy mildew of mustards on these plants, or the white rust. Let us take another well known illustration — the common wheat rust. What student has not seen the yellow spot on the barberry leaf with the little black specks, the spermogonia, and on the lower surface the cuplike bodies? With a good hand lens the fringed cup and spores may be seen. One who knows can tell the *uredo sori* of *Puccinia coronata* from *P. graminis*. How easy it is also to recognize by macroscopic characters the difference between *Gymnosporangium macropus* and *G. globosum*, a difference between the perennial and annual gall of the two species.

No one could make a mistake in the identification of the common bunt of wheat (*Tilltia foetens*) and loose smut of wheat (*Ustilago Tritici*). One could hardly make a mistake between loose smut of oats (*Ustilago avenae*) and the covered loose smut (*Ustilago laevis*). In a study of the macroscopic characters of such diseases as Illinois canker one could hardly make a mistake. Nor could we make a mistake in the two forms of plum pockets commonly found on the wild plum, the *Exoascus prunii* and *E. communis*, the former on the plum and the latter on branches of the Miner plum. There is nothing else exactly like the black knot of the plum and one should be able to place it without much trouble.

In modern courses in plant pathology growing pure cultures form a part of the regular work. Pure cultures of the organism can be used to inoculate plants and the lesions produced may be studied. Of course inoculations with diseased plant material can be made with such diseases as sorghum blight, apple blight and rust.

I hope you will pardon this somewhat disconnected discussion of the topic before us.

DEPARTMENT OF BOTANY |