DISCUSSION AND CORRESPONDANCE

BOTANY AFTER THE WAR

There has been running in the issues of the *New Phytologist,* beginning in December, 1917, a discussion on "The Reconstruction of Elementary Botanical Teaching," which all American botanists alive to the future of their subject should read. British botanists are talking over ways and means of bettering their teaching with a degree of criticism and candor hopeful for significant reforms.

It is a discussion that should result in an attempt to modify elementary teaching in such a manner that certain material, some of it quite new to prevailing practise but believed to be of fundamental importance, shall find a place or adequate treatment in elementary courses. Since introductory courses can not be long courses certain subjects, some of them time honored, are brought into court to justify their value or to give way wholly or in part to the demands of the new.

The universities of the United States have this year been asked by the government to present in prescribed terms of twelve weeks a group of subjects for a very large body of men —the Student Army Training Corps. One of these is biology and in most cases the course is likely to be organized as of two subjects, botany and zoology, which, for practical reasons, will probably be treated in large measure apart from one another. Botany is, therefore, to be taught by a large number of instructors in courses that will approximate the equivalent of six or twelve weeks from nine to eighteen hours a week. The mental adjustments of the instructors to the pedagogical problems presented will be great, their reactions will be various. Compelled by the time limits to give a short course they must lay aside many a pet affection for this or that topic and practise a rigid selection of material to a degree never before demanded of them. There is certain to result from this large experiment a very considerable readjustment of values in the minds of those who organize the work. Botany after the war will not be taught in many institutions as it was before.

In the first place instructors will feel strongly the pressure to present practical aspects of the subject since their students are definitely fitting themselves for special fields of interest. There will not be time to develop in detail any of the great fields of botany, morphology, physiology or ecology. All that can be hoped is to give some understanding of plants as living things, with structure developed to accomplish certain results, with life habits adapted for certain ends, organisms that fit into a scheme of evolution subject to certain simple principles. Always in the mind of the teacher will be the desire to show how plant life works harm or renders service to man.

Since practical considerations are so largely to establish the ends toward which such a course will lead and to guide the lines along which the course is to be framed, and because the course must be short and the students will not in general have had much training in science, the problems of the selection of material and methods of treatment become tests of judgment more severe perhaps than any which ever before have been presented to teachers of biology.

Morphology obviously can not ask for much more than the opportunity to serve the requirements of physiology since a knowledge of structure is basic to an understanding of function and life processes. The study of comparative morphology with the end in view of developing phylogenetic relationships is clearly impossible in so short and condensed a course.

Physiology must content itself with simple considerations because the students will have had little training in physics and chemistry. General principles of plant physiology alone can be presented. Since the thought of the whole world is at present so largely centered on food problems the subjects of food elaboration and food storage should take a prominent place in the course.

Ecology has its part to perform but will be severely limited by the fact that extended acquaintance with groups of plants can not be given. It must rely chiefly on what general information the students may possess of forest, prairie, shrub and swamp vegetation, together with some elementary facts of physiography and geology.

Economic botany will make its demands wherever in the course appropriate connections can be made. Its importance is evident but it can hardly hope for much opportunity of consecutive treatment.

Of direct interest will be some of the lower plants in their relation to the subjects of sanitation, hygiene, fermentation, decay and to disease.

Finally such a course will miss an end, if the student fails to comprehend some of the simpler principles of organic evolution and the fundamental biological deductions which have so profoundly affected philosophy.

This is the general nature of the course to be tried out in our numerous institutions of higher education, and it seems not unreasonable to hope that the experiment may bring about a certain amount of agreement in the profession as to what may constitute the best introductory course in botany. Some possible results of the experiment and the discussions that formally or informally will come out may be briefly outlined.

Is it not probable that comparative morphology, based on type studies and having for its end the outlining of evolutionary relationships between the great groups of plants, must give way in introductory treatments and work out its ends through courses that will follow? Physiology and ecology in simple form may take a more prominent place, especially as they bear on such practical subjects as agriculture, forestry, etc. Fundamental principles of genetics for the same reasons will call for attention besides having their obvious connection with broad biological principles. Evolution may be treated not so much as a record of past accomplishments in phylogenetic history but with respect to the manner through which it is ever working. Economic botany seems certain to make important demand on the content of an introductory course.

Comparative morphology needs no advocate of its value and interest. Its followers may feel confident in the security of its position in botany. Those who teach it know that satisfactory results are not obtained when the subject is crowded for time. There are no short cuts to an understanding of morphological relationships. The basis of study must be detailed and thorough laboratory work. It is a fair question whether comparative morphology will not find greater satisfaction and obtain better results unfettered from the time limitations of the crowded introductory course with its necessarily mixed topics.

Morphology, physiology, ecology, genetics and the long list of special botanical subjects—none of them can hope to build upon an introductory course with any considerable degree of security. Each must construct its program according to its own special requirements frequently dependent upon other subjects or sciences. Physiology rests upon physics and chemistry; genetics makes use of mathematics; all special lines of botany require to some degree a knowledge of morphology.

Under these conditions will not the introductory course come more and more strongly to stand out as one that attempts nothing more than the grounding of fundamental principles and a selection of information with rather definite reference to its general and practical interests, or its broad philosophical bearing?

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A POSSIBLE NEW FUNGICIDE FOR WHEAT AND BARLEY SMUT

THE eradiction of stinking smut from wheat grown on the Pacific coast appears to be contingent upon the prevention of reinfection of treated seed by spores of smut in the soil or upon its surface. Even though the wheat farmer may have a smut free field, his soil is subject to infection by smut showers from his neighbors who thresh and blow into the air myriads of smut spores which are carried for miles by the winds.

Formaldehyde treatment for stinking smut in seed wheat, which has been found so effective and cheap in the states east of the Rocky Mountains where soil infection apparently does not occur, is ineffective against smut infected soils everywhere.* This is due to the immediate evaporation of formaldehyde gas when the solution dries from the seed.