

SUGGESTIONS FOR A PHYSIOLOGICAL LABORATORY IN HIGH SCHOOLS.

BY H. D. DENSMORE,

Beloit College.

One of the pressing needs of departments of botany in high schools, and in many colleges as well, is a room in which plants may be grown and experimented upon during the entire school year. The universities and some of the older colleges have greenhouses as accessories to their botanical departments in which fresh plant material of different kinds can be grown and prepared for class use. In such institutions a physiological laboratory independent of the growing houses is the logical and natural arrangement. In the high schools, however, such an arrangement is not feasible on account of the large expense



involved in maintaining a greenhouse and laboratory. A room combining some of the features of a growing house and an experimental laboratory is, therefore, a great desideratum. Such a combined physiological laboratory and growing room has recently been constructed at Beloit College and the following account of it with the above cut is given in the hope that it may suggest a similar possibility in some of our high schools.

The Beloit laboratory is over fifty feet long by twenty-five wide and was constructed from an unused portion of the fourth story of our science hall. The remodeling consisted largely in the changing of partitions and in placing skylight in the south and west roof spaces between the windows of the original rooms. The room thus made available for plant growth and experimentation was then furnished, as shown in the cut, with wall growing tables and a large chemical work table running lengthwise of the room. This work table is supplied with water and gas for each student. A somewhat novel feature of the new laboratory was introduced by covering the floor with "Inderoid Roofing," sold by the Interior Wood Work Company of Milwaukee. This roofing has proved durable and serviceable, since it enables us to spill as much water as we please without danger of leakage into the laboratories below. This feature also allows of frequent sprinkling of the floors with the hose to keep the room moist enough for plant growth. Another feature of some interest is a series of soil bins along one side of the laboratory which contain clay, sand, humus, and other soil types, with a potting table above the bins for convenience in potting plants and sifting the soil without littering the main laboratory floor. Adjacent to the laboratory is a convenient store room and in a south window a growing case for plants needing more moisture than can be maintained in the main laboratory. A dark chamber and an aquarium complete the essential equipment of the laboratory, which is already indispensable to the entire department, not only for plant physiology proper, but as a general growing room for supplies of fresh plants for Morphology, General Biology, and Anatomy.

Last semester we spent considerable time in experimenting upon plants which could be grown easily and which were likewise good material for experimentation. Among the plants experimented upon, Indian corn proved to be one of the easiest growers and one of the most serviceable for much experimental work on photosynthesis, absorption, and root pressure. For color screen work in photosynthesis and for starch translocation and rapid formation corn was found to be particularly favorable material. It proved, also, to be the best plant tried for root pressure. This year I hope to have my students work out as completely as time will permit the physiology of the corn plant, using the suggestions which came from last year's experience.

The total cost of the laboratory was about eight hundred

dollars, but a smaller room with many of its essential features could be fitted up at a comparatively small cost. It is hardly necessary to add that no really effective work can be done in plant physiology without a room in which plants can live a normal life. The appeal for a suitable equipment for teaching plant physiology in the high school comes from many sources. Agriculture, as it is being taught in many high schools, is on the plant side too often studied without the necessary physiological basis. Forestry, horticulture, and plant breeding combine physiology, morphology, and ecology in such a way as to make physiology necessary for their proper appreciation. My own conviction is that the botany in high schools should be practical and applicable to what the student will see and do in after life. It must never be forgotten, however, that the basis of all practical scientific work with plants is found in the knowledge of pure science and in skill gained by real science work. It will never do to study about agriculture and forestry without understanding the scientific principles which underlie them. We need to equip our high schools for good work in physiology and morphology and use as materials for study and scientific training plants which are familiar, useful, and ornamental.

REPORT OF THE COMMITTEE ON THE EXPERIMENTAL INVESTIGATION OF THE TEACHING OF BIOLOGY.¹

Your committee finds itself obliged to report that it has not been able to uncover much research of an experimental sort upon the teaching of biology, other than that which enters into the program of this meeting. We have not, therefore, been able to perform that part of our duties which relates to coöperation with members engaged in research. We have, instead, given our attention to the preparation of a report upon the importance and opportunities of such work. We believe that it is necessary to urge this upon members.

The present is a critical period in the history of science instruction. Botany and zoölogy have both been in the curriculum long enough to demonstrate what they can do, and we are already hearing it said that they have not fulfilled their early promises. We are going to be called upon to demonstrate our right to the time we occupy in the course of study, to show

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