COMPETITION IN BOTANY FOR OHIO SCHOOLS.

W. A. KELLERMAN.

Whatever may contribute to a more direct and real study of the plant kingdom on the part of the pupils can well be encouraged by the teacher. It is an unfortunate fact that in reference to a course in botany the notion largely prevails that it consists of lesson-work with a text-book like a course in history or algebra. It is often more dreaded than the latter because of the supposed necessity of learning a long list of difficult technical terms. Few teachers would be willing to give up the use of the text-book entirely and it is not at all necessary that they should. But every teacher can now choose a modern book of botany from the fairly long list that is offered by American publishers. These are not mainly terminology nor written with the chief aim of enabling the pupil, after having gone through a sufficient number of chapters, to "analyze" flowers.

Many of them unfortunately provide no means of identifying the native plants as a part of a school course, but teachers are not left without choice of a good book after such ultra ones are thrown out of the list.

The text of an elementary book on botany should contain the important facts and principles of the science, and give a brief but comprehensive idea of the plant kingdom, in simple and plain language. An intimation and partial elucidation of means and methods employed to test or to verify the principles and inferences should be evident in the text. But this of itself is not sufficient for pedagogical purposes; there should be besides practical work provided, regular in time, ample in amount, that may train in the exercise of observation, experimentation and judgment.

I have for years devoted one-half the time of the botanical courses, both elementary and advanced, to such real work carried on partly in the labratory, partly in the field. Besides courses here referred to others devoted wholly to laboratory, experimental or observational work are provided; but it is not my purpose to discuss these now. Neither is it necessary to give here a detailed outline of the practical work that should constitute a substantial portion of the elementary work for beginners. Those who wish to use such a simple yet ample course in the public schools can consult the "Practical Studies in Elementary Botany" published by Eldredge & Bro., Philadelphia, Pa.

But I desire to say in this connection that more real work on the native flora than is attempted even by able and enthusiastic teachers in Ohio schools would undoubtedly be advisable. I have outlined some competition work and submitted it to some of the schools looking to more interest in elementary practical work in this science. It has been urged that the project might be made more widely known to our Ohio schools with possible advantage, and therefore I have furnished, though with some misgivings, the following statement of this scheme.

Either of the following subjects may be selected: Mosses, Lichens, or Trees; the work to conform to the suggestions and directions given below. The Report of the work must be completed on or before May 15, 1901, and submitted to the Teacher of Botany, or person (or persons) designated by him, who—taking into account both the quality and quantity of the work—will forward, if worthy, the best report accompanied by the illustrative material, to the undersigned; whereupon the latter will, on or before May 31, send as a reward to the author of said report a copy of the OHIO NATURALIST VOL. 1.

Pupils now studying, or those who have formerly studied, botany are eligible to enter the competition. No award will be made unless at least two or three pupils undertake the work; it is hoped that every member of the class will compete.

It is desired that the pupils consult teachers, parents, and others, who may be able to advise as to the subject, kind and extent of the work, also as to the best arrangement and wording of the report, and the labelling and preparation of the accompanying illustrative material.

The report is to contain a detailed account of the work actually done by the pupil and in no case to contain anything not his own.

The names of those entering the competition must be sent to the undersigned on or before March 30th. The suggestions, directions and explanation of the three subjects proposed are as follows:

BRYOLOGICAL.—All the kinds of Mosses in the region should be collected and put under slight pressure till dry; then a small portion should be glued directly upon a piece of card-board and a larger amount placed in a paper pocket and attached to the same piece; the notes and drawings can also be attached to the same card-board which for each species should be $8\frac{1}{4}$ x $11\frac{1}{2}$ inches. Most of the kinds (species) can be found in fruit; the latter is a capsule (little pod) on a slender stem called the seta. Specimens without fruit are not very satisfactory.

Tell in each ease on what the specimen grows as the ground, tree trunk, old log, rock, boulder, etc.; add other notes relating to its situation (habitat), abundance, appearance, general character (habit), etc.

Draw an enlarged figure at least of the capsule (fruit) of some or all of the species (kinds) collected. In the early stage there is usually a cap (called calyptra) on the capsule. When the capsule is ripe it opens by a lid (called the operculum) for the escape of the spores. Notice the teeth (called collectively the peristome) surrounding the mouth of the capsule—evident when the operculum falls off.

A good pocket lens must be used for this work. The drawings must be clear; after completed with a sharp lead pencil it would be well to retrace with a fine pen and india (or drawing) ink. Excessive shading of the figures is objectionable.

If a book is desired, a suitable one for beginners is Grout's "Mosses with a Hand-lens," price $1.10; orders sent to the author or to the writer of this article will be promptly attended to. But for the purposes of this competition the botanical names of mosses are not *required;* it will be of course more interesting if an attempt at the identification of the species is in all cases made.

LICHENOLOGICAL.—All the kinds of Lichens in the region should be collected. The little disks, or saucer-like bodies, on the plants are the fruit (called the apothecium); the apothecia are more distinct and striking in appearance, as is the whole plant also, when moist; therefore the best time to collect lichens is after a prolonged rain, or when the air is moist; when dry they are usually brittle and cannot be satisfactorily handled.

Do not save specimens that have no fruit, except in case of rare species. Only enough pressure on the specimens (placed between blotters or soft papers) should be brought into requisition as is necessary to keep them from curving or crumpling while drying. Then glue a specimen to a card-board, 8¼ x 11½ inches, and also attach a paper pocket containing ample material, and the drawings (if any are attempted), also the notes, to the same piece of card-board. Use a separate card-board for each kind (species).

Tell the substratum on which the specimen was found—as boulders, limestone, sandstone, log or stump, fence-rail, tree or plant, soil, etc. Give additional notes as to appearance, size, abundance, habitat, habit, etc. Those growing on rocks can not generally be removed – a thin piece of rock must be chipped off to secure them.

A detailed description should be written of each kind (species); drawings perhaps might be undertaken; the different species should be compared and contrasted. Use a good pocket-lens. There is no text-books on Lichens that is usable by beginners.

DENDROLOGICAL.—The Trees may be studied from one of several points of view. If a camera be used, selected trees should be studied and illustrated; the bark compared in case of different species, likewise in case of one and the same species when the individuals are of different ages and sizes or grow in different situations or exposures; also modes of branching compared and shapes contrasted. Very full notes should be taken, and when written up in the report reference should be made constantly to the numbered illustrations. Few or many kinds of trees, as preferred, may be taken if this phase of the subject is selected.

Instead of the above one may study and identify all the kinds (species) of trees in the region. Full descriptions should be written out, and similarities and contrasts of different species noted. Give uses of the kinds of woods only when such use is made in the region or the near town or city. Collect twigs and fasten them to cardboards (8¼ x 11½ inches). Attach a specimen of the fruit also when it can be found under the tree. A pamphlet (price 10 cents) with a Key to the Ohio Forest Trees by means of which the names can be determined, may be obtained from the writer.

A third method of carrying out the work on trees would be to give an account of the forest area in the region — either taking a square or rectangular tract of a mile or more in extent; or selecting if possible a natural area, as a river or creek valley, or other obviously bounded tract of ample dimensions. Draw a map of the selected region and locate thereon the forests and groups of trees. Describe them, indicating the prominent kinds of trees, the less abundant species, and the very rare ones. Tell approximately the size of the largest, the commonest size, etc. Note uses made of some of the kinds in the region or at a near manufactory. Record other observations.