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Hints to Students on the Study of Botany.

BY A STUDENT OF '93.

There is scarcely another study which the students of the various institutions of learning throughout the Dominion have to undergo in order to pass the various examinations attached thereto, on which there is such a diversity of opinion as to the best modes of obtaining the required amount of knowledge, that the student may pass those examinations, as the study of Botany. Not so much diversity in the modes of teaching and presentation of the subject by the lecturers and teachers, but in the way in which the students study and try to master the subject for themselves. It is the custom here, and in most of the advanced centres of education, in teaching Botany, to commence with the lower order of plant life and gradually lead the student to a knowledge of the higher order of plants, such plants as he is surrounded by and the more familiar with, and to impress upon him the marked steps of difference along this line. This method is very good, and with my limited knowledge of teaching I would not care to oppose it, but it does not, in my opinion, enable the student to master in so short a time, as often desired, the numerous technical terms applied to the various parts and construction of plants, so that he, on examination day, may have them at his mind's command and call.

What I propose to do is to lay down a few short rules and hints that a student may follow in connection with the lectures at college, that I myself found great

assistance in adopting. I think all who have studied Botany will agree that there is no quicker way to learn the name and particular part or function of a plant than by practical observation, or an object lesson, as well as a careful study of the opinions of learned authors and instructors, at the same time. In short create, first, by examining and having pointed out, or having found, a desire for a name or word to express the part, and you will the more readily remember and adopt that name than you would by the dry method of reviewing notes or the reading of books. Therefore I would like to impress upon the student the importance of, as far as possible, practical observation with his studies, and suggest the following lines of procedure:

First you will find it a great help to learn the component parts that go to make up a plant in toto, as suggested to the ordinary mind, viz.: Root, stem, branches, leaves, flowers, together with their technical terms as used by the botanist, dividing your work up in like manner, using an ordinary scribbler for rough sketches and notes. Next, take each component part and learn its various forms and shapes and their technical terms, starting with the roots: not stopping to investigate their fibro-vascular system and cellular construction, but merely to grasp their more common forms and names. Next the stems, their various shapes, forms and names, together with the branches and their component parts, not stopping to investigate the various arrangements of branches on the stems, but learn their points of growth and their more common forms and names, such as stolon, runner, etc., and their marked distinctions. Next the leaves, their shape, where found, their names, etc., leaving out the intricate construction of the flower leaves, by designating them the floral involucres, and do not stop to investigate their cellular construction, but note their marginal structure and their veining, which will help to impress their forms on your mind. Next, take the flowers, note the component parts that go to make up a perfect flower. Learn the names that are given to those flowers in which one or more of these parts are wanting. Learn the shape of these parts and the names that the flowers are given from those facts. Do not stop to investigate the intricate arrangement of the parts, aestivation and vernation, and their modes of attachment. In short, first learn the names and parts

that go to make up a plant of the higher order, by studying various plants practically, without stopping to learn the complicated construction of those parts, and you will have a basis or skeleton in your mind's eye that will give you a starting point to work from.

Now you may say, why that includes the whole of Botany, and one may just as well plod along with the lectures and notes, and work in a few details, and all is learned, but, if you will restrict yourself to the names and various forms of those parts, and draw out a rough outline of those parts in an ordinary scribbler, keeping each set together as much as possible, you will soon see that they are not so numerous and are easily committed to memory in that way. Having learned the various parts, names and shapes of a plant, as above, go back again to the roots, study their various modes of growth, their peculiar functions, in a restricted sense, as to cause those shape, etc. Then again, the stems and branches, their arrangement and growth, showing the cause for those forms, etc. Then, again, the flowers, taking particular pains to note the arrangement of the different parts, both in regard to themselves and to each other, aestivation and vernation. Also their arrangement into clusters or flower heads. Note also the particular function of each part, their various modes of attachment to each other, and the changes they undergo in performing their functions, or in the different stages of their growth. Here you will find it necessary to study the fruits in order to understand these various changes. You will find it well to take them in the same order as the other parts. Note their general outlines, forms and names first. Then compare them one with another, noting their marked points of difference, not stopping to trouble their cellular construction, but note the relation these changes bear to the flowers and the parts of a fruit. You cannot be over careful in your study of the flowers and fruits. Having mastered thus far, and feeling that you are fairly well grounded in the various parts, their functions, and relations to each other, you should take up cell structure, study it thoroughly, beginning first with a good understanding and definition for a cell, the cell contents and its changes, the various forms and shapes of cells, together with their names, and the plants and parts of a plant where they are most commonly found. Then take cell divis-