

a text-book. For example, it makes little difference whether a pupil begins with a study of petals or stamens, buds or roots, leaves or pistils; but it is desirable after beginning any topic, not to abandon it till many of the various forms have been thoroughly studied. After a day, two, three, or more of study of specimens pertaining to one topic, comes the study of the book. Even in the shortest and most elementary course, a study of some of the specimens by all of the class precedes the study of the text. A young man of eighteen begins and pursues the same course as a child of ten, only he will progress faster and go deeper. As students advance in morphology and systematic botany, subjects for descriptive compositions, "Observation Papers," are assigned them, usually from one to three a term, of which the following will serve as examples. Each pupil studies the living plants for himself and makes his own observations, experiments, and notes, the only help afforded him being brief hints as to how to set to work intelligently. For instance,—one studies the arrangement and development of the parts of the flower with reference to its self-fertilization or fertilization by birds, insects, wind, or other means; one the vines of dodder; one the climbing of Virginia creeper; one the time of opening and closing of flowers; and so on ad infinitum. When completed the theses are read in the class-room. During five-sixths of the academic year, in which the students have daily lessons in botany, fully three-fourths of the time is given to the study of plants in some form or other, the books serving only for reference. But little time is occupied with lectures, short talks of ten, fifteen, or twenty minutes being occasionally given. In the whole course there is kept constantly in view how best to prepare students to acquire information for themselves with readiness and accuracy, in other words, they are trained more than they are taught.

I have been thus lengthy in my abstract of Professor Beal's paper as it most plainly sets forth the modern method of teaching botany. This, or some modification of it, is the system now most in repute, and wisely so. I agree with him fully, that the great object in teaching botany should be, to put students in the way of becoming independent and reliable observers and experimenters, and that the method of study pursued should be primarily objective and based upon the actual examination of the appropriate material. But while agreeing with him as to the end to be attained, I am not quite in accord with his method of attaining that end. To my mind, a cer-

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