

NATURE STUDY—No. XXIV.

APPARATUS REQUIRED FOR NATURE STUDY.

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It is often urged that "A Nature Study laboratory is necessary for the successful teaching of elementary science and that without expensive apparatus the work done will be of little or no value." If this view be entirely correct it is prohibitive as regards the introduction of Nature Study into the primary grades of elementary schools, for the general public are not likely to sanction any large expenditure for such a purpose. A brief investigation of this argument therefore may not be out of place.

Nature Study versus Laboratory Method.—The method of the laboratory is usually artificial, technical, abstract. In a laboratory experiment the conditions set up are different from the natural conditions and are established with the purpose in view of discovering or proving certain facts or laws by eliminating irrelevant factors and gaining control of others.

Now, a study of genetic psychology reveals the fact that, speaking generally, it is only when the child has reached the period of youth (beginning at the age of from 12 to 14 years) that the mind takes on the more reflective laboratory attitude which is interested in law, abstraction and generalization, seeks truth for its own sake, desires to probe into the hidden meaning of things and to develop technique in a scientific way.

Previous to this age and during the period of childhood (from about 6 to 12 or 13 years) when the child is in the primary classes of the Public School, the attitude is quite different. During this period the unity of interest is found in serial order, a relation of means and ends, a history or scheme. The child likes to observe the process from one stage to another and see how it is going to come out. He also finds his greatest pleasure in the development of skill in the attainment of some life purpose. It is a delight to him to find that he has gained a power to cause the process to come out differently from the way in which it otherwise would. He is not content with mere play as he was in the previous stage of infancy, but begins to look ahead, make plans for the future

and work for the achievement of his purpose, and he is willing to take considerable pains in gaining skill which will enable him to attain his end quickly and effectively.

With such an attitude the child naturally finds the laboratory work of the High School distasteful, but he takes to certain forms of Nature Study as instinctively as the duck to the water. The life-history of birds, trees and insects, the adaptation of each to its environment, the relation of each to his own life, the care of animals and plants—these and similar subjects, if presented in the right way possess an irresistible charm to him.

These characteristics of child-nature furnish a key to the material and the method of study which should be selected during those early years.

It may be noted in this connection that such study may be quite as scientific as laboratory work. If we accept the dynamic definition of Science as that which furnishes insight to interpret a new situation, we must admit that the child who intelligently and perseveringly studies the life history of a bird or plant and acquires skill in the control of the life process, is proceeding scientifically even though he never perform a laboratory experiment. Further, there is reason to believe that if the child omits such study during childhood when the impulse is at its height he will never again be able to atone for his neglect.

As the attitude, during this entire period constantly progresses toward the more thoughtful attitude of youth there should similarly be a constantly increasing emphasis upon the conventional side and particularly upon the development of skill. The need for such experimental investigation will be realized most readily by the child when there is a selection of material which lies very close to his own life interest, for example, the study of the effects of various kinds of food upon pet animals, of heat, light and moisture upon plants, or the humane extinction of injurious insects. These subjects may be treated from the functional standpoint without any tendency to commercialism. Such studies enlist the interest of the parent in the work of the school. They prevent and cure habits of vandalism and cruelty, and develop in the child a spirit of co-operation and helpfulness, which is the highest aim of education.

Character of Presentative Material—As regards the materials of Nature Study, it may be noted in the first place that many of the models offered for sale are very poor substitutes for the original object. The study of the singing bird in its natural habitat is likely to prove a much more attractive and helpful exercise (especially with beginners) than the investigation of the mounted specimen or the inaccurately colored picture "11-17 of the original size." However, in some cases, after he has failed repeatedly to obtain a close and continuous view of the flitting object of his investigation, the learner turns to a study of the school model with a due appreciation of its special advantages. At the beginning, outdoor study is most valuable, and with proper preparation and care an occasional field excursion presents the best form of non-conventional Nature Study for the little child, and the most lasting results will be those gained from such outdoor study by the pupil without any immediate assistance from the teacher. Fields and woods are always accessible, the domestic animals, garden plants and flowers, birds and insects, the wonders of water, earth, air, forest and sky, are available in every locality, and all that is required is a sympathetic attitude toward nature, a genuine desire to investigate, and a few simple suggestions regarding the mode of procedure. I know a boy of 12 years of age who, with very slight preliminary instruction, has acquired a good working knowledge of all of our common local birds, their appearance, migration, nesting, song, adaptation etc., and has formed a close acquaintance with several of them. His interest in the subject is normal and wholesome, and his method of study quite ingenious, e. g., he never takes an egg except from a deserted nest and yet he has a fairly good collection. Making out-door investigation the starting point, the teacher soon finds that the children themselves bring specimens to the school for examination. Thus a collection of specimens for a cabinet is begun. As a rule children enjoy making collections, and there is a sense of proprietorship about such a possession which is a desirable factor and cannot be gained from bought specimens. The materials for definite study can very often be brought by the children, e. g., each child may bring a sample of the flower to be studied. There is no difficulty in securing a number of pet animals in a similar way.

For the highest type of work, books and other kinds of materials must be secured, but at the outset the cost will not be great, and these should succeed and not precede the collection of natural specimens. Under such conditions the purchased materials will be wisely selected, carefully studied and properly cared for.

Experimental Apparatus.—As has been pointed out, the experiments at this period are not of a vigorous analytic type, and consequently little apparatus is required, and that of a most elementary character, easily constructed by the teacher or pupil, or procured at trifling expense. A twenty-five cent lens may be of more value in such work than a compound microscope. The life-history of a plant, together with such phenomena as appeal to the child can be studied from a single specimen, the only expense involved being the cost of the seed and the crock. One of the most scientific and fruitful investigations of insects made in recent years is a study of ants, extending over six years, conducted by Miss Fielde of New York City, and reported to the members of the Philadelphia Academy of Natural Sciences. The following is a description of the apparatus used: "An ant nest can be made in an hour or two with two pieces of glass 3 in. by 4 in. and strips of Turkish towelling glued around for walls. A partition with a door is necessary to make a separate room for the food, a wet sponge in the living room, a few dead flies, and the home is quite satisfactory to your little guests. A sheet of orange tinted glass over the nest enables you to study them without any offensive publicity."

In no other subject is it so true as in Nature Study that "half a loaf is better than no bread." The teacher who waits for gilt-edged apparatus, a well-prepared school garden, a sympathetic public and other ideal conditions, will always find good and sufficient reason for postponing the introduction of the subject. On the other hand, the teacher who makes a wise selection of material, is content to begin with the day of small things and to make the best of the present situation, will find that in Nature Study, as in every other activity, "Perfection consists not in a having and a resting but in a growing and a becoming."



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