

Collecting Apparatus for Insects.

J. M. SWAYNE, Principal Antigonish (N. S.) School.

A good collection may be made with very little equipment, and a little knowledge of insect habits will prove of more value than many traps. A few pieces of apparatus, however, will be a very great help, and the following are the most useful:

A Butterfly Net.—This is used for collecting all kinds of flying insects, and if strong may be used for sweeping back and forth over grass and bushes, where, if the sun is shining, many interesting forms are sure to be found. It may be made as follows: Take a light stick—a piece of bamboo pole is good—about four feet long, for a handle, and fasten a ferrule on one end, or bind the end with wire. Have a hoop made of stout iron wire. The diameter of the hoop should be about fourteen inches. The ends of the wire should be bent at right angles, soldered together, and cut off about four inches from the hoop. Fasten the hoop in the handle and cover the wire with strong sheeting, to which the net will be attached. The latter may be made of white mosquito netting. It should taper slightly at the end, and the length must be a little more than twice the diameter of the hoop, so that when an insect is enclosed the mouth of the net may be shut by a turn of the handle.

A Water Net.—For obtaining water-insects and their larvae, fish, and the various water forms, a net of this kind is useful and in some cases necessary. The handle should be eight or ten feet long; the hoop strong and about eight inches in diameter; the net itself about twelve inches deep, and of stout, open-meshed cloth. When swept through water-plants and over the bottom, the water-net seldom fails to bring "something."

Killing Jars.—If a pinned collection is to be made, the insects must be killed at once. In a small, wide-mouthed bottle, put a roll of cotton-wool, soaked in chloroform; cover the wool with thick paper and cork the bottle tightly. Drop small insects to be killed into this bottle, which must be kept tightly corked when not in use. A few of these jars will answer nearly all purposes. One large one, made from a pickle-jar, is needed for the larger insects. Unless left for a considerable time in the chloroform-bottle, some insects revive after being pinned, and for this reason collectors usually prefer the cyanide-jar. This, however, is rather dangerous for children to handle; at least there is the possibility of accident, and the chloroform-bottle described above will prove

effective if properly used. To kill butterflies and large moths in the net, hold the latter mouth down, and raise the bottom as high as it will go. The insect will usually flutter upwards, and may easily be caught. With the thumb and finger carefully hold the wings over its back and drop a very little chloroform on the middle portion of the body (thorax). A small bottle of chloroform for this purpose should be carried in the pocket. After being stupefied in the net, butterflies and moths should be placed in a large killing-jar or box carried for the purpose. I use a cigar-box containing a number of sheets of thick paper and a roll of cotton-wool soaked in chloroform. The butterflies are placed between the papers, and there is little danger of the scales being rubbed off in carrying. A drop of benzine on the thorax will usually kill butterflies and moths instantly.

Beetles, hard-bodied hemiptera (bugs), and all larvae are best killed by dropping into a small bottle of alcohol.

Boxes.—A number of these must of course be taken. Any kind of small box will do. The metal and glass cases in which watch-makers receive the better quality of Elgin and Waltham works make the best collection boxes I have ever seen. While pinned collections are valuable for reference, nature-study has largely to do with the living animals. These may be carried home in boxes and bottles of any sort. Water-insects and fish must of course be taken in pails or jars (uncovered) of water. The mistake is frequently made of trying to carry too many in one dish. Water-insects may be taken in a box of wet moss. Predaceous varieties must be kept by themselves.

A trowel for ants and other underground forms, a knife for borers, and tweezers for handling some species are convenient. The sweeping-net, umbrella, beating-cloth, sieve, and other appliances are in use among collectors, but those named above will provide all material needed for study in the common schools.

Have a question box in your school in which any child can place any question he pleases, signing his name. Read the questions each day and have the pupils answer impromptu all for which they are prepared, and take the others home to search for the answers. Teachers who have used the question box say that it gives excellent results.—*Am. Primary Teacher.*