

## Scientific.

### COLLECTING INSECTS.

#### How to Collect, Preserve, and Transport Them.

Having frequently, in years past, invited our correspondents in various parts of the world to collect and send to us insects, we now propose to give them brief but plain instructions in regard to the simplest modes of collecting and transporting. In every country and locality there are insects which interest the entomologist, and persons who have no knowledge of the subject may do much toward aiding investigation, if they will collect and forward specimens to those who make this branch of science a specialty.

The larvae of butterflies and moths prey upon our trees, shrubs, grains, and garden vegetables, and those of some of the beetles are equally as destructive, while bugs of various species are the pests of our fields.—There are also cannibal beetles and bugs as well as various parasitic insects which aid in checking the increase of certain species, and the habits of all these must be known if we are to work understandingly and in harmony with natural laws, and thereby assist our friends in destroying our enemies.

The farmer and gardener should be particularly interested in the science of Entomology, inasmuch as they are constantly brought into close contact with those very beings of which we know so little, but should desire to know more. Entomology, as a science, is certainly attracting more attention in this country, at the present time, than ever before; but it would advance far more rapidly if every man, woman, and child would only do what they could, however trifling that might be, instead of leaving the entire work to a few, who are so overtaxed that their labors must necessarily be very incomplete.

It should not be considered as labor or an irksome task by any one to collect a few insects and forward them to a scientific institution, or to an individual who may be spending his time and money in endeavoring to enrich science and benefit mankind. There are scores of men who have traveled the world over, but never experienced the pleasure or received the honor of contributing as much as one grain of sand to the welfare of mankind or the advance of science. The very butterflies, moths, or other insects which constantly crossed their path would have been more highly appreciated by some entomologist than the most precious mineral. Pioneers in our new States and Territories, and travelers in foreign countries, should not be negligent, but should observe the habits of local species of insects, and forward specimens to us whenever convenient.

**COLLECTING APPARATUS.**—To collect insects rapidly in summer, a net of some kind is quite indispensable. In Fig. 1, two forms of nets are shown; *a* is made of common muslin, or cambric, and about a foot in diameter, and 18 inches long, and is used for sweeping bushes, weeds, or

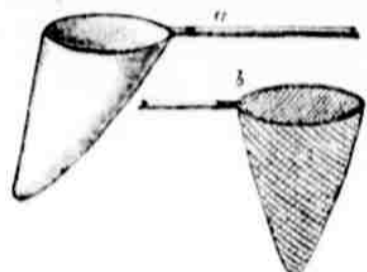


FIGURE 1.

dragging over the grass, where hundreds of minute but interesting specimens of insects may be taken with a net, which would not otherwise be found. The other net, *b*, is made of netting or thin gauze; a common mosquito netting will answer, and it is used for taking butterflies, moths, and other insects on the wing. These nets can be purchased in our large cities, but one that will answer every purpose for the amateur can be made of any strong wire bent to form a hoop, and the two ends driven into the end of a stick four to six feet long, that will answer for a handle. In the first or sweep net it will be noticed that the front side is straight, the taper being entirely from the back to the front. This form is far better for this kind of a net than to have it a regular cone, inasmuch as when sweeping along, the insects are thrown forward into the point, and held there more securely than they would be if the smallest part was exactly in the center.

**KILLING BUGS AND BEETLES.**—All the harder kinds of insects, such as Beetles (*Coleoptera*) and Bugs (*Hemiptera*), which have firm wing-cases, may be preserved for almost any length of time in spirits, such as alcohol or whisky. Some bottles

with wide mouths should be provided, and these partly filled with spirits, into which the beetles and bugs may be put as soon as caught. Vials holding two or three ounces will usually be most convenient to carry in the pocket or collecting bag. Entomologists use glass tubes similar to the one shown in Fig. 2, as these may be emptied more readily than vials of the ordinary form. Dry collecting vials may also be employed by obtaining a few pieces of cyanide of potassium and drop these into the vial, covering with a thin layer of cork, paper, cotton, or any similar material that will hold them firmly at the bottom and not prevent the poisonous fumes reaching the insects to be killed. If this cannot be obtained, use ether, chloroform, gum camphor, or ordinary benzine—anything that will kill the insects quickly and not injure their color. In using the dry bottle, it is always best to put in a few small loose bits of

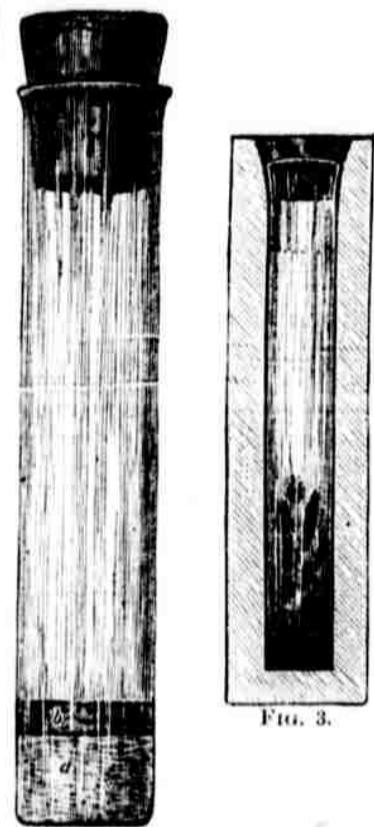


FIG. 2.

blotting paper to absorb any liquid ejected by the insects, and prevent their discoloration. The tube shown in Fig. 2 is one we have used for collecting our ordinary beetles, altho' not large enough for all species. In the bottom, *a*, is a little cotton saturated with benzine; a thin piece of cork is put in to hold the cotton in its place and prevent small species from crawling into it and becoming entangled in the fiber. Any other form of vial can be used instead, but the beetles should not be allowed to remain any longer than is actually necessary in the dry bottle, but should be emptied into the jars or larger bottles of alcohol or other spirits, and kept there until required for mounting or transporting to some other locality.

**HOW TO PACK AND SEND BEETLES AND BUGS.**—The most certain way of preserving specimens in good condition, especially if sent a long distance, is to send them in alcohol. In packing large bottles and jars, see that they are corked tight and the corks tied in; or, what is still better, fastened with copper or brass wire; but a good strong cord will answer. If they are to be sent by express or similar mode of transportation, the bottles should be enclosed in fine hay, grass, or other soft material, and then enclosed in a strong box. This, of course, is only necessary when a large number is sent, and a long distance; but where a small number, say from one hundred to a thousand of various species, large and small, they may be sent by mail packed in the following manner:—Select a few strong tin boxes, holding a gill or more, according to the number of insects to be sent away; get some fine sawdust; now take the beetles out of the spirits and put a layer in the bottom of the box; then fill up all interstices between with sawdust; then put in more beetles, and so on in alternate layers until the box is filled. The box should be full, to prevent any moving about and breaking of its contents. The whole should be rolled in paper, and the direction written on the outside wrapper, and then sent by mail.

We have received insects by mail from the most distant parts of the country, packed in this manner, and they have invariably arrived in good order.

Another most excellent method of sending by mail is to take a small piece of pine plank one or two inches square, and of the proper length; into this bore a hole lengthways of the grain, and just large enough to admit the vial to be used, as shown in Fig. 3. The insects are sent in the alcohol or spirits, and the vial should be corked tight; also the space in the

case should be filled either with a cork or plug of wood to keep it from falling out. The package is then wrapped and directed. This is the safest way of sending minute specimens, as well as large ones, by mail, although the weight of the alcohol is greater than that of the sawdust, and the postage more in proportion.

**NUMBERING SPECIMENS.**—It often occurs that those sending insects desire to obtain the names of specimens sent. In such cases, all that is necessary is to number the specimens, retaining one or more of each with a corresponding number. If the specimens are packed either in sawdust or alcohol, roll in soft tissue paper, enclosing with each a small bit of paper, upon which the number is written with a soft pencil. Ink will spread, and be obliterated when wetted, but a pencil mark will remain legible for years, even if constantly immersed in spirits. If it is desirable to pin the specimens retained, always thrust the pin through the right wing case, near the inside edge, and at a point where it will pass between the second and third pair of legs, as shown in Fig. 4, *a*, leaving enough of the pin above to



FIG. 4.

take hold of conveniently; usually about three-eighths of an inch is sufficient. Smaller species may be gummed upon little lance-shaped pallets, or pasteboard.

In mounting most other kinds of insects, the pin should be thrust through the middle of the thorax.

**WHERE TO FIND BEETLES AND BUGS.**—In summer, beetles and bugs are very abundant upon weeds and plants, and this is the season to use the sweep or drag net. Hundreds of small but interesting species lurk under their flowers, and the net is the most rapid and sure means of bringing them from their hiding-place. Larger species may be found sunning themselves upon the bark of trees, logs, or upon the farm fence, while the little tiger beetles (*Cicindela*) frequent sandy roads and barren fields. The ground beetles (*Carabidae*) are usually found under flat stones, on hill sides, and especially near brooks and rivers, while others are more abundant under old logs, or between the loose bark and wood; in fact, there is no place, from the bald rock on the mountain, to the lowest depths of the most gloomy cavern, that is not the abode of some insect. Our rivers and stagnant ponds also furnish numerous species, from whence they may be taken with nets or by hand. As a rule, the more secluded the abode, the more rare the insect; for those living and feeding in exposed situations are the most likely to be well known. The same is true in regard to size; for all young and inexperienced collectors are sure to take all the large insects, and overlook the small ones; but the minute species are equally as valuable as the larger. Some of the most destructive insects to vegetation are among the smallest; therefore, collectors should not neglect to take the small as well as large.

**BUTTERFLIES.**—Butterflies, or what are usually termed *Diurnal* (day-flying) *Lepidoptera*, are readily distinguished from moths by their knobbed antennae, although in some species this characteristic is not very conspicuous. Their bodies are small in proportion to the size of their wings, which are usually held erect when in repose. It requires far more care to collect butterflies and preserve them in a perfect condition than beetles or bugs, as their bodies are covered with very minute scales which are torn off by the slightest pressure. In capturing them, the net should always be used, and the moment one passes within throw the bottom of the bag over the heap by a dextrous twist of the handle, and thereby secure the butterfly in a position where it cannot disfigure itself in its struggles to escape; then grasp it by the under side of the thorax, with the thumb and fore finger, pressing so firmly as to kill or benumb, until a drop of ether or chloroform can be applied with a camel's hair pencil. A small vial of chloroform can be carried in the vest pocket, to be used for this purpose whenever required. A slight crushing of the thorax, however, will usually be sufficient to kill any butterfly, and we prefer this method to wetting the body even with the most volatile liquid. If the butterflies are to be

put immediately into a cabinet, they may be pinned as caught; but when collected to be sent away or preserved for some time before mounting, they should be carefully taken out of the net and placed in papers, as shown in Fig. 5.

Any smooth writing paper will answer the purpose, and, before going out to collect, a quantity should be cut up into pieces a little longer than broad, and varying in size from two to four or five inches, and then folded as shown in Fig. 5, forming, when finished, a triangular-shaped bag,

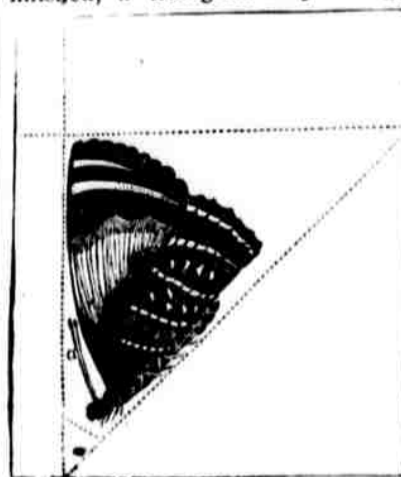


FIG. 5.

into which the butterfly is dropped head downward. The antennae (*a*), or feelers, should be folded back between the wings, or at least close to the front edge, in order to secure them against being broken after they have become dry and brittle. If a record is kept of captures, the date, locality, or number of specimens, may be written on the outside of the envelope, always using a soft lead pencil for this purpose. These little paper bags containing specimens of butterflies may be laid away in tight boxes, or sent to any part of the world by mail or through other channels of transit. It is better to have the envelopes a little too large than too small, because it is quite important that the wings should remain flat, and their edges not folded or broken.

**MOTHS.**—Collecting moths is mainly night work, although many species can be captured during the day time or early in the morning or evening. The larger kinds should always be taken with a net, and the same care exercised in handling as with butterflies. Having large and heavy bodies, they are not readily killed, and a slight pinching of the thorax, or even thrusting a pin through them, will not answer.

Chloroform or ether, if applied to the surface, will only stupefy for a few moments, and a more summary method is required for dispatching our large Sphingids or Hawk moths (Fig. 6); but smaller kinds, as shown in Fig. 7, are more delicate, and killed almost instantaneously by



FIG. 7.

placing in a box or under an inverted glass, containing a drop of any of the various substances we have named. To kill the larger species while in the net, we have found no better way than to puncture the body or thorax with a sharpened quill or sliver of wood, and then dip it into moistened cyanide of potassium, and again thrust the poisoned implement into the wound. It requires very little of this poison to produce almost instant death. Chloroform, ether, or benzine, may be used instead, or the moth may be pinned in a tight box and killed with the fumes of sulphur, tobacco, creosote, or other noxious and poisonous substances. When the moths are killed, their wings and antennae should be folded in the same manner as described for butterflies, and then placed in the paper bags. Very small moths, such as are caught about the lamp at night, may be laid carefully between layers of soft paper, their wings remaining in a natural position. The cocoons and chrysalids of



FIG. 6.

Insects may also be collected and allowed to finish their transformation in boxes, where the perfect insect or imago can readily be captured.

**INSECTS OF OTHER ORDERS.**—Flies, Wasps, Grasshoppers, Crickets, Bees, Dragon-flies and Ants, may all be taken and killed in the dry collecting bottles already described, and if to be sent a long distance, packed in small vials with very little fine sawdust, and the whole moistened with a few drops of ether. Every collector should carry a few small pill or common wooden match boxes in his pocket, for the purpose of keeping specimens of insects belonging to different orders, separate, as well as to avoid the necessity of putting too many of one kind of the tender species together. Neither should those who are collecting specimens to be sent to a distant part of the world or our own country, be fearful of obtaining too many of one species, because entomologists not only derive much pleasure from distributing rare insects among their friends, but it is highly important that every cabinet, both public and private, should be as complete and contain as many species as possible. The heads of families should not overlook the fact that even their children who chase the butterfly, play kite with the bumble bee, or harness the lazy beetle to a stick, may do something towards aiding science and placing scientific men under obligations to them for favors. It is far better to teach children how to be useful assistants to learned men in various parts of the world, than to remain in ignorance of their names or abode. The farther away from the centers of civilization a family may reside, the more interesting will their surroundings be to the naturalist, and the more valuable the specimens collected.

#### To the Reader.

Having in the foregoing remarks endeavored to point out some of the most simple methods of collecting, preserving, and transporting insects, I would be pleased to receive any specimens which you may send to me. My first choice would be Beetles, as I make this order a specialty, but Butterflies and other insects would also be acceptable, with whatever notes upon their habits you may choose to send.

Whenever specimens are sent by mail, I will return the amount paid in postage, if desired; and shall also hold myself in readiness to return an equivalent in kind or otherwise for rare specimens from any part of the world.

Letters and packages may be addressed to my office in New York City; but I would prefer to have the insects sent direct to my country residence at Ridgewood, Bergen Co., New Jersey.

#### ANDREW S. FULLER.

Agricultural Editor of *Weekly Sun*, cor. Nassau and Frankfort Streets, New York; also Associate Editor of *Moore's Rural Year Book*.

**BRAIN WORRY.**—Many of us pray to be delivered from sudden death, and do we worry ourselves into it? If we do, can we help it? To most of us it is not given to choose our lives, to avoid the rough places, to gently shoulder to one side disagreeable facts. We must climb over the rocks though they hurt us sore, and the difficulties, however they may annoy us must be met with brain fret and wear until they are conquered, or we have passed them. They are as real, living, annoying as any tangible ache or pain could be; as bruising and irritating as the peas in the shoes of the pilgrims of old. Nervous health is one thing, and moral health and purely physical health is quite another and different thing. Calm and steady mental work is conducive to long life; but nervous emotion, mental work that is a constant urging, and, at the same time, is an unchanging of the even tenor of the mind, eats away the brain faster than any mental labor, no matter how hard, that is systematic. As men do not really die of heart disease as often as is supposed, but of apoplexy, or congestion of the lungs, so they do not die of brain work, but brain worry. Scott died of it, Southey, Swift, Horace Greely, and probably Thackeray.—*London Times*.