Direction Leaflet Number Two

HOW TO MAKE AND USE INSECT NETS

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In the popular mind the insect net is the trade-mark of the entomologist, and although a majority of insects can be captured with the fingers, a net of some sort is a necessity to every general collector. Professional collectors may have a battery of them, from a teacup-size wisp of silken gauze, for the most delicate midges, to an iron-bound canvas laundry-bin of a beating net, used to dislodge hidden specimens from bushes and trees. The amateur collector will probably require a single medium-sized net only. This may be purchased at a scientific supply house, but it is so easy and inexpensive to construct that many people prefer to make their own.

Essentially, the insect net is a cloth bag, held open at one end by a rigid hoop attached to a handle of convenient length, the whole as light in weight as is consistent with moderate durability. Any suitable materials, put together in any workable manner, will produce a satisfactory result. The directions here given are the simplest we have been able to devise, the materials such as are readily available in any neighborhood shopping center, if they are not already in the house, and the dimensions those of a good general-purpose aerial net.

MATERIALS

From the hardware store:

- 4 ft. 1/8 or 3/16 in. iron wire, or the wire hoop of a barrel or nail keg.
- A 3/4 in. dowell, or old broom handle.
- 2 staples, about 1/4 in. between the points.
- About 4 yd. of very strong twine.
- A very small quantity of laquer, varnish, or shellac. A bottle of clear fingernail polish will do very well.

From the dress-goods or upholstry shop:

- 1/4 yd. of unbleached muslin, or any strip of strong cloth about 4 in. wide and some three inches more than long enough to reach entirely around the hoop of your net frame.
- A spool of sewing thread, no. 40.
- 1 1/4 yd. of good strong netting, 1 yd. wide. There are several kinds of suitable material—heavy tulle, brussels net, and various curtain fabrics, for instance. For greatest durability, the threads should be twisted around each other at the intersections, rather than simply interwoven, although a good quality of cheese cloth will give fair service at much smaller cost. The mesh should be small enough to retain the insects, and large enough to permit the free passage of air. Color is not important. Most commercial nets are white. You can see enmeshed specimens most easily if the fabric is black, and some collectors think that a green or brown net is less visible to the insects.

  Since good netting is apt to be expensive and comes in several widths, you may want to be more precise in your measurements when you buy. In that case, finish the frame of the net first, and then make a paper pattern for the bag. Take this with you, and no matter what the width of the material you select, you can esaily determine exactly how much you will need to cut your bag in the most economical manner.
- Before you buy any netting at all, find out whether there is not, in the family, a tulle gown which has gone out of fashion. This should keep you in insect nets for years. There is no objection to piecing the material if necessary.

TOOLS

- A pair of wire-cutters, or a hack saw, to cut off the hoop-wire, if it is too long.
- A hand drill, with bit about 1/16 in. larger than the wire.
- Sandpaper.
- A hammer.
- A piece of string.
- A saw, to cut off the handle, if necessary.
- Scissors.
- Sewing machine, if available.
- Needle.
- Pins.
- Tape measure.

MAKING THE FRAME

With the hand drill, make a hole straight through the stick, from side to side, about three quarters of an inch from one end, and another not less than half an inch below the first.

Smooth the end of the stick and the edges of the holes with sandpaper, so that no splinters remain to catch in the fabric of the net.

Make a right-angle bend in the hoop-wire about four inches from one end. You can do this with pliers, if you have strong hands, but it is much easier to clamp the short end in a vise and bend the long end over. If no vise is available, the wire may be bent over any sharp-edged object of sufficient durability by hammering; but do not try this on the dining table, for the surface is certain to be marred.

Pass the straight end of the wire through the upper hole in the end of the handle, bend it around in a loop, and pass it through the lower hole in the same direction. Pull it up until the loop is 12 to 14 inches in diameter, and mark, on the wire, the place where it leaves the handle. Pull it further through, and make, at the point marked, a second right-angle bend, so that the two ends of the wire are parallel. Do not try to do this by bending the wire against the edge of the hole, or you will almost certainly split the stick.

If the second end is much more than 4 inches long,

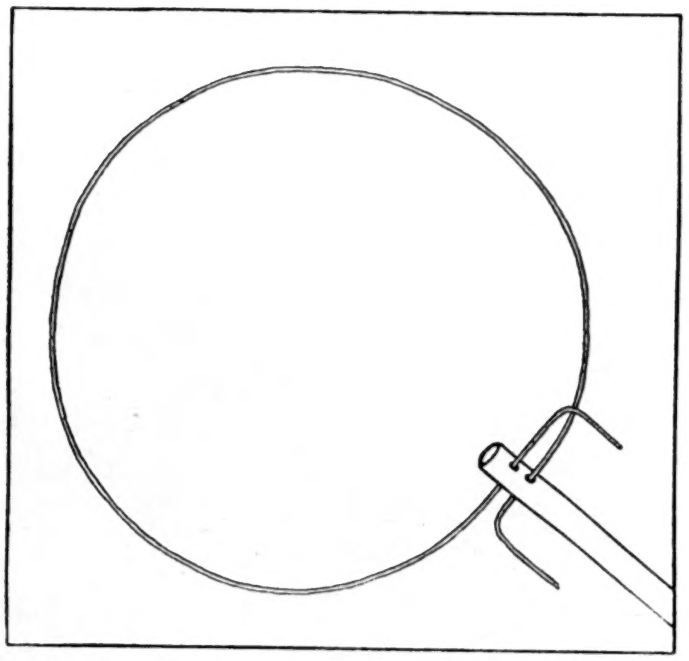

Fig. 1. Frame of insect net, before whipping.

remove the surplus. The frame will then look like fig. 1.

Bring both ends of the wire to lie along the sides of the stick as closely as possible and tie a string around them, near the top, to hold them in position. Secure each end with a staple driven into the wood about an inch above the tip of the wire, as shown in fig. 2. Then remove the string.

Make, in one end of a piece of strong cord, a loop about two inches longer than the ends of the wire. Place this loop close beside one of the wires, with the closed end at the top of the stick. Leaving the short end protruding for an inch or more at the bottom, wind the long end spirally upward around the stick, from just below the ends of the wires to within half an inch of the lower bend, keeping the turns tight

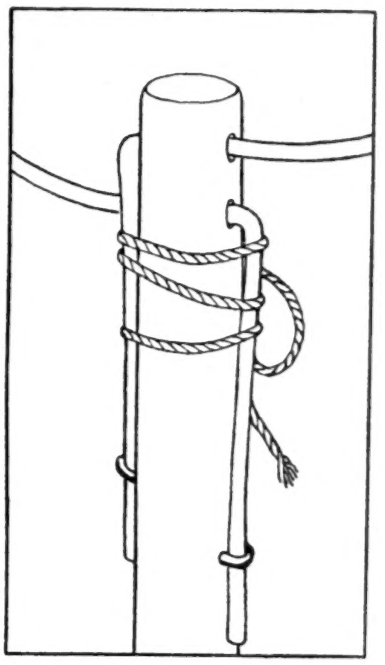

Fig. 2. Net handle ready for whipping.

and close together. When you reach the top, pass the end of the cord through the loop, as is shown in fig. 3, and pull downward on the other end. This will cause the loop to vanish into the space at the side of the wire, taking with it a loop of the free end of the cord. When the bulge in the whipping tells you

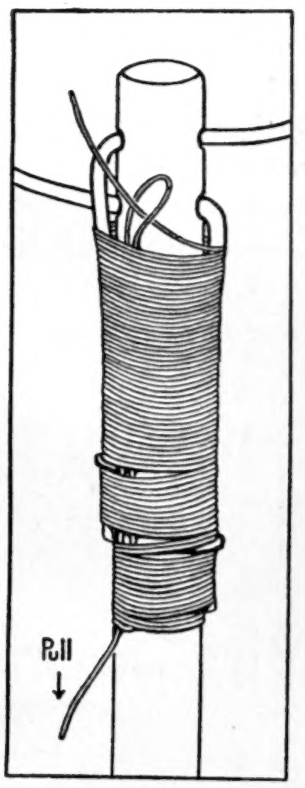

Fig. 3. Whipping the handle.

that this knot has reached the middle, cut off both ends. Then soak the whipping in laquer, varnish, or shellac, and allow it to dry over night, or longer, if necessary.

MAKING THE BAG

The bag may most easily be made of a single piece of cloth, folded double, lengthwise if the fabric is

narrow, or across the bottom if it is very wide. The shape is variable, but it should taper somewhat toward a rounded bottom without coming to a point. Specimens lodged in a sharp corner are difficult to extract. At the top edge the bag should measure about two inches more than the circumference of the hoop, much better too large than too small. In depth, twice the diameter of the hoop is satisfactory, though some collectors find 1 ½ diameters sufficient, while for others 2 ½ is not too much. Several successful shapes for net bags are shown in fig. 4.

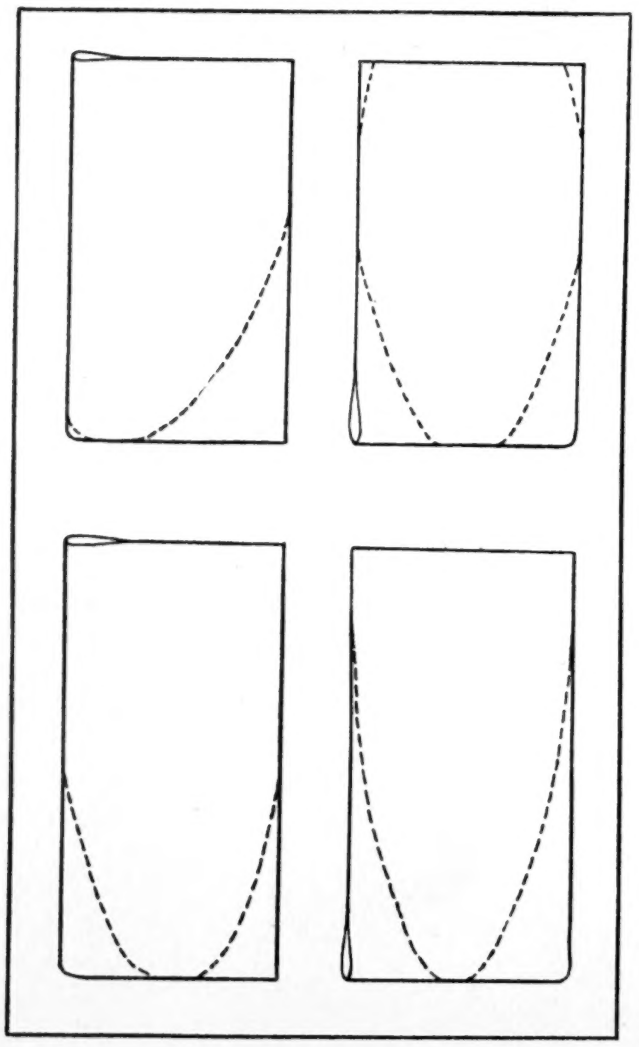

Fig. 4. Variations in the cut of insect nets.

Measure your frame carefully with the tape measure, and plan your bag to fit. If you do not care to make a paper pattern for it, you may draw the design onto the folded cloth with a crayon, or lay it out with pins. cut the cloth to shape, and pin the edges together to hold them while you sew. Make the seam about half an inch wide, using a sewing machine, if you have one. If you have not, a small back stitch or a running stitch fastened every inch or two will do. These stitches are diagrammed in fig. 5.

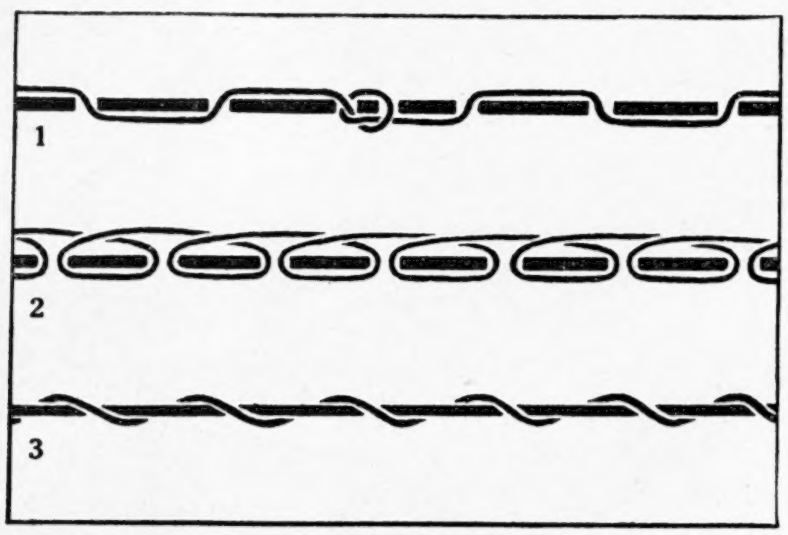

Fig. 5. Stitches useful in sewing an insect net by hand.
1. Running stitch, fastened.
2. Back stitch.
3. Overcasting.

When the seam has been stitched once, turn the raw edges under, together, and sew them down onto the body of the net. If you are using a machine, stitch as close to the fold as you can, if you must work by hand, overcasting will be more secure. This kind of flat seam is called a fell, and is illustrated in fig. 6.

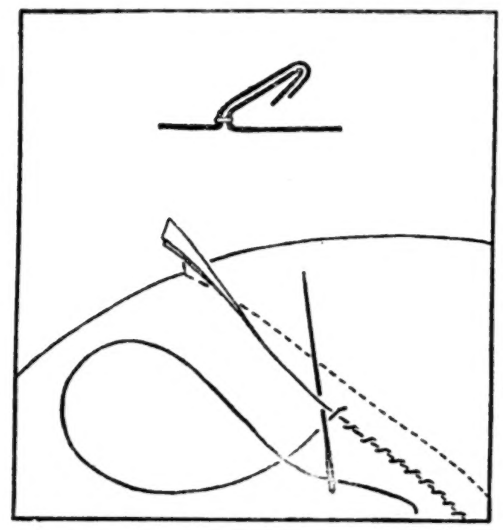

Fig. 6. A felled seam, used in sewing an insect net.

It is used because it gives the specimens no crack in which to hide, no matter which side of the net they occupy.

Make a strip of muslin or other strong cloth about four inches wide and an inch and a half longer than the top edge of the net. At each end of this, make a half inch hem, as shown in fig. 7. Pin this band around the inside of the net bag, matching one long edge with the top edge of the net. Join them with a half inch seam. If the ends of the band overlap a little, there will be less danger of ripping the net at the point of juncture when it is in use.

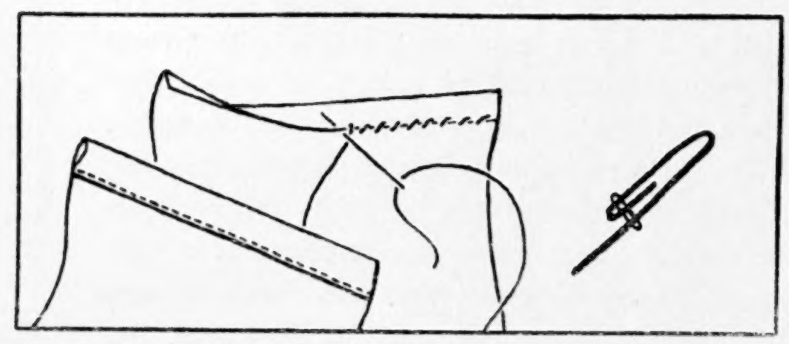

Fig. 7. Hems, hand and machine stitched.

When stitched on, turn up the muslin band to form a continuation of the bag, with the free edge of the band at the top. Turn the raw edges of the seam up onto the outside of the band. Place the bag inside the hoop with one hemmed end of the band on either side

of the handle. Fold the band down over the wire of the hoop, turn the free edge under about a quarter of an inch, and overcast it to the seam at the top of the neeting, as shown in fig. 8. This strip of heavy cloth

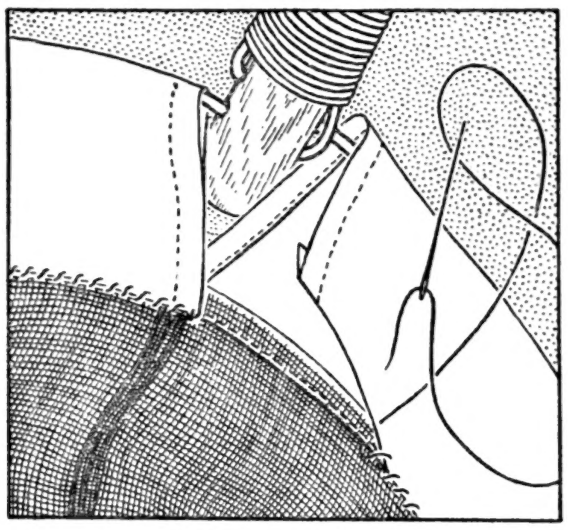

Fig. 8. Sewing the bag to the hoop.

at the rim of the net can take a great deal more abuse than can the delicate mesh, and greatly prolongs the utility of the net.

When the net is finished make a few practice swings with it. If the handle is too long for your convenience, cut it down to a length which you can manage easily. In the handling of a net, maneuverability is more important than reach.

USE OF THE AERIAL NET

A net of this kind is used principally to capture insects on the wing. Only experience can teach you how to approach each kind, for some, when alarmed, will fly upward while others drop, or dodge. Once in the net, however, a specimen may be kept there by quickly inverting the rim of the net, thus bringing the bag together and keeping it closed by its own weight. This is a basic trick of the insect collector, and should be practiced until it becomes automatic. It is diagrammed in fig. 9.

The process of getting the insect out of the net and into the killing jar although complicated to describe, soon becomes easy to perform. Assuming that you handle your net with the right hand, grasp the net fabric between the left thumb and forefinger so as to imprison the specimen in the smallest possible fold of cloth. Let go of the net handle, and, taking the killing bottle in your right hand, open it by grasping the lid or cork between the third or fourth finger and heel of the left hand. Insert the bottle into the net, as close to the specimen as you can get it. Release your hold on the net fabric and use the left hand to drop or knock the insect into the bottle and keep it there by covering the bottle's mouth with the palm. With practice, you will learn

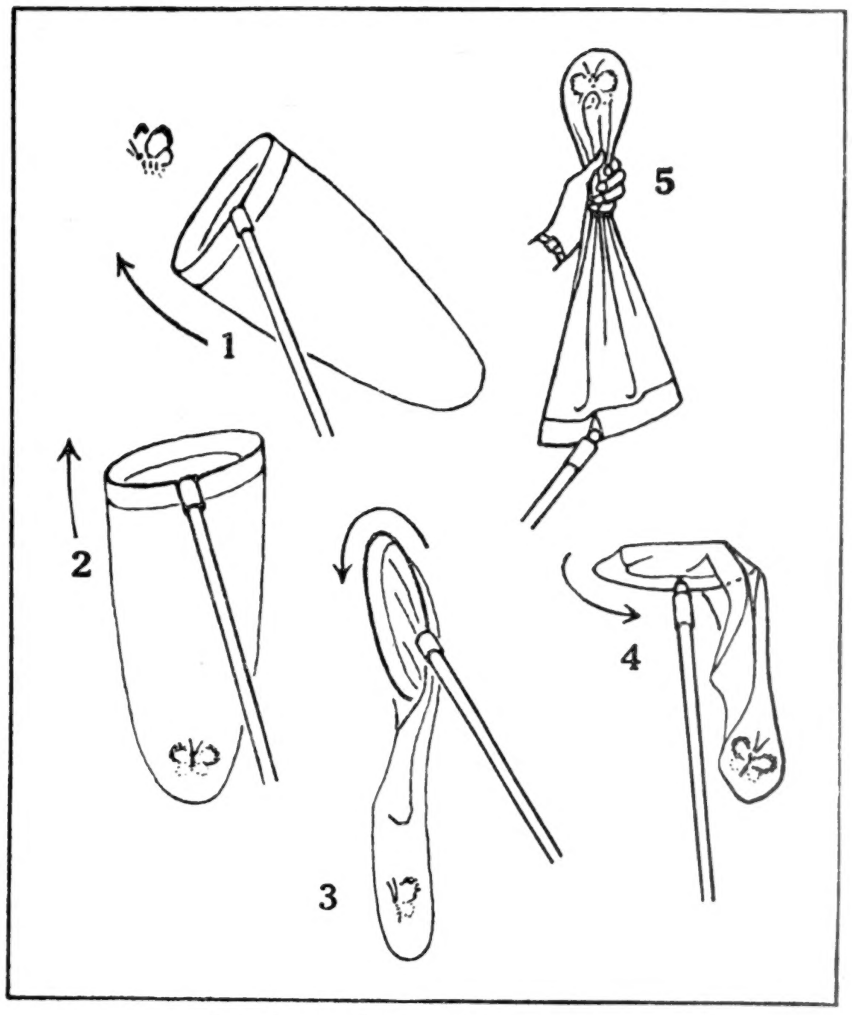

Fig. 9. Aerial net in operation.

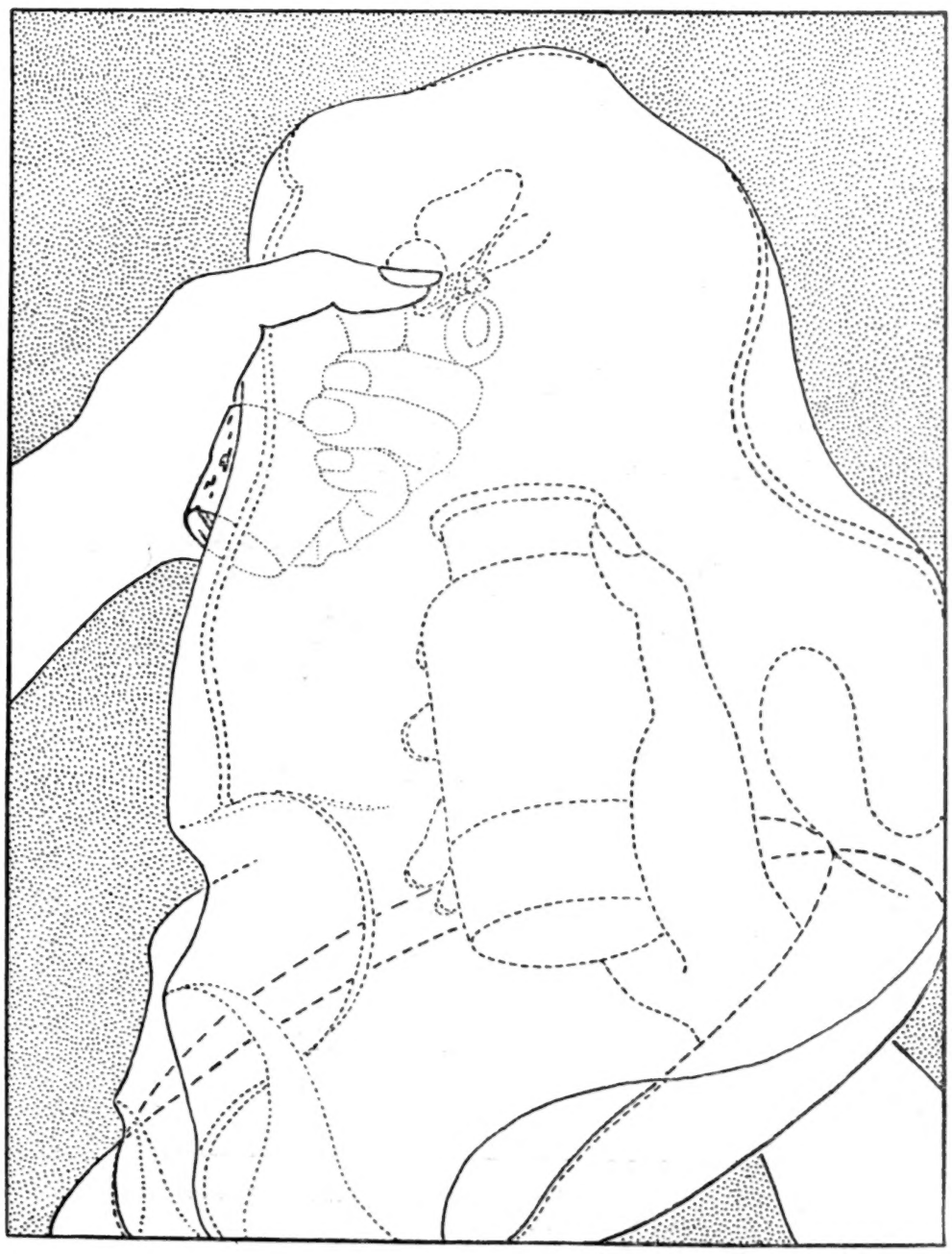

Fig. 10. Removing a butterfly from the net.

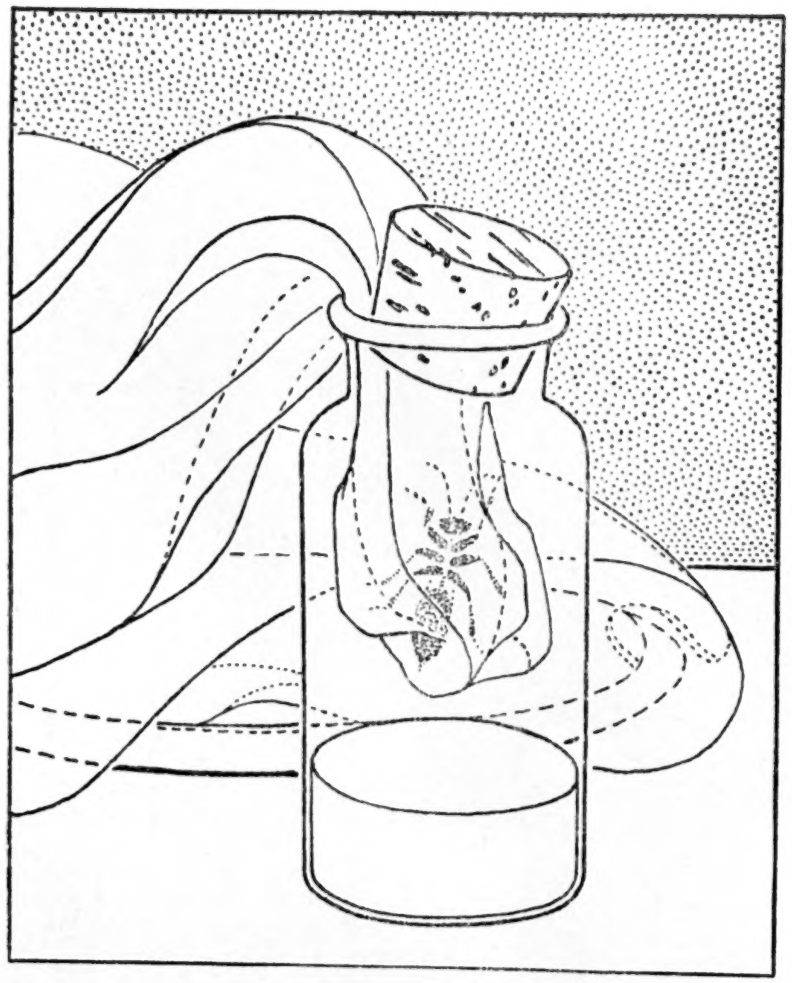

Fig. 11. A method of dealing with species that bite or sting.

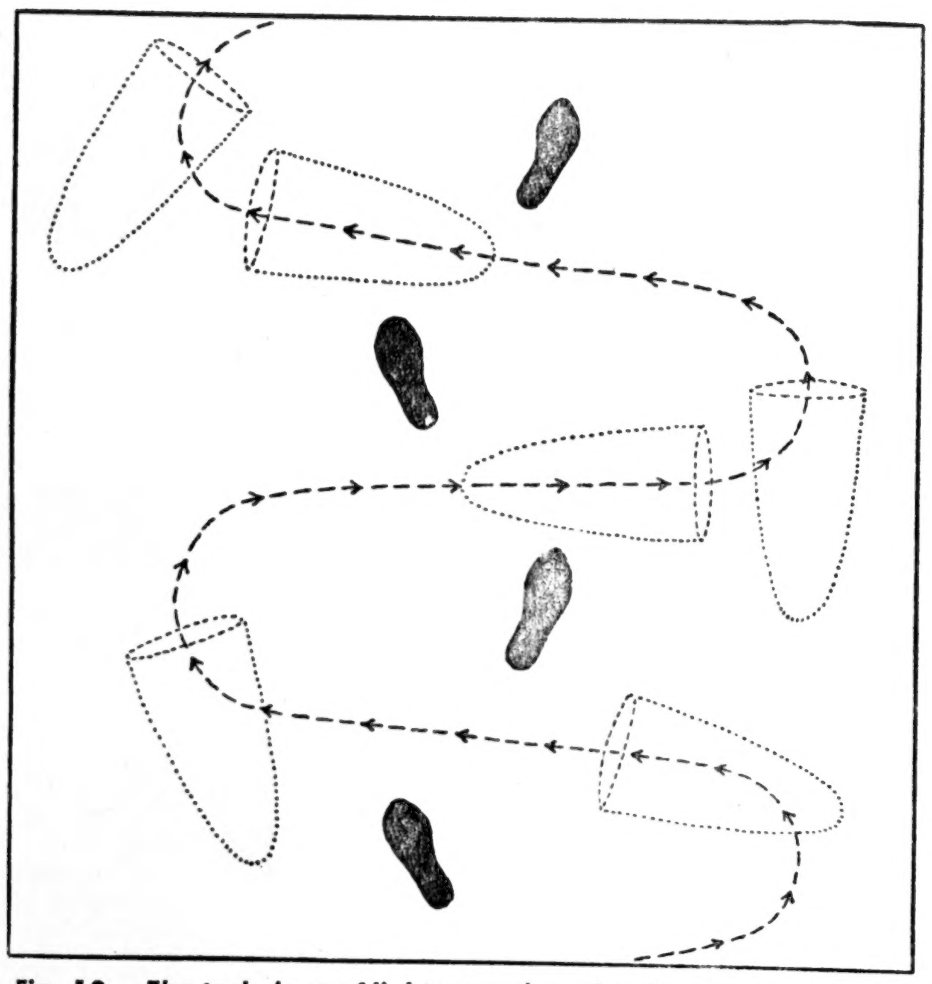

Fig. 12. The technique of light sweeping, showing the paths of the collector and his net, with the positions of the bag during the stroke.

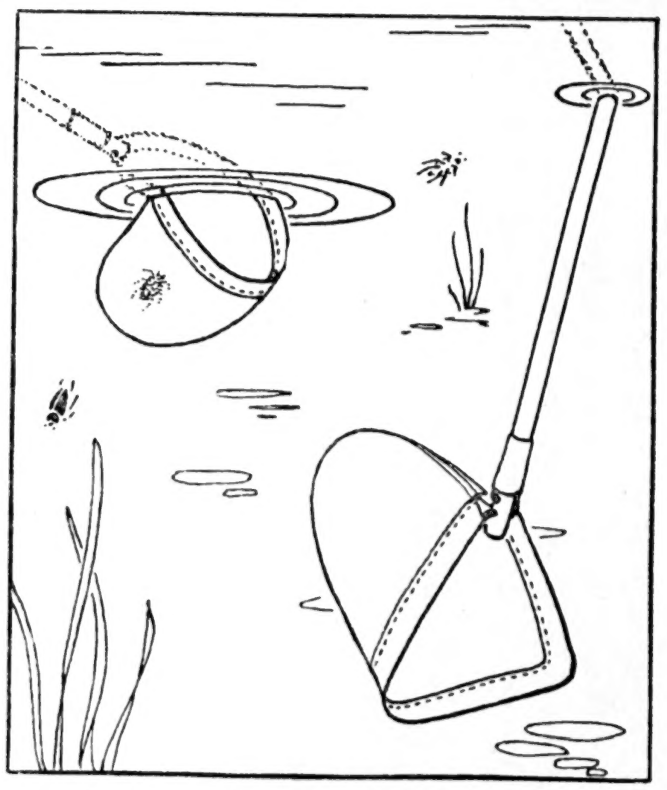

Fig. 13. Aquatic nets; dip net above, scrape net below.

to do this while retaining your grip on the stopper with the little finger. Then, holding the bottle through the netting with the first fingers of the left hand, take the stopper in the right and slip it under the net and into place.

Butterflies and large moths which flutter violently may be held through the net by the sides of the thorax, just under the wings. Some collectors claim that a hard pinch at this point will paralize the wings and prevent the specimen from battering itself as it flaps in the bottle. Others say that pinching ruins the specimen. You might try it and see. The process is illustrated in fig. 10.

Fig. 11 shows a simple method of dealing with species known or suspected to bite or sting; wasps, bees, and many of the beaked bugs, for instance. These should be corked up in the killing jar, while still enmeshed in a fold of the net, until they have stopped kicking. They may then be picked out of the net and dropped back into the bottle without danger.

SWEEPING

This is a wholesale method of collecting by swinging the net back and forth through tall grass or forest undergrowth, as diagrammed in fig. 12. The catch includes insects in all stages of development, spiders, and other creatures, together with a considerable quantity of leaves. The whole may be dumped into the killing jar at once, but as this results in the destruction of a great many harmless animals of no interest to the collector, it is probably better to open the net and pick out, with fingers or tweezers, the specimens you wish to keep, and let the others go. If too many valuable specimens escape, try putting the lot, net included, into the killing jar for a few minutes, as you would a stinging insect. When all are quiet, you can pick them over at more leasure. The rejects will shortly revive and go on about their business.

Although an ordinary aerial net may be used for sweeping where there are no bushes or brambles, a special sweeping net will give better and longer service. The hoop should be stronger than that of the aerial net, and the handle so short that the hoop just clears the ground when the hand holding the net hangs loosely at the side. The bag of this net is made entirely of muslin, no netting at all. Stronger and heavier yet is the beating net, used in sweeping bushes and the branches of trees for their hidden occupants.

AQUATIC NETS

Water is so much denser than air that an aerial net is quite unmanageable in that medium. Nets for use in water should be small, very strong, and proportionally much shallower than the aerial net. Since most aquatic insects are awkward out of their element, they need not be secured by inverting the rim of the net. To lower resistence to the water, and permit as much debris as possible to wash out of the net, the mesh should be the largest that will retain the desired specimens. In addition to the round dip net, thorough collectors may use a triangular scraping net for species which inhabit the bottoms of streams and ponds. See fig. 13.