

COLLECTION AND PRESERVATION OF INSECTS

COLLECTING

Here naturally the question arises: where, when and how to collect the insects?

Where: The insects are found in large number almost every where and can be collected from the following locations:

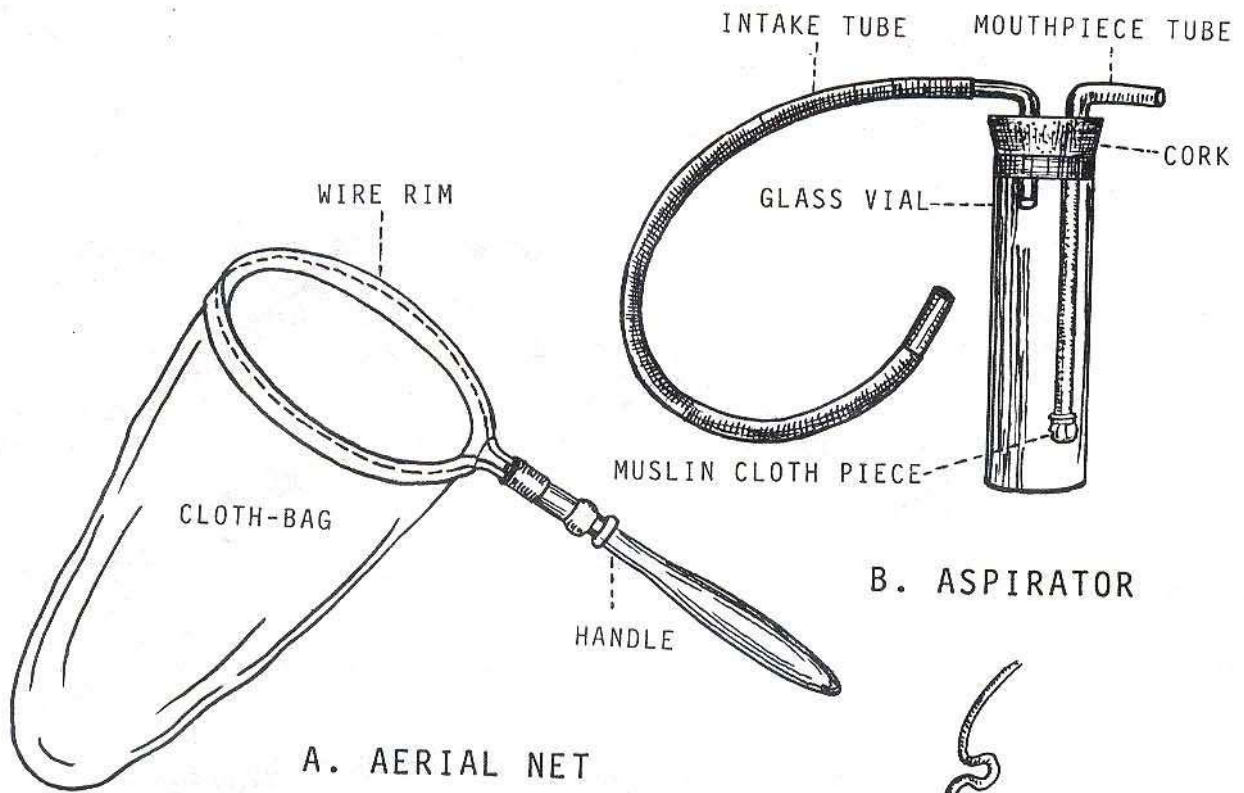
1. On or within plant parts like roots, stems, leaves, flowers, fruits, etc.
2. Inside or around human habitats feeding on food, clothing, furniture, grain and other materials.
3. Various sources of artificial light during night.
4. Different aquatic habitats like ponds, streams, lakes, rivers, etc.
5. Bodies of other insects, birds and animals including man.
6. Rotting and decaying materials of plant or animal origin.
7. Under stones, bark, logs, debris, litter, etc.
8. In soil up to a great depth.

When: The majority of insects hibernate in winter and become active from early spring to late fall. During this period, the best time to collect them is the summer. It is also of great value to collect the hibernating stages of insects during winter. The diurnal species can be collected during the day time whereas the nocturnal species should be collected from dusk to dawn. Some insects which have a short seasonal range should be collected during different months of the year.

How: There is a special equipment for collecting different types of insects. The students will be demonstrated these collecting devices in the laboratory. But, for making a good collection of the insects, they will prepare their own devices according to the following details:

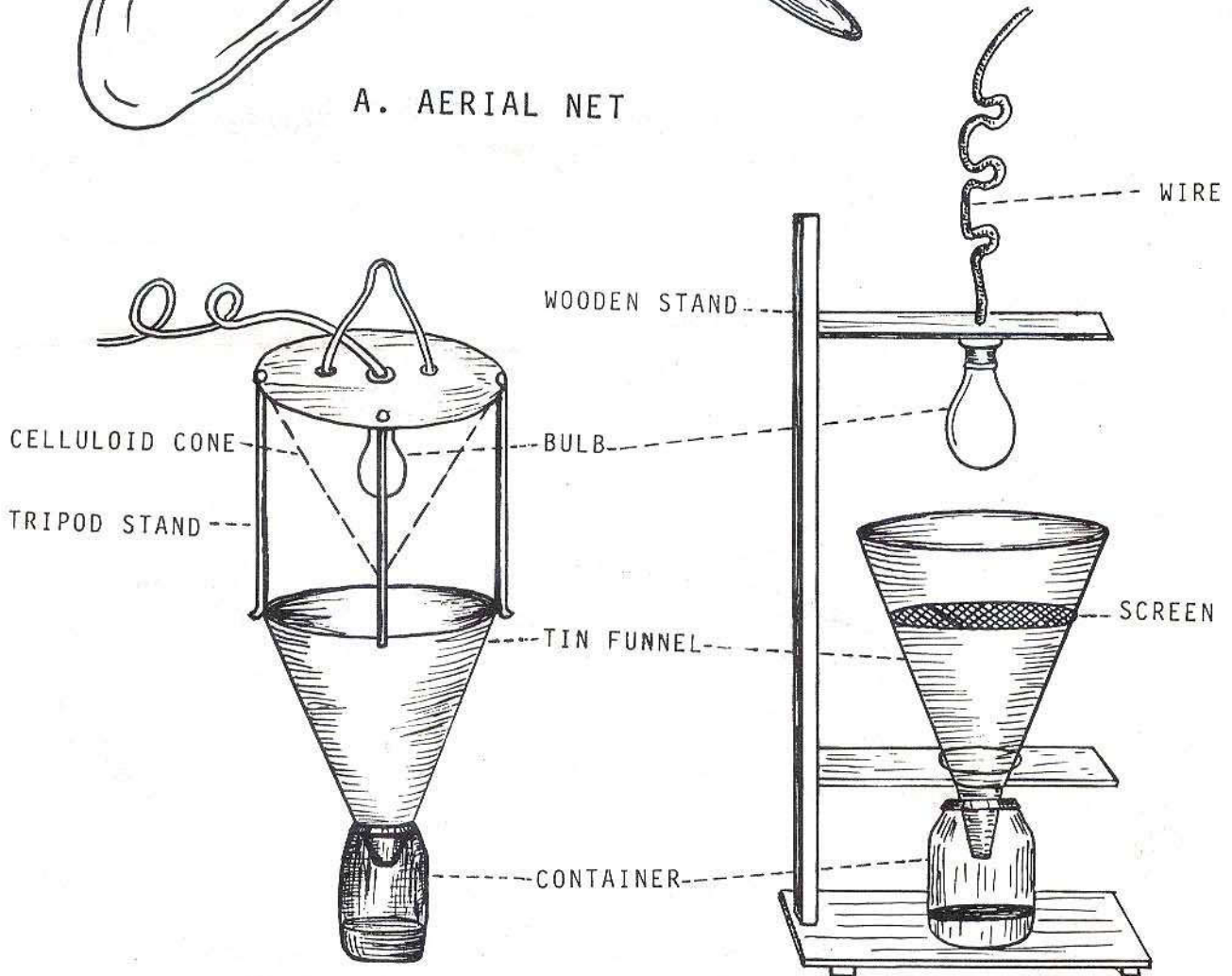
1. **Insect net:** It is of two types:

(a) **Aerial net** (fig. 5A): It consists of a handle, a wire rim and a cloth-bag. The wooden handle should be light, strong and about a yard long. The stout metal rim with a diameter of about 12 inches should permanently be attached to the end of the handle. The muslin cloth-bag, which is double the width of the metal ring (i.e. 24 inches) and is generally cone-shaped (tapering towards bottom), should be attached to the metal ring. The students can also construct a net whose handle can easily be detached for transporting purposes. After sweeping through vegetation or swinging at the insects, the net must be turned over immediately for preventing the escape of active insects.



A. AERIAL NET

B. ASPIRATOR



D. LIGHT TRAP

C. SIFTER (BERLESE'S FUNNEL)

FIG. 5. COLLECTING EQUIPMENT

(b) **Dip net:** The aquatic insects can be collected with a dip net. It is almost similar to the aerial net but is shallower (i.e. the length of bag is equal to the width of the metal ring) and has a stronger nylon cloth-bag with fine meshes. The net is simply dipped into water for collecting the swimming insects and then lifted up. But in a stream, its mouth is placed against the flow of water at some narrow place for collecting the aquatic insects.

2. **Aspirator (Fig. 5B):** It consists of a glass vial, a mouthpiece tube and an intake tube. The glass vial is fitted with a cork or rubber stopper having two holes in it. In one hole the mouthpiece tube is inserted, while in the other hole the intake tube is fitted. The inner end of the mouthpiece tube is covered with a small piece of muslin cloth to prevent the insects from being sucked up into the mouth. This device is very useful for collecting small insects, especially for keeping them alive. The outer end of the intake tube is brought near the insect and then it is sucked in from the outer end of the mouthpiece tube.

3. **Sifter (Fig. 5C):** The best and simple type of sifter is the Berlese's funnel. It consists of a tin funnel which is fitted on its inner side with a screen of wire-gauze or cloth. This funnel has a container of alcohol below and a light bulb above it. All these are fitted in a wooden stand. The sample of litter or soil containing the minute insects is placed on the screen in the funnel. The light and heat of the bulb repel and force down the insects through the screen and they ultimately fall into the container where they are killed.

4. **Light trap (Fig. 5D):** It consists of a tripod stand having a light bulb in its top covering. The lower side of the stand is fitted with a tin funnel which has a container of alcohol below it. A celluloid cone is placed around the bulb for deflecting the insects into the funnel and ultimately into the container. As the light shines on all sides except top and bottom, many insects attracted to light can be collected with this trap.

KILLING

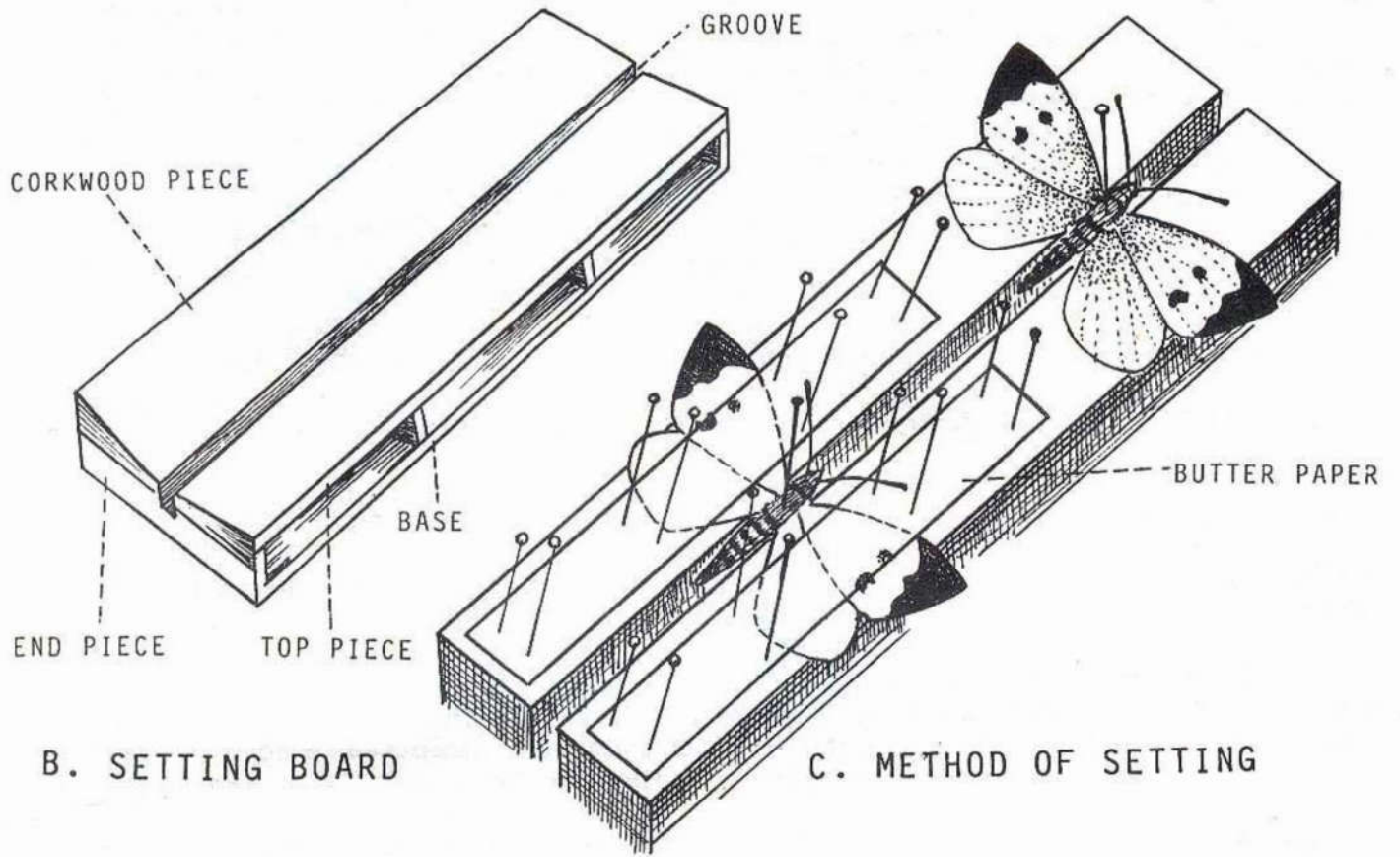
After collecting, the insects are generally killed in a cyanide killing bottle (Fig. 6A) which is prepared according to the following procedure:

Take a wide-mouthed glass jar or bottle. Put a thin layer of finely powdered sodium or potassium cyanide at the bottom. On this layer, place an other half inch layer of some porous material like dry plaster of Paris. On this layer, add still an other half inch layer of wet plaster of Paris for holding the cyanide below. After this, leave it uncorked for a few hours until it is completely set and dried. Now close it tightly with a cork and finally label it as 'POISON'.

Note: Remove the insects immediately after they are killed because a long exposure to cyanide results in discolouration, especially in brilliantly coloured specimens. Besides, the body appendages may become stiff and distorted.

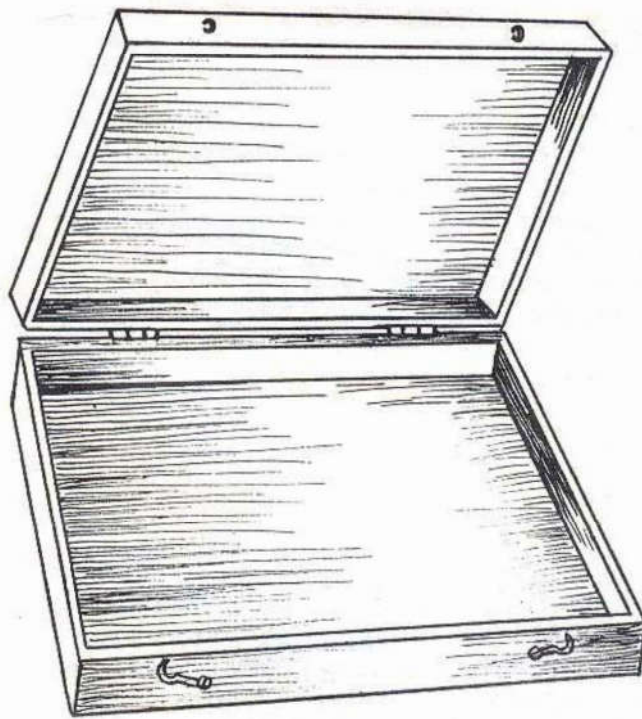
PINNING AND MOUNTING

After killing, the insects should immediately be pinned, otherwise their body parts on drying are likely to be broken. The common pins should not be used because they are short and thick and soon become rusty. For this purpose, special type of steel pins (insect pins or entomological pins) are

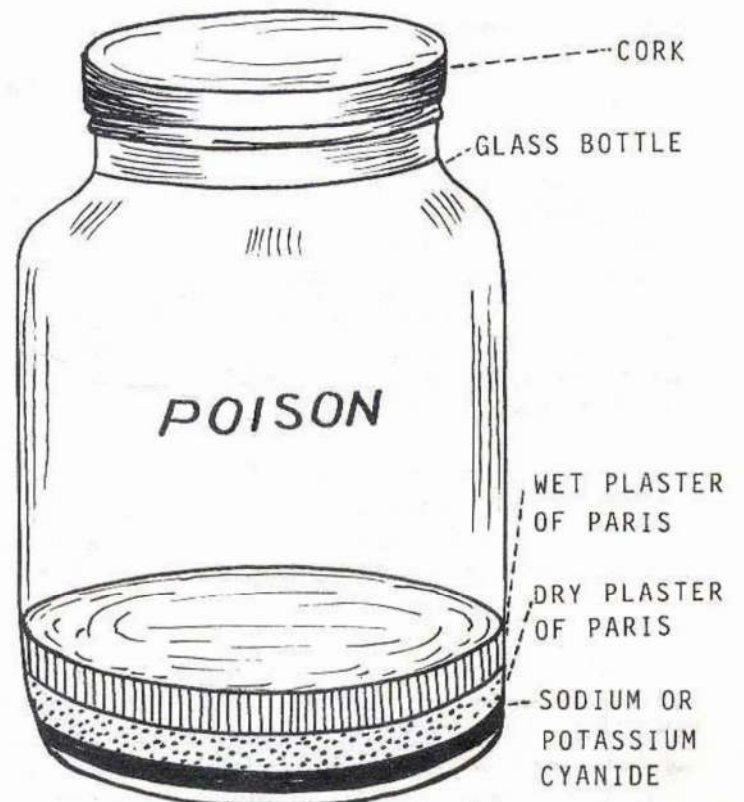


B. SETTING BOARD

C. METHOD OF SETTING



D. COLLECTION BOX



A. KILLING BOTTLE

FIG. 6. KILLING, SETTING AND STORING EQUIPMENT

used. These pins are available in many varieties according to their variable sizes. But generally two types of these pins, namely, No. 16 and No. 20 are used for pinning the large and small insects respectively. All insects should be mounted on the same height by leaving the upper one-third of pin which is sufficient for grasping the specimen. The pin should always pass vertically through the body of the insect. The insects for pinning and mounting purposes can be divided into the following groups.

1. Large insects: They are pinned with pins No. 16 and the pinning pattern is as follows:

(a) True bugs are pinned through the centre of the scutellum (Fig. 7A).

(b) Beetles and weevils through the base of the right elytron (Fig. 7B).

(c) Grasshoppers through the middle of the pronotal shield which is also called notalia (Fig. 7C).

(d) Almost all other insects are pinned through the thorax between the bases of the fore wings (Fig. 7D, E).

2. Small insects: They are pinned with pins No.20 in exactly the same manner as the above mentioned large insects. But these small pins having insects are then fastened on the tips of specially prepared pieces of cork or read-pith which, in turn, are held in position by large pins (Fig. 7F).

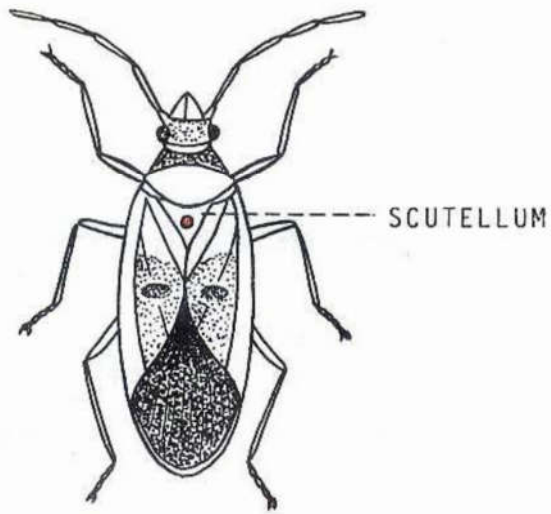
3. Minute insects: The insects which are too small to be pinned are either glued on the tips of specially prepared card, celluloid or cardboard pieces which, in turn, are held in position by large pins (Fig. 7G) or they are mounted on microscope slides.

SETTING OR SPREADING

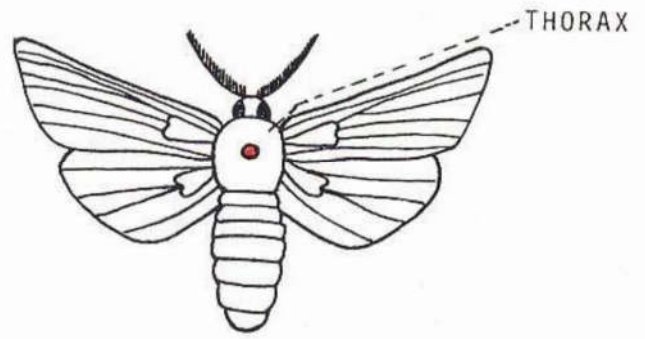
It is an important step in insects, especially in those whose wings have great taxonomic value. After pinning, the wings are spread on a setting or spreading-board. The size of the insect determines the size of the board needed. Small insects need boards with narrow grooves while the large species need boards with wider grooves. The boards in which the size of the groove can be adjusted according to the size of the insect can also be prepared. A general purpose setting-board (Fig. 6B) can be prepared according to the following measurements:

1. A hardwood base 12" x 3" x 1/2".
2. Two hardwood end pieces 1/2" x 3" x 3/4".
3. Two softwood top pieces 12" x 1 1/4" x 1/2".
4. Two flat corkwood pieces 12" x 1 1/4" x 1/2".

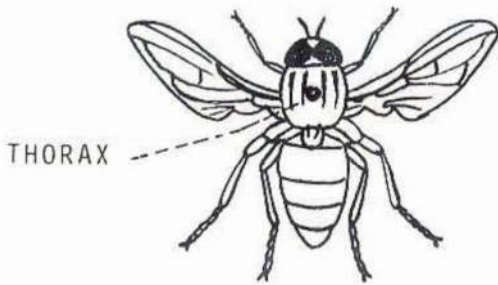
The pinned insect should be accommodated in the groove by inserting the pin so much so that the wing bases come at the level of the surface of the board or slightly above (Fig. 6C). Now spread the wings. To move the wings into a desired position, make use of dissecting needles or pins. When the wings are in the desired position, lay parallel strips of butter paper over them. Then pin these strips to the surface of the board close to the wings



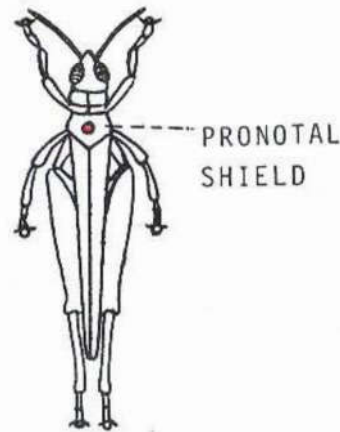
A. BUG



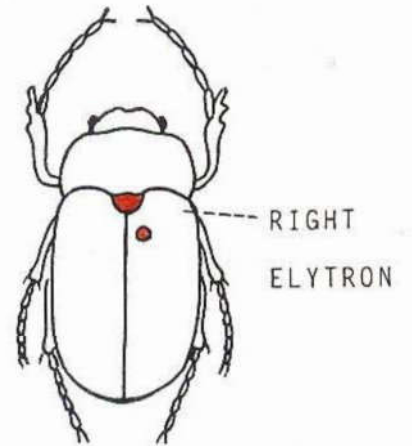
D. MOTH



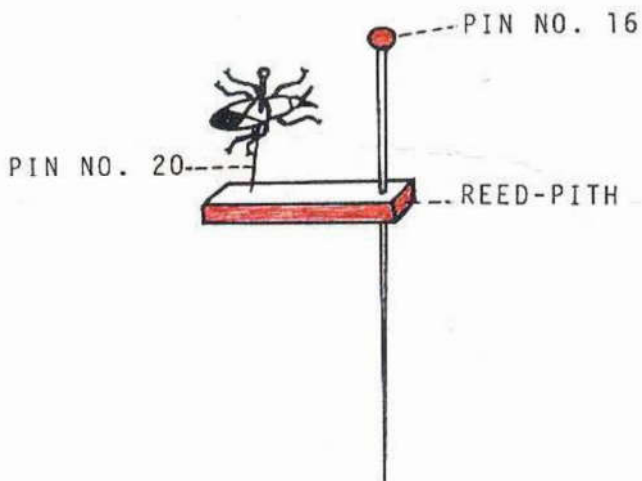
E. HOUSE FLY



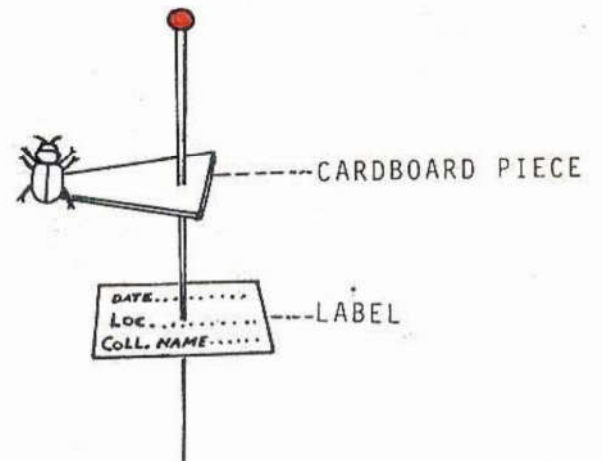
C. GRASSHOPPER



B. BEETLE



F. SMALL INSECT



G. MINUTE INSECT

FIG. 7. PINNING. MOUNTING AND LABELLING

but not through them. The antennae and abdomen are held in position by careful use of pins as a support. The specimens should be removed from the board when they are completely dry.

LABELLING

The collected specimens must be labelled. There are two types of labels according to the method of insect preservation.

1. **Dry labels** (Fig. 7G): They are made from white stiff paper in rectangular form, each having a size of 1" x 1/2" and bearing on it the date of collection, locality and the collector's name. Sometimes, the printed labels are also available. The labels are always held underneath the insect and should be at a uniform height on the pin.

2. **Wet labels**: These labels are for the specimens preserved in alcohol and are prepared in exactly the same way as described above. They are written either in black India ink or in lead pencil and finally placed in alcohol.

STORING OR PRESERVING

For permanent study the insect must be stored or preserved. There are two methods of insect preservation.

1. **Dry preservation**: The pinned insects and those mounted on the specially prepared cardboard, cork or reed-pith pieces are arranged systematically in lines in wooden boxes (collection boxes), which have a cork-sheet fitted at the bottom. The most commonly used box of this type measures 18" x 12" x 3". It has also a tightly fitting hinged lid (Fig. 6D).

The insects in these boxes are often attacked by insect predators such as dermestid beetles, ants and booklice. To protect the collection from these enemies, place naphthalene balls in the boxes that will repel the predators. The balls can be mounted on pins by heating the pin-head and then thrusting it into the ball. Place many such balls in a box. Paradichlorobenzene kills the insect pests very effectively by fumigation when placed in the boxes. DDT can also be dusted lightly for this purpose.

2. **Wet preservation**: All soft bodied adult insects and those which can not be pinned due to their very minute size are preserved in a fluid. The most commonly used preserving fluids for adult and young stages are 70-80 per cent ethyl alcohol and 2 per cent formalin. Frequently, a few drops of glycerine are added in the former to have a good storage of the insects.