TAXIDERMY WITHOUT A TEACHER.

A COMPLETE MANUAL OF INSTRUCTION

For Preparing and Preserving Birds and Animals.

BY WALTER P. MANTON.

Postpaid, 50 cts.

INSECTS

HOW TO CATCH AND HOW TO PREPARE THEM
FOR THE CABINET

COMPRISING

*A MANUAL OF INSTRUCTION FOR THE
FIELD NATURALIST*

BY

WALTER P. MANTON

ILLUSTRATED

BOSTON

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BOSTON STEREOTYPE FOUNDRY,
NO. 4 PEARL STREET.

NOTE.

THE aim of this little book is to furnish the beginner in the practical parts of Entomology with reliable information in a cheap form, and to awaken a love for Nature, and a closer study into her works.

If this shall be accomplished in one individual case, it will well repay the time and labor expended by

THE AUTHOR.

BOSTON, 1881.

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HAND-BOOK OF INSECT COLLECTING.

CHAPTER I.

OUTFIT.

As in every craft one must have tools, so in this. Take time by the forelock, and during the cold, rainy days of spring, prepare your kit. If you are ingenious, so much the better. In any case, make your own outfit, so far as in you lies.

FIELD APPARATUS. — If you are to collect all kinds of insects, you will need three NETS. One handle for all three is enough. This should be of some light, strong wood, about six feet in length. I use four joints of a bamboo fishing-rod. The jointed handle to a landing-net used by fishermen is just the thing, if not too heavy.

To the smaller end of the rod a brass wire hoop, from twelve to fifteen inches in diameter, must be fastened. The net, which is to be sewed around, or made so as to be slipped on the hoop, should be about twenty inches deep, and conical.

Book-muslin, tarlatan, mosquito-netting, or gauze (silk or cotton), may be used, and may be green or white, each color having a certain advantage not possessed by the other.

The SECOND net, stouter in every way than the first, should have a strip of cloth, about half an inch wide, first fastened to the hoop, and to it the net is sewed. This net is for beating the bushes and grass for insects there concealed.

The THIRD net has a hoop of a little different shape (Fig. 1). It is

FIG. 1.

like a sugar-scoop; the net part of grass-cloth or coarse millinet. This is for collecting aquatic

insects and larvæ, which cling to the weeds and grasses, in ponds and streams. You will also provide yourself with a

HUNTING-BOX. — This should be of such a

shape as to fit into the coat-pocket easily; or it may be larger and slung from the shoulders by straps. A pocket-box shaped like a book is very handy. You can get any bookbinder to make this, or you can make it for yourself. I recommend the latter, for it is always best to be independent and self-reliant, when possible.

If you are your own manufacturer, you know how everything you have is made; and if you make a blunder now and then you will profit by it. Now for the box. Take a cigar-box, and tearing off the top and bottom, whittle down the sides until you have it about two and a half (2 1-2) inches deep. To one side glue a piece of wood rounded like the back of a book. Then find some old volume, — an Agricultural Report for instance, — the cover of which will project over the box sufficiently to allow some sort of a fastening to be put on. Remove the leaves from the cover, and firmly glue your box in their place. Glue sheet-cork or pith to the bottom, and paste unsized paper over it. Now fasten the cover down by a small hook; or pass a broad elastic band around the box. You can carry

from four to six of these in your coat-pocket, — provided you wear a shooting-coat, — and with the Reports, Vital Statistics, or what not, showing on both sides, you will seem a perambulating library of valuable information.

The BOX, to be suspended from the shoulders by straps, may be of any convenient size, and should be lined with cork, covered with paper. One end should be partitioned off, and have a cover. In this, forceps, pail, &c., may be carried.

You will have a bottle of CHLOROFORM, ether, or benzine, with a camel's-hair brush, attached inside to the cork, which should be of rubber. You will also need a

CYANIDE BOTTLE.

For this take a pint glass jar, such as is used for canning fruit, and place in it several pieces of cyanide of potassium, each the size of a filbert. Over these place a layer of pine sawdust, on top of which lay a small piece of paper, and over all pour plaster-of-Paris, of the consistency of cream, enough to cover the paper and saw-dust.

Set the bottle aside, uncorked, until the next

day, after which cork tightly. This bottle will last, according to use, from ten days to four weeks, after which the cyanide must be removed. Care should be taken not to breathe the fumes from the bottle, as they are deadly poison when inhaled to any extent.

You will also have a pair of brass FORCEPS, small at the ends. These may be made by bending a strip of sheet brass in the middle, and filing the tips to the proper size.

You should have plenty of INSECT-PINS of various sizes. The German pins are the best. Also, several dozen PILL-BOXES, and as many BOTTLES — homœopathic pill-bottles are best — as you have pockets in your vest. It is a good plan to paste a cross of tape over the bottom of your pill-boxes, to strengthen them.

The GELATINE CAPSULES, sold by druggists, are very convenient for collecting small beetles, flies, &c. They may be carried in a box, and, as they are filled, placed in the cyanide bottle. Care must be taken that the capsules do not become wet or heated, lest they melt. Several sizes are made.

A DIGGER is also quite indispensable. This is simply a very strong, narrow trowel, — used for tearing the moss and bark from trees, and digging at their roots, for larvæ, &c.

You will find a large, strong KNIFE, with a *saw* blade, exceedingly useful.

A small pocket MAGNIFYING-GLASS often proves of great value.

A bottle of WHISKEY or ALCOHOL is necessary ; and a few TRIANGULAR envelopes, of different sizes, are useful.

I have referred to the VEST. This must have a series of little pockets on either side of the median line, besides the four pockets ordinarily found in a vest. A skilful needle will in a few minutes transform an old garment into a collecting vest, *par excellence*.

Thus equipped, you are quite ready for a day in the field.

CHAPTER II.

HOW TO PREPARE INSECTS.

You have returned from a morning's hunt, with your boxes and bottles well filled. After washing, and changing your collecting-suit for your every-day clothes, you will eat your dinner, and drink a cup of coffee or tea—hot. If you feel a little tired and sleepy, take a nap; or, at all events, for a little while banish entomology, and feel as free as if you had nothing in the world to do. Get rested.

Suppose you go to work immediately on arriving home. You are tired; your fingers are all thumbs; you break the legs and antennæ, and rub the scales off, and pin your specimens so poorly that your morning's work is well-nigh spoiled. If you wish to save yourself much regret, and good specimens, always rest after a tramp.

While you are resting, I will look over your—

HOME KIT. The first thing you will need is a SETTING-BOARD.

Take an inch plank, a foot and a half long, and saw a groove along the middle three-fourths of an inch deep. Bevel the edges of this groove, and at the bottom glue a strip of cork or pith.

Another way, which I like better: Take two thin pieces of board, and, placing them the sixteenth of an inch apart, nail a strip of wood across each end. Bevel the edges of the slit, and glue the cork to the bottom of the boards so as to cover the opening (Fig. 2-1). Over the cork should be pasted a strip of white paper. The

SETTING-NEEDLE is a straight or slightly curved needle, from two and a half to four inches long, fixed in a little handle. It may be made from a fine knitting-needle, or wire. Several lengths are convenient, some straight, others slightly curved.

FORCEPS. You will need several pairs of these, some with fine-drawn points, such as jewellers use; others with broad, flat ends; and

still others with the blades sharply curved at the ends, so that an insect may be pinned or unpinned without slanting the hand too much. One or two fine scalpels, a pair of sharp-pointed surgical scissors, a blow-pipe, drawn to a fine point, several camel's-hair brushes, and an alcohol-lamp, are necessary.

This is about all the necessary — practice will suggest convenient accessory — apparatus.

Now we will begin PREPARING your insects for the CABINET.

You take a butterfly from your collecting-box, and thrust the pin through the cork of the Board. The body of the specimen should be a quarter of an inch from the top of the pin, and should rest in

FIG. 2.

the groove. Now, with the setting-needle and forceps, — remember never to use the fingers, — draw out the wings, and keep them in place by pinning over them narrow strips of paper

(Fig. 2), or laying on them little squares of glass (*b*). The antennæ should also be straightened and held in place. Insects should be left on the board to dry from two to six weeks, according to the specimen. If removed too soon, the muscles are apt to relax, and let the wings fall.

Your setting-boards may be arranged like drawers in a frame, which should be covered with wire gauze or mosquito netting to keep out the dust, and yet allow air free access to the drying specimens.

KILLING. Specimens in the cyanide bottle will be found dead and nicely relaxed. Some butterflies and large moths will not be killed by the application of ether made in the field. A red-hot needle plunged through the thorax, placing them in a well-corked, large-mouth bottle, which is to be plunged into hot water; or lastly, — and infinitely the worst, since it is sure to spoil the plumage, — pinching them under the wings, gently, of course, will generally end their struggles.

Small specimens in the pill-boxes may be killed by dropping on a sponge a little ammonia, and

placing it and the boxes for a few minutes in a tin can, with a tightly-fitting cover. *Pale pink* or *bright green* insects should be killed in another way, as the ammonia affects the color.

PINNING. The pin should be thrust through the thorax of most insects, and inclined slightly backwards (Fig. 3, *a*). Beetles should be pinned

FIG. 3.

through the right wing cover, or elytron (Fig. 3, *b*), and the Hemiptera (squash bug, &c.), through the scutellum (*c*). Very small insects may be gummed to a triangular bit of mica, or white paper, through which the pin is thrust. Or those slightly larger may be impaled by a bit of very fine silver wire, which is stuck into a bit of pith, the pin running through the other end of the pith.

Long-legged spiders should have a piece of

paper placed below to support the legs and guard against breakage.

The steel punches used for cutting gun-wads will be found useful in making these paper supports.

Worms, caterpillars, &c., if not preserved in alcohol, or one of the other solutions, may be prepared as follows: With the scalpel or fine scissors make a small incision at one end, and by rolling a pencil or like round body over the worm, press out the contents through the slit. Do not roll too much, as the color is apt to be affected by too great pressure. Now blow up the flattened skin with the blow-pipe, or a straw, and, keeping it distended with air, hold it over the flame of the alcohol-lamp, high enough not to burn. Held in this position, and rotated from time to time, the skin will become thoroughly dried, and keep its shape.

SOLUTIONS, ETC.

I.

Glycerine.

Water. Equal parts.

Mix.

This is for spiders, &c. The first solution will become turbid. Change the specimens to fresh, which will keep clear for years, and preserve the color.

II.

Alcohol, one pint.

Arsenic, seven grains.

Corrosive sublimate solution, one dram.

Mix.

Label POISON !!

I have used this and found it good to preserve hard-bodied worms, and the bodies of large butterflies and moths. Apply with a brush.

III.

ALCOHOL.

Spiders, beetles, hairy caterpillars, &c., may be preserved in alcohol without changing color. At first it should be diluted with water; afterwards the specimens should be changed to alcohol of full strength.

GUM I. — Oxgall.

Soften with a little water.

Used for sticking on legs, &c., which have fallen off.

GUM II.

Inspissated Oxgall.

Gum Arabic. Equal parts.

Water to dissolve.

Mix.

Same use as above.

GUM III.

Gum Arabic.

Water to dissolve.

Corrosive sublimate, one grain.

Mix.

For fastening insects (small) on to mica, or paper triangles, &c.

GUM IV.

Pulv. Gum tragacanth, three drams.

“ “ Arabic, one dram.

Corrosive sublimate, one grain.

Mix.

Add water to consistency just thick enough to run. It will take two weeks to make this gum.

A little water should be added occasionally (Wollaston).

LURE.

Brown sugar; ale; a little rum.

Mix.

CHAPTER III.

THE CABINET.

THIS can be a case, with a series of shallow drawers; or a deep, glass-covered picture-frame; or like the collecting-books already described. For a small collection the picture-frame is best. This should be made about two inches deep, and of any shape or size. The front should be a frame-work, fitted with glass, and hung on hinges, so that the frame may be opened when desired.

The inside should be painted white; and to the back a layer of thin cork should be glued, and covered with white drawing-paper. Or, if you do not care to cover the whole surface of the back with cork,—in which case much is wasted,—you can glue small velvet corks, which may be obtained of any druggist, in rows, or in any other form desired, at a proper distance apart, and cover them with the white paper.

For a collection that is to be used much, as for classes, &c., the Books are the best cabinet. As I have already described these, I will only add, in this case, they should be neat, and have the order of the insects inside printed or labelled on the back. They should lie flat, and not stand on the end.

Or a collection may be placed in a cabinet, the size and shape of which is optional. A word, however, in regard to the drawers is necessary. These should be two inches deep, and tightly covered with glass. The bottom of the drawer is covered with sheet cork, and over it white drawing-paper. The cabinet should be closed by tightly-fitting doors.

Another very good case, which may be of any size, is made in this way. Have the top and bottom of the case of glass set in a wooden frame, lined inside with tin-foil. Glue bits of cork to the bottom of the glass to hold the pins, the width of the border frame being sufficient to allow the full length of insect-pins. The advantages of this kind of case consist in showing both sides of the insect, and furnishing surfaces

too smooth for the parasites to crawl around upon.*

.

Whatever you may keep your collection in, you must guard against the attacks of insects and dust.

The presence of parasites is indicated by a little pile of dust and débris at the bottom of the pin on which the insect is fastened. When this is discovered, give the specimens a slight baking in the oven; or atomize them well with benzine.

A little cup of benzine or a bag of camphor should be placed in each drawer, frame, or book.

* This kind of case is used in the collection at Brown University, and I am indebted to my friend, Professor J. W. P. Jenks, the able curator of the museum, for a description of its construction.

CHAPTER IV.

PRINTING BUTTERFLIES.

THIS very pretty and effective method I have used with great satisfaction. Much interest, scientific and other, may be added to an herbarium by printing the butterfly on the plant on which it feeds. The method is simple, and the results charming.

Take the insect in the left hand, holding beneath thorax. Clip off the wings next to body with the scissors, and lay both body and wings aside. Take a piece of white paper, and fold in the middle like a sheet of note paper. Now cover the inside of this with a clear solution of gum Arabic (Gum III), fold down upper half of sheet, and pass hand over it gently to spread the gum evenly.

Now reopen it, and arrange the butterfly's wings in the position desired, leaving space

enough between the two pairs of wings to paint the body.

When the wings are quite even, fold down upper half of paper, and put the specimens under a heavy weight or press to dry. When dry, place against the window-pane so that the wings are clearly defined against the light.

With a soft, black pencil draw a line around the edges of the wings, and moisten the part *outside* the line with water. In a few minutes the gum will soften, and the two sides of the sheet separate easily. On one side a perfect representation of the upper surface of the wings will be found; and on the other side the lower surface of the wings; while between the two a perfectly clean, bony membrane will be seen.

CAUTION. Do not let the water run into the part enclosed by the lead line, lest the scales be softened, in which case they will adhere to the skeleton instead of to the paper.

Now with pen and brush fill in body, antennæ, and legs, coloring from the natural body, which you have preserved, as a model.

If carefully done, the result will be exceedingly beautiful.

CHAPTER V.

TIME AND PLACES TO HUNT.

To be a successful entomologist, a student of insect life as well as a collector, one must be a close observer. We must watch Nature in her varying moods, and consider the fields and forests, the air and water, dead things and living, as open books, wherein may be read the histories of these little creatures.

The large works on entomology will tell you that insects are placed in *nine* classes, as follows :

1. Hymenoptera (Bees, wasps, &c).
2. Lepidoptera (Butterflies and moths).
3. Diptera (Flies, mosquitoes, &c).
4. Coleoptera (Beetles).
5. Hemiptera (Bugs, plant-lice, &c).
6. Orthoptera (grasshoppers).

7. Neuroptera (Dragon-flies, &c).
8. Arachnida (Spiders, scorpions, &c).
9. Myriopoda (Centipedes, &c).

You will also learn that the habits of all these classes and individuals are different.

Lepidoptera have been divided into three classes, *Diurnal*, *Crepuscular*, and *Nocturnal*.

For butterflies fly only during the day; hawk-moths at twilight; and the moths generally during the night; but some during the day-time.

Bees, wasps, and grasshoppers can be collected only during the day; while some beetles are diurnal, and others nocturnal.

If you hunt by night you will carry a dark-lantern, with a strong reflector. During the day you will have made several insect *lures*, and unless this is done, you had better not hunt at all at night, for your success will be indifferent.

You will take some of the mixture, the formula for which has been given, and smear it over fences and the trunks of trees in the woods.

The insects, attracted by the smell and sweetness of the bait, may be found on the tree at the

edge of the lure, or hovering in the immediate vicinity. Moreover, the brightness of the light will draw them to you, — as you have seen a moth flutter and burn its wings at a candle, — when by a skilful sweep of the net you can take them as they hover near.

STREET LAMPS will often prove very efficient cages, as well as lures, and in the morning, especially after a dark night, will frequently yield rare and choice specimens.

But of course the day will be your harvest-time.

You will seek for insects in the woods; under bark; in rotten logs; under chips; in the ground, at the foot of trees, where also the *larvæ* may be found. Hedges and sand-pits; mud; water; manure; dead animals; meadows; marshes; ponds; moss; roots of grass; dried bones; fungi, and flowers; river banks, and under stones, — everything, everywhere, will yield some insect worthy of study, and a place in the collection.

Beautiful specimens of minute *coleoptera* are often found in mud. They may be separated by passing the material through a not very fine

sieve, on to a white cloth, and watching for motion among the particles; the beetles can then be easily secured.

You will find that collecting will become doubly interesting, if, besides capturing the specimen, you seek for its home, and, when practicable, carry it off with its builder. The cells of the carpenter-bee add greatly to the beauty and value of the specimen; and so it is with each individual in the nine classes.

Many hours may be profitably spent in watching the doings of these little creatures; and a ready pencil can find plenty to do on a summer's day in the fields. Take notes as you go along; never depend upon memory.

Suppose you have just succeeded in catching a bee or a butterfly in your net,—what will you do?

With your right hand carefully draw the net close to the insect, so that it cannot flutter or damage itself, for the delicate scales which cover the body are easily knocked off, and the appearance altered.

You then place a drop of chloroform—or

whatever killer you have — on the fellow's head with the camel's-hair brush. If it is a hairy bee, it may be pinned through the net, the pin having the direction as in the figure (Fig. 3 *a*). Otherwise, shake it carefully into the palm of the right hand, seize it by the legs with the thumb and forefinger of the left hand, and with the right thrust the pin through the thorax, and place the specimen in the collecting-box.

Beetles, flies, and in fact most specimens other than the *Lepidoptera*, which you cannot stop to pin in the field, can be placed in the pill-boxes or bottles; while all spiders, caterpillars, worms, &c., may be dropped into the alcohol, to be further dealt with on your return home.

Or, having secured a specimen in the net, you will open the *cyanide* bottle, and, placing the corner of the net, with the insect in it, into it, cork. The insect will suffocate in a few minutes, when it may be removed and pinned, or shaken into the bottle, where a number may be conveniently carried.

TRANSPORTING INSECTS. When room is an object, butterflies, dragon-flies, and the like may

be placed in triangular envelopes, properly labelled, and so carried. If apparatus, as setting-board, &c., is not at hand, stretch the wings of the insects, and place them between layers of soft paper, subjecting to light pressure until dry, when they may be packed in the three-cornered envelopes.

If room is plenty, plain pine boxes, eight by twelve, two inches deep, with cork-covered bottom, may be used.