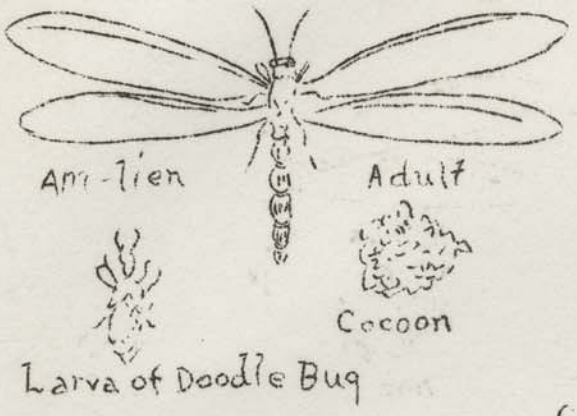
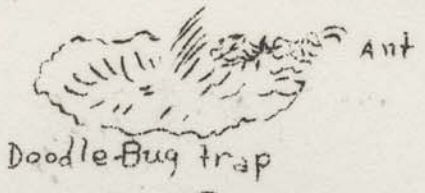
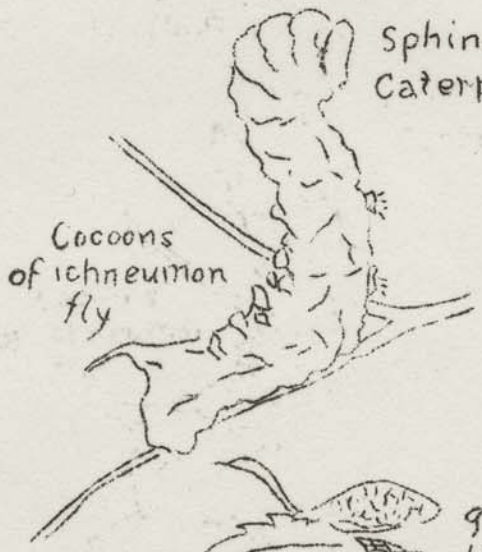
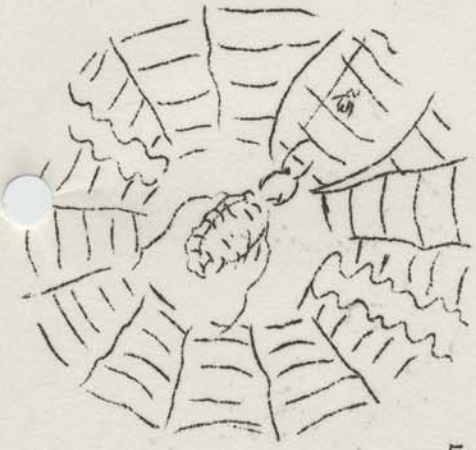
INSECT TRAILS

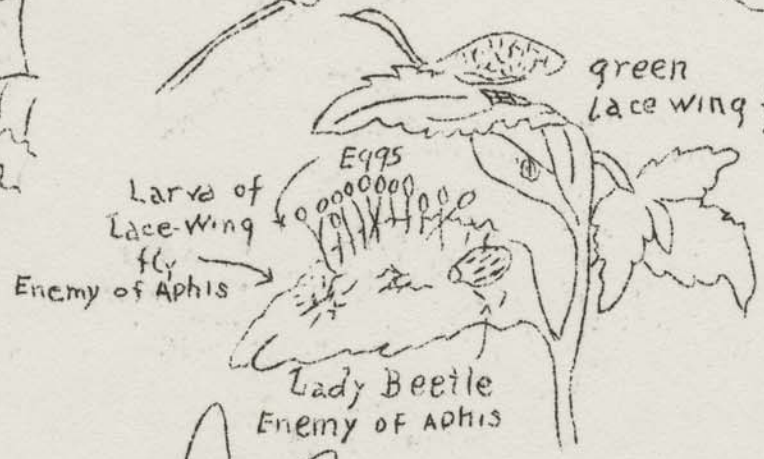
All the insects have little Parasites upon their backs to bite them And all those parasites have lesser parasites And so ad infinitum

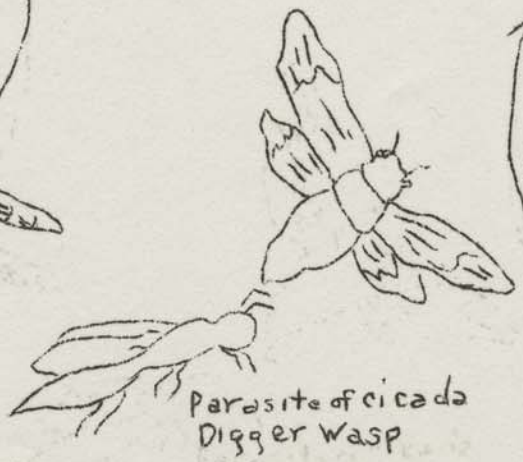


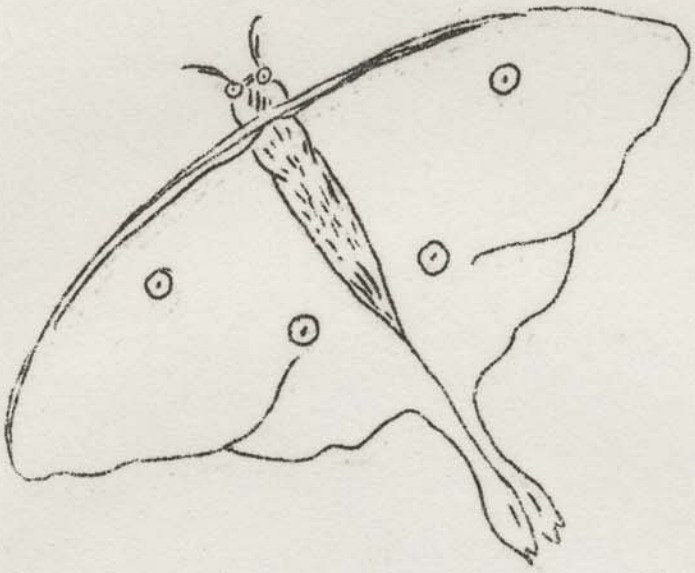












BUTTERFLIES

The rosy flush of early dawn,
    The flash of gold of setting sun,
The grace of thistle-down and fawn,
    The velvet dusk when day is done;
The vital youth of early spring,
    The vivid hues of sunset skies,
The joyousness of birds on wing:-
    Of these, are fashioned
Moths and butterflies.

L.D. Fazzini

INSECT TRAILS

Foreword

Insects furnish the accurate and keen observers more or fully as many human interest stories as any phase of wild life; one needs only time to learn much from relation between the cicada and the digger wasp; the ants and ant lion; the bee and the flowers; the borers and the trees and woodpeckers; the fleas and many larger animals.

Many original findings in these studies may occur for, although the life history of many insects are known still, there are nearly as many unknown. Scientists believe that injurious insects may some day crowd man from the face of the earth and we know that if it were not for the beneficial insects working tirelessly for us that our chance would be small against this horde of insect enemies. These injurious insects strive to steal our food, take our life blood and scatter diseases. It is important that one knows these so as to exterminate them, but is it not equally as important that one recognizes the friendly insects so as to save those? The difficult part of this identification is that insects have three to four stages in their life cycle. So one must try to know all phases.

Signs in General

Possibly on the master sign a list of beneficial and harmful insects such as are given in "Insects of Nebraska," Conservation Bulletin #5, from Nebraska Game, Forestation and Park Commission, Lincoln, Nebraska, and also in Hodge's "Nature Study and Life," could be posted. If pictures of the outstanding types could be posted, more interest would be evident. Also the simple key for distingushing insects, as given in "Boys Scouts Merit Badge Pamphlet" on insects, would give the trailer some of the elements of insect life.

But signs to show the evident relationship between insects and other forms of life will be the most interesting. A few will be given here but the trails may offer such a variety that the trail marker will have to make field studies of his own trail. Field book of Insects by Frank E. Lutz, Government Insect Bulletins, Keys to Galls, and Insects from the Slingerland Comstock Co., Ithaca, New York, and School Nature League bulletins of American Museum of Natural History, offers excellent and convenient sized books and pamphlets to carry in the field.

Some Suggestions for Signs

1. Some insects are careless about their clothes. You will find them on tree trunks as this cicada (put this sign near a cast-off skeleton.)
2. Dr. Howard says "The average loss every year from insect causes to the United States can not be less than $20,000,000 while U.S. Dept. of Agriculture puts the loss past the billion mark."
3. Near bugs or plant lice - Insects that suck must be smothered by contact with oily or soapy mixtures. How do they breathe?

4. Near the tent caterpillars often found in plum thickets, place a sign "An insect that chews, therefore their food must be poisoned." Look at jaws with lens.

5. When sawdust or sap or gum is found on trees, place near it a sign reading - This is the work of borers. If the tree is dead, the sign might be,- This may be done by caterpillar borers, or generally by round headed or flat headed beetles. The round headed borers go into the hard wood. What insect makes the channels between bark and sap wood?

6. Watch the swallows, swifts, fly catcher and woodpeckers in the day time and bats, and night hawks at night. What are they doing? How are they equipped to catch their prey?

7. Follow the activities of the phoebe, pewee and king birds. Consider their value to us. Why is a dead branch their favorite perch?

8. Near the funnel traps of doodle bugs found in sheltered places in fine sand, this sign might encourage observation. Where is the doodle bug or ant lion? For what is he waiting? What confuses the ant? The ant-lion's food is so scarce that it often takes two or three years before he changes into the large four-winged fly.

9. Near the paper wasp nest this question could be asked: What insect did a French scientist watch for many years before he learned how to make paper from wood?

10. Near a bumble bee nest, a sign could ask: When the clover, imported into Australia, yielded no seed, for what insect did they send?

11. Does the bee visit a clover, a rose and apple blossom on the same trip? Watch them. Why?

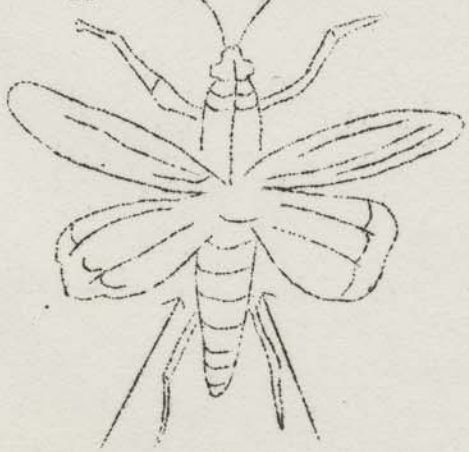
12. Near the evening primrose or a yucca plant, this could be posted. Find the moth and discover whether this relation to the plant is of mutual benefit.

13. On a grape vine leaf is often found eggs on stilts and possibly the green lace wing fly with golden eyes. Here the sign might read, Why such a tactful mother? Are the eggs out of harms way? A helpful insect! What do the larvae eat?

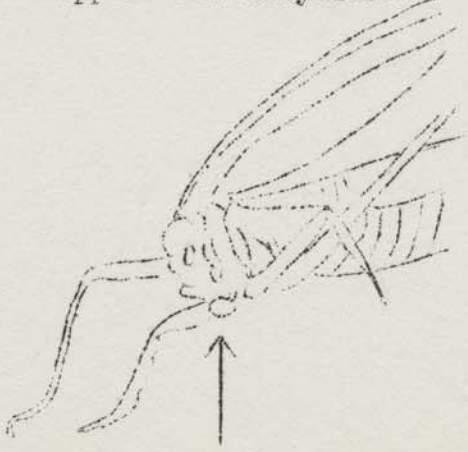
14. Eggs on milkweed plants are apt to belong to the monarch butterfly. This butterfly migrates to the southland and often in "flock" as birds. Can you tell this one from the Viceroy butterfly? The birds cannot, so they let them both alone because of foul taste of one.

15. Near a spider web this question could be placed. The spider is not an insect. Why? Spiders are our friends, feeding on injurious insects.

16. Many grasshopper signs could be placed, such as the enemies of the hoppers are red aphis and some wasps. Scientists tell us the planting of castor oil beans around the flowers and vegetables and trees will protect the plants from grasshoppers. Where are the ears of grasshoppers and katydids?



Grasshoppers' ears are on sides of abdomen



Katydids' ears are on front legs

Fig. XXXIV

17. Find "balls" of lady beetles and scatter out among fruit trees. What plant insects do they eat?

18. Near mulberry tree many insects and birds are found so many temporary signs could be placed here. Here one could ask difference between moths, butterflies and flies and bees, and many interesting questions and statements about them. For identification of butterflies and moths any of Dr. Holland's books or the chart given in Dr. Hodge's "Nature Study and Life" will give ample help to the trail marker.

19. If a digger wasp is found dragging a paralyzed cicada to its hole for its nursery food this question might arouse interest: How much would our meat packers pay for the formula of the preservative which the wasp inserts into the body of its prey in order to keep the meat fresh for its young?

20. Are all cicadas musical when they are pushed over on their backs? While they are in this position, find out if they are drummers or fiddlers.

21. (On a willow cone). Was this house built for a tenant? Are there visitors too? Does the tree sacrifice any growth for the sake of its tenant? Is there a mutual benefit? "And there's never a leaf nor a blade too mean, To be some happy creature's palace." Lowell.

Insect Trail Activities

1. The modern little Miss Muffets of the Nature Trail will wish to put their spiders in a jar, cover punctured for air, and feed with flies.

2. Fill a jar with stagnant water containing wrigglers and rafts of their eggs. Where do they breathe? How do they get food? Watch them change to mosquitoes.

3. Fill another jar with stagnant pool water and watch the larva of damsel flies or dragon flies eat the mosquito larvae. In the woods watch the adult dragon fly catch the adult mosquito.

4. Suggest a seat near a nettle patch and count the number of insects finding a safe retreat here.

5. Sit by the water side and watch the toad or frog catch flies. How does the toad's tongue differ from man's?

6. Make a collection of "bughouses" or galls.

7. Make small homes or insect zoo, for crickets, cicadas, spiders, caterpillar, bugs, bottles, doodle bugs, etc. These can be made from small boxes with one or more sides being replaced by screen, or a glass jar with perforated top. These are to be fed and watched, and if of the beneficial kind, they are to be released again to live. These can be mounted on a small tripod table for the trailers to observe with their lenses or macroscopically. Many questions can accompany these zoos, all to be answered by watching.

8. Make a list of insects seen getting food of nectar by a tubular mouth, another list where they were chewing food with jaws and still another seen piercing skin and lapping up their food, almost pumping.

9. Mount a case of harmful insects of the trail area.

10. Mount a case of the beneficial insects. Some stages of the same insect may be harmful and other stage may be useful as the blister beetle adult and larvae.

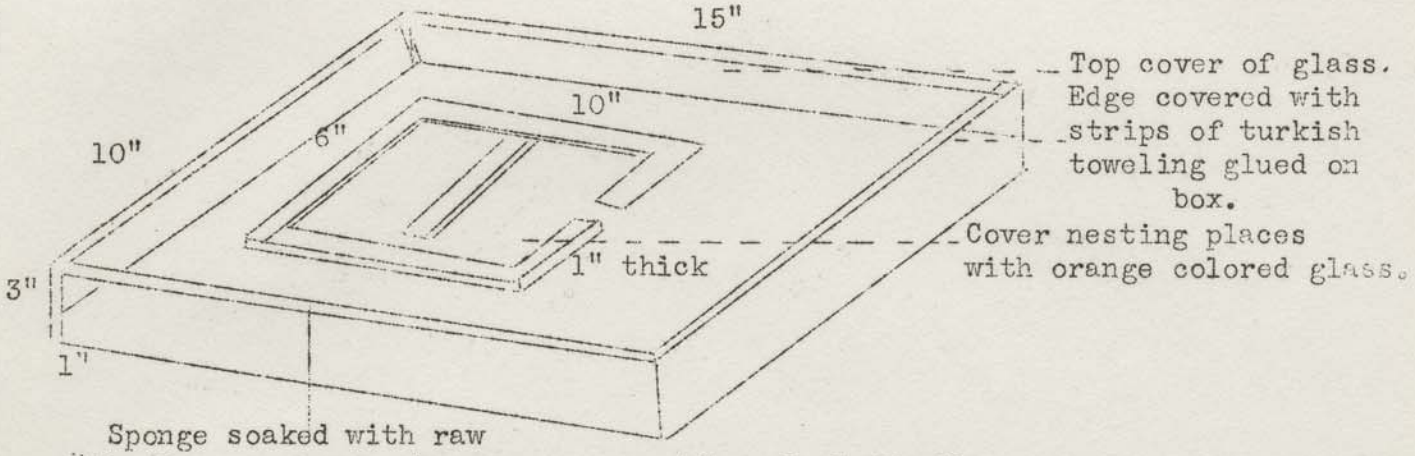
11. Break off twigs and weeds containing galls, place one end in moist soil in jar with perforated top, the object is to watch adult insect emerge.

12. Cocoons or pupal stages of moths and butterflies can be also kept to watch the bursting of the cocoons.

13. The large cecropia pupa in an oblong silky case or the hard jug handled tomato sphinx pupa can be watched in several phases of its life cycle.

14. Find some beetles or caterpillars as the sphinx parasitized by ichneumon fly larvae. Thus watch the struggle for existence and the delicate "Balance of Life."

15. Make a rooming house for ants* and try experiments to show their neatness, their idea of division of labor, their recognition of their own kind, etc.



After J. C. Bradley
Professor of Entomology.

Miss Fielde says "Sponge cake merged in honey and molasses, banana, apple, mashed walnut, and the muscular parts of insect larvae are among their favorite foods."

Fig. XXXV

Gather as nearly as possible the inhabitants of one entire hill of ants including eggs, larvae, workers and queen, in a box. Place box in ant house and they will carry all into the nesting chambers. Bring in branches covered with insect eggs, aphis, or larvae of other insects for preying observations.

16. A Riker mount of insects can be made in a shallow box filled with cotton. The cover may have a glass, celluloid or cellophane top inserted. The specimen, with sprinkle of camphor powder, tar camphor or naphaline, is placed on the cotton and the top secured by pins at each corner.

17. Dr. Hodges suggests this mounting:

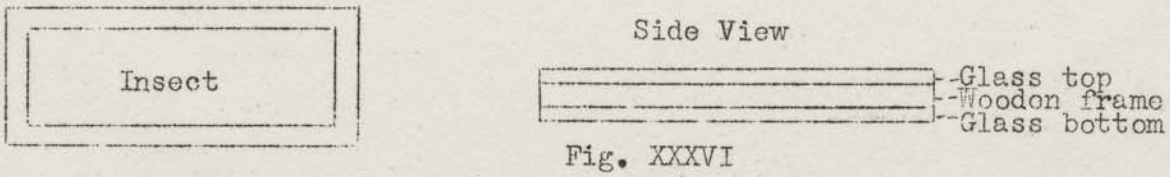


Fig. XXXVI

The insect is touched lightly with glue on under side and placed on bottom glass. The wooden frame is placed around speciment on edge of glass. The top glass is placed and all is bound together with gummed paper or cloth.

*Bul. M.B. #476, NRA , N.Y. City. For description of plans and experiments to be carried out. Also Boy Scout Merit Badge Pamphlet on "Insects".

18. Insects may be killed by placing immediately into alcohol* and mounted according to the Riker method. Cotton saturated with carbontetra chloride, either or cyanide can be placed in the screw top of the jar. A perforated card board can hold the cotton in place.

19. Many beautiful and instructive mounts can be made by putting a pressed flower with the insects that pollenate this flower in a Riker mount. The chrysalis, the butterfly, the eggs, the eaten leaf and the picture of the larva can all be under the same glass.

20. Collect a spider web. Make two pasteboard frames as in Fig. XXXVII and two pasteboard of same dimensions. These are tied together and taken to a field where there is a new web. Put paste or glue on two open frames. Put the pasted sides on edges of the web, press down over the edges and break off. Put the other pasted frame on the first frame containing web. Now the web is between the two frames. Put the two pasteboards oneach side of the frames, tie together and carry to museum or shop. Substitute glass for the two outside pasteboards and bind all together with gummed paper or cloth.

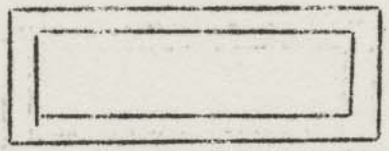
A spider is not a true insect. Why?

Make a list of all the types of spider webs - Balloon, orb, funnel and filmy dome**. Spiders have a sullen trade which is generally friendly to mankind.

Fig. XXXVII

Frames on which to mount Spider Web

Pasteboard to cover frame when carried in.



Frame for Web

Cut two of each kind

21. Vivariums can be made of a glass container with glass cover. The container can be one half full of moist garden soil and powdered charcoal (to keep soil non-acid). Into this the twigs or plants holding - eggs, or puppa stages of many insects, can be placed.

22. The terrarium can be made in the same way using plants.

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* Mr. Lyman Cavin of Superior, Nebraska, showed some perfect specimens killed in this way.

** Look in Handbook of Nature Study by Comstock for wonderful descriptions of these webs.