

UNITED STATES
DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

Mesa Verde NATIONAL PARK

PARK ARCHEOLOGIST'S OFFICE

FILE NO.

FILE BOX

MESA VERDE: NATURAL HISTORY

Insects

INSECTS

COLLECTED IN MESA VERDE NATIONAL PARK

THE SUMMER OF

1929

By Paul R. Franke.

IMPORTANT

This file constitutes a part of the official records of the National Park Service and should not be separated or papers withdrawn without express authority of the official in charge.

All Files should be returned promptly to the File Room.

Officials and employees will be held responsible for failure to observe these rules, which are necessary to protect the integrity of the official records.

NEWTON B. DRURY,

Director.

Orthoptera.

Collected at Mesa Verde Nat'l Park summer 1929.

by Paul R/ Franke.

A-7

ORTHOPTERA.

Insects, which when adult, have mouth parts for chewing; usually four wings, the front pair thicker than the others; the hind pair larger and folded in plaits when at rest. A pair of cerci is always present.

Blattidae.

Only one Cockroach was found during the summer. This was a young individula and identification was not possible.

Mantidae.

Two species of the Praying Mandits or Soothsayers are found in Colorado. Both were in the collection. These insects are characterized by the long prothorax, and the head set away from the thorax. The front legs are large and fitted for seizing prey, usually feeding on other insects!

Yersinia solitaria--Scudder.

This insect is readily recognized by the shrap conical eyes. The specimen obtained is reddish brown in color and 20 mm. in length.

Litanœutria minor--Scudder.

This Mantid is distinguished from the other Colorado specie in having the eyes blunt above. About 16 mm. long of tan color with dark brown mottling.

Phasmidae.

Commonly called Walking Sticks or Leaf Insects. They have an elongated sub-cylindrical body. Metathorax is usually the longest.

Parabacillus coloradus--Scudder.

This insect found in Colorado is known from all other United States phasmidae by having the antennae much shorter than the anterior femora. The specimen is dark brown in color and 65 mm. long.

Acridiidae.

This family contains the Locusts or Shorthorned grasshoppers.

Oedipodinae.

The Band-winged Locusts are placed in this suborder. The wings are usually of two colors giving them the banded effect.

Dissosteira carolina--Linnaeus.

The tegmina is plain or with numerous very small indistinct maculations. General color brown to reddish-brown. Wings with the disk and greater area deep black with a yellow border. Of rather large size 41--60 mm. the males being the smaller.

Trimerotropis texana--McNeill.

This hopper is blackish-brown; tegmina almost a solid uniform color. 27 mm. long in female; body yellow-green. Wings yellow in the disk with black band narrowing at, scarcely at all continued, on the posterior border towards the base.

Trimerotropis vinculata--Scudder.

This is a medium sized brown-gray species, with conspicuous maculations on the tegmina, which is broadest in the region of second black band; without taper towards the end. Wings almost twice as long as broad; disk greenish-yellow, narrow black band, almost central, bending toward the angle, and the tip is clear. Tegmina 19-30 mm, the female having the larger size.

Trimerotropis caeruleipennis--Brunner.

Light brown-gray in appearance, with indistinct maculations. Pale bluish, almost transparent wings. Antennae are darker in color. Size, tegmina 20--30 mm., Femora 10--12 mm., the females being the larger.

Melanoplus bivittatus--Say. The Yellow Striped Locust.

The females of this group is very large, males somewhat smaller. Dull olive brown to brownish-fuscous above. Face yellow, and two stripes run down the back from eyes almost to the tip of tegmina. Specimen is a young individual with undeveloped wings. Body length female 31-40mm, male 23-29 mm.

Tettigoniidae.

These are the longhorned grasshoppers. Tympana in this family and Gryllidae are situated near the upper part of the tibia of their front legs. Antenna is very long and cerci but three jointed.

Capnobotes fuliginosus--Thomas.

Tegmina and wings both present and well developed, longer than the body in both sexes. Tegmina is long and slender, that of male is furnished with small tympana. Wings long

and broad tapering apically. Color grayish brown, body length about 25 mm. Tegmina 40 mm.

Capnobotes accidentalis var. viridis--Cockerell.

This is a green colored hopper, the elytra having a row of obiloue discal spots. The costal margin of the wings is green the rest hyaline. Elytra of male 39 mm, female 49 mm. pronotum male 6.5 mm and female 7.5 mm.

Scudderia texensis--Sassure-Pictet. Texas Bush-katydid.

Size is large for the genus. Tegmina, wings and legs are all a bright grass green; the face tinged with yellow. The pronotum is longer than broad. Hind femura vary slender. Length of body 21-28 mm, tegmina 31-39 mm. the female being the larger.

Stenopelmatus sp? Child of the Earth.

This is the same animal that Kellog calls "Jerusalem Cricket" and found living along the Pacific Coast. It is a large awkward, thicklegged sand cricket. It is found under stones or in the soil. It has a large smooth head and "Baby face" and is believed to feed on dead plant or animal matter. Body length 3cm and the head is about 1 cm broad. The abdomen is transversely striped. General color is shiny amber.

Ceuthophilus sp?

Unable to classify this individual. Seems to be a rather primitive form. Dark brown in color, with legs of light brown, body length 14 mm.

Ceuthophilus sp?

This is a light brown insect which I have been unable to classify. Body length 10 mm. General color of legs and body is light brown.

Gryllidae.

This is the family of Crickets. The head is more rounded than most of the grasshoppers. Wings of two kinds; one with short and one with long functional hind wings. Ovipositors long and needle like when present. Cerci three jointed.

Oecanthinae.

These are the tree crickets and vary in coloring from green to white, brown and black.

Oecanthus niveus--DeGeer. The Snowy Tree Cricket.

The form is moderately slender. Ivory white tinged with a pale green. Antenna suffused with pale orange. The black spots on both basal segments are round. Tegmina of male very broad--size 13 mm. long and 6 mm. broad; body length 12-14 mm. The female is long and narrow in body and wing.

Oecanthus sp?

Only a female was found of this species. It checks up well with all the characteristics of *O. latipennis* except in color, which is a grayish-tan and black antenna. Body length is 12 mm. wna wings of 10 mm Abdomen is black.

Gryllinae.

These are the field crickets and their general color is black, though there are variations from this.

Gryllus assimilis vernalis--Blatchley.

Size is small of uniform black, shining and no reddish brown spots on hind femora. An early spring cricket. body length 13-14 mm.

1

Neuroptera.

Neuroptera.

Chrysopidae.

These are the Lace-winged Flies or often called Aphis Lion. Greenish wings and antenna without terminal enlargement. They are very small and delicate little insects.

Chrysopia nigricornis--Burmeister.

This little lace wing has some of the cross veins of the delicate wings black, this being the distinguishing marks of the species. Color green and a yellowish stripe running down the upper side of the thorax and abdomen. Body length 10 mm and a wing spread of 20 mm.

Myrmeleonidae.

The ant lions have the antenna enlarged toward the end with terminal knobs. They live in sandy places and the larva hide in little funnel like pits waiting for their prey to slip in.

Brachynemura carrizonus--Howards Book.

This is a large fly of 5 cm. body length and a wing spread of over 7 cm. Gray black in color. Wings with a double row of costal areoles. Larva about 5 mm. in length is blackish-brown, covered with bristles.

Brachynemura 4-punctatus--Howard's Book

A smaller species than B. carrizonus, measuring but 5 cm. in body length and wings spreading but 4.5 cm. It is light brown in color and the abdomen has alternate bars of light and dark brown. Wings are brownish and four clusters of darker color.

10.
Bibliography.

Blatchley, W. S.-----Orthoptera of Northeastern America.

Wytzman, B.-----Genera Insectorum, a, Bruxelles.

Cockerell, T.D.A.D.-----Zoology of Colorado.

Henderson, W.W.-----A Taxonomic and Ecological Study
of the Subfamily Oedipodinae.
Bull. 191, Sept. 1924.
Utah Agric. Experiment Station.

Howard, L. Q.-----Insect Book.

Kellog, V. A.--}}}}-----American Insects.

Report of Butterflies
collected in
Mesa Verde National Park.
1929.

by Paul R/ Franke.

A

PIDOPTERA.

Rhopalocera.

The butterflies of the United States are grouped in seven families: Nymphalidae, Erycinidae, Lycaenidae, ^{Papilionidae} Papilionidae, Pieridae, and Hesperidae. The following is an outline of the families and members of each family found on the Mesa Verde this (1929) summer.

Nymphalidae.

Members of this family are chiefly of large or medium size. With a single exception "Hypatus" these butterflies all have the fore legs very greatly reduced in size in both sexes. This is the largest family of butterflies

The Crescent Spots.

This group includes some of the smaller members of Nymphalidae. The color of the wings is sometimes black, with red and yellow spots; but it is usually fulvous with the fore wings broadly margined, especially at the apex, with black, and crossed by many irregular lines of black.

Phyciodes montana--Behr. The Mountain Crescent.

This is a mountain butterfly ranging in altitudes over 5,000 feet. It is recognized by the clear fulvous area distal to the cell on the upper side of the secondaries. The adult has a wing spread of about 4.5 cm.

The caterpillar, 10 mm long, is of whitish color and has an odd number of spines on the abdomen.

Euphydryas wheeleri--Edwards. Wheeler's Checker-Spot.

This butterfly with a wing spread of 4.5 cm. is very common during the early summer. Characterized by the large amount of whitish-yellow on the basal portion of the upper side of secondaries. Very partial to a desert environment.

The caterpillar of white ground color, is marbled with black. The head is black and the second segment has a black collar like mark. Each of the succeeding segments has seven branching spines. The larval food plant is plantago.

Melitaea pola monache--Comstock. Monache Checker-Spot.

This checker-spot is smaller than the foregoing group, the wings expanding but 3.5 cm. Top coloring and marking is similar to Euphydryas wheeleri, but the underside of the secondaries give it distinguishing features. The background is white and three lines of brown cut across the field of white.

Caterpillar and food plant not described.

The Angel Wings.

This group is characterized by the irregular wings, which are variously notched and pointed. This is particularly true of the species of "Grapta."

Aglais antiopa--Linnaeus.

The Mourning Cloak.

The wings above are purplish brown, with a broad yellow margin, sprinkled with brown, and a submarginal row of blue spots. It has a wing expanse of 55 to 70 mm. This butterfly is common throughout the temperate zone.

The larva, often called spiny elm caterpillars, are purplish black, with a row of orange spots on the dorsum, and orange-brown prolegs. The body is clothed with short pale hairs and long forked spines. They feed on willows, elms and poplars.

Vanessa carye--Hubner.

The West Coast Lady.

The wings above are dark brownish-black, with irregular spots of golden orange. Several white spots in the apical portion of the fore wings. A characteristic feature of this species is the complete black band which crosses the cell primaries. Wings spread 5--6 cm.

The caterpillar, 3cm long, body of velvet black, has numerous orange blotches and a number of fine whitish hairs scattered throughout. No spines on the head, but bristly spines on the body. Food plant; members of the malvacea, but has been found on nettle, tree lupine, and California privet.

Basilarchia weidermeyer--Edwards.

Weidermeyer's Admiral.

This butterfly has a wing expanse of 6--7 cm. Three white spots on the apical section of the fore wings, and a row of large white spots extending through the middle of both pairs of black wings are the characteristic markings. The under surface of the wings is brownish-blue with similar white markings.

The caterpillars are about 25mm long, gray or brown mottled with white, and feed on willows, poplars and choke cherry.

Satyridae.

These butterflies are often classified as a sub-family of Nymphalidae. They are commonly called Nymphs or Satyrs and often Meadow-browns. They are chiefly brown butterflies whose markings consist almost entirely of eye-like spots. Some western species however are brightly colored.

The larva are cylindrical, tapering towards each end. The caudal segment is bifurcated and this separates them from all other American butterflies, excepting those of the emperors; Chlorippe.

Cercyonis alope boopis--Behr.

The Boopis Satyr.

This is one of the larger of the Meadow-browns. Wing expanse 5--6 cm. Characteristics of this species are its tendency towards obsolescence of the ocelli on the under side of secondaries and the lighter shade of grayish-brown on the upper surface. Fly from June to August.

The caterpillar feeds on all sorts of grasses.

Cercyonis alope ariane--Boisduval. Ariane Satyr.

This genus is distinguished by the clear cut striations on the under side, and the series of six spots on each secondary, disposed in groups of three, fixes the species. Wing expanse of 4--5 cm? flying from July through August.

The larva feed on grasses.

Cercyonis oetus--Boisduval. The Least Satyr.

There is a tendency in this species to restrict the ocelli on the upper side of primaries to a single spot, and the underside of the secondaries are streaked with black. Wing spread is 4cm.

The caterpillar when mature is of various shades of green and the tails are tinged with red. Feed on Grasses.

Coenonympha ochracea--Edwards. The Ochre Ringlet.

These small butterflies have bright yellow wings, and now markings above. The underside of various shades of yellow and brown, has a single ocelli in the apical corner of the primaries; the number of ocelli on the secondaries varying. Wing spread of 3.5 cm.

Early stages not described.

Papilionidae.

These are the swallowtail butterflies and their allies. They are large, brightly colored beautiful butterflies which frequently have the hind wings tailed.

The caterpillars are large, usually brightly colored, and frequently have a pair of retractile orange colored scout horns (Osmeria) which are enclosed in the segment behind the head.

None of the members are serious pests.

Papilio bairdii brucei--Edwards. Bruce's Swallowtail.

The imago has a wing expanse up to 10cm, and twice as long as broad. It is yellow with a broad black margin. Blue and orange markings on the posterior end of the secondaries and a tail 10mm. in length.

The mature caterpillar is bright yellowish-green, striped with black on each segment, and has a series of orange spots on the black bands. About 6cm long. The larval food plant are members of the parsley family, the Comstock states, a close relative of this species, *Papilio bairdii*, feeds also on *Artemisia*.

Pieridae.

In size this family includes medium to small members, and are nearly always white, yellow or orange, and usually marked with black. The fore legs are well developed in both sexes.

The larva are usually small slender worms clothed with short fine hairs, commonly known as "cabbage worms".

The Whites.

Pieris protodice vernalis--Edwards. The Vernal White.

Wing expanse of 4--4.5 cm. Surface of wings is white, with a bar or dash across the end of discal cell, and a submarginal row of three, more or less distinct, spots. This variation is the Spring generation of the Protodice butterfly, resulting from over-wintering chrysalis. Is distinguished by its small size and the distinct veining on the underside of secondaries.

The caterpillar is colored from deep to pale blue and green. Has four longitudinal stripes of yellow and is thickly covered with black dots. It feeds on the mustards.

Euchlo creusa hyantis--Edwards. Edward's Marble.

This insect has a wing spread of 4--4.5 cm. Wings are white with a black bar across the end of the discal cell and a group of black spots in the apical corner of the primary wings. The underside of the secondaries has greenish marbled striations. This group is usually found in desert like sections in the early spring.

The caterpillar is apple-green, dotted with black and with a fine stigmatal stripe. Feeds on the cruciferae.

The Orange-Tips.

Anthocharis cethura deserti--Wright. The Desert Orange-tip.

Besides the orange tips on the primaries, we also find a yellow suffusion occurs on the secondaries, in this variety. Wing spread is about three centimeters and will be found flying in the early spring.

The caterpillar is not described.

Anthocharis sara reakirtii--Edwards. Reakirt's Orange-tip.

This is the earliest flier of the butterflies, being abundant in March and April. It is characterized by the accentuated dark points at the end of nervules on the upper side of secondaries, and the increased amount of black on the primaries.

The caterpillar is not described.

The Sulphurs.

Eurymus eurytheme amphidusa--Boisduval. The Flavid Sulphur.

This variety is the summer brood of Eurymus eurytheme. It is larger than the spring form, 5--5.5 cm. wing spread. Usually orange tinged, it has a black spot at end of discal cell in the primaries and a red spot in the secondaries, and broad black margin.

The caterpillar is dark green, a basal white line running longitudinally, enclosing a narrow crimson line. Is covered with fine white hairs and a number of black dots.

Eurymus eurytheme eriphyle--Edwards. The Yellow Sulphur.

This is a high altitude summer form of this variable species. The ground color, upper and unders surfaces, is a clear lemon yellow, otherwise as the fore mentioned species. Found flying in association with amphidusa.

Eurymus alexandra edwardsii Edward. Edward's Sulphur.

This is a Rocky Mountain species. The clear unspotted yellow-white of the upper side of secondaries with help to differentiate it from the others. The females usually have darker scaling on the under side.

Lycaenidae.

These are the Gossamer-winged butterflies. Small of size and delicate of structure. Often confused with the skippers, they are readily recognized, by the slender body and the delicate bright colored wings. The front legs of the male are shorter and without tarsal claws.

The caterpillars are more or less slimy and slug like, and seem to glide rather than crawl. Some species have osmeteria; some feed on plant lice.

The family is represented by three well marked groups, all in this collection.

The Hair Streaks.

Hypouris chrysalus--Edwards. The Colorado Hair-Streaks.

Purple in color with a black margin and two orange spots in the lower corner of each wing, this variety is readily recognized. The under surface is of blue-gray metallic sheen, with white lines and orange, blue and red markings. Wings spreading 4 cm. and a tail of about 4mm.

The caterpillar is not described.

Mitoura siva juniperaria--Comstock. The Juniper Hair-Streaks.

This little butterfly is never found very far away from its beloved juniper. The color and markings are perfectly harmonized with its environment. Grayish-brown on the upper surface and greenish-brown underneath. The underside has a margin of white and brown running across both wings, and blue-gray spots in the lower corner of the secondaries. Wing spread of 3 cm.

The larva resemble the small end twigs of the food plant so perfectly as to be undistinguishable.

The Coppers.

Tharsalea virginiensis Edward. The Nevada Copper.

With a wing spread of 3.5 cm. this butterfly has a rich copper color on top, with a narrow black outer margin and an orange mark at the lower end of secondaries. Also a short hair like tail. The underside is a rich gray suffused with orange and black striation and a white margin running across the ends of both wings.

The caterpillar is undescribed.

Heodes heteronea--Boisduval. The Varied Blue.

The male is conspicuous with his gaudy blue goat and spotless white undercolor. The female is dark and often truly copper colored with black spots. The wings spreading 3.5--4 cm.

The Blues.

Plebejus melissa--Edwards. The Orange Margined Blue.

The distinguishing feature of this butterfly is the narrow sub-marginal line of orange spots on the upper side of both wings in the female. This line is present as a series of dots on the under side of both male and female. It flies in July and has a wing spread of 3 cm. The larva feeds on astragalus.

Plebejus icarioides evius--Boisduval. The Evius Blue.

This is the southern race of "icariaodes" and is characterized by the narrow dark margins on the upper side of the wings of the male, and the reduction of size of spots on the secondaries of both male and female. Wings expand 3 cm. and it flies in May and June.

Hesperiidae.

These are the common skippers and also the nearest relatives to the moths. They are called skippers on account of their peculiar mode of flight, darting suddenly from place to place. They are day fliers. The antenna are thread-like and enlarged towards the end, but in most cases the extreme tip is recurved forming a hook. The abdomen is stout, resembling the moths.

Erynnis persius afranis--Lintner. Afranius Dusky Wing.

The hind wings of the male are almost solid black on the upper side and the fringes are lighter. On the underside there is a double row of light spots along the margin of the hind wings in both sexes. The female is generally lighter than the male.

The caterpillar when mature, is plumb of body and pale green, feeding on willow, poplar and clover.

Hesperia nevada--Scudder. The Nevada Skipper.

This golden green skipper is common during June, July and August. The underside of the secondaries are green with large irregular white spots. The apical corner of the primaries has two light colored spots above and below. Wings spread 3.5 cm.

The caterpillar is not described

Bibliography.

Comstock, J./A.-----The Butterflies of California.

Elrod, M.J.)))-----Butterflies of Montana.
Bul.#30, Biol.Ser.#10, University of Montana.

Scudder, S.H.-----Butterflies of Eastern U.S.

Edwards, W.H.-----Butterflies of North America.

Comstock, J.H.&A.B.-----How to Know Butterflies.

Essig, E.O.-----Insects of Western North America.

Comstock, J.H.+-----Introduction to Entomology.

LEPIDOPTERA.

Outline of Heterocera
found at
Mesa Verde National Park.
1929.

by Paul R. Franke.

A

LEPIDOPTERA.

Suborder HETEROCERA.

The moths do not form as natural group as the Rhapalocera, the best that can be said about them, is that all Lepidoptera that are not butterflies are Heterocera. A great many family groups are included in the suborder. The following is an outline of the families and members of each family found on the Mesa Verde National Park this (1929) summer.

SPHINGIDAE.

THE Hawk Moths of Sphinxes are easily recognized by the form of the body, wings and antennae. They are strong fliers and the hind wings are smaller than the front wings. The body is stout and tapered at the hind end. The proboscis is generally very long. The antennae are more or less thickened in the middle part or towards the tip, which is often curved back in the form of a hook.

The larva is hairless, and usually have a horn at the hind end of the body, though when the larva is full grown this horn is often reduced to a tubercle. The name of the family and its English translation, "Sphinx," comes from the attitude of the larva when at rest with their front segments elevated, and the head drawn in.

Celerio lineata--Fabricus. The Striped Morning Sphinx.

This white lined sphinx has distinctive lines of white on the fore wings and thorax. The secondary wings are small with a large and wide pink band running across them.

The larva is variable in color and feeds on apple, plum, grape and currant.

Protoparce quinquemaculatus--Haworth. The Five-Spotted Sphinx.

This large gray moth has five yellow spots on each side of the abdomen. The general ground color of gray is peppered with spots of black and the thorax and abdomen are also striped with black.

The larva of this group is commonly known as the tomato worm and feeds on most all members of "Solanaceae."

Hyloicus chersis--Hubner. The Chersis Sphinx.

This is a beautiful gray variety of sphinx with black stripes setting off the gray coat. The small hind wings have alternate bars of black and gray, and distinctive bars of white and black on the abdomen.

The imago is very numerous around the evening primroses.

NOCTUIDAE.

The Noctuids or Owlets form the largest family of Lepidoptera in this country, consequently we find them rather common on the Mesa Verde. These are mostly dull colored moths and night fliers. Body is large in proportion to wings. Front wings

are strong and narrow. When at rest the wings are folded on the abdomen giving the insect a triangular appearance.

The larva are naked and of dull color. As a rule they feed on clovers but some feed on fruit and others are borers. A good many of them are harmful pests.

Synedra adumbrata--Behr.

This is a small moth of a wing spread of 3.5 cm. and when the wings are folded in appearance and color it is similar to the common dart-"Euxoa." When the wings open up the secondaries reveal the characteristic orange wing crossed by irregular lines of black, and a black outer margin.

Larva is not described.

Catocala pura--Hulst. The Pure Underwing.

A medium sized moth of 7.3 cm. wing spread. The primary wings are grayish with a number of distinct toothed stripes of light and dark shades running across the wing. The secondary wing is a pure red, with a broad black margin and a black bar across the field.

The larva is not described.

Euxoa tessellata--Harris/ The Tessellata Moth.

This dart is dark brown with large light and dark spots on the dull brown primary wings. The secondary wings are of plain gray brown. There is a heavy fringe about both pair of wings, which spread out to about 3.5 centimeters.

The larva is not described.

Members of this family not classified:

a. This is a gray peppered moth marked with black. The upper side of the primaries has a white spear-like mark and below this another white comma like mark. The under wings are of pure gray with heavy fringe. The wing spread about 4 centimeters.

b. This moth is about the same size as the foregoing but has a ground color of amber on the primaries, which have a narrow gray margin surrounding the entire wing, and several grayish spots within the brown field. The secondaries are cream colored and white fringed

ARCTIIDAE.

The majority of the species are conspicuously striped or spotted, suggesting the popular name "Tiger Moths." They are all stout bodied moths with moderately broad wings. When at rest the wings are folded upon the body.

Most of the larva are clothed with dense hairs and so are often called "Woolly Bears." Found feeding on legumes, pigweed, and milkweed.

Arachnis picta--Packard. The Painted Arachnis.

This insect has a wing spread of 4-6 cm. is distinctly marked on thorax and primaries. These are yellowish-white ground color crossed and recrossed by irregular bars of gray. The secondaries

and abdomen are pink crossed by the same irregular lines of gray.

The larva feeds on lupines, roses, and sagebrush. They are densely clothed in black and brown hairs.

Halisidota cinctipes--Grote. The Gartered Halisidota.

This is a pinkish bodied moth with very few scales on the wings, which are almost clear. Black and gray markings on the fore wings are rather distinct. The tarsi are annulated with black bands marked with gray points.

The larva is not described.

Halisidota argentata--Packard. The Silver Spotted Halisidota.

This is a very pretty insect and somewhat smaller than either of the first mentioned members of this family. Wings spread about 4.5 Cm. The gray brown color of the primaries is interspersed with spots of silver. The hind wings are almost clear.

The hairy black and yellow caterpillars feed on pines, fir and other conifers and are often quite destructive.

SATURNIDAE.

This is the group in which we find the silk worms. They are nearly^{all} very large thick bodied hairy moths, with sunken heads and strong wide wings.

The larva of most of our species live on the leaves of trees and shrubs. They are armed with spines and tubercles and easily recognized by their size.

Only one member of the family was found at the Park.

Samia cecropia--Linnaeus. The Cecropia Moth.

Cecropia's head, body, and bases of the fore wings are a rich red except for the white bands; the general wing color is dusky reddish brown; the crescents on the wings vary from white to reddish and are bordered with red and black; outside the prominent white band there is a reddish band; the outer border of both pairs of wings is light gray band. This is the general description of of the moth, but the species caught at the park is remarkable for the grayish color which seems to displace most of the red. Other color markings check up well. It is possible that this is just a Western variation.

The larva is about four inches long, green with bluish tints, especially along the back, and two pairs of red ones on the thorax. They feed on Poplars.

GEOMETRIDAE.

These moths are of medium size, the body is slender and wings are broad and delicate in appearance. They have only a short flight. Many hold their wings horizontally.

The larva have a peculiar method of locomotion. They first cling to the supporting twig or leaf by their thoracic legs and then arch up the back and bring the hind part close up, and then stretch their front portions. This gives them the name of land measurers or Geometrids.

Four members of this family were found but not classified:

a. This is a small ochre colored moth with an outer margin of black on upper portion of both wings. The outer ~~fringe~~ ~~is~~ black and white in alternate triangulation and there is a series of black bars on the top portion of the fore wings. The under side of the secondaries are a mottled mixture of cream, brown and black. A wing spread of 4 centimeters.

b. A brown moth with irregular margined wings. A darker brown band runs across the top of the primaries and one line of this band continues across the secondaries. In size it is slightly larger and heavier than a.

c. Plain yellow in color, the only marking this moth has, is an almost invisible darker yellow line across both pairs of wings. Wings spread of 4 centimeter.

d. This is a gray moth with black striations and dashes cross-ways in the wings, which are long and narrow. Very delicate in appearance the wings spread but 3.5 centimeters.

PTEROPHORIDAE.

These are the Plume moths so called on account of the remarkable form of the wings in most species. These being split into fissures of more or less plume like divisions. Two members of the family were found but their poor condition makes identification almost impossible.

LASIOCAMPIDAE.

These moths are mostly of large size. Palpi correct and generally large. No proboscis and very small eyes. The antenna are large--bipectinate--in both sexes. Body and legs usually hairy/Veination of hind wings very prominent.

The larva is always thickly coated with hairs.

Gloveria arizonensis--Packard. The Arizona Gloveri.

These moths have a wing spread of 8-9 centimeters. There are several variations differing in color from a light brown to a deep gray. A white spot is characteristic in each of the wings. The head and body is very hairy.

The larva is not described.

PRODOXIDAE.

Pronuba yuccasella--Riley. The Yucca Moth.

These little moths are white when the wings are closed and folded over the body. But when the wings are opened, the secondaries are seen to be of very dark gray. There is an intimate relationship existing between the Yucca plant and this species of moth.

The larva feed on the tissue of the seed capsule of these host plants until it matures.

Bibliography.

Holland, W.J.-----The Moth Book.

Essig, E.O.-----Insects of Western North America/

Lutz, Frank E.-----Fieldbook of Insects.

Comstock, J.H.-----Introduction to Entomology.

Sharp, David++++-----Cambridge Natural History.

COLEOPTERA

Collected at Mesa Verde Nat'l Park/

Summer 1929.

by Paul R. Franke.

90

COLEOPTERA.

THE BEETLES.

The winged members of this order have four wings; but the first pair of wings are greatly thickened, forming a pair of wing covers or elytra, beneath which the membranous hind wings are folded when at rest. The elytra meet in a straight line along the middle of the back and serve as armor, protecting that part of the body which they cover. The mouth parts are formed for chewing. The metamorphosis is complete.

Suborder ADEPHAGA.

Ventral part of the first segment of the abdomen divided by the hind coxal cavities, so that the sides are separated from the very small medial part. - Comstock.

CINCINDELIDAE.

Very graceful forms and beautiful colors are characteristic of the Tiger Beetles. Their name is suggestive of their predacious habit. One specimen was in the collection.

Cincindela sp.

This is a beautiful blue-green beetle, with a large and small gold spot on each elytra separated by a long angular comma like mark. It is 14 mm. long.

Very active -
lives in the soil.

CARABIDAE.

The Ground Beetles are so called because they are very common on the surface of the ground, lurking under stones and rubbish during the day.

Anisodactylus sp.

A small blackish beetle 7 mm. long. Abdomen and legs are black.

Anisodactylus sp.

The same size and form as the first mentioned one, but the abdomen and legs are of light brown color.

Suborder
POLYPHAGA.

The ventral part of the first segment of the abdomen is visible for its entire length beneath; the first three ventral segments are immovably united and the notum of the prothorax is not separated from the pleura by the distinct sutures.

SILPHIDAE.

The Carrion Beetles are mostly of medium size, some obtaining 35 mm in length. The segments near the tip of antenna usually form a knob. They feed upon decaying vegetable matter.

Necrophorus marginatus-Fabricius.

This is a black beetle, about one inch long with the antenna tipped with orange and two long bars of reddish-orange across both elytra. The wing covers are short and stubby, allowing three segments of the abdomen to protrude beyond their end.

CLERIDAE.

These are the Checkered Beetles usually found on flowers and on tree trunks. Many are beautifully marked.

Trichodes ornatus--Say.

This is a black and yellow checkered beetle, the wing covers having a black circle anteriorly and two black bars across the elytra posteriorly. 8 mm long.

MELOIDAE.

The Blister Beetles are characterized by the soft body, and the soft and flexible wing covers, and the prothorax is narrower than the wing covers.

Tricranoides stansburyi--Haldeman.

This beetle is small and black with bright red elytra, which are rather soft. 10 mm. in length. Head, thorax, abdomen and legs are all black. *Believed to be parasitic on nests of solitary bees.*

Epicauta sp.

A small soft winged insect, 7 mm. long, light brown in color and speckled with gray white spots. Long hind legs and very short antenna.

HISTERIDAE.

These beetles are easily recognized. Usually found around carrion and other decomposing substances; are small, short and generally black in color.

The beetle of this family in the collection is shiny black in color; oval in shape, and the elytra are truncate behind leaving two segments of the abdomen uncovered. The antennae are elbowed and have a short club. Length 6 mm.

BUPRESTIDAE.

These are the Metallic Woodborers. They are long and narrow, and appear as if made of bronze. Broad square cut head and the elytra taper back from the shoulders.

Buprestis aurulenta--Linnaeus. (#)

This is a beautiful metallic colored beetle. Blue-green in color the elytra having a very fine border of copper around them. They are three quarters of an inch in length.

Buprestis sp.

This is another beautiful wood borer, five eighths of an inch long, the elytra being checkered in black and brown, a black diamond the most characteristic marking in the center of the back. The thorax is blue gray in color.

(#)Thoreau in "Walden" refers to bug as being hatched out (by ?) the furniture.

EROTYLIDAE.

This group is usually of small or moderate size, tho some do measure up to 18 mm, one of the larger ones being caught in the park. They are elongate or oval in form, the tarsi are five jointed, the fourth being small. Antenna clubbed.

Cypherotylus boisduvali--Chevrolat.

A black insect with olive green elytra, profusely peppered with black spots. It is 15 mm. long and oval in shape. Antenna distinctly clubbed.

COCCINELLIDAE.

These insects are well known to every child under the popular name of Lady-Bug. More or less round in shape, generally red or yellow, with black spots or variations of this,

Hippodamia sp.

Three lady-bugs are in the collection. They are similar to *H. convergens* of Guer in spots and thorax markings, but are light brown in color instead of reddish. *H. pallida*

TENEBRIONIDAE.

The Darkling Beetles are nearly all of a uniform black color, and very common in the Southwest. The Western Pinacate (Eleodes) "The bug that stands on his head" is a member of this family.

Eleodes nigrina--Leconte

Pure black those in the collection varying from 15 mm up to 30 mm. in size. The characteristic elytra continues on backward and seems to envelop the abdomen, they end in a sharp point, to the rear.

Moretemnus sp.

A small dark brown beetle, 10 mm long and very narrow. Abdomen is twice as wide as the thorax; head same width as the thorax. Head, abdomen, and thorax are all ovoid in shape, antenna half as long as the body.

Zopherus sp.

This is a very hard black beetle with a large shield over the thorax and a small head. The elytra are black and crinkly with a grayish side or border. The underside, of all legs, is lined in white. 15 mm. long and 6 mm. wide.

SCARABAEIDAE.

These are the Scarabaeids or Lamellicorn Beetles. They are mostly short, stout-bodied beetles, commonly called June-bugs or May-beetles. The antenna is a lamellate form of club, the segments constituting it being flat, capable of being brought close together.

Trox sp.

A black, dirt covered, beetle with the wing covers speckled and crinkled and very rough. 10 mm. long.

Trox sp.

Similar to the above only smaller, 7 mm. long, and the antenna are rather conspicuous for so small an insect.

Serica sp.

Three brown beetles of this genus are in the collection. They are all light brown in color. Two small shiny ones 7 mm. in length and a larger one of 14 mm. The larger one is covered with a fine brown pubescence.

Diplotaxis carbonata--Leconte

This brown beetle is (covered with fine gray hair) of uniform shiny color. Length about 12 mm. Three specimens are in the collection. They are much darker in color than the Serica,

Euphoria inda--Linneaus.

This brown beetle is covered with fine gray hair and the elytra are peppered with black spots. The abdomen and legs are profusely covered with hair. Size 15 mm. long.

Polyphylla decemlineata--Say.

This is the largest and prettiest of the Scarabaeids in the collection. 30 mm. long. It has seven cream colored stripes down the back. The surface between the stripes appears greenish, this is due to minute yellow scales on the black ground. The antenna are rather large.

CERAMBYCIDAE.

These are the Long-horned Beetles or Cerambycids. They are usually of graceful form, differ in size, oblong of body, and the antenna are usually as long or longer than the body.

Ergates spiculatus var. neomexicanus--Casey.

This is a very large beetle--measuring 55 mm. The elytra have pale marblings on a dark ground and a number of spines at the sides of the thorax. Rather flat in appearance.

Monohammus scutellatus--Say.

This is a speckled beetle with finely crinkled elytra. General color is brown speckled with silver. Very long antenna, usually more than twice as long as the body. The insect is 21 to 23 mm. long.

Prionus californicus--Motschulsky.

A very large beetle, much thicker than Ergates and about as long, 55 mm. Dark red brown in color and have a high gloss. Antenna segments give an overlapping appearance. There are three spines on each side of the thorax.

Two other species were caught an the Park, but I have been unable to place them. They are both dark brown, almost dull black, in color. One has antenna about three fourths as long as the body, and the thorax wider (almost twice) than the head and is 34 mm. long. The other has antenna as long as the body and the head equally as wide as the thorax, is 17 mm. long.

CHRYSOMELIDAE.

These Leaf Beetles feed upon the leaves of plants both as larva and adults. They are usually small and oval in shape--the front is not produced into a beak.

Haltica obliterata--Leconte.

A small metallic blue beetle, 6 mm. long and with antenna that are coiled and many jointed, about onethird as long as the body.

CURCULIONIDAE.

The Curculios or typical Snout Beetles are easily recognized by having the fron produced into a snout. They compromise a very large family of thirteen sub-families.

The weevil in the collection is a gray one, longitutinally striped with black. It is 13 mm. long, snout 3 mm long and very stout. The antenna are ringed and clubbed; the beak being grooved to receive them.

ODONATA.

ODONATA.

The damsel and dragon flies belong to this order. All the members of this order live in water until they get their wings. Due to the dryness up on the Mesa Verde these flies are rather rare, but the unusual wet summer of 1929 kept the reservoirs in water and they were rather common. This order is divided into two suborders.

Suborder ZYGOPTERA.

The Damsel Flies.

Enallagma civile--Hagan.

This Damsel Fly is blue and black in color. Body 33 mm. long with a wing spread of 44 mm. Thorax has a midorsal black stripe, and the pale antehumeral stripe broad, and the dark humeral stripe is narrow and widest anteriorly. Abdomen blue, the following segments black: basal spot on 1, apical spot and ring on 2, apical fourth of 3-5, half of 6, nearly all of 7, and all dorsum of 10; 8 and 9 are entirely black.

Enallagma carunculatum--Morse.

Color buff and black, other markings are the same as in E. civile except that the abdomen is buff beneath and blackish buff dorsally. similar in size.

Suborder ANISOPTERA.

The Dragon Flies.

Libellulidae.

Sypetum corruptum--Hagan.

Length 41 mm. and wing expanse of 65 mm. Face and vertex yellow, black stripe between. General color is tawny red, legs blackish, abdomen olivaceous with spots on the sides of segments three to nine. Angulation of anal loop of hind wing is foot-like and bisected.

o.

Bibliography.

Sharp, David-----Cambridge Natural History, Vol.VI.

Cockerell, T.D.A.-----Zoology of Colorado, Univ. of Colo.
1927.

Kellog, V.L.-----American Insects.

Leng, Chas. W.-----Catalogue of the Coleoptera of America
North of Mexico.

Comstock, J.H.-----Introduction to Entomology.

Brues & Melander-----Key to the Families of North American
Insects.

Lutz, Frank E.-----Fieldbook of Insects.

Needham & Heywood -----Handbook of the Dragon Flies of
North America.

HYMENOPTERA

found Summer 1929 at Mesa Verde Park.

by Paul R. Franke.

HYMENOPTERA.

Hymenoptera are divided into a number of superfamilies, of these only the APOIDEA, bees, will be discussed in the following report.

APOIDEA.

The characteristics of this superfamily are;--First segment of hind tarsus expanded, flattened, and usually very hairy; trochanters one-jointed; many of the hairs branched; adults always winged. Male bees have 13 jointed antenna and 7 visible abdominal segments; females, one less of each.

Bees are very industrious and careful to store up food for their offsprings, differing in these habits from the wasps. The bees eat pollen and nectar themselves but, except for the "cuckoos" which lay their eggs in other bees' nests, store their nests with honey and pollen.

In the aggregate the bees do take large quantities of pollen from plants but, they are of great benefit to the plants because they transfer the pollen from one flower to another, thus fertilizing the ovum, which develops into the seed.

"Only the Bombidae and Apidae have developed a "worker caste". In the other families, the mother does the work of provisioning her nest, carrying home pollen on her hind legs, on the hairs of her abdomen, and in other ways, and regurgitating as honey the nectar she swallowed."

The following members were found in the collection of insects obtained at the Park this past summer (1929). I am greatly indebted to Dr. T. D. A. Cockerell of the University of Colorado for the identification of the various specimens.

Halictus trizonatus--Cresson	HALICTIDAE
Agapostemon texanus subtilior--Cockerell	
Proteraner leptanthi--Cockerell.	

Andrena argentiniae--Cockerell	ANDRENIDAE
Andrena viridibasis--n.sp.	
Andrena adjuncta--n.sp.	
Andrena speculifera--n.sp.	
Andrena --n.sp.	
Andrena --sp.	

Nomada peconensis--Cockerell	NOMADIDAE
Nomada crawfordi--Cockerell	
Nomada frankei--n.sp.	

Anthophora neo mexicana--Cockerell
Anthophora dimillina--Cockerell
Anthophora porterae--Cockerell
Anthophora subignava--n.sp.
Xenoglossa excubans--Cockerell
Emphoropsis citulus--n.sp.

ANTHOPHORIDAE

Bombomelecta fulerida--Cresson

MELECTIDAE

Bombus morrisoni--Cockerell
Bombus bifarius--Cresson

BOMBIDAE

Osmia gaudiosa--Cockerell
Osmia wilmattae--Cockerell
Lithurgus apicalis--Cresson
Heteranthidium occidentale--Cresson

MEGACHILIDAE.

Apis mellifera--ligustice--Spinole

APIDAE.

HALICTIDAE.

Mostly small bees; the first discoidal cell is not long or scarcely longer than the marginal cell, which is not square-cut at the tip; basal vein rounded posteriorly, first recurving vein not meeting the first transverse cubital; second recurrent not sinuate; first submarginal cell longer than third, often as long as second and third combined; stigma well developed, lanceolate; hind basitarsi narrower than tibia. No pubescent depressions on the face.

Halictus:-Abdomen usually not shiny, segments 1 to 4 or 5 usually fringed at apex with pale pubescence, fifth of females with a longitudinal furrow.

They usually nest in the ground, frequently making branched tunnels. Some of the *Halictus* are very small and are called Sweat-bees because they seem fond of alighting on perspiring humanity. Some of these bees are among the first to appear in the spring. The pupae are enclosed in transparent skin-like cocoons.

Agapostemon:- The males have only the head and thorax metallic colored and the first recurrent vein is received by the second submarginal cell near the middle. Their habits are similar to *Halictus*, of which they are often classed as subgenera.

Proteraner:- The abdomen is narrow and the males appear in the spring with the females, which is not the case with the other *Halictinae*.

ANDRENIDAE.

These are usually black, with pale pubescence, medium sized bees. Closely related to Halictidae, but the basal vein is almost straight, and the face, at least of the females has pubescent depressions.

Andrena:- This is the principal genus. They all seem to nest in the ground, but the sites chosen for their burrows vary greatly. Some make simple channels, others branched, but none seem to do much more than smooth the sides and stock each tunnel with a pill of pollen and an egg, filling the opening with dirt.

Some of the species have two generations a year.

NOMADIDAE.

Usually less than one-half inch long; some are almost hairless, with yellow or red chitinous markings. Wasplike in appearance and all are "cuckoos" lacking pollen collecting apparatus and living in the nests of other bees. Usually three submarginal cells, first recurring vein does not meet first transverse cubital; first discoidal cell longer than the marginal; first portion of subdiscoidal vein shorter than third portion of the discoidal. Eyes extending to, or nearly to, the base of the mandibles.

Nomada:- The apex of the marginal cell touches the front wing margin and the abdomen has chitinous bands or spots.

This genus lives at the expense of the genus Andrena, living in the colonies, in fact in the same burrows; using the pollen brought in by its host. The relationship is perfectly friendly, no opposition being shown to the parasite or inquiline.

ANTHOPHORIDAE.

These are large hairy pollen collecting bees. The clypeus is protuberant and, in males, usually yellow. Males often have long antenna. Marginal cell rarely longer than the first two submarginal cells united; first recurrent vein meeting the first transverse cubital; first portion of the subdiscoidal vein distinctly longer than the third portion of the discoidal; stigma not well developed. Eyes extending to the base of the mandibles.

Anthophora:- The marginal cell is not bent away from the front wing margins; first discoidal cell longer than marginal cell; third submarginal cell not narrower above than beneath.

Xenoglossa:- Maxilla palpi is five jointed and tarsal claws cleft. The lower anterior portion of the orbits have a large, somewhat triangular, space; the clypeus is remote from the eyes.

Habits of all members of this family are much alike. Burrows are made in the ground and stocked with a paste of pollen and honey for larval food.

Emphoropsis:- Robust pollen collecting bees, thorax with abundant erect hairs. They have the first recurrent nervure joining the second submarginal cell at or very near the end.

MELICTIDAE.

Usually robust bees with conspicuous markings due to hair, but without yellow tegumentary markings. A type derived from Anthophoridae.

Bombomelecta:- They have the maxillary palpi six jointed. Abdomen with hair and pale markings or spots. Scutellum has two spines.

MEGACHILIDAE.

These bees have two submarginal cells; top of marginal pointed, second recurrent vein not bent or directed outwardly before joining the subdiscoidal vein; face not pitted. The underside of the female abdomen has pollen collecting hair, except in the cuckoo genera. The second submarginal cell is much longer than high and almost in length to the first.

Osmia:- This genera includes metallic green, blueish or purplish bees, with tarsal pads. They are called Mason-bees because they construct small, earthen cells under stones, in burrows excavated in twigs and decaying wood, in deserted snail shells, in plant galls, and elsewhere.

Lithurgus:- Bees of large or medium size; the marginal cell is sharply pointed; face in female with a protuberance; male have a pulvillus, and abdomen ends in a point.

Anthidium:- These bees have no pads between the tarsal claws; the chitin of the abdomen bears pale markings not found in the other members of this family. They use the down of woolly-leaved plants for nests in burrows.

BOMBIDAE.

These are the Bumble Bees. They are conspicuous and abundant. The first discoidal cell is not long, or scarcely longer, than the marginal, which is pointed at the tip and extends far beyond the apex of the third submarginal cell; the stigma is not well developed; the second marginal cell is longer than the first or third, and strongly produced at lower basal corner.

Psithyrus:- is a large lazy genus that lives with its relatives. There are no workers, the "queen" living in a Bombus nest and letting Bombus workers bring up its young.

Bombus:- This is a social bee. A family nest is made and the

older daughters do not mate, but give their attention to caring for the nest and feeding the younger brothers and sisters. Workers are females, but smaller than the queens; males and queens are not born till late in the season.

Apidae.

Although the American Tropics have several general of stingless Honey Bees our only species of this family is the introduced and cultivated Honey Bee or Hive-Bee, *Apis mellifera*. The color of the abdomen is variable. This is the most written about insect.

The individuals usually seen are workers, almost sexless females. Legs are not concerned solely with walking, but are equipped for other activities such as; cleaning antenna, pollen gathering, scraping the pollen from abdomen, pollen carriers, etc.

The swarming of the honey-bee brings about an increase in the number of colonies, but it is the queen of the old colony, not her daughters, which goes out to form the new colony. The stimulus to the act of swarming is not understood; since a swarm sometimes starts without a queen, she cannot be the instigator.

The swarming bees usually cluster on a branch or some other support before going to a cavity, such as a hollow tree, where the new colony is found. If there be a delay in finding a suitable cavity, unprotected comb will be made on the branch where the bees have clustered.

Shortly after the swarm has departed, a young queen, which has been left behind, eats her way out of her cradle, takes her mating flight several days later, and then settles down to her work at the old stand with the help of her unmarriageable sisters that have remained.

BIBLIOGRAPHY.

- Lutz, Frank E.....Fieldbook of Insects,
- Sharp, David.....Cambridge Natural History, Vol.VI.
- Comstock, J.H.....Introduction to Entomology.
- Cockerell, T.D.A.....Bees of Boulder County, Colo.
University of Colorado Studies,
Volume 4, page 239--.
- Cockerell, T.D.A.....Introduction to the Study of Rocky
Mountain Bees. University of
Colorado Studies. Volume 7, page 179--.