

Article XIII. — REVISION OF THE SPECIES OF
EUCHLOË INHABITING AMERICA, NORTH OF
MEXICO.

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PLATES XIII AND XIV.

The present paper is based upon the material contained in the collections of the Museum, W. H. Edwards (in possession of Dr. Holland), Dr. Ottolengui, Dr. Skinner, Dr. Strecker, J. Doll, and also that of the late B. Neumoegen. I am also under obligation to Dr. Scudder for bringing to me his type of *A. thoosa*.

The Butterflies of this country very much need revision, especially the genera *Argynnis*, *Melitæa*, *Lycæna* and *Colias*, in fact nearly all of the larger genera contain too many 'so-called species.' I expect to publish, from time to time, the results of my studies on the Butterflies, and I would earnestly appeal to those who are also studying these insects to do likewise, so as to enable us to get a clearer and more definite understanding of the species.

The name *Euchloë* was erected by Hübner (Verz. Bekant. Schmett., 1816, p. 94) for the European species *ausonia*, *tagis*, *cardamines* and *eupheno*; the Indian *eucharis* (*cæneos*) and the North American *genutia* (*midea*).

Boisduval (Spec. Gen., I, 1836) used *Anthocharis* in the same sense as Hübner, for a mixed lot of species, including those mentioned by Hübner.

Doubleday (Gen. Diurn. Lepid., 1847) placed ten species in *Anthocharis* (sens. restrict.) and many other species in *Callosune*, to which genus he also refers *eucharis* (*cæneos* Hüb.).

Herrich-Schæffer (Corr.-Blatt. Zoöl.-Min. Verein, Regensburg, Vol. XXI, 1867, p. 105) established the genus *Midea* for *genutia*, which consequently is the type of the genus. The name *Midea* is based on one of the synonyms of *genutia*, and is perfectly tenable. Scudder (Generic Names for Butterflies, 1875, p. 113) considered

genutia the type of *Anthocharis*, but this view cannot hold since Herrich-Schæffer had already used *Midea* for it.

Hübner's name *Euchloë* has been employed for *cardamines* only, by Westwood (Brit. Butt., 1841, p. 30), Stephens (1850) and Kirby (1858), and therefore must be considered as the type of the genus. This has been pointed out by Kirby (Zoöl. Record, 1872, p. 339) and Scudder (*l. c.*, p. 169) also specifies *cardamines* as the type of *Euchloë*.

From the above it will be seen that *Midea* may be used for *genutia*; *Euchloë* for *cardamines* and allied species. And I would here propose that *Anthocharis* be used for *ausonia* Hüb. and allied species.

The genus *Euchloë* may be divided into three groups, which may be separated as follows:

Euchloë Hübner.

Fore wings with 12 veins; veins 6-9 on a short stalk, sometimes with vein 6 free.

Costa straight, apex rounded. *sara* (and varieties), *cardamines*, *gruneri*, *pyrothoë*, and *eupheno* (*euphenoides*).

Anthocharis Boisduval.

Fore wings with 12 veins; veins 6-9 on a long stalk, sometimes with vein 10 also on a stalk.

Costa slightly sinuate (especially in the male); apex pointed—*ausonides*, *creusa*, *lotta*, *olympia*, *ausonia*, *bellemia*, *tagis*, *charlonia* and *levellandii*.

Midea Merrich-Schæffer.

Fore wings with 11 veins; veins 6-8 on a stalk; vein 9 absent; more or less falcate. *genutia*, *pima*, *cethura*, *lanceolata* and *bieti* (Asia).

Fore wings with 12 veins; strongly falcate. *scolymus* (Japan).

The venation is subject to variation. In the many specimens of *cardamines*, *sara*, *reakirtii* and allies which I have examined, veins 6-9 are usually on a short stalk, but in many individuals of the same species vein 6 is free from apex of cell and is not stalked, thus leaving only veins 7-9 on a stalk. The same is also the case with *ausonia*, *ausonides*, etc. In these veins 6-9 are usually on a long stalk, with vein 10 from cell or on a short stalk. Little or no dependence can therefore be placed on

hind angle. This band shows a tendency to become disconnected at the middle. Outwardly, at the apex and margin, bordered with black, serrated within and becoming broken into two spots about the middle of the margin. Hind wings with the nervures more or less tipped with black at the outer margin. Under side: Fore wings with patch bright orange and smaller than above. At end of cell is a double black spot, the transverse band absent. Apex white, instead of black, sprinkled with olive green; extreme outer margin narrowly yellow, with small black dots. Hind wings with veins yellow and marbled with olive green patches. Expanse 40-44 mm.

Female.—Upper side white or yellow. Apical patch smaller, orange, transverse black band absent. At end of cell is an elongate, black discal bar; outwardly the patch is edged by a sinuous black stripe, which is sometimes more or less distinct and broken. Outer margin of wing bordered by a series of black dashes, in form of spots, pointed inwardly. The space between the stripe and spots is yellow. Hind wings and under side same as in the male. Expanse, 40-50 mm.

Habitat.—California to Vancouver.

***Euchloë sara* var. *reakirtii* (Edw.).**

PLATE XIII, FIG. 6.

Anthocharis reakirtii W. H. EDWARDS, Trans. Am. Ent. Soc. Vol. II, 1869, p. 369; Butt. N. Am. Vol. I, 1870, pl. 1, figs. 1-4; Can. Ent. Vol. XXIV, 1892, p. 52; H. V. EDWARDS, Pacific Coast Lepid. No. 22, 1876, p. 6; SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, 1896, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Anthocharis thoosa W. H. EDWARDS, Can. Ent. Vol. XI, 1879, p. 87.

Male and *Female*.—Upper sides white and marked as in *sara*, but the black band on fore wing in the male as a rule much heavier and more continuous. On the under side the apex and outer margin of the fore wings is more heavily sprinkled with dark olive green, and the hind wings are uniformly and densely covered with dark olive green patches, much more so than in *sara*. Expanse, 28-40 mm.

Habitat.—California, Oregon and Washington to Vancouver, Arizona.

***Euchloë sara* var. *stella* (Edw.).**

Anthocharis stella W. H. EDWARDS, Can. Ent. Vol. XI, 1879, p. 87; SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, 1896, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Marked like *reakirtii*, but both male and female are yellow instead of white. Expanse, 35 mm.

Habitat.—Nevada, California, Oregon, Vancouver, Arizona, Idaho.

Euchloë sara var. **julia** (*Edw.*)

PLATE XIII, FIG. 7.

- Anthocharis julia* W. H. EDWARDS, Trans. Am. Ent. Soc. Vol. IV, 1872, p. 62; STRECKER, Lepid. Rhop.-Het. 1873, p. 50, pl. vi, figs. 6, 7; SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, 1896, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.
- Synchloë thoosa* SCUDDER, Bull. U. S. Geo. Surv. Hayden, Vol. IV, 1878, p. 257.
- Anthocharis thoosa* SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, 1896, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Male.—White and marked like *reakirtii*, but the oblique band on the fore wings is disconnected, or nearly so, at the middle. On the under side of the hind wings the patches are confluent. Expanse, 30 mm.

Female.—Yellow and resembles *stella* on the upper side.

Habitat.—Colorado, Utah, Montana, New Mexico, Arizona.

Sara may be readily known by its large size and by having the marbling on the underside of the hind wings less heavily marked, while in some individuals it is merely a sprinkling of small patches. It is the summer brood of *reakirtii*, as has been proven by Mr. Koebele (W. H. Edwards, Can. Ent., XXIV, p. 52) who states that *sara* of May and June proceeds from the eggs laid by *reakirtii* in March, and that some pupæ go over the winter to produce *reakirtii* in early spring, and that the product of *sara* was *reakirtii* of next spring.

With this conclusive evidence there can be no question as to the identity of *sara* and *reakirtii*. I have examined four specimens of *flora*, and they are the same as *sara*, with the black marginal spots on the hind wings somewhat heavier. It is not even worthy of a varietal name.

Reakirtii may be known from *sara* by being smaller and by having the markings on the hind wings beneath much heavier, though in a large series of specimens there is considerable variation as to the intensity of the patches. There are also examples which have the disc of the wings above yellow, but the majority of specimens are white. Dr. Skinner considers *julia* and *stella* slight modifications of *reakirtii*, and I fully agree with him. *Reakirtii* varies from white to yellow, and in large series of specimens it is quite difficult to separate *stella* and *julia*. *Julia*, how-

ever, has the markings on the hind wings beneath confluent, the marbling being in large patches, and in the male the black bar on the fore wings is angulate and broken in the middle. The females are either yellow or white. Scudder's *thoosa* was described from a single female example, and is the same as *julia*. The specimens described as *thoosa* by W. H. Edwards (Can. Ent., XI, 1879, p. 87) are the same as *reakirtii*. In *stella* both the male and female are yellow, but the markings on the hind wings beneath are like those of *reakirtii* in pattern.

Euchloë ausonides (Boisd.).

PLATE XIV, FIG. I.

Anthocharis ausonides BOISDUVAL, Ann. Ent. Soc. France, Ser. 2, Vol. X, 1852, p. 286; Lepid. California, 1869, p. 40; LUCAS, Revue Zool. 1852, p. 349; W. H. EDWARDS, Proc. Ent. Soc. Phil. Vol. II, 1863, p. 81; Butt. N. Amer. Vol. II, 1874, pl. I; Can. Ent. Vol. XXIV, 1889, pp. 52 and 109; MEAD, Rep. U. S. Geog. Surv. Wheeler, Vol. V, Zool. 1874, p. 747; H. V. EDWARDS, Pacific Coast Lepid. July 6, 1874; COCKERELL, Ent. Am. Vol. V, 1889, p. 34; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Male.—Upper side white, bases black. Fore wings with a black apical patch, broken on the costa by a white spot and on the outer margin by two or three white streaks. At end of cell is a discal bar of variable breadth. Costa speckled with black. Hind wings uniform white. Under side: Fore wings white, spot on disc repeated. Apical patch olive green instead of black. Hind wings mottled with green, in form of three irregular, wavy, connected transverse bands, the outer one throwing out forked branches to the margin. Expanse, 30-40 mm.

Female.—Similar to the male, but as a rule the hind wings above are suffused with a creamy white, especially so in the Californian specimens. Discal bar on fore wings heavier and the apical patch is usually more broken, the inner part forming a sinuous line. Expanse, 32-47 mm.

Larva.—Head small, round, green speckled with black; body covered with minute black granules from each of which springs a short hair. On each side are two longitudinal lead-colored stripes and one along the dorsum. The intervening spaces are yellow; lateral stripes edged below with white shading into yellow. Legs black; thoracic feet greenish yellow. Length, 28 mm.

Chrysalis.—Slender, cylindrical, thickest in the middle, tapering therefrom evenly, the ends being of nearly equal size. Triangular at the middle beneath, and the thorax above slightly waved. Color gray-brown, covered with fine longitudinal darker streaks. Length, 23 mm.

Food-plants.—Cruciferous plants.

Habitat.—California to Alaska, British America, Arizona, Utah, Montana, Colorado.

***Euchloë ausonides* var. *coloradensis* (Hy. Edwards).**

Anthocharis coloradensis HY. EDWARDS, Papilio, Vol. I, 1881, p. 50.

Like *ausonides*, but the discal bar on the fore wings is in form of a small, black, lunate spot instead of a broad bar. The under side of the hind wings have the markings of a somewhat deeper green.

Habitat.—Rocky Mountains, Colorado, Montana.

This is a common species wherever it occurs. In California it makes its appearance at the end of February, if the weather is moderately warm, and is on the wing until May. In Colorado it makes its appearance in May and June. It is single brooded, and the larva very much resembles that of *Pieris protodice*. The insect is closely allied to, if not the same as, the European *Euchloë ausonia*. The European species is double brooded, and as far as I can learn the larva is also different from our species. It is supposed by some collectors that *ausonides* is the spring form of *creusa* (*hyantis*), but W. H. Edwards (Can. Ent., XXIV, 109) contradicts this by stating that he had, in different years, bred from pupæ four examples of typical *ausonides*, all in the month of March.

***Euchloë creusa* (Doubl.-Hew.).**

PLATE XIV, FIG. 2.

Anthocharis creusa DOUBLEDAY & HEWITSON, Gen. Diur. Lepid. 1847, p. 56, pl. 7; HY. EDWARDS, Pacific Coast Lepid. No. 22, Dec. 18, 1876; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Anthocharis hyantis W. H. EDWARDS, Trans. Am. Ent. Soc. Vol. III, 1871, p. 205; HY. EDWARDS, Pacific Coast Lepid. No. 28, June 17, 1878; MEAD, Psyche, Vol. II, 1878, p. 183.

Male.—Similar to *ausonides*, pure white and of a different shade. The discal mark almost always uniform in size and shape. Apical marks as in *ausonides*. Markings of hind wings beneath as in *ausonides*, but the white spaces are more shining. It is also much smaller on an average. Expanse, 35 mm.

Female.—Similar to the male, but the black markings on the fore wings are a little more prominent.

[July, 1898.]

Larva.—Head and body apple green, very minutely dotted with black, and with a pure white stigmatal stripe or line.

Food-plant.—Various species of cruciferous plants.

Habitat.—California, Colorado, British America.

Hy. Edwards (Pacific Coast Lepid., No. 22, 1876) states that after an examination of a figure of *creusa*, from Dr. Butler, *hyantis* is the same species. W. H. Edwards, in his list of Butterflies of 1877 makes *hyantis* a synonym of *creusa*, and in his list of 1879 (Append. Bull. N. Am.) *hyantis* is entirely omitted. In 1878 Hy. Edwards changed his former opinion (Pacific Coast Lepid., No. 28, June 17) and re-established *hyantis* as a valid species, and it is so placed at the present time. I have recently had the opportunity of consulting Doubleday & Hewitson's work on 'Genera of Diurnal Lepidoptera,' in the library of the American Entomological Society, and find that the figure of *creusa* agrees very well with the insect described by W. H. Edwards as *hyantis*, the types of which I examined in Dr. Holland's collection. The upper side only of *creusa* is figured, and no description is given, but there can hardly be any doubt as to its identity with *hyantis* or possibly *ausonides*. At any rate it is not what we at present know as *creusa*, as it is labeled in collections. Found in June and July.

Euchloë creusa var. **elsa**, var. nov.

PLATE XIV, FIG. 3.

Male and Female.—Upper sides like *creusa*, but the hind wings beneath have the bands confluent, with small clear spaces and streaks. Expanse, 32 mm.

Habitat.—Laggan, British Columbia.

This is undoubtedly a variety of *creusa*, and it bears the same relationship to this species that *morrisonii* does to *cethura*, and it is closely allied to *orientalis* of Asia. It may be known by the almost uniform green markings on the hind wings beneath. Two examples are in the collection of Dr. Holland and Dr. Strecker; one specimen in each of the collections of Dr. Ottolengui and Mr. Doll.

Euchloë lotta, sp. nov.

PLATE XIV, FIG. 4.

† *Anthocharis creusa* HY. EDWARDS, Pacific Coast Lepid. No. 28, 1878; W. H. EDWARDS, Lists of N. Am. Diurnals.

Male and Female.—Like *creusa*, but the discal spot is always much larger, broader and in form of a cloud-like patch above and below. Hind wings beneath, with the marbled surface darker and the spaces between somewhat glistening white. Expanse, 32 mm.

Habitat.—Colorado, Arizona, Utah, Southern California.

This is the species which heretofore was known as *creusa*. I am of the opinion that it may be a variety of *creusa* (*hyantis*), from which it differs only in the larger size of the black spot on the fore wings.

Euchloë olympia (*Edw.*).

PLATE XIV, FIG. 5.

Anthocharis olympia W. H. EDWARDS, Trans. Am. Ent. Soc. Vol. III, 1871, p. 266; Butt. N. Am. Vol. II, 1874, pl. 2, and Vol. III, 1889, p. 2; STRECKER, Lepid. Rhop.-Het. 1874, p. 64. pl. 8; SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, 1896, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Male.—Pure white, blackish at base. Fore wings with a grayish black discal bar and a black apical patch enclosing a white spot on the costa. Under side: Fore wings with discal bar much reduced, lunate, white centrally; a green sub-apical mark on the costa and one on the outer margin. Hind wings white, beneath with a rosy tint along the costa and crossed by three bands; the first band is near the base, forming a circle; the second is a little in front of the middle, with irregular edges, and sends a branch into the third band on the submedian vein; the third band begins on the inner margin and curves towards the outer margin, which it strikes in three branches. A short dash on the outer angle, between the second and third bands. Female similar to the male. Expanse, 33-37 mm.

Euchloë olympia var. *rosa* (*Edw.*).

Anthocharis rosa W. H. EDWARDS, Papilio, Vol. II, 1882, p. 45; Butt. N. Am. Vol. III, 1889, pl. 2; SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, 1896, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Like *olympia*, but the apical patch is fainter in color and much broken, being indicated by a grayish black shade or scales at the extreme apex and a subapical spot on the costa and outer margin. These two spots are sometimes connected by grayish-black scales and form an oblique sinuous line.

Habitat.—West Virginia to Texas and Nebraska.

Euchloë cethura (Felder).

PLATE XIII, FIGS. 1, 2.

Anthocharis cethura FELDER, Reise Navarra, Lep. Vol. II, 1865, p. 182, No. 174, pl. 25, figs. 1 and 2; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Anthocharis cooperi BEHR, Trans. Am. Ent. Soc. Vol. II, 1869, p. 304; EDWARDS, Butt. N. Am. Vol. I, 1870, pl. I, figs. 5-8.

Anthocharis angelina BOISDUVAL, Lepid. Calif. 1869, p. 40.

Male.—Upper side white, sometimes tinged with pale yellow; base of wings black. Fore wings with an orange subapical patch, as in the female of *reakirtii*, bordered outwardly by a row of connected or disconnected wedge-shaped spots. At the end of the cell is a prominent black discal bar. Costa streaked with black. Hind wings with a minute black spot on each nervure on the margin. Under side: Fore wings with subapical patch canary yellow, shaded and irrorated with greenish yellow beyond. Fringes spotted with black. Discal mark reduced or obsolete. Hind wings white with green or greenish yellow patches or confluent irregular bands, with clear white spaces between and a row of clear spaces at the margin. Expanse, 28-35 mm.

Female.—Similar to the male, but has the orange patch on the fore wings much smaller, and in some specimens it is more or less wanting. The outer streaks connect with a black line at the end of the orange patch. Otherwise like the male. Expanse, 28-35 mm.

Habitat.—Southern California (San Diego, Kern River).

Euchloë cethura var. *morrisonii* (Edw.).

PLATE XIII, FIG. 3.

Anthocharis morrisonii W. H. EDWARDS, Papilio, Vol. I, 1881, p. 43, and Vol. III, 1883, p. 43; SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, 1896, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 268.

Male.—Upper sides and under side of fore wings same as *cethura*. Hind wings beneath densely covered with green or yellowish green, with only a few small, clear white openings about the middle and a series of clear openings around the edges, those on the outer margin triangular. Size same as *cethura*.

Habitat.—Southern California.

Cethura, as far as we know at present, is found only in southern California. It occurs in barren *mesa* lands, particularly on the summits of small hills, in March. I have examined the types of *morrisonii*, and they are without much doubt a variety or seasonal form of *cethura*. It only differs from *cethura* by the intensity of the green color on the hind wings beneath. We possess a female of *morrisonii* in which the orange subapical patch is absent, thus making it superficially resemble the female of *hyantis*.

Euchloë pima (Edw.).

PLATE XIII, FIG. 8.

Anthocharis pima W. H. EDWARDS, Can. Ent. Vol. XX, 1888, p. 158; Butt. N. Am. Vol. III, 1889, pl. II, figs. 6-9; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.

Male.—Bright lemon with a bright orange subapical area, broadly bordered outwardly by black, the outer and costal parts of which are alternately pale yellow and black. In the orange space, at the end of the cell, is a conspicuous black bar. The lower part of the outer border sends a shoot inwards which shows a tendency to connect with the lower end of the discal bar. Hind wings uniform yellow, with a minute black dot at the end of each nervure. Under side: Fore wings lemon yellow; orange area much reduced. Apical region marked with green. Costa very pale yellow, with black points. Discal spot smaller than above. Hind wings heavily marbled with green in form of irregular confluent bands; spaces between yellow. Expanse, 40 mm.

Female.—Similar to the male.

Habitat.—Arizona.

This is the only species known in this country in which both sexes are of the same color and with the marking similar. Dr. Richard Kunze writes me as follows about the habits of the insect: "It flies in Pima and Maricopa Counties, Arizona, principally during March. It affects the desert near mountains, and during the heat of mid-day ascends loftier surroundings, either for purpose of assembling or to enjoy cool breezes. On the north side of the mountains are found herbaceous plants and annuals, which thrive best where the palo verde tree, a prickly *Parkinsonia microphylla*, affords a little shade to tender annuals. *A. pima* rifles the flowers of a hirsute plant called *Amsinckia spectabilis*, a foot high, bearing very small, yellow, funnel-shaped flowers. I

never observed *pima* feeding on other flowers. I have followed and watched this insect flying along arroyos or dried-up channels, which carry the surface water to lower levels, and where one finds the greatest number of herbaceous plants during March and April, or the spring of the Arizona desert. I have noticed *pima* hovering over a yellow flowered composite two feet high, and examined its leaves and branches, yet I did not find eggs or larvæ, as often as I had opportunity to investigate. *Pima* on that occasion may have been looking for its mate, because the few I took there were all males, and if any such which I failed to net were females, it would have been difficult to differentiate between the sexes on the wing, as both are exactly alike in color. Besides the female is very rare, in proportion as 1 to 20. *Pima* is single brooded."

Euchloë genutia (Fabr.).

PLATE XIV, FIG. 7.

- Papilio genutia* FABRICIUS, Entom. Syst. Vol. III, 1793, p. 193.
Mancipium vorax midea HÜBNER, Samml. Exot. Schmett. 1806-19. Vol. I, pl. 142.
Euchloë midea HÜBNER, Verzeich. Bek. Schmett. 1816, p. 94.
Pieris genutia GODART, Encyl. Meth. Vol. IX, 1819, pp. 118, 168.
Libythea genutia GODART, Encyl. Meth. Vol. IX, Suppl. 1819, p. 8c6.
Pieris l'herminieri GODART, Encyl. Meth. Vol. IX, 1819, pp. 118, 167, 168.
Midea HERRICH-SCHÆFFER, Corr.-Blatt. Zool.-Min. Verein, Regensburg, Vol. XXI, 1867, p. 105; KIRBY, Cat. Diurnal Lepid. 1871, p. 508.
Anthocharis genutia BOISDUVAL, Spec. Gen. Lepid. Vol. I, 1836, p. 565; MORRIS, Synop. Lepid. N. Am. 1862, p. 20; SCUDDER, Can. Ent. Vol. IV, 1872, p. 74; Generic Names for Butterflies, 1875, p. 113; Butt. N. Eng. Vol. II, 1889, p. 1147; W. H. EDWARDS, Butt. N. Am. Vol. II, 1878, pl. II; *L. c.* Vol. III, 1888, pl. I; Can. Ent. Vol. XIII, 1881, p. 211, and Vol. XXIV, 1892, p. 109; FRENCH, Butt. E. U. S. 1886, p. 118; SKINNER & AARON, Can. Ent. Vol. XXI, 1889, p. 129; ROWLEY, Can. Ent. XXII, 1890, p. 123; MARTINDALE, Ent. News, Vol. III, 1892, p. 240; SKINNER, Ent. News, Vol. VI, 1895, p. 146; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, 1897, p. 208.
Euchloë genutia BUTLER, Cat. Fabr. Lepid. 1869, p. 214; SCUDDER, Syst. Revis. Am. Butt. 1872, p. 42.

Male.—White. Fore wings falcate, apex orange edged with yellow and black dots at the margin. At the end of the discal cell is a small rounded spot. Costa sprinkled with black. Hind wings with a small black dot on the edge of each vein. Under side white with the apex scaled with olive brown and the orange patch absent, or very slightly indicated. Discal spot present, also a marginal row of small black dots. Hind wings uniformly and densely marbled with olive brown patches and spots on a yellowish ground. Expanse, 34 mm.

Female.—Differs from the male by the absence of the apical orange patch, which is rarely indicated by a pale orange shade. Discal and marginal dots somewhat larger than in the male. Expanse, 34 mm.

Habitat.—Massachusetts to Texas.

Larva.—Dark yellow green, glossy under side, feet and legs lighter. Along the back is a yellow stripe and a broader, white one along each side. On each segment above are six shining black tubercles, each of which has a short black hair, which thickens at the end. On the second and third segments the tubercles are arranged straight across, those on the first and fourth to last segments are placed in triangle. From the third to last segments below the band is also a row of tubercles, one to each segment. Last segment with a blackish plate. Head white and green, with a small black spot on each lobe and one below crossing the triangle, covered with small white tubercles. Length about 24 mm.

Food-plants.—*Sisymbrium thaliana*, *Arabis perfoliata* and *Cardamine*.

The species may be known by the strongly falcate wings, by means of which it differs from all the other species of the group. It is single brooded. In the North it appears in April and May and in the South in April. It is found in open woods and is not difficult to capture.

Euchloë lanceolata (Boisd.).

PLATE XIV, FIG. 6.

Anthocharis lanceolata BOISDUVAL, Am. Ent. Soc. France, 2 Ser. Vol. X, 1852, p. 284; Lepid. Calif. 1869, p. 12; LUCAS, Revue Zool. 1852, p. 338; MORRIS, Synop. N. Am. Lepid. 1862, p. 21; SCUDDER, Proc. Bost. Soc. Nat. Hist. XII, 1869, p. 406; STRECKER, Lepid. Rhop.-Het. 1873, p. 49; HY. EDWARDS, Pacific Coast Lepid. No. 22, 1876; MEAD, Psyche, Vol. II, 1878, p. 182; W. H. EDWARDS, Butt. N. Am. Vol. III, 1881, pl. I; SKINNER, Journ. N. Y. Ent. Soc. Vol. IV, p. 114; BEUTENMÜLLER, Journ. N. Y. Ent. Soc. Vol. V, p. 208.

Anthocharis edwardsii BEHR, Trans. Am. Ent. Soc. Vol. II, 1869, p. 304.

Euchloë edwardsii KIRBY, Cat. Diurn. Lepid. 1871, p. 508.

Midea lanceolata KIRBY, Cat. Diurn. Lepid. Vol. I, 1871, p. 509.

Male.—Upper side white. Fore wings with a small discal spot at the end of the cell. Apex more or less shaded with black and the fringes are also black. Hind wings with a few black points around the apex. Under side: Fore wings very pale yellowish white, apex pure white with brownish scales in form of streaks. Discal spot curved, fringes yellow at base and edged with black. Hind wings white and thickly covered with transverse, broken streaks, which become confluent on the costal region to about the middle of the wing; on the

costa is a short white dash directed downwards, veins marked with brown. Expanse, 45 mm.

Female similar to the male. Expanse, 50 mm.

Larva.—Upper side apple green, shading off laterally with pale blue, which is bordered by a distinct bright stripe just above the spiracles; next to this line is a slightly broader one, pure white. Under side and legs apple green, the former bluish along the middle. Each segment is covered with fine black points, arranged in transverse rows, each with a fine black bristle. Head rounded, pale green, thickly dotted with black. Length about 30 mm.

Habitat.—Nevada, California, Yukon River, Alaska.

EXPLANATION OF PLATES.

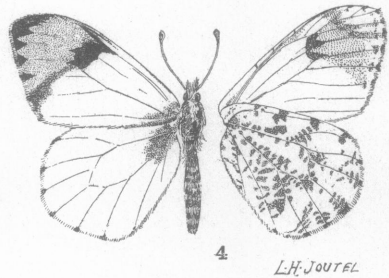
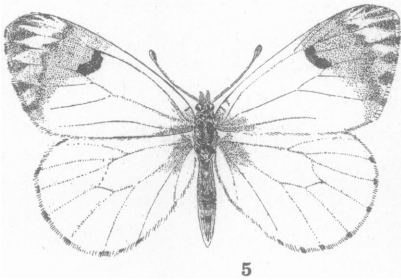
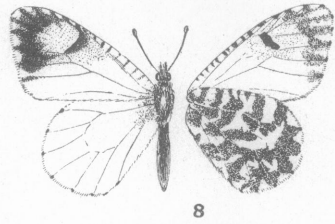
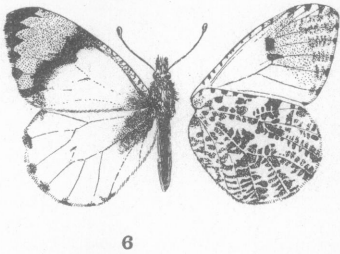
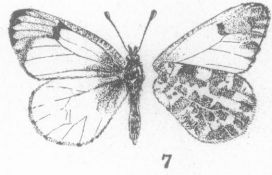
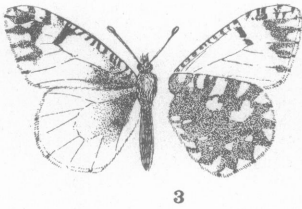
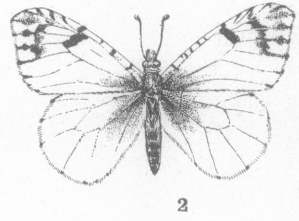
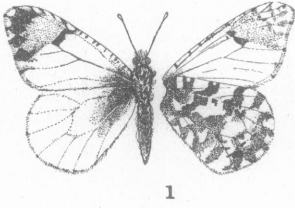
PLATE XIII.

- Fig. 1.—*Euchloë cethura* (male).
 Fig. 2.— “ “ (female).
 Fig. 3.— “ “ var. *morrisonii* (female).
 Fig. 4.— “ *sara* (male).
 Fig. 5.— “ “ (female).
 Fig. 6.— “ “ var. *reakirtii* (male).
 Fig. 7.— “ “ var. *julia* (male).
 Fig. 8.— “ *pima* (male).

PLATE XIV.

- Fig. 1.—*Euchloë ausonides* (male).
 Fig. 2.— “ *creusa* (male).
 Fig. 3.— “ “ var. *elsa* (male).
 Fig. 4.— “ *lotta* (male).
 Fig. 5.— “ *olympia* var. *rosa* (male).
 Fig. 6.— “ *lancoolata* (male).
 Fig. 7.— “ *genutia* (male).

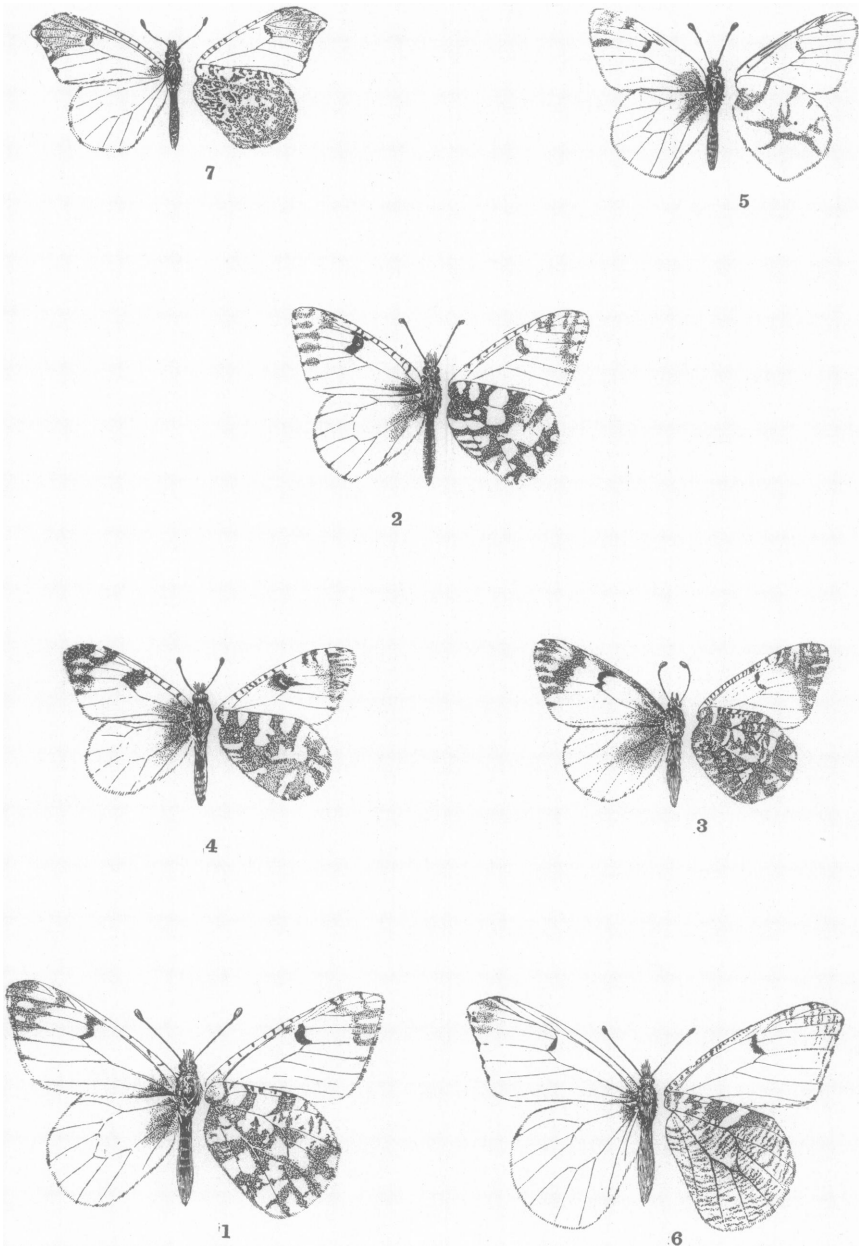
The detached wings on the right hand sides represent the under sides.



L.H. JOUDEL

- 1. *Euchloë cethura* (male).
- 2. " " (female).
- 3. " " var. *morrisonii*.
- 4. " *sara* (male).

- 5. *Euchloë sara* (female).
- 6. " " var. *reaktirii*.
- 7. " " var. *julia*.
- 8. " *pima*.



- 1. *Euchloë ausonides*.
- 2. " *creusa*.
- 3. " " *var. elsa*.
- 4. " " *lotta*.

- 5. *Euchloë olympia* *var. rosa*.
- 6. " *lanceolata*.
- 7. " *genutia*.

