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TWO NEW NORTH AMERICAN SUBSPECIES OF *ARGYNNIS*, WITH SOME REVISIONAL NOTES (LEPIDOPTERA: NYMPHALIDAE)

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The large collection of Lepidoptera acquired by The American Museum of Natural History during the winter of 1936-1937 from Mr. J. D. Gunder of Pasadena, California, has been incorporated with the Museum's general collection and is available for further research. Mr. Gunder had made a careful study of *Euphydryas*, culminating in "The Genus *Euphydryas* Scudder of Boreal America" (1929), and had proposed fifty new names in that genus. At the time his collection was sold Mr. Gunder was accumulating specimens of *Argynnis* and had proposed twenty-six names. We have recently gone over this material. Our preliminary studies have resulted in a new arrangement of several names and in the description of two new subspecies.

Argynnis utahensis linda, new subspecies

As described below, we consider this to be an Idaho extension of *utahensis* Skinner (1919, p. 216), which in the Sawtooth Range is a fairly constant population. It is intermediate between specimens of *utahensis* from Salt Lake City, Utah, and of *macdunnoughi* Gunder (1932, p. 280) from Gallatin County, Montana. The latter would be best understood as a subspecies of *utahensis*.

Wing expanse of Sawtooth Range specimens averages 45 to 50 mm. (45 mm. in holotype) or about the size of *macdunnoughi* and somewhat smaller than *utahensis*. As seen in series, the Sawtooth material is much lighter above and not so suffused as other northern *utahensis* populations. The veins stand out prominently, as is common in the group, but in *linda* they are less pronounced due to the general lightness of the ground. The black pattern is also much less intense, and there is a general reduction of the dark suffusion which is shown by *macdunnoughi* basally, and often discally, above.

Below, both *utahensis* and *macdunnoughi* are usually patched with brown on the apices of primaries. In *linda* this brown scaling is nearly absent, and the apex is therefore much clearer. The slight edging of the lunules is dirty greenish.

In the secondaries there is a striking difference; here *macdunnoughi* is typically some shade of brown, usually dark. In *linda* this discal area is a relatively light greenish tint, with a very light clear tan, almost straw colored band which contrasts sharply with the darker band of *macdunnoughi*. All the spots are well silvered in the forms under discussion, although unsilvered individuals and other extreme variants are to be expected when the plasticity of this genus is recalled. As exemplified by the type series, *linda* appears to be a homogeneous population distinguishable from the other named *Argynnis*.

TYPE MATERIAL.—Holotype, male, Heyburn Peak, Sawtooth-Boise, Idaho, 9500-10,000 feet, July 15, 1931 (C. W. Herr), Gunder collection, in The American Museum of Natural History. Allotype, female, same data as the holotype and in the same collection. Paratypes: three males, same data; two males, Deadwood, Payette National Forest, Idaho, July 18, 1931 (C. W. Herr); one male, Cape Horn, Challis Payette, Idaho, 7000 feet, July 16-17, 1931 (C. W. Herr); one male, Bear Valley, Challis Payette, Idaho, 7000 feet, July 16-17, 1931 (C. W. Herr); four males, Sawtooth-Lemhi, Idaho, 7500-8500 feet, July 5-17, 1931 (C. W. Herr); and one female, Sawtooth Mountains, Idaho, August 10, 1941 (Dr. and Mrs. R. C. Turner). The male paratypes are from the Gunder collection, and eleven are in the American Museum. Two male and one female paratypes are in the junior author's collection.

This new subspecies is well linked to *utahensis* by southern Idaho material of the sort which Gunder appears to have had in mind, erroneously, as *platina* Skinner (1897, p. 154). *A. pfoutsi* Gunder (1933, p. 171) from Payson Canyon, Utah, does not differ materially from Skinner's Ogden, Utah, holotype of *platina* in the

Academy of Natural Sciences of Philadelphia and seems best placed as a synonym under *platina*.

We feel that *utahensis* has not hitherto been given due consideration as a species from which widespread variations may be traced to make a large group distinct from other stocks in the genus. Earlier authors were wont to compare it to *coronis* Edwards (1864B, p. 435), but this relationship does not appear to be substantiated either by distributions or by resemblances. Many probably heretofore unrecognized races of *utahensis* occur, as, for example, a population in British Columbia (Jaffrey, several in Gunder collection), a minor race in northern Nevada associated with and tending to resemble the *platina* from the same area, and other Rocky Mountain and Great Basin variants which are found wherever suitable conditions prevail. A Sierran extension seems likely for such an ubiquitous stock, and in this connection special attention should be paid to northern specimens of *montivaga* Behr (1863, p. 84) which probably intergrade with *utahensis*. If such intergradation could be well authenticated, *montivaga* would replace *utahensis* as the specific name.

Argynnis albrighti Gunder (1932, p. 281) appears to be an intensified form under *macdunnoughi*. It is a rarity of extremely narrow range, and but few specimens are available. Pending further study we would place it in the *utahensis* group.

Some northern extensions of *utahensis* stock, especially in the female sex, are easily confused with *semivirida* McDunnough (1924, p. 42). The latter is correctly placed with *nevadensis* Edwards (1870, p. 14), which is a species distinct from *utahensis*.

At the time of describing *macdunnoughi*, Gunder suggested an unfortunate comparison to *chitone* Edwards (1879, p. 82), but in a later paper (1933, p. 172), he gave a more nearly correct classification of *chitone* which should be listed as the Great Basin subspecies of *hesperis* Edwards (1864A, p. 502).

William Hovanitz (1937) has proposed a tentative arrangement of the *Argynnis*

coronis subspecies and has offered a lucid exposition of typical *coronis*, to which students should refer for a discussion of this name. After describing a new subspecies of *coronis*, we shall venture some further notes regarding this group.

Argynnis coronis carolae, new subspecies

MALE.—Average wing expanse, 56 mm. Above, more ruddy than *semiramis* Edwards (1886, p. 61) and nearly as red as *adiaste* Edwards¹ (1864B, p. 436). Both *semiramis* and *carolae* lack the blacker and more suffused appearance of *coronis coronis*; the wings thus present a more open and more contrasting pattern; also, the basal suffusion of *coronis* is only faintly suggested in the more southern stocks. In size, *carolae* averages slightly larger than the usual examples of *semiramis*. The wing shape is the same, or even more falcate, in *carolae*.

Below, the new subspecies is dark. The *semiramis* affiliation is evident after studying series of both, but the contrast between the light shades of *semiramis* and the reddish brown of *carolae* is marked. Primaries with the discal flush covering nearly three-quarters of the wing, *semiramis* usually having this confined to the inner third. Apical area dark, heavily marked, all pattern markings much heavier. On the secondaries *semiramis* has the discal area widely varied in color but usually of some light tan shade and with the spots standing out in brilliant silver, whereas the spots in *carolae* are often but partly silvered and usually enroached upon by an overlay of some darker scales of the reddish brown ground. The pale band is much the same in both insects, only slightly darker in *carolae*,

¹ This name has usually been ascribed to Behr with the references 1862, Proc. Calif. Acad. Nat. Sci., II, p. 175, and 1863, Proc. Calif. Acad. Nat. Sci., III, p. 84. In neither place is the name *adiaste* proposed or even mentioned by Behr. In the first paper Behr described nine *Argynnis* from California but proposed a name for only one of them. The others were referred to by numbers. In the second paper Behr proposed names for three more of the nine *Argynnis* but left number seven, the eventual *adiaste*, unnamed. The first use of the name *adiaste* appears to be by Edwards (1864, Proc. Ent. Soc. Phila., III, p. 436), who ascribed it not to Behr but to Boisduval "in lit." Edwards probably received specimens bearing some such name in manuscript from Boisduval or even from Behr, since there is a specimen in the Edwards' collection at the Carnegie Museum bearing a label "*adiaste* Bdv." in Boisduval's handwriting, a name published by him in 1869 (Lep. de la Calif., p. 61, from Ann. Soc. Ent. Belg., XI). In 1877 (Cat. Lep. of Amer. N. of Mex., p. 22) Edwards ascribed the name *adiante* to Boisduval and sank his name *adiaste*, of which he there claimed authorship, as a synonym. This, of course, he could not do as his name *adiaste*, although ascribed to Boisduval in 1864, had priority. But his action shows that Edwards considered that the insects were one and the same, and very likely *adiaste* Edwards was originally a misspelling of *adiante* Boisduval ms. Definitely *lappi calami* are *adraste* Kirby (1870, Syn. Cat. Diur. Lep., p. 160) and *adianthe* Barnes and McDunnough (1917, Lep. of N. Amer., p. 8).

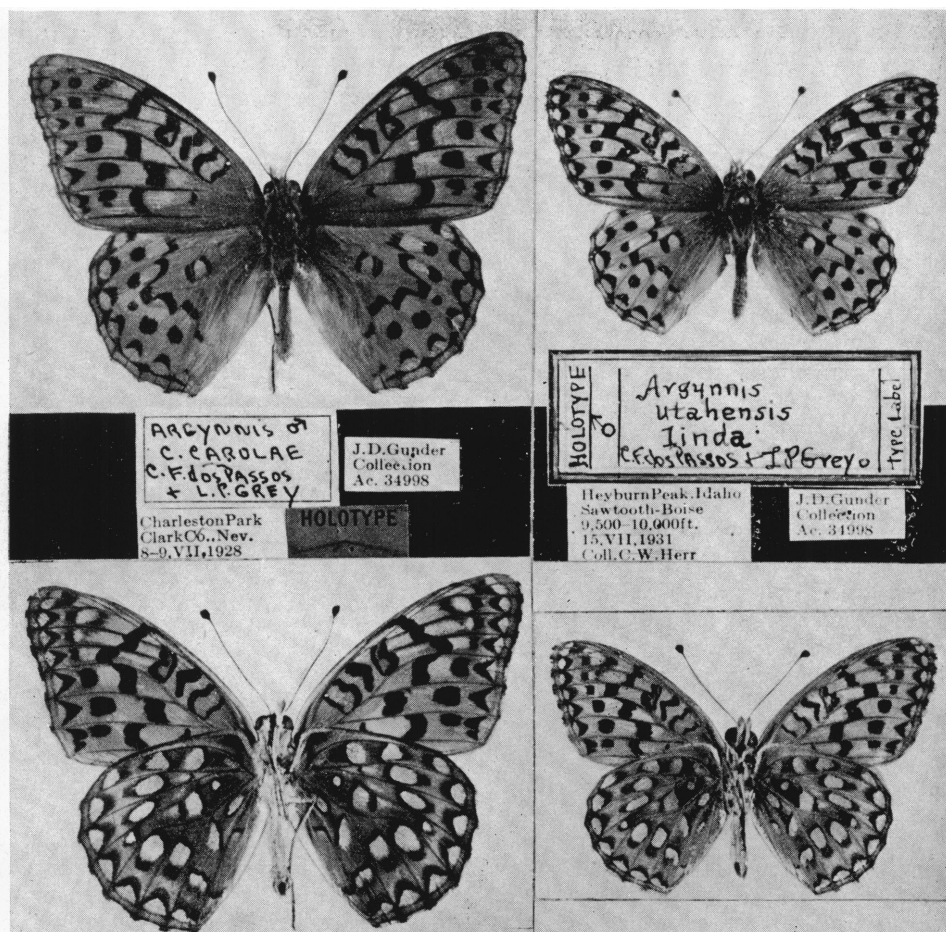


Fig. 1. (Left) upper and under surfaces of *Argynnis coronis carolae* dos Passos and Grey. (Right) upper and under surfaces of *Argynnis utahensis linda* dos Passos and Grey.

but in the bordering of the submarginal lunules and in the marginal line, the accentuated heaviness and darkness are extreme. Often the lunules extend well into the band area and are much larger and more conspicuous than in *semiramis*.

FEMALE.—The above remarks apply in general to this sex. Among *semiramis* females there is an especially wide range of variation, so that it is hard to choose a "typical" example. Broadly speaking, *carolae* is darker above, and the red shade and heaviness of pattern are distinctive; also it tends to an increase in wing spread. Below, the primary discal flush is extensive, as in the males. The secondaries have an even darker disk, with darker and heavier banding and lunulation. The spots vary from brilliantly to obscurely silvered and are in pattern and size as in *semiramis*. Fluctuation in size, shape and disposition of these spots, as well as the other pattern markings above and

below, is so great as to make descriptions of individual specimens of little value for comparative purposes. As seen in series, *carolae* is separable from its Californian relatives.

TYPE MATERIAL.—Holotype, male, Charleston Park, Clark County, Nevada July 8-9, 1928 (Eugene Schiffel), Gunder collection, in The American Museum of Natural History. Allotype, female, same data as holotype and in the same collection. Paratypes, twenty-four males and eight females: six, Charleston Park, Clark County, Nevada, 8000 feet, July 8-9, 1928; nine, Charleston Range, Clark County, Nevada, 10,000-11,000 feet, July 10-15, 1928; four, Charleston Range, Clark County, Nevada, 6000-8000 feet, July

15-28, 1928; eleven, Charleston Park, Lincoln County, Nevada, 8000 feet, July 9-24, 1928; and two, Charleston Park, Lincoln County, Nevada, 10,000 feet, July 13-15, 1928. Since the Charleston Mountains are almost entirely in Clark County, the last thirteen paratypes recorded are undoubtedly wrongly labeled "Lincoln Co." All are from the Gunder collection and, except for three male and two female paratypes in the junior author's collection, all are in The American Museum of Natural History.

In the revisional paper by Hovanitz, previously alluded to, *snyderi* Skinner (1897, p. 154), *hennei* Gunder (1934, p. 126) and *gunderi* J. A. Comstock (1925, p. 67) are given as subspecies of *coronis*.

We feel that *snyderi* should be held apart from *coronis* pending improvement of our knowledge. Undoubtedly it will list near that species, but present proof of any intergradation seems lacking. *A. snyderi* does appear to intergrade with *halcyone* Edwards (1869, p. 83), the latter being the Rocky Mountain equivalent. *A. snyderi* is best placed as a subspecies of this older name pending further investigation. It is even likely that *halcyone* can be regarded as forming a stock wholly distinct from the *coronis* equivalents, since *garretti* Gunder (1932, p. 282) and *platina* Skinner are probable Rocky Mountain and Great Basin extensions of the *coronis* group which exist independently of the *halcyone* modifications. We do not propose definite classifications for the northern *coronis* stocks because the regions are so extensive, and collecting and study to date have been so limited as to permit little but speculation regarding the relationships involved. There is some basis for believing that *garretti* is a northern extension of *coronis*, from which *platina* is derived as a Great Basin replacement, and we recommend this view to students for consideration.

We also feel that *gunderi* should be given further attention. As figured by Comstock in his "Butterflies of California" (1927, Plate xxvii, figs. 4, 5 and 6) and as understood by us from specimens from Buck Creek, Modoc County, California,

it appears to be true *snyderi*, just as Comstock considered it in his description. It is very light above and below, probably representing the extreme of a local form from an arid environment. Thus interpreted, *gunderi* is absent from nearly all collections. Great confusion has arisen by reason of calling much Nevada material *gunderi*. All of these Nevada specimens that we have seen have been light extremes of the Great Basin *platina*. *A. snyderi* flies with and is totally distinct from *platina* both in Utah and in Nevada. Since extensions of *platina* into California are unknown to us, we assume *gunderi* to be an extreme of the *snyderi* found along the eastern slopes of the California Sierra Nevada. This view would prevent inclusion of *gunderi* in the *coronis* group.

A. henei, judging from topotypical examples and from the long series, including the types, in the Gunder collection at the American Museum, appears to be an insect which geographically and in appearance is intermediate between *coronis* and *semiramis*. Typical *coronis* from the Coast Range, San Francisco Bay region, California, is analogous to *callippe* Boisduval (1852, p. 302), which is also topotypically from this region where it exists as a large, dark and somewhat aberrant colony. *A. californica* Skinner (1917, p. 328) is a direct synonym of *coronis*, as was pointed out by Gunder when describing *henei* and by Hovanitz in his paper on *coronis*. *A. semiramis*, long associated with the *adiaste* group, is incongruous there except for superficialities of color, and the similarity does not include any definite intergradation as a basis for such a classification. From Mount Pinos, where *henei* occurs, the intergradation toward the north with *coronis* seems well shown. The southern extension and linkage with *semiramis* are somewhat discontinuous, but considering the *semiramis*-like aspect of *henei* at its type locality, as well as the variability in the Tehachapi region, it seems safe to assume that any gap left, after diligent collecting, would be insignificant. Variations of *semiramis* in the "Bad Lands" area of eastern San Bernardino County, California, and possible extensions northward toward the Sierran

region are as yet poorly known, since but little collecting has been done with these problems in mind. The isolated colony named *carolae* in this paper is the easternmost known representative of the stock. An interesting subject for further explorations would be to reveal its intergradations.

Some students may hold that the *coronis* complex is related to *zerene* Boisduval (1852, p. 303) or, indeed, maintain that *carolae* and possibly *semiramis* should be placed with *zerene*. The Tehachapi extensions of *hennei* fringe upon *zerene*, which is a Sierran insect, and in Tulare County both insects occur in the same locality but show no sign of influence upon one another. The crux of matters seems to be the *hennei* relationship to *semiramis*. If we are correct in this, the other classifications follow. *A. zerene* does appear to be related closely to the *coronis* group; future collecting may prove some definite linkage, but for the time it seems better to keep them separate. Perhaps we should say that we use the term *zerene* following the recognizable figures by Oberthur (1913, Pl. cclviii, figs. 2168 and 2169) and the current usage of Comstock and of McDunnough. Actually, we may never know just how Boisduval worked over his original mixed series when proposing a second name. Perhaps we rob Behr of a name to which he is entitled (*monticola* Behr, 1863, p. 84). Pending better knowledge than we now have, it seems safest to treat *monticola* as a synonym.

Since we have spoken briefly of *zerene* and of *montivaga*, it might be well to point out that *malcolmi* J. A. Comstock (1920, p. 4) should be removed from *montivaga*, under which it is now listed, and associated with *zerene* as a race from the eastern slopes of the Sierra Nevada. Intergradations between *malcolmi* and *zerene* are found in the Lake Tahoe region. *A. montivaga* can be better understood with the removal of this subspecies, which by wing shape, pattern and intergradation seems much better placed with *zerene*. Aside

from the removal of *malcolmi*, the synonyms and subspecies of *montivaga* are well arranged by McDunnough (1938, p. 15).

A. conchyliatus J. A. Comstock (1925, p. 63) is relatively constant in many northern Sierran localities and might be listed as a subspecies of *zerene* rather than as a form. *A. shastaensis* (1925, p. 65) is a black aberration, a common mutation in *Argynnis*. With all due acknowledgment of the debatability of the question, we prefer to treat such names as synonyms.

We append a summarizing list with the caution that it is incomplete and intended merely as a convenient résumé of the classification proposed in this paper insofar as the two new subspecies are concerned.

- Argynnis hesperis* W. H. Edwards
 - a. chitone* W. H. Edwards
- Argynnis utahensis* Skinner
 - a. linda dos Passos and Grey*
 - b. macdunnoughi* Gunder
 - f. loc. albrighti* Gunder
- Argynnis platina* Skinner
 - a. garretti* Gunder
 - pfoutsi* Gunder
 - gunderi* auct. nec J. A. Comstock
- Argynnis coronis* W. H. Edwards
 - californica* Skinner
 - a. henniei* Gunder
 - b. semiramis* W. H. Edwards
 - c. carolae dos Passos and Grey*
- Argynnis halcyone* W. H. Edwards
 - a. snyderi* Skinner
 - f. loc. gunderi* J. A. Comstock
- Argynnis zerene* Boisduval
 - monticola* Behr
 - a. malcolmi* J. A. Comstock
 - b. conchyliatus* J. A. Comstock
 - shastaensis* J. A. Comstock

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