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TWO NEW SUBSPECIES OF *OCCIDRYAS ANICIA* (Doubleday) FROM NEW MEXICO

(Nymphalidae: Melitaeinae)¹
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INTRODUCTION

For a number of years, both authors have collected extensively in New Mexico for the purpose of developing regional checklists of butterfly fauna (Holland, 1974; Ferris, 1976, 1977). Through their own field work and utilization of data provided by other collectors, various local populations of butterfly species have been examined and analyzed. As a result of this work, two interesting *Occidryas anicia* populations have come to light. These occur in the Chuska Mtns. of NW New Mexico and the Sacramento Mtns. in the southcentral portion of the state. Flight periods are synchronic with adults in late June and early July. Our generic nomenclature follows that established by Higgins (1978).

Although one would expect, from the geographic locations cited, that *anicia* from these areas would show affinities to *carmentis* (Barnes & Benjamin) TL Pagosa Springs, Archuleta Co., Colorado, or *alena* (Barnes & Benjamin) TL "Southern Utah", they are actually closest to *capella* (Barnes) from the central Colorado massif (TL "Denver and Manitou Springs, Colorado"). They reflect the red-banded expression of *anicia*, rather than the more commonly found spotted forms.

Bauer (in Howe, 1975) divided the *anicia* complex into four groups. He placed *capella* in the "*anicia*" group along with three definitely spotted subspecies. We feel that *capella* should appear in a separate group along with the two New Mexico entities and *carmentis*, although the latter is "spotted". Some collectors (*in litt.*) have associated these insects with the "*wheeleri*" group of *anicia*. We would observe that there are some apparent errors in the Howe text regarding *wheeleri* (H. Edwards) and *alena*, perhaps as a consequence of the original manuscript passing through several editors. Subject to reproduction color variations, these subspecies are correctly illustrated (*alena*, Pl. 38, f. 1, 2; *wheeleri*, Pl. 39, f. 4). Although we have examined all pertinent original descriptions for the taxa cited herein, it is not our intent to revise the species complex. We would urge that subsequent revisors consult original descriptions and examine type specimens carefully.

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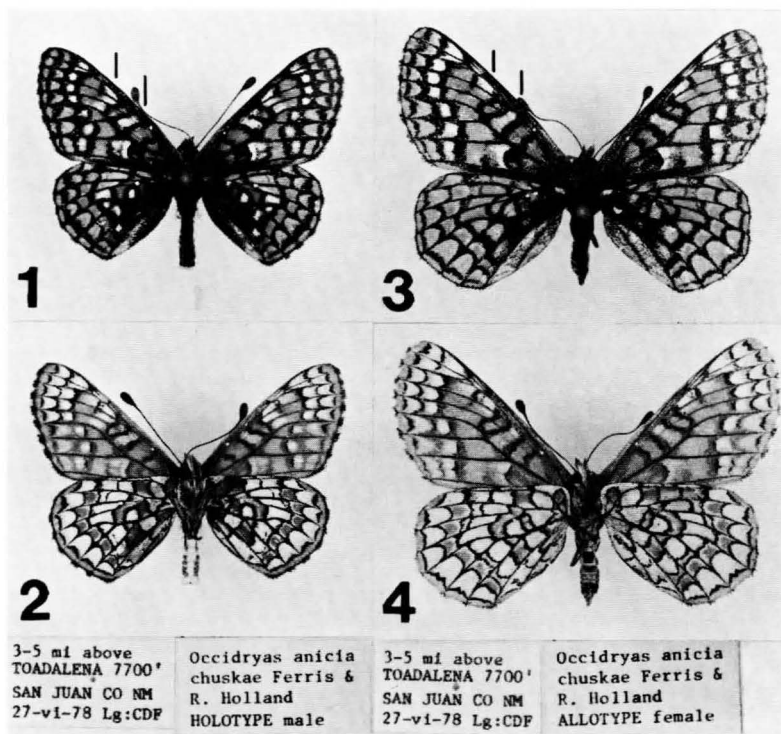
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We believe the two New Mexico populations are sufficiently different from *capella*, and from one another, to warrant subspecific recognition. We now describe them.

Occidryas anicia chuskae* Ferris & R. W. Holland *ssp. nov.

Types and Location. This subspecies is described from 157 specimens collected by the authors on 27 June, 1978 in open clearings along an Inidan Reservation road, 3-5 miles above (NNW) Toadlena, Chuska Mtns., ca. 7700' (2348 m), San Juan Co., New Mexico. The Holotype male and Allotype female are placed in the Allyn Museum of Entomology, Sarasota, Florida. They are illustrated with their labels in Figs. 1-4. The locality labels are white with black printing; the Holotype and Allotype labels are respectively red and green with black printing. Paratypes will be distributed to other museums.

Diagnosis and Description. As noted in the Introduction, this subspecies falls in the *capella* group of *anicia*. Maculation is similar to *capella*, but *chuskae* is of slightly smaller size. The dorsal ground color is intermediate between Flame Scarlet and Chrome Orange (Smithe nos. 15 & 16). *O. a. capella* is darker, tending to range between Scarlet (no. 14) and Flame Scarlet. The pale markings are washed-out Spectrum Yellow (Smithe no. 55). The sexes are similar dorsally. With the exception of a postdiscal pale DFW spot-band and a few additional pale markings, as subsequently noted, the basic



Figures 1-4: *Occidryas anicia chuskae*, new subspecies. 1-2, Holotype ♂, dorsal (1) and ventral (2), labels below specimen. 3-4, Allotype ♀, dorsal (3) and ventral (4) surfaces, labels below specimen. Note that the name Toadlena was misspelled "Toadalena" on the specimen labels. The extra "a" has been stricken with black ink.

ground color prevails, overlaid by dark brown-black maculation. In most specimens, there are three additional pale FW markings: 1. between the cell quadrate spots; 2. at the end of the cell; 3. median area between veins 2A and Cu₂. These pale markings are generally more pronounced in the males than in the females. The two FW cell pale areas are indicated by black pointers in Figs. 1 & 3. On the DHW, pale spots may occur in the cell (DC) and in the median area in cell spaces M₂-M₃, M₃-Cu₁, Cu₂-2A. These are frequently absent in the females and may be absent in the males. They appear in the Holotype, but not in the Allotype.

Ventrally, *chuskae* resembles *carmentis* rather than *capella*. In *capella*, the VFW is sparsely maculated, except for some subapical Creamy-Buff markings (Smithe nos. 53-54). The VHW is boldly marked with alternating dark orange and cream bands, outlined in black. The ventral surface of *carmentis* has a very pale and washed out aspect. The orange-ochre ground color is very subdued with creamy-buff predominating. Ventrally, *chuskae* falls between these two extremes, and the sexes are similar. The dorsal ground color is repeated in a paler hue on the VFW. Two creamy-buff spot-bands appear in the subapical region with the innermost extending weakly to space Cu₂-2A. These spots are basally edged with black.

The VHW is marked as in *capella* and *carmentis*, brighter than *carmentis*, but more subdued than *capella*. The orange areas repeat, in paler hue, the dorsal color. The basal-discal and postmedian orange spot-bands are not solidly colored, as in *capella*. They are outlined with black and are generally separated from their black borders by creamy-buff intrusions, as in *carmentis*. These produce a pale VHW aspect as compared to the boldly marked VHW of *capella*. Figs. 5-12 illustrate *capella* and *carmentis* for comparison with *chuskae*.

Size, (FW costal margin length). Holotype: 19 mm; male range: 17-19 mm. Allotype: 23 mm; female range: 20-24 mm.

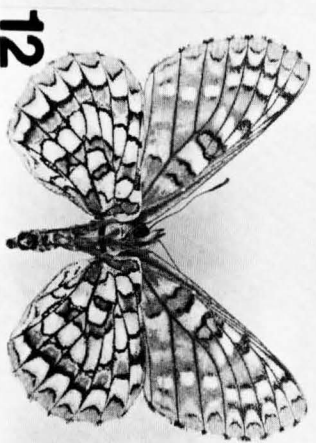
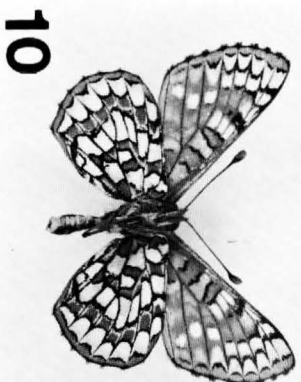
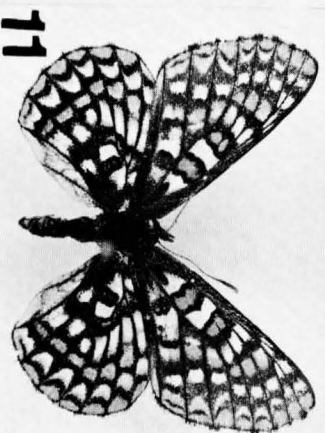
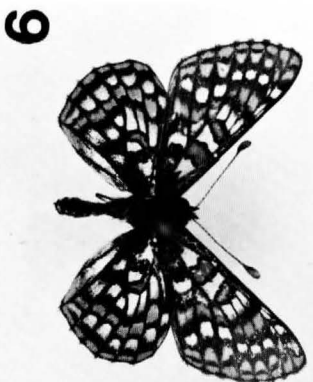
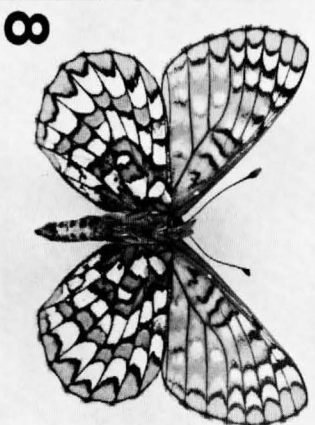
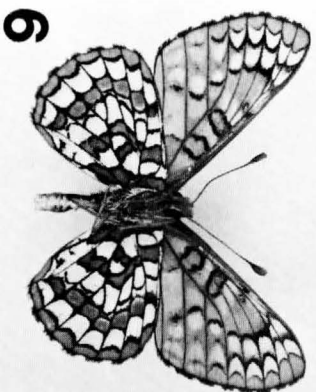
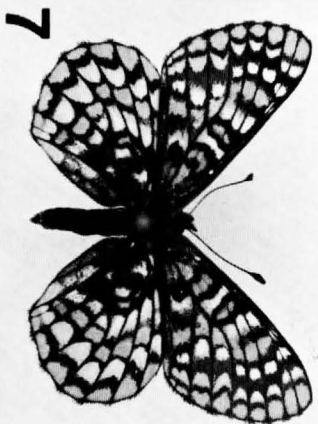
Variation. *O. a. chuskae* is remarkably constant in facies for this genus. The major variation occurs in the extent of the pale dorsal markings as noted above. A few females were taken in which the dorsal dark markings are significantly reduced. Ground color is quite uniform. No annual variation was noted when 1978 specimens were compared to those collected in previous years.

Bionomics and Distribution. The life history of *chuskae* is unknown. *Penstemon strictus* Benth. (as determined from Kearney & Peebles, 1964) grows in the understory of the habitat and is presumed to be the larval host, although egg masses could not be located. The butterflies occur in and at the edges of clearings in Gambel Oak-Ponderosa Pine forest. They are sometimes also encountered in meadows at higher elevation where Aspen and Douglas Fir dominate. This insect is particularly attracted to a yellow composite nectar source, *Helenium hoopesii* (A. Gray) Rydb. The flight period is very short and peaks during the last week in June. Fig. 13 shows a portion of the type locality.

This butterfly appears to occur only above the 7500' (2288 m) contour in the main portion of the Chuska Mountains. Fig. 14 illustrates specific collection sites, and this insect probably occurs much more widely, at suitable elevation, than the map indicates. To date, searching northwest of Buffalo Gap, on Beautiful Mountain, or on the Fort Defiance Plateau has not turned up *chuskae*. We believe it probably does not occur in these areas. It may occur on Carrizo Mtn., about 30 mi. N. of Buffalo Gap.

Occidryas anicia cloudercrofti Ferris & R. W. Holland ssp. nov.

Types and Location. This subspecies is described from 162 specimens: 49 ♂, 23 ♀ taken by C. D. Ferris on 5-vii-78; 23 ♂ taken by R. W. Holland on 3-vii-76; 38 ♂, 16 ♀ taken by F., P. & M. Rindge on 2, 3-vii-64; 9 ♂, 4 ♀ taken by C. A. Bridges on 3, 5-vii-76. The type locality is Pines Campground, 2 mi. NE of Cloudercroft, Sacramento Mtns., 8600' (2623 m), Otero Co., New Mexico. The Holotype male and Allotype female are placed in the Allyn Museum of Entomology, Sarasota, Florida. They are illustrated with their labels in Figs. 15-18. The locality labels are white with black printing; the Holotype and Allotype labels are respectively red and green with black printing.



Paratypes are in the American Museum of Natural History and will be distributed to other museums.

Diagnosis and Description. This subspecies is generally similar to *chuskae*, but differs from it in several major respects. The ground color is slightly darker and there is much more extensive black maculation dorsally. The VFW postmarginal pale spot-band is heavily outlined in black, as is the VHW basal-anal margin region. The two quadrate VFW cell spots nearly touch, while they are clearly separated in *chuskae*. The DHW postdiscal band is slightly darker than the ground color, while in *chuskae* it is concolorous.

Dorsally, the sexes are generally similar. The pale markings are of a hue similar to *chuskae*, but they are more extensive in the females, both at the FW cell end and at the base of the cell. The DHW pale markings are evident in the females, but generally subdued in the males; just the opposite of *chuskae*. The HW subterminal line is much reduced in some females.

Ventrally, in both sexes, this subspecies is similar to *capella*. It is boldly marked and the dorsal ground color is repeated. The principal VFW maculation consists of a repetition of the dorsal subapical white-spot rows and black outlines of the cell quadrate spots. On the VHW, the three (basal-discal, postdiscal, marginal) dark orange spot-bands are clearly defined and lack the buff-cream intrusion found in *carmentis* and *chuskae*. The veins and spot borders are strongly defined in black.

Size, (FW costal margin length). Holotype: 23 mm; male range: 21-24 mm. Allotype: 24 mm; female range: 22-28 mm.

← Figures 5-12: *Occidryas anicia capella* (5-8) and *O. a. carmentis*. 9-12, *O. a. capella*, ♂ dorsal (5) and ventral (6) surfaces; COLORADO: Jefferson Co., Lookout Mtn., 18.vi.68. 7-8, *O. a. capella*, ♀ dorsal (7) and ventral (8) surfaces; COLORADO: El Paso Co.: Cheyenne Mtn., 14.vi.68. 9-10, *O. a. carmentis*, dorsal (9) and ventral (10) surfaces; COLORADO: Archuleta Co.: Pagosa Springs, 30.vi.65. 11-12, *O. a. carmentis*, ♀ dorsal (11) and ventral (12) surfaces; COLORADO: Archuleta Co.: Pagosa Springs, 5.vii.71.



Figure 13: Type locality meadow in which *O. a. chuskae* was taken.

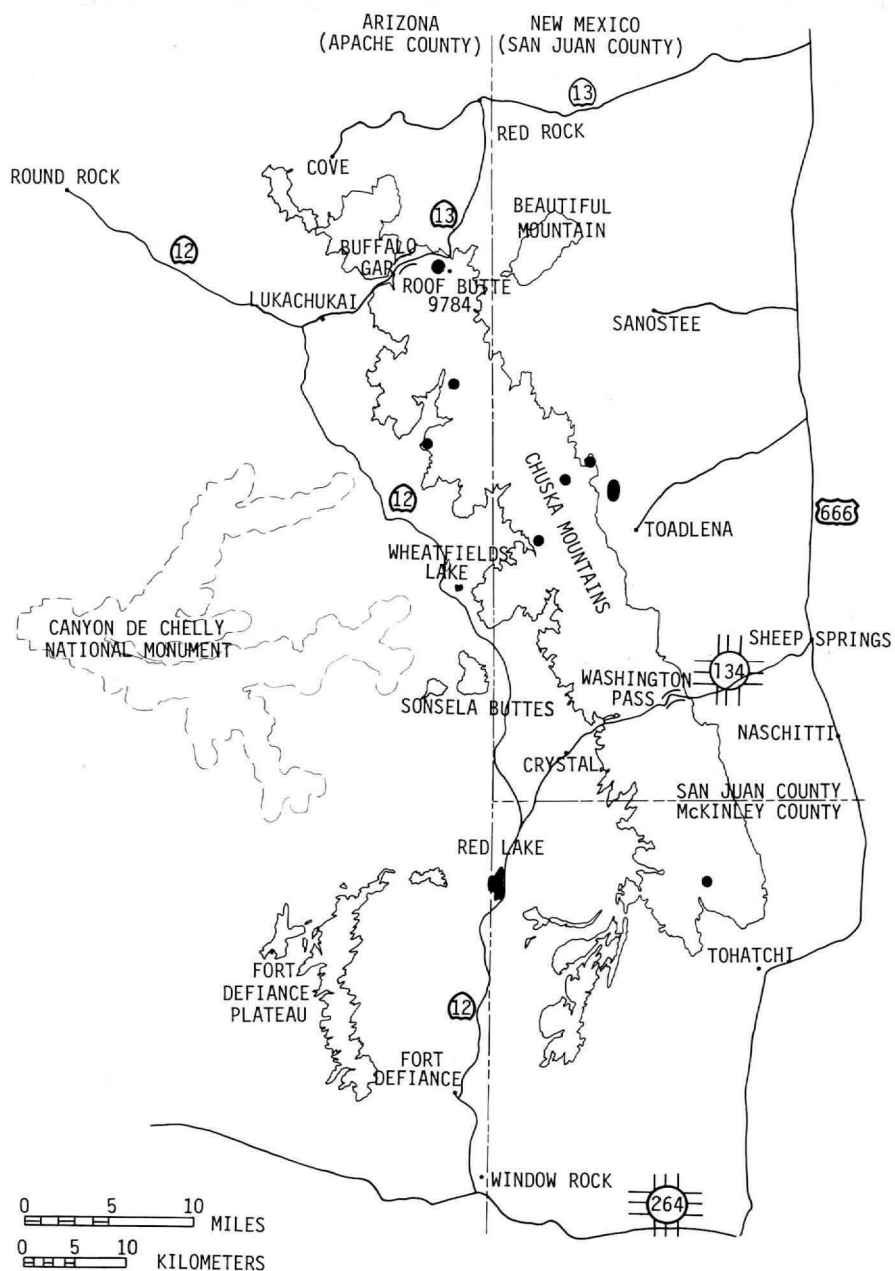
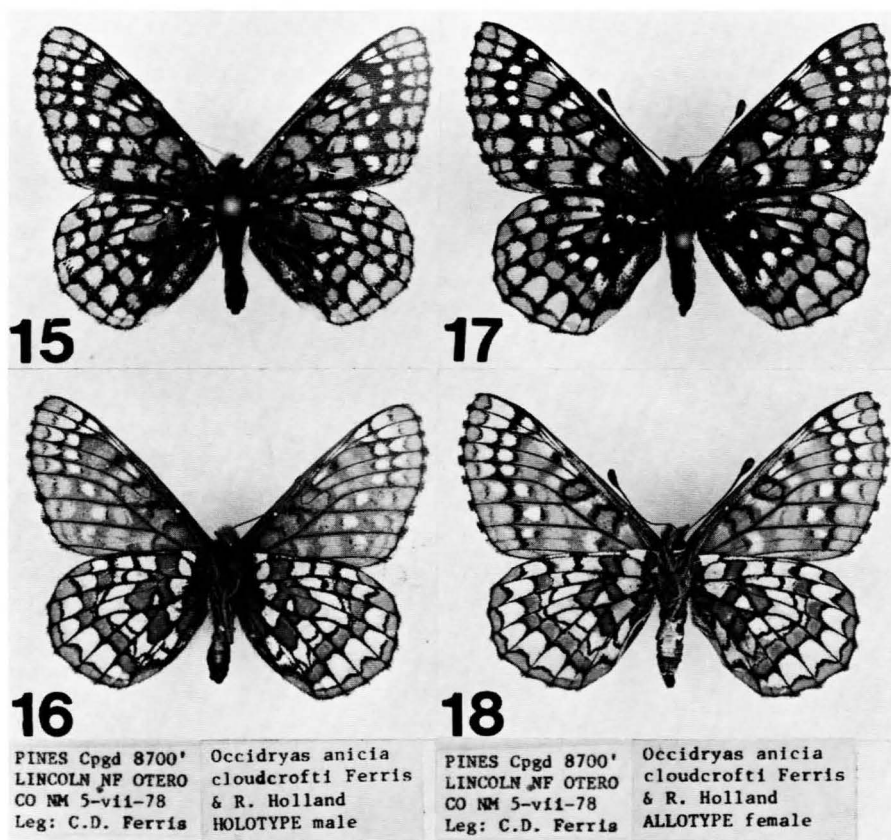


Figure 14: Distribution map for *O. a. chuskae*. Large oval dot marks type locality.

Variation. This subspecies is also quite uniform in ground color and maculation. The sizes of the DFW postdiscal pale spots are somewhat variable as is the extent of the postcellular pale area. No annual variation has been noted. 1978 specimens have been compared with material collected in 1977, 1964, 1959 (by A. B. Klots), and 1902 ("Cloudcroft, N.M.", O. Buchholz Collection — AMNH). The 1902 specimens are slightly smaller than later specimens, perhaps reflecting either a dry year or shrinkage.

Bionomics and Distribution. The life history of *cloudcrofti* is unknown. A robust, erect blue *Penstemon* (tentatively identified as *P. virgatus* Gray) is the presumed larval host. The butterflies are attracted to numerous nectar sources, but favor a yellow composite, possibly another species of *Helenium*. The habitat is typical Lower Canadian Zone and Fig. 19 illustrates the type locality. The butterflies frequent cleared areas and forest openings. They may be collected over an area of perhaps 1-2 square miles around the type locality. Extensive collecting elsewhere throughout the Sacramento Mtns. has failed to produce any additional *anicia* specimens. There is a single male of *cloudcrofti* in the AMNH collection (O. Buchholz Collection) labeled "Beulah, N.M. VI.27.02". Beulah was a former settlement in the Sapello Valley, San Miguel Co., N.M., some 175 air miles north of Cloudcroft. We suspect that this specimen was mislabeled and actual-



Figures 15-18: *Occidryas anicia cloudcrofti*, new subspecies. 15-16, Holotype ♂, dorsal (15) and ventral (16) surfaces, labels below specimen. 17-18, Allotype ♀, dorsal (17) and ventral (18) surfaces, labels below specimen.

ly came from the Cloudcroft area.

The first week of July appears to represent the peak of the annual flight, although males have been recorded as early as 16 June and females as late as 22 July.

Etymology. The names selected for the two new subspecies are derived from Latin constructions of the English place names. Both are nouns in the genitive case.

Genitalic Studies. The male genitalia of both subspecies are similar and characteristic of *anicia*.

Other Observations. It is interesting to note that *O. a. alena* occurs in the Chuska Mtns. It is neither sympatric nor synchronic with *chuskae*. It occurs below 7500' (2288 m) in canyon and stream bottoms. It normally flies in April and May. We have not observed a similar situation with *cloudcrofti*.

In the Bibliography, we have cited the articles that contain the original descriptions of *alena*, *capella* and *carmentis*.

ACKNOWLEDGEMENTS

We would like to thank Mr. A. C. Allyn and Dr. L. D. Miller of the Allyn Museum of Entomology for providing specimens for examination and for making publication of this paper possible. Dr. F. H. Rindge of the American Museum of Natural History kindly provided material for study. Mr. C. A. Bridges, Sunspot, N.M. assisted in providing specimens and distribution data for *cloudcrofti*. Specimens of *carmentis* were obtained



Figure 19: Type locality of *O. a. cloudcrofti*.

from Rev. Bernard Rotger of Pagosa Springs, Colorado. Both authors have been in correspondence with Dr. Paul R. Ehrlich and anyone interested in the "*Euphydryas*" group should read the population dynamics papers that have been published by the Stanford group (such as Brussard *et al.*, 1974).

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