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A NEW CONCEPT FOR THE *CŒNONYMPHA* OF THE FRONT RANGE OF COLORADO (SATYRIDÆ)

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In the preparation of a revision of the genus *Cœnonympha* of North America it became apparent that the *Cœnonympha* of the Front Range of Colorado should be elevated to racial distinction. This race has formerly been referred to as *Cœnonympha ochracea* Edwards, but a comparison with the known printed figures and scores of specimens of *C. ochracea* that conform to EDWARDS' description of this butterfly prove that the deviation is sufficient to permit a recognizable separation from *C. ochracea.* The large majority of the specimens found in this region are quite constant in the characters that distinguish them.

SKINNER (1900) published a colored illustration of this butterfly in his revision of the genus (figure 13, from Bear Creek, Colorado, near Morrison). This illustration excellently exemplifies a typical figure of this population but it is erroneously designated as *C. ochracea* to which it is quite atypical. The correct figure that conforms to EDWARDS' description of *C. ochracea* is the accompanying figure 14, from Park City, Utah. A comparison of these figures leaves no doubt that they are quite distinguishably different in appearance.

DAVENPORT (1941) illustrates in black and white (plate 10, figure 38) the underside of this Front Range race, which he designates as *C. ochracea.* In adjacent figures, one from Yellowstone Park, Wyoming, and another from some unspecified locality in Utah, he illustrates specimens of typical *C. ochracea.* It is clear that he also missed the dissimilarity, as have many others, that is so apparent between these two populations.

For the sake of consistency it seems appropriate to establish a complete separation between *C. ochracea* and its relative in the Front Range. This should help to clarify the status of *C. ochracea* which has been the subject of much speculation. As other populations have been separated by means of the absence or obsolescence of ocelli and ground color a parallel treatment in this case must certainly be in order.

The description of the race from the Front Range of Colorado follows.

Cœnonympha inornata phantasma new subspecies

MALE. Upperside evenly colored light orange-yellow, except along the inner margin of the secondaries to about the sub-median vein, where the color becomes light

gray. The grayish-white fringes are in striking contrast to the ground color of the wings, and they are well developed.

On the underside the primaries have one apical ocellus on each wing and it is prominent as in *C. ochracea* and *C. benjamini.* The general appearance of the primaries is very similar to that of *C. ochracea* except that the gray apical area is usually darker and somewhat more extensive. The obsolescent sub-marginal ocelli on the under side of the secondaries are a standard feature of *phantasma.* They are impressively in contrast to the robust sub-marginal ocelli featured by *C. ochracea.* MCDUNNOUGH says, "that only occasionally does *C. benjamini* show traces of weak sub-marginal ocelli on the secondaries." The pale, irregular shaped basal spots on the secondaries, definitely not a character of *C. benjamini,* are normally present in *phantasma* but are usually of slightly less magnitude than those seen in *C. ochracea.* Sometimes they are slightly obscure, but this is not the rule. The pale straight ray on the primaries and the tortuous ray on the secondaries are quite variable in extent, just as they are in other races of *Cœnonympha.* It should be emphasized that the description of *C. ochracea* states that the ground color of the undersides of the secondaries is "light reddish-brown." In *phantasma* it is definitely greenish-gray.

FEMALE. There seems to be no sexual dimorphism with the exception that the female is often slightly larger.

HOLOTYPE male (expanse 28 mm.): Eldora, Boulder Co., Colo., 21 June 1941, *leg.* DONALD EFF.

ALLOTYPE female (expanse 30 mm.): same locality and collector as HOLOTYPE, 9 July 1937.

HOLOTYPE and ALLOTYPE deposited in the collection of the Los Angeles County Museum at Los Angeles, California.

PARATYPES (twenty-six in all): Twenty paratypes in the collection of the author with the following data will be distributed among the following collections:

The Peabody Museum of Natural History, Yale University, New Haven, Conn.: one male, 23 June 1941, and one female, 9 July 1937, both Eldora, Boulder Co., Colo., *leg.* P. S. & C. L. REMINGTON.

The Carnegie Museum, Pittsburgh, Pa.: one male, 21 June 1941, and one female, 9 July 1937, both Eldora, Boulder Co., Colo., *leg.* P. S. & C. L. REMINGTON.

The United States National Museum, Washington, D.C.: one male, Tolland, Gilpin Co., Colo., 15 June 1951, *leg.* DONALD EFF; one female, Eldora, Boulder Co., Colo., 9 July 1937, same collector.

The American Museum of Natural History, New York, N.Y.: one male, Eldora, Colo., 9 July 1937, *leg.* DONALD EFF; one female, Tolland, Colo., 6 July 1953, same collector.

The Canadian National Museum, Ottawa, Canada: one male, Tolland, Colo., 6 July 1953, *leg.* DONALD EFF; one female, Eldora, Colo., 21 July 1941, same collector.

Fourteen paratypes are in the collection of the author: four males, Eldora, Colo., 21 June 1941, and one male, Sugar Loaf Mountain, Boulder Co., Colo., 19 May 1948, all collected by DONALD EFF; four males, Eldora, Colo. (27 June 1937, 18 June and 2, 8 July 1941) and one female, Eldora, Colo. (7 July 1937), all collected by P. S. & C. L. REMINGTON.

Six specimens in the collection of the Los Angeles County Museum are also designated as paratypes: three males from Tolland, Colo., 4 July 1951; one male from Tolland, Colo., 26 June 1953; one female, Caribou, Boulder Co., Colo., 15 July 1951, all collected by DONALD EFF; one male from Tolland, Colo., 9 July 1935, *leg.* F. M. BROWN.

The average measurement of thirteen male paratypes from the base to the wing tip is 16-17 mm. That of four female paratypes is 17-18 mm.

The elevations of the area from which the type series came are Eldora 8800 ft., Tolland and Caribou 9500 ft., and Sugar Loaf Mt. 8000 ft.

A number of other specimens that appear to belong to the new race have been collected at Fraser, Grand Co., Colo., and Chautauqua Mesa, Gregory Canyon, Plainview, and a number of nearby localities in Boulder Co., Colo., during May, June, and July.

The specific name *inornata* has been selected, as the author's treatment of the genus, now in preparation, divides American *Cœnonympha* into three species: *C. californica* Westwood & Hewitson (white), *C. inornata* Edwards (yellow), and *C. haydenii* Edwards (brown) having similar differences in color and other features as are noted in the study of anthropology. The subspecies *inornata* represents a race of probably later establishment than *C. ochracea,* considering the movement of the continental glaciers. However, the name *inornata* has line priority over the name *ochracea* and therefore must be considered as the name for the yellow races of American *Cœnonympha.* The Asiatic name *tullia* seems unacceptable for American species inasmuch as it is based upon a very questionable theory, in fact one that presents many negative elements. This opinion will be elaborated at length in a subsequent paper in which the application of the name *tullia* will be discussed.

Apparently *phantasma,* which inhabits localities of considerable altitude, is single brooded as are the other races of *Cœnonympha* that are found in regions where boreal influences prevail.

Treatment of the genitalia is here omitted, because with the possible exception of *C. haydenii,* the genitalia of all American *Cœnonympha* are so similar that useful taxonomic characters have not yet been found.

Because of the fact that *phantasma* has in the past been confused with *ochracea* it seems pertinent to discuss here some of the opinions previously recorded on this subject. In the Carnegie Museum at Pittsburgh the single type specimen of *C. ochracea* may be seen. It is labeled "Lake Winnipeg." This single specimen conforms to EDWARDS' description of that race. It seems evident that sometime later specimens from another locality were acquired. EDWARDS apparently believed that these, which were labeled as

from "Col." and "Colo.," bore similarity to his lone female type. A number of these were deposited with the type. This served to confuse the status of *C. ochracea* because these Colorado specimens do not conform to the description, and they differ quite noticeably from the type specimen. Typical *C. ochracea* occurs in western Colorado, Utah, and Nevada, but its appearance is quite different from that which DAVENPORT designates as the "Rocky Mountain race." Colorado is a state of large extent in which there are rather extreme and varied climatic conditions. The ambiguous locality "Colo." is insufficient grounds for racial establishment, and it is far removed from the original type locality. DAVENPORT wrote, "A careful examination of EDWARDS' description of *ochracea* will show one that it is an accurate description of the Rocky Mountain race; he stresses the strong row of ocelli and the similarity of males and females." DAVENPORT'S figures of this Rocky Mountain race certainly do not show a strong row of ocelli. On the contrary it is quite obvious that the "Rocky Mountain race" is very definitely lacking in this respect. This error, which DAVENPORT did not make alone, plus the lack of a substantial series from the type locality (Lake Winnipeg), have contributed much toward the bewilderment surrounding the status of *C. ochracea.* It seems that an examination of the original description and of the number of familiar published figures should make it clear that to regard the Front Range population as *C. ochracea* is quite unacceptable. DAVENPORT theorizes that EDWARDS must have got his labels mixed and that the lone type of *C. ochracea* was actually from some other locality than Lake Winnipeg. A letter from Dr. J. H. MCDUNNOUGH expresses the belief that the type specimen of *C. ochracea* actually came from Lake Winnipeg and so was correctly labeled, but that it was atypical of the population of that area. In other words it was a freak in a colony of *C. inornata.* In view of all the speculation complicating this problem, Dr. MCDUNNOUGH'S opinion seems the most acceptable.

It has also been said that *C. ochracea* has occurred in California, but there is no authentic record of this and it is most doubtful. Any occurrence in Kansas is also very doubtful, so that statement should be discounted.

It may be revealing to review here EDWARDS' description of *C. ochracea* and to point out its major deviation from *C. phantasma.*

CŒNONYMPHA OCHRACEA — EDW.

Male. Upper side of a bright glossy ochre yellow without any spot or mark, except what is caused by the transparency of the wings; base of both wings dark grey; abdominal margin of the secondaries pale grey; fringes pale grey crossed by a dark line.

Under side of primaries same color as above, costal margin, apex and base greyish, near the apex a round, sometimes rounded oblong, black spot with white pupil and pale yellow iris; this is preceded by an abbreviated, pale yellow ray.

Secondaries LIGHT REDDISH-BROWN, grayish along the hind margin; abdominal margin and base dark grey; near the hind margin and parallel to it A SERIES OF SIX BLACK DOTS, SOMETIMES OBSOLETE, USUALLY WITH WHITE PUPIL AND BROAD YELLOW IRIS; near the base two irregular pale brown spots, and midway between the base and the hind margin a sinuous, interrupted ray of the same color, extending nearly across the wing.

Female like male.

The salient features that are to be emphasized in comparing *C. ochracea* with *C. phantasma* are here capitalized. A study of scores of specimens of *C. ochracea* makes it evident that EDWARDS must have meant that the black dots were sometimes obsolete but that the white pupil and the yellow iris persisted.

It here seems pertinent to examine some other phases of the *C. ochracea* complex, for instance, the name *Cœnonympha brenda* EDWARDS which has often been confused with *C. ochracea.* Without doubt, HOLLAND'S figures of *C. brenda* that appear in his revised edition of *The Butterfly Book* are *C. ochracea.* Judging from this conception BARNES and MCDUNNOUGH rightly have said, "*brenda* described from some of REAKIRT'S material ostensibly from Los Angeles, California, is a typical *ochracea.*" Dr. MCDUNNOUGH synonymizes *C. brenda* under *C. ochracea* in his 1938 *Check List.* In fact, no insect resembling HOLLAND'S figures of *C. brenda* has ever been recorded in or adjacent to the Los Angeles region. Unfortunately no type specimen of *C. brenda* can be found in the Edwards Collection which is at the Carnegie Museum. There are in the Strecker Collection in the Chicago Natural History Museum the supposed types of *C. brenda.* These specimens do not agree with the original description of that insect. They are remarkably similar to *C. ochracea.* On account of this error the identity of *C. brenda* has been obscured. It is unlikely that EDWARDS, being quite familiar with both of these races, should have confused them. *C. brenda* probably was from Los Angeles and so was rightly recorded. All evidence points to the fact that it is a form of *Cœnonympha california* Westwood & Hewitson which conforms to the description of *C. brenda.* This form of *C. california* is not uncommon in southern California. It is comparatively well spotted and has a rusty-white ground color. EDWARDS' description of *C. brenda* in substance embraces these characters and goes on to qualify further by stating that the under-side of primaries have "a faint, transverse, reddish line beyond the cell, commencing at subcostal, thence straight to upper median, after which it is tortuous and disappears near lower median. Secondaries have a similar line angular to end of cell thence tortuous to abdominal margin." These features do not agree with any specimens that have a likeness to *C. ochracea* or any other Utah material, but they do agree with a form of *C. california* that is found near Los Angeles and San Diego. *C. california* is a species that embraces many forms in a continuous cline of gradually changing character that extends the length of the state of California. Thus it seems that *C. brenda* is a form of *C. californica* with the possibility that it may fall as a synonym.

Another member of the genus rather closely related to *C. phantasma* is *Cœnonympha benjamini* McDunnough. It will be noted in the description of *C. benjamini* that there is no mention made of basal spots on the under side of the secondaries, nor do any such spots normally occur. All available illustrations of *C. benjamini* show that these basal spots, which are a definite part of the pattern of *C. phantasma,* are entirely lacking in *C. benjamini.* In writing about *C. benjamini,* MCDUNNOUGH states, "Sometimes two or three light colored blotches appear sub-marginally on the under sides of the secondaries but this is atypical."

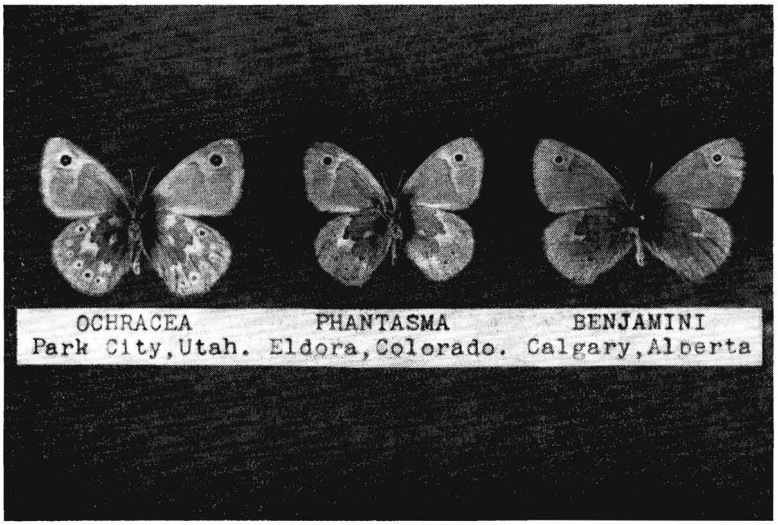
COMPARATIVE TABLE OF DISTINCTIVE CHARACTERS

Under sides of secondaries

Color: — *ochracea* light reddish-brown; *benjamini* greenish-gray; *phantasma* similar to *benjamini.*

Sub-marginal Ocelli: — *ochracea* well defined; *benjamini* none; *phantasma* reduced.

Basal Spots: — *ochracea* well defined; *benjamini* none; *phantasma* present.



Left: *Cœnonympha inornata ochracea* Edw. ♂, Park City, Utah, 4 July 1937, *leg.* W. N. BURDICK.

Center: *Cœnonympha inornata phantasma* Burdick, HOLOTYPE ♂, Eldora, Colorado, 21 June 1941, *leg.* D. EFF.

Right: *Cœnonympha inornata benjamini* McD. ♂, Calgary, Alberta, 4 July 1900, *leg.* F. WOLLEY DOD.

[All undersides. Photo by PAUL HOLLOWAY.]

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