A NEW RACE OF *EUPHYDRYAS* FROM THE CASCADE RANGE OF OREGON (*NYMPHALIDÆ*)

by WILLIAM N. BURDICK

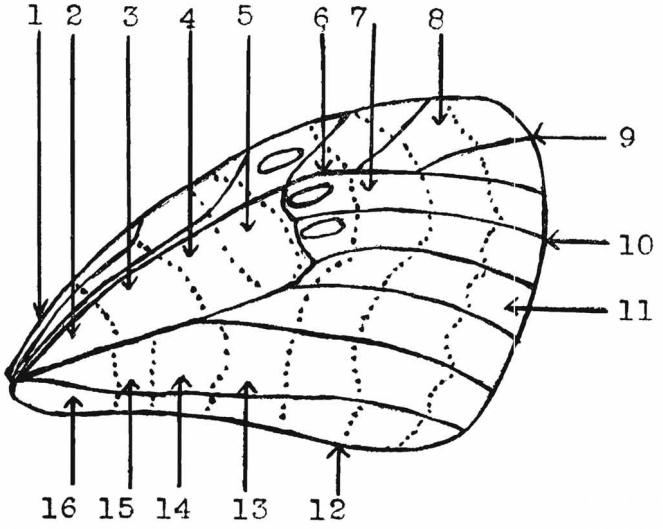
While collecting on the slopes of Mt. Thielsen in the region of Diamond Lake, Oregon, the author obtained forty specimens of *Euphydryas* that have served to stimulate an attempt to distinguish a new racial entity.

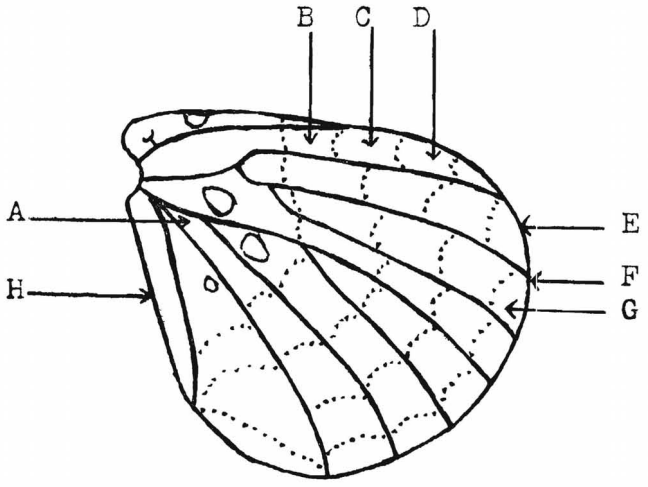
After studying some extensive collections of the genus *Euphydryas* Scudder, it has been concluded that the only population known in the United States bearing similar characters to this Oregon race is *Euphydryas editha aurilacus* Gunder. There seem to be a number of consistant separative qualities between *Euphydryas aurilacus* and the new race here described. The most noticeable differences are the much sharper definition of the maculation of this Oregon material, the much darker red coloration ("Morocco-Red" in RIDGEWAY'S (1912) Chart, plate I) and the very distinct difference in size. *E. aurilacus* is of a yellowish-red by comparison ("English-Red" in RIDGEWAY'S Chart, plate II). These colors are constant in both races. The white areas of *E. aurilacus* are more extensive and the black markings are of less quality; also it is definitely larger in size. The average expanse of males of *E. aurilacus* is 38 mm. and that of females is 45 mm. compared to the like measurements of 31 mm. and 38 mm. in this new race.

Following GUNDER'S five species classification for *Euphydryas,* the specific name employed in this description will be *editha. E. aurilacus* has often been listed as a race of *Euphydryas nubigena* Behr. There has been some difference of opinion regarding the status of *E. nubigena.* Many regard *E. nubigena* as a race of *editha* to which it is believed to have similar structural characteristics. If we are to accept the more limited theory of five species for *Euphydryas* consisting of *phaeton* Drury, *chalcedona* Doubleday & Hewitson, *anicia* Doubleday & Hewitson, *editha* Boisduval and *gillettii* Barnes the race here described should be identified by the specific name of *editha.*

In an attempt to contribute something toward some standardization of *Euphydryas* descriptions other than the species *phaeton* and *gillettii,* the characters of which are relatively stabilized, a precedure will here be employed that it is hoped will serve to picture the maculation of specimens with greater understanding and greater consummation than is usually present in the customary orthodox treatment. Many descriptions if at all complete are often so laborious that it is frequently difficult to formulate a clear conception of the character of the populations involved. The customary black and white photographs in which the red coloration is disguised as black does little to give an understandable perception of the mosaic appearance of races of *Euphydryas.* If a standard chart of some fashion could be employed by authors a much clearer picture of the subject might be accomplished. If such a chart outline were available many novices by following a simple description, such as presented herein, and using a red and black crayon could fill out the spaces as explained and gain an impressionistic image of the specimen being con-

sidered. In the description here presented examples of this process will be exhibited. If it should appear to be advantageous and should receive general approval charts like the ones here submitted could be printed in numbers and distributed to those requesting them. This suggested procedure has been tested with various races of *chalcedona, anicia,* and *editha* and apparently accomplishes the desired purpose quite effectively. The macular arrangement of





Working chart for *Euphydryas chalcedona, anicia,* and *editha.* Forewing above, hindwing below.

these three species is basically similar, *chalcedona* exhibiting the greatest deviation. All three species can be satisfactorily processed by following the simple text which specifies the elaborations or restrictions as the case may require. It should be realized that in this article this process advances no further than the elements of maculation of the upperside of the wings but in cases where it is advisable to extend the operation to cover the undersides a similar method could be developed. In limiting this process to the upperside of the wings it is recognized that in each of the three species the pattern of the underside is practically stabilized so a detailed description of the underside is somewhat superfluous. It seems usually sufficient to state that the pattern of the undersides is typical of the species and to mention any slight quality that should be noted. A process somewhat similar to this could be erected for descriptions in the genus *Speyeria* Scudder which to many students wallows in a mire of complexity. It could also be adapted to clarify the descriptive maculation of other genera where unique but somewhat complex characters prevail. In all instances where red coloration occurs black and white photographs give a most inadequate impression of the aspect of the wings as the red must appear as black.

It is a fact that the size, shape, and color are subject to diverse appearance in various populations. It is upon this premise that separations can be effected. In the case of *Euphydryas* the fundamental pattern here proposed is well established and it is only upon variations that are constant within a population that valid descriptions can be tolerated.

The accompanying charts are offered only as working hypotheses inasmuch as individuals manifestly exhibit varied patterns normally within the limits of a race. In order to correctly follow characters in the description it is first necessary to inaugurate a key, which is here presented. In this key the primary wing is divided laterally by the median vein, from the base as far as the inside margin of the mesial band. The characters above this vein are indicated by the term "subcostal" and those below it by the term "over-innermarginal."

EUPHYDRYAS KEY

Primaries	Secondaries
1. costa.	A. base.
2. subcostal basal area.	B. mesial band.
3. first subcostal spot.	C. extra-mesial band.
4. second subcostal spot.	D. submarginal band.
5. third subcostal spot.	E. fringe.
6. fourth subcostal spot.	F. vein termini.
7. mesial band.	G. marginal band.
8. extra-mesial band.	H. innermargin.
9. fringe.	
10. vein termini.	
11. marginal band.	
12. innermargin.	
13. first over-innermarginal spot.	
14. second over-innermarginal spot.	
15. third over-innermarginal spot.	
16. innermarginal basal area.	

Euphydryas editha remingtoni Burdick, new subspecies

MALE: Upperside of primaries:

1. Black, broad.
2. Black, a white spot with red shading toward the outermargin of base.
3. Red, large, subquadrate, broad black borders.
4. White, subquadrate, twice as long as wide.
5. Red, reduced in size, longer than wide, broad black borders.
6. Black, large, subquadrate, containing three laterally elongated white spots one below the other.
7. Red, longitudinal, festooned, visibly divided by black veins.
8. Black, wide, sinuate, parallel to mesial band, containing medially seven white spots in the interspaces.
9. Black, white dots in the interspaces.
10. Black, slightly enlarged.
11. Red, divided into two rows of parallel spots each bounded laterally by black borders and visibly intersected by black veins, the inner row of spots somewhat crescentic.
12. Black, broad.
13. Black, variable in size and shape, sometimes narrow and sometimes subquadrate.
14. White, often shaded with red, variable in size and shape.
15. Red, somewhat shaded with black scales, broad black borders.
16. Black.

Upperside of secondaries:

A. Black, extensive from costa to innermargin covering the lower half of the discal area, containing four irregular shaped white spots, outside of these near basal outermargin an irregularly shaped red streak from costa to near median vein.
B. White, shaded outwardly with red, diminishing in width toward innermargin, visibly intersected by black veins.
C. Red, heavy black borders, visibly intersected by black veins, costal spot black, wide black borders.
D. Red, sometimes a few white scales, somewhat crescentic, visibly intersected by black veins.
E. Black, like that of primaries.
F. Black, like those of primaries.
G. Red, prominent, visibly intersected by black veins, wide black borders.
H. Black, usually superimposed with grayish scales variable in placement and extent.

FEMALE: The female does not differ materially from the male except for its larger size.

The maculation of the undersides of both wings are typical of the species *editha* so do not require additional detailed description except to record that the colors are much more intense and the pattern is sharper than found in *aurilacus*. The body, legs, palpi, and antennæ are similar to those of *aurilacus* and other *editha*.

In view of the definite relationship of *remingtoni* to *aurilacus* especially and to other races of *E. editha* generally it seems unlikely that study of the genitalia would yield information that could be used to further identify the subject.

HOLOTYPE male, ALLOTYPE female, thirty-eight PARATYPES, consisting of thirty-two males and six females will be disposed as follows:

HOLOTYPE male: Mt. Thielsen, Douglas Co., Oregon. 14 July 1956. Deposited in Yale Peabody Museum, Yale University. New Haven, Conn.

ALLOTYPE female: Same data and disposition.

PARATYPES: one pair each to: the Los Angeles County Museum, Los Angeles, Calif.; the United States National Museum, Washington D. C.; the American Museum of Natural History, New York, N. Y.; the Canadian National Museum, Ottawa, Canada. The remaining PARATYPES consisting of two female and twenty-eight male specimens will be retained in the author's collection. All these specimens have the same data as the TYPES and were collected at an elevation of about six to seven thousand feet.

To demonstrate the advantages of the chart theory further it would be interesting to see how it would be relevant to the case at hand to experiment with the chart theory with *E. chalcedona chalcedona* which appears to be as remote in appearance from *remingtoni* as any of the genus. Again following the *Euphydryas* key the description as it would have been visualized in this process would be as follows:

MALE: Upperside of primaries:

1. Black, broad, sprinkled with a few white scales.
2. Black, inferior.
3. White, subquadrate.
4. Black, subquadrate.
5. White, narrow, twice as long as wide.
6. Black, fused with no. 7, containing three laterally elongated white spots one below the other.
7. Black, sinuate, fused with no. 8, containing three subcostal white spots extending downward from the costa, below these two inferior white dots, then a substantial white spot on the innermargin.
8. Black, very wide, sinuate, containing marginally two rows of seven white spots each, the outside row inferior.
9. Black, narrow white dots in the interspaces.
10. Black, wide.
11. Red, consisting of a variable number of elongated spots in the interspaces separated by broad black vein areas and successively diminishing in size from the apex and disappearing before reaching the inner angle.
12. Black, broad, sometimes sprinkled with white scales.
13. Black, wide, subquadrate, often superimposed with a few white scales.
14. White, variable in size and shape, twice as long as wide.
15. Black, fused with basal area.
16. Black, sprinkled with a few white scales.

Upperside of secondaries:

A. Black, extensive from costa to submedian vein and covering lower half of discal area, containing four irregular shaped white spots, from submedian vein to innermargin whitish with a sprinkling of black scales.
B. White, a sinuate row of seven laterally elongated, bold spots filling the interspaces but visibly intersected by black veins.
C. Black, wide, containing medially a row of six annular white spots parallel to the mesial band.
D. Black, fused with "C", containing an arc-like row of seven prominant subtriangular spots pointing inward.
E. Black, like that of primaries.
F. Black, like those of primaries.
G. Black, any red spotting atypical.
H. Whitish, some irregular black scaling. See "A".

Underside typical of all *chalcedona* etc.

It is not necessary to give details other than those of the maculation of the upperside to demonstrate the applicatory effect of this plan for *E. chalcedona* as well as other *Euphydryas*.

It should be realized that the above is not the original description of *Euphydryas chalcedona* nor does it follow the substance of that description in any manner. It is only the author's version of how it might be described by using the chart method.

In appreciation of the valued counsel and also the painstaking efforts so generously given in preparing our society's periodical by our Editor-in-Chief, Dr. CHARLES L. REMINGTON of Yale University, I have assumed the privilege of recording this race in his name.

References

Gunder, J. D., 1929. The genus *Euphydryas* Scud. of Boreal America. *Pan-Pacific Ent.* 6: 1-8.

Holland, W. J., 1942. *The Butterfly Book,* rev. ed. New York. Doubleday, Doran & Co.

Ridgeway, Robert, 1912. *Color Standards and Nomenclature.* Publ. by author. Press of A. Hoen & Co. Baltimore.

1108 So. Harvard Blvd., Los Angeles, Calif., U. S. A.

MORE OBSERVATIONS OF THE "PUMPING" ACTION OF MOTHS AT WATER, WITH NOTES ON OBSERVATIONS IN QUINTANA ROO

by EDUARDO C. WELLING

I cannot remember the exact date on which I experienced the following, as I had made many collecting trips in the evenings of 1952 and 1953 to Gildersleeve Mt. State Park, in Lake Co., Ohio. It was the evening of one hot day in 1953 in which I passed with my lantern and killing jars, can of sugar-bait, brush, net, etc, by a shallow stream that in some places barely trickled over the large slabs of bed rock in an open area surrounded by secondary forest and fields, at about 1/3 mile from the base of Gildersleeve Mt. The night had already fallen, and by the light of my lantern I noticed 2 or 3 moths sitting on the rocks. I paid no attention to them until I returned, as I had hopes to reap a fine harvest of moths by baiting the trees along a larger stream further on down the trail. Later, on returning with a fair number of things, and upon approaching the place where I had noticed the moths sitting on the rocks, I was surprised to see many moths, about 20 or 30, sitting also. I put down my equipment and went for a closer look, and collected several of the better varieties. I noticed that they were sitting on