

THE VARIATION OF *POLITES DRACO* (HESPERIIDÆ)
WITH ALTITUDE

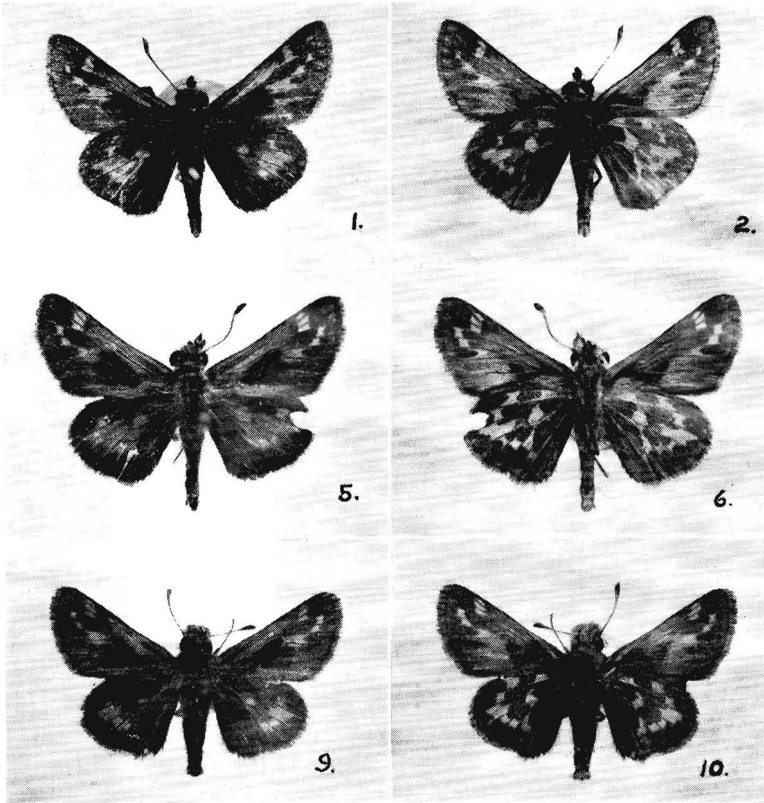
by F. MARTIN BROWN

While collecting in the vicinity of Ouray, Colorado, in 1960, I was struck by the large size and the light coloration on the under side of the *Polites draco* that I was getting at little more than 7,000 feet above sea level. This is about as low altitude as the species inhabits in Colorado. It ranges upward from there to the grasslands above timberline, almost reaching 13,000 feet above sea level.

EDWARDS (1871) described the butterfly from material that had been collected in that year by THEODORE L. MEAD, his future son-in-law. In the original description EDWARDS credited MEAD with the capture of the types and gave the type locality as "Colorado." MEAD (1875: p.790) wrote of *draco*: "Specimens were brought by the expedition from Southern Utah, and from Twin Lakes, Colorado. It is also found in California." This situation led BROWN (1935: p.162) to suggest that Twin Lakes, Colorado, be considered the type locality of the species. MEAD was at Twin Lakes from July 9, 1871, to around the 17th of the month (Brown 1956: p.189). This is just the time of the year at which to get the species at Twin Lakes, which is situated about 9,500 feet above sea level. It is very near to the midpoint of the altitudinal range of *draco* in Colorado.

EDWARDS' description of *draco* fits very well what I choose to call the "low altitude" or light form of the species. HOLLAND's figures of the types (1931: pl.53, fig.15, 16) compare favorably with material from the 9,000 to 10,000 feet elevation zone within which Twin Lakes is situated. Fresh specimens are a little greyer or greener than the reproduction in my copy of *The Butterfly Book* suggests.

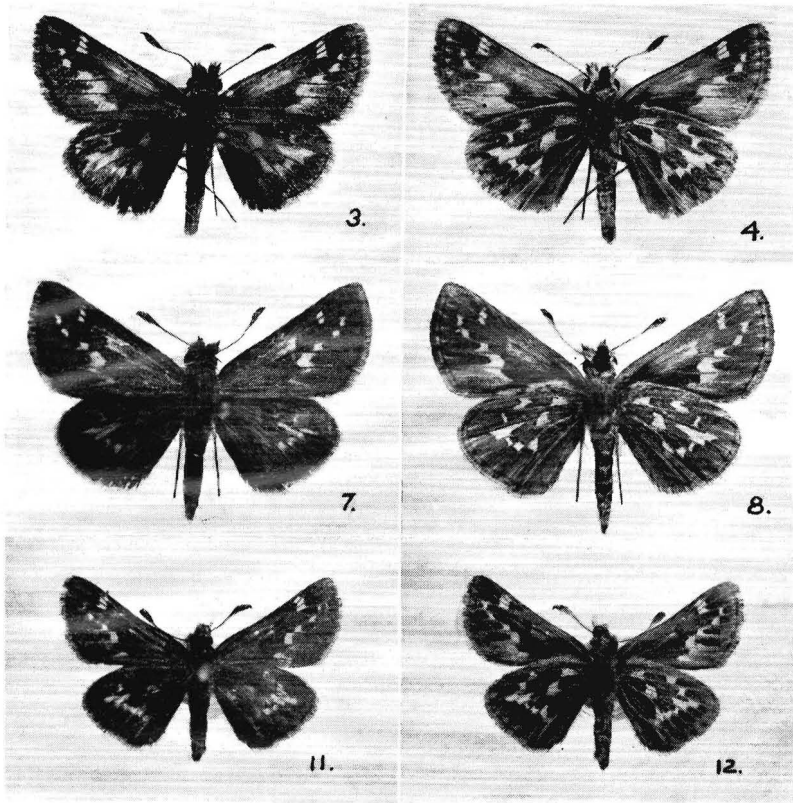
These are the systematic variations that occur with altitude in *draco*: 1) the length of the costal margin of the fore wing decreases with increase in altitude; 2) the area covered with fulvous scales on the upper side of the wings decreases with increased altitude and, concomitantly, the fuscous margins become wider; 3) the maculation on the upper side of the hind wings of the females becomes more sharply defined and the individual marks become smaller with increase in altitude; 4) on the under side of the hind wings the marks become smaller and more sharply defined with increase in altitude; 5) the ground color of the under side of the hind wings and the outer marginal area on the fore wings becomes



Polites draco ♂♂, all COLORADO: 1 & 2) low altitude form, Ouray, Ouray Co., 7,800', 28 June 1960; 5 & 6) type altitude form, Canyon Creek, Ouray Co., 9,000', 20 June 1960; 9 & 10) high altitude form, Glen Cove, Pikes Peak, Teller Co., 12,000', 15 July 1932. (Uppersides left, undersides right.) $\times 1.5$.

less greyed and more nearly chocolate brown with increase in altitude; 6) light lunular smudges, often violet grey in color, along the outer margin of the under side of the hind wings, especially clear on females, found on low altitude specimens disappear with increased altitude.

The two ends of the cline of variation are abundantly distinct. However, intergradation from one to the other is so complete on the slopes of a single mountain that naming them would be unwise. The changes evidently are a response to environmental conditions imposed by changes in altitude. In Colorado there is a regular increase in moisture accompanying the usual decrease in temperature as you ascend a mountain.



Polites draco ♀♀, all COLORADO: 3 & 4) same data as figs. 1 & 2; 7 & 8) same data as 5 & 6; 11 & 12) Buckskin Joe Gulch, Park Co., 12,000', 5 August 1949. (Uppersides left, undersides right.) $\times 1.5$.

It is possible that the decrease in oxygen tension may have something to do with the metabolic changes that bring about the darker coloring that increases with altitude. It also is possible that the shorter growing season at high altitude reduces nutrition of the growing caterpillars and thus produces smaller imagoes.

Long and short series of *Polites draco* from forty-three localities in Colorado were examined for this brief study. They are distributed among fifteen of the mountainous counties in the State. The distribution of the localities sampled may be summarized:

<i>Altitude range</i>	<i>Number</i>	<i>Counties</i>
12,000 ft. upward	7	Park, Summit, Teller, Pitkin
11,000 - 12,000 ft.	10	Park, San Juan, Lake, Saguache, Eagle, Pitkin, Boulder
10,000 - 11,000 ft.	9	Park, LaPlata, Saguache, Mineral, Lake, Clear Creek, Pitkin
9,000 - 10,000 ft.	11	Park, Clear Creek, Teller, El Paso, Grand, Gilpin, Ouray, Lake
8,000 - 9,000 ft.	6	Park, Pitkin, Grand, Ouray
7,000 - 8,000 ft.	1	Ouray

The dates upon which the collections were made become later in the summer as altitude increases:

<i>Altitude</i>	<i>Range of dates</i>
12,000 ft. upward	15 July to 20 August
11,000 - 12,000 ft.	4 July to 19 August
10,000 - 11,000 ft.	28 June to 5 August
9,000 - 10,000 ft.	21 June to 27 July
8,000 - 9,000 ft.	25 June to 13 July
7,000 - 8,000 ft.	12 June to 29 June

It would be interesting to learn through breeding experiments how much of the variation found in *Polites draco* is genetic and how much a somatic response to the environmental factors that accompany increase in altitude.

References

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