

OBSERVATIONS ON *BOLORIA DISTINCTA* (NYMPHALIDÆ)

by COLIN W. WYATT

Until 1955 *Boloria distincta* Gibson was only known from four specimens, the original male and two females in the Canadian National Collection at Ottawa, described in the *Report of the Canadian Arctic Expedition 1913-18*, Vol. III (1920), of which only one female is in really good condition, and one battered male in the American Museum of Natural History in New York. Its systematic position has been in some doubt, the consensus of opinion being that it was probably a form of *Boloria alberta* Edw.

In July 1955, while on a long collecting trip in the Canadian arctic, I was fortunate enough to collect a good series of both sexes in the mountains near the Yukon - Northwest Territories border, some 200 miles north of the Arctic Circle. Two males of these I sent out by the first passing aircraft to my friend L. PAUL GREY of Lincoln, Maine, for dissection, since I would not be back in civilization for another five months. I give his report below, which I have his full permission to reproduce.

"Male genitalia of *Boloria distincta* Gibson.

"This insect proves to affiliate as a subspecies of *Boloria astarte* Doubleday. The idea that *distincta* might associate with *alberta* can be laid to rest, for *alberta* differs significantly in the broad ædeagus with high, narrow dorsal saddle and with long, dorsally recurved tip, in the heavier wings of the phallobase and in the slighter harpe.

"In *distincta*, and in a series of *astarte* examined, there is some variation in the size and shape of the harpe, from nearly like that of *alberta* to much larger, occasionally angled to resemble a horse's head in outline, and the extent of spiculation varies considerably. If the similarities of ædeagus and wings of the phallobase were insufficient to ensure the correctness of the present association, as they seem to be, there is the extensive patch of ciliary hairs dorsad on the tegumen, in and around the membranous area, asserted by dos Passos & Grey (1945, p.6) to be diagnostic of *astarte*; these setæ are conspicuous on *distincta* and *astarte*, absent in *alberta*."

However, I do not entirely agree with his findings (other than that *distincta* has nothing whatsoever to do with *alberta*), for I am very familiar with all three of these rare species, *B. alberta*, *B. astarte*, and *B. distincta*, and have taken the first two in considerable numbers in various localities in several consecutive years. All three have certain habits in common, and the first two have very similar habitats, but not only is the habitat of *distincta* rather different to those of the other two, but its habits differ. It also flies fully three weeks earlier, during the first week of July, while the other two fly during the last week of July and the first week of August. As these two live some 1,200 miles south of the home of *distincta*, one would expect *astarte*, if con-

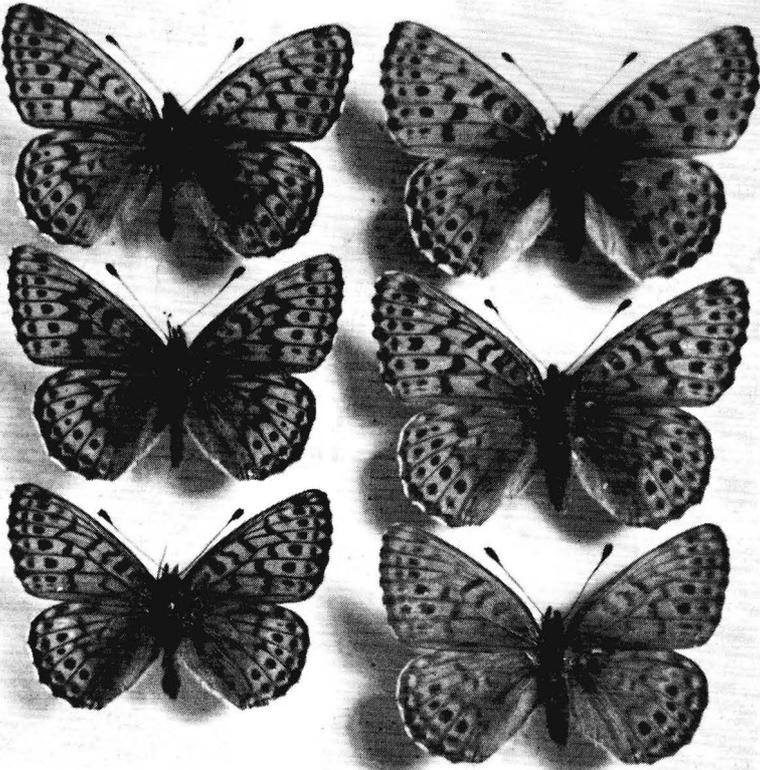
specific with *distincta*, to fly proportionately earlier in the year, or at least at the same time. As *distincta* has obviously nothing to do with *alberta*, we can disregard the latter species and only make comparisons with *astarte*.

*B. astarte* flies exclusively on very barren scree where almost the only vegetation is *Dryas octopetala*, *Silene acaulis*, a small *Rumex* (the food-plant of *Lycæna snowi*), and a few dwarf grasses. I have never noticed any species of dwarf *Salix* growing where either *astarte* or *alberta* fly, except at much lower levels. The males of *astarte* fly almost exclusively along the level tops of the highest exposed ridges or over the actual stony summit of the mountain, only occasionally making sweeps down over the scree below them and immediately returning to the tops. The females I have only met with on these scree just below the summits or upper ridges, up to 500 feet below, where only very rarely have I seen an occasional searching male. On no occasion have I ever met with either sex anywhere except on scree or broken rock slides. The only species that seem to fly with *astarte* and *alberta* are *Melitæa damocetas* Skinner, *Æneis beani* Elwes, and *Lycæna snowi* Edwards, all "rock-slide" species. In neither *astarte* nor *alberta* do the sexes fly together, but only meet at the "frontier" between the upper (male) zone and the lower (female) zone.

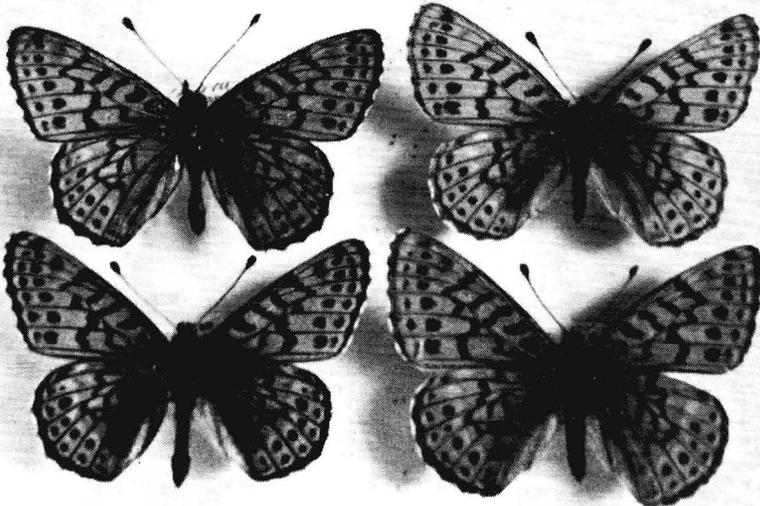
In distinction to this, the males of *distincta* very seldom fly on the summits or on the tops of ridges, but prefer to fly along twenty to fifty feet below them, in areas where there are more flowers and other vegetation (*Phlox sibirica*, *Arnica alpina*, *Cassiope tetragona*, *Saxifraga* spp., etc.). I took *distincta* in two fairly distinct areas, first of all near the summit of the mountain at about 3,000 ft., and also on the slopes with fairly plentiful arctic vegetation about 400 feet lower down, on what was a normal alpine flower-covered hillside and not a scree at all, and secondly along the broad top of a spur below the (dwarf) tree-level about 1,200 ft. below. In the first area I found only males, (although in the slope 400 feet below it I would have expected to see only females had I been dealing with *astarte*), while in the second I not only took all my females, which was to be expected, but also an almost equal number of males. Here there were no scree or rocks within a mile or more. In four seasons' experience of *astarte* this has never been the case.

Secondly, the females of *distincta* were flying over a thickly vegetated area where grew a *Salix* some 18" high with large soft leaves, the tiny dwarf prostrate *Salix* which is probably the food-plant of *Boloria improba* Butler which was flying here with *distincta*, a creeping prostrate birch, dwarf alders, and a rich vegetation of flowers and grasses. Flying with them were *Colias nastes*, *C. hecla*, *C. palæno*, *Æneis cairnesi*, *Erebia disa*, *E. rossi*, *Boloria chariclea*, etc. One female *distincta* was fluttering around the *Salix* with the large soft leaves in a very maternal manner, so this is very likely the food-plant. Only 300 feet lower down the grassy slope *Erebia youngi* was flying, while on a saddle at the same level where the spur ran into the grassy hillside among thickets of alders, *Erebia fasciata* Butler was flying over dampish ground covered with cotton-grass. In other words, the whole area was totally dissimilar to the chosen habitat of female *astarte*.

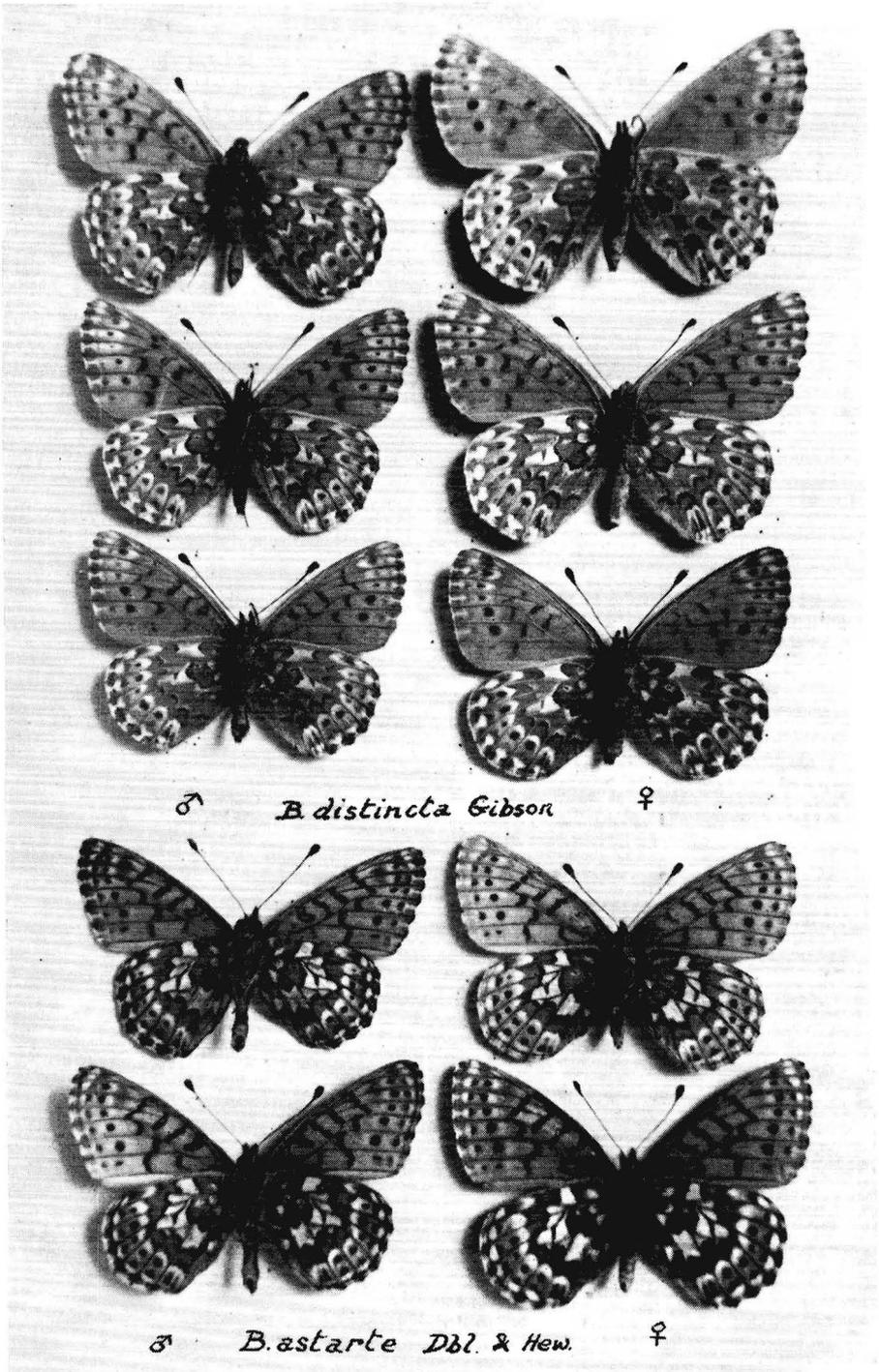
Next as to flight. The flight of the male *distincta* is swift, but much less so than that of either *alberta* or *astarte*. It is easy to catch compared to these



♂ *B. distincta* Gibson ♀



♂ *B. astarte* Dbl. & Hew. ♀



two species. The male *astarte* is extremely shy when settled on the bare stones, but *distincta* can almost always be taken when basking. I also took several at flowers which I have never done with male *astarte*. The female *distincta* is also a much slower flier than that of *astarte* which, except when feeding, flies very swiftly in a straight line, while the *distincta* female zigzags about like a *Speyeria* and tends to stop here and there to flutter around some plant or bush.

Finally there is the problem of food-plants. GREY is of the opinion that most of these high alpine or arctic Bolorians feed on some species of dwarf willow. This is, I think, the case with *B. improba*, whose females I have often taken walking about on the tiny, very prostrate *Salix* with almost round, shiny leaves. It is, I think, also possible that *distincta* feeds on the larger *Salix* with the long, soft leaves, since this was growing very plentifully where its females were flying and they often appeared to pay special attention to it.

However, I have never seen females of either *astarte* or *albertaina* anywhere near any *Salix*. Most of my females of both these species were taken either feeding at flowers of *Dryas octopetala*, or walking about on it as if examining its potentialities for a nursery. My females of *albertaina* were taken exclusively in association with *Dryas*. Again, near Norman Wells last summer I came upon a colony of very large *Boloria polaris* in clearings in a pine forest at about 2,500 ft.; I had been walking all around the flank of this mountain, but this was the only area where *polaris* flew and, significantly, this was the only area where *Dryas octopetala* was growing. Here again, most females were taken on or around this plant. I noticed later that in other areas further north, both in the foothills and on the tundra, *polaris* was almost always associated with either *Dryas octopetala* or *D. integrifolia*.

If these observations have any value, they tend to justify a theory that *astarte*, *albertaina*, and *polaris* feed on *Dryas* spp., while *distincta*, *improba*, and possibly others feed on *Salix* spp., and that *distincta*, for all its structural similarities to *astarte*, may be, if not a fully valid species, at least in the process of becoming one. This can only be proved by actually observing the females in the act of oviposition, which with such rare and inaccessible species is not likely to happen for some time. However, it indicates a line of approach for future workers. I would be very glad to hear of any experiences by other collectors of this group, especially from the arctic.

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