

Lowland Insects on Mountain Tops

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Three species of widely distributed lowland butterflies and the Australian eucalyptus tortoise beetle, *Paropsis dilatata* Er., have been observed at altitudes of 4,000–5,000 feet above sea-level in the Tararua Ranges during the summer of 1958–1959 by one of us (G. W. G.) employed there by the New Zealand Forest Service on their alpine ecological survey. Lowland insects are also reported from the summit of Mt. Egmont during January, 1955, from 4,000 feet in the Kaweka Ranges during February, 1957, and from 5,000 feet in the Kaimanawa Ranges during March, 1959.

The Red Admiral, *Vanessa gonerilla* F., was present on McIntosh in the Southern Tararuas at approximately 4,000 feet on January 21, and on Mitre at a similar altitude and in considerable numbers on March 8, 1959. One of these was observed feeding at flowers of *Dracophyllum uniflorum* Hook. f. Both localities were in scrub and tussock above the bushline. *Dodonidia helmsi* Fered., occurred in tussock country at a height of over 4,000 feet on the Dress Circle on January 19 and on McIntosh on January 21. Food plants and adults of both these species were present at lower altitudes in the Tararua Ranges, where the butterflies were probably breeding. Hudson (1928, p. 35) remarks that he has seen *V. gonerilla* between 4,000 and 5,000 feet in mountainous districts and that *D. helmsi* "frequents sunny glades in beech forest often at considerable elevations". The above record of the latter species is therefore probably the first of its occurrence far above the bushline.

The White Butterfly, *Pieris rapae* L., was generally common above 4,000 feet in the Tararuas throughout January and February. On March 7 several specimens were seen in misty conditions at approximately 4,500 feet on Mitre.

The abundance of the White Butterfly was great enough to suggest that the species could be breeding on some alpine plant. However, no evidence of this was found despite constant searching, and it seems most probable that the butterflies originated from either the Horowhenua or Wairarapa Plains. The unusually favourable weather conditions in the Tararuas during this summer undoubtedly enabled the butterflies to survive in considerable numbers at the high altitudes. Numerous specimens of this species were also seen by Mr. D. Manson at 4,000 feet in the Kaweka Ranges on February 13, 1957, and at a lower altitude above "The Lakes" on February 12. Both these localities are far from the usual breeding places of this butterfly. During Easter (March 29), 1959, Mr. G. Caughley observed fifteen specimens at 5,000 feet along the tops of the

Kaimanawa Ranges, but none were present lower down in the bush.

It is probable that the White Butterfly occurs along the tops of most of the high mountain ranges of the southern and eastern parts of the North Island whenever the conditions are favourable. It is unlikely to breed there, however, and has not been previously recorded from such altitudes in New Zealand.

The eucalyptus tortoise beetle, *Paropsis dilatata*, first seen on Pukematawai at 4,800 feet on November 18, 1958, was observed quite commonly during January in the Southern Tararuas on Alpha (4,400 feet) and Hector (5,000 feet) flying in hot sunshine. This insect has recently appeared in the North Island again (Gurr, 1957), where it is apparently common and widespread, at least in the southern part of the island.

The large black wasp, *Salix monachus* Sm., occurred commonly at the summit of Mt. Egmont (8,260 feet) where it was flying in bright sunshine during January, 1955. It was not noticed in the bush lower down on the mountain slopes, but obviously must have been common somewhere in the surrounding Taranaki district, for such numbers to occur high on the mountain. Other insects were also common in the snow at the summit and areas nearby. These included many small species of Hymenoptera and Hemiptera, and a few beetles. All were dead and some had lain there long enough to absorb sufficient warmth from the sun to melt their way down into the snow, leaving a vertical shaft.

Other instances of lowland insects occurring high up on mountains in New Zealand are reported by G. V. Hudson (1906 and 1950) who records a large swarm of lady-birds, *Coccinella 11-punctata* L., at approximately 7,200 feet on the summit of Mt. Enys, and vast swarms of a species of *Pyronota* at 4,000 feet on Mt. Earnslaw. S. Hudson (1922) describes the occurrence of a swarm of lowland insects on a glacier at 7,500 feet on Mt. Ruapehu. She reports that many hundreds of specimens were present, most being dead or moribund, and that representatives of the orders Coleoptera, Lepidoptera (four families), Diptera, Odonata, Plecoptera, Trichoptera and Hemiptera were present. As far as can be ascertained, no other records of this phenomenon occurring in New Zealand have been published.

The subject has been reviewed by Chapman (1954), who cites examples of lowland insects occurring on mountains in Europe and North America. Many of these records concern the swarming of flies, beetles, and ants on mountain summits and ridges.

There appear to be very few records of lowland butterflies occurring on mountain tops. Chapman records nymphalid and pierid butterflies on Squaw Peak, 7,996 feet, in Montana and

Williams (1958) mentions examples of migrating butterflies crossing the Port de Gavarnie Pass, 7,500 feet, in the Pyrenees, and records a swarm of butterflies flying upwards over snow-covered ground at 10,000 feet on Dharmasala in India, and butterflies flying at 12,000 feet on Mt. Everest. Certain species of dragon flies, locusts, lady-birds, hymenoptera, syrphid flies and a pentatomid bug also form swarms which may sometimes reach great heights. However, these are examples of another phenomenon which is only interesting here in showing that these insects can reach great heights by their own controlled flight.

As regards lowland insects on mountain tops Chapman (1954) suggests that an "inherent tendency to seek prominent topographic features such as mountain summits is one of the bases of the phenomenon". There is little doubt that air currents can carry insects upwards for considerable distances above the land surface (Glick, 1939), but there is a considerable amount of evidence indicating that the concentration of species, present in surrounding areas, on mountain summits, cannot be attributed to the action of updraft air currents alone (Chapman).

It seems probable that the insects occurring high up in the Tararua, Kaimanawa and Kaweka ranges, and also the large wasp and beetles present on the summit of Mt. Egmont, were carried upwards partly by their own free flight and partly by the accident of suitable wind or air currents. The small Hymenoptera and Hemiptera, which were all winged, on the summit of Egmont, may have been carried aloft by wind or air currents alone, and possibly formed part of an aerial plankton.

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