autochthonous group existing exclusively in the biome above the forest, at elevations above 2000–2500 m." None of our Nevada ants can qualify because of the adverb *exclusively,* so we will use the more modest term *alpine.*

The student of mountaintop faunas must be duly warned (as does Mani, p. 4) that not all insects occurring at high altitudes are hypsobionts: "Incredibly large numbers of insects [even heavy flying insects] are lifted from the lowland by warm updraft air currents to high altitudes, to be chilled dead, blown passively and eventually cast on high mountain slopes." The converse, however, is not true: hypsobionts are rarely encountered on the lowlands.

In this study we define a Nevada mountain ant species as one that inhabits the Coniferous Forest Biome or the Alpine Biome or the ecotone between them. We cannot use an elevational boundary because the lower limit of the forest is too uneven.

HIGH-ALTITUDE ENVIRONMENT

The high-altitude environment, like all others, is a complex of many interrelated factors, but it differs from all others in one respect: reduced atmospheric pressure, which is itself the result of high altitude. This seems to say that the high-altitude environment is characterized by high altitude, but we shall avoid being so foolish by describing some of the effects of reduced atmospheric pressure.

1. Deficient oxygen, the most important characteristic. In the Himalaya at the timberline the oxygen is 68 percent of what it is at sea level; at 6000 m it is only 45 percent. Mountain sheep, ibexes and yaks live up to 5800 m; man without an artificial oxygen supply lives up to 8540 m. Certain insects, mites, and spiders flourish at 6800 m, because they are only slightly affected by decreased oxygen or by sudden changes in atmospheric pressure (Mani 1968:10).

2. Atmospheric cold. While it is true that cold does slow down the activities of insects, high-altitude insects can exist only because of the atmospheric cold: it enables them to withstand the atmospheric aridity (Mani 1968:22–23).

3. Atmospheric aridity.

4. Intense solar radiation. "Regardless of atmospheric temperature, objects exposed to direct sunshine warm up far more rapidly than at sea level" (Mani 1968:21). This is enormously important for insects because of the short days and the short summers.

5. Snow cover. This is absolutely essential for high-altitude insects. It prevents freezing and desiccation and, because the habitat under the snow is not frozen, makes possible an earlier start of summer activities.

6. Biotic factors. (After Mani 1968:44) Most biotic factors are ultimately based on the following:

(a) Trees are absent.
(b) The scant cespitose vegetation has a short growing period.
(c) The active feeding period is severely restricted by the short summer. In the northwestern Himalaya on south slopes the average annual feeding period may last 10 weeks at 3000–4000 m. On north slopes it starts later and is shorter.
(d) Sources of food are extremely irregular, relatively scant, and often localized.
  (1) Autochthonous sources are plants and animals normally living at high altitudes.
  (2) Wind-blown organisms from the lowlands are the predominant source and are most abundant at the melting edges of snow where dead plants and animals (mostly insects) become exposed. The surface of the snow is likewise important; it is almost the exclusive source in the Himalaya above 5000 m.
(e) Suitable microhabitats are scarce. Actually there are only two of any significance: (1) cracks in the soil and rocks and (2), of far greater importance, under stones.
(f) Crowding and isolation, caused by this scarcity, may result in "a state of . . . armed neutrality rather than peaceful coexistence!" (p. 81)
(g) The majority of high-altitude insects are predators, parasitoids, or parasites. "It would seem that almost every