

with regard to the relationship of color and size, it is clear that these are poorly correlated geographically. Thus all three characters studied tend to vary independently, and as in the case of *Lymantria*, several racial divisions can be drawn depending on which characters are used and in what combinations.

A simple case of discordant variation involving a pair of characters has been described by Mayr (1942) for the bird *Paradisaea apoda*. This species is distributed linearly in the lowlands around the coast of New Guinea. Coloration of the back lightens in a cline extending around the eastern tip of the island and terminating in the north at Goodenough Bay, while coloration of the plumes lightens in a cline which commences to the northwest at Cape Ward Hunt and terminates at the Huon Peninsula. Mayr uses the resultant superimposition patterns to demarcate at intervals five races. One wonders what new racial lines could have been drawn had other, less obvious characters been carefully analyzed.

*Polytopic races.* If races are delimited by a single character, it is easily within the realm of possibility that this character may be selected to predominance in more than one population of the species. Dice (1940) reports the apparent independent origin of populations of the races *Peromyscus maniculatus rufinus* and *P. m. artemisiae* in western North America; these have arisen through the selection of certain coat color alleles best suited to the color of their environmental background. Cazier (in Mayr, Linsley, Usinger, 1953) has found a similar origin for certain color races in the tiger beetle genus *Cicindela*. We have observed the polytopic occurrence of a distinctive racial character involving appendage length in populations of the ant *Lasius niger* (L.) occupying eastern Asia and the eastern Mediterranean and Atlantic Islands region. Mayr (in the work cited) has expressed the opinion that such populations be recognized under a single subspecific name if no other characters vary geo-

graphically to form racial patterns. The extreme taxonomic difficulties arising when the distribution becomes more complex are self-evident and need no further comment here.

*The microgeographic race.* Even when only one or a few characters are employed by the taxonomist, these often vary so elaborately and extensively that nearly every local population is distinguishable from all the others. The best-known examples of this phenomenon are in the snail genera *Achatinella*, *Partula*, *Cepaea*, *Io*, *Polymidas*, *Liguus*, *Europtis*, *Orion*, *Chondrothyra*, etc., the first three of which have been discussed so often in general papers on evolution that they need little additional comment here. The most obvious variation is in shell color patterns, but variation in sculpture, size, coiling, etc., also occurs, and the resultant characters can be used in combination to distinguish endless distinct populations even by the most stringent racial standards.

Microgeographic races are especially prominent in snails because of the sedentary habits of these organisms and their tendency to form isolated local colonies. The same phenomenon is evident in more active animals restricted to habitats of a discontinuous or isolated kind, such as bogs, desert streams, and caves. Examples can be drawn from such diverse groups as butterflies (Higgins, 1950), cave beetles (Valentine, 1945), and *Dendroica* warblers (Hellmayr, 1935; Bond, 1950).

The chief disadvantage inherent in formally recognizing microgeographical races is that regardless of how valid the distinctiveness and internal concordance of their characters may prove them, the list of their trinomials must reach stupendous proportions in time. The result is a top-heavy nomenclature helping little of itself to clarify the nature of the geographical variation, but which instead will certainly obscure it as synonymies are recognized and diagnoses shifted. This is apparently the situation being approached in certain rodent groups. In the pocket gophers *Thomomys bottae* and *T. tal-*