

*poides* a total of thirty-five races has already been recognized from Utah alone (Durrant, 1946), and the area has not been so exhaustively worked as to preclude the possibility that many more races remain undetected.

The microgeographical race as conceived in present evolutionary literature is an unusually well differentiated deme, or local communal population. There is no reason to believe that it is an exceptional phenomenon or anything more than the extreme of the tendency prevalent in all geographically variable species to form local populations of a homogeneous and distinctive genetic constitution. If several independent characters enter into the geographical variation, it is reasonable to assume that many demes can be distinguished by racial standards ordinarily applied in taxonomy if enough of the characters are used in combination. This is in fact the condition described in *Rana pipiens* by Moore, and it is reflected by the many references of geneticists and taxonomists to special "strains" typifying geographical localities.

☞ *The arbitrary lower limit of the subspecies.* Even when the discrepancies arising from discordant geographical variation are eliminated by the use of one or a very few characters, systematists are faced with the fact that there is no real lower limit to the subspecies category. It has been affirmed repeatedly in a variety of animal groups that racial populations show all degrees of divergence from the lowest level of statistical reliability of mean difference to complete differentiation, with no particular tendency to fall either way. Obviously the only way to resolve this situation taxonomically is to establish an arbitrary lower limit above which populations will be formally recognized as subspecies. This subject has been dealt with thoroughly in the recent text on animal systematics by Mayr, Linsley, and Usinger (1953), and there is no need to treat it in any detail here. The point we wish to emphasize is that no arbitrary lower limit will ever be completely satis-

factory, for even if only one character is used, there will always be borderline cases of an extremely vexing nature. Samples defined with vague, untrustworthy characters will often fall above a fixed lower limit, while samples usefully distinguished by striking characters will often fall below it. Furthermore, any hard and fast line will unavoidably produce a condition in which some populations are recognized formally as races while others, essentially of the same constitution but of a slightly lower statistical level, are not recognized.

This difficulty concerning the lower limit of the subspecies is well known to most taxonomists who have devoted much serious attention to the problem. Some have compromised the situation by choosing the level of statistical reliability most nearly conforming to their preconceived notion of what should constitute a valid race in the particular group under study. This appears to have been the procedure followed by Austin (1952), for instance, in his study of Pacific petrels: "A subspecific name designating a geographical population is of no practical use unless at least three-quarters or more of the individuals of that population can be correctly assigned by their morphological characters alone." Austin chooses the "84% from 84%" rule of Simpson and Roe, making the illuminating statement that the "97% from 97%" rule would be too stringent, since "Among the petrels it is rare indeed to find the means of any character separated by two standard deviations, allowing a 97% separation." Austin's method is in no way irregular as modern systematic practice goes, a fact that should signal a general re-examination of the relationship between the "taxonomic intuition" and the choice of hard statistical bases of differentiation.

It is apparent that in their application of the subspecies concept most revisionary workers have misinterpreted the nature of geographical variation as revealed by the more careful analyses in the literature. It is also apparent that taxonomic revisions, using as they do relatively small