STATISTICS AND TAXONOMY AGAIN

by F. MARTIN BROWN

Mr. SHOUMATOFF'S article is a valid criticism, in the light of current statistical thought, of my series of articles in *The Lepidopterist's News.* It requires a defence of my position. Just as taxonomy is a tool of systematics, I propose to make statistics a more useful tool of taxonomy. Neither taxonomy nor statistics is an end in itself; each is an intermediate between unassimilated information and an understanding of life.

The original tenets of statistics were developed by KARL PEARSON at the turn of the century to aid the study of variation in natural populations. Since then the emphasis in biology has been toward the study of limited populations living under laboratory controlled conditions. This has developed the statistics of small numbers, a potent laboratory tool. R.A. FISHER'S work on probability opened fruitful ways of establishing "betting odds" for experimental work. The general result of these advances has been to establish the sanctity of philosophically evolved "limits". This is dangerous! It is a return to Greek philosophical science. It is pressing Nature into preconceived limits instead of seeking natural "limits". This I consider putting the cart before the horse.

My divergence from the classical statistical approach is not original. In the field of anthropology metrical research reached a point of utter confusion. The classical approach had led to a morass of meaningless data. W. H. SHELDON cut the Gordian Knot with radical surgery! He sorted individuals into categories by non-metrical observation, much as a taxonomist sorts out forms or subspecies. He then set about finding the statistical differences among the measurements made on these categories. What he did was to establish a taxonomic system of human physique and then discover the statistical constants of the system. The result has been a useful system for classifying human beings and thus relating these categories to other fields that impinge upon us.

What I am doing is seeking out the statistics of an accepted taxonomic system. Such an approach does not allow the investigator to say, "I will accept a 1 in 100 — or any other preconceived ratio — as the limit of subspecific difference", the currently accepted statistical approach. It imposes upon him the discovery of what ratio of chance is accepted by Nature in the light of currently accepted taxonomy.

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FOOTNOTE TO BROWN'S STATISTICS

Mr. BROWN in his recent articles in *The Lepidopterists' News* takes little note of the fact that variation may not fit within the statistically "normal" pattern. A convenient test may be made. After dividing the material into classes of equal range of the dimension considered, take the **differences of the logarithms** of the numbers in the classes, and plot them in order. If they approximate an oblique straight line, the distribution is normal; if one gets a sinuous line the distribution is bimodal, and other patterns suggest more complicated patterns, not immediately suitable for statistical analysis.

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