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A number of isolated table mountains in southern Venezuela and adjacent districts of Brazil and the Guianas may be referred to by the collective name "Pantepui". These mountains, including Roraima and Duida, are the home of a peculiar fauna and flora. The 93 species of birds which can be considered the subtropical elements of Pantepui include 30 endemic species, two of which are placed in (not very distinct) endemic genera.

Pantepui is isolated from other mountain areas by the lowlands of the Orinoco and its tributaries in the north and northwest, and by the vast Amazonian lowlands in the southwest and south. The question thus arises: How did the upland fauna get to Pantepui and where did it come from? Four theories have been proposed by CHAPMAN, TATE and others, in answer to this question.

(1) *The fauna of Pantepui is a relic of a once widespread fauna of a formerly existing plateau.*

As proof is cited the fact that most (22 of 30) of the endemic species are widespread in Pantepui. It is evident, however, that ecological reasons must be accountable for this, since the geological facts oppose the existence of such a plateau during the comparatively recent period since which these endemic species have existed. The sandstones of Pantepui are at least as old as Triassic, and much of the erosion must already have taken place during the Mesozoic. The plateau fauna theory is very improbable, even for the old endemics.

(2) *The subtropical fauna of Pantepui was able to cross the surrounding lowlands while these had a subtropical climate during the cool periods of the Pleistocene.*

This theory is based on the assumption that the ecological tolerance of birds is too narrow to permit mountain birds to cross lowlands unless the latter have a cool climate. That this assumption is erroneous is demonstrated by much geographical variation in the preference for climatic and altitudinal zones shown in many species of birds. Also, to produce a "subtropical" climate in the tropical lowlands of South America, a drop in temperature of 10°C would be required, while the available evidence indicates that in this area the temperature did not drop by more than 3°C even at the height of the cold periods of the Pleistocene. Finally, the fauna of Pantepui is by far too heterogeneous to have originated in a few Pleistocene invasions. This theory is thus unlikely if better alternatives are available.

(3) *The Pantepui fauna, or parts of it, originated from lowland elements through shift of ecological preference.*

This is undoubtedly correct. Among the endemic species, 16 (53%) have the nearest relative in the tropical zone and the relationship is very close in many cases. Twenty six of the non-endemic species (41%) are essentially tropical species even though they have subtropical populations on Pantepui. It is thus correct to state that an important portion (about 45%) of the Pantepui fauna is derived from the tropics.—What about the remaining 55%?

(4) *The subtropical fauna of Pantepui, or parts of it, is derived from other subtropical regions by "hopping" across the intervening lowlands.*

This theory, the plausibility of which was categorically denied by CHAPMAN in 1931, has gained much support from recent investigations of the colonization of oceanic islands. Records are now available for many colonization flights of small birds covering distances of 2000 km and even more than 3000 km. A flight of merely 500 km required to reach Pantepui (Paraque) from the Andes is no serious obstacle for many species. It is now evident that the Pantepui element not derived from the tropics reached the area by such "hopping".

Conclusions

(a) The bird fauna of Pantepui consists almost equally of two elements, one derived from the adjacent tropical lowlands, and one received from distant mountain ranges by "hopping". Both classes are found among the recent and the old elements.

(b) Many species are able to colonize suitable territories by crossing large areas of unsuitable terrain. Many species are much less constant ecologically throughout their range than is generally assumed.

(c) The reason for the development of the Pantepui fauna is mainly ecological. Pantepui offers a specially favorable habitat to subtropical species able to jump across the lowland barrier, to tropical species able to enter the only sparsely settled upper tropical subtropical niche, and to certain ecological specialists such as cliff dwellers.

(d) The colonization of Pantepui has been a continuous process, although presumably more active during some periods than during others.

(e) The continuous colonization by new elements is counterbalanced by a continuous process of extinction.

A more detailed analysis of this topic will be published in the Bull. Amer. Mus. Nat. Hist.