

FAUNAL TURNOVER IN SOUTH AMERICAN FOSSIL AVIFAUNAS: THE  
INSUFFICIENCIES OF THE FOSSIL RECORD

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Vuilleumier (1984 p. 1391) has presented what he has termed "the first quantitative analysis of faunal dynamics in fossil South American birds." I believe, however, that the data used therein to attempt to document "faunal dynamics" and "turnover" are in considerable part illusory. Even if all of the genera and families listed by Vuilleumier were valid and correctly identified, which many are not, the fossil record of birds in South America is simply too scattered in time and space, and specimens too few, to derive the sorts of generalizations regarding faunal "turnovers" attempted by Vuilleumier.

Apart from some seabirds and a single fossil from the Miocene of Colombia, the published fossil rec-

ord of birds in South America for the entire Tertiary is restricted to Argentina, Uruguay, and southern Brazil. Although, as Vuilleumier (1984 p. 1386) notes, similar biases have not prevented paleomammalogists from drawing generalizations that are assumed to be valid for the rest of the continent, there is simply no comparison between the much richer and much more intensively studied mammalian fossil record and that currently available for birds.

Except for the fossil record from the Argentinian Cenozoic, discussed below, most of Vuilleumier's data are derived from two large late Quaternary avifaunas from opposite sides of the continent in Ecuador and Peru (Campbell, 1976, 1979) and in

Brazil (Winge, 1888). These are essentially modern avifaunas and thus make only a minor contribution towards an understanding of long-term faunal dynamics in South America. Furthermore, the limitations of the original studies of these faunas should be recognized.

Oluf Winge (1888) described a large avifauna from undated Quaternary cave deposits in Minas Gerais, Brazil. He listed 126 numbered species, several of which he considered likely to be composed of remains of more than one species. His comparative reference material of modern skeletons was probably very limited and even some of the more positive identifications cannot be uncritically accepted; for certain species, it is likely that no reference specimens were available (e.g., *Asio stygius*). Winge listed 58 (almost 50%) of the species in his sample with queries or qualifiers conveying varying degrees of uncertainty as to their proper identity [e.g., "*Podilymbus (antarcticus vel podiceps, si sp. dist.)*"; "*Porzana sp. e minimus, non P. flaviventris*"; or "*Ibis (Theristicus) sp.; melanopsis v. caudata?; coeruleus?*"] This notwithstanding, in Brodkorb's "Catalogue of Fossil Birds" (Brodkorb, 1963-1978), these and other uncertainties are for the most part simply omitted. Thus, for example, Winge listed his species number 17 as "*Penelope sp. (ferc certe sp. 2, vel 3)*" ["*Penelope sp. (almost certainly 2 species, even 3)*"], making comparisons in his discussion with *Penelope superciliaris* and *P. cristata* (= *P. obscura*). In Brodkorb (1964), this is used as the basis for records of both *P. superciliaris* and *P. obscura*, with no further comment. Therefore, it is perhaps best to use Brodkorb's Catalogue mainly as a guide to the primary literature.

Although Winge named only one extinct species and no extinct genera from the Brazilian fossil faunas, Campbell (1976, 1979) described 23 new species and six new genera of birds from late Quaternary deposits on the coasts of Ecuador and Peru. The influence of habitat degradation on a fauna endemic to the western coast of South America could explain much of the extinction of species. However, Campbell's (1979) study of the tar pit avifauna from Talara, Peru, evinces a very narrow view of generic limits, and other workers possibly might not consider the differences he ascribes to his six new genera to be of generic value in every instance.

More serious, however, is the great unreliability at this point of the fossil record of birds from Argentina. These fossil birds were described mainly by Florentino Ameghino and a few other 19th century authors who had limited resources of modern comparative material and little experience with identifying avian remains. Certain fossil genera listed by Vuilleumier are based on small fragments, some of which stand relatively little chance of ever being identified correctly even to the family level. Unfortunately, unlike mammals, relatively few of the taxa of fossil birds from Argentina have been subjected to modern systematic revision. Nevertheless, the invalidity of some of them has already been demonstrated, and doubts concerning many others have been voiced.

*Tinamisornis* was shown to be a synonym of the modern genus *Eudromia* by Tonni (1977). *Liptornis* is based solely on an unillustrated, incomplete vertebra the identity of which is questionable. *Tiliornis* is "a meaningless name until the type is located and restudied" (Olson and Feduccia, 1980). *Protibis* has been relegated to incertae sedis (Olson, 1981). The Quaternary genus *Prociconia* was considered to be a synonym of the extant genus *Jabiru* by Patterson and Kraglievich (1960), or possibly referable to *Ciconia* by Brodkorb (1963), so its status as an extinct genus is in doubt. *Loxornis*, *Eutelornis*, and *Eoneornis* (not *Euneornis*, as in Vuilleumier) were all considered incertae sedis by Lambrecht (1933), and the last named was founded solely on the distal end of a radius that may never be certainly identified. According to Tonni (1980), *Teleornis* and *Loxornis* are of uncertain position. Tonni (1980) considered *Dryornis* to be "closely related to *Vultur*," but if it possesses any differences from that living genus, these have not been identified. *Climacarthrus* and *Cruschedula* "are both based on non-diagnostic material and their position . . . is uncertain" (Tonni, 1980 p. 112). *Badiostes* is probably a valid genus and is referable to the Falconidae, but its true familial identity was recognized by Wetmore (1922), not by Ameghino (1895), who originally described it as an owl (Strigiformes).

Probably none of the supposedly extinct genera of birds described from the late Pleistocene of Argentina by Moreno and Mercerat (1891) are valid. Tonni (1980) suggested, correctly I believe (Olson, 1985), that *Lagopterus* Moreno and Mercerat is a synonym of the living genus *Polyborus*. Another supposed extinct genus of hawk, *Foetopterus* Moreno and Mercerat, was earlier shown by Tonni (1970) to be based on the humerus of the extant sheldgoose *Chloephaga picta*. The putative extinct tern *Pseudosterna* Moreno and Mercerat is likewise probably invalid (Olson, 1985).

*Onychopteryx simpsoni* Cracraft (1971), which was described in a new family, Onychopterygidae, is based on a small fragment of a tarsometatarsus from the early Eocene of Argentina that Brodkorb (1978) rightfully placed in *Aves incertae sedis*. Such isolated fragments of early Paleogene birds are simply not identifiable (Olson, 1977b, 1985; Steadman, 1981).

It has already been noted that "the unillustrated descriptions . . . are inadequate to determine the generic or familial relationships of *Euryonotus*" (Olson, 1977a p. 348). As evident from Cracraft (1973), the relationships and validity of *Aminornis* and *Loncornis* are far from certain, and the same is doubly true for *Anisolornis*, which has been associated in one way or another with the Phorusrhacidae, Phasianidae, Cracidae, Tinamidae, Aramidae, and Psophiidae (Cracraft, 1973; Olson, 1974). The identity of *Cunampaia* and the Cunampaiidae, which are based on poorly preserved and poorly illustrated material, was considered uncertain by Patterson and Kraglievich (1960).

The large, flightless, carnivorous "phorusrha-

coids" are the most widely known of South America's fossil birds. There was a considerable radiation of these birds into numerous genera and species, all of which are now extinct. The actual number of families, genera, and species, however, is still not accurately known. Although many of these names have already been synonymized, there has never been a comprehensive modern revision of all of the phorhusrhacoids, the last partial attempt being that of Patterson and Kraglievich (1960), who treated only the Pliocene taxa of Argentina. Perhaps no other group of fossil birds is as much in need of a careful systematic review. Mourer-Chauviré (1981) demoted the Psilopteridae and Prophororhacidae to subfamilies of the Phorhusrhacidae, while relegating the genera *Riacama*, *Smiliornis*, and *Pseudolarus* to *incertae sedis*.

If one follows Mourer-Chauviré's (1981) taxonomy of the Phorhusrhacidae and deletes the dubious families Onychopterygidae and Cunampaiidae, the number of extinct families recognized by Vuilleumier would be reduced from eight to four. Of these four, the Presbyornithidae, Teratornithidae, and Phorhusrhacidae are well characterized and are known from abundant remains. Fossils of each of these families occur outside of South America. The family Cladornithidae is known only from a single bone. Although this is so distinctive that it must represent an extinct family, its relationships are as yet quite unknown (Olson, 1985).

Of the 36 extinct genera of non-phorhusrhacoid birds listed by Vuilleumier, 24 are either invalid or dubious, and this does not include the six extinct genera named from the Quaternary of Peru (Campbell, 1979). Thus, in our present state of knowledge, it is impossible to say how many extinct species, genera, and families of birds there are among the various named fossil taxa from South America. Many of these names are very likely to be synonymous with living taxa or with other fossil taxa, while others may be completely unidentifiable. It is therefore likewise impossible to say anything meaningful about the times of "origination" and extinction of most of these taxa. The figures presented in Vuilleumier's tables 2 and 3, and especially in table 4, have, therefore, little bearing on reality.

Vuilleumier's main conclusions are 1) that "Recent birds cannot provide us with sufficient clues to reconstruct the composition of the early to mid-Tertiary South American avifaunas" and 2) that the paleontological patterns of "faunal turnover" in birds are similar to those ascribed to mammals. The first is hardly an issue, I would think; no paleontologist would suggest otherwise. We now know that it is not even possible to reconstruct Holocene avifaunas based on "Recent" birds (Olson and James, 1982a, 1982b; Steadman et al., 1984). The second conclusion is founded on data that are, in my opinion, too inaccurate to permit any such generalizations to be made.

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*Editor's Note.* —Dr. Vuilleumier responds that he has read Dr. Olson's note with interest and that he feels that several of Dr. Olson's points are well taken. Nevertheless, he concludes that there remains an overall difference of opinion about the merit of making a census of the existing information on South American fossil birds, imperfect as the record may be.