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An Early Miocene Passeriform from Argentina

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The fossil record of Passeriformes from South America had previously been restricted to the Pleistocene of Argentina, Brazil and Venezuela (Brodkorb 1978, Tambussi and Tonni 1986, Cuello 1988, Noriega 1991). In this contribution we report the first passeriform fossil from the Miocene of South America (Noriega and Chiappe 1991).

Recent joint paleontological expeditions of the State University of New York (Stony Brook) and the Museo Argentino de Ciencias Naturales have recovered abundant avian remains from the Miocene deposits of southern Patagonia (Chiappe 1991). The material on which we report comes from beds of the middle part of the Pinturas Formation, which outcrops at the locality of "Portezuelo Sumich Sur" (Bown and Lariestra 1990), northwestern Santa Cruz Province, Argentina. The age of these deposits has been considered to be Early-Middle Miocene by several authors (Marshall et al. 1983, Bown and Lariestra 1990, MacFadden 1990).

Description.—The fossil is a nearly complete distal end of a right humerus (MACN-SC-1411; Museo Argentino de Ciencias Naturales, Sección Paleontología de Vertebrados, Buenos Aires; Fig. 1B). In cranial view, the brachial fossa (Fossa M. brachialis) is shallow, not well delimited, and of subelliptical shape. The ventral supracondylar tubercle (Tuberculum supracondylare ventrale) is large and subtriangular. This area is situated just distal and lateral to the brachial fossa.

The distal condyles are globose and well defined. The dorsal condyle (Condylus dorsalis) is very convex and its proximal area curves medially. The distal margin of the ventral condyle (Condylus ventralis) is remarkably convex, and it projects distally with respect to the dorsal condyle. On its medial half, the ventral condyle exhibits a smooth depression, which is proximally bounded by the superior margin of the condyle.

Proximal to the dorsal condyle there is a subelliptical papilla of insertion of the ventral head of the M. extensor metacarpi radialis. The dorsal supracondylar process is well-developed, hook-shaped, and proximally projected. The ventral epicondyle (Epicondylus ventralis) is missing. However, the large area of break indicates that it must have been extensive and directed distocaudally. In caudal view, the olecranal fossa is superficial and the scapulo-tricipital groove (Sulcus M. scapulo-tricipitis) is pronounced.

Discussion.—Comparisons of the specimen were made with members of the Passeriformes and with those taxa considered closely related to Passeriformes, the so-called "perching birds" of Feduccia (1977; i.e. Trogoniformes, Coraciiformes and Piciformes). Despite its fragmentary nature, the fossil can be unquestionably assigned to the Passeriformes because the ventral epicondyle is prominent and distally directed. The ventral epicondyle is not projected mediocranially as in the nonpasseriforms (Fig. 1A), but

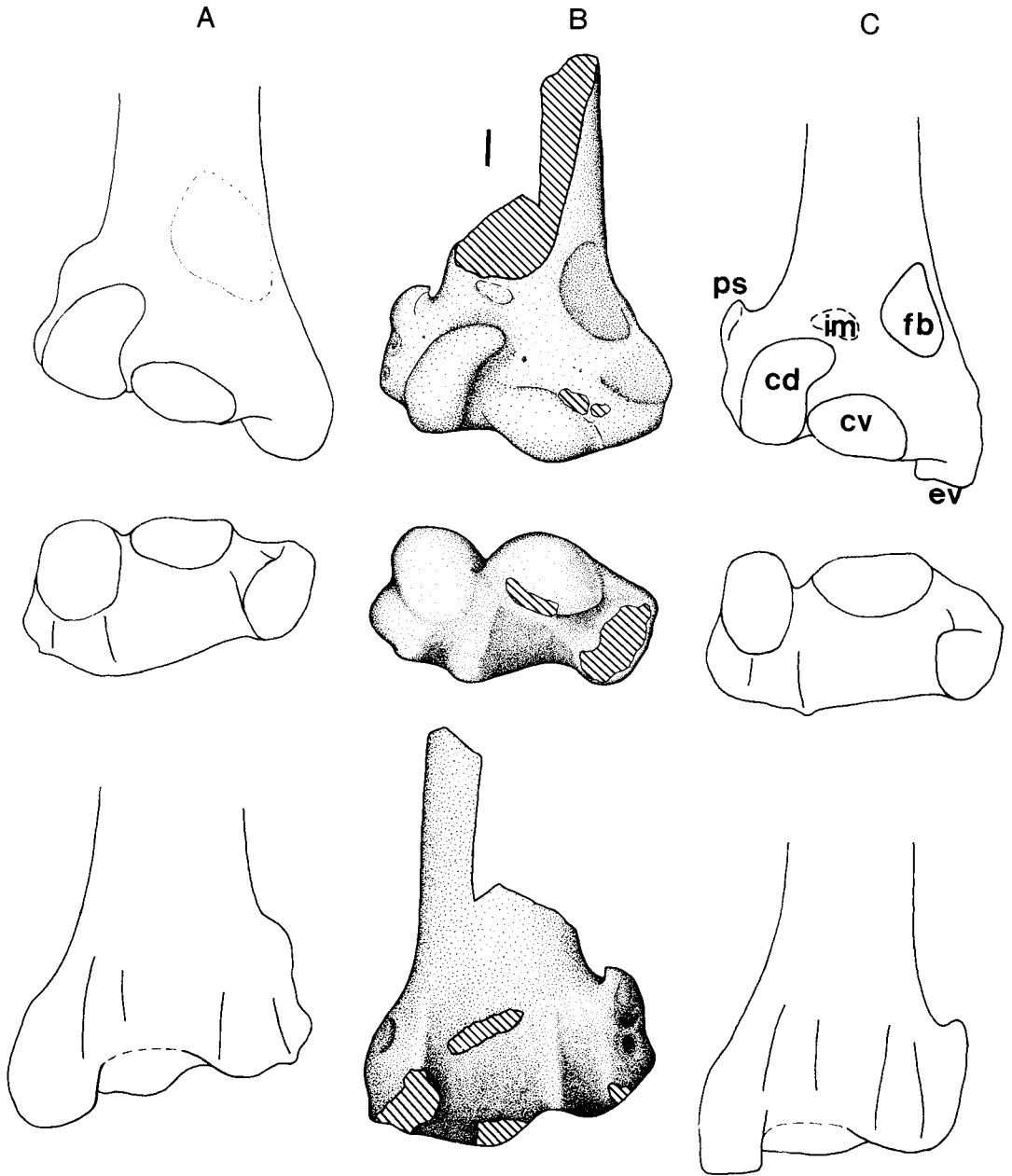


Fig. 1. Distal ends of humeri in cranial view (top row), distal view (middle row), and caudal view (bottom row). (A) *Colaptes campestris* (Piciformes, Picidae); (B) fossil from Pinturas Formation (MACN-SC-1411); (C) *Pitangus sulphuratus* (Passeriformes, Tyrannidae). Abbreviations; cd, dorsal condyle; cv, ventral condyle; ev, ventral epicondyle; fb, brachial fossa; im, impression of ventral head of *M. extensor metacarpi radialis*; ps, dorsal supracondylar process. Scale bar in panel B is 1 mm; panels A and C not drawn to scale.

is located caudally (Fig. 1B). As a consequence, the cranial margin of the base of the ventral epicondyle is nearly aligned with the caudal margin of the ventral condyle, whereas it is situated further cranially

and nearly approaches the cranial border of this condyle in the nonpasseriforms. A caudal position of the ventral epicondyle was found in all the passerine families studied (Fig. 1C).

Other passerine features of the fossil that are absent among the nonpasseriform taxa compared include the presence of a papilla of insertion of the ventral head of the *M. extensor metacarpi radialis* (Fig. 1B), and a prominent, hook-shaped and proximally directed dorsal supracondylar process. In addition, it shows a clear-cut demarcation of condyles (Fig. 1B), as is typical of passerine birds.

The evidence for a more precise assignment of the fossil within Passeriformes is more tentative. The subelliptical shape and shallowness of the brachial fossa, the smaller and less-margined dorsal supracondylar process, the more superficial olecranal fossa, and the weak development of the intercondylar notch (*Incisura intercondylaris*; Fig. 1B) suggest that the specimen could be a suboscine (suborder Tyranni). These features, although not exclusive, are more frequently observed in suboscine passerines than within the oscines (suborder Passeres).

At present, hypotheses that explain the origin of the order Passeriformes, and particularly of one of its major clades, the Tyranni, are highly speculative due to the scanty fossil record. Suboscines are autochthonous elements of the Neotropical avifauna, either "Primarily South American" (Mayr 1964) or "Southern Hemisphere" in origin (Cracraft 1973, Feduccia 1977, Feduccia and Olson 1982). Under the latter hypothesis, suboscine passerines purportedly evolved and radiated within South America, but had ancestors that were more broadly distributed on southern continents. In spite of the probability that such an adaptive radiation must have occurred through the long period of Tertiary isolation of South America, the undoubted fossil record of suboscines in this continent is restricted to the Quaternary. As we mentioned above, the fossil possesses features suggesting a suboscine affinity. If it truly represents a suboscine, the fossil would reinforce some aspects of the hypotheses previously proposed.

Taking into account the previous record for the order as a whole (Olson 1985), the passeriform of Pinturas Formation provides the oldest record for South America and is one of the earliest in the world (Mourer-Chauviré et al. 1989).

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