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A PLIOCENE BUNTING FROM CHIHUAHUA, MEXICO

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The fossil record of passerines in the Tertiary is very sparse. Only seven passerine genera have been reported for the entire Tertiary (Brodkorb 1978), among which the nine-primaried oscines are represented by but a single genus, *Palaeostruthrus*. Steadman (1981) has recently synonymized *Palaeostruthus* with *Ammodramus*, finding *P. hatcheri* (Miocene of Kansas) very similar to the living *A. savannarum* (the Grasshopper Sparrow), and *P. eurius* (Pliocene of Florida) to be of indeterminable identity at present. Because the entire meaningful Tertiary fossil record of New World nine-primaried oscines thus consists of the single Clarendonian-Hemphillian occurrence of the sparrow *Ammodramus*, it is important to document a record of a bunting, cf. *Passerina*, from a Pliocene (late Hemphillian) site at Yepómera in western Chihuahua, Mexico.

Howard (1966) described a fossil avifauna from Yepómera that was dominated by aquatic forms such as ducks and flamingos. The only passerine recorded was an indeterminate thrasher (Mimidae) known from an incomplete humerus that presumably is much larger than the specimens discussed here. The fossil mammals and chronology of Yepómera (early references in Howard 1966) are now being reviewed (Jacobs and Lindsay 1981; Lindsay and Jacobs, unpubl.). These authors report an age of approximately 4 million years for Yepómera. Although this age is certainly within the Pliocene Epoch, a designation of early or late is precluded by the differing estimates of the time included in the Pliocene, ranging from 7–3 million years ago to 5–2 million years ago.

The specimens of cf. *Passerina* from Yepómera are the proximal and distal ends of a right humerus (Fig. 1), and the distal end of a left humerus of an immature individual that is only very tentatively referred. These three specimens were collected in June–July, 1971, by E. H. Lindsay, L. L. Jacobs, N. T. Tessman, and T. R. Van Devender (all of the University of Arizona), who collected vertebrate fossils from 31 different localities in the Yepómera region (approx. 29°N, 108°W; 160 km NW of Ciudad Chihuahua). The present specimens are from site Y-3 (=locality CH-11 of the Instituto de Geología, Ciudad Universitaria, Mexico), otherwise known as Arroyo de las Burras and CIT locality 276. These uncatalogued fossils belong to the government of Mexico and will eventually be returned to that country.

The Yepómera fossils are referable to the nine-primaried oscines (Family Fringillidae, *sensu lato*) as opposed to other New World passerines, including vireos, by the following combinations of characters: proximal end—both Fossae pneumotricipitales very deep, particularly in the medial and proximal portions; distal end—Proc. supracondylaris dorsalis, Condylus dorsalis, Condylus ventralis, Fossa olecrani, and Sulcus m. humerotricipitis large, Fossa m. brachialis deep. The two diagnostic Yepómera fossils further resemble the humeri of emberizines and differ from those of the other subfamilies of nine-primaried oscines (two-seven genera compared within each subfamily) in the following characters (descriptive terminology follows Baumel et al. 1979):

From Parulinae. Sulcus lig. transversus larger and deeper, Caput humeri protrudes less caudad, Proc. flexorius larger, Fossa olecrani deeper;

From Thraupinae. Crista bicipitalis meets the Corpus humeri more abruptly, Caput humeri protrudes less caudad, absence of a small process on Margo caudalis, Fossa m. brachialis usually smaller;

From Carduelinae. Medial Fossa pneumotricipitalis narrower, Crus dorsale fossae smaller (except in *Loxia*), proximal portion of Crista pectoralis more slender, Fossa m. brachialis shallower, Condylus ventralis more rounded and protrudent craniad;

From Icterinae. Size smaller, Caput humeri less protrudent caudad, Fossa pneumotricipitalis farther from Margo caudalis, Condylus ventralis usually less protrudent distad, Fossa m. brachialis usually shallower.

Within the Emberizinae, we compared the Yepómera specimens with the humeri of 46 species (23 genera), representing every genus recorded in Mexico or the United States, and found these fossils to be referable to *Passerina* on the basis of the following combination of characters: proximal end—small amount of caudal protrusion of Caput humeri, unique depth and width of Fossae pneumotricipitales, Crista bicipitalis joins Corpus humeri abruptly, Sulcus lig. transversus deep; distal end—unique size and orientation of Proc. flexorius, small amount of cranial protrusion of Condylus ventralis, unique depth and width of Fossa olecrani, reduced Fossa m. brachialis. The available specimens are not adequate for a definitive generic assignment, however, because the humeral osteology in emberizines can be variable within genera as well as very similar among genera. We therefore prefer to assign these specimens to "cf. *Passerina*, species indeterminate." We do not consider this material to be sufficient for a specific diagnosis, although the Yepómera specimens undoubtedly do represent an extinct and undescribed species. The proximal end is virtually indistinguishable qualitatively from certain humeri of *P. amoena*, while the distal end is most similar qualitatively to that of *P.* (*Guiraca*) *caerulea*. Among the species of *Passerina*, both fossils are exceeded in size by the humeri of *P. cyanoides* and *P. caerulea*, and are larger than the other species (Table 1), except the distal width in *P. cyanea* is also larger than in the fossil. Thus it appears that the species of probable *Passerina* at Yepómera is intermediate between *P. amoena* and *P. caerulea*, both qualitatively and in size.

Brodkorb (1978) placed *Passerina* in the subfamily Pitylinae (=Cardinalinae of most authors) of the tanagers,

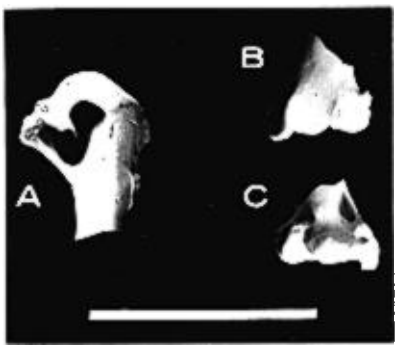

FIGURE 1. Fossil humeral fragments of cf. *Passerina* from Yepómera, Chihuahua, Mexico. A. Proximal end, caudal aspect. B. Distal end, caudal aspect. C. Distal end, cranial aspect. Scale bar = 1 cm.

TABLE 1. Measurements (in mm) of the humerus in species of *Passerina*. Merger of *Cyanoloxia, Cyanocompsa,* and *Guiraca* into *Passerina,* and sequence of species, follows Paynter (1970). Our *P. cyanea* and *P. cyanella* are listed as *P. brissonii* and *P. cyanea,* respectively, in Paynter (1970).

		Proximal width			Distal width		
		$\bar{x}$	Range	n	$\bar{x}$	Range	n
Yepómera fossils		6.0		1	4.8		1
Indigo Grosbeak	(*P. glaucocaerulea*)	5.1		1	4.5		1
Blue-black Grosbeak	(*P. cyanoides*)	6.36	6.1–6.9	5	5.46	5.3–5.7	5
Ultramarine Grosbeak	(*P. cyanea*)[a]	5.75	5.7–5.8	2	5.05	4.9–5.2	2
Blue Bunting	(*P. parellina*)	5.15	5.1–5.2	2	4.30	4.2–4.4	2
Blue Grosbeak	(*P. caerulea*)	6.62	6.2–7.1	23	5.53	4.5–6.0	20
Indigo Bunting	(*P. cyanella*)	5.02	4.7–5.3	23	4.13	3.8–4.4	22
Lazuli Bunting	(*P. amoena*)	5.26	5.1–5.5	15	4.33	4.1–4.5	13
Varied Bunting	(*P. versicolor*)	4.70	4.3–4.9	5	3.80	3.5–4.0	5
Painted Bunting	(*P. ciris*)	5.18	4.9–5.5	16	4.26	4.0–4.5	14
Rose-bellied Bunting	(*P. rositae*)	5.3		1	4.6		1
Orange-breasted Bunting	(*P. leclancherii*)	5.17	5.0–5.5	7	4.18	4.1–4.3	6

[a] Our use of *P. cyanea* for the South American Ultramarine Grosbeak and *P. cyanella* for the North American Indigo Bunting follows the as yet unpublished work of A. Wetmore, R. F. Pasquier, and S. L. Olson, *The birds of the Republic of Panama,* Part 4.

Tanagridae. *Passerina* is generally placed in the Cardinalinae as a subfamily of the Fringillidae (*sensu stricto*). On the basis of cranial and post-cranial osteology, however, we believe that the Cardinalinae is an artificial group, of which some genera are indeed referable to the Tanagridae (=Thraupinae herein), while others, including *Passerina,* belong in the Emberizinae.

We know of no previous fossil record of *Passerina.* The report of the living *P. ciris* from Abaco Island, Bahamas (Conklin 1971) is based on unreliable identifications of modern owl pellets (see Olson and Hilgartner, in press). It is not surprising for *Passerina* to have existed in Chihuahua during Pliocene times, as both *P. amoena* and *P. caerulea* occur there today (Miller et al. 1957), the former as a migrant only and the latter as both a migrant and a breeding bird. The main significance of the Yepómera fossils is that they document the occurrence of an apparently extant passerine genus in Chihuahua approximately 4 million years ago.

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