Neanis schucherti Restudied: Another Eocene Piciform Bird

Alan Feduccia

ABSTRACT

Neanis schucherti, an avian fossil from the lower Eocene Green River Formation of Wyoming, was described in 1913 under the genus *Hebe* by Shufeldt as the earliest representative of the order Passeriformes. The name *Neanis* has since been substituted for *Hebe* for reasons of priority. The specimen is here restudied and is found to be of piciform, not passeriform, affinity. It is assigned to the extinct Eocene family Primobucconidae. Of the two other previously described lower Eocene Piciformes, *Primobucco kistneri* Feduccia 1973 is reassigned to *Neanis,* while *P. mcgrewi* Brodkorb 1970 is retained in *Primobucco,* which genus is recognized by its larger size.

Introduction

The oldest North American avian fossil referred to the order Passeriformes and the only one assigned to the Neotropical family Rhinocryptidae (tapaculos) is *Neanis schucherti* (Shufeldt, 1913) from the lower Eocene Green River Formation of Wyoming. This fossil was first described under the generic name *Hebe.* Brodkorb (1965) substituted *Neanis* for Shufeldt's genus, which was preoccupied by *Hebe* Risso 1826 (Crustacea). The type of *Neanis schucherti* consists of a small slab and counterslab (YPM 1233) containing impressions of bone and feathers and some poorly preserved pieces of bone (Figures 1, 2). These were collected in 1874 by F. A. C. Richardson of the Powell Expedition. The original label reads: "Found five miles west of Green River City, Wyoming. In the fish cut of the R.R. . . . Associated with insects described by Scudder." On the back of the label is the following inscription: "Compare *Pteroptochidae;* see *Ibis,* 1874, p. 191 (July), for sternum with 2 emarginations in *sternum.*" The citation is to Sclater's (1874) paper on the tapaculos and it was no doubt the above inscription that led Shufeldt to place the fossil in the family Pteroptochidae (= Rhinocryptidae). He based this conclusion almost entirely on the presence of a four-notched sternum (i.e., with "2 emarginations" on each side), and on an alleged "large manubrium which is *bifurcated* anteriorly" (Shufeldt, 1913:647). I have recently had the opportunity to examine the type of *Neanis schucherti,* and I present here my conclusion that the affinities of *Neanis* are with the Piciformes rather than the Passeriformes.

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Alan Feduccia, Department of Zoology, University of North Carolina, Chapel Hill, North Carolina 27514.

Description and Comparisons

Two facts render the assignment of *Neanis* to the Rhinocryptidae questionable or suspect. First, the characters used in the identification, namely the presence of a four-notched sternum and a bifurcate manubrium (= forked spina externa of the sternum), are unique neither to the Rhinocryptidae nor the Passeriformes. Second, in recent years several primitive piciform birds have been described from the lower Eocene Green River Formation of Wyoming, the same horizon and locality from which *Neanis* was recovered. Piciform birds typically have a four-notched sternum and a forked spina externa. The Green River species *Primobucco mcgrewi* Brodkorb (1970) and *Primobucco kistneri* Feduccia (1973)* provide the earliest records of the order Piciformes. Among the structurally primitive piciform families, the Bucconidae has been used in the past to accommodate these lower Eocene zygodactyl birds, but they are now considered to merit their own family, the Primobucconidae, which also includes three middle Eocene genera (Feduccia and Martin, p. 101, herein).

The presence of a four-notched sternum is an unreliable taxonomic character even at the ordinal level. Both two- and four-notched sterna occur in many orders not related to the passerines and their allies (e.g., Ciconiiformes and Charadriiformes), and four-notched sterna are commonly found in certain coraciiform birds (e.g., rollers and kingfishers). All members of the Piciformes possess a four-notched sternum (Feduccia, 1972), and within the Passeriformes the four-notched sternum is found within the Formicariidae and Rhinocryptidae (Heimerdinger and Ames, 1967). I am able to confirm that *Neanis schucherti* does indeed possess a four-notched sternum although to determine this requires "very close and careful examination with a high-power lens" (Shufeldt, 1913:646). Shufeldt (1913:646) goes on to point out that "the *sternum* of [*Neanis*] differed in this particular from all *typical existing* passerines as they now occur in North America, at least north of Costa Rica."

In birds, the spina externa of the sternum may be forked (as in most passerines) or a simple rod (as in most nonpasserines). Olson (1971) has examined the spina externa of the sternum and found it to be highly variable. It is typically forked (bifurcate) in the Passeriformes (exclusively so in the suborder Passeres) but within the "suboscines" an unforked spina externa occurs within the Eurylaimidae, Cotingidae, Philepittidae (Ames, 1971), and Dendrocolaptidae (*Xiphocolaptes promeropirhynchus,* (personal observation). However, *Smithornis* of the Eurylaimidae has a forked spina externa and within the Cotingidae the character is intragenerically variable in *Procnias* (Olson, 1971). Olson (1971:509) also points out that, "the forked versus simple spina externa is variable in other orders as well. In the Piciformes either conformation may be found in the Picidae, Capitonidae, Bucconidae and Galbulidae. The character is also variable in the Coraciiformes and Trogoniformes." Thus, perhaps the only taxonomic use of the nature of the spina externa would be to exclude forms with the simple, unforked spina externa from the suborder Passeres. In any case, I am unable to confirm the presence of a forked spina externa in *Neanis schucherti.* I have found the structure Shufeldt evidently intended (Figure 1), but the area is so crushed that some imagination is necessary to envision it as a bifurcate spina externa.

The two slabs containing the type of *Neanis schucherti* are illustrated in Figures 1 and 2. Figure 1 depicts the slab containing the actual bones; Figure 2 shows the counterslab with bone and feather impressions. The bones present on the slab are as follows: sternum (left side: ventral aspect); both coracoids (left, 10.8 mm); furcula (12.1 mm from furcular process to scapular tuberosity); left scapula; left humerus (proximal portion as preserved, 13.3 mm; width of proximal end, 5.4 mm; least width of shaft, 1.8 mm); right ulna (19.1 mm); right radius (approximately 18.4 mm); bones of manus (very faint). Unfortunately, no useful ratios could be obtained. Furthermore, few useful osteological characters are exhibited in the bones exposed, except for the form of the proximal end of the humerus, which is preserved in palmar view. It is in the humerus that one finds characters that ally *Neanis* with the structurally primitive families of the Piciformes, such as the modern family Bucconidae. *Neanis* conforms with the characters

* Misspelled *"kisterni"* in two places in the original reference.

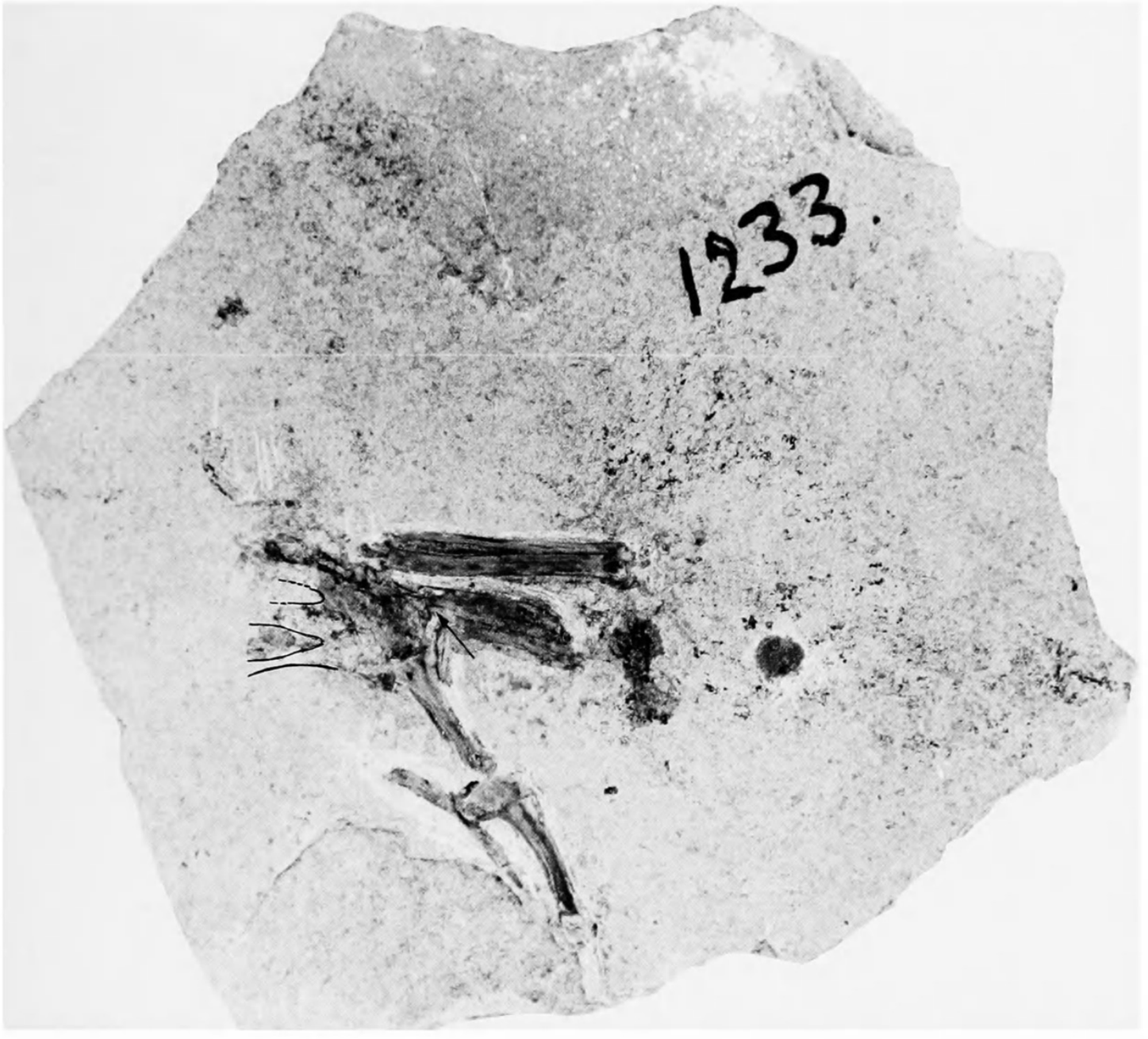

FIGURE 1.—Holotype of *Neanis schucherti* (YPM 1233). The slab containing the actual bones, top to bottom: right radius, right ulna, right coracoid, furcula, left coracoid, and left humerus (actual length of proximal portion, 13.3 mm), left scapula. The sternum is to the left, and the approximate boundaries of the posterior notches of the left side of the sternum are outlined in ink. The position of the supposed spina externa is indicated by an arrow.

that Brodkorb (1970:13) used to place *Primobucco mcgrewi* in the Piciformes and Bucconidae: "(1) proximal end inflected, so that entire caput humeri is medial to inner border of shaft (head of humerus more nearly in line with shaft in other families of Piciformes); (2) shaft more curved than in other piciform families; (3) deltoid crest long, bent near its mid-length at an angle of about 150 degrees (deltoid crest nearly parallel with shaft in other piciform families)." The other characters outlined by Brodkorb are not clearly visible in *Neanis;* however, it is clear from the palmar view of the hu-

FIGURE 2.—The counterslab of the holotype of *Neanis schucherti,* containing the impressions of the bones of the slab in Figure 1 and some feather impressions.

merus (Figure 1) that *Neanis* is not passerine, but piciform, and of living families is most similar to the Bucconidae, as are the two other species of Piciformes from the lower Eocene Green River Formation.

The length of the humerus of *Primobucco mcgrewi* is 26.7 mm, and that of *Primobucco kistneri* was accurately estimated at 18–19 mm, as the entire outline of the bone was extant. In outline, the humerus of *Neanis schucherti* is somewhat similar to that of *Primobucco kistneri,* but the bones of the latter are so crushed that the comparison is unsatisfactory; however, the two forms were of the same general size, which, as I stated of *Primobucco kistneri* (Feduccia, 1973:503), "would probably best approximate . . . some of the modern African barbets (Capitonidae) of the genus *Pogoniulus* (including *Viridobucco*), which are approximately 4–5 inches in total length." In the absence of the evidence to the contrary, it seems best for the present to regard *Neanis schucherti* and *Primobucco kistneri* as distinct species; however, because of their general similarity in size, I recommend that *P. kistneri* be included in the genus *Neanis,* which has priority over *Primobucco.* Because *Primobucco mcgrewi* is considerably larger than either *Neanis schucherti* or *Neanis kistneri,* I strongly recommend the retention of the genus *Primobucco* to represent the large lower Eocene piciform birds from the Green River Formation.

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