A NEW CRETACEOUS CHARADRIIFORM FAMILY

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THE genus *Telmatornis* was described for two species, *T. priscus* and *T. affinis*, from the Late Cretaceous (Maestrichtian) of New Jersey (Marsh, 1870). In his original description Marsh concluded that *Telmatornis* was probably related to rails (Rallidae). Some years later Shufeldt (1915) described a third species, *T. rex*, which he also considered to be allied to the rails. Both Marsh and Shufeldt noted certain resemblances between *Telmatornis* and the herons and larger shorebirds, but Shufeldt was definite in his opinion that *Telmatornis* was not a heron. Subsequent authorities (Lambrecht, 1933: 489; Wetmore, 1956: 62; Brodkorb, 1967: 116) have continued to place *Telmatornis* tentatively in the Rallidae.

While undertaking a revision of the extinct genera of rails it was necessary for me to reexamine the systematic position of *Telmatornis*. After comparison with numerous genera of Recent and fossil rails and with nearly all families of nonpasserine birds, I have come to the conclusion that *Telmatornis* is not referable to the Rallidae but is instead more closely related to the charadriiform family Burhinidae. In this paper I discuss this relationship and comment on the systematics of fossil burhinids.

COMPARISON WITH THE RALLIDAE

The humeri of *Telmatornis* (Figures 1 and 2) differ from those of rails in that: (1) the entepicondyle projects much less distally and anconally, (2) in palmar view, the external condyle extends less proximally, less elongated proximodistally, (3) the attachment of M. pronator brevis is more distinct and developed into a deeper pit which is located much more palmarly, (4) the internal condyle is less round on its palmar surface (due to presence of a small depression), (5) the external tricipital groove is shallower, (6) the olecranal fossa is much shallower, (7) the ridge between the internal condyle and entepicondyle is not constricted or depressed, (8) the impression of the brachialis anticus is located less internally, and (9) in external view, the shaft is curved more distally and proximally and is more S-shaped.

AFFINITIES WITH THE CHARADRIIFORMES AND BURHINIDAE

The preceding comparison demonstrates a distinct morphological difference between *Telmatornis* and rails. On the other hand, *Telmatornis* agrees much more closely with the family Burhinidae of the Charad-

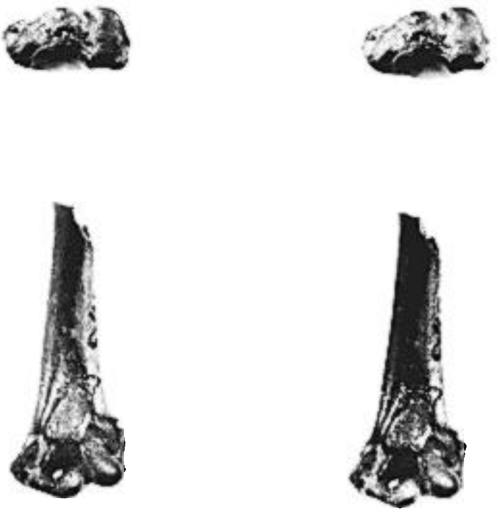

Figure 1. *Telmatornis priscus*, type, YPM 840. Lower, stereophotographs of palmar view. Upper, stereophotographs of distal end. Both about ×1.5.

riiformes. It is difficult to characterize the Charadriiformes solely on the basis of the distal end of the humerus, but the order can be divided into three morphological groups: (a) the Alcidae, (b) the Burhinidae, and (c) all other families. The Jacanidae are somewhat intermediate between groups (b) and (c). In general the distal end of the charadriiform humerus tends to have the following characters: (1) the attachment of M. pronator brevis is formed into a pit (sometimes deep) that is located far palmarly, (2) the ectepicondylar prominence is well-developed (usually into a long process), (3) the entepicondyle typically does not project much distally relative to the internal condyle (but can project anconally), (4) the impression of M. brachialis anticus is moderately deep (and well-defined) within the brachial depression, which is extensive distally, (5) typically the shaft narrows sharply away from the distal end so that the distal end appears broad relative to the width of the shaft, (6) the internal tricipital groove is well-developed, and (7) the olecranal fossa tends to be deep and formed into a slight shelf set off from the shaft rather than grading smoothly into the shaft. Except as noted below, *Telmatornis* agrees with this generalized description of the charadriiform humerus.

Telmatornis can be grouped with the Burhinidae on the basis of the following shared characters: (1) the area between the ectepicondyle and ectepicondylar prominence is the same shape, and the pits of the

Figure 2. *Telmatornis affinis* (lower), type, YPM 845, and *Telmatornis rex* (upper), type, YPM 902. Stereophotographs of palmar view. Both about ×1.5.

tendons and ligaments are in similar positions, (2) the attachment of M. pronator brevis is formed into a deep pit and is located palmarly, (3) in ventral view, the tendon pits on the entepicondyle have similar shapes and relative positions, (4) the entepicondyles do not project much distally or anconally, (5) the olecranal fossa is shallow, similar in shape, and grades rather smoothly into the shaft, and (6) the internal condyle is not bulbous but rather elongated lateromedially and projects distally only moderately relative to the external condyle.

Although the above shared characters unite *Telmatornis* and the burhinids within the Charadriiformes, a detailed comparison indicates that *Telmatornis* is as distinct from the burhinids as are some other taxa of family rank (e.g. the Jacanidae). Hence, it is desirable to recognize a new family, to be called

TELMATORNITHIDAE, new family

TYPE GENUS: *Telmatornis* Marsh.

DIAGNOSIS: In characters of the humerus, the Telmatornithidae differ from the Burhinidae as follows: (1) the internal condyle is less rounded on the palmar surface because of the presence of a small depression, (2) the internal and external condyles are located closer to each other, (3) the external tricipital groove is shallower, (4) in external view the shaft is curved more at the distal end, (5) the ectepicondylar prominence protrudes less externally, and (6) the distal portion of the entepicondyle is broader internoexternally.

Genus *TELMATORNIS* Marsh

Telmatornis Marsh, 1870, p. 210

TYPE SPECIES: *Telmatornis priscus* Marsh.
DIAGNOSIS: Same as for family; only included genus.

Telmatornis priscus Marsh

Figure 1

Telmatornis priscus Marsh, 1870, p. 210

HOLOTYPE: YPM 840, distal end of right humerus; from upper Cretaceous deposits (middle Maestrichtian in age), Navesink Formation ("middle marl bed"; Baird, 1967); Cream Ridge Marl Company quarry near Hornerstown, Monmouth County, New Jersey.
MEASUREMENTS: See Table 1.
REMARKS: See below under *T. affinis.*

Telmatornis affinis Marsh

Figure 2

Telmatornis affinis Marsh, 1870, p. 211

HOLOTYPE: YPM 845, distal end of right humerus; from upper Cretaceous deposits (middle Maestrichtian in age), Navesink Formation ("middle marl bed"; Baird, 1967); Cream Ridge Marl Company quarry near Hornerstown, Monmouth County, New Jersey.
MEASUREMENTS: See Table 1.
REMARKS: *Telmatornis affinis* is very similar to *T. priscus* in both size and morphology. Marsh (1870: 211) held that *T. affinis* was a separate species from *T. priscus* because the "notch between the radial and ulnar condyles is somewhat deeper; the elongated tubercle, on the inner surface behind the notch, which confines the upper tendon of the triceps muscle, is larger; the impression of the anterior brachial muscle

TABLE 1

MEASUREMENTS OF THE SPECIES OF *TELMATORNIS*

	T. priscus YPM 840 (type)	*T. affinis* YPM 845 (type)	*T. rex* YPM 902 (type)	*T. rex* YPM 948
Breadth (external-internal) across distal end	11.0[1]	10.2	13.5	13.1
Depth (anconal-palmar) of external condyle	5.7	5.1	7.3	7.4
Depth of internal condyle	3.0	2.8	3.8	3.9
Breadth of shaft at proximal end of brachial depression	6.0	5.3	6.9	7.3
Depth of shaft at proximal end of brachial depression	3.1	2.6	4.2	4.4

[1] Measurements in mm.

on the outer surface is higher up, and more shallow; and the epitrochlear elevation is more prominent."

The only difference I note in the two species is the slightly larger size (and therefore greater robustness) of *T. priscus* (Table 1). The other characters mentioned by Marsh are either not apparent to me or are too slight to accept as species differences. Both bones appear to be those of adult birds. The only justification for separating these species, then, is size, and in this instance the differences are probably not significant. Hence, I recommend synonymizing *T. affinis* and *T. priscus*; the latter name would apply to the species because of page priority.

Telmatornis rex Shufeldt

Figure 2

Telmatornis rex Shufeldt, 1915, p. 27

HOLOTYPE: YPM 902, distal end of right humerus; from upper Cretaceous deposits (probably late Maestrichtian in age); Hornerstown marl; Monmouth County, New Jersey.

REFERRED MATERIAL: YPM 948, distal end of left humerus; from upper Cretaceous deposits (late Maestrichtian in age); locality data on box gives "Cream Ridge Marl Co." quarry; Monmouth County, New Jersey.

MEASUREMENTS: See Table 1.

REMARKS: The two specimens of *T. rex* show slight differences in size. The type is somewhat broader across the condyles and the referred specimen has a slightly heavier shaft. The brachial depression of the type is also less well-defined. If the same criteria used to separate *T. priscus* and *T. affinis* were followed here, then the two specimens of *T. rex* could not be considered conspecific. However I favor uniting them under one name.

Except for its decidedly larger size, *T. rex* does not differ from *T. priscus* in any significant features.

DISCUSSION

SYSTEMATIC POSITION OF *MILNEA* LYDEKKER, 1891

Because *Milnea gracilis* (Figure 3), described for a humerus from the Aquitanian (late Oligocene-early Miocene) of France, is the only pre-Pleistocene fossil currently placed in the Burhinidae, its correct systematic position is central to a discussion of the relationships of *Telmatornis*. A comparison of the type of *Milnea gracilis* (BM(NH)47457) with *Burhinus* and representatives of other nonpasseriform families shows that *Milnea* should be allocated to the Threskiornithidae rather

Figure 3. *Milnea gracilis,* type, BM(NH) 47457. Lower, stereophotographs of palmar view. Upper right, anconal view, distal end. Upper, anconal view, proximal end. All about ×1.2.

than to the Burhinidae. The following differences that *Milnea* exhibits from *Burhinus* will serve to demonstrate the significant morphological gap between these two taxa: (1) the humerus is decidedly heavier and more robust, (2) the external condyle is relatively smaller, (3) the olecranal fossa is less deep, (4) the area distal to the impression of M. brachialis anticus is less depressed and excavated, (5) the entepicondyle is less pronounced, (6) the pneumatic fossa is much smaller, (7) the capital groove and area distal to the head (on anconal surface) is much less excavated, (8) the external tuberosity is less pronounced, (9) the ridge extending distally down the shaft from the median crest is less pronounced, and (10) the bicipital surface is less inflated, less bulbous, and flatter.

When *Milnea* is compared with the threskiornithids, numerous shared characters indicate a close relationship. Among these features are: (1) a deep, oblong-shaped impression of M. brachialis anticus, (2) condyles of the same shape and position, (3) same shape and contour of the shaft, especially the distal end where the tapering is distinctive, (4) rather pointed humeral head, (5) moderately deep and elongated capital groove oriented more or less perpendicularly to the long axis of the shaft and noticeably undercutting head, (6) thin median crest, (7) small pneumatic foramen, and (8) internal side of shaft just proximal to attachment of M. pronator brevis constricted anconal-palmarly.

Three European pre-Pleistocene species are currently assigned to the Threskiornithidae (Brodkorb, 1963a: 277–278). *Ibidopsis hordwelliensis* from the late Eocene of England is incorrectly placed in the Threskiornithidae and is instead a rallid (Cracraft, MS). A species from the Aquitanian of France, *Ibidopodia palustris* Milne-Edwards, is represented by a cranium and tarsometatarsus and thus cannot be compared directly with *Milnea*. Another threskiornithid species from the Aquitanian of France, *Eudocimus paganus* (Milne-Edwards), compares closely with *Milnea gracilis*. The specimens of *E. paganus* that I have examined (USNM 6360, 6361; includes four specimens) differ greatly in size and morphology, and the humerus of *Milnea* probably could be included within this variation (Table 2). The humeral head of *Milnea* is more pointed but this could reflect individual variation; the distal ends of *Milnea* and *E. paganus* are very similar. Two size ranges may be present within the specimens of *E. paganus* but only a statistical analysis of the abundant material in European collections will provide evidence about specific limits. The present data suggest *Milnea gracilis* is conspecific with *Eudocimus paganus* or at least very closely related to it.

Comparison and Phylogenetic Significance of *TELMATORNIS*

In addition to *Telmatornis priscus* and *T. affinis* Marsh (1870) also described three species of birds from upper Cretaceous deposits (Navesink Formation) of New Jersey and placed them in a new genus *Palaeotringa*. This genus is currently allocated to a separate subfamily within the Scolopacidae (Brodkorb, 1967). Two species, *P. vagans* and *P. vetus*, are very fragmentary and probably cannot be identified even to order. The third species, *P. littoralis*, is based upon a distal left tibiotarsus with the internal condyle lacking. Shufeldt (1915: 23) considered the tibiotarsus to represent a gull and not a wader, but because of the fragmentary nature of this fossil allocation to a family may prove impossible. In any case, there is evidence that *P. littoralis* was not close to the Burhinidae and, by inference, to the Telmatornithidae. For example,

TABLE 2

MEASUREMENTS OF *MILNEA GRACILIS* AND *EUDOCIMUS PAGANUS*

	Milnea gracilis BM(NH) 47457 (type)	*Eudocimus paganus*			
		USNM 6360	USNM 6361 (left humerus)	USNM 6361 (right humerus)	USNM 6361 (right humerus)
Total length	81.9[1]	69.8	—	—	—
Breadth (external-internal) across distal end	12.4	11.2	12.9	—	—
Depth (anconal-palmar) of external condyle	6.0	6.4	7.0	—	—
Depth of internal condyle	3.6	3.6	4.1	—	—
Breadth of middle of shaft	5.9	5.4	6.3	5.2	6.3
Depth of middle of shaft	4.8	4.5	5.0	4.3	5.3
Breadth of proximal end	18.3	—	—	18.9	ca. 19.2

[1] Measurements in mm.

compared to *Burhinus* the external condyle of *P. littoralis* is not constricted as much proximally (in anterior view) and the short ridge which runs proximodistally from the supratendinal bridge is much more developed. Hence, it is probable that *Telmatornis* and *Palaeotringa* do not have a close (i.e. familial) relationship.

Any statement regarding the phylogenetic interpretation of *Telmatornis* must be considered tentative. The inclusion of *Telmatornis* within the Charadriiformes and near the Burhinidae suggests that the burhinids themselves, or at least their relatives, may be primitive within the order. This conclusion gains some support from a study by Brodkorb (1963b) that included several late Cretaceous charadriiforms from Wyoming. The family Cimolopterygidae is known for two genera, *Cimolopteryx* and *Ceramornis,* which Brodkorb believes are closest to the Recurvirostridae but which may also have burhinid or glareolid affinities. *Telmatornis* is definitely closer to the burhinids than to the recurvirostrids, but possibly the Telmatornithidae and Cimolopterygidae represent an early radiation that eventually gave rise to the two modern families. Unfortunately no humeri of the cimolopterygids are known, and thus a comparison with *Telmatornis* is impossible. The Telmatornithidae and Cimolopterygidae are both Maestrichtian in age and hence are the oldest members of the Charadriiformes.

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Summary

The Cretaceous genus *Telmatornis* is removed from the Rallidae and placed in the Charadriiformes near the Burhinidae. A new family, the Telmatornithidae, is erected for the genus. *Telmatornis priscus* and *T. affinis* are considered conspecific. The Aquitanian fossil *Milnea gracilis* is removed from the Burhinidae and is probably conspecific with *Eudocimus paganus* of the Threskiornithidae.

Literature Cited

Baird, D. 1967. Age of the fossil birds from the greensands of New Jersey. Auk, 84: 260–262.

Brodkorb, P. 1963a. Catalogue of fossil birds: Part 1 (Archaeopterygiformes through Ardeiformes). Bull. Florida State Mus., 7: 179–293.

BRODKORB, P. 1963b. Birds from the upper Cretaceous of Wyoming. Proc. 13th Intern. Ornithol. Congr.: 55–70.

BRODKORB, P. 1967. Catalogue of fossil birds: Part 3 (Ralliformes, Ichthyornithiformes, Charadriiformes). Bull. Florida State Mus., 11: 99–220.

LAMBRECHT, P. 1933. Handbuch der Palaeornithologie. Berlin, Gebrüder Borntraeger.

LYDEKKER, R. 1891. Catalogue of the fossil birds in the British Museum (Natural History). London, Brit. Mus. (Nat. Hist.).

MARSH, O. C. 1870. Notice on some fossil birds from the Cretaceous and Tertiary formations of the United States. Amer. J. Sci., 49, 2nd Ser. 205–217.

SHUFELDT, R. W. 1915. Fossil birds in the Marsh Collection of Yale University. Trans. Connecticut Arts Sci., 19: 1–110.

WETMORE, A. 1956. A check-list of the fossil and prehistoric birds of North America and the West Indies. Smithsonian Misc. Coll., 131: 1–105.

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