

TWO FOSSIL BIRDS FROM THE LOWER MIOCENE OF SOUTH DAKOTA

WITH ONE ILLUSTRATION

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In collections made by the University of California Museum of Palaeontology in 1934 near Martin, South Dakota, are remains of two avian species from the Lower Miocene. These came from Flint Hill, locality V 3417, SW quarter sec. 31, R 38 W, T 37 N, 9 mi. WSW of Martin, Bennett County. Mr. R. A. Stirton, in charge of the field party, reports that the Flint Hill fauna was taken from a lens in the upper part of the so-called Rosebud formation, Lower Miocene.

The bird bones represent an anseriform and a falconiform. The anseriform is an aberrant type, the size of a swan, which appears to belong to a distinct family within the order. The fossil falconiform is related to the Old World vultures of the subfamily Aegypiinae, a group that now is extinct in the New World. With the addition of this species there are now known six American representatives of the Aegypiinae. Thus it is evident that these vultures were a fairly prominent element in our avifauna of the past.

We are indebted to Mr. R. A. Stirton for the opportunity of studying these avian fossils and for assistance in arranging for the illustrations which were made by Mr. Owen Poe. Dr. Hildegard Howard kindly offered valuable advice as to relationship of the falconiform and made available the comparative material in the Los Angeles Museum of History, Science and Art.

Family PARANYROCIDAE, new family

Anseriforms with only two calcaneal ridges of the tarsometatarsus well developed; medial calcaneal ridge rounded in profile, as viewed medially, and smoothly continuous with crest of internal cotyla; articular surface of lateral trochlea of metatarsus faces obliquely laterad; metatarsal II not strongly deflected toward plantar surface.

One genus and species is known from the Lower Miocene of South Dakota, which may be described as

Paranyroca magna, new genus and species

Characters. Tarsometatarsus, distal end.—Differs from all other anseriforms as follows: articular surface of outer trochlea faces much more laterad, the outer flange much lower than the median; innermost trochlea less deeply grooved; posteromedial edge of distal end of metatarsal II much less abruptly deflected from shaft, and medial surface proximal to articular surface well excavated with its distal margin less rounded (see fig. 33); groove on plantar surface between ends of metatarsals II and III more excavated, resulting in larger hollow on lateral surface of II and shortening of medial ridge of trochlea of metatarsal III. Resembles the extinct *Chendytes*, the modern *Melanitta* and *Mergus*, and the diving ducks generally in configuration of trochleae, and especially in their relative location; differs from other ducks, and from swans and geese, in lateral compression of plantar surface and consequent proximal and lateral (in relation to axis of body) position of end of metatarsal II. Bridge distal to the intermetatarsal foramen pierced by tendinal canal from within foramen as in geese and swans, not superficially as in scoters. Scar for articulation of metatarsal I absent as in Anatidae (present in Anhimidae).

Proximal end.—Profile of largest, medial calcaneal ridge much more rounded, as viewed medially, than in other anseriforms; proximal end of ridge continues smoothly into crest of internal cotyla. Area on medial surface below internal cotyla depressed, due in part to crushing. Small, deep depression lateral to junction of calcaneal ridge and internal cotyla unlike configuration in most other anseriforms. Second and apparently fourth calcaneal ridges of the Anatidae lacking, a broad bipartite groove lying between medial and lateralmost (third?) ridge; smooth, well-preserved surface gives no hint of loss of ridges through breakage. Lateral ridge somewhat sharper than in Anatidae and more laterally deflected. Scars of ligamental attachments of lateral surface extremely close to rim of

cotyla; diving ducks, of all anatids, most nearly approach this condition (exact configuration subject to much individual variation). Anterior part of proximal end broken away. Articular surfaces poorly preserved, but general configuration much as in Anatidae, not as in Anhimidae.

Shaft.—Anterior medial ridge of shaft immediately distal to head not strongly concave as in scoters and *Chendytes*, but straighter as in swans and geese. Proportions of shaft and ends similar to those in swans and geese.

Type.—Left tarsometatarsus, nearly complete, no. 34456 Univ. Calif. Mus. Pal., field no. 1020, from Lower Miocene, Rosebud formation, 9 mi. WSW Martin; Bennett County, South Dakota. Collected by R. A. Stirton, June 13, 1934.

Measurements.—Type, total length from prominence on posterior rim of internal cotyla, 111.0 mm.; transverse diameter across trochleae, 21.2; least transverse diameter of shaft, 9.0.

Second, incomplete left tarsometatarsus, distal end only, no. 34457, field no. 1020, same locality as type, transverse diameter across trochleae, 20.2; least transverse diameter of shaft, 9.0.

Paranyroca was a large anseriform, the size of a whistling swan, and considerably specialized for swimming and diving. In adaptive type it paralleled the modern diving ducks (Nyrocinae). This is seen especially in the arrangement of the trochleae and in the lateral compression of the distal end of the tarsometatarsus; this trend in configuration reaches an extreme in the grebes and loons. The proximal end of the tarsometatarsus of *Paranyroca* does not show any special modification for diving, but it does not depart greatly from the pattern of the Nyrocinae. In a few particulars, such as the straight anteromedial ridge of the shaft just distal to the head and in the moderate height of the principal calcaneal ridge, it is less specialized for aquatic activity.

The configuration of the hypotarsus differs strongly from that of other members of the suborder Anseres and represents a primitive state in the evolution of tendinal grooves. This condition is roughly equivalent to that in the screamers, suborder Anhimae. However, the latter in many other respects, such as the configuration of the proximal articular surfaces, the development of the first metatarsal and the arrangement of the trochleae, are widely set apart from typical anseriforms. Actually the hypotarsus of *Paranyroca* resembles that of the albatrosses as much as it does that of the screamers.

We may conclude that *Paranyroca* represents a distinctive and primitive anseriform family which may have some special phylogenetic relation with the Nyrocinae of the Anseridae. It shows more affinity to the Anseridae than does the Anhimidae and may be included with the former in the suborder Anseres.

The only other North American anseriform fossil known from the Miocene is *Presbychen abavus* from the Temblor formation in California. This species is based on the distal end of the tibiotarsus. Wetmore (Proc. Calif. Acad. Sci., vol. 19, 1930, pp. 92-93) emphasizes its resemblance to *Branta canadensis* and places it in the Anatidae. There seems to be little to suggest aberrancy of the degree seen in *Paranyroca*. *Chendytes* of the Pleistocene is typical of the Nyrocinae, although much larger than living members of that group.

Of other fossil anseriforms, there are only two that represent distinct subfamilies under the Anatidae. *Eonessa anaticula* (Wetmore, Jour. Paleo., vol. 12, 1936, p. 280) of the Eocene of Utah is known from wing bones that differ in a number of particulars from those of the Erismaturinae, the modern group that *Eonessa* approaches most closely. There is no means of determining any affinity of *Eonessa* with the much larger *Paranyroca*. *Romainvillia* (Lebedinsky, Mem. Soc. Paleo. Suisse, vol. 47, no. 2, 1927, p. 1) was placed in a separate subfamily (Romainvillinae) by Lambrecht (Handbuch Palaeornith., 1933, p. 351). It was found in the Upper Eocene of the Paris Basin and, among other parts, is known from an incomplete tarsometatarsus. The hypotarsal region is lacking, so that it is not known whether it was primitive, as is *Paranyroca*, in the configuration of this region. The articular surface of the lateral trochlea is not directed

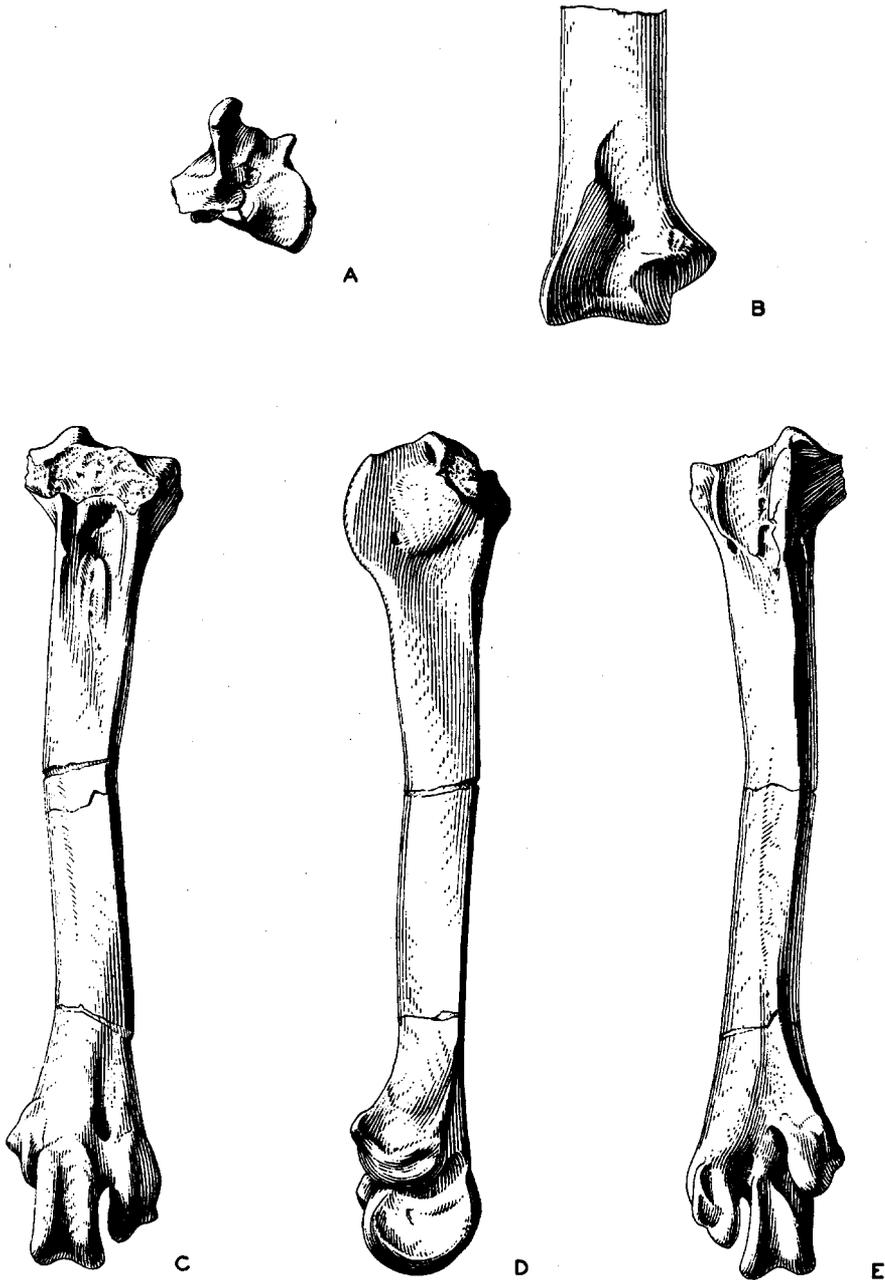


Fig. 34. A, C, D, E, tarsometatarsus of *Paranyroca magna*, type, no. 34456 Univ. Calif. Mus. Pal., all natural size; A, articular surface of proximal end; C, anterior view; D, medial view; E, posterior view.

B, internal aspect of distal end of ulna of *Palaeoborus rosatus*, type, no. 34452, Univ. Calif. Mus. Pal., $\times 1\frac{1}{2}$.

obliquely laterally, and the end of metatarsal II is strongly deflected toward the plantar surface and is not set far proximally relative to metatarsal IV. The general aspect of the tarsus is that of shortness and breadth. Thus, nothing more than a general ordinal resemblance between *Paranyroca* and *Romainvillia* is discernible from the figures and descriptions of the latter.

Family ACCIPITRIDAE
Subfamily AEGYPIINAE

Palaeoborus rosatus, new species

Characters.—Ulna similar to that of *Neogyys errans*, but carpal tuberosity larger and, proximally, more abruptly deflected from shaft; lateral surface of external condyle flatter; proximal crest of external condyle straighter and more in line with shaft; size 7 per cent larger.

Type.—Left ulna, complete and well preserved distally, but proximal end shattered; no. 34452 Univ. Calif. Mus. Pal., field nos. 1020, 1028, from Lower Miocene, Rosebud formation. Collected by R. A. Stirton, June 14, 1934.

Measurements.—Length from tricipital attachment to distal end, 241 mm.; distance from distal articular surface between condyles to proximal end of crest of external condyle, 15.8 ("height of condyle" of Howard, Carnegie Inst. Wash. Publ. no. 429, 1932, p. 53); least diameter of shaft 9.5.

The ulnae of the aegyptine vultures may be distinguished from those of the eagles (Aquilinae) by the longer crest of the external condyle as Howard (*op. cit.*) has shown. The length of the condyle in *Palaeoborus rosatus*, as per cent of ulnar length measured to the tricipital attachment is 6.5; 6.2-6.6 in *Neogyys errans*; 6.4-6.9 in the modern aegyptine vulture *Sarcogyys*; but, 7.9-8.3 in *Haliaeëtus* and 9.6-10.1 in *Aquila*. Except for this feature of condylar length, *Palaeoborus rosatus* has considerable resemblance to *Haliaeëtus*. It differs additionally, however, in the shorter tendinal pit, convex distal outline of carpal tuberosity, straighter crest of external condyle, flatter lateral surface of external condyle, and more slender shaft.

Although it is apparent that the fossil represents another member of the Old World Aegyptinae that occurred in North America up to the Pleistocene, its generic assignment is by no means certain. *Palaeoborus umbrosus* (Cope, Proc. Acad. Nat. Sci. Phila., vol. 26, 1874, p. 151) and *Palaeoborus howardae* (Wetmore, Proc. U. S. Nat. Mus., vol. 84, 1936, p. 73) of the Miocene are not represented by the distal ends of ulnae. *Neophrontops dakotensis* (Compton, Am. Jour. Sci., vol. 30, 1935, p. 344), a small aegyptine from the Pliocene of South Dakota, is known only from the distal end of the humerus. The fossil aegyptines with complete ulnae are those of the Pleistocene, *Neogyys errans* and *Neophrontops americanus* (see Howard, *op. cit.*). *Neophrontops* and the modern *Neophron* appear to represent a phyletic line distinct from *Palaeoborus* and *Neogyys* which were of more eagle-like aspect. Because the new fossil, *rosatus*, resembles *Neogyys* more than it does *Neophrontops*, its generic affinities would seem to lie either with *Neogyys* or *Palaeoborus*; the osteologic characters that are preserved are not such as to warrant establishing a new genus. Although *rosatus* compares closely with *Neogyys*, there is much reason to think that it would also be very similar to *Palaeoborus* which perhaps was ancestral to *Neogyys*. Rather than extend the time range of *Neogyys* back to the Miocene, it seems best to place *rosatus* with the then existing *Palaeoborus*. *P. umbrosus* and *P. howardae* are sufficiently small to preclude specific identity with *rosatus* which was slightly larger than the bald eagle (*Haliaeëtus leucocephalus*).

Museum of Vertebrate Zoology, Berkeley, California, May 29, 1939.