

Fossil Birds from the Oligocene of Colorado

By ALEXANDER WETMORE

Explorations in the fossil deposits of Weld County, Colorado, prosecuted by the Colorado Museum of Natural History, have brought to light among many excellently preserved specimens of mammals, a small series of fossil bones of birds. Through the interest of Mr. J. D. Figgins, Director of the Museum, and Mr. Harold J. Cook, Honorary Curator of Palaeontology, these avian remains have come to my hands for study. There are represented four forms of birds all distinct from any others heretofore known.

From data supplied by Mr. Cook it is learned that these specimens were collected in the *Trigoniis* quarry in Weld County, Colorado, in 1923 and 1926. They were associated with hundreds of skeletons of *Trigoniis*, and with bones of *Symborodon* and *Archaeotherium*, all beautifully preserved, and found in a relatively small area. Mr. Cook states that the locality seems apparently to have been an old water hole. The bones lay in a great pocket of extremely fine clay silt, bounded by walls and floor of much harder material.

It is estimated from present information that the level of the quarry where these deposits occur is about twenty-five feet above the unconformity that marks the junction of the Chadron formation with the Pierre Shale, which underlies it. Mr. Cook, on basis of studies made to date, considers the horizon from which come the bird bones to be lower Chadron, in all probability from below the middle of the formation, which at this point in its higher levels blends so with the overlying Brule clays that its exact upper limit is somewhat uncertain.

Fossil bird remains from the Oligocene of North America are so few and their association with deposits of that age in most cases so uncertain that the three species here described assume great importance. The two vultures are to be expected from an area which at the time in question was apparently the home of great numbers of mammals of considerable size. The form and stature of these birds in relation to their Pleistocene and recent representatives is of more than passing interest. The ralline form is the first large gallinule from North America though such have been common in other countries. The finding of an extinct form of the group existing today as the Oedictnemidae, called usually the thick-knees or stone plovers, is totally unexpected, the more so since the fossil form had a hind toe which is entirely absent in living species. It is to be hoped that the present is but a beginning of the bird remains to be obtained from these beds.

Drawings illustrating this report were made by Mr. Sydney Prentice.

Family CATHARTIDAE

PHASMAGYPS PATRITUS gen. et. spec. nov.

Characters.—Tibio-tarsus similar to that of *Coragyps urubu*¹ but at least fifty percent larger; peroneal groove on outer face more distinct; external condyle with posterior margin more produced externally; lower portion of shaft proportionately thicker, less flattened.

¹*Vultur urubu* Vieillot, Ois. Amer. Sept., Vol. 1, 1807, p. 23, pl. 2. (Carolina and Florida.)

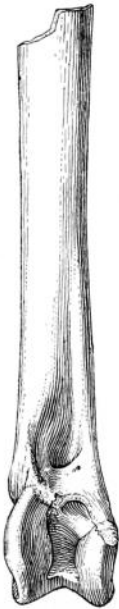


Figure 1.—Type of *Phasmagyps patritus*, anterior view (natural size).

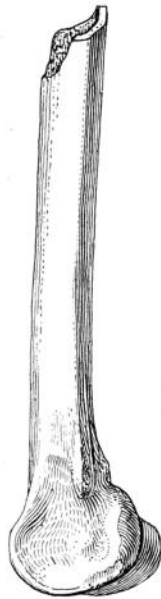


Figure 2.—Type of *Phasmagyps patritus*, external face (natural size).

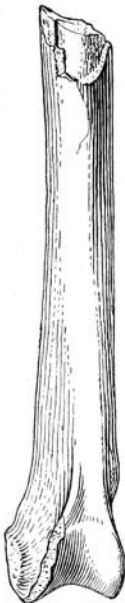


Figure 3.—Type of *Phasmagyps patritus*, posterior view (natural size).

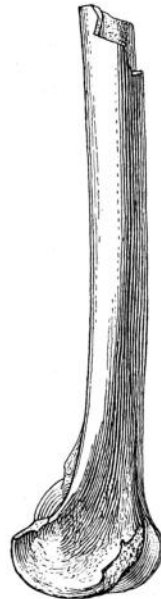


Figure 4.—Type of *Phasmagyps patritus*, internal face (natural size).

Description.—Type No. 804, fossil catalog, Colorado Museum of Natural History, lower portion of right tibio-tarsus (figures 1 to 6) from Chadron Oligocene, collected in the *Trigonias* quarry of Weld County, Colorado, in 1923, by Philip Reinheimer.

Outer face of outer condyle with margin rounded, distinctly flattened below, more angular posteriorly than in front and rising decidedly higher on shaft anteriorly; external surface slightly and evenly excavated in a basinlike depression; internal condyle projecting in a blunt point that extends for one-third of diameter of condyle beyond the anterior line of the shaft; posterior margin broken away but evidently produced in a narrowed plate; a small tubercle on external face, near center, in a line with anterior margin of shaft, with a faint excavation in front; behind this tubercle the bone slopes quickly away with slightly concave outline to merge above with shaft; anterior channel between condyles narrow and deep, with perpendicular walls that meet the bottom at a right angle, so that viewed directly from below the opening appears rectangular; external margin of groove rounding away externally toward outer margins of both condyles, a slight overhang evident on inner side; articular surface well produced posteriorly, at upper end with margins pinching in toward one another, the inner extended slightly higher on shaft than outer; a well marked groove externally at lower end of shaft for peroneus profundus; tendinal bridge strong and relatively wide, extended across a triangular sulcus, deepest toward inner side, that merges gradually with lightly rounded surface of shaft above until it finally disappears; shaft relatively slender with strongly rounded posterior surface that extends around to meet the more flattened anterior face at a marked angle.

Measurements.—Transverse breadth across condyles 14.9 mm.; anterior-posterior diameter of inner condyle (approximate) 17.0 mm., of outer condyle 17.9 mm., smallest transverse diameter of shaft 9.2 mm.

Discussion.—*Phasmagyps patritus* has the characteristics of the black vulture group and is quite distinct from the turkey vulture and its allies. *Coragyps occidentalis* and *C. shastensis*, described by L. H. Miller from the Pleistocene of California, in this assemblage may be dismissed with the statement that they are little if any larger than the modern black vulture. They are eliminated from the present discussion on point of size. Other fossil species in this family known at present are of another type so that they do not require mention, except to note that *Palaeoborus umbrosus* (Cope) from the late Tertiary seems allied to modern *Cathartes*.

The fossil here named was a bird apparently fully one-third larger than the modern black vulture. Though of similar form its characters indicate that it is generically distinct from *Coragyps* and are such as to indicate a different form of bird.

PALAEOGYPS PRODROMUS gen. et. spec. nov.

Characters.—Lower end of tibio-tarsus similar to that of *Gymnogyps californianus*¹ but more than one-third smaller; articular surface more produced posteriorly; rotular channel relatively broader; peroneal groove somewhat more prominent.

Description.—Type, No. 803, fossil catalog, Colorado Museum of Natural History, lower part of right tibio-tarsus below the level of the

¹*Vultur californianus* Shaw. Nat. Misc., Vol. 9, 1797, pl. 301. ("Coast of California" [San Francisco or Monterey?].)



Figure 5.—Transverse outline of shaft of tibio-tarsus (near middle) of *Phasmagyps patritus* (type natural size).



Figure 6.—End view of tibio-tarsus of *Phasmagyps patritus*, (type, natural size).

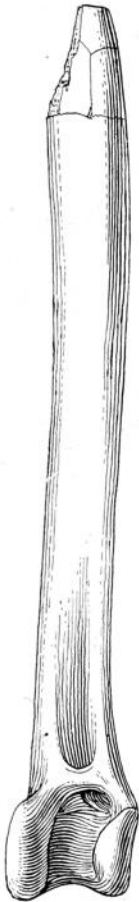


Figure 7.—Type of *Palaeogyps prodromus*, anterior view (natural size).

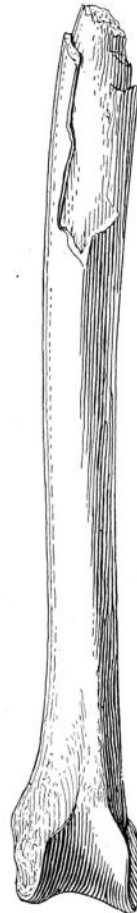


Figure 8.—Type of *Palaeogyps prodromus*, posterior view (natural size).

peroneal ridge, (figures 7 to 11) from the Chadron Oligocene, collected in the *Trigonias* quarry of Weld County, Colorado, in 1923, by Philip Reinheimer.

Outer face of external condyle rounded, projected very slightly more toward front of center than toward rear, with lower margin decidedly flattened; external margin slightly raised all around to bound the faintly depressed central area; internal condyle on outer face with anterior margin strongly projected beyond line of shaft for a distance equivalent to one-third its entire width, lower margin flattened, and posterior margin protruded as a thin, raised plate; a rounded tubercle near level of anterior margin of shaft about equidistant from upper and lower margins, with a shallow, rounded excavation in front; behind this the tubercle sloping abruptly inward to base of shaft to form an irregular depression bounded by the raised outer margin; rotular channel in front broad and deep; outline in general square, but with well-marked overhang on inner side; anterior margins of condyles rounded; articular surface continued around lower face of bone as a broad, shallow depression bounded externally by sharply raised margins, that finally pinch in abruptly at the back, and slope into base of shaft, the posterior margin of the articulation projected well behind level of shaft; groove for peroneus profundus shallow but projecting and well marked; tendinal bridge (for extensor digitorum communis tendon) broad and strong, (in the actual specimen distorted from proper position); a broad depression above it somewhat imperfectly defined internally due to crushing of bone; shaft somewhat slender but strong, flattened on anterior face for a short distance above the tendinal bridge, gradually becoming rounded to level of peroneal ridge where it is once more plane, the slope of the inner margin more abrupt than that of the outer; posterior face rather smoothly rounded throughout; slightly expanded and flattened toward peroneal ridge.

Measurements.—Transverse breadth across condyles 16.8 mm.; anterior-posterior diameter of inner condyle 18.4 mm.; of outer condyle 17.6 mm.; smallest transverse diameter of shaft 9.5 mm.; length to lower margin of peroneal ridge approximately 102 mm.

Discussion.—With the broken tibio-tarsus selected as type for the present species there is associated the upper end of a tarsometatarsus, bearing the same catalog number, that articulates so definitely with the type as to indicate that it comes from the same bird. It is so identified here. Description of this bone (figures 12 to 14) which is perhaps one-third complete is as follows:

External glenoid facet faintly concave, extending up on side of intercondylar prominence; internal glenoid facet similar but somewhat larger; intercondylar tubercle strong and prominent, rising high above the level of the articular surfaces, from in front appearing as a truncated triangle, with a faint excavation at base on its posterior margin; shaft heavily excavated below head, the cavity continued down on shaft as a deep groove; insertion of tibialis anticus tendon high; talon a squared block located at center of shaft, with perpendicular sides, set off above from the glenoid facets by a flattened groove with an abrupt inner wall that forms a line across upper articular surface, narrowed posteriorly to slope as a rounded ridge gradually down into level of shaft; face of talon posteriorly excavated as a widely open groove; lateral faces slightly excavated with broad concavities below on either side; both margins of shaft flat-

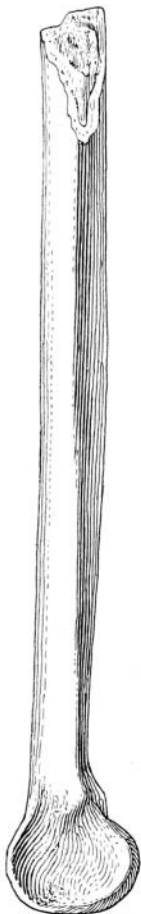


Figure 9.—Type of *Palaeogyps prodromus*, external face (natural size).



Figure 11.—Type of *Palaeogyps prodromus*, end view of lower articular surface (natural size).



Figure 10.—Type of *Palaeogyps prodromus*, internal face (natural size).

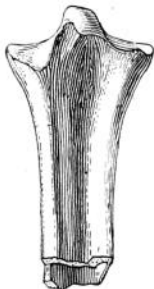


Figure 12.—Upper portion of metatarsus of *Palaeogyps prodromus*, anterior view (natural size).

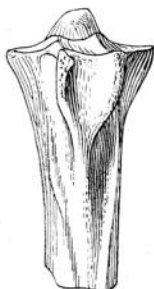


Figure 13.—Upper portion of metatarsus of *Palaeogyps prodromus*, posterior view (natural size).



Figure 14.—Metatarsus of *Palaeogyps prodromus*, upper articular surface (natural size).

tened, with only faintly indicated anterior and posterior grooves on lower part.

The greatest breadth of the head measures 19.5 mm., the distance from center of tibialis anticus tubercle to upper end of intercondylar tubercle 17.3 mm., and the transverse diameter of the shaft at the lower end of the fragment 9.8 mm.

This metatarsal fragment differs from that of *Gymnogyps* in its relatively narrower and longer talon with no raised ridge to divide its posterior surface into two portions, and in its stronger, less flattened shaft.

The present species seems to have been a small condor somewhat similar, but perhaps not closely allied, to the living California condor. Its characters are such that it must be placed in a distinct genus. It has no definite connection with other fossils that have been described in this group, e. g. *Cathartornis gracilis* L. H. Miller and *Sarcorhamphus clarki* L. H. Miller, other than that of family relation. Its type is distinct from that of any cathartid now known either living or extinct.

Family RALLIDAE

PALAEOCREX FAX gen. et. spec. nov.

Characters.—Lower portion of tarsometatarsus somewhat similar to that of *Tribonyx mortierii* Du Bus¹ but much larger; inner trochlea broader and heavier, with outer face swollen so that the projecting posterior plate or wing arises from near center of trochlea instead of being a continuation of outer margin.

Description.—Type, No. 1078, fossil catalog, Colorado Museum of Natural History, lower portion of left tarso-metatarsus (figures 15-18) from Chadron Oligocene, collected in the *Trigoniás* quarry of Weld County, Colorado, in 1926, by Philip Reinheimer.

Distal margin of outer trochlea reaching to middle of central trochlea, of inner trochlea extending only to the base of the expanded portion of the middle trochlea; viewed from the distal end the three ranged in a gentle curve with convexity toward the anterior face; outer trochlea of moderate development, compressed laterally, with a projecting outer flange (which is partly broken away) extending well beyond level of inner margin; posterior face slightly grooved; distal and anterior margins with groove only minutely indicated; distal margins nearly in the same level; anterior face sloping strongly back to outer margin; external face concave; groove of separation from middle trochlea relatively narrow and not deeply cut; middle trochlea compressed laterally, with a strong groove extending clear around articular surface, terminating in a faint pit at upper anterior end with both outer and inner faces well excavated so that both margins project prominently; outer margin behind, on upper end, cut in slightly toward center but posterior surface on the whole relatively broad; articular surface terminating on posterior face in a relatively abrupt line; outline of trochlea from the side distinctly rounded but wider from front to back than high; inner trochlea relatively small, with basal attachment to shaft entirely above base of middle trochlea, compressed laterally, with inner face deeply excavated so that the depression is shallowly cupped; outer surface swollen into a moderately projecting tubercle, with a bladelike posterior projection from the center of

¹*Tribonyx mortierii* Du Bus, L'Institut, Vol. 8, 1840, p. 258. (New Holland.)

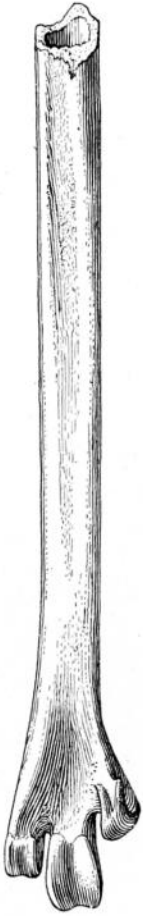


Figure 15.—Type of *Palaeocrex fax*, posterior view (natural size).



Figure 18.—Type of *Palaeocrex fax*, outline of trochlea (natural size).



Figure 17.—Type of *Palaeocrex fax*, lateral view (natural size).

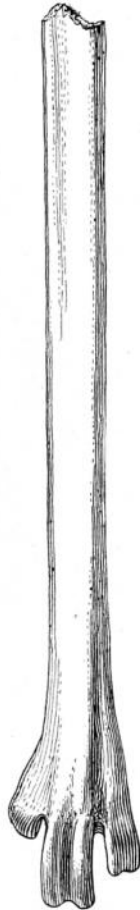


Figure 16.—Type of *Palaeocrex fax*, anterior view (natural size).

the posterior surface that extends back and up, with a bluntly truncated tip; basal attachment of trochlea thin and compressed, uniform in width, with the entire process swung strongly back from the line of the transverse axis of the bone; sulcus between inner and middle trochlea wider than that on the opposite side; lower extremity of shaft broadened laterally and strongly compressed in the opposite plane; a moderate external foramen from which a shallow groove leads upward to disappear in a short distance in the face of the shaft; a slightly marked impression for the articulation of the hallux; above this the shaft thickens.

Measurements.—Smallest transverse diameter of shaft 7.7 mm.; breadth across trochlea 18.4 mm.; width of outer trochlea 4.8 mm.; width of middle trochlea 7.4 mm.; width of inner trochlea 4.9 mm.

Discussion.—The present species is considerably larger than the largest modern gallinules of the genus *Porphyrio* so that it must have stood between two and three feet in height. It is assigned tentatively to the subfamily Gallinulinae but has certain characters (explained below) that will perhaps eventually place it in a separate group. Relationships of the subfamily groups of the rails I consider at present to be somewhat involved due to the many aberrant forms known so that the proper divisions may be decided only after fuller studies of both living and extinct forms. Comparison with *Tribonyx* in the diagnosis has been made as a matter of convenience as the fossil seems nearer in form to that genus than to others of the modern forms.

Palaeocrex fax seems to be related definitely to the gallinules rather than the coots through the projecting form of the bladelike process on the inner trochlea, in coots this being cut away until it is only slightly evident. The fossil differs from modern gallinules in the swollen form of the outer margin of the inner tubercle with the posterior blade rising from the center of the posterior face instead of being continuous with the outer margin of the main trochlea. In certain characters, notably the one just described for the position of the projecting process on the inner trochlea, *Palaeocrex* has indication of affinity with the Megalornithidae. The form of outer and middle trochlea is, however, ralline so that this species may be considered an ancient form that carries more closely the affinity of Rallidae and Megalornithidae than the modern representatives of these groups, which today we hold so closely allied that we place them in the order Megalornithiformes. Such indication of closer union between the two families in question should not be unexpected in a species of the Oligocene period.

Family ŒDICNEMIDAE

BATHORNIS VEREDUS gen. et. spec. nov.

Characters.—Tarso-metatarsus somewhat similar to that of *Oedicnemus capensis* Lichtenstein¹ but many times larger than any existing species of the family; hallux apparently present; posterior surface of middle trochlea relatively shorter and broader; inner and outer trochlea with posterior margins more produced.

Description.—Type, No. 805, fossil catalog, Colorado Museum of Natural History, lower portion of right tarso-metatarsus (figures 19 to

¹*Oedicnemus capensis* Lichtenstein, Verz. Doubl. Zool. Mus., 1823, p. 69. (Cape of Good Hope.)

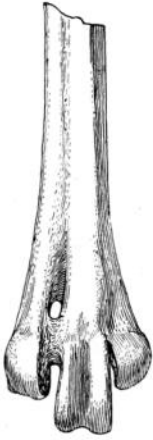


Figure 19.—Type of *Batthornis veredus*, anterior view (natural size).



Figure 21.—Type of *Batthornis veredus*, outline of trochlea (natural size).

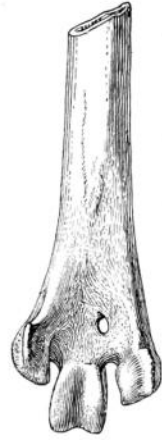


Figure 20.—Type of *Batthornis veredus*, posterior view (natural size).



Figure 24.—Type of *Batthornis veredus*, transverse outline of shaft above articular surface for hallux (natural size).



Figure 22.—Type of *Batthornis veredus*, external face (natural size).



Figure 23.—Type of *Batthornis veredus*, internal face (natural size).

24) from Chadron Oligocene, collected in the *Trigonias* quarry of Weld County, Colorado, in 1923, by Philip Reinheimer.

Outer trochlea strong, flattened antero-posteriorly, on anterior face sloping abruptly from inner margin to outer, with surface slightly rounded; sides excavated, especially on inner face; grooved shallowly behind, with a thin lateral plate projecting posteriorly and flaring slightly outward; middle trochlea strong and robust with deep excavations on either side, heavily grooved around articular surface, a slight depression at upper anterior end; outer flange projecting slightly beyond the inner on the posterior face, and the inner flange extended slightly beyond the outer on the anterior face; lateral outline on both sides somewhat constricted, on outer side near lower end, and both sides pinched in at upper end on posterior surface; inner trochlea smaller, flattened, with rounded anterior surface, and inner and outer faces heavily excavated; outer margin produced posteriorly as a thin, blade-like point; lower line of inner trochlea not reaching center of middle trochlea; lower end of shaft flattened and expanded toward base of trochlea, with a nearly round external inferior foramen of good size, that anteriorly lies at the lower end of a broad, faintly indicated groove; articulation for first toe a faint, elongated depression; shaft above this point narrow and more or less squared in outline.

Measurements.—(Of type) Smallest transverse diameter of shaft 8.4 mm.; breadth across trochlea 19.7 mm.; breadth of outer trochlea 5.2 mm.; breadth of middle trochlea 7.5 mm.; breadth of inner trochlea 5.7 mm.

Discussion.—The only other fossil form previously recorded in the family *Oedicephalidae*, or thick-knees, is *Milnea gracilis* Lyddeker¹ from "Lower Miocene (Upper Oligocene) of Allier," France, described from a humerus which indicates a bird similar in size to modern species. If properly depicted in the original figure I doubt its reference to the family in question.

Bathornis veredus was of enormous size when we contemplate its modern relatives since the part of the skeleton available to us represents a bird apparently one-third larger than the *Cariama* (*Cariama cristata*). A roughened depression on the outer side of the dorsal face of the metatarsus indicates a facet for attachment of a hallux, which is absent in modern species, but which it is not surprising to find represented in an ancestral form. Other peculiarities, aside from size, are so slight that it is deemed best to segregate *Bathornis* from modern thick-knees, only as a subfamily which will be known as the **Bathornithinae**.

Geologists, from available evidence, inform us that North America during the Oligocene was comparatively level with low relief, so that we may imagine the species here under discussion as coursing over extensive plains. It is one of the most remarkable of recent additions to our fossil avifauna.

U. S. National Museum, February 11, 1927.

¹Cat. Fossil Birds Brit. Mus., 1891, p. 169, fig. 38.