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MISCELLANEOUS NOTES ON
FOSSIL BIRDS

(WITH FIVE PLATES)

By
ALEXANDER WETMORE
Research Associate
Smithsonian Institution



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The following observations cover some recent studies. While the separate accounts have no relationship to one another other than that concerned in the general field of paleo-ornithology, it has seemed desirable to present them as sections under one general title, rather than as separate notes published individually.

I. OBSERVATIONS ON THE GENERA OF FOSSIL KITES, WITH DESCRIPTIONS OF TWO ADDITIONAL SPECIES

The first fossil species described as a kitelike hawk from North America was *Proictinia gilmorei* Shufeldt (1913, p. 301) based on a right coracoid from the lower Pliocene of Phillips County, Kans. While the author called it a kite, he was not definite regarding its affinities, as he remarked that "it is not far removed from such genera as *Ibycter* or *Milvus* or *Ictinia*." His uncertainty is evident when it is remembered that his "*Ibycter*," now a synonym of *Daptrius*, is a species allied to the caracaras in the family Falconidae, while *Milvus* and *Ictinia* are found in the subfamily Milvinae of the family Accipitridae.

The second bird assigned to this general category of fossil hawks was *Proictinia effera* Wetmore (1923, p. 504), named from a tarso-metatarsus with associated phalanges from the lower Miocene of the Agate fossil quarry in Sioux County, Nebr. Though my study of Shufeldt's type of *P. gilmorei* in 1923 was sufficient to indicate that it was a species of the Accipitridae, skeletons of enough of the modern species of kites were not available then to give clear understanding of relationships. In view of this I placed *effera* tentatively in Shufeldt's genus *Proictinia*. Recently, when Brodkorb (1956, p. 368) named *Proictinia floridana* on the distal end of a tarsometatarsus from the

lower Miocene of Gilchrist County, Fla., he described it also tentatively in *Proictinia* as it is generally similar to *effera*. In the 35 years since 1923 there have been important additions to the collection of skeletons of kites and allied species in the United States National Museum so that now better understanding of their characters is possible. With further fossils in this general area of related species now at hand for description it is desirable to make a detailed examination to determine more definitely the generic relationships of those already named.

The type coracoid of *Proictinia gilmorei* appears most like that of the Everglade Kite *Rostrhamus sociabilis* (Vieillot) among living kinds, differing from that species in the more central position of the tubercle on the dorsal face of the shaft, in a slight thickening of the inner edge of the bone opposite this tubercle, and in being slightly shorter and more robust. Though the distinction between the two is not of great amount, it appears sufficient to maintain *Proictinia* as a valid genus, since the coracoid is an element that shows slight variation in species that are closely related. Through its resemblance to *Rostrhamus* it is therefore to be placed near that genus in the subfamily Milvinae.

Since *Proictinia gilmorei* and *P. effera* are represented by different parts of the skeleton, their relationship may be determined only by analogy. It has been stated above that on the basis of the coracoid *gilmorei* is most like *Rostrhamus sociabilis* among living kites. Comparison of the tarsometatarsus of the fossil *Proictinia effera* with that of living *Rostrhamus* shows that this second fossil differs in form, having the upper end of the outer face of the shaft distinctly narrowed below the head, the lower end of this same surface immediately above the trochlea for digit 4 broader, and the tubercle for insertion of the tibialis anticus slightly more elevated and located relatively nearer the head. In each of these particulars the fossil is nearer the living species of *Milvus*, as represented by *Milvus milvus*, *M. migrans*, and *M. lineatus*. *P. effera* differs from *Milvus* in having the tarsometatarsus relatively slighter throughout, this being especially apparent in the proportions of the head and of the second and third trochleae in comparison to the total length of the bone. The tibialis anticus tubercle also is weaker and is located higher on the shaft, and the attachment for the external ligament is less evident. The fourth trochlea is heavier as it is in *Rostrhamus*.

In view of these comparisons it seems warranted to describe in the subfamily Milvinae as an additional genus—

PROMILIO, new genus

Characters.—Similar to *Milvus* Lacépède, but tarsometatarsus relatively longer and more slender; tubercle for insertion of the tibialis anticus tendon weaker, and located higher on the shaft, toward the head; attachment for the external ligament less evident; fourth trochlea relatively heavier; second and third trochleae weaker; inner ridge on head of hypotarsus relatively longer.

Type.—*Proictinia effer* Wetmore, which becomes *Promilio efferus* (Wetmore).

Proictinia floridana Brodkorb, which differs mainly from the type species in slightly smaller size, and larger distal foramen which opens lower down on the shaft, is also to be referred to this genus, where it will be listed as *Promilio floridanus* (Brodkorb).

Milvus desperditus named by Milne-Edwards (1871, p. 461) from lower Miocene (Aquitanean) deposits at Langy in the Department of Allier, France, according to the original description and figures appears to be a small species of kite. It seems to resemble *Milvus*, the genus in which it was described, in form of shaft, and in form and relatively short length of the inner head of the hypotarsus (or talon). The attachment for the external ligament is less evident, and the articular facet for the first metatarsal apparently is relatively shorter and smaller. It seems to be distinct from *Promilio*, but the type should be examined in detail to determine that it is truly a form of the genus *Milvus*.

The only other fossil genus requiring consideration that has come to my attention is *Thegornis*, in which Ameghino (1895, pp. 598-600) described two species from the Miocene of Patagonia. These are named from the distal ends of two right tarsometatarsi, which in the illustration accompanying the description appear rather similar to one another in outline but differ decidedly in size. Lambrecht (1933, p. 421) listed these two, without special comment, adjacent to *Proictinia*, apparently indicating possible relationship to the Milvinae. Superficially, the larger one, *Thegornis musculosus*, does suggest a kite, but on close comparison with *Milvus* and *Rostrhamus* which are the genera apparently most similar, it is seen that the second trochlea of *musculosus* appears heavier, the base of the shaft relatively more slender, and the trochleae smaller. This indicates placement in another subfamily of the Accipitridae, perhaps in the Circinae. While relationship may be decided finally only by direct examination of the types, it appears definite that the two species of *Thegornis* are not to be included in the Milvinae.

Apparently the Milvinae were as varied in kinds in the latter part of the Tertiary as were the Buteoninae, since following this preliminary discussion I have for description two additional species that are to be named in the genus *Promilio*, as follows:

PROMILIO EPILEUS, new species

Characters.—Femur (pl. 5, fig. 2) similar in size to that of *Milvus lineatus* (J. E. Gray), but head, including the neck, relatively smaller; shaft somewhat more slender; rotular groove narrowed, with the ridges bounding it on either side longer; internal condyle with articular surfaces slightly less swollen, the planes being flattened rather than rounded.

Type.—Museum of Comparative Zoölogy No. 2716, right femur (a section missing from center of shaft), from Lower Miocene, Thomas Farm, 8 miles north of Bell, Gilchrist County, Fla., collected February 1955, by S. J. Olsen.

Measurements.—Transverse diameter of bone through head 15.0, transverse diameter of shaft near center 6.7; transverse breadth of distal end 14.9 mm.

Remarks.—The present species is readily separated from the other kites allocated to this genus by greater size, as it is approximately 50 percent larger than any of them. The missing part of the shaft is that adjacent to the nutrient foramen, the break being slightly more than is indicated by the gap shown in the drawing. The general resemblance to *Milvus*, except in the points noted in the diagnosis, indicates its systematic position in the subfamily Milvinae, where it appears related to others now allocated to *Promilio*.

The name *epileus* was applied by Pliny to a kind of hawk.

PROMILIO BRODKORBI, new species

Characters.—Tarsometatarsus (pl. 5, fig. 1) similar to that of *Promilio efferus* (Wetmore), but definitely larger, the bone being heavier throughout; intercotylar area of head relatively broader and more prominent; the attachment for the external ligament more prominent, with the upper end of the shaft supporting it more compressed; anterior face of shaft below head decidedly concave.

Type.—Collection of Pierce Brodkorb No. 1775, proximal two-thirds of left tarsometatarsus, from Lower Miocene, Thomas Farm, 8 miles north of Bell, Gilchrist County, Fla.

Measurements.—Transverse breadth of head 11.0; width of outer

face of shaft, near center, 6.0; anterior-posterior diameter of head through hypotarsus 9.3 mm.

Remarks.—The present species in size apparently stood more or less midway between *Promilio efferus* and *P. epileus* named above. It is named for Dr. Pierce Brodtkorb, in recognition of his contributions to our knowledge of fossil birds, particularly those of Florida.

II. A SPECIMEN OF *BATHORNIS CELERIPES*

Dr. James Bump, Director of the Museum of Geology, South Dakota School of Mines and Technology, has sent me for examination a fossil collected from the base of the Scenic member of the Middle Oligocene, 2 miles east of Scenic, S. Dak., which I have identified as *Bathornis celeripes* Wetmore. The specimen (catalog No. 422) includes a leg nearly complete, except for the femur, and the distal ends of right and left humeri. The tibiotarsus, tarsometatarsus, and phalanges, which were found associated in such a manner that there is no doubt as to their belonging to the same individual, agree definitely with the abundant material of *Bathornis celeripes* from the type locality in the Brule formation of the Upper Oligocene, near Torrington, Wyo. The new material is of especial interest for the presence of tendons from the back of the tarsus, an element infrequently preserved in fossil bird remains. The tendons in this area in the living *Cariama cristata* regularly are calcified so that they appear as firm as the tarsometatarsus with which they are associated. Their preservation in this specimen of *Bathornis* is indication of a similar condition in this genus, confirming still further the supposed relationship of the Bathornithidae with the Cariamidae.

The two fragments of humeri are of equal interest, since they constitute the first representation of this part of the skeleton in any of the four species that have been described in the Bathornithidae. The bones (pl. 4, fig. 2) have the shafts distorted by having been somewhat flattened by pressure, and the right fragment has part of the posterior surface at the articular end missing. The two, however, in combination serve to illustrate this part of the skeleton sufficiently to bear out also the assumptions of relationship of the family with the living Cariamidae of South America.

Allowing for the distortion mentioned, the size of the humeri is approximately that of larger specimens of *Cariama cristata* of the Cariamidae, and the general appearance, particularly the outline, is similar to that species. The ulnar trochlea is about as long as that of *Cariama*, but the bulk is less. The radial trochlea does not appear

to differ. These details are shown in the drawings (pl. 4, fig. 2). Aside from this there is little that may be said as to characters because of uncertainties due to distortion. Also because of this distortion it has not seemed desirable to give detailed measurements, as these might be misleading.

The two humeral fragments were found with the leg bones in such a way that they are supposed to have come from the same individual bird. This is indicated also by the size, since they have the dimensions, with due allowance for crushing, to be expected in *Bathornis celeripes*. The species *Bathornis cursor* Wetmore, found associated with *B. celeripes* in the Oligocene deposits at Torrington, has the lower limb bones decidedly larger, so that it would be expected that the wing also would be larger.

The general impression to be derived from these wing bones verifies the earlier idea that *Bathornis* was a cursorial species that retained the power of flight but that it did not regularly utilize this. In this apparently it was like the two living species in the family Cariamidae, *Cariama cristata* and *Chunga burmeisteri*.

The drawings illustrating this note are the last made for me by my friend, the late Sidney Prentice.

III. THE CANADA GOOSE IN THE PLEISTOCENE OF MINNESOTA

The Canada Goose, *Branta canadensis* (Linnaeus), distributed across the continent in the present day, seems to have had equally wide range for a long period of time, since its bones have been reported from Pleistocene deposits in Oregon, California (including offshore Santa Rosa Island), and Florida, and from beds of supposed Pleistocene age in Nevada. As an additional, interior, link between the western and the southeastern localities it is of interest to report the occurrence of the species at St. Paul, Minn. The record is based on the distal end of a right ulna, sent to me for identification by Scott K. Wright of that city. Mr. Wright reports that the bone was found at the bottom of a large trench dug by the City Water Department in an ancient peat bog. Bones of the Pleistocene *Bison occidentalis* came from the same trench, though it is noted that there were also other remains identified as the modern *Bison bison*. While the goose bone was not encountered in place, having been found, as stated, in the bottom of the trench, Mr. Wright believes it to be of Pleistocene age. This conclusion is substantiated by the condition of the bone, which has lost all free animal matter, in addition to having the dark brown discoloration usual to specimens found in peat de-

posits. The occurrence of *Bison bison* should not preclude a late Pleistocene age so that it appears proper to record the occurrence as Pleistocene.

IV. THE IDENTITY OF THE PLEISTOCENE CRANE *GRUS PROAVUS* MARSH

Grus proavus was named by Marsh (1872, p. 261) from "Post-pliocene deposits of Monmouth County, New Jersey," on the basis of "a nearly perfect sternum, a femur, and a few other less important remains, which are probably all parts of the same skeleton." The brief original description has been the only source of information on this fossil bird to date, since while the type material was listed as "in the collections of the Yale Museum," subsequently it could not be found in the Peabody Museum of that institution. In fact, it was recorded by Shufeldt (1915, pp. 65, 77) as apparently lost.

It appears that Marsh was in error in ascribing the specimens to "the Yale Museum," since William F. Rapp, Jr. (1944, p. 218) found in the paleontological collections at Princeton University an avian sternum marked "*Grus proavus*," which was appropriate in size to match Marsh's description. Subsequently, a femur came to light that also matched Marsh's description, so that Dr. Glenn L. Jepsen reached the definite conclusion that these two bones were the important parts of the original type material. More recently Dr. Donald Baird has confirmed this belief, a decision in which I am fully in accord. When Dr. Baird mentioned the matter to me recently I asked to see the bones, a privilege that Dr. Jepsen has kindly accorded me. The two specimens are illustrated, natural size, in the accompanying plates.

The sternum, now Princeton University Department of Geology No. 16258, bears the ancient marking printed in ink "*Grus proavus* N.J." While Marsh noted it as "a nearly perfect sternum" the bone has suffered somewhat with the passage of years as the posterior end and much of the keel are missing, and part of what remains has been broken and repaired. It is fortunate that the main portion, including the anterior end, is intact as this part furnished the dimensions published in the original description. Marsh gives these as follows:

Width of sternum between outer ends of coracoid grooves....	45 mm.
Width of sternum at middle.....	39
Distance between coracoid grooves.....	5

These sizes check exactly in the specimen at hand. The color of the bone is dull earthy brown. While it is not mineralized there is no indication of organic material other than the bony structure itself. Though much of the keel is missing, the basal part of the anterior cavity that originally held the tracheal loop is intact, except for a small irregular hole in the bottom, as are the costal margins, and the anterior end, barring a few minor breaks. Apparently the specimen was never washed, as a few flakes of somewhat sandy soil, blackish in color, still cling closely to irregularities on the under surface at the anterior end.

Marsh's statement as to the characters by which the sternum may be separated from that of the living sandhill crane does not hold. He wrote that his specimen differs "in not having the grooves for the coracoids meet on the median line. They are in fact separated from each other by a space nearly equal to the width of the adjacent groove. The sternum is, moreover, less constricted near the middle than in *G. canadensis*." Actually, the variation in four sterna of living *Grus canadensis* of the larger subspecies (two of which are certainly subspecies *tabida* while the third, without locality, is assumed to be the same) covers completely the form found in the fossil.

The femur, catalog No. 16528-A, is lettered "N.J." in the same hand as the sternum. This bone lacks the anterior articular head and neck with adjacent parts, but is otherwise complete. The texture of the bone is like that of the sternum, while the color is lighter brown. Marsh, in the original description wrote, "The femur differs from the corresponding bone in that species [i.e., *Grus canadensis*] mainly in having the shaft less curved: in other respects the resemblance is close." He gave the following measurements:

Length (approximate) of femur.....	126 mm.
Transverse diameter of shaft at middle.....	12.5
Transverse diameter of distal end.....	26

Here, also, the measurements are so exactly identical as to leave no question but that this bone is the actual one that Marsh had in hand. On careful comparison with the corresponding femora of three of the modern skeletons listed above, it is found again that the rather slight amount of individual variation, including the curvature of the shaft, covers the characters found in the fossil.

There is no hesitation, therefore, in assigning *Grus proavrus* Marsh as a synonym of the sandhill crane *Grus canadensis* (Linnaeus), with the observation that the fossil belongs in the category of the larger subspecies, e.g., *Grus canadensis tabida* Peters, whose modern range

has reached, casually at least, to New England, eastern New York, and the District of Columbia. Monmouth County, in east-central New Jersey, is to be added to the Pleistocene range of *Grus canadensis*.

V. PLEISTOCENE BIRD RECORDS FROM ONTARIO

Bones of birds from deposits of Pleistocene age have been found in abundance at several localities in the United States, but until now none has been reported from Canada. Recently Dr. Hugh R. Thompson of the Department of Geography at Hamilton College, McMaster University, has placed in my hands a small collection secured near Hamilton, Ontario, from a find made early in 1955 by J. N. Weber (1955, p. 2) during an investigation of rock shelters in the Hamilton area.

The bones were obtained in two small caves, located 6 feet apart, and were collected through the efforts of Dr. Thompson and his colleagues, Dr. D. M. Davies and Dr. D. E. Dalzell of the Department of Zoology, and Dr. G. V. Middleton and R. V. Best of the Department of Geology. The bone-bearing deposit consisted of sediments ranging from medium sand to raisin gravel, underlying much coarser deposits from 3 to 4 feet in depth that constituted a part of the former shoreline of Pleistocene Lake Iroquois during the period of shrinkage of that body of water. The site is at an altitude of about 275 feet above sea level, and is dated as Late Pleistocene (late Lake Iroquois). According to Dr. Thompson, the bone bed is interpreted as an inshore lake-bottom deposit that became covered with true beach material as the lake level lowered.

Four species of birds are represented, as follows:

Wood Duck, *Aix sponsa* (Linnaeus). A complete cranium, and the distal end of a right humerus. This is the first Pleistocene record of this species.

Barred Owl, *Strix varia* Barton. The shaft of a left humerus. This owl has been found previously in Pleistocene deposits at several localities in Florida.

Red-winged Blackbird, *Agelaius phoeniceus* (Linnaeus). A complete left ulna. The species has been identified from the Pleistocene of Florida.

Common Grackle, *Quiscalus quiscula* (Linnaeus). A sternum nearly complete. The grackle also has been found in Pleistocene beds in Florida.

Mammal remains associated with the birds are more abundant, the following 10 species having been identified by Dr. Charles O. Handley, Jr.:

- Short-tailed shrew, *Blarina brevicauda* Say.
- Chipmunk, *Tamias striatus* (Linnaeus).
- Gray squirrel, *Sciurus carolinensis* Gmelin.
- Red squirrel, *Tamiasciurus hudsonicus* (Erxleben).
- Flying squirrel, *Glaucomys sabrinus* (Shaw).
- White-footed mouse, *Peromyscus* sp.
- Meadow mouse, *Microtus pennsylvanicus* (Ord).
- Pine mouse, *Pitymys pinetorum* (LeConte).
- Muskrat, *Ondatra zibethicus* (Linnaeus).
- Red fox, *Vulpes fulva* (Desmarest).

There are also part of the jaw of a frog (*Rana* sp.) and vertebrae of a colubrid snake, identified by Dr. Doris M. Cochran, a few bones of a pickerel (*Esox* sp.), determined by Dr. Leonard P. Schultz, and two snails, *Mesomphix* (*Omphalina*) *cupreus* (Rafinesque), identified by Dr. Harald Rehder.

The material is preserved in the collections of the U.S. National Museum, through the kindness of Dr. Thompson.

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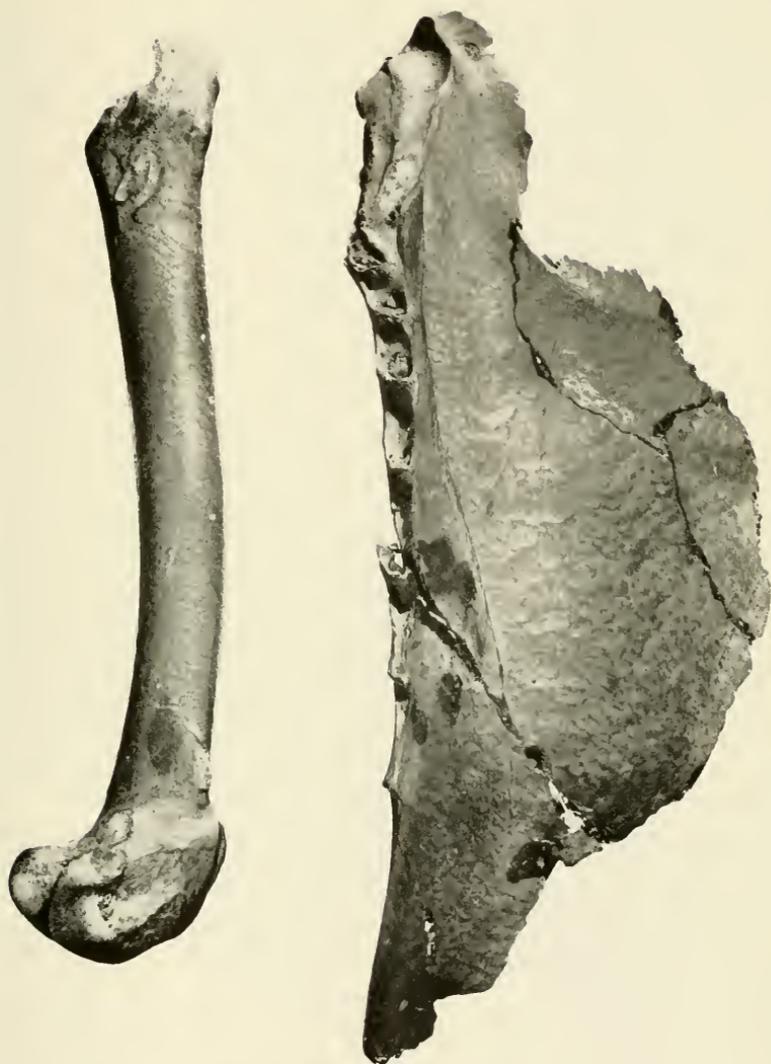
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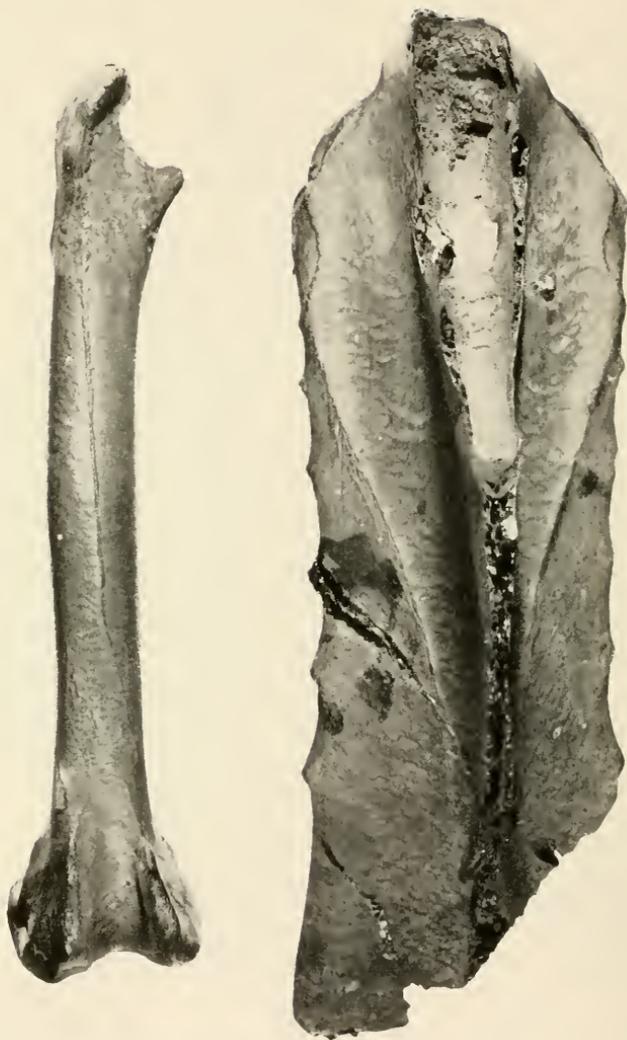
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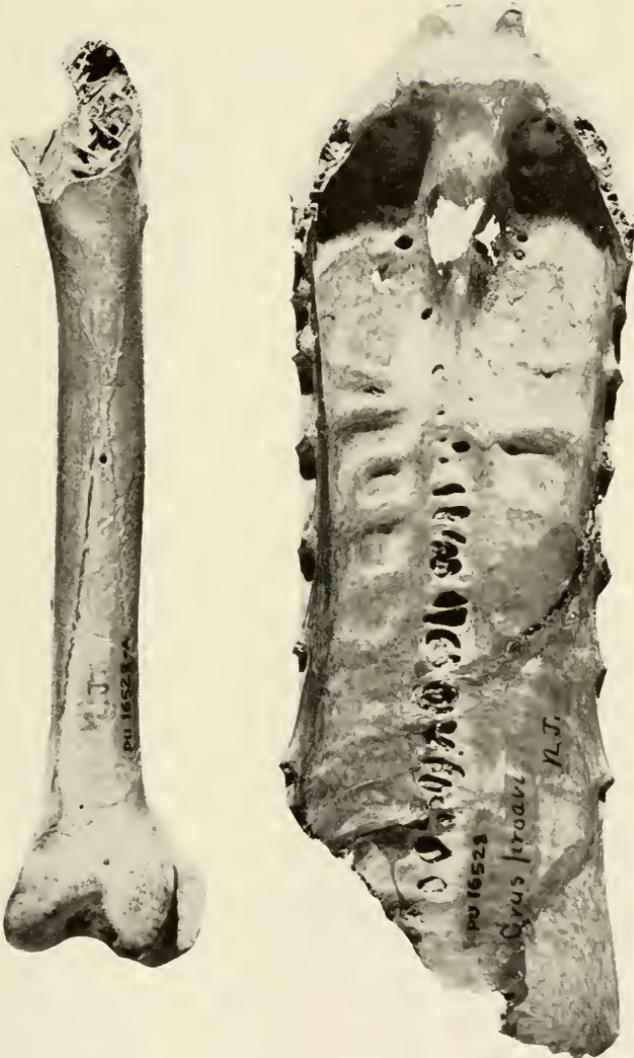
PLATES



Cotypes of *Grus proavus* Marsh, lateral view, about natural size.



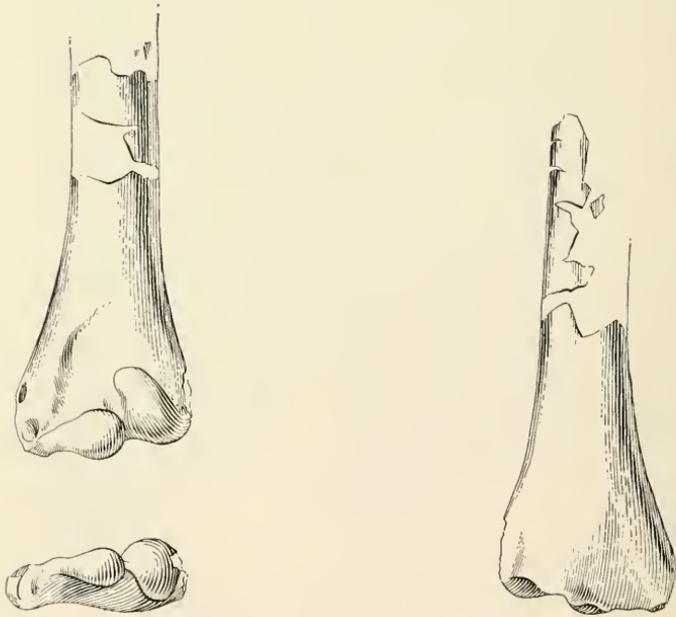
- Cotypes of *Grus proazus* Marsh, ventral view, about natural size.



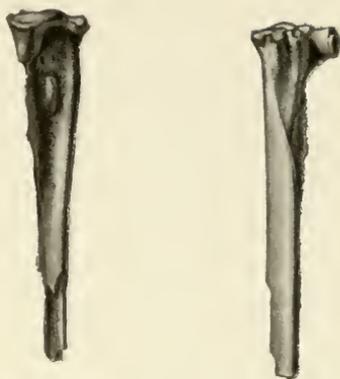
Cotypes of *Grus proavis* Marsh, dorsal view, about natural size.



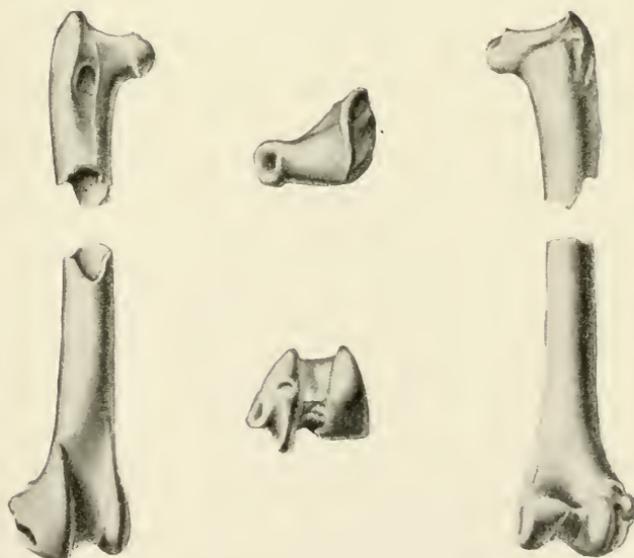
1. Cotyles of *Grus proavus* Marsh, anterior view, about natural size.



2. Humerus of *Bathornis celeripes* Wetmore, about natural size.



1. Type of *Promilio brodkorbi*, about natural size.



2. Type of *Promilio cpileus*, about natural size.