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PLIOCENE BIRD REMAINS FROM IDAHO

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During the field seasons 1929 to 1931 the Smithsonian Institution has carried on paleontologic explorations near Hagerman, Idaho, which have yielded a most remarkable collection of fossil horse bones, a few other mammalian remains, and scattered bones of other vertebrates. The beds in which this material occurred were brought to attention in 1928, when Dr. Harold T. Stearns, of the United States Geological Survey, during geologic studies in this area, was told of fossil deposits by Mr. Elmer Cook, a local resident. Dr. Stearns obtained from Mr. Cook a small collection of fossilized bones, and this collection, forwarded through the Geological Survey to the United States National Museum for examination, appeared so promising that the following June the late Dr. J. W. Gidley, assistant curator of mammalian fossils in the National Museum, went to Hagerman and made preliminary collections. These indicated that the deposits constituted one of the important discoveries in vertebrate paleontology in recent years, so that in May 1930 Dr. Gidley again visited the site to continue work for the summer. The following year field-work was pursued under the direction of Norman H. Boss, chief preparator in the division of vertebrate paleontology of the National Museum.¹ The resulting collections from 3 years of effort include one of the most remarkable known series of fossil horse bones, of a species named by Dr. Gidley *Plesippus shoshonensis*.²

The fossil-bearing beds are in what is known as the Hagerman Lake beds. Although regarded by earlier authorities as Pleistocene, Stearns, through his detailed studies of this area, has placed these beds in the Upper Pliocene, in which conclusion he is supported by Gidley.³

The principal quarry from which the fossil horse material was obtained is located in the face of the slopes lying above Snake River

¹ See Explorations and Field-Work of the Smithsonian Institution in 1931, Smithsonian Publ. 3134, 1932, pp. 41-44, figs. 35-39.

² Journ. Mamm., 1930, p. 301.

³ For an account of Gidley's field-work in this area see Explorations and Field-Work of the Smithsonian Institution in 1929, Smithsonian Publ. 3060, 1930, pp. 31-34; idem, in 1930, Smithsonian Publ. 3111, 1931, pp. 33-40.

about 2 miles in an airline west of Hagerman, the exact locality being NW $\frac{1}{4}$ Sec. 16, T. 76, R. 13 E. The elevation is about 400 feet above the level of Snake River. According to Gidley,

the bone deposit was evidently at the time of its formation a boggy, springy terrain, perhaps a drinking place for wild animals. . . . This assumption is based on the general character of the deposits as stated, and the fact that it contains the bones of literally hundreds of animals, mostly belonging to an extinct species of horse. For the most part the bones are disarticulated, intermingled, and scattered in a way to suggest that they represent the slow accumulation of many years rather than the sudden overwhelming of a large herd in one grand catastrophe. Springs and swampy conditions are indicated from the fact that there are in the deposits the remains of frogs, fish, swamp turtles, beavers, and other water living animals, and abundant evidence of vegetation.

The bones were found mainly in unconsolidated beds of sand and gravel.

Considering the nature of these deposits and the large numbers of parts of other animals present, remains of birds are few, only two bird bones coming from the main quarry—a fragment of a swan humerus collected by Gidley and a bit from a pelican collected by Boss.

For bird remains, a locality about 3 miles south of the fossil quarry described above is of more importance, as Gidley, assisted by S. P. Welles and Elmer Cook, obtained there in June 1930 a number of fragmentary specimens. These were labeled by Gidley as "from about 200 feet above level of Snake River and estimated to be about 200 feet below horizon of fossil horse (*Plesippus shoshonensis*) quarry". The deposit is Upper Pliocene. Additional specimens were collected subsequently at this point by Elmer Cook.

It is unfortunate that the majority of these specimens are not more complete, as a highly interesting avifauna is indicated; but with most of the species represented so indefinitely that they cannot be described their generic affinities are uncertain. To assign them names at this time would only give rise to uncertainty in subsequent work, so that they are listed with whatever discussion seems pertinent in the hope that further specimens may come to hand.

Two additional specimens of the large *Cygnus* come from a locality designated as Canyon 9, 5 $\frac{3}{4}$ miles south of the main quarry, and at the same level as the fossil horse deposit.

Subsequent to the field-work outlined additional specimens have been obtained from time to time from Mr. Cook, who found them in scattered areas south of the main quarry. Occurring also in Upper Pliocene deposits, these include fragmentary remains of several aquatic species of considerable interest.

The assemblage of birds is wholly of species of aquatic habit, thus bearing out Gidley's belief that the deposits were formed in bogs or swampy areas.

A detailed discussion of the birds identified follows. Drawings illustrating this report have been made by Sydney Prentice.

ANNOTATED LIST

Order COLYMBIFORMES

Family COLYMBIDAE. Grebes

COLYMBUS sp.

The distal end of a left humerus (U.S.N.M. no. 12825) was found by Elmer Cook in October 1930 at a site 6 miles south of the main quarry and about 300 feet above the level of the river. The specimen is identical in form with living *Colymbus nigricollis* and *C. auritus*, these two being identical in conformation and also indistinguishable in size in the part concerned.

Colymbidae

The head of a femur (U.S.N.M. no. 12242) from the deposit 3 miles south of the *Plesippus* quarry and 200 feet above Snake River comes from a grebe, intermediate in size between the horned and the Holboell's grebe, that differs in its details from any of the genera of the family Colymbidae found in North America today. It seems to represent a distinct genus and certainly an unknown species but is considered too fragmentary to name at present.

Order PELECANIFORMES

Family PELECANIDAE. Pelicans

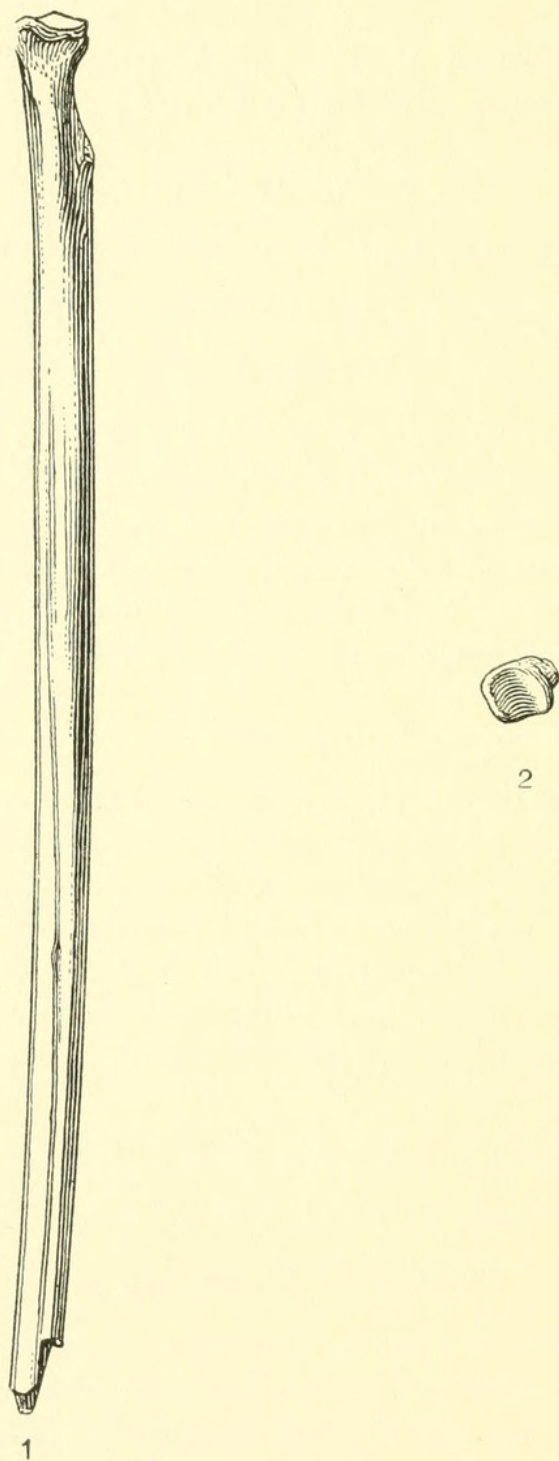
PELECANUS HALIEUS sp. nov.

Characters.—Radius (figs. 1, 2) similar in form to that of modern *Pelecanus erythrorhynchos* Gmelin⁴ but much smaller; slightly smaller than modern *Pelecanus occidentalis occidentalis* Linnaeus,⁵ with bicapital tubercle located nearer to head.

Type.—U.S.N.M. no. 12233, proximal portion of right radius, collected July 20, 1931, by Norman H. Boss, from Upper Pliocene

⁴ *Pelecanus erythrorhynchos* Gmelin, Syst. Nat., vol. 1, pt. 2, 1789, p. 571.

⁵ *Pelecanus Onocrotalus* β *occidentalis* Linnaeus, Syst. Nat., ed. 12, vol. 1, 1766, p. 215.



FIGS. 1-2.—Type of *Pelecanus halieus*, natural size. The smaller drawing depicts the distal end of the bone.

deposits of the Hagerman Lake beds, in the NW $\frac{1}{4}$ Sec. 16, T. 76, R. 13 E., about 2 miles west of Hagerman, Idaho.

Description.—Head quadrilateral in general outline, with angles rounded; humeral facet well depressed; ulnar facet slightly rounded, with head projecting at this point beyond line of shaft; ligamental papilla strong, projecting as a shelf below level of head; bicipital tubercle located only a short space below head, forming a sharp-angled ridge of slight prominence; shaft moderately strong, somewhat inflated below head, flattened slightly from side to side at first, with a marked projection forming a ridge on outer aspect below head; beyond this the shaft becomes somewhat trihedral in outline, with the side facing the ulna more flattened, and then assumes a more rounded form; shaft with a strong sigmoid flexure.

Measurements.—Transverse diameter of head at right angles to ligamental papilla 7.5 mm; transverse diameter of head through and including ligamental papilla 9.5 mm; distance from center of bicipital tubercle to margin of humeral facet 7.0 mm; transverse diameter of shaft near center 6.8 mm.

Remarks.—The radius, while susceptible of identification in dealing with fossil or modern birds, ordinarily is a bone with such slight differential characters that I have usually considered it of doubtful value in determining the identity of species where other material corroborative of the identification was lacking. The specimen used here as a type, though laid aside with scant attention when first brought to me, to my surprise has on study proved to be so characteristic that it serves to establish an extinct form without the slightest doubt or confusion. It is therefore used as the basis for a new name.

In outline this bone is a diminutive replica of the corresponding part in the American white pelican, common today in the general area under discussion. It differs distinctly from the salt-water-inhabiting brown pelicans, in which the bicipital tubercle is located relatively farther below the head. In size *Pelecanus halieus* is slightly smaller than the West Indian race of *P. occidentalis*. Resemblance to the white pelican, except for its smaller dimensions, is remarkably close, so that there is the distinct impression that the bird is closely related to *P. erythrorhynchos*.

Family PHALACROCORACIDAE. Cormorants

PHALACROCORAX IDAHENSIS (Marsh)

Graculus idahensis Marsh, Amer. Journ. Sci., ser. 2, vol. 49, 1870, p. 216.

The distal portion of a left ulna (U.S.N.M. no. 12240) was collected in 1930 about 200 feet above Snake River and the same distance

below the fossil horse horizon. The specimen comprises about one third of the bone.

The type specimen of this cormorant is the proximal end of a right metacarpal, including about one half the bone, preserved with other material in the Marsh collection in the Peabody Museum at Yale University. Through the kindness of Dr. Malcolm R. Thorpe, an excellent cast of this type has been available for study, which has made possible proper consideration of its characters and relationships. In general, this type is similar to the metacarpal in modern *Phalacrocorax auritus* but is decidedly larger, being larger, in fact, than any living cormorant. It is about equivalent in size to the extinct Pallas's cormorant, *Phalacrocorax perspicillatus*, from Bering Island, differing from this species in being more slenderly, less heavily, molded.

The fragmentary ulna here under discussion is distinctly larger than that of living cormorants, though not quite as heavy as in *P. perspicillatus*. On this basis of relative proportion it is identified as *P. idahensis*. Its characters in general, aside from dimensions, are those of other cormorants, except that the carpal ridge is somewhat longer. This find represents the second known occurrence of this species.

In the original description Marsh states that his type of *idahensis* "is from a fresh-water Tertiary deposit, probably of Pliocene age, on Castle Creek, Idaho Territory". Dr. O. P. Hay⁶ places this locality in the Pleistocene, stating in the last reference given that it is from the Nebraskan stage. On this basis *P. idahensis* was listed as from the Pleistocene in the third and fourth editions of the "Check-list of North American Birds" prepared by committees of the American Ornithologists' Union. Dr. Harold T. Stearns, of the United States Geological Survey, who has done extensive work on the geology of this general area, informs me, however, in recent correspondence that the deposits at Castle Creek are correlative with the Hagerman beds or possibly older. This would place them in the Pliocene, so that *Phalacrocorax idahensis* should be allocated to the Pliocene, instead of to the Pleistocene as generally accepted at present.

PHALACROCORAX AURITUS (Lesson)

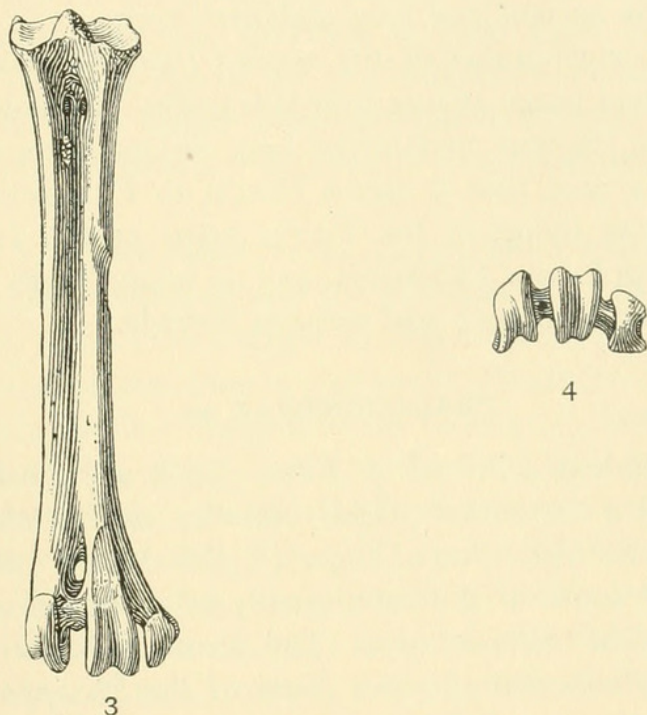
Carbo auritus Lesson, Traité d'Orn., Livr. 8, June 11, 1831, p. 605.

A right metatarsus (U.S.N.M. no. 12239), complete except for slight wear on the margins of its various processes, was obtained in

⁶ Bull. U. S. Geol. Surv. 179, 1901, p. 533; and Carnegie Inst. Washington, Publ. 322, 1923, p. 8.

the same locality as the specimen identified as *Phalacrocorax idahensis*, about 3 miles south of the fossil horse quarry, 200 feet above the present level of Snake River, and the same distance below the fossil horse horizon. The specimen, like various others with which it was found, has a slightly porous surface but is well preserved.

The association of this specimen with the fragmentary ulna identified as *Phalacrocorax idahensis* immediately suggested that it might be that species. The relative proportions, however, are such as to indicate with certainty that this metatarsus comes from a much smaller bird.



FIGS. 3-4.—Metatarsus of *Phalacrocorax auritus* from a Pliocene specimen, natural size.

so small that it must be considered as belonging to an entirely different species.

On careful comparison this metatarsus (figs. 3-4) is found to be identical with that of the existing double-crested cormorant. It is somewhat more slender than many individuals but is equalled in this respect by some specimens of the modern bird. Its contours are so exactly those of the existing species that there can be found no basis whatever for separating it as a distinct form.

While it is commonly recognized that numerous fossils indistinguishable from living species and therefore identified as representing modern birds occur in Pleistocene deposits, it may at first glance seem dubious or even impossible to carry this same procedure back into the Pliocene. The writer has in recent years expressed the belief

that our modern avifauna, in so far as its various species is concerned, has had its period of origin and evolution in the Tertiary period, with such changes as have since occurred confined to the minor differences that characterize geographic races or subspecies, these being expressed in color and in slight variations in size. As his work with the avian life of the past proceeds, he has become more and more convinced of these facts. It is therefore only natural to suppose that representation of various modern species will be found in Pliocene deposits as more remains of birds from such horizons are discovered. This may be expected especially among such groups as the cormorants, which appear to be of ancient and long stabilized type.

The modern cormorants of the species *Phalacrocorax auritus* are divided in current usage among four subspecies. Without any attempt to identify the Pliocene metatarsus here discussed as to geographic race, it may be said that it seems closest to *Phalacrocorax auritus albociliatus*, now living in the Pacific coast region from northern Oregon south to Lower California, and on inland lakes from Oregon and Utah south to Arizona and western Nevada.

PHALACROCORAX sp.

Among specimens collected by Elmer Cook are the heads of two coracoids from a cormorant slightly smaller and slenderer than the average for *P. auritus*. One of these (U.S.N.M. no. 12827) was obtained $5\frac{1}{2}$ miles south of the main quarry at an elevation of 400 feet above the river in October 1930. The second specimen (U.S.N.M. no. 12828) was collected $4\frac{1}{2}$ miles south of the *Plesippus* quarry and 350 feet above the stream. These appear to represent a third species of cormorant from this Pliocene locality.

Order ANSERIFORMES

Family ANATIDAE. Ducks, Geese, and Swans

CYGNUS sp.

The material collected in 1930 from the locality 200 feet above Snake River, and the same distance below the fossil horse horizon, includes the head of a metacarpus and the shaft of a metatarsus of a swan having the approximate size of the modern whistling swan, *Cygnus columbianus*. The specimens (U.S.N.M. no. 12238) are worn and broken and cannot be specifically identified. The head of a scapula (U.S.N.M. no. 12830), considerably worn, collected by Cook in November 1930, $5\frac{3}{4}$ miles south of the main quarry and 400 feet

above the river, and another similar fragment (U.S.N.M. no. 12826) obtained by Welles 3 miles south of the main quarry opposite Two-mile Rapids on Snake River are also similar in size to this species.

CYGNUS sp.

Remains of a swan about as large as the modern trumpeter swan, *Cygnus buccinator*, are fairly abundant in the collection here under discussion but are all in such fragmentary condition as to make an attempt at specific identification inadvisable.

A small section of the lower end of the shaft of a right humerus (U.S.N.M. no. 12234) was collected in June 1930 from the main *Plesippus* quarry, being one of the few bird bones obtained from that excavation. This bone differs from the humeri of modern swans examined in having the brachial depression located nearer the external margin.

The locality 200 feet above Snake River, from which the smaller swan was obtained, produced also the proximal ends of two scapulae (U.S.N.M. no. 12243) of a larger species that should be mentioned here. They are about the same in size as the trumpeter.

From another locality designated as Canyon 9, located $5\frac{3}{4}$ miles south of the main *Plesippus* quarry, at the same level as that deposit, there were obtained the proximal ends of two metacarpals more or less fragmentary and worn (U.S.N.M. no. 12236). One of these is slightly larger than the other, the difference probably being individual. A specimen (U.S.N.M. no. 12824) identical with these was collected in a locality indicated as Canyon 8, 5 miles south of the main quarry at an elevation of 200 feet above the river.

CHEN PRESSA sp. nov.

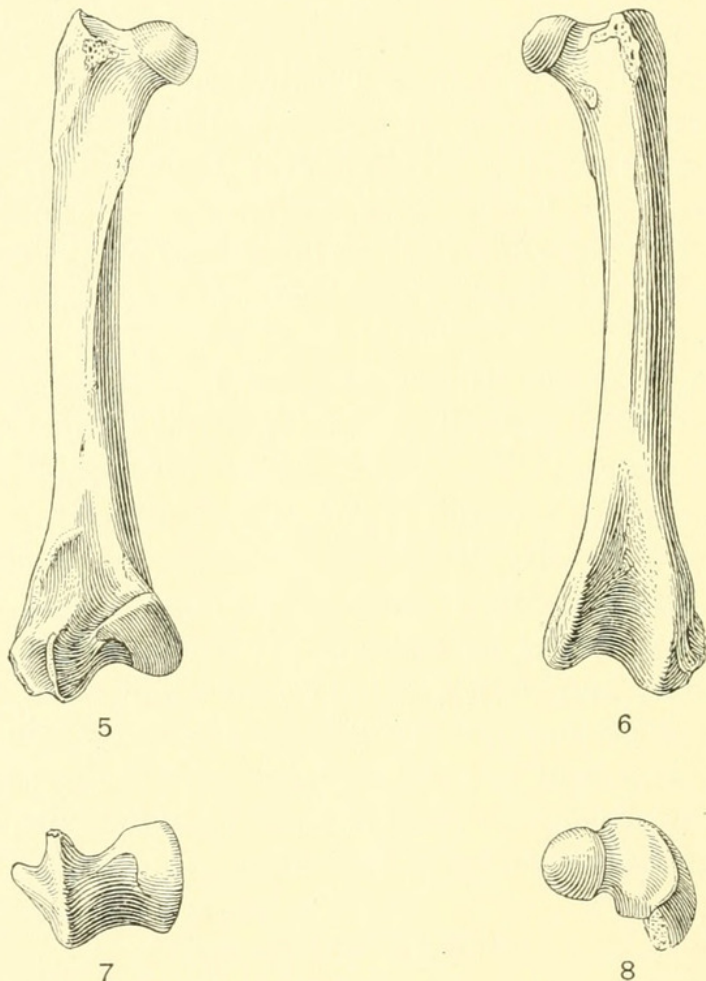
Characters.—Femur (figs. 5-8) similar in form to that of *Chen hyperborea* (Pallas)⁷ but smaller; neck shorter, so that the space between the trochanter and the head is decidedly reduced.

Type.—U.S.N.M. no. 12823, left femur, collected in February 1931 by Elmer Cook from Upper Pliocene deposits of the Hagerman Lake beds 1 mile south of *Plesippus* quarry and 350 feet above level of Snake River, near Hagerman, Idaho.

Description.—Head with upper free surface hemispherical (outer surface somewhat broken), indented slightly for the attachment of the round ligament, lower free margin undercut; iliac facet broad and nearly plane; trochanter prominent (partly broken away), approach-

⁷ *Anser hyperboreus* Pallas, Spic. Zool., vol. 1, fasc. 6, 1769, p. 25.

ing very near to head and forming an abrupt right angle with the neck, the neck being appreciably shortened; obturator ridge strong and prominent; trochanteric ridge well developed; a strong, sharply ridged linea aspera from below the head down the posterior (lower) surface of the shaft, becoming flattened and disappearing after traversing about three fourths of the length; a nutrient foramen near its



FIGS. 5-8.—Four views of the type of *Chen pressa*, natural size. The smaller drawings represent the proximal and distal ends respectively.

lower end on the posterior face of the shaft; another linea aspera, less elevated, but strongly marked, on anterior surface extending down from the trochanteric ridge for about two thirds the length; shaft strong, straight, somewhat swollen at either end, cylindrical in the center and flattened slightly anteroposteriorly at proximal and distal extremities; fibular condyle well developed (external surface partly broken away) with a flattened fibular groove; external condyle strongly ridged; internal condyle heavily sculptured, flattened on articular surface, rising abruptly from the popliteal area; inter-

condylar fossa broadly open, leading anteriorly into a broad rotular groove. Bone brownish white, varying to slate or dull white at the extremities and along shaft; strongly fossilized.

Measurements.—Total length 66.9 mm, transverse breadth through head 15.4 mm, transverse breadth of shaft at center 6.7 mm, transverse breadth through condyles 16.5 mm.

Remarks.—The type femur is about the size of the corresponding bone of the emperor goose, *Philacte canagica*, which may be taken as some criterion of the relative size of the new species. In the arrangement of the various tubercles on the shaft and in other particulars it agrees with *Chen* and differs from *Branta*, being closely similar, except as indicated above, to the modern snow geese. It represents an interesting addition to our steadily increasing list of fossil birds.

QUERQUEDULA sp.

In material collected by Elmer Cook there is the distal end of a humerus (U.S.N.M. no. 12829) obtained February 11, 1931, in Canyon 3, 1½ miles south of the main quarry and 350 feet above the river, that represents a teal of this genus, being equal in size to males of *Querquedula discors* and *Q. cyanoptera*.

The upper section of a coracoid (U.S.N.M. no. 12833) secured in 1932, about 3 miles south of the *Plesippus* quarry and about 200 feet lower, agrees also in form and size with this genus, having the head slightly heavier than in *Nettion*, which is about equal in size.

Anatidae

In material associated with the cormorant bones from a locality 3 miles south of the *Plesippus* quarry there is the distal end of a metatarsus and the head of a humerus (U.S.N.M. no. 12241) belonging to this family that cannot be certainly identified. They represent birds about the size of the blue-winged teal; the two may possibly come from one species, though this is not certain. They cannot be allocated to any genus on the basis of present information.

The distal end of a tibio-tarsus (U.S.N.M. no. 12831) obtained by Cook about 3 miles south of the main quarry comes from another species of duck about the size of a shoveller but having the intercondylar sulcus broader than in that species. It is so worn that it cannot be certainly identified.

Order GRUIFORMES

Family GRUIDAE. Cranes

Among miscellaneous fragments from a locality "about 3 miles south of Smithsonian Hill", *i. e.*, from the *Plesippus* quarry, there is a section of the premaxilla of a crane (U.S.N.M. no. 12235) that is as large as the whooping crane, *Grus americana*. This specimen seemingly represents a peculiar type of this family, as the groove on the lower surface is unusually narrow, owing to the approximation of the projecting overhanging walls on either side.

Family RALLIDAE. Rails, Coots, and Gallinules

GALLINULA CHLOROPUS

The distal end of a right tibio-tarsus (U.S.N.M. no. 12822) was found November 8, 1930, by Elmer Cook in Canyon 9, $5\frac{1}{2}$ miles south of the main quarry at a level 400 feet above the river. This specimen agrees in size with males of the modern Florida gallinule, being closely similar to U.S.N.M. no. 318852 male, from Île à Vache, Haiti. While *Fulica* and *Gallinula* are closely similar in this part of the skeleton and in some individuals cannot be separated, this specimen shows the narrowed intercondylar sulcus and the form of the posterior articular surface characteristic of well-marked tibio-tarsi of *Gallinula*. Some modern birds have the intercondylar sulcus broader, but as indicated above this fossil is identical with at least one modern skeleton at hand.

The identification of this bone carries this species back into the Pliocene; it has been recorded previously as fossil from the Pleistocene of the Seminole Field and Itchtucknee River, Florida.

Rallidae

The distal end of a tibio-tarsus (U.S.N.M. no. 12237) from the deposit 3 miles south of the fossil quarry, and 200 feet above Snake River, is distinctly ralline in form, but from the fragment at hand cannot be definitely allocated except to state that it represents either a coot (*Fulica*) or a gallinule (*Gallinula*)—probably the former. It comes from a bird about one half or less the size of the modern American coot.

Another species of this family, represented by a fragment of a metacarpal intermediate in size between the sora (*Porzana carolina*) and the king rail (*Rallus elegans*), was collected by Elmer Cook in 1932 at a point about 3 miles south of the *Plesippus* quarry, and 200 feet lower in elevation (U.S.N.M. no. 12832). The specimen is too fragmentary to be definitely identified.



Wetmore, Alexander. 1933. "Pliocene bird remains from Idaho." *Smithsonian miscellaneous collections* 87, 1–12.

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