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A new genus of tiny condor from the Pleistocene of Brazil (Aves: Vulturidae)

Herculano M. F. Alvarenga and Storrs L. Olson

(HA) Museu de História Natural de Taubaté, Rua Colombia 99, Jardim das Nações, Taubaté SP, CEP 12030-520, Brazil
(SLO) Division of Birds, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560, U.S.A.

Abstract.—A new genus and species of Vulturidae (Cathartidae auct.), *Wingegyps cartellei,* is described from Pleistocene cave deposits in the states of Bahia and Minas Gerais, Brazil. This species is closely related to condors *Gymnogyps* and *Vultur,* particularly the former, as opposed to the smaller cathartid vultures, but is much smaller, being slightly smaller than the smallest living member of the family, the Lesser Yellow-headed Vulture *Cathartes burrovianus.* The Vulturidae appears to consist of two basic divisions (condors vs. other vultures) that differ profoundly in the morphology of the skull. Each appears to have been more diverse in the past and to contain larger or smaller species than survived to the present.

Resumo.—Um novo gênero e nova espécie de Vulturidae (Cathartidae auct.), *Wingegyps cartellei,* é descrito dos depósitos pleistocênicos de cavernas da Bahia e Minas Gerais, Brasil. Este é mais relacionado aos condores *Gymnogyps e Vultur,* principalmente com o primeiro, do que com os verdadeiros urubus, embora seja de tamanho reduzido, menor ainda que *Cathartes burrovianus,* o menor membro vivente da família. Os Vulturidae se constituem de dois grupos basais, condores e urubus, que diferem entre si basicamente pela morfologia do crânio (o tamanho não é fundamental), sendo que ambos parecem ter sido bastante diversificados no passado.

Peter Wilhelm Lund was a Danish naturalist who resided in Brazil from 1832 until his death in 1880. Between 1835 and 1849 he shipped masses of Quaternary fossils from the state of Minais Gerais back to Denmark for study (Voss and Myers 1991). The great majority of these fossils were of mammals, including extinct megafauna, but also rodents and bats (Voss and Myers 1991, Czaplewski and Cartelle 1998, Cartelle 1999).

The mammals were originally studied by Herluf Winge, who published his exceptionally perceptive findings in a series of volumes entitled *E Museo Lundii* from 1887 to 1915. The study of fossil birds from these deposits fell to his brother Oluf Winge (1888) who produced a list of some 126 species. Only one of these, the anatid *Chenalopex* (now *Neochen*) *pugil,* was named as new, and many were referred to modern taxa. Others could not be assigned either for lack of comparative material or because Winge considered them probably to represent unknown species that he left unnamed.

Among the last was a vulture that Winge (1888: 33) regarded as probably belonging to a new genus and species ("G. sp. indet. magnitudine *Catharistae atrati*" [= *Coragyps atratus*]). This was represented by the distal end of a humerus and an ulna lacking the distal end. He described these specimens in considerable detail and illustrated

the humerus in comparison with a fossil of the Black Vulture *Coragyps atratus*. Nothing further was ever made of this discovery during the succeeding 115 years.

In identifying fossil bird remains from a cave in the state of Bahia, we puzzled over a peculiar ovoid cranium that defied placement to family until we happened to notice that fossil crania of *Gymnogyps* from Rancho La Brea, California, seemed to be similar in shape, although larger. We identified two humeri from Bahia as probably belonging to the same species as the cranium, and a well-preserved distal fragment appeared to be identical to that illustrated by Winge as his unidentified new genus. We were able to borrow Winge's original material and confirmed that he was quite correct that a new genus and species is indicated. This, however, turns out not to be closely related to the smaller genera of Vulturidae,*Cathartes* or *Coragyps,* but to the much larger condors, especially *Gymnogyps.*

Comparative material examined.—Preliminary comparisons were made with almost all families of non-passerine birds and all species of South American vultures in Museu de História Natural de Taubaté. The original material of Vulturidae collected by Lund in Minas Gerais was borrowed from the Zoological Museum University of Copenhagen (ZMUC) and restudied and compared. Modern skeletons examined in the Division of Birds, National Museum of Natural History, Smithsonian Institution (USNM) included: *Gymnogyps californianus* 3369, 492447; *Vultur gryphus* 345384, 429839; *Sarcoramphus papa* 345434, 559318; *Coragyps atratus* 613353; *Cathartes aura* 490864, 612254; *C. melambrotus* 621939, *C. burrovianus* 431336, 622341.

Systematics

Class Aves
Family Vulturidae

Within the family, there is marked osteological distinction, particularly in the neurocranium, between the two living genera of condors (*Vultur* and *Gymnogyps*) on one hand, and all of the other genera (hereafter "vultures") on the other. The more salient of these were first noted by Miller and Howard (1938) and were further documented by Fisher (1944). The extinct genus and species *Breagyps clarki* was also shown to belong with the condors based on cranial characters (Miller and Howard 1938). Cranial differences were detailed and extended to additional fossil specimens by Emslie (1988). In the following comparisons, "condors" includes the new genus.

Neurocranium.—In dorsal view the neurocranium of condors is relatively longer and narrower, appearing almost ovoid in shape; the tranverse nuchal crest is visible because the attachments of the cervical musculature extend much farther dorsally than in the vultures, and the cerebellar prominence is much larger and more distinct.

In posterior view, the last two features are equally distinct. The foramen magnum is much larger and more elliptical in condors, as opposed to nearly circular in the vultures. The occipital condyle is more distinctly stalked (better seen in ventral view) and is rounded, lacking the notch in the dorso-posterior surface seen in vultures. In condors, the dorsolateral margins of the foramen magnum give rise to distinct crests that angle ventro-laterally to the extremely well developed paroccipital processes (supraoccipital processes of Suárez and Emslie 2003; opisthotic processes of Fisher 1944; postauditory processes of Miller & Howard 1938) that parallel the similarly well developed processes that angle out from the occipital condyle (occipital processes of Suárez and Emslie 2003; medial basitemporal processes of Bock 1960; exoccipital processes of Fisher 1944). In the vultures these processes were always much smaller and differently shaped.

In lateral view, the temporal fossa is much larger in condors, so that the postor-

bital and zygomatic processes are farther apart, and the orbit is relatively smaller than in the vulture.

Humerus.—Differs from *Cathartes* or *Coragyps* in having the distal end more expanded and the ectepicondylar prominence situated more distally on the shaft. *Sarcoramphus* differs in having a large pneumatic opening in the depression between the entepicondylar prominence and the ulnar condyle. The entepicondylar prominence is less developed than in *Vultur.* In almost every respect, down to the slightest detail of pneumatization, the distal end of the humerus of the new genus is a perfect duplicate in miniature of that of *Gymnogyps.* The complete humerus of the new genus is so worn as to preserve few useful characters, but it does have on the palmar surface a slightly pneumatized depression just distal to the head as in *Gymnogyps.* This depression is absent in *Cathartes,* only slightly indicated in *Vultur,* and bears a very large pneumatic foramen in *Coragyps* and *Sarcoramphus.*

Wingegyps, new genus

Type species.—Wingegyps cartellei, new species.

Diagnosis.—A tiny condor most similar to *Gymnogyps* in the narrowness and elongation of the neurocranium, but even narrower, with the braincase in dorsal view being of nearly uniform width, rather than expanding posteriorly. Muscle scars on either side of the cerebellar prominence are correspondingly narrower. The foramen magnum opens directly posteriorly rather than partly ventrally. The paroccipital processes and their associated crests are angled more ventrally than in *Gymnogyps* or *Vultur.* Differs from other condors in having the entire occipital condyle and its stalk visible in lateral view (not visible in *Breagyps,* only partially visible in *Gymnogyps* and *Vultur*).

The ulna is like that of condors and *Sarcoramphus* in having very little pneumatization in the brachial depression (well developed in *Cathartes* and *Coragyps*) but differs from all but *Vultur* in having the olecranon more distinctly set off from the margin of the internal cotyla. The olecranon is narrower, however, than in *Vultur.*

Etymology.—Winge + Greek *gyps,* vulture, in commemoration of the perspicacity of Oluf Winge for recognizing the distinctiveness of this remarkable new genus.

Wingegyps cartellei, new species
Figs. 1–4

Holotype.—Neurocranium lacking the parasphenoid rostrum and ethmoid region, with damage to the anterior margin of the frontals and left otic area, MCL CLA782 (Fig. 1B, 2B).

Type-locality.—Brazil, Bahia State, Município de Morro do Chapeu, Gruta dos Brejões (11°00′30″S, 41°26′07″W), elevation ca. 600 m.

Horizon and age.—Probably late Pleistocene or early Holocene. A radiocarbon date of 12,200 ± 120 radiocarbon years before present was obtained from a coprolite of a ground sloth from the type-locality (Czaplewski and Cartelle 1998). Associated mammals from caves in Bahia and Minas Gerais are considered to be of Pleistocene age (Cartelle 1999).

Measurements (mm) of holotype.—Total length as preserved 48.6; width at level of postorbital processes 27.5; width at level of base of zygomatic processes 29.4; greatest depth at midline 27.2; width and depth of foramen magnum; 8.9 × 8.1; width of occipital condyle 4.1

Paratypes.—Topotypes: Complete but very worn left humerus MCL CLA670 (Fig. 4C); distal third of left humerus MCL CLA1678 (Fig. 3B).

Lapa do Tiú, Minais Gerais, Brazil: distal half of right humerus ZMUC 1116 (Fig. 3A); right ulna lacking distal end ZMUC 1118 (Fig. 4A).

Measurements (mm) of paratypes.—Humeri (in the same sequence as above): total

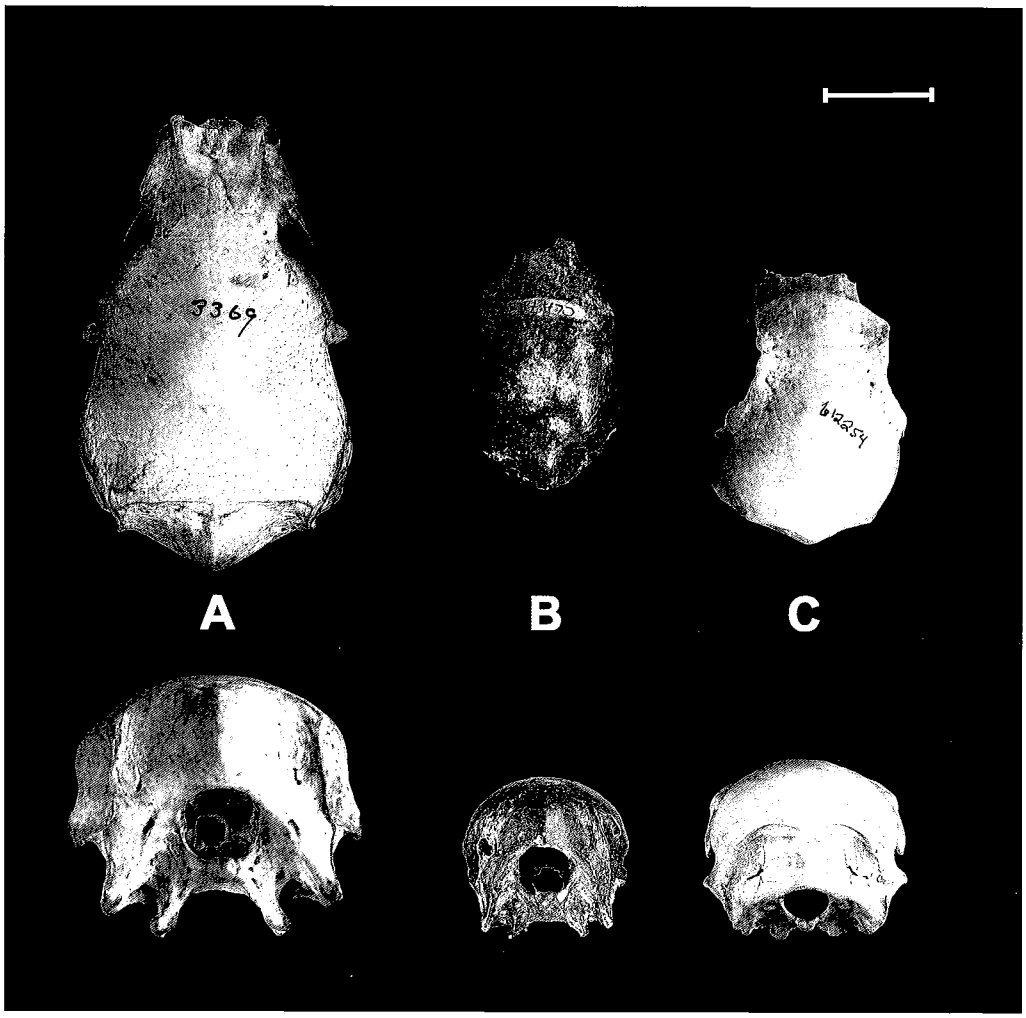

Fig. 1. Neurocrania in dorsal (top) and posterior (bottom) views: A, *Gymnogyps californianus* USNM 3369; B, *Wingegyps cartellei,* new species, holotype MCL CLA782; C, *Cathartes aura* USNM 612254. Scale = 2 cm.

length 129.5, —, —; length from head to distal end of pectoral crest 54.4, —, —; shaft width and depth at midpoint 10.0 × 8.5, —, 9.7 × 7.6; distal width —, 24.8, 23.2; greatest dimension of brachial depression 13.4; 11.7, 13.0; greatest dimension of radial condyle —, 10.8 11.1. Ulna: proximal width 12.5; proximal depth 15.8; length of brachial depression 23.4.

Etymology. Dedicated to paleotologist Cástor Cartelle of the Universidade Federal de Minas Gerais in recognition of his excavations at Gruta dos Brejoes (Cartelle 1983) and his contributions to the paleontology of Brazil.

Diagnosis—Much smaller than any known condor; slightly smaller than the smallest living cathartid vulture (Lesser Yellow-headed Vulture *Cathartes burrovianus*).

Discussion.—Wingegyps is indisputably a condor based on the very distinct features of the neurocranium and on similarities of the distal end of the humerus. Its extraor-

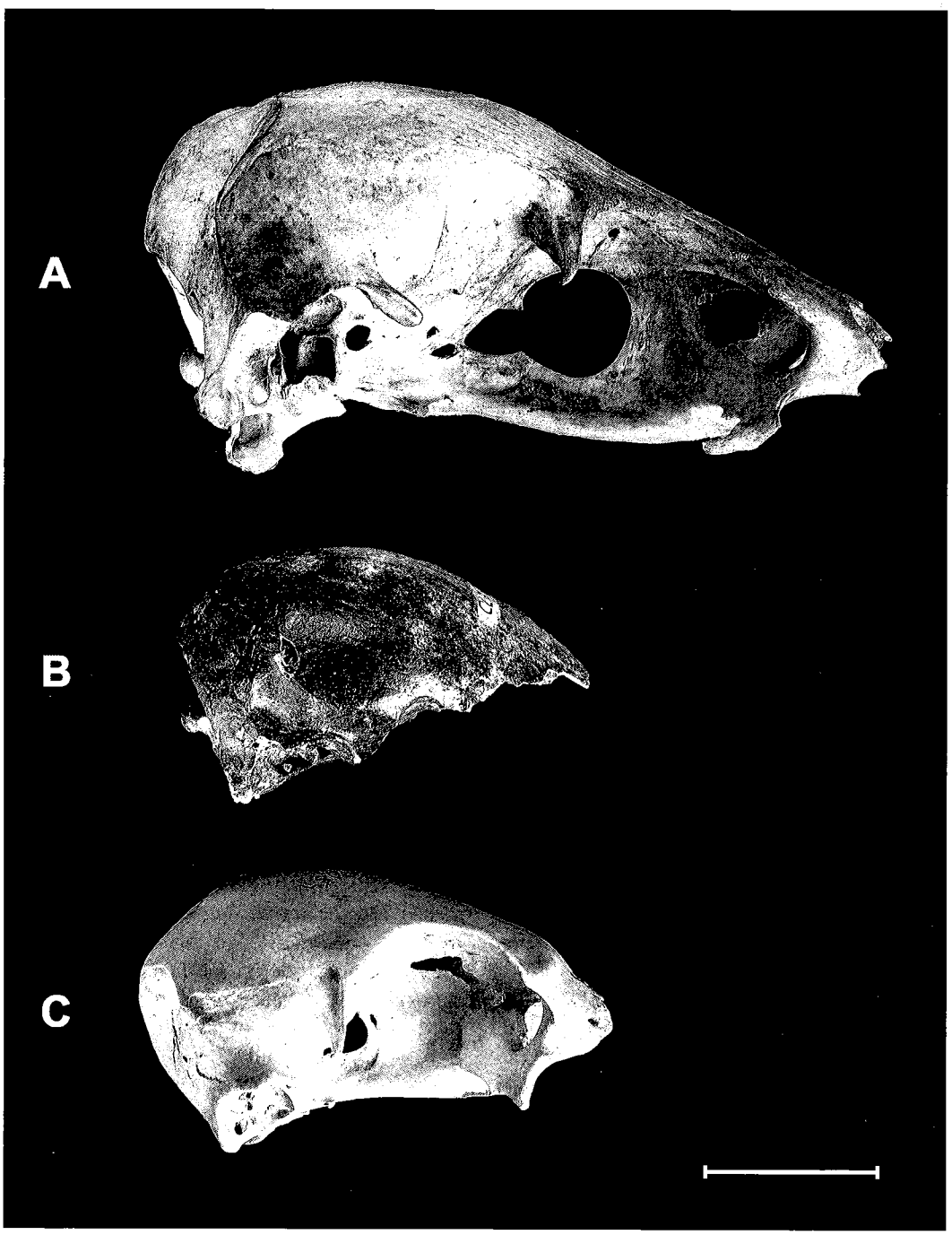

Fig. 2. Neurocrania in lateral view: A, *Gymnogyps californianus* USNM 3369; B, *Wingegyps cartellei,* new species, holotype MCL CLA782; C, *Cathartes aura* USNM 612254. Scale = 2 cm.

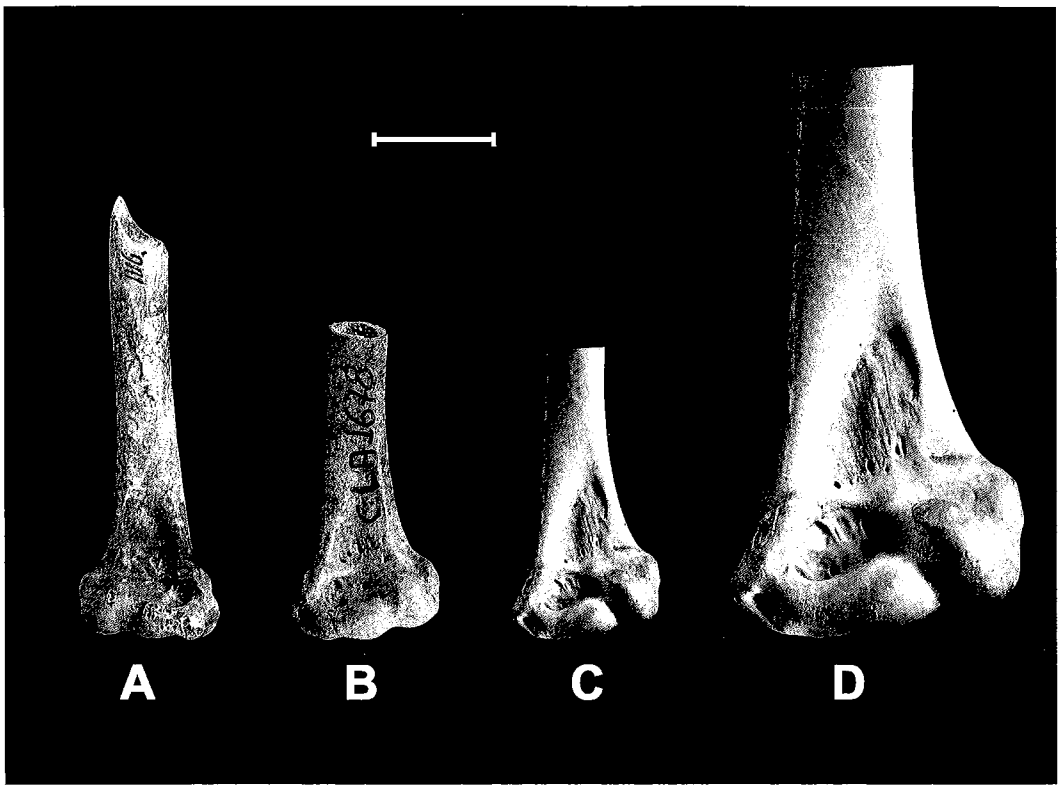

Fig. 3. Humeri in anconal view: A, *Wingegyps cartellei,* new species, paratype ZMUC 1116; B, *Wingegyps cartellei,* new species, paratype MCL CLA1678; C, *Gymnogyps californianus* USNM 492447, reduced to the same size as B; D, same natural size. Scale = 2 cm except for C.

dinarily small size is quite unanticipated, being somewhat smaller than the smallest living species of the family (*Carthartes burrovianus*). The humerus is only slightly shorter than in females of the Black Vulture *Coragyps atratus* from the tropics, which are smaller than individuals at the temperate ends of the species' range (Brodkorb 1944). But the humerus is proportionately much shorter in *Coragyps atratus* than in *Cathartes,* so that this species is otherwise much larger than *Cathartes burrovianus* (1875 g in a female *Coragyps* from Panama vs 960 g in a male *C. burrovianus* form Guyana).

Wingegyps shows that condors were much more diverse in size in the past. The family Vulturidae may be viewed as being divisible into two basic groups: the condors (*Vultur, Gymnogyps, Breagyps, Wingegyps*), which appear to be derived (Emslie 1988) and the remaining living genera (*Cathartes, Coragyps, Sarcoramphus*), which may be paraphyletic. Both may have been more diverse at one time and perhaps some of the larger fossil taxa (*Geronogyps, Pliogyps, "Sarcoramphus" kernense*—see Emslie 1988), for which cranial material is unknown, may prove to be more closely related to the assemblage of smaller vultures than to condors.

Known only from a rather limited area in eastern Brazil, *Wingegyps* doubtless had a greater range than indicated at present, possibly much greater. If it has been collected in fossil deposits elsewhere the material might easily be overlooked as belonging to *Cathartes* or *Coragyps* because of its small size.

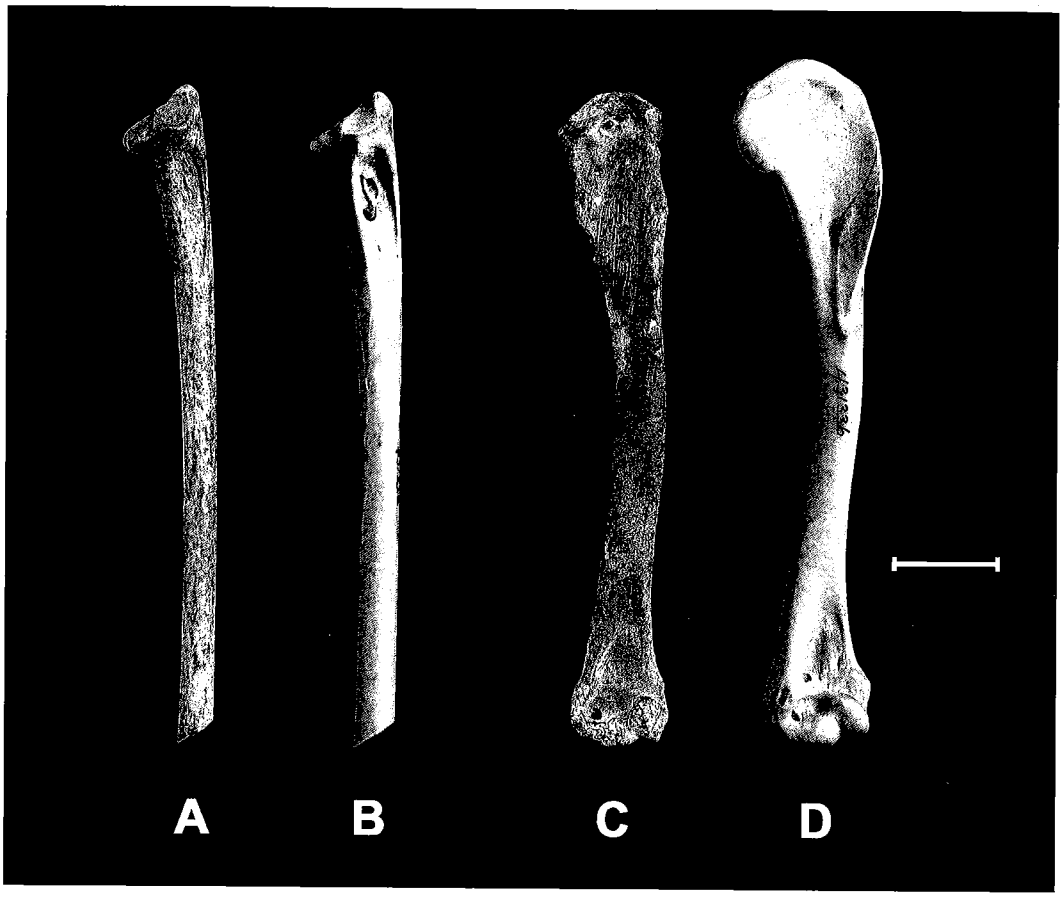

Fig. 4. Right ulnae (A, B) and left humeri (C, D) in palmar view: A, *Wingegyps cartellei,* new species, paratype ZMUC 1118; B, *Cathartes burrovianus* USNM 431336; C, *Wingegyps cartellei,* new species, paratype MCL CLA670; D, *Cathartes burrovianus* USNM 431336. Scale = 2 cm.

What sort of feeding niche might such a tiny condor have occupied? The habits of living species of the family are briefly summarized from Olson et al. (1967), Sick (1993), and Hertel (1994). The living condors *Vultur* and *Gymnogyps* forage by sight and prefer soft viscera from large carcasses. *Sarcoramphus* and *Coragyps* forage by sight and are very aggressive at carcasses. *Coragyps* takes food in small bits, tearing even small carcasses such as a frog or mouse to pieces before eating. The species of *Cathartes* are very different in finding food with their keen sense of smell. Thus, they specialize in finding caracasses of small animals either before they are located by sight foragers or detecting food that cannot be seen at all from above. They are also very docile and not at all competitive with other vultures at carcasses.

The small size of *Wingegyps* would have placed severe limitations on its ability to process the majority of carcasses or to compete at carcasses with other species of vultures. If we assume that it was like its closest relatives in lacking the olfactory capabilities of *Cathartes, Wingegyps* would have had little success competing with any of the species of *Cathartes* for small carcasses. There does seem to be a potential

niche in the New World, however, that is not as fully exploited as it is in the Old World, viz. palm fruits.

In Africa, the Palm-nut Vulture (*Gyphohierax,* Accipitridae) feeds mainly on the soft mesocarp of the African oil palm *Eleis guineensis.* This palm has been introduced to Brazil and Sick (1993:149) describes Turkey Vultures *Cathartes aura* as being a "nuisance" in palm plantations in Amazonia, where they consume the fruits. He also records them as feeding on the native palm *Acrocomia sclerocarpa* (= *A. aculeata*), a very widespread species occurring through the West Indies and from Mexico south to southern Brazil and Paraguay (Henderson et al. 1995), and overlapping the small known range of *Wingegyps.* Although *Wingegyps* may possibly have been the New World ecological equivalent of the unrelated Old World Palm-nut Vulture, its habits might also have been like that of the Egyptian Vulture *Neophron percnopterus* in subsisting on scraps thrown off of carcasses by larger vultures. Such habits might better explain the extinction of *Wingegyps,* as many of the larger avian scavengers in the New World also went extinct at the time of disappearance of much of the mammalian megafauna (Steadman and Martin 1984).

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