

A HAMERKOP FROM THE EARLY PLIOCENE OF SOUTH AFRICA (AVES: SCOPIDAE)

Storrs L. Olson

Abstract.—Two bones from early Pliocene deposits at Langebaanweg, southwestern Cape Province, South Africa, constitute the first fossil record of the family Scopidae. These are described as a new species, *Scopus xenopus*, that was larger than the living Hamerkop, *S. umbretta*, and that had a foot structure possibly indicating that the fossil species was better adapted for swimming.

The Hamerkop, or Hammerheaded Stork, *Scopus umbretta*, is the sole living member of the family Scopidae. The exact systematic position of this family has long been disputed (Kahl 1967), although it is generally conceded that *Scopus* is probably related to storks (Ciconiidae) and the Shoebill (Balaenicipitidae), with which it is associated in all modern classifications. *Scopus umbretta* is widely distributed through sub-Saharan Africa and also occurs in Madagascar and southwestern Arabia (Snow 1978). Up to the present, there has been no fossil record for the Scopidae (Brodkorb 1963). This has now changed with my discovery at the South African Museum of two bones of a new species from the early Pliocene at Langebaanweg, in southwestern Cape Province, South Africa.

The deposits at Langebaanweg are renowned for the number of vertebrate remains they have yielded, including a great diversity of birds (Rich 1980). A variety of ecological conditions existed in the vicinity of Langebaanweg in the Pliocene (Hendey 1981a, b; 1982), resulting in remains of freshwater, marine, and terrestrial organisms being deposited. The geology and chronology of the Langebaanweg succession have been detailed by Hendey (1981b).

Order Ciconiiformes Bonaparte, 1854

The content and relationships of this polyphyletic order are still being actively debated. One of the families traditionally included here, the flamingos (Phoenicopteridae), has been shown conclusively to belong in the Charadriiformes near the Recurvirostridae (Olson and Feduccia 1980). The ibises and spoonbills (Plataleidae) seem to be more closely related to the Charadriiformes and Gruiformes than to storks (Olson 1979), a conclusion that has received strong support from the fossil record (Peters 1983). On the other hand, the vultures of the families Vulturidae (=Cathartidae) and Teratognathidae, currently placed with the hawks in the Accipitriformes, are probably best included in or near the Ciconiiformes (Ligon 1967; Olson, in press). Thus, at this point it is neither possible nor prudent to provide a diagnosis of the order Ciconiiformes. Nevertheless, *Scopus* would surely be included in the same ordinal level taxon as *Ciconia*, and as the ordinal name Ciconiiformes has priority over that of any of the groups that might possibly be included with the storks and allies (e.g., Pelecaniformes), the Scopidae would belong in the Ciconiiformes regardless of its ultimate composition.

Table 1.—Measurements (mm) of fossil and living species of *Scopus*.

	<i>S. umbretta</i>			
<i>S. xenopus</i>	n	Range	Mean	
TARSOMETATARSUS				
Distal width through trochleae	9.2	6	8.2–8.7	8.4
Shaft width at proximal end of distal foramen	6.6	6	6.1–6.3	6.2
Width of middle trochlea	3.3	6	2.9–3.3	3.1
Shaft width 25 mm proximal to middle trochlea	3.6	6	3.0–3.4	3.3
CORACOID				
Distance from humeral edge of glenoid facet to sternal lip of scapular facet	8.8	7	7.2–8.7	8.1
Shaft width just sternal to procoracoid process	5.8	7	4.5–4.8	4.7

Family Scopidae Bonaparte, 1853

The fossil specimens can be referred to the Scopidae on the basis of the following characters: (1) distal end of tarsometatarsus essentially similar to that in the Ciconiidae but much smaller than in any known living or fossil stork; coracoid with (2) distinct ovoid furcular facet, (3) extensive pneumatization, (4) lack of excavation on the ventrolateral surface between the head and the glenoid facet, and (5) no procoracoid foramen. Character 2 separates the Scopidae from all avian taxa except the Balaenicipitidae and Pelecaniformes (within which the Phaethontidae are exceptional in lacking this character and the modern Fregatidae have it obliterated by fusion with the clavicle). Character 3 separates the Scopidae from the Phalacrocoracidae and Anhingidae, character 4 from the Pelecanidae and Sulidae, and character 5 from the Balaenicipitidae.

Genus *Scopus* Brisson 1760
Scopus xenopus, new species
Figs. 1–2

Holotype.—Distal end of left tarsometatarsus with posterior parts of inner and outer trochleae abraded, SAM-PQ-L43396.

Paratype.—Scapular half of right coracoid lacking part of the head and the tip of the procoracoid process, SAM-PQ-L28440S.

Type-locality and horizon.—"E" Quarry, Langebaanweg, southwestern Cape Province, South Africa. Varswater Formation (early Pliocene). The holotype is either from bed 3aS of the Pelletal Phosphate Member or from the Quartzose Sand Member, whereas the paratype is definitely from the latter (see Hendey 1981b).

Measurements.—See Table 1.

Etymology.—Greek, *xenos*, strange, and *pous*, foot; in reference both to the peculiarities of the tarsometatarsus and to the fact that frogs and tadpoles of the genus *Xenopus* Wagler are one of the principal food items of the living species *Scopus umbretta* (Kahl 1967).

Diagnosis.—Somewhat larger than *Scopus umbretta* (Table 1). Inner trochlea

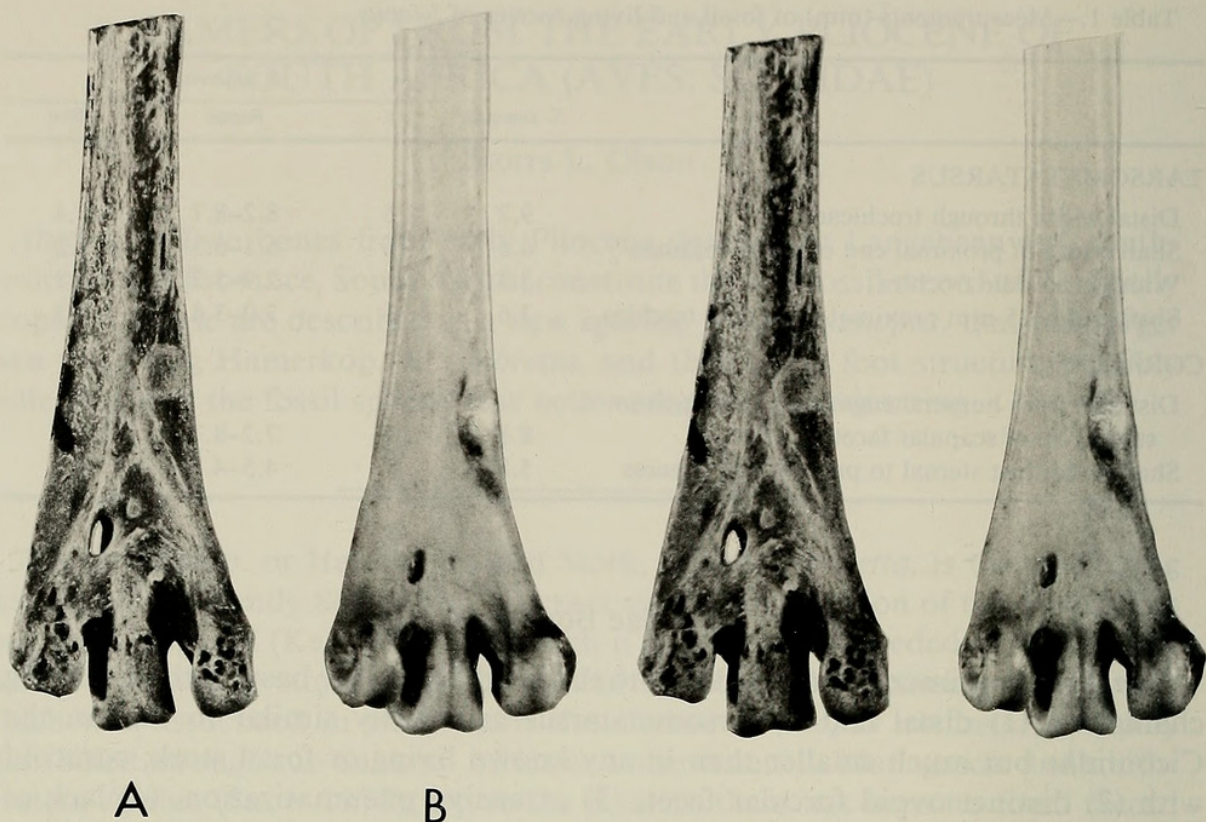


Fig. 1. Stereo pairs of distal end of left tarsometatarsus, plantar aspect. A, *Scopus xenopus* new species, holotype, SAM-PQ-L43396; B, *Scopus umbretta*, USNM 18898. Figures are 3 \times .

(II) of tarsometatarsus more distally produced, almost level with the middle trochlea (III), and consequently with a noticeably longer shaft; scar for hallux larger, extending farther distally, with a more distinct, rounded proximal articular surface; middle trochlea angled more medially; distal foramen relatively larger. Furcular facet of coracoid narrower and more elongate.

Discussion.—In the preliminary sorting of avian remains from Langebaanweg (Rich 1980), the holotype of *Scopus xenopus* was identified as a pelecaniform of uncertain affinity; as such it was listed under the Pelecaniformes by Hende (1981b:48) as “Fam., gen. and sp. not det.” This determination was not unjustified and carries interesting functional and systematic implications. The tarsometatarsus of *Scopus xenopus* resembles that in the Pelecaniformes because of the more distally situated inner trochlea that is nearly even with the middle trochlea. Such a condition obtains in most of the Pelecaniformes, in some of which the inner trochlea extends farther distally than the middle one. This adaptation is associated with swimming behavior; increasing specialization for terrestrial locomotion involves elevation of the inner trochlea rather than distal displacement.

The living Hamerkop is an aquatic “wading” bird that typically walks in shallow water while foraging (Kahl 1967). The scant fossil evidence suggests the possibility that *Scopus xenopus* may have been better adapted for swimming locomotion and thus may have had different habits from *S. umbretta*. If so, *S. xenopus* and *S. umbretta* may not have had an ancestral-descendent relationship.

That the tarsometatarsus of *S. xenopus* bears a resemblance to that in the Pelecaniformes may have phylogenetic significance. Cottam (1957) noted many

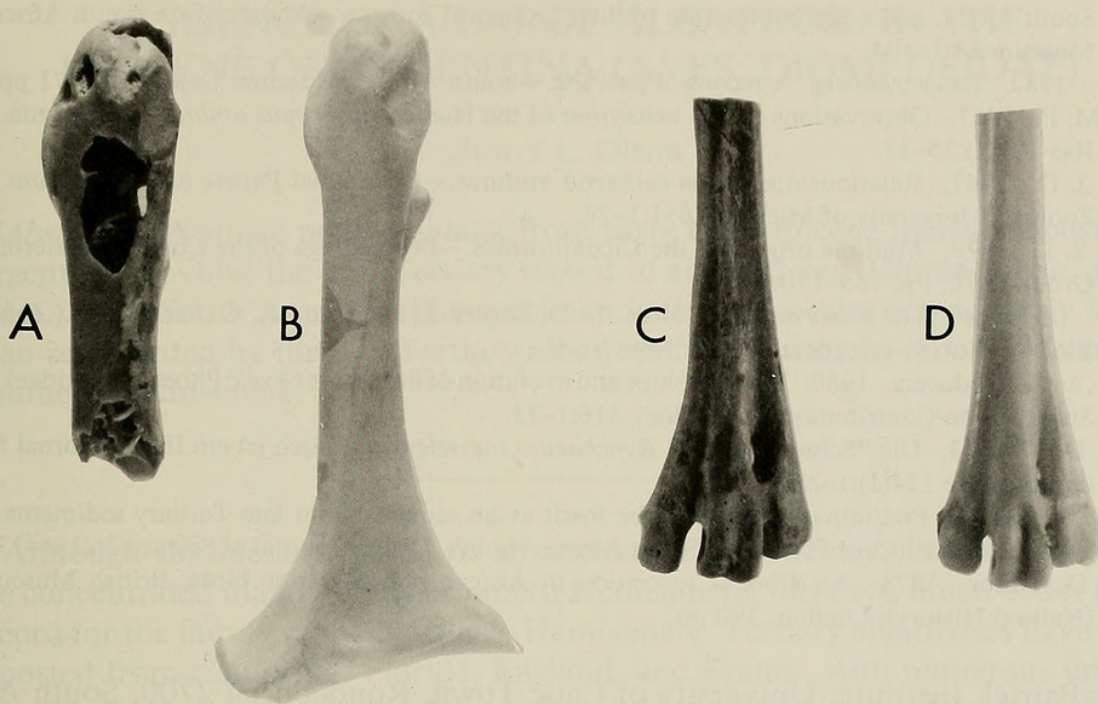


Fig. 2. Fossil and recent species of *Scopus*: right coracoid, ventral aspect (A, B); distal end of left tarsometatarsus, cranial aspect (C, D). A, *Scopus xenopus* new species, paratype SAM-PQ-L28440S; B, *Scopus umbretta*, TM 42863; C, *Scopus xenopus*, new species, holotype SAM-PQ-L43396; D, *Scopus umbretta*, USNM 18898. Figures are 2 \times .

striking similarities between the Shoebill (*Balaeniceps rex*) and the Pelecaniformes; a number of these same characters are also present in *Scopus*. The highly derived order Pelecaniformes must have had its origins in some less specialized group. Such a group may have included the ancestors of *Scopus* and *Balaeniceps*, a possibility that merits detailed investigation.

Acknowledgments

I am grateful to T. M. Crowe and the FitzPatrick Institute, University of Cape Town, for the opportunity to work in South Africa, and to P. Haarhoff and Q. B. Hendey for providing facilities at the South African Museum (SAM) and for much information and assistance. I am indebted to Clive Booth (SAM) for the photographs and to R. K. Brooke, P. Haarhoff, P. V. Rich, and D. W. Steadman for comments on the manuscript. Comparative material examined was from the collections of the SAM, the National Museum of Natural History, Smithsonian Institution (USNM), and the Transvaal Museum (TM).

Literature Cited

- Brodkorb, P. 1963. Catalogue of Fossil Birds. Part 1 (Archaeopterygiformes through Ardeiformes).—Bulletin of the Florida State Museum, Biological Sciences 7:179–293.
- Cottam, P. 1957. The pelecaniform characters of the skeleton of the Shoe-bill Stork *Balaeniceps rex*.—Bulletin of the British Museum (Natural History) Zoology 5(3):51–71.
- Hendey, Q. B. 1981a. Geological succession at Langebaanweg, Cape Province, and global events of the late Tertiary.—South African Journal of Science 77:33–38.
- . 1981b. Palaeoecology of the late Tertiary fossil occurrences in 'E' Quarry, Langebaanweg,

- South Africa, and a reinterpretation of their geological context.—*Annals of the South African Museum* 84:1–104.
- . 1982. Langebaanweg. A record of past life.—*South African Museum: Cape Town*. 71 pp.
- Kahl, M. P. 1967. Observations on the behaviour of the Hamerkop *Scopus umbretta* in Uganda.—*Ibis* 109(1):25–32.
- Ligon, J. D. 1967. Relationships of the cathartid vultures.—*Occasional Papers of the Museum of Zoology, University of Michigan* 651:1–26.
- Olson, S. L. 1979. Multiple origins of the Ciconiiformes.—*Proceedings of the Colonial Waterbird Group* 1978. Pp. 165–170.
- . [In press.] The fossil record of birds. In D. Farner, J. King, and K. C. Parkes, eds., *Avian Biology*. Vol. 8.—Academic Press: New York.
- , and A. Feduccia. 1980. Relationships and evolution of flamingos (Aves: Phoenicopteridae).—*Smithsonian Contributions to Zoology* 316:1–73.
- Peters, D. S. 1983. Die "Schnepfenralle" *Rynchaeites messelensis* Wittich ist ein Ibis.—*Journal für Ornithologie* 124(1):1–27.
- Rich, P. V. 1980. Preliminary report on the fossil avian remains from late Tertiary sediments at Langebaanweg, (Cape Province), South Africa.—*South African Journal of Science* 76:166–170.
- Snow, D., editor. 1978. An atlas of speciation in African non-passerine birds. *British Museum (Natural History)*: London. 390 pp.

FitzPatrick Institute, University of Cape Town, Rondebosch 7700, South Africa. Permanent address: Department of Vertebrate Zoology, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560 USA.



Olson, Storrs L. 1984. "A Hamerkop From The Early Pliocene Of South africa (Aves, Scopidae)." *Proceedings of the Biological Society of Washington* 97, 736–740.

View This Item Online: <https://www.biodiversitylibrary.org/item/107740>

Permalink: <https://www.biodiversitylibrary.org/partpdf/46202>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Biodiversity Heritage Library

Copyright & Reuse

Copyright Status: In copyright. Digitized with the permission of the rights holder.

Rights Holder: Biological Society of Washington

License: <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Rights: <https://biodiversitylibrary.org/permissions>

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.