

A THIRD SPECIES OF *MANCALLA* FROM THE LATE PLIOCENE SAN DIEGO FORMATION OF CALIFORNIA (AVES : ALCIDAE)

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ABSTRACT—*Mancalla emlongi*, new species, is the fifth species described in this extinct genus of flightless auks and is the third to be described from the late Pliocene San Diego Formation of southern California. The species is based on a right ulna that is markedly larger than in any other member of the genus.

INTRODUCTION

Flightless auks (Alcidae) of the extinct subfamily Mancallinae have been reported only from Neogene deposits of California and Baja California. Four species of *Mancalla* Lucas, 1901, have been named from the Pliocene. Possibly ancestral to *Mancalla* is the genus *Praemancalla* Howard, 1966, of which two species are known from late Miocene deposits (Howard, 1966; 1976). Another late Miocene genus, *Alcodes* Howard, 1968, was tentatively referred to the Mancallinae in the original description.

The species of *Mancalla* are the most specialized of the Alcidae for wing-propelled diving. The bones of the wing are highly modified to form a paddle and are quite diagnostic. The single ulna described below represents a new species that is decidedly larger than any hitherto known. The specimen differs greatly from the ulna of all other Alcidae by the very short, wide proportions, and it possesses all of the characters described for the ulna of *Mancalla* by Miller and Howard (1949). The less pronounced olecranon further distinguishes it from *Praemancalla* (see Howard, 1976).

SYSTEMATIC PALEONTOLOGY

Order CHARADRIIFORMES
Family ALCIDAE
Subfamily MANCALLINAE
Genus *MANCALLA* Lucas, 1901
MANCALLA EMLONGI, new species
(Figs. 2, 3a)

Holotype—Right ulna lacking only the very tip of the olecranon (Fig. 2), collections of the Department of Paleobiology, National Museum of Natural History, Smithsonian Institution, USNM 243765. Collected 25 November 1975 by Douglas R. Emlong (field number E75-43).

Locality—Sea cliff about 0.4 km south of Tourmaline Road, Pacific Beach (between La Jolla and San Diego), San Diego County, California.

Horizon—Pliocene, San Diego Formation. The holotype was taken in place about 5 m from the top of the cliff (Fig. 1). I visited this locality in November 1977, before receiving photographs from Emlong pinpointing the precise site, and found the cliffs in the vicinity to be about 14 to 15 m high. The upper 2 m or so consist of rather dark sandy silt, at the base of which is a layer of water-worn cobbles and boulders. Below this, extending down at least to sea level, is a rather homogeneous deposit of yellowish silty sand, most of which produced specimens of *Pecten* (*Patinopecten*) *healeyi* Arnold, 1906, a pelecypod that is diagnostic of the San Diego Formation. Specimens of *P. healeyi* were taken both above and below the level at



FIGURE 1. Type locality of *Mancalla emlongi* n. sp. (exact position marked with X) at Pacific Beach, San Diego County, California (San Diego Formation). Photograph by Douglas R. Emlong, 1978.

which the type of *Mancalla emlongi* was found. A specimen of the gastropod *Opalia ovaricostata* Stearns, 1876, also typical of the San Diego Formation, was found at a level about 2 m below that of the bird bone, within the same formation.

Etymology—Dedicated to Douglas R. Emlong, who collected the holotype and supplied information about it. Emlong's tragic death on 8 June 1980 deprived vertebrate paleontology of one of its most dedicated collectors. In addition to the new *Mancalla*, Emlong also collected the holotype of the ptopterid *Tonsala hildegardae* Olson, 1980, several important specimens of pseudodontorns (Pelagornithidae), and numerous other Tertiary birds. His contribution to avian paleontology, although overshadowed by his collections of fossil marine mammals, is nevertheless of considerable significance.

Diagnosis—Known only from the holotype, which differs from the ulna in *Mancalla californiensis* Lucas, 1901, *M. cedrosensis* Howard, 1970, *M. diegensis* (L. H. Miller, 1937), and *M. milleri* Howard, 1971, as follows: larger and more robust; in proximal view, olecranon markedly deeper, internal cotyla deeper in relation to external cotyla; in internal view, proximal end heavier, attachment of anterior articular ligament more swollen and sulcus between it and lip of internal cotyla much more distinct; in palmar



FIGURE 2. Stereophotographs of the right ulna of *Mancalla emlongi* n. sp. (holotype, USNM 243765). A, internal view; B, palmar view; C, external view; D, proximal view. Scale equals 2 cm for all views.

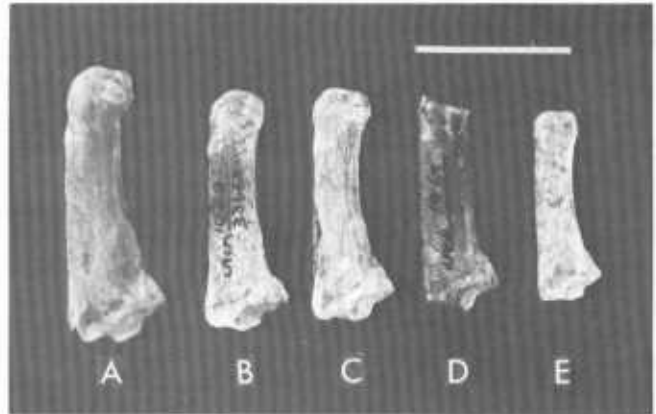


FIGURE 3. Size comparison of the right ulnae in the five species of *Mancalla*. A, *M. emlongi* n. sp. (holotype, USNM 243765); B, *M. diegensis* (LACM 33665); C, *M. cedrosensis* (LACM 15471); D, *M. californiensis* (LACM 2380); E, *M. milleri* (LACM 2497). Scale equals 2 cm for all species.

view, ridge between proximal radial depression and nutrient foramen more pronounced, rims of proximal radial depression more swollen, distal radial depression less distinct; in distal view, internal condyle markedly heavier, external condyle deeper and narrower.

Measurements of Holotype—Overall length 37.2 mm, depth of proximal end 13.7, width through cotylae 7.9, depth and width of distal end 10.3 by 6.3, depth and width of shaft at midpoint 8.7 by 5.1.

Remarks—The greater size of *Mancalla emlongi* is its most notable feature (Fig. 3). As given by Howard (1971:15), the maximum length of the ulna is 27.0 mm in *M. milleri*, 31.7 mm in *M. cedrosensis*, and 32.1 mm in *M. diegensis*. The only ulna thus far assigned to *M. californiensis* (see Howard, 1970), although incomplete, is within the size range of *M. diegensis* or *M. cedrosensis*. These ulnae are all considerably smaller than that of *M. emlongi* (37.2 mm). The holotype of *M. emlongi* does not resemble any one species of the genus more closely than the others; apart from size differences, the ulnae of these forms are all rather similar.

The first species of *Mancalla* described from the San Diego Formation was *M. diegensis* (Miller, 1937). Howard (1970) determined that there were two species represented among the fossils previously assigned to *M. diegensis*. The smaller and more abundant species she named *Mancalla milleri*, with the name *M. diegensis* being applied to the larger and rarer form. *Mancalla emlongi* is an even larger and evidently much rarer contemporary of these two species. *M. californiensis* and *M. cedrosensis* are the size of *M. diegensis* and are somewhat older than the species from the San Diego Formation (see Barnes, 1973, and Repenning and Tedford, 1977, for a discussion of the age of the type locality of *M. cedrosensis*). It remains to be determined whether either of the two earlier species is ancestral to any of those known from later deposits.

Comparative Material Examined—Right ulnae of *Mancalla*: *M. californiensis* LACM 2380, Capistrano Forma-

tion, Corona del Mar, Orange County, California; *M. cedrosensis* LACM 15371 and 15372, Almejas Formation, Cedros Island, Baja California; *M. diegensis* LACM 2323 and 33665, San Diego Formation, San Diego, San Diego County, California; *M. milleri* LACM 2497 (2 individuals), San Diego Formation, San Diego, San Diego County, California.

Acknowledgments—Comparative material was kindly lent by the Section of Vertebrate Paleontology, Natural History Museum of Los Angeles County (LACM). I am indebted to Ralph and Elizabeth Ann Schreiber for the opportunity to investigate the type locality of *M. emlongi* and to Edward Wilson for identifying fossil mollusks. I am indebted to Lawrence G. Barnes, Hildegard Howard, Clayton E. Ray, and David W. Steadman for critical comments and suggestions. Photographs of specimens are by Victor E. Krantz.

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