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A marine turtle (Cheloniidae) from the lower Miocene of Port Waikato, New Zealand

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Abstract A new species of marine turtle from the lower Miocene Waikawau "Cast Bed" at Port Waikato is described. The species is based on a left femur and is tentatively located within *Lepidochelys*, a relatively tropical genus, the presence of which would indicate that lower Miocene sea temperatures in the region were warmer than at present.

Keywords marine turtle; ?*Lepidochelys waikatoica* n. sp.; Waikawau "Cast Bed"; Otaian; Port Waikato; new fossil taxa

INTRODUCTION

Potential reptilian remains from the New Zealand Cenozoic were discussed by Fordyce (1979), with only 2 records of marine turtles being authenticated. Both are restricted to the Paleogene of the South Island. The specimen described here is the only one known from the Neogene, and though only a single bone has been recovered, it is sufficiently well preserved and distinctive to permit formal systematic description.

SYSTEMATICS

Order TESTUDINES

Family **CHELONIIDAE** Gray, 1825

Genus ***Lepidochelys*** Fitzinger, 1843

TYPE SPECIES: *Chelonia olivacea* Eschscholtz, 1829 (O.D.) (Recent; Indo-Pacific and Atlantic Oceans; tropical).

DISTRIBUTION: ?Lower Miocene to Recent; tropical seas.

REMARKS: *Lepidochelys* is a genus of marine turtles with adults being confined to tropical seas (Honeggar 1979); not surprisingly then, it is unknown from the New Zealand Recent. *Lepidochelys* has no previous fossil record, and its probable presence in the New Zealand lower Miocene strongly supports earlier conclusions (Fleming 1979) that early Miocene temperatures were warmer than those of the present.

?*Lepidochelys waikatoica* n. sp. Fig. 1-5

MATERIAL AND LOCALITY: Holotype, V15. An almost complete left femur held in the Geology Department, University of Auckland. It was collected in 1979 by the author, with Geology II students of Auckland Technical Institute, from a fallen block of the phosphatised Waikawau "Cast Bed" at the southern end of Waikawau Stream, Port Waikato (locality N51/f1078 in the Fossil Record File of the Geological Society of New Zealand; metric grid reference R13/62491384 on the 1:50 000 topographical map series NZMS 260). The specimen appears to have originated from about 7 m above the base of Waikawau Sandstone Formation.

AGE: Waterhouse (1978) has shown that the Waikawau Sandstone is of Otaian age (early Miocene) throughout.

MEASUREMENTS: Length, 40.4 mm; minimum dorsoventral diameter, 4.6 mm; minimum anteroposterior diameter, 5.3 mm; distal diameter dorsoventral, 8.7 mm; distal diameter anteroposterior, 11.7 mm.

DESCRIPTION: Femur relatively small, shaft well developed, cylindrical, moderately arched upwards distally; caput femoris oblong (width to length ratio 0.58), set off from dorsal surface at about 120°; trochanter major well developed, extending proximally almost to femoral head; trochanter minor well defined; testofemoral depression shallow; ventral intertrochanteric fossa evident but weak; distal end with tibial condyle relatively featureless, broad, gently and evenly curved, articular end oval in section, flattened dorsoventrally; ventral surface with weak basally restricted median ridge.

REMARKS: The features which identify this bone as cheloniid are the trochanter major, the rounded, relatively featureless tibial condyle, and the orientation of the caput femoris. These characteristics are well developed in this femur, suggesting that the bone belonged to an adult individual. In marine turtles, femoral length is likely to give some indication of carapace length, and based upon modern species such as *Eretmochelys imbricata*, (a specimen held by the Auckland Museum has a ratio of femur length to carapace length of 0.11) a

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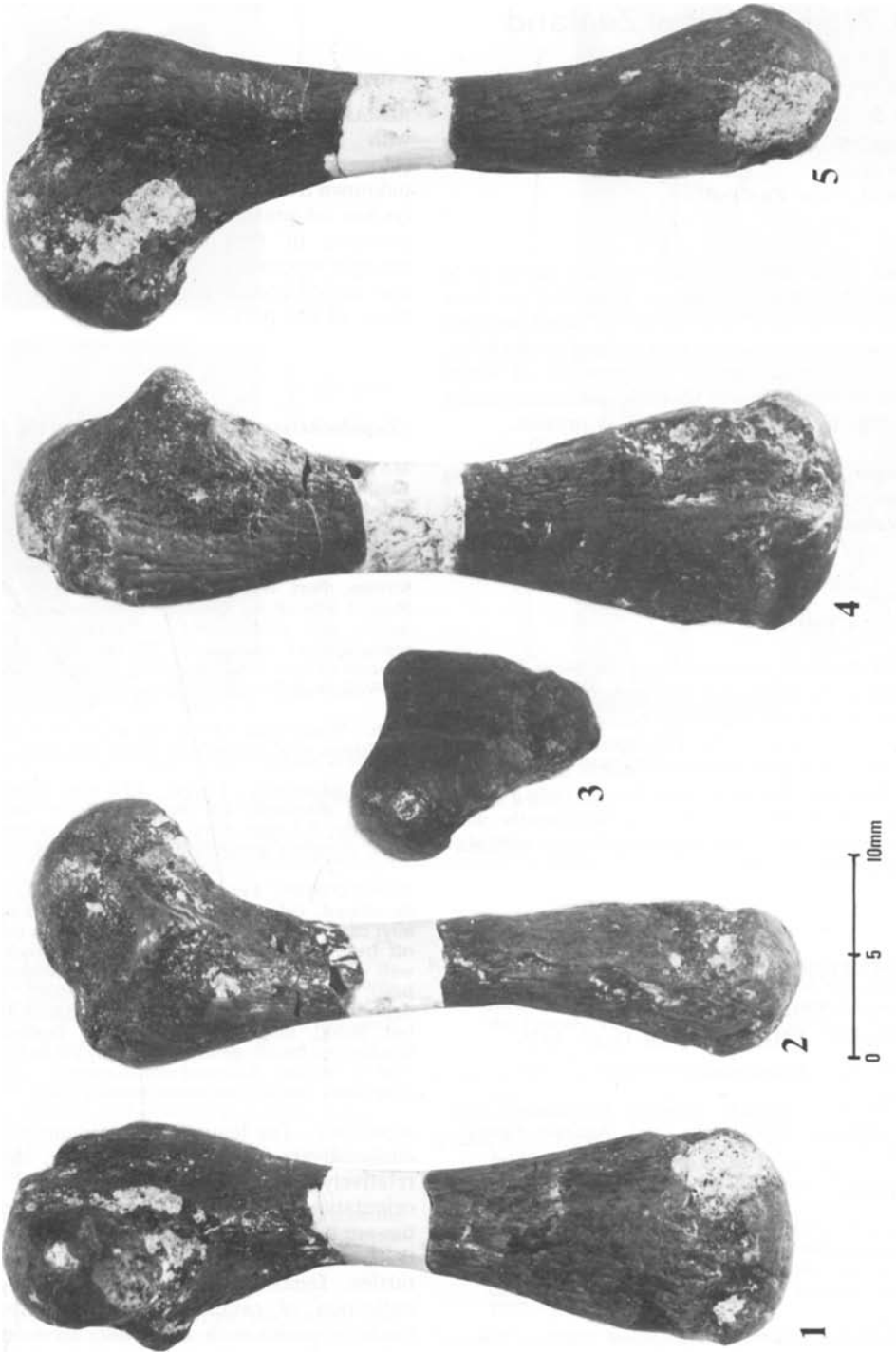


Fig. 1-5 ?*Lepidocheilus waikatoica* n. sp. left femur, V15. 1 dorsal view; 2 anterior; 3 proximal; 4 ventral; 5 posterior.

carapace length of about 400 mm can be deduced. Thus, this New Zealand fossil turtle would have been a relatively small individual, and if it is an adult representative of the species, it would indicate that specimens would have been about one-half the size of mature individuals in the several turtle species that are found around New Zealand at present (see McCann 1966), and about two-thirds the size of adult specimens of extant species of *Lepidochelys*.

The taxonomic location of this specimen is based upon general similarity with *Lepidochelys*, especially with respect to the oval rather than circular caput femoris. It is on the basis of size, ventral fossa, and caput femoris morphology that this specimen can be distinguished from *Dermochelys coriacea* (Linnaeus), *Chelonia mydas* (Linnaeus), *Eretmochelys imbricata* (Linnaeus), and *Caretta caretta* (Linnaeus), which are species known to frequent New Zealand waters at present (McCann 1966).

Waterhouse (1978) interprets the depositional environment of the Waikawau Sandstone as "shallow to moderately deep shelf". The phosphatised Waikawau "Cast Bed" is, however, a very distinct lithology within the Waikawau Sandstone, and a more restricted environment, perhaps a large but sheltered embayment for this bed, is envisaged. This would be a more likely site where marine reptiles could be washed up and/or stranded. The concept is supported by a recently described cirriped fauna from the locality (Buckeridge 1979), particularly a new pachylasmid with a very restricted temporal and geographic distribution.

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