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PALÆONTOLOGICAL NOTES.

No. IV.*

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(Plates viii–x, and one map.)

FOSSIL MARSUPIALS FROM NEW GUINEA.

IT is surprising that up to the present there is no record of the finding of fossil marsupials in the large island of New Guinea, which in its recent fauna presents a strong similarity to the Australian continent, a similarity which without doubt obtained also in the Pleistocene and earlier. The existence today of the cassowary, echidna, tree kangaroos, wallabies, and other marsupials on both sides of Torres Strait, indicates that at one time there was land communication between Australia and New Guinea, and it is natural to expect that some of the extinct forms which are of common occurrence in Australia would also be found in the neighbouring island. That they have not previously been recognized there is probably due to the fact that until recently there were no mining, quarrying, or other operations in New Guinea, activities which often result in the discovery of fossil bones.

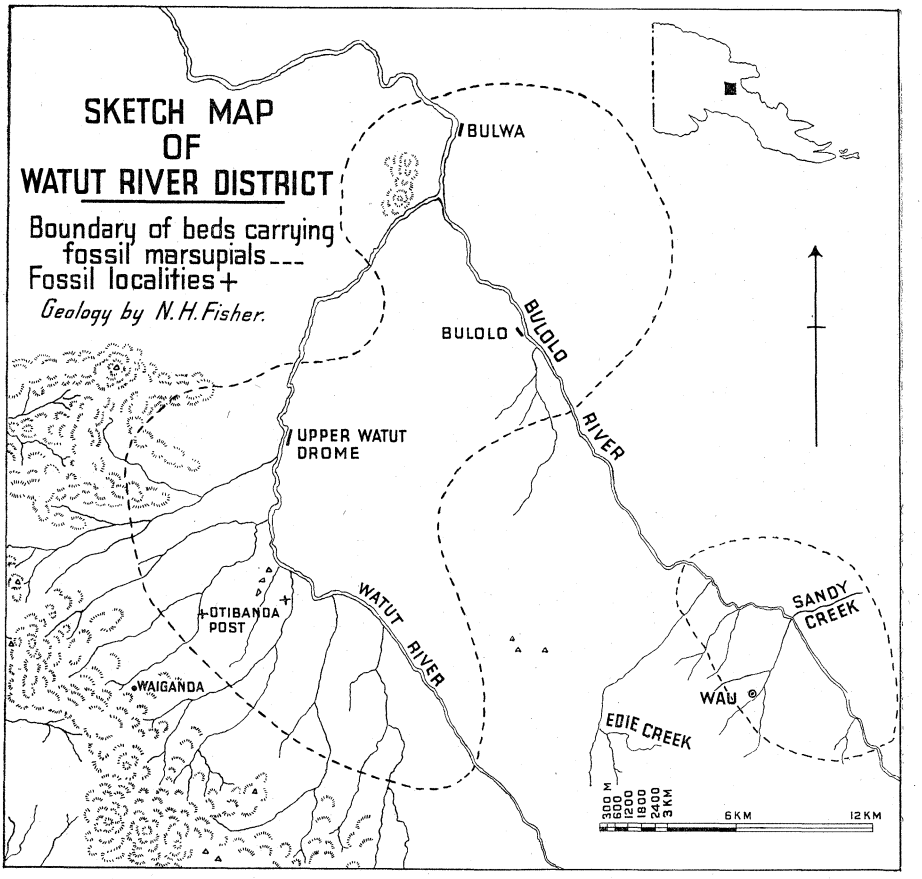
It was, therefore, with great interest that some fossil bones from the Morobe district, Territory of New Guinea, recently received at the Museum, were examined, particularly when it became apparent that they presented a close resemblance to specimens which are commonly found in Australian superficial deposits of Post-Tertiary age.

These interesting specimens were first brought to our notice by Mr. G. A. V. Stanley, B.Sc., a geologist on the staff of Oil Search Ltd., who had observed a jaw bone, since determined as that of a *Nototherium*, in the office of the Geological Survey at Wau. This specimen, consisting of two mandibular rami, was forwarded to the Museum by Mr. N. H. Fisher, Government Geologist, Territory of New Guinea, who subsequently visited the spot where it was found and examined the occurrence. Mr. Fisher was also fortunate enough to obtain additional material consisting of some fragmentary macropod bones, which he also sent to the Museum. While on furlough in Sydney Mr. Fisher kindly gave me some particulars of the mode of occurrence and also supplied a map from which a sketch map of the district has been prepared.

Occurrence.

The nototherian mandible was found on the Waiganda or Roaring Creek, a tributary of the Watut River. This river junctions lower down with the Bulolo

* For No. III, see RECORDS OF THE AUSTRALIAN MUSEUM, Vol. xviii, No. 7, June, 1932, p. 383.



and flows into the Markham, which empties into the sea at the head of the Huon Gulf. The other specimens were found at a distance of about two miles on Iroa Creek, which also flows into the Watut. In each case the specimens were discovered in lacustrine beds, which are definitely older than the overlying alluvial deposits (river flats and terraces). These freshwater beds consist of sandstones, shales, and mudstones, mostly fine grained, but with occasional bands of conglomerate, the pebbles of which are seldom more than a few inches in diameter. Beds of a volcanic agglomerate are included in this freshwater series, the strata of which are only slightly tilted and show signs of tranquil deposition. They contain some plant remains, consisting of leaves in fairly good preservation.

This lacustrine deposit is about twenty miles in maximum length and about eight or nine miles wide in places, but is not continuous, there being two main areas, one on the lower Bulolo and Watut Rivers, the other on the upper Bulolo area. Its approximate extent is shown on the accompanying map.

In both cases the discovery was the result of the construction of water races connected with sluicing operations, and the bones were found at shallow depths; the Roaring Creek find was made at a depth of about six feet from the top of the

freshwater beds (there is an overburden of about three or four feet of soil); the bones on Iroa Creek were found at depths varying from two to six feet.

Nototherium watutense, sp. nov.

(Plate viii.)

The most interesting of the specimens are the two mandibular rami, which from their similarity in size and appearance are in all probability the right and left halves belonging to the same individual. Unfortunately, both are fragmentary, but they retain diagnostic features which leave little doubt that they belong to an undescribed species of *Nototherium* (*sensu lato*), to which the name *N. watutense* is assigned. They are considerably smaller than the corresponding bones of any known species of the genus, yet the solitary tooth (part of a fourth molar) which is preserved indicates by its wear that the animal was adult.

The left half of the mandible (Reg. No. F.36311; Pl. viii), so far as preserved, consists of a segment 167 mm. in length, beginning slightly in advance of the third molar (of which the posterior root is *in situ*) to a little behind the posterior opening of the dental canal, which is practically on the level of the alveolar surface of the mandible. The inflected angle is broken, but sufficient remains to indicate its general character. It begins slightly in front of the anterior lobe of m_4, forming a short shelf which almost disappears about 20 mm. behind the posterior lobe of m_4. The shelf widens again about 25 mm. in front of the orifice of the dental canal, which is situated in the angle between the ascending ramus and the platform forming the continuation of the alveolar surface (Pl. viii, O). The posterior lobe of m_4 is preserved, but the medial portion is fractured. The tooth shows considerable wear, the dentine being well exposed on the crown of the lobe; the enamel is highly polished and has a slightly bluish tinge.

The following comparative measurements have been obtained:

	A.	B.	C.	D.	E.	F.
Depth at hind lobe m_4	54·5	74·0	74·5	—	84·0	—
Thickness below m_4	46·0	62·0	65·0	—	53·0	—
Front of dental canal orifice to m_4 (exclusive)	46·5	58·0	—	—	—	83·0
Length m_4	31·0	46·0	48·0	37·0	38·0	—
Breadth m_4 (anterior lobe) ..	17·0	34·5	32·0	22·0	25·0	—

A = *Nototherium watutense*. Austr. Mus., F.36311.
B = *N. victoriæ* Owen. Cast of type.
C = *N. mitchelli* Owen. Austr. Mus., F.4626 (*Brit. Mus. Cat. Foss. Mamm.*, Pt. v, 1887, No. 43088, p. 164).
D = *Owenia* (=*Euowenia*) *grata* De Vis. *Proc. Roy. Soc. Queensland*, iv, 1887, p. 99 (*fide* H. A. Longman).
E = "Zygomaturus" De Vis. *Proc. Roy. Soc. Queensland*, xi, 1895, p. 6 (*fide* H. A. Longman).
F = *N. tasmanicum* Scott. *Tas. Geol. Surv. Rec.* No. 4, 1915, p. 10.

These measurements indicate that our specimen is the smallest member of its family yet described, the only one approaching it in this respect being *Euowenia grata* De Vis. The main distinguishing feature of that genus, however, is the fact that it has but two upper incisors, and I therefore prefer to leave the Watut River form in *Nototherium* (*sensu lato*), pending the discovery of maxillary specimens. The "Zygomaturus" jaw described by De Vis has molars of relatively small size, but the mandible itself is much more massive than ours.

But little can be said of the affinities of *Nototherium watutense* on account of the scantiness of the material, but the position of the posterior orifice of the dental canal links it with *N. victoriæ* and *Euowenia grata* ("posterior dental

foramen level with the worn surface of the last molar") rather than with *N. mitchelli* and *N. tasmanicum*.

The age of the Watut River specimen is uncertain; Mr. Fisher is of opinion that the freshwater beds in which it was found are Pleistocene (overlying Tertiary volcanics) or very late Tertiary. It is possible that *N. watutense* is slightly older than its Australian congeners, which are found in superficial unconsolidated deposits, such as river terraces, flood plains, swamps, and cave earth, not, as in New Guinea, in consolidated beds distinctly underlying alluvial material.

As regards the significance of its occurrence, apart from the proof it affords that this distinctive family, which is so widely spread in the Australian Pleistocene, also extended to New Guinea, its small size suggests the possibility that it was a member of a more primitive assemblage of animals than that which characterized the Australian Pleistocene, and that it is an outlying representative of a slightly older fauna which may yet be found in the Australian Tertiary. This does not mean, however, that Australian Pleistocene marsupials originated in New Guinea, for there can be little doubt that *Nototherium* and its contemporaries evolved on the Australian continent.

Type.—Left mandibular ramus with part of m_4, No. F.36311. Associated right ramus, F.36312. In the Australian Museum collection.

Macropod Bones.

The bones found on Iroa Creek consist of part of the jaw bone of an extinct macropod, about as large as *Macropus titan*, with one much worn molar tooth, the centrum of a caudal vertebra, the proximal and distal ends of a tibia, and the distal end of a femur. All these bones may well belong to one individual, although the leg bones seem rather too large to match the mandible; but they are too fragmentary to allow definite conclusions to be drawn, and are merely put on record with the hope that better specimens will yet be found.

Sternum of a Ratite Bird (*Dromaius* sp.) from the Wellington Caves, N. S. Wales.

(Plate ix.)

Some years ago Mr. H. R. Quiney, then a geology student in the University of Sydney, presented to the Museum portion of the sternum of a ratite bird from the Wellington Caves, about 250 miles north-west of Sydney, well known as the source of many fossil specimens now preserved in various museums. Unfortunately, the specimen is incomplete and few diagnostic features are preserved, but it is evident that it conforms most nearly to the type exhibited by the sternum of the emu (*Dromaius*).

The bone as preserved measures 147 mm. in length by 118 in greatest breadth, and is remarkable for its thickness, which reaches 35 mm. just posterior to the level of the articulation of the last sternal rib. On the ventral surface (Pl. ix, fig. 1) there is a well-marked protuberance extending over the posterior half of the bone, which is here strongly convex. The surface for articulation of the sternal ribs is fairly well preserved on the right side, and shows four septa separated by deep pits, the most anterior of which is imperfect. This costal margin is almost parallel to the sagittal plane, to which it approaches slightly posteriorly; in the living emu the articular margins converge distinctly caudad. Of the coracoid

grooves only the extreme lateral angles are preserved, the distance beween them measuring approximately 68 mm.

The following table gives available measurements for comparison with corresponding dimensions in the emu and the cassowary:

	A.	B.	C.	D.
Length	—	152	150	202
Span of coracoid grooves	68	57	65	92
Distance between facets for 1st sternal ribs	144	133	120	122
Distance between facets for last (4th) sternal ribs	138	107	108	98
Greatest thickness	35	28	27	10

A=*Dromaius* sp. Pleistocene, Wellington Caves. Austr. Mus., F.25,218.
B=*D. novæhollandiæ*. Austr. Mus., A.13,244.
C=*D. novæhollandiæ*. Austr. Mus., S.1515.
D=*Casuarius australis*. Austr. Mus., S.1435.

In general proportions the sternum most resembles that of the emu, from which it differs, however, in its greater thickness and the larger angle between the two pleurosteal surfaces; it apparently belonged to a larger and more robust bird than the recent emu. From the sternum of the cassowary the fossil is at once distinguished by its much greater thickness. The sternum of *Genyornis newtoni* as described by Stirling and Zietz[1] is quite different; it is much larger, yet its thickness is more or less constant at 20 mm. in the preaxial two-thirds, and diminishes to 6 to 8 mm. in the posterior third, where in *Dromaius* the thickness is greatest. The sternum of *Dromornis australis* is unknown.

From the Post-Tertiary deposits of the Darling Downs, Queensland, De Vis described two species of extinct emu: *Dromaius patricius*,[2] based on a left coracoid and the proximal and distal ends of a right tibia, and *D. gracilipes*,[3] the type of which is a fragmentary tarso-metatarsus. De Vis was of opinion that *D. patricius* had a shorter and stouter leg than *D. novæhollandiæ*, and that *D. gracilipes* was smaller than the latter. It is possible, therefore, that the Wellington Caves sternum belongs to *D. patricius*, but until a more complex skeleton is discovered no certainty on this point can be reached.

Fossil emu bones have been previously recorded from the Australian Pleistocene,[4] and in the Wellington Caves remains of both *Dromaius* and *Casuarius*[5] have been found.

Crocodilian Jaw from North Queensland.

(Plate x.)

This specimen was recently presented to the Museum by Mrs. M. E. Allan, with the information that it was collected about 1886 by her father, the late Edward Palmer. Unfortunately, the exact locality of the find is not known, but the donor is of the opinion that it was obtained in the Gregory River district; the Gregory River flows into the Gulf of Carpentaria near Burketown.

[1] Stirling and Zietz.—*Mem. Roy. Soc. S. Australia*, i, 2, 1900, p. 72, pl. xxiii.
[2] De Vis.—*Proc. Linn. Soc. N. S. Wales*, iii (2nd Ser.), 3, 1888, p. 1290.
[3] De Vis.—*Proc. Linn. Soc. N. S. Wales*, vi (2nd Ser.), 1891, p. 445.
[4] Etheridge.—*Rec. Geol. Surv. N. S. Wales*, i, 2, 1889, pp. 132-4.
[5] Krefft.—Australian Vertebrates, Recent and Fossil, 1871, p. 37. Lydekker.—Brit. Mus. Cat. Fossil Birds, 1891, pp. 352-3, 354.

The specimen consists of the anterior portion of the two rami, fused at the symphysis, and showing the alveoli of seven teeth on the right and six on the left; no teeth are present, but portions of the roots remain in some of the alveoli.

This symphysial fragment is remarkable for its breadth and massive structure, in which it at once recalls *Pallimnarchus pollens* De Vis,[6] which it also resembles in that the symphysis terminates in a line joining the middle points of the sixth alveolus, where the greatest breadth is approximately 196 mm. The length of the symphysial suture is 108 mm., and the greatest depth in the symphysial plane (opposite middle of fourth tooth) is 62 mm. The width between the outer edges of the alveoli of the fourth tooth is 189 mm., and the alveolus has a diameter of 33 mm.; the alveolus of the first tooth ("incisor") is 31 mm. in diameter.

When these measurements are compared with those given by De Vis and Longman, allowance being made for variation due to possible age and sex differences, we may safely conclude that this specimen is part of the mandible of *Pallimnarchus pollens*.

EXPLANATION OF PLATES.

PLATE VIII.

Nototherium watutense, sp. nov. Roaring Creek, Watut River, Territory of New Guinea. Part of the left ramus of the mandible; natural size. F.36311.

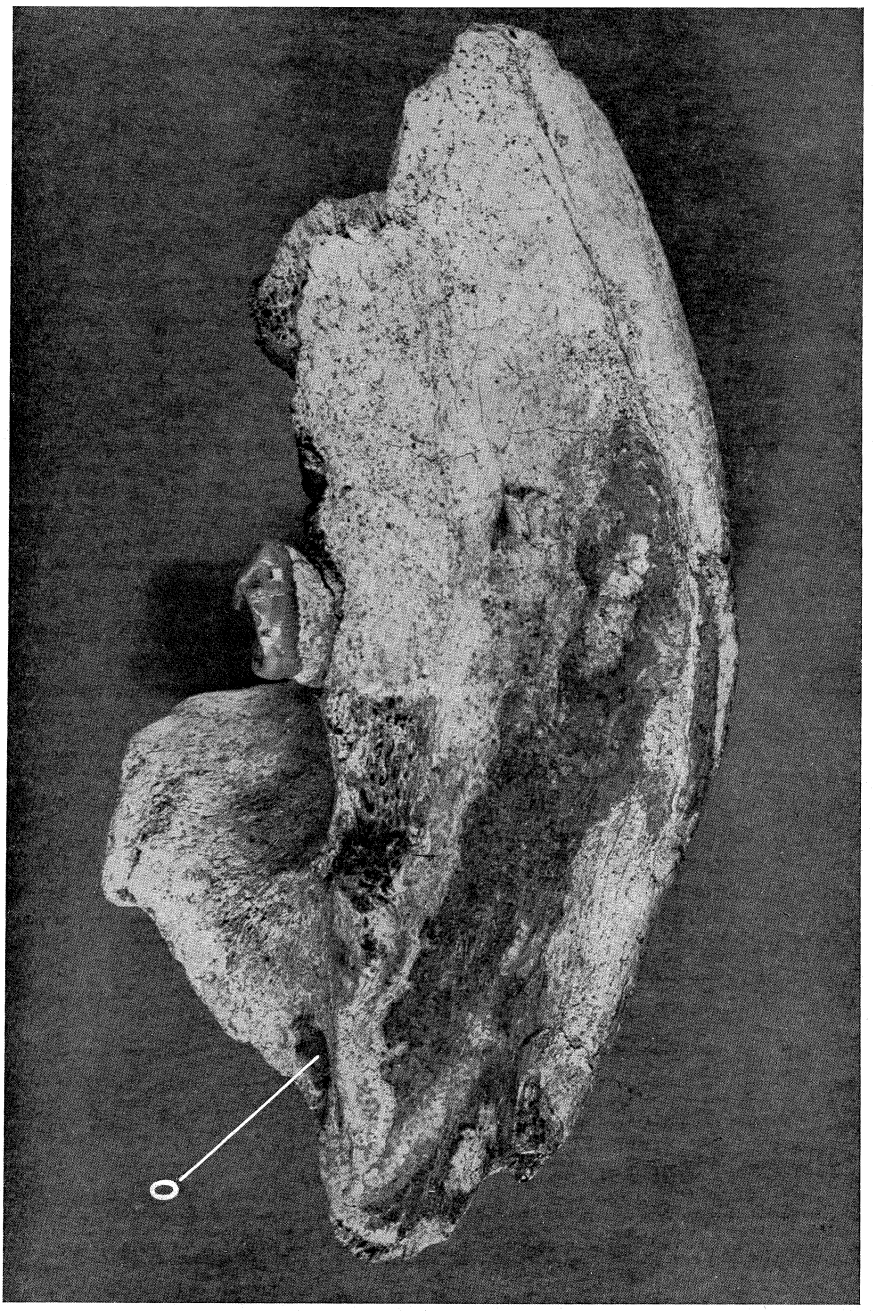
PLATE IX.

Dromaius sp. sternum. Wellington Caves, N. S. Wales; × ½. F.25218.
Fig. 1.—Ventral view.
Fig. 2.—Dorsal view.

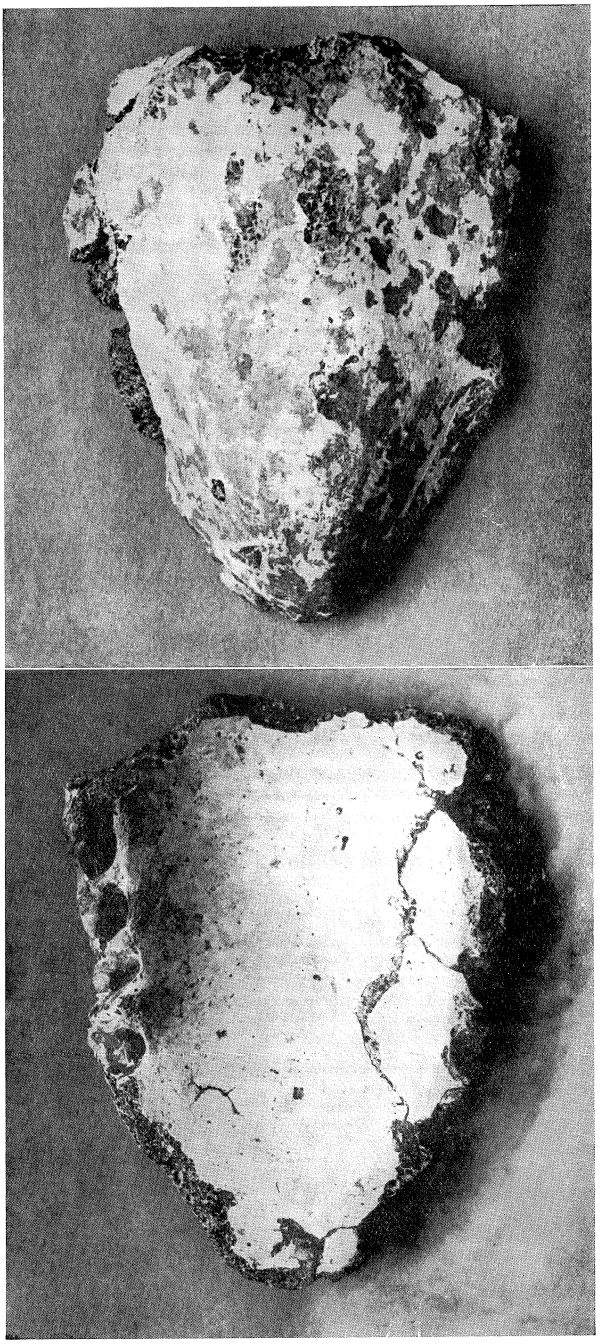
PLATE X.

Pallimnarchus pollens. ? Gregory River district, Queensland. Anterior part of mandible; × ¾. F.36947.

[6] De Vis.—*Proc. Roy. Soc. Q'land*, ii, 1885, pp. 181-191, pls. x-xv. Longman.—*Mem. Q'land Mus.*, viii, 1925, p. 103-8, pl. xxvi, fig. 1; ix, 1928, pp. 158-9, pl. xviii.



G. C. CLUTTON, photo.



1

2

G. C. CLUTTON, photo.

G. C. CLUTTON, photo.