X. *Evidence of a Large Extinct Lizard* (Notiosaurus dentatus,* Owen) *from Pleistocene Deposits, New South Wales, Australia.*

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[Plate 12.]

On the 19th November, 1883, I received from Robt. Etheridge, Jun., Esq., the subject of the present Paper, with the following memorandum which accompanied the specimen transmitted to him by Ch. S. Wilkinson, Esq., F.L.S., F.G.S., of the Department of Mines, Sydney.

"Portion of jaw and teeth from Cuddie Springs. These springs are in pleistocene deposits full of bones of *Diprotodon*, *Sthenurus*, Crocodile, &c., as far down as they have been sunk into—viz., 30 feet."

The specimen was a small fragment, as will be seen by the annexed figures; and to the bone were attached the bases of the crowns of two teeth. These were of the size of the serial teeth of the Australian *Crocodilus porosus*, of similar shape, with longitudinally striated enamel.

Under the impression of Mr. Wilkinson's note, I first compared them with the teeth in the series of Crocodilian skulls now exhibited in the Reptilian Gallery, of the Natural History Museum. But, though a longitudinally-ridged enamel is common to the teeth of other than the Australian species, in none were the ridges so strongly developed. Afterwards, submitting the fossil to a closer scrutiny, I observed that each ridge began by a pair of feebler ones rising from the root of the crown, and uniting after a course of from 2 to 5 millims.—a character not shown by any of the Crocodilian teeth; next, after close scrutiny of the broken portion of jaw to which the teeth were attached, I determined the parts of the bone which retained their natural unbroken surface.

The fossil in question was of a jet black colour, and the surface which I concluded to be the outer one of a dentary element of the mandible (Plate 12, fig. 1, *a*) shone as does a piece of polished jet.

Now such glistening exterior with perfect petrifaction characterises other fossil remains, especially of plants, from the same formations in Australia; and, as to the coal-

* Gr. νότιος, australis; σαῦρος, lacerta.

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black colour shown in parts of such fossils, that also we find in some Mammalian fossils from our own tertiaries.*

The bases of both teeth in the pleistocene fossil (Plate 12, figs. 2–5, *b*, *b'*) were anchylosed to the alveolar floor continued from the outer wall *a*, and to this also was similarly anchylosed so much of the supposed part of the crown as remained of each tooth. The portion of the jaw-bone continued from the inner surface of the anchylosed teeth showed a natural surface sloping away from the teeth upon so much as remained of the inner surface, *a'*, of the dentary bone.

Here, therefore, were plain characters, not of a Crocodilian, but of a Lacertian mandible, and of a species of that division of the *Lacertilia* called "pleurodont."†

Of existing Australian Lizards *Chlamydosaurus* is "acrodont;"‡ *Hydrosaurus* is "pleurodont;" and, moreover, is the largest known existing Lacertian. The base of the tooth in this species is striated, and that character is best shown on the inner side (Plate 12, fig. 8), which is free from the bony parapet, according to the fashion exemplified in *Notiosaurus* (Plate 12, fig. 2); but with fewer and larger ridges.

I append figures, nat. size, of a portion of the jaw of *Hydrosaurus gigas* (Plate 12, figs. 7, 8), corresponding to the fossil. The proportions of the outer wall, and of the base of the teeth thereto anchylosed, are the same; such confluent part is, also, longitudinally ridged. The pleurodont character prevails in both upper and under jaws, but the teeth are mostly wider apart in the mandible, and are juxtaposed as in the fossil, only in a small proportion of the dentigerous part. At this stage of the comparison a vertical transverse section was taken of that end of the fossil to which the more fragmentary tooth was attached. This section (ib., fig. 5) demonstrated the anchylosis of tooth to bone according to the pleurodont type. A slice of the section was prepared for microscopic scrutiny. Under a magnifying power of 120 the coarse lamellate disposition of the osseous tissue of the Lacertian mandible, the elongate bone-cells, and the fine plasmatic tubules, diverging from the vascular cells, were demonstrated at *a*, fig. 9. The basally attached portion of tooth showed the Lacertain vascularity of the part and the dentinal tubes radiating from the vascular canals, also the lamellate walls of the canals (ib., *b*).

Another character was brought to light by this section. The remains of the pulp-cavity were seen, on first inspection of the fossil, in an aperture of 2 millims. diameter at the middle of the fractured surface of each tooth-crown, fig. 3, *c*, *c*. On the Crocodilian hypothesis such aperture should expose a pulp-cavity widening as it receded from the enamelled crown. In the section above described such cavity or continuation of the aperture was longitudinally traversed, and demonstrated its contracting to a termination at 6 millims. above the anchylosed base of the tooth (Plate 12, fig. 5, *c*).

In *Hydrosaurus* the outer surface of the dentigerous part of the mandible is perforated by neuro-vascular apertures almost as numerous as the teeth, and about the

* 'History of British Fossil Mammals,' 8vo., 1846, pp. 301, 414, 420.

† 'Odontography,' 8vo., 1845, p. 240, plates 67 (*Monitor*), 68 (*Iguana*). ‡ Ib., p. 241.

level of the base of the outer wall to which they are anchylosed. This character is also manifested in the mandibular fragment of the Notiosaur. The fossil has been broken away from the lower part of the ramus at the level of one of these apertures (Plate 12, fig. 1, *d*), and the fracture exposes the common canal (fig. 6, *d*, *e*), which was traversed by the mandibular vessel, and the branch leading from that canal to open upon the outer surface, in the same relative position to the free margin of the outer wall, as in *Hydrosaurus*.

And now, it may be asked, why may not the fossil here described, which has clearly come from a saurian as large as *Megalania*, be part of an individual of that extinct Australian genus ?

True it is, that as yet I have received no portion of mandible so associated with the rest of the skull of *Megalania* as to enable me to make the requisite comparison.

But so much of the skull, with the upper jaw, as has been recovered indicates that such jaw was edentulous, sheathed with horn, as in Chelonia,* and could not have been opposed to a series of large, mandibular, conical, carnivorous teeth. Such edentulous condition led to the inference that *Megalania* had been phytiphagous; and, like many herbivorous Mammals, it was proved to be provided with formidable horns as defensive weapons.†

In *Notiosaurus* we have evidence of a second form of Lacertian Reptile of ordinary Crocodilian dimensions, so far as these are indicated by the size and number of the piercing, lacerating teeth, of which the fossil in question shows samples.

I have taken the liberty to write to the Geologist of the Department of Mines, Sydney, requesting the loan of any other specimens from the Cuddie Springs which may have been regarded as Crocodilian.

Description of the Plate.

PLATE 12.

Notiosaurus dentatus.

Fig. 1. Portion of mandible, outside view.
Fig. 2. Ib. ib. inside view.
Fig. 3. Ib. ib. upper view.
Fig. 4. Ib. ib. end view.
Fig. 5. Ib. ib. vertical section of mandible and tooth-base.
Fig. 6. Ib. ib. under view.
Fig. 9. Longitudinal slice of mandible and tooth-base, magnified 120 diameters.

Hydrosaurus gigas.

Fig. 7. Portion of mandible, with two teeth; outside view.
Fig. 8. Ib. ib. inside view.

(All the figures, save fig. 9, are of the natural size.)

* Phil. Trans., 1880, p. 1045. † Ib., p. 1048.

Fig.1

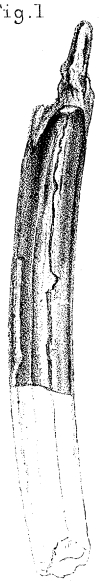


Fig.2

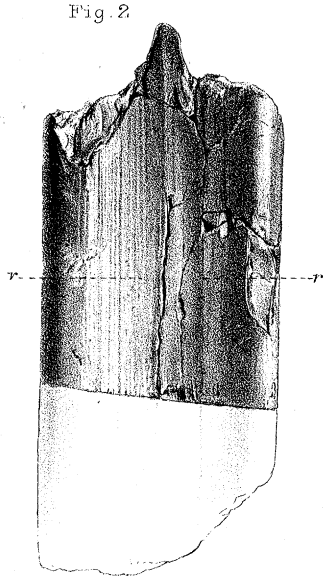


Fig.3

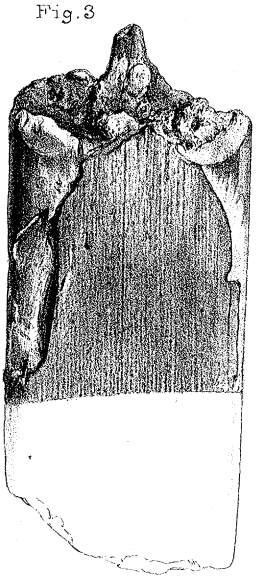


Fig.3a

Fig.4

Fig.5.

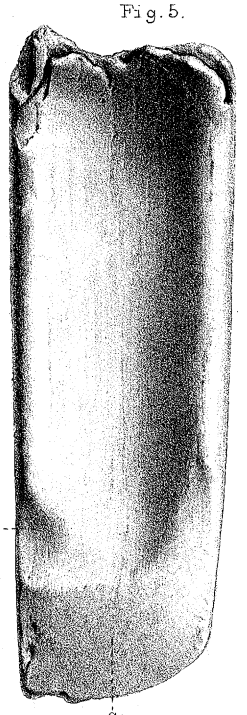


Fig.5a

Fig.6

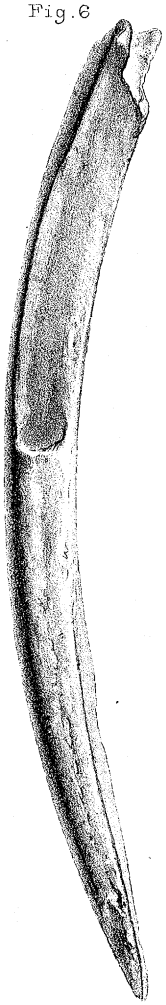
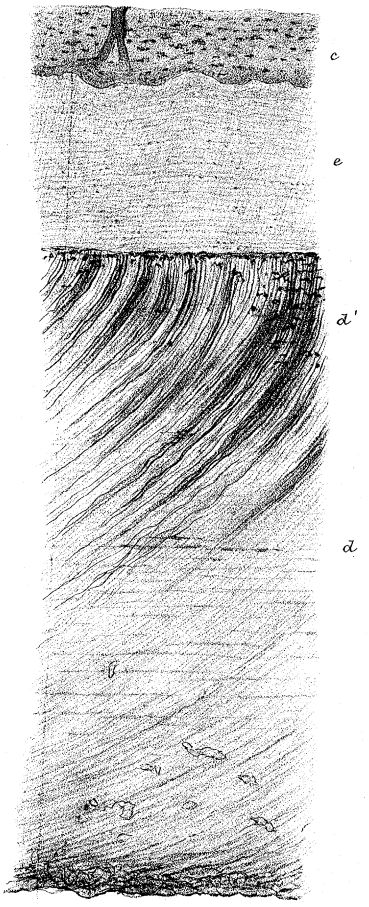


Fig.7.

Fig.7'

Fig.8.

Fig.9.



W.H. Wesley lith.

West, Newman & Co. imp.