"Contributions to the Natural History of the Bermudas, Vol. I." Washington, 1884. [Bulletin of the U. S. National Museum, No. 25.] From the Smithsonian Institution.

"Transactions and Proceedings of the Royal Society of South Australia, Vol. VII., 1883-84." Adelaide, 1885. From the Society.

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The following Paper was read :—

ON AN EXTINCT MONOTREME, ORNITHORHYNCHUS AGILIS.

BY

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(Plate IV.)

In the former existence in Australia of a rich and diversfied development of marsupial forms of mammals, and in the fact that the antique fish, Ceratodus, had then a less, probably far less, restricted range than at present, we may see reason to believe that the monotremes, their present associates, must have also been their comrades on the march from previous ages, and another hemisphere towards their shore of extinction on this the limit of their journey southwards. We have, in fact, been already instructed that one of the two divisions of these strange links in the chain of evolutionary effects was included in our newer tertiary fauna. Some years ago an arm-bone of a large Echidna was described by Krefft (An. & Mag. Nat. Hist. 1868, Vol. I , Page 113) under the names of E. owenii : in 1883 a similiar bone was in the hands of Sir Richard Owen, and to Krefft's species may possibly belong a claw-bone preserved in the Queensland Museum. To all who gave attention to the subject the discovery of some trace of a fluviatile monotreme com-

parable with the existing platypus must have seemed a mere matter of time and good-hap; and by time and good-hap the expectation has been fulfilled, and a relic has been found of an ancestor of the living ornithorhynchus. The bone, a right tibia of an adult, has been very lately received from King's Creek, in the vicinity of Pilton, where the Museum collectors were for a short time excavating. It shews no sign of having been inherited from a less modified, that is more reptilian, precursor; on the contrary, it possesses all the character of the genus as represented by *paradoxus*, fully matured and even more pronounced than in its descendant. It is, perhaps, worthy of remark that, presuming this tibia to be full-sized as well as adult, it indicates a species of smaller dimensions than the present one. If, then, the extinct species were the only one then existing, it formed an exception to the general rule, which maintained superiority of size in members of every group, compared with that of their modern representatives. It may not, therefore, be too rash to infer that the customary giant of its tribe has yet to make itself known.

Viewed in common with a recent bone of *paradoxus*, the specific distinctness of the fossil tibia is seen at a glance—a closer examination leaves, for the moment, a doubt on the mind whether its owner were, strictly speaking, an ornithorhynchus or of a genus nearly allied. The feature, which has been noted by Sir R. Owen as one of those distinguishing the tibia of ornithorhynchus from that of echidna, the curvature of the shaft, is in the fossil exaggerated, and the whole surface is more deeply impressed and sharply moulded by the muscles than in the living platypus. It is this circumstance which has suggested the specific name *agilis*.

The comparative measurements of the tibia in *paradoxus* and *agilis* are these :—

	paradoxus. c.m.		agilis. c.m.
Total length.....	5·65	...	4·85
Length of the head	1·4	...	1·25
Breadth „ „	9·3	...	0·275
„ of the shaft	0·5	...	0·45

The facet for the outer condyle is narrower, flatter, and, anteriorly, more distinctly separated by a groove from the precondylar tuberosity. It is also separated from the intercondylar area by a narrow and sharp ridge. The inner condylar facet (fig. 1, i.c.) is likewise more clearly defined by an extension forward of the depression, thus formed into a groove, on the inner side of the sunken "spine." By these inner and outer grooves the precondylar tuberosity is narrowed and rendered more distinct. The lateral edge of the inner facet which in *paradoxus* is produced into an angle overhanging the base of the head, and forming the extreme limit of its breadth, is in the fossil shortened and rounded, the head sloping downward and outward from it ventrad. The muscular impression on the hinder side of the shaft, below the head (fig. 1, m.), is deeper. It is bounded on the inner side by a ridge-like margin, and on the outer renders the ridge descending from the head much thinner than in *paradoxus*. On the outer side of the anterior surface of the shaft, the procnemial fossa or concavity (fig. 2, p.) is much longer, reaching downwards quite to the middle of the shaft. The distal end of the shaft is relatively narrower—its outer edge, opposed to the inner edge of the fibula, being less expanded. It is also more concave on both the facets of its hinder side, which are separated more markedly by a low ridge descending from about the middle of the shaft. As a consequence of the elevation of this ridge, and the contraction of the outer edge of the shaft, its form is more nearly trihedral than in the living species. The inner malleolus (fig. 2, i.m.) is proportionately smaller, and its summit hemispherical rather than oval. The curvature of the shaft is almost as great in the shorter as in the longer bone, and is, therefore, absolutely greater.

The sum of the differences observed would almost seem to be beyond the limits of specific variation; but on the evidence of this fossil alone it would be imprudent to propose a new genus for it. Other portions of the skeleton will, however, be sought for with increased interest.

Since the foregoing notes were made, a mandible (Fig. 3) has come to hand from the same spot as that which yielded the tibia. Both bones are of the same dark colour, and in the same state of mineralization. They, therefore, probably belong to the same individual. The mandibulary fossil is the distal half of the right horizontal ramus with the colander-like socket of the molar nearly perfect. In accord with the tibia, it shows a smaller and slenderer animal than *paradoxus*. It is narrower in proportion to its length, and especially narrower in the postalveolar region. Other specific differences are patent in the arrangements of the perforated depressions and subdivisions of the alveolus. In the recent species, the pits in which are moulded the mammillary processes of the under side of the horny grinder are disposed in three groups, separated by low septa. The anterior of these contains two pairs of depressions, and one or two smaller subsidiary pits. The middle group consists also of two pairs of pits; and the third, confined to the posterior angle of the alveolus, of a single depression. In the fossil there are four groups, divided from each other by transverse ridges. The foremost contains two pits, the second also two, the third four, and the fourth a single pit. There are no subsidiary pits in the first of these, and the arrangement of the whole has more linear regularity and lateral symmetry than in the living species. The internal coronoid or pterygoid process is well developed. The inner angle of the jaw is rather more distinctly inflected than in the present representative of the genus. On the whole, nothing can be observed in this mandible to confirm the suspicion previously expressed that the extinct monotreme was something other than an ornithorhynchus.

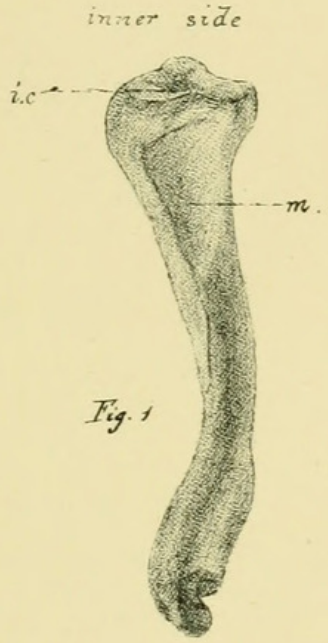

Fig. 1

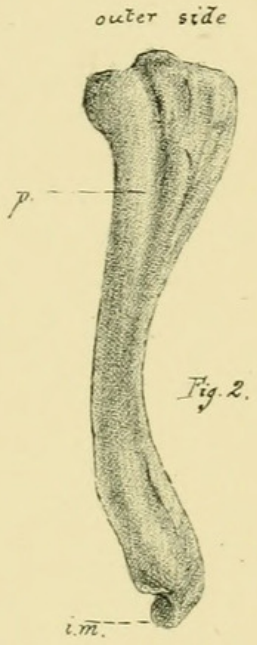

Fig. 2.

Fig. 3.

Fig. 4.

H. Denniss delt.

Ornithorhynchus agilis.

Fig. 1. 2. right tibia.

" 3. mandible.

" 4. " (O. paradoxus).