

cannot be argued that they have perished, for the most delicate bones are preserved, as well as the finest scales of the *Lepisosteus*; so that, to say the least, there certainly appears to be a difficulty in referring them to the Crocodile.

There are other genera the remains of which are found in the Wealden formation, but very little is known respecting them, and it would be little better than conjecture to refer the scales in question to the *Megalosaurus* or the *Phytosaurus*, because there were difficulties in referring them to the Crocodile or the *Iguanodon*. Before long it may be hoped that other specimens will be found under more favourable circumstances with respect to their determination.

III.—*On the Discovery of the Remains of a Mastodontoid Pachyderm in Australia.* By Prof. OWEN, F.R.S.

To the Editors of the Annals of Natural History.

GENTLEMEN,

I HAVE lately received a letter, dated April 6, 1842, from Sir Thomas Livingstone Mitchell, Surveyor-General of Australia, in which he announces the interesting discovery of large fossil mammalian remains in that continent. The specimens from the bone-caves in Wellington Valley, described in the second volume of Sir Thomas's work on Australia, were, it may be remembered, remains of extinct species of marsupial genera now existing in that continent, and of a genus very nearly allied to the existing ones; the largest fossil, which had been supposed to belong to a *Hippopotamus* or *Dugong*, indicating rather an extinct gigantic *Phascolome*; and there was not any conclusive evidence of a genus of placental mammal in that collection*.

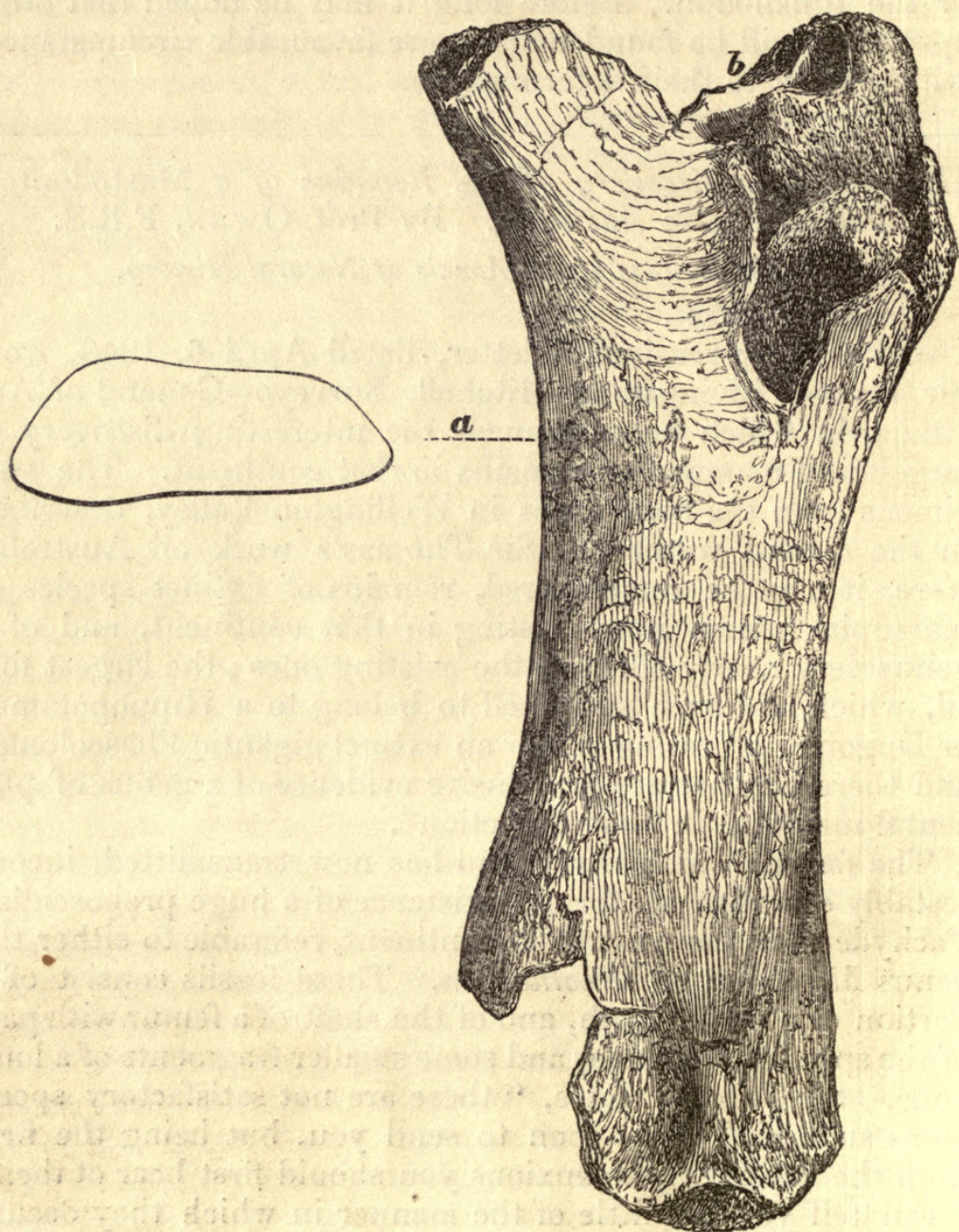
The fossils, which my friend has now transmitted, incontestably establish the former existence of a huge proboscidian *Pachyderm* in the Australian continent, referable to either the genus *Mastodon* or *Dinotherium*. These fossils consist of a portion of a molar tooth, and of the shaft of a femur with part of the spine of a scapula, and some smaller fragments of a long bone. Sir Thomas states, "these are not satisfactory specimens such as I hope soon to send you, but being the first from the locality, I am anxious you should first hear of them. I can tell you but little of the manner in which they occur; but such bones are found on the Darling Downs—those extensive plains which you will see marked to the S.W. of Moreton Bay on most maps of this country. They are at the

* Mr. Pentland informs me that a bone of a large quadruped, apparently a pachyderm, from the Wellington Valley, is, he believes, in the Museum at Paris.

sources of the Darling river and at a great height above the level of the sea, upwards of 4000 feet. I am informed that these huge bones, of which I send you but fragments, are found in some abundance."

These fragments, when their broken surfaces were re-adjusted, composed the very considerable part of the right femur, of which the subjoined cut, fig. 1, gives a view of the posterior and most entire surface, one-fifth the natural size ;

Fig. 1.



the contour of the circumference at (a) illustrates the principal characteristic of the bone, viz. its being flattened from before backwards.

Among the larger quadrupeds the femur presents a similar antero-posterior compression in the elephant, mastodon, and rhinoceros, but the latter animal is distinguished by a

second external trochanter, situated below the great trochanter, which is not present in the Australian fossil. In the *Megatherium* and its congeners the flattening of the femur and its transverse breadth greatly surpass the proportions exhibited by the fossil under consideration, or those of the femora of the proboscidian *Pachyderms*.

The femur of the *Mastodon* is that which the fossil from the Darling Range most resembles, in being flatter on the posterior than on the anterior surface. Compared with the femur of the *Mastodon giganteus*, the fossil presents the following differences: it is broader in proportion to its length; as, for example,

Australian femur.	Mastodon.
in. lines.	in. lines.

From the lower part of the post-trochanterian depression to the prominence

above the outer condyle	18	0	24	0
Breadth of middle of shaft of femur . .	5	0	5	9
Circumference of do. do.	13	6	14	6

The surface of the bone below the post-trochanterian depression (*b*) is more convex in the Australian fossil, and the prominence above the back part of the outer condyle is more developed; the small trochanter is narrower and longer, and is defined by a groove along its anterior part. The femur in the *Mastodon giganteus* thins off almost to an edge at the outside of the distal half of the shaft: in the Australian fossil the corresponding part is broad and convex. The anterior part of the great trochanter rises higher above the level of that part of the femur in the Australian fossil than in the *Mastodon*. The orifice of the medullary artery is conspicuous in the Au-

Fig. 2.

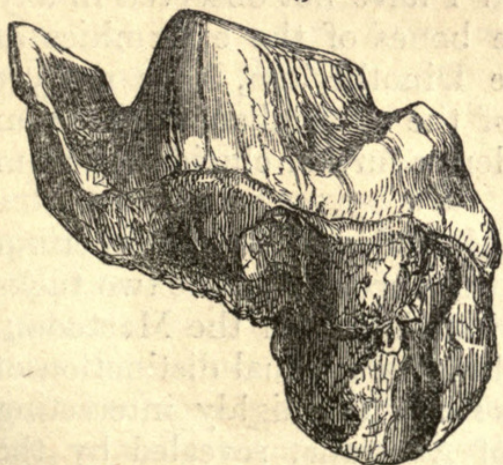
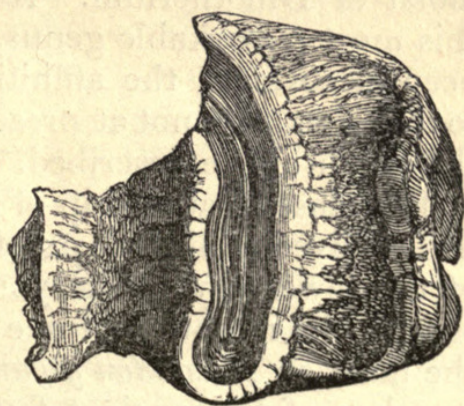


Fig. 3.



stralian fossil at the back part a little above the middle of the shaft, and towards the inner side; the canal sloping upwards. I cannot detect the corresponding orifice in the *Mastodon's* femur compared. The Australian fossil exhibits a large me-

dullary cavity along the middle of the shaft, with dense parietes an inch thick. The total length of the fossil is twenty-two inches; its greatest breadth across the upper or proximal end, where the neck begins to bend inwards, is ten inches.

Traces of the smooth pitted surface at the broken distal end indicate the place of junction of the articular epiphysis, and prove that the entire shaft of the femur is here preserved; a part of the epiphysis is anchylosed to the shaft.

The portion of the molar tooth was obtained from the same locality as the femur, and if it belong, as is most probable, to the same animal, proves it to be most nearly allied to those Pachyderms, as the *Dinotherium* and *Mastodon giganteus*, in which the grinding surface of the teeth is raised into broad transverse ridges. Parts of two of the anterior ridges, and a smaller or lower one which runs across the base of the first, at the anterior part of the crown of the tooth, are here preserved; but the accuracy of the figures (figs. 2. and 3.), which are of the natural size, precludes the necessity of further description. The apex of both the higher ridges has been worn by mastication, but not to such an extent as is usually seen in the small deciduous molars of the Mastodons: there is less trace of a division of the summit of the ridge into mammillæ than would be presented by a similar sized molar, equally worn down, of the *Mastodon giganteus*, in which the two mammillæ would be indicated by a median constriction. The transverse ridges are still more subdivided in the other known species, as *M. longirostris*, *M. latidens*, *M. angustidens*, or *M. elephantoides*: the Australian tooth more resembles that of the *Dinotherium* in the simplicity of the transverse eminences, but there is a deposit of cement or *crusta petrosa* at the bottom of the intervening valleys, which I have not observed in any molar of *Dinotherium*. As the bones of the extremities of this most remarkable genus, the *Dinotherium*, have not yet been discovered, the affinities of the Australian Pachyderm to that genus do not at present derive further elucidation from the femur above described.

The close relationship of the *Mastodon* to the *Dinotherium* has received additional proof by the discovery of the two tusks of the lower jaw in the young individuals of the *Mastodon*, and by the retention of one of these as a sexual distinction of the male, in *Mastodon giganteus*: and the highly interesting member of the ancient fauna of Australia, revealed by the remains above described, must be referred, on their evidence, to the same natural family of gigantic Pachyderms as that which includes the Mastodons and *Dinotheres*, and to a species distinct from any yet determined. The interests of science

will, perhaps, be best consulted by refraining from the imposition of any generic or specific name until the requisite characters are obtained; and of this most desirable acquisition reasonable hopes may be entertained, since the zealous and distinguished officer to whom we are indebted for all the interesting fossils yet met with in Australia promises a continuance of his valuable aid. At the conclusion of his letter Sir T. L. Mitchell states, "I am promised part of a rib and other bones by the gentleman who gave the tooth, and I have some hopes of obtaining a jaw-bone; when I do, it shall be sent to you forthwith."

The fossils above described will be presented, in the name of Sir T. L. Mitchell, to the Museum of the Royal College of Surgeons, London. They cannot be contemplated without suggesting many interesting reflections. They tell us plainly that the time was when Australia's arid plains were trodden by the hoofs of heavy Pachyderms; but could the land then have been, as now, parched by long-continued droughts, with dry river-courses containing here and there a pond of water? All the facts and analogies which throw light on the habits of the extinct Mastodons and Dinotheres, indicate these creatures to have been frequenters of marshes, swamps, or lakes. Other relations of land and sea than now characterize the southern hemisphere, a different condition of the surface of the land and of the meteoric influences governing the proportion and distribution of fresh water on that surface, may, therefore, be conjectured to have prevailed, when huge Mastodontoid Pachyderms constituted part of the quadruped-population of Australia. May not the change from a more humid climate to the present peculiarly dry one have been the cause or chief cause of the extinction of such Pachyderms? Was not the ancient *terra australis*, when so populated, of greater extent than the present insular continent?

The mutual dependences between large mammalian quadrupeds, and other members of the animal kingdom, suggest other reflections in connexion with the present fossil. If the extinct species ever so abounded as to require its redundancy to be suppressed by a carnivorous enemy, then some destructive species of this kind must have coexisted, of larger dimensions than the extinct *Dasyurus lanarius*,—the ancient destroyer of the now equally extinct gigantic kangaroos, *Macropus Titan*, &c., whose remains were discovered in the bone-caves of Wellington Valley. Extremely few coprophagous beetles have hitherto, I believe, been found in Australia, and the scarcity of such is readily explained by the absence of native species of large herbivorous mammals; but the dung of the Mastodon;

toid quadrupeds which formerly existed in Australia must then have afforded the requisite conditions for a greater abundance of such Coleoptera. These and other speculations are naturally suggested by the highly interesting fossils here described. The great importance of such organic remains will be obvious from the few inferences which have been here briefly noted: our obligations to the enlightened collector and transmitter of the Mastodontoid fossils are great, and the arrival of additional facts and specimens will be most earnestly welcomed.

I have the honour to be, Gentlemen,

Your most obedient servant,

RICHARD OWEN.

London, Nov. 1st, 1842.

IV.—*Observationes de quibusdam Plantis Surinamensibus.*

Scriptit Dr. F. A. G. MIQUEL.

To the Editors of the Annals of Natural History.

GENTLEMEN,

Rotterdam, Dec. 1, 1842.

I TAKE the liberty to offer you a botanical paper on some plants of Surinam, and to pray you to give it a place in your 'Annals and Magazine of Nat. History,' which journal I have for several years read with the greatest interest.

Believe me to be, your obedient Servant,

F. A. G. MIQUEL.

COMBRETACEÆ.

1. *Combretum Guianense*. Arborescens, ramis obtuse tetragonis tetrapteris, foliis oppositis breviter petiolatis oblongis obtuse et breviter acuminatis utrinque lepidotis, spicis terminalibus opposite vel ternatim paniculatis, floribus unilateralibus confertis ebracteolatis, calycibus extus lepidotissimis intus longe pilosis, fructibus tetragono-tetrapteris lepidotis.

Hab. Surinam prope plantationem Bergendaal, Sept. florens. Flores pulchre rubri.

Frutex humilis, ut videtur haud scandens; *rami* tereti-subtetragoni, faciebus duabus lateralibus angustioribus et magis planis quam reliquæ convexiores ac majores, sordide fusci, membranis exiguis rigidis nigrescentibus fere tetrapteri, hic illic accessoriis membranulis pluralati, $\frac{1}{2}$ cent. fere crassi; internodia 8—10 cent. longa, nodis parumper tumidis, cicatricibus petiolorum fere circularibus. *Folia* opposita decussata; petioli breves $\frac{1}{2}$ cent. paullo superantes, cylindracei, antice canaliculati; *laminæ* ellipticæ, 14—17 et plura cent. longæ, 7—8 latæ, basi rotundatæ obtusæ, apice obtuse breviter et inæqualiter acuminatæ, margine repandæ, membranaceæ, subcoriaceæ, nervo medio valido 7—8 costas alternas aut suboppositas venoso-anastomosantes emittente, et ut ramuli, pagina inferior pal-



Owen, Richard. 1843. "III.—On the Discovery of the Remains of a Mastodontoid Pachyderm in Australia." *The Annals and magazine of natural history; zoology, botany, and geology* 11, 7–12.

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