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ORIGINAL ARTICLES.

I.—NOTE ON THE MOLAR OF A TRILOPHODONT MASTODON FROM THE  
BASE OF THE SUFFOLK CRAG.

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(PLATE XI.)

THE tooth figured in the accompanying plate was originally noticed by me in this Magazine thirty years ago, and was more fully described by me a year later in the Quarterly Journal of the Geological Society, 1870, p. 507.

At that time it was in the collection of Mr. Baker, of Woodbridge. It has since passed into the collection of the York Museum. I am greatly indebted to the authorities of that institution for lending it to me again for further study, and for allowing me to remove from the valleys between the transverse ridges of the tooth the remarkable matrix which formerly filled them up. (Compare the figure in the Quart. Journ. Geol. Soc., 1870, with that now published.)

The interest attaching to this tooth is twofold. In the first place it was determined by me to be the upper penultimate molar of a Trilophodont Mastodon, being a perfect enamel crown from which no portion had been detached. It thus differs from the well-known Tetralophodont Mastodon of the East Anglian area (*M. Arvernensis*). The completeness of the tooth-crown was recognized by all the palæontologists who saw the actual specimen, including the late Mr. George Busk, F.R.S., whose testimony on the subject I cited.

The second point of interest about the tooth is that its valleys were filled by a matrix which I was able to identify with the sandstone nodules called 'box-stones,' the true nature of which I had recently determined by collecting from every available source the shell-casts and other organic remains which they contain. It was shown that the 'box-stones' which occur abundantly at the base of the Suffolk Crag (and not in the Norfolk area) are the rolled fragments of a Diestien deposit, in all probability an extension of the Black Crag of Antwerp. The Trilophodont Mastodon was therefore necessarily a tenant of the land surface before the deposition of this Upper Miocene 'Black Crag.' In this respect it

was shown to contrast with *Mastodon Arvernensis*, the teeth of which occur at the base of both the Suffolk and Norfolk Crags in a peculiar condition of mineralization, differing widely from that of the present specimen and from that of some other fragments of *Mastodon* teeth not referable to the species *M. Arvernensis*. The molars of *M. Arvernensis* from the East Anglian area are very seldom water-worn, and in many cases are found, not in the condition of 'enamel crowns,' but with the softer material which forms the fangs of the tooth still perfect. On the other hand, the teeth of *Rhinoceros Schleiermacheri*, of *Tapirus priscus*, of *Hipparion*, and some other mammals, which occur in the same deposit, are in the same water-worn condition and in the same state of mineralization as that which characterizes this *Trilophodont Mastodon* and some other fragments of *Mastodon* teeth referred by me to *M. tapiroides*. The conclusion to which I came was, that we have at the base of the Suffolk Crag successive sweepings (as it were) of the land surface, the latest (Pliocene) being represented by *M. Arvernensis* and possibly some other remains, an older sweeping by the *Trilophodont Mastodon*, other *Mastodon* fragments, and the *Rhinoceros*, *Hipparion*, and *Tapirus*, whilst a still older contribution is that of the Eocene land fauna indicated by *Coryphodon* and *Hyracotherium*.

The specific identification of the single penultimate *Trilophodont* molar was a difficult task, especially as the valleys were filled by matrix. After discussing the possible identification of the tooth with *M. (Trilophodon) Borsoni*, a Pliocene species, I came to the conclusion that the probabilities were in favour of its being referable to *M. (Trilophodon) tapiroides* (= *turicensis*, Pom.).

The chief reason which I have had for making a re-examination of this specimen is, that my main conclusion as to its nature has been directly traversed in two separate publications by Mr. R. Lydekker, F.R.S. I find that Mr. Lydekker had never examined the original specimen, but based his opinion on a coloured cast which I had presented to the British Museum. This cast did not show the under surface of the specimen at all, and therefore was devoid of any evidence which could justify the formation of an opinion as to the completeness or incompleteness of the enamel crown.

In a paper on Crag Vertebrata, Mr. Lydekker writes as follows (in the Quart. Journ. Geol. Soc., vol. xlii, p. 365, 1886):—"The evidence for the presence of *M. longirostris*, Kaup, is afforded by several fragments of molars in the British Museum,<sup>1</sup> and by the greater part of a second or third upper true molar<sup>2</sup> figured by Lankester in vol. xxvi, pl. xxxiv, figs 1, 2, of the Society's Journal, and regarded by him as the complete tooth of a *Trilophodont* species. The examination of the cast of the latter shows, however, without doubt, that it has lost one or more posterior ridges, and that, as suggested by Lartet,<sup>3</sup> it really belongs to *M. longirostris*, the form

<sup>1</sup> These and the preceding specimens were noticed by Lydekker in part iv of the British Museum Catalogue of Fossil Mammalia.

<sup>2</sup> Cast in British Museum.

<sup>3</sup> See Lankester, op. cit., p. 508.

of the anterior talon and the separation of the inner and outer columns being decisive."

In the fourth volume of the Catalogue of Fossil Mammalia, published by the Trustees of the British Museum (1886), p. 65, Mr. Lydekker records the cast presented by me as No. 48,427 in the collection, and declares it to be a cast of the first three ridges of the second or third left upper true molar of the Tetralophodont *Mastodon longirostris* of Kaup. He states that the original is described and figured by Lankester as the complete molar of a Trilophodont species, and proceeds—"The specimen has, however, lost a ridge, and agrees precisely with the corresponding portion of the molars of the present species (*M. longirostris*)."

In a note Mr. Lydekker refers to Lartet's opinion of the 'specimen.' But as a matter of fact Mr. Lartet had never seen the specimen any more than had Mr. Lydekker. Both of them based their opinions on a very incomplete cast of a specimen, which was still largely obscured by matrix, and had never been seen by either of them.

There never was any doubt in my own mind as to the completeness of the enamel crown under discussion, and I am glad to be able to state that on examining the actual specimen, lent to me by the authorities of the York Museum last autumn, Mr. Lydekker at once admitted that the enamel crown is complete, and that his contention that it was not so is devoid of any foundation.

During its sojourn in the British Museum (Natural History) our skilled 'preparateurs' have removed from the 'Baker' molar the mass of matrix which filled up the two valleys. It is now, therefore, a more hopeful task than was the case thirty years ago, to attempt to arrive at a conclusion as to the species of Trilophodont *Mastodon* to which it should be referred.

The clearing out of the matrix from the valleys in our specimen has shown that the transverse ridges and valleys have by no means the simple and clean-cut character which is found in those of *Mastodon Borsoni*. The semi-detached columns on the sides of the first and second ridges and the sharp median incision traversing the whole tooth antero-posteriorly place this tooth in that middle group of Mastodons (so far as ridge structure is concerned) occupied by *Trilophodon angustidens* and *Tetralophodon longirostris*, a group lying between the simpler *Trilophodon Americanus* and *Trilophodon Borsoni* and the complicated *Trilophodon Humboldti* and *Tetralophodon Arvernensis*.

The *Trilophodon angustidens* of Cuvier is a Middle Miocene form to which several other species are related, perhaps only as local specializations. *M. Pyrenaicus* of Falconer and *M. tapiroides* (*turicensis*) are not remote from it. Specimens are preserved in the various museums of Europe which afford an almost complete transitional series between these three species. The most striking difference between *M. angustidens* and the two others is, that it has really narrow molars whilst the others have broad ones. Our Suffolk molar is remarkably broad in proportion to its length, broader, I should say, than any penultimate upper molar I have seen.

It has not so well developed a cingulum as have typical molars of *M. tapiroides* (*turicensis*), and the ridges are not so high in proportion to the other dimensions of the tooth. In place of the oblique fold of enamel traversing the face of each ridge which is seen in *typical* (but not in all) specimens of molars referred to *M. tapiroides*,<sup>1</sup> we have here a breaking up of the transverse ridge itself into semi-detached columns. On the whole it comes nearest amongst described molars to those called *M. Pyrenaicus* by Falconer. This *M. Pyrenaicus* is essentially a *Mastodon angustidens* which is not angustident, and that perhaps is the best description which can be given of the present tooth. I should be inclined, supposing that the species '*M. Pyrenaicus*, Falc.,' is to be considered as a synonym of *M. angustidens*, Cuv., to recognize such broad molars of the *M. angustidens* type as belonging to *Mastodon angustidens*, Cuv., var. *latidens*.

In any case we have to go to the Middle Miocene for the species with which to associate this Suffolk Mastodon, and this fact is well in harmony with the age indicated by the once adhering matrix, viz., one anterior to that of the Diestien or Black Crag of Antwerp.

#### EXPLANATION OF PLATE XI.

FIG. 1, view of the upper surface, and FIG. 2, side view of the trilophodont upper penultimate molar of *Mastodon angustidens*, var. *latidens*, from the base of the Red Crag of Suffolk, preserved in the Yorkshire Philosophical Society's Museum, York. Originally figured with its valleys still filled by the peculiar Diestien matrix, which has since been removed. (See Quart. Journ. Geol. Soc., 1870, vol. xxvi, p. 507, pl. xxxiv, figs. 1 and 2.) Drawn of the natural size.

## II.—THE GLAUCOPHANE GABBRO OF PEGLI, NORTH ITALY.

By JOHN PARKINSON, F.G.S.

(PLATE XII.)

**I**N a paper published some years back on the Tuscan and Ligurian Serpentine<sup>2</sup> Professor Bonney has noticed incidentally the occurrence of glaucophane in the gabbro associated with these rocks at Pegli, a village to the west of Genoa; and later added a rather fuller description towards the end of his paper<sup>3</sup> on "The Glaucophane Eclogite of the Val d'Aoste." Last year I spent a few days at Pegli for the purpose of examining the rocks at the village and in its neighbourhood, when I found the gabbro in some abundance, in consequence, as I think, of blasting for road-making. The specimens then collected have disclosed on examination a few points of interest which may not, I hope, be deemed a superfluous addition to the accounts already published. Those have been rather numerous. Dr. G. H. Williams has briefly described<sup>4</sup> a glaucophane containing rock from this neighbourhood, which he calls an amphibolite, and, later, Stefani<sup>5</sup> has called in question the propriety of the term

<sup>1</sup> Fragments of molars showing this typical fold have been recorded by me from Suffolk: Quart. Journ. Geol. Soc., 1870.

<sup>2</sup> GEOL. MAG., Dec. II, Vol. VI (1879), p. 363.

<sup>3</sup> Min. Mag., vol. vii (1885-7), p. 5.

<sup>4</sup> Neues Jahrb. für Min. Geol., 1882, Bd. ii, p. 201.

<sup>5</sup> Boll. d. Soc. Geol. Ital., vol. vi (1887), p. 233.

