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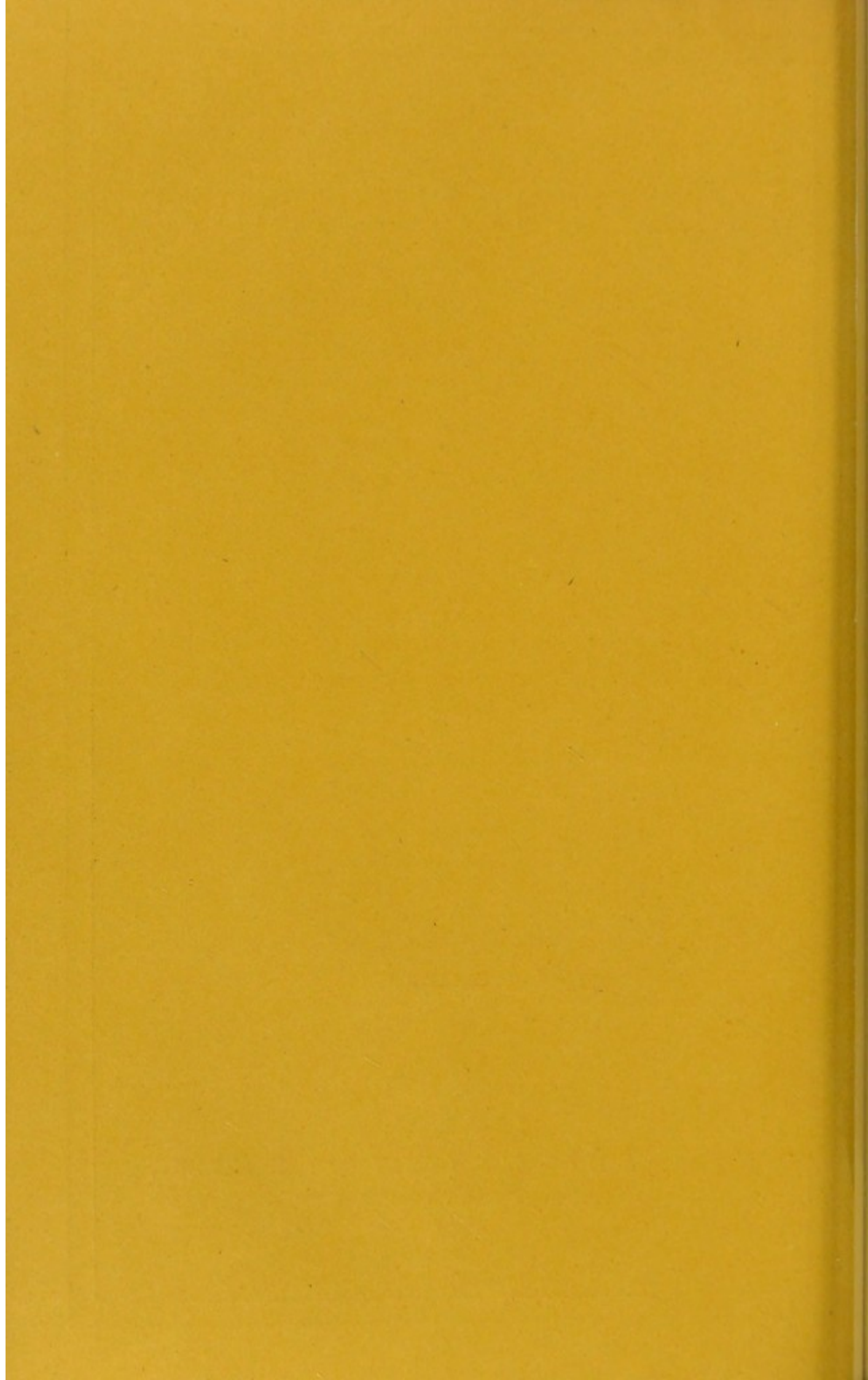
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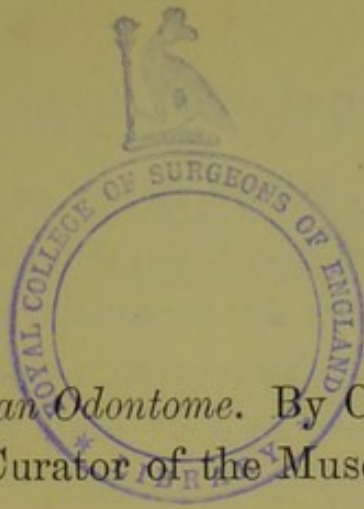
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Description of an Odontome. By CHARLES S. TOMES,
Curator of the Museum.

MR. PRESIDENT AND GENTLEMEN,—

I PROPOSE to call your attention to a specimen which has been for some years in our museum, but which, although of extreme rarity, there being only three* other similar forms of tooth-tumour recorded in the most recent works on the subject, has not hitherto been fully described.

This tooth-tumour, or Odontome, was presented to the Society by Mr. Hare, of Limerick, and was figured and described in the Transactions, † where

* Notice of the other examples of this form of tooth-tumour will be found in the following works:—1. "Des Anomalies Dentaires, et de leur Influence sur la Production des Maladies des Os Maxillaires," par A. Forget. Paris, 1869. Plate II., figs. 1 & 2. The same specimen is more fully described in "Traité des Tumeurs," par Prof. P. Broca. Paris, 1869. Tome deuxième, p. 364.—2. "Atlas zur Pathologie der Zähne," von Prof. Dr. M. Heider und Prof. Dr. C. Wedl. Leipzig, 1868. Erste Lief., Taf. II., fig. 28 und 29.—3. (Spec. 1022, Museum Royal Coll. of Surgeons) "Guy's Hospital Reports," Series 3, vol. xiv., 1869. S. J. Salter.—Art. "Diseases of the Teeth," p. 351, by S. J. Salter, in Holmes's Dictionary of Surgery.

† "Transactions of Odontological Society," vol. iii. p. 335, 1863.

it was spoken of by my father as an exostosis. Shortly afterwards, Mr. Coleman, dissenting from the view that it was an exostosis, on the ground that it was hollow, expressed an opinion that it might be a calcified cyst;* and, more recently, Mr. Salter, writing in Holmes's "Dictionary of Surgery" (*loc. cit.*), gave to it, in common with the other specimens alluded to, the name of "Hypertrophied Dilated Fang."

With the view of settling the disputed point as to the real nature of the tumour, I have lately made sections through it in two directions: one section passing vertically through the crown and roots of the tooth which surmounts the mass, and the other passing through the rounded lobe furthest removed from the tooth.

It will be superfluous for me to describe here the external characters of the specimen, as these have been detailed in the Transactions already (*loc. cit.*), but the original woodcut has been reproduced here to render the direction of the sections more intelligible: this drawing is of the natural size of the object.

Fig. 2 shows the position of the sections made. The microscopic section (fig. 3) was taken along the line *a b*; along the line *b c* the tissues displayed were, on the outside, a thin layer of

* "Transactions of Odontological Society," vol. iv. p. 4, 1865.

cementum; next to this, a layer of dentine; and within this, a solid mass of bony tissue.



FIG. 1.

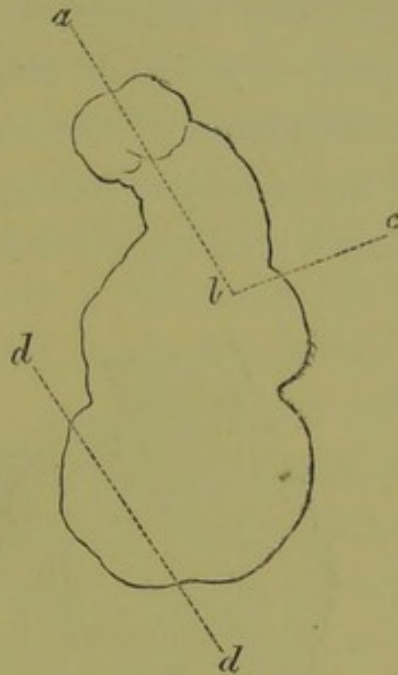


FIG. 2.

The section marked *d d* exposed only the irregular bony tissue, with its covering of cementum; no dentine was found here, even on microscopic examination.

To the naked eye the section through the tooth reveals the following appearance:—At the top is a tooth which, but for its fangs being rather small in proportion to the crown, is of tolerably normal form; the fangs are well defined, but in place of being free, they are embedded in an osseous mass, which, at a short distance below them, expands out to form the lobulated tumour.

The first great lobe is seen to be bordered by a

thin shell of whitish, translucent-looking tissue, the interior of which is filled up solid with a tissue having, to the naked eye, very much the appearance of the secondary dentine which is found in the pulp-cavities of elephants' teeth, obliterated in consequence of the irritation of a foreign body.

A microscopic examination confirms the conclusion which would have been arrived at from a

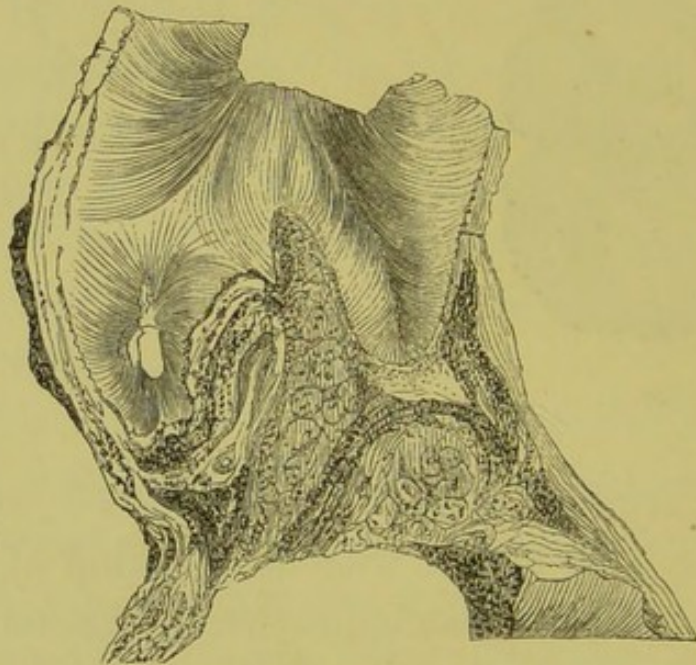


FIG. 3.

naked-eye examination, namely, that the fangs display, on a somewhat reduced scale, the structure of those of a normal tooth. The section has, unfortunately, not exactly passed along the pulp-cavities of the fangs; but the dentinal tubes radiate outwards to the periphery with great regularity, and the granular layer of the dentine is unbroken and continuous all round their surface. The outer

layers of cement which coat the fangs at the neck of the tooth, are continued round the outer surface of the whole tumour, thus indicating that the whole mass was contained inside the tooth-capsule; while some layers are reflected inwards, and form a covering to the inner surface of the fangs.

The great bulk of the growth, which is solid at its upper, and more or less hollowed out at its lower portions, is made up of an irregular bone-like tissue, with—especially in the neighbourhood of the tooth—indications of contorted stratification. At a little distance from the tooth, at the right-hand lower corner of the figure, is seen a thin band of dentine, running parallel to the surface of the tumour, and overlaid by a few layers of cementum. This is the upper edge of that shell of dentine, previously alluded to as forming a coating round the upper of the two great lobes; from the lower lobe it is entirely absent,—at all events, where the section has been made.

The dentinal tubes in this shell of dentine run, as a rule, in a direction perpendicular to the surface, though at the free edges of the shell they are rather irregularly disposed; the internal surface of this dentine shell is in many places hollowed out by those sinuous concavities generally held to be the result of absorption: these are everywhere filled with bone-like tissue, so that the interior of this shell presents very much the appearance of the figure copied from Heider and

Wedl, by Mr. Henry, in the last month's Transactions.

The study of these sections must, I think, lead to some alteration in the views which were expressed on the nature of the tooth-tumour after an external examination, before any sections had been made of its substance; in face of the facts which these sections have disclosed, it can hardly be considered either as an exostosis or as a calcified cyst. For the presence of a layer surrounding, like a shell, a considerable portion of the mass, shows that the whole must, in the first instance, have been a dentinal pulp, in which, for a time, the normal process of calcification went on at the surface, so as to form a skin of dentine, but afterwards gave place to a form of calcification leading to the production of a bone-like substance, in parts not unlike secondary dentine, blocking up the interior of the shell.

The question then arises whether we should adopt the name given by Mr. Salter (*loc. cit.*), viz., "Hypertrophied Dilated Fang;" this name being based on the appearances presented by a specimen in the museum of the College of Surgeons, in which the only section made lies, like the second section * spoken of in the tumour under consideration, far away from the fangs of the tooth; hence the relations of the morbid growth (which is seen

* Fig. 2, *d* *d*.

to consist of a shell of dentine surrounding a bone-like tissue) with the fangs of the tooth is not at all shown.

And as far as can be learnt from their figure, the specimen recorded by Heider and Wedl has been treated in the same manner, so that nothing can be learnt from it of the condition of the fang. In the case recorded by Forget, one of the three fangs is slightly deformed, the other two remaining normal; but it could by no means be said to be "dilated;" it is rather crushed, and, moreover, no shell of dentine encircles the tumour; in fact, Prof. Broca (*loc. cit.*) states distinctly that no dentine enters into the constitution of the mass.

The use of the term "hypertrophied dilated fang" would lead to the inference that the whole mass took the place of, or, more strictly speaking, actually was one or all of the fangs of the tooth. Now, such a view is not at all borne out by the specimens examined: in two out of the four described by recent authors, nothing whatever is known of the fang, whilst in the remaining two the fangs are seen to be fairly regularly developed, and neither "dilated" nor "hypertrophied."

The use of the term, therefore, seems to me undesirable, as it is descriptive of a state of things which, indeed, possibly may occur, but which has not yet been demonstrated in any specimen, and which certainly does not exist in the only two which have been fully examined.

Prof. Broca, in whose work is a most exhaustive and instructive account of odontomes, does not appear to have met with a precisely similar case, but he has provided in his classification of these bodies for its occurrence, and he would term it an "Odontome Radiculaire Dentinaire" (*op. cit.*, p. 300); that is to say, a tooth-tumour resulting from an outgrowth from the formative dental pulp, *at a period when the fangs were already in great part complete.*

This offset of the pulp and the dentine resulting from its calcification, may or may not retain its primitive connection with that part from which it springs; in the present instance, the true dentine constituting the shell is not seen to be in continuity with that of the fang, but it approaches very nearly to it at one place: at this point, however, the direction of the tubes in the normal and abnormal portions is such, that it does not suggest their fusion at any point in that immediate neighbourhood. However, even though there be actual continuity at some unseen part, this does not greatly affect the matter, for no one can doubt that the pulp which by its calcification constituted the tumour, was derived from the pulp of the tooth; the reason that the name "Odontome Radiculaire" is preferred, being that it is descriptive of the origin of the tumour, whereas the term "Hyper-trophied Dilated Fang" indicates a state of things which has never yet been demonstrated.

Description of an Odontome. By CHARLES
S. TOMES, Esq., Curator of the Museum.

LIKE the somewhat similar Tooth-tumour, which I described at the last meeting of the Society, this specimen has lain for several years in my father's collection in the Museum, but I am unable to discover any published description or figure of it.

The tooth from which it springs is a right lower molar of a horse, which has been but little altered either in size or shape, although there is attached to it this enormous mass, five or six times as large as the tooth itself and weighing upwards of 10 oz.

The great bulk of the mass lies in front of the tooth, though a portion extends over the outside; hence the anterior and external surfaces of the tooth are covered up by the new growth, which is accurately adapted to them, though it is only attached by a comparatively small pedicle to the outer surface of the crown. This is well seen where the greater part of the mass has been broken away from that which is in the immediate neighbourhood of its pedicle. It is noteworthy that

the tooth proper is covered by its external layers of cementum in a perfectly normal manner, even where it was overlaid by the new growth being accurately moulded to its surface, indicating that the development of at least that portion of the tumour was subsequent to the completion of that region of the tooth.

Looking on the fractured surfaces, the mass is seen to consist of a dense shell, from which run stalactite-like processes, which more or less completely obliterate its central cavity.

The figure represents the upper surface, a part of which is deeply worn and grooved by the opposing teeth in mastication, a fact which would seem to indicate that the internal hollows were occupied by a living pulp; for, were it otherwise, it is difficult to suppose that it would have been sufficiently free from tenderness and pain to be useful in mastication: these hollows would have become occupied by various decomposing matters, which would have infallibly set up irritation in the surrounding tissues; moreover, the fact above mentioned, as to the tooth proper being covered with cement, shows that this mass was continuing to grow for some length of time, and moulding itself around pre-existing hard structures. In this way was produced the impression of the next tooth in front of it (at the point marked *a* in the figure), which was obviously much displaced by the advancing growth.



Looking down on the surface worn by mastication, we see (at the left-hand upper corner of the figure) the crown of the tooth, with the complex pattern characteristic of a horse's lower molar quite unaltered; this tooth, the internal and posterior surfaces of which are free, whilst the anterior and external surfaces are imbedded in the growth, formed a part of the masticating surface.

The remaining portion, which is grooved and worn by mastication, presents a polished, smooth surface, with holes in places, and consists of one single histological structure—namely, cementum.

In the section made I did not discover any dentine or any enamel, and herein it differs from the Odontome described last month.

Nevertheless, although made up solely of cementum, the name exostosis is not altogether appropriate to it. In exostosis, successive layers

of cementum are added concentrically, layer after layer, on the surface of those already deposited; but we do not meet with huge independent outgrowths, springing away from the tooth, and wrapping themselves round, and modelling themselves upon, the hard structure with which they come in contact.

Moreover, microscopic examination of the mass shows that there is a structural difference between the external dense shell above mentioned, and the more internal parts of the mass. The outside consists of numerous parallel laminae of cementum, not differing in any marked character from that which covers the fangs ordinarily in the herbivora. Inside this laminated covering there is a tissue quite devoid of anything like lamination, in which numerous bone-corpuscles are found, and an abundance of those globular forms which are seen in secondary dentine or in dentine of very imperfect formation. In places, those festooned outlines, considered as characteristic of absorption,* are traceable, the notches being occupied by large bone-corpuscles. In fact, there is, in one place, a minute fragment with sharply-defined edges, on the one side straight, and on the other deeply festooned, which lies imbedded in this central mass of osteoid tissue, and reminds me very strongly of the appearance

* Cf. figure in Tomes's "Dental Surgery," p. 78.

presented by the inner surface of the dentine shell of the Odontome described last month.* I should not, therefore, feel greatly surprised if sections taken in other places should reveal the existence of dentine in the mass, particularly as its structure corresponds very closely with that revealed by the section marked *d d* in the first-described specimen, where, it will be recollected, no dentine was seen.

The whole outgrowth springs from a smallish pedicle in the median groove which traverses the surface of a horse's tooth; from this point a soft mass seems to have grown, wrapped round three sides of the tooth, and extended forwards along the jaw.

This outgrowth may have originated from two sources: it may have sprung from the dentinal pulp, and so be of similar origin to that described last month; or it may have had nothing to do with the dentine and its pulp, and be referable both in its origin and its after-development to the cement. If this latter explanation be the true one (and it is one to which I should have very strongly inclined had it not been for the existence of that one minute fragment of tissue, too small to clearly identify, which looked so suspiciously like dentine), it is an argument in favour of the existence of a special "cement organ" in the

* Trans. Odon. Soc., Jan. 1872, p. 85.

herbivora. The existence of this special cement organ is strongly insisted on by Robin and Magitot,* and is adopted by Professor Broca, who explains, in this manner, the occurrence of all those tumours arising in connection with the teeth of herbivora with which he has met;† but the existence of a cement organ is altogether denied by Waldeyer.‡ If we adopt Professor Broca's classification of Odontomes, this specimen would probably be referable to his class of "Odontômes coronaires cémentaires," and could only have arisen in an animal having a special cement organ; for the sharp differentiation between its central, confused structure, and the regular well-defined laminae of cement which surround it, entirely precludes the idea that it could have been wholly formed from the tooth-capsules, which these external laminae probably were. But if, on the other hand, it be held to have arisen from the dentine pulp, the existence of such a tooth-tumour throws no light on this vexed question of the existence of a cement organ.

Whatever may be the cause, these outgrowths

* Ch. Robin et E. Magitot, *Mémoire sur la Genèse et le Développement des Follicules Dentaires*. Paris, 1860, p. 145, et seq.

† Broca, *Traité des Tumeurs*, p. 350.

‡ Stricker, *Human and Comparative Histology*, New Sydenham Society Translation, 1860, p. 490.

seem not to be so very uncommon in the teeth of horses, though I am unable to find any record of one attaining to the dimensions of this specimen. Other examples will be found figured in Broca's work (pp. 352, 353); in Forget, "Des Anomalies Dentaires, et de leur Influence sur la Production des Maladies des Os Maxillaires," and in Owen's "History of British Fossil Mammalia."

It is hardly necessary to discuss the appropriateness of the term "Hypertrophied Dilated Fang," for describing this specimen, for it is apparent to the naked eye that the fang is perfectly distinct from the tumour, which takes its origin much higher up, in fact, from the crown of the tooth; yet any nomenclature which would separate the present specimen widely from that described last month, would be manifestly imperfect; hence this specimen furnishes an additional argument, if one were needed, for rejecting the term "Hypertrophied Dilated Fang," as descriptive of this class of tumours.

