

I. *An Account of Elephants Teeth and Bones found under Ground.* By Sir Hans Sloane, Bart.

IT is observable, that among the vast Variety of extraneous Substances lodged and found in several Layers of the Earth, at considerable Depths, where it is impossible that they should have been bred, there are not so many Productions of the Earth, as of the Sea. And again, among those which must have originally belonged to the Earth, there are many more remains of Vegetables, than of Land Animals. It appears, however, by the Histories of past Times, and the Accounts of many, both antient and modern Authors, that Bones, Teeth, nay sometimes very near entire Skeletons of Men and Animals have been dug up in all Ages of which we have Histories, and almost in all Parts of the World, whereof those, which were the most remarkable for their unusual Size, have been also the most taken Notice of. Thus, for Instance, they have found in *Ireland*, the Horns, Bones, and almost entire Skeletons of a very large Sort of Deer, which is commonly believed to have been the Mouse-Deer, an Animal of an uncommon Size, some of which Kind are thought to be still alive in some remote and unfrequented Parts of the Continent of *America*. I shall in this Paper confine my self chiefly to the Elephant, and such Bones, *dentes exerti*, Tusks and Teeth of this Animal, as are either in my own Possession, or have been mentioned by Authors I have

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met with, to have been found under Ground. And first, as to those Fossil Teeth in my own Collection, which unquestionably once belonged to Elephants, I shall here produce the following.

N^o 116 of my Catalogue of Quadrupeds and their Parts, is the *dens exertus* of an Elephant, which was taken up, 12 Foot deep, from among Sand, or Loom, as they were digging for Gravel by the End of *Gray's-Inn-Lane*, near *London*, and preserved with tying it about with Whale-bones and Tape, to keep it from falling to Pieces, by *Mr. Conyers*, an ingenious Apothecary, and a great Collector of Curiosities of all Kinds.

As the greatest Part of this Tooth was fallen to Pieces, nothing could be determined about its Length, when entire. The largest Piece, and also the most entire, hath five Inches and $\frac{2}{10}$ in Length, and 9 Inches and $\frac{6}{10}$ in Circumference, consequently something more than 3 Inches in Diameter. This Piece belonged to the Basis, or Bottom of the Tooth; I mean, that Part by which it is articulated with the Head, as appears by a Cavity in form of a Cone, which all these Tusks have at Bottom, and which was filled, in this, with the Sand of the Gravel-pit wherein it was found.

The Condition this Tooth was found in, suggests the two following Remarks. It shews in the first Place, how far the subterraneous Steams are apt to calcine Substances of this Kind, which was done in this Tooth to such a Degree, that it was grown extream brittle, and ready to fall to Pieces, and had moreover acquired an astringent Quality common to calcined Substances of this Kind, which makes them stick pretty close, when held to the Tongue. They had altogether the same effect on
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the very large Skeleton, found near *Drapani* in *Sicily*, and mentioned by *Boccatius*, on that remarkable one found near *Tonna*, which hath been described by *Tentzelius*; as also on two Teeth found in *Northamptonshire*, which I shall next take into consideration. However it doth by no means follow from thence, that all Teeth and Substances of this Kind undergo the like Calcination by lying long under Ground, forasmuch as there are others, as those found in *Island*, and sent to *Thomas Bartholin*, which were turned to a perfect hard, flinty Substance. It serves, in the second Place, to ascertain the Structure of these Teeth, and consequently of Ivory in general, to be Layer upon Layer, or Coat upon Coat, like the Skins in an Onion, or rather the annual Circles, or Rings in Trunks of Trees. That this Tooth is composed of different Coats, surrounding and placed upon each other, is very apparent by the largest Piece remaining (Fig. 1.). I have already observed, that this Piece belonged to the Basis of the Tooth, and there appear in it very visible marks of nine Coats, some whereof have about one tenth of an Inch in thickness. Towards the further End of the Tooth, where it tapers almost into a Point, these several Coats also join together into two or three, and those pretty considerably thick (Fig. 2.). With some Care these Coats might be farther sub-divided into a considerable Number of other smaller ones, perhaps no thicker than a common Parchment. Farther, the very manner of its falling to pieces is an evident Proof of its Structure, all the Fragments being concave within, and convex without, and the Lines of Convexity and Concavity, Fragments of concentrick Circles, which the several Coats composed, when entire. *Thomas Bar-*

tholin, in his Treatise *De Unicornu* *, takes Notice, that Part of a fossil *Unicorn's Horn* having been calcined by Order of *Christian IV.* King of *Denmark*, it was found to be composed, after the same manner, of thin Layers upon Layers; whence he infers, that it was not the Horn of an Animal, as was commonly pretended, but a Tooth, and namely the Tooth of a Sort of Whale in the Northern Seas, called *Narwhal*, as he had afterwards an excellent Opportunity to verify by one of these *Unicorn's Horns* still sticking in the Skull of the Creature, which was sent to *Wormius* by *Thorlacus Scutonium*, Bishop of *Island*. Nor is this Structure by any means to be looked upon as an Effect of the Calcination, whither brought about by the subterranean Steams, or by a chymical Trial, but is natural to the Tooth, as appears in some measure by a Piece of Ivory, marked 1181 (Fig. 3.); but still more plain in another marked 731, where several of these Coats are by some Disease in the Tooth actually separated from each other, like the Leaves of a Parchment Book, the Ivory on the other Side being still firm and close (Fig. 4.). This Structure appears likewise from the Teeth of the very young Elephant which died at *London*, where the uppermost Coat, being very moist, cracked upon drying, and broke at the Top.

N^o 750, is Part of another *dens exertus*, which I had from the Reverend Mr. *Morton*, who in his Natural History of *Northamptonshire* †, gives the following Account of it: *An extraordinary Elephant's Tooth, one of those which grow out of the upper Jaw, and which for their Magnitude and Length,*

* *De Unicornu observationes novæ, pag. 102.*

† *Pag. 252.*

have by some Writers been accounted Horns, was lately taken out of the Earth by digging in Bow-don-parva Field. Even the native Colour of it hath been in great measure preserved; but it is become brittle with lying in the Earth; and was broken into three or four Pieces transversely by the Diggers in taking it up. The two larger Pieces of it, which happily came into Mr. Haldford's Hands, were presented to me. One of them is somewhat above a Yard; the other is two Foot in Length; but the whole Tooth must needs have been at least six Foot long;—the thickest Part of the biggest Piece in my Possession is sixteen Inches round. The Tooth lay buried above five Foot deep in the Earth. The Strata from the Surface downwards to the Place where the Tooth was lodged, were as follows: 1. The Soil 13 or 14 Inches. 2. Loam, a Foot and a Half. 3. Large Pebbles, with a small mixture of Earth amongst them, two Foot and a Half. 4. Blue Clay. In the upper Part of this Stratum the Tooth was found. Thus far Mr. Morton. That Part of this Tooth, which is now in my Hands, bears again very visible Marks both of the Calcination it underwent by lying in the Earth, and of its laminated Structure (Fig. 5.).

N^o 1185, is the *dens exertus*, or Tusk of an Elephant, remarkable for its large Size, and for its being so very entire. It was found under Ground in *Siberia*, and was brought from thence and given to me by Mr. *Bell*, an ingenious Surgeon, who was presented with it by the Governor's Lady, in Lieu of a Reward for having cured her of a Distemper, upon his travelling through the Country in his passage with the Caravan sent to *China*. It is very entire, of a brownish Colour,

Colour, and hollow at Bottom like other Elephants Teeth, one of which it plainly appears to be. From the Basis, measuring along the outward Circumference to the small End, it is 5 Foot 7 Inches long, and along the inward Circumference 4 Foot 10 Inches. Measuring from the Inside of the Basis to the small End in a streight Line, the Distance is of 3 Foot 10 Inches and a Half. At the Basis, where thickest, it measures one Foot six Inches round, and is there six Inches in Diameter: It weighs 42 Pound. The like Tusks, and other Bones of the same Animal, that is, of the Elephant, are found in sundry Parts of *Siberia* to a considerable Quantity, and the Tusks and Teeth in particular, when less corrupted, are used all over *Russia* for Ivory. *Henricus Wilhelmus Ludolfus*, in the Appendix to his *Russian Grammar* *, mentions them among the Minerals of *Russia*, by the Name of *Mam-motovoikost*, and takes Notice, that the *Russians* believe them to be the Teeth and Bones of an Animal living under Ground, larger than any one of those above Ground. They use it in Physick in Lieu, and for the same Purposes with the Unicorn's Horn; and *Ludolfus* himself having been presented with a Piece by one of his Friends, who said, He had it from a *Russian* of great Quality, lately returned from *Siberia*, found it to be true Ivory. He adds, That the most sensible among the *Russians* affirm them to be Elephants Teeth brought thither at the Time of the Deluge. The Description of these Teeth and Bones given by *E. Tsbrants Ides* †, is still more extensive, and withal so particular, that his whole Passage deserves to be transcribed at Length. *Amongst the Hills*, says he,

* Pag. 92.

† In his Travels from *Mosco* to *China*.

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which are situate to the North-East of Makofskoi, not far from thence, the Mammut's Tongues and Legs are found; as they are also particularly on the Shores of the Rivers Jenize, Trugan, Mongamsea, Lena, and near Jakutskoi, to as far as the frozen Sea. In the Spring, when the Ice of this River breaks, it is driven in such vast Quantities, and with such Force by the high swollen Waters, that it frequently carries very high Banks before it, and breaks off the Tops of Hills, which falling down, discover these Animals whole, or their Teeth only almost frozen to the Earth, which thaw by Degrees. I had a Person with me to China, who annually went out in Search of these Bones: He told me, as a certain Truth, That he and his Companions found a Head of one of these Animals, which was discovered by the Fall of such a frozen Piece of Earth. As soon as he opened it, he found the greatest Part of the Flesh rotten, but it was not without difficulty, that they broke out his Teeth, which were placed before his Mouth, as those of the Elephant are; they also took some Bones out of his Head, and afterwards came to his fore Foot, which they cut off, and carried Part of it to the City of Trugan, the Circumference of it being as large as that of the waste of an ordinary Man. The Bones of the Head appeared somewhat red, as though they were tintured with Blood. Concerning this Animal there are very different Reports. The Heathens of Jakuti, Tungusi, and Ostiacki, say, That they continually, or at least by reason of the very hard Frosts, mostly live under Ground, where they go backwards and forwards; to con-

firm which, they tell us, That they have often seen the Earth heaved up, when one of these Beasts was on the March, and after he was past the Place, sink in, and thereby make a deep Pit. They further believe, that if this Animal comes so near the Surface of the frozen Earth, as to smell, or discern the Air, he immediately dies, which they say is the Reason that several of them are found dead on the high Banks of the River, where they un-awares come out of the Ground. This is the Opinion of the Infidels concerning these Beasts, which are never seen. But the old Siberian Ruffians affirm, that the Mammuth is very like the Elephant, with this only Difference, that the Teeth of the former are firmer, and not so straight as those of the latter. They also are of Opinion, that there were Elephants in this Country before the Deluge, when this Climate was warmer, and that their drowned Bodies floating on the Surface of the Water of that Flood, were at last washed and forced into subterranean Cavities: But that after this Noachian Deluge, the Air, which was before warm, was changed to cold, and that these Bones have lain frozen in the Earth ever since, and so are preserved from Putrefaction till they thaw and come to Light, which is no very unreasonable Conjecture; though it is not absolutely necessary that this Climate should have been warmer before the Flood, since the Carcasses of drowned Elephants were very likely to float from other Places several hundred Miles distant, to this Country, in the great Deluge which covered the Surface of the whole Earth. Some of these Teeth, which doubtless have lain the whole Summer on the Shoar

Shore, are entirely black and broken, and can never be restored to their former Condition, but those which are found in good Case, are as good as Ivory, and are accordingly transported to all Parts of Muscovy. The above-mentioned Person also told me, That he once found two Teeth in one Head, that weighed above 12 Ruffian Pounds, which amounts to 400 German Pounds; so that these Animals must be of Necessity very large, though a great many lesser Teeth are found. By all that I could gather from the Heathens, there is no Person ever saw one of these Beasts alive, or can give any Account of its Shape. Thus far *E. Ysbrant Ides*. What he observes of those Teeth that are black and broken, may serve as a Comment to the following Passage of *Pliny* *: *Theophrastus autor est, & ebur fossile candido & nigro colore inveniri, & ossa è terra nasci, inveniri que lapides osseos*. *Lawrence Lang*, in the Journal of his Travels to *China*, whither he went with Dispatches from His *Czarish Majesty* in 1715, takes Notice of these Bones †, as being found about the River *Jenisei*, and towards *Mangasea*, along the Banks, and in the Hollows occasioned by the Fall of the Earth. He calls them *Maman-bones*, and informs us, that some of the Inhabitants are of Opinion, that they are no real Bones, Teeth, &c. but a Sort of *Cornu Fossile*, that grows in the Earth, and that others will have them to be the Bones of the *Behemoth* mentioned in the 40th Chapter of *Job*, the Description whereof they pretend fits the Nature of the Beast, whose Bones and Teeth they are imagined to be, those supposed Words, in particular, that he is caught with

* Lib. xxxvi. C. 18.

† Present State of *Russia*, Vol. II. pag. 14.

his own Eyes, agreeing with the *Siberian* Tradition, that the *Maman* Beast dies upon coming to Light. The same Author affirms, from the Report, as he says, of credible People, That there have been sometimes found Horns, Jaw-bones and Ribs, with fresh Flesh and Blood sticking to them. The same is confirmed by *John Bernard Muller*, in his Account of the *Ostiacks* *, who adds, That the Horns in particular have been found sometimes *all bloody at the broken End, which is generally hollow, and filled with a Matter like concremented Blood*; that they find, together with these Teeth, or Horns, as he calls them, the Skull and Jaw-bones with the Grinders still sticking in them, all of a monstrous Size; and that he himself, with some of his Friends, hath seen a Grinder weighing four and twenty Pounds, and better; that the Inhabitants make divers Sort of Works of these Teeth, and that they are mostly to be met with in the coldest Places of *Siberia*, as for Instance, *Jakutsky, Beresowa, Mangasea, and Obder*. He likewise gives the Description of one of these Animals, from the Accounts of several Persons, who assured him, That they had seen them in the Caverns of the high Mountains beyond *Beresowa*: But as this Description hath very much the Face of a Fable, I forbear inserting it here. The Author of the *Present State of Russia* † observes, that some of the *Swedish* Prisoners banished into *Siberia*, got their Livelihood by turning Snuff-boxes out of these Teeth; and in another Place ‡ he mentions them among the *Siberian* Commodities, of which the Czar hath the Monopoly.

* *Ibid.* pag. 52. † Vol. I. pag. 12. ‡ Pag. 78.

The Accounts which I have hitherto given of these *Maman*-bones and Teeth, or at least their most essential Parts, are confirmed by a Letter of *Basilius Tatischev*, Director General of the Mines in *Siberia*, and Counsellor of the Czar's Metallick Council, wrote to the learned *Ericus Benzelius*, now Bishop of *Gothenburg*, and printed in the *Acta Literaria Sueciae* (M. DCC. XXV. *Trimestre Secundum*, pag. 36.) wherein he mentions the following Pieces he had in his own Possession: A large Horn, as he calls it, or Tooth, weighing 183 Pounds, which he had the Honour to present to his *Czarish* Majesty, and is now kept in the Czar's Collection of Curiosities at *Petersburg*; another large Horn, which he presented to the Imperial Academy at *Petersburg*; another still larger than either of these two, which he caused to be cut, and carved himself several Things of it, the Ivory being very good; Part of the Skull, corrupted by having lain in the Ground, and so large, that it seemed to him to be of the same Size with the Skull of a great Elephant; the Forehead in particular was very thick, and had an Excrecence on each Side, where the Horns usually stick to it, which Excrecence however, as the Author observes, was so small, as to make him doubtful, whether or no there was ever any Horns stuck to them. The Cavity, wherein the Brain was lodged, was exceedingly small in Proportion to the Bulk of the Skull. He had found also a spongy Bone of a Foot and a Half in Length, and three Inches in Breadth, sticking to the Skull, and of a conical Figure, whence he conjectured, that it served to support one of the Horns, which is observed also in other Animals that bear Horns: Lastly a Grinder, which had

ten Inches in Length, and six Inches in Breadth, besides several of the Ribs, Shank-bones, and other Bones found from Time to Time, which the Author forbore mentioning. The same Author hath taken no small Pains to inquire into the true State of those Pits and Hollows which the Pagan Inhabitants of *Siberia* say, these Animals make when they walk under Ground, and found that they were nothing but Caverns, such as are common in other mountainous Countries, and are owing to the Force of subterranean Rivers and Cataracts, which at last eat through and undermine the Places where they pass, so as to make the Ground above them give Way and sink in. This is what I found remarkable in this Letter of Mr. *Tatishow*. I cannot forbear adding, that although the Author hath left the grand Question about the Origin of these Bones undetermined, yet his Observations seem to me to contribute very much to establish the Opinion above related, that these Bones are the Bones, and the Horns, as he calls them, the Tusks of Elephants drowned in the universal Deluge. It is to be hoped, that this Matter will one Time or other be set into a still clearer Light, particularly after the Order his late *Czarish* Majesty was pleased to give to the Governor General of *Siberia*, to spare no Care nor Cost to find a whole Skeleton of this Animal, and to send it to *Tatishow*.

Before I proceed farther, I will beg Leave to add one Observation of *Cornelius le Brun*, who in his Travels through *Russia* to the *East-Indies*, tells us, That in the Neighbourhood of *Veronitz* they had found several Elephants Teeth on the Surface of the Ground, which no Body could tell how they came thither,

thither, and that the Czar's Opinion about them was, that *Alexander* the Great, when he passed the *Tanais*, or *Don*, advanced as far as *Kostinka*, a small Town eight Werfts from thence, and that probably some of his Elephants died there, of which those Teeth were the Remains.

N^o 764 of my Collection, is one of the Grinders of an Elephant, which was likewise found in *Northamptonshire*, for the Description whereof I shall again borrow the Reverend Mr. *Morton's* own Words *. *Northwards*, says he, *about fifty Yards from this Place*, (where the above-mentioned *dens exertus* was found) *was also digged up one of the Molares, or Grinder-teeth of an Elephant, perhaps of the same that the Tusk belonged to. The Grinder whole, or however all the Pieces of it I could find (for it was broken into three or four in taking it up) being put together as they grew, exhibit 13 or 14 parallel Lamellæ; each of which extends the whole Length, and almost the whole Thickness of the Tooth; and of these for the Main it is composed. But in a live, or perfect Tooth, these Lamellæ do not appear so plainly, being in Part crusted over with a white osseous Crust, or Integument, which in this Fossil Tooth is almost wholly perished and gone, insomuch that the Lamellæ are more exposed to View. From the Root to the Top in the longest Part, which is near the Middle of it, it is just seven Inches long. Its Thickness in the thickest Part of the Root, which is also near the Middle of it, is almost three Inches, and it is a little above eight Inches broad: Measuring it this*

* Natural History of Northamptonshire, C. iii. §. cxxxv. pag. 252.

*Way, we take in the whole Pile of the Lamellæ. None of the Lamellæ are contiguous; there interposes betwixt them a thinner Plate of a whiter Colour, and a laxer Texture. Three or four of the outmost at one End of the Pile, appear undulated at the Top of the Tooth, are near as broad at Top as at the Root, and have a blunt Ending. The rest of them are by Degrees contracted to a Point, are gradually shorter and shorter to the other Extremity of the Pile, and also bend a little over one another. And each of them, as it approaches the Top, divides, as it were, into several smaller Teeth; and with these the Lamellæ of this Figure terminate. The above-described Tooth was lodged at almost twelve Foot Depth in the Earth. Above it were the following Strata: 1. The top Earth, a blackish, clayey Soil, about 16 Inches. 2. Sandy Clay intermixed with Pebbles, five Foot. 3. A blackish Sand with small white Stones in it, one Foot. 4. A loamy, softer Sort of Gravel, one Foot. 5. A sharper Gravel, about two Foot. The Tooth was found a Foot and a Half deep in this Stratum of Gravel. Below this fifth Stratum there was a blue Clay. Thus far Mr. Morton. It is very visible, that this Grinder also, by lying in the Earth, hath undergone the same Alteration with the Tusk above described found in *Bowdon-parva* Field.*

N^o 119, and 120, of my Catalogue, are two Pieces of another large Grinder, very probably of an Elephant toe, turned to a very hard, stony, and almost metallick Substance.

N^o 121 is a Piece of the *Molaris*, or Grinder of an Elephant, where the undulated Lamellæ are set very close to each other. N^o

N^o 122 is a Piece of another Grinder, perhaps of an Elephant. It hath very apparent Marks of being fossile, as well as the preceding, and is farther remarkable, for that a petrifying Substance being got between the Lamellæ hath very considerably separated and divided them from each other, in such a Manner, that they appear to have been set very loose.

N^o 427, of my Collection of Quadrupeds and their Parts, is Part of an Elephant's Skull which was found at *Gloucester* after the Year 1630, together with some large Teeth, some five, others seven Inches in Compass, according to a short Inscription wrote upon this very Piece.

N. B. Tab. 11. Fig. 7. is one of the Tusks of the young Elephant that died at *London*, of which Mention hath been made above.

II. *Observationes Astronomicæ à R. P. Joh. Baptista Carbone transmissæ, communicante H. de Seguera Samuda, M. D. R. S. S. & Coll. Med. Lond. Lic.*

Observatio Solaris Eclipsis propè Ulyssiponem habita die 15 Septembris Manè 1727. N. S. à P. Joanne Baptista Carbone S. J.

IN *Prædio*, quod est occidentalius nostro Collegio D. Antonii M. 4^{te} hor. circiter, & cujus Latitudo Quadrante astronomico trium pedum explorata, est 38° 42' 58'', observavi hanc Eclipsim Telescopio pedum circiter 8, quod micrometro instruxeram vite comparato. Initium infra horizontem celebratum est; jamque digitos circiter 4 deficiebat Sol, quando ex opposito monte primò emerfit. Sequentes tamen phases
observari

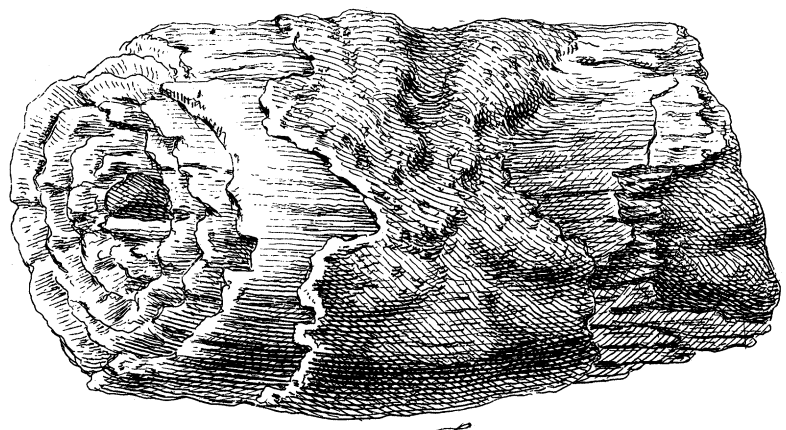


Fig. 2.

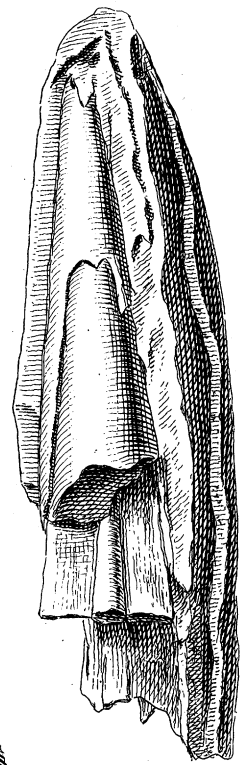


Fig. 3.

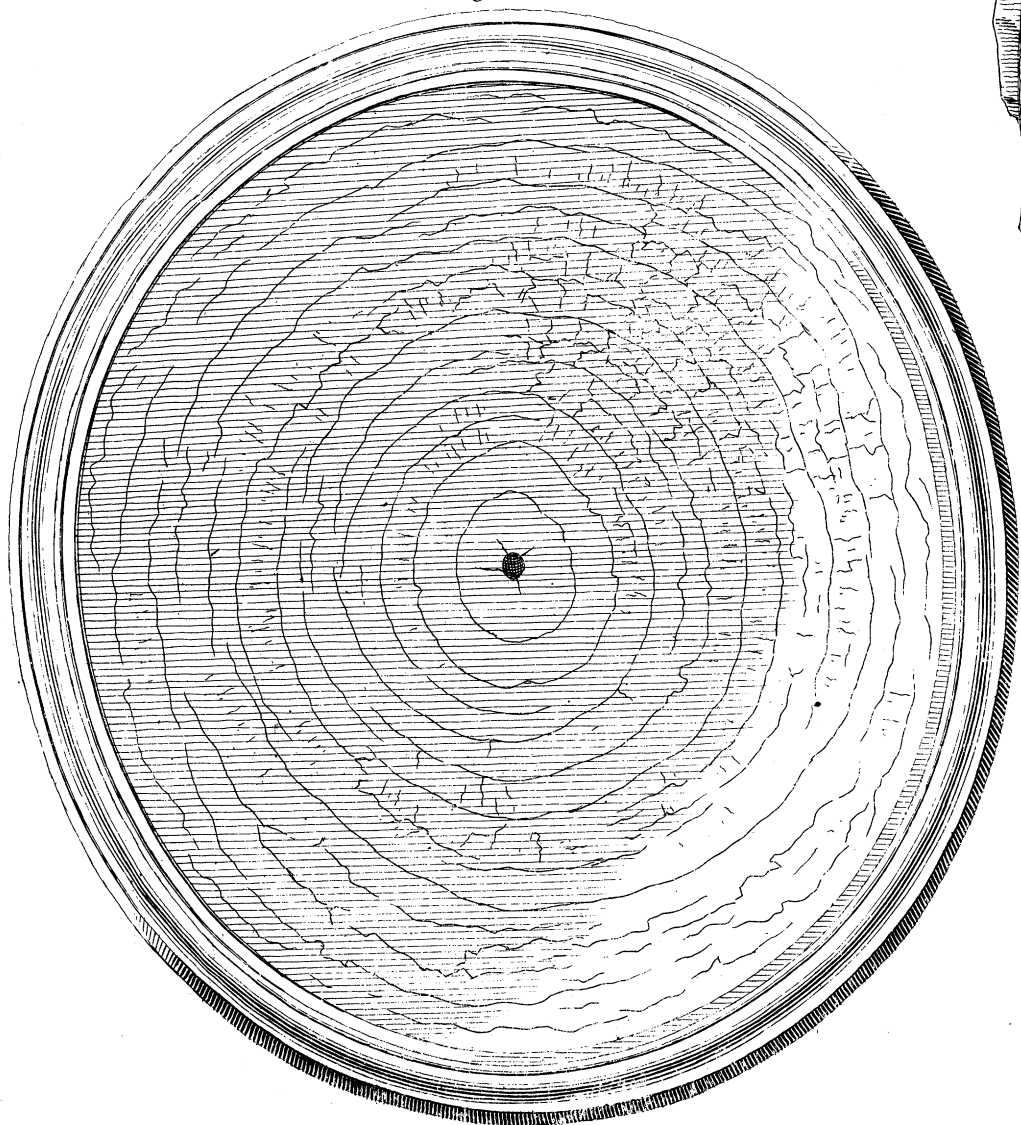




Fig. 4.

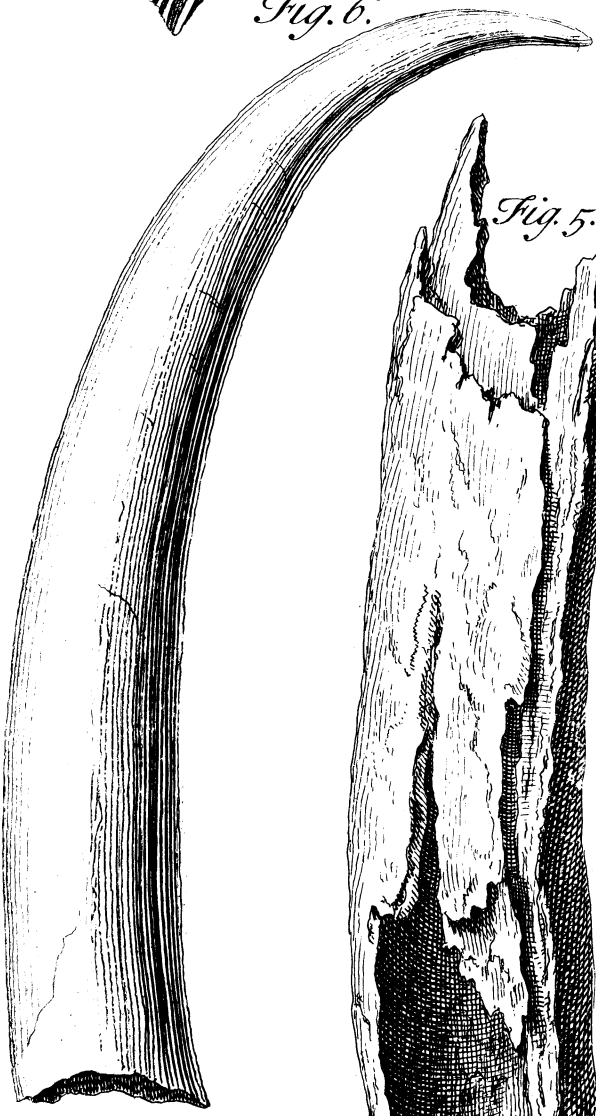


Fig. 6.

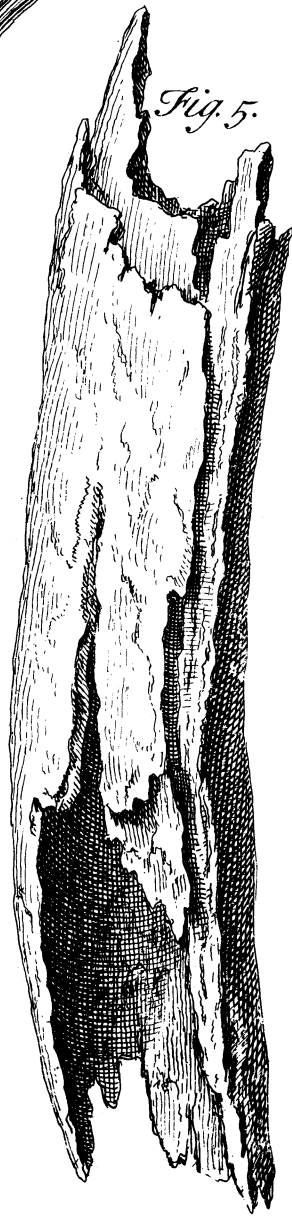


Fig. 5.

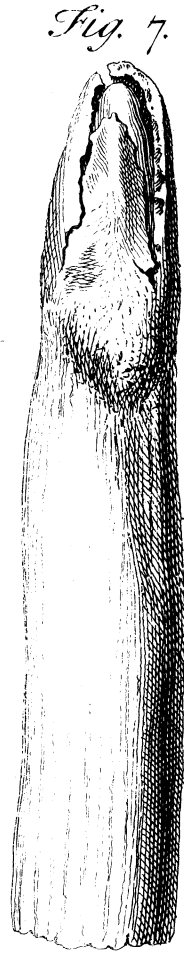


Fig. 7.

Fig. 8.



Fig. 9.



Fig. 10.



Fig. 11.

