

XXVIII. *Some Account of the fossil Remains of an Animal more nearly allied to Fishes than any of the other Classes of Animals.*
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THE study of comparative anatomy is not confined to the animals that at present inhabit the earth, but extends to the remains of such as existed in the most remote periods of antiquity; among these may be classed the specimen which forms the subject of the present Paper.

That the bones of the elephant, rhinoceros, hippopotamus, crocodile, and of many other animals should be met with in a fossil state in this island, in such numbers as to make it appear that at some distant period they were inhabitants of Great Britain, is perhaps one of the most wonderful circumstances that occurs in the history of the earth.

To discover the changes that have taken place in our globe, which can account for the remains of animals only fitted to live in warm climates being found in so northern a situation; and to explain the circumstance of human bones never having been met with in a fossil state, is the province of the geologist. To examine such fossil bones, and to determine the class to which the animals belonged, comes within the sphere of inquiry of the anatomist, and considerably increases its extent.

This branch of comparative anatomy not only brings to our knowledge races of animals very different from those with which we are acquainted, but supplies intermediate links in the gradation of structure, by means of which the different classes will probably be found so imperceptibly to run into one another, that they will no longer be accounted distinct, but only portions of one series, and show that the whole of the animal creation forms a regular and connected chain.

The fossil remains of animals are too frequently brought under our observation in a very mutilated state; or are so intimately connected with the substances in which they are deposited, that it is difficult to make out the figure of the bones. In the present instance, the pains that have been taken, and the skill which has been exerted in removing the surrounding stone, under the superintendance of Mr. BULLOCK, in whose Museum of Natural History the specimen is preserved, have brought the parts distinctly into view.

This specimen was found upon an estate of HENRY HOST HENLEY, Esq. between Lyme and Charmouth, in Dorsetshire, in a cliff thirty or forty feet above the level of the sea-shore. It had been thrown down by the breaking off of a part of the cliff, and buried in the sand upon the shore, to the depth of nearly two feet. The skull was dug out in 1812, the other parts in the following year, at a distance of some feet.

The cliff is composed of that species of argillaceous limestone called blue lias, in which the fossil bones were deposited. Above the lias there is only a thin layer of black earth.

The figure and appearance of the fossil bones are so accurately shewn in the annexed drawings, (Plates xvii. xviii. xix. xx.) as to make a very particular description of them unnecessary.

The head is four feet long, and all the parts of one side of the skull, and of the upper and under jaw, are very distinct: the vertebræ immediately behind the skull remain in their natural situation respecting the head; many of the other bones have been displaced in a greater or less degree, shewing that the skeleton, before the bones were rendered fossil, had been pressed upon by a considerable weight, which had broken many of them, and entirely destroyed others.

The lower jaw had been forced a little backwards, and the intermediate bone, by which it was attached to the skull, displaced; but a portion of it is seen projecting beyond the base of the lower jaw.

The bony sclerotic coat of the eye on one side is entire; that of the other is forced through the nose, and a part of it is seen in the opening of the nostril, which is enlarged by the bones in which it is situated being broken.

The vertebræ of the back have been twisted, and their spinous processes broken off; one of them in a detached state is preserved sufficiently entire to shew its shape, and the size of the canal which contained the spinal marrow.

The anterior surfaces of the dorsal vertebræ are exposed, and several of the ribs of the opposite side remain in their place, connected to the vertebræ, with their concave surfaces uppermost. Those of the other side are all forced down upon the vertebræ, and squeezed into a mass: the pressure has been so great, as to give many of them a fluted appearance, the middle line being more crushed than the edges; they are not only in close contact with the vertebræ, but are made to follow all the irregularities of their surface, so forcibly have they been beaten in upon them.

One scapula remains nearly in its place, on the outside of the ribs; the other, less perfect in its form, is seen in the mass of blue lias beyond the broken ends of the concave ribs of the opposite side.

In the same situation are several broken fragments of bones cemented together, but not sufficiently entire to have their forms made out; beyond these are three small flattened bones connected to one another, having their natural form.

The number of vertebræ collected, which appear to have formed one connected chain, is sixty, and when these are placed in a line, the skeleton measures about seventeen feet. The dimensions of the largest vertebræ are one inch and a half thick, three inches broad from side to side; and three and a half broad from the anterior surface to the origin of the spinous process.

There are other vertebræ in the same blue lias, but they are much smaller, and there is no evidence of their having belonged to the same animal.

Detached portions of ribs were found so much crushed, that the softer middle part appeared split through; but on a close examination, some of the substance of the rib was found to remain, although a deep sulcus in this way had been formed. This very uncommon appearance is represented in the annexed drawing.

There are other fragments of fossil bones collected from the same place, and evidently deposited at the same time; but as they are too imperfect to enable me to ascertain the exact figure of the bones, and it cannot be determined whether they really belonged to this animal, or to others, I have not ventured to notice them on the present occasion.

The circumstance of the lower jaw extending backwards beyond the skull, and there being an appearance of small conical teeth contained within the large ones, led me to believe that the skull belonged to a species of crocodile; but this conjecture was readily proved to be erroneous by an examination of the intervertebral joint, which is an oval cavity, only met with in fishes. The spinous process of one of the vertebræ which is preserved, shews that the fish was not of the family of sharks or rays.

As no fishes that I am acquainted with, have the young teeth growing up in the cavities of the old ones, it became necessary to ascertain whether these teeth were really of that description. This was done by splitting one of them, and its cavity was found to contain calcareous spar, in appearance only resembling a young tooth; the characteristic mark therefore of crocodile's teeth, which had at first been so very imposing, was thus removed.

Upon examining the mode in which the lower jaw is connected to the skull, there appears to have been no regular joint, as in the crocodile, but a long intermediate flat bone, as in many fishes.

The sclerotic coat of the eye being composed of bone, is a character of the eye of fishes, and not met with in the crocodile. In this animal there is a subdivision into thirteen plates, which is only met with in birds.

The situation of the nostrils, one of which is tolerably distinct, corresponds with those of fishes.

The mode of articulation of the lower jaw with the skull, admits the mouth to be opened to a great extent; in this respect it resembles what is met with in the voracious fishes, of

which I may mention the pike as an example; but in them the teeth are not conical, nor does the lower jaw extend so far back under the skull. The vertebræ and ribs are not unlike those of the pike, but the spinous processes are a great deal shorter.

The jaws and scapulæ, both in shape and size, are more like those of the crocodile than of any fishes at present known, and the three small flat bones near the broken portion of the scapula, have a resemblance to those of the tarsus of a species of turtle.

These particulars, in which the bones of this animal differ from those of fishes, are sufficient to shew, that although the mode of its progressive motion has induced me to place it in that class, I by no means consider it as wholly a fish, when compared with other fishes, but rather view it in a similar light to those animals met with in New South Wales, which appear to be so many deviations from ordinary structure, for the purpose of making intermediate connecting links, to unite in the closest manner the classes of which the great chain of animated beings is composed.

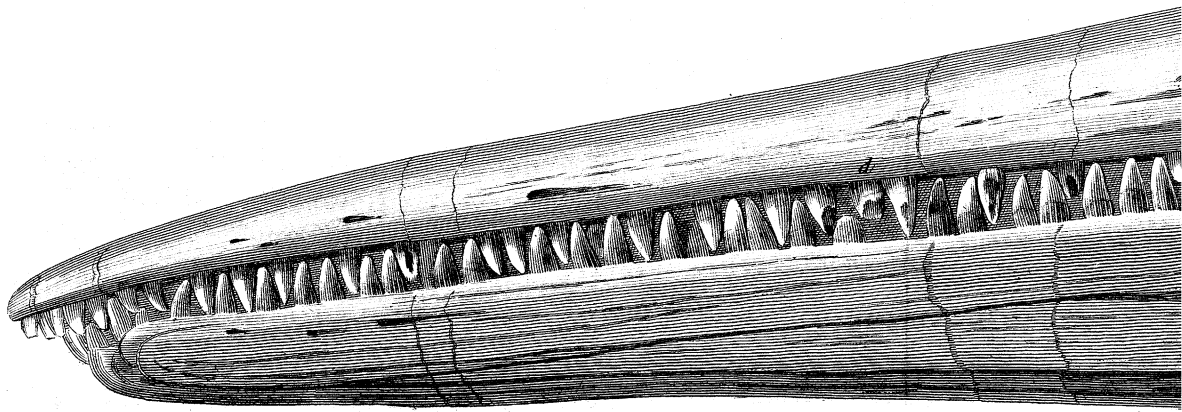
EXPLANATION OF THE PLATES.

PLATE XVII. A side view of the skull and the two jaws.

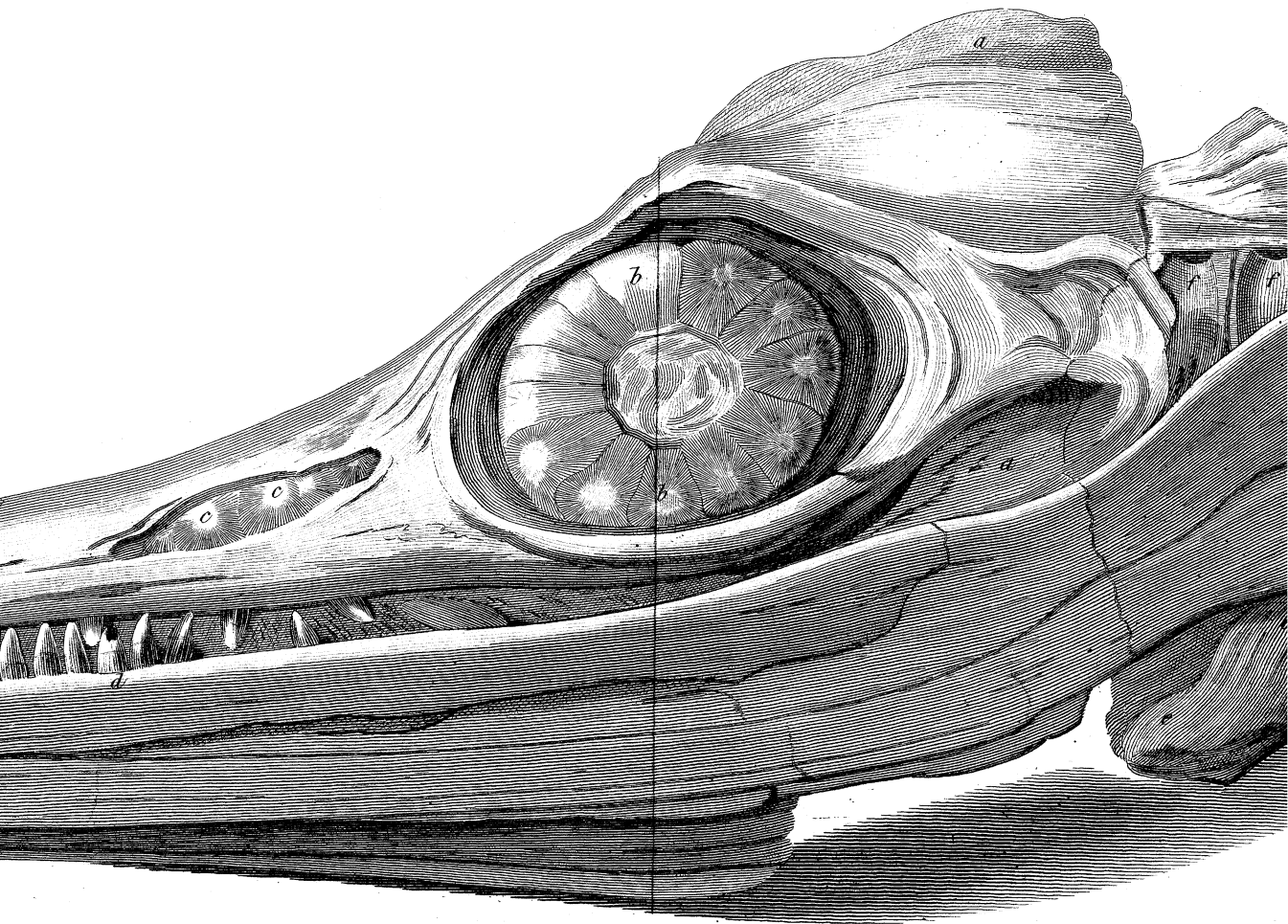
aa. The blue lias in which the skull was imbedded.

bb. The bony plates in the sclerotic coat of the eye.

cc. The bony plates of the sclerotic coat of the opposite eye forced through the bones of the nose, and only partially exposed.

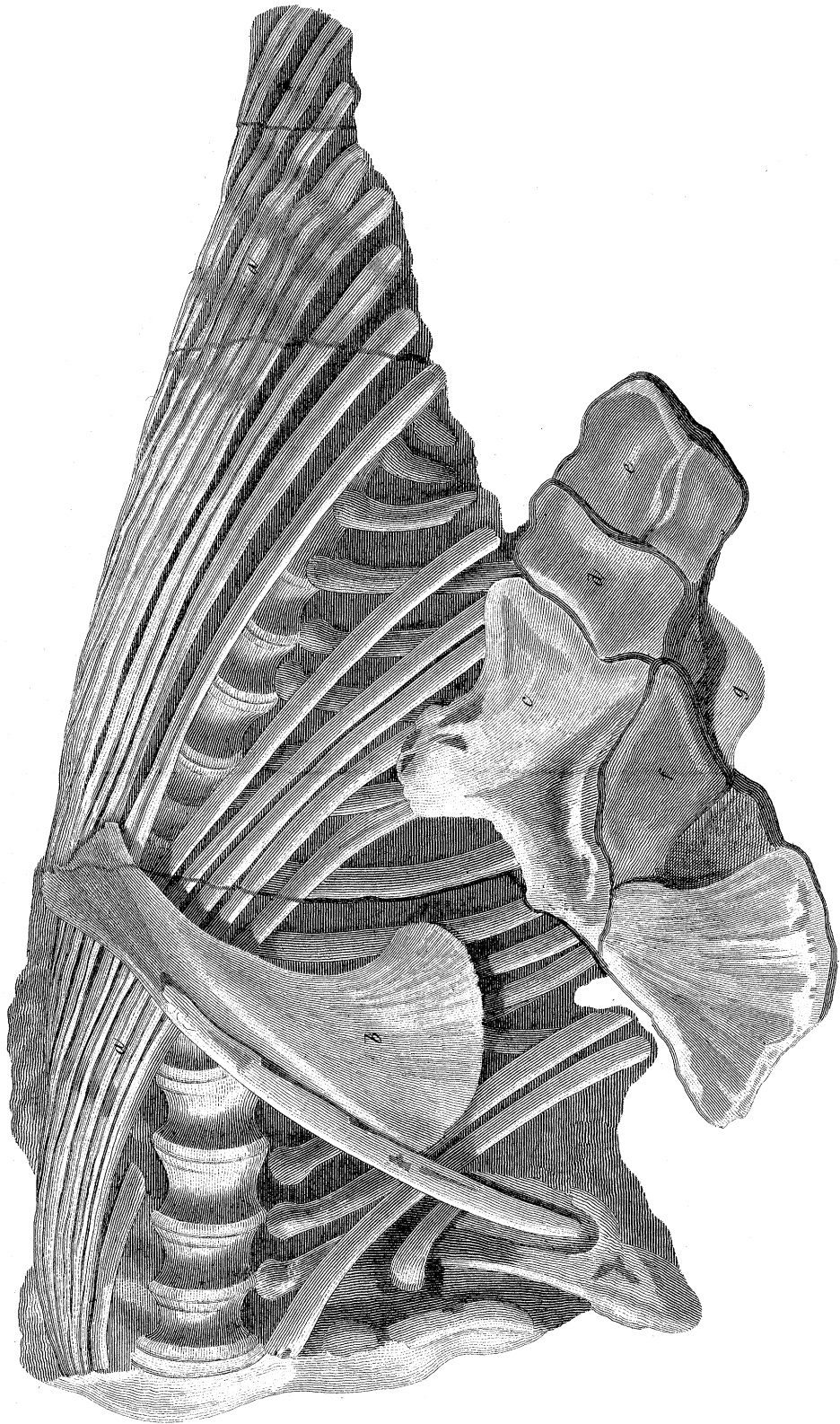


See.



Scale. Three inches to a Foot.





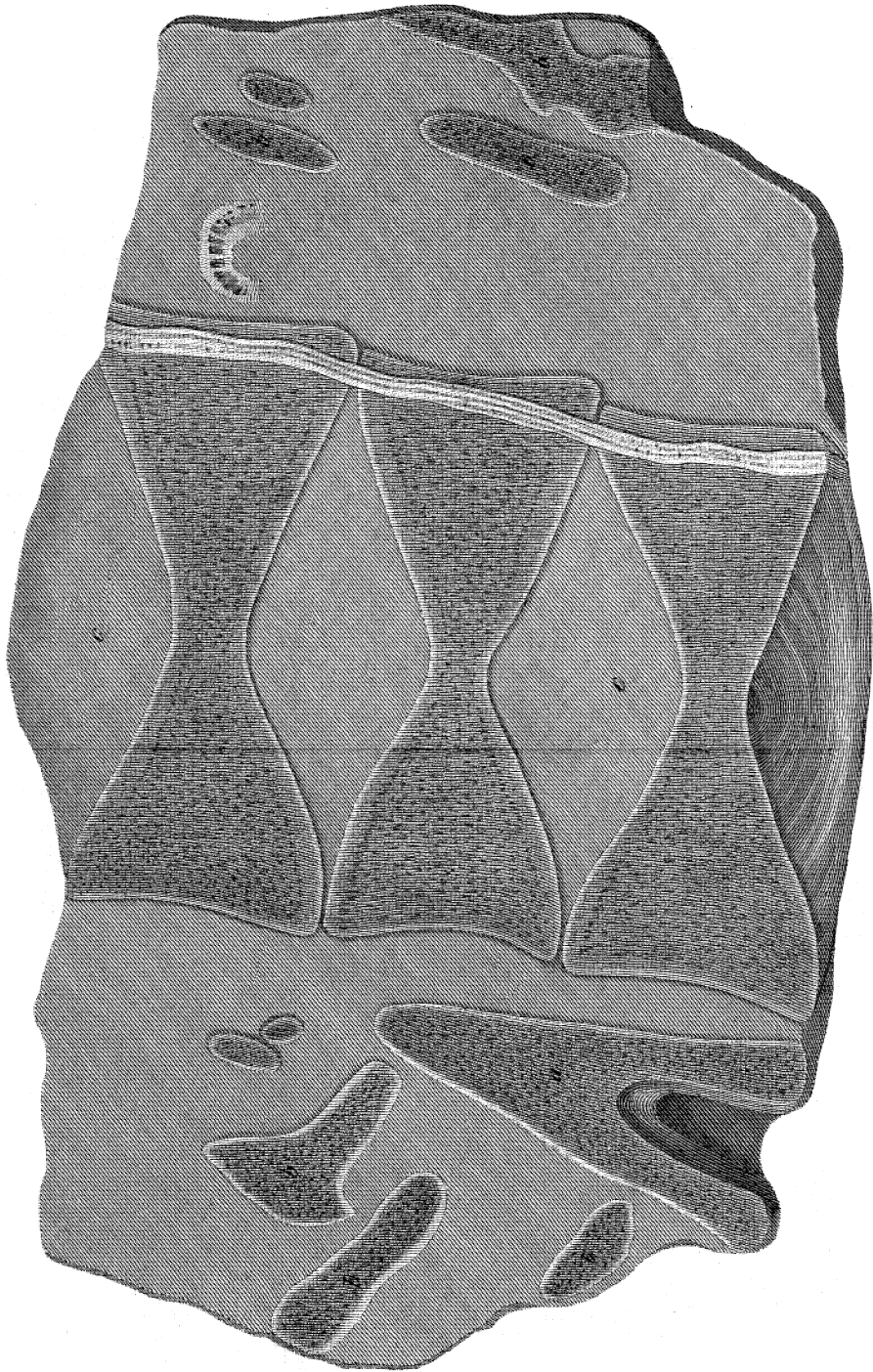
Scale. Three Inches to a Foot.



Natural Size.



1/2 Size.



Natural Size.

dd. Broken teeth, the cavities filled with calcareous spar.

ee. A portion of the intermediate bone, by which the lower jaw is connected to the skull.

fff. Three vertebræ connected to the skull.

PLATE XVIII. The continuation of the chain of vertebræ broken off from the mass represented in Plate XVII. The broken surfaces when applied to each other were found to fit exactly.

The anterior surfaces of the vertebræ are exposed, the ribs of the left side are seen upon the convex surface, those opposite on the concave. The left scapula lies over the ribs, a portion of the right scapula is seen detached.

aa. Some of the ribs so much crushed in the middle line of their length, as to appear fluted.

b. The broken portion of scapula.

c, d, e. Bones bearing some slight resemblance to those of the tarsus of the turtle.

f, g. Fragments of bones too imperfect to have their form ascertained.

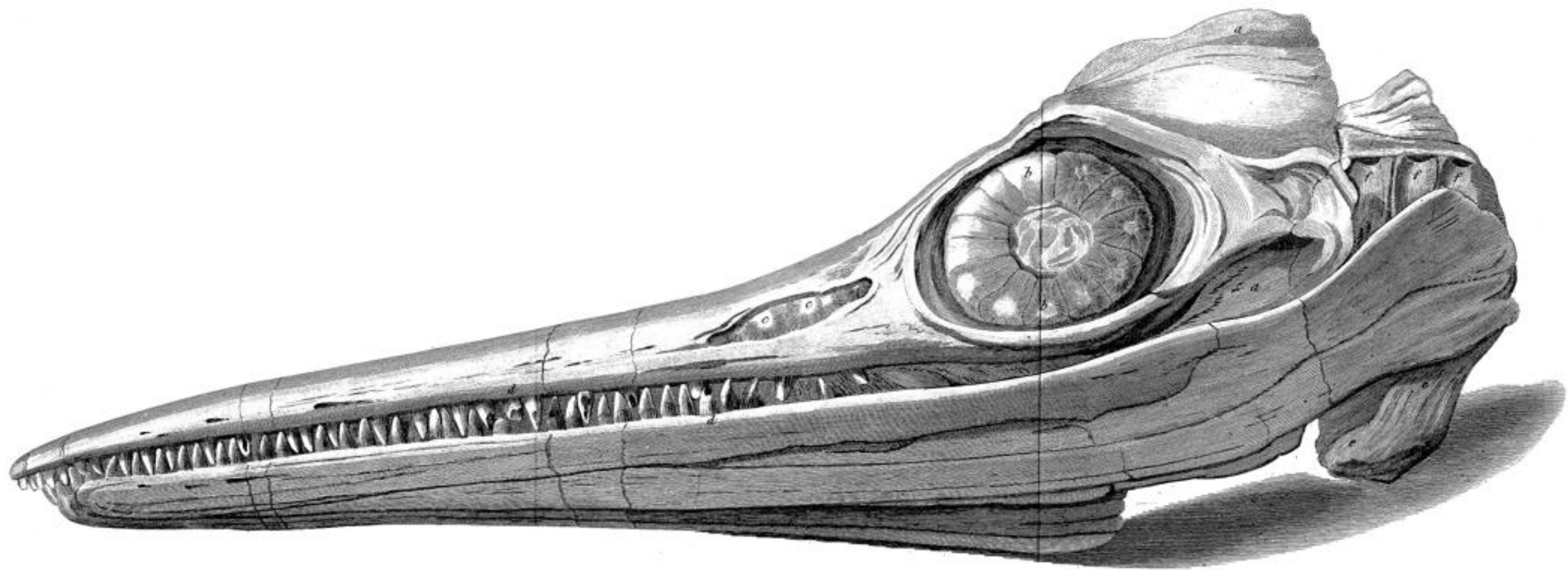
PLATE XIX. Portions of ribs imbedded in blue lias, to shew the fluted appearance; the parts are represented of the natural size.

PLATE XX. Three vertebræ sawn through in a longitudinal direction to shew the intervertebral cavities which are filled with blue lias. Also one of the spinous processes broken off, in which is seen the canal for the spinal marrow.

a. The detached spinous process.

bbbbbb. Fragments of bones.

cc. The blue lias, in which they are imbedded.



Scale. Three inches to a Foot.



Natural Size.