Breakout Session Record

Amanuensis/Student name: Alette Fleischer

Date: 13 July 2005

Institution: Natural History Museum

Title of Breakout session: Palaeontology, collecting, conservation and specimen preparation

Name(s) of Breakout session leaders: Chris Collins, Prof Martin Rudwick

General themes discussed at the Breakout session:
As Prof Rudwick pointed out that this session was about scientific knowledge found in the field, and how an object, a fossil, became a commodity which was sold, drawn, engraved, printed and published. This was the trajectory of raw natural that was turned into a scientific object.
The problems with fossils is the slow decay, of the specimen itself, and due to its development as a preparation: the paint that was used to colour the fossil, the way it was mounted, the influence of the climate in the museum.
Chris Collins informed us that the way we retrieve fossils today is different than in the 19th century. There is more attention to remains of skin tissue, or the so-called shadow of skin tissue, and other information around the site, forensic techniques are used to gather additional information.

Any other information about the session:
Recently researchers are interested in the social context of the specimen. One wants to know more about the construction an mounting of a fossil: the chissel marks are studied, just as the wood used for mounting, who mounted the specimen and where it was made. The downfall of such type of research, said Chris Collins, is that the original feature of the fossil may suffer in the process.

Object information

Object Title: Replica of a Mosasaurus Hoffmanni

Object Date: early 19th century

Museum accession number of object: 11589

Description of object (please attach any information received from breakout session leaders to this sheet):
Replica of a Mosasaurus, circa 70 to 65 million years old. Original is in France. The cast was made in Paris, and distributed by M. Cuvier.
The object was cast and mounted in a wooden frame.
M. Rudwick showed two pictures and explaned the need to depict the fossil as accurately as possible, because of its scientific value.

Function of the object?
It was a study object and of commercial value at the same time.

Where was the object used/viewed/consumed?
The original was buried near Maastricht in the Netherlands until 1780, it was "relocated" (stolen) by the French after the 1800s war.

Who used it?
The replica was bought by a Mr. Montell, who sold it to the N-H museum because he needed the money.

Original context of the object?

The significance of the object?
The original was a very good specimen and very famous in the 19th century. It gave rise to discussions and questions by researchers and amateur-scientists on what it was.

What questions did the audience ask about this object?
Q: Did the cast-making degrade the original? A: the casting was done by professional sculpturs who were used to casting and moulding.

Object information

Object Title: Ichtosaurus

Object Date: 203-194 million years old

Museum accession number of object: R1158

Description of object (please attach any information received from breakout session leaders to this sheet):
Neck and skull of an Ichtosaurus mounted in a wooden frame
The skull was found in 1811 and the neck in 1812 by Mary Anning.
Visible are the toolmarks.
This object has bee coated with a certain paint, which was done in the 19th century.
Coatings can deteriorate the object
Picture 3: this engraving was made before the neck was found

Function of the object?

Where was the object used/viewed/consumed?
In 1819 this fossil was bought by the British Museum

Who used it?
The images made of this object made the fossil mobile and accessible to scientific philosophy. The picture could also invite people to come and study the object.

Original context of the object?

The significance of the object?
M. Rudwick used this object to inform us that Mary Anning was a very good fossil-finder, but not an expert on scientific knowledge of palaeontology. There has been some restauration done on this object in the 19th century.

What questions did the audience ask about this object?

Object information

Object Title: Plesiosaurus Dolichodeirus

Object Date: 203-194 million years old

Museum accession number of object: 22656

Description of object (please attach any information received from breakout session leaders to this sheet):
Mounted Plesiosaurus and two pictures of it.
Picture four is an upside-down engraving of the fossil (my remark whether or not the original could be turned round did pass unnoticed)
Picture five, 19th century engraving of "how the world might have looked like".

Function of the object?
Once a life animal, now studied fossil

Where was the object used/viewed/consumed?
Found by Mary Anning, later bought by the Duke of Buckingham

Who used it?

Original context of the object?

The significance of the object?
Mary Anning enhanced the skeleton with shellak, this gave an even tone to the bone structure and the detailling thus has gone lost.
This was the first skeleton of this species to be found. One can see the different blocks of stone and the cuts through the skeleton.
The preperation marks and tool marks/chisel marks are clearly to be seen. Chisel marks can function as an identification, one can identify the person who worked on the site.

What questions did the audience ask about this object?
Q: when do you mount? A: it depends on the bone, the site, the qualitiy of bone and the preservation whether you present a fossil flat (mounted) or standing. Flat fossils work like artworks.

Object information

Object Title: Megatherium Americana, plaster replica

Object Date: 1848

Museum accession number of object: M26540

Description of object (please attach any information received from breakout session leaders to this sheet):
Large standing on two legs giant sloth, made from plaster and is a combination of the bones found in Madrid and London. The original was from circa 8000 BC.
Picture 6: one interpretation on how the animal moved/walked

Function of the object?
Study object, it was prove for extinction, and supported Darwin's Origin of Species.
The replica was a research project on bones and skeleton

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of the object?
This replica gave insight on what type of animal the bones belonged to and how this animal moved. And the type of skin, first thought to have scales, which were also found on the site, but the scales of a different animal.

What questions did the audience ask about this object?

Object information

Object Title: five fossils and five drawings from the Smiths collection

Object Date:

Museum accession number of object: a.o. B1506 and L1591

Description of object (please attach any information received from breakout session leaders to this sheet):
One reproduction of a map of Great Britain with colour codes, these colour codes indicate the rock layers where the fossils and shells were found

Function of the object?

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of the object?

What questions did the audience ask about this object?

Object information

Object Title: Hylaeosaurus armatus

Object Date:

Museum accession number of object:

Description of object (please attach any information received from breakout session leaders to this sheet):
Block of stone fossil. See picture and information sheet

Function of the object?
This is not an object on display, but a research object.

Where was the object used/viewed/consumed?

Who used it?

Original context of the object?

The significance of the object?
How to deal with objects, conservation, restauration and preservation. This fossils head, which is hidden under its neck, needs to be retrieved since there are so view heads of this fossil. They are digging the head out of the skeleton. How to do it? Make a cast of the first stage, then drilling and taking away the layers of rock. It is a combination of research skills, drawing and technical skills.

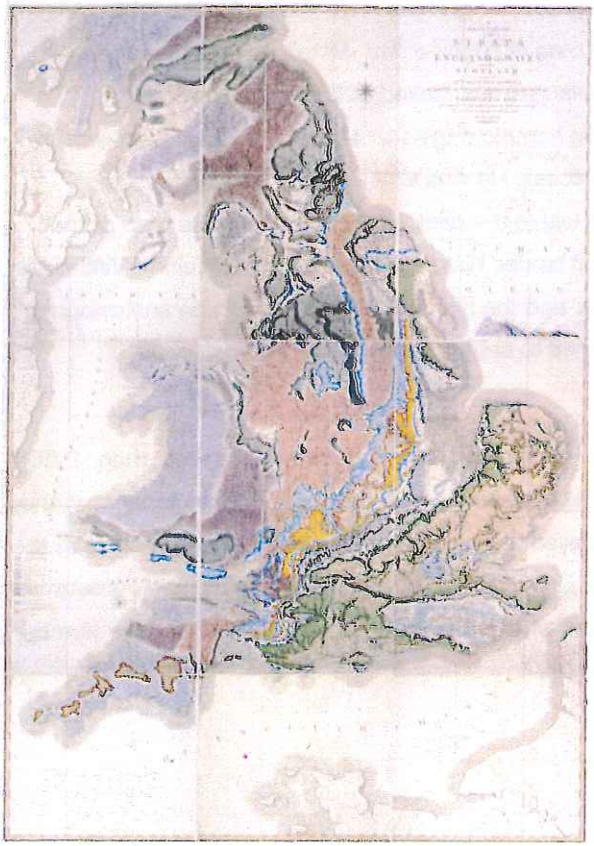
What questions did the audience ask about this object?

THE NATURAL HISTORY MUSEUM

paper treasures

William Smith 1769 –1839

The Geological Map of England and Wales, 1815



William Smith, maker of the first geological map of Britain, was the first person to use fossils as a tool for determining the strata of rocks, rather than their composition. He revolutionised the study of geological time and order of succession, and correlation of widely separated formation. For this contribution he is known as "Strata Smith" and the "Father of English Geology". The map is also a work of art. No fewer than twenty colours were used. The base of each strata was deeply coloured and then gradually softened to a pale tint towards the outcrop of the next overlying one.

William Smith was born in 1769 in Oxfordshire into a family of small farmers. He took an early interest in exploring and collecting. He was skilled at drawing and colouring, and in calculations. At 18, he became an assistant to Edward Webb, a Master Surveyor from Stow-on-the-Wold in the Cotswolds. Over the next 4 years, he became acquainted with the topography, water and mineral resources of Southern England and the Midlands.

While working on the Somerset Coal Canal, Smith realised the significance that fossils were found in layers – *strata* - of sedimentary rock.

The map, entitled *A Delineation of the Strata of England and Wales with part of Scotland...* was finally published on 1 August 1815. It was dedicated to Sir Joseph Banks (1743–1820), the premier scientist of the day and President of the Royal Society, and Smith's patron and sponsor for many years, to thank him for his encouragement. The map was on a scale of five miles to an inch and consisted of 15 sheets. Approximately 400 copies were issued and many (although not all) bear a number and are signed by William Smith himself. The map was offered in six different forms – in sheets, mounted on canvas and rollers or spring rollers (with or without varnish), on canvas in travelling case, from five guineas to twelve pounds.

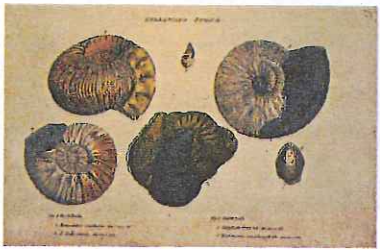
Smith was awarded 50 guineas prize money for the first mineralogical map of England and Wales. Its greatness and originality was largely overlooked at first by the scientific community. His humble origins and his limited education was an obstacle to success. He was also victim of fierce rivalry and discrimination within the geological community. His map did not sell as well, and landed him in great financial difficulties. Without a private income, and the high cost of the production and colouring Smith was forced to sell his prized geological collection.

The Treasury purchased the collection of more than 2,500 specimens – 693 species - at a cost of £700, in order that they might be displayed in the British Museum. The collection in the Palaeontology Department of the NHM, with each specimen labelled to show where it was found along with a unique number allocated by Smith.

Moreover these always appeared in a definite sequence. In addition, he observed that this 'order' of appearance also occurred in other rock sections on the other side of the country! In 1799 he made public his intention to publish a work on the geology of England & Wales.

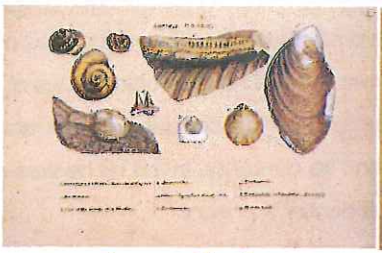
He studied books on the natural histories of the various counties, and John Woodward's *Catalogue of English Fossils*, to help in identifying the strata by their embedded organic fossils.

Smith used his knowledge to drain Pristley Bog at the Woburn Estate in Buckinhamshire for agricultural use. Demand for similar work flowed in across the country. It allowed him to travel all over England and adding to his knowledge of the geology of the country and accumulating information for his publication.

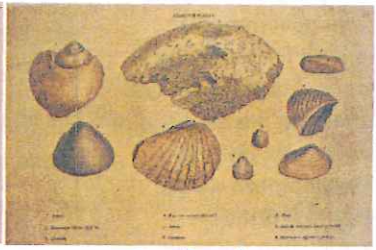


Kelloways

London Clay



Lower Chalk



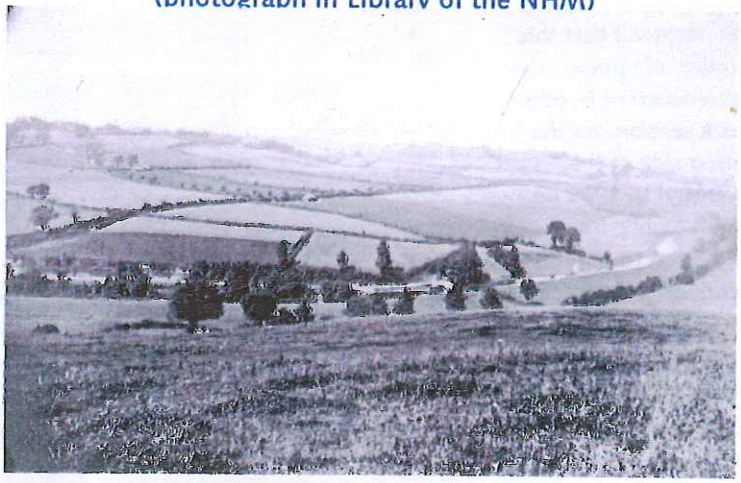
Cornbrash

He was also required to catalogue his collection and in 1817, a portion of this descriptive catalogue was sent to the British Museum (Natural History) and was published under the title *Stratigraphical System of Organised Fossils* (tables and illustrations above).Curious coloured tables were also added - the first of their kind ever published – showing the geological distribution of particular groups. He was assisted by his nephew John Phillips (1800-1874), his biographer and later Professor of Geology at Oxford.

paper treasures

Despite his amazing achievement, recognition came slowly. The Geological Society, who had earlier denied him honorary fellowship, awarded him the first Wollaston medal in 1831. In 1832, King William IV granted him a pension of £100 per annum for the rest of his life. Some 20 years after the publication of his great map Smith had a honorary doctorate bestowed on him by Trinity College, Dublin. Tempting offers came from governments abroad for surveying work. Active to the end of his life, he died age of seventy in 1839 in Northampton on his way to a British Association meeting.

The Somerset Coal Canal
(photograph in Library of the NHM)



Smith continued to travel the country on his professional engagements with his nephew as his assistant. He continued with his publications produced a series of large-scale county maps that formed his Geological Atlas of England and Wales. His finances ever precarious, this project forced him to sell his house and its contents. In 1819 he was even obliged to spend time in a debtor's prison.

Bibliography

Morton, J L (2001) Strata. 160 p. Tempus, Stroud. ISBN 0752419927

Winchester, S (2001) The map that changed the world. 338 p. Viking, London. ISBN 0670884073

Ann Lum 2003

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The History and Preparation of the Enigmatic Dinosaur *Hylaeosaurus armatus*

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History

In 1832 Dr Gideon Mantell collected over fifty blocks containing dinosaur bones from a quarry in the Tilgate Forest in Sussex, southern England. In 1833 in The Geology of the South-East of England he named this new dinosaur *Hylaeosaurus armatus* ('forest lizard'). The front part of the skeleton is preserved in a slab over four and half feet long. The skeleton includes fragments of skull bones, an associated series of dermal spines and dermal scutes.

Systematics

Hylaeosaurus has been placed in the suborder Ankylosauria Osborn 1923 and the family Nodosauridae Marsh 1890. *Hylaeosaurus armatus* Mantell, 1833 is the type and only species.

Review

It has been over 170 years since this specimen was collected and named. The preparation is now underway and the complete extraction of this skeleton is anticipated. When removed, the under surface of the block thought to contain skull bones showed the remains of fossil wood. However further preparation of this surface may reveal part of the neck armour (pers. comm. PB)

Preparation

Main block pre-preparation

Lowering slab into acetic acid

Post acid preparation

'Skull' block after initial acid prep.

Supporting Victorian bricks taken from beneath block

Removing 'skull' block

Underside of skull block

Dermal spine removed and reconstructed

Most of the extensive wooden frame was carefully removed using various types of saw, screwdriver and hammer. This was done to allow the specimen to be immersed in water or acid and to ease bulk matrix removal.

The original annotated letters on the bones were protected with two coats of an industrial water/acid resistant varnish (in M.E.K)

The slab was carefully lowered into 5% acetic acid, examined after 24 hours and then left in the acid for a further 48 hours. It was then washed in running water for about 9 days .It was then slowly air-dried and conservation and repair work were carried out where necessary. It was found that many of the bones had been previously repaired in many places and the acid had dissolved these old repairs.

One of the dermal spine was removed, repaired and conserved.

The slab is composed of a series of smaller blocks cemented together as Mantell had originally described.

It was decided to concentrate on the block containing the 'skull elements. This block was removed and has been partially prepared mechanically using powerful pneumatic saws, dental tools and electric rotary grinders, along with the usual tungsten-carbide tipped chisels.

The matrix was found to be very hard and gritty, preparation was made easier by cutting 'criss-crossed' grooves in the bulk matrix and then removing the 'squares' which were left, using either air-pen or hammer and chisel.

Paraloid B72 consolidants and adhesives have been used sparingly to avoid over use of consolidants.

Due to the very hard nature of the matrix the next stage will be to acid prepare this block. The slab will also be systematically separated into Mantell's individual blocks for detailed development

A. **Mosasaurus** (cast of jaws, in gallery)

1. Extraction in 1780 of jaws of "Maastricht animal" from chalk mine: engraving published by Faujas in 1799.

2. Jaws of the "Maastricht animal" after removal to Paris in 1794: drawing by Marechal, engraved by Marchand, published by Faujas in 1799.

B. **Ichthyosaurus** (skull and neck, in gallery)

3. Skull found at Lyme Regis in 1811 by Joseph Anning: drawing by Clift, engraved by Basire, published by Home in 1814 (the neck was found later, in 1812, by Mary Anning).

C. **Plesiosaurus** (complete skeleton, in gallery)

4. Skeleton found at Lyme Regis by Mary Anning in 1823 (purchased by Duke of Buckingham), drawn by Webster, lithographed by Scharf, printed by Hullmandel, published by Conybeare in 1824.

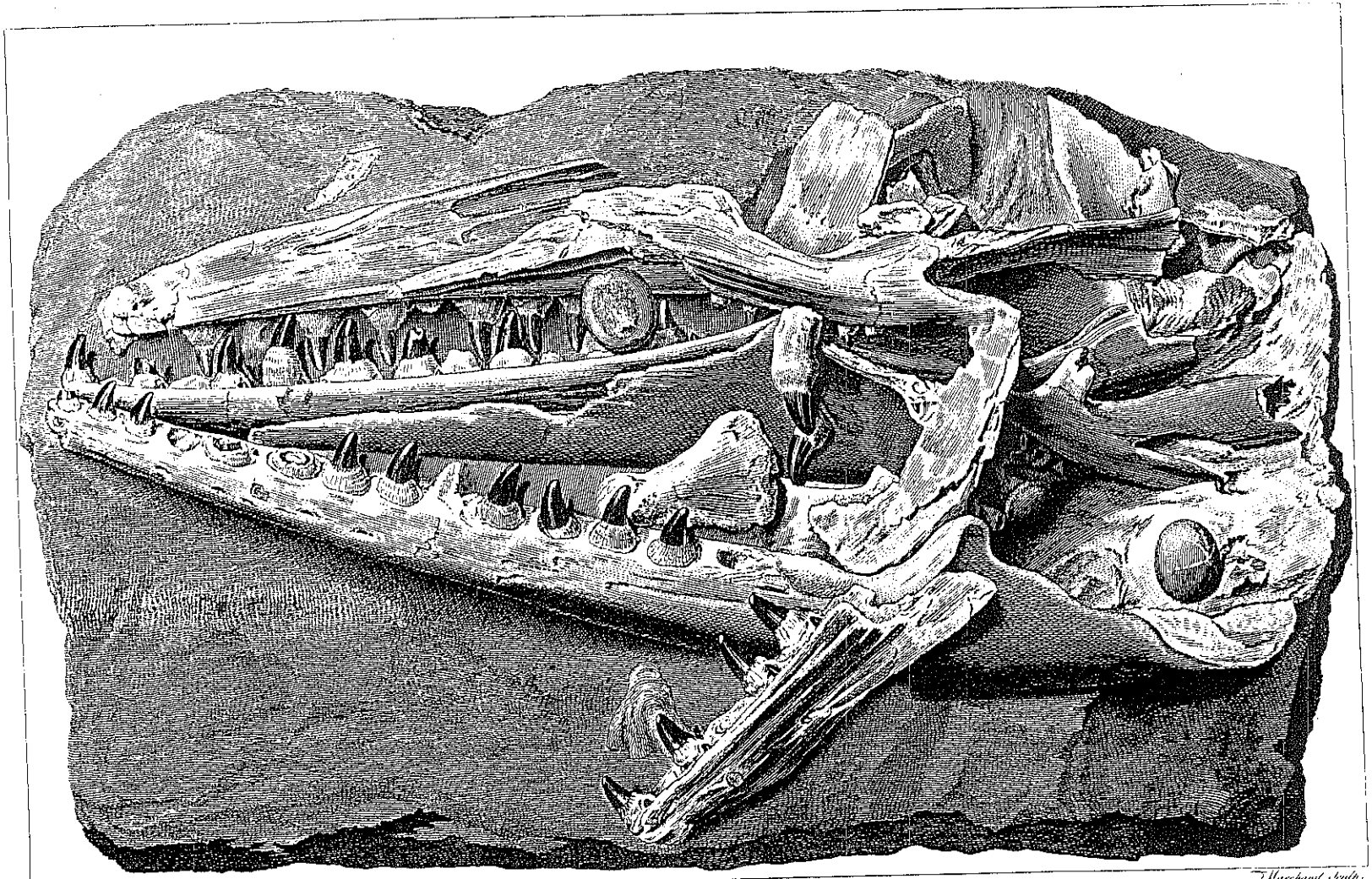
5. Scene of "Duria antiquior" ["A more ancient Dorset"], drawn and lithographed by De la Beche in 1830 (widely distributed but never formally published).

D. **Megatherium** (reconstructed skeleton, in gallery)

6. Illustrations lithographed by Scharf, printed by Hullmandel, published by Buckland in 1836:
(a) reconstructed skeleton (left), copied from engraving published by Pander and d'Alton (1821) of reconstruction in Madrid museum, by Bru ca. 1795, based on bones sent from Buenos Aires in 1789..
(b) pelvis, hind leg etc. (right), found near Buenos Aires and sent to London in 1836.

E. **Smith's fossils** (in Conservation Dept)

7. Engravings of "characteristic fossils" from Cornbrash formation, published in 1819 but probably displayed on "Cornbrash" shelf of his private museum in London from ca. 1804.



V. Marechal Del.

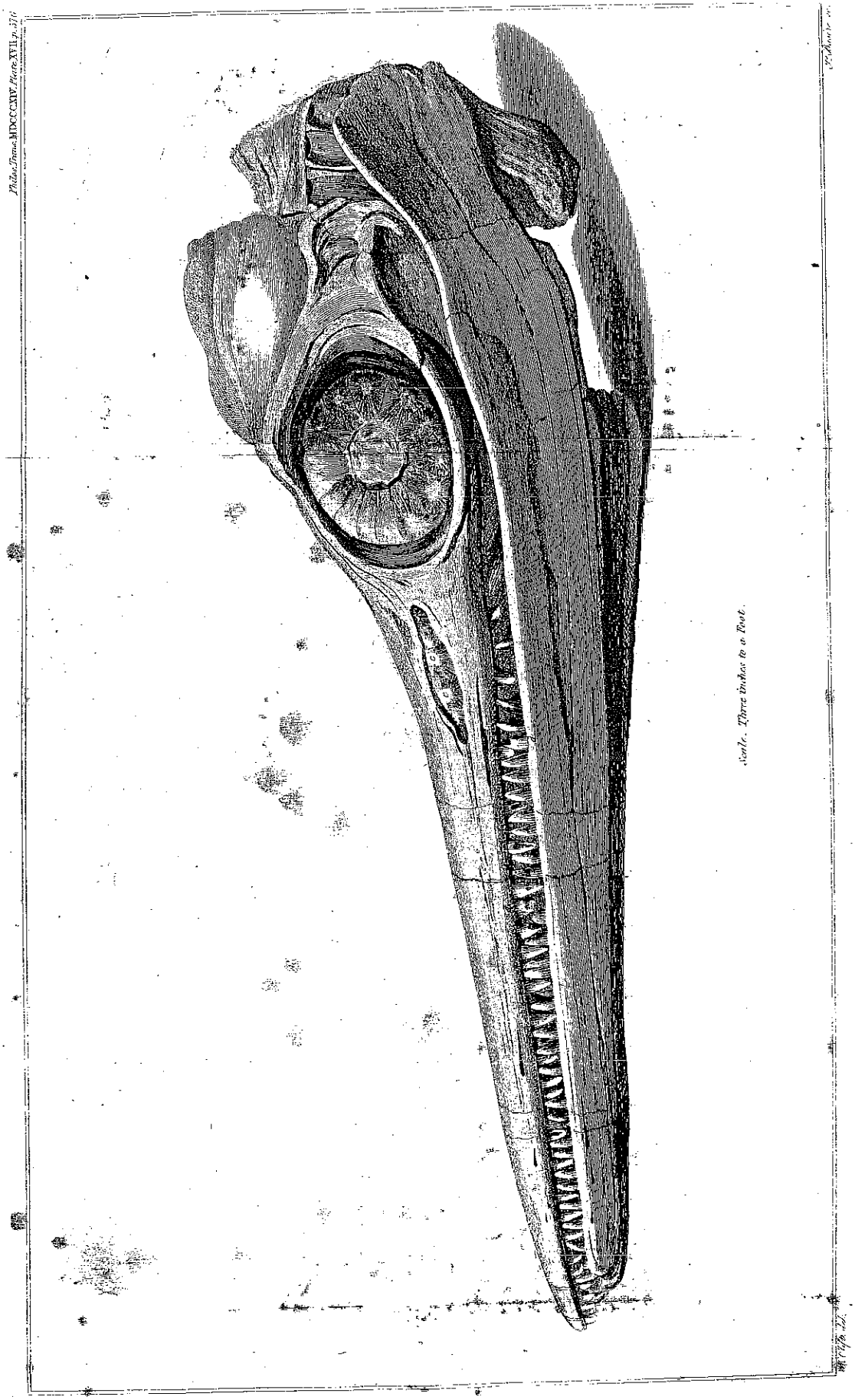
V. Marchand Sculp.

OS MAXILLAIRES FOSSILES

Trouvés en 1780, dans un Bloc de pierre des Carrieres de Maestricht à 90 pieds de profondeur;
Dessinés au quart de la grandeur, par Marechal Peintre du Muséum, d'après l'Original déposé dans les Galleries
d'Histoire naturelle, du Jardin des Plantes de Paris.

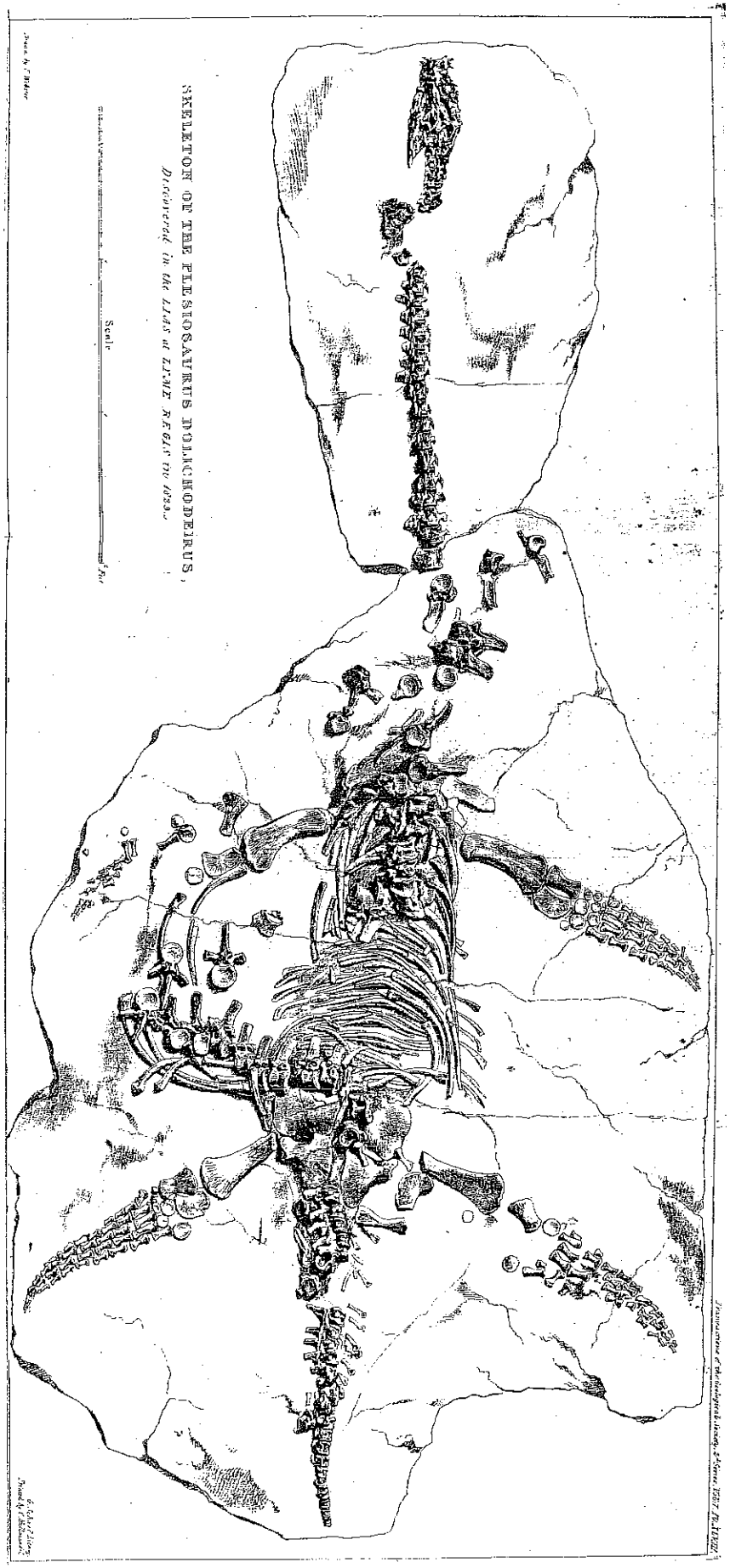
Ecrit par Besançon

Ichthyosaurus



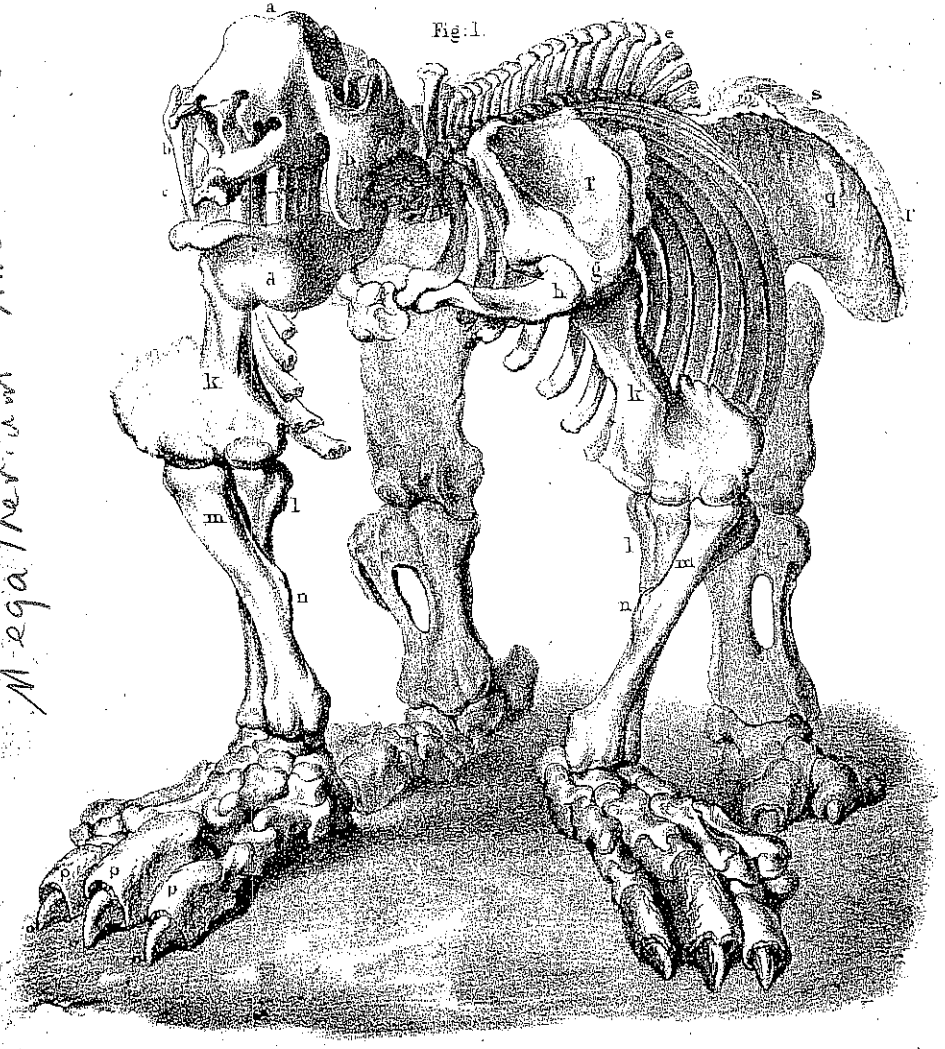
Plesiosaurus dolichodeirus

4

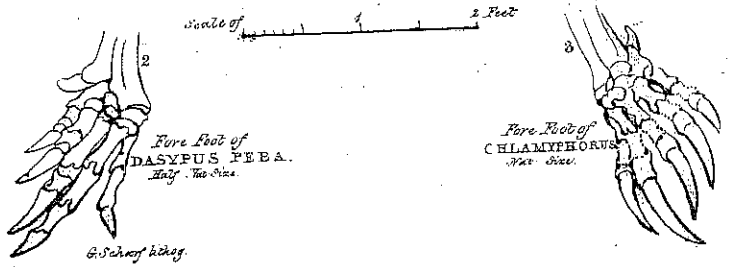


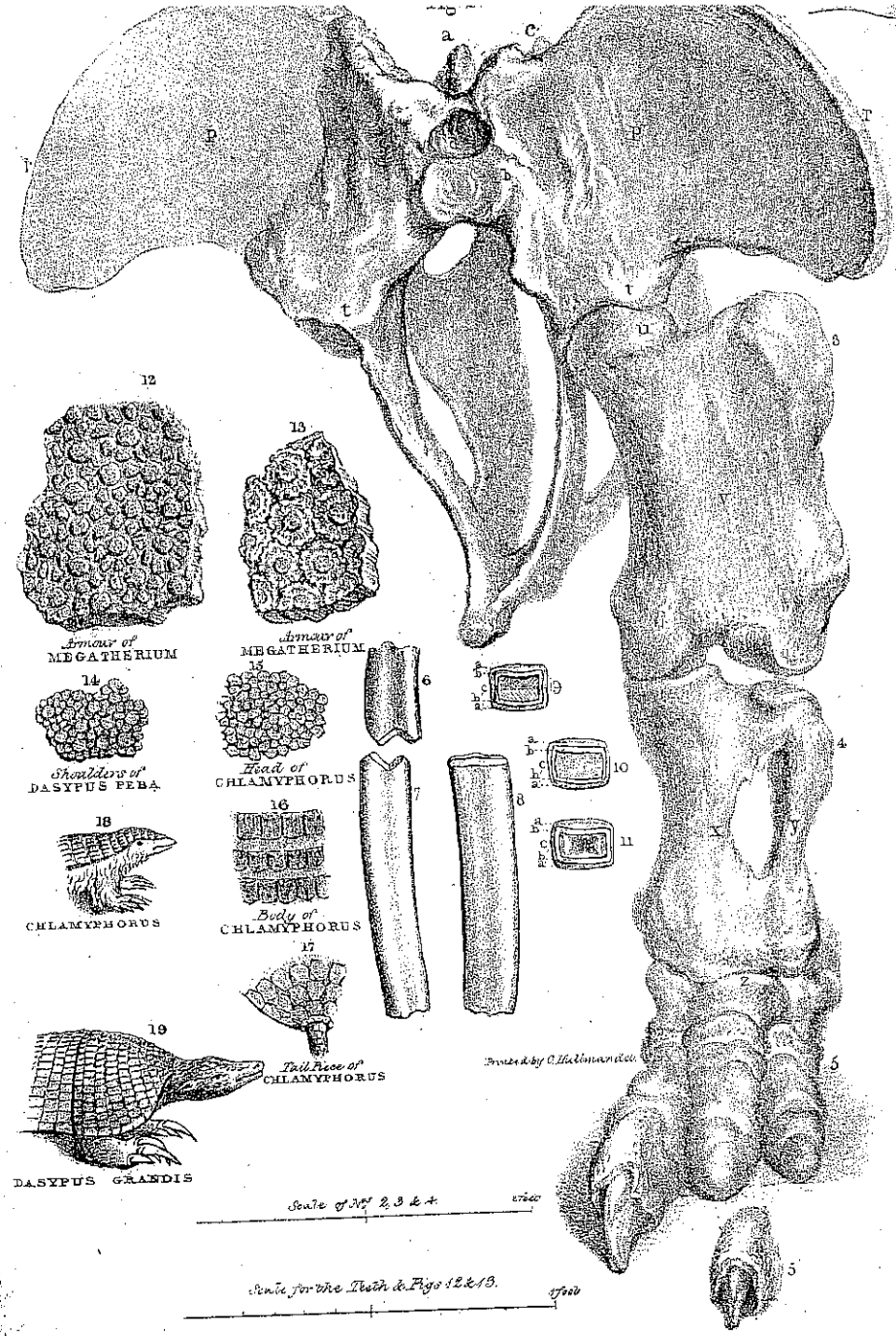
Megatherium Americanum

Fig. 1.

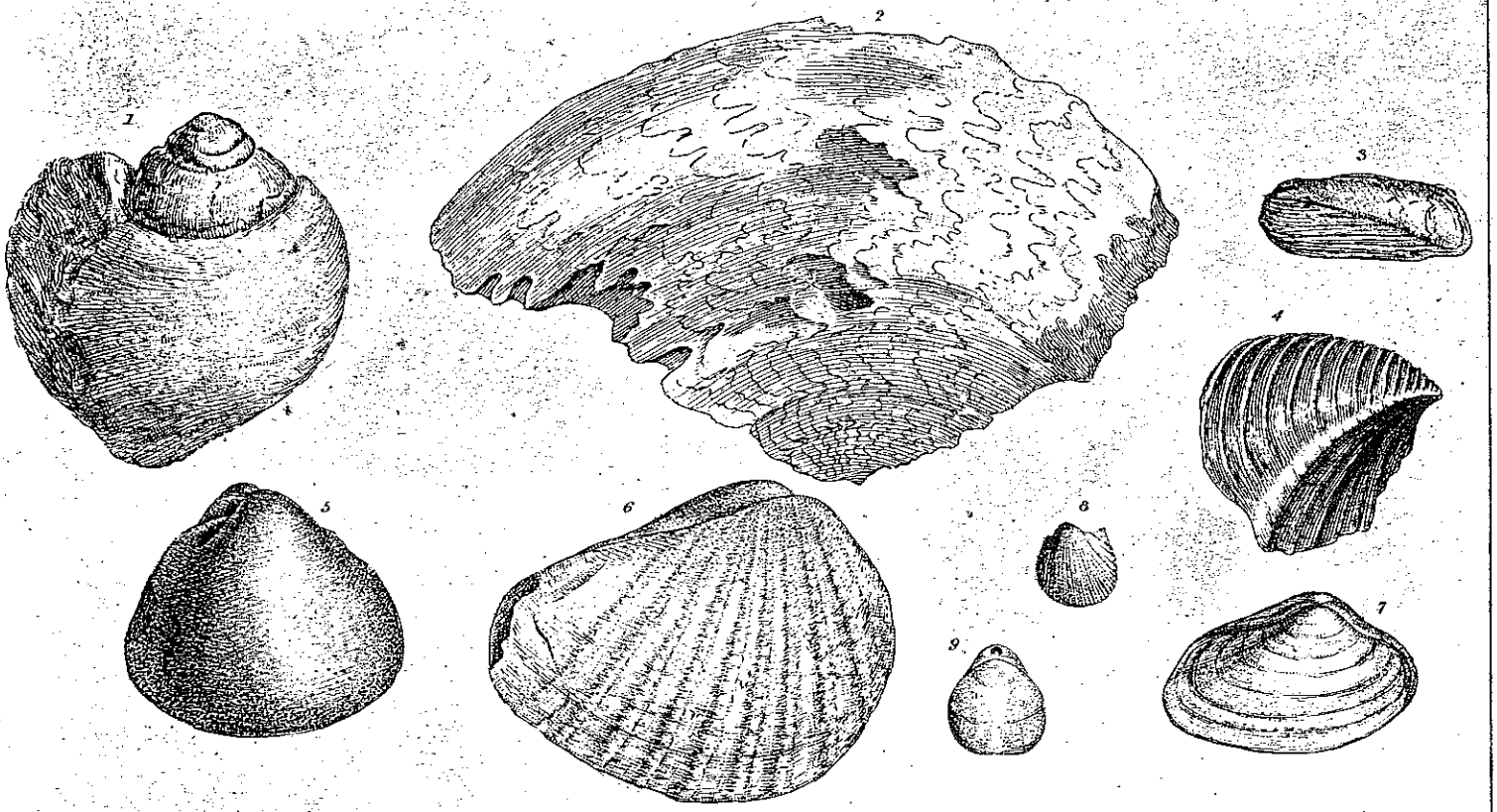


MEGATHERIUM.





CORNBRASH.



1. *Natica.*
2. *Ammonites discus. M.C. 12.*
3. *Modiola.*
4. *Trigonia costata, M.C. 85.?*
5. *Venus.*
6. *Cardium.*
7. *Unio.*
8. *Avicula echinata. Strat. Syst. P. 67.*
9. *Terebratula digona v. globosa.*