Conservation report re the preparation of the Scunthorpe Pliosaur.

Nigel Larkin 18th June 2020

Description of the specimen

This recently excavated pliosaur consists of an incomplete and disarticulated skeleton comprising various bones that were numbered during the excavation: 29 vertebrae; a large humerus (in five pieces); the premaxilla of the skull (already prepared); one tooth; various ribs (x 14?) in plaster and foil field jackets; and numerus small to medium fragments, some still in the clay sediment. All the specimens required cleaning/preparing to remove the clay (and pyrite) still adhering to the bone surfaces but the epifauna (encrusting organisms such as sea shells etc) were to be left in place where possible as they are part of the story of the life and death of this marine reptile and how it interacted with its environment. The long, thin fragile ribs in their field jacket still had a large amount of sediment attached to them. Any clay or other sediment removed from the bones was kept in separate bags, numbered the same as the bone that the sediment came from.

Conservation policy

The bones all needed to be cleaned of the clay and pyrite etc so that they can be studied and described and would be ready for display. Cleaning the bones generally involved using pneumatic reciprocating needle pens (standard fossil cleaning tools) to remove hard lumps of clay and pyrite, and an airbrasive machine that uses a combination of gentle compressed air and soft sodium bicarbonate powder to remove the film of clay from the surfaces of the fossils - another standard preparation technique. Sodium bicarbonate is the gentlest of airbrasive powders. Scalpels were also used as required. All processes and materials used in the project were the least invasive as possible. The only consolidant and adhesive used was Paraloid B72 in acetone which is stable and reversible. Some filling of gaps was required and plaster of paris was used for this and then the plaster has been painted a mid-grey.

Skull

Premaxilla. The premaxilla of the skull was the only piece of skull preserved and this had already been prepared by Richard Forest and required no further work.

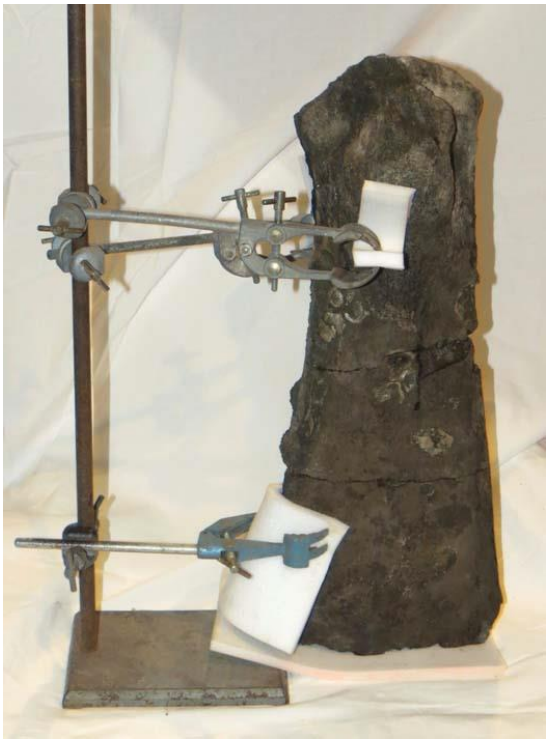
Tooth. A single tooth, in good condition requiring the removal of some clay matrix with the airabrasive unit.

Above: the tooth before cleaning.

Humerus

The humerus was in five pieces. These were cleaned, consolidated and adhered together as appropriate, using Paraloid B72 in acetone.

Above, examples of the surface of the humerus requiring the removal of clay matrix and pyrite.

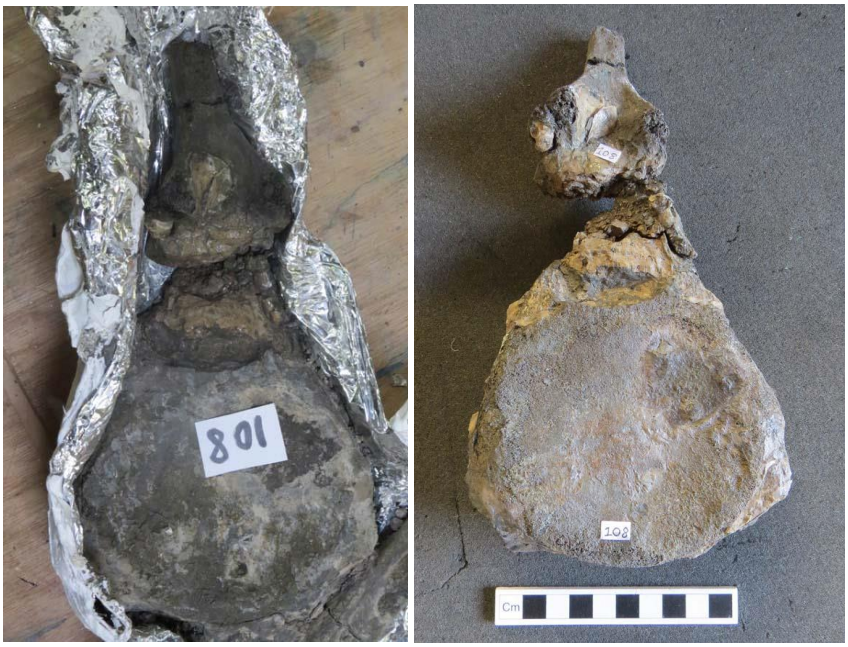
Above: left, a natural cross-section through the central portion of the humerus; right, the five pieces of the humerus being adhered together and held in place.

Vertebrae

The vertebrae were cleaned (removing matrix and pyrite but not the epifauna where this was attached to the bone) using airpens and the airabrasive . Then the bones were consolidated using Paraloid B72 at 5% in acetone. Rather than list all the vertebrae here, I will provide a handful of examples:

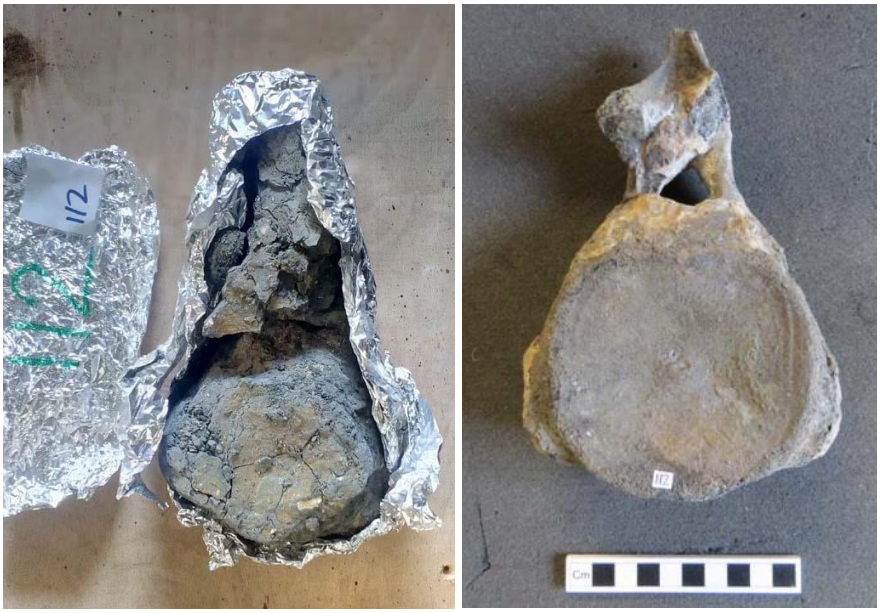
Above: a vertebra (no 060) that has been half-cleaned/prepared (at the top of the image) and remains half unprepared (bottom half of the image).

108 vertebra in 2 pieces (neural arch not attached to centrum).



Above left: vertebra 108 after loose sediment removed from field jacket but before preparation (label upside-down). Above right: after preparation and labelling.

112 vertebra with neural arch. However, there are two specimens labelled 112. I don't know if this was a mistake made in the field or a mistake made by me. One is a vertebra, the other looks like a partial neural spine though I could be wrong. The latter is very crumbly and should stay supported on its pedestal of matrix, or it will fall apart.



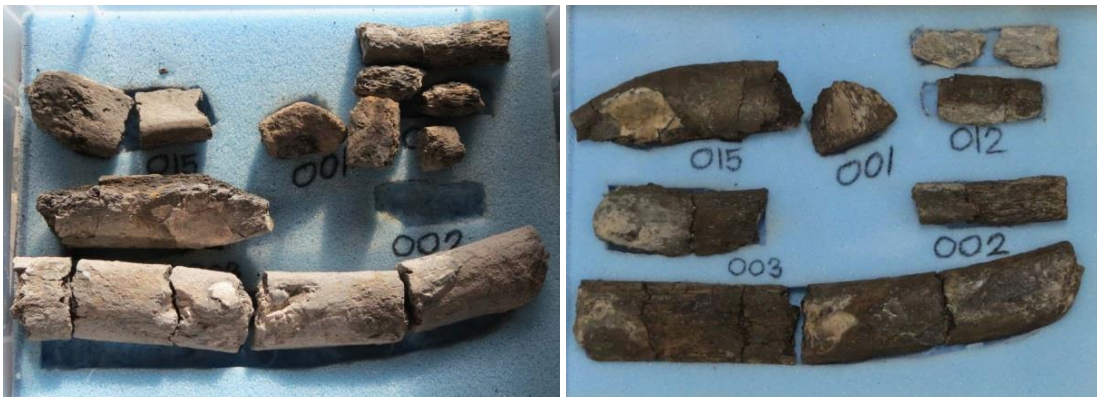
Above: vertebrae 112 before preparation (left) and after (right).

Above: crumbly bone fragment labelled 112.

Ribs

Many ribs were still in their plaster of paris field jackets with a lot of sediment still in place. They were upside-down compared to their found orientation in the field, which is traditional as the plaster is applied to the upper surfaces and then when set the jacket is turned over to provide support from underneath. The bones have been cleaned and left in the same orientation i.e. upside down compared to their original orientation in the field. The sections of each rib have been labelled with their field number. These labels have been adhered with Paraloid B72 so can be removed easily with acetone if necessary. The labels have been placed consistently on the underside of the bone when known. Therefore they can be displayed the other way round if desired (the right way up) with the labels hidden underneath. This also applies to the vertebra (no.108) that was within the field jacket containing ribs (nos. 106 and 107). All the sediment removed from each field jacket has been kept, in bags labelled appropriately with the bone's field number. Some ribs were so badly deteriorated that they are just a pile of fragments that are impossible to put back together.

001, 002, 003, 012 and **015** are presumably fragments of rib.



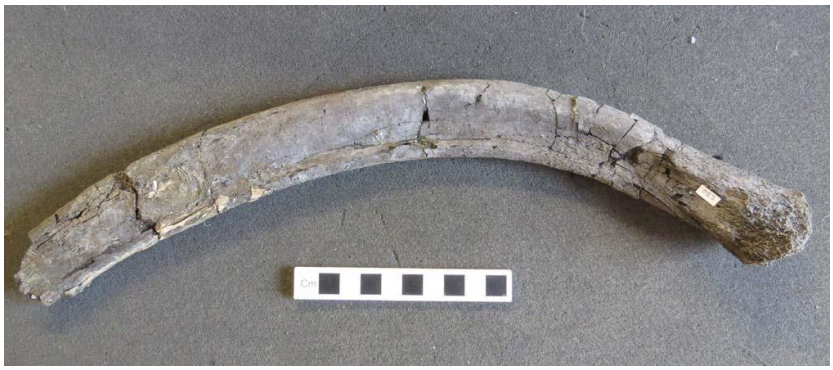
Above left: the pieces before conservation. Above right: the pieces after conservation.

011 is presumably a rib. Two pieces glued together plus many fragments

Above: rib 011 with a couple of sections glued together. The rest is fragments.

052 is a rib in one piece (several breaks joined).

Above: rib 052 before conservation.



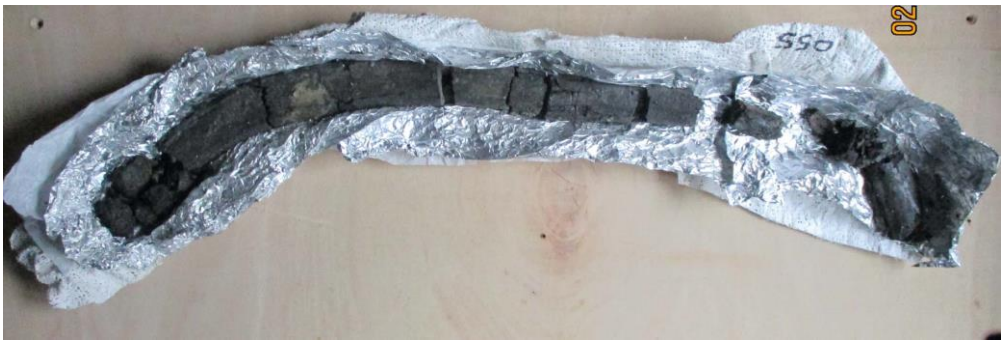
Above: rib 052 after conservation.

054 consists of fragments of a rib including rib head.

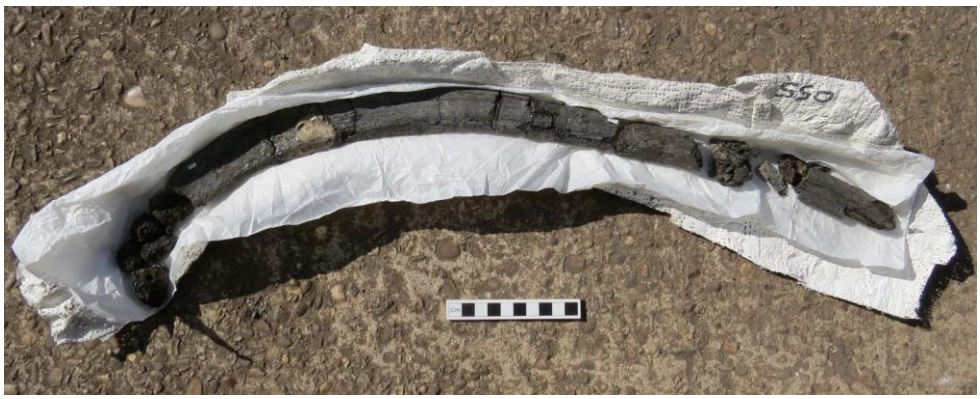
Above: rib 054 before conservation.

Above: rib 054 after conservation.

055 is a rib, the proximal half of which has glued together nicely, but the distal half is fragmentary

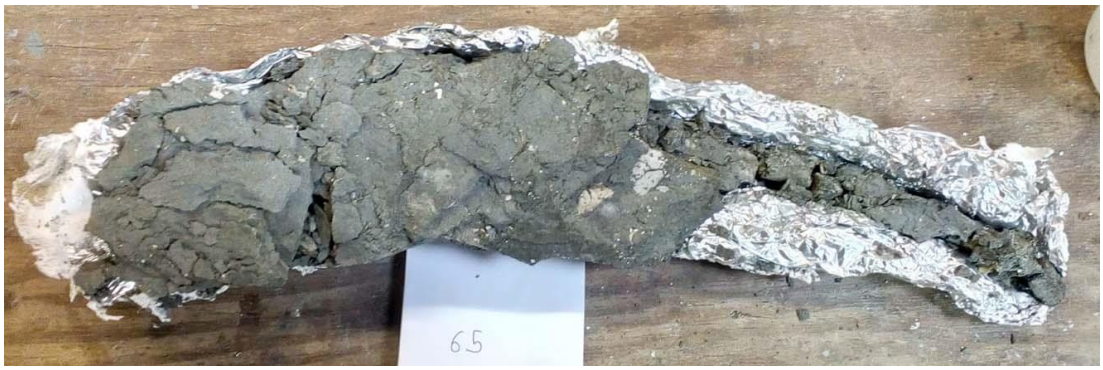


Above: rib 055 before conservation.

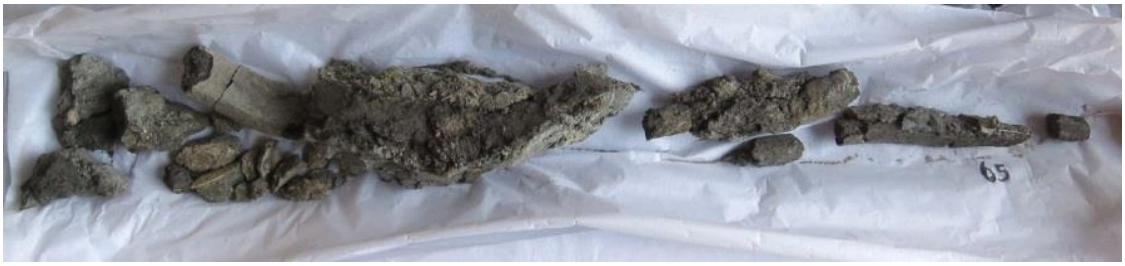


Above: rib 055 after conservation.

065 was just fragments of rib, not connected.



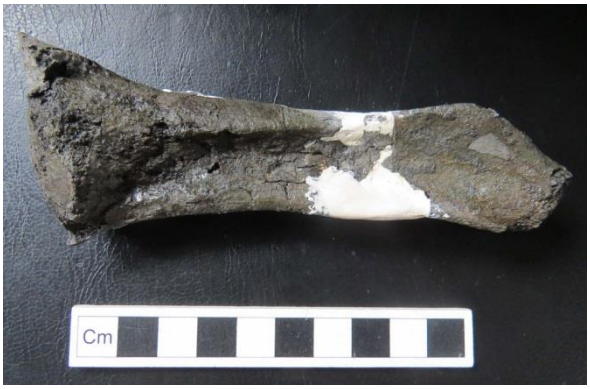
Above: rib 065 before conservation.

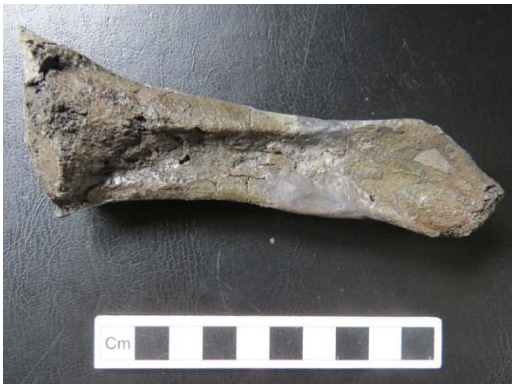


Above: rib 065 after conservation.

Bone 105. Fragmentary bone in matrix within foil package. Middle third of the bone was missing except fragments at the bottom so the missing section was replaced with plaster. Then more matrix could be removed. The plaster was painted grey. It looks like this could be one half of a chevron, or a small rib. There was a separate piece of bone in the jacket that does not connect to the rest. This looks like the proximal end of a chevron or rib.

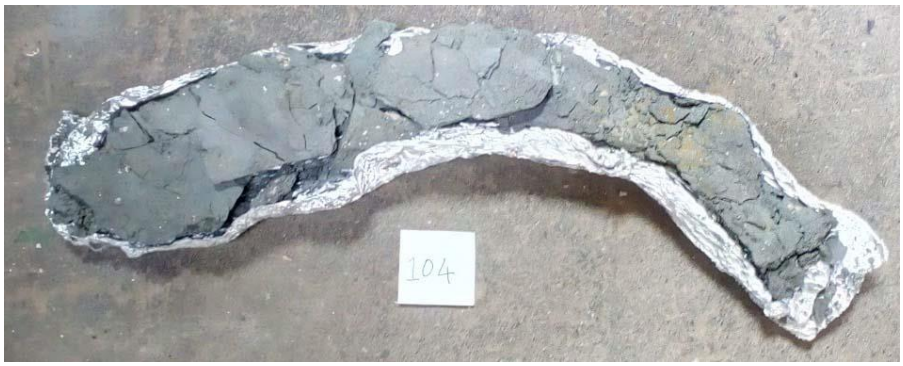
Bone 105 before conservation.





Above left: Bone 105 after conservation and preparation. Above right: Bone 105 after the plaster has been painted out. Below: a piece of bone also in the field jacket labelled 105, but not connected to the other piece.

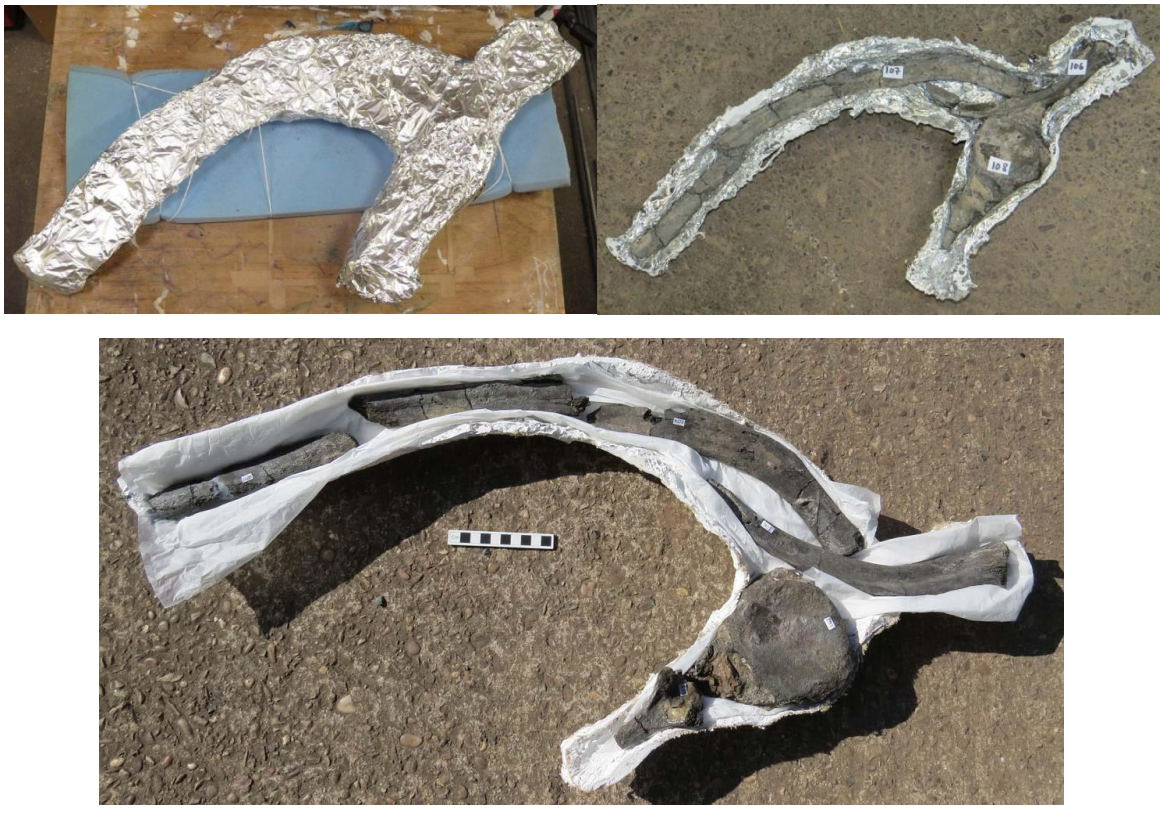
104 is a rib in four pieces (several breaks joined).



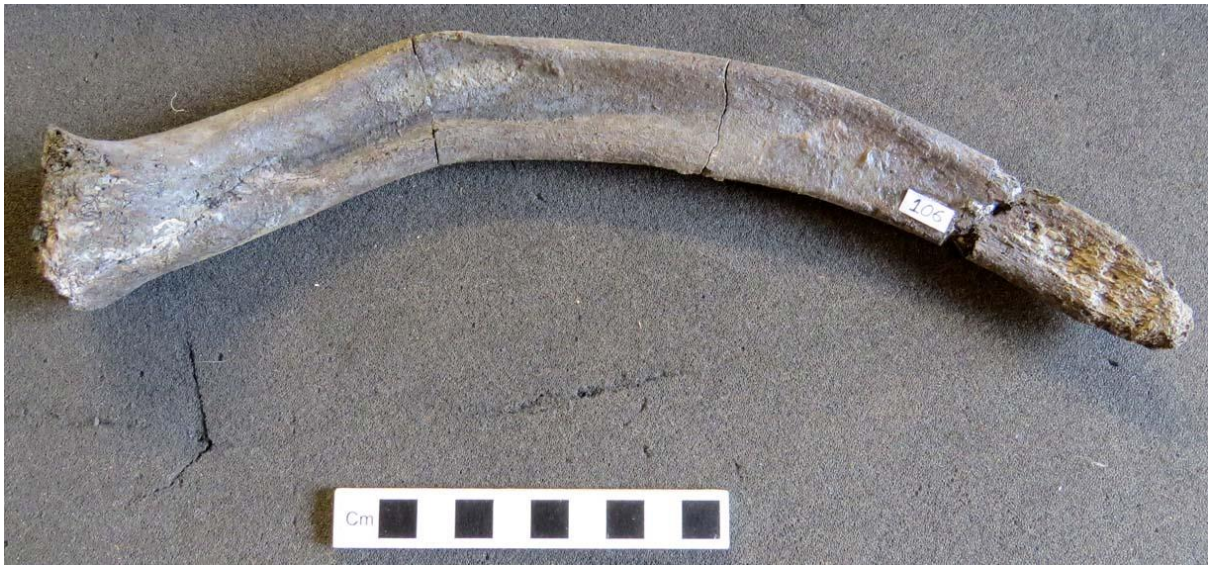
Above: rib 104 before conservation.

Above: rib 104 after conservation.

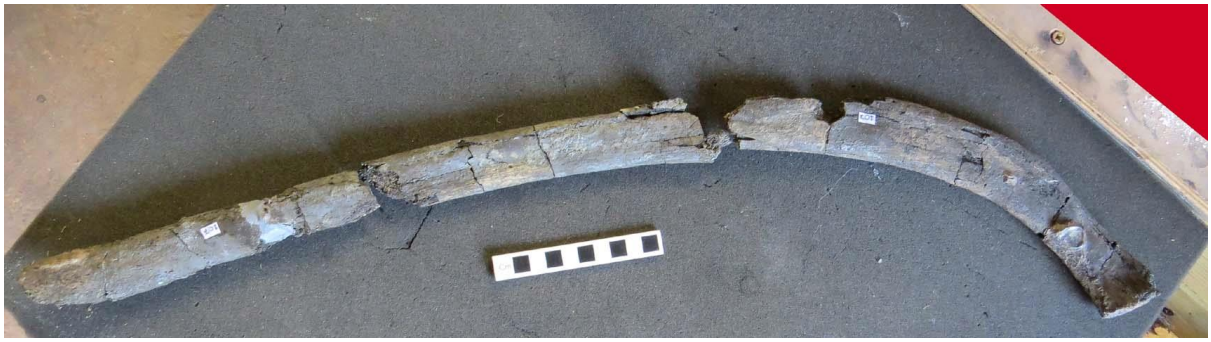
Rib **106** (several breaks joined), rib **107** (in 3 pieces) and vertebra **108** (in 2 pieces) are three associated bones, still laying in their relative positions in their field jacket (but prepared and conserved) lying upside-down as found in the field.



Above: the two ribs 106 and 107 in association with vertebra 108 before, during and after conservation.



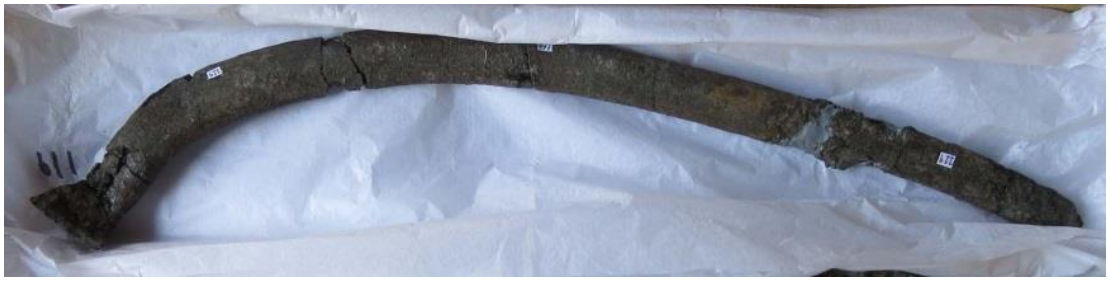
Above: rib 106 after conservation



Above: rib 107 after conservation

119 is a complete rib (several breaks joined).

Above: rib 119 before conservation



Above: rib 119 after conservation.

Other specimens: Small unidentified pieces

There are many small bags or pots containing small pieces of bone that are hard to identify. Even when they can be identified as, for instance part of a neural arch of a vertebrae, it is impossible to say exactly where they are likely to have come from. All these pieces have been cleaned and consolidated.