

REPORT

Peterborough Museum and its collection of marine vertebrates from the Oxford Clay

Peterborough Museum was founded in 1871 by the Peterborough Natural History Society and Field Club (known since World War II as the Peterborough Museum Society). For many years the Society was the premier cultural organisation in Peterborough, and it still has a varied programme of evening lectures and summer outings. These are now augmented by the Friends of Peterborough Museum and Art Gallery, who arrange lunchtime lectures and outdoor meetings.

The museum building dates back to 1816 and was originally Squire Cooke's private residence until Earl Fitzwilliam bought it in 1856, after which it became the Infirmary and Dispensary. A serious fire in 1884 destroyed much of the original Georgian interior. New wings were added in 1897 and 1902. The opening of the new hospital on Midland Road in 1929 led to the vacation of the building as an Infirmary and its present use as the Museum began in 1931. A bequest by Mrs Ann Maxwell Davis allowed construction of the Art Gallery in 1938, although the war delayed its use as such until 1952. The Peterborough Museum Society handed over management of the Museum and Art Gallery to the City Council in 1968. The Museum remains a registered charity.

There are three floors of displays. The lift gives access to all floors for visitors using wheelchairs.

Ground Floor. At reception you can have a chat with our friendly receptionists, buy your souvenirs in the shop and help our coffers by dropping some money in our 'letter box'. The first gallery, opposite reception, usually has a temporary or travelling exhibit of specific topical interest.

At the far end of the entrance corridor is a display about Peterborough's most famous son, John Clare, the "Peasant poet" (there is more about Clare on the first floor landing). The Art Gallery has a constantly changing programme of exhibitions, mainly of contemporary art, but also of crafts or other aspects of our culture. Recent themes have included such diversities as cake icing and science fiction.

First Floor. Here you are greeted by Mark Noble, one of Peterborough's watchmakers, in a mock-up of his eighteenth century workshop. Through the double doors you have *Geology and Wildlife* on your left, and *Archaeology* on your right. Straight ahead and to the right there is the Period Shop display where you can see many of the household items your grandparents might have bought! Also on this landing is a display about Mary Queen of Scots, who was beheaded at nearby Fotheringhay in 1587, and about John Clare.

Geology and Wildlife takes you through the story of

Peterborough since the time of the dinosaurs, 150 million years ago, when giant sea reptiles swam around eating ammonites and belemnites. Next comes the Ice Age, with creatures such as woolly mammoth and hippopotamus. The wildlife sections show glassland, woodland, urban and fenland habitats. Finally you can see the pliosaur skeleton excavated by the Museum in 1994 which is believed to be a new species (see *Pachycostasaurus* below).

Archaeology picks up in history more or less where *Geology and Wildlife* leaves off, continuing the story from the first human settlers of the Stone and Bronze ages through to the Iron Age. There are displays of the important Roman remains associated with Peterborough, together with early Christian silver, and mediaeval artefacts connected with the city's cathedral.

Second Floor. Through the door on the left is our display of bone and straw marquetry items made by the inmates of the Napoleonic prisoner-of-war depot at Norman Cross, which opened 200 years ago in 1797. Our collection is certainly one of the largest in existence, and includes the actual fire engine used at the camp. On the right is our display of Peterborough's social history, telling the story of the local industries, schools, entertainments and so forth. This gallery is very popular with school parties.

Fossil marine reptiles of the Peterborough brick pits

Major urban growth in Victorian England led to rapid expansion of the brick-making industry, requiring large scale extraction of clay for the purpose. Many clay pits were opened in the late Jurassic Oxford Clay of the Peterborough area, and brickworks chimneys remain a common sight in the district. The properties of the Oxford Clay make it ideal for the manufacture of cheap, yet strong and durable bricks. The manufacturing procedure used is known as the Fletton process, named after one of the local villages where it was first developed around the turn of the century. The illitic clay has about 20 per cent water content. This makes it sufficiently plastic to press into shape, and yet not so wet that the moulded bricks need to be dried out before firing. It is also strong enough to stack the bricks straight into the kiln without distorting. The lime content of the clay in the *jason* and *coronatum* Zones is at about the optimum to prevent shrinkage during firing. Furthermore, the carbon fuel content of the clay in these zones is about 5 per cent, which makes the clay self-firing. A very small amount of coal is necessary to control the firing temperature of 1050 degrees centigrade. Impurities in the form of fossil shell material occur mainly as soft and friable aragonite. Above and below the worked beds, the more calcite-rich shells of belemnites and *Gryphaea* abound, and if these are included in the bricks they produce pockets of quicklime after firing, with disastrous results when the bricks are wetted.

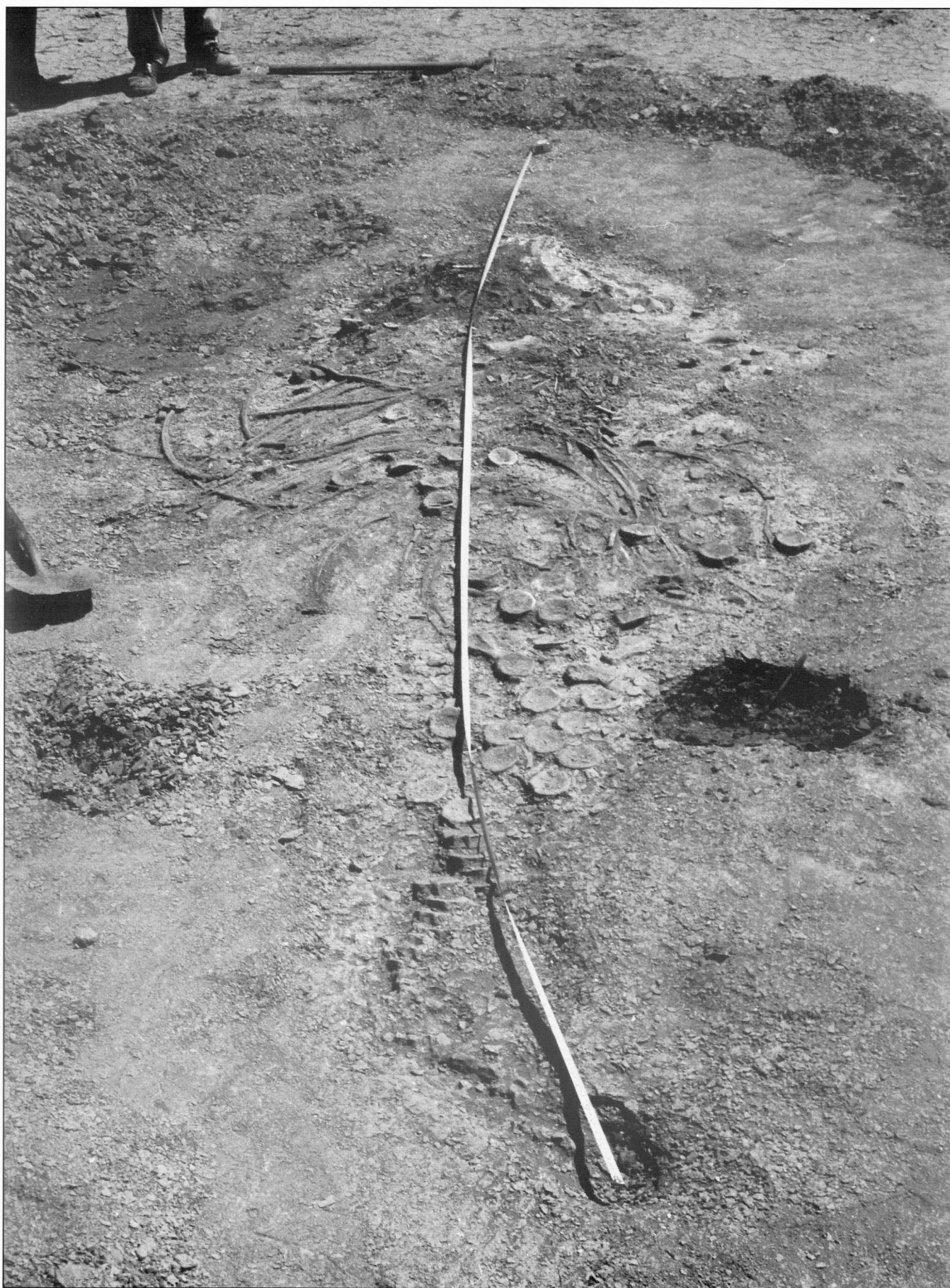


Fig. 1. Skeleton of *Ophthalmosaurus* exposed in situ in 1995. The restored specimen is 4.2m long.



Fig. 2. The author (right) and Shaun Shearman at work, mounting the specimen of *Pachycostasaurus dawni* for eventual display.

Such large-scale brick clay extraction led to the discovery of a considerable number of fossilized, large marine reptiles. Indeed the Oxford Clay of the English Midlands has been one of the most prolific sources of such fossils in the world. The clay was originally extracted by hand and transported by horse and cart. A series of benches or steps were cut into the face of the "knotholes" (the local name for the brick pits) and the cart would back up to the face. Heavy crowbars then levered the clay from the top of the bench into the cart. An experienced workman would know immediately when his crowbar hit anything harder than clay, and this led to the discovery of large numbers of vertebrate skeletons. The frequent discoveries were encouraged by two brothers who lived at Eyebury, to the east of Peterborough. Alfred and Charles Leeds were gentlemen farmers by profession but more interested in palaeontology. They would pay coins to workmen who discovered bone. Not all finds led to the excavation of a complete skeleton, but in the period up to the First World War the Leeds brothers amassed three major collections at Eyebury House. Each collection was sold when it became too large to house. Much went to the British Museum of Natural History, and some of their material may be found in museums all over the world.

The introduction of steam shovels in the pits meant that there was less opportunity to detect the skeletons and many must have been destroyed before they could have been discovered. After the Leeds brothers no more systematic collecting was done until Phillips resumed an interest after the war. He died in the 1920s and much of his collection is now stored in Peterborough Museum. Some of it has deteriorated through pyrite rot but the bulk is sound and is gradually being restored and mounted.

After Phillips' death, little serious collecting seems to have been carried out until the 1980s. Occasional finds found their way to the Peterborough Museum or brickworks exhibitions, but then Leicester University became interested in the vertebrate faunas. Dr Roy Clements and Dr John Hudson worked on the Oxford Clay and more recently Dr Dave Martill has made some important finds. Today the extraction of clay is much reduced and many quarries have been abandoned or land-filled. However, Peterborough Museum has its band of volunteers and new material is found at regular intervals.

Modern methods of strip-mining or shale planing with conveyor belts mean that potential specimens are either badly damaged or missed altogether. But the horizon which yields most skeletons is fortunately not worked for clay. The famous Bed 10 contains considerable numbers of large concretions, and it is in these that bones occur. The excavators do not go below this bed, but from time to time they skim over the top of the boulders and reveal bones. The Museum has several volunteers who scour the remaining pits at regular intervals and an average of about two skeletons per year are discovered, occasionally nearly complete.

The most recent find was made in June 1995 by Nigel Truss, who entered the museum one morning and produced several vertebrae from an ichthyosaur. He led us to the site where more bone was protruding. Permission was obtained from London Brick Company (now Hanson) to carry out an excavation. Two weeks of work revealed a near complete, partly-articulated skeleton of *Ophthalmosaurus*, 4.2 metres long (Fig. 1). Once uncovered, the whole skeleton was traced in situ on a large sheet of acetate, using a felt-tipped pen. Each bone was first numbered on the acetate trace and then, following lifting, the numbers were transferred to each bone.

The *Geology and Wildlife* gallery at Peterborough Museum contains many other fine fossil reptile specimens from the local brick pits. A crocodile (*Steneosaurus*), collected by Phillips in 1923, mounted three-dimensionally, immediately draws the eye of entering the gallery. Opposite, a near complete specimen of the plesiosaur *Cryptoclidus eurymerus* is displayed. This 1987 specimen has the most complete skull ever found for this species. In 1990 a worker unearthed bones which turned out to be a near complete specimen of *Liopleurodon ferox*. The skull is over one metre in length and the whole beast is some five metres long — and this is only a juvenile! In 1994, another small pliosaur was unearthed from the pits at Whittlesey. This has been mounted three dimensionally (Fig. 2) and is now on display. This specimen is unique — a new genus and species. It has been described by Cruickshank, Martill and Noe and has been named *Pachycostasaurus dawni*. Ammonites, belemnites and other shellfish formed the diet of many of the reptiles, as evidenced by the presence of their remains in the stomachs of articulated skeletons.

There is a sense of excitement, awe and wonder in the finding of these creatures never before seen by human eyes. Buried 150 million years or so ago, they have awaited discovery until now. Who knows what else remains to be revealed, or what previously-unknown animal will turn up to add to our gradually expanding knowledge of life in the Jurassic seas?

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