

REPORT

Leedsichthys problematicus

Fish remains are not uncommon in the Oxford Clay, and are associated with the marine reptiles and invertebrates which abound in this material. The largest of the fishes was first recorded in the 1890s by Alfred Leeds, after whom the fish is named.

Alfred Leeds and his brother Charles lived at Eyebury Farm, near Peterborough, and collected widely from the local brick pits (Knot Holes) in the Oxford Clay. In 1898, Alfred Leeds excavated the caudal fin of *Leedsichthys*. This was huge: the measure from tip to tip of the tail was 3.6 m. The fin rays bifurcated at intervals until, at the distal end, they were no more than needle thickness. It is recorded that, having assembled the bones, Leeds swore never to tackle another excavation.

In the summer of 2001, two students from Portsmouth University were working on their field projects in the Oxford Clay at Whittlesey. They found a bone projecting from the clay face and reported the fact to members of Stamford and District Geological Society. Further investigations revealed a line of bone ends stretching for a distance of some nine metres. One piece was extricated and set for identification. It turned out to be *Leedsichthys*.



The quarry face in Oxford Clay where the fossil was found.

The quarry, now disused, had been worked on a shale planer. This machine scrapes the face of the quarry directly on to a conveyor belt, and it was obvious that some part of the skeleton had gone for ever. However it was deemed likely that much more could be buried further into the cliff. The line of bones exposed was some 6 m above the quarry floor, but it was accessible up a slope of fallen scree. Unfortunately, there was a further 15 m of clay above the bones. It would have been extremely dangerous to excavate without removing the overburden.

Work on *Leedsichthys* was already being carried out by Jeff Liston, researching his PhD in Glasgow University. He had assembled and was studying most of the known material in Britain, and had examined the collections in most of the European museums. Jeff was delighted to hear of the discovery.

After some thought, it was decided to try to find the funds to carry out an excavation. This task fell to Dr Dave Martill at Portsmouth University, and by early summer 2002 it was possible to hire an excavator to remove the superficial clay.

It took five days to remove some 10,000 tonnes of clay. An area the size of a tennis court was cleared to a level some 100 mm above the bone bed. A brown shell bed at the level acted as a marker horizon. It also yielded an abundance of fossil material – mostly invertebrate. The sides of the excavation had to be graded to an angle of about 45° to obviate the risk of rock falls on to the workers on the site.

Next, a work force had to be assembled and housed on the site. About 20 students, mainly from Portsmouth, were involved. A tent camp was erected for their accommodation. Working together, the students and the members of Stamford Geological Society were now able to begin the delicate business of exposing any bone which lay beneath the shell bed.



Leedsichthys bones on a bedding plane in the clay.



The temporary shelter against rain and sun hastily built over the exposed site.

Work continued for about three months. The camp site became quite a social gathering point. Situated alongside the railway line it soon became known to the regular train drivers, who sounded their hooters in response to the waving arms. Much to the relief of Messrs Martill and Liston it soon became obvious that there was a considerable spread of bone over a wide area. Excavation and mapping progressed.

Mapped, recorded and numbered, each bone was consolidated by painting with Paraloid B72 in acetone before it was lifted. The smaller bones were laid out on sand trays for transport. Larger bones were encased in a Plaster of Paris jacket before lifting.

Inevitably it rained – hard. The site was flooded. Drainage channels were dug around the perimeter and a pump was employed to clear the water. A shelter was erected over the site, covered by plastic sheeting. Needless to say it never rained again, but the shelter from the heat of the sun was appreciated by the workers. It also prevented too rapid drying of exposed bone. Hanson Brick made available a pre-fabricated building to store the bone until it was ready to be taken from the site.

It was realised that we had the fore-quarters and skull only of the beast. If any more had been there, it had already gone down the conveyor to become bricks. Two large fins were revealed. Each more than a metre long, they were the central portion of the fin. The proximal ends were found detached elsewhere, and the distal ends bifurcated repeatedly until they were but needle-thickness or absent. Numerous gill rakers were found, indicating that the creature was a filter-feeder, rather as today's whales and basking sharks. Did *Leedsichthys* shoal as whales and sharks do? A number of large flat plates were found – possibly the platy covering of the skull and gills.

Cleaning, conservation and preparation of the bones was commenced at Peterborough Museum, but at the end of the 2002 operation the whole collection, amounting to some 2,500 bones, was taken to Portsmouth University. The intention was to employ a preparator to work on the bones, but no funding was available. The bones are currently being returned to Peterborough Museum in small numbers for two or three volunteers from Stamford Geological Society to continue the work of preparation. Every bone is



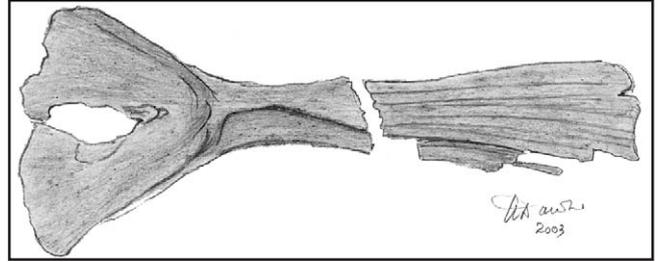
Working with the plaster to encase isolated blocks of clay that contained most fish bones.



A plaster-reinforced block of clay ready for lifting.

broken into numerous small pieces. As each is cleaned, re-assembled and glued it is given a supporting cradle of fibre-glass resin and recorded by drawing to full size. We hope the structure of the skull and gill region can be calculated by Jeff Liston in the Hunterian Museum in Glasgow.

Local interest in the find grew as information spread around. Organised visits were arranged for local groups, schools and university groups. The whole operation was recorded for television over a period of several weeks. Local children were filmed searching for fossils, and a programme titled "The big monster dig" was broadcast in the summer of 2003.

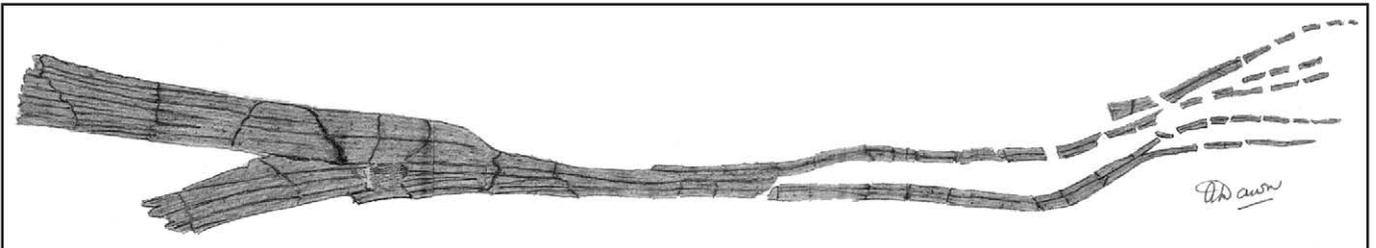


Main limb of a fin, drawn originally life-size, 500 mm long.

The site was closed down for the winter in September 2002, and was re-opened for further work in 2003. There appears to be more bone in the clay face not yet excavated and it is hoped to get a machine back in 2004 to clear more of the overburden. Meanwhile the task of preparation, slow and tedious, proceeds bone by bone in Peterborough Museum. Each bone requires hours of work, even days on the large ones. It will take years to complete them all.

This is by far the most complete assemblage of bone from the forequarters of *Leedsichthys* ever found. Successful reconstruction will greatly enhance our knowledge of the creature. What is not certain is the total length of the fish. No vertebrae have ever been found. It is thought that they were cartilagenous and so not preserved, as ossified bone would be. Estimates, based on small, supposedly related, species, are from 10 to 20 metres long. This fish is truly whale-size.

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Distal part of a Leedsichthys fin, drawn originally at life-size, 1200 mm long (P.M.A.G. F174-73).