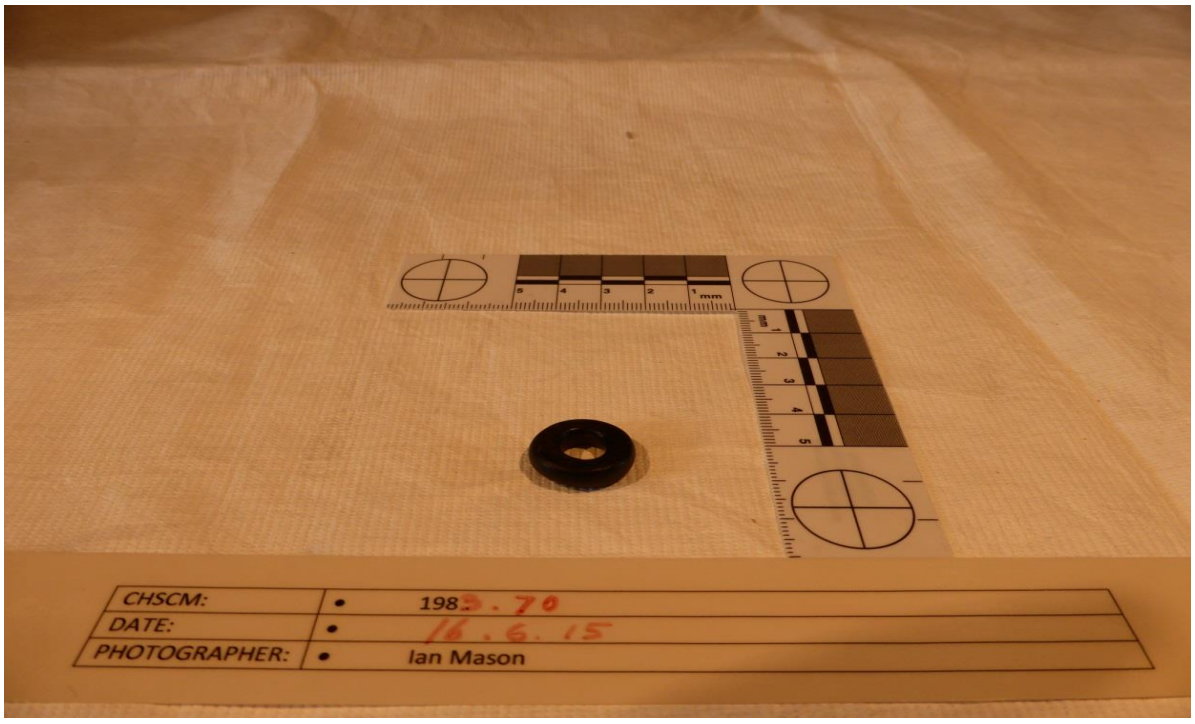
JET BEAD BIOGRAPHY

We have a single bead of Jet, a naturally occurring stone found only in Britain along the east coast at Whitby in Yorkshire. Our artefact, found by a local metal detectorist at Langwood Hill in the 1980s, is on display in the Neolithic section of this exhibition under reference CHSCM:1983.70.



*What is Jet?

In essence -Whitby Jet is an anaerobic fossil of the tree Araucaria. The cells of which have been flattened by huge pressures and subjected to complex chemical changes that have taken place over millions of years. Independent seams or pockets are contained in the Jet bearing shale and exposed by the natural erosion of our wild and beautiful coastline.

Whitby Jet was undoubtedly one of the earliest gemstones used to create artefacts and items of jewellery. Prehistoric man found the deep black shiny material irresistible. Wearing jewellery was often a display of wealth or used to bestow some 'magical' protection upon the wearer. Because of the exclusivity of many of the raw materials great skill in manufacture and care in design was invested in the items. Whitby Jet scores highly in all these areas.

Although jet was used in Europe around 10,000 BC, it was not used in Britain until the late Neolithic Period in the form of Beaker grave goods with items like

V-perforated buttons, belt rings, early washer-shaped bead necklaces and this unusual mace head from the Clandon Barrow, Dorset.

At Preshute, Wessex, lies the Manton Barrow. It was excavated just after the turn of the century, and yielded one of the finest female graves from the early Bronze Age, 1700BC. These items were among the grave goods:

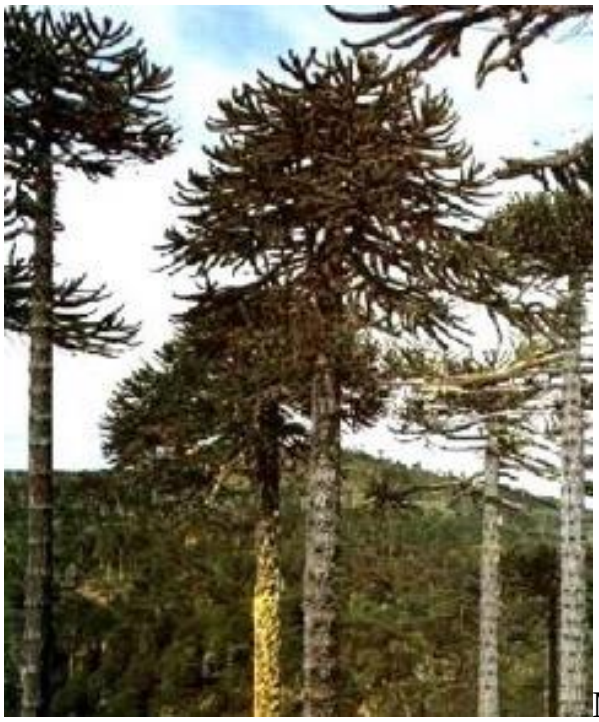
The gold work on this bi-conical jet bead (dress fastener) and an amber Halberd pendant [found with it], are similarly executed with grooves. It is most likely that the bi-conical jet bead was turned on some form of lathe as well. Archaeologists think that one person was responsible for most of the fine gold foil work of this period.

Jet was also used for this necklace, made from one hundred and fifty disc-shaped beads graded in size from 2mm to5mm and a single ribbed bead of jet. Other odd beads include one made from chalk, a ring bead of steatite and the stem joint of a fossil encrinite.

Its history can be charted from the Neolithic age, through the Roman occupation and Viking invasions and onwards to its ultimate claim to fame in the mid19th century when Queen Victoria used it as a sign of mourning after the death of her husband Prince Albert. Its geological history starts in the middle of the Jurassic era, some 150 million years ago at the bottom of the Liassic Sea, which then covered much of Britain. Fossil evidence from this fascinating era is abundant and easily detected in the cliffs and on the beaches that adjoin Whitby to the north and south. From a literary perspective, Whitby Jet has captured the imagination of many famous authors, the venerable Bede, Drayton, Prior and John Dunne have all used the deep lustrous shine of Jet as a descriptive analogy and the well known phrase, "as black as Jet", coined by Shakespeare, is still in common usage.

All this history is confined to just seven and a half miles of North Yorkshire coastline! It has been called the 'Black amber of the North' a possible allusion to some of the properties that both these fossils share. It has been likened to a mineral deposit similar to turquoise and the most consistent misrepresentation is that it is a by-product of coal formation. There are other materials similar to jet like soft jet, Lignite, cannel coal and Kimmeridge shale, which have confused archaeologists.

Note: *The use of this data is for educational purposes only


Monkey Puzzle or Chilean Pine

During the mid Jurassic period some 150-180 million years ago what was to be the British Isles was located further south in the area of Northern Spain and Portugal. It was thus much nearer the equator and had a climate to match. The dominant species of tree was the Araucaria very similar to the Araucaria araucana we see today. Its common name is the Monkey-puzzle tree or Chilean pine. On the floor of the sea there had already been deposits of materials that subsequently became the Main Seam Ironstone, on top of this there were deposits of mud being washed down the rivers from adjoining landmass and forming an ever-increasing sedimentary layer. The Araucaria trees that formed a significant part of the vegetable debris were washed into the Liassic Sea and gradually became waterlogged. This served to introduce trace elements not found naturally in the wood and also took them to the bottom of this shallow sea were they became embedded in the thick sedimentary layer.

This new stratum of rock being formed contained a plethora of these trees, scattered entirely at random. The trees had already received a certain amount of 'pruning' during their journey to the seabed and the huge pressure from the ever-increasing sedimentary layer caused the dispersal of the partly decayed sections of the trees leaving the more resistant sections in situ to gradually become hard Jet. The accumulation of mud plus the weight of sea above produced enormous pressures and the individual trees were flattened into narrow 'seams'. The glutinous nature of the sedimentary layer completely sealed these seams and pockets of wood and an anaerobic fossilisation slowly took place. This geological process occurred from the outside in and worked along the medullary rings of the tree. In some specimens of Jet there is a hard stone like centre with

a surrounding skin of Jet, this was caused by the centre of the tree becoming silicified before the process of jetonization.

 Jet shale

This layer is readily seen as the Jet shale and is dense and composed of fine layers reminiscent of the pages in a book. The average thickness of this layer is between 7-10 metres and other evidence of Jurassic marine life may be found contained within these 'leaves' in the form of several species of ammonite. This shale contains an estimated 0.055 to 0.086 cubic metres of oil per ton and there is also a relatively high percentage of iron pyrite (fool's gold). The finest seam was found at Kettleness point approximately two miles North of Whitby. The seam produced just short of 90 kilos at 40mm thick!

There is a distinctive sulphurous smell redolent of petroleum products that arise from the light ginger-brown dust during the grinding process. On the occasions that pyrites is detected a faint glitter spoils the surface and so is a most unwelcome inclusion. On a wider perspective, the combination of pyrite and oil, present an unstable element and there have been documented occasions of spontaneous combustion in the spoil heaps surrounding some inland mines. In Victorian times there was a great deal of dry grinding on sandstone wheels and the accumulation of dust must certainly have contributed to the frequent and devastating work shop fires.

In lapidary terms the chemical properties of Whitby Jet are found in the Journal of Gemmology XVII No.1 (1980) H.Muller presents the following analysis.

Refractive index 1.64-1.68 Specific gravity 1.3 -1.4 Mohs scale 2.5 - 4.0 Carbon 75.2% Hydrogen 7.0% Nitrogen 0.7% Sulphur 4.6% Oxygen 12.5%

Also contained are trace elements of silicon, potassium, calcium, iron, copper, and aluminium. A further note of interest is that with X - ray emission spectroscopy Whitby Jet contains a high proportion of aluminium while Spanish Jet contained more sulphur (Muller 1980) and it has been suggested that this is another contributory fact to the world-renowned quality of Whitby Jet.

On top of the Jet shale there is a clearly visible layer of limestone about 100 to 150 mm thick. This is known as the 'Top Jet Dogger' and served as a good guideline for the Victorian miners as very little if any good quality Jet is found above this layer, it also provided a relatively stable 'roof' for their excavations. This light coloured section meanders its way along the cliffs and appears at a variety of levels, sometimes at eye-level sometimes very much higher up the cliffs. Ironically at Whitby it is 5 metres below sea level and does not emerge until Sandsend at the furthest end of Whitby's west side beach, never the less it is still possible to find sea washed pieces of Jet along this part of the coastline.

A further sedimentary layer is composed of Alum bearing shale, which was once extensively quarried and often extended to 37 metres. On top of this is a variable layer of ferruginous rock called the 'Dogger' comprised of sandstone, limestone or sometimes a conglomerate. In the 19th century it was worked as an ironstone band and was referred to as the 'Top seam of Cleveland'. Above this layer there exists an accumulation of rocks that were formed under fresh water conditions. For a time the sea receded which allowed the development of indiscriminate vegetation this produced a thin layer of low-grade coal, which was sometimes mined and is still found on the beaches today. These fresh water conditions gave rise to streams that eventually cut out channels that were then the repositories of 'log jams'. Accumulations of sand and silt buried these and a source of 'soft' Jet was created. This is of inferior quality but was occasionally used in Victorian times for some carvings. The carvings were then set into a large cabochon of the hard and more resistant Jet. Safe to say that the finest work would only contain the very best (3-4 Moh scale) Whitby Jet.

Ian Mason, Chatteris Museum – December 2015