

Wivenhoe in the Ice Age

1. What is an Ice Age?

Britain, as well as the many other parts of the planet, have not had such a warm climate as we enjoy it today. During the earth's history a number of periods have taken place when the Earth's average temperature was about minus 11 degrees Celsius colder than it is today.

That was enough to keep snow from melting during the summers in northern regions. As snow fell on snow it compacted more and more, finally thick sheets of ice called glaciers formed and in some places in Britain the ice was three miles thick. A period like this is called an ice age.

In the past 2.6 million years Britain has gone through extremes of cold ice ages (glacials) and warm interglacials (warmer periods) in a time of geological history that is called the Pleistocene. We are still in an overarching ice age period - known as the Quaternary glaciation which lasted from about 100 000 years ago until about 11700 years ago. At the moment, the Earth is just in a slightly warmer period, an interglacial lasting 10 – 20 000 years.

The ice age will return in about 50 000 years. However the increase of CO₂ in modern times, most likely due to humans burning fossil fuels, has led to an enhanced greenhouse effect which is increasing our planet's average temperature and may lengthen the interglacial (warmer) period.

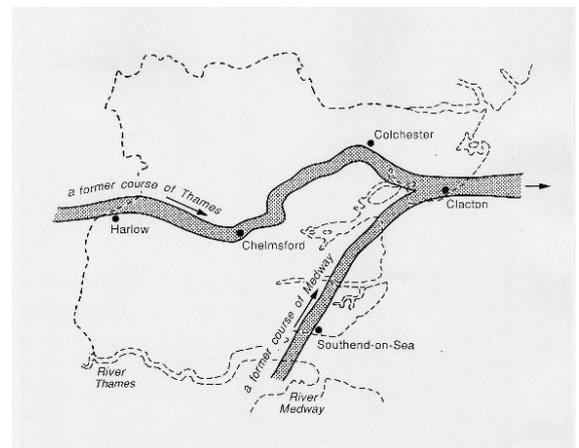


British ice coverage during the most recent glaciation

2. The Flow of the River Thames in the Early Ice Age

During the early Ice Age about 450 000 years ago the Thames flowed to the north of London, through north Essex, passing Colchester, Wivenhoe and Clacton on Sea and further on to Suffolk and Norfolk and out across what is now the southern North Sea to become a tributary of the Rhine.

In the bed of the river substantially thick deposits were laid down what is called the **Kesgrave Sands and Gravels**. These old Thames gravels contain a variety of unusual pebbles from as far away as North Wales, proving that, at that time, the Thames, and its tributaries, must have been a huge river system draining the Welsh mountains and bringing their characteristic volcanic rocks into the Thames basin.



The Flow of the Thames in the early ice age 450 000 years ago



worked in numerous gravel pits

The gravels also contain large boulders of puddingstone and sarsens, which are very hard conglomerates and sandstones respectively. They are believed to be derived from pebble and sand seams in the Reading Beds, and which have subsequently become cemented by quartz. The gravels have great commercial value

and are

Boulder of Hertfordshire Puddingstone in the churchyard wall at Roxwell, near Chelmsford. This rock occurs throughout Essex as isolated boulders and some pieces are highly attractive. They were brought here from Hertfordshire by the early Thames and can often be seen in the walls of early churches.

between Harlow, Chelmsford and Colchester.

3. The Wivenhoe gravel pit

The Wivenhoe gravels are part of the **Kesgrave formations** and were laid down during two cold stages consisting of coarse grained sediments. Between the layers of gravel an organic silky clay was formed during a more temperate interglacial period. The fossils from this warmer time mainly contain well-preserved pollen, plant macro-fossils and beetle remains. They are not distinctive enough to identify which interglacial they come from.



Wivenhoe gravel pit filled with water

The Wivenhoe Gravel Pit (Grid Reference TM 050236) itself represents the character of this category of gravel and was classified as a Site of Special Interest (SSI) under Section 28 of the Wildlife and Countryside Act 1981. The sediments at Wivenhoe have great scientific potential for improving the record from this part of the Pleistocene in Britain and for providing valuable correlation with the much better continental sequence, particularly that in the Netherlands.

The pit has been closed some time ago. It is now water filled and can be found north of Wivenhoe in a field off Brightlingsea Road opposite Broad Lanes.

4. The Anglian ice sheet



Boulder clay, or till, exposed in a road cutting in Chelmsford.

The regular intervals of climate change found its peak in the **Anglian glaciation**. This was a severe cold stage about 450,000 years ago that allowed a great ice sheet to spread south into the region across the valley of the early Thames. A lobe of ice from this ice sheet blocked the Thames in the Vale of St. Albans causing a catastrophic change to the route of the river, diverting it south to its present position.

Evidence for the existence of this ice sheet is a substantial thickness of **boulder clay**, or **till**, left behind by the ice as it ground southwards across the frozen landscape.

The boulder clay, lying on top of the old Thames gravels, forms a distinct plateau over the north of Essex, now dissected by modern river valleys. Boulder clay can be found as far south as Hornchurch, which is known as the most southerly point in England that the ice penetrated during the whole of the Ice Age. The boulder clay contains rocks that have been carried south by the ice, some of them from as far away as northern England and Scotland.



Cliff of glacial gravel at Fingringhoe Wick Nature Reserve near Colchester. The gravel was laid down by torrents of melt water issuing from beneath an ice sheet

Glacial gravel is present in many other places in Essex. It is recognisable as an unsorted residue of many rock types, mostly flint, laid down under these

exceptional conditions.

5. The flow of the Rhine through the English Channel

A land bridge, mainly consisting of chalk, linked the Weald in Great Britain to the Cap Gris Nez, a cape near Calais in France. This link to the European continent existed right into the Pleistocene ice ages, enabling migration of early man and animals.

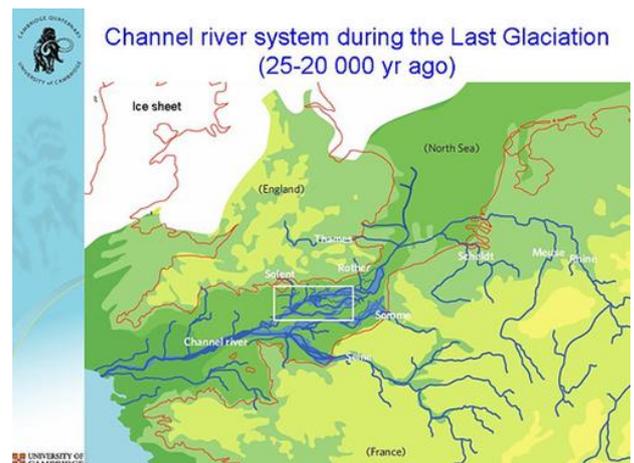
During the glacial periods of the ice age the sea level dropped 120m. Much of the continental margins became exposed. In the first of the Pleistocene ice age the Rhine followed a course to the northwest, into the present North Sea.

The ice, formed 450,000 years ago, created a dam from Scandinavia to Scotland and the Rhine, combined with the Thames and drainage from the glaciers of north Europe, created a vast lake behind the dam, which eventually spilled over the Weald into the English Channel. This overflow channel became the Strait of Dover about 425,000 years ago. A narrow deep channel along the middle of the strait was the bed of the Rhine in the last glacial period of the Ice Age.

The English Channel was formed by the erosion caused by two major floods. The first was about 425,000 years ago, when the ice-dammed lake in the southern North Sea overflowed and broke the Britain to France chalk range in a catastrophic erosion and flood event. The famous white cliffs of Dover in Britain and the Cap Blanc Nez in France are the remaining evidence of this event. The Thames and Scheldt flowed through the gap into the English Channel, but the Meuse and Rhine still flowed northwards. In a second flood about 225,000 years ago the Meuse and Rhine were ice-dammed into a lake that broke catastrophically through a high weak barrier. Both floods cut massive flood channels in the dry bed of the English Channel,

Since then, during glacial times, the Rhine river mouth was located off shore from Brest in France. Rivers, like the Thames and the Seine, became tributaries to the Rhine. Due to the drop in sea level the English Channel, the Irish Channel and most of the North Sea were dry land and again open for migration of early man and animals.

During interglacials, when sea level rose to approximately the present level, the Rhine built deltas, in what is now the Netherlands. Britain again was cut off from the continent.



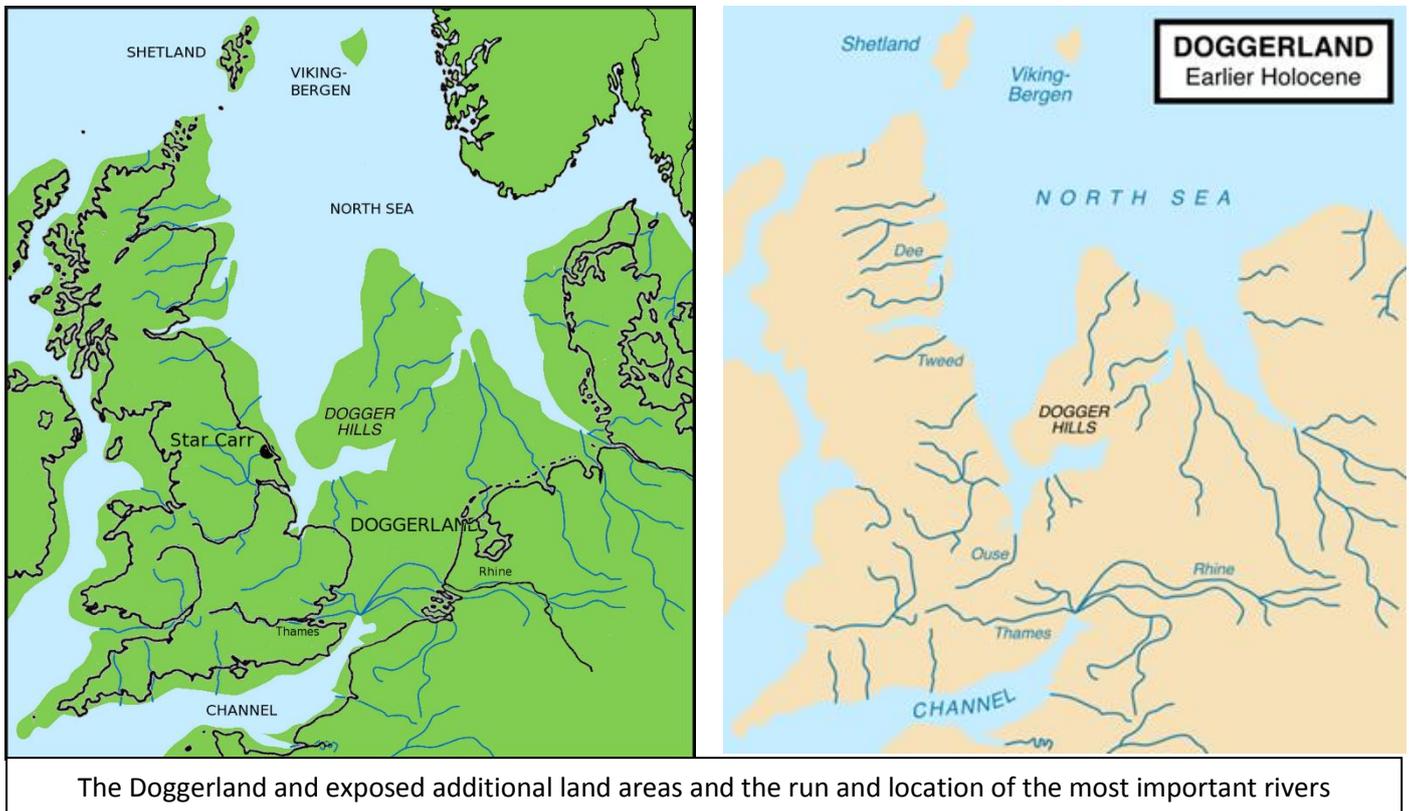
6. Doggerland – the last connection to the continent

About 12,000 years ago, the last major ice age was reaching its end. The lower sea level not only revealed additional land around familiar coastlines but also exposed a low lying 18,000 square mile landmass called Doggerland. The Rhine estuary was located in the Straits of Dover.

Doggerland had a rich landscape of hills, rivers and lakes and a coastline comprising lagoons, marshes and beaches. It had woodlands of oak, elm, birch, willow, alder, hazel and pine. It was

home to horses, aurochs, deer, elks and wild pigs. Waterfowl, otters and beavers abounded in wetland areas and the seas, lakes and rivers teemed with fish. It was probably the richest hunting and fishing ground in Europe at the time and had an important influence on the course of prehistory in north Western Europe as maritime and river-based societies adapted to this environment.

Then warming accelerated, the ice sheets rapidly melted and sea levels rose. Over time parts of Doggerland started to submerge beneath the North Sea and Britain was more and more cut off from the European mainland. Dogger Bank remained as an island before it too was flooded by a tsunami caused by a submarine landslide off the coast of Norway. The landmass connecting Great



Britain to mainland Europe was drowned by the southern North Sea. Since then Britain is an island.

7. Human occupation in Britain during the ice age

Homo Antecessor: Researchers have discovered stone tools and footprints that suggest that these early humans arrived in Britain nearly a million years ago - or even earlier. The discoveries were made in Happisburgh, in the north of Norfolk. The Thames was flowing through this area and laid down sediments where the finds were made. No fossils were found.

The Happisburgh footprints are the only ones of this age in Europe and there are only three other sets that are older, all of which are in Africa. The scientists assume they belonged to a family searching for food.

It is believed that Homo antecessor evolved into Homo Heidelbergensis.

Homo Heidelbergensis: In the interglacial sediments of the Wivenhoe gravel pit two flint flakes were discovered that may have been worked by humans. If they represent a period of human occupation at Wivenhoe it will be the earliest evidence of humans anywhere in Essex and may be as much as 650,000 years old. They would be older than the tools and human fossils discovered in Boxgrove in Sussex about 500,000 years ago, which were thought to represent occupation by Homo heidelbergensis, a species of human that is probably a direct ancestor of the Neanderthals.

400,000 year old finds have been made in an ancient river channel at Clacton-on-Sea. Archaeologists named the manufacture of these typical European flint tools the Clactonion industry. The artefacts found there included flint chopping tools, flint flakes and the tip of a worked wooden shaft along with the remains of a giant elephant and hippopotamus. Further examples have been found near Swanscombe in Kent and Barham in Suffolk.

Homo Neanderthalensis: We know early Neanderthals were in Britain about 400,000 years ago thanks to the discovery of the skull of a young woman from Swanscombe, Kent. Fossils of Neanderthals 225 000 years old were found at Pontnewydd in Wales.

Britain was unoccupied by humans between 180,000 and 60,000 years ago, when Neanderthals returned. By 40,000 years ago they had become extinct and modern humans had reached Britain.

Homo sapiens (Modern man): The occupations were brief and intermittent due to a climate which swung between low temperatures with a tundra habitat and severe ice ages which made Britain uninhabitable for long periods. The last of these, the Younger Dryas, ended around 11,700 years ago, and since then Britain has been continuously occupied.

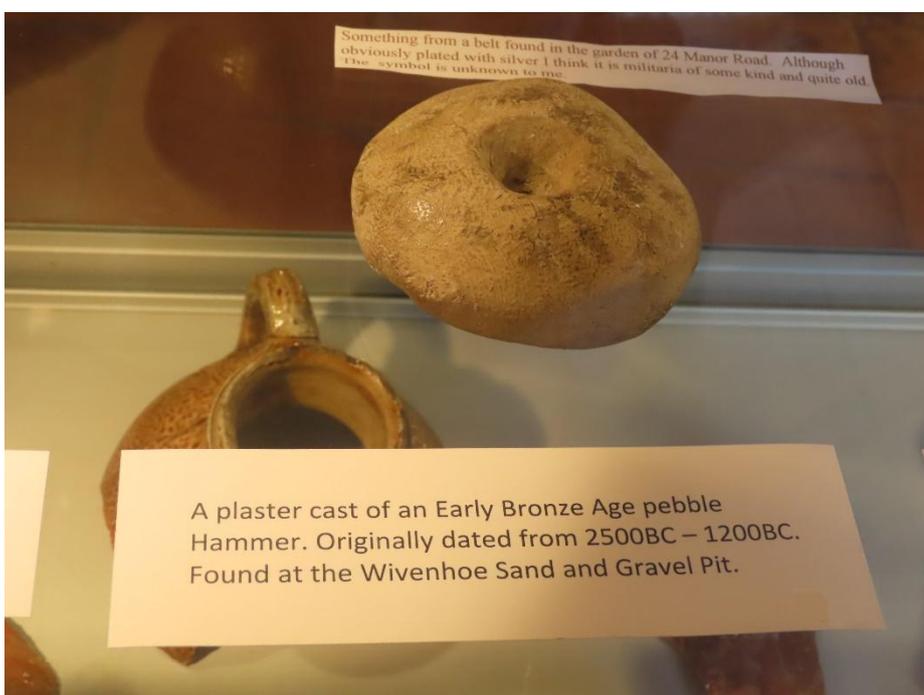
A modern human male fossil was found in Gough's Cave in Cheddar Gorge, Somerset. The skeletal remains date to the Mesolithic circa 9100 years ago. He was named Cheddar Man and is Britain's oldest complete human skeleton.

Cheddar Man has been described as the first modern Briton as he marked the start of continuous habitation of the island. All previous human populations who attempted to settle in Britain had been wiped out, and modern-day Britons are descended from the same pool of people as he was.

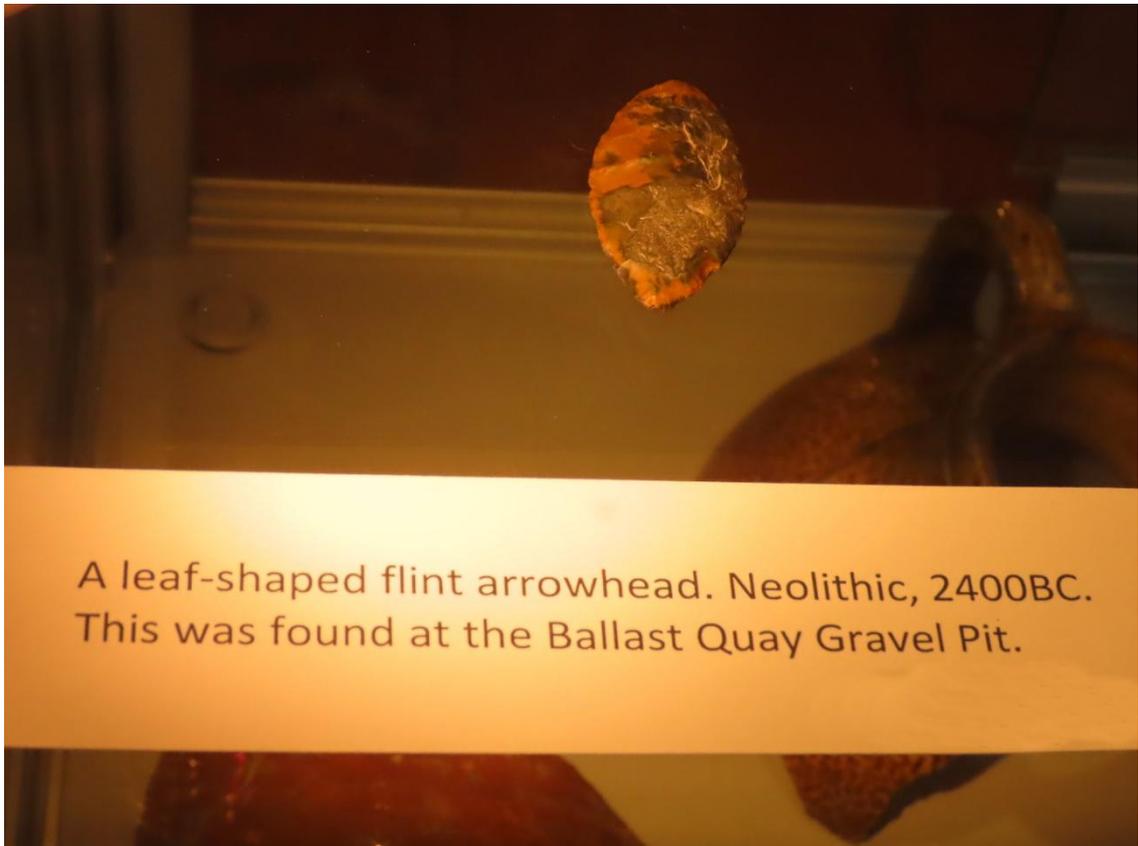
Mesolithic people populated Doggerland. They are known as Doggerlanders'. Their nomadic presence can be found embedded in the seafloor, where modern fishermen often find ancient bones and tools that date to about 9,000 years ago.

The warming climate caused the glacial melt. Sea levels were forced onto higher ground in what is today England and the Netherlands.

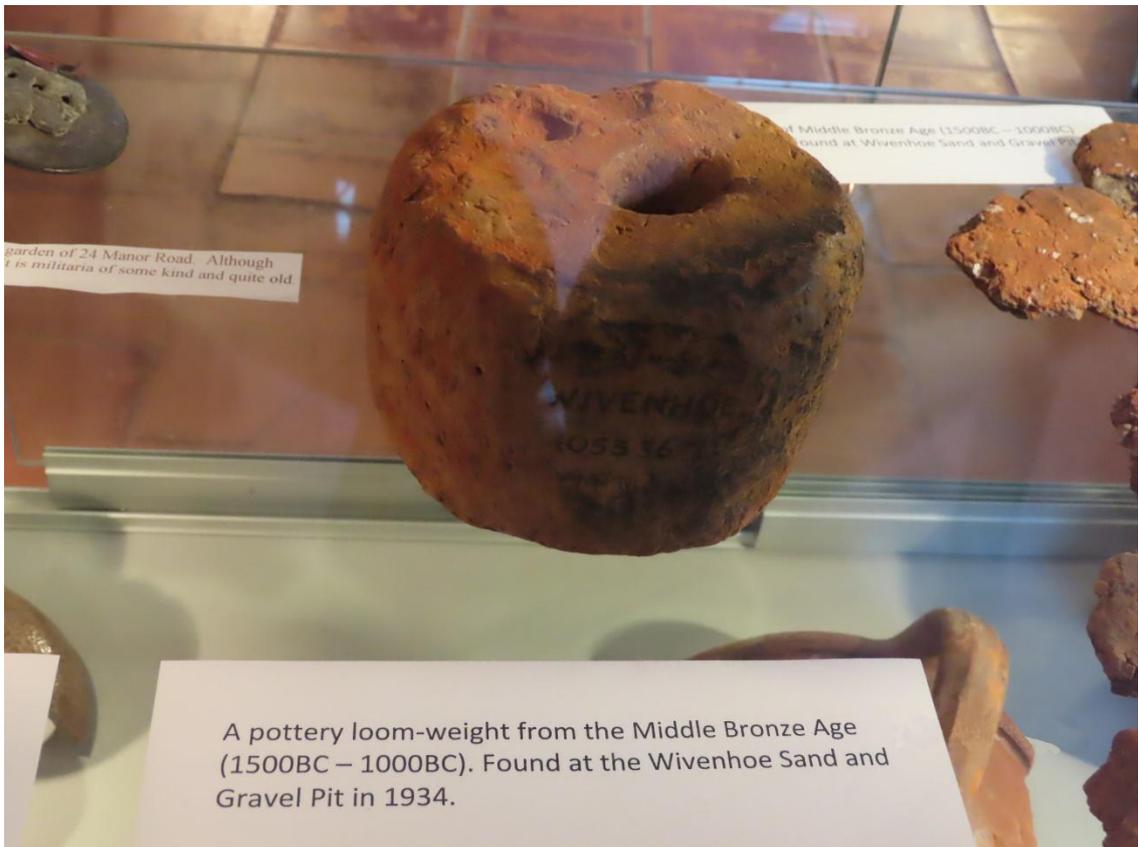
8. Prehistoric exhibits in the Wivenhoe Chapel museum: These finds, pictured below, were made in the Wivenhoe Sand and Gravel Pit or the Ballast Quay gravel pit. They fall into a time frame from 2500 BC till 43 AD when the Romans began to govern Britain.



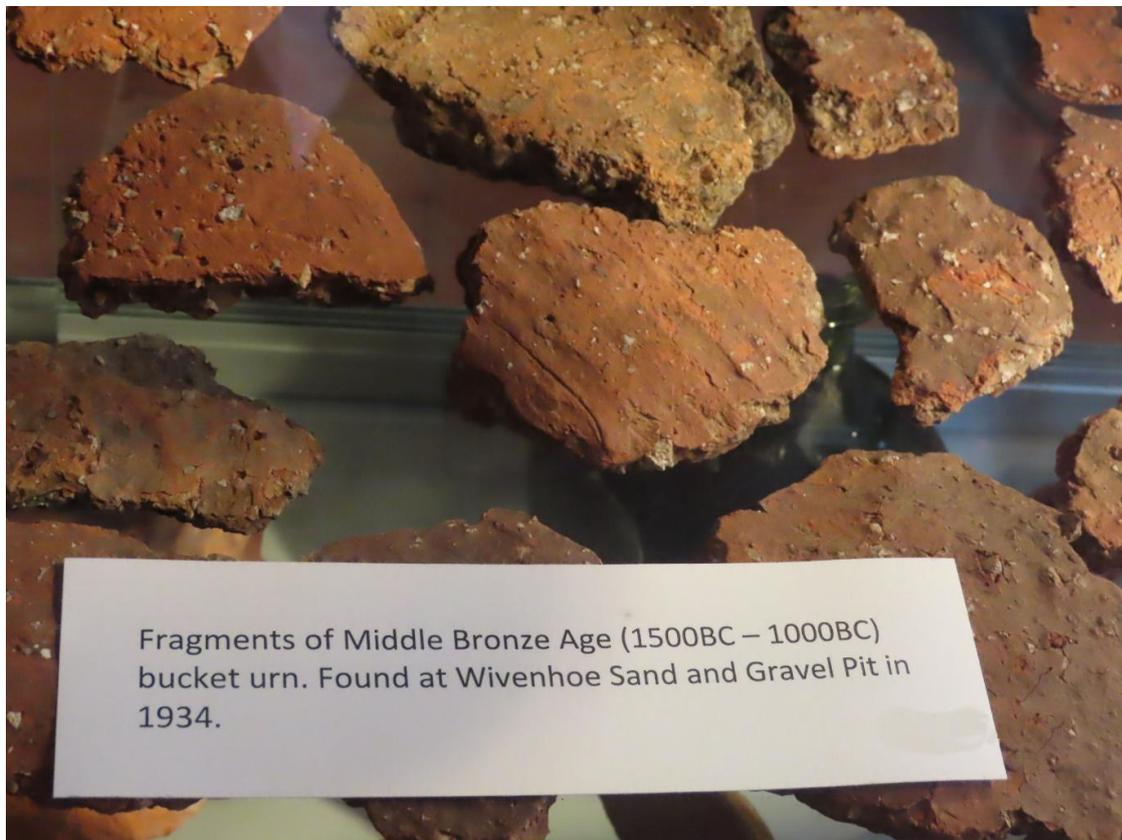
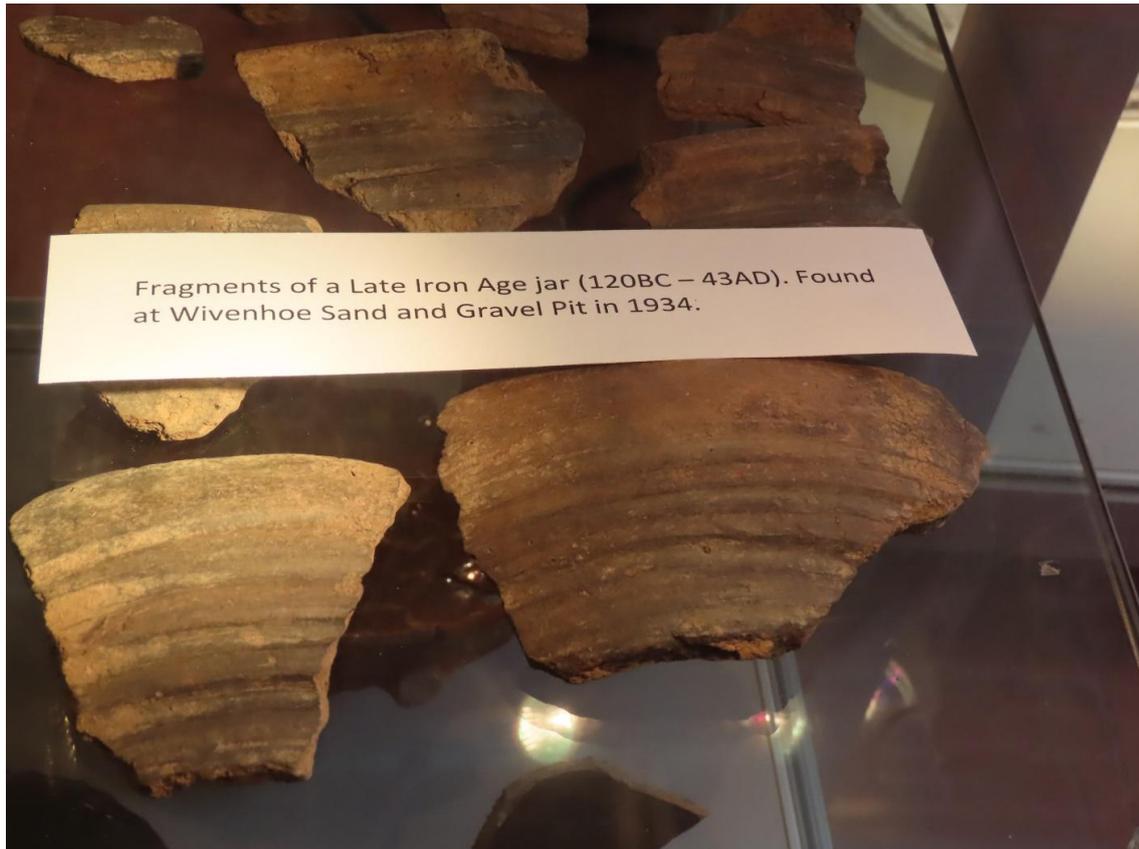
It indicates that Wivenhoe and its surrounding area was occupied by modern people permanently for a long time. It is therefore with confidence to conclude that during the ice age periods, when human species came from the European continent to Britain, they migrated through or settled in Wivenhoe.



A leaf-shaped flint arrowhead. Neolithic, 2400BC.
This was found at the Ballast Quay Gravel Pit.



A pottery loom-weight from the Middle Bronze Age
(1500BC – 1000BC). Found at the Wivenhoe Sand and
Gravel Pit in 1934.



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